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Enterprise Manager Cloud Control 12c Managing Oracle SOA Suite and Oracle Service Bus

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Executive Overview

Oracle Enterprise Manager 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 knowledgebase with each customer environment

Introduction

Oracle Enterprise Manager's Fusion Middleware Management solutions provide full-lifecycle management for Oracle WebLogic, SOA suite, Coherence, Identity Management, WebCenter, and Oracle Business Intelligence Enterprise Edition. Oracle Enterprise Manager provides a single console to manage these assets from a business and service perspective, including user experience management, change and configuration management, patching, provisioning, testing, performance management, business transaction management and automatic tuning for these diverse environments.

Enterprises have adopted Service Oriented Architectures (SOA) to speed the time-to-market for new applications and reduce the cost of development. Use of Oracle SOA infrastructure, such as the Oracle SOA Suite and the Oracle Service Bus, allows businesses to flexibly create

and compose new capabilities while maximizing the re-use of existing enterprise services. The increasingly powerful orchestrations that Oracle SOA infrastructure enables also bring certain complexities in the management of these services. Business transactions may now span many departmental, enterprise, and even 3rd party systems. Orchestration behavior may now be implemented using dynamic, tool-driven configuration rather than as Java code.

SOA Application Discovery

To help organizations maintain awareness of services in the runtime environment, Oracle Enterprise Manager automatically discovers deployed application components, as well as the dependencies among those components. It bootstraps governance processes by automatically publishing this information to registries or repositories, while periodically updating these stores to keep the data up to date. It provides an informative view of the service network and its dynamic relationships to help organizations manage the complex dependencies inherent to loosely-coupled business systems.

Oracle Enterprise Manager's runtime blueprint enables architects and managers to ensure that only approved application components are deployed within their environments. It also helps them to uncover "rogue" services and brings these unapproved components into the fold by submitting them to the appropriate governance processes. Runtime dependency information is particularly useful for service impact analysis, enabling architects to instantly identify downstream and upstream effects of any change to individual component with the SOA application.

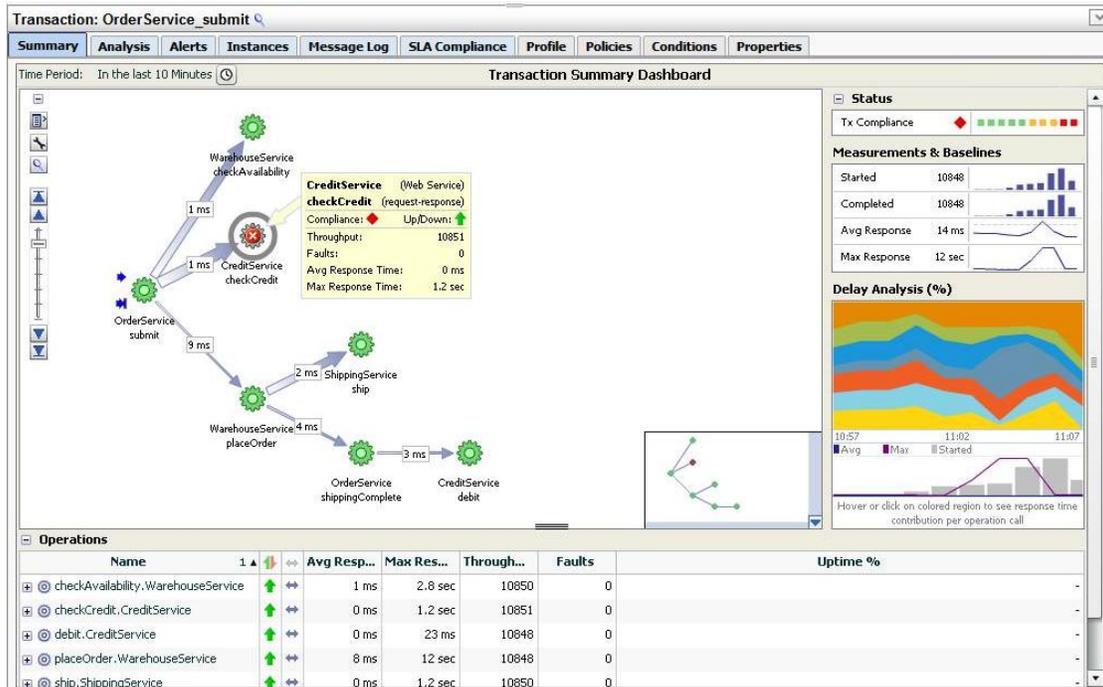


Figure 1 – Oracle Enterprise Manager Business Transaction Management discovers components and maps applications

Service and Transaction Monitoring

Oracle Enterprise Manager brings predictability, visibility and control to service-oriented applications by delivering comprehensive service level management for services, transactions and business processes across heterogeneous environments.

Ensuring healthy and reliable composite applications requires that you monitor the service components underlying these applications — as well as the business transactions flowing across these services — for performance and availability. Oracle Enterprise Manager ensures composite application health by providing real-time visibility into key performance indicators such as throughput, availability and response times.

Oracle Enterprise Manager continuously monitors actual application traffic to collect data on the operational health of application components and their affiliated business transactions. Oracle Enterprise Manager can present a unified view into both the SOA service layer from the Oracle SOA Management Pack Enterprise Edition and lower level implementation components such as EJBs, JAX-WS services and plain Java objects from the Oracle WebLogic Server Management Pack Enterprise Edition.

Oracle SOA management provides the end-to-end visibility necessary to operate SOA applications, providing:

- Real-time monitoring of individual service components and business transactions
- Key performance indicators visualized in charts and graphs for easy analysis
- Automated data archiving for historical reporting

Oracle Enterprise Manager generates a bird's-eye-view across your transaction flow dependencies, making critical operational information available at a glance. It provides live, color-coded network graphs for rapid identification of operational issues, with rich filtering capabilities across operational and business information to evaluate specific components of interest. Once components are identified for analysis, contextual drill downs provide immediate access to information on specific issues, alerts and faults.

On top of real-time monitoring, Oracle Enterprise Manager enables users to apply service-level agreements to SOA applications and the business transactions that flow across them. It aggregates and analyzes performance data from components across the distributed environment, and enables administrators to define both internal targets as well formal SLA objectives. Administrators can set multiple thresholds for warnings and failures, and make use of realistic performance baselines, drawn from runtime data and historical trends. Once SLAs are have been applied to SOA applications, administrators can make use of detailed service level views by operations, services, processes/applications, customers or user-defined business context.

With Oracle Enterprise Manager, administrators can target SLAs toward discrete business segments, such as gold customers, key business partners, or top-tier suppliers. The SLAs defined can prioritize service use by any business criteria—such as focusing on the most valuable users (customers, partners) or providing the best QoS during peak hours. SLAs can be set and monitored for individual services as well as composites such as processes and transactions, and they are monitored continuously and in real time. Calendaring capabilities enable administrators to define when an SLA is and is not in effect, for example, only during business hours from Monday to Friday, or during scheduled maintenance every Saturday. This prevents false-positive alerts from being sent to the operations teams.

For each SLA, administrators create a set of service level objectives (SLOs). To determine if an objective has been met (say, an average response time of less than 8 seconds) the Oracle Enterprise Manager evaluates the objective based on:

- Measurable data about a service — response time, throughput, availability, faults, average response time, etc.
- Performance during specified times — e.g., Monday through Friday from 8:00 AM to 5 PM
- Periodic evaluations — every ten seconds or every eight hours
- Consumers of the service – Platinum versus Bronze customers, for example

Ideally, an IT team would like to act before an SLA objective has been violated. Also, IT should be able to create multiple objectives (potentially for different user roles) for a single SOA application component. To meet these needs, Oracle Enterprise Manager enables administrators to set performance “targets” that function as the unofficial thresholds complementing formal “objectives”. The “tripwires” can alert administrators to impending failures—before customers are impacted or contractual SLA objectives are violated—saving the enterprise from customer churn as well as penalties imposed for failed SLA compliance.

As the IT team manages their processes over time, historical knowledge will give them added insight—including the ability to identify bottlenecks, fine-tune service level objectives and observe changes in system health. Enterprises can build historical insight into these service-oriented applications and use this insight to clearly understand the business impact of varying service levels. Oracle Enterprise Manager provides historical reporting that covers all aspects of SOA application performance monitoring.

Operational availability and service level conformance often extends to periods when, due to variation in user patterns, there may be inadequate or no load on the particular component in question. For instance, a back-end service dependency may malfunction at 3AM when there is no traffic. It would be desirable to detect that the service endpoint is failing prior to the first traffic at 7AM when users begin to execute transactions. Additional infrastructure preconditions may exist, such as DNS or network availability that is not specific back-end service dependencies, but will cause service failures if they break down.

Oracle Enterprise Manager augments transaction and infrastructure monitoring with synthetic transaction monitoring that can be used to actively determine the functional behavior of a large variety of services and infrastructure components. Periodic tests can be executed against web service and HTTP endpoints to verify that they are behaving the way they are supposed to. ICMP pings and DNS lookups can be run against different network segments or DNS servers in order to ensure that basic infrastructure is working.

In addition to availability and performance conformance, Oracle Enterprise Manager also centralizes security policy conformance metrics generated by the Oracle Web Services Manager to give a view into all aspects of the SOA infrastructure summarized onto a single page.

Diagnostics and Root Cause Analysis

SOA applications introduce a new order of complexity in tracking down failures. One challenge for operations trying to identify transaction bottlenecks is that the problem could originate anywhere in the stack. It could result from components in the implementation layer of the service, or it might actually be located in one of many replicated services or in the infrastructure supporting the orchestrated services. Some SOA applications may support long-running or asynchronous transactions, involving human interaction and spanning multiple systems and several days. All of this makes it tremendously difficult to pinpoint the source of a failure.

Oracle Enterprise Manager gives administrators the ability to view composite application dependencies in real-time. Exceptions in SOA applications are often technical (such as invalid data in requests, transport-level errors, or inaccurate responses) but they can also be business events (like excessive weight of shipment, a credit rejection for a premier customer, or an exceptionally large order). Such business exceptions are rarely understood by existing application monitoring solutions running on an e-commerce website (such as “Sorry, unable to process request at this time”), delayed orders, lost packages, rejected insurance claims, and so on. However, with Oracle Enterprise Manager, these business exceptions can be brought to the forefront and analyzed within a business transaction.

When SOA applications are failing, proactive alerting is required to initiate the diagnostic process before the phone starts ringing. Administrators can configure alerts in Oracle Enterprise Manager to let them know when:

- A SOA application is approaching SLA limits
- Transactions fail to complete—e.g. order fallouts, missing packages, missing phone activations etc.
- SOA applications throw technical or business exceptions
- Business parameters are violated—for example, a purchase order exceeds a user’s purchasing limit

Oracle SOA management offers end-to-end transaction tracking and recording to capture this context and the tools to sift through these transactions to isolate the problematic ones. Out-of-the-box search capabilities enable auditing and diagnostics of transactions after-the-fact, and script-based interfaces provide support for integration log-analysis tools, for highly customized diagnosis of transactions and application behavior.

Configuration and Lifecycle Management

SOA application environments are often complex with many components working together in tandem. Behind the scenes of a transaction flow are a complex assortment of configuration settings and deployment artifacts, whose presence and content are critical to the proper functioning of a system. By understanding these artifacts natively and automating their management, Oracle Enterprise Manager enables operators to save significant amounts of time and effort.

Configuration information about the applications and server infrastructure are continuously gathered and stored in a repository. Administrators can compare configurations over time and monitor drift.

During critical outages (especially during QA where changes may occur frequently and costly test resources may sit idle when a system is down), administrators can compare current configuration settings to a known good set and quickly identify changes that could be the root cause. SOA application components (e.g. BPEL processes or SOA composites) can be cloned from staging servers into a software library. These “gold master” components can then be deployed centrally to rapidly scale out an application or quickly revert that application to a known good state.

Conclusion

Today’s IT organizations are increasingly adopting Java EE, SOA, and cloud computing to 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 provides a new approach that enables Oracle SOA Suite and Oracle Service Bus 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.



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