Overcoming the Limitations of Conventional Application Performance Management

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Adopting an intelligent APM platform such as Oracle Composite Application Monitor and Modeler enables enterprises to more efficiently manage distributed applications, attain management agility, and achieve lower total cost of ownership.

EXECUTIVE OVERVIEW

Leaders in today's IT organizations are under tremendous pressure to deliver mission-critical business applications while managing constantly evolving business requirements. To overcome these challenges, many have turned to Java 2 Platform, Enterprise Edition (J2EE) and service-oriented architecture (SOA) to help them attain higher levels of performance and agility. As IT organizations deploy more J2EE and SOA applications in quality assurance and production, they start to discover that conventional methods of application performance management (APM), such as Java Management Extension (JMX) data collection and bytecode instrumentation, are no longer adequate.

Oracle provides the industry's first and only model-driven intelligent APM platform for J2EE and SOA. Unlike conventional APM toolkits, Oracle Composite Application Monitor and Modeler analyzes J2EE and SOA applications to capture the complex relationships among various application building blocks in its drill-down application model—the core of this intelligent platform.

Using the insights stored in the application model, Oracle Composite Application Monitor and Modeler can deliver an APM environment that self-customizes out of the box; evolves with change; minimizes expert involvement; and delivers a holistic, service-oriented view across heterogeneous environments. Adopting an intelligent APM platform such as Oracle Composite Application Monitor and Modeler will enable enterprises to more efficiently manage distributed applications, attain management agility, and achieve lower total cost of ownership.

INTRODUCTION

Organizations increasingly rely on composite applications to create enterprise agility. Unfortunately, the challenge of managing the performance of these composite environments is significantly more complex than with traditional systems. Although a few enterprises respond to this issue by simply ignoring the need to manage application performance, most choose to implement custom manual processes that enable them to effectively apply conventional APM toolkits to distributed architectures. To be truly effective with these conventional APM toolkits, these repetitive do-it-yourself (DIY) manual processes must be followed

consistently. Doing so not only incurs additional resource overhead but it also adds a significant time lag for getting applications into quality assurance and production.

Using the insights captured during semantic modeling, these new APM platforms can intelligently and automatically insert performance measurements, apply service context, track calling relationships, monitor application performance, send real-time alerts, and evolve with application and infrastructure changes.

In fact, these conventional APM toolkits and their repetitive DIY manual processes act like pairs of rigid handcuffs handicapping organizational ability to efficiently deliver applications and meet the requirements of today's highly competitive business climate.

To be effective and efficient, enterprises need to manage highly distributed J2EE, portal, and SOA applications in a holistic fashion while using the minimum IT resources and specialized expertise. They need an intelligent APM platform that can

- Provide a holistic, service-oriented view across heterogeneous environments
- Minimize involvement from J2EE, SOA, and portal application experts
- Eliminate repetitive DIY manual processes

Using semantic modeling is the only way to inject intelligence into APM platforms. This model-driven approach enables the APM platform to understand the structure of these J2EE, portal, and SOA applications and the configuration of their distributed runtime environments. Using the insights captured during semantic modeling, these new APM platforms can intelligently and automatically insert performance measurements, apply service context, track calling relationships, monitor application performance, send real-time alerts, and evolve with application and infrastructure changes.

INCREASING COMPLEXITY OF COMPOSITE APPLICATIONS

Today's J2EE, portal, and SOA applications enable enterprises to deliver mission-critical business functions to key constituencies, including customers, partners, and employees. These composite applications are assembled from many different J2EE components and exposed services distributed across a heterogeneous environment.

Unlike conventional monolithic applications, today's J2EE and SOA applications have seen exponential growth in their complexity, for the following three reasons:

- **Highly distributed execution:** Having interconnected application components executing in different runtime environments significantly increases execution complexity.
- **Significant code generation:** Code generation associated with modern application servers and application development frameworks significantly increases architectural complexity.
- **Rapid application deployments and changes:** Rapid incremental application deployments and changes significantly increase operational complexity.

Regrettably, conventional APM toolkits cannot effectively overcome the escalating challenges of J2EE and SOA complexity, because they

- **Focus on resource-centric measurements and views:** Conventional APM toolkits associate measurements and views with the individual agents. This approach makes managing applications with highly distributed components and runtimes extremely difficult.
- **Require deep J2EE, SOA, and/or portal application expertise:** Configuring conventional APM toolkits to manage today's J2EE and SOA applications requires teams of experts with deep J2EE, SOA, and/or portal application knowledge. Based on their knowledge, these experts perform various DIY manual tasks. Heavy reliance on experts strains IT resources and increases dependency risks.
- **Depend on repetitive DIY manual processes:** Setting up an effective APM environment with conventional APM toolkits requires teams of experts to perform DIY manual tasks such as metric selection, metric grouping, threshold setting, and alert action configuration. As new application deployments and updates occur, teams of experts must consistently use several repetitive DIY manual processes to maintain the effectiveness of their APM environments. This manual and expensive approach breaks down with rising complexity and a rapid rate of change.

To be effective at managing today's complex, distributed J2EE and SOA applications across a heterogeneous environment, enterprises must adopt an intelligent APM platform that provides service-oriented views across a heterogeneous environment, minimizes reliance on application experts, and eliminates DIY manual processes.

Given these flaws, enterprises using conventional bytecode instrumentation APM toolkits for J2EE must commit significant IT resources to set up and maintain effective APM environments for their distributed applications. Allocating more IT resources to address the complexity problem is not the answer.

INTELLIGENT APPLICATION PERFORMANCE MANAGEMENT

To be effective at managing today's complex, distributed J2EE, SOA, and portal applications across a heterogeneous environment, enterprises must adopt an intelligent APM platform that

- **Provides service-oriented views across heterogeneous environments:** An intelligent APM platform must provide high-level service-oriented metrics that map to low-level technology-centric metrics. These measurements must be organized in a service-oriented fashion to deliver a unified, holistic view of the numerous interconnected application components deployed across heterogeneous environments.
- **Requires minimal J2EE, SOA, and application expertise:** An intelligent APM platform must be able to capture complex relationships among various interconnected components of today's J2EE, portal, and SOA applications. This ability can help minimize reliance on J2EE, SOA, and portal application experts for setting up and maintaining effective APM environments.
- **Eliminates repetitive DIY manual processes:** An intelligent APM platform must eliminate repetitive DIY manual processes by delivering the ability to self-customize out of the box and evolve with change. Elimination

of repetitive DIY manual processes is the only way to deal with rising complexity and a rapid rate of change with ease.

Oracle Composite Application Monitor and Modeler is the only intelligent APM platform that can effectively overcome the management challenges of today's complex, distributed J2EE, portal, and SOA applications.

Holistic, Service-Oriented Views Across Heterogeneous Environments

To manage J2EE and SOA applications effectively, enterprises must first gain an understanding of the complex relationships among the business functions, the associated interconnected components, and the underlying runtime environments.

Today's mission-critical business functions are powered by J2EE, SOA, and portal applications that comprise numerous interconnected components deployed across highly distributed environments. To manage these applications effectively, enterprises must first gain an understanding of the complex relationships among the business functions, the associated interconnected components, and the underlying runtime environments. To enable clear and accurate understanding, IT organizations need holistic, service-oriented views that span heterogeneous environments. Furthermore, appropriate rendering of these views will help users at different levels of the organization collaborate with each other and do their jobs more efficiently.

Unfortunately, conventional APM toolkits cannot provide holistic, service-oriented views, due to limitations of server-centric, Java-centric, and transaction-tracing application management approaches.

Server-centric Management

This is a typical approach that enterprise system management frameworks use to gain visibility into the J2EE tier. This resource-centric approach collects availability and performance measurements from various J2EE containers across the enterprise and organizes them into a single view. Although adequate for monitoring the health of various servers, this approach does not provide sufficient visibility for application-level management.

JVM-centric Application Management

Commonly used by conventional APM toolkits for J2EE, this resource-centric approach collects low-level technology-oriented measurements from components running in a single Java Virtual Machine (JVM). Although these toolkits offer ways for users to arbitrarily group measurements from multiple JVMs into logical units, these groupings are imprecise representations of distributed applications. This approach has been the most common method for monitoring J2EE applications, but it increasingly falls short as J2EE applications become more complex, distributed, and service-oriented.

Transaction Tracing

The transaction-centric approach follows the path of a single transaction across multiple resources and collects low-level technology-oriented measurements along the way. Although this approach provides sufficient visibility for distributed

applications, it incurs significant overhead per trace and is thus not traditionally employed for production environments. Consequently, conventional APM toolkits employ techniques such as sampling rate limitation, sampling window reduction, and overflow protection to control overhead. These visibility-limiting techniques and the need to identify target transactions beforehand make this approach less desirable for managing J2EE and SOA applications continuously.

Holistic Visibility with Oracle Composite Application Monitoring and Management

Oracle developed the only intelligent APM platform capable of delivering a holistic, service-oriented view across heterogeneous environments for J2EE and SOA applications.

Oracle developed the only intelligent APM platform capable of delivering a model-driven, service-oriented view across heterogeneous environments for J2EE and SOA applications. Oracle Composite Application Monitor and Modeler uses the application modeling technology to capture complex relationships among distributed applications, software components, and runtime infrastructure. The semantic mappings stored in the application model enable Oracle Composite Application Monitor and Modeler to accurately measure the performance of its managed entities across heterogeneous environments in the appropriate context. Moreover, model-driven features such as drill-down application model visualization and navigation significantly improve overall usability.

Drill-down application model visualization automatically models and displays these complex relationships in an organized fashion through various visualization techniques, as shown in Figure 1.

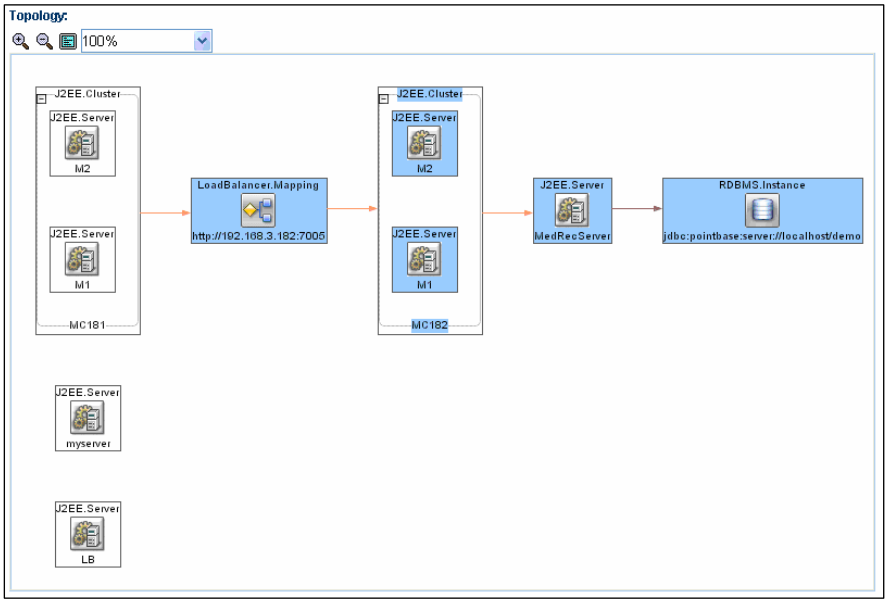

Figure 1: The Topology View feature in Oracle Composite Application Monitor and Modeler visualizes resource deployment.

Drill-down application model navigation provides efficient ways for users to access relevant information, using techniques such as hierarchical traversal, architecture model navigation, and string queries, as well as drill-in and drill-out (see Figure 2).

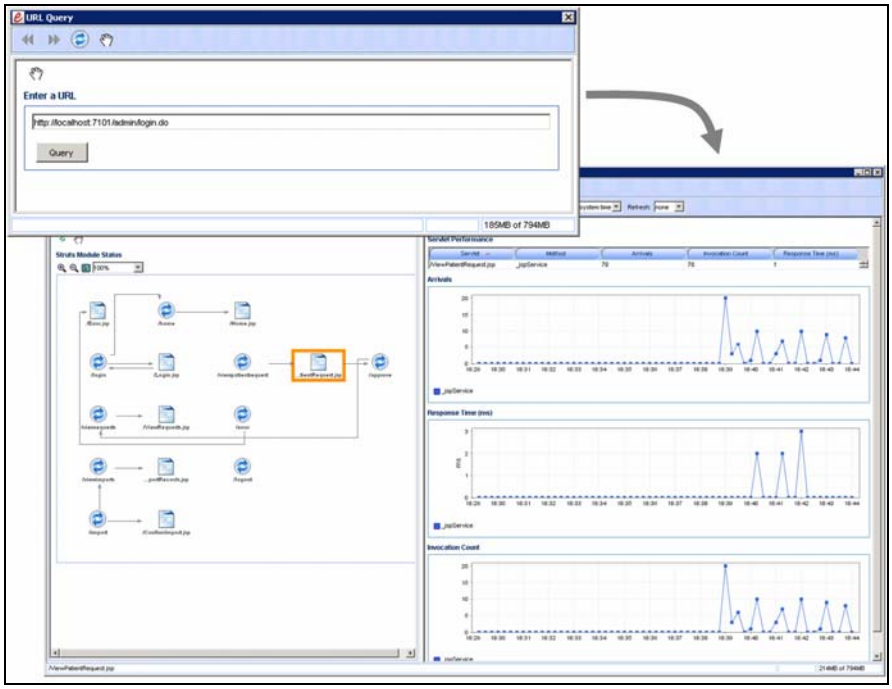

Figure 2: Use this URL to search for the most appropriate representation of the Oracle Composite Application Monitor and Modeler model.

Minimized Involvement from J2EE, SOA, and Portal Application Experts

Today enterprises' IT organizations are under constant pressure from corporate leadership to create solutions that enable companies to obtain competitive advantage or maintain parity. To churn out applications that meet these fast-changing requirements, enterprise developers and architects have turned to J2EE, SOA, and other application development frameworks to maximize efficiency and flexibility. Over time, these experts specializing in how these frameworks are used in their IT organizations become instrumental in the software development lifecycle process.

IT organizations are seeking new ways to address expertise shortage, minimize reliance on specialist resources, and give experts more bandwidth to focus on value-added activities. Intelligent APM addresses this challenge.

In recent years, demand for J2EE, SOA, and portal applications has increased steadily. As a result, IT organizations are now experiencing expertise shortages as existing specialist resources are stretched to their limits. Consequently, IT organizations are seeking new ways to address expertise shortage, minimize reliance on specialist resources, and give experts more opportunity to focus on value-added activities.

Unfortunately, conventional APM toolkits only make this problem worse. Setting up and maintaining an effective APM environment with conventional APM toolkits requires deep J2EE, SOA, and portal application knowledge. With these toolkits, experts are needed to determine the architecture of these distributed applications, figure out the configuration of the runtime environments, and select optimal locations for inserting performance measurements. These knowledge-intensive tasks require IT organizations to dedicate even more specialist resources, thus

worsening the expertise shortage problems. Additionally, it is very difficult to monitor applications created by third-party independent software vendors and offshore development teams with these conventional tools, due to lack of in-house knowledge.

Unlike conventional APM toolkits, Oracle Composite Application Monitor and Modeler does not rely on human expertise to set up and maintain customized APM environments. Instead, it uses a unique model-driven approach that leverages the information stored in its application model to keep the involvement of experts to a minimum.

To overcome these challenges and manage J2EE, SOA, and portal application performance effectively, IT organizations must adopt an intelligent platform, such as Oracle Composite Application Monitor and Modeler, that requires minimal expertise to set up and maintain. Unlike conventional APM toolkits, Oracle Composite Application Monitor and Modeler does not rely on human expertise to set up and maintain customized APM environments. Instead, it uses a unique model-driven approach that leverages the information stored in its application model to keep the involvement of experts to a minimum. Oracle Composite Application Monitor and Modeler's unique ability to self-customize out of the box and evolve with change makes it the perfect solution for managing not only custom enterprise applications but also third-party applications.

Eliminate Repetitive Do-It-Yourself Manual Processes

Since the advent of Java bytecode injection techniques, in the late 1990s, IT organizations have gradually abandoned the completely manual, repetitive source code instrumentation techniques that developers and architects relied on for years, in favor of partially automated bytecode instrumentation techniques. Conventional APM toolkits have capitalized on this trend, offering features that insert bytecode instrumentation automatically. Regrettably, these conventional APM toolkits have done little to reduce repetitive DIY processes.

With conventional APM toolkits, IT organizations must go through the following activities repetitively to set up and maintain effective APM environments:

- Understand application structure and runtime configuration
- Manually select relevant performance measurements for each application
- Apply context by manually creating arbitrary metric groups
- Update the APM environment when changes occur

The need for today's IT organizations to efficiently churn out enterprise applications has stretched existing IT resources to their limits. To make matters worse, IT organizations are putting more applications into production faster and making application changes more frequently. These trends, combined with expertise shortages, make it more difficult for IT organizations to keep their APM environments up-to-date. As a result, these organizations look for ways to minimize wasteful activities such as repetitive DIY manual processes associated with conventional APM toolkits.

Embrace Intelligent APM

Oracle Composite Application Monitor and Modeler's unique ability to self-customize out of the box and evolve with change enables short time to value and low total cost of ownership while maximizing return on investment.

Oracle Composite Application Monitor and Modeler can help IT organizations overcome this challenge. Based on a unique model-driven approach, it is the only intelligent APM platform that eliminates repetitive DIY manual processes. To achieve this level of self-customization and continuous change adoption, Oracle Composite Application Monitor and Modeler leverages its drill-down application modeling technology to perform the critical task of analyzing application structure and infrastructure configuration. After capturing these insights in the application model, Oracle Composite Application Monitor and Modeler leverages this information to establish a fully customized APM environment. To keep this environment up-to-date, Oracle Composite Application Monitor and Modeler continuously updates the application model as new applications are deployed and changes are applied. Its unique ability to self-customize out of the box and evolve with change enables short time to value and low total cost of ownership while maximizing return on investment.

CONCLUSION

Today's IT organizations leverage J2EE, SOA, and portal application development frameworks to efficiently churn out powerful and agile enterprise applications to meet fast-changing business requirements. To ensure that these mission-critical applications and services are available and performing at the highest level, enterprises must invest in proper APM solutions. Unfortunately, conventional APM toolkits and their repetitive DIY manual processes—once suitable for managing monolithic applications—are no longer effective for managing fast-changing, highly distributed J2EE, SOA, and portal applications running in heterogeneous environments.

Today's composite solutions require intelligent APM platforms that eliminate repetitive DIY manual processes and reduce the involvement of expert resources. These platforms must empower organizations to quickly adapt to change by delivering a holistic, service-oriented view across heterogeneous execution environments, leveraging a metadata-based model to capture the complex relationships among various application building blocks.

Oracle Composite Application Monitor and Modeler delivers the industry's first intelligent APM platform for J2EE, SOA, and portal applications. Unlike conventional APM toolkits, it analyzes these applications and captures complex relationships among various application building blocks in its drill-down application model—the brain of this intelligent APM platform.

Using the insights stored in the application model, Oracle Composite Application Monitor and Modeler can deliver an APM solution that self-customizes out of the box; evolves with change; minimizes expert involvement; and delivers a holistic, service-oriented view across heterogeneous environments. Adopting an intelligent APM platform will help your enterprise more efficiently manage distributed applications, attain management agility, and lower the total cost of ownership.

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