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Maximizing Portal Application Performance

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INTRODUCTION

Enterprise portal servers are vital components of today's Web applications, providing a single interface point for personalized access to information, applications, services, and business processes. Advances in portal technology have significantly reduced the time required to develop and deploy portal applications. As a result, more organizations are leveraging enterprise portals to improve developer productivity, customer service, architectural flexibility, and application integration, essential requirements for achieving rapidly evolving business objectives. A well-performing portal adds immense value to the IT organization and the line of business. Conversely, poor performing portal applications can lead to budget overruns, schedule delays, lost business and lower customer satisfaction.

As portals move into the mainstream, high performance and availability are becoming key initiatives not only for operational measurements, but also for the overall return on investment of the technologies themselves. Unfortunately, the technology advancements that helped create development productivity gains have added layers of complexity, some of which are "invisible," making it more difficult to monitor and manage portal application performance. In this white paper, we will explore key portal technological advancements, their impact on the ability to manage performance and how Oracle Enterprise Manager - Management Pack for WebCenter Suite can help enterprises overcome these management challenges.

PORTAL TECHNOLOGY ADVANCES HAVE ACCELERATED ADOPTION

Application owners have always embraced portals. Even before mainstream portal servers were available, large organizations could build their own portal enablement frameworks. Of course, this was a costly proposition, requiring organizations to fund large development, QA and support organizations for a non-revenue project. The introduction of enterprise portal frameworks built on Java 2 Enterprise Edition (J2EE) platforms helped facilitate industry-wide rollout of portal applications. The introduction of standard frameworks for development and deployment of UI elements has led to easier, faster, and cheaper application projects. Thus, more organizations are deploying portal-based applications.

Individual portal project tends to integrate a greater number of individual applications in any given project—with most organizations planning and executing multiple portal application projects at once. The current level of technology has the capabilities to enable almost any IT shop to easily and quickly build and deploy complex applications. New integrated functionality enabling massive acceptance includes single sign-on security services, built-in business process design and management, plug-in search capabilities, and integrated content management systems.

With enterprises making strides into Web Services and Service Oriented Architecture (SOA) applications, Enterprise 2.0 portals add immense value. For example, the Web Services for Remote Portlets (WSRP) standard provides efficient reuse and flexibility by distributing the deployment of portal resources across the infrastructure, enabling easy development of federated portals that pull remote content and business functionality into a central web UI. The loosely coupled nature of WSRP also enables enterprises to quickly add and modify portal functionalities to best achieve their business objectives.

With the ease of design, deployment and administration, organizations are investing the time, energy and dollars to convert their Web applications to portal applications across the entire enterprise.

MODERN PORTALS PRESENT UNIQUE MANAGEMENT CHALLENGES

While technology advances have ushered in the age of federated portals, they have also created unique management challenges that conventional application management tools and techniques can't overcome. Like many IT operational challenges, some customers are actively trying to fix the pains associated with these issues, some feel they just have to deal with the pain, and others are still unaware of the problems (until that day the application crashes and costs thousand or millions of dollars). There are three unique challenges of managing enterprise portal applications.

- Portal component usage context is difficult to monitor and manage
- Rapid pace of portal change requires continuous management updating
- Federated portals with WSRP add management complexity

Portal Usage Context is Difficult to Monitor and Manage

The application code (J2EE or other platform) sitting behind the customer-facing portal user interface is commonly referred to as the application business logic. This layer of the application manages the integration of multiple data, messaging and transaction systems to deliver the appropriate data or transactions to the end user. However, end users drive the portal functionality through the portal's integrated UI framework, made up of entities such as Books, Tabs, Labels and Pages. Whether utilizing a customized version of the UI or the standard layout, end users execute the business logic through a layer of abstraction tied to the portal UI framework functionality. This layer of logic that creates the UI and ultimately drives requests into the business logic is referred to as the Functional Logic.

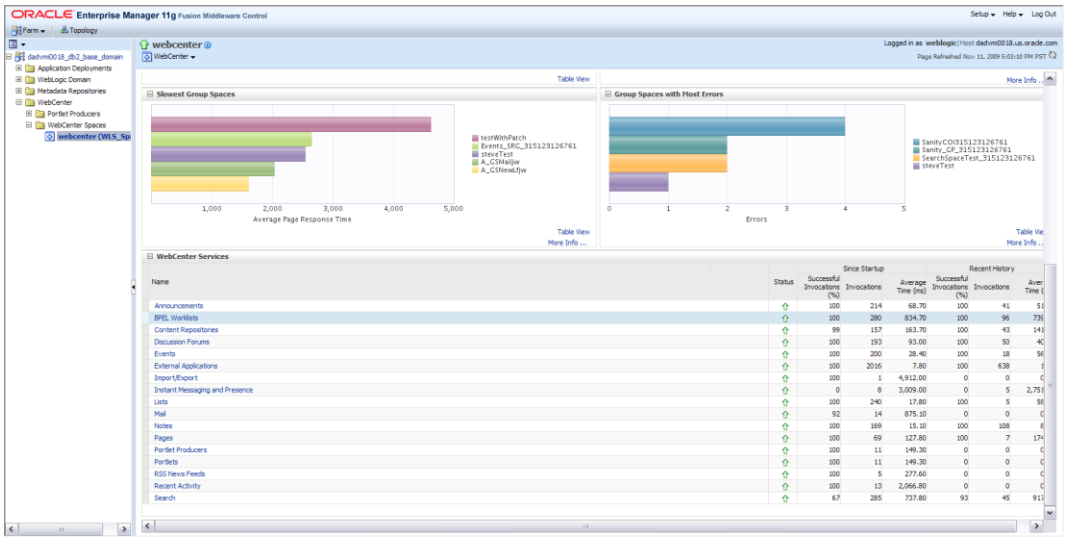


Figure 1. Management Pack for WebCenter provides context-rich monitoring capabilities specific to portal applications such as WebCenter Spaces

Monitoring and managing a portal application's functional logic is as critical, if not more so, than monitoring the business logic. The importance of the functional logic and its performance stems from the fact that the functional logic is the closest representation in the application layer of the actual user experience, and the only way to tie performance to how users are functionally using the application.

One challenge of monitoring the functional logic is understanding just what is there, what the entities are, how they're laid out and how they work together to create the functional logic. The next challenge is being able to tie the high level portal functionality to the business processes that use it – and to the underlying application components that make up the business logic behind the portal.

But an ever greater challenge exists in highly distributed, highly shared application components. Shared components are management nightmares due to the many different ways a particular component is called and used. Monitoring the true performance of the entire portal application requires each and every measurement to be taken within the context of the calling business process, transaction, portal entity or application component. A portlet that is used by 3 different pages should be measured 3 different ways (in addition to its overall aggregate metrics).

Up to now, some organizations have tried to perform the correlation from URL to deep application measurements with a manual process, creating and manipulating dashboards that artificially capture the presumed relationships. This worked enough in simple portal applications to warrant its continued use, however with more component sharing, distributed applications and Web services, today's complex federated portals have pushed past the ability to manually correlate and artificially create the business context through all calls and all components.

Rapid Change Requires Continuous Management Updating

Since portal applications are usually deployed as an effort to address more frequent changes to business requirements around application functionality, dealing with constant environmental change is critical when considering application performance management. As enterprise portals are quickly assembled, modified, disassembled and reassembled, the task of tracking these changes and updating the associated management environments becomes more difficult, creating an interesting dilemma: Application Performance Management (APM) owners can either manage generically, turn monitoring off completely or resign themselves to investing weeks of manpower and outside consulting for each and every application change—not exactly a great set of solutions.

Federated Portals with WSRP Add Management Complexity

One interesting new portal technology advancement, the use of Federated Remote Portals, enables application architects and developers to create federated portals using remotely distributed portal components. The remote components are gathered together at runtime and presented to the end user in a single web UI called the consumer portal. Unlike a local (or non-federated) portal, these remote components can be independently maintained, updated, and released without changing the consumer portal which uses them, resulting in less risky portal projects.

Switching production applications from non-federated portals to federated portals is a paradigm shift for most organizations, but the benefits are significant. Without federated portal architectures, any change—even a small change—to a single portlet would result in a complete cycle of application

deployment including quality assurance, performance testing, certification, staging, deployment, management configuration and regression testing of the entire application and application environment. By distributing the business logic through remote portlet calls and a federated consumer, IT organizations only have to test the updated functionality, since everything else (other portlets and the consumer portal) remained the same.

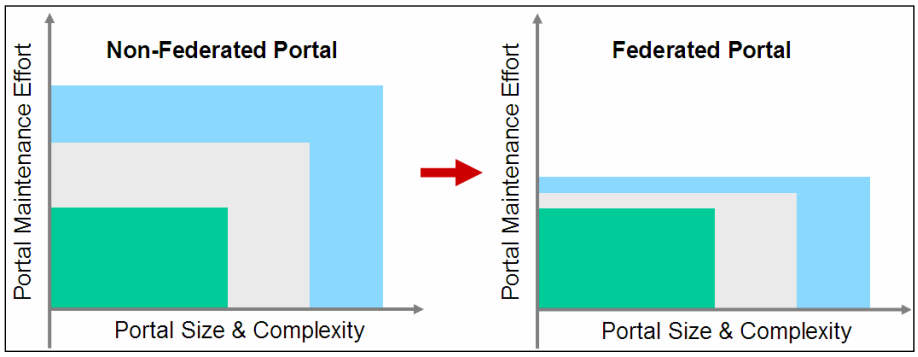


Figure 2. The shift from non-federated to federated portals creates a paradigm shift in maintenance.

While all management tools must keep up with this benefit, so far, only Management Pack for WebCenter Suite has the capability to support the new testing process of updating federated portal applications. Traditional APM tools require that any monitoring of the application that may touch the updated portlet—even though it is remote—must be revisited to insure that the manually created dashboards, custom metrics, alerts, and correlation are still valid. Even if they all remain valid, it could take weeks of time, manpower and consultant fees to perform this task.

By contrast, Management Pack for WebCenter Suite's engine will automatically detect the change in the remote portlet, analyze the change, and incorporate any new information into the overall model for the federated portal application. In addition, the direct correlation from the remote portlet with the federated portal application(s) that call it is automatically updated, including service level dashboard roll-ups, drill-down links, and architecture maps.

While it takes less effort to deploy and maintain federated portals, the use of WSRP presents a unique management challenge for portal owners. Since the execution of a remote portlet occurs on the WSRP producer server, performance measurements of the consumer portal only provide a portion of the data needed to solve any performance bottlenecks or availability issues. To help triage performance problems associated with federated portals, management tools must include measurements across the consumer / producer gap, including the exact relationships between the consumers and producers.

As an application uses more web services, creates more distributed applications, and employs massively re-used components, it creates substantial complexity that minimizes the ability for the support team to understand all the relationships between consumers and producers.

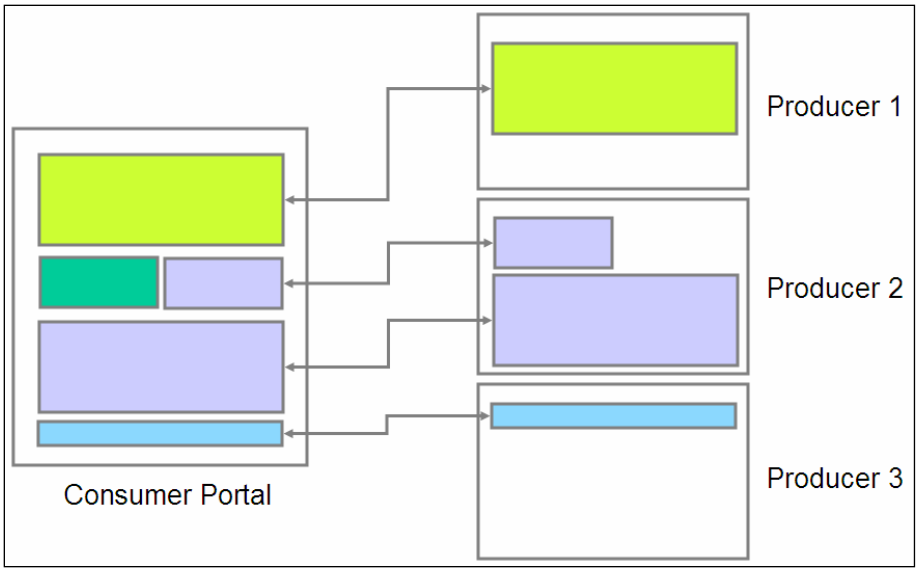


Figure 3. As the number of components increases, relationship transparency decreases which hinders the ability to quickly and efficiently perform manual performance measurements.

OVERCOME CHALLENGES WITH INTELLIGENT AUTOMATION

Manual tactics are not conducive for addressing the complex management challenges outlined above. Time-consuming manual approaches require extensive manpower and trial-and-error (thus, being error prone) that simply cannot scale as needed to manage complex, distributed applications. Intelligent automation is the only way to overcome the unique challenges associated with managing portal applications. Management Pack for WebCenter Suite provides organizations with the automated configuration, contextual measurements, and analytics needed to efficiently and effective manage composite application environments.

Reduce Time, Effort, and Errors with Automated Configuration

There are three key steps in the APM lifecycle, each with distinct requirements that are much easier to achieve with an automated solution.

1. **Setup and Configuration**
   - Discover all applications, business logic components, functional logic components, and all associated relationships between components
   - Build maps of all possible paths through the functional and business logic
   - Make a discerning selection of the appropriate application components to monitor for complete coverage of the business processes
2. **Correlation and Analysis**
   - Track relationship between each application component and all the associated business processes

- Take all measurements within the context of the top level business function and/or process: connect the portal functional logic to the application business logic
- Automatically rolling up alerts and warnings to each successive level (method→component→service→application→server→portal→process)
- Provide both drill-down capabilities for root cause analysis and drill-up capabilities for business impact analysis of specific problems

3. **Change Detection and Management**

- Detect changes to any aspect of the application environment, including new and updated java classes, brand new or updated applications, and new servers.
- Automatically analyze how the changes impact the overall transactions (for example, select new metrics, deprecate unneeded measurements, and map new transaction paths)

In a distributed, SOA, Web service application, even a small number of services can mean dozens of changes every month—sometimes even in a week. Given this constant change, how quickly and accurately a performance management solution can complete these steps is critical. Manually adjusting the setup, re-correlating metrics and re-configuring the service level monitoring is untenable and leads to degradation of the APM solution's value.

An automated approach is the only way for an APM solution to effectively handle the complexity of distributed, framework-oriented applications as changes continually hit the infrastructure. By automating the three steps outlined above, operations and portal administration teams can

- Quickly deploy service level management across broad application portfolios, with correlation from the business process level down to the critical methods deep inside the application business logic
- Deliver consistent coverage and reporting capabilities, regardless of the personnel involved in the deployment and/or configuration of the APM solution
- Handle change in the application environment automatically, without requiring intervention, or even analysis, from application development or architecture experts, maintaining the consistent excellence of the APM solution

For federated portals that use WSRP, Management Pack for WebCenter Suite not only selects the appropriate tracer locations, but also tracks and displays WSRP consumer-producer relationships. This unique ability to dynamically monitor WSRP consumer-producer relationships enables Management Pack for WebCenter Suite to provide other unique capabilities such as automatic organization of performance measurements and topological visualization.

Figure 4. Management Pack for WebCenter Suite is engineered to automate the performance management of composite applications, addressing the complete APM lifecycle in a fraction of the time required by manual approaches.

Improve Management with Contextual Measurement

Management Pack for WebCenter Suite is the only APM solution that accounts for the usage context for each and every portal entity—such as books, pages, tabs, and labels—and application component—such as servlets, EJBs, and JSPs—for each and every request automatically. This capability enables Management Pack for WebCenter Suite to determine how a shared portlet performs for each of several different portal pages. With an automatically generated map of all entity–component relationships, Management Pack for WebCenter Suite can measure portlet performance in each calling context, including response time and call counts for each and every unique page/label/tab/… combination.

For example, in Figure 5 below, Portlet E is used by all three portals. To truly manage the performance of Portlet E, any measurements must be made with an eye to context of where the request originated (Portal 1, 2, or 3). Management Pack for WebCenter Suite's unique ability to track usage context yields contextual measurements that appropriately breakdown Portlet E's behavior by different portals.

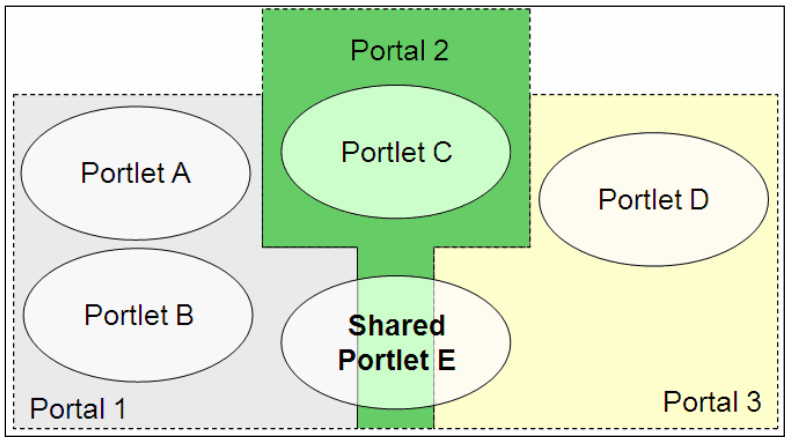


Figure 5. Management Pack for WebCenter Suite measures portlet performance within the context of each calling portal.

While conventional APM solutions will report the overall performance of Portlet E, Management Pack for WebCenter Suite provides a complete selection of metrics including the following:

Response Time

- Average, min, max response time of all requests to Portlet E
- Average, min, max response time of all requests to Portlet E from Portal 1
- Average, min, max response time of all requests to Portlet E from Portal 3
- Average, min, max response time e of all requests to Portlet E from Portal 3

Request Count

- Number of requests and completions of Portlet E for all requests
- Number of requests and completions of Portlet E for requests from Portal 1
- Number of requests and completions of Portlet E for requests from Portal 2
- Number of requests and completions of Portlet E for requests from Portal 3

An additional benefit of continuous contextual monitoring is the ability to report on high level service levels for all transactions and processes through the measurement and analysis of low level application components. Since no reported metric will be skewed by the performance of requests from other transactions, pages, labels, or tabs, the service level measurements will be more accurate.

Ease of Use Enhances Contextual Measurement Effectiveness

Ease of use is still tantamount to making an APM solution as effective as possible. Management Pack for WebCenter Suite includes an unparalleled user interface designed to allow anybody in IT operations to report on service levels, monitor performance, and perform the necessary levels of triage and root cause analysis when problems occur—without having to learn anything about application structure, architecture, or environment.

Each portal framework has a set of descriptors for its page rendering logic (the functional logic), called meta-data. Management Pack for WebCenter Suite knows how to extract this metadata and translates the portal application's functional layout into a user friendly view called the virtual portal desktop, a patent-pending visualization of the portal functional entities such as pages, books, labels, tabs, and portlets. Management Pack for WebCenter Suite users can bring up the performance of a page/book/label combination by traversing the virtual portal desktop the same way that an end user would traverse the portal page itself.

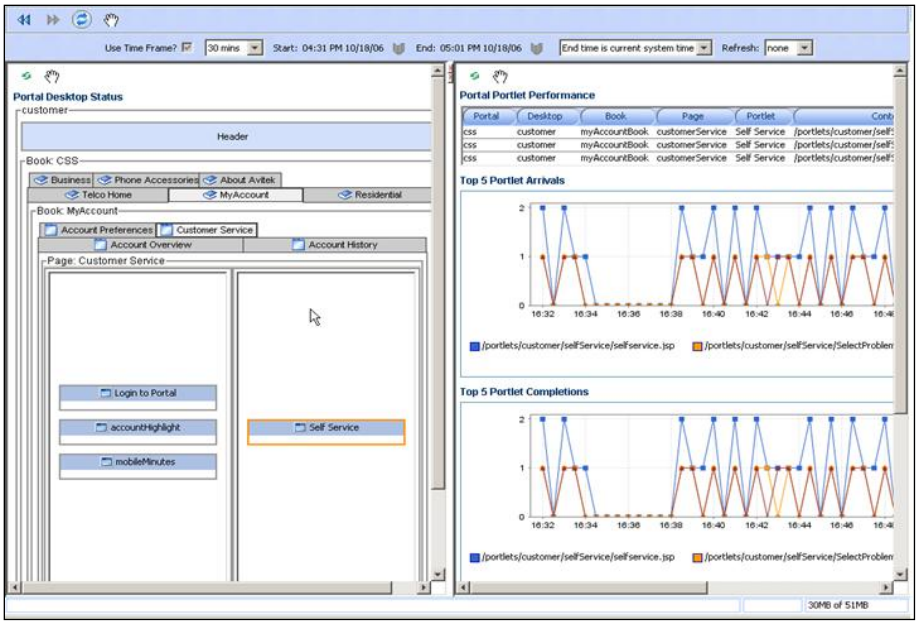


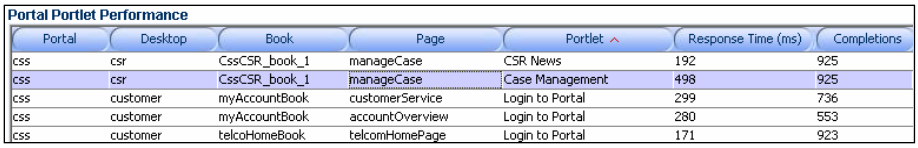
Figure 6. Management Pack for WebCenter Suite's desktop portal layout view enables IT application support teams to look at an enterprise portal from the perspective of the end users.

The combination selected in the virtual portal desktop results in request count and performance information about the particular combination. In the picture above, for instance, the Self Service Portlet on the Customer Service Page in the MyAccount Book has been selected (note the Orange outline on the Self Service portlet). The performance pane on the right has the performance of all the different calls to the portlet. Note that there are two different ways that the Self Service portlet is executed, both of which show up in the performance preview pane.

All the relationships between the Portal Page entities (discovered from the metadata), the portlets that get executed, and the application business logic, as well as the correlation between the application code components and the overlying portal entities that use them, are all determined automatically by Management Pack for WebCenter Suite with no human intervention, programming or configuration required.

Understanding the Context of Shared Components

Understanding performance and availability of shared applications with regard to the specific functional calls they're serving is critical in distributed applications, or applications that contain many shared components. A shared component could be an Enterprise Java Bean, a Servlet, a JSP, or a portlet. As an example, in the application discussed above, there is a Login to Portal portlet that performs the same types of authorization and authentication functions for multiple portal processes. The performance of the portlet may be different based on the specific portal functions that are being requested. In the screen snippet below, notice that the Login to Portal portlet actually has three distinct measurements—one for each of the three pages that uses it—providing performance measurements within the context of the actual user request.



Portal Portlet Performance

Portal	Desktop	Book	Page	Portlet	Response Time (ms)	Completions
css	csr	CssCSR_book_1	manageCase	CSR News	192	925
css	csr	CssCSR_book_1	manageCase	Case Management	498	925
css	customer	myAccountBook	customerService	Login to Portal	299	736
css	customer	myAccountBook	accountOverview	Login to Portal	280	553
css	customer	telcoHomeBook	telcomHomePage	Login to Portal	171	923

Figure 7. Tracking the measurements of a shared component, in this case Login to Portal, based on the calling component, is critical to understand and manage application performance.

As noted in the previous discussion on contextual monitoring, Management Pack for WebCenter Suite always shows associated usage context data to create the most logical organization of performance metrics. In the above screenshot, a person diagnosing the application's worst performing portlet (Case Management) can use the associated contextual information about portal, desktop, book, and page to quickly locate the problematic portal and transaction node.

Accelerate Problem Resolution with Diagnostic Views

While intelligent automation, contextual measurements, and logical visualizations enable application support teams to effectively monitor portal with minimal time, effort, and expertise, Management Pack for WebCenter Suite provides additional automated capabilities around performance analytics to accelerate performance problem diagnosis and resolution.

To accelerate problem identification, Management Pack for WebCenter Suite contains powerful features such as URL Query. URL Query allows any IT operations or support personnel to paste a URL address from the end user into Management Pack for WebCenter Suite, which then automatically determines the Portal entities executed by the URL and the underlying application components used by the request.

Once a potential problem has been identified, the application support team can bring up the appropriate diagnostic view to begin root cause analysis. An easy way to perform quick triage is to use Management Pack for WebCenter Suite's unique application architecture view—a diagnostic view that enables users to look at active call path and low-level performance measurements.

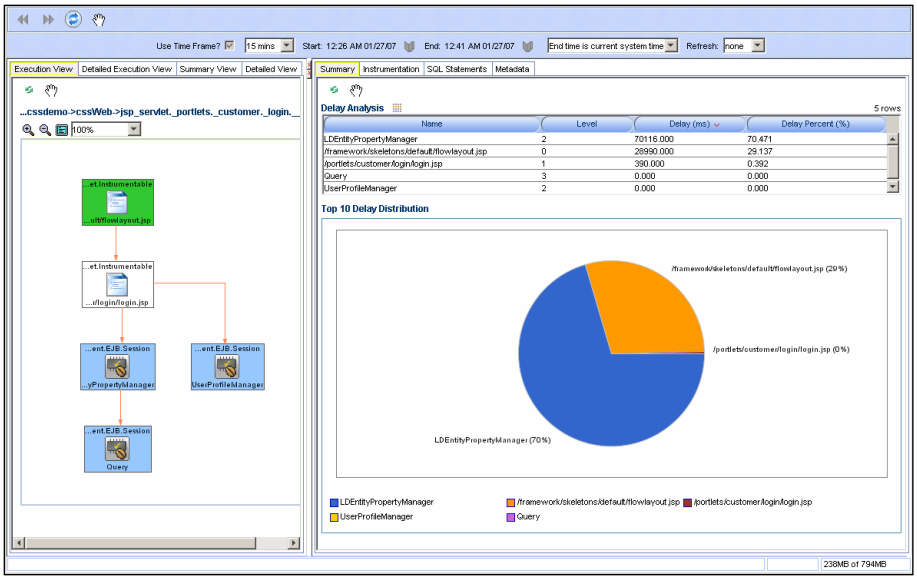


Figure 8. Robust analytics and diagnostic views enable operations and support staff to quickly retrieve measurements and identify problem components, in this case, LD.Entity.PropertyManager.

In the above Oracle Enterprise Manager screenshot, the left pane (Application Architecture View) shows the relevant active call path of the end user's request. The right pane (Delay Analysis) shows the most egregious users of time and resources in the transaction call path. For the specific transaction analyzed above, the Delay Analysis identified that 70 percent of the overall call path delay was contributed by a single component, and EJB called LD.Entity.PropertyManager.

Performance analytics such as Delay Analysis help guide Management Pack for WebCenter Suite users to performance bottlenecks quickly. Users can click on any identified problem component and retrieve additional method-level and SQL statement-level measurements for even deeper problem analysis. With these performance diagnostics and analytics features, IT operations and support personnel can reduce the time and effort required to resolve problems.

CONCLUSION

Today's enterprises are deploying portals to address ever-changing competitive business needs in a flexible highly fluid application environment. While advances in J2EE portal technology have given more enterprises the ability to deploy complex portal applications, these organizations are now experiencing challenges in delivering and managing the performance of these applications. These new challenges require production portal management solutions that understand both business logic and functional logic, accurately track and measure usage context, automatically keep up with application changes, and effectively deal with the added complexity of federated portals with WSRP.

Management Pack for WebCenter Suite is the only APM solution for J2EE Portals that can overcome the unique challenges of managing the performance of today's portal applications. Management Pack for WebCenter Suite leverages its patent-pending modeling and visualization technology to automate the three key steps of application performance management:

- Setup and configuration
- Analysis and correlation
- Change detection and management

Management Pack for WebCenter Suite's automated approach significantly reduces the time, effort, and expertise required with the setup and maintenance of portal management environments, saving upwards of hundreds of thousands of dollars in total solution costs. The modeling engine also drives the unique ability to detect, understand and manage the performance of the application functional logic. And Management Pack for WebCenter Suite's unique visualizations and maps provide an easy-to-use interface for any IT personnel to monitor performance and triage problems when they occur—without requiring extensive knowledge of the application, itself.

Modern enterprise portals need modern portal management. Join enterprises that have already deployed Management Pack for WebCenter Suite and overcome portal management challenges with intelligent automation.

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Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com

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