

Oracle JD Edwards EnterpriseOne UX One

Performance Characterization Using UX One

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Executive Summary

EnterpriseOne UX One helps visualize a customer's data for improved decision-making so that users can perform their job more efficiently. This visualization uses the concept of Alert-Analyze-Act to provide a direct path from a notification of an issue, to some analysis (graphs), and to the ability to launch other applications to address these notifications.

UX One has three components: the Watchlist pane, Analyze pane, and Springboard pane. Watchlists provide a count of notifications. The Analyze pane is the analytical component of the UX One interface, which includes charts. The Springboard pane has quick icon links to applications that allow users to perform actions on the EnterpriseOne user notification or chart.

The EnterpriseOne software feature configuration of UX One is role-based in nature, customized according to the EnterpriseOne functional role. The Oracle UX One project management team initiated an effort to characterize the performance of interactive applications in conjunction with UX One using AIS caching. The two role-based UX One applications configured for this project are Accounts Receivable (AR) and Customer Service Management (CSM).

The resulting performance characterization concluded that there was a beneficial impact to enabling AIS caching. The server end-to-end performance gain of 16%-22% provides more stability to the back-end server EnterpriseOne architecture components. Similarly, a nominal gain of +0.112 seconds is observed in the end-user or browser-based experience, where the average chart rendering time in the browser was 0.48 to 2.89 seconds.

Introduction

Oracle JD Edwards EnterpriseOne is an integrated applications suite of comprehensive enterprise resource planning (ERP) software that combines business value, standards-based technology, and deep industry experience into a business solution. The JD Edwards solution architecture can exist on multiple platforms and on multiple database architectures. This document describes performance characterization testing performed with JD Edwards UX One on an Oracle Linux-based virtual machine.

UX One Concepts

UX One provides enterprise-wide visibility on JD Edwards' components of information that EnterpriseOne users need for a specific job role (for example, Accounts Receivable Manager or Customer Service Manager). A sample configuration login page for an Accounts Receivable Manager role is provided below.



Figure 1. Example UX One Interface

For a more detailed explanation of the Oracle EnterpriseOne UX One feature, see UX One on LearnJDE.com:

http://docs.oracle.com/cd/E84502_01/learnjde/application_92x.html?8

Test Configuration

Below is the list of the EnterpriseOne component machines that comprised the UX One architecture for this project:

Machines and Platforms

Enterprise Server:

- » Oracle Enterprise Linux 6
- » Oracle Database12c (12.1.0.2) 32-bit Client
- » 4 VCPUs x Intel® Xeon® CPU E5-2697 @ 2.90 GHz
- » 12 GB RAM

Database Server:

- » Oracle Enterprise Linux 6
- » Oracle Database12c (12.1.0.2) Enterprise Edition 64 bit

- » 8 VCPUs x Intel Xeon CPU E5-2697 @ 2.90 GHz
- » 30 GB RAM

WEB / HTML Server1:

- » Oracle Enterprise Linux 6
- » 6 VCPUs x Intel Xeon CPU E5-2697 @ 2.90 GHz
- » 16 GB RAM
- » WebLogic Server 12c (12.1.3); Java JDK (1.8)
- » Single Managed Instance (4 GB Heap Size)

WEB / HTML Server2:

- » Oracle Enterprise Linux 6
- » 2 VCPUs x Intel Xeon CPU E5-2697 @ 2.90 GHz
- » 8 GB RAM
- » WebLogic Server 12c (12.1.3); Java JDK (1.8)
Single Managed Instance (4 GB Heap Size)

Deployment Server:

- » Windows 2012 R2 Enterprise Edition
- » 2 VCPUs x Intel Xeon CPU E5-2697 @ 2.90 GHz
- » 8 GB RAM

Server Manager Console:

- » Oracle Enterprise Linux 6
- » 1 VCPUs x Intel Xeon CPU E5-2697 @ 2.90 GHz
- » 132 GB RAM

OATS Test Controller:

- » Windows 2012 R2 Enterprise Edition
- » 8 VCPUs x Intel Xeon CPU E5-2697 2.90 GHz
- » 32 GB RAM
- » Oracle Application Testing Suite 12.3.0.1.0.376

Software:

- » JD Edwards EnterpriseOne Application 9.2 with Tools 9.2.1.1

Hardware:

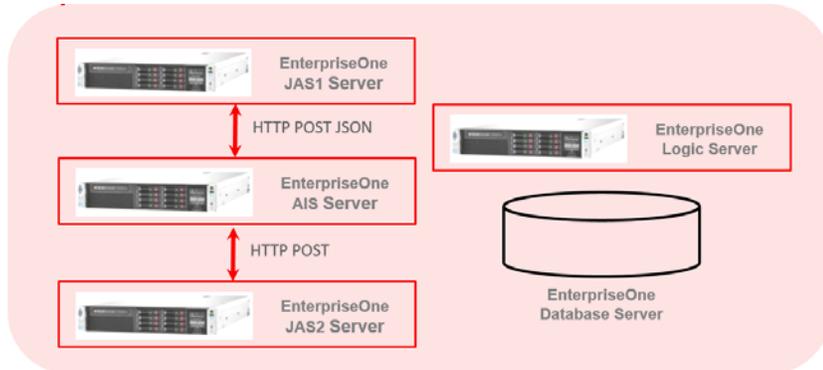


Figure 2. EnterpriseOne Architecture

It is important to understand what function each of the components in the above diagram provides to the UX One EnterpriseOne application. All component servers used in this testing were colocated in the same data center for maximum network and communication benefit. Below is a short list of the functions of each UX One server:

EnterpriseOne JAS1 Server

- » Processes all HTML requests from the browser, including login, Fastpath, and normal EnterpriseOne requests
- » UX One actions initialized by the login job role for processing

EnterpriseOne AIS Server

- » Processes JSON requests over the REST interface
 - » Calls UX One applications created with the AIS Client API (that is, Springboard applications)
 - » Initiates components created using the Java Extension Toolkit (JET) that runs inside the UX One EnterpriseOne pages, including processing the data for the Analyze pane charts and Watchlists
- » AIS does not make any EnterpriseOne Logic or database requests; the server acts as a JSON process traffic director for UX One

EnterpriseOne JAS2 Server

- » Processes directed data service and form requests from the AIS server
- » Performs calls to the EnterpriseOne Logic and EnterpriseOne Database servers for the charts and form requests

End-User Browser

- » The end-user browser interface processes the data for the charts returned by the AIS server to complete what the EnterpriseOne role-based user will see in the analyze pane.
- » For this reason, end-user experience assumed that no bandwidth or network latency issues exist that would delay the processing and rendering of the charts in the UX One Analyze pane.
- » The Internet Explorer browser was used for this testing.

» Data collection techniques

The items listed below are the metrics and data collection techniques used for testing UX One. Although many metrics were collected, only a subset of those metrics are presented in this document. The other metrics were used for tuning the EnterpriseOne architecture and for troubleshooting any issues encountered in the project.

» CPU/Memory/Network operating system metric collection on the EnterpriseOne Logic and JAS / HTML servers was performed using scripts with the standard Linux UNIX commands of 'ps', 'iostat', 'vmstat', 'netstat', and 'sar'. The LFRAME utility was used to collect all statistics on the EnterpriseOne Database server.

» JVM heap memory on the JAS / HTML server collected statistics using the verbose garbage collection (GC). The following arguments to the JVM collect all GC activity and heap size data over time:

```
-Xloggc:<path to log directory>/gc.log -XX:-PrintGCDetails -XX:+PrintGCTimeStamps
```

Verbose GC statistics are an excellent method of Java memory analysis. The impact of this utility on the EnterpriseOne JAS server is negligible, making it an ideal tool for ensuring stability of the EnterpriseOne application and identifying possible memory shortages and memory leaks.

» Call Object response times collection used the EnterpriseOne Server Manager Console facility included in the EnterpriseOne base product offering.

» Response times of all interactive transactions were collected using the Oracle Application Testing Suites (OATS) built-in analysis tools, which provided server end-to-end timing metrics. The OATS Oracle Functional Utility provided the metrics for measuring end user and browser-based metrics.

For more information on the Oracle Enterprise Manager Oracle Application Testing Suite (OATS) utility: <http://www.oracle.com/technetwork/oem/app-test/etest-101273.html>

Use Cases

The Oracle EnterpriseOne Day-in-the-Life (DIL) Kit was used in the testing of EnterpriseOne UX One to create the background load to the environment. The DIL Kit is a set of Oracle internally automated load testing scripts for the purpose of generating various interactive loads in an EnterpriseOne architecture environment. The DIL Kit comprises 25 interactive applications across five functional modules, including Customer Service Management, Finance Management, Human Capital Management, Supplier Relationship Management, and Supply Chain Management. Another component of the DIL Kit is the 1.2 TB foundational database that applications use, designed to represent an average-sized JD Edwards EnterpriseOne customer.

Each of the use cases for the UX One Accounts Receivable and Customer Service Manager job roles consisted of the following steps and continued for a duration of an hour. These UX One use cases were imitated concurrent to the background load of the DIL Kit to mimic a real customer.

1. Logging in to the EnterpriseOne application as a specific EnterpriseOne role/user
2. Allowing the UX One page to render fully, including the Watchlists, charts in the Analyze pane, and application links in the Springboard pane
3. Launching specific Watchlists and Springboard pane applications per UX One role-based user
4. Returning to the original UX One page
5. Logging out of the EnterpriseOne application



Exercising 500 users of the DIL Kit and scaling for a combined UX One user load of 20, 50, and 100 (equal users consisting of Accounts Receivable and Customer Service Management role-based users) provided the foundational basis for comparing the metrics with the AIS caching feature enabled.

Results

Testing was broken down into two phases, a server-based analysis and an end-user experience. Metrics such as end-to-end server response times collected by the Oracle OATS utility comprised the bulk of the server-based analysis used for measuring the performance. Server-based performance measures the back-end of the EnterpriseOne architecture and provides an indication of the health of the network and communications between EnterpriseOne server components.

The end-user experience measured the timings of the browser rendering of the charts in the Analyze pane. The end-user experience is a reflection of the back-end server performance and any network limitations that might exist between these services and the browser interface into the application. End-user experience provides a health indicator from the perspective of the user. Typically, end users will be the first to notice any poor performance of the UX One application. Both server-based and end-user experience metrics are important in troubleshooting the source of any problem with overall performance.

Server-Side Performance

The purpose of this testing was twofold with regard to EnterpriseOne server-side architecture performance:

1. Determine the direct impact of enabling the AIS caching feature.
2. Determine the impact when the UX One user load was spread across multiple JAS instances.

The results presented in the diagram below are the server-side performance testing of 100 combined AR and CSM UX One users, alongside a 500 DIL Kit users set of standard EnterpriseOne user activities. The test was performed using two use case scenarios, one was initiating the 100 combined AR and CSM users on a single JAS managed instance. The second was spreading the 100 combined AR and CSM users across three JAS managed instances.

The results of enabling the AIS cache for UX One users represented a 22% benefit to the UX One users on a single WebLogic JAS-managed instance and a 16% performance benefit if the UX One users were spread across multiple WebLogic JAS-managed instances.

Currently, Oracle JD Edwards EnterpriseOne ships the AIS caching feature OFF. It is our recommendation to enable the AIS caching feature for best results regarding UX One performance.

Recommendation: Turn ON AIS caching and evaluate for increased performance of UX One applications.

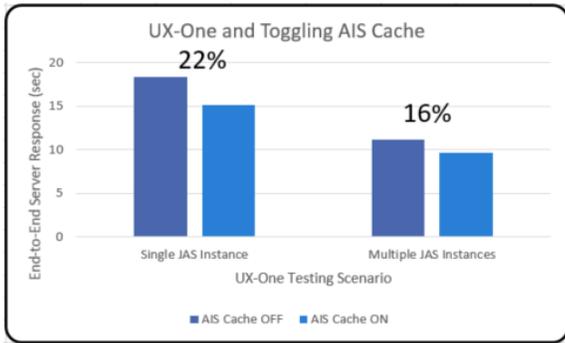


Figure 3. AIS Caching and Multiple JAS instances

Secondly, the server end-to-end testing determined the effect of increasing the number of WebLogic-managed instances and the overall effect to the AIS caching mechanism. In testing, it was seen that increasing the number of JAS instances decreased the impact that AIS caching benefit had to the performance of UX One. This observation was not a surprise, since it follows that increased numbers of resources can lessen the need for AIS caching. This is because each JAS-managed instance has fewer users to manage, making the resources per user greater. In this testing, 100 UX One users were supported by a single JAS instance or a 100:1 ratio. Spreading the load to three JAS-managed instances decreased this ratio by a third or 33:1 ratio. There is still a benefit to the AIS caching feature, but its impact decreased by 6% (from 22% to 16%).

End-User Experience

Although server-side metrics are an important indicator to performance with respect to the communications from the different server components in the EnterpriseOne architecture, end-user experience provides a more critical metric for customers. Presented here are the metrics for the end-user experience of UX One chart rendering.

Two end-user metrics were collected. The first is the average time it takes to render the UX One charts in the Analyze pane when the EnterpriseOne user first logs in. The second metric measures the time to re-render an already loaded chart in UX One after a user has navigated to either Watchlists or other links in the Springboard pane. This average time to re-render an existing chart is the sequential chart rendering time. The figure below presents the results of these two metrics while enabling AIS cache.

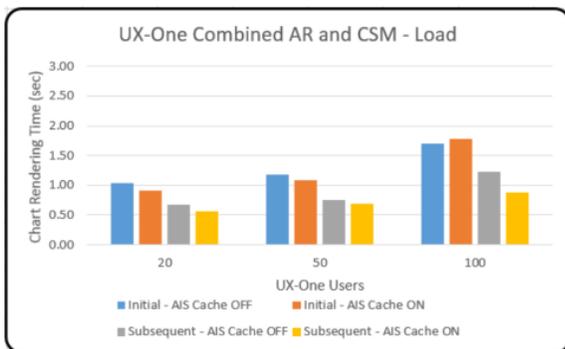


Figure 4. UX One Chart Rendering Time

Overall, with AIS caching enabled, there was a positive +0.114 second benefit for sequential or re-rendering of a chart, and an average positive benefit +0.112 second to end-user rendering.



The chart rendering times were below 2 seconds, which is below the generally acceptable end-user experience of 3-5 seconds using a browser for navigation. Furthermore, although 0.114 seconds and 0.112 seconds are small in comparison, they do represent a significant enough benefit to browser navigation and end-user experience. In general, end users can usually detect performance changes in end-user response times as small as 0.1 to 0.2 seconds, so the benefit of AIS caching and the increased performance of displaying already loaded charts will enhance the end-user experience.

UX One Analysis

There were three activities performed on the UX One environment for the results presented above:

- Enabling AIS caching
- Configuring the EnterpriseOne architecture
- Setting up the Java Heap Size and enabling garbage collection

Enabling and configuring the AIS caching 'keep alive' timings was required to maintain a consistent set of timings so that the cached objects on the AIS server would not timeout and re-cache the objects during the testing process.

Configuring the EnterpriseOne architecture, namely the introduction of a second WebLogic server-managed instance to handle the AIS requests is the recommended architecture performance solution for UX One.

Finally, setting up the Java Heap Size and enabling garbage collection is necessary in understanding the load requirements and profiles of the UX One JAS components.

A detailed discussion with the steps required to perform the above functions is available in the following Oracle by Example (OBE):

[Advanced Tuning of JD Edwards EnterpriseOne UX One](#)

Conclusion

Enabling AIS caching has a performance benefit to the back-end EnterpriseOne architecture of 16%-22% in the Oracle testing environment. Similarly the benefit of AIS caching to the browser end-user experience, although nominal (0.1-0.2 seconds), can improve the browser navigation of the EnterpriseOne UX One application and provide a smoother end-user experience.



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