



# IBM i Solution Edition for Oracle's JD Edwards EnterpriseOne performance benchmark results

*Delivering outstanding performance  
at a very competitive price*



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## Change history

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Version	Date	Editor	Editing description
1.0	08/17/2010	Patrick Moore	Original version



## Abstract

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*This paper describes the results of recent measurements which demonstrate the performance of Oracle's JD Edwards EnterpriseOne on IBM Power Systems™ POWER7™ processor-based servers running IBM i. These latest measurements reflect the recent announcements of POWER7 based entry servers, the IBM i Solution Edition for JD Edwards, and Oracle support for WebSphere Application Server Express.*

*The POWER7 results show near linear scalability across measurements of 300, 600, and 1200 web-based users on one, two, and four core configurations. They also validate that these servers provide an outstanding server option at a competitive price.*

*IBM and Oracle remain committed to providing customers with an integrated, scalable, and easy to manage environment based on the latest processor technology and a robust software solution including the use of IBM PowerVM™, DB2® for i, and WebSphere® Application Server.*

## Introduction

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IBM and Oracle continue to work together closely to ensure customers have the application and platform solutions needed to maximize their business results. This paper contains new performance results which reflect some recent announcements from IBM and Oracle.

- In August 2010, IBM announced new POWER7 processor-based Power System servers targeting the lower end of the product line including entry servers. With anywhere from 1 to 16 processor cores, these new servers provide a broad range of processor options at very competitive prices.
- At the same time, IBM also announced the IBM i Solution Edition for JD Edwards which is an infrastructure solution specifically designed, configured, and priced to reduce the cost, complexity, and risk of deploying JD Edwards world-class solutions on IBM i. It provides a complete hardware and software solution, it is quick and easy to implement, and it provides powerful POWER7 processor-based technology at a lower cost than competing solutions. For further information, please refer to the "IBM i Solution Editions" website:  
<http://www.ibm.com/systems/power/hardware/editions/solutions.html>
- Earlier this year, Oracle announced support for WebSphere Application Server Express. Because DB2 for i and WebSphere Application Server Express are included with IBM i, this provides customers with the option of running what is often called "clear stack" in which only the JD Edwards EnterpriseOne Tools need to be purchased from Oracle. This in contrast to JD Edwards Technical Foundations which offer either IBM ("blue stack") or Oracle ("red stack") middleware for use with JD Edwards EnterpriseOne. Note that WebSphere Application Server Network Deployment is still supported and provides advanced options such as clustering for improved performance and availability.

These announcements provide a significant improvement in the price/performance of JD Edwards EnterpriseOne solutions on IBM i. This paper provides performance results for representative configurations of the IBM i Solution Edition for JD Edwards and demonstrate the continued value of the "All on i" option with the entire application running on a single instance of IBM i. These results take advantage of the powerful integration capabilities of IBM i and IBM PowerVM virtualization technology.



## POWER7 performance tests

### Test objectives

The objectives of these tests were as follows:

- Validate the performance of the POWER7 processor-based IBM i Solution Edition for JD Edwards configurations by running enough web-based users to achieve nominal processor utilization on different configurations. Note that these tests did not include any UBE (Universal Batch Engine) processing.
- Demonstrate the functionality and performance of WebSphere Application Server Express for JD Edwards EnterpriseOne.

### Test environment

The environments were defined to represent the sample configurations for the IBM i Solution Edition for JD Edwards. Note that many other configurations are possible. Table 1 shows the configuration information for the three environments used for the performance testing. All three were implemented in a single instance of i on the same server with different logical partition definitions to provide different processor and memory resources. The number of processor cores indicates the number of processors which were licensed for IBM i and used for the tests. Note that the physical hardware may have additional processors which were not activated. CPW values for the one and two core configurations are estimates based on the published value for the four core configuration.

	1 core configuration	2 core configuration	4 core configuration
<b>Processor</b>	<b>1 core</b>	<b>2 cores</b>	<b>4 cores</b>
Technology	POWER7	POWER7	POWER7
Clock rate	3.0 Ghz	3.0 Ghz	3.0 Ghz
CPW	5,950	11,900	23,800
<b>Memory</b>	<b>16 GB</b>	<b>32 GB</b>	<b>64 GB</b>
<b>HTML servers</b>	<b>1</b>	<b>2</b>	<b>4</b>
<b>Disk arms</b>	<b>48 arms</b>	<b>48 arms</b>	<b>48 arms</b>
<b>Software</b>			
Operating system	i 7.1	i 7.1	i 7.1
WebSphere Express	7.0.0.7	7.0.0.7	7.0.0.7
EnterpriseOne	9.0 / 8.98.3	9.0 / 8.98.3	9.0 / 8.98.3

Table 1 – Summary of POWER7 test configurations

## Test results

Table 2 shows the results of the measurements.

Configuration	Number of Web-based users	Processor utilization in percent
1 core	300	69.4
2 core	600	72.3
4 core	1200	75.2

Table 2 - Performance results from the POWER7 measurements

The following are some additional observations regarding these results:

- These values represent near linear scaling from one to four processors.
- CPU utilization increases slightly as the numbers of users and processor cores increases due to some additional system overhead. All measurements are within normal guidelines for interactive or web-based user workloads and consistent with previously published results. Weighted average response times were all subsecond.
- Although the number of disk arms used (48) is greater than many entry configurations, this was not a significant factor in overall system performance. The disk utilization was always less than 1% in these tests.

Figure 1 shows the number of web-based users and the processor utilization in graphical form.

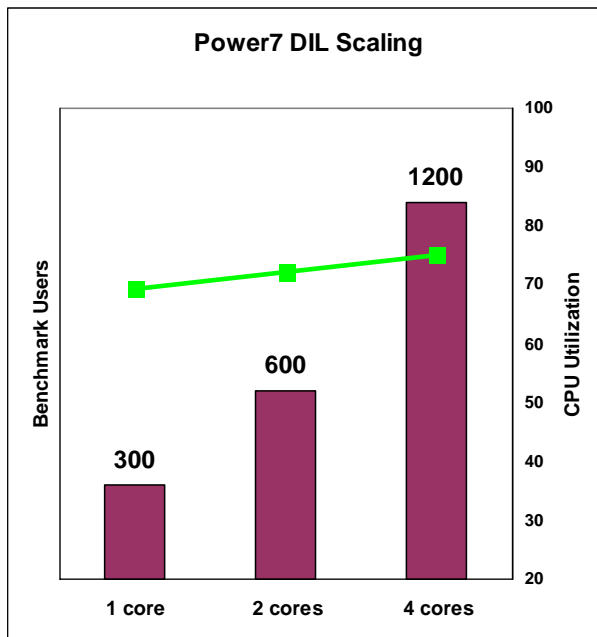


Figure 1 - Comparison of POWER7 measurements



## Summary

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These results demonstrate IBM's continued commitment to improving the performance of customer environments running JD Edwards EnterpriseOne software on Power Systems servers with IBM i. The results reflect the following:

- These results demonstrate outstanding performance from IBM Power Systems POWER7 processor-based servers available as part of the IBM i Solution Edition for JD Edwards which provides significant improvements in price/performance and competitive prices with competing solutions.
- The results show near linear scalability for 300, 600, and 1200 web-based users on one, two, and four core configurations.
- The results also demonstrate the performance and functionality of WebSphere Application Server Express for use with JD Edwards EnterpriseOne.



## Resources

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The following resources contain additional information which supplements the content of this paper.

- System i JD Edwards Solutions from Oracle  
<http://www.ibm.com/systems/i/advantages/oracle/>
- Performance benefits of POWER6 processors and IBM i 6.1 for Oracle's JD Edwards EnterpriseOne - a customer case study  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3620>
- Oracle's JD Edwards EnterpriseOne Scaling with IBM POWER6, POWER7, and IBM i  
<http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101555>
- Overview of Oracle's JD Edwards EnterpriseOne "Day in the Life" 8.12 Sizing Kit on the IBM System i Platform  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101153>
- IBM System i Performance and Tuning Tips for Oracle's JD Edwards EnterpriseOne 8.12, WebSphere 6.0, and WebSphere 6.1  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100985>
- IBM Power Systems with IBM i Performance and Tuning Tips for Oracle's JD Edwards EnterpriseOne 9.0  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101504>
- Using JD Edwards EnterpriseOne Server Manager to create an HTML server vertical cluster on WebSphere ND and IBM i  
<http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101647>

## About the author

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Jim Denton has been an IBM Rochester employee since 1981 and has held a variety of positions in operating system development and performance analysis on the S/38, the AS/400®, the System i®, and Power Systems platforms. Jim is the senior JD Edwards software on IBM i specialist and is responsible for working with JD Edwards EnterpriseOne and JD Edwards World developers on functional enhancements and customer issues, producing performance benchmark results, and providing performance and tuning guidance for JD Edwards EnterpriseOne customers on IBM i. Jim frequently attends and speaks at conferences such as Collaborate and Oracle OpenWorld. He is also provides technical consulting services for JD Edwards on IBM i and DB2 for i.

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## Appendix 1: Day in the Life workload

Table 3 contains the list of the web-based transactions used in the Day in the Life workload. The table reflects the transaction mix defined by Oracle for use with JD Edwards EnterpriseOne application release 9.0.

Transaction	Description	Percent of Users
H03B102E	Apply Receipts	10
H0411I	Supplier Inquiry	10
H051141E	Daily Time Entry	2
H17500	Case Mgmt Add	5
H31114U	Work Order Completion	3
H3411AE	MRP Messaging	2
H3411BE	MRP Messaging	2
H3411CE	MRP Messaging	2
H4113E	Inventory Transfer	5
H42101E	Sales Order Entry	25
H42101U	Sales Order Update	5
H4310E	PO Entry	20
H4312U	PO Receipts	3
H4314U	Voucher Match	1
H4915AU	Ship Confirmation	1
H4915CE	Ship Confirmation	1
H4915CU	Ship Confirmation	1

*Table 3 - Day in the Life benchmark transactions*

The Day in the Life benchmark definition was designed to be more representative of customer environments and more realistic and has been the standard for performance evaluations since the release of JD Edwards EnterpriseOne 8.12. It has several changes from the previous classic 17 benchmark definition:

- It uses a larger database.
- It includes both web-based and UBE based operations.
- It has broader application coverage including options for turning on Advance Pricing and Advanced Transportation. It includes Customer Relationship Management (CRM), Human Capital Management (HCM), Supplier Relationship Management (SRM), and Financial Management Service (FMS). It also uses Powerforms.
- It is process oriented rather than inquiry oriented.
- It integrates the use of Verity and Vertex.

For additional information on the Day in the Life workload, please see the IBM whitepaper titled 'Overview of Oracle's JD Edwards EnterpriseOne "Day in the Life" 8.12 Sizing Kit on the IBM System i Platform' which is listed in the Resources section.

The tests executed in this benchmark are part of a "Day in the Life" benchmark kit provided by Oracle. Oracle has reviewed IBM's testing methodology and results and has found them to be sound and consistent with industry standard practices.



## Appendix 2: System and application tuning

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The following describes how IBM i, WebSphere Application Server, and JD Edwards EnterpriseOne were tuned for the measurements in this whitepaper.

### System configuration

The POWER7 processor-based system used was an IBM Power 720 Express with varying partition configurations as described above. All tests were run on the same system using the “All on i” configuration in which the Database, Enterprise, and HTML servers are all run in a single instance of IBM i.

### IBM i tuning

- Activity levels were set to sufficiently large values to preclude job transitions to ineligible.
- Websphere Application Server and the HTML Server were run in a separate memory pool to minimize faulting.
- The memory pools were configured to minimize faulting in the machine pool and the pool used by WebSphere Application Server.

### WebSphere tuning

- Up to four HTML servers were used as indicated previously.
- Initial and maximum heap size for the HTML Server JVM's were set to 436MB and 1744MB respectively. This is consistent with guidance published for the 32 bit IBM Technology for Java™ JVM.
- Separate shareclasses caches were used for each JVM. All JVM's were configured for a garbage collection policy of gencon which more effectively manages the needs of both short lived temporary and tenured heap objects.

### EnterpriseOne tuning

- All application users run using the same IBM i user profile.
- Kernels were configured based on previously published guidance. The only exception is that the number of Call Object Kernels was based on a value of one COK for 25 users.



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