Lawson 9.0.1 on IBM i V6.1 and IBM POWER6

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1. Introduction

As of May 2009 Lawson 9.0.1 became available for the IBM® i 6.1 operating system. This significant announcement allows the latest Lawson 9 Foundation and Application code to take advantage of the latest technologies and feature in IBM i 6.1 In addition Lawson 9.0.1 now runs under JDK 1.6 using the IBM Technology for Java 64-bit JVM available in IBM i 6.1. Thus Lawson 9.0.1 now takes advantage of the latest Java™ technology available on IBM i which may result in significant increases in performance and use significantly less memory.

This paper describes testing that was done using the Lawson S3 benchmark kit to run a set of both online and batch tests using some of the most common Lawson S3 applications. All testing was done on an IBM POWER6 570 with the IBM i 6.1 operating system. The results in this paper show the excellent performance and scalability of Lawson 9 on IBM i 6.1 and POWER6.

This report is also a demonstration of the unique capabilities of the IBM i™:

- IBM POWER6™ technology with its superior scaling and integration demonstrates that processor speed is not everything.
- The ability to run multiple complex workloads.
- The integration strength of IBM i 6.1, DB2® UDB for IBM i, Java, and WebSphere® Application Server demonstrates the ability of IBM i system to support new application models.
- Reliability of single IBM i, which can be used for both back-end and complementary front-end applications to replace a group of heterogeneous servers, with significant price/performance and Total Cost of Ownership (TCO) gains over the previous generation technology.
- On Demand capability is available for small and medium businesses to provide capacity for peak loads and future growth.
- Flexibility of IBM i to handle workloads on even small environments and grow as your business grows.

2. System Configuration

All components required for the tests in this paper were installed on a single IBM i system . These components include:

- Lawson System Foundation 9.0.1.4
- Lawson Applications 9.0.1.1
- Lawson Portal 9.0.1.4
- WebSphere Application Server ND 7.0
- IBM HTTP Server for IBM i 6.1
- IBM DB2 UDB for IBM i 6.1
- IBM Tivoli® Directory Server for IBM i 6.1
- IBM i 6.1 operating system

The hardware configuration that was used for all testing in this report was:

- IBM Power6 570
- Edition Feature: 7540
- Number of Processors: 4
- Chip Speed: 4.2 GHz
- L3 cache: 32 MB
- CPW rating: 16,200
- Main storage: 16 GB
- Disk: 54 arms (type 4328), 15k RPM, 140GB capacity
- Disk configuration: Single ASP with device parity protection
- Disk IOP: Disks spread across two 571F IOPs (390 MB write cache)
- Network: 100Mbps Ethernet, full duplex

3. Lawson S3 Batch Benchmark

This section shows results for all of the batch tests that were done. Several different applications were tested. For each application the jqdef, job queue definition, was changed to allow different numbers of concurrent batch jobs to be active at any point in time. Changing this value allows us to show the scalability and flexibility of IBM i to handle workloads with both a small and high number of concurrent batch jobs.

3.1 General Ledger Batch Benchmark

For this batch test the Lawson benchmark kit was used to create data for and facilitate the testing of following Lawson General Ledger (GL) closing processes:

GL165, GL190 and GL199 .

The database was created with an extra large volume size of 256,000 journal entries plus a default of 6 months of general ledger history. For GL165 64 distinct run groups, or jobs, were created each with 4,000 journal entries, for GL190 there were 4 distinct run groups, and for GL199 there was only one run group.

To execute the test, the benchmark kit submits all run groups for each of the GL tests, GL165, GL190 and GL199. Results are calculated as the total time it takes to complete all of the run groups for each GL process. To show the scalability of both Lawson 9.0.1 and IBM i 6.1 the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Results:

GENERAL LEDGER PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS) BY NUMBER OF CONCURRENT JOBS			
		1	2	8	16
Interface Journal Entries	GL165	00:05:42	00:03:33	00:01:21	00:01:26
Journal Posting	GL190	00:00:57	00:00:33	00:00:21*	00:00:21*
Period Closing (Single job)	GL199	00:00:03	00:00:03	00:00:03	00:00:03
Average CPU Utilization		20 %	32 %	57%	72%

* configured for four concurrent jobs

Note: Times reported are the total time required to complete all job groups for each GL process

3.2 Accounts Payable Batch Benchmark

For this batch test the Lawson benchmark kit was used to create data for and to facilitate the testing of following Lawson Accounts Payable (AP) closing processes:

 AP520, AP150, AP155, AP170, AP175, AP125, AP265, and AP195

The database was created with a large volume size of 120,000 invoices plus a default of 600,000 historical invoices for accounts payable history. For all transactions, except AP195, 12 distinct run groups, or jobs, were created each with 10,000 invoices to process. For AP195 there was only one distinct run group.

To execute the test the benchmark kit submits all run groups for each of the AP tests, AP520, AP150, AP155, AP170, AP175, AP125, AP265, and AP195. Results are calculated as the total time it takes to complete all the run groups for each AP process. To show the scalability of both Lawson 9.0.1 and IBM i 6.1 the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Results:

ACCOUNTS PAYABLE PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS) By Number of Concurrent Jobs		
		1	6	12
Invoice Interface	AP520	00:18:53	0:05:01	0:03:47
Expense Invoice Release	AP125	00:13:55	00:03:21	00:02:45
Cash Requirements	AP150	00:03:29	00:01:11	00:01:11
Payment Forms Creation	AP155	00:02:59	00:01:04	00:01:04
Check Register	AP265	00:10:50	00:03:08	00:02:21
Payment Closing	AP170	00:14:00	00:03:38	00:02:49
Invoice Distribution Closing	AP175	00:00:01	00:00:01	00:00:01
Period Close (Single Job)	AP195	0:00:22	00:00:11	00:00:12
Average CPU Utilization		19%	73%	96%

Note: Times reported are the total time required to complete all job groups for each process

3.3 Payroll Batch Benchmark

For this batch test the Lawson benchmark kit was used to create data for and to facilitate the testing of following Lawson Payroll (PR) processes:

 PR140, PR160, PR197, and PR198

The database was created with a medium volume size of 96,000 employees with a retail client type and 50 positions. In addition, a default of three years of payroll history data was created. For all transactions 48 distinct run groups (process levels), or jobs, were created each with 2,000 employees to process.

Note: A retail client type is defined as one that has 20% exempt employees and 80% non-exempt employees.

To execute the test the benchmark kit submits all run groups for each of the PR tests, PR140, PR160, PR197, and PR198. Results are calculated as the total time it takes to complete all the run groups for each PR process. To show the scalability of both Lawson 9.0.1 and IBM i 6.1 the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Results:

PAYROLL PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS) By Number of Concurrent Jobs			
		1	2	4	8
Calculate Gross to Net	PR140	1:55:48	1:00:43	0:32:54	0:19:43
Print Checks	PR160	0:49:56	0:26:21	0:15:27	0:09:21
Payroll Close	PR197	3:59:04	2:11:41	1:14:29	0:39:25
Posting	PR198	2:35:40	1:28:48	0:51:18	0:30:13
Average CPU Utilization		22%	37%	54%	94%

Note: Times reported are the total time required to complete all job groups for each process

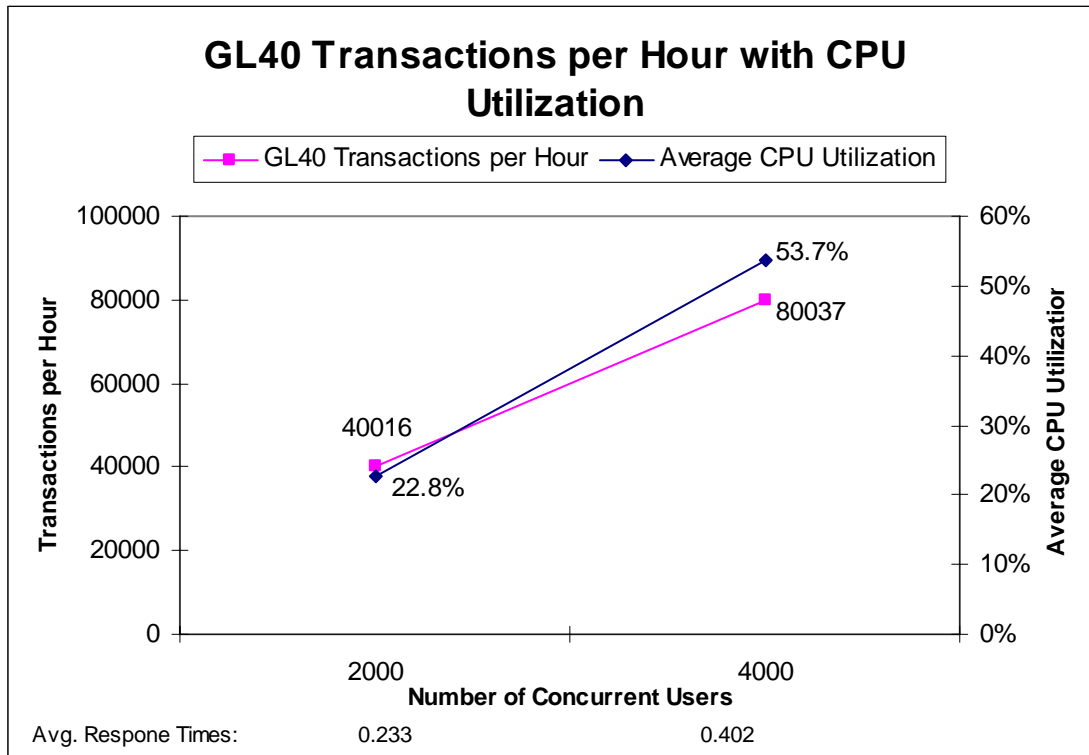# 4. Lawson S3 Online Benchmark

This section shows results for all of the online tests that were done. Several different applications were tested. Each application was run multiple times, using a different number of users for each run. Changing the number of concurrent users allows us to show the scalability and flexibility of IBM i to handle work-loads with small to higher numbers of online users.

4.1 General Ledger Online

This Online Performance Test executes Basic Journal Entry (GL40) for Lawson System Foundation 9.0.1. The Lawson S3 benchmark kit uses the LoadRunner load generation tool to simulate a number of virtual users entering GL40 transaction at a reasonable rate through Lawson Portal.

Each completed GL40 transaction adds four journal entries to the database. The GL40 database was built using medium volume size with 16,000 journal entries. No history data was generated for this database.

The chart below shows results for GL40 with 2000 and 4000 users. As the chart shows with 2000 users IBM i is able to process 40,016 GL40 transactions per hour using 23% CPU. With 4000 users IBM i is able to process 80,037 GL40 transactions per hour using 54% CPU. Response times were sub second for all tests.
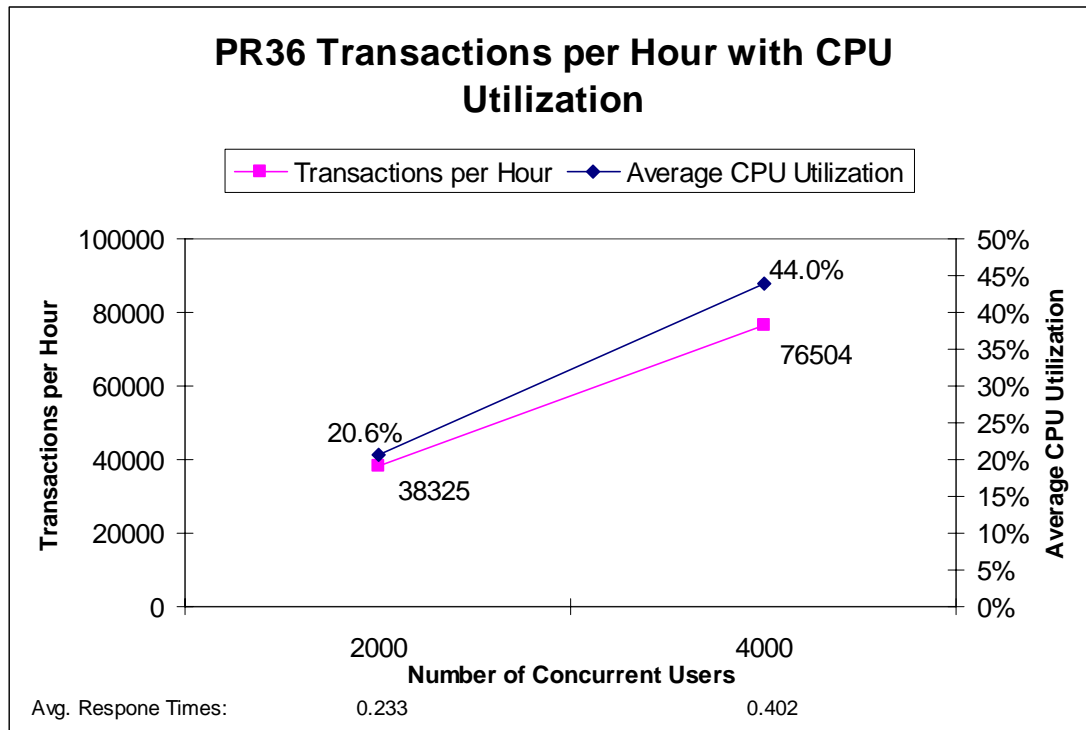
GL40 Transactions per Hour with CPU Utilization

Legend: ■ GL40 Transactions per Hour ◆ Average CPU Utilization

- Transactions per Hour (left axis): 0 to 100000
- Average CPU Utilization (right axis): 0% to 60%
- Number of Concurrent Users: 2000, 4000
- At 2000 users: 40016 transactions, 22.8% CPU
- At 4000 users: 80037 transactions, 53.7% CPU

Avg. Respone Times: 0.233 (2000 users), 0.402 (4000 users)

4.2 Accounts Payable Online Benchmark

This Online Performance Test executes accounts payable processes (AP20 and AP90) for Lawson System Foundation 9.0.1. The Lawson S3 benchmark kit uses the LoadRunner load generation tool to simulate a number of virtual users entering AP20 or AP90 transaction at a reasonable rate through Lawson Portal.

AP20 adds invoices and their associated distributions. AP90 is used to search for invoices belonging to a particular vendor or list of vendors, and can optionally select on various criteria like status, invoice type, currency, location, and also date and/or amount ranges.

Note: The invoices AP90 searches for were limited to those invoices that were added via a run that was done with AP20.

The AP20 database was built using a large volume size with 40,000 invoices. No history data was generated for this database. For AP90 a database was created by restoring a save file from a run of AP20 with 6,000 users that ran for 2 hours.

The chart below shows results for AP20 with 2000 and 6000 users. As the chart shows with 2000 users IBM i is able to process 40,046 AP20 transactions per hour using 25% CPU. With 6000 users IBM i is able to process 120,104 AP20 transactions per hour using 79% CPU. Response times were sub second for all tests.

AP20 Transactions per Hour with CPU Utilization

Legend: AP20 Transactions per Hour — Average CPU Utilization

Number of Concurrent Users	2000	6000
Transactions per Hour	40046	120104
Average CPU Utilization	25.4%	78.5%
Avg. Respone Times:	0.233	0.402
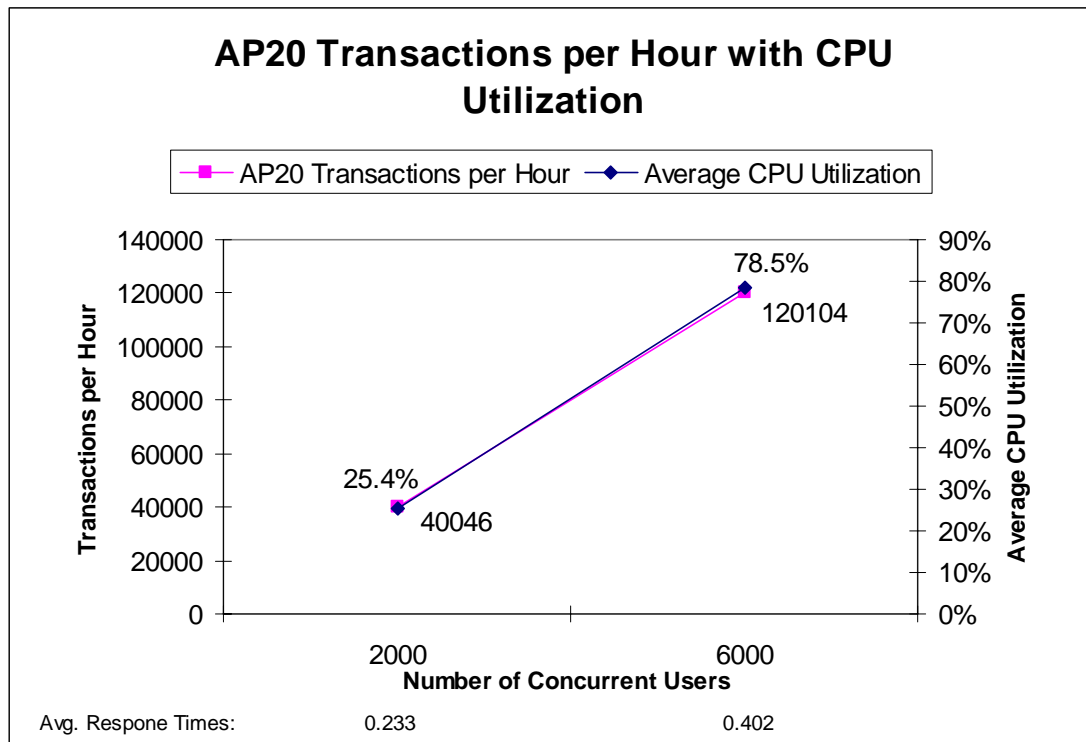
The chart below shows results for AP90 with 2000 and 6000 users. As the chart shows with 2000 users IBM i is able to process 39,989 AP90 transactions per hour using 16% CPU. With 6000 users IBM i is able to process 120,020 AP90 transactions per hour using 49% CPU. Response times were sub second for all tests

AP90 Transactions per Hour with CPU Utilization

Legend: AP90 Transactions per Hour ■ — Average CPU Utilization ◆

	2000	6000
Transactions	39989 (15.9%)	120020 (48.8%)

Number of Concurrent Users

Avg. Respone Times: 0.091   0.122
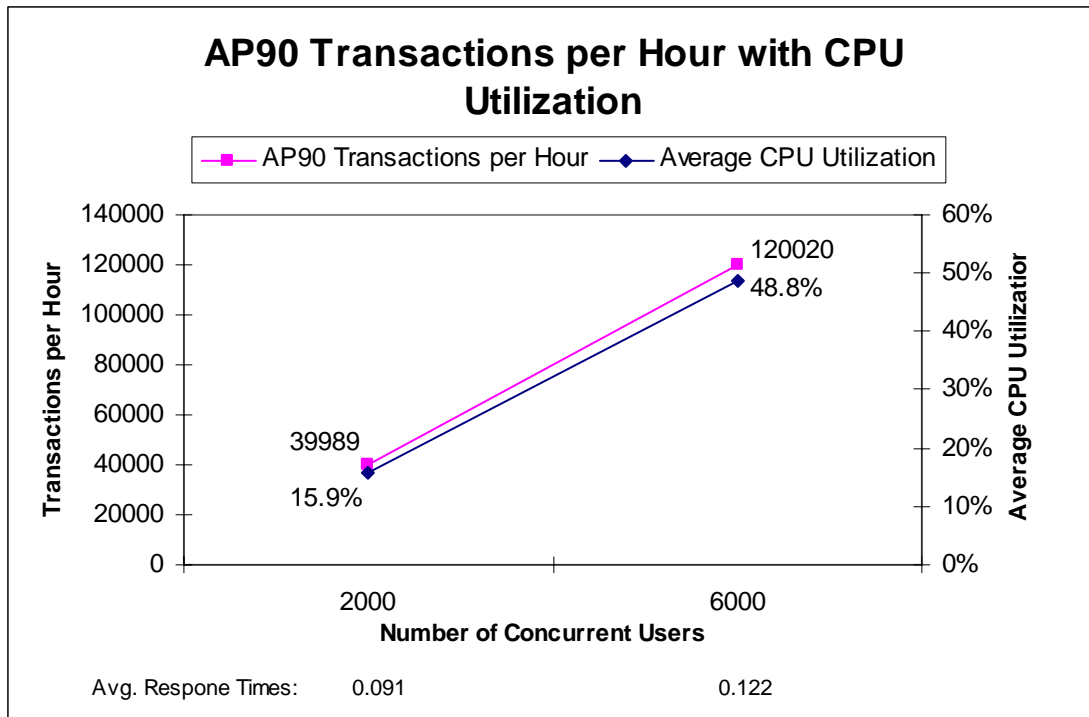
4.3 Payroll and HR Online Benchmark

This Online Performance Test executes online payroll and hr processes (PR36 and HR11) for Lawson System Foundation 9.0.1. The Lawson S3 benchmark kit uses the LoadRunner load generation tool to simulate a number of virtual users entering PR36 or HR11 transaction at a reasonable rate through Lawson Portal.

Each PR36 transaction adds three time records for an existing employee to the database. Each HR11 transaction adds a new employee record to the database. The HR11 and PR36 database was built using 12000 employees with 12 time records per employee, retail client type and 500 supervisors as the base data set. No history data was generated for this database.

Note: A retail client type is defined as one that has 20% exempt employees and 80% non-exempt employees

The chart below shows results for PR36 with 2000 and 4000 users. As the chart shows with 2000 users IBM i is able to process 38,325 PR36 transactions per hour using 21% CPU. With 4000 users IBM i is able to process 77,507 PR36 transactions per hour using 44% CPU. Response times were sub second for all tests

PR36 Transactions per Hour with CPU Utilization

Transactions per Hour	Average CPU Utilization

	44.0%
	76504
20.6%	
38325	

Number of Concurrent Users

Avg. Respone Times:	0.233	0.402

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The chart below shows results for HR1 with 500 and 1000 users. As the chart shows with 500 users IBM i is able to process 6,642 HR11 transactions per hour using 13% CPU. With 1000 users IBM i is able to process 13,320 HR11 transactions per hour using 21% CPU. Response times were sub second for all tests

HR11 Transactions per Hour with CPU Utilization
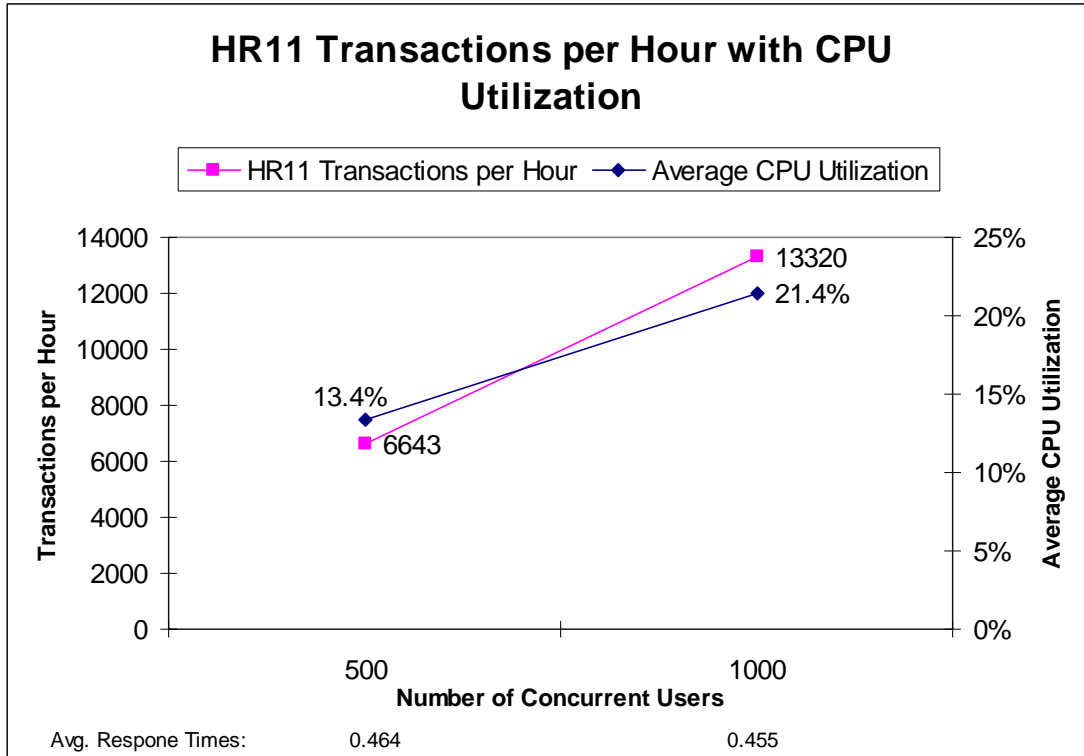
5. Summary

As this paper has shown combining the Lawson 9.0.1 with IBM i 6.1 and POWER6 can help improve the performance of your ERP environment. In addition, Lawson 9.0.1 now runs under JDK 1.6 using the IBM Technology for Java 64-bit JVM available in IBM i 6,1. Thus Lawson 9.0.1 takes advantage of the latest Java technology available on IBM i which can result in significant increases in performance and use significantly less memory.

Overall the testing done in this report shows the scalability and flexibility of IBM i 6.1 and POWER6 to handle both a small and large amount of Lawson batch jobs, as well as handle a small or large number of users running Lawson online transactions. All of this while still maintaining sub second response times. Thus this demonstrates the ability of the IBM i to grow as your business grows.

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