Infor Lawson on IBM i 7.1 and IBM POWER7+

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1. Introduction

In May 2012, Infor Lawson 10 was released for utilization with the IBM i operating system and Power Systems. Lawson 10 (or Infor10 Lawson, or Infor Lawson S3) is the latest version of the Lawson S3 solution and combines Infor and Lawson technology and products.

As part of the Infor10 product family, Lawson S3 10 provides a simpler user interface, deeper best-in-class and industry-specific functionality and greater business speed and agility. Lawson S3 10 delivers enhanced functionality across Lawson best-in-class and industry-specific suites. In addition, it deepens these suites through connections to Infor10 applications.

Lawson and Infor technology are now connected to deliver greater value and speed to Lawson customers. Lawson delivers connectivity to Infor ION through Lawson Process Automation. This allows Lawson customers to use ION as a key component for interfacing Lawson, Infor, and other third-party applications such as Salesforce and allows Lawson to rapidly deliver complete best-in-class and industry-specific applications

For IBM i and Power Systems customers, it means the latest Infor Lawson solutions can take advantage of the integrated runtime technologies, and integrated database technology.

This paper describes the testing that was completed by IBM® using the Lawson benchmark kit to run a set of both on-line and batch tests using some of the most common Lawson S3 applications. Testing was performed on an IBM POWER7+® 740 Express server with the IBM i 7.1 operating system. The results were compared to previous measurements that were performed on an IBM POWER7® 780 Enterprise server with Lawson S3 version 9. The testing results described in this paper show how the latest Lawson S3 software and the latest IBM Power technology continue to work together to provide customers the best overall solution.

This report also demonstrates the unique capabilities of the IBM i and Power Systems:

- IBM POWER7+ technology, with its superior scaling and integration demonstrates that processor speed, is not everything.

- The ability to run multiple complex workloads with SMT4 and integrated L2/L3 cache.

- The integration strength of IBM i 7.1, DB2® UDB for IBM i, Java, and WebSphere® Application Server demonstrates the ability of the 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.

- IBM Power Systems virtualization that allow for efficient usage of hardware, flexible deployment of workloads, and support for IBM i, Linux on Power, and AIX all in a single hardware footprint.

2. System Configuration

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

- Lawson System Foundation 10
- Lawson Applications 10
- Lawson Portal
- WebSphere Application Server ND 7.0
- IBM HTTP Server for IBM i 7.1
- IBM DB2 UDB for IBM i 7.1
- IBM Tivoli® Directory Server for IBM i.

The POWER7+ and i 7,1 hardware configuration that was used for the new tests was:

- IBM POWER7+ 740 Express Server, processor feature EPCR
- Chip Speed: 4.2 GHz
- Partition configuration, 4 cores, 64GB memory
- CPW rating: 32,250
- Disk: 16 arms (type 19B1), 15k RPM, 283GB capacity
- Disk configuration: Single ASP with device parity protection
- Disk IOP: Disks spread across two 5913 IOAs (1.8 GB write cache)
- Network: 100Mbps Ethernet, full duplex

The POWER6 and i 6,1 hardware configuration that was used for comparison testing in this report was:

- IBM POWER6 570 Server, processor feature 7540
- Chip Speed: 4.2 GHz
- Partition configuration, 4 cores, 64GB memory
- CPW rating: 16,200
- Disk: 54 arms (type 4328), 15k RPM, 140GB capacity
- Disk configuration: Single ASP with device parity protection
- Disk IOP: Disks spread across two 571F IOAs (390 MB write cache)
- Network: 100Mbps Ethernet, full duplex

3. Lawson S3 Batch Benchmark

This section provides the results obtained for all of the batch tests that were completed. As mentioned above, several different applications were tested. For each application the jqdef (i.e., 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) critical batch processes:

GL165, GL190 and GL199.

The database was created with a large General Leger company together with 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. 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 based on the total time it takes to complete all of the run groups for each GL process. To show the scalability of both Lawson S3 and IBM i, the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Figure 1 below shows the results for each batch tests and compares the new tests with Lawson S3 v10 and IBM POWER7+ with i 7.1, to Lawson S3 v9 and IBM POWER6 with i 6.1. As the results show, the Elapsed Time for Lawson S3 10 and POWER7+ with i 7.1 has been reduced on average by 24% and CPU utilization is significantly less.

Results:

GENERAL LEDGER PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS)							
		P6 i 6.1 S3 v9	P7+ i 7.1 S3 v10	P6 i 6.1 S3 v9	P7+ i 7.1 S3 v10	P6 i 6.1 S3 v9	P7+ i 7.1 S3 v10	P6 i 6.1 S3 v9	P7+ i 7.1 S3 v10
Concurrent Jobs		1	1	2	2	8	8	16	16
Interface Journal Entries	GL165	00:05:42	0:04:47	00:03:33	0:02:51	00:01:21	0:01:09	00:01:26	0:01:02
Journal Posting	GL190	00:00:57	0:00:34	00:00:33	0:00:18	00:00:21	0:00:12	00:00:21	0:00:12
Period Closing (Single job)	GL199	00:00:03	00:00:02	00:00:03	00:00:01	00:00:03	0:00:02	00:00:03	0:00:01
Average CPU Utilization		20 %	16%	32 %	29%	57%	63%	72%	66%

Figure 1. GL Batch results

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) critical batch processes:

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

The database was created with a large General Ledger company together with 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 based on the total time it takes to complete all the run groups for each AP process. To show the scalability of both Lawson S3 and IBM i, the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Figure 2 below shows the results for each batch tests and compares Lawson S3 v10 and IBM POWER7+ with i 7.1, to Lawson S3 v9 and IBM POWER6 with i 6.1. As the results show, the Elapsed Time for Lawson S3 10 and POWER7+ has been reduced on average by 32% and CPU utilization is significantly less.

Results:

ACCOUNTS PAYABLE PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS)					
		P6 i 6.1	P7+ i 7.1	P6 i 6.1	P7+ i 7.1	P6 i 6.1	P7+ i 7.1
Concurrent Jobs		**1**	**1**	**6**	**6**	**12**	**12**
Invoice Interface	AP520	00:18:53	0:13:00	0:05:01	0:03:25	0:03:47	0:03:23
Expense Invoice Release	AP125	00:13:55	0:08:57	00:03:21	0:02:19	00:02:45	0:02:09
Cash Requirements	AP150	00:03:29	0:02:11	00:01:11	0:00:56	00:01:11	0:00:53
Payment Forms Creation	AP155	00:02:59	00:01:49	00:01:04	0:00:54	00:01:04	0:00:55
Payment Closing	AP170	00:10:50	0:06:17	00:03:08	0:02:08	00:02:21	0:01:47
Invoice Distribution Closing	AP175	00:14:00	0:08:35	00:03:38	0:02:20	00:02:49	0:02:09
Period Close (Single Job)	AP195	00:00:01	00:00:01	00:00:01	0:00:00	00:00:01	0:00:01
Check Register	AP265	0:00:22	0:00:18	00:00:11	0:00:08	00:00:12	00:00:08
Average CPU Utilization		19%	15%	73%	58%	96%	76%

Figure 2. AP Batch results

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) critical batch processes:

PR140, PR160, PR197, and PR198.

The database was created with a medium General Ledger company together with 96,000 employees with a retail client type and 50 positions. A medium payroll profile is one that has 20 deductions per employee and 12 timerecords per employee. 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 based on the total time it takes to complete all the run groups for each PR process. To show the scalability of both Lawson S3 and IBM i Power Systems, the job queue definition was changed to allow one or more jobs to run in QBATCH at one time.

Figure 3 below shows the results for each batch tests and compares Lawson S3 v10 and IBM POWER7+ with i 7.1 to Lawson S3 v9 and IBM POWER6 with i 6.1. As the results show, the Elapsed Time for S3 v10 and POWER7+ with i 7.1 has been reduced on average by 46% and CPU utilization is significantly less. With 8 concurrent jobs, the IBM POWER7+ with SMT4 shows a CPU utilization 26% lower than POWER6.

Results:

PAYROLL PROCESS	PROGRAM	ELAPSED TIME (HH:MM:SS)							
		POWER6 i6.1	POWER7 i7.1	POWER6 i6.1	POWER7 i7.1	POWER6 i6.1	POWER7 i7.1	POWER6 i6.1	POWER7 i7.1
Concurrent Jobs		**1**	**1**	**2**	**2**	**4**	**4**	**8**	**8**
Calculate Gross to Net	PR140	1:55:48	1:08:38	1:00:43	0:35:50	0:32:54	0:20:50	0:19:43	0:14:42
Print Checks	PR160	0:49:56	0:16:41	0:26:21	0:09:18	0:15:27	0:06:12	0:09:21	0:04:26
Payroll Close	PR197	3:59:04	1:44:46	2:11:41	0:59:17	1:14:29	0:36:59	0:39:25	0:25:20
Posting	PR198	2:35:40	1:29:12	1:28:48	0:48:02	0:51:18	0:29:53	0:30:13	0:19:11
Average CPU Utilization		22%	16%	37%	28%	54%	47%	94%	68%

Figure 3. PR Batch results

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

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4. Lawson S3 Online Benchmark

This section provides the results for all of the online tests that were completed. 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 workloads with small to higher numbers of online users.

4.1 General Ledger Online Benchmark

This Online Performance Test executes Basic Journal Entry (GL40) for Lawson System Foundation 10. The Lawson S3 benchmark kit uses the LoadRunner load generation tool to simulate a number of virtual users entering GL40 transactions at a reasonable rate through Lawson Portal.

Each completed GL40 transaction adds four journal entries to the database. The GL40 database was built using a medium General Ledger company and 16,000 journal entries. No history data was generated for this database.

Figure 4 below shows results for GL40 with 2000 users. As the chart shows, with 2000 users, Lawson v9 and POWER6 with IBM i 6.1 is able to process 40,016 GL40 transactions per hour with 23% CPU utilization. Lawson v10 and POWER7 with IBM i 7.1 is able to process 39,943 GL40 transactions per hour with only 14% CPU utilization, a reduction of 39% in CPU utilization (for basically the same number of transactions). Average response time for Lawson S3 v10 and POWER7+ were 80% lower, coming in at 0.032 seconds versus 0.153. seconds with Lawson S3 v9 and POWER6..
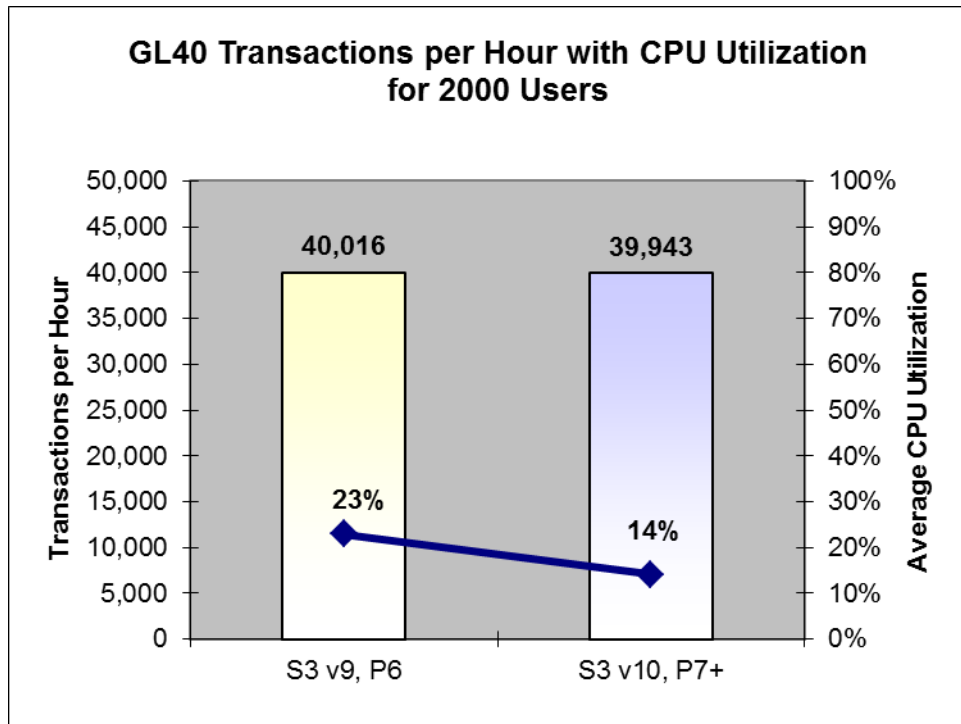

Figure 4. GL40 with 2000 users

Figure 5 shows results for GL40 with 4000 users. As the chart shows, with 4000 users, Lawson v9 and POWER6 is able to process 80,037 GL40 transactions per hour with 54% CPU utilization. Lawson v10 and POWER7+ is able to process 80,069 GL40 transactions per hour with only 28% CPU utilization, a reduction of 49% in CPU utilization (at a transaction rate basically equivalent). Response times were again about 80% lower, with S3 v10 and POWER7+ having an average response time of 0.036 seconds.
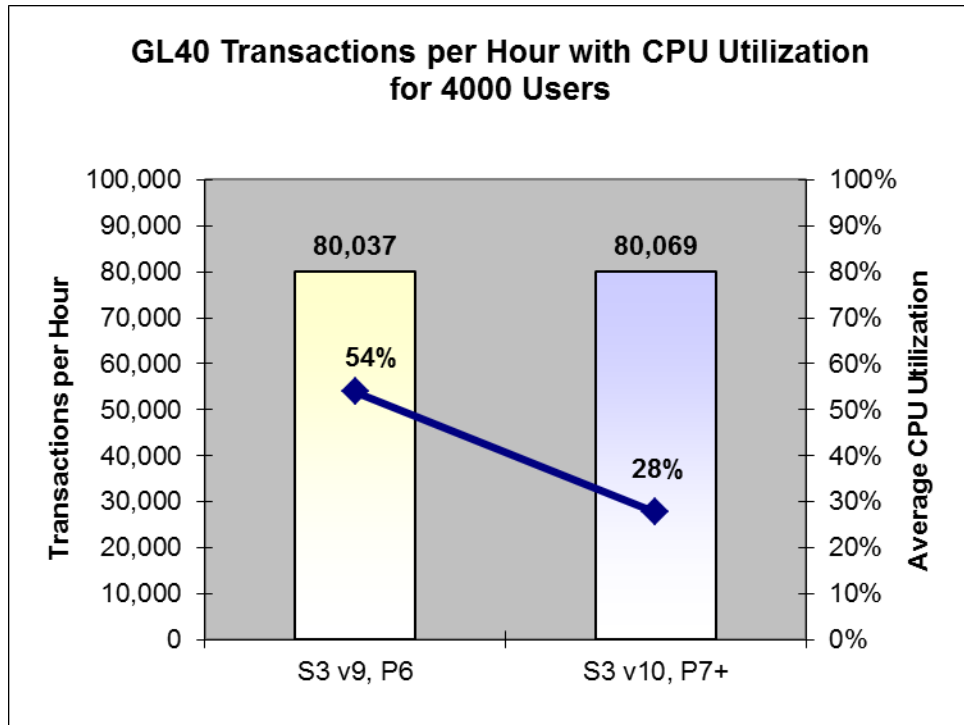

Figure 5. GL40 with 4000 users

4.2 Payroll and HR Online Benchmark

This Online Performance Test executes online payroll and HR processes (PR36 and HR11) for Lawson System Foundation 10. The Lawson S3 benchmark kit uses the LoadRunner load generation tool to simulate a number of virtual users entering PR36 or HR11 transactions 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 a medium General Ledger company together with 12000 employees with 12 time records per employee, retail client type and 500 supervisors as the base data set. A medium payroll profile is one that has 20 deductions per employee and 12 timerecords per employee. 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

Figure 10 shows results for PR36 with 2000 users. As the chart shows, with 2000 users, Lawson S3 v9 and POWER6 is able to process 38,325 PR36 transactions per hour with 20% CPU utilization. Lawson S3 v10 and POWER7+ is able to process 39,362 PR36 transactions per hour with only 14% CPU utilization, a reduction of 30% in CPU utilization. Response times with S3 v10 and POWER7+ averaged 0.058 seconds, 25% lower than S3 v9 and POWER6.
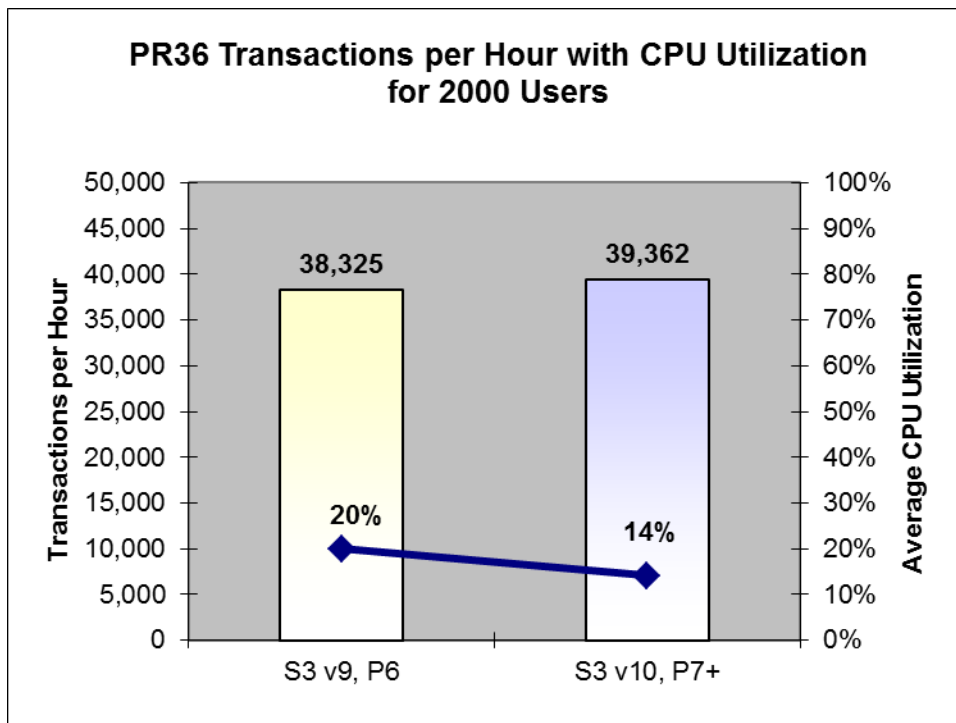

Figure 6. PR36 with 2000 users

Figure 11 shows results for PR36 with 4000 users. As the chart shows, with 4000 users, S3 v9 and POWER6 is able to process 76,507 PR36 transactions per hour with 44% CPU utilization. S3 v10 and POWER7+ is able to process 78,806 PR36 transactions per hour with only 28% CPU utilization, a reduction of 36% in CPU utilization. Response times were also 19% better with S3 v10 and POWER7+.
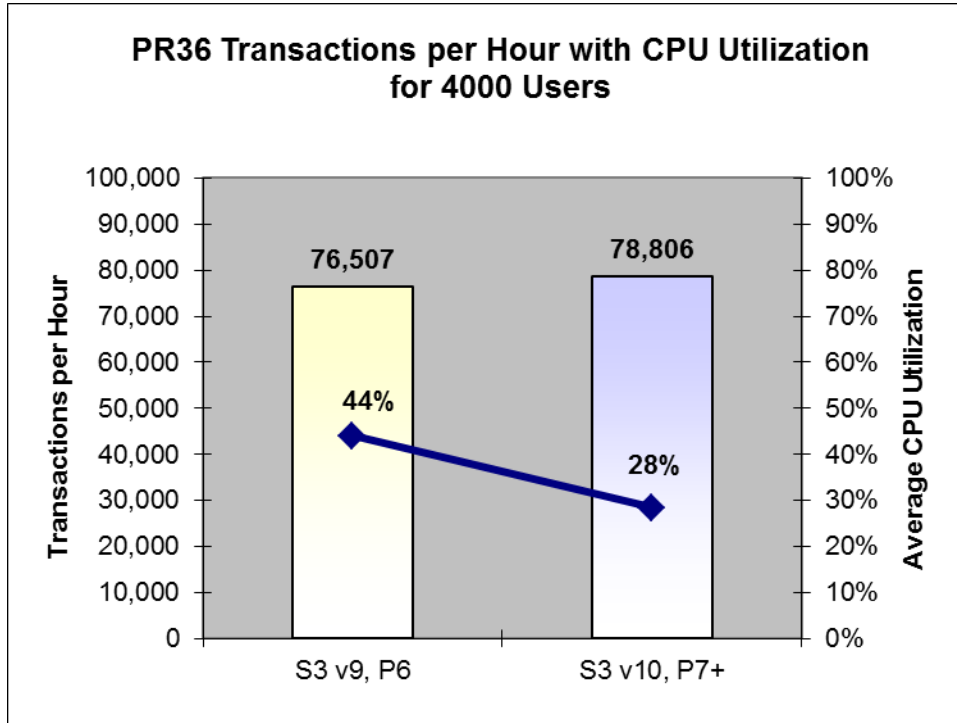

Figure 7. PR36 with 4000 users

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Figure 12 shows results for HR11 with 500 users. As the chart shows, with 500 users, Lawson S3 v9 and POWER6 is able to process 6,642 PR36 transactions per hour with 13% CPU utilization. Lawson S3 v10 and POWER7+ is able to process 6,649 PR36 transactions per hour with only 6% CPU utilization, a reduction of 54% in CPU utilization. Response times were less than 0.4 seconds for all tests.
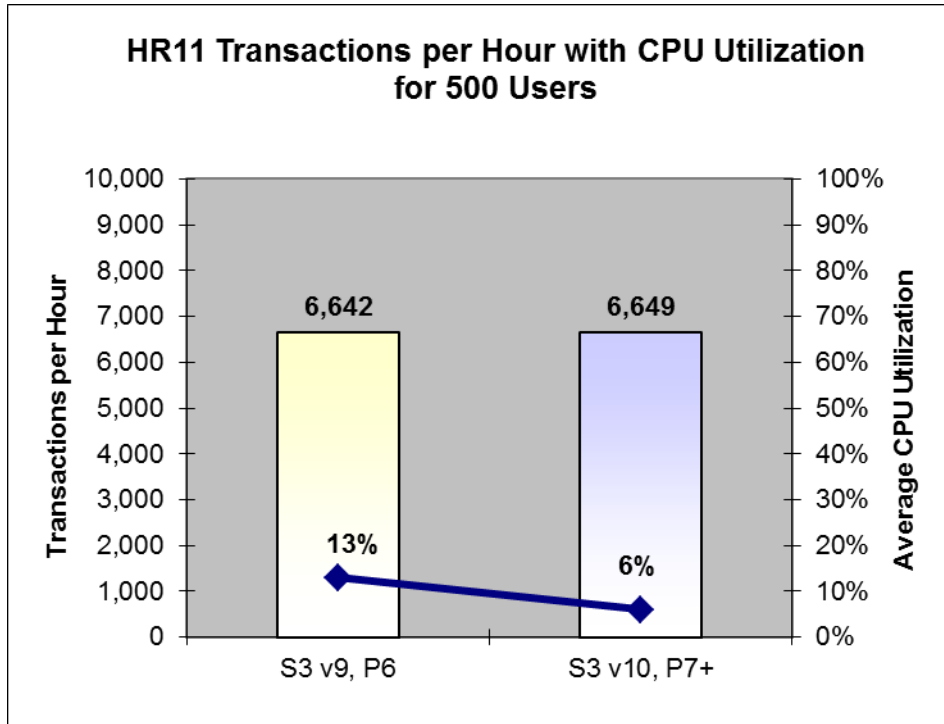

Figure 8. HR11 with 500 users

Figure 13 shows results for HR11 with 1000 users. As the chart shows, with 1000 users, Lawson S3 v9 and POWER6 is able to process 13,320 PR36 transactions per hour with 21% CPU utilization. Lawson S3 v10 and POWER7+ is able to process 13,360 PR36 transactions per hour with only 13% CPU utilization, a reduction of 38% in CPU utilization. Response times were less than 0.4 seconds in all tests.
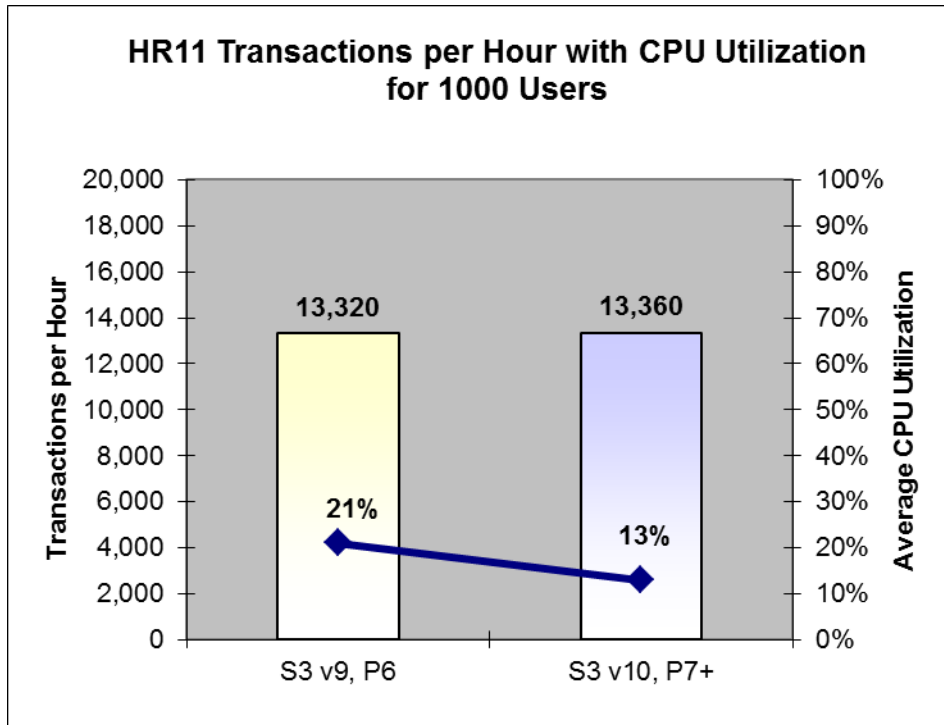

Figure 9. HR11 with 1000 users

5. Summary

As this paper has demonstrated, combining Lawson S3 10 with IBM i 7.1 and POWER7+ can help im-prove the performance of your ERP environment. You will have all the latest Lawson S3 and Infor10 technologies, on a platform that scales and grows with your business. The IBM Power Systems Express systems, 720 and 740, with POWER7+ featuring SMT4 and integrated L2/L3 cache will handle all of your current Lawson needs and provide an excellent platform for growth.

In addition, Lawson S3 10 runs utilizes the latest IBM Technology for Java 64-bit JVM available in IBM i and optimized for Power System environments. This allows Lawson 10 to take advantage of the latest Java technology available on IBM i which can result in significant increases in performance and use sig-nificantly less memory for those upgrading from older Lawson S3 releases, and older IBM i and Power System technologies.

Overall, the testing described in this report shows the scalability and flexibility of Lawson S3 v10 running on IBM i 7.1 and POWER7+ 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 maintaining sub second response times. Hopefully this gives those customers the proof points they need to grow their business with Lawson S3 10 technologies on IBM i Power.

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