Performance benefits of IBM Power Systems and IBM FlashSystem for Oracle E-Business Suite

IBM Power 780 server with AIX and IBM FlashSystem 820 flash storage improves order processing in a client proof of concept test

IBM Advanced Technical Skills
IBM Oracle International Competency Center
November 2013

Table of contents

Change history

Version	Date	Editor	Editing description
1.0	11/15/2013	Patrick Moore	Initial version

Abstract

This paper describes a proof of concept test done with a large wholesale grocery supply company that runs their operations using Oracle E-Business Suite application software. The results show that an IBM Power® 780 server with POWER7+® processors running AIX® and IBM FlashSystem™ 820 flash storage provided two to four times faster run times for two key order processing jobs for this client. This validates previous test results that show significant performance improvements can be achieved with POWER7+™-processor based servers and IBM flash storage products.

Introduction

IBM Power Systems™ servers running Oracle E-Business Suite applications provide the reliability and efficiency needed to run almost every aspect of a business. Many organizations rely on this proven combination of hardware and software for running their mission-critical business processes within operational windows and service level agreements. As companies change and grow, business processes increase in complexity and scope while operational windows and service level agreements become more restrictive. Clients need to be sure their applications and infrastructure can handle these requirements and they rely on their infrastructure providers to partner with them to meet these needs.

A large wholesale grocery supply company in the United States contacted IBM for assistance with a business challenge. The company was concerned that their existing infrastructure could not scale adequately to handle their projected growth in order volumes. The client asked IBM to engage in a proof of concept (PoC) test to investigate ways to significantly improve the performance of their nightly high-volume order processing jobs to ensure they could maintain adequate service levels, including being able to handle significantly larger volumes as the company was planning for growth by acquisition.

The PoC tests simulated the company's workload by running the same business-critical Oracle E-Business Suite batch jobs using actual client data in the test runs. This ensured that results could be repeated in the production environment, and allowed the client to see the real business value of running this workload on IBM Power Systems servers with flash storage.

The PoC test results clearly demonstrated how IBM Power Systems and IBM FlashSystem flash storage can be combined to help this client meet their business challenges by significantly decreasing the time needed for their nightly order processing, even as order volumes increased significantly.

Current environment and challenges

The client was running Oracle E-Business Suite on an IBM Power 795 server to process their critical nightly order volumes. These orders are submitted primarily by EDI from all the various stores they supply. Many of the items ordered by the individual stores are perishable and these supplies must be delivered by the next day to the stores in order to achieve agreed-to service levels.

Current hardware and software environment

The existing Oracle E-Business Suite production environment was running on an IBM Power 795 server with 4.0 GHz POWER7® processors and AIX 6.1.6.8. Two database LPARs were configured and were running in Oracle Real Application Clusters (RAC) mode, each had 10 processor cores and ran Oracle Database 11*g* R1 (11.1.0.7). The Power 795 server was attached to a SAN Volume Controller (SVC) to virtualize the storage for the environment and used an IBM System Storage® DS8000® storage array.

Client challenges

The client uses Oracle E-Business Suite 12.1 applications to process their nightly order volumes. The order processing workflow consists of a number of job steps, those jobs are:

- **High Volume Order Import**
- Pre Processor Wrapper Program
- Soft Check Wrapper Program
- Pre Allocation Wrapper Routing Program
- **Regular Order Allocation Processor**
- Order Management Release to Warehouse Management System Wrapper Program
- Post Release Wrapper Routing Program

The client was interested in seeing the potential performance improvements for the cumulative order processing workflow and also for the critical individual job steps. The critical individual job steps for this client were the “High Volume Order Import” and “Regular Order Allocation Processor” jobs (in bold above). The company was looking at growing their business by potentially acquiring other wholesale grocery distributors and wanted to be sure they had computing infrastructure in place that could handle a significant increase in order volumes while still ensuring their service agreements were maintained. The client asked to test with up to ten times their normal order volumes to be sure any proposed infrastructure could handle significant growth while still providing adequate performance.

In addition, the client was interested in assessing the impact of an upgrade to their data gathering and reporting process in which they gather schema statistics for their production Oracle Database. The information gathered in this process is used to tune their Oracle E-Business Suite environment to ensure smooth operation and performance.

Selecting the proof of concept environment

Given the current set of challenges, the client approached IBM about partnering with them to conduct a proof of concept test of their current Oracle E-Business Suite application environment to help them assess the value of a potential upgrade.

The IBM team and the client IT group worked jointly on the PoC testing.

Selecting the hardware

For the hardware, the IBM team recommended bringing in a Power 780 server with the latest POWER7+ processor technology. IBM also recommended using IBM FlashSystem 820 flash storage which can significantly improve the performance of workloads that generate significant amounts of I/O activity.

IBM Power 780

The Power 780 provides a unique combination of performance for the most demanding application workloads and availability characteristics that keep your business running. In addition, PowerVM virtualization helps to maximize your efficiency to keep your costs in line and Capacity on Demand technology for non-disruptive growth options to maintain business resiliency. With all this coming together in one integrated energy-saving package, the Power 780 makes a great business solution.

Figure 1. IBM Power 780 server

IBM FlashSystem 820

The IBM FlashSystem 820 is designed to speed up the performance of multiple enterprise-class applications, including OLTP and OLAP databases, virtual desktop infrastructures, technical computing applications and cloud-scale infrastructures. These IBM systems deliver extreme performance per gigabyte, so organizations can quickly uncover business insights using traditional data analytics as well as new, big-data technologies.

Figure 2. IBM FlashSystem 820 flash storage

The Power 780 server used for the PoC testing was configured with POWER7+ processor cores at 4.42 GHz running AIX 6.1.8.1. The system was set up with two database LPARs running Oracle Database 11*g* R2 (11.2.0.3.5) in a RAC cluster, one with 16 cores and one with four cores. The Power 780 server was attached to the existing SAN Volume Controller (SVC), DS8000 storage array, and FlashSystem 820 flash storage.

Selecting the workload

The client identified the workload and measurement criteria based on what was most critical to their business. In addition, they wanted a repeatable workload so that multiple tests could be run with a consistent amount of work applied to the system.

The client elected to test the cumulative order processing workflow and for the purposes of comparison to primarily examine the run times of the “High Volume Order Import” and “Regular Order Allocation Processor” job steps. A plan was developed to test the workflow at their current one day volumes to compare to their existing production environment, and to test at ten times the current one day volumes to simulate the performance should their order volumes grow significantly.

Performing the PoC tests

The PoC testing began with an assessment of the performance for the Gather Schema Statistics histogram collection, and then moved into testing the performance of the order processing workflow. During the tuning phase of the PoC testing, the logical partitioning and configuration flexibility of the Power 780 server was utilized to test seven different configurations, and eleven iterations of the tests were executed.

Results of the proof of concept test

Gather Schema Statistics

Figure 3 below summarizes the test results for the Gather Schema Statistics histogram collection job. In the current client production environment the job took 6 hours and 35 seconds to run, in the PoC test environment the run time for the job was reduced to 1 hour and 6 minutes, completing nearly six times faster.

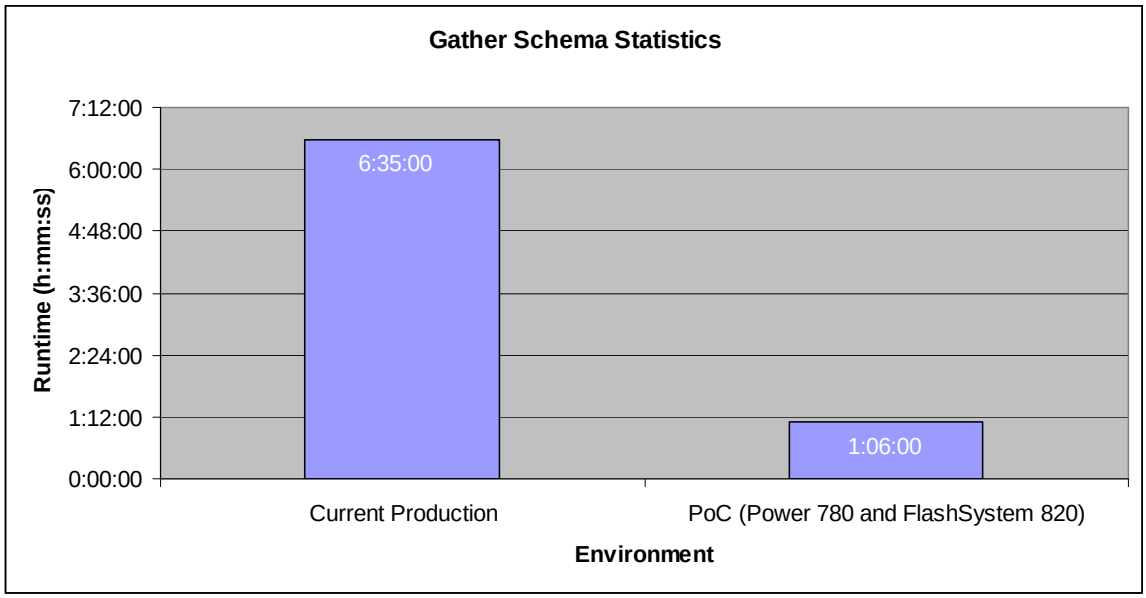

Figure 3. Gather Schema Statistics performance results

One day order volumes

The performance tests for the current one day order volumes consisted of processing approximately 30,000 order lines. The run times for the “High Volume Order Import” and “Regular Order Allocation Processor” job steps were collected and analyzed. The “High Volume Order Import” job ran about four times faster in the PoC test environment as compared with the current production environment, and the “Regular Order Allocation Processor” job ran more than two times faster in the PoC environment as shown in Figure 4.

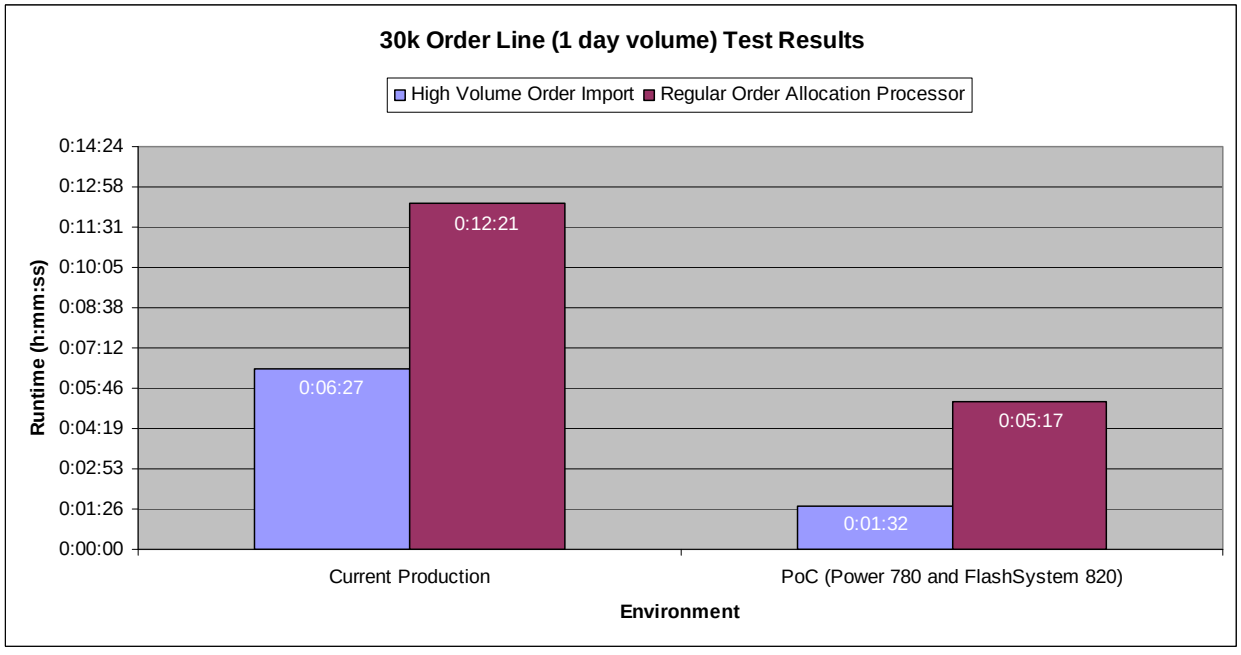

Figure 4. One day order volume test results

Ten day order volumes

For this phase of the testing, the PoC test environment was used to test the performance when running ten times the normal daily order volumes, or approximately 280,000 order lines, through the cumulative order processing workflow. For this testing there was no baseline run available for comparison since a ten times daily volume test was never run in the production environment. However it is interesting to compare the ten day volume test to the one day volume test results as shown in Figure 5.

When running the cumulative order processing workflow with one day order volumes (30,000 order lines) the current production environment completed the process in 24 minutes and 45 seconds, when the same workload is run in the PoC test environment the run was completed in 11 minutes and 3 seconds, more than two times faster.

Processing ten day order volumes (280,000 order lines) in the PoC environment required 49 minutes and 57 seconds to complete. So the PoC environment was able to handle ten times the order volumes in only about four times the runtime. Or, compared to the current production environment, the PoC environment can run ten times the order volume workload in only about two times the runtime.

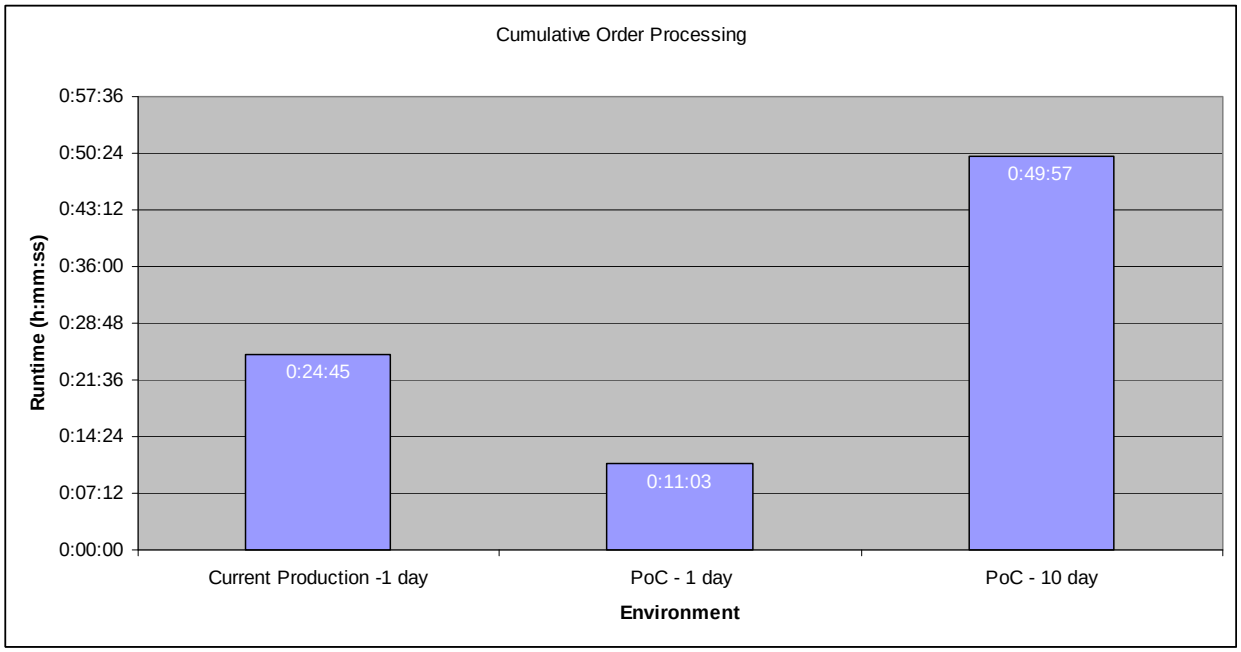

Figure 5. One day and ten day order volume test results

Summary

The tests documented here, based on actual data from a large wholesale grocery supply company, demonstrated that both IBM Power Systems servers with POWER7+ processor technology and FlashSystem 820 flash storage when used together can provide substantial improvements for Oracle E-Business Suite batch job performance. These results validate other published test results based on Oracle workloads with IBM Power Systems servers and storage products. They also indicate that the ongoing development investments in IBM Power Systems servers and FlashSystem flash storage continue to provide significant performance improvements to clients using Oracle E-Business Suite applications.

Contact Information

Please submit any questions you may have about the content of this paper to: ibmoracle@us.ibm.com.

Resources

These Web sites provide useful references to supplement the information contained in this document:

- For more information about IBM Power Systems servers visit:
  http://www.ibm.com/systems/power
- For more information about IBM FlashSystem flash storage, visit:
  http://www.ibm.com/systems/storage/flash
- For more information about the IBM AIX operating systems, visit:
  http://www.ibm.com/systems/power/software/aix
- For more information about the IBM and Oracle alliance, visit these two sites:
  http://www.ibm.com/oracle
  http://ibmandoracle.com
- For more information about Oracle E-Business Suite applications, visit:
  http://www.oracle.com/us/products/applications/ebusiness/overview/index.html

Trademarks and special notices

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

IBM, the IBM logo, AIX, FlashSystem, Power, Power Systems, POWER7, POWER7+ and System Storage are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

Oracle and Java are registered trademarks of Oracle and/or its affiliates.

Other company, product, or service names may be trademarks or service marks of others.

The information provided in this document is distributed “AS IS” without any warranty, either express or implied.

The information in this document may include technical inaccuracies or typographical errors.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Some information addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.