



Oracle Database 11g and 12c on IBM Power Systems built with IBM POWER8 processor technology and IBM FlashSystem 840

Tips and considerations



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Abstract

This paper consolidates available information about running an Oracle Database on the new IBM® Power® Systems servers built with POWER8™ technology architecture and processors with the AIX® operating system and IBM FlashSystem™ 840.

This paper summarizes the information available at the time of this publication. It might be updated as changes, such as new certifications, are available. It is meant to be used only as a guide. For any official Oracle certification information, refer to the Oracle “My Oracle Support” website.

Topics include high level configurations of the new Power Systems™ servers that are based on the new POWER8 processor technology, Oracle Database versions certified, AIX and Linux® versions supported, and new capabilities.

This document also provides education-oriented information involving performance comparisons of the new POWER8 logical CPU capability Simultaneous Multi Threading 8 (SMT8) with SMT4, SMT2, and SMT1 for Oracle Database 12c Release 1.

Introduction

On April 28, 2014, IBM announced five new models of IBM Power Systems servers with different sized chassis and numbers of sockets. They are 2U and 4U models with one socket or two sockets, up to 24 cores, and 1 TB of memory. The systems support IBM AIX, IBM i, and Linux operating systems. IBM Power Systems 2U and 4U scale-out servers provide up to 12 cores per socket. Each core is capable of running up to eight simultaneous multithreads (SMT) to meet the requirements of resource-hungry applications.

At the IBM laboratory, Oracle Database 12c Release 1 and Oracle Database 11g Release 2 products were tested on a new Power Systems server in order to confirm the readiness of those servers for Oracle Database products.

The new Power Systems servers are built with IBM POWER8 processor technology, on-chip transactional memory, SMT8, Java™ code optimization with hardware assists, Coherent Accelerator Processor Interface (CAPI), PCIe Gen3 I/O slots, and enhanced reliability, availability, and serviceability (RAS) features packed together to provide efficient consolidation of workloads through virtualization and a reliable environment for business applications.

New Power Systems S class servers are optimized for big data and analytics while still delivering the capacity needed for current workloads such as online transaction processing (OLTP). These 1 and 2 socket servers provide the ideal foundation for scale-out and cloud environments, while the 24 cores and up to 96 simultaneous multithreads deliver sufficient scalable capacity to meet the demands of many single-system workloads.

For detailed information about the new IBM Power Systems servers built with POWER8 processor technology and their features, refer to the following link:

ibm.com/systems/power/?lnk=mprSY-psys-usen



New IBM Power Systems product line

On April 28, 2014, IBM introduced the next generation of Power Systems S class servers with POWER8 technology that are best suited for big data, analytical, scale-out data, and cloud environments.

The new Power Systems servers are rack mounted and managed by Hardware Management Console (HMC) server type 7042-CR8 with version V8 R8.1.0.

IBM PowerVC™ version 1.2.1 and IBM PowerVP™ 1.1.2 are supported on the new Power Systems servers for virtualization management and virtualization performance monitoring respectively.

The following table shows the list of new POWER8 processor-based servers. The Power Systems server models having a name ending with “L” are designed for Linux only (for example, IBM Power S822L and Power S812L). The letter “S” stands for scale-out.

New Power Systems server model	Number of sockets, cores, and size	Memory (Maximum)	OS and virtualization support	Server image
Power S824	Two sockets, up to 24 cores, 4U size	1 TB	AIX, IBM i, Linux, and IBM PowerVM™	
Power S814	One socket, up to 8 cores, 4U size	512 GB	AIX, IBM i, Linux and PowerVM	
Power S822	Two sockets, up to 20 cores, 2U size	1 TB	AIX, Linux, and PowerVM	
Power S822L	Two sockets, up to 24 cores, 2U size	1 TB	Linux and PowerVM or PowerKVM	
Power S812L	One socket, up to 12 cores, 2U size	512 GB	Linux and PowerVM or PowerKVM	

Table 1. New IBM Power Systems server models

For full specifications of the new IBM Power Systems servers, refer to the following link:

ibm.com/systems/power/hardware/

IBM FlashSystem 840

IBM FlashSystem 840 is an enterprise data storage system that stores data on flash memory chip modules. IBM FlashSystem 840 is based on a custom hardware architecture which incorporates Field-Programmable Gate Arrays (FPGAs) that replace traditional server-based array controllers. The FlashSystem unit includes flash modules, external storage area network interfaces, and FPGA logic which spread data throughout the system.

IBM FlashSystem 840 is designed to provide extreme performance and large flash storage capacity with reliability, availability, and serviceability (RAS) features. The IBM FlashSystem 840 supports several protocols, including Fibre Channel (FC), Fibre Channel over Ethernet (FCoE), and Infiniband interfaces to connect with high performance host servers and Storage Area Networks (SAN).



Figure 1 IBM FlashSystem 840

The IBM FlashSystem 840 supports a maximum of twelve 4 TB flash modules, which provide a maximum raw capacity of 48 TB (RAID 0). The flash modules available are either 2 TB or 4 TB storage capacities. For our lab test with the IBM Power System S824 and Oracle Database 12c, 12 of the 2 TB modules were used.

The FlashSystem 840 supports both RAID 0 and RAID 5 configurations. The RAID 5 array with twelve 2 TB flash modules gives 20 TB of usable storage space and 4 TB flash modules give 40 TB of usable space.

The performance results published for the FlashSystem 840 was measured using an Oakgate storage test appliance and an FC protocol analyzer and achieved a maximum of 1.1 Million I/O operations per second (IOPS), 600K write IOPS, and up to 8GBps throughput.

For Oracle Database 12c testing on the Power S824 and FlashSystem 840, twelve 2 TB modules were used with RAID 5 configured on them. 64 logical units (LUN) were carved out of the RAID 5 array and presented to Oracle Automatic Storage Management (ASM) diskgroups. Each LUN size was 128GB.

The number of LUNs that you create on FlashSystem 840 can affect the overall performance in AIX. It is recommended to carve out 32 LUNs and present them to Oracle ASM. If fewer volumes are needed by an application in AIX, use AIX Logical Volume Manager (LVM) to create fewer logical volumes on 32 LUNs and present the logical volumes to the application.

The FlashSystem 840 16 Gb/s FC ports do not support direct connection to client hosts. A SAN switch must be placed between the FlashSystem 840 and any 16 GB/s-attached client host. If arbitrated loop is required by the client host, connect at 8 GB/s FC to the FlashSystem 840.



The configuration and total quantity of host connection ports on IBM FlashSystem 840 include:

- Up to 16 ports of 8Gb FC or 8 ports of 16Gb FC (can also operate at 8Gb and 4Gb)
- Up to 16 ports of 10Gb FCoE
- Up to 16 ports of 10Gbps iSCSI
- 8 ports of InfiniBand QDR 40Gb

A FlashSystem 840 supports only a 512-byte sector size. The AIX operating system supports the 512-byte sector size.

For more technical information about IBM FlashSystem 840 and best practices, refer to the Document Resources section of this document.

IBM AIX and Linux support

IBM AIX is an open standards-based UNIX® operating system. AIX in combination with IBM's virtualization offerings provides new levels of flexibility and performance to allow you to consolidate workloads on fewer servers, which can increase efficiency and conserve energy. AIX delivers high levels of security, integration, flexibility, scalability, and reliability that are essential for meeting the demands of today's information technology environments. AIX operates on IBM systems based on IBM Power Architecture® technology. For more information about AIX, refer to the following web page:

ibm.com/systems/power/software/aix/

In general, Oracle product support for IBM Power Systems servers is based on AIX operating system support. Oracle does not directly certify IBM server hardware for their software. It certifies a specific level of AIX.

For fully leveraging new features and capabilities of the new IBM Power Systems servers, the following AIX, Linux, and virtualization software versions are supported.

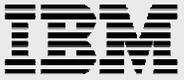
IBM AIX and Virtual I/O Server (VIOS)	AIX 7.1 TL03 SP3
	VIOS 2.2.3.3
IBM virtualization management	IBM PowerVC 1.2.1
	IBM PowerVP 1.1.2
	IBM PowerKVM 2.1

Table 2. Supported AIX and virtualization software

IBM also provides support for earlier technology levels or service packs for AIX 7.1 and AIX 6.1 for the IBM Power S822, Power S814, and Power S824. When running on these levels, not all of the new features and capabilities of the POWER8 architecture will be available at these or lower version TL levels.

IBM AIX and Virtual I/O server (VIOS)	AIX 7.1 TL01 and TL02
	AIX 6.1 TL07, TL08 and TL09
	VIOS 2.2.1 and 2.2.2

Table 3. Supported earlier versions



The following versions of Linux are supported with the new Power Systems 'S' class servers.

Linux	Red Hat Enterprise Linux 7.0
	Red Hat Enterprise Linux 6.5
	SLES 11 SP3
	Ubuntu LE 14.04

Table 4. Supported Linux versions

Oracle Database 10g Release 2 is currently supported on Power Systems servers running Linux. For use on POWER8 processor-based servers, Oracle supports the Oracle Database on SUSE Linux Enterprise Server (SLES) 11 and, for the Oracle Database 10g Release 2 Instant Clients only, Red Hat Enterprise Linux. 6. You can use the certification tool in *My Oracle Support* (see resources) to confirm support of the Oracle Database 10g Release 2 products.

To support the need for a newer Instant Client software version, Oracle has announced that a release of the Oracle Database 11g Re2 Instant Client is planned for Power Systems running Linux. Refer to the *Instant Client Releases Section of My Oracle Support* (see resources) note "Release Schedule of Current Database Releases (**Doc ID 742060.1**)" for the latest status.

Recommended code levels

There are two tools to help determine the recommended code levels among AIX and Power Systems related components.

- The Fix Level Recommendation Tool (FLRT) can determine the recommended code levels among a mixture of AIX, HMC, server firmware, VIOS, IBM General Parallel File System (IBM GPFS) and IBM PowerHA®. The FLRT web page is: <http://www14.software.ibm.com/webapp/set2/flrt/home>. Note, the FLRT recommendation provides a minimum acceptable level of compatibility.
- The IBM POWER® code matrix indicates the recommended code levels for the HMC and server firmware. The POWER code matrix web page is: <http://www14.software.ibm.com/webapp/set2/sas/f/power5cm/home.html>. Note that the POWER code matrix recommendations can provide the maximum stable code combinations.

Service strategy

To review the latest *IBM AIX Operating System Service Strategy Details and Best Practices* document, refer to the website: <http://www14.software.ibm.com/webapp/set2/sas/f/best/home.html>.

C and C++ compilers

The XL C/C++ compiler family includes several versions of standards-based, high performance C and C++ compilers with advanced optimizing and debugging features. They provide you the ability to optimize and tune applications for optimal execution on systems using all types of IBM POWER processors. The compiler family supports IBM Power Systems servers capable of running IBM AIX 6.1 and AIX 7.1.

XL C/C++ V13.1 is designed to use the IBM POWER8 processor. Applications compiled with earlier supported compiler versions are able to run on the new IBM Power Systems servers with POWER8



processors, but the XL C/C++ V13.1 compiler can be used to optimize and tune the application further for Power Systems servers.

C++ applications might have dependency on C++ runtime; and the XL C/C++ runtime environment is installed during the installation of base AIX. To update to the latest runtime environment, go to the XL C/C++ web page at: ibm.com/software/awdtools/xlcpp/features/aix/ and click the product support link under XLC/C++ for AIX link, then click the “Latest XL C/C++ Updates (PTFs)” link. Then select “[All XL C/C++ for AIX and XL C++ Runtime for AIX downloads](#)” in the AIX/PTF Search Results section.

If the XL C/C++ Enterprise Edition for AIX compiler is installed, confirm that the latest updates are applied by visiting the product support link under the “XLC/C++ for AIX” link, then click the “Latest XL C/C++ Updates (PTFs)” link, then select from the AIX section the appropriate compiler updates.

Oracle Database and IBM Power Systems

Oracle Database 12c Release 1 is the latest version (at the time of this publication) in a nearly two decade long series of releases of the database on the AIX operating system. Oracle Database 12c includes many new features over its previous database versions. The letter “c” in “12c” stands for “cloud”. Oracle Database 12c provides a multitenant architecture that simplifies the process of consolidating databases into a private cloud model. Oracle Database 12c allows each database plugged into the multitenant architecture to have the look and feel of a standard database to the applications. Oracle Real Application Clusters (RAC) is an option of Oracle Database that allows a database to be installed across multiple servers (RAC nodes). Oracle RAC uses the shared disk method of clustering databases. Oracle RAC processes running in each node access the same data residing on shared data disk storage.

Refer to the following two white papers for the latest certifications and support information for Oracle Database 12c Release 1 and Oracle Database 11g Release 2 on AIX and IBM Power Systems servers.

- For Oracle Database 11g, *Oracle Database 11g R2 and Oracle RAC 11g R2 on IBM AIX: Tips and Considerations*:
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP101176
- For Oracle Database 12c, *Oracle Database 12c R1 and Oracle RAC 12c R1 on IBM AIX: Tips and Considerations*:
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP102425

The following table shows the versions of Oracle Database supported on the new IBM Power Systems servers built with POWER8 processor technology.

Oracle Database	Oracle Database 12c Release 1.
	Oracle Database 11g Release 2.
	Oracle Database 10g Release 2 (Note - Oracle Database 10g Release 2 is supported on AIX 6.1 only. So, it can run in the <i>IBM POWER7@ compatibility mode</i> on the new IBM Power Systems servers.)

Table 5. Supported Oracle Database versions



Testing with an IBM Power S824 server, Oracle Database, and IBM FlashSystem 840

At the IBM lab, Oracle Database 12c Release 1 and Oracle Database 11g Release 2 were verified on a Power S824 server with IBM FlashSystem 840 configured as follows:

IBM Power S824 Configuration	Two PCIe2 16Gb 2-Port Fibre Channel Adapter
	PCIe2 4-port 1GbE Adapter 5899
	Two PCI3 and eight SAS RAID Internal Adapter 6Gb
AIX for Oracle Database logical partition (LPAR)	AIX 7.1 TL03 SP03 48 GB of System memory
VIOS	VIOS 2.2.3.3
HMC version	HMC V8R8.1.0.0
IBM FlashSystem 840	12 x 2 TB flash modules (RAID5 array [10 + 1 Parity + 1 Spare])
Oracle Database 12c	Oracle Database 12c version 12.1.0.1 Multitenant Database (Pluggable Database) Automatic Storage Management (ASM) Database created on IBM FlashSystem 840
Oracle Database 11g	Oracle Database 11g Release 2 version 11.2.0.4 Automatic Storage Management (ASM) Database created on local SAS RAID array

Table 6. Tested Power S824 configuration

The following diagram shows the set up of different components configured for testing Oracle Database 12c with IBM Power S824 and FlashSystem 840. The LPAR1 was allocated with 4 CPU cores and 48 GB of system memory. The storage LUNs were assigned to virtual FC adapters through the N-Port ID (NPIV) method from a FlashSystem 840 through VIOS.

Test setup for Oracle Database 12c with IBM Power S824 and FlashSystem 840

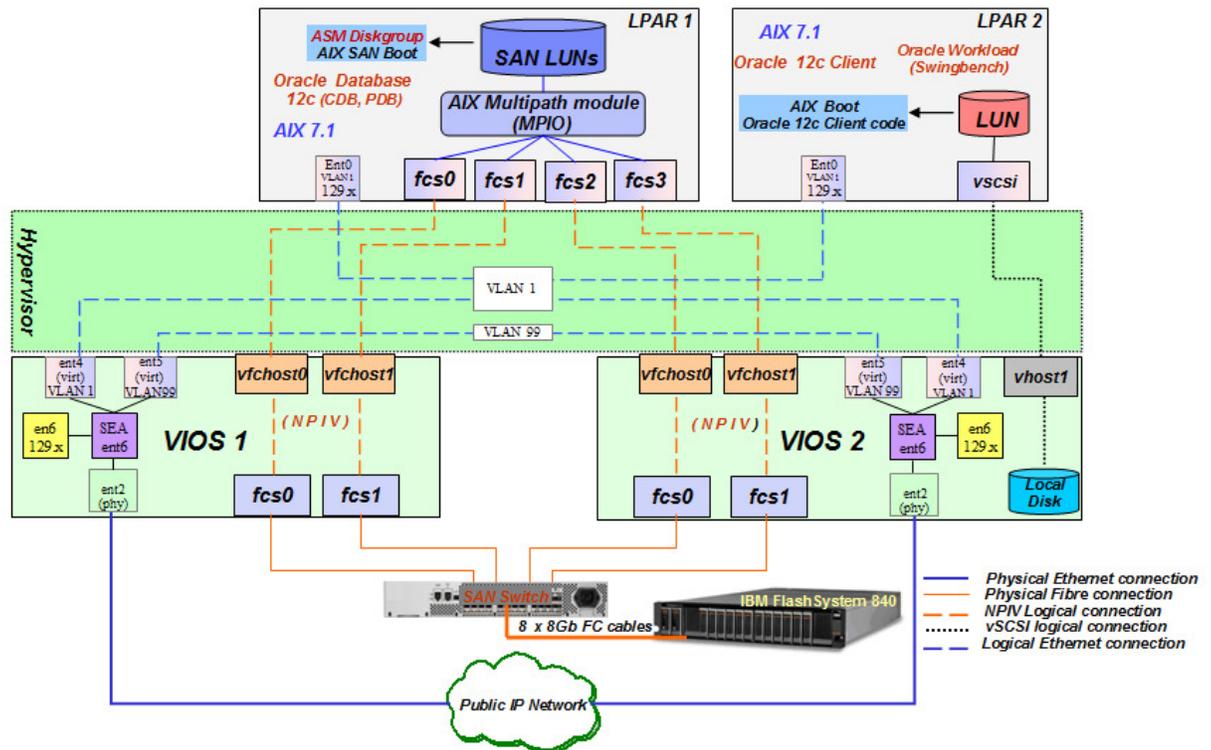


Figure 2 Test setup for Oracle database 12c with IBM Power S824 and FlashSystem 840

Redundant Virtual I/O servers are used for high availability and load balancing of Ethernet and SAN storage respectively. The LPAR2 was configured for running the Oracle workload generator tool “Swingbench” to simulate OLTP-type workloads on Oracle Database 12c.

Oracle Database 12c Release 1 on IBM Power S824 experiences

Disclaimer: The results shown in this section are for education purpose only. The results DO NOT represent the full potential performance capability of IBM Power S824, Oracle Database 12c, and IBM FlashSystem 840. The results were derived from the “out of the box” configuration, without any intense tuning on AIX, Oracle Database 12c, or the SAN Storage server. The performance results would vary for different types of applications and their workload characteristics.

Oracle Database 12c Release 1 (version 12.1.0.1) was successfully installed on the Power S824 server and tested with Oracle Database 12c Container and Pluggable database. No patches of Oracle or AIX were required to complete this step on POWER8.

Because Oracle certifications are done to the AIX operating system, Oracle fully supports running on POWER8. IBM’s commitment to binary compatibility across all Power Systems servers allows customers to run with confidence on any of the new Power Systems servers built with POWER8 processor technology.



The *Swingbench* workload tool was used to generate a large number of transactions on the database to consume almost all of the processor cycles and memory in the configured LPAR. The Power S824 server proved that it can easily handle this test workload.

The Oracle Database 12c was tested on the Power S824 with various SMT capabilities enabled for OLTP-type workloads.

Test Scenario: Four POWER8 cores, Oracle Database 12c, and 4 TB of IBM FlashSystem 840.

The workload was generated by the Oracle *Swingbench* tool with a different number of users for each run. The workload characteristic was set for the Order Entry schema as "Browse products" 70% and "Order products" 30%. The following sample performance results were seen for the same workload run with POWER8 capabilities SMT8, SMT4, SMT2, and SMT1 modes.

The following graph shows the amount of CPU utilization (%) with SMT4 and SMT8 modes for different numbers of users and the Transactions per Second (TPS) improvement with SMT8 over SMT4.

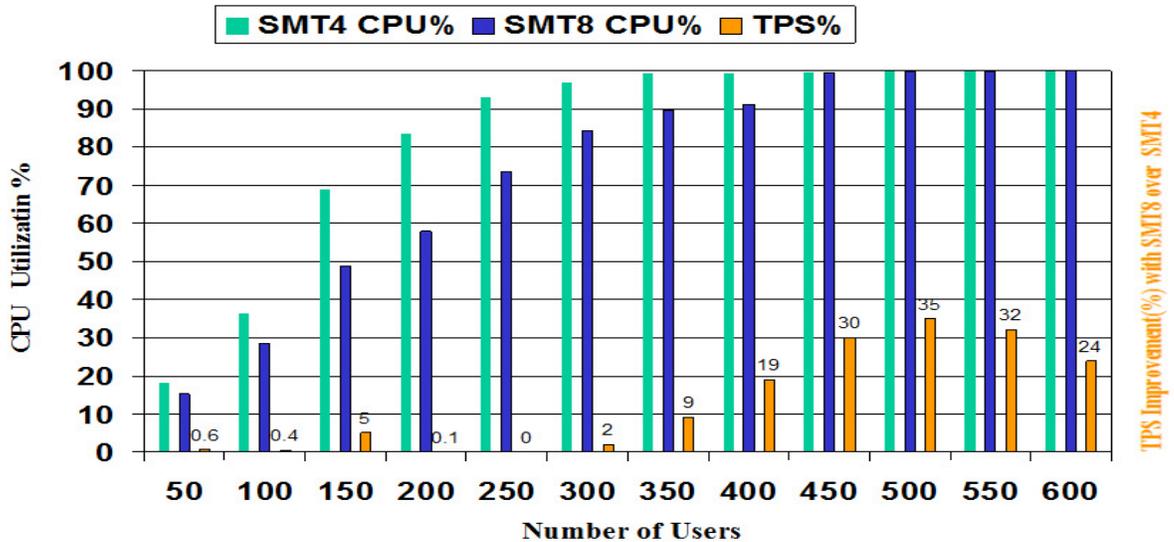


Figure 3. Number of Users vs CPU utilization (%) and TPS improvement with SMT8 over SMT4

SMT8 outperforms SMT4 for OLTP type workloads:

- For 400 Users by 19%
- For 450 Users by 30%
- For 500 Users by 35%

CPU utilization: The workload almost saturated the whole CPU cycles for 350 users with SMT4 enabled. The same workload running with SMT8 with the same number of users has left 10% CPU cycles in the idle state. Thus, there is more room available for scaling up the number of users with SMT8 than SMT4. SMT1 and SMT2 were low performers compared to SMT4 and SMT8 for OLTP type workloads.

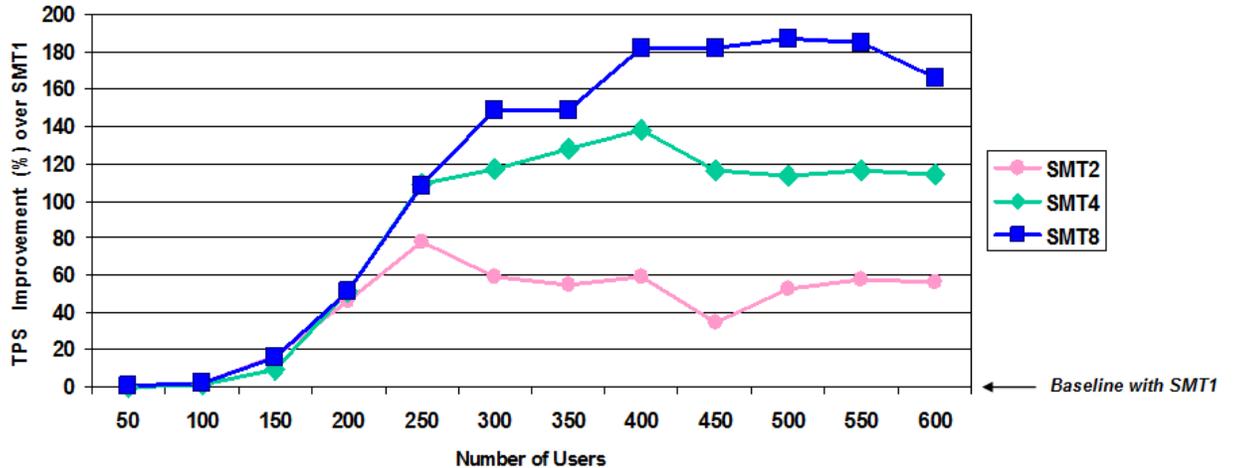


Figure 4. Number of Users vs TPS improvement over SMT1

Relative number of Transactions per Second: For a higher number of concurrent users (500 users), SMT8 out-performs other lower SMT modes. When the CPU utilization goes up more than 70%, SMT8 yields more performance in TPS than SMT4, 2, and 1.

For up to 300 users, even though the TPS is almost the same for SMT4 and SMT8, the CPU utilization by SMT8 is about 12% to 22% lower than SMT4. Thus, SMT8 has more room for a larger number of users.

SMT1 and SMT2 couldn't sustain performance with the load for more than 100 and 200 users respectively. SMT1 and SMT2 were consuming high amounts of CPU cycles and yielded a lower number of transactions with higher average response times.

No I/O bottlenecks were seen for the heavy random I/O workloads and the Oracle Automatic Database Diagnostic Monitor (ADDM) report did not show I/O-related issues; instead, the workload was CPU bound at a higher number of users.

Based on the above tests, enabling SMT8 would be a recommended choice for OLTP-type workloads on Oracle Database. The Oracle Database server spawns multiple processes and threads for each client application request to do data processing. The more logical CPUs provided by SMT8 mode on the POWER8, the more processes and threads utilize the full potential speed of POWER8 processor cores, yielding the optimal results for this workload.

If there are some unexpected spikes in the number of users connecting to the database in a normal business day, SMT8 would still accommodate the extra load at a certain level and maintain the same performance for additional loads.

Benefit of using IBM FlashSystem 840 for Oracle Database on Power S824

Running workloads on Oracle Database 11g or 12c with IBM POWER8 servers needs fast storage servers with low latency to ensure applications won't run into I/O bottlenecks. The workloads running on IBM POWER8 servers generating the I/O requests for random reads and/or writes expect the I/O response time in micro- or milli- seconds. If the storage subsystem is not capable of responding to the data processing speed of CPU cores, there are some situations where a lot of CPU cycles will be wasted



waiting for the responses from the storage subsystem. Thus, a speedy and balanced set of hardware resources are recommended for implementing database servers and applications.

Our experimentation with a combination of Oracle Database 12c, IBM Power S824, and IBM Flash Storage 840 showed a balanced load on both the Power S824 server and IBM FlashSystem 840 when running OLTP workloads. Virtually no I/O bottlenecks were seen with IBM FlashSystem 840 while four POWER8 cores were fully busy processing OLTP workloads. A scenario where the OLTP workload almost saturated the CPU cycles made the IBM FlashSystem 840 about 20% busy. The workload was set with the characteristics of generating about 70% random reads and 30% random writes.

If low latency applications running on a high speed server such as the Power S824 using HDD for storage, they could suffer from long response times. The I/O capabilities of spinning disks (HDD) are limited and provide only thousands of IOPS. Increasing the number of disks might increase the I/O capacity but would not provide improved latency.

A better solution for providing better I/O performance with low latency is to implement Solid State Disks (SSDs) with HDD where the frequently accessed data blocks are moved to SSDs and the data can be accessed quickly. Still, the other factors such as floor space and cost of power and air-conditioning are higher and affect Return on Investment (ROI).

The best solution for low latency applications is using IBM FlashSystem products, which have low-power consumption, efficient cooling, and provide up to 48TB of storage in a small 2U design. The IBM FlashSystem 840 offers fast and efficient flash storage modules with RAID protection for low latency applications and databases in business-critical production environments.

Huge OLTP workloads running on a database server would normally need a large amount of costly system memory (RAM) used for the database System Global Area (SGA) on the host server. The large SGA might help to keep more frequently accessed data and frequently executed SQL statements in the database buffer cache and libraries to avoid high latency I/O requests to the storage subsystem. IBM FlashSystem 840 is a solution for low latency I/O requests and thus helps reduce the size of the SGA. The fast access of data from IBM FlashSystem 840 minimizes the use of costly memory on the host servers for the applications and databases.

For more information on IBM FlashSystem 840, refer to the link:

ibm.com/systems/storage/flash/840/

Oracle Database 11g Release 2 on IBM Power S824 experiences

Oracle Database 11g Release 2 version 11.2.0.4 was successfully installed and verified on the Power S824 server. The Oracle workload tool, *Swingbench*, was used for generating a large number of transactions on the database to stress the server.

Oracle Database 11g was implemented on an ASM disk group which was managed by an Oracle Database 12c Grid infrastructure ASM instance. The ASM disk group was created on local serial-attached SCSI (SAS) drives on the IBM Power S824 server.

The test results proved the success and readiness of the Power S824 server for use with Oracle Database 11g Release 2.



The tests were completed on the Power S824 server. However, because Oracle certifications are done on the AIX operating system, IBM's commitment to binary compatibility across all Power Systems servers allows customers to run with confidence on any of the new Power Systems servers built with POWER8 processor technology.

Tuning tips

The same AIX OS tuning tips are applicable for both Oracle Database 11g Release 2 and Oracle Database 12c Release 1. For a list of resources that can be useful when tuning an Oracle Database on IBM Power Systems servers, refer to the "Document Resources" section at the end of this paper.

SMT default and operational configuration

SMT enables concurrent execution of instruction streams in multiple threads on the same core. In the new IBM Power Systems servers built with POWER8 processor technology, up to eight instruction stream threads (SMT8) can concurrently run on a single core.

An AIX logical partition is set with SMT4 by default. The decision on whether to keep the default SMT (SMT4) or tune it to SMT8 or SMT2 can be based on the nature of the application and characteristics of the workload being used in the LPAR.

Database software such as Oracle Database is capable of using multi-threading processor cores and can make use of the SMT8 configuration option to take full advantage of the available cores.

From the lab test, we find that using Oracle Database 12c Release 1 on a Power S824 server with POWER8 processors with SMT8 increased the rate of transactions significantly.

Oracle Database licensing on IBM Power Systems

At the time of this publication, Oracle's policy on licensing their technology products on servers with POWER8 processors remains unchanged.

The new Power Systems servers with POWER8 technology are all configured with one or two sockets, where each socket is populated with a dual-chip module. The two-socket servers might be configured with up to 24 cores.

Three versions of the Oracle Database are available for use on a Power Systems server.

- **Oracle Database Standard Edition One** is supported on servers with up to two sockets. Because Oracle defines each chip as a socket for the purpose of licensing, only the Power S814 and Power S812L servers might be used with this Oracle Database edition.
- **Oracle Database Standard Edition** is supported on servers or clusters of servers with up to four sockets. Because Oracle defines each chip as a socket for the purposes of licensing, the Power S812L, S822L, S822, S814, and S824 servers might be used with this Oracle Database edition. When using the Oracle RAC capability of Standard Edition, the number of chips in the entire cluster must be no more than four.
- **Oracle Database Enterprise Edition** is licensed by the number of physical cores available in the logical partitions that the Oracle Database is running in. This is because Oracle treats Dynamic Logical Partitions as hard partitions and charges for the maximum number of physical cores that



the Oracle Database is capped to run on. IBM and IBM Business Partners can contact the IBM Oracle International Competency Center (ibmoracle@us.ibm.com) for help with evaluating the number of cores to be licensed for a given deployment scenario.

The document in the following link shows Oracle's partitioning policies:

oracle.com/us/corporate/pricing/partitioning-070609.pdf

Oracle core factors are applied to licenses of Oracle Database Enterprise Edition. The current values are available at:

oracle.com/us/corporate/contracts/processor-core-factor-table-070634.pdf#search=processor

Oracle application benchmarks on Power S824 servers

IBM has completed two new benchmarks with the Power S824 server, one for Oracle E-Business Suite and one for Oracle Siebel CRM. For more information regarding these benchmark results, refer to the following links.

Power S824 server with Oracle E-Business Suite benchmark:

oracle.com/us/solutions/benchmark/apps-benchmark/results-166922.html

Power S824 server with Oracle Siebel CRM benchmark:

oracle.com/us/solutions/benchmark/white-papers/siebel-167484.html

Summary

This paper gathers the key technical topics that help understanding the support of AIX versions, Oracle Database versions, and IBM virtualization software versions for the new IBM Power Systems servers built with POWER8 processor technology. Additionally, a set of performance results were included in this document from performance evaluation studies with an IBM Power S824 server with POWER8 processors in SMT8, SMT4, SMT2, and SMT1 mode with Oracle OLTP workloads running on Oracle Database 12c Release 1 and AIX7.1. The performance numbers shown in the charts are for education purpose only.



About the authors

Arun Sar is a Software Engineer with the IBM Systems and Technology Group ISV Enablement team that works at the Oracle headquarters in Redwood Shores, CA.

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Wayne Martin is the IBM Systems and Technology Group Technology Solutions Manager responsible for the technology relationship between IBM and the developers of Oracle Corporation Database and Fusion Middleware for all IBM server brands. His responsibilities include driving mutual understanding between IBM and Oracle on technology innovations that can generate benefits for mutual customers, managing the process of getting that technology implemented in products, and insuring that availability of the products to customers is timely. Wayne has held a variety of technical and management roles at IBM that have focused on driving enhancements of ISV software that uses IBM mainframe, workstation, and scalable parallel products.



Document Resources

The following references are useful when tuning an Oracle Database environment. The same tuning of AIX for Oracle Database 11g Release 2 applies to Oracle Database 12c Release 1.

- IBM AIX “From Strength to Strength – A summary of upgrade benefits for each release of AIX”
<http://public.dhe.ibm.com/common/ssi/ecm/en/poo03022usen/POO03022USEN.PDF>
- Tuning IBM AIX 5.3 and AIX 6.1 for Oracle Database (whitepaper)
<http://public.dhe.ibm.com/partnerworld/pub/whitepaper/162b6.pdf>
- Oracle RAC on IBM AIX best practices in memory tuning and configuring for system stability
ibm.com/developerworks/community/blogs/fd4076f7-7d3d-4080-a198-e62d7bb263e8/entry/oracle_real_application_clusters_on_ibm_aix_best_practices_in_memory_tuning_and_configuring_for_system_stability?lang=en
- Oracle Architecture and Tuning on AIX (white paper)
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP100883
- Implementing IBM FlashSystem 840
<http://www.redbooks.ibm.com/abstracts/sg248189.html>
- Flash or SSD: Why and When to use IBM FlashSystem
<http://www.redbooks.ibm.com/redpapers/pdfs/redp5020.pdf>
- Configuration considerations for Oracle 11.2.0.2 use on AIX (with HAIP)
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP102001
- Using VIPA and Dead Gateway Detection on AIX for High Availability Networks, including Oracle RAC
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP102177
- IBM POWER7 AIX and Oracle Database performance considerations
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP102171
- Managing AIX Devices used by Oracle Automatic Storage Management (ASM)
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP102158
- IBM H/W sizing process
ibm.com/erp/sizing



These are the supplemental tuning resources.

- AIX 6 Performance Management (AIX documentation):
<http://publib.boulder.ibm.com/infocenter/systems/scope/aix/topic/com.ibm.aix.doc/doc/base/performance.htm>
- Diagnosing Oracle Database Performance on AIX Using IBM NMON and Oracle Statspack Reports (white paper):
ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP101720
- RAC Starter Kit and Best Practices:
"My Oracle Support" (see resources) note 811293.1
- My Oracle Support (userid and password are required to sign in)
<https://support.oracle.com/>



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