IBM

ORACLE

IBM Power Systems with PowerVM for Oracle software deployments

Powerful, dynamic systems with POWER8 processors keep you ahead of the latest technology trends

Designed and built for your business-critical Oracle software deployments

Virtualized processor, memory and I/O resources increase asset utilization and reduce infrastructure costs

Improved agility by dynamically adjusting server capacity to meet changing workload demands

Higher quality services by moving running workloads between servers to maximize application availability and minimize planned downtime

Joint IBM and Oracle testing, planning, and support deliver a robust enterprise-class computing platform

Built with innovation that puts data to work

It's no secret that dynamic technology changes are rapidly remaking how organizations do business. The growing torrent of data from both within and outside your organization, from mobile employees and from customers and prospects, presents an unprecedented opportunity to gain valuable insights and apply these insights at the best point of impact to improve your business results.

Making the transition to advanced capabilities requires an integrated infrastructure that supports your key IT initiatives, and business critical Oracle software deployments. Our investments to bring optimized solutions in the areas of big data, analytics, cloud, and mobile access are designed to simplify and accelerate your journey to address today's market opportunities.

The newest generation of IBM® Power Systems™, with POWER8™ technology, is the first family of systems built with innovations that transform the power of big data and analytics, mobile, and cloud into competitive advantages in ways never before possible.

Optimized for the rigorous demands of enterprise computing

IBM understands that applications and business processes have differing demands and that one size does not fit all. To ensure that technology aligns to business rather than the other way around, IBM offers a full range of Power® Systems servers each of which delivers leadership data capabilities, security, performance and scalability in its class. A totally integrated approach to the design, development, and testing of each and every Power server ensures the resiliency required for today's Oracle software deployments.

All Power Systems server models include innovative reliability, availability and serviceability features that help avoid unplanned downtime—plus a wide range of open technologies that give you added flexibility to match business needs. And, with Enterprise Pools, Capacity on Demand, and Live Partition Mobility—Power Systems enterprise servers ensure businesses can keep their Oracle software available, even as they add capacity to handle new and growing business demands.

Built on POWER, designed for data

POWER® processor technology is a reduced instruction-set computing (RISC) architecture that spans applications from consumer electronics to supercomputers. POWER processors are at the forefront of both commercial and technical or high performance computing. So, in addition to excelling at commercial workloads, POWER is also behind many of today's top supercomputers. And POWER8 is the first processor designed from the ground up to handle big data.

POWER processors provide the foundation for designing systems for both traditional workloads and compute and data-intensive workloads like Web, analytics, mobile, and social applications. To achieve maximum performance, POWER processor-based systems are designed with optimization technologies that enable the system to tune automatically to specific workloads. Our latest generation of systems built with POWER8 technology offers balanced data-centric design to support the most challenging and complex data-hungry applications 2x faster than the prior generation:

- Gain faster insights with the POWER8 processor and smart acceleration enabled by CAPI (Coherent Accelerator Processor Interface) technologies such as FPGA accelerators for key workloads
- Achieve lower latency and smaller footprint with CAPI Flash
- Move data in and out of systems more quickly with twice the memory and I/O expansion
- Achieve greater speed and efficiency for database, transactional and other highly multi-threaded applications with transactional memory supported by 50 percent more cores and 2x the number of simultaneous threads per core

Integrated and easy-to-deploy

A totally integrated approach to the design, development, and testing of each and every IBM Power Systems server ensures that they are simple to deploy and highly reliable as a foundation for Oracle software. IBM Power Systems offers thousands of popular industry applications from ISVs running on a choice of IBM i, Linux®, and AIX® operating systems.

IBM offers a full range of affordable Power Systems servers—from the highly scalable enterprise models to the powerful scale-out models—each of which delivers leadership performance and scalability in its class.

The IBM and Oracle alliance

Since 1986, Oracle and IBM have been providing customers with compelling joint solutions, combining Oracle's technology and application software with IBM's complementary hardware, software and services solutions. More than 100,000 joint clients benefit from the strength and stability of the Oracle and IBM alliance, which offers technology, applications, services, and hardware solutions that mitigate risk, boost efficiency, and lower total cost of ownership.

IBM is a Diamond level Partner and has also earned Cloud Elite status in the Oracle Partner Network, delivering the proven combination of industry insight, extensive real-world Oracle applications experience, deep technical skills and high performance servers and storage to create a complete business solution with a defined return on investment. From application selection, purchase and implementation to upgrade and maintenance, we help organizations reduce the total cost of ownership and the complexity of managing their current and future applications environment while building a solid base for business growth.

AIX – The future of UNIX

According to IDC, the IBM Power Systems platform with AIX technology is the leader in worldwide UNIX® server revenue share.[1] An open standards–based UNIX operating system, IBM AIX software exploits decades of IBM technology innovation. According to ITIC's 2013 survey, the IBM AIX operating system delivered the highest reliability scores among different server operating systems, including Linux and other UNIX operating systems.[2]

AIX technology offers deep integration and optimization with PowerVM™ virtualization, PowerVC™ advanced virtualization management, and PowerHA® high availability software. The latest AIX 7.2 release features new cluster-aware integration with PowerHA, as well as the ability to run AIX 5.3 Workload Partitions to facilitate application migration and reuse. The AIX operating system is available in three editions for a range of capability and flexibility for both mid-sized and large enterprises. AIX 7 and the previous release, AIX 6, are binary compatible with previous versions of AIX including AIX 5L™. This means that applications that ran on earlier versions will continue to run on AIX 7 or 6—guaranteed.[3]

PowerVM and IBM Power Systems – virtualization without limits

Today's businesses use virtualization to not only reduce costs and maximize IT infrastructure investments, but also to provide more flexibility, higher application availability, and improve response times to business needs. IBM Power Systems with PowerVM® offers a complete set of virtualization solutions that can help IBM and Oracle clients achieve extremely high levels of sustained utilization with great performance while delivering greater flexibility in deploying virtual machines.

PowerVM consists of hardware and software features that allow an IBM Power System server to virtualize computing resources to be shared across many user workloads. A high availability feature like PowerVM Live Partition Mobility enables active partitions to be moved between servers and eliminates planned application downtime while Micro-Partitioning® supports up to 20 partitions per processor core and can dynamically shift processor, memory, and I/O resources between partitions to match changing workload requirements.

PowerVM delivers industrial strength virtualization for AIX, IBM i and Linux operating systems running on Power Systems servers. It offers a secure virtualization environment, built on the advanced resiliency features and industry-leading performance of the Power Systems platform.

The following is a partial list of the PowerVM features. Note that not every PowerVM feature is certified with each combination of Oracle products running on IBM supported operating systems. When planning a deployment, confirm that the desired PowerVM function is certified with a given Oracle product.

- PowerVM Micro-Partitioning supports up to 20 dynamic logical partitions per processor core. Depending on the Power server, you can have as many as 1,000 independent partitions—each with its own processor, memory, and I/O resources—within a single physical Power server. Processor resources can be assigned at a granularity of 1/100th of a core. Consolidating systems with PowerVM can help reduce operation costs, improve availability, ease management, improve service levels and allow businesses to quickly deploy applications.
- Multiple Shared Processor Pools provide the automatic, non-disruptive balancing of processing power between partitions assigned to shared pools to help increase throughput. It also provides the ability to cap the processor core resources used by a group of partitions, potentially reducing processor-based software licensing costs.
- Shared Dedicated Capacity means that spare CPU cycles from dedicated processor partitions can be allocated to a Shared Processor Pool. The dedicated partition maintains absolute priority for dedicated CPU cycles. Enabling this feature may help to increase system usage, without compromising the computing power for critical workloads in a dedicated processor.
- Active Memory™ Expansion is a technology for expanding a system's effective memory capacity for AIX workloads. Active Memory Expansion employs memory compression technology to transparently compress in-memory data, allowing more data to be placed into memory and thus expanding the memory capacity of POWER8 systems. Utilizing Active Memory Expansion can improve system utilization and increase a system's throughput.

- The Virtual I/O Server (VIOS) is a special-purpose partition that can be used to virtualize I/O resources to AIX, IBM i, and Linux client partitions. The VIOS owns the physical I/O resources that are virtualized and shared between the virtual machines running on the PowerVM-based server. The VIO server helps reduce costs by eliminating the need for dedicated network adapters, disk adapters and disk drives, and tape adapters and tape drives in each client partition. With the PowerVM VIOS I/O virtualization, client partitions can easily be created for test, development or production purposes.
- PowerVM Live Partition Mobility supports the movement of a running AIX, IBM i or Linux partition from one physical server to another compatible server without application downtime, helping minimize application interruptions for planned system maintenance, provisioning and workload management. Live Partition Mobility can ease the migration of operating environments to new servers—temporarily or permanently.

IBM Workload Partitions and Workload Partition Manager for AIX

Available in AIX 6.1 and above is a new software-based virtualization approach called Workload Partitions (WPARs). With WPARs, you can create multiple virtual AIX environments within a single AIX instance. Each WPAR can have a unique root administrator, network address, file system and security context. WPARs are the only software-based virtualization approach designed from the beginning to be capable of migrating between systems.

WPARs can be very useful for server consolidation and when applying patches to AIX. For example, you can patch the global AIX instance and all WPARs in that instance will inherit that same patch level.

IBM PowerVM with Oracle solutions

When evaluating the support status for various PowerVM features with Oracle solutions, keep in mind that it can take some time for newer features of PowerVM to be supported by Oracle. Typically, Oracle certifies its products for a specific operating system version. For example, Oracle Database 12c Release 1 and Oracle Database 11g are certified with IBM AIX 7.1 and AIX 7.2. The completed operating system version certification is a pre-requisite for an Oracle product to be supported by Oracle.

In general, the certification of new IBM technologies requires comprehensive testing and is a thorough process. This is especially true with Oracle Real Application Clusters (RAC). Oracle separately tests each feature of PowerVM with Oracle Database and Oracle RAC and issues support statements for these product combinations on a feature-by-feature basis. As of December 2016, several tests are in progress and more testing is planned as IBM and Oracle keep adding new features to their respective solutions.

Table 1 provides an overview of the PowerVM features that are certified, or are in the process of being certified, as of December 2016, with the Oracle Database. It is important to reiterate that a specific line item is supported only when the certification is completed and approved.

PowerVM Feature	Operating System	Single Instance	Oracle RAC	Comments
Dynamic LPAR	AIX	Yes	Yes	Note (1)
Micro-Partitioning	AIX	Yes	Yes	Note (1)
Multiple Shared Processor Pools	AIX	Yes	Yes	Note (2)
VIOS	AIX	Yes	Yes	Note (1)
LPM	AIX	Yes	Yes	
LPM and IBM Spectrum Scale™ 4.1	AIX	Planned	Planned	Note (3)
WPAR	AIX	Yes	Not Planned	
Active Memory Expansion	AIX	Planned	Planned	Note (3)

Table 1. PowerVM features and Oracle certification

(1) Verify with Oracle's My Oracle Support Web site and the general notes for Oracle Database on Power Systems with AIX.

(2) There is no separate certification required for multiple shared pools.

(3) Valid as of January 2017.

When planning an Oracle software implementation with IBM PowerVM, consider the entire operating environment when verifying the support status. In some cases, a given PowerVM feature may not be supported with all combinations of IBM and Oracle software.

For example, the Virtual I/O Server feature of PowerVM enables many different types of connections (such as virtual Ethernet, virtual SCSI, and virtual LAN). The support status for these features can vary depending on the version of AIX in use, the Oracle Database version, whether or not Oracle RAC is used, and whether or not other subsystems, such as IBM PowerHA or IBM Spectrum Scale, are used.

The combination of supported products changes constantly as testing is completed. Given the complexity of the support issues, we recommend consulting the IBM Oracle ICC at ibmoracle@us.ibm.com for the latest support information.

Sizing PowerVM with Oracle software running on IBM Power Systems

Sizing PowerVM on IBM Power Systems servers follows the same procedure as sizing Oracle solutions on IBM servers. The first step is to complete a sizing questionnaire for the specific Oracle product that will be used, such as Oracle E-Business Suite or Oracle's JD Edwards EnterpriseOne.

The next step is to submit the completed questionnaire to IBM. You can obtain a sizing estimate customized for your environment from the IBM Digital Techline Center which provides worldwide sizing support. Access this organization through your IBM or IBM Business Partner representative. To start the sizing process, download a questionnaire from:
ibm.com/partnerworld/wps/servlet/ContentHandler/techline/FAQ00000750

For more information

To explore other Power Systems and Oracle solutions or to find out more about other joint solutions from IBM and Oracle, please contact an IBM sales representative at 1-866-426-9989, or visit us at:
ibm.com/oracle
ibmandoracle.com

For more information about how IBM Power Systems and Oracle software products work together, visit:
ibm.com/solutions/oracle/us/en/index/powersystems.html

For more information about the IBM Power Systems family, visit:
ibm.com/systems/power

For more information about PowerVM, visit:
ibm.com/systems/power/software/virtualization

For more information about Oracle visit:
oracle.com/index.html

[1] IDC Quarterly Server Tracker Q214 release, August 2014
[2] IBM's Power Systems recorded approximately 13 minutes
per server / per year of unplanned downtime (99.997
percent uptime) according to the ITIC 2013 Global Server
Hardware and Server OS Reliability Survey (itic-corp.com)
with Oracle x86 servers recording the highest percentage of
server outages among the 14 platforms surveyed
[3] More information on the binary compatibility of AIX can be
found at: ibm.com/systems/power/software/aix/compatibility/
guarantee/index.html

ORD03024-USEN-02