IBM Power Systems for Oracle Database 12*c*

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

Designed and built for your business critical Oracle Database deployments

Scale flexibly—vertically within a system or horizontally with Oracle Real Application Clusters (Oracle RAC)

Improve IT economics with Oracle Database and PowerVM virtualization

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 Database 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 enterprise IT infrastructure.

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 Database 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 like Oracle Database, 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 like Oracle Database 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:
- More computing power to distribute workloads—50 percent more cores, twice the number of threads per core, and smart acceleration enabled by our Coherent Accelerator Processor Interface (CAPI), an open interface allowing PCIe3 devices to participate in operations at memory speed without risk
- Massive workspace to process data quickly—Twice the memory and CAPI flash technology to achieve lower latency and a smaller footprint
- Broad pathways to move data in and out of systems with ease through expanded I/O

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 Database. IBM Power Systems offers thousands of popular industry applications from ISVs running on a choice of Linux®, AIX®, and IBM i operating systems. IBM has a full range of affordable Power Systems servers, 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 140 000 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 Partner 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, PowerHA® high availability software, and PowerSC™ security and compliance software. The latest AIX 7.1 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]

Oracle Database 12*c* and IBM AIX

Oracle Database 12*c*, the latest generation of Oracle Database, has a major focus on cloud and enables customers to make more efficient use of their IT resources. This latest generation Oracle Database has a new multitenant architecture, and includes several enhancements and new features for:
• Consolidating multiple databases into multitenant containers
• Automatically optimizing data storage
• Providing continuous access with high availability features
• Securing enterprise data with a comprehensive defense-in-depth strategy
• Simplifying in-database analysis of Big Data
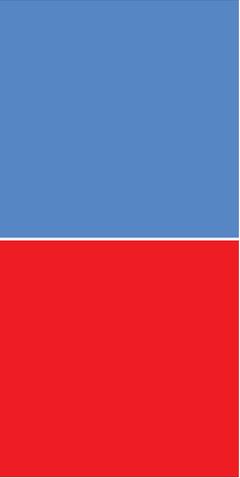
Multitenant architecture

Oracle Multitenant delivers an architecture that simplifies consolidation and delivers the high density of schema based consolidation, but without requiring changes to existing applications. It's an option of Oracle Database 12*c* that offers the benefits of managing many databases as one, yet retains the isolation and resource control of separate databases. In this architecture, a single multitenant container database can host many 'pluggable' databases. Each database consolidated or 'plugged in' to a multitenant container looks and feels to applications the same as the other existing Oracle Databases and administrators can control the prioritization of available resources between consolidated databases.

Database In-Memory

Oracle Database In-Memory, which uses a new dual-format in-memory architecture, allows customers to improve the performance of online transaction processing and also of analytics and data warehousing applications. The dual-format architecture that allows simultaneous row and column format in-memory enables existing applications to run transparently with better performance without additional programming changes.

Automatic Data Optimization

The pattern of usage of rows stored in database tables and partitions changes over time. In addition to the age of data, its level of activity is also important. It's common for rows to be continuously updated over time; therefore a combination of age and activity is required to determine the usage pattern of table rows. New Automatic Data Optimization features in Oracle Database 12*c* can be used to implement an automated Information Lifecycle Management strategy using a Heat Map and server managed storage policies that enable smart compression and storage tiering.

High availability

Basic high availability architectures using redundant resources can prove costly and fall short of availability service level expectations due to technological limitations, and complex integration, and inability to offer availability through planned maintenance. Oracle Database 12*c* goes beyond the limitations of basic high availability and in conjunction with hardware features such as provided by IBM storage devices and servers, offers customers a set of best practice blueprints that can be deployed at minimal cost and address the common causes of unforeseen and planned downtime.

Reducing planned downtime

Planned downtime for essential maintenance such as hardware upgrades, software upgrades and patching are part and parcel of every IT operation. Oracle Database 12*c* offers a number of solutions to help customers reduce the amount of planned downtime required for maintenance activities, including:
- Hardware Maintenance and Migration Operations to Oracle Database 12*c* infrastructure can be performed without taking users offline.
- Online Patching of database software can be applied to server nodes in a 'rolling' manner using Oracle RAC. Users are simply migrated from one server to another; the server is quiesced from the cluster, patched, and then put back online.

- Rolling Database Upgrades using Oracle Active Data Guard enables upgrading of a standby database, testing of the upgraded environment and then switching users to the new environment, without any downtime.
- Online Redefinition can reduce maintenance downtime by allowing changes to a table structure while continuing to support an online production system.
- Edition Based Redefinition enables online application upgrades. With edition-based redefinition, changes to program code can be made in the privacy of a new edition within the database, separated from the current production edition.
- Data Guard Far Sync provides zero data loss protection for a production database by maintaining a synchronized standby database located at any distance from the primary location.
- Global Data Services provides inter-region and intra-region load balancing across Active Data Guard and Golden Gate replicated databases. It effectively provides Real Application Cluster failover and load balancing capabilities to Active Data Guard and Golden Gate distributed databases.

Simplifying analysis of Big Data

Oracle Database 12*c* fully supports a wide range of Business Intelligence tools that take advantage of optimizations including; advanced indexing operations, Oracle OLAP aggregations, automatic star query transformations, partitioning pruning and parallelized database operations.

By providing a comprehensive set of integration tools, customers can use their existing Oracle resources and skills to bring together big data sources into their data warehouse. With this, customers can add to the existing Oracle Database 12*c* features, the ability to better analyze data throughout the enterprise.

Power Systems Software

IBM offers a full range of IBM Power Systems Software™ technologies that enable businesses using Oracle Database to fully exploit Power Systems servers. Designed and optimized specifically for Power Systems, IBM's offerings include IBM PowerVM virtualization software, IBM PowerHA software for high availability, PowerSC software for security and compliance, PowerVP™ for performance monitoring, PowerVC™ for advanced virtualization management, PowerKVM™—the open virtualization choice for Power scale-out Linux Systems, and IBM Systems Director with IBM Active Energy Manager for platform and energy management. IBM's integrated approach to developing the systems and software together enables high system utilization, high resiliency and simplified management.

PowerVM virtualization

IBM PowerVM provides the industrial-strength virtualization solution for IBM Power Systems servers and blades that run Oracle Database workloads. Based on more than a decade of evolution and innovation, PowerVM represents the state of the art in enterprise virtualization and is broadly deployed in production environments worldwide by most Power Systems owners.

The IBM Power Systems family of scale-out and enterprise (scale-up) servers includes proven workload consolidation platforms that help clients control costs while improving overall performance, availability and energy efficiency. With these servers and IBM PowerVM virtualization solutions, an organization can consolidate large numbers of applications and servers, fully virtualize its system resources, and provide a more flexible, dynamic IT infrastructure. In other words, IBM Power Systems with PowerVM deliver the benefits of virtualization without limits.
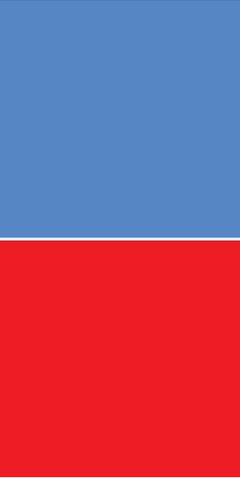
PowerVM also offers a secure and resilient virtualization environment, built on the advanced RAS (reliability, availability and serviceability) features, extreme scalability and leadership performance of the IBM Power Systems platform, based on the outstanding Power processors.

PowerHA – resiliency without downtime

Smarter computing by nature requires businesses to raise their services delivery levels, fueling 24×7 high availability demands for their applications and IT infrastructure. PowerHA SystemMirror for AIX and IBM i is a high availability clustering solution for both data center and multisite resiliency. PowerHA is designed to protect Oracle Database business applications from outages of virtually any kind, helping ensure round-the-clock business operations.

The best high availability and disaster recovery plans involve an integrated approach to resiliency spanning across applications, operating systems, servers and storage. That's why PowerHA software offers deep integration and optimization between PowerHA SystemMirror software and AIX and IBM i.

PowerSC – designed to protect virtualized data centers

Security and compliance are intrinsic to today's business processes, development and daily operations and should be factored in to the initial design of any IT or critical infrastructure solution, not added after the fact. IBM offers solutions to protect data from threats and unauthorized access on Power Systems servers running AIX, IBM i and Linux workloads. Security is integrated and built into every layer of the hardware and software on Power systems not as an afterthought add-on. Data encryption capabilities to protect file systems, data and backup are integral to securing your Oracle Database business information.

IBM System Storage

Disk and tape storage are critical elements of an Oracle Database environment. Designed with performance, growth, reliability, and availability in mind, IBM System Storage® products, such as the IBM DS8000®, IBM XIV® Storage System, and IBM Storwize® V7000 provide a continuum of storage solutions. IBM FlashSystem™ flash storage that can deliver significant performance improvements and the IBM SAN Volume Controller to enhance your storage infrastructure flexibility round out IBM's comprehensive storage product portfolio.

IBM also offers a compelling market-leading array of tape storage products to help protect Oracle Database data including deduplication virtual tape appliances, enterprise tape libraries, and tape drives. With IBM Tivoli® Storage Manager for Databases, these tape products are designed to provide low-cost, superior performance, high capacity and unattended backup from entry-level to enterprise server environments.

Sizing and capacity planning Oracle Database on a Power Systems server

Working together, IBM and Oracle have developed a capacity-estimation capability to aid in designing an optimal configuration for each specific Oracle Database client environment. A detailed sizing estimate customized for your environment should be obtained from the IBM Techline ISV Solutions Sizing Team, accessible through your IBM or IBM Business Partner representative. You can download a questionnaire to start the sizing process from:
ibm.com/erp/sizing

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/solutions/oracle
ibmandoracle.com

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

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

For more information about Oracle Database 12*c*, visit:
www.oracle.com/us/products/database/overview/index.html

[1] IDC Quarterly Server Tracker Q210 release, August 2010
[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