IBM Z servers running Oracle Database 12*c* on Linux

Put Z to work for you

Scale and grow Oracle Database 12*c* applications and data with confidence

Benefit from mission-critical reliability for Oracle Database 12*c*

Simplify IT operations with advanced virtualization, multi-architecture workload support and operations management capabilities

Minimize network security vulnerabilities, and reduce latency

Deploy and manage Linux and z/OS workloads on the same system

Today, enterprises require a trusted IT infrastructure that is dynamic, scalable and flexible enough to support both mission-critical work and the development and deployment of new workloads. This infrastructure must help decision makers to use their company's most valuable asset—their data—with insight rather than hindsight, and it must assist in using IT to gain a competitive edge.

The IBM Z® family of servers are designed to be the infrastructure to trust in the digital economy. Open and connected in the cloud, they enable massive transaction scale. IBM Z servers offer superior capabilities to meet demands for new services and better customer experiences, while securing growing amounts of data and complying with increasingly complex regulations. They can help deliver advanced performance, security, resiliency, availability and virtualization for a high quality of service.

IBM Z is exceptionally good for deploying Oracle data-serving workloads

The IBM z14™ Models M01 though M05 deliver outstanding transaction processing and data serving performance for excellent economies of scale and more efficient use of critical data. With up to 170 configurable cores, up to 32 TB of memory, and simultaneous multithreading (SMT) support, the z14 is ideally suited for consolidating large-scale distributed environments and for new in-memory and Java™ workloads.

The IBM z14 Model ZR1™, the newest member of the z14 family, is a single-frame system in a 19-inch industry standard rack allowing it to sit side-by-side with any other platform in a data center. The z14 ZR1 supports SMT, up to 30 configurable cores and up to 8 TB of memory. This new entry model is ideal for any growing business that seeks to use Z technologies' qualities of service, flexibility and performance.

As environmental concerns raise the focus on energy consumption, the ASHRAE A3 rated systems promote energy efficiency. Their design helps to dramatically reduce energy consumption and save floor space by consolidating workloads into a simpler, more manageable and efficient IT infrastructure.

Linux and IBM Z

A Linux® infrastructure on Z provides an enterprise-grade Linux environment. It combines the advantages of the Z hardware servers and leading IBM z/VM® virtualization—along with the flexibility and open standards of the Linux operating system.

IBM Z virtualization technology

During spikes in demand, IBM z14 systems can quickly redistribute system resources and scale up, scale out, or both in a way that can make the difference between flawless execution or costly, slow response times and system crashes.

You can further improve the virtualization management capabilities of Linux and z/VM by using the intelligent visualization, simplified monitoring, and unified management features of IBM Wave and IBM® Dynamic Partition Manager. These solutions are designed to help simplify everyday administrative and configuration tasks and to help you transform your Linux environment to a virtualized private cloud.

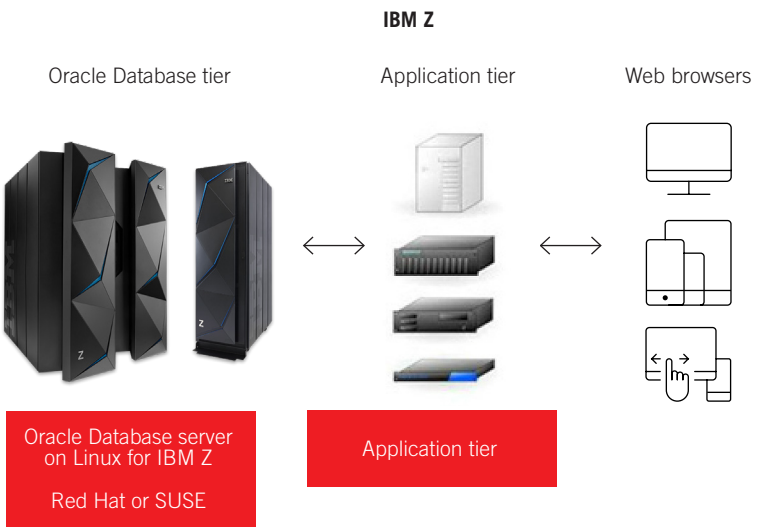

Figure 1: Oracle Database 12c on IBM Z

The enterprise-grade Linux infrastructure on z14 is designed to bring unique business value in the areas of operational efficiency, scalability, autonomic workload management, reliability, business continuance and security. Linux on IBM Z solutions can further benefit from the following IBM technologies to enhance this infrastructure:

- High availability capabilities are provided by the IBM Spectrum Scale™ high-performance data and file management solution based on IBM General Parallel File System (GPFS™). The Spectrum Scale solution is a cluster file system that provides access to storage that can deliver greater speed, flexibility, cost efficiency and security that are achievable by using built-in encryption and data protection.

- IBM GDPS® provides near-continuous availability and disaster recovery for Linux guests on z/VM environments. It can help substantially reduce recovery time, recovery point objectives and the complexity that is associated with manual disaster recovery.

IBM Z offers co-location of data and applications running on Linux or z/OS

Linux running on IBM Z provides the power to reduce complexities while extending existing IT investments and deploying new solutions more quickly with accelerated time to market. Co-location of data and applications on an IBM Z, with Linux or z/OS®, offers efficient data serving with minimal latency and a centralized management that allows for operational efficiency.

Oracle Database 12*c* and IBM Z

Oracle Database 12*c*, has a major focus on cloud and enables customers to make more efficient use of their IT resources. Oracle Database 12*c* 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 without requiring changes to existing applications. This Oracle Database 12*c* option 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, up to 4,096 pluggable databases can run on a single container database. 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 uses a new dual-format in-memory architecture that allows customers to improve the performance of online transaction processing and enables 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. New features such as In-Memory Virtual Columns and In-Memory expressions can further improve performance.

High availability

Basic high availability architectures using redundant resources can prove costly and fall short of availability and service level expectations due to technological limitations, complex integration, and inability to offer availability through planned maintenance. Oracle Database 12*c* goes beyond the limitations of basic high availability and with hardware features such as provided by IBM storage devices and servers, offers customers a solution that can be deployed at minimal cost and that addresses 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 standard for 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 these features of Oracle Database 12*c* and other Oracle offerings:

- 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 Real Application Clusters. 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 Data Guard or 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 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. This service 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, 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.

Oracle's stated goal is to help lower total cost of ownership (TCO) by delivering customer requested product features, minimizing customizations and providing pre-built integration to other Oracle solutions. These Oracle Database benefits further complement the IT infrastructure TCO savings gained by implementing Oracle Database on a Z server.

The enterprise-grade Linux on Z solution is designed to add value to Oracle Database solutions, including the new functions that were introduced in Oracle Database 12*c*. Oracle Database on Z includes the following benefits:

- Provides high levels of security designed for the industry highest EAL5+ and virtualization ratings, and quality of service
- Optimizes performance by deploying powerful database hardware engines that are available on z14 systems
- Achieves greater flexibility through the Z workload management capability by allowing the Oracle Database environment to dynamically adjust to user demand
- Reduces TCO by using the specialized Z cores that run the Oracle Database and management of the environment

Sizing and capacity planning for Oracle Database 12*c* on IBM Z

By working together, IBM and Oracle have developed a capacity-estimation capability to aid in designing an optimal configuration for each specific Oracle Database 12*c* client environment. You can obtain a detailed sizing estimate that is customized for your environment from the IBM Digital Techline Center, which is accessible through your IBM or IBM Business Partner representative. You can download a questionnaire to start the sizing process at **ibm.com**/partnerworld/wps/servlet/ContentHandler/techline/FAQ00000750.

The IBM and Oracle alliance

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For more information

For more information about joint solutions from IBM and Oracle, please contact an IBM sales representative at 1-866-426-9989.

For more information about IBM Z, see **ibm.com**/Z.

For more information about Oracle Database 12*c*, visit oracle.com/us/corporate/features/database-12c/index.html.

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