IBM LinuxONE running Oracle Database 12c on Linux

Put LinuxONE to work for you

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 data, a company's most valuable asset, with insight rather than hindsight, and assist in using IT to gain a competitive edge.

The IBM® LinuxONE Emperor™ is the first of a new generation of systems, designed for digital business and the mobile economy. Emperor can help deliver advanced performance, security, resiliency, availability and virtualization for a high quality of service. Designed for larger enterprises, the Emperor offers massive scalability for secure data serving, high-volume transaction processing and large-scale consolidation.

The Emperor features 22 nm processor technology and supports simultaneous multi-threading for Linux® and Java™ workloads. It helps deliver outstanding transaction processing and data serving performance. The Emperor offers excellent economies of scale, supporting up to 141 configurable cores and more efficient use of critical data. Coupled with up to 10 TB of memory, the Emperor is ideally suited for consolidating large-scale distributed environments and the introduction of new in-memory workloads.

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

Benefit from mission-critical reliability for Oracle Database 12c

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

Minimize network security vulnerabilities, and reduce latency
The IBM LinuxONE Rockhopper™, the newest member of the IBM LinuxONE™ family, is designed as an entry-level enterprise server for any growing business that is looking to use LinuxONE technologies’ qualities of service, flexibility and performance.

As environmental concerns raise the focus on energy consumption, the Emperor and Rockhopper can 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 LinuxONE**

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

**IBM Emperor virtualization technology**

During spikes in demand, the Emperor platform 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. This product is 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 LinuxONE*
An enterprise-grade Linux infrastructure on Emperor and Rockhopper is designed to bring unique business value in the areas of operational efficiency, scalability, autonomic workload management, reliability, business continuance and security. Linux on LinuxONE 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 the IBM General Parallel File System™ (IBM GPFS™)). The Spectrum Scale solution 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 Geographically Dispersed Parallel Sysplex™ (IBM GDPS®) Virtual Appliance provides near-continuous availability and disaster recovery by extending GDPS capabilities for Linux on LinuxONE and z/VM environments. It can help substantially reduce recovery time, recovery point objectives and the complexity that is associated with manual disaster recovery.

**Oracle Database 12c and IBM LinuxONE**

Oracle Database 12c, 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. This Oracle Database 12c 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. 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.

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 12c goes beyond the limitations of basic high availability and 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 standard for every IT operation. Oracle Database 12c offers a number of solutions to help customers reduce the amount of planned downtime required for maintenance activities, including these features of Oracle Database 12c and other Oracle offerings:

- Hardware Maintenance and Migration Operations to Oracle Database 12c 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 12c 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 12c 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 LinuxONE server.
The enterprise-grade Linux on LinuxONE solution is designed to add value to Oracle Database solutions, including the new functions that are introduced in Oracle Database 12c. Oracle Database on LinuxONE includes the following benefits:

- Optimizes performance by deploying powerful database hardware engines that are available on Emperor and Rockhopper systems
- Achieves greater flexibility through the LinuxONE workload management capability by allowing the Oracle Database environment to dynamically adjust to user demand
- Reduces TCO by using the specialized LinuxONE cores that run the Oracle Database and management of the environment
- Provides high levels of security and quality of service

Sizing and capacity planning for Oracle Database 12c on IBM LinuxONE

By working together, IBM and Oracle have developed a capacity-estimation capability to aid in designing an optimal configuration for each specific Oracle Database 12c client environment. You can obtain a detailed sizing estimate that is customized for your environment from the IBM Techline ISV Solutions Sizing Team, 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

Since 1986, Oracle and IBM have been providing clients 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. Through this partnership, Oracle and IBM offer technology, applications, services and hardware solutions that are designed to mitigate risk, boost efficiency and lower total cost of ownership.

IBM is a Diamond Partner in the Oracle Partner Network, delivering industry insight, extensive real-world Oracle applications experience, deep technical skills, and high performance servers and storage that creates a complete business solution with a defined return on investment. From application selection, through purchase and implementation to upgrade and maintenance, IBM helps organizations reduce the TCO and the complexity of managing their current and future applications environment while building a solid base for business growth.
For more information

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

- IBM and Oracle alliance overview: [ibm.com/solutions/oracle](http://ibm.com/solutions/oracle)
- IBM technology hub for Oracle Solutions: [ibmandoracle.com](http://ibmandoracle.com)

For more information about IBM LinuxONE, see [ibm.com/LinuxONE](http://ibm.com/LinuxONE).
