IBM LinuxONE servers running Oracle Database 19c on premises on Linux

Put IBM LinuxONE to work for you

Highlights

Improve operational efficiency with a streamlined infrastructure

Scale and grow applications and data with confidence

Benefit from mission-critical reliability

Simplify IT operations

Protect data with quantum-safe cryptography

Reduce your carbon footprint and costs

Oracle Database 19c and IBM LinuxONE

The digital transformation of business, institutions and society is accelerating faster than ever. A sustainable IT infrastructure is a component in business strategy, providing essential capabilities to deliver scalable value and services in highly competitive markets in the digital economy while protecting our environment.

Improve operational efficiency with a streamlined infrastructure

IBM® LinuxONE is a family of systems designed for secure data serving. With IBM LinuxONE, you get a single system engineered for running multiple Linux®-based workloads that include Oracle Database 19c, Oracle WebLogic Server, open source, blockchain and other Linux-based commercial software. All these workloads can operate at the same time on the same IBM LinuxONE system.

Scale and grow applications and data with confidence

The IBM LinuxONE Emperor 4 is designed for deploying Oracle Database data-serving workloads to deliver superior performance for mission-critical applications in transaction processing, data sharing and mixed workloads, where nothing can be compromised. The system is massively scalable with the ability to add capacity on demand and grow processing with minimal impact to energy use, floor space and staffing.

IBM LinuxONE is designed for balanced performance with multiple layers of cache, massive input/output (I/O) capabilities and integrated accelerators to drive high utilization and processor efficiency.

The IBM LinuxONE Emperor 4 system uses industry-standardized power and networking hardware. Built with a 19-inch frame that flexibly scales from 1 to 4 frames, the system provides advanced performance, security, resiliency, availability and virtualization for a high quality of service.

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Each IBM Telum™ Processor chip on the IBM LinuxONE Emperor 4 has 16 cores that use the density and efficiency of a 7 nanometer (nm) chip. This system can deliver outstanding transaction processing and data serving performance for excellent economies of scale and more efficient use of critical data. It's built for scale with up to 200 IBM LinuxONE configurable cores, 40 terabytes (TB) of memory and simultaneous multithreading (SMT) support in a single model.

It delivers flexibility with up to 85 logical partitions (LPARs), providing hard partitions for workload isolation. Oracle Database workloads see performance and manageability benefits from its internal high-speed I/O fabric, with its thousands of dedicated processors, reducing dependency on workload-dependent Linux cores. These features make the IBM LinuxONE Emperor 4 ideally suited for consolidating large-scale distributed environments and adding in-memory, Java workloads and hybrid cloud deployments.

Benefit from mission-critical reliability
The IBM LinuxONE architecture is different by design, intentionally engineered to meet the most challenging demands of mission-critical workloads in a digital economy.

The IBM LinuxONE Emperor 4 is designed for 7 9s application availability, seamless on-demand scalability and to execute disaster recovery actions in response to unplanned events.

IBM Remote Code Load for IBM LinuxONE firmware optimizes resilience and keeps your system up to date with the latest features, fixes and maintenance without requiring someone to be physically in the data center to install and monitor planned updates to your system. This optional feature provides secured, remote installation and monitoring by IBM for planned updates to your IBM LinuxONE system.

The 19-inch frame technology supports the A3 operating class as defined by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).[1] The benefit of having an A3 class rating enable you to save on heating, ventilation and air conditioning (HVAC) costs due to the wide range of operating conditions that will now be available.

Ideal for larger enterprises looking to reduce costs, IBM LinuxONE Emperor 4 offers massive scalability in a high-volume transaction processing and large-scale consolidation platform.

Simplify IT operations
The IBM LinuxONE Emperor 4 contains new capabilities to help make compliance to PCI-DSS regulatory guidelines easier and more productive. Audit preparation times can be significantly reduced and require less staff to complete. The IBM LinuxONE Emperor 4 is integrated with the IBM LinuxONE Security and Compliance Center to monitor and record system, network and application data for changes and adherence to PCI-DSS standards. A user-friendly dashboard enables infrastructure personnel to easily and quickly generate reports that auditors need and help ensure a continuous compliance posture that mitigates the potential for noncompliance regulatory fines.

The IBM LinuxONE Emperor 4 system provides Linux deployments with more cores and more memory and cache innovations. It provides the platform for modernizing, developing and managing on-premises, containerized applications.

Protect data with quantum-safe cryptography
IBM continues its leadership in data security with quantum-safe security on the IBM LinuxONE Emperor 4, extending encryption capabilities, Fibre Channel endpoint security, the IBM Hyper Protect Data Controller and other innovative advancements that help make it one of the most secured computing platform in the industry.

Reduce your carbon footprint and costs with an energy-efficient system
Ideal for larger enterprises looking to reduce costs, LinuxONE Emperor 4 offers massive scalability in a high-volume transaction processing and large-scale consolidation platform. IBM LinuxONE Emperor 4 greater processor utilization means workloads run more efficiently on IBM LinuxONE, requiring fewer cores to run the same workload. The need for fewer cores means lower software licensing costs, and less electricity and space, helping companies meet their sustainability goals.

For example, consolidating Linux workloads on five IBM LinuxONE Emperor 4 systems, instead of running them on compared x86 servers under similar conditions, may reduce energy consumption by 75%, space by 50% and the CO_2e footprint by over 850 metric tons annually.[1]

Another system in the family is the IBM LinuxONE III Model LT2. The 19-inch air-cooled single-frame system supports SMT, up to 65 Linux cores, 16 TB of memory, 40 LPARs and dedicated I/O processors. The IBM LinuxONE III LT2 is ideal for any growing business that seeks to use IBM LinuxONE technologies' qualities of service, flexibility and performance.

Linux and IBM LinuxONE
The infrastructure on IBM LinuxONE provides an enterprise-grade Linux environment. This combination offers the advantages of the IBM LinuxONE hardware servers and leading IBM z/VM® virtualization with the flexibility and open standards of the Linux operating system.

IBM LinuxONE virtualization technology
During spikes in demand, the IBM LinuxONE systems can quickly and automatically redistribute system resources and scale up, scale out or both. These capabilities make the difference between flawless execution or costly and slow response times, and system crashes for your enterprise.

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

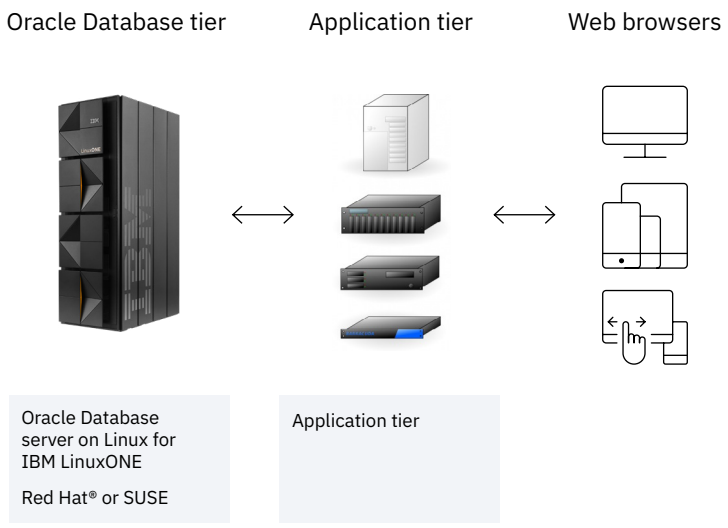

Figure 1: Oracle Database 19c on IBM LinuxONE Emperor 4

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

- The IBM Spectrum® Scale high-performance data and file management solution provides high availability capabilities based on the IBM General Parallel File System (GPFS). This solution is a cluster file system that provides access to storage. IBM Spectrum Scale can deliver additional speed, flexibility, cost efficiency and security by using built-in encryption and data protection capabilities.
- IBM GDPS® (Geographically Dispersed Parallel Sysplex) Virtual Appliance provides near-continuous availability and disaster recovery by extending GDPS capabilities for Linux guests on z/VM environments. It can help substantially reduce recovery time, recovery point objectives and complexity associated with manual disaster recovery.

Oracle Database 19c and IBM LinuxONE

Oracle Database 19c has a major focus on cloud and enables customers to make more efficient use of their IT resources. Oracle Database 19c is the long-term support release of the Oracle Database 12c and 18c family of products. Oracle Database 19c builds upon key architectural, performance and distributed data innovations successfully established in Oracle Database 12c and 18c releases including Multitenant, In-Memory, JSON support, Sharding and many other features.

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Multitenant architecture
Oracle's multitenant database offers a unique architecture that simplifies consolidation and delivers the high density of schema-based consolidation, but without requiring changes to existing applications. It delivers isolation, agility and economies of scale. A multitenant container database can hold many pluggable databases. An existing database can simply be adopted with no application changes required. Oracle Multitenant fully complements other options, including Oracle Real Application Clusters and Oracle Active Data Guard.

Database In-Memory
Oracle Database In-Memory provides a unique dual-format architecture that enables tables to be simultaneously represented in memory using traditional row format and a new in-memory column format. The Oracle SQL Optimizer automatically routes analytic queries to the column format and OLTP queries to the row format, transparently delivering best-of-both-worlds performance. Oracle Database automatically maintains full transactional consistency between the row and the column formats, just as it maintains consistency between tables and indexes today. The new column format is a pure in-memory format and is not persistent on disk, so there are no additional storage costs or storage synchronization issues.

High availability
Oracle offers customers a comprehensive set of database high availability capabilities that seamlessly work together to help reduce both planned and unplanned downtime. Oracle Database 19c goes beyond the limitations of basic high availability and with hardware features such as provided by IBM storage devices and LinuxONE servers.

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 19c offers a number of capabilities to help customers reduce the amount of planned downtime required for maintenance activities, including:

- Hardware Maintenance and Migration Operations to Oracle Database 19c infrastructure can be performed without taking users offline. Using Automatic Storage Management, disks can be added or removed online and the data is automatically rebalanced.
- 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 Oracle Data Guard or Oracle Active Data Guard enables upgrading of a standby database, testing of the new (upgraded) environment and then switching users to the new environment, without any downtime.
- Online Redefinition Oracle Database can reduce maintenance downtime by allowing changes to a table structure while continuing to support an online production system, and data files and partitions may be moved around storage devices while users continue to access underlying data.
- Edition Based Redefinition enables online application upgrades. Using 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.

Enhancing database availability

- Data Guard provides the management, monitoring, and automation software to create and maintain one or more synchronized copies of a production database to protect Oracle data from failures, disasters, human error, and data corruptions while providing high availability for mission critical applications.
- 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, without impacting database performance and with minimal cost or complexity.
- 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.
- Zero-Downtime Oracle Grid Infrastructure Patching enables patching of Oracle Grid Infrastructure on clustered architectures without interrupting database operations. This is achieved in a similar manner to rolling database patching, by applying patches out-of-place in a rolling fashion, with one node being patched at a time.
- Active standby DML Redirect is a popular feature of Active Data Guard with its ability to make use of standby databases for reporting and backups.

By working together, IBM and Oracle have developed a capacity estimation capability to aid in designing an optimal configuration for each specific Oracle Database 19c client environment.

Simplifying analysis of Big Data
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.

Oracle Database on a IBM LinuxONE server
The enterprise-grade Linux on IBM LinuxONE solution is designed to add value to Oracle Database solutions, including the new functions Oracle Database 19c introduces. Oracle Database on IBM LinuxONE includes the following benefits:

- Offers innovative technologies through IBM LinuxONE servers that consolidate workloads with mature virtualization and hardware partitioning capabilities
- Provides high levels of security with an industry-leading Evaluation Assurance Level (EAL5+) and virtualization ratings, and high quality of service
- Optimizes performance by deploying powerful database hardware engines available on IBM LinuxONE systems
- Improves performance by using the specialized dedicated IBM LinuxONE I/O processors
- Achieves greater flexibility through the IBM LinuxONE workload management capability by allowing the Oracle Database environment to dynamically adjust to user demand
- Reduces TCO by using the specialized IBM LinuxONE cores that run the Oracle Database and management of the environment
- Provides a platform to modernize for hybrid cloud to deliver new value

Sizing and capacity planning for Oracle Database 19c 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 19c client environment. You can obtain a detailed sizing estimate, customized for your environment, through your IBM or IBM Business Partner representative.

The IBM and Oracle alliance

Since 1986, Oracle and IBM have provided clients with compelling joint solutions, combining Oracle's solutions with IBM's complementary hardware, software and consulting solutions. More than 80,000 joint clients benefit from the strength, stability and endurance of the Oracle and IBM alliance. IBM has been providing Oracle customers complementary server and storage solutions that are designed to mitigate risk and boost efficiency, enabling customers to meet sustainability goals and improve availability and security, all while delivering a lower TCO. And as a hybrid cloud leader, IBM has been accelerating clients' journey to hybrid cloud for their Oracle workloads, enabling digital transformation across the enterprise, improving responsiveness of application owners to their line-of-business stakeholders and delighting end-users with high-performing, always available systems.

IBM is a member of the Oracle Partner Network

IBM delivers a combination of industry insight, extensive real-world Oracle experience, deep technical skills and high-performance servers and storage to create an optimized business solution. From planning to purchase, deployment, maintenance and support, IBM representatives help organizations reduce the TCO and complexity of managing their Oracle solutions environment while building a solid base for business growth. In addition, IBM solutions are certified by Oracle, providing the highest level of assurance that the two companies will work together to resolve any technical issues, so our joint clients can focus on their business needs.

For more information

For more information about joint solutions from IBM and Oracle, contact an IBM sales representative at 1-800-IBM-4YOU (426-4968).

For more information about IBM LinuxONE, visit ibm.com/LinuxOne.

For more information about Oracle Database 19c, visit oracle.com/database/technologies.

For more information about IBM LinuxONE and Oracle workloads, visit ibm.com/partnerworld/systems/linuxone/oracle-db-on-linuxone.

1. IBM LinuxONE Emperor 4 Product carbon footprint, IBM, 2022.

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