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## Highlights

- **OPEN:** Choose the tools and applications you know and love
  - **FLEXIBLE:** Meet demand with virtually limitless scale
  - **SIMPLE:** Fewer servers, less complexity, lower cost
  - **EFFICIENT:** Get unparalleled utilization and speed
  - **TRUSTED:** Embedded security and designed to never stop
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## IBM LinuxONE Emperor

Linux has been the world's fastest growing server operating system for a number of years and is now a major player in the global IT market, driving a multitude of new solutions. To be competitive in the market, the Linux infrastructure has to be efficient, secure, adaptive, and integrated. It must be designed to handle the explosive growth of mobile clients, be able to leverage vast amounts of data, and provide deep real-time insight at the point of impact to facilitate better informed decision making. And it must be deployable within a secure and resilient cloud ready environment.

The IBM® LinuxONE™ Emperor system offers the necessary capabilities and processing power to be that Linux infrastructure. It can protect sensitive transactions to minimize business risk and client exposure, while providing the performance needed to help deliver on service level agreements. Emperor can provide exceptional customer experience.



## Scalability and Performance

The LinuxONE Emperor allows for a simple Linux infrastructure approach. It is available with up to 141 configurable cores using the world's fastest commercial processor running at 5.0 GHz, for impressive performance and massive scaling. It can support up to 8,000 virtual Linux servers on a single footprint. That means that the virtualization capabilities in a single Emperor system can result in a less complex Linux infrastructure with fewer components, less management, less space requirements, and less software costs than x86 servers. For compared environments, it is estimated that a cloud environment on an Emperor will have a 32 percent lower total cost of ownership over three years than an x86 Cloud and a 60 percent lower total cost of ownership over three years than a public cloud.<sup>1</sup>

Emperor is a responsive service delivery platform capable of starting up hundreds of new virtual Linux servers in minutes. It allows you to share and over-commit system resources to meet your client expectations for unlimited access to existing and new services. LinuxONE supports multiple Linux Distributions such as Red Hat (RHEL), SUSE (SLES) and Canonical (Ubuntu). Virtualization capabilities are delivered by KVM or IBM z/VM hypervisors. The OpenStack support for KVM and IBM z/VM allows for cloud like management, with 3rd party tools such as by VMware vRealize™ Automation™.

Impressive scalability is provided by the virtualization alternatives to fully exploit the Emperor capabilities to meet your mobile and analytic demands. It can run at utilization rates as high as 100 percent for extended periods of time, and you can scale your capacity on demand. Having your Linux environment all in one server also means less time is spent on managing your Linux infrastructure.



## Trustful, reliable and secure for less risk

Within a single footprint, a LinuxONE Emperor is designed to avoid or recover from failures to minimize business disruptions. High availability is realized through component reliability, redundancy, and features that assist in providing fault avoidance and tolerance, as well as permitting concurrent maintenance and repair.

Emperor provides privacy for transactions and sensitive data by employing a dedicated cryptographic coprocessor, the CP Assist for Cryptographic Function (CPACF), which delivers cryptographic and hashing capabilities in support of clear-key operations. Exclusive to CPACF is the protected key support which provides the speed of processor based cryptography while helping to keep sensitive keys private from applications and the operating system.

Emperor also offers a cryptographic acceleration feature, the Crypto Express5S, providing a state of the art tamper resistant cryptographic coprocessor for secure-key operations along with new hardware assists for fast data encryption. Emperor with Crypto Express5S offers asymmetric key support for constrained environments using hardware assisted Elliptic Curve Cryptography (ECC), providing algorithms with much shorter key lengths than RSA keys for similar cryptographic strength—making ECC cryptography ideal for mobile and smartcards where performance constraints may be a consideration.

Emperor is a highly securable commercial server, built using groundbreaking technology you can trust. Without risk you can run many Linux virtual servers concurrently, leveraging Emperor's ability to isolate and protect each Linux virtual server, as if they were running on physically separated servers.

### **Enterprise qualities of service**

Emperor enables enterprise grade Linux, one that is more robust and trusted for critical workloads, provides high performance and throughput to deliver a lower cost per transaction.

Resiliency analytics for LinuxONE is designed to offer near real time diagnostics to help identifying potential problems in the Linux environment. It is an analytics solution executed in firmware, which intelligently examines message logs for potential inconsistencies or anomalies. With this capability organizations can address IT problems quickly, minimize availability lapses and intervene in IT problems before they become severe.

The IBM GDPS® Virtual Appliance can deliver multiplatform resiliency capability for Emperor. The solution is targeted to clients, who run the z/VM® hypervisor and associated Linux guests, providing high availability and disaster recovery benefits in case of system, application, or network failure.

IBM Spectrum Scale™ for Emperor, based on IBM GPFS™ technology, is designed to provide high availability through advanced clustering technologies, dynamic file system management and data replication. Spectrum Scale can continue to provide data access even if the cluster experiences storage or node malfunctions. Its scalability and performance are designed to meet the needs of your most data intensive applications.

When your IT infrastructure needs to be expanded, the efficiency, flexibility and qualities of Emperor are best in class. Its design allows you to grow capacity inside the server—on the fly—without affecting the running environment. Emperor can support exponential growth with up to 141 cores and up to 85 logical partitions for secured workload isolation, and HiperSockets™ for high speed internal partition-to-partition communications. Scaling within a single server helps eliminate the need to constantly buy, configure, and manage new services to handle growth. Emperor also supports up to 10 TB of memory which can provide impressive response time for in-memory applications as well as provide support for richer transactional analytics.

**IBM Systems**  
Data Sheet

<b>IBM LinuxONE Emperor at a glance</b>		
<b>Emperor Models</b>	Cores: Minimum* – Maximum	Memory: Minimum – Maximum
L30	1 – 30	64 GB – 2.5 TB†
L63	1 – 63	64 GB – 5.0 TB
L96	1 – 96	64 GB – 7.5 TB
LC9	1 – 129	64 GB – 10.0 TB
LE1	1 – 141	64 GB – 10.0 TB
<b>Cryptography</b>		
Crypto Express5S	2 - 16 features	
<b>Disk Connectivity</b>		
FICON Express16S / FICON Express8S	Maximum: 320 ports	
<b>NIC – Connectivity</b>		
OSA-Express5S	Maximum: 96 ports	
<b>High Speed 'Virtual' LANS</b>		
HiperSockets	Up to 32 connections	
<b>Supported Linux distributors</b>		
Red Hat	Red Hat Enterprise Linux (RHEL) 6, and 7	
SUSE	SUSE Linux Enterprise Server (SLES) 11 and 12	
Canonical	Ubuntu 16.04 LTS	

**IBM LinuxONE Emperor at a glance**

**Supported Hypervisors**

IBM z/VM	z/VM 6.3	
KVM	KVM 1.1 running on IBM LinuxONE with SUSE SLES SP1 guests	
IBM partitioning technology	Up to 80 LPARs for secure workload isolation	
<b>Typical Physical Weight of Air Cooled Configuration<sup>‡</sup></b>	Minimum configuration weight of new build L30 <sup>‡</sup>	Maximum configuration weight of new build LE1 <sup>‡</sup>
With Internal Battery Feature (IBF)	L30 3333 lbs (1512 kg) With overhead cabling 3453 lbs (1566 kg)	LE1 5983 lbs (2714 kg) With overhead cabling 6103 lbs (2768 kg)
Without Internal Battery Feature (IBF)	L30 2886 lbs (1309 kg) With overhead cabling 3006 lbs (1364 kg)	LE1 5312 lbs (2410 kg) With overhead cabling 5432 lbs (2464 kg)
Product Dimensions (D x W x H) without overhead cabling	73.5 x 61.6 x 79.3 inches (186.7 x 156.5 x 201.3 cm)	
Product Dimensions (D x W x H) with overhead cabling	73.5 x 72.7 x 84.8 inches (186.7 x 184.7 x 215.3 cm)	
Airflow (Capacity of Exhaust)	6370 cubic meters / hour (3800 CFM)	

**Why IBM?**

IBM understands your goals to drive top line growth and to enhance customer experience and loyalty. We understand your desire to use smart, efficient and robust technology solutions to achieve this. IBM provides expertise in systems, software,

services and financing, that can help you optimize your Linux environments for the constant flow of opportunities and challenges. Emperor helps you address the velocity of your business while helping to keep users and data secure and budgets in check.

## For more information

To learn more about the IBM LinuxONE Emperor, please contact your IBM representative or IBM Business Partner, or visit the following website:

[ibm.com/systems/linuxone/enterprise-linux-systems/emperor.html](http://ibm.com/systems/linuxone/enterprise-linux-systems/emperor.html)

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<sup>1</sup> Performance comparison based on IBM Internal tests comparing IBM LinuxONE Emperor cloud with one comparably configured private x86 cloud and one comparably configured public cloud running an aggregation of light, medium and heavy workloads designed to replicate typical IBM customer workload usage in the marketplace. System configurations are based on equivalence ratios derived from IBM internal studies and are as follows: Public Cloud configuration: total of 219 instances (128 for light workloads, 64 for medium workloads and 27 for heavy workloads); x86 Cloud configuration: total of eleven x86 systems each with 24 Intel E7-8857 v2 3.0GHz cores, 512 GB memory, and 7x400 GB SSDs; LinuxONE Emperor Cloud configuration: total of 32 Linux cores, 3806 GB memory, and Storwize v7000 with 47x400 GB SSDs. Price comparison estimates based on a 3YR Total Cost of Ownership (TCO) using publicly available U.S. prices (including a 20 percent discount for middleware) current as of January 1, 2015. Public Cloud TCO estimate includes costs (US East Region) of infrastructure (instances, data out, storage, support, free tier/reserved tier discounts), middleware and labor. LinuxONE Emperor and x86 TCO estimates include costs of infrastructure (system, memory, storage, virtualization, OS, cloud management), middleware, power, floor space and labor. Results may vary based on actual workloads, system configurations, customer applications, queries and other variables in a production environment and may produce different results. Users of this document should verify the applicable data for their specific environment.



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Statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

\* Ordering an IBM LinuxONE Emperor with Elastic Pricing the minimum Linux cores must be six (6), independent of the model that is purchased.

† Provides the minimum physical memory required to hold base purchase memory plus 96 GB HSA

‡ The Power® Estimator tool includes weight data and has the capability to provide a more accurate weight for your particular configuration. Log on to Resource Link at <http://www.ibm.com/servers/resourceLink>. Navigate to Tools, then to Power and weight estimation. Specify the quantity for the features that are installed in your machine. This tool estimates the power consumption for the specified configuration.



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