

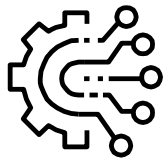
# IBM LinuxONE Rockhopper II Overview

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Steven Dickens

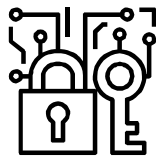
- Value proposition
- Product overview
- Use cases /  
success stories



# LinuxONE



Unparalleled  
engineering for  
data serving



Unmatched  
security and  
privacy



Unrivaled  
economics  
at scale



# Unmatched security and privacy

## The world's premier Linux® system for highly secured data & cloud serving

- Encryption at rest and in flight
- Industry-leading multi-tenant isolation
- FIPS 140-2 Level 4 certification
- Industry-unique IBM Secure Service Container helps protect data and applications from both internal and external threats

*“The security offered by LinuxONE is key. Our customers can feel confident that their data is safe at all times.”*

-- Cristian Dinu, Co-founder and Technical Leader, Learn Forward / Hypersay



Redefining the security perimeter for the next generation of applications

IBM LinuxONE™ delivers Secure Service Containers to protect against:

- Threats to data privacy
- Stolen credentials
- Malware / ransomware
- Database manipulation

# Unrivaled economics at scale

With LinuxONE, scale a single MongoDB database to 17TB with less than 1ms response times at large scale<sup>1</sup>... and save up to 37% when compared to x86<sup>2</sup>

"Scalability is one key factor that keeps us on LinuxONE."



China's highway passenger ticketing system replaces 4,000 x86 servers with one IBM LinuxONE to scale with growing customer needs.

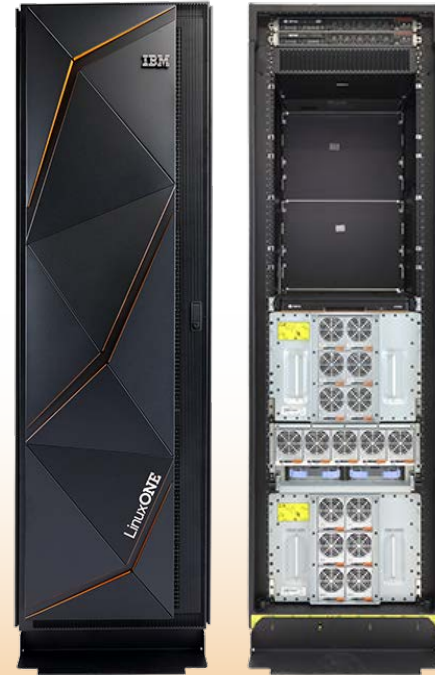
With LinuxONE, scale a single MongoDB database to 17TB with less than 1ms response times at large scale<sup>1</sup>... and save up to 37% when compared to x86<sup>2</sup>

# Introducing the IBM LinuxONE Rockhopper II

- Up to 30 cores, equivalent to 180-240 x86 cores
- Up to 8 TB memory
- I/O support for up to 2 million IOPS, 128 Gbps
- 19" industry standard form factor
- Optional 16U of available frame space for additional components, e.g., storage, server, network switch
- PDU-based<sup>1</sup> with 200v-240v power
- Air-cooled only

Machine Type: 3907

Model: LR1



"Bare Metal"  
(on LPAR)

z/VM®



vRealize  
Automation

# Common functions available across all LinuxONE models

## I/O

FICON Express16S+  
OSA-Express 6S  
Crypto Express6S  
zEDC Express,  
RoCE Express2  
zHPF

## RAIM memory

## HiperSockets™

## Security

In-core crypto (CPACF),  
Crypto Express6S, GCM  
Encryption (Java™), TKE

## Pause-less garbage collection

## SIMD

## SMT

## IBM Dynamic Partition Manager (DPM)

## IBM Secure Service Container capable

## On-chip compression

## Physical planning

- Overhead (top exit) cabling and power
- ASHRAE A3

## HMC Mobile app

## Rockhopper II

Machine Type: 3907

Model: LR1

<b>Model</b>	<b>LR1</b>
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<b>Customer PUs</b>	<b>30</b>
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<b>Max Memory</b>	<b>8 TB</b>
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# Scalability and flexibility ... ready for growth

**Rockhopper II**  
Machine Type: 3907  
Model: LR1

- Processor capacity (processor quantity) is now ordered by **feature code** rather than by model number
- Flexible infrastructure allows adding choice of storage, server or switch options in the optional 16U of available frame space
- Easy setup for hardware and logical partition configuration with IBM Dynamic Partition Manager
- New mobile device capabilities available
  - Push notifications for system administrator
  - Secure monitoring and management from anywhere



Feature Code	Chips	Configurable Processor Units (PUs)	System Assist Processors (SAPs)	Integrated Firmware Processor (IFP)	Spare Processors	Linux Cores		Optional Additional SAPs
						Min	Max	
Max4	1	8	2	1	1	1	4	0-2
Max12	2	16					12	
Max24	4	28					24	
Max30	4	34					30	



# Common architectures, different packaging and markets



## Platform Simplification

- Standardization across many components – including industry standard 19” rack
- 16U free space in frame

## Processor Units (PUs)

- 8, 16, 28, 34 PU cores per CPC drawer
- Feature based sizing - 4, 6/12, 6/24 or 6/30 CP/PU cores available for characterization
- Up to 2 SAPs per system
- 1 spares designated per system
- Up to 40 LPARs

## Memory

- RAIM Memory design – Min of 64 GB – Max to 8 TB
- 64 GB Fixed HSA
- IBM Virtual Flash Memory (replaces Flash Express)

## I/O

- New PCIe Gen 3 IBM zHyperLink™ technology
- 16 GBpS PCIe Gen 3 I/O Interconnects
- 3 Logical Channel Subsystems (LCSSs) with 3 Sub-channel sets per LCSS



# Hypervisors and Virtualization for LinuxONE

PR/SM-LPARs  
IBM DPM

EAL 5+

- Virtualization is **built into the DNA of LinuxONE**
- PR/SM™ **manages and virtualizes all** the installed and enabled system resources as a single large SMP system
- **Full sharing/partitioning of the installed resources** with the highest levels of efficiency and utilization
- **Scale up or scale out on demand** with support for up to 85 partitions on Emperor II or up to 40 on Rockhopper II
- IBM Dynamic Partition Manager is PR/SM with a **simplified provisioning and management experience**
  - New in DPM: FICON® ECKD™ support - Guided storage setup, provisioning and management
- Assured **workload isolation**, designed to meet the highest EAL5+ security certification
- Dynamic optimization and scalability

z/VM v6.4  
and v7.1

SOD

- **Enables extreme scalability, security and efficiency** – Support for 2TB of memory and improved z/VM paging, enabling workload consolidation, growth in memory-intensive applications, and superior levels of elasticity
- **Operational improvements** by providing Guest Large Page Support and Guest TX (Transactional eXecution) support
- **Increase efficiency and reduce complexity** – Reliability, availability and serviceability enhancements remove the need for a SAN Volume Controller, allowing low-end devices such as Storwize, SAN Volume Controller, V7000, V840 and V9000 to be directly connected to z/VM host use
- **HW Security features** – Pervasive encryption support: encrypting data moving between active memory and z/VM paging volumes. Enable guests to improve application program security by exploiting LinuxONE encryption features
- **HW Performance features** – Allowing guests to improve the performance of Java garbage-collection processes
- **Introducing z/VM 7.1** – Delivering a new release cadence that improves z/VM's **Continuous Delivery (CD)** model. Includes Single System Image (SSI) support in the base product, improving availability of z/VM systems by allowing clients to schedule outages without disrupting business critical applications

KVM running on  
IBM LinuxONE



IBM LinuxONE / 82017182USEN-00/ R

- Supports up to **8TB memory per guest** for greater processing scale and performance
- Support new analytics workloads with Single Instruction Multiple Data (SIMD) for competitive advantage
- **Improved performance** for guests, Java workloads, and cryptographic processing
- Secure and protected business data with **crypto exploitation**
- Technology **developed by IBM** ... product **offered by Linux Distribution partners**

# IBM LinuxONE Operating system support for Emperor II and Rockhopper II

## Linux OS support:

### Minimum Distributions\*

- RHEL 7.3 with service update
- RHEL 6.9 with service update
- SLES 12 SP2 with service update
- SLES 11 SP4 with service update
- Ubuntu 16.04 LTS
- Ubuntu 18.04 LTS

## IBM z/VM

- z/VM® 6.4 with PTFs



## KVM supported

- KVM running on LinuxONE is offered by Linux distributions

\*Note: Listed support is for Emperor II and Rockhopper II, For minimum required distribution levels for all LinuxONE models see the IBM tested and supported Linux environments:

[ibm.com/it-infrastructure/z/os/linux-tested-platforms](https://ibm.com/it-infrastructure/z/os/linux-tested-platforms)

IBM cannot legally discuss Linux exploitation prior to GA from distributors.

IBM is working with the open source community and the Linux distribution partners to get new Rockhopper II functionality supported with Linux for Z

# A new opportunity to build an “all in one” solution for greater efficiency

New to the platform with Rockhopper II

With smaller I/O configurations – a new 16U Reserved feature code can be added that tags 16U of space in rack as “Available” for customer use

This creates **a new opportunity** to build a fully customized, comprehensive solution to meet your infrastructure needs

Populate with your choice of server, switch or storage elements <sup>1</sup>

<sup>1</sup> Hardware service to IBM or non IBM options may be provided by a 3<sup>rd</sup> party – but they must be able to provide analysis of power, thermal, air flow and other requirements as listed in the IMPP guide. Requirements for physical structures as well as interactions with the ‘mainframe server’ will be provided



# IBM LinuxONE and Storage synergy

## Storage Networking



SAN256B-6 SAN512B-6



SAN64B-6



SAN42B-R



## Flash and Hybrid Storage Systems

z/VM, LinuxONE (FCP only)



FlashSystem™  
A9000



Storwize®  
V7000 / V7000F



FlashSystem  
V9000



FlashSystem  
FS900



DS8880

Other examples of uses for 16u Reserved include IBM 1u HMC, TKE, Power Systems™, NVMe

# Upgradeability for Rockhopper II

No upgrades *to* Rockhopper II

Frame roll upgrade *from* Rockhopper II Model LR1 to IBM z14 Model ZR1

Frame Roll MES	z14™ Model ZR1	Rockhopper II LR1
Rockhopper I (L10)	No	No
Rockhopper I (L20)	No	No

Within Family after installed	
Rockhopper II LR1 to z14 ZR1	Yes
z14 ZR1 to Rockhopper II LR1	No

# Why customers buy LinuxONE – Customer use cases



# IBM LinuxONE and Storage synergy

*Designing, developing and testing together is key to unlocking true value*

	<b>Connectivity to LinuxONE</b>	<b>Virtualization supported</b>	<b>Comments</b>
IBM System Storage® DS8880	FICON, FCP	z/VM	<ul style="list-style-type: none"><li>• zHPF and Extended Address Volumes</li><li>• GDPS®/PPRC HyperSwap®<sup>1</sup></li><li>• FICON Express16S+ with Forward Error Correction Codes, FICON Dynamic Routing, Read Diagnostic Parameters, Enhanced Write Protocol</li></ul>
TS7700	FICON	z/VM	
IBM FlashSystem A9000/A9000R	FCP	KVM, z/VM	
Storwize® V7000/V7000F	FCP	KVM, z/VM	
SVC	FCP	KVM, z/VM	
IBM FlashSystem V9000	FCP	KVM, z/VM	
IBM FlashSystem 900	FCP	KVM, z/VM	
TS1150, TS4500	FICON, FCP	z/VM	<ul style="list-style-type: none"><li>• Support for z/VM via FICON if TS7700 is front end</li></ul>

<sup>1</sup> GDPS support for HyperSwap via the GDPS Virtual Appliance for Linux running under z/VM or KVM (GDPS appliance not available for native Linux on LinuxONE)





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GDPS*	IBM Z*	PowerPC*	System Storage*	

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