IBM LinuxONE Rockhopper II
Announcement

Frequently Asked Questions

Worldwide

LinuxONE Rockhopper II

What is IBM announcing?

IBM is extending its family of IBM z14® and IBM LinuxONE systems with a new lower cost of entry built on an industry-standard form factor. Now businesses of all sizes can take advantage of a low-cost, highly secure cloud platform that protects and leverages their most valuable data while enabling rapid development and deployment of critical workloads within a multi-cloud infrastructure. Built on proven IBM Z® technology, the new systems feature a 19-inch rack design, allowing for easy placement into cloud data centers. The new models do not require special space, cooling or energy, bringing the power of IBM Z – unsurpassed security with pervasive encryption, machine learning, cloud capabilities and powerful analytics – to an even broader set of clients. The new cloud-ready models round out a strong family of IBM Z and LinuxONE offerings.

What business challenges do these systems address?

The world is transforming to digital, and this transformation is having a profound impact on each of us as individuals, in business and in society at large. As businesses adapt to capitalize on digital, trust will be the currency that drives this new economy. Consumer, client and partner expectations have increased. They demand security, transparency and greater value in every interaction and transaction. Cyber threats continue to come from outside – but the new concern of the chief information officer is the exposure of internal threats. The focus on cloud continues to grow, as our clients face balancing cloud agility with on-premises security. Our new offerings are built on the groundbreaking technologies of IBM z14 and IBM LinuxONE Emperor II: pervasive encryption and data serving at scale. This announcement introduces industry-leading security for Linux environments, with the broad use of IBM Secure Service Container technology. This unparalleled capability provides a hyper-secure logical partition (LPAR) and encryption of all data within that partition. CIOs and service providers can provide these environments to their end users without fear of compromising the trust they have, while also meeting data compliance regulations, such as GDPR.

What new technologies are you introducing?

We are expanding the z14 and LinuxONE families, adding capabilities for all our clients to address their challenges. These offerings are built on the groundbreaking technologies of IBM z14 and IBM LinuxONE Emperor II: pervasive encryption and data serving at scale. Using IBM Design Thinking, we worked closely with more than 80 clients and Business Partners to create our newest offerings.

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These systems provide a hyper-secure and on-premises or private cloud-enabled execution environment that features:
- Industry-leading peer isolation
- Vertical isolation and protection of data from privileged users
- Automatic encryption of data and code (both in flight and at rest)
- Validation of code to reduce risk of tampering or malware

In addition, our new z14 and LinuxONE offerings bring increases in capacity, performance, memory and cache across nearly all aspects of the system.

Supporting facts:

- Both systems have a complete system redesign to meet industry standard data center placements, frame size, power, airflow, etc. – while still maintaining total flexibility for raised floor, non-raised floor, I/O exits, etc.
- Rockhopper II: Up to 30 IFLs, 8 GB memory, and Secure Service Containers for Linux® environments on top of Emperor II (e.g., DPM for easier Linux administration).
- z14 ZR1: Up to ~8000 MIPS, 8 GB memory, 25% SMT performance, Secure Service Containers for Linux environments, on top of z14 (pervasive encryption, hyperlink, 1.5x cache improvements, pause-less garbage collection).

How are these new entry-level systems different from their predecessors?

We continue focus on our foundational qualities of service, while delivering new and innovative technology to our clients. The new systems hold to our high standard of quality, reliability and availability: There are no better or more scalable platforms for business-critical workloads. These new systems represent the most significant system redesign for the mainframe, standardized for modern data center requirements.

- IBM LinuxONE Rockhopper II compared to LinuxONE Rockhopper I: 40% smaller footprint, 50% greater capacity (30 IFLs vs. 20). Secure Service Containers available for all applications for Linux environments.
- z14 ZR1 compared to IBM z13s®: Full system redesign, 10% more capacity, 2x more memory, standardization for easy data center placement, 25% increased performance of SMT, crypto functions, availability of things like Hyperlink, and pervasive encryption – none of which are supported or perform well on z13s.

What are the business benefits?

We designed these new offerings with our clients – addressing their requirements but also providing them opportunities to spend more time on innovation – in both on-premises and hybrid cloud environments.

Technologies such as pervasive encryption and zHyperLink™ require no application changes, so clients can see benefits right away. Our system design with increased I/O performance and Java™ performance mean faster completion of every transaction. Powerful and simple security translates to easier compliance with industry regulations.

Supporting facts:

- Using a publicly available standard benchmark test, Java workloads on Linux on IBM Z (or LinuxONE) running with pauseless garbage collection delivered an SLA up to 4x better than x86 servers.
- Rockhopper II: CPO tested 8:1 consolidation ratio, shared architecture for vertical scale for business peaks, hundreds of non-client configurable cores dedicated to RAS and I/O. New Smaller system footprint translates to less power/ cooling costs, and direct rental space rental costs if server is in co-lo data center.
- Support up to 330,000 Docker containers.

- Run 240 concurrent MongoDB databases executing a total of 58 billion database transactions per day on a single z14 ZR1 server.
- z14 ZR1: shared architecture for vertical scale for business peaks, hundreds of non-client configurable cores dedicated to RAS and I/O.
- z14 ZR1 is capable of processing over 850 million fully encrypted transactions a day on a single system.
- Microservices show a better performance across z14 ZR1 LPARs than compared cross x86 servers providing up to 2.1x more throughput per core for the AcmeAir benchmark.

What do these systems allow clients to do that they couldn't do before?

IBM Secure Container Service enables the development and management of container-based mission critical applications on IBM Z and LinuxONE, while seamlessly integrating with enterprise-wide DevOps container strategy

- The z14 Model ZR1 and LinuxONE Rockhopper II are extremely scalable and support an optimized cloud infrastructure that is flexible and meets workload demands.
- The z14 Model ZR1 and LinuxONE Rockhopper II are cloud-ready platforms that fully support connecting and integrating Z applications and data via industry standard APIs and microservices with other applications across an enterprise's ecosystem, empowering application developers, even those with no IBM Z skills, to continuously and rapidly build, refine and deploy applications.
- The z14 Model ZR1 and LinuxONE Rockhopper II can be the base for an integrated hybrid cloud for mission critical core business workloads which demand maximum security and can create the foundation for better business partnerships.

The industry-standard form factor allows clients to reduce power costs and have a 40 percent smaller footprint cost (than the previous generation—z13s and Rockhopper) that fits easily in any datacenter. Clients now have the option to customize servers by adding storage, server or switches of their choice in the 16U of available frame space.

How does this offering differ from what was announced during THINK, where we have four new services in our cloud that provide mainframe-level security?

This is the server from which those offerings are based on, and can be the foundation for new services - in public, private and hybrid clouds, as well as on prem.

What are the three key messages we want to get across with this announcement?

Platform simplification:

- Deploy an appliance and operating system in minutes with IBM Secure Service containers
- Fully encrypt all applications and their data with any changes to the applications
- Encrypting as much data and transactional pipeline as possible cloud infrastructures can be secure—and compliance with regulatory mandates can be simplified
- New HMC provides users with a modern workspace that enables them to securely manage system hardware
- New Manage System Time task provides a simplified workflow that includes improved help tools
- Easier system administration using IBM Dynamic Partition Manager with simplified hardware configuration and provisioning tools

- IBM z/OS® Management Facility (z/OSMF) new browser-based management console for simplified administration and management
- zHyperLink improves application response time, cutting I/O sensitive workload response time by up to 50 percent without requiring application changes
- 1000s of open source source application packages available on IBM Z
- LinuxONE removes the need for Z skills to develop applications
- 2. IBM z14 provides a trusted digital experience delivered through the cloud.
- 3. New industry-standard design.

What workloads are the new systems best suited for?

The LinuxONE Rockhopper II is best suited for data-serving workloads. The z14 ZR1 is best suited for transaction processing, heavy I/O workload applications.

How are they sized to different client business requirements?

Security remains one of the top concerns of CxOs. These new systems allow clients to realize business benefits regardless of the operating environment. Secure Service Containers create the most secure Linux environment, while pervasive encryption is easy to turn on for z/OS environments. IBM Z continues to have offerings such as On/Off Capacity on Demand (OOCoD), allowing clients to grow as business demands and scale back down accordingly.

Both systems will support the new "data center in a frame" capability – allowing clients to customize the environment by using up to 16U of free space in the frame, for other components, such as storage, networking, switches, HMC, etc.

Supporting facts:

- Rockhopper II: Starting with the entry model of 2 IFLs, and 128 GB memory ranging to 30 IFLs and 8 GB memory, clients can start small and grow with their business. Increased capacity for I/O as well.
- z14 ZR1: The ZR1 is a single-frame system, and the sixth model of the z14 family – which now scales from 88 MIPS to over 140k MIPS, (a z14 for everyone). Increased capacity for I/O as well.

What marketplace demands are driving the need for these new systems?

More and more workloads are considered mission-critical as businesses of all sizes embrace the digital enterprise. Penalties for downtime are forcing customers to increase availability levels of their infrastructure. There are increasing needs and/or legal requirements for absolute, uncompromised fault tolerance, particularly in finance, telecommunications, healthcare and government.

Data continues to grow as our clients' most valuable asset. The ability to rapidly derive actionable insights will enable progressively smarter business decisions and improve customer experiences, leading to new revenue streams. Protection of data and insights is paramount for trust across the ecosystem.

As we designed pervasive encryption, we had client feedback at every step – to make sure we addressed these new demands. "Cloud First" and "Build Once, Deploy Anywhere" design approaches are driving our clients to implement mixed models for IT.

Supporting facts:

- ICP, blockchain on premises, z/OS cloud provisioning and Secure Service Container are all examples of how we are merging cloud and on premises to bring our clients the best options for how they want to deploy. And now we are extending our capabilities into IBM public cloud offerings.

What are the benefits of these new systems?

The key client benefits include of our new IBM Z and LinuxONE systems include:

- Transparently grow with 10% more capacity and 2x (8 TB) the memory than z13s.
- Grow with 50% more capacity and 2x (8TB) the memory than Rockhopper.
- Complete system redesign delivers above growth with 40% less machine space and standardized to be deployed in any data center.
- Cut application response time in half, performance optimized at scale.
- IBM z14 ZR1 is capable of processing over 850 million fully encrypted transactions a day on a single system.
- Deploy and run any Linux-based application in a Secure Service Container, an industry leading technology that nearest competitor can't come close
- No unique mainframe skills required for Linux administrators.
- Scale-out to 330,000 Docker containers, no application server farms necessary.
- Plus – all the benefits of pervasive encryption, crypto performance, compression and other technology delivered with z14 processor.
- Supports the new IDAA for z/OS offering from October 2017, can be the foundation for an IBM ICP solution, create a data center in a frame by co-locating storage, networking, or other elements in the same frame as the mainframe server.
- Lower entry cost compared to z13s

Performance claims:

- The largest z14 ZR1 is expected to provide up to 13% more z/OS and up to 60% more Linux on IBM Z capacity than the largest z13s
- The zIIP processors on the IBM z14 ZR1 also provide an optional multi-threading technology capability; with the multi-threading function enabled, the performance capacity of a zIIP is expected to typically be up to 25% higher (range typically between 10% and 40%) than without the multi-threading function enabled
- CPACF encryption rates for like modes and data sizes on z14 ZR1 vs. z13s
- Up to 4.2x improvement in throughput per core with IBM Java 8 SR5 on z14 ZR1 compared to Java 8 SR3 on z13s
- 17% improvement in batch elapsed time due to FICON Express16S+ as compared to z13s FICON Expressx16S.
- Java Performance using new IBM Java 8 SR5 Pause-less garbage collection feature provides Up to 3x better throughput for response time constrained SLAs on z14 ZR1 compared to using Java 8 SR3 on z13s
- A specific example of a workload as compared to x86:
- Business Rules Processing Performance with IBM Operational Decision Manager on z14 ZR1 vs. x86, provides Up to 55% improvement in throughput per core with IBM Java 8 SR5 compared to x86

How does this announcement support IBM's Cloud strategy?

The new IBM z14 Model ZR1 and IBM LinuxONE Rockhopper II are cloud-ready systems that offer a new flexible and scalable infrastructure, supporting new and existing Z environments, and are ready to securely and aggressively participate in a cloud data center.

The IBM z14 Model ZR1 and IBM LinuxONE Rockhopper II, with 8TB of memory, provide greater processing scale and performance, enabling more in-memory workloads and in-line analytics for delivering richer transactional experiences

IBM z14 Model ZR1 and LinuxONE Rockhopper II offerings:

- IBM Cloud Private (ICP)
- Pervasive Encryption
- Secure Service Containers
- IBM Db2® Analytics Accelerator (IDAA)
- Blockchain
- IBM Database as a Service on LinuxONE

Does including one of these (ZR1) make the entire cloud center more secure or just the data running through the mainframe? How does that work?

Having a ZR1 makes the data and applications associated with the mainframe more secure. By using it 'as a service' you can enable the high level of security easily across the data center.

Are we going to sell these to Google, Amazon and MSFT for their data centers? If yes, then wouldn't doing so water down the IP/advantage of IBM's Cloud data centers?

These systems were designed for our clients with the cloud in mind, no matter what their cloud deployment is (public, private, hybrid). IBM is the first to bring these hyper secure services like Secure Service Containers to the public cloud.

How tightly coupled are the new systems to IBM storage systems?

With our strong ecosystem partnerships, we add to our strengths in scalable and secure data serving, machine learning and analytics, agile DevOps and as-a-service offerings. These partnerships are both within IBM and outside IBM, as we focus on tightly coupled, full-stack solutions for our clients, for their existing applications and new cloud-ready applications.

Supporting facts:

- Rockhopper II: Supports both FCP and FICON® channels so clients can choose the storage that works best for them – with the new 'data center in a frame' ability, they can co-locate storage.
- z14 ZR1: Supports both FCP and FICON channels – we develop our offerings with our storage team as partners – Hyperlink is a perfect example of the two teams working together for our clients' benefit. The first exploitation of hyperlink provides up to 10x performance on Db2 log reads, with no application changes. with the new 'data center in a frame' ability, they can co-locate storage.