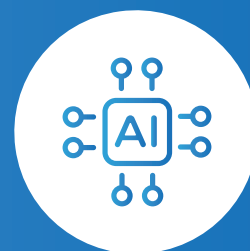# IBM LinuxONE 4 Express
Your essential questions answered

Freeform Dynamics Ltd

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Linux beyond x86

If you're running Linux workloads at scale, you understand the power and openness that has made Linux the operating system of choice for many x86 environments. However, maintaining a significant x86 landscape while meeting the needs of demanding applications is far from easy.

It was to address this challenge that IBM introduced its high-end LinuxONE platform nearly a decade ago, engineered to bring extreme performance, resilience, security and operational simplicity to enterprise Linux environments. With the new IBM LinuxONE 4 Express launched in early 2024, these capabilities are now available in a preconfigured, cost-optimized system for customers looking to start with a smaller footprint and scale up over time. LinuxONE 4 Express also targets demanding use cases that can push x86 architecture beyond its limits, from core banking, through high-scale digital asset management, to AI-augmented medical imaging.

To learn more about LinuxONE 4 Express as an alternative to x86 infrastructure, we spoke with Marcel Mitran, an IBM Fellow and the CTO for LinuxONE, to get his perspective on some of the key questions prospective customers are likely to have:

1 What is LinuxONE 4 Express, and how is it different to x86 platforms?

2 What types of use case particularly benefit from a platform like this?

3 How is the ability to start small and grow supported in practice?

4 What are the skills requirements for working with this platform

5 What support can we expect from IBM and its ecosystem?

6 What else do I need to know about LinuxONE 4 Express ?

Background and relevance

What is LinuxONE 4 Express?

IBM launched LinuxONE in 2015 to address the challenges of running large x86 Linux estates. Server proliferation had led to escalating costs and overheads in relation to power, cooling, space. software licensing and the operation of ever more complex environments. Meeting the needs of workloads that pushed x86-based systems beyond their natural limits was also becoming increasingly difficult.

Against this background, IBM LinuxONE provided an opportunity to consolidate many x86 Linux VMs onto a single high-density platform that took performance, resilience, security and simplicity to the next level. Dynamic resource and contention management also allowed co-hosting of workloads with different demand profiles without jeopardizing SLAs for critical applications.

"IBM LinuxONE launched in 2015 to target clients running Linux workloads who wanted the next level of security, scalability and reliability."

Marcel Mitran
IBM Fellow, CTO for LinuxONE

So how was IBM able to achieve all this? Well, with decades of experience delivering ultra high-end enterprise systems, IBM had a lot to build on.

At its core, LinuxONE leverages the same powerful, sophisticated, AI-enabled Z architecture found in IBM's modern mainframes - the systems that power so much of the world's economy. However, LinuxONE itself is not a mainframe in the familiar sense of being a massive-scale general purpose powerhouse. Rather, it represents a repurposing of proven technology to create an open, flexible systems architecture specifically designed to meet the needs of enterprise class Linux hosting.

As the platform matured, IBM was able to incorporate the LinuxONE architecture into a pre-configured rack-mount offering with a fixed entry price point (details later). And so IBM LinuxONE 4 Express was born to meet the needs of customers looking to start smaller and scale up over time.

What is the platform suited for?

IBM LinuxONE 4 Express is a versatile platform capable of supporting a wide range of enterprise workloads. One common use case is data serving and transaction processing at extreme scale. The platform's ability to efficiently handle high-volume, low-latency transactions makes it well-suited for applications like core banking systems, financial markets, and large-scale databases. With pervasive encryption, secure key management and hardware-based inferencing, the platform is also ideal for advanced workloads such as high-scale digital asset management, blockchain-based solutions, and emerging AI applications in areas ranging from medical imaging to real-time fraud detection.

Another important use case is private and hybrid cloud infrastructure. The platform's ability to securely partition and share resources across diverse workloads makes it ideal for hosting VMs, Kubernetes clusters, and serverless environments. The openness of Linux and support for commonly used toolchains also makes LinuxONE 4 Express one of the most robust DevOps platforms available.

Across all these scenarios, a very low energy footprint and an ability to support extremely high utilization rates means LinuxONE 4 Express can also deliver a significant sustainability advantage.

Addressing the obvious concerns

What does 'start small and grow' mean in practice?

LinuxONE was designed from the outset with commercial accessibility in mind, and LinuxONE 4 Express takes this further. At the time of writing, IBM LinuxONE Express 4 is available in 3 preconfigured sizes, with 4, 6 or 12 cores activated, and expandable up to 16 cores. This allows organizations to start with a configuration that meets their current needs and budget, while preserving the ability to grow by activating additional cores as workload demands increase.

To give you an idea of the entry point, pricing for the base hardware starts at $135,000 USD, though exact costs will vary by geography. Even at this initial size, the platform can cost-effectively host the equivalent of many tens of physical x86 servers, with a significant reduction in operational overhead, floor-space usage, power consumption, cooling and overall CO2 emissions. The point is, you don't need a huge server estate for LinuxONE 4 Express to make sense.

"IBM Global Finance can help make both the initial step and the ongoing progression more financially manageable as you grow."

Marcel Mitran
IBM Fellow, CTO for LinuxONE

Beyond activating additional cores, LinuxONE offers other growth options. For organizations that outgrow the capabilities of LinuxONE 4 Express, IBM provides larger models in the LinuxONE family. Using penguin-themed naming, the mid-sized option is called 'Rockhopper', while the largest is known as 'Emperor'. Migrating from LinuxONE 4 Express to one of these larger systems can often be achieved with no service interruption, providing a smooth path for continued growth. These larger models can also be custom-configured and incrementally expanded internally, offering even more flexibility to match your specific capacity and performance requirements over time.

Another approach to scaling is to add multiple LinuxONE 4 Express servers to your environment, forming a distributed cluster. This allows you to spread your workloads across several systems, achieving greater horizontal scalability and resilience.

What specialized skills are needed?

From the Linux layer up, IBM LinuxONE 4 Express only requires standard Linux-related skills. Whether you're an architect, developer, or operator, you'll find no difference between Linux on the LinuxONE architecture and Linux hosted on x86 platforms like VMware, Nutanix, or public cloud VMs.

However, as with other converged and engineered systems, some additional skills will be required to fully exploit LinuxONE's advanced enterprise capabilities. Experienced IT pros will need to familiarize themselves with the platform's logical partitioning for resource segmentation, VM creation and management using the z/VM or KVM hypervisors, and the unique aspects of storage and network administration in a LinuxONE environment.

Critically, none of this is particularly onerous for those already well-versed in managing virtualized infrastructure. The learning curve is comparable to adopting any new software-defined stack, such as VMware or Nutanix. With a little focused enablement, your existing talent can quickly master the nuances of the platform.

Other considerations

What support can we expect?

One of the strengths of IBM's ecosystem has always been the availability of expert resources to help you succeed with your initiatives. When it comes to LinuxONE, that support is available through an extensive global network of business partners, including distributors, resellers, systems integrators and consultancies.

This means that wherever you are in the world, you'll have access to people with proven skills and experience in both LinuxONE and enterprise Linux in general. They can help with all aspects of your LinuxONE 4 Express deployment - from scoping, sizing, procurement and implementation, right through to day-to-day operations and ongoing optimisation.

"We and our partners are there to help initially with as much or as little support as necessary. Even when we are more involved, it's pretty straightforward to transition to self-sufficiency so the client can move forward on their own."

Marcel Mitran
IBM Fellow, CTO for LinuxONE

And if you do ever hit a snag, either IBM or one of its partners will always be on hand to jump in and troubleshoot the problem. It's also worth mentioning IBM's online resources, such as the LinuxONE Community Cloud, which provides a free LinuxONE environment to experiment in and develop skills, along with extensive documentation, tutorials and forums to interact with the LinuxONE community.

What else do I need to know?

While reading through this overview should give you a good sense of what IBM LinuxONE 4 Express is about, the best way to determine whether the platform makes sense for your business is to speak with IBM or one of its partners. They'll be able to walk you through the specifics of your current Linux estate, assess the potential benefits of consolidation, and provide you with a more concrete idea of what a LinuxONE 4 Express deployment would entail in practice.

In the meantime, if you want to learn more, here are some key IBM resources to check out:

The IBM LinuxONE home page
https://www.ibm.com/linuxone

The IBM LinuxONE 4 product page
https://www.ibm.com/products/linuxone-4

The IBM LinuxONE TCO and CO2E calculator
https://www.ibm.com/resources/systems/zsystems-linuxone-tco-co2e-calculator/

The LinuxONE Community Cloud
https://linuxone.cloud.marist.edu/#/login

Company details

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