Achieve cloud without compromise

Build the cloud you
want — with the privacy
and protection you need

IBM

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Estimated 18-minute read.

Introduction
Think differently about hybrid cloud

Cloud remains a primary business driver. Organizations like yours are shifting workloads to a hybrid cloud architecture that blends on-premises infrastructure with private and public cloud models.

In this ongoing journey to cloud, security, cost and flexibility are top of mind. And with good reason. According to recent research from Ponemon, 59 percent of companies experienced a data breach caused by a third party.[1] Cloud enables data sharing across the enterprise but can also expose data in the process, leading to risk. The market is also demanding new and better digital products and services, and your cloud model must help you meet this demand by driving to market faster. Cloud deployment and management costs can be a concern, particularly the costs of workload expansion as demand fluctuates and grows.

These converging needs require a new way of thinking about hybrid cloud. What your organization needs is cloud without compromise. That means cloud with data privacy and protection. Cloud with availability. Cloud with smooth workload migration and predictable pricing. And also cloud with the openness and flexibility you've come to expect.

This approach requires a unique on-premises platform. But not all platforms are created equal. Read on to see how IBM LinuxONE helps you capture the opportunities of hybrid cloud through an open-source Linux® operating system.

Chapter 1
Build once,
deploy anywhere

## Build and modernize to meet customer needs

Customer demand for new digital and AI services is driving a shift to cloud native applications. Your organization is tasked with building and modernizing these applications using an agile DevOps approach. This requires openness and structure.

Developers currently use many open-source tools such as Linux containers and Kubernetes. These tools enable an application to be built once and deployed anywhere, accelerating your time to market with the ability to scale when needed.

Rapidly building and deploying cloud native applications requires an efficient approach using automation and scalability. Containerization helps speed time to market because it enables applications to be packaged together with their software dependencies. An enterprise-wide software build pipeline with continuous integration/continuous delivery (CI/CD) processes makes cloud native development more efficient. Kubernetes then enables orchestration of containerized applications at scale across multiple nodes.

How can you enable this streamlined cloud native approach while maintaining security and availability?
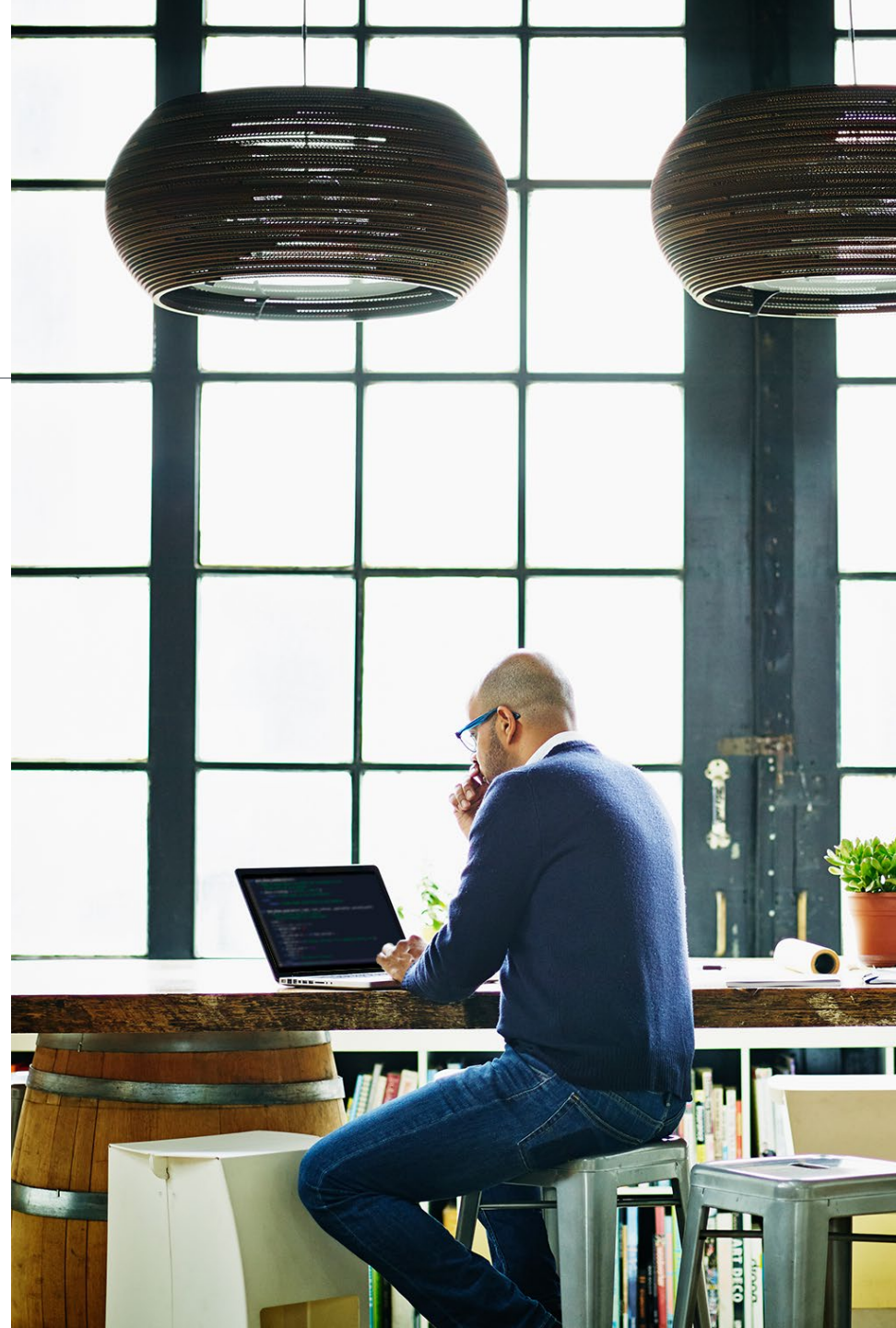
Enable a cloud native experience with Red Hat OpenShift on IBM LinuxONE

IBM LinuxONE provides a cloud native ecosystem for access and use by Linux administrators, developers and architects. Now you can build, deploy, manage, orchestrate and automate applications and infrastructure on a system designed to be secure and resilient.

With IBM LinuxONE, you can deliver new applications and services with confidence by embracing open-source tools and containerization. Red Hat® OpenShift® is now available on IBM LinuxONE. OpenShift is a fully integrated platform-as-a-service supporting application build through to deployment.

It combines the portability and agility of containers and Kubernetes with the security, scalability, and reliability of IBM LinuxONE. This platform enables you to build applications once and deploy them anywhere.

IBM LinuxONE integrates, as it always has, with your developers' preferred open-source tools, including containers, Git, and Jenkins. This integration enables straightforward, efficient development through an integrated enterprise CI/CD pipeline — supported by the security and scale of IBM LinuxONE. Kubernetes and containers give your developers the freedom to build and modernize services in the private cloud.

Also supporting your cloud native experience are IBM Cloud™ Paks for IBM LinuxONE. IBM Cloud Paks are enterprise-ready containerized software solutions that build on Red Hat OpenShift and help you quickly develop core business applications on IBM LinuxONE infrastructure in the cloud.

IBM LinuxONE supports the full cloud native experience to help you transform and innovate through faster and more effective application development and deployment.

Chapter 2
Encrypt data, wherever it goes

Keep data protected and private in a hybrid multicloud world

Consumers have grown more concerned with the privacy of their data — as have regulators. In 2019, many fines were levied related to GDPR and U.S. Federal Trade Commission regulations. High-profile corporate data breaches and misuses have increased consumer scrutiny of how corporations use and share their data. These trends, along with recent regulations such as the California Consumer Privacy Act and Thailand's Personal Data Protection Act, indicate that the pendulum is swinging toward more privacy and protection of personal data.

In addition to protection, your customers now expect privacy and control of their data. How can you deliver this?

Protect eligible data wherever it goes with IBM LinuxONE

Data Privacy Passports on IBM LinuxONE III is a consolidated data-centric audit and protection (DCAP) technology that has the capability to protect eligible data along its journey by setting appropriate data protection controls for your enterprise. It can help you reduce the risks associated from a security breach and can also help address compliance requirements.[2]

Protecting data within the enterprise is a challenge. Selective data encryption, the traditional method for protecting data, can be costly and resource intensive. With pervasive encryption on IBM LinuxONE, you no longer need to choose which data to encrypt. Encryption at the network level helps protect your data from potential attacks while in flight. Encryption at the dataset level is designed to ward off insider attacks that could compromise unencrypted data. And new IBM Fibre Channel Endpoint Security for IBM LinuxONE extends the value of pervasive encryption by protecting data flowing between LinuxONE platforms or through the Storage Area Network from the LinuxONE platform to storage.

As encryption is adopted more widely, organizations must manage an ever-growing set of encryption keys to help them maintain availability and security of the encrypted information. IBM Enterprise Key Management Foundation (EKMF) Web Edition is designed to efficiently and securely manage keys for IBM LinuxONE data set encryption.

"Equipped with pervasive encryption and the ability to integrate easily with open source solutions, our clients can think big with LinuxONE, confident that they still have robust system and data security."

Robert Miller
Senior Manager, Deloitte

With these new IBM LinuxONE capabilities, you can protect your ecosystem's data — regardless of data source — at rest and in flight. This helps you build trust with customers and partners in the evolving cloud landscape.
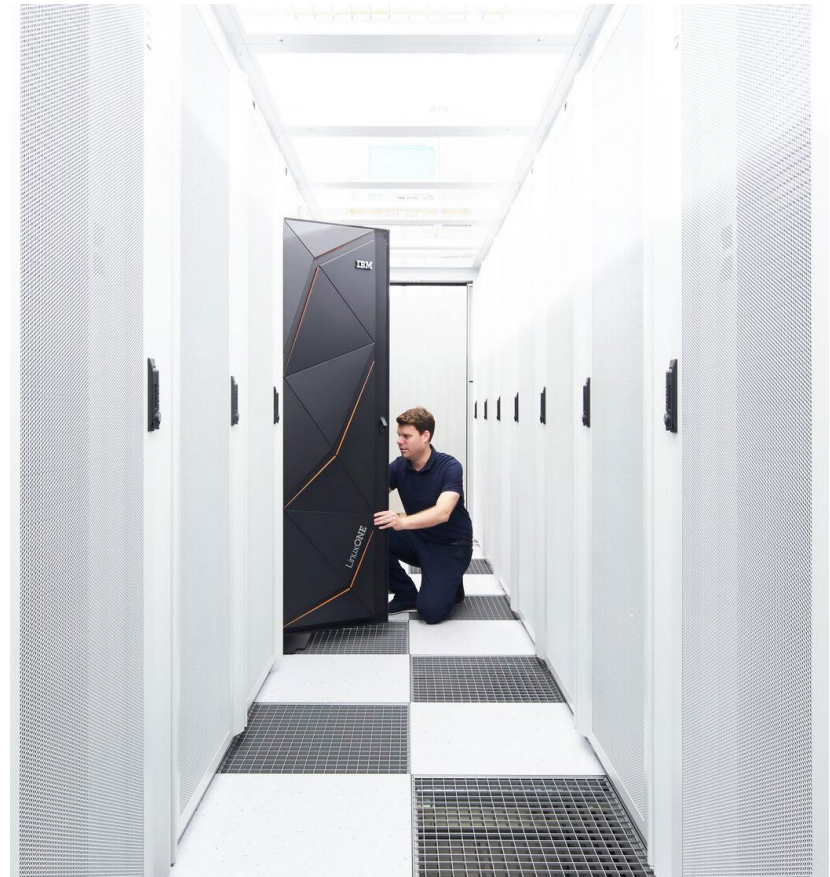
Chapter 3
Remain always available for your customers

Be available and resilient to meet "always-on" demands

Customers expect your services to be always on and accessible — 24 hours a day, 7 days a week, 365 days a year. That means your IT systems must be always on. This requires the highest levels of systems availability and resiliency.

Even the most reliable systems require planned downtime for routine maintenance and security patching.

Having a resilient system means you can get back up-and-running and recover quickly from planned maintenance and disruptions. IBM LinuxONE is designed to deliver 99.999% availability and beyond, through a combination of highly reliable components such as RAIM memory and high-availability software such as IBM GDPS®.

Scale trusted execution environments with IBM Secure Execution

Confidential computing is the industry movement around using technology to protect data in use. You can provide this protection through the implementation of a hardware-based trusted execution environment (TEE). TEE technologies are intended to help users achieve higher levels of trust, isolation and access control over their data assets compared to general-purpose software environments.

The scaling of fully secure and isolated environments is an important differentiator for managed service providers and cloud service providers. TEE technologies pack in more power, security and resiliency to help meet the demands and privacy users require.

Now you can consolidate machines, migrate and run capacity-hungry workloads on one box.

With IBM LinuxONE III you can use IBM Secure Execution for Linux to provide scalable isolation for individual workloads to protect from attacks such as malicious administrative access. Deploy secured and isolated services within a single LinuxONE server, without needing to run on physically separated logical partitions (LPARs).[3]

With high systems availability and a new scalable solution for workload isolation, IBM LinuxONE helps you meet your most demanding workload challenges.

Chapter 4
Get the platform purpose-built for cloud

Find a platform that fits your capacity needs

The demands of cloud require a flexible compute approach to your IT infrastructure. Your organization must have access to computing resources on demand. You need flexible consumption models to account for fluctuating demand and scaling workloads. And you need the ability to deploy your workloads on whichever cloud model you choose — public, private, hybrid, or a combination of these.

In addition, you require IT infrastructure fitted to your capacity needs. This is true whether you are a Fortune 500 company, a startup, or anywhere in between. You need the capacity to handle your most challenging workloads and remain always on for your clients. Yet you don't want to pay for more than you truly need.
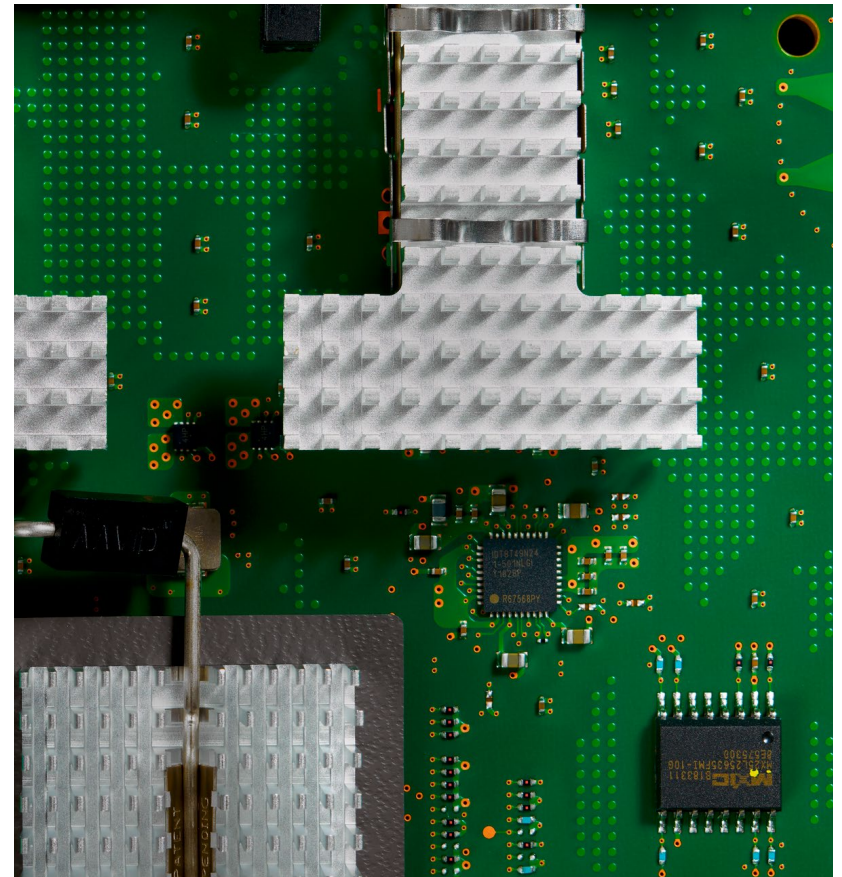
Meet your unique capacity and workload needs with IBM LinuxONE

The new IBM LinuxONE is designed for the modern cloud data center. Meet growing or unique workload needs by unlocking additional capacity through new on-chip acceleration. This capability makes available additional computing resources within IBM LinuxONE for defined workloads such as cryptography and compression. Fit IBM LinuxONE right into your cloud data center with flexible packaging built for cloud.

IBM LinuxONE is designed for organizations of all sizes, industries and capacity needs. The IBM LinuxONE family scales dramatically in capacity from the entry-level LT2 single-frame model to the fully equipped LT1 multiframe. This makes LinuxONE ideal for meeting business demands of all levels and for scaling as your business does. All models offer significant power-consumption-cost and floor-space savings over x86 architectures.

"Flexible compute" means resources, consumption and pricing models, and an infrastructure footprint geared to your needs. And IBM LinuxONE provides this.

"With just a single, highly utilized server to host all our clients, we spend less on energy and cooling, avoid server waste, and limit our environmental footprint. All in all, IBM LinuxONE really helps us to keep our data costs firmly under control."

Ron Argent
CEO and Founder, Cognition Foundry

"When the TCO model came out it was jaw-dropping: we stood to make substantial savings by moving away from a distributed infrastructure to LinuxONE."

Chester Gorski
Chief Technology and Operations Officer, Techcombank

Chapter 5
Integrate storage into your hybrid multicloud

Cloud native storage for all your workloads

To get the most out of your hybrid multicloud, you need cloud native storage that's designed for your hybrid multicloud environments and the critical workloads you deploy in them. You want that storage to be fast, reliable and secure. But you'll also need seamless multicloud integration. Years of research

and collaboration between IBM Storage and IBM LinuxONE teams deliver this business value.

The newest generation of the IBM DS8900F and IBM TS7770 families, designed to match the mission-critical capabilities of LinuxONE servers,

provides a transparent connection to multicloud environments, bringing massive capacity and replication through the cloud.

With the TS7770 virtual tape solution you can transfer IBM LinuxONE data directly and more efficiently to any

cloud. You'll also save on your IBM LinuxONE CPU utilization when you migrate large data sets, so you can focus on applications like cognitive computing, business intelligence and real-time analytics.[4]

And of course container support is a must. IBM DS8900F supports Red Hat OpenShift (through OpenShift flex volume driver support) and IBM Cloud Paks, so you can accelerate tasks associated with developing, deploying and maintaining cloud-native applications.[5]

Along with bringing all the benefits of LinuxONE and the cloud to your critical workloads, these solutions can also be customized with smaller footprint, lower entry-cost options and a flexible variety of racked and rack-mounted configurations, so you get the same enterprise capabilities regardless of your business size.

Protect 100 percent of data

Extending the security and protection capabilities of IBM LinuxONE, IBM Storage helps you protect 100 percent of your data across your hybrid multicloud. Within a trusted network shared by IBM LinuxONE, all of your data is encrypted both when in storage and when in flight through the network. With IBM DS8900F as your primary storage for production data, and the IBM TS7770 as a secondary storage for backup and data protection, your data is 100% encrypted and only accessible by authorized devices, wherever it resides across the hybrid multicloud.

For example, you can use IBM LinuxONE host systems to securely access data across an entire grid of linked the TS7770 systems, even if they are not in the same physical location. Data transfer capabilities that provide 100% encryption of all grid data will help your organization keep pace with regulations and compliance requirements.

Cyber resilient storage

Every business needs measures in place to protect data from being altered, corrupted or deleted in the case of an outage or attack. Your storage needs to have high availability and disaster recovery capabilities to help you recover access to data in seconds and uphold service-level agreements without interruption. And you may need an additional layer of "air gap" protection to keep a copy of some of your data offsite on tape systems.

IBM LinuxONE has the cyber resilient storage that's critical for your hybrid multicloud. IBM DS8900F protects your data from being modified or deleted due to user errors or ransomware attacks, allowing you to continue delivering your business outcomes.

With nearly zero seconds failover across a linked "grid" of up to eight systems, the IBM TS7770 virtual tape solution is designed to provide high availability and disaster recovery, and it integrates with physical tape systems to create true air gap protection.[6]

Conclusion
Choose a superior platform for secure cloud

To capitalize on opportunities in the cloud landscape, your organization must have superior IT infrastructure. It must be secure yet open, resilient and available yet flexible, and aligned to your current needs yet able to scale as they change. Get cloud without compromise — with IBM LinuxONE.

Explore the new IBM LinuxONE $\longrightarrow$

For more information, contact your business partner.

References

1 59 percent of companies said they have experienced a data breach caused by one of their vendors or third parties. In the U.S., that percentage is even higher at 61 percent -- up 5 percent over last year's study and a 12 percent increase since 2016. Source: Data Risk in the Third-Party Ecosystem: Third Annual Study Ponemon Institute © Research Report Sponsored by Opus; Nov. 2018 (secured approval to quote).

2 Data Privacy Passports supports data sources that can be accessed through a JDBC connection.

3 Cryptographic isolation uses special encryption keys in the hardware. IBM Secure Execution is supported on the latest z15 and LinuxONE III generation machines (including T02 and LT2).

4 Results are based on internal IBM data measurements on an EC12 (8 CPs, 32GB Main Memory) when migrating data sets exceeding 6000 3390 tracks in size. Results will vary by customer based on particular workloads, configurations, software levels and the quantity and size of data sets being migrated.

5 Performance metrics based on internal IBM tests using zHyperLink technology (4K read) in a controlled environment.

6 High availability and disaster recovery with nearly zero seconds failover across up to 8 redundant TS7770 systems. A DS8800 replicates simultaneously up to 2 TS7770s, resulting in absolute Zero Recovery Point Objective.