IBM Cloud Private and IBM Multicloud Manager with Linux on Z

Empower how you build, deploy and manage cloud-native hybrid-multicloud applications in your enterprise

Highlights

- Offers the benefits of a public cloud on a security-rich, scalable private cloud platform for Linux and z/OS for developing and delivering cloud-native apps
- Helps make heritage applications cloud-ready
- Helps protect confidential and proprietary Kubernetes and Docker workloads with IBM Secure Service Containers
- Enables organizations to build new microservice-based apps for improved agility and innovation
- Designed to more securely use data and services from external private cloud sources
- Supports heavy workloads with thousands of parallel users and thousands of Linux servers–in one box

Introduction

Many organizations have unique data sensitivity needs, such as internal policies, government regulations or industry compliance requirements. As a result, these organizations typically require a private cloud solution. Yet in a world of changing business demands, they also need to run demanding applications and use multiple services both on-premise and on multiple clouds for the sake of agility.

IBM Cloud™ Private with Linux® on IBM Z® and LinuxONE® provides the advantages of a private cloud on a server platform optimized for data, transactional workloads and cognitive services and is designed to deliver the benefits of a public cloud in a security-rich, scalable and reliable environment. It enables enterprises to accelerate innovation using modern agile processes, integrates with existing systems, and provides a strategic platform for multi-cloud integration while maintaining the control and compliance that organizations need.

IBM Multicloud Manager enables visibility, governance, compliance and operations across multiple clouds including all major public and private cloud vendors.

Deploy, Manage and Connect anything, anywhere

IBM Cloud Private gives developers and IT operations a combination of critical capabilities to transform the enterprise. IBM Cloud Private provides an integrated cloud platform for enterprise workloads that need to be run in a customer-controlled and security-rich environment. It is designed for refactoring and deploying heritage enterprise applications for the cloud era — componentized, scalable, highly optimized, security-rich and highly available. This environment can help you easily connect to existing apps and migrate at your pace.

IBM Cloud Private is the only Platform-as-a-Service with multiple deployment models with Docker containers and Kubernetes for enterprise leading container deployment and orchestration, Terraform based Cloud Automation Manager that supports traditional Virtual Machine based workload deployment, Apache OpenWhisk and kNative based serverless deployment and z/OS Cloud Broker based z/OS middleware deployment. IBM Cloud Private accelerates digital transformation by providing integration for all deployment models along your transformation journey.

Development teams can leverage single click deploys across all supported deployment models and choose from a rich catalog of open source and proprietary middleware. They can also leverage IBM Cloud Private's extensive set of modernization tooling and inbuilt private cloud-based integrated development environment (IDE) and DevOps toolchains to achieve unparalleled development velocity across all deployment models.

Operations teams can configure auto-deployment policies to reduce cost, optimize for availability, throughput, latency and other SLAs. They can also setup security and governance policies through IBM Multicloud Manager that can detect on-compliance and auto-remediate in certain scenarios.

Why IBM Cloud Private on Linux on Z?

Built to help you solve problems and advance opportunities in a world rich with data, IBM Cloud Private can deliver:

Low barrier to entry for developers

Developers can quickly get started on their successful journey to developing cloud-native services either on x86 distributed systems or IBM LinuxONE and Linux on IBM Z, with virtually no change in tooling. This capability helps ease the transition to cloud while leveraging the inherent QoS and security of the IBM Z and IBM LinuxONE platform, for new cloud-native application development and optimization of existing applications.

Vast Ecosystem

- Distributions: RHOS, SUSE, Ubuntu
- Hypervisors: KVM, VM, LPAR
- PaaS/IaaS: OpenStack, Docker, OpenShift, Mesos
- Languages: Java, JavaScript, Go, Python, Ruby, Scala, Swift
- Runtimes: node.JS, Apache Tomcat, Zend, Rails, LLVM, OpenJDK
- Management: Chef, Kubernetes, etcd, Sysdig, Juju, Urbancode, VMware, Puppet, DPM
- Database: PostgreSQL, MongoDB, Oracle, Db2,
- Analytics: TensorFlow, Anaconda, ELK, Spark

Modernization Tooling

- Transformation Advisor enables and accelerates conversion of virtual machine or z/OS based monolithic application to cloud native Docker based microservices running on Kubernetes.
- The z/OS Cloud Broker allows deployment of z/OS applications from the same visual catalog consumed by containers and virtual machines. This allows for integration with cloud native DevOps and integration with IBM Cloud Privates central control plane.

Innovation Acceleration

- New microservices-based applications to build, deploy and manage more easily — offering dynamic scalability and variable demand management
- Microclimate provides an out-of-box DevOps pipeline built for cloud native workloads enabling lower time to market.
- The Helm Package Manager enables complex hybrid cloud application deployment from a single, declarative chart.

Integration

- Calico provides seamless and high-performance integration network between deployed microservices.
- Connect with z/OS services using enterprise standard REST APIs and JSON through z/OS Connect.
- Deploy worker nodes to public cloud environments to provide hybrid-cloud integration capabilities local to public cloud services.
- Istio provides an industry leading service mesh for seamless connectivity across services deployed through different deployment models.
- Catalog of services and integration tools to assist developers on- and off-premises.
- Rich application connectivity choice is providing by IBM MQ, App Connect Enterprise and Apache Kafka – all part of the ICP Catalog.

Operational Optimization

- Quickly spin up a fit-for-purpose cloud to optimize for functional and non-functional requirements.
- Provide a single control plane for all deployed workloads – VMs, containers, serverless, and z/OS workloads.
- Automated scaling/HA-DR reduces the need for manual intervention, optimizing cost.
- High platform uptime provided by IBM Z and IBM LinuxONE prevents the need for excessive replicas for the IBM Cloud Private management plane itself as well as workloads running, further reducing licensing cost.

Security First Cloud Native Applications

- IBM Secure Service Containers provides pervasive encryption for ***all data generated*** by the ICP platform and workloads.
- Encryption and cryptographic acceleration on-chip provides substantial improvements in cryptographic performance while having minimal impact to SLAs.
- Image tamper protection ensures ICP platform components are not maliciously modified before or during deployment.
- IBM Secure Service Containers exploits the industry leading HSM, certified FIPS 140-2 Level 4, included in the IBM Z and IBM LinuxONE systems.

Unmatched Visibility

- IBM Cloud Private includes best-in-class open source tooling for monitoring including ELK & Prometheus with Grafana. dashboards. This provides an enterprise wide dashboard for workloads across containers, virtual machines, serverless and z/OS.
- Istio provides latency metrics for microservices to enable alerting and tuning.
- IBM Multicloud Manager extends IBM Cloud Privates monitoring to multiple clouds on and off-premise to provide rich topological views of your entire enterprise.
- Out-of-box metering capabilities enable chargeback for managed service providers.

Effortless Compliance

- IBM Multicloud Manager provides cross industry compliance templates ranging from federal to retail to healthcare to financial industries.

- Continuous compliance testing can be performed across multiple clusters – on or off prem.
- Pervasive Encryption provided by Secure Service Containers enables ease of security audits.
- Platform level HA/DR through Kubernetes can be augmented with infrastructure level HA/DR provided by the Z Platform (GDPS, z/VM Live Guest Relocation, etc.).

Investment protection

- z/OS Cloud Broker enables cloud deployment and management experience for z/OS workloads without the need for migration.
- Expose and connect existing proprietary applications with new applications with minimal risk.
- Ability to steadily modernize across deployment models to minimize risk.

Cost optimization

- Ability to deploy across public and private clouds across multiple platforms enables cost optimization for dev-test-prod environments, bursting etc.
- Ability to migrate from proprietary monolithic middleware to microservice based open-source or proprietary middleware with favorable licensing.
- Elastic deployments enable infrastructure usage optimization on or off-premises.

Trusted Reliability

- In the three generations since IBM introduced redundant array of independent memory (RAIM) technology, IBM Z and IBM LinuxONE have experienced no server failures due to a memory crash.
- IBM Z and IBM LinuxONE has experience zero unplanned downtime greater than 4 minutes.[1]

Industry Leading Performance out-of-box

- IBM Latency sensitive applications may see latency reduction by co-locating business logic with data sources located on z/OS.
- IBM studies show running an unsharded MongoDB instance of 8 TB runs 2x faster than a comparable database sharded across multiple x86 servers
- Controlled testing demonstrated better insights in less time with up to 3x more analytics performed with Apache Spark (Spark) on the same system

Unmatched Scale

- Horizontally scale workloads across 8000+ VM's running across 85 LPARs on a single system.
- IBM Z and IBM LinuxONE are the best platforms to take advantage of Kubernetes vertical pod auto-scaling introduced in early 2019.
- With enterprises first migrating to Docker based SOA macroservices and then decomposing to microservices, IBM Z and LinuxONE offers higher density of workload running on the same box for ease of management and lower licensing.
- A 17TB unsharded MongoDB instance can deliver up to 350,000 transactions per second or 30 billion transactions per day on a single IBM Z or IBM LinuxONE system.

[1] ITIC 2015-2016 Global Server Hardware, Server OS Reliability Survey

How to move forward

IBM has extensive experience with high transaction volume data and infrastructure security. Take advantage of this IBM expertise by:

- Attend a single-day Wildfire Workshop near you to get hands-on with the platform.
- Arranging an IBM Linux on Z workshop, including presentations and demonstrations of deploying solutions on the new technology
- Arranging a Discovery Session to determine how running open source software on your Linux on IBM Z hardware can benefit your workloads.
- Performing IT assessments, developing implementation plans or providing IBM Linux on Z solution deployment services. IBM IT services professionals can help you prioritize your IT projects, plan installations with little or no disruption to your business operations and perform as much or as little of the implementation as you need.
- Arrange for a 6-week proof-of-concept for ICP on your premises with your hardware and data with the Innovation Lab.

Ready to try it out?

- IBM Cloud Private guided demo: ibm.biz/BdjSYK
- Free Community Edition: ibm.biz/BdjKEa
- IBM Cloud Private proof of technology demos: ibm.biz/BdjSYn
- IBM Cloud Private on Linux on z trial environment: ibm.biz/BdjKEa

For more information

- ICP Knowledge Center: ICP Knowledge Center
- ICP on Z Knowledge center: IBM Cloud Private on Z and LinuxONE

To learn more, please contact your IBM representative or IBM Business Partner, or see the following websites: Linux OS on IBM Z: ibm.com/systems/z/os/linux

[1] These claims are based on results from internal IBM lab measurements in a controlled environment with dedicated processors. Unless specifically documented, performance is based on External Throughput Rate (ETR) measurements and projections using standard IBM benchmarks in a controlled environment. The actual performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance stated here.

[2] These claims are based on results from internal IBM lab measurements in a controlled environment with dedicated processors. Performance is based on elapsed time measurements. The actual performance will vary depending on Spark-Perf benchmark version, Spark versions, IBM JDK versions and other factors. Also, the actual performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the stack configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve performance improvements equivalent to the performance stated here. Spark-Perf performance suite core primitives component, called 'Spark', was used for this measurement (Dated June 29th, 2015 with Commit ID 1cb45d3). The above z13 measurements were performed on a standalone dedicated System z13 running Linux in a native LPAR. The z13 machine was at GA hardware level. Only externally documented options were used. The z13 was configured with 6 physical cores and each core in SMT2. IBM 64-bit SDK for Java Technology Edition, Version 8 with SR1-FP10 service release applied was used for Spark on z13. The above alternative platform (x86) measurements were performed on standalone dedicated Intel(R) Xeon(R) CPU E5-2699 v3 @ 2.30GHz, running Ubuntu 15.04 with no other workloads running. The x86 was configured with 36 physical Cores using hyper-threading but only 6 physical Cores were used for Spark. IBM 64-bit SDK for Java Technology Edition, Version 8 (with SR1 service release applied) was used in the x86 configuration. Spark 1.4.0 used on both platforms had Spark local, log and working directories on Ram Disk; 540672Mb was the total executor memory on both platforms.

© Copyright IBM Corporation 2019
IBM Corporation New Orchard Road Armonk, NY 10504
June 2019

IBM, the IBM logo, ibm.com, Db2, IBM API Connect, IBM Cloud, IBM LinuxONE, IBM z, and z/OS are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" www.ibm.com/legal/copytrade.shtml.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

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

It is the user's responsibility to evaluate and verify the operation of any other products or programs with IBM products and programs.

THE INFORMATION IN THIS DOCUMENT IS
PROVIDED "AS IS" WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

The client is responsible for ensuring compliance with laws and regulations applicable to it. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the client is in compliance with any law or regulation.

Statement of Good Security Practices: IT system security involves protecting systems and information through prevention, detection and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, misappropriated or misused or can result in damage to or misuse of your systems, including for use in attacks on others. No IT system or product should be considered completely secure and no single product, service or security measure can be completely effective in preventing improper use or access. IBM systems, products and services are designed to be part of a lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products or services to be most effective. IBM DOES NOT WARRANT THAT ANY SYSTEMS, PRODUCTS OR SERVICES ARE IMMUNE FROM, OR WILL MAKE YOUR ENTERPRISE IMMUNE FROM, THE MALICIOUS OR ILLEGAL CONDUCT OF ANY PARTY.

Please Recycle

GMS14044-USEN-01