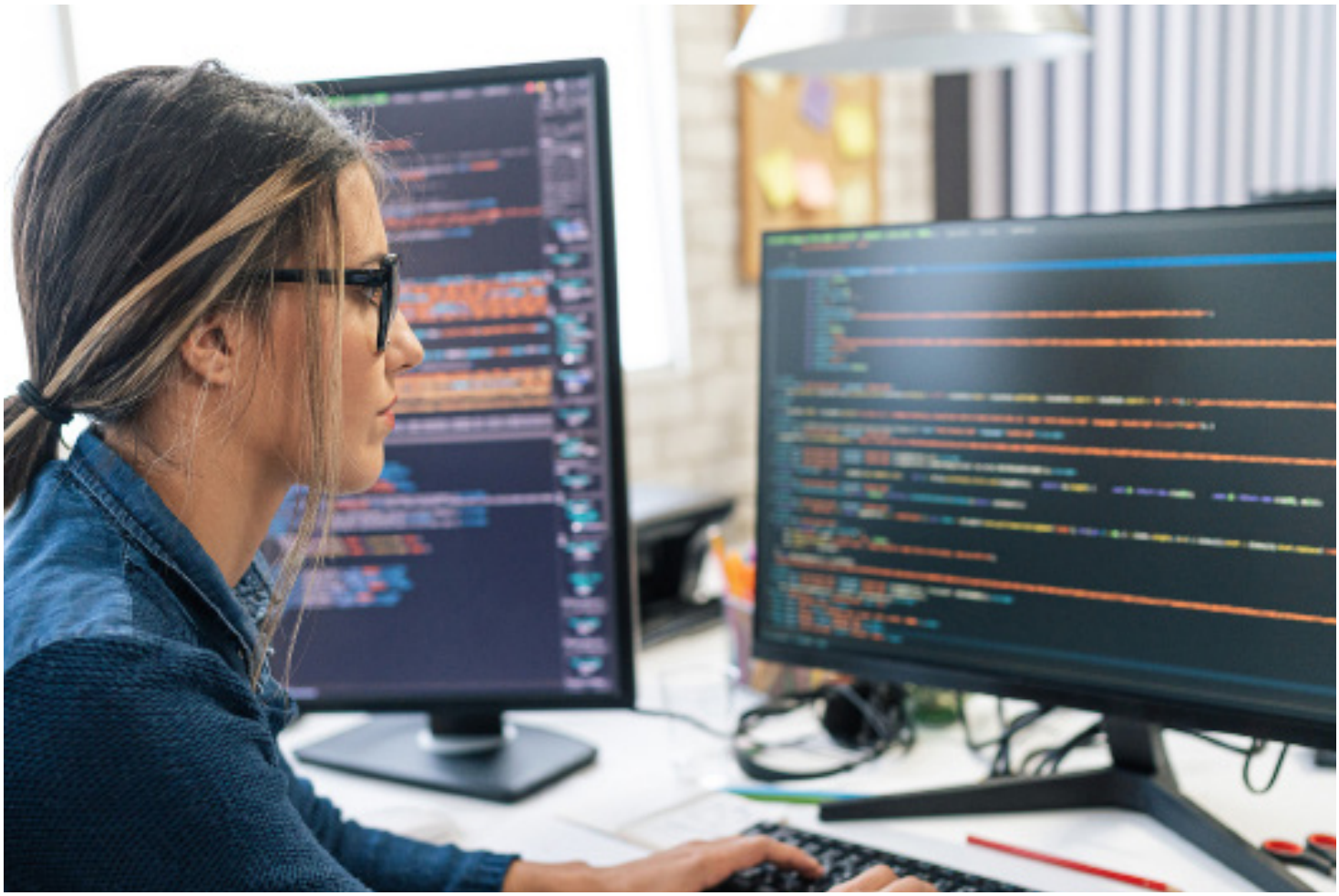
Empower how you deploy, manage, and integrate infrastructure as a service

Simplified infrastructure management on IBM® Z® and IBM® LinuxONE



Introduction
IT organizations globally have turned to the agility of infrastructure as a service to accelerate their digital transformation initiatives, seamlessly supporting both non-containerized and containerized workloads. They are shifting workloads to a computing model that integrates on-premises infrastructure with private and public cloud computing models.

Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS) are common 'cloud computing' models, used by many IT organizations. This paper focuses on Infrastructure-as-a-Service.

The term 'cloud computing' also refers to technologies that make cloud computing work, such as virtualization and infrastructure management.

Virtualization optimizes data center resource utilization by abstracting infrastructure into virtualized servers and networks, decoupling them from physical hardware. This enables IT organizations to dynamically pool and allocate resources, enhancing flexibility, scalability, and efficiency. As a strategic imperative, organizations are increasingly adopting virtualization for their on-premises infrastructure to drive business agility, achieve optimal resource utilization, and realize significant cost savings.

Infrastructure management delivers comprehensive control and automation, enabling Infrastructure-as-a-Service (IaaS) capabilities that streamline provisioning, monitoring, maintenance, and integration of IT resources.

Effective infrastructure management and optimization are crucial for achieving agility, efficiency, and scalability. As IT strategies increasingly adopt hybrid infrastructure and cloud models, robust infrastructure becomes a critical enabler of business success.

By using existing infrastructure, organizations can accelerate their digital transformation, improve operational efficiency, and drive business innovation, while also ensuring seamlessly integrating new computing models, thereby unlocking maximum return on investment and minimizing disruption to operations.

What is Infrastructure-as-a-Service?
Infrastructure-as-a-Service (IaaS) is a model of cloud computing that delivers fundamental compute, network, and storage resources to users on demand. IaaS enables users to scale and shrink resources on an as-needed basis, especially in the case of 'spiky' workloads.

The resources can be provisioned and released in an automated fashion, when offered in a self-service portal as on-demand services initiated by the users and without administrative intervention.

Managing the infrastructure as a service enables the integration of these infrastructure services into cloud computing across the enterprise. IaaS is used with non-containerized and containerized workloads.

Infrastructure on IBM Z® and IBM® LinuxONE
IT infrastructure serves as the critical foundation for driving business outcomes, and as such, it is essential to invest in a strategic infrastructure that scales to support non-containerized and containerized workloads, across multiple computing models. Furthermore, a robust infrastructure must deliver comprehensive cyber resiliency, ensure continuous service quality, and prioritize sustainability throughout its entire lifecycle.

IBM Z and IBM® LinuxONE deliver on-premises computing platforms that provide a robust, scalable, and highly secure infrastructure foundation, optimized for a broad range of workloads, cloud-native applications, and automation scenarios. In particular, the new IBM Z and IBM® LinuxONE servers use innovations and traditional strengths to satisfy the growing demand for artificial intelligence and a more flexible infrastructure.

The hypervisors IBM z/VM® and Red Hat® Enterprise Linux KVM, together with IBM Cloud Infrastructure Center, provide the foundation for on-premises as-a-service deployment range of non-containerized and containerized workloads on a flexible infrastructure on IBM Z and IBM® LinuxONE that seamlessly integrates with hybrid infrastructure and cloud environments.

Infrastructure management with IBM Cloud Infrastructure Center
IBM Cloud Infrastructure Center is an IaaS solution on IBM Z and IBM® LinuxONE designed to address the following key challenges:

Infrastructure management

Cloud Infrastructure Center can manage the full lifecycle of virtual machines based on IBM z/VM or Red Hat Enterprise Linux KVM, meaning that virtual machines can be created, started, stopped, restarted, resized, captured, and deleted. Live migration is also supported.

The lifecycle management includes managing the storage, such as carving/deleting volumes from storage subsystems along with fabric management, and the management of network resources, such as IP allocation and network setup.

To create a virtual machine in Cloud Infrastructure Center, an image can be created from a snapshot of an existing virtual machine that is managed by Cloud Infrastructure Center, from an ISO, or downloaded from a Linux® distribution partner website.

By leveraging the 'deployment template' feature, organizations can configure and save a customized image along with its associated, necessary deployment settings to rapidly provision and therefore expedite the deployment of virtual machines.

An image can either be based on a Linux distribution from Canonical, Red Hat, or SUSE and can include non-containerized workloads, or it is based on Red Hat Enterprise Linux CoreOS as part of Red Hat OpenShift® Container Platform.

Automated infrastructure deployment via self-service portal

Through Cloud Infrastructure Center's self-service portal, users can invoke services without requiring technical expertise or worrying about the underlying infrastructure. Administrators define and publish these services, making them easily accessible to users through the portal.

In addition, administrators can capture and maintain a library of virtual machine images to quickly deploy a virtual machine environment. They can launch a stored image from the library, instead of manually recreating a virtual machine image. As well, they can move virtual machines to available systems, thereby expediting deployment and improving productivity.

Through the self-service portal, the IT organization can operate as a centralized service bureau for infrastructure services and can support separate groups of tenants.

The basis idea: create once and deploy quickly and easily.

Integration of IBM Z / IBM® LinuxONE based infrastructure into enterprise cloud computing

Withthe built-in OpenStack-compatible APIs, Cloud Infrastructure Center supports the de facto industry standard for vendor-agnostic infrastructure management. The OpenStack-compatible APIs enable easy integration with automation and orchestration tools that provide OpenStack integration points or plugins, and the widespread OpenStack knowledge can be used.

The integration capability of Cloud Infrastructure Center with infrastructure and cloud management tools can simplify the lifecycle management of virtual machines across the enterprise and can provide a unified hybrid infrastructure and cloud environment with a single pane of glass for the IBM Z and IBM® LinuxONE platforms. This helps to increase flexibility and to improve operational efficiency, especially when integrating with tools such as IBM Cloud Pak® for AIOps, IBM Instana®, Red Hat Ansible®, Terraform, or VMware vRealize.

Popular use cases of IBM Cloud Infrastructure Center

CloudInfrastructure Center's adoption patterns include four common use cases, although that doesn't exclude others.

Simplified virtualization experience

Having a great experience with the IBM Z and IBM® LinuxONE platforms is of interest of all, particularly for users who are just starting on these platforms. As organizations continue to seek simplicity and efficiency in managing their infrastructure, Cloud Infrastructure Center is providing a user-friendly and effective management experience.

The capabilities of Cloud Infrastructure Center in 'infrastructure management', 'automated deployment', and the 'integration of IBM Z and IBM® LinuxONE into enterprise computing' are all designed to significantly simplify the management of the on-premises IT infrastructure.

Infrastructure management for service providers

Service providers demand exceptional efficiency in managing the infrastructure, and for them, Cloud Infrastructure Center can serve as a centralized management system to achieve this efficiency.

Service providers can benefit and use Cloud Infrastructure Center to streamline a wide range of infrastructure management tasks, automate infrastructure services, and deliver predictable and repeatable outcomes in a secure, multitenant environment.

The IBM Z and IBM® LinuxONE virtualization technologies provide impressive scalability – horizontally and vertically and are predestined to serve many workloads and tenants. Resources can be assigned dynamically and efficiently, whenever and wherever they are needed. Furthermore, a single IBM Z and IBM® LinuxONE system can run up to thousands of virtual machines, which can result in less operational management effort and cost savings.

Accurate and transparent charging of allocated and consumed resources is crucial for service providers serving multiple tenants. Cloud Infrastructure Center, integrated with the IBM Cloud Pak for AIOps, enables metering of the consumed resources by the virtual machines. As well, Cloud Infrastructure Center can work together with IBM Instana.

Deployment of on-premises database-as-a-service

As described above, Cloud Infrastructure Center can help to deploy Linux based images with non-containerized workloads. Using this capability, administrators can create customized images that combine a Linux distribution and a database. By offering this image as a service in the self-service portal, user can rapidly deploy a database with a seamless and on-demand experience.

Administrators can create a range of database-as-a-services, using different Linux distributions, different data bases, and tailor each service to specific user needs. The services can be saved and offered as distinct services to the users.

While database-as-a-service is a widely adopted use case, such as MongoDB-as-a-service being utilized as a caching database for read-only queries of the backend database, the 'as-a-service' approach can be seamlessly applied to other workloads to achieve similar benefits.

Deployment of Red Hat OpenShift clusters

Cloud Infrastructure Center supports the simplification and automation of the deployment of the Red Hat OpenShift and the management of the virtual machines used for the deployment.

It supports an automated Red Hat OpenShift deployment in a user provisioned infrastructure model via Red Hat Ansible[1] and Terraform.

A Red Hat Enterprise Linux CoreOS image as part of Red Hat OpenShift can be deployed like any other image into a virtual machine that is based on z/VM or Red Hat KVM.

Red Hat OpenShift empowers organizations to integrate and modernize applications with great agility through integrated tooling and a secure and resilient foundation for cloud-native development and deployment on IBM Z and IBM® LinuxONE.

Summary

IBM Cloud Infrastructure Center is designed to improve user experience and administrator productivity, providing infrastructure management and the integration of the IBM Z and IBM® LinuxONE infrastructure.

Unlock the full potential of Infrastructure-as-a-Service by streamlining deployment, management, and integration processes. Achieve greater control, flexibility, and scalability across your hybrid infrastructure, and drive business agility through Cloud Infrastructure Center operations.

[1] An Ansible Playbook example is available for download, and a technical blog describes the details.

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