IBM Cloud Paks and Red Hat OpenShift on IBM Power Systems

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IBM Cloud / Cognitive Infrastructure
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IBM Systems
What is Hybrid Multicloud?

Hybrid Cloud

A hybrid cloud is a computing environment that combines a private cloud and a public cloud by allowing applications and data to be shared between them.

Multicloud

Multicloud is a cloud approach made up of more than one cloud service, from more than one cloud vendor—public or private.

Hybrid Multicloud = Hybrid Cloud + Multicloud

A hybrid multicloud combines a private cloud, a public cloud and more than one cloud service, from more than one cloud vendor.
Enterprises are deploying on-premises clouds and containers as a foundation for hybrid cloud strategies.

80% of organizations have migrated apps or data from public cloud to on-premises or private cloud.

Digital transformation requires apps to be easy to develop and deploy anywhere at cloud scale

Businesses uniquely evolve on their cloud and digital transformation journey. Clients often are forced to span multiple public and private clouds, which must be integrated to achieve the agility and speed that enterprise demands.

Modernizing apps with micro-services and new software technologies to seamlessly run apps and access data from anywhere is painful without automating cloud infrastructure:

- Agile DevOps require new applications built using the latest software approaches vs. traditional waterfall
- Deploying apps across multiple architectures in a repeatable, continuous DevOps model is challenging
- Delivering breakthrough insights via AI model-driven insights requires accelerated platforms for faster results

As a result, organizations are struggling to integrate their multiple on-premises private clouds—where business critical apps and most of their data resides—with their public clouds.
Hybrid multicloud has arrived

A real-world look at multicloud

- 94% Share of enterprises using a mix of cloud models
- 67% Share of enterprises using more than one public cloud provider

Movement between clouds 73% priority concern
Connectivity between clouds 82% priority concern
Consistency of management 67% priority concern

USD 438 billion in 2020 2018–2020 CAGR 15%
USD 609 billion in 2020 2018–2020 CAGR 18%
USD 640 billion in 2020 2018–2020 CAGR (-9%)
75% of application development supporting digital business will be BUILT — *not* bought — by 2020

Gartner
A Hybrid Multicloud-enabled Data Center supporting Heterogeneous Cloud Infrastructure

Manage entire Hybrid Multicloud

Manage Public Cloud Apps
- Red Hat OpenShift
- IBM Cloud and others...
- Choice of public cloud provider(s)

Manage IBM Z Apps
- Red Hat OpenShift (coming soon...)
- IBM Cloud Pak for Multicloud Mgmt.

Manage x86 Apps
- Choice of Intel x86 servers from HP, Dell, Cisco, Lenovo, etc.

Manage IBM POWER Apps
- Red Hat OpenShift
- IBM Cloud Pak for Multicloud Mgmt.

Cloud Ready Enterprise Power E, C and L
- IBM Cloud Pak for Multicloud Mgmt.

Scale-out Cluster/Cloud Power AC and LC
- IBM Cloud Pak for Multicloud Mgmt.
Challenges to business

“Applications and code lack portability.”
- Studies show that moving all applications to a public cloud is usually not the most cost efficient or business effective approach
- Patterning development on proprietary APIs increases the risk of lock-in — with difficult and costly application refactoring being the only way out
- Enterprises require frictionless movement across both private and public clouds (interchangeably)

“Information architecture across vendors is inconsistent.”
- Organizations need to support the complete build-test-deploy pipeline for any private infrastructure that their business runs on
- Application design and workload planning shouldn’t need bespoke code for each infrastructure vendor you deploy with
- Your business needs a way to abstract duties between container workloads, the underlying OS, and the hardware that runs it

“Deployments and growth are unpredictable.”
- When clients deploy software, sometimes things go wrong — users may inadvertently change configurations or they mis-tune their environment
- Enterprises require containerized environments that are immutable and consistently deployed
- Repeatable patterns emerge from this type of deployment model, allowing projects to scale in a predictable and consistent way
Red Hat + IBM Solution

Red Hat OpenShift

- Over half of all cloud workloads run on Linux today, and Red Hat is the world's number one distributor and support provider of Linux.
- Kubernetes is central to IBM and Red Hat's combined hybrid cloud strategy for deploying and managing containerized apps.
- Together, IBM and Red Hat can provide end-to-end solutions that allow clients to unify private and public cloud investments for their applications and services.

IBM Cloud Paks on Power Systems

- Accelerate digital transformation by unleashing the open innovation of Red Hat, IBM Software, and Power Systems.
- The joint solutioning of Red Hat OpenShift and IBM Cloud Paks on Power Systems allows our clients to rapidly boost the productivity of data scientists, developers, administrators, and line of business users within a cohesive platform fabric.
- This offering has been optimized specifically for IBM Power Systems infrastructure for the highest-performance AI workloads on the world's most cost-efficient and resource-dense servers.

“We believe that Red Hat Enterprise Linux, combined with the latest generation of IBM Power Systems, provides an excellent choice for enterprise environments seeking impactful solutions that optimize performance and bring openness, choice and flexibility.”

Jim Totton
Vice President
Platform Business Unit
Red Hat
Cloud Paks – Enterprise-ready containerized software

A faster, more secure way to move your core business applications to any cloud through enterprise-ready containerized software solutions

**IBM containerized software**
Packaged with Open Source components, pre-integrated with the common operational services, and secure by design

**Complete yet simple**
Application, data and AI services, fully modular and easy to consume

**IBM certified**
Full software stack support, and ongoing security, compliance and version compatibility

**Run anywhere**
On-premises, on private and public clouds, and in pre-integrated systems
# Application Modernization with IBM Cloud Paks

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**Runs on choice of IBM Power Systems Infrastructure-as-a-Service (IaaS)**

- PowerVC
- PowerVM
- Bare-metal
Red Hat OpenShift and IBM Cloud Paks on Power Systems

Accelerate digital transformation by unleashing the open innovations of Red Hat, IBM Software, and IBM Power Systems.

Continuously deliver innovative client experiences while reducing development time, operational expense, and cloud infrastructure costs.

**Key Capabilities**
- Enterprise-grade, full-stack cloud solutions that dramatically reduce development time and operational expenses
- Next generation client experience apps that drive digital transformation
- Hybrid cloud agility, economics, and resiliency
- Faster AI driven insights continuously infused into cloud native apps

**Benefits**
- Deliver next gen client experience apps that drive digital transformation
- Develop, run, and operate cloud native apps with full control of Kubernetes on Power Systems (bare-metal, KVM, PowerVM)
- Accelerate performance of AI workloads by training models 4x faster
- Do more with less cloud infrastructure using 3.6x more containers per core

**Details**
- Joint solution with Red Hat and IBM Software uniquely optimized for IBM Power Systems cloud infrastructure-as-a-service
  - Red Hat Enterprise Linux, optimized for POWER9
  - Red Hat OpenShift
  - Red Hat Virtualization
  - IBM Cloud Paks
  - PowerVC / PowerVM
  - POWER9 Enterprise and Scale-out Servers
How can IBM help?

Massachusetts Open Cloud

Red Hat OpenShift and IBM POWER9 Systems are delivering an Open Cloud Exchange (OCX) of AI and Machine Learning services to researchers and companies across New England.

Data scientists, engineers, analysts, and knowledge workers are able to coalesce around a single open platform for big data insights. Red Hat OpenShift’s containerized environments on IBM POWER9 are ideally suited to consistent, repeatable deployment patterns needed for scientific research.

“We knew a public cloud built on open source technology would let many entities operate the cloud together, offer innovative new services, and even build on top of each other’s services.”

Orran Krieger
Project Lead
Massachusetts Open Cloud
Why an IBM + Red Hat solution stands apart

Hybrid Cloud Agility, Enterprise Resiliency

Accelerate time to market, optimize performance, cut costs, and build skills across on-premises and off-premises clouds.

Integrate traditional and modern cloud-native applications on resilient, enterprise-grade servers with 99.999%* uptime.

Consume with Cloud Economics

Reduce application development time by up to 84% and operational expenses by up to 75%.

IBM cloud-enabled servers are capable of running 3.6x more containers per core, enabling high container density for the most efficient use of your infrastructure’s resources.

Boost Dev & Data Science Productivity

Train 4x as many deep learning models per hour on GPU-accelerated POWER9 servers vs. commodity x86 servers.

Dynamically infuse advanced algorithms into cloud native applications and data science workflows, including: Distributed Deep Learning (DDL), Large Model Support (LMS), and more.
Value to your business

**Build Once, Run Anywhere**

- Today you can leverage Red Hat OpenShift’s deployment engine and operational management across all of IBM's comprehensive IT estate (Power, Z, and x86)
- 3x more containers running per core for clients using OpenShift on Power than OpenShift on x86
- Enterprise class servers with the latest container management and 99.999% uptime you need for mission-critical workloads

**Information Architecture for Artificial Intelligence**

- IBM AI software, such as WML-A and WML CE run on RHEL — a compelling opportunity for IBM Power Systems clients
- IBM POWER9’s architecture is optimized to make full use of the CPU and GPU resources available within clustered systems, scaling upwards of 256 GPUs with 88% efficiency; comparatively, other competing distributed deep learning struggles to scale beyond a single server

**Differentiated Hardware, Optimized for AI**

- RHEL has been optimized for IBM Power systems, built on 20 years of joint development
- Train AI and deep learning models nearly 4x times faster using Power AC922 systems than Intel x86 systems (as well as 5.6x I/O bandwidth and 2.6x more RAM than equivalent x86 systems)
- NVLINK 2.0 for breakthrough GPU-CPU bandwidth, distributed deep learning, and memory sharing for larger model sizes
Cloud has reset expectations

Self-service user experience, from anywhere
Pay as you go for what you use
Rapid access to resources – compute, storage, GPUs, network bandwidth
Deploy and scale apps rapidly – on demand
Simplified management and operations
Continuous software, infrastructure innovation

Cloud is a capability and not a place

94% of organizations are using a mix of public and private clouds and are embracing a multicloud strategy

IDC Cloud Forecast 2018-2020
IBM Cloud Journey Workshops

Take the Next Step
- Schedule a Power Cloud e-Briefing
- Setup an Onsite Discovery Workshop
- Let Us Host a Design / Co-creation Workshop
- Join Us for a Cloud Garage Workshop

For assistance on the Journey to Cloud, Contact Us Today
- Email: ibmsls@us.ibm.com
- Web: ibm.com/it-infrastructure/services/lab-services/power/
IBM Cloud Strategy for today’s Hybrid Multicloud World

**Develop Once.**

**Deploy Anywhere.**

**Operate Everywhere.**

Enterprise Grade Infrastructure – *Runs all your apps*

Built from Open Source – *No technology lock-in*

Reliable, Extensible, Scalable – *Grows with you*

Multicloud enabled – *Goes anywhere you need*

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**IBM Cloud Services**

- Watson
- Security
- Weather

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**IBM Cloud Pak for Multicloud Mgmt.**

- Red Hat OpenShift

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Public Cloud (IBM and others…)

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IBM Edge Cloud

- x86, IBM POWER

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IBM On-Premise Cloud

- x86, IBM POWER, IBM Z

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IBM Cloud Pak for Multicloud Mgmt.

- Red Hat OpenShift

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**IBM Multicloud Manager**

Single dashboard to manage all of your clusters—in your data center, in a public cloud or at the edge

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AWS

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Azure

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...etc.
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