Navigating your hybrid multicloud vision with
↪ IBM Power

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Life in a hybrid multicloud world

Cloud computing has undoubtedly changed how enterprise IT is delivered. It has opened the door to compute and storage resources without limits, as well as a wealth of cloud services (for example, artificial intelligence, weather data and more) for IT administrators to leverage and create the next wave of enterprise innovation. This paper provides a practical guide for IBM® Power® users to gain an understanding of the portfolio and how to map out a journey to a secure and reliable hybrid multicloud infrastructure.

Navigating a complex IT infrastructure
Whether you're creating an on-premises private cloud, leveraging one or more off-premises public clouds (that is, multicloud) or taking a hybrid cloud approach, cloud infrastructure capabilities can expand your business opportunities.

Given this broad range of technologies, how can IBM Power users running IBM® AIX®, IBM® i and Linux® enterprise applications understand these capabilities and create a technology roadmap in an approachable and methodical manner?

A need for a clear vision

According to IDC, by 2022, 70% of enterprises will deploy unified virtual machines, Kubernetes and multicloud management processes and tools to support robust multicloud management and governance across on-premises and public clouds.[1]

Hybrid multicloud has become a reality for enterprise and technology leaders. Yet, there is a need for a clear vision of how to navigate and operate in this environment.

What is hybrid multicloud?

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. A multicloud refers to a cloud environment made of more than one cloud service from more than one cloud vendor. Thus, a hybrid multicloud combines a private cloud, a public cloud and more than one cloud service from more than one cloud vendor.

A multicloud strategy can unlock tremendous organizational value because it combines the best of both private cloud and public cloud. It allows organizations to run mission-critical applications and host sensitive data on premises. It offers the flexibility of public cloud, and it enables the movement of information between the private and public services.

81%

of organizations use more than one public cloud provider.[1]

02
Hybrid multicloud motivators and use cases

There are several motivators driving enterprises to construct a hybrid multicloud platform. Let's explore some of the more prevalent scenarios for Power customers (several of them are often pursued in parallel):

Deliver streamlined deployment of enterprise resources, including AIX, IBM i and Linux virtual machines (LPARs) and containerized applications
Users have grown to expect easy and on-demand access to IT resources through a cloud experience. Developers, quality assurance (QA) engineers and line-of-business users want simplified access to infrastructure and applications. IT administrators want trusted enterprise-grade security and simplified operations. Streamlining all of these processes is made possible by adopting Power hybrid multicloud technologies and processes within the data center.

Increase operational and budgetary flexibility by leveraging IBM Power in a public cloud
One of the major advantages of a public cloud is that it provides effectively limitless access to compute capacity billed as an operational expense. With a few clicks of the mouse on cloud.ibm.com, users get immediate access to new virtual machines or containers — where they want, when they want. IBM Cloud® is the perfect place to spin up QA, production or high-availability (HA) and disaster-recovery (DR) environments for your Power estate.

Modernize existing applications to adopt cloud-native software development principles
Containers, Kubernetes and Red Hat® OpenShift® have transformed how software is packaged, installed and operated — paving the way for new software delivery models. Enterprises worldwide are exploring container technology and developing plans on how to integrate them into their technology stacks, while delicately balancing the ongoing business need to deploy, manage, operate and integrate with today's virtual machine-based applications.

Integrate IBM Power with the broader cloud strategy
As the industry shifts toward hybrid multicloud, a comprehensive cloud management strategy has become increasingly important. Long gone are the days of building siloed infrastructures. Enterprises are striving toward a model of interconnectedness so that the collective strength of their platforms and cloud providers can be leveraged to create the next wave of innovation.

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High-level reference architecture

Figure 1 on page 7 shows is a hybrid multicloud reference architecture inclusive of the major industry hardware platforms — IBM Power, IBM® zSystems and x86. Power is designed and built to economically scale mission-critical data-intensive applications, either virtual machine-based or containerized — delivering industry-leading reliability to run them and reducing the cost of operations with built-in virtualization to optimize capacity utilization. It also provides flexibility and choice to deploy applications in the cloud of your choice.

From a cloud deployment perspective, the on-premises private cloud solution includes IBM® PowerVC that provides the infrastructure-as-a-service (IaaS) layer and Shared Utility Capacity (previously Enterprise pools 2.0) to deliver a pay-per-use consumption model with permanent activation of installed capacity. These solutions deliver the agility and economics of cloud in an on-premises environment while enabling organizations to rapidly respond to shifts in workload demand.

Power servers are also available on IBM Cloud and in other public clouds, providing flexibility and choice to deploy HA/DR, DevTest and more. Sitting atop the infrastructure layer is Red Hat OpenShift, which provides the enterprise Kubernetes platform-as-a-service (PaaS) layer. Red Hat OpenShift users can run their software of choice, including IBM's enterprise software delivered by way of IBM Cloud® Paks, ISV software, open-source software and custom enterprise software.

To manage and operate everything from a centralized location, the IBM Cloud Pak® for Watson AIOps, IBM® Turbonomic® and IBM Instana® can be used to connect the historically separate cloud infrastructures. Lastly, the Red Hat® Ansible® Automation Platform can be leveraged across the entire landscape to provide a consistent approach to manage all of your operating systems, cloud infrastructures — regardless of the platforms you're running.

Hybrid multicloud reference architecture

Consistent hybrid cloud management and enterprise automation software
Automate deployment management and governance of multiplatform cloud using:

- IBM Cloud Pak® for Watson AIOps
- IBM® Turbonomic®
- IBM Instana® Observability

- Red Hat® Ansible® Automation Platform
- Red Hat® Advanced Cluster Management for Kubernetes

Applications

Existing enterprise applications
- Running on IBM® AIX®, IBM® i, Linux®

New cloud-native applications
- Running on Red Hat® OpenShift®

Other applications
- Running on other platforms

Hybrid multicloud infrastructure

IBM® Power® infrastructure (on-premises)
- IBM Power Private Cloud with Dynamic Capacity

IBM Power infrastructure (off-premises)
- IBM® Power Systems Virtual Server

Public cloud providers (off-premises)
- IBM Cloud®
- Other public clouds

Other compute infrastructure
- IBM® zSystems
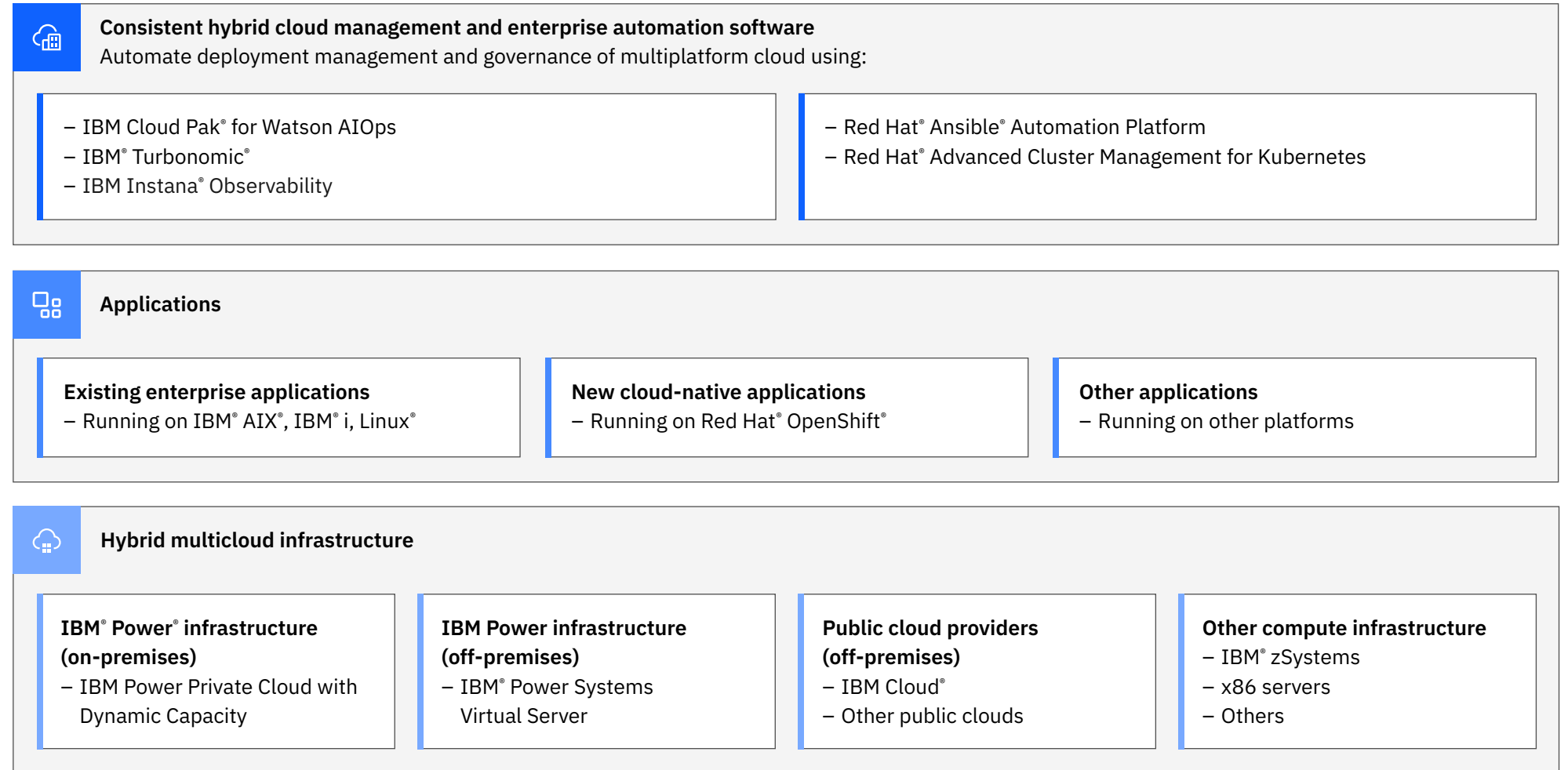- x86 servers
- Others

Figure 1: Hybrid multicloud reference architecture

Journey to the hybrid multicloud

While each organization will have its own unique characteristics, Figure 2 on page 9 serves as a general blueprint to guide Power users through the myriad of cloud technologies and remove the mystery from the journey. The path to hybrid multicloud begins with a solid foundation of infrastructure and hardware management capabilities. From there, users are directed toward establishing a cloud experience within their own data center (that is, a private cloud). This offers simplified virtualization management and operations, advanced automation and a platform to start building innovative cloud-native applications leveraging Red Hat OpenShift, Kubernetes and containers.

As a parallel track to establishing a private cloud, it's also recommended to explore the public cloud to spin up QA, production or HA/DR environments without the need to procure and administer the infrastructure in your data center.

Lastly, users need to establish robust connectivity between their on-premises and off-premises infrastructures so that applications and data can flow seamlessly between the two.
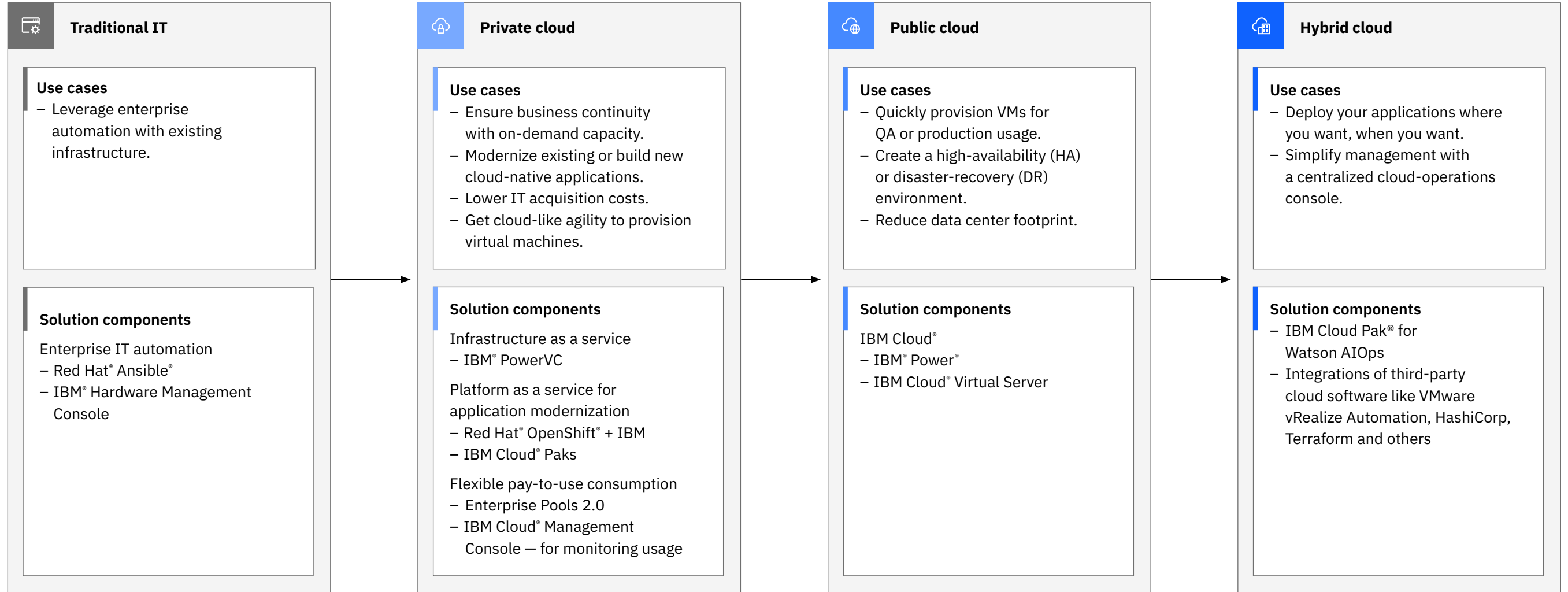
Traditional IT

Use cases
— Leverage enterprise automation with existing infrastructure.

Solution components

Enterprise IT automation
— Red Hat® Ansible®
— IBM® Hardware Management Console

Private cloud

Use cases
— Ensure business continuity with on-demand capacity.
— Modernize existing or build new cloud-native applications.
— Lower IT acquisition costs.
— Get cloud-like agility to provision virtual machines.

Solution components

Infrastructure as a service
— IBM® PowerVC

Platform as a service for application modernization
— Red Hat® OpenShift® + IBM
— IBM Cloud® Paks

Flexible pay-to-use consumption
— Enterprise Pools 2.0
— IBM Cloud® Management Console — for monitoring usage

Public cloud

Use cases
— Quickly provision VMs for QA or production usage.
— Create a high-availability (HA) or disaster-recovery (DR) environment.
— Reduce data center footprint.

Solution components

IBM Cloud®
— IBM® Power®
— IBM Cloud® Virtual Server

Hybrid cloud

Use cases
— Deploy your applications where you want, when you want.
— Simplify management with a centralized cloud-operations console.

Solution components
— IBM Cloud Pak® for Watson AIOps
— Integrations of third-party cloud software like VMware vRealize Automation, HashiCorp, Terraform and others

Figure 2: Reference product journey to hybrid multicloud

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Deploy hybrid cloud on IBM Power

Ensure business continuity and lower IT acquisition costs with on-prem private cloud

The Power private cloud solution with Shared Utility Capacity delivers enhanced multisystem resource sharing and seamless, by-the-minute consumption of on-premises compute resources for clients deploying and managing a private cloud Power infrastructure. It provides a complete range of flexibility for customers to tailor initial IBM® Power10 system configurations with the right mix of purchased and pay-per-use capacity across a collection of systems in their enterprise.

With Shared Utility Capacity, purchased processor activations, memory activations and operating system resources are seamlessly and independently shared across a pool of systems. Any remaining, unpurchased processor and memory capacity on systems in the pool is then activated and made available on a pay-per-use basis, metered by the minute.

Resources are easily monitored by the IBM® Cloud Management Console for IBM Power, which automatically tracks usage and provides sophisticated drill-down views of real-time and historical resource consumption by virtual machine for all systems within a pool.

The IBM® Power Private Cloud Solution infrastructure can deliver cloud-like economics on premises to enable IT teams to more simply automate application deployment and balance workloads across systems. Shared Utility Capacity offers unique innovation to reduce overprovisioning of resources required to ensure business continuity and maintain service levels during unforeseen spikes in demand. And its by-the-minute metering ensures users pay only for the precise amount of capacity consumed.

IBM® Power Virtualization Center (PowerVC) provides on-premises enterprise virtualization management for IBM Power, inclusive of AIX, IBM i and Linux guests. Built on OpenStack,it provides a multitenant IaaS layer in your data center, allowing administrators to quickly provision new virtual machines in minutes.

IBM PowerVC provides numerous operational benefits
– One-click system evacuation for simplified server maintenance
– Dynamic resource optimization to balance server usage during peak times
– Automated virtual machine restart to recover from failures
– Importing and exporting virtual machine images for cloud mobility

It enables DevOps capabilities such as "infrastructure as code" by way of Ansible or HashiCorp Terraform. PowerVC provides the foundational technology on top of which the rest of the on-premises Power cloud stack is built.

Reduce your data center footprint and get cloud agility with public cloud

IBM® Power Systems Virtual Server integrates AIX, IBM i and Linux capabilities into the IBM Cloud experience and is available on Power10 servers. Users receive fast, self-service provisioning, flexible management and access to a stack of enterprise IBM Cloud services with pay-per-use billing.

Users can easily export virtual machine images in the standard open virtual appliance (OVA) format from PowerVC and upload them onto IBM Cloud for easy back-and-forth image mobility. With this public cloud solution, Power users can grow at their own pace and run enterprise workloads when and where they choose with a variety of flexible operating systems, compute, storage and networking configurations.

Simplify hybrid cloud management

Hybrid cloud environments offer flexibility, but are complex to manage. Organizations need the right tools that can simplify management of heterogeneous environments of public and private cloud systems and data centers.

Managing your hybrid cloud presence with Power provides cost-effective and compelling offerings that enable you to support and manage hybrid cloud landscapes, automate end-to-end IT operations and modernize cloud-native applications.

Virtual infrastructure management
IBM Cloud Pak for Watson AIOps integrates a virtual landscape into a consistent user experience, greatly simplifying management of your hybrid cloud resources. IBM Cloud Pak for Watson AIOps not only enables teams to easily understand the health and performance of applications and infrastructure, but also delivers insights to recommend and leverage automation, delivering efficiencies and results for your business.

Learn more →

Enterprise observability
Instana provides enterprises a comprehensive observability platform that covers not only what's in their data centers, but also across public cloud providers and across all platforms (IBM Power, IBM zSystems and x86). From the standpoint of capabilities, Instana provides enterprise observability, automatic application performance monitoring and hybrid and multicloud monitoring.

Explore more →

Resource optimization
Turbonomic enables ongoing resource optimization across any cloud infrastructure. The software continuously makes resourcing decisions that ensure applications get the compute, storage and network resources they need, while automatically accounting for business constraints. Turbonomic also provides continuous performance assurance with AI-powered software, increased IT productivity and united application and infrastructure teams with true full-stack visibility.

Discover more →

Enterprise application modernization

Red Hat® Advanced Cluster Management for Kubernetes aggregates the management of multiple Kubernetes or Red Hat OpenShift Container Platform clusters into a single management framework.

From there, you can more easily see all your clusters and applications from a single place. You can even deploy new applications and define policies to ensure every cluster is adhering to organizational standards and best practices.

Modernize and build cloud-native applications

Red Hat OpenShift is a single platform for application innovation. It enables organizations to operate consistently across any infrastructure with full-stack automated operations and streamlined developer workflows, empowering teams to innovate continuously and outpace rising customer expectations.

Red Hat OpenShift helps organizations accelerate their cloud-native journey with a trusted platform to build new cloud-native, containerized applications, while benefiting from the reliability, adaptability and performance provided by IBM Power. Designed to offer flexibility and choice for a variety of cloud-consumption models, Red Hat OpenShift on IBM Power improves continuity to establish a hybrid cloud environment so organizations can be ready for today and build for the future.

Solutions to build cloud-native applications

IBM Cloud Paks are enterprise-ready containerized software solutions that provide an open, fast and secure way to move core business applications to any cloud. They are lightweight and easy to run and certified by IBM and Red Hat. Each IBM Cloud Pak sits atop Red Hat OpenShift and can run anywhere — on premises, in the cloud or at the edge.

IBM Cloud Paks are comprised of a set of containerized IBM middleware and common software services. IBM offers six IBM Cloud Paks: IBM Cloud Pak for Watson AIOps, IBM Cloud Pak™ for Data, IBM Cloud Pak™ for Integration, IBM Cloud Pak™ for Business Automation, IBM Cloud Pak™ for Network Automation and IBM Cloud Pak™ for Security. Each offering provides a broad set of capabilities for a particular domain.

Red Hat OpenShift (link resides outside of ibm. com) is the industry-leading platform-as-a-service (PaaS) technology built on Kubernetes, fully enabled and supported on IBM Power. Red Hat OpenShift provides an infrastructure-independent common operating environment that serves as a common foundation across both private and public cloud, making it the de facto standard fabric for hybrid cloud infrastructures. Red Hat OpenShift provides a trusted platform from which to build new cloud-native, container-based applications. It also provides a broad set of open source software, including IBM enterprise middleware (by way of IBM Cloud Paks) and ISV software.

Integrations with other cloud orchestrators

VMware vRealize Automation (vRA) (link resides outside of ibm.com) speeds up the delivery of infrastructure and application resources through a policy-based self-service portal, on premises and in the public cloud. In addition to x86 VMware-based virtual machines, VMware vRA is able to provision Power virtual machines (including AIX, IBM i and Linux) with PowerVC, providing the ability to orchestrate deployments across hybrid cloud.

VMware vRealize Operations for IBM Power Systems (link resides outside of ibm.com) brings together all management functions, including performance management, capacity, cost analytics, planning, topology analysis and troubleshooting in a single integrated, highly intuitive, scalable and extensible platform. It also provides deep insights and key performance indicators for enterprise applications, including SAP HANA, IBM® Db2®, Oracle and several others. This comprehensive monitoring solution is a perfect complement to a cloud management software stack, as it provides a broad and deep perspective into what's happening in the cloud.

Our commitment to delivering open and flexible solutions for your hybrid multicloud journey will help you leverage partner cloud technologies and seamlessly integrate Power with the rest of your data center.

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Seamlessly integrate with IBM Power

With the right advice and solutions, IT leaders can seamlessly integrate IBM Power into their overall hybrid multicloud strategy.

IBM Power has a solution to help you:
– Streamline virtual-machine deployments.
– Streamline operations with a private cloud.
– Leverage the flexibility of public cloud.
– Modernize applications with microservices, containers and Kubernetes.
– Innovate with AI.
– Build a hybrid multicloud.

Let us help you identify the next steps in your journey to the hybrid multicloud world. Reach out to an IBM Power sales representative, IBM Business Partner or the IBM Systems Co-creation Lab to start the conversation today.

1 *DC FutureScape: Worldwide Cloud 2020 Predictions*
  (link resides outside of ibm.com0, IDC, 2020.
  https://www.idc.com/getdoc.jsp?containerId=US44640719

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