



Modernizing your VMware workloads with containers in the Cloud

Streamline your application modernization
journey while maintaining control, enhancing
security and sparking innovation

IBM Cloud



Overview

Modernizing applications is crucial for enhancing user experience and responding to marketplace needs. This e-book addresses key challenges, offers best practices and introduces a cloud-based solution to enable your modernization journey.

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What is application modernization?

How should your organization make the move to modern, cloud-native apps?



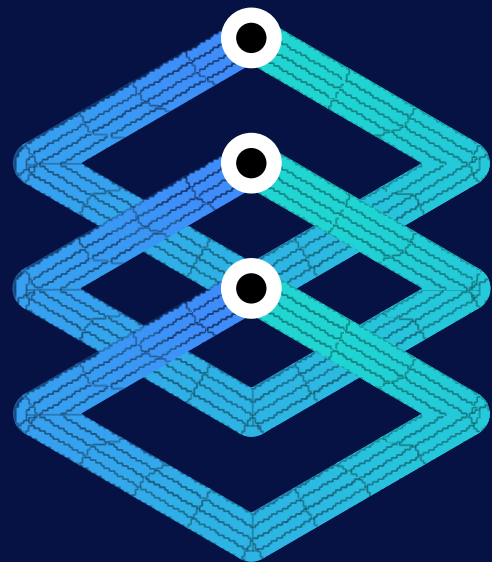
What is application modernization?

Many organizations today are making application modernization a top priority. Whether apps serve customers, partners or enterprise employees, organizations want to introduce new features and capabilities that will improve the user experience. They also want greater agility for the future to better respond to marketplace changes and evolving user demands.

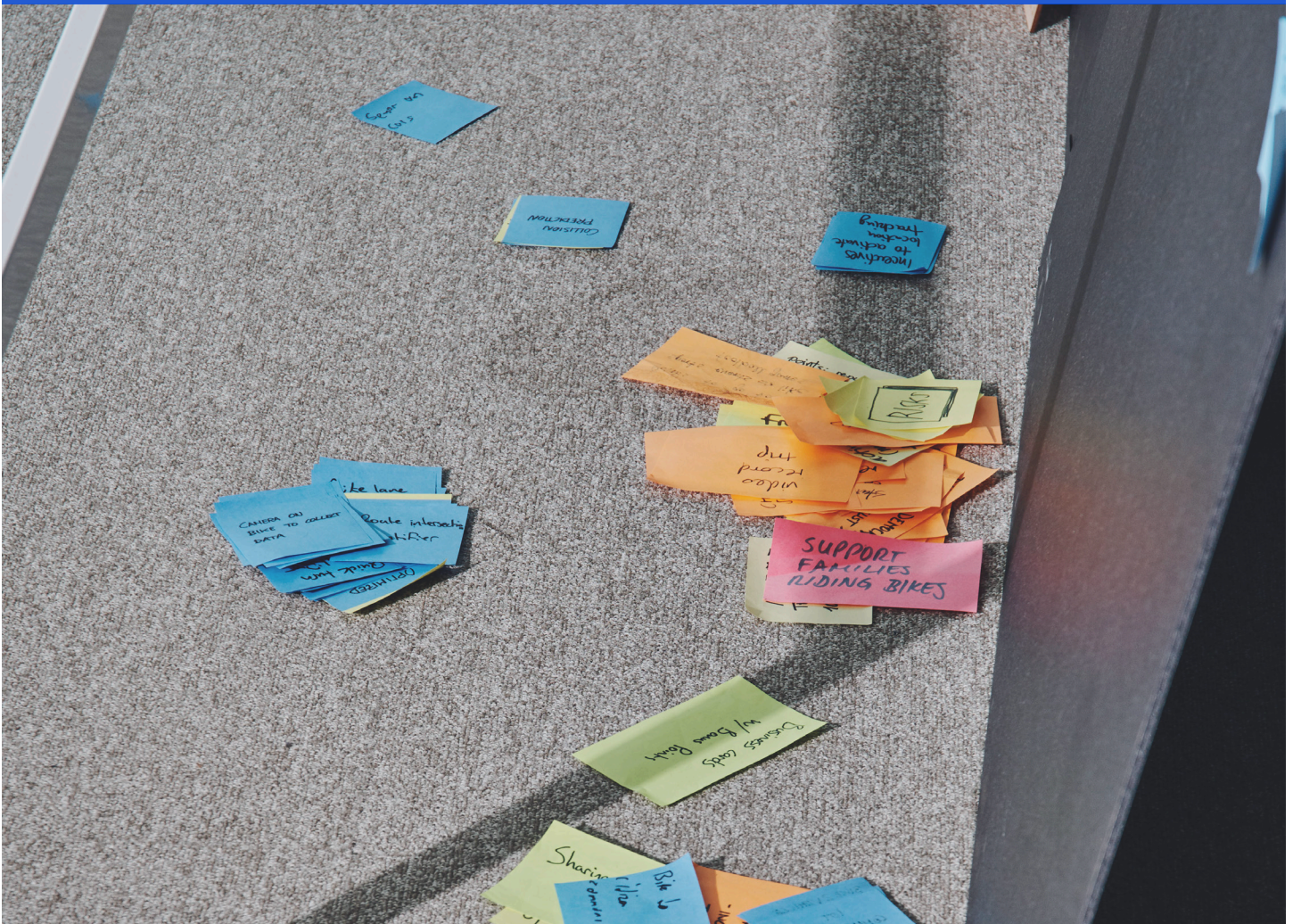
The cloud plays an essential role in modernizing apps. In the cloud, organizations can:

- Standardize on app architectures that enhance agility and facilitate innovation
- Capitalize on advanced cloud-based services ranging from artificial intelligence (AI) to blockchain—to implement cutting-edge features
- Better support mobile use cases and a dispersed user base leveraging the cloud's geographic flexibility
- Enable IT groups to automate administrative functions, shift their cost mode to a usage-based model and gain more cost-effective scalability

How should your organization make the move to modern, cloud-native apps? For many, app modernization is a multiphase journey. With the right cloud solutions, an organization can start to realize benefits immediately and then progress through the rest of the journey at a desired pace.



Addressing the challenges



Addressing the challenges

Transforming existing apps into cloud-based apps can seem daunting. Some organizations see the process of modernizing existing VMware workloads as potentially costly, time-consuming, resource-intensive and risky.

A few common questions are:

- What happens if a workload doesn't run as it should in the cloud? Will my enterprise experience downtime and be forced to spend resources fixing problems?
- How can we maximize the value of our current infrastructure—including both the hardware and middleware to run our apps?
- Will moving to the cloud open new security vulnerabilities?
- Will we be forced to relinquish control over our environments when we move to the cloud?

An end-to-end app modernization plan can help address these questions and minimize concerns.

Where do you start?

First, recognize that only few organizations move directly to cloud-native apps. Many run legacy apps alongside some version of cloud-enabled apps for months or years.

Second, list and rank all requirements, indicating which are critical and non-negotiable. For example, retaining control of the entire application stack might be essential. If so, you'll need solutions that enable you to benefit from the cloud without altering your governance policies or jeopardizing compliance with internal or external regulations.

Third, identify the best candidates for modernization. Begin with less complex, customer-facing apps and gradually modernize mission critical enterprise apps. Staggering the modernization of apps can help further reduce complexity and decrease risks.

Fourth, do what makes sense for your organization and consider all support options. A large pool of solutions can facilitate the transition to app modernization and offset many concerns. Research is key!

Exploring IBM Cloud for VMware Solutions

Retain control, strengthen security and lay a robust foundation for innovation—all while using familiar VMware tools



Exploring IBM Cloud for VMware Solutions

IBM and VMware have streamlined app modernization by enabling organizations to extend existing VMware workloads to the IBM Cloud™ platform. With IBM Cloud for VMware Solutions, you can take advantage of container-based technologies to modernize VMware workloads and begin to realize benefits quickly. IBM Cloud for VMware Solutions offers a path to retain control, strengthen security and lay a robust foundation for innovation – with the benefit of having experts available to enable progress along the way.

Retain control

IBM Cloud automatically provisions servers and provides the VMware virtualization layer in the cloud, but you control the entire stack. Retain root access control down to the hypervisor level, just as it is with your on-premises environment. Additionally, IBM Cloud containerizes your apps, creates microservices and applies the same governance and security policies already in place—all while enabling you to use familiar VMware tools.

Strengthen security

IBM Cloud for VMware Solutions provides the critical tools needed to safeguard workloads and data throughout the app modernization journey. Protect workloads wherever they are running within the IBM Cloud Private Network, and capitalize on additional turnkey security solutions from industry-leading vendors such as F5, Fortinet and HyTrust. VMware NSX-T enables enforcement of network security policies across containers and virtual machines (VMs).

Lay a robust foundation for innovation

IBM Cloud for VMware Solutions gives developers the foundation needed to implement an agile DevOps methodology and bring new functionality to market quickly. Developers can easily draw from a cloud-native services catalog to add new app features that enhance the customer experience. They can revise apps at their own pace and scale IBM Cloud resources as needed.

Experts to enable success

IBM Cloud Expert Services can overcome networking and migration hurdles. They are available to jump-start design and implementation and can be leveraged for on-demand consulting.

See the full stack of components available for app modernization, from infrastructure to advanced cloud-based services.

Charting your journey

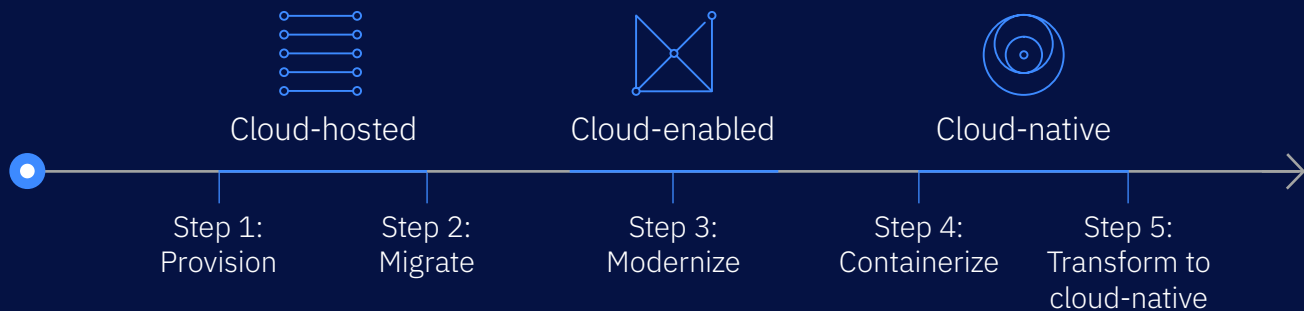


Charting your journey

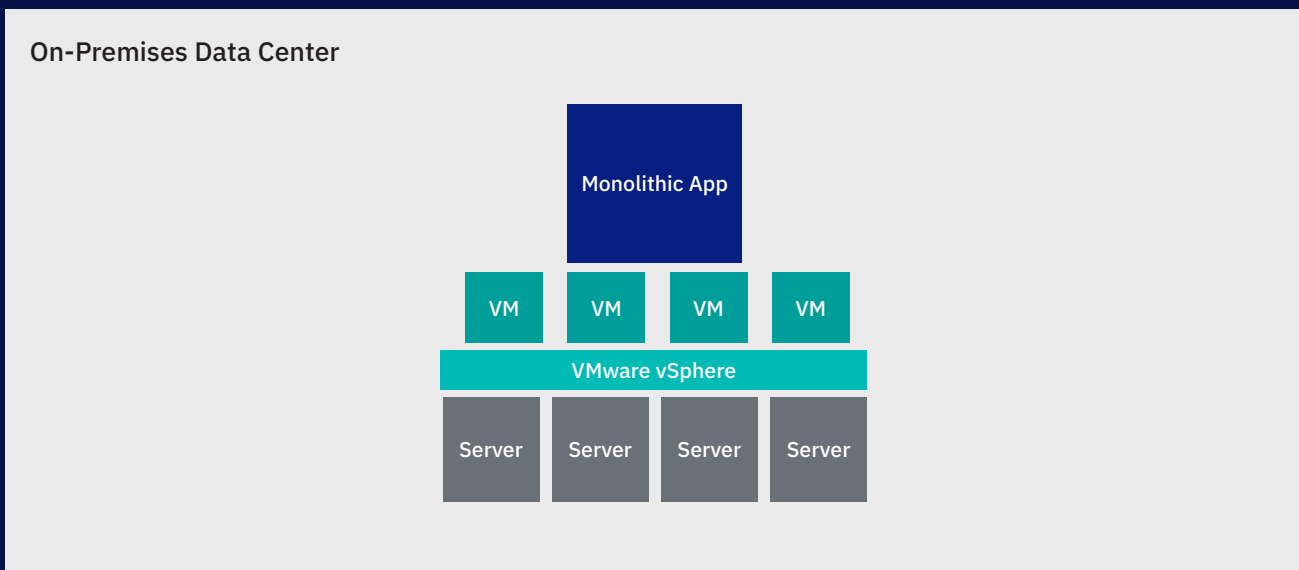
Many organizations begin their app modernization journey with existing monolithic apps running on-premises in a VMware-based virtualized

environment. By adopting IBM Cloud for VMware Solutions, your organization can get started quickly, without completely rewriting apps.

Our journey



Before we start...





Charting the app modernization journey

Cloud-hosted

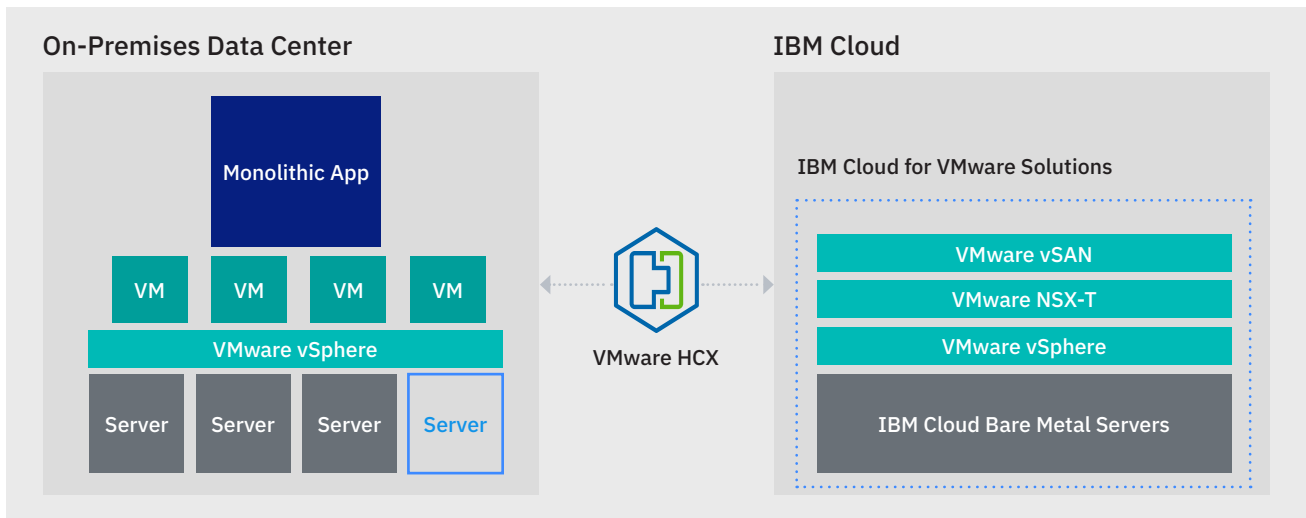
Cloud-enabled

Cloud-native

Cloud-hosted

The IBM Cloud console is designed to enable seamless provisioning of a complete VMware software-defined data center (SDDC) instance running on bare metal servers in under 12 hours.

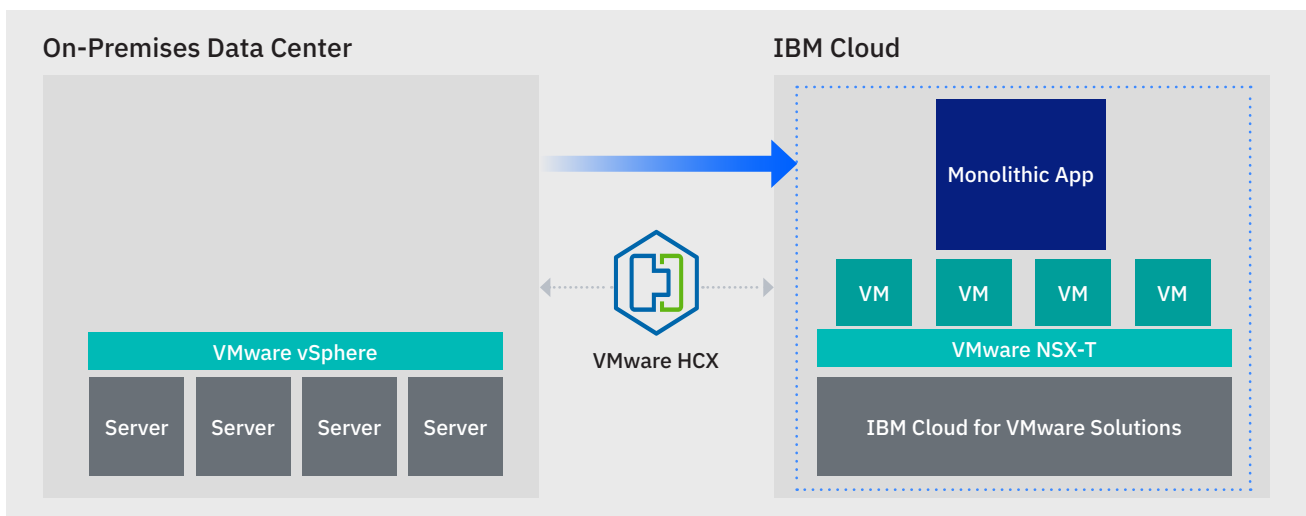
Step 1: Provision



VMware HCX can easily lift and shift the initial VMware on-premises workloads selected for modernization. This phase extends your data center—as it currently exists—into the cloud without any VM changes and

leverages the same VMware tools you have always used to manage workloads. You can even extend your existing IP addresses in the cloud.

Step 2: Migrate



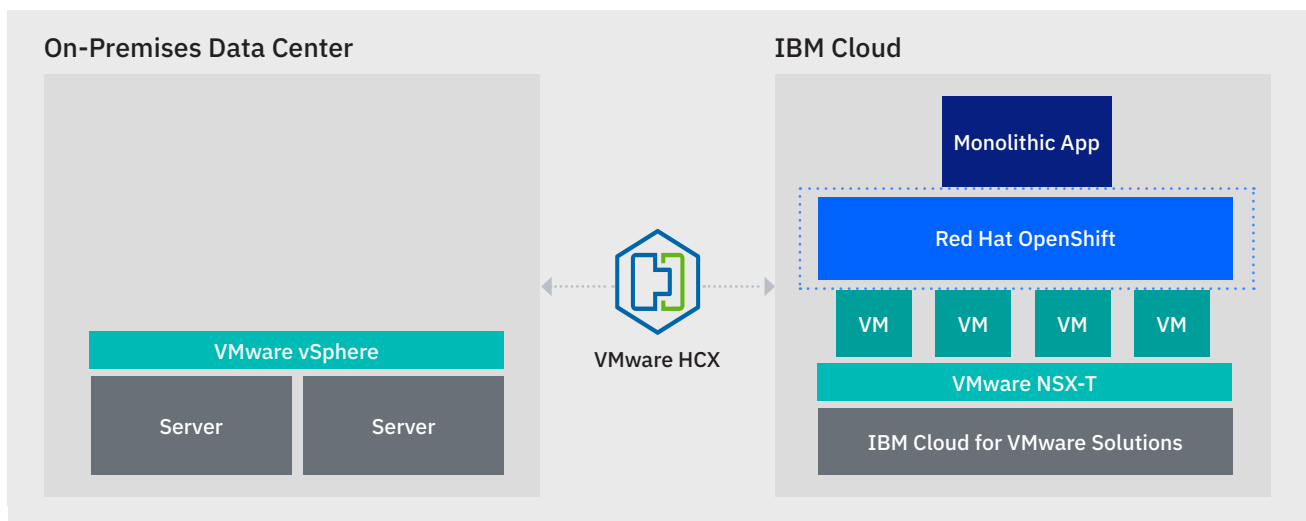
Charting the app modernization journey



Cloud-enabled

After initial migration is complete and successful, it is important to gain operational experience managing a hybrid cloud deployment. Leverage tools such as Red Hat OpenShift to manage VMs and bare metal servers across cloud and on-premises environments.

Step 3: Modernize



Use Red Hat OpenShift to refactor apps for the cloud. With Red Hat OpenShift, you can apply Kubernetes-based containerization to the entire app or just parts of it, creating microservices. You might decide to containerize only the web and app tiers of a monolithic

app while keeping a database tier as a VM. Red Hat OpenShift makes it possible to containerize and create microservices without having to fully re-architect the app.

Why are containers and microservices beneficial?

Containerization improves portability of applications thus the ability to easily move containers among on-premises and cloud environments without rewriting apps. Microservices enhance agility meaning part of the app can be modified without having to revamp all of it. Additionally, microservices create an opportunity to adopt a DevOps-based continuous delivery model in which software developers can quickly, iteratively and automatically add new features.

Charting the app modernization journey

Cloud-hosted

Cloud-enabled

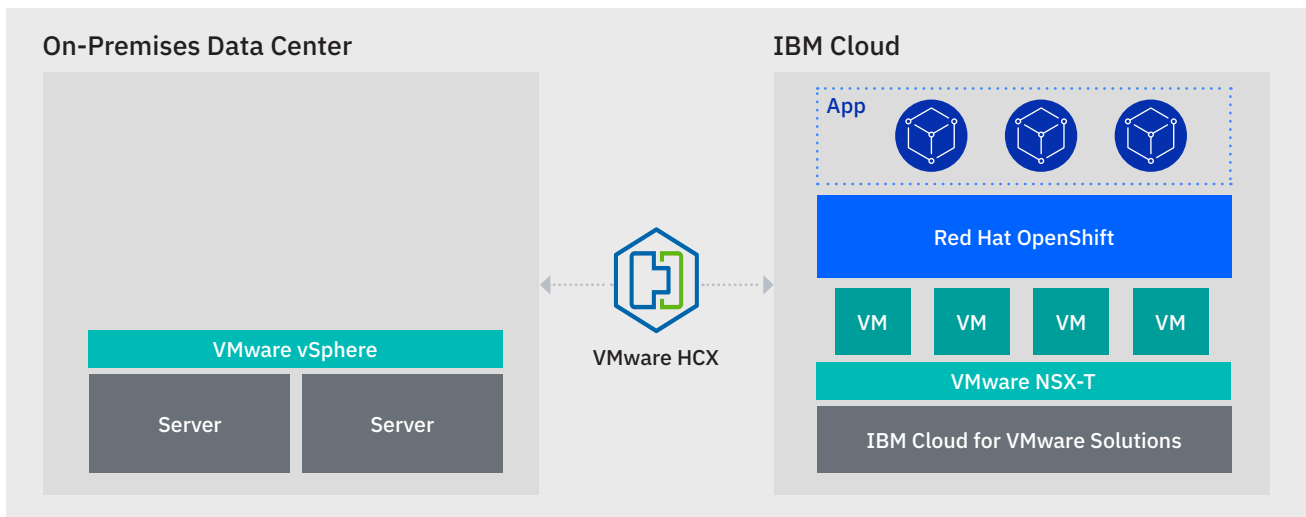
Cloud-native

Cloud-native

The final phase involves producing cloud-native apps, either by re-architecting existing apps or developing net-new ones. Cloud-native apps use multiple, independent microservices, enabling the most from the DevOps continuous delivery model. These cloud-native apps also deliver a full array of cloud benefits, from scalability and geographic flexibility to a consumption-based cost model.

As you develop your cloud-native apps, draw from a wide array of cloud-native services from IBM that will help enhance app functionality and deliver strong end-user experiences.

Step 4: Containerize



As a next step, gain access to a wealth of high-value cloud services, which can be used to enhance app capabilities. For example, tap into analytics, IBM Watson® and machine learning IBM Cloud Services to add intelligence to your app without large-scale programming projects.

Additionally, many organizations benefit from engaging with IBM Cloud Garage™. IBM Cloud Garage combines deep expertise with a methodology based on IBM Design Thinking, Lean Startup, agile development and continuous delivery to enable swift development of cloud-native apps. This network of physical innovation hubs will provide skills needed for migrating to the cloud, producing cloud-native apps, and optimizing the end-user experience.

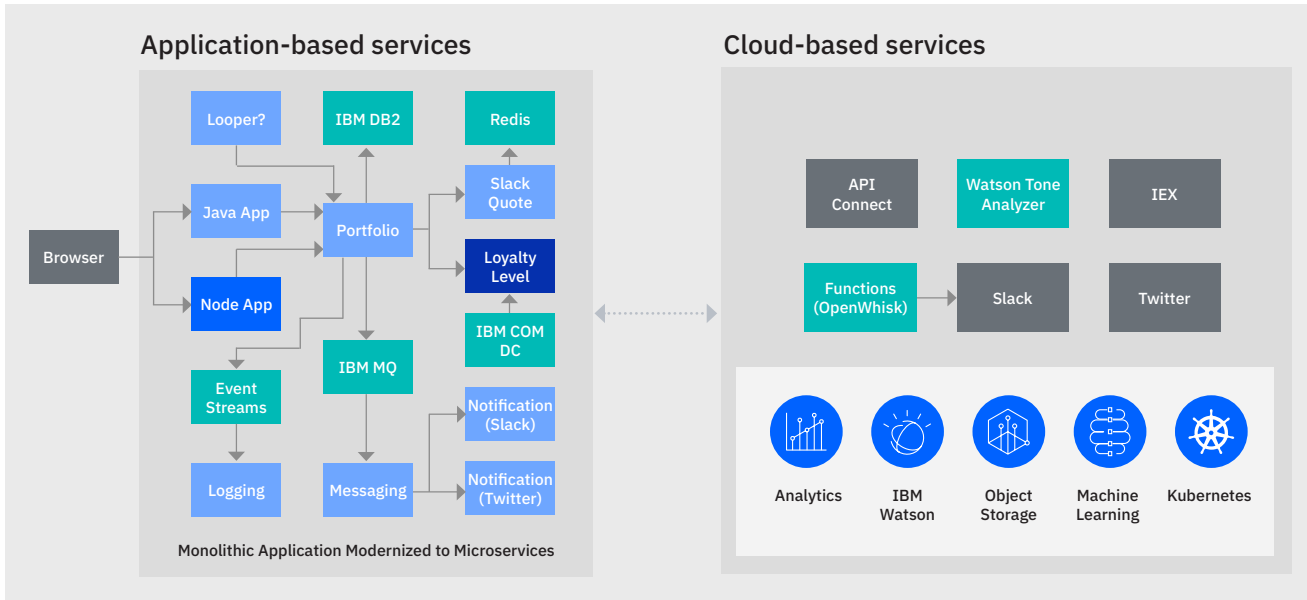
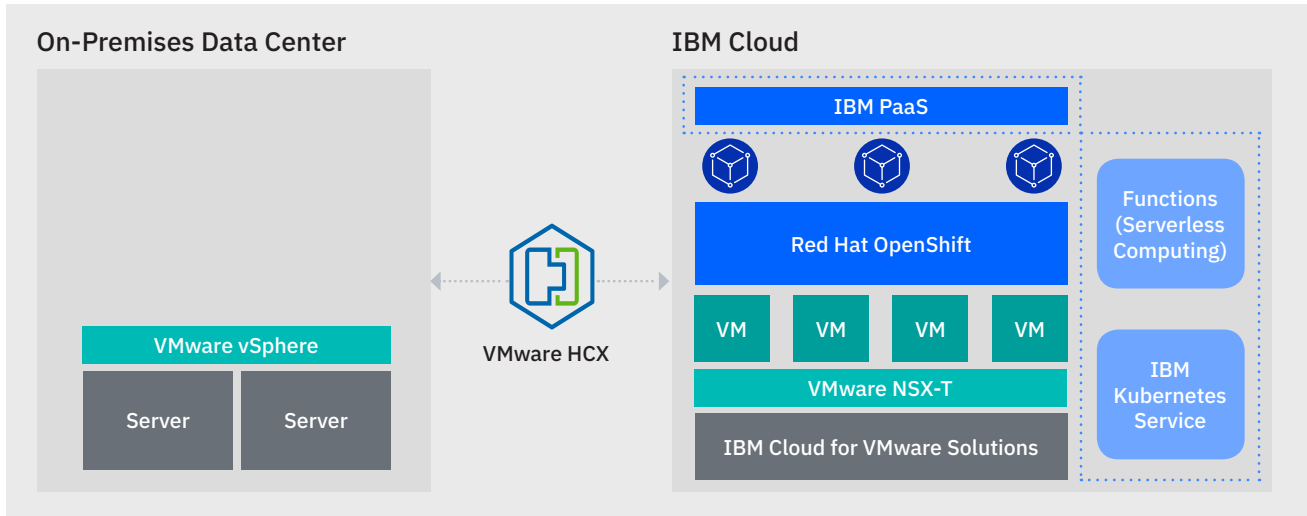
Charting the app modernization journey

Cloud-hosted

Cloud-enabled

Cloud-native

Step 5: Transform to Cloud-native



Getting started

App modernization is vital to staying competitive and meeting evolving user demands. For many organizations, app modernization will be a multiphase journey that begins with lifting and shifting virtualized workloads, continues with containerization and ultimately enables the production of cloud-native apps. IBM Cloud for VMware Solutions simplifies the journey by providing access to tools, expertise, security, services, and of course full control of your environments.

Ready to begin your journey today?

Test-drive IBM Cloud for VMware Solutions with our special offer for migration and app modernization.

To begin the trial, visit the IBM Cloud Portal:

<http://ibm.biz/singlenode>

- Lift and shift up to 20 test/development VMs to the IBM Cloud using VMware HCX and VMware vCenter Server on IBM Cloud
- Modernize two simple apps using Red Hat OpenShift
- Automation capabilities will install and configure Red Hat OpenShift, VMware HCX, vSphere and vCenter Server for a speedy start



Appendix:

Full stack of IBM solutions for app modernization

IBM Cloud for VMware Solutions offers an entire stack of components available for app modernization, from infrastructure to advanced cloud-based services. Automation capabilities make building the stack a turnkey process. Fast-track your progress to Day 2 operations.

VMware vCenter Server on IBM Cloud

Automatically installed and configured on cloud-based servers, VMware vCenter Server on IBM Cloud is a VMware software-defined data center (SDDC) platform. Lift and shift workloads onto IBM Cloud securely and seamlessly without changing anything about your VMs using the VMware HCX component.

Red Hat OpenShift

The Red Hat OpenShift service brings the power of Kubernetes-based containerization and microservices to a VMware environment on IBM Cloud. Use this service's app development and management to containerize existing workloads while retaining full control of the stack, from the Kubernetes layer down through the VMware layer. Gain a catalog of native services that can be natively integrated into an environment—without having to call APIs over the public internet. Continue to use existing IBM® middleware licensing—such as for IBM Db2® data management or the IBM WebSphere® server environment—which runs on Red Hat OpenShift—helps streamline the deployment of cloud infrastructure. This multicloud, self-service software facilitates management and service delivery using end-to-end automation.

IBM Cloud Private Network

To bolster security, IBM Cloud offers a private network backbone that spans all IBM Cloud data centers globally. Use any IBM Cloud data centers and migrate workloads among them freely. Establish backup, disaster recovery or other environments while controlling costs. The private network backbone prevents data from being exposed to the public internet.

HyTrust on IBM Cloud

Initially developed to provide an extra layer of security for financial services organizations, HyTrust on IBM Cloud encrypts container images. This solution also helps ensure that the host environment for VMs and containers remains compliant with company policies and any applicable government regulations.

VMware NSX-T

This next-generation, software-defined networking technology provides a single network fabric for connecting a variety of infrastructure components, from x86 systems and IBM Power Systems servers to VMs and containers. It also provides a single-pane view that helps streamline network management, minimize errors and improve administrative consistency across your infrastructure. NSX-T provides seamless transitions through the app modernization journey.