Red Hat OpenShift Virtualization

Introduction

Red Hat® OpenShift® Virtualization addresses the needs of development teams that have adopted, or want to adopt, Red Hat OpenShift Container Platform for containerized workloads but who possess traditional virtual machine (VM)-based workloads that cannot be easily containerized. This technology provides a unified development platform where developers can build, modify, and deploy applications residing in app containers and VMs in a unified environment. And these capabilities support rapid app modernization across hybrid cloud environments.

With OpenShift Virtualization, teams that rely heavily on traditional VM-based workloads can accelerate cloud-native development. By managing virtualized workloads and containerized workloads as part of a single app development and life-cycle workflow, teams can manage and deploy apps that currently include VMs and containers directly from Red Hat OpenShift. Teams also have the option to move more components of the app to containers over time.

OpenShift Virtualization is a feature of Red Hat OpenShift Container Platform and Red Hat OpenShift Kubernetes Engine. It is not an add-on or a separate product. The OpenShift Virtualization operator must be installed to access the feature. All current and future subscribers will receive OpenShift Virtualization as part of their Red Hat OpenShift subscription.

Question: What is OpenShift Virtualization?

Answer: OpenShift Virtualization is a feature of Red Hat OpenShift that lets developers bring conventional VMs into workflows on OpenShift Container Platform. OpenShift Virtualization represents a continuation of Red Hat's commitment to Kubernetes as the future of app orchestration and as a common standard across the hybrid cloud.

OpenShift Virtualization is based on the upstream KubeVirt project, which is a sandbox project in the Cloud Native Computing Foundation (CNCF). While in tech preview, OpenShift Virtualization was known as container-native virtualization.

Question: What does OpenShift Virtualization do?

Answer: OpenShift Virtualization brings virtualized workloads directly into the development, deployment, and management workflows within OpenShift Container Platform. OpenShift Virtualization uses the Red Hat Enterprise Linux® KVM hypervisor technology deployed using containers, allowing Kubernetes to deploy and manage VMs locally. This capability accelerates app modernization by:

- Supporting development of new, microservices-based apps in containers that interact with traditional virtualized apps.
- Combining virtualized workloads with container workloads on the same platform, making it easier to gradually refactor monolithic, virtualized applications into containers.

OpenShift Virtualization uses the KVM hypervisor, a core part of the Red Hat Enterprise Linux kernel used by Red Hat Virtualization for more than a decade.

Question: How will OpenShift Virtualization be made available?

Answer: OpenShift Virtualization is a feature of Red Hat OpenShift Container Platform and Red Hat OpenShift Kubernetes Engine. It is not an add-on or a separate product. The OpenShift Virtualization operator must be installed to access the feature. All current and future subscribers receive OpenShift Virtualization as part of their Red Hat OpenShift subscription.

Question: What are the key customer benefits of OpenShift Virtualization?

Answer: New development is shifting to containers and serverless, but organizations have a huge investment in apps that run as virtual machines—many of which provide vital services to new and existing containerized applications. OpenShift Virtualization brings virtual machines to Red Hat OpenShift. This innovation allows developers and operations to develop, manage, and deploy virtual machines, containers, and serverless in one platform using the same tools and frameworks, accelerating their ability to deliver differentiated applications and services.

OpenShift Virtualization lets customers modernize existing apps and services to a single Kubernetes-based platform, Red Hat OpenShift. With this modernization, customers can develop and deliver new and existing apps with VMs, containers, and serverless functions managed together in a Kubernetes-native architecture. Teams can also develop containerized apps faster by hosting VM-based workloads on the same platform as container-based apps while continuing to use virtualized applications where there are app dependencies.

Question: What are the key use cases for OpenShift Virtualization?

Answer: OpenShift Virtualization helps technology teams modernize app development and optimize their IT infrastructure.

- **Modernizing app development:** In this use case, developers incorporate existing apps and components into their workflows while simultaneously building new, complex applications. OpenShift Virtualization lets teams with conventional VM technology modernize, so they can develop containerized apps faster. It also provides a way to refactor complex virtualized apps gradually while continuing to run virtualized components. As developers modernize existing apps, OpenShift Virtualization helps them run VMs in Kubernetes pods alongside normal pods made up of app containers, all on OpenShift Container Platform. It supports connectivity between app containers and VMs, while also letting VMs share networking and storage infrastructure with app containers.
- **Optimize IT infrastructure:** As development teams embrace new workload footprints, operations teams need efficient ways to manage them alongside existing investments. OpenShift Virtualization helps optimize IT by providing a unified way to deploy, run, and manage containerized and virtualized workloads on the same platform.

Question: How does OpenShift Virtualization work?

Answer: When OpenShift Virtualization operator is enabled for a Red Hat OpenShift cluster, developers can create and add virtualized applications to their projects using standard workflows, automation, and tools like GitOps. The resulting VMs run in parallel on the same Red Hat OpenShift nodes as standard application containers.

Question: Is OpenShift Virtualization a product?

Answer: OpenShift Virtualization is a feature, not a product. It is based on the upstream open source KubeVirt project and is available to download as a Red Hat OpenShift operator. More information on how to get and install the OpenShift Virtualization operator can be found in the OpenShift Virtualization documentation.

Question: When will OpenShift Virtualization be available?

Answer: OpenShift Virtualization is generally available today. More information on how to get and install the developer preview of container-native virtualization can be found in the OpenShift Virtualization documentation.

Question: How does OpenShift Virtualization differ from other Red Hat virtualization solutions?

Answer: Red Hat offers a portfolio of virtualization solutions including Red Hat Virtualization, Red Hat OpenStack® Platform, and now Red Hat OpenShift Virtualization to fit the various needs of our customer base.

Red Hat Virtualization is an enterprise virtualization platform for business-critical workloads built on and fully supported by Red Hat. For a traditional virtualization experience, Red Hat Virtualization is our most robust offering today and offers an alternative to proprietary virtualization solutions.

Red Hat OpenStack Platform simplifies the delivery of applications and services by empowering organizations to innovate with confidence through an extensible, production-ready private cloud. Red Hat OpenStack Platform is a best practice for apps with requirements for private cloud or network function virtualization (NFV).

OpenShift Virtualization lets customers modernize existing apps and services to a single platform, Red Hat OpenShift. OpenShift Virtualization lets users develop and deliver new and existing apps that consist of virtual machines, containers, and serverless computing, managed together in a Kubernetes-native architecture. OpenShift Virtualization allows both virtual machines and containers to be managed and consumed from within the Red Hat OpenShift management plane, and the technology supports app modernization over time.

Question: What hypervisor is used by OpenShift Virtualization?

Answer: VMs running in OpenShift Virtualization continue to use the same trusted Red Hat Enterprise Linux KVM as Red Hat Virtualization and Red Hat OpenStack Platform.

Question: What is the difference between OpenShift Virtualization and Kata Containers?

Answer: OpenShift Virtualization supports migration of traditional virtualized workloads directly into OpenShift Container Platform development workflows. Full operating system VMs can be run in OpenShift clusters with little or no modification. OpenShift Virtualization is based on the KubeVirt project.

In contrast, the Kata Containers project focuses on using hardware-assisted virtualization technology to provide more secure isolation of workloads that have already been deconstructed into app containers.

OpenShift Virtualization is focused on running and managing traditional VMs as if they were containers, while Kata Containers is focused on running app containers within VMs to increase their isolation from a security perspective.

Red Hat is a sponsor of both projects and views them as complementary solutions that take advantage of the strength and reliability of Linux virtualization, including the KVM hypervisor.

Question: Is OpenShift Virtualization open source?

Answer: Yes, OpenShift Virtualization is based on the upstream KubeVirt project, the source code to which is available under the Apache Software License 2.0.

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O-F24749