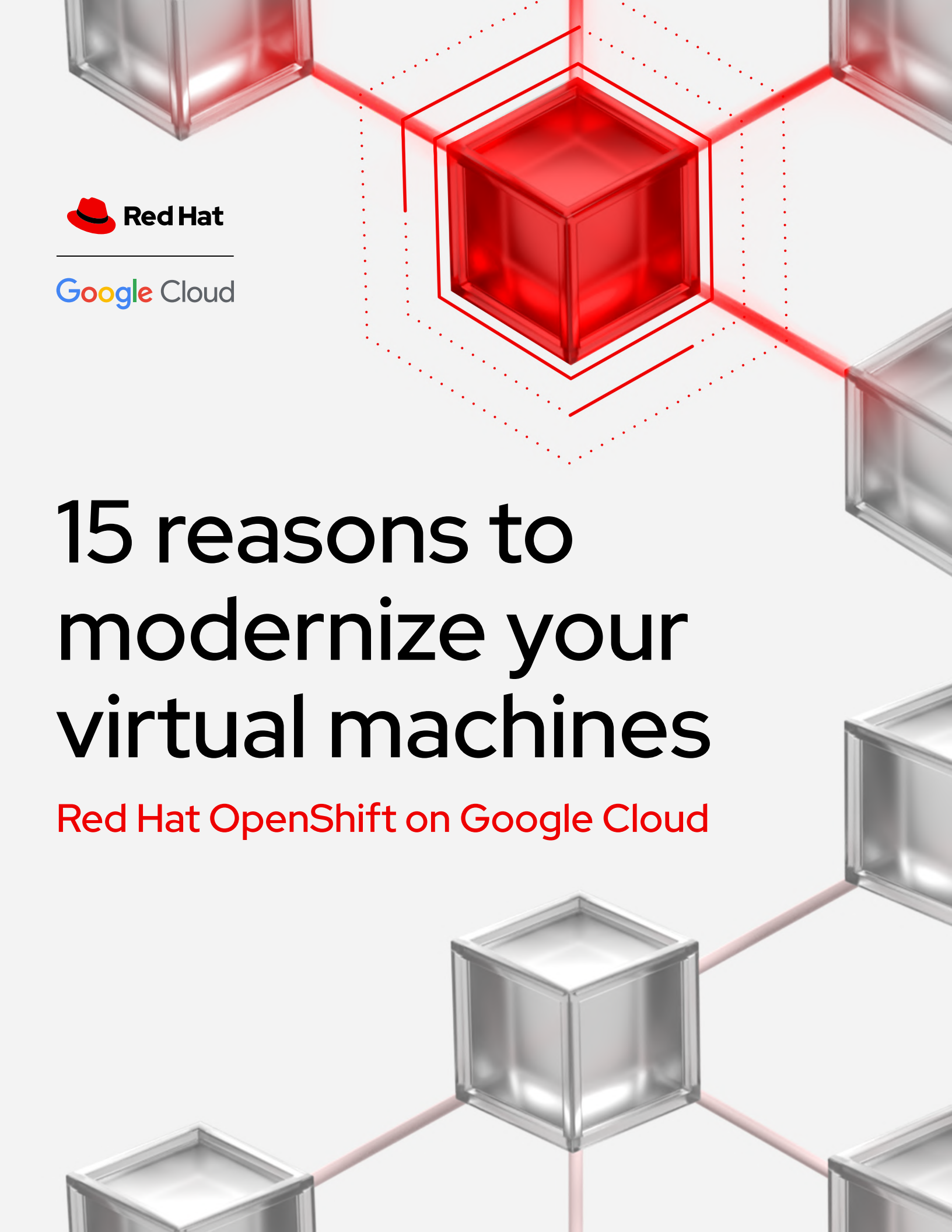
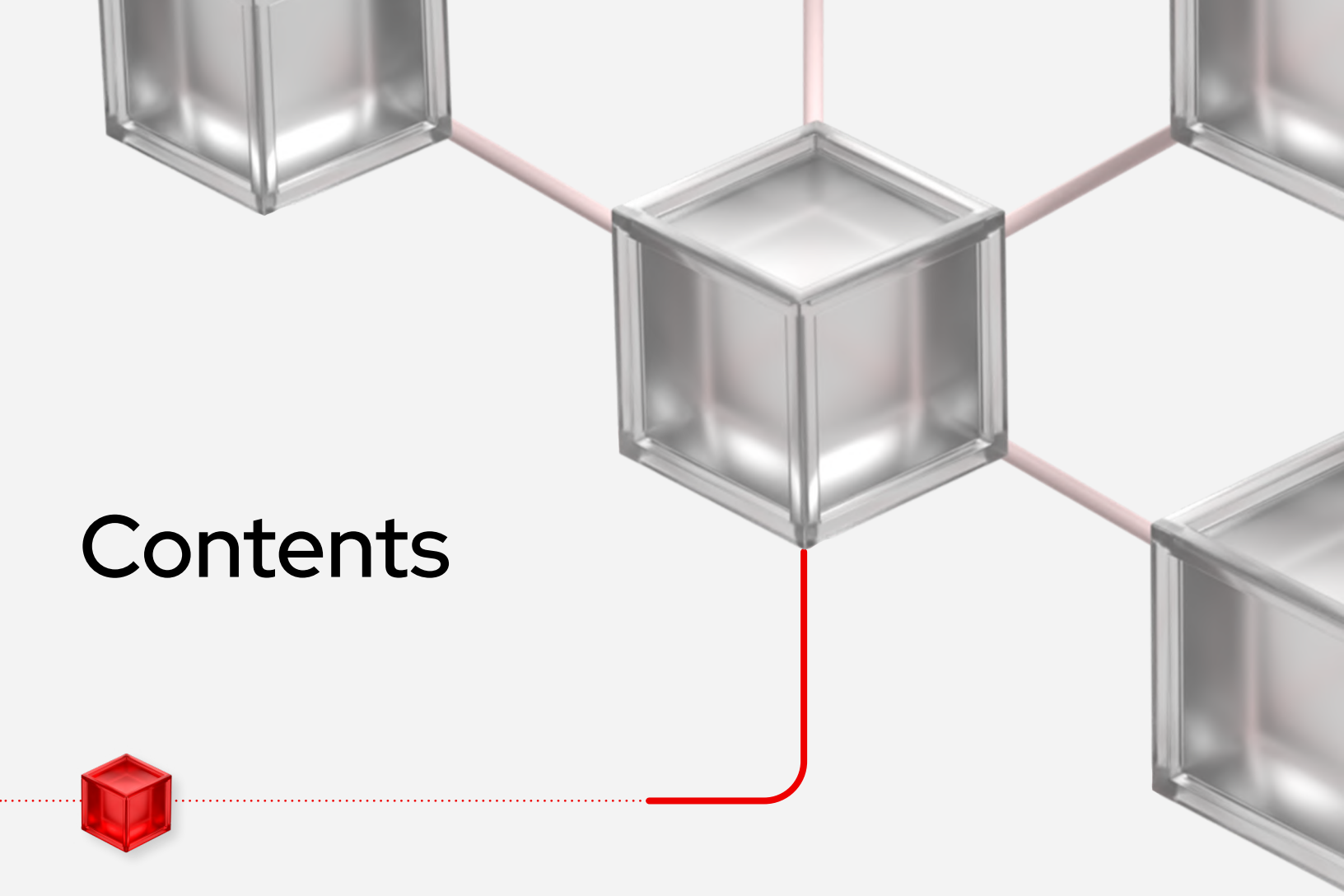


Red Hat

Google Cloud

15 reasons to modernize your virtual machines

Red Hat OpenShift on Google Cloud

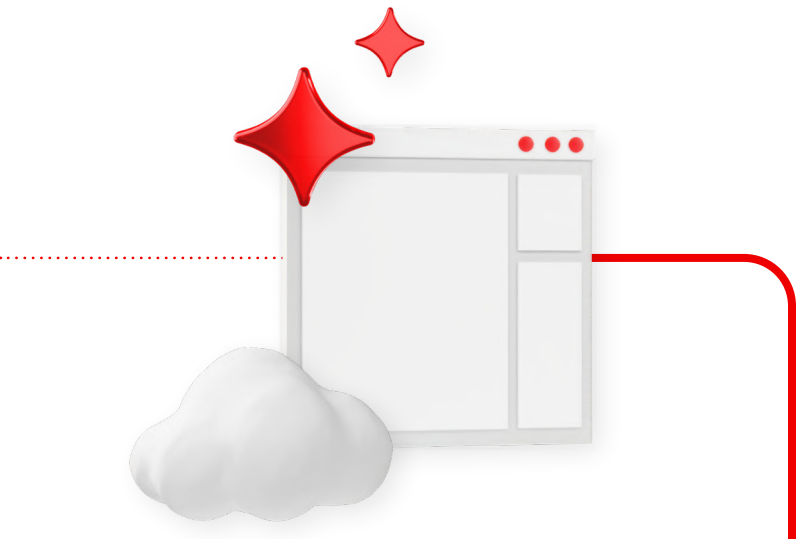


Contents

Virtualization infrastructure continues to evolve

For decades, organizations have relied on virtualization technologies to streamline operations, optimize costs, and deliver innovative applications.

While virtual machines (VMs) helped IT teams efficiently use resources and improve flexibility, the rise of public clouds has evolved these platforms to use the scalability and agility of new cloud computing models.



Now, many organizations are reassessing their strategies to make sure they have the right consistency and efficiency for future operations. While enterprises will continue using virtualization to maximize return on investment (ROI), there is a growing need to migrate to unified platforms that handle existing VMs while preparing for IT modernization. To succeed, organizations require a cloud-ready foundation that meets current virtualization needs while integrating with modern systems.

A unified foundation for the future

Red Hat® OpenShift® on Google Cloud offers a modern, enterprise-ready platform for running and managing VMs alongside container, serverless, and AI workloads without disrupting traditional operations. Powered by Kubernetes and DevSecOps capabilities, this security-focused foundation allows teams to build, deploy, and manage applications at scale across hybrid, multicloud, and edge environments.

By working together, Red Hat and Google Cloud provide a consistent environment that helps teams speed up application development and streamline operations while keeping costs under control. This integrated hybrid cloud environment supports cloud-native development, data management, DevOps, and AI/machine learning (ML) technologies, offering the tools needed to operate effectively.

Flexible deployment and migration

Red Hat OpenShift on Google Cloud offers flexible deployment options to meet your organization's specific requirements.

- Self-managed **Red Hat OpenShift** provides a comprehensive hybrid cloud foundation that allows you to migrate existing workloads (including AI, traditional, and virtualized applications) to a single platform.
- **Red Hat OpenShift Dedicated** is a fully managed application platform available on Google Cloud. It reduces operational complexity by automating cluster deployment and management, allowing your team to focus on building applications that add business value.

Both solutions include **Red Hat OpenShift Virtualization**, a feature based on the Kernel-based Virtual Machine (KVM) and KubeVirt open source projects that supports VM operations directly within the Red Hat OpenShift console. This allows you to create, manage, and live-migrate VMs while running them simultaneously with containerized workloads. Using supported tooling such as the Migration Toolkit for Virtualization (MTV), you can migrate Linux® and Windows VMs to this unified platform at your own pace. When deploying VMs on Red Hat OpenShift Dedicated, a Red Hat site reliability engineering (SRE) team manages the underlying platform as a standard practice, while your internal teams manage OpenShift Virtualization and the VMs running on it.

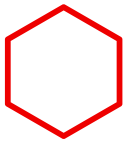
Once workloads are running next to containers, organizations can maximize the value of existing investments while adopting cloud-native architectures and modern development practices.

Expert platform and cloud management

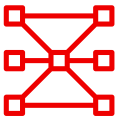
With OpenShift Dedicated on Google Cloud, Red Hat experts manage the entire software stack, including:

- **Cluster creation.**
- **Cluster management.**
- **Monitoring and logging.**
- **Network configuration.**
- **Software and security updates.**
- **24/7 Platform support.**

VMs



Containers



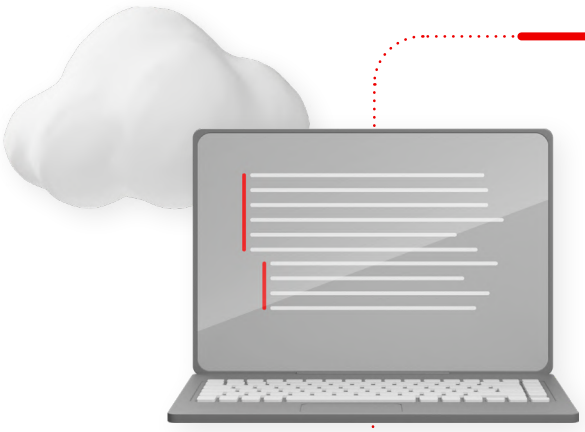
AI models

Red Hat OpenShift Virtualization

Red Hat OpenShift

Red Hat Enterprise Linux

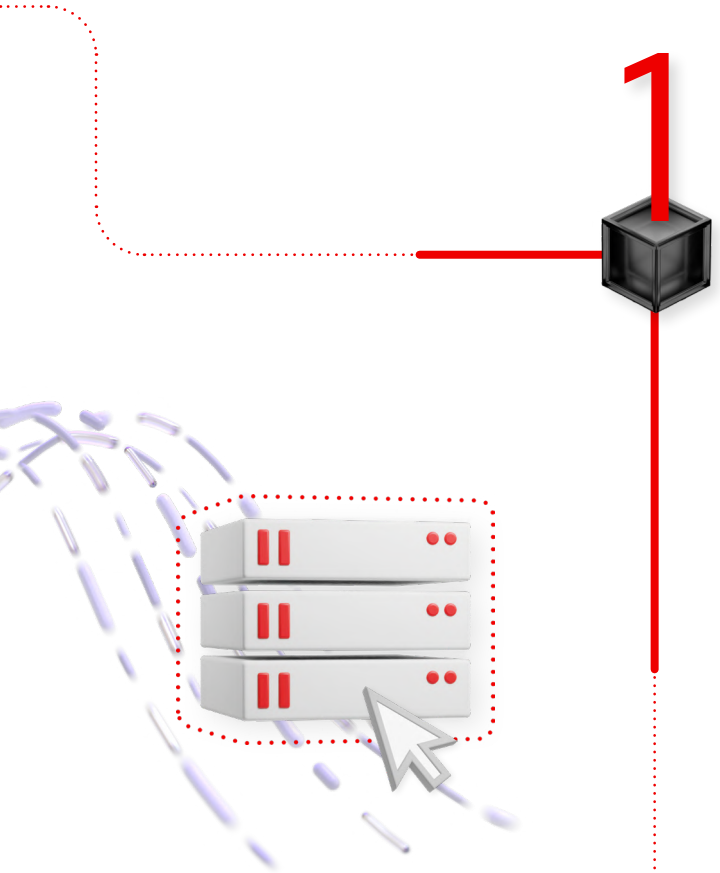
Physical machine



Migrating your VMs to Red Hat OpenShift on Google Cloud delivers value at every point in the application modernization journey.

Gain benefits across your organization

Here are 15 reasons to migrate your traditional VMs to a unified foundation based on Red Hat OpenShift on Google Cloud



1 Maintain stability and support on a modern virtualization platform

Migrating workloads from traditional to modern virtualization platforms can be complicated. To make sure the migration process is smooth and efficient, you need to carefully consider VM compatibility, possible configuration changes, and potential performance optimizations. Additionally, differences in virtualization platform deployment and management processes and tools need to be accounted for in your migration plans, especially when moving between cloud providers. Pre-emptively validating VM compatibility, using warm migration capabilities, and transitioning multiple VMs at once can help you move workloads between virtualization platforms faster and with less effort. Cold migration is also available as an option.

The migration toolkit for virtualization streamlines and accelerates the process of moving existing VMs to OpenShift Virtualization, saving time and minimizing potential errors. Plus, by combining this toolkit with Ansible® Automation Platform, you can automate the migration of groups of VMs and related infrastructure efficiently and at scale.

2

Operate consistently and cost-effectively across hybrid and multicloud environments

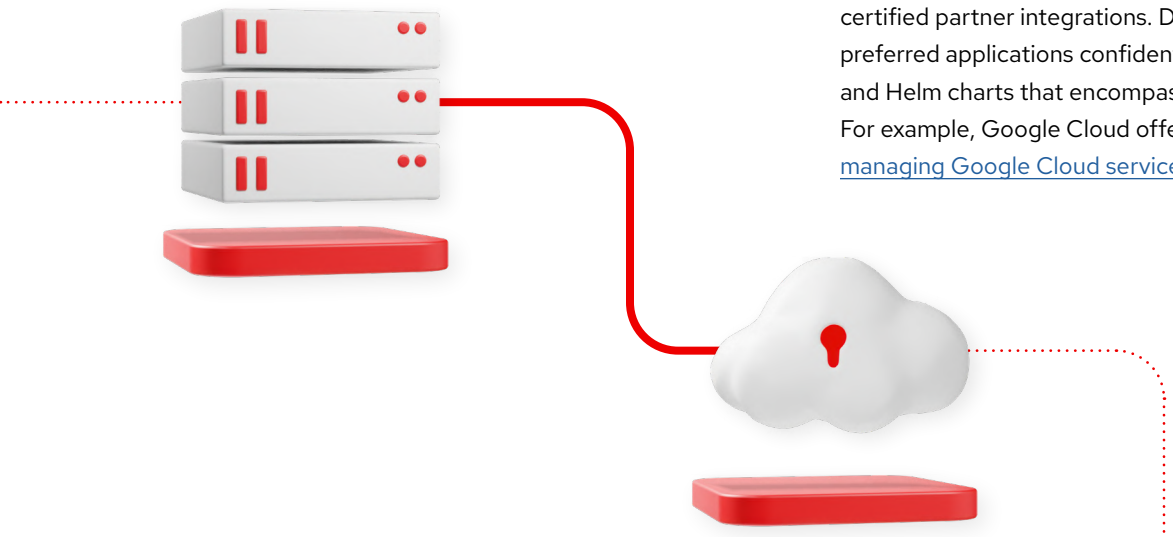
One of the key advantages of adopting hybrid and multicloud environments is flexibility. During application deployment, these environments let you choose between various datacenters and cloud resources to balance scalability, performance, and cost according to your business objectives. Application platforms that run and migrate VM workloads consistently across hybrid and multicloud environments help you streamline application deployment, optimize resource use, and maintain operational consistency.

OpenShift Virtualization supports self-managed physical servers in datacenters, edge environments, and public cloud environments, so you can deploy and manage your VMs on optimal infrastructure. Because Red Hat OpenShift on Google Cloud runs consistently in datacenters and public, private, hybrid, or multicloud environments, you can choose the right location for each application and VM, and move them as needs change. This consistency also streamlines the migration of on-site workloads and VMs to Google Cloud.

Managing separate platforms for VMs and containers can lead to increased complexity, resource fragmentation, and operational overhead. Unified platforms that streamline infrastructure deployment, management, and monitoring across both VMs and containers can help you optimize resource use, eliminate duplicate efforts, and quickly adapt to diverse workloads. Red Hat Advanced Cluster Management for Kubernetes helps Red Hat OpenShift Virtualization scale by providing a single console to manage VMs and containers across clusters, with built-in governance, policy enforcement, and automation.

OpenShift Virtualization streamlines operations with a single platform for VMs, containers, bare metal, and serverless workloads. Standardize infrastructure deployment and maintain all workloads using a common, consistent set of established enterprise tools. You can also streamline Day 2 operations from provisioning to compliance to deprovisioning with Ansible Automation Platform.

Plus, you can continue to use your existing services and applications with Red Hat OpenShift on Google Cloud via certified partner integrations. Deploy and manage your preferred applications confidently with certified operators and Helm charts that encompass detailed vendor expertise. For example, Google Cloud offers a variety of operators for managing Google Cloud services and resources.



3

Flexible pricing and streamlined procurement

Achieve the right balance of flexibility and cost with versatile purchasing options. Buying Red Hat OpenShift on Google Cloud directly from the Google Cloud Marketplace streamlines procurement by combining all deployment costs into a single Google Cloud bill. This unified billing approach helps you manage subscriptions more efficiently and reduces administrative overhead.

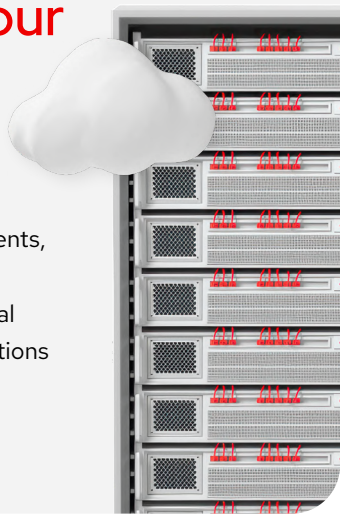
For operational flexibility, consumption-based pricing makes sure you pay only for the instances you use, while multiyear reserved instance models offer significant discounts for predictable workloads. You can also apply your existing Google Cloud committed spend to these deployments to maximize the value of your investment. Additionally, private offers available through Red Hat or reseller partners provide further opportunities for lower pricing while still counting toward your Google Cloud commitments.

4

Transform your applications

Red Hat OpenShift runs consistently across on-site datacenters, cloud environments, and managed cloud services, so you can choose the optimal environment for your applications and VMs.

Read the e-book



Modernize your applications over time, on your schedule

While migrating monolithic or n-tier applications on VMs to containerized, microservices-based workloads can deliver major benefits—enhancing scalability, productivity, and agility—it can also require significant investments in time and resources. That's why platforms that support mixed environments, including VMs, containers, bare metal, and even serverless workloads, are critical. They let you strategically transform applications at your own pace and according to your unique business needs.

With Red Hat OpenShift on Google Cloud, you gain a single, unified platform to modernize without disruption. You can run VM and container-based workloads side by side, effectively maintaining operational consistency across on-premise, cloud, and edge environments. This approach reduces the burden of platform management, freeing your teams to focus on strategic innovation. It also empowers developers to upskill in emerging technologies (such as gen AI) and accelerate application development by using the combined strengths of the Google Cloud and Red Hat ecosystems.

5

Provide self-service options for deploying VMs

Manually deploying VMs is an inefficient, error-prone process that can result in inconsistent configurations, long deployment times, and an increased risk of security vulnerabilities. Self-service capabilities let users rapidly and reliably deploy pre-approved, security-compliant VM configurations when they need them and without opening an IT service ticket.

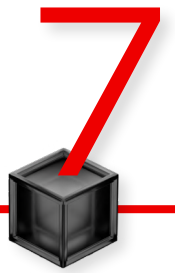
With Red Hat OpenShift on Google Cloud, users can independently provision the resources they need without manual intervention from IT operations teams. Following standard Red Hat OpenShift role-based access controls (RBAC), users can create VMs in their projects—and then grant access to other project members—to help their entire team get the resources they need. VM instance types streamline self-service provisioning via predefined operating system (OS) images, workload types, and hardware requirements. You can also use templates to deploy VMs that require advanced configuration, including virtual appliances.

6

Adopt GitOps and integrate VMs into your pipelines

Using VMs in development and deployment pipelines can increase the scalability, consistency, and speed of your application delivery processes. Red Hat OpenShift on Google Cloud allows you to adopt a GitOps approach to manage not only application workloads but also VM workloads, bringing the best practices of modern application delivery to VM lifecycle management.

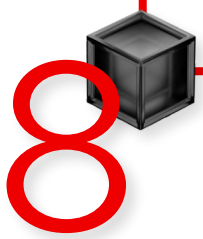
- **Unified lifecycle management.** Because VMs on Red Hat OpenShift are treated as Kubernetes resources (Custom Resource Definitions), you can manage their entire lifecycle using ArgoCD. This transforms VM operations from a manual, isolated process into an automated, auditable, and consistent cloud-native workflow.
- **Standardized environments.** Integrating VMs into your continuous integration/continuous deployment (CI/CD) pipelines lets you deploy standardized, isolated, and reproducible environments for coding, testing, and debugging.
- **Integrated tooling.** With Red Hat OpenShift Pipelines and Red Hat OpenShift GitOps (based on ArgoCD), you can create, manage, and run commands in VMs directly within your pipelines. This allows you to modernize operations without discarding your existing virtualized workloads.



Take advantage of production-ready virtualization hypervisor technologies

Hypervisor performance, stability, and security posture are critical for efficient, dependable virtualization infrastructures. Adopting extensively tested and validated hypervisors that are supported by trusted vendors can help you better manage virtualized workloads at scale and increase reliability across diverse environments.

As the underlying hypervisor for OpenShift Virtualization and Red Hat Enterprise Linux, KVM is a security-focused, high-performance, open source hypervisor. First released in 2007, KVM provides a stable, efficient virtualization foundation for organizations worldwide. Today, Linux virtualization powers critical IT infrastructure for a large number of global financial services firms, airlines, manufacturers, public sector organizations, and telecommunications companies, and is a popular choice for public cloud deployments.



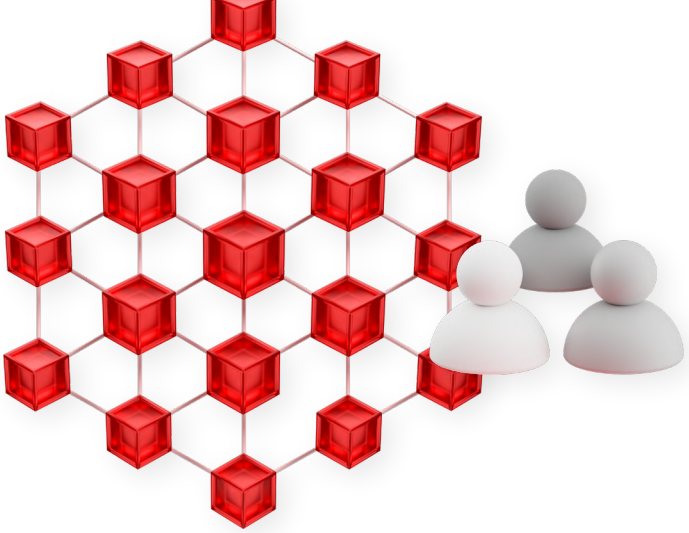
Boost VM performance

Fast recovery times are critical when IT services experience interruptions that cause downtime. When this occurs, applications running in VMs that use those services are also unavailable. An application platform that can recover and reboot VMs quickly and efficiently is essential for keeping your business up and running at all times.

OpenShift Virtualization exhibits near-linear boot times for large numbers of VMs, so your critical applications can always be available.

Accommodate multiple guest OSes

In virtualized environments, support for guest OSes increases the diversity of workloads, applications, and services you can run on shared physical infrastructure. Compatibility with a wide range of OSes, advanced security features that isolate guests and hosts, and support from experts with extensive experience simplifies virtualization across varied IT environments.



Red Hat tests, certifies, and supports guest OSes for use with OpenShift Virtualization—including certification for Microsoft Windows guest support through Microsoft's Server Virtualization Validation Program (SVVP)—to help you create an IT environment that meets your business needs. You can also continue to use common in-guest tools such as PowerShell and Ansible Automation Platform with VMs running on OpenShift Virtualization.

10

Decrease risk with advanced security features and best practices

Security vulnerabilities in virtualized environments with shared hardware infrastructure increase the risk of unauthorized access, data breaches, and potential service disruptions. Strong isolation technologies, consistent security policies, and adherence to least privilege principles enhance the overall security posture of VM workloads.

OpenShift Virtualization follows the restricted Kubernetes pod security standards profile and runs VM workloads without root privileges, helping you comply with current, industry-standard security practices and safeguard your organization. Red Hat OpenShift also includes core security features—such as access controls, network security, and an enterprise registry with a built-in scanner—to safeguard your platform from the start. Red Hat OpenShift on Google Cloud is certified to and managed in compliance with key security standards, including Payment Card Industry Data Security Standard (PCI DSS), System and Organization Controls (SOC) 2, and International Organization for Standardization (ISO) 27001.

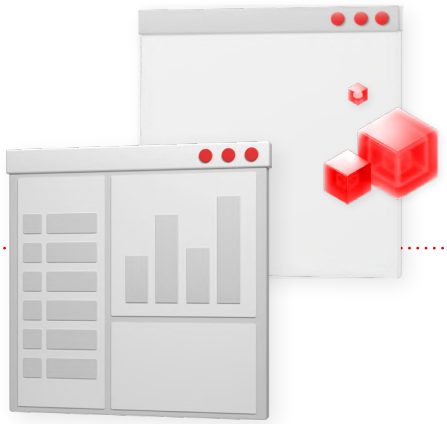
Plus, OpenShift Dedicated on Google Cloud is certified out of the box with ISO 27001, Payment Card Industry Data Security Standard (PCI DSS), and SOC 2 Type 2.

Google Cloud establishes itself as the Trusted Cloud by providing a secure-by-design foundation rooted in a shared fate model for comprehensive risk mitigation, supporting stringent digital sovereignty requirements and organizational compliance objectives.

This security ecosystem is added to by gen AI, using tools such as Gemini in Security (or Duet AI) and the modern Google Security Operations (SecOps) platform for intelligent, fast threat detection, investigation, and response. The platform integrates the frontline intelligence and deep expertise of Mandiant incident responders and threat analysts, providing a critical view into threat actors and making sure organizations can understand active threats and minimize the impact of a breach.

Coupled with a broad portfolio of controls—such as Security Command Center for risk mitigation and Assured Workloads for compliance—Google Cloud helps organizations confidently put a security focus on their entire cloud transformation. Learn more about Google Cloud security.

11



Streamline live migration of VMs

Live migration—moving a running VM to another host without interrupting the workload—is crucial for maintaining continuous operations as infrastructure demands change. A virtualization platform that lets you configure, initiate, and monitor live migrations across your environment helps balance workloads and avoid downtime during maintenance activities.

OpenShift Virtualization supports complete live migration workflows with a unified management console, configurable policies, VM metrics, and traffic encryption to help keep your applications running reliably. You can migrate live VMs between compute instances, storage instances, and even Google Cloud availability zones.

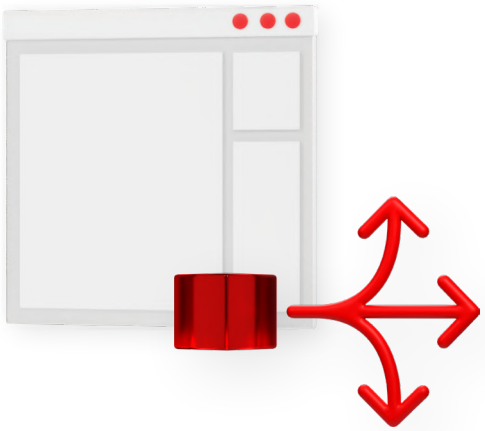
12

Back up and restore VMs

When unexpected events or system disruptions occur, reliable backup and restore capabilities are essential to recover VMs quickly and make sure there is business continuity. While OpenShift Virtualization provides built-in tools to create snapshots and restore VMs, you can take advantage of Red Hat's extensive certified partner ecosystem for enterprise-grade disaster recovery. Instead of relying on manual scripts or generic automation, organizations can deploy certified backup solutions from partners such as Veeam Kasten and Trilio. These solutions are designed specifically for Kubernetes and virtualized workloads, making sure you have data integrity and fast recovery times.

Using the Red Hat OpenShift Operator Framework, you can install and manage these third-party backup tools directly from the Red Hat OpenShift console. This integration allows you to orchestrate backups for both VMs and containers through a single, unified interface. Beyond backup and restore, the Red Hat ecosystem connects you with a wide range of storage and data management partners, giving you the flexibility to choose the best tools for your specific compliance and operational needs.

13



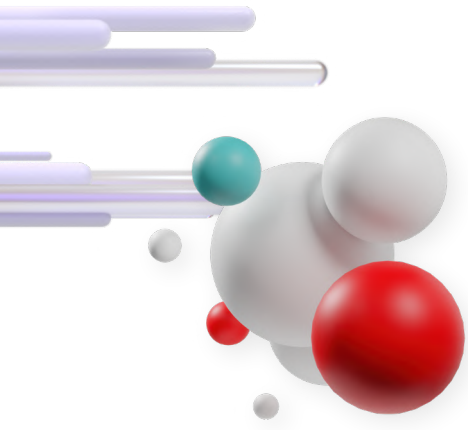
Scale infrastructure as workloads change

The dynamic workloads, diverse technologies, and rapid pace of development and deployment associated with modern applications places high demands on IT infrastructure. To deliver optimal performance and resource use, virtualization platforms must dynamically and efficiently scale up and down as workloads change. Ansible Automation Platform can assist with this by helping with the scaling of cluster resources and orchestrating processes such as load balancing and configuration.

Machine management features in Red Hat OpenShift—including autoscaling based on workload policies and machine health checks—help you administer infrastructure with greater flexibility and efficiency to meet modern application demands. And with Red Hat OpenShift Dedicated on Google Cloud, Red Hat's SRE team monitors your control plane usage 24x7 and will notify you if a cluster needs to be scaled to avoid an outage.

14

Support a collaborative, open source model



Open source development models promote collaboration, innovation, and community-powered development to rapidly deliver new, advanced virtualization technologies. With access to stable community innovation, open standards for broad compatibility, and open APIs for flexible integration, open source technologies can help you build efficient virtualized environments across datacenter and cloud infrastructures.

OpenShift Virtualization uses container-native virtualization technology to deliver ongoing innovation. This technology is developed and maintained in KubeVirt, a Cloud Native Computing Foundation (CNCF) project. As the foundation of Red Hat OpenShift Virtualization, KubeVirt provides a unified development platform where developers can build, modify, and deploy applications residing in both containers and VMs in a common, shared environment.

15

Work with Red Hat cloud and virtualization experts

Successfully planning, deploying, and maintaining a virtualized environment requires specialized skills and knowledge. Expert support and guidance, backed by extensive virtualization experience and in-depth platform knowledge, can help you optimally configure your environment, proactively resolve potential issues, and maximize performance, security, and reliability.

Red Hat OpenShift Dedicated on Google Cloud helps you optimize support costs and operations with included 24x7 expert support. Red Hat's SRE team automates the deployment and management of your clusters so your teams can focus on application development and strategic initiatives. Reduce costly downtime and maintain reliability and security with managed threat monitoring and remediation. Resolve issues in less time via a single path to support through Red Hat. Access Kubernetes experience without retraining or moving existing staff or hiring new members.

Although your teams are responsible for managing OpenShift Virtualization on top of Red Hat OpenShift Dedicated on Google Cloud, Red Hat support staff are still available to answer questions and provide expertise about migrating, running, and managing VMs on the platform.

You can also accelerate deployment with migration planning assistance through Red Hat Consulting engagements.

A consistent foundation for innovation

By giving you a single scalable and flexible platform for VMs and containers, OpenShift Virtualization reduces operational overhead and opens a straightforward path to modernization. This integration offers a unified approach for managing VMs and containers in an efficient, security-focused manner.

And with Red Hat OpenShift on Google Cloud, you can benefit from a unified foundation, integrated products and services, a large partner ecosystem, and expert support and services to transform your applications with less effort.

You can also apply modern application development principles to your VMs and run all of your applications and workloads consistently across on-site datacenter, edge, and cloud environments. Increase developer productivity, simplify operations, and streamline infrastructure and application delivery to better support your business. With OpenShift Virtualization and Red Hat OpenShift on Google Cloud, you can meet today's business needs while preparing for future modernization and change.

Ready to migrate your VMs?

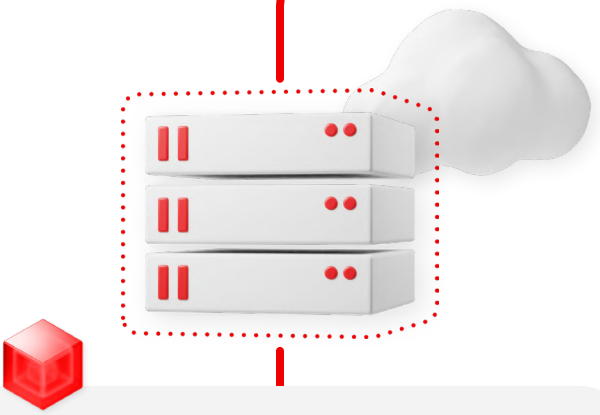
Unify and streamline IT operations with a single, cloud-ready application platform for VMs and containers.

OpenShift Virtualization and Red Hat OpenShift on Google Cloud reduce operational complexity and provide a unified, modern, cloud-native infrastructure for all of your virtualized and containerized applications and workloads. Plan your path to modernization with a platform and cloud services that bring modern application development principles to existing VMs and prepare your organization for a cloud-native future.

Learn more about OpenShift Virtualization.

Learn more about Red Hat OpenShift Dedicated.

Learn more about self-managed Red Hat OpenShift.



Experience OpenShift Virtualization at no cost

Modernize your infrastructure with Red Hat OpenShift Virtualization on Google Cloud. Discover how you can manage virtual machines and containers side-by-side on a trusted global platform.

Explore Red Hat OpenShift on Google Cloud