



# Migrate and manage virtual infrastructure

Virtualization and automation  
solutions with Red Hat



**Red Hat**

# Table of contents



Chapter 1

## Virtual machines are a business reality

page 3



Chapter 2

## Migrate to Red Hat at your own pace

page 4



Chapter 3

## Manage complex virtual infrastructure using automation

page 8



Chapter 4

## Manage the ongoing operation of virtual machines with Red Hat

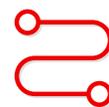
page 12



Chapter 5

## Gain a flexible solution with Red Hat technologies and services

page 15



Learn more

## Start where you are and modernize when you're ready

page 16



## Chapter 1

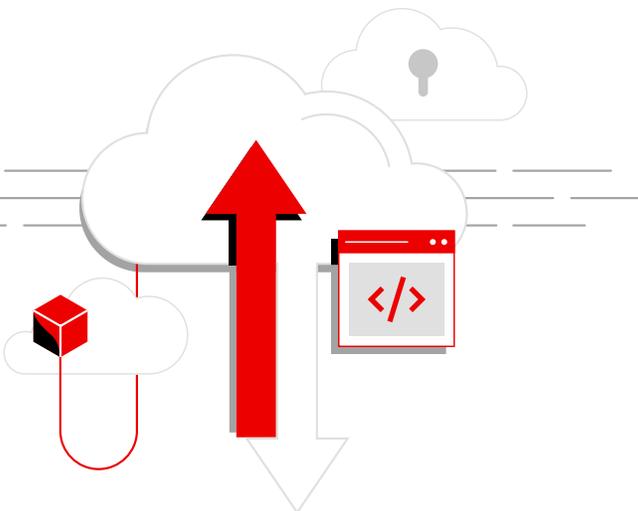
# Virtual machines are a business reality

Virtual machines (VMs) are the foundation for a wide range of essential business and operational applications, making them an essential component of IT infrastructure—but operational strategies may be changing.

Virtualization technology was a step forward at the time it became popular, as the alternative was monolithic IT infrastructures that often were inefficient at fully utilizing hardware resources. Today, containerization provides scalability and flexibility, and virtualization technology, which businesses have invested in over many years, continues to be central to running critical workloads.



**Many find the idea of a common platform for both cloud-native and VM-based workloads appealing, especially when it provides a pathway to the future.**



Many organizations are reassessing their virtualization platforms and strategies to make sure they have the right combination of consistency, efficiency, and support for their future operations and cloud-based applications.

As organizations examine changes in skills requirements, operational investments, modernization, and other factors, the idea of a common platform for both cloud-native and VM-based workloads is appealing, especially when it provides a pathway to the future. Red Hat® OpenShift® Virtualization can be that pathway, by providing a flexible solution to meet existing and new business requirements.

## Chapter 2

# Migrate to Red Hat at your own pace

**OpenShift Virtualization empowers organizations to efficiently manage and operate VM workloads on a modern application platform.**

Red Hat OpenShift Virtualization is an integrated feature of Red Hat OpenShift. It provides a unified environment where existing VMs can coexist and thrive alongside containerized workloads, using a consistent set of management tools and processes. This cohesive approach helps businesses to optimize operations while preparing for future modernization efforts.

OpenShift Virtualization also provides the tools for efficient VM migration, while the broader Red Hat OpenShift platform allows organizations to modernize their applications and embrace cloud-native infrastructures over time. For organizations seeking a dedicated virtualization solution, [Red Hat OpenShift Virtualization Engine](#) provides the virtualization functionality of Red Hat OpenShift to deploy, manage, and scale VMs only. Whether operating on premise, in the cloud, or at the edge of the network, Red Hat OpenShift allows for consistent and flexible operations, making it a valuable choice for diverse IT environments.



## Incorporating automation

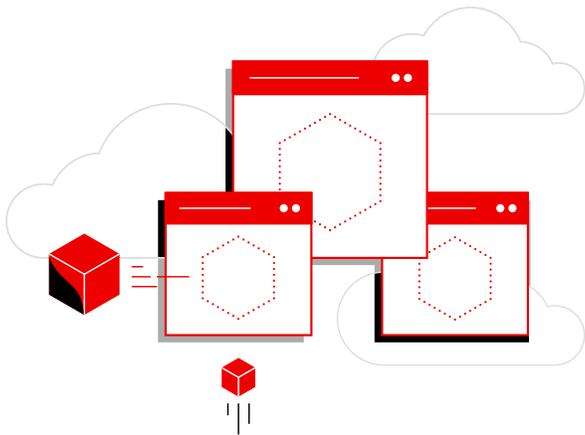
In a disrupted virtualization market, the capabilities of OpenShift Virtualization present a compelling alternative. By combining Red Hat OpenShift with the advanced automation capabilities of [Red Hat Ansible® Automation Platform](#), organizations can automate workflows, simplify complex VM migrations at scale, and streamline day-to-day operations.

Red Hat Advanced Cluster Management extends the solution even further, by providing multicluster management for virtualized environments and full VM lifecycle management.

Together, these technologies provide a reliable way to migrate from traditional virtualization platforms while establishing a scalable and easily managed foundation for hybrid environments and modernization.

## Ease migration with the right tools

With the migration toolkit for virtualization that comes included with Red Hat OpenShift, organizations can streamline the VM migration process to minimize disruption. Available as an integrated capability of Red Hat OpenShift and using an intuitive interface and process, the migration toolkit for virtualization provides tools to assess, plan, and execute migrations with limited downtime.



When paired with Ansible Automation Platform, you can automate the process to conduct VM migrations at scale. Ansible Automation Platform also allows you to migrate large groups of VMs (potentially hundreds or thousands at a time), plus the related infrastructure, in dramatically less time, while enforcing consistency and accuracy to mitigate risk.

## Red Hat's approach to migration and modernization lets you set the timeline so you can:



### Preserve existing IT investments

Continue using your current VMs and infrastructure while planning for the future. Avoid disruption by operating business-critical applications, and replatforming at your own pace.



### Control costs

Spread modernization expenses over time, avoiding large upfront costs. Automate to reduce operational efforts, freeing teams from repetitive, manual Day 2 tasks, and allowing them to focus on higher-value initiatives while avoiding potentially costly errors.



### Mitigate risk

Automate at-scale migration processes to maintain accuracy and consistency, reducing downtime and human error. Gradual migration allows you to address complexities incrementally so your organization can continue the modernization journey with less exposure to risk.



### Prepare for the future

Build a foundation for modernization with a unified platform that supports both VMs and containerized workloads.

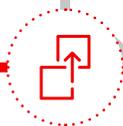
## Migrate and modernize with Red Hat solutions

Red Hat provides a suite of solutions to help you manage and migrate VMs efficiently. Here's what a step-by-step migration process can look like using Red Hat solutions:



### 1 Create an inventory of what needs to be migrated

Understand what VMs you have and which ones you want to migrate. For example, you can understand the specifics of a group of VMs, such as a set of departmental VMs, and then plan for their migration.



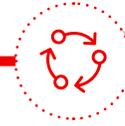
### 2 Use Red Hat's migration toolkit for virtualization

The migration toolkit for virtualization allows you to plan all of the specifics that you need in order to move your VMs to OpenShift Virtualization. Use this toolkit to quickly run checks on VM configuration before you begin your migration and avoid disruption on other running workloads throughout the migration process.



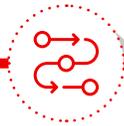
### 3 Migrate at scale

Large blocks of VMs can be time-consuming to migrate individually, but Ansible Automation Platform allows you to migrate VMs at scale, quickly and consistently. Using an Ansible Playbook, you can apply the settings you discovered and defined in Red Hat's migration toolkit for virtualization to migrate at scale.



### 4 Include related infrastructure migration needs

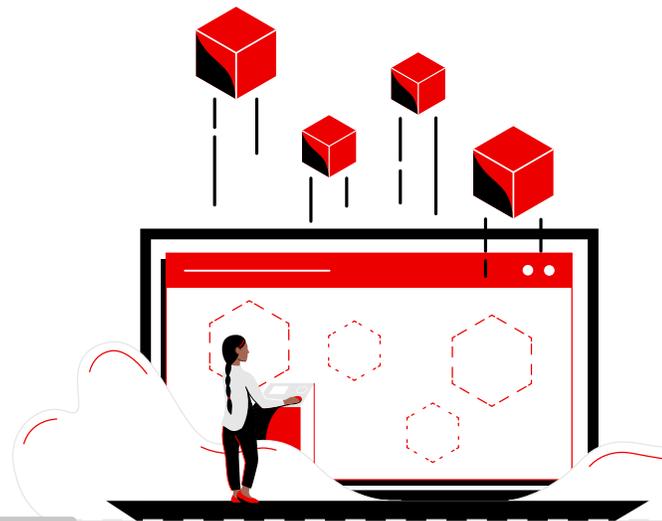
Depending on the specific needs of the applications and workloads that run in your VM, your solution can touch many aspects of your technology stack—from network connectivity to storage resources to specific operational procedures, including security monitoring, backups, compliance, and more. As you migrate, a flexible automation solution such as Ansible Automation Platform can help you orchestrate these needs as part of a migration workflow.



### 5 A pathway to modernization

OpenShift Virtualization allows you to run both VM-based and containerized applications on a single platform. This dual capability provides unified management that simplifies operations by managing VMs and containers together. This also sets up your transition to container-based workloads when you're ready—at your own pace—without disrupting existing environments.

With solutions that let you deploy workloads on the platform that suits you best, whether it's hybrid cloud, bare metal, or multicloud, you gain the ability to deploy anywhere and modernize everywhere.



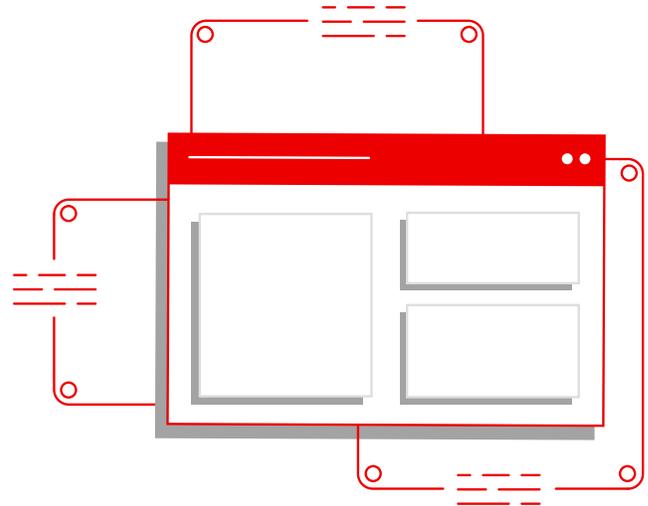
## Ongoing management of VMs and related infrastructure

Even after migrating to OpenShift Virtualization, it's important to plan for ongoing management. Virtualization technology often houses critical applications that rely not only on VMs, but also related infrastructure such as networks, storage, and more. From provisioning and deployment to ongoing maintenance and eventual decommissioning, maintaining speed, accuracy, and consistency is critical to ongoing VM management.

Consider the provisioning of a new VM. You have to orchestrate the delivery of the VM, plus storage and network connectivity at a minimum, and you have to meet the demands of development teams and other stakeholders who depend on you to deliver infrastructure quickly.

Once the virtual infrastructure is deployed, you also have to manage the ongoing Day 2 operational lifecycle. This often leaves teams struggling with manual processes, including slower completion of tasks, inconsistently applied changes, and human error. The challenge becomes pronounced when teams are managing thousands or even tens of thousands of VMs and related infrastructure. Without the right tools, these challenges can lead to wasted resources, reduced performance, and slower delivery.

All of this highlights the need for unified, streamlined management that helps VMs remain available, performant, and consistently configured, with the ability to rapidly and continually address security risks. At the same time, unused or redundant VMs must be swiftly retired to optimize resources, control costs, and mitigate security risks.



## Manage your complete virtual infrastructure

Managing VMs isn't just about the machines themselves; it involves overseeing the connected multivendor infrastructure. Red Hat® Ansible® Automation Platform goes beyond VM management to encompass management for the entire virtual infrastructure, including:



**Networking.** Automate network configurations, manage updates, and maintain connectivity for your VMs.



**Storage.** Manage data storage efficiently by automating tasks such as provisioning, backup, and recovery processes.



**IT security.** Incorporate robust security management into every layer of your virtual environment, from individual VMs to the broader infrastructure.



**Backup and recovery.** Automate disaster recovery workflows to avoid interruptions in the availability of your critical applications and data.

## Chapter 3

# Manage complex virtual infrastructure using automation

Automation plays an important role in efficient virtual infrastructure management. Repetitive manual tasks increase the opportunity for errors that can take valuable time to identify and fix.

By automating management tasks, you can keep extensive virtualized environments performant, and quickly scale VMs to meet current business demand. Automation can also help your organization:

- Enforce standard configurations and rulesets when provisioning VMs.
- Manage related infrastructure such as network and storage.
- Orchestrate tasks across OpenShift Virtualization and cross-functional domains.
- Implement automated workflows.
- Update configurations and install applications.
- Increase the efficiency of administration and operations teams.

By adopting end-to-end automation at scale, your organization can build, deploy, and manage VMs more efficiently, meeting the demands of key applications and workloads.

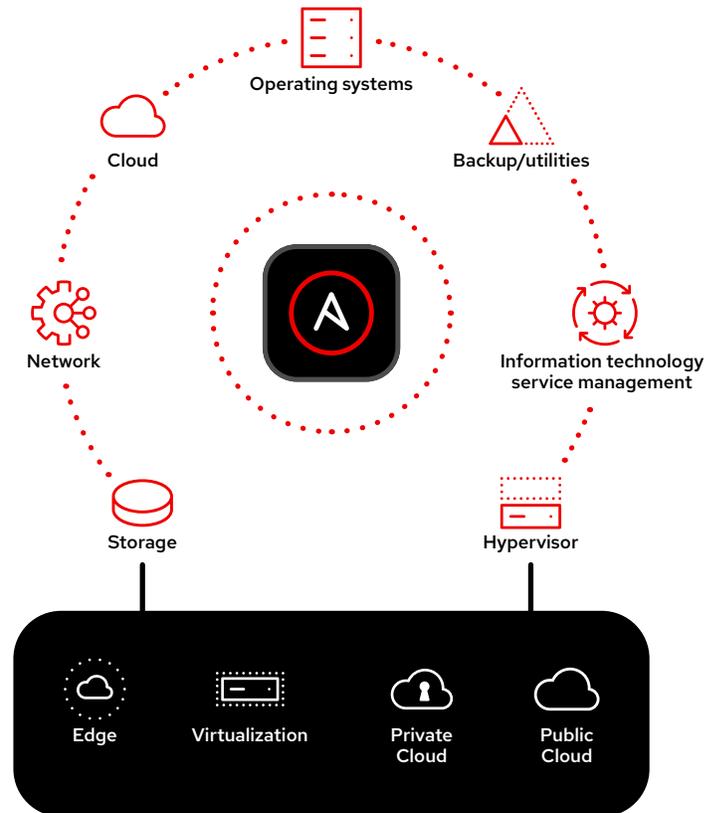
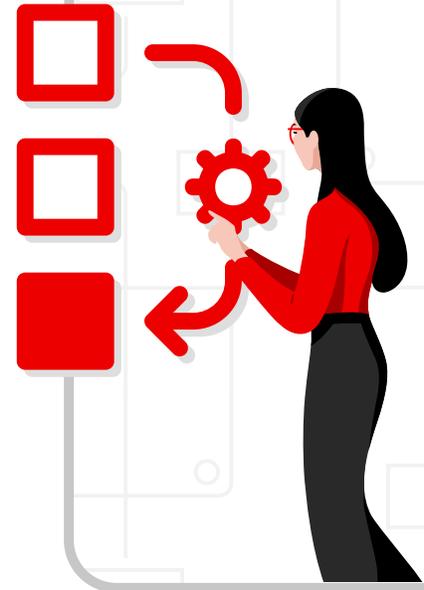


Figure 1: Automate complex virtual infrastructure using Ansible Automation Platform.

## Where to start with automation

The initial challenge that any team must address is where to start. Before taking steps toward automation adoption, it's important to take a step back and observe the entire lifecycle of the VMs across your organization.

This is because VMs don't exist in isolation—they're part of a larger ecosystem that includes networking, storage, databases, backup systems, high-availability solutions, observability and logging tools, and more.

A holistic approach that manages all of these components through a unified automation framework is required. This makes sure that every aspect of the infrastructure is optimized to support your unique business needs.

## Gain the benefits of automation

Your teams can operate with greater speed, reliability, and scalability.



**Speed.** Automation accelerates processes, allowing for rapid provisioning and real-time response to infrastructure changes or performance issues.

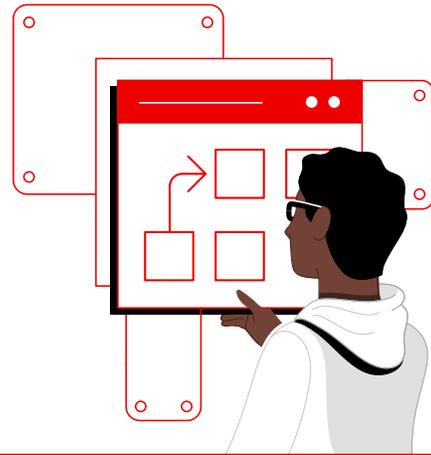


**Consistency.** Standardized automation reduces the risk of human error, providing assurance that VMs are configured and maintained according to best practices.



**Scalability.** Automation scales effortlessly with your needs, whether you're managing a handful of VMs or thousands across multiple datacenters.

Self-service capabilities further enhance the value of automation, empowering development teams to spin up or manage VMs with certain configurations without burdening IT operations. Event-driven automation takes this a step further by enabling systems to respond automatically to predefined alerts, such as scaling resources during peak demand or notifying teams about idle VMs, shutting down resources while you investigate a security risk, or automatically decommissioning unused resources as desired.



### Why automate management?

Automating VMs on OpenShift Virtualization offers several key benefits and can help organizations:

**Reduce human error** and improve accuracy by automating repetitive manual tasks that are often completed at scale.

**Improve management** not just of VMs, but related infrastructure as well.

**Streamline** cross-functional workflows and eliminate extensive manual coordination.

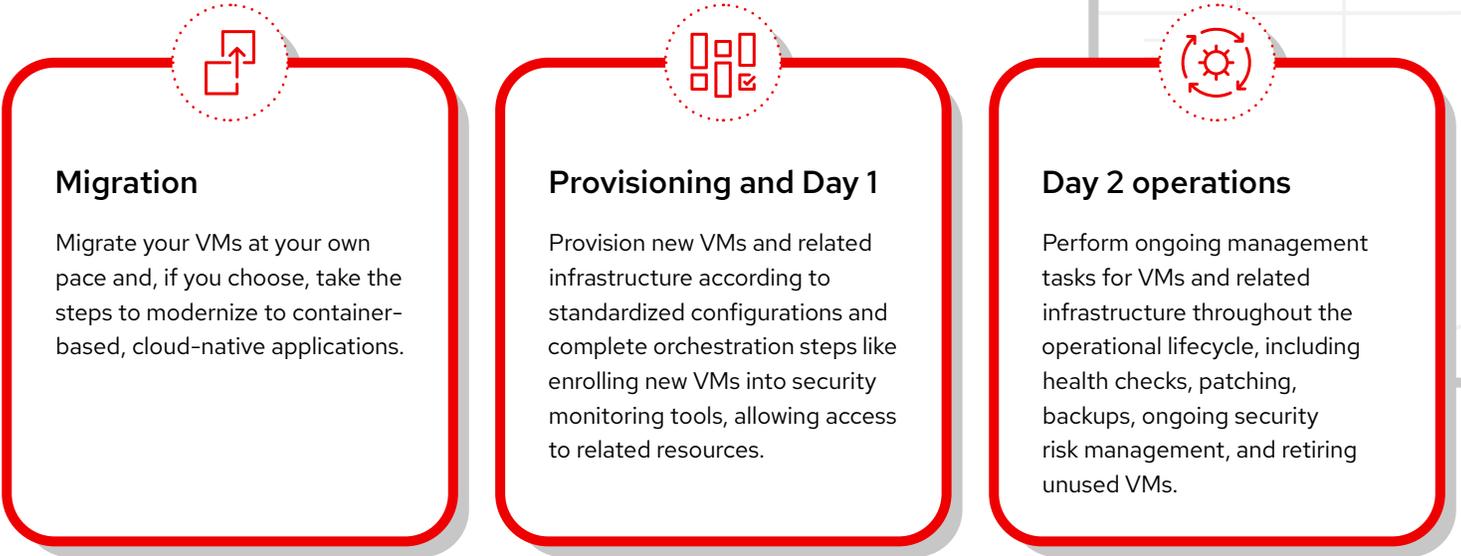
**Save time and improve team efficiency**, freeing up teams for innovation.

**Automatically respond** to changing conditions for better resilience of VMs and related applications.

**Reduce the complexity, time, and costs** associated with moving VMs to a new platform.

**Establish a pathway** for application modernization by adopting and gradually refactoring applications into cloud-native, container-based architectures, as desired.

## Automation for virtual infrastructure at scale can help across 3 key areas:



## Red Hat Ansible Automation Platform & OpenShift Virtualization

Better together

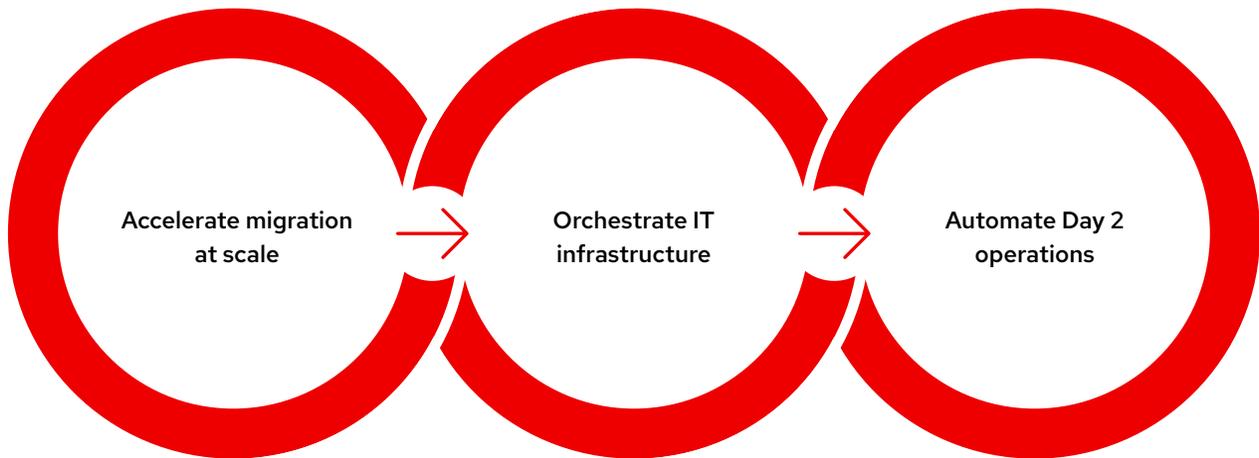


Figure 2: The Red Hat solution goes from migration to ongoing operations.

**170+**  
Ansible Content Collections are available and supported through Ansible Automation Platform subscriptions.

## Automation that meets you where you are

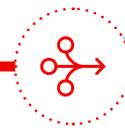
Meeting you where you are means Ansible Automation Platform can cover you as you migrate virtualization platforms, including related infrastructure. Ansible Automation Platform is a highly flexible solution for automating management of the infrastructure that best suits your unique requirements.

### Manage VMs across the hybrid cloud

Ansible Automation Platform gives IT teams the tools to manage VMs confidently, no matter where they run their infrastructure.



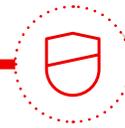
**Boost platform flexibility:** Manage VMs with consistent processes in diverse environments across the hybrid cloud.



**Scale operations:** Simplify automation across a wide range of IT technologies—at scale, starting with automation content included in your subscription.



**Adopt event-driven automation:** Use Ansible Rulebooks to respond dynamically to changes, such as scaling resources to maintain performance or resolving issues automatically.



**Enhance risk management:** Maintain security standards, enforce configuration consistency, and address vulnerabilities proactively with a single automation solution.



## Chapter 4

# Manage the ongoing operation of virtual machines with Red Hat



The operational lifecycle of VMs doesn't end after migration or deployment.

Managing VMs effectively on an ongoing basis requires continuous monitoring, maintenance, and adaptation to evolving business needs. Tasks such as scaling resources, patching systems, managing backups, and responding to incidents can quickly become overwhelming without the right tools.

## Automate tasks to keep your VMs running smoothly

You can automate tasks across the ecosystem, from the VM itself to the infrastructure it relies on.

### Lifecycle management within and across any IT domain

- Health checks and drift
- Upgrades, rollback
- GitOps

- Provisioning
- Orchestration
- Migration
- Inventory



Automation  
use cases

- Automate incident response
- Compliance
- Optimization
- Patch and update
- Continuity
- Retire, tear down
- ITSM

Figure 3: Automation use cases for lifecycle management across VMs and related infrastructure.

With highly flexible tools to automate every aspect of VM operations, Red Hat can help your organization across 4 key areas:



### 1 Configuration management

Automatically gather and update your inventory of VMs and associated infrastructure. Keep configuration information up to date with real-time data.



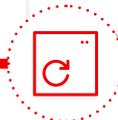
### 2 Health checks and monitoring

Perform automated health checks to make sure VMs are running, reachable, and performing as they should. Adopt event-driven automation to respond to detected issues, such as local disk space that is full.



### 3 Backup and disaster recovery

Automate backup processes to safeguard VM data and applications. Depending on your automation maturity, you might schedule or trigger backups based on predefined conditions.



### 4 Patching and upgrades

Apply patches and updates to operating systems, hypervisors, and applications running on your VMs. You can also roll back to previous versions if needed, providing consistent updates without disruptions.

## Enforce a single source of truth

Repeatability is critical for reliable operations. Red Hat helps organizations enforce configuration consistency through Configuration-as-Code via Github or another single source of truth repository for configurations and other specifications. This makes sure that desired configurations are consistently implemented across all VMs and supporting infrastructure. Using Ansible Playbooks and Ansible Rulebooks to call on this single source of truth reduces configuration drift and takes the complexity out of maintaining compliance so operations are consistent and in line with expectations.



## Managing security risk on VMs and infrastructure

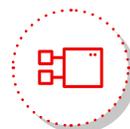
Security is a cornerstone of ongoing IT operations, and virtual infrastructure is no exception. Red Hat helps organizations mitigate risk by automating critical security tasks, including:



**Updating security standards.** Automatically update VMs and infrastructure to meet the latest security standards.



**Responding to suspicious activity.** Choose event-driven automation to notify administrators of security incidents or immediately shut down suspicious activity until it can be investigated.



**Patching vulnerabilities.** Regularly patch systems to address known vulnerabilities, reducing exposure to potential threats.

## Respond to issues and changing conditions more quickly

As part of the platform, Event-Driven Ansible provides a flexible, proactive approach to managing VM operations, allowing for rapid and effective responses to issues. With Event-Driven Ansible, you choose the condition for automated response, as well as design the actions to be taken. To understand the effectiveness of event-driven automation, it's beneficial to look at a few common use cases for VM management.



### Issue detection and resolution

In conjunction with observability and monitoring tools, Ansible Rulebooks can be used to create event-driven workflows that detect and resolve problems automatically. For example, when CPU or memory usage exceeds a set threshold, an alert is transmitted so an Ansible Rulebook can scale resources up to maintain performance.



### Self-service provisioning

Allow your teams to provision VMs and resources as needed, reducing the burden on IT operations. Event-driven workflows make sure that these actions are aligned with organizational policies and can eliminate manual effort in creating these policy-aligned VMs.



### Service ticket integration

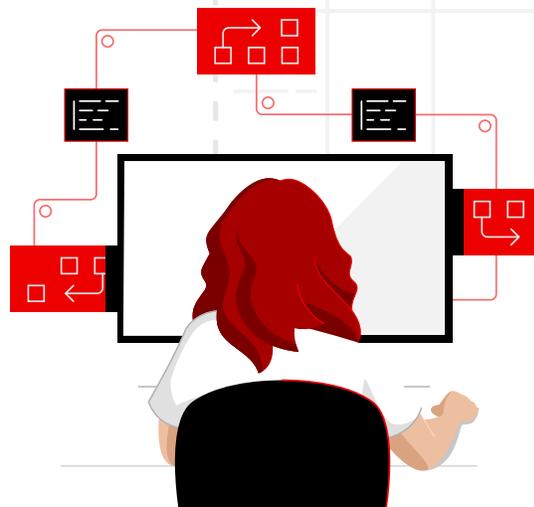
Integrate with IT service management (ITSM) systems such as ServiceNow to create, update, and resolve service tickets automatically. This might also include automated actions such as fact-gathering for service tickets to reduce resolution time.



### Sunset unused resources

Use automation to identify inactive VMs and move them to low-cost storage options or archive them altogether, reducing operational costs.

Managing the ongoing operations of VMs requires a holistic, automated approach that addresses the full ecosystem. Ansible Automation Platform empowers organizations to automate tasks, maintain continuity, and respond proactively to changes. The right tools help IT teams reduce manual effort, enhance their security posture, and allow for the highest performance at any scale.



## Chapter 5

# Gain a flexible solution with Red Hat technologies and services

Red Hat OpenShift Virtualization, complemented by Red Hat's migration toolkit for virtualization, Red Hat Advanced Cluster Management for Virtualization, and Ansible Automation Platform, helps your organization to migrate virtual infrastructure while managing ongoing and complex Day 2 operational tasks with consistency, efficiency, and accuracy.

Together, these solutions provide a clear means to success, helping you migrate your VMs with confidence, manage VMs and containers, modernize to cloud-native applications, and maintain visibility and control across diverse environments.



## Red Hat Services and partners can help

Red Hat Services brings the expertise you need for Red Hat platforms, including Ansible Automation Platform and Red Hat OpenShift Virtualization. Start with a [Virtualization Migration Assessment](#) to identify a clear roadmap and timeline for migrating your VMs quickly and safely. Red Hat Training and Certification can help teams understand how to implement automation on an enterprise, business-critical scale, and assist with culture change by addressing skills gaps to help ease the learning curve. Additionally, [Red Hat's ecosystem of trusted partners](#) brings industry expertise and a deep understanding of your environment to extend the value of your solution.

Learn more

# Start where you are and modernize when you're ready

Red Hat's flexible approach to VM migration, management, and modernization allows you to adapt at your own pace by automating tasks, reducing risk, and helping ease the transition to cloud-native technologies. Prepare your IT environment for the future while preserving operational continuity. With Red Hat, modernization isn't a race—it's a journey tailored to your needs.



## Take the next step

Read more about [automated virtual infrastructure management](#) with Red Hat.

Learn how to automate your virtual infrastructure from VMs to virtualization platforms. Access the [webinar on demand](#).

Explore a dedicated solution for virtual machines with Red Hat [OpenShift Virtualization Engine](#).

Read the [15 reasons to adopt OpenShift Virtualization](#) e-book.

Join an interactive walkthrough of [Red Hat virtualization migration](#).

Find out how [Red Hat Services](#) can help you automate your enterprise, or migrate virtual infrastructure with the [migration assessment for OpenShift Virtualization](#).