Red Hat
Enterprise Linux

Managing Red Hat Enterprise Linux In a Kubernetes World



Shane McDowell
Sr. Principal Product Manager, RHEL Management

Red Hat

Topics:

- Intros

  It's me, hi.

- RHEL Management...

  With Satellite, Insights, and more

- ...using container technologies...

  With Image Mode RHEL

- ...in a Kubernetes World

  With OpenShift Virtualization and Insights Cost Management

Red Hat

Who am I?



Sr. Principal Product Manager (fewer characters than Richard)

- 13+ years with Red Hat
- Officially: RHEL Management / Red Hat Insights
- Honorarily: Subscription Management

Resident of Michigan (One of us! One of us! One of us!)

Email: smcdowel@redhat.com
LinkedIn: @shanemcdowell1

Red Hat



RHEL Management...

Red Hat

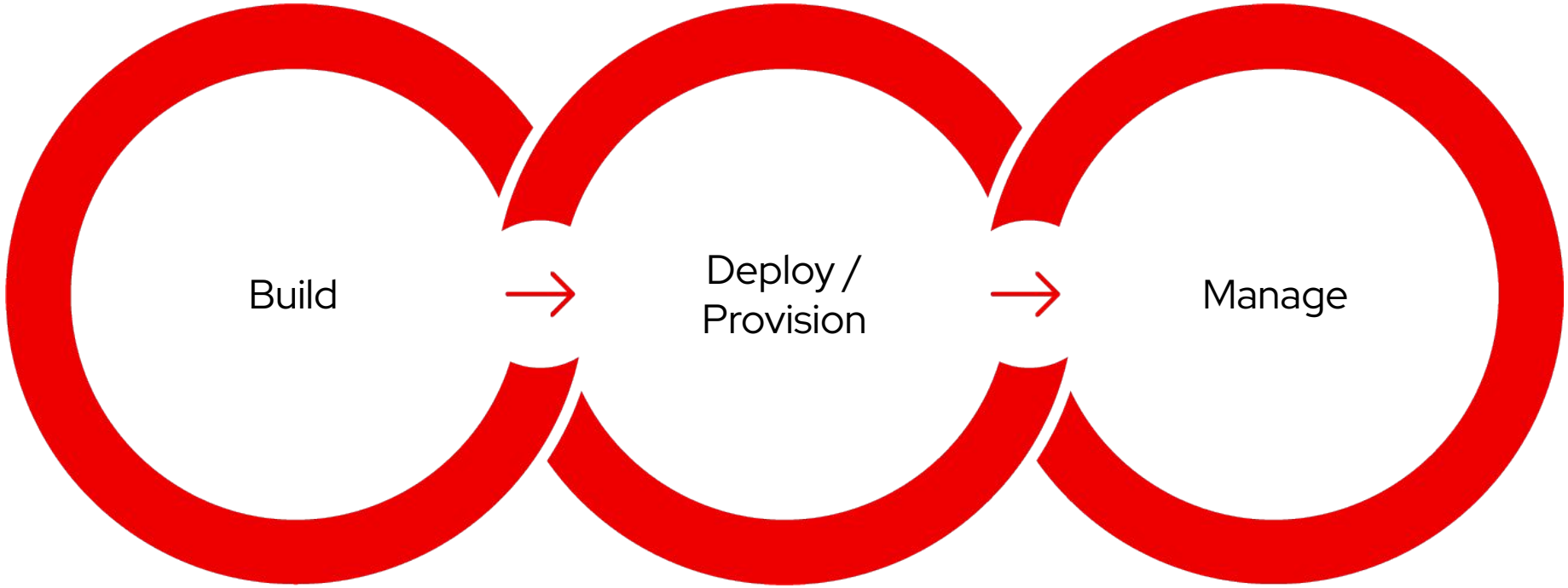
What do you need to manage your infrastructure?

- Scheduled maintenance/patching & errata installs
- Take out the possibility of human error
- Filesystem management interface
- Provisioning
- Ability to integrate with other tools
- Host based access
- Ability to handle upgrades
- Monitoring
- Tooling around compliance
- Ability to deploy systems

“I tell it to go do something. I come back, you know, five minutes later, whatever, and, and it's done and I don’t have to think about it anymore.”

Red Hat

Management Lifecycle

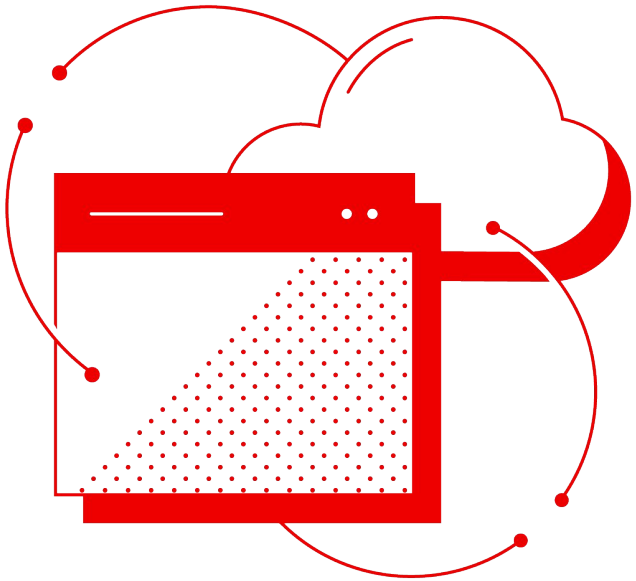


Red Hat

"Anything that **can** be baked into the image **should** be baked into the image. Automate the rest."

– Me, just now

Red Hat



Multiple ways to use image builder

Composer-cli | On premise

- Command line tool
- On-premise build node
- Included with Red Hat Enterprise Linux (RHEL) subscription

RHEL web console | On premise

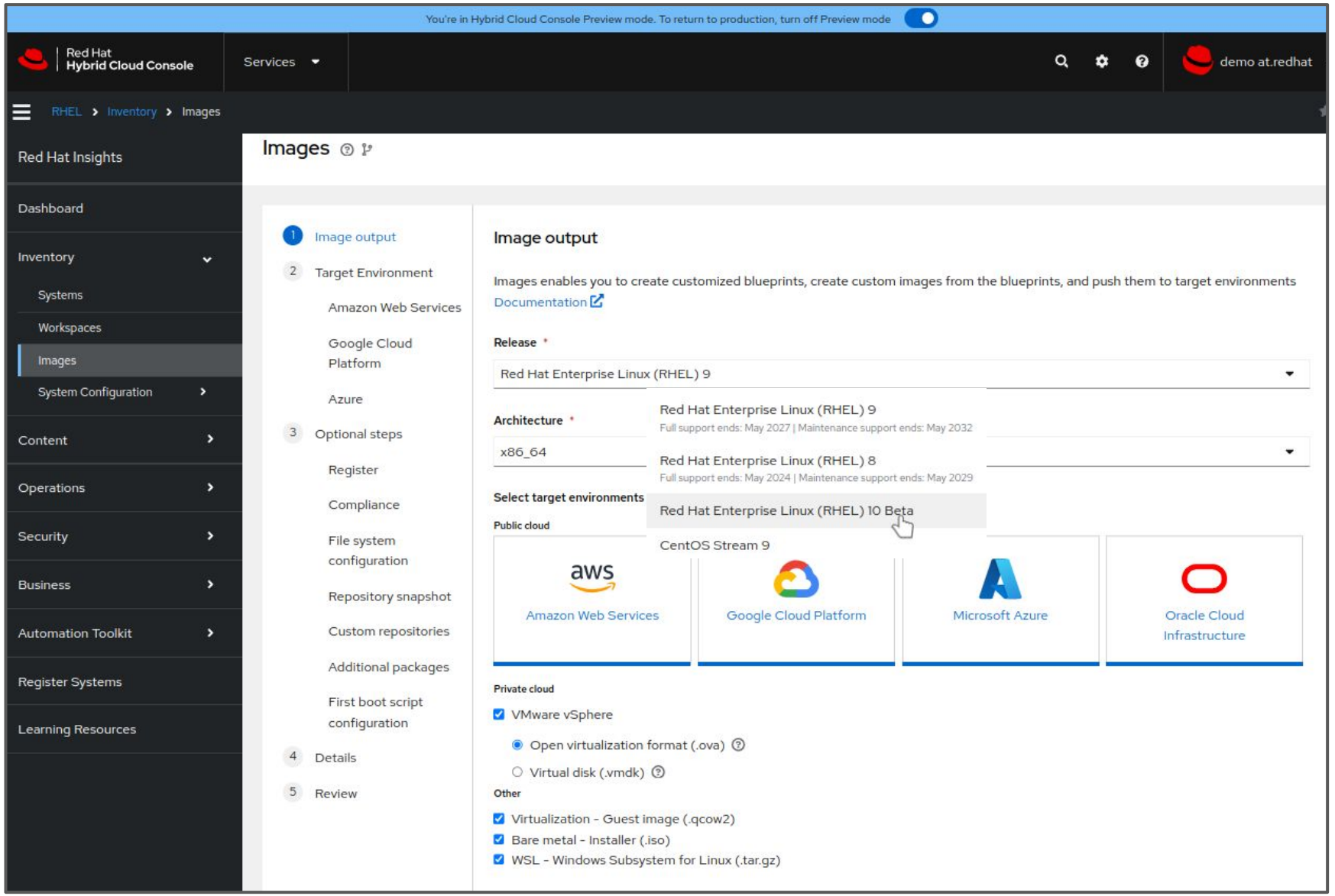
- Via interface in RHEL web console
- On-premise build node
- Included with RHEL subscription

Red Hat Insights image builder | Hosted

- Cloud-hosted experience
- No infrastructure required
- Included with RHEL subscription
- API for CI/CD automation
- console.redhat.com

Red Hat

Red Hat Insights image builder



Versions of RHEL

- RHEL 10 Beta
- RHEL 9 latest
- RHEL 8.latest
- CentOS Stream 9

Supported Cloud Partners

- Amazon Web Services (AWS EC2)
- Google Cloud Platform (GCP)
- Microsoft Azure
- Oracle Cloud Infrastructure (OCI)

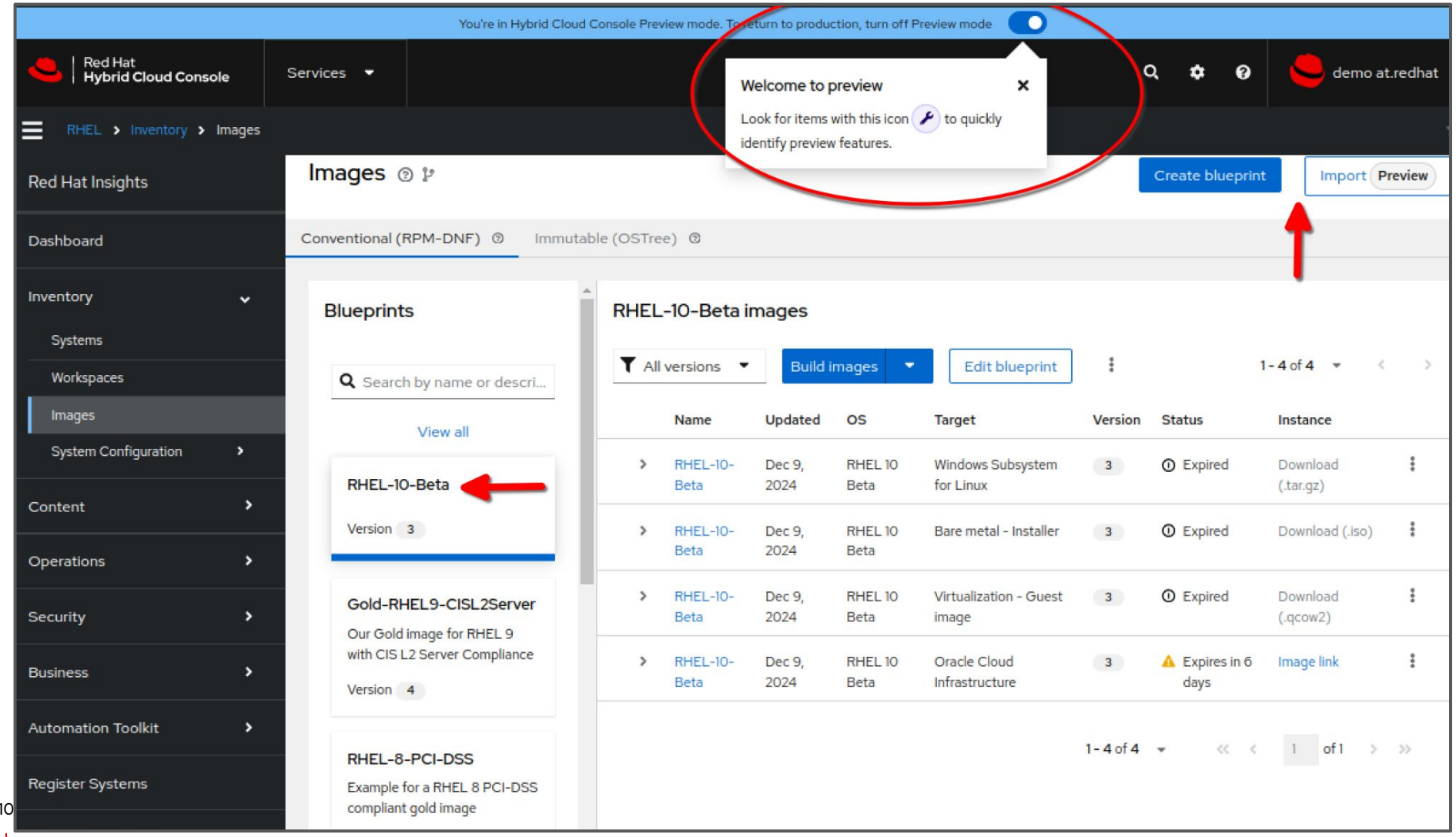
Hybrid-Cloud Image Types

- VMware vSphere platform (.vmdk)
- Virtual guest (.qcow2)
- Red Hat OpenStack, RHEL
- Physical system installer (.ISO)
- Microsoft WSL2

Configuration options

- Package selection
- Simple auto-registration
- Security Compliance Policies - and Insights Compliance integrations
- Filesystems
- Custom repositories
- Package selections
- Firstboot script automation
- Extend configurations with cloud-init

Red Hat Insights image builder



Preview mode
enables the latest features coming to production

Try RHEL 10 public beta today!
As well as all other active versions

Share blueprints
Create, edit, import, and export blueprints to collaborate and share optimized RHEL image definitions

Red Hat

Red Hat management tools

Navigate Infrastructure Complexity



Insights

Gain a clear view across your Red Hat deployments, helping you better manage your hybrid, on-premises, and cloud environments.



Satellite

Enables you to improve the reliability, availability, security and compliance of your RHEL systems.



Web Console

A web-based management interface to simplify deployment, daily administration and complex tasks



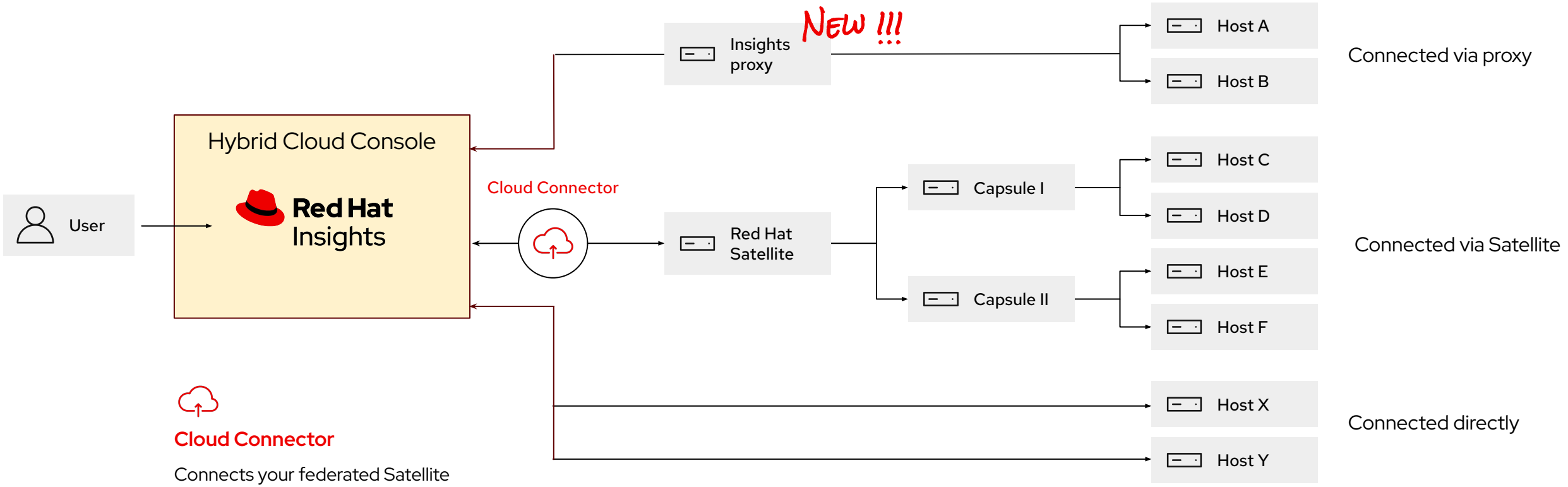
RHEL System Roles

A collection of supported Ansible roles that ensure consistent workflows and streamline the execution of manual tasks

Red Hat

Red Hat Insights and cloud connectivity

This model supports connecting a Satellite, direct hosts to Insights or a proxy.



Cloud Connector

Connects your federated Satellite infrastructure to Insights to execute remediation playbooks at scale.

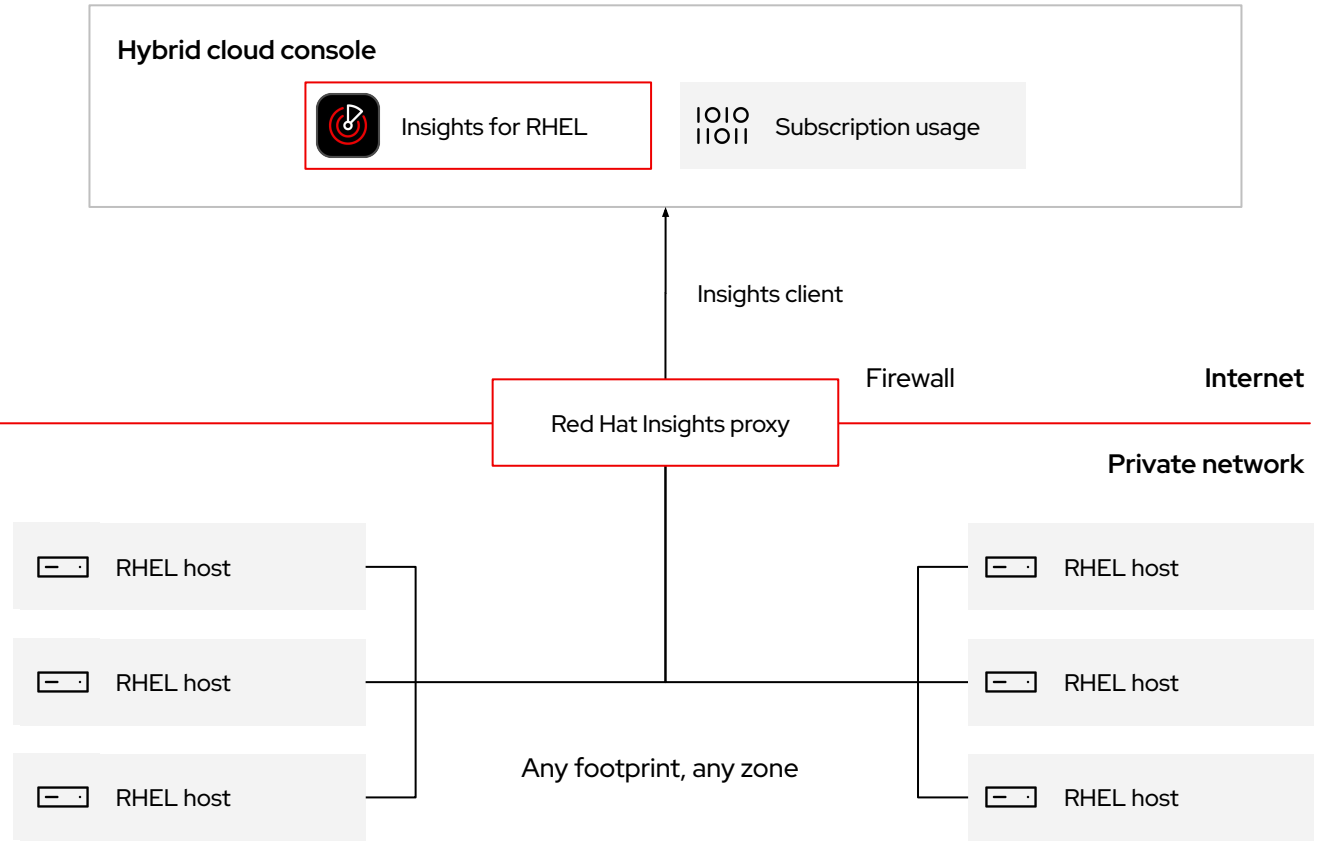
Red Hat

Fully connected setup using Red Hat Insights proxy

Red Hat URLs are white listed pending security review to allow for uni or bidirectional communication with Red Hat

Customer's systems are registered with Red Hat enabling consumption of Red Hat and 3rd party content.

Customers can lifecycle systems with Red Hat Insights via a single connection



Red Hat

Satellite Roadmap

Does not represent a guarantee of delivery. All content contained herein subject to change.

	Coming Soon	Next	Beyond
Host Management	RHEL 10 Clients ipv4/ipv6 network support secureboot support Image mode RHEL support	SCA Manifests Image Mode Provisioning OpenShift VM Provisioning	Dual stack IPv4/IPv6 - registration, content management and patching
Platform / Arch	RHEL 9 Only	Containerized Satellite	Containerized capsules
Content	Initial flatpak support	Multiple Content Views CV sync to capsule	Artifact registry for additional content types
Integrations	Red Hat Insights	RH Cloud telemetry Red Hat Insights Image Builder	Red Hat Insights

Red Hat

We did it!

We solved OS management!

Oh, you still have concerns?

Red Hat

Infrastructure & organizational complexity

is still a problem...



Common challenges that involve the OS

- Different platforms require different tools, teams and expertise
- Testing and validation are time consuming
- Application support matrix
- No one budgets for maintenance and upgrades
- Negotiating between stakeholders
- Drift between images, instances, and runtime
- Immutable aspirations vs. mutable realities
- Image inventory, versioning, and pruning
- Let’s not forget security!

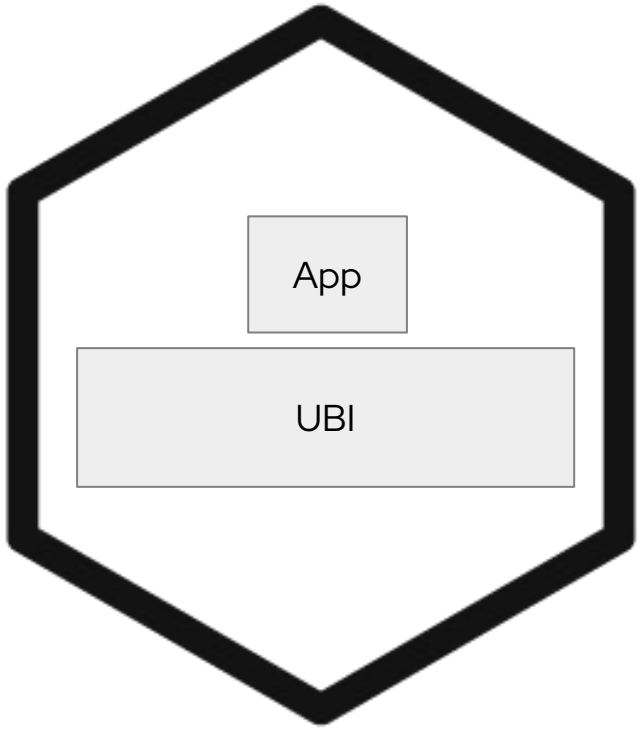
Red Hat



...using container technologies...

Red Hat

Containers revolutionized application deployment



- Standardized packaging via OCI image format
- Standardized delivery via OCI registry
- Clarity and transparency with the container file
- Deployment portability & predictability
- Rich ecosystem of security, automation, & orchestration tooling
- Rapid adoption and pervasive

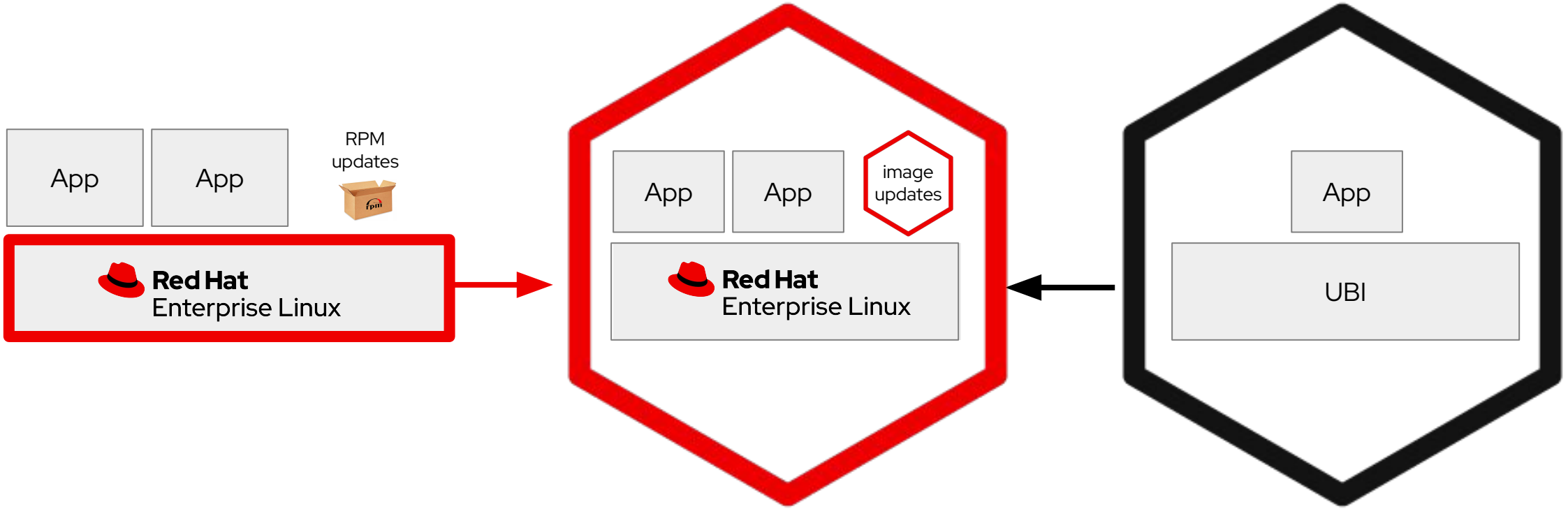
...and they will also become the language of modern IT

Red Hat

New!

Introducing image mode for Red Hat Enterprise Linux

Combining the power of RHEL with the benefits of containers



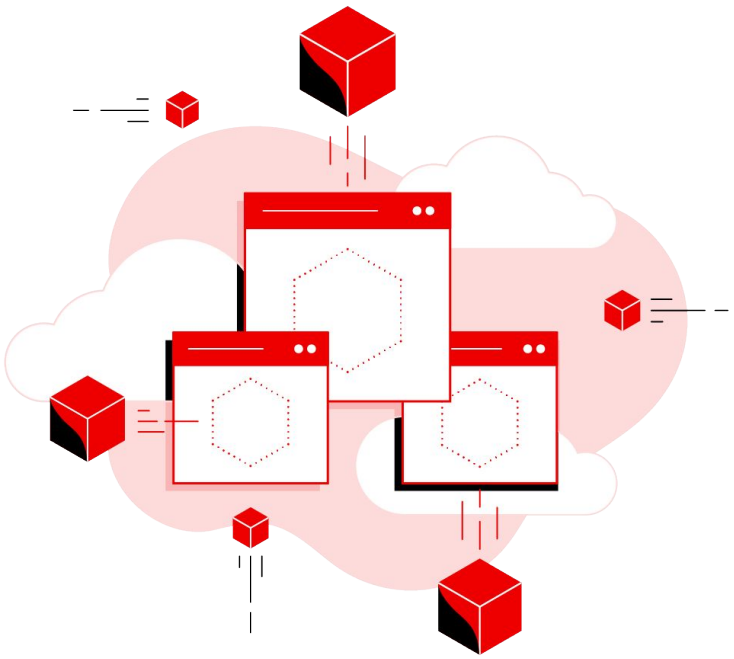
Package mode

Image mode

Application container

Red Hat

Image mode creates opportunities to think differently



- **All RHEL users** will benefit from standardization, simplicity and portability across all of their environments that span the hybrid clouds
- **DevOps teams** can easily plug RHEL into their CI/CD & GitOps workflows, easing the friction that exists between the platform and the application.
- **Security teams** can apply container security tools, from scanning and validation to cryptography and attestation to the base elements of the operating system, making their jobs far less complex.
- **Solution providers** will love how easy it is to build and distribute their offerings on the trusted RHEL platform

One RHEL, two modes

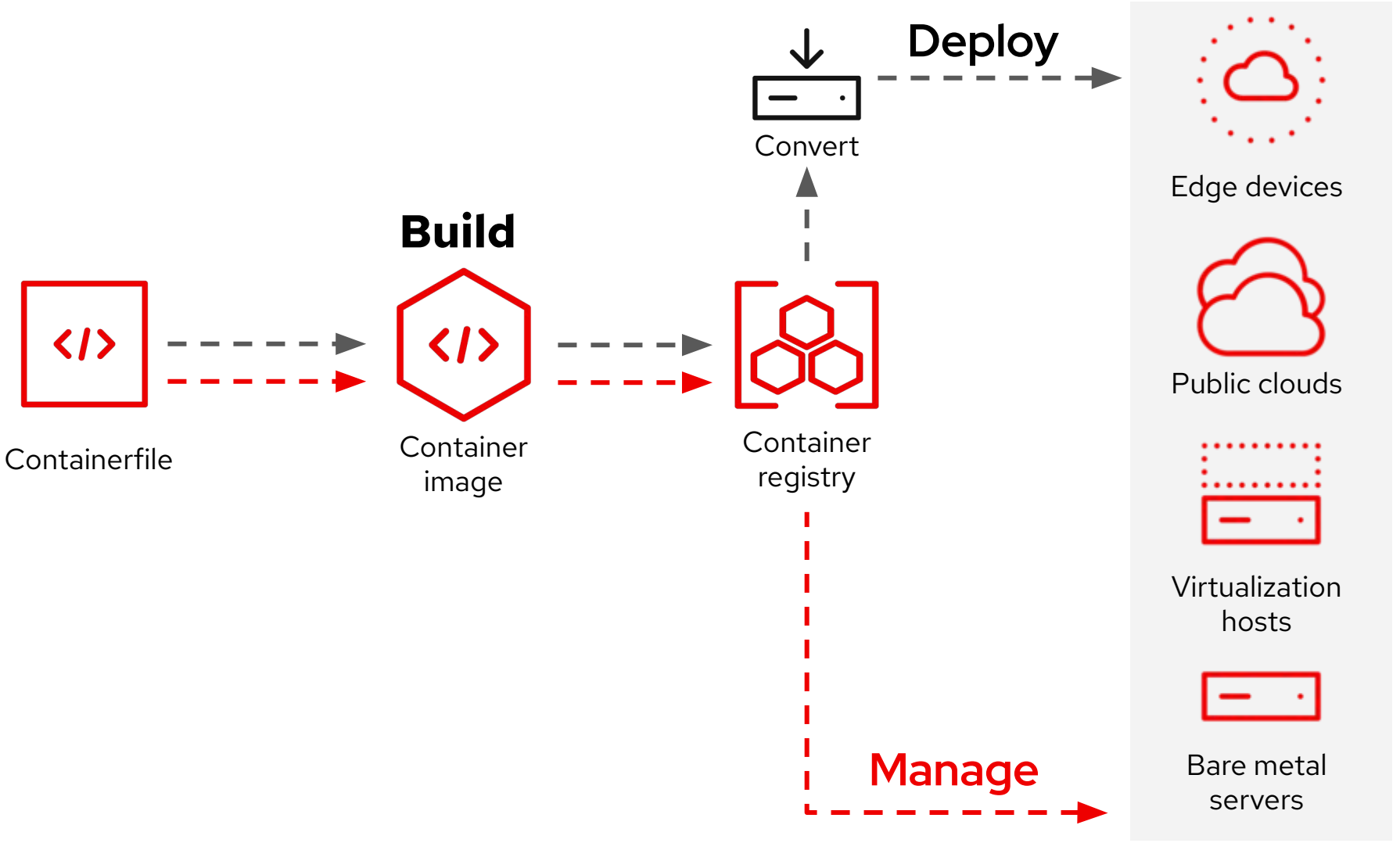
	Package mode	Image mode
Image creation	Image builder	Container tools
Updates	Packages (`dnf`)	Images (`bootc`)
Update distribution	rpm repository	Container registry
Management	Red Hat Insights, Satellite*, Ansible*	
Deployment footprint	Bare metal, VM, cloud, edge	

* On image mode roadmap

Red Hat

Image mode for Red Hat Enterprise Linux

Simple. Consistent. Anywhere.



Red Hat

Image mode for RHEL

A container-native workflow for the life cycle of a system

```
FROM rhel9/rhel-bootc:latest

RUN dnf install -y [software]
[dependencies] && dnf clean all

ADD [application]
ADD [configuration files]

RUN [config scripts]
```

Tech Preview

Build

A *bootc* base image & container file is all that's needed to describe a system, applications, and dependencies. Use your existing container tools or pipelines to quickly create and test images.

Deploy

Easily convert to a VM/cloud image or deploy on bare metal using RHEL's installer. The container image includes full hardware drivers, but not cloud agents by default.

Manage

Designed for modern GitOps & CI/CD driven environments. Systems will auto-update from the container registry by default. More advanced control and automation is available via custom rollouts (e.g. Ansible). Intelligence via Insights and on-prem content curation via Satellite are planned for the future.

Red Hat

Tech Preview

Install via Kickstart

Deploy container images to bare metal using installation media

```
lang en_US.UTF-8
keyboard us
timezone Etc/UTC --isUtc
text
zerombr
clearpart --all --initlabel
autopart
reboot
user --name=admin-user --groups=wheel
sshkey --username=admin-user "ssh-rsa
AAAAB3Nza……..."

ostreecontainer --url quay.io/myimage:latest
```

NEW

Use existing provisioning workflows

- Red Hat Enterprise Linux boot media (isos)
- PXE & HTTP Boot for network based deployments

Kickstart and Anaconda are used for disk layout and select configurations

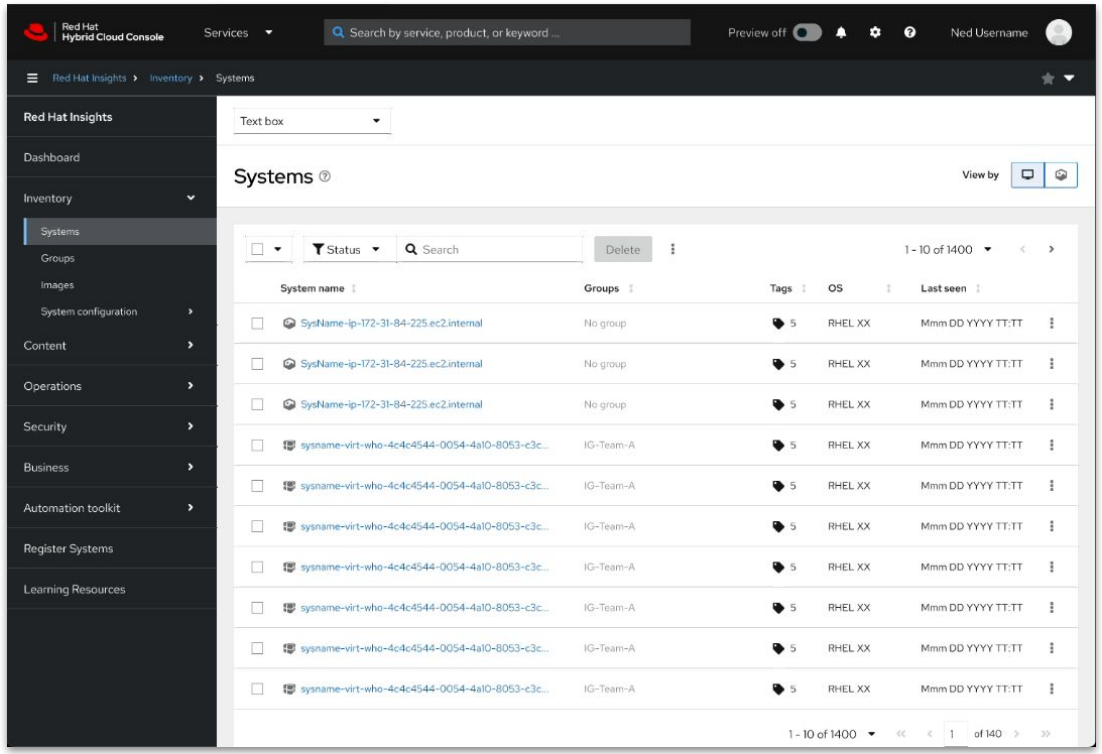
- `%packages` is ignored
- ostreecontainer will fetch the container image from a registry and write it to disk.

`%pre` and `%post` used for configuration

Red Hat

Management with Red Hat Insights

Visibility and reporting made simple



RHEL is RHEL

Image mode systems appear in inventory like package based systems.

Registration is simple

Activation keys can be baked into images via Containerfile, allowing auto registration to Insights at boot time.

Insights has ... Insights

Image mode systems can be scanned for security and operational recommendations.

Updates are flexible

Image mode systems can be updated to new versions of images or remediated based on image-specific recommendations.

Red Hat

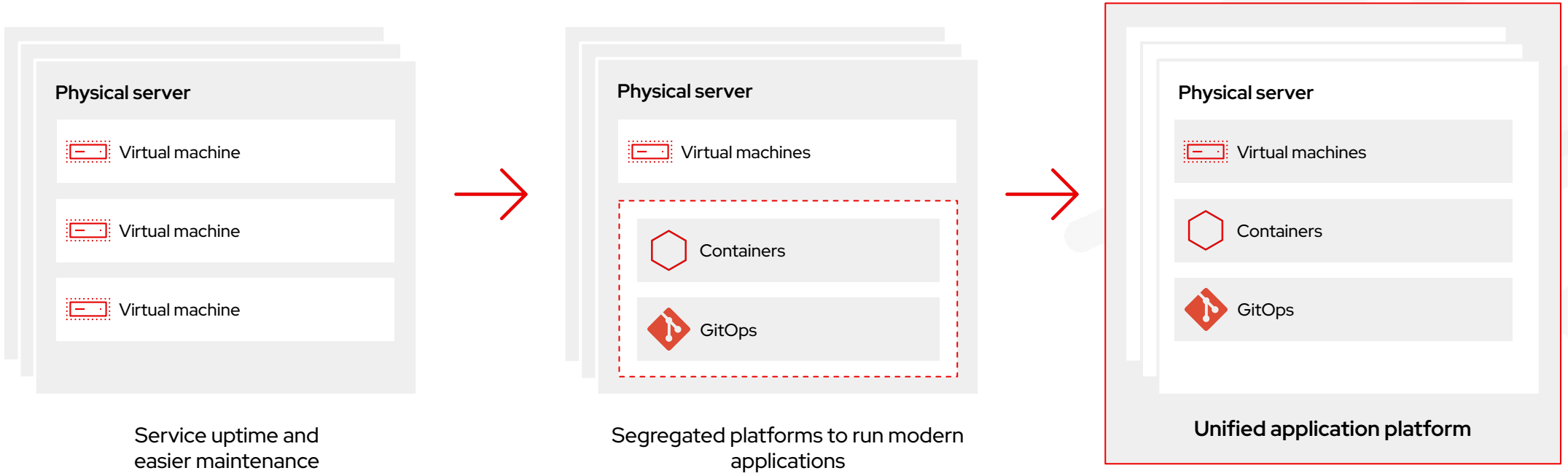


...in a Kubernetes world.

Red Hat

Bring cloud-native functionality to virtual machines

Kubernetes benefits for virtual machines with Red Hat innovation



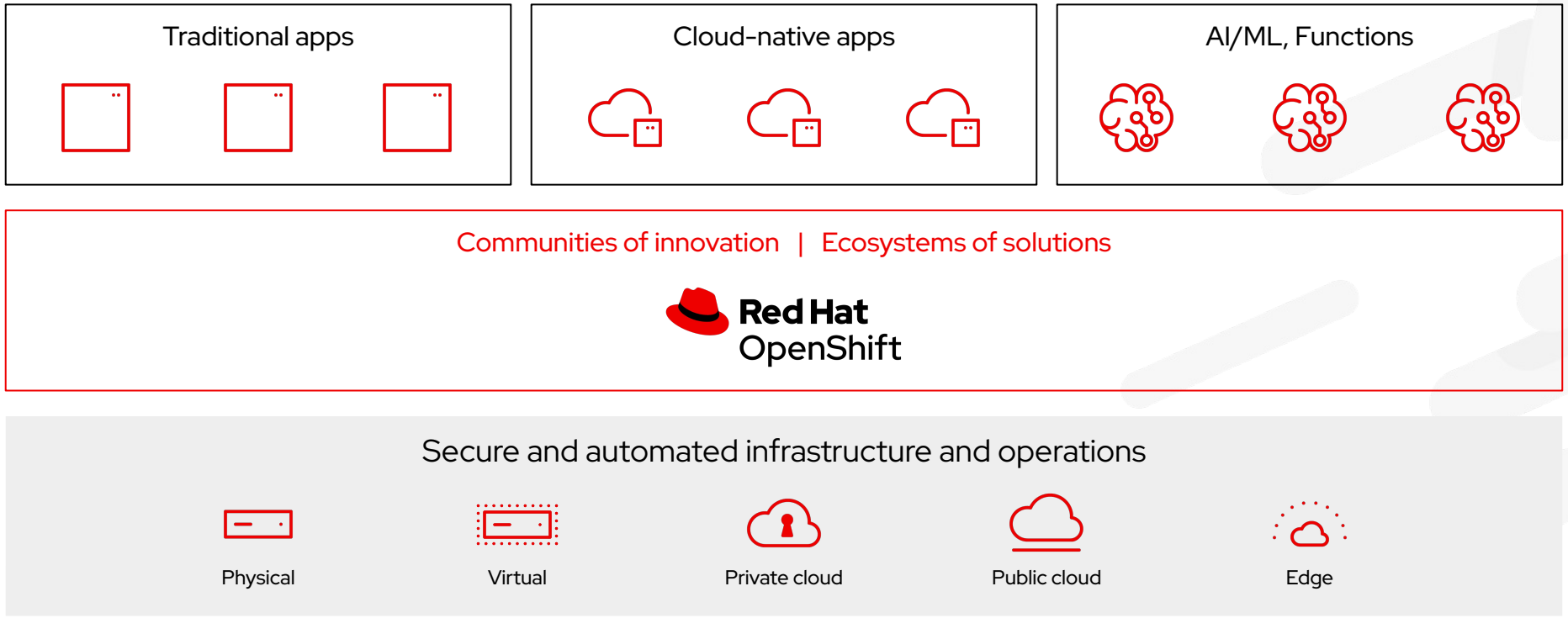
Service uptime and easier maintenance

Segregated platforms to run modern applications

OpenShift Virtualization

Red Hat

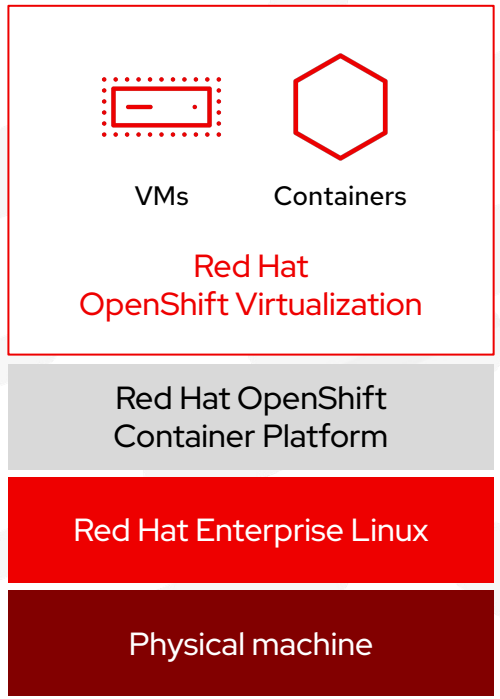
Delivering consistency, flexibility, security



Red Hat

What is Red Hat OpenShift Virtualization?

- **Unified platform**
  for running virtual machines and containers
- **Built on KubeVirt**
  to be open source
- **Performance and stability**
  of Kernel-based Virtual Machine (KVM), the Linux kernel-based hypervisor
- **Consistent management**
  toolings, interface, and ecosystem
- **Included feature**
  of the Red Hat OpenShift application platform
- **Includes Red Hat Enterprise Linux**
  guest entitlements
- **Supports Microsoft Windows**
  guests through Microsoft Server Virtualization Validation Program (SVVP)



Red Hat

Bring traditional virtual machines into OpenShift

Traditional VM behavior in a modern platform

- Administrator concepts and actions
- Network connectivity
- Live migration

Use existing VM roles and responsibilities

- Maintain application components that are business critical
- Modernize skill sets over time

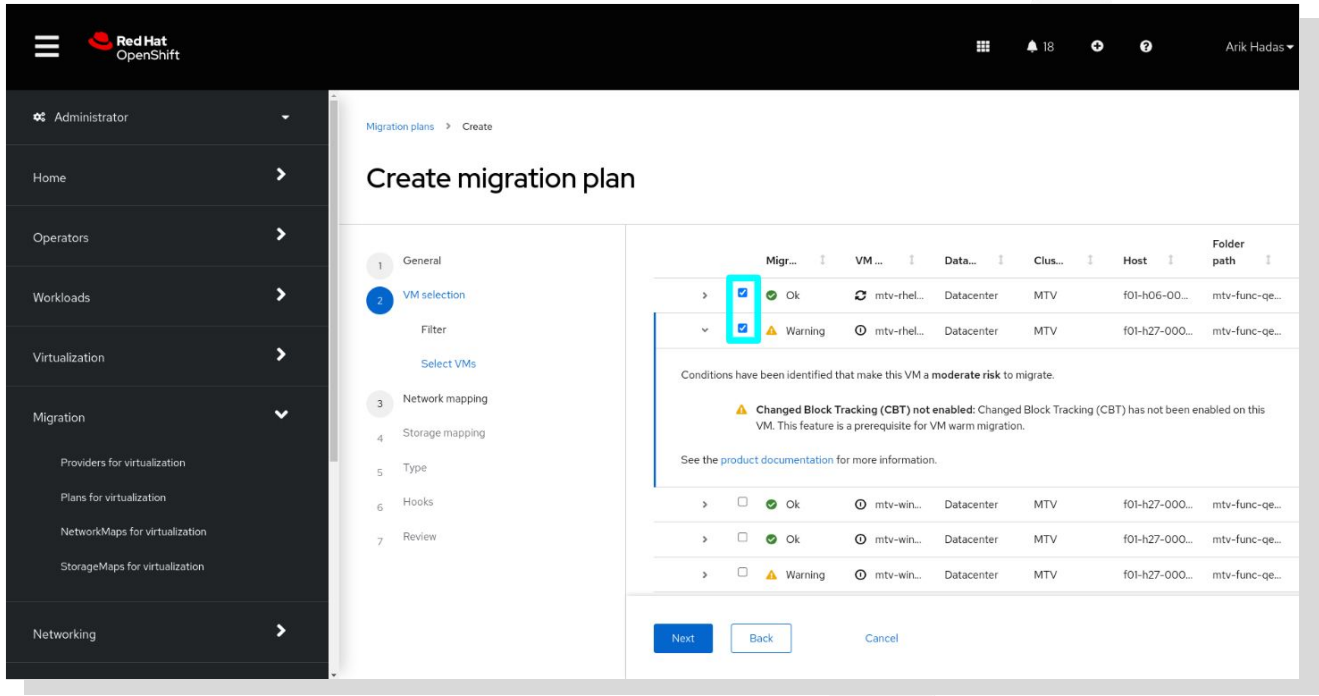


Red Hat

Bring traditional virtual machines into OpenShift

Migration tooling

- **Migration Toolkit for Virtualization** (MTV)
- Warm migration of virtual machines at scale
- Comes free with OpenShift Virtualization



Red Hat

Red Hat management tools

Navigate Infrastructure Complexity



Insights

Gain a clear view across your Red Hat deployments, helping you better manage your hybrid, on-premises, and cloud environments.



Satellite

Enables you to improve the reliability, availability, security and compliance of your RHEL systems.



Web Console

A web-based management interface to simplify deployment, daily administration and complex tasks



RHEL System Roles

A collection of supported Ansible roles that ensure consistent workflows and streamline the execution of manual tasks

Red Hat

How does this affect the cost of our OpenShift infrastructure?

I'm so glad you asked.

Red Hat

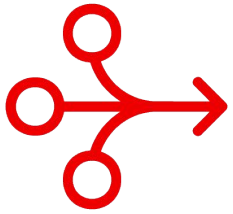
Red Hat Insights cost management



Visualize costs

Review cloud and OpenShift costs aggregated across hybrid infrastructure so you can stay on budget

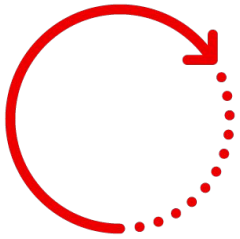
Show Red Hat-related costs in context



Allocate costs

Understand spending habits and distribute costs into projects, organizations, and regions

Improve communication between IT and line of business (LOB)



Communicate and Influence behaviours

Models costs to align operations, developers and business.

Make those responsible accountable so they take action

Red Hat

How much does an application cost to run?

1 application = X containers + Y virtual machines + Z cloud services + T external costs

- X containers
  - Compute
  - Storage
  - Network traffic
  - RHOCP subs
  - GPU
- Y virtual machines
  - Compute
  - Storage
  - Network traffic
  - GPU
- Z cloud services
  - Cloud native services
  - Marketplace services
- T external costs
  - Fixed costs
  - Variable costs

https://console.redhat.com/openshift/cost-management

Red Hat Insights cost management

Included with your Red Hat subscription

Modeling costs on cloud and on-prem clusters



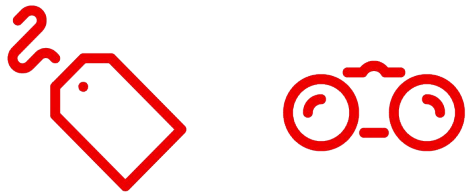
Cost models with input from cloud bills and OCP metrics.
Advanced rating with tag-based rating and effective usage.
Forecast.

Cloud, OpenShift and RHEL cost visibility & distribution

Red Hat OpenShift
Red Hat Enterprise Linux
Red Hat OpenShift Virtualization Engine
Microsoft Azure
Google Cloud Platform
aws
ORACLE CLOUD Infrastructure

Insights about how OpenShift and cloud costs are distributed, including cloud marketplace costs and multiple accounts. Fleet view.

Business mapping



Filter and group costs and resource using hierarchical information, cost categories, labels and tags (incl. tag mapping).

Cost explorer (time-based views)

Dashboard, details and cost explorer views. API.
90 days of data.
Excel and Power BI sample reports.

Cost Management Metrics Operator

CPU, Memory, Storage

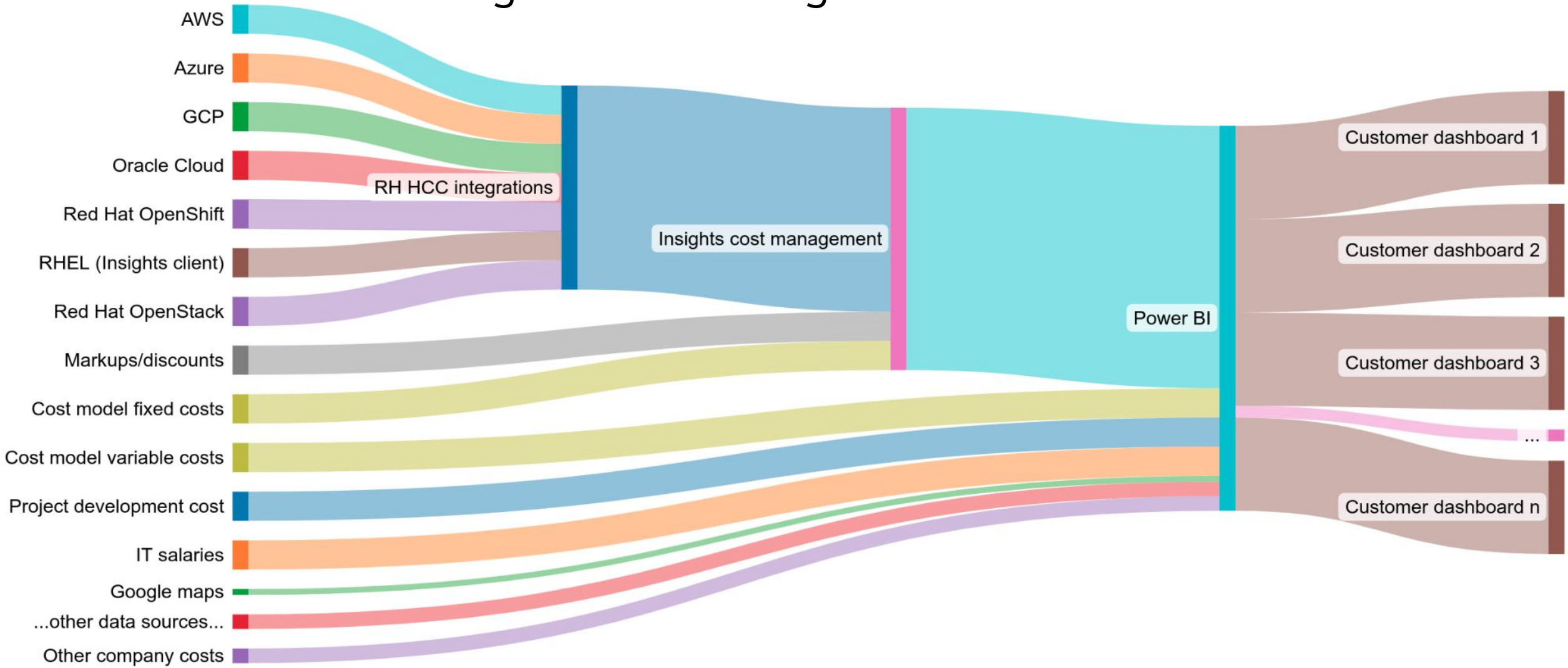
x86-64, ARM, IBM Z, LinuxONE, POWER

Resource optimization for OpenShift

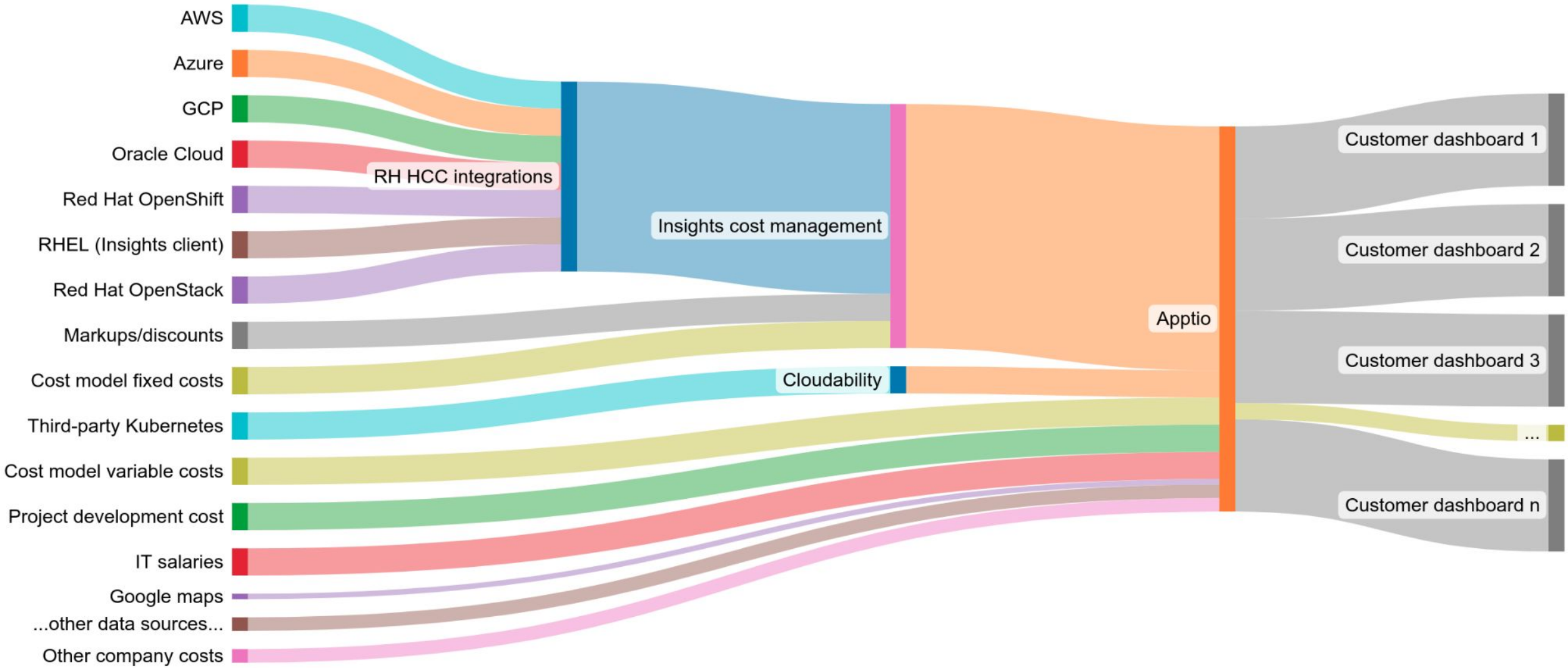
Specific, actionable recommendations to improve performance and/or save money

Red Hat

Insights cost management + BI tool

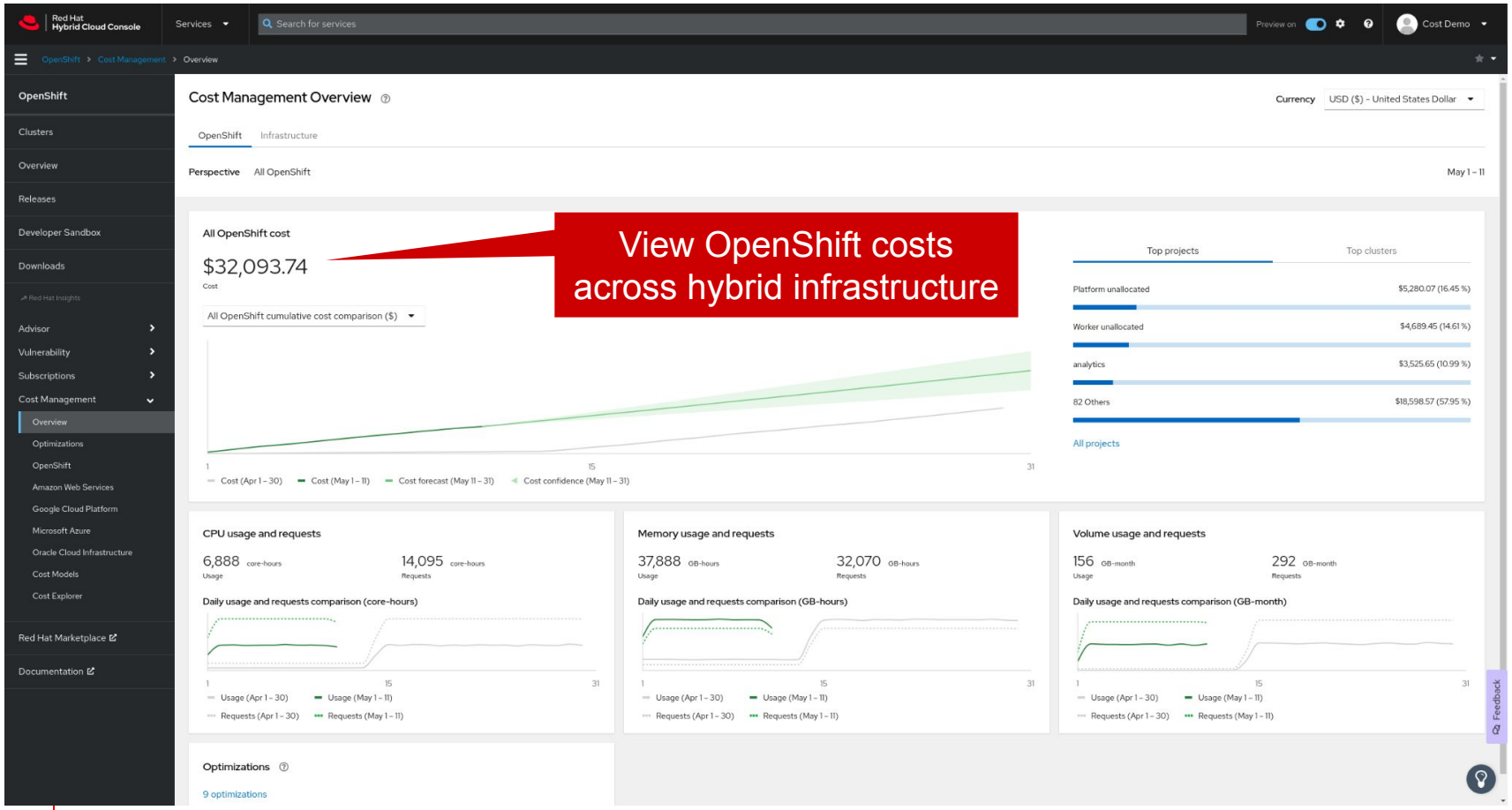


Insights cost management + FinOps tool



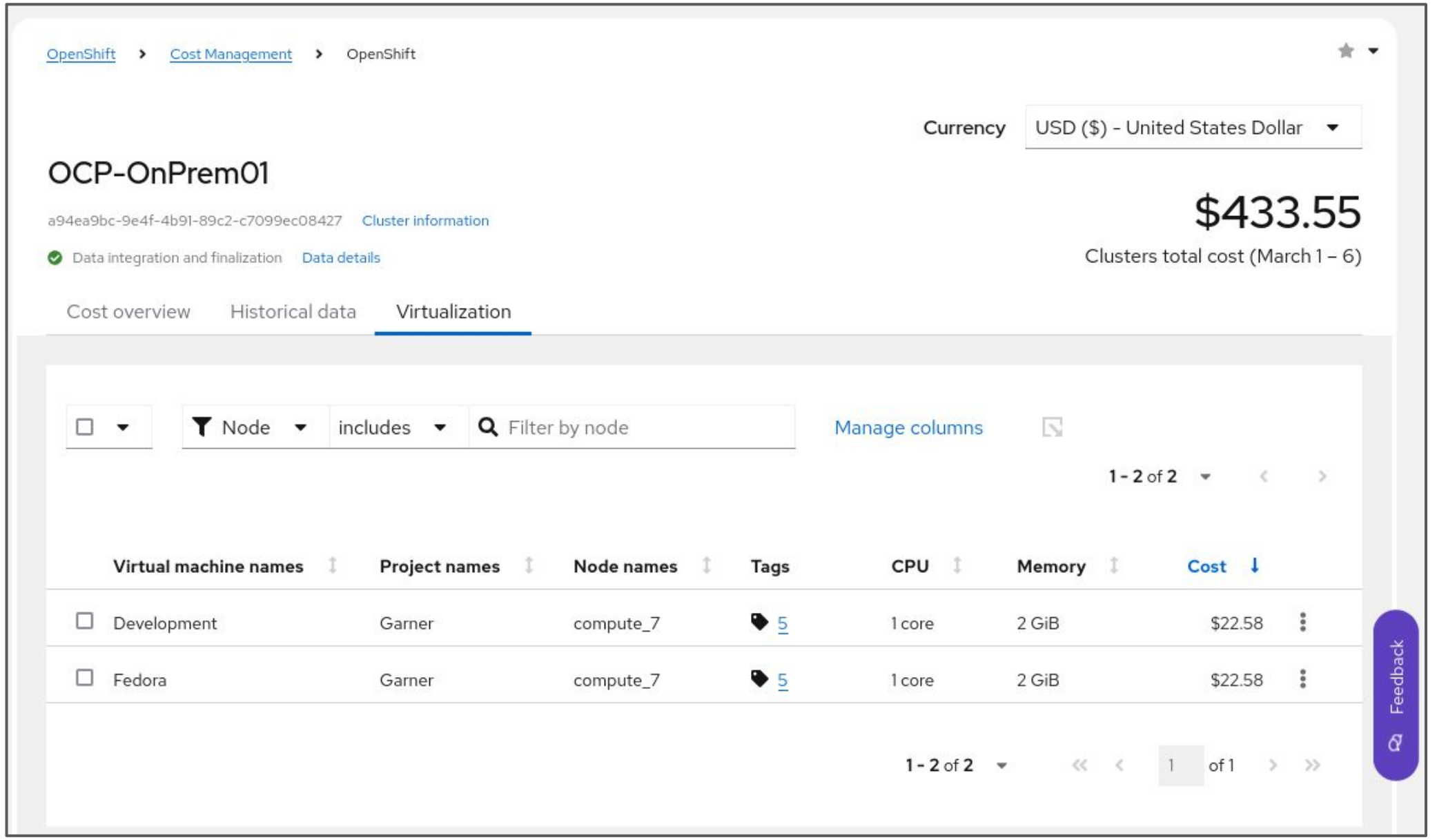
Red Hat Insights cost management

Red Hat SaaS offering to provide customers with cost visibility across OCP clusters on-premises and in the cloud

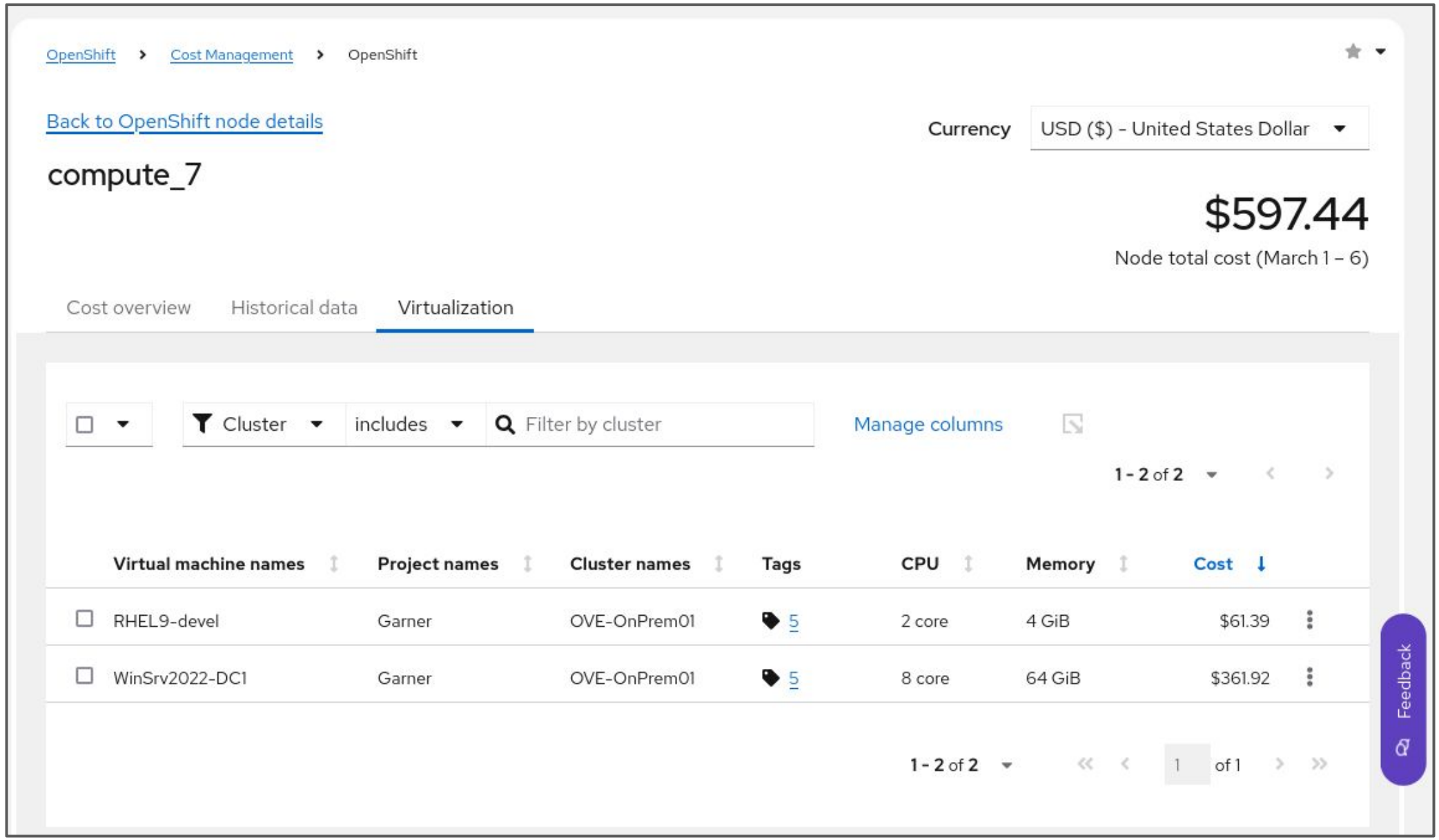


- Visualize costs across hybrid cloud infrastructure
- Track cost trends
- Map charges to projects, labels and organizations. Slice and dice the data with filters
- Use cost models to normalize data from the cluster and clouds
- Generate showback exports and utilize them to build your chargeback reports
- 99% of customers export data to BI or FinOps tools

Red Hat


OpenShift
Cost Management
OpenShift
Currency
USD ($) - United States Dollar
OCP-OnPrem01
a94ea9bc-9e4f-4b91-89c2-c7099ec08427
Cluster information
Data integration and finalization
Data details
$433.55
Clusters total cost (March 1 – 6)
Cost overview
Historical data
Virtualization
Node
includes
Filter by node
Manage columns
1 - 2 of 2
Virtual machine names
Project names
Node names
Tags
CPU
Memory
Cost
Development
Garner
compute_7
5
1 core
2 GiB
$22.58
Fedora
Garner
compute_7
5
1 core
2 GiB
$22.58
1 - 2 of 2
1
of 1
Feedback

Red Hat


OpenShift
Cost Management
OpenShift
Back to OpenShift node details
Currency
USD ($) - United States Dollar
compute_7
$597.44
Node total cost (March 1 – 6)
Cost overview
Historical data
Virtualization
Cluster
includes
Filter by cluster
Manage columns
1 - 2 of 2
Virtual machine names
Project names
Cluster names
Tags
CPU
Memory
Cost
RHEL9-devel
Garner
OVE-OnPrem01
5
2 core
4 GiB
$61.39
WinSrv2022-DC1
Garner
OVE-OnPrem01
5
8 core
64 GiB
$361.92
1 - 2 of 2
1
of 1
Feedback

Red Hat

Red Hat
Enterprise Linux

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.


youtube.com/c/RedHatEnterpriseLinux


twitter.com/RHEL


Reddit.com/r/redhat

Red Hat