Azure Red Hat OpenShift
from Microsoft and Red Hat

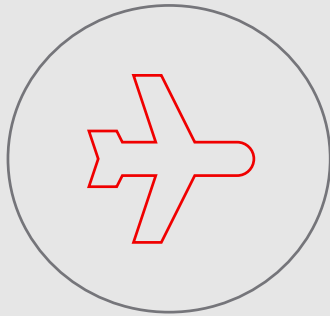Bart Mathis (Microsoft)
David Cohn (Red Hat)

Microsoft + Red Hat

>95%

of **Fortune 500** use Microsoft Azure

100%

of the **Fortune Global 500** companies
in these industries rely on Red Hat

Airlines

Telecommunications

Healthcare

Commercial
Banking

Microsoft | Red Hat

Microsoft + Red Hat partnership

Red Hat Enterprise Linux in Azure

Cost savings and operational efficiency gained from using consistent/standard OS platforms across your hybrid infrastructures

Integrated support for RHEL in the Azure Marketplace

Red Hat subscription flexibility/portability

Red Hat OpenShift Container Platform in Azure

Easily build, deploy, and manage modern container-based apps

Technology that enables digital transformation and application modernization

Consistent application platform for hybrid cloud infrastructures.

Fully managed Red Hat OpenShift service

SQL Server on Red Hat Enterprise Linux

Industry-leading, most-secure data platform on a leading OS and cloud platform

Optimize with a modern data platform

Red Hat Enterprise Linux for SAP Solutions in Azure

Most-powerful and scalable cloud for SAP HANA

Deep partnership among SAP, Microsoft and Red Hat

First-class hybrid support experience for Red Hat on Azure

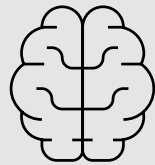Integrated management portal experience

—— **Hybrid application framework** —— **Hybrid cloud storage** —— **Hybrid cloud management** ——

Microsoft | Red Hat

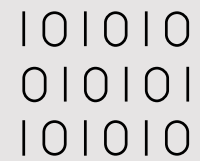# Creating value by delivering applications faster

Cloud-native applications

AI and machine learning

Analytics

Internet of Things
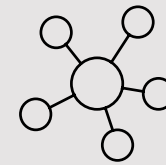
Culture of innovation
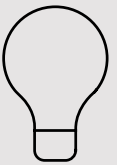
Containers, Kubernetes, and hybrid cloud are key ingredients

Microsoft | Red Hat

Kubernetes done right is hard

75%

of enterprise users say the complexity
of implementation and operations
are the top blockers to adoption

Source: The New Stack, The State of the Kubernetes Ecosystem, August 2017

Microsoft | Red Hat

Kubernetes done right is hard

Install	Deploy	Harden	Operate
Templating	Identity & Security Access	Platform Monitoring & Alerts	OS Upgrade & Patch
Validation	App Monitoring & Alerts	Metering & Chargeback	Platform Upgrade & Patch
OS Setup	Storage & Persistence	Platform Security Hardening	Image Upgrade & Patch
	Egress, Ingress & Integration	Image Hardening	App Upgrade & Patch
	Host Container Images	Security Certifications	Security Patches
	Build/Deploy Methodology	Network Policy	Continuous Security Scanning
		Disaster Recovery	Multi-environment Rollout
		Resource Segmentation	Enterprise Container Registry
			Cluster & App Elasticity
			Monitor, Alert, Remediate
			Log Aggregation

Microsoft | Red Hat

Containers come with their own challenges

Red Hat OpenShift
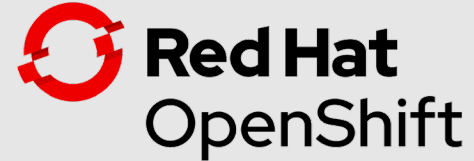
Container security
Image scanning, patching, and compliance

▶ **Trusted enterprise Kubernetes**
Continuous security, world-class support and services and deep expertise to confidently run any application

Day 2 management
Install, upgrade, and maintain
Integrate existing enterprise technology

▶ **A cloud-like experience, everywhere**
Full-stack and automated operations on a consistent foundation for on-premises or hybrid cloud infrastructures

Application delivery
Monitoring, metering, and management
Integrate existing developer tools

▶ **Empowering developers to innovate**
Get applications to production sooner with a wide range of technologies and streamlined workflows

Microsoft | Red Hat

There are two ways to run OpenShift on Azure

OpenShift Container Platform on Virtual Machines

Deploy through cloud.redhat.com/openshift

Self-managed on infrastructure as a service (IaaS)

Bring your own license

Azure Red Hat OpenShift

Deployed through the Azure Portal or the Azure CLI
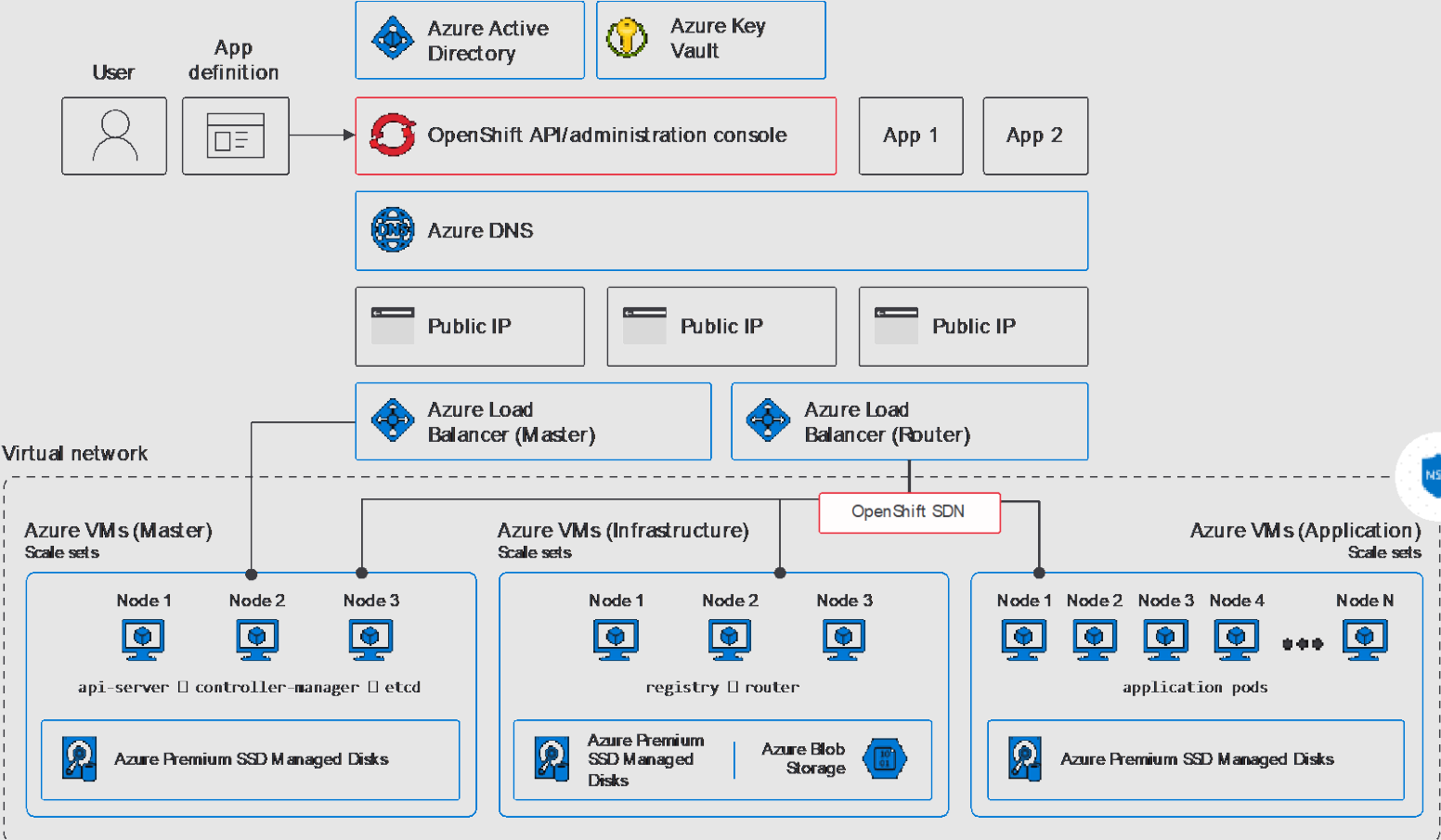
Fully-managed and supported Red Hat OpenShift platform

Billing integrated in your Azure subscription

Microsoft | Red Hat

OpenShift Container Platform on Virtual Machines

Responsibilities

User management	▪
Project and quota management	▪
Application lifecycle	▪
Cluster creation	▪
Cluster management	▪
Monitoring and logging	▪
Network configuration	▪
Software and security updates	▪
Platform support	◢

◻ Customer   ◢ Microsoft and Red Hat

User

App definition

Azure Active Directory

Azure Key Vault

OpenShift API/administration console

App 1   App 2

Azure DNS

Public IP   Public IP   Public IP

Azure Load Balancer (Master)   Azure Load Balancer (Router)

Virtual network   NSG

OpenShift SDN

Azure VMs (Master) Scale sets
Node 1   Node 2   Node 3
api-server □ controller-manager □ etcd
Azure Premium SSD Managed Disks

Azure VMs (Infrastructure) Scale sets
Node 1   Node 2   Node 3
registry □ router
Azure Premium SSD Managed Disks | Azure Blob Storage

Azure VMs (Application) Scale sets
Node 1   Node 2   Node 3   Node 4   ••• Node N
application pods
Azure Premium SSD Managed Disks

Microsoft | Red Hat

Fully-managed clusters with Azure Red Hat OpenShift

Responsibilities

User management	⬜
Project and quota management	⬜
Application lifecycle	⬜
Cluster creation	🟦🟥
Cluster management	🟦🟥
Monitoring and logging	🟦🟥
Network configuration	🟦🟥
Software and security updates	🟦🟥
Platform support	🟦🟥

⬜ Customer   🟦🟥 Microsoft and Red Hat

User   App definition

👤   ▦ → ⟳ OpenShift API/administration console   App 1   App 2
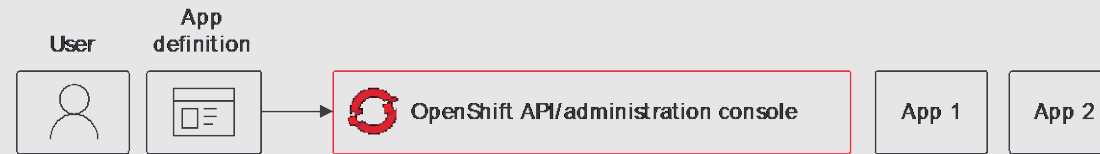
Let **Microsoft** and **Red Hat**...

Manage all your clusters   Monitor and operate your VMs

Secure your nodes   Manage environment patches

Microsoft | Red Hat

Azure Red Hat OpenShift

Jointly engineered, operated, and supported by both
Microsoft and **Red Hat** with an integrated support experience

**Build, deploy and scale apps
with confidence**

In just minutes, deploy enterprise-
grade Red Hat OpenShift clusters
on Azure

Enterprise-grade operations, security and compliance
Deploy your business-critical apps with confidence with an industry-
leading SLA of 99.95% availability, with PCI DSS, ISO 27001, HITRUST,
SOC 2 Type II, and FedRAMP certifications.

Empowering developers to innovate
Promote developer productivity with built-in CI/CD pipelines, then
easily connect your applications to hundreds of Azure services such
as MySQL, PostgreSQL, Redis, Cosmos DB, and more.

Scale on your terms
Start a highly available cluster in a few minutes, then scale as your
application demand changes; plus, get your choice of standard, high-
memory, or high-CPU application nodes. Pay through your Azure
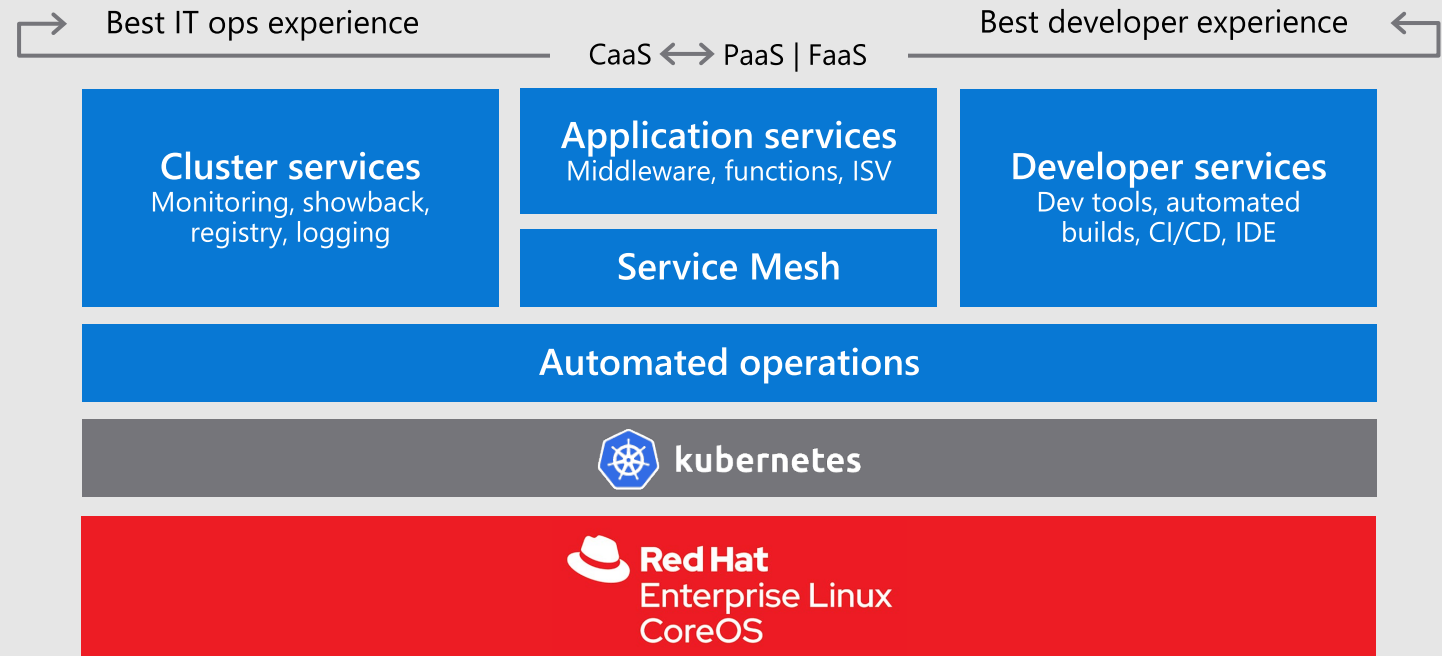subscription.

Microsoft | Red Hat

Azure Red Hat OpenShift running on OpenShift 4

OpenShift 4 – a smarter Kubernetes platform

Up and running in minutes from the container host to application services.

Scales with your needs from 10 containers to thousands.

One-click updates for platform, services, and applications

Best IT ops experience

Best developer experience

CaaS ⟷ PaaS | FaaS

Cluster services
Monitoring, showback, registry, logging

Application services
Middleware, functions, ISV

Service Mesh

Developer services
Dev tools, automated builds, CI/CD, IDE

Automated operations

kubernetes

Red Hat
Enterprise Linux
CoreOS

Microsoft | Red Hat

What's new when running on OpenShift 4.5

Kubernetes 1.18 on Red Hat Enterprise Linux CoreOS
An immutable, container optimized, Linux OS host that is delivered and installed as a component of OpenShift.

Private cluster management and ingress endpoints
Choose between public and private endpoints.

Cluster-admin role
Full cluster administrator capabilities enabling running privileged containers and installing Custom Resource Definitions (CRDs).

Bring your own Virtual Network
Create clusters into your own Virtual Network and connect to on-premises environments using Azure Express Route.

Multi-Availability Zones clusters
To ensure the highest resiliency, cluster components are deployed across 3 Azure Availability Zones in supported Azure regions.

Bring your own identity provider
In addition to Azure Active Directory, configure supported OpenShift identity providers, for example using OpenID Connect.

Industry compliance certifications
Certified for PCI DSS, ISO 27001, SOC 2 Type 2, HITRUST, FedRAMP and more.

FIPS 140-2 Level 1 compliant encryption
Strong encryption controls to protect sensitive data including platform secrets and application configuration data.

Operator Framework
Support for community and certified operators with developer self-service as well as Custom Resource Definitions (CRDs).

OpenShift Service Mesh
Integrated Service Mesh for enhanced security and network segmentation of microservices applications, based on Istio, Jaeger and Kiali.

OpenShift Serverless (Tech Preview)
Build functions based applications that can scale to zero, based on the Knative framework.

OpenShift Do (odo)
A fast, iterative, and straightforward CLI tool for developers who write, build, and deploy applications on OpenShift.

More at Red Hat OpenShift 4.5 release notes

Microsoft | Red Hat

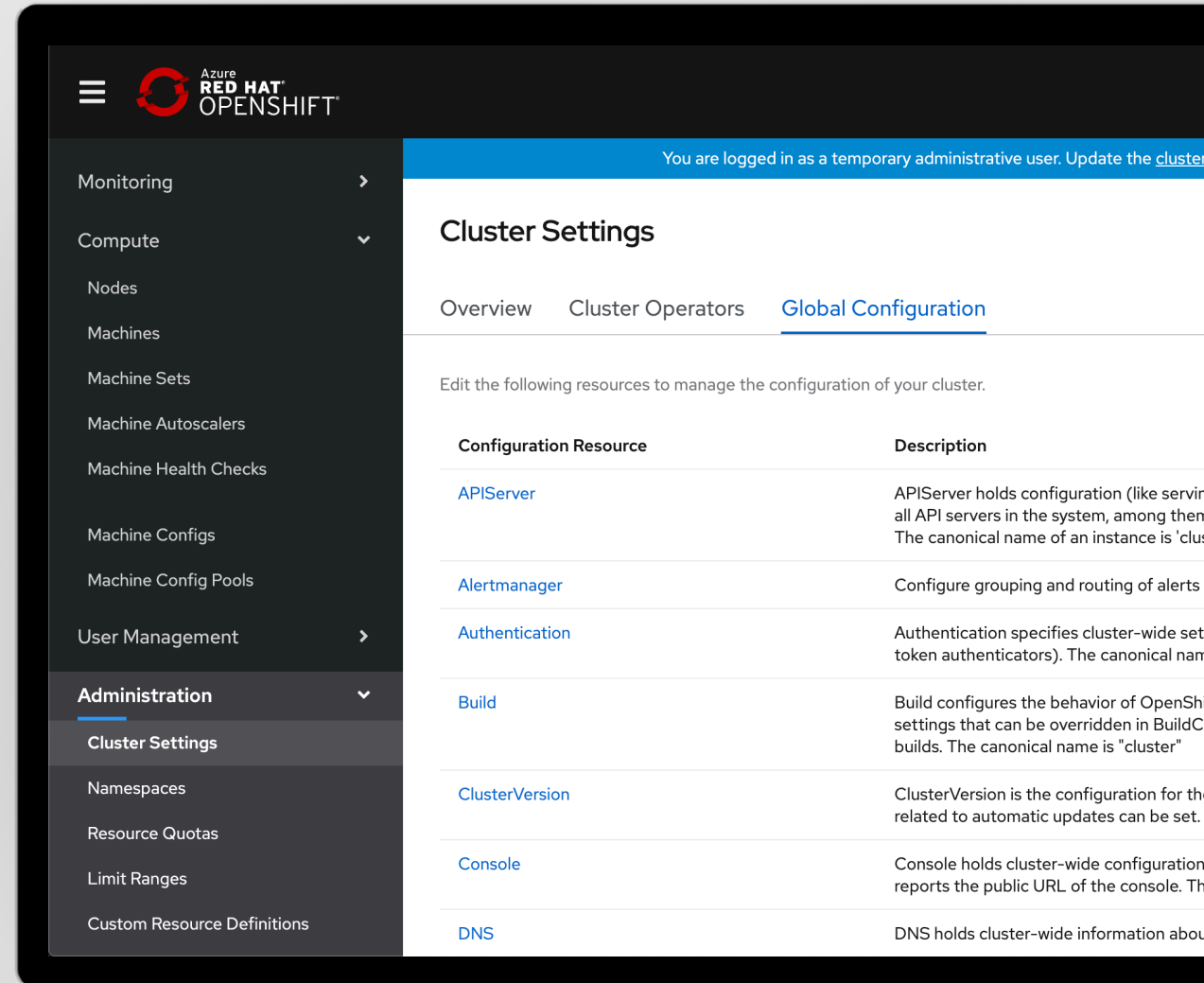# Enterprise-grade operations, security and compliance

Microsoft | Red Hat

Flexible, self-service deployment

Create fully managed OpenShift clusters in minutes, using **az aro create** with integrated billing and no long-term commitment.
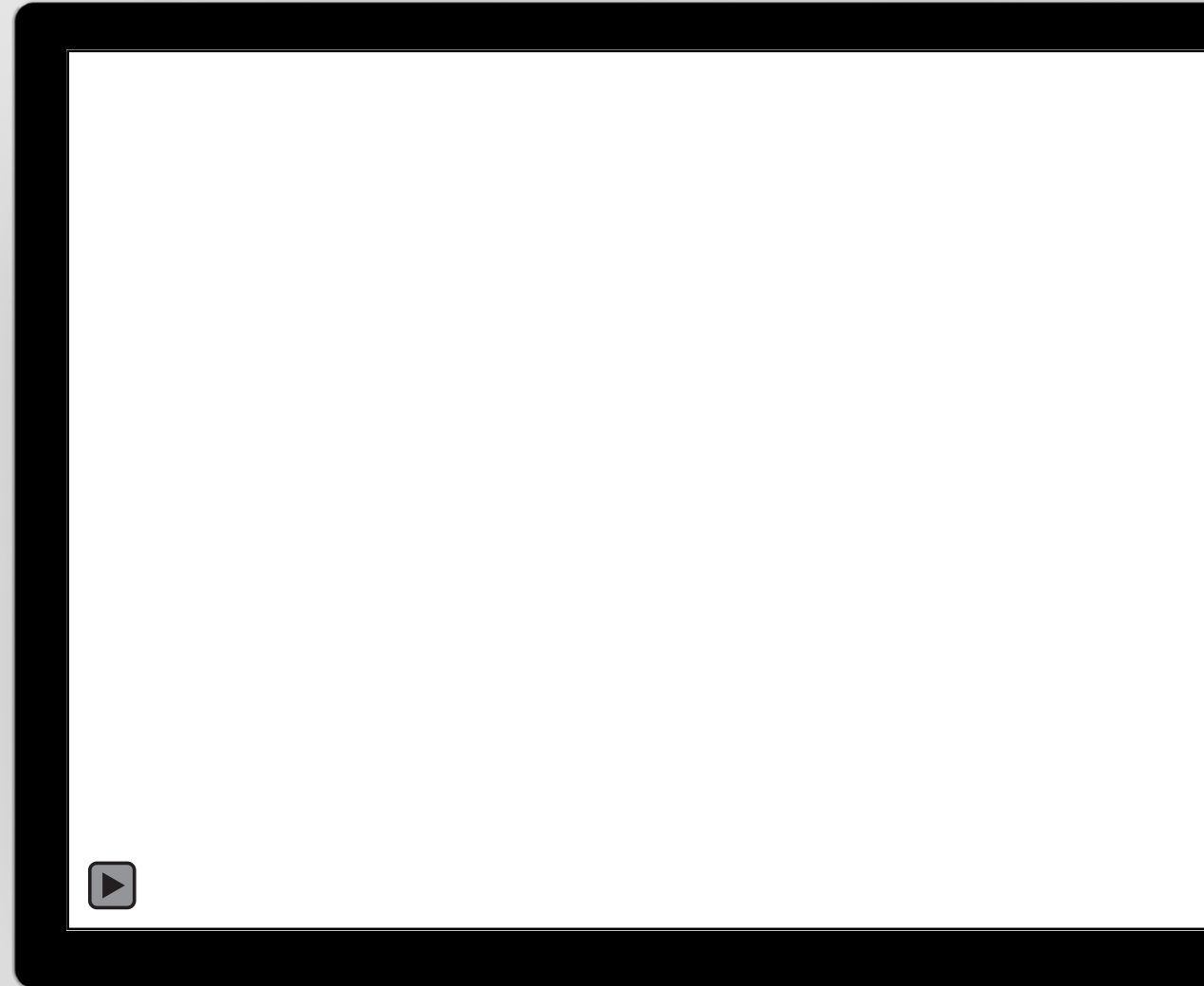
Full control for administrators

Administrators have full **cluster-admin** role. They're able to configure running privileged containers and installing Custom Resource Definitions (CRDs).
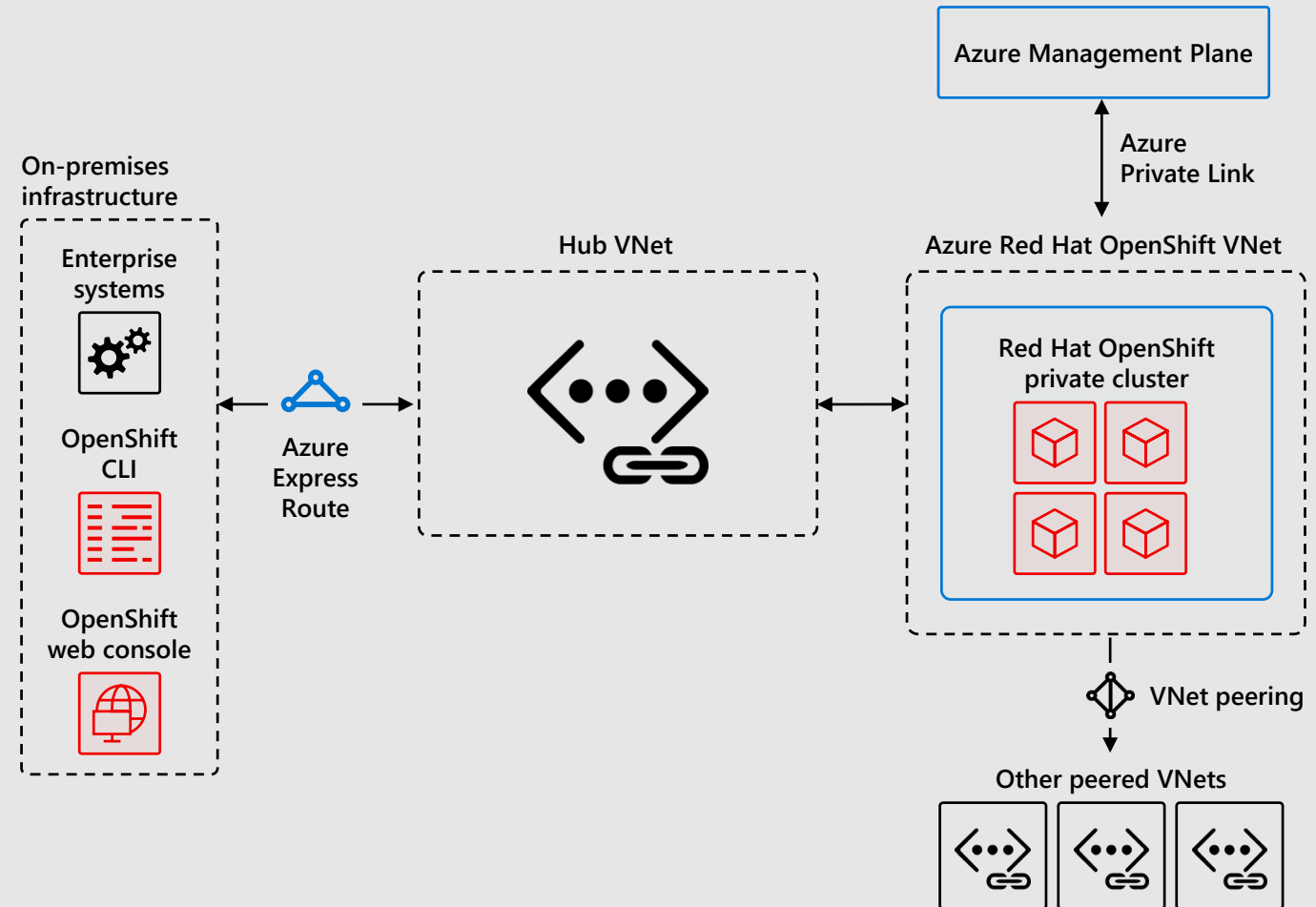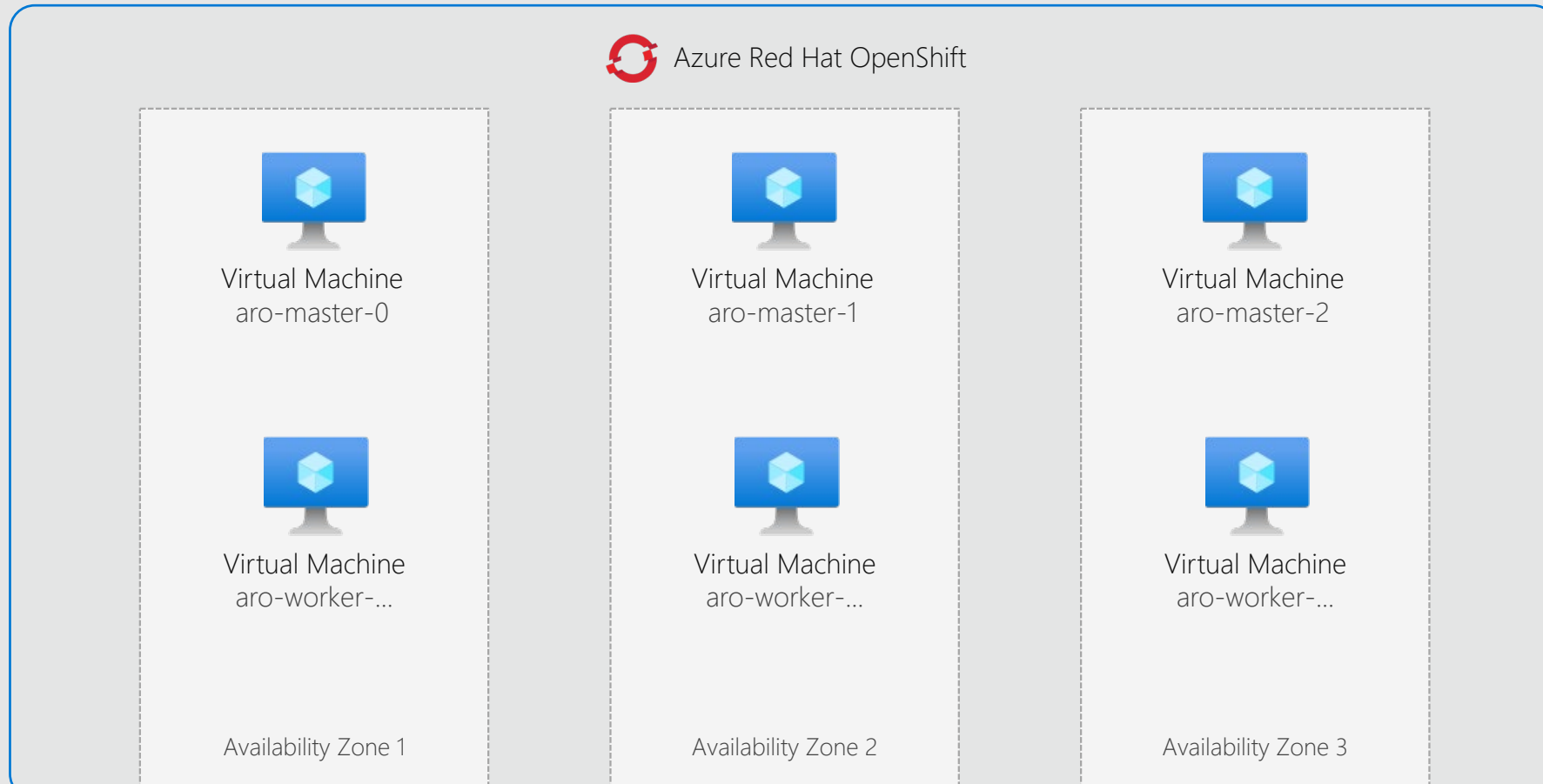
Private cluster management and ingress endpoints

Configure control plane (API) and ingress to use public or private endpoints

The virtual network is configurable, enabling peering with other virtual networks, including Express Route circuits

Multi-Availability Zones clusters and 99.95% SLA

To ensure the highest resiliency, cluster components are deployed across 3 Azure Availability Zones in supported Azure regions.

Azure Red Hat OpenShift

Virtual Machine
aro-master-0

Virtual Machine
aro-master-1

Virtual Machine
aro-master-2

Virtual Machine
aro-worker-...

Virtual Machine
aro-worker-...

Virtual Machine
aro-worker-...

Availability Zone 1

Availability Zone 2

Availability Zone 3

Industry compliance certifications

FIPS 140-2 Level 1 compliant encryption provide strong encryption controls to protect sensitive data including platform secrets and application configuration data.

To help you meet your compliance obligations across regulated industries and markets, Azure Red Hat OpenShift is certified for **PCI DSS, HITRUST, ISO 27001, SOC 2 Type II** and **FedRAMP** more.

Microsoft | Red Hat

Single sign-on with your own identity provider

In addition to Azure Active Directory, configure supported OpenShift identity providers, for example using OpenID Connect.
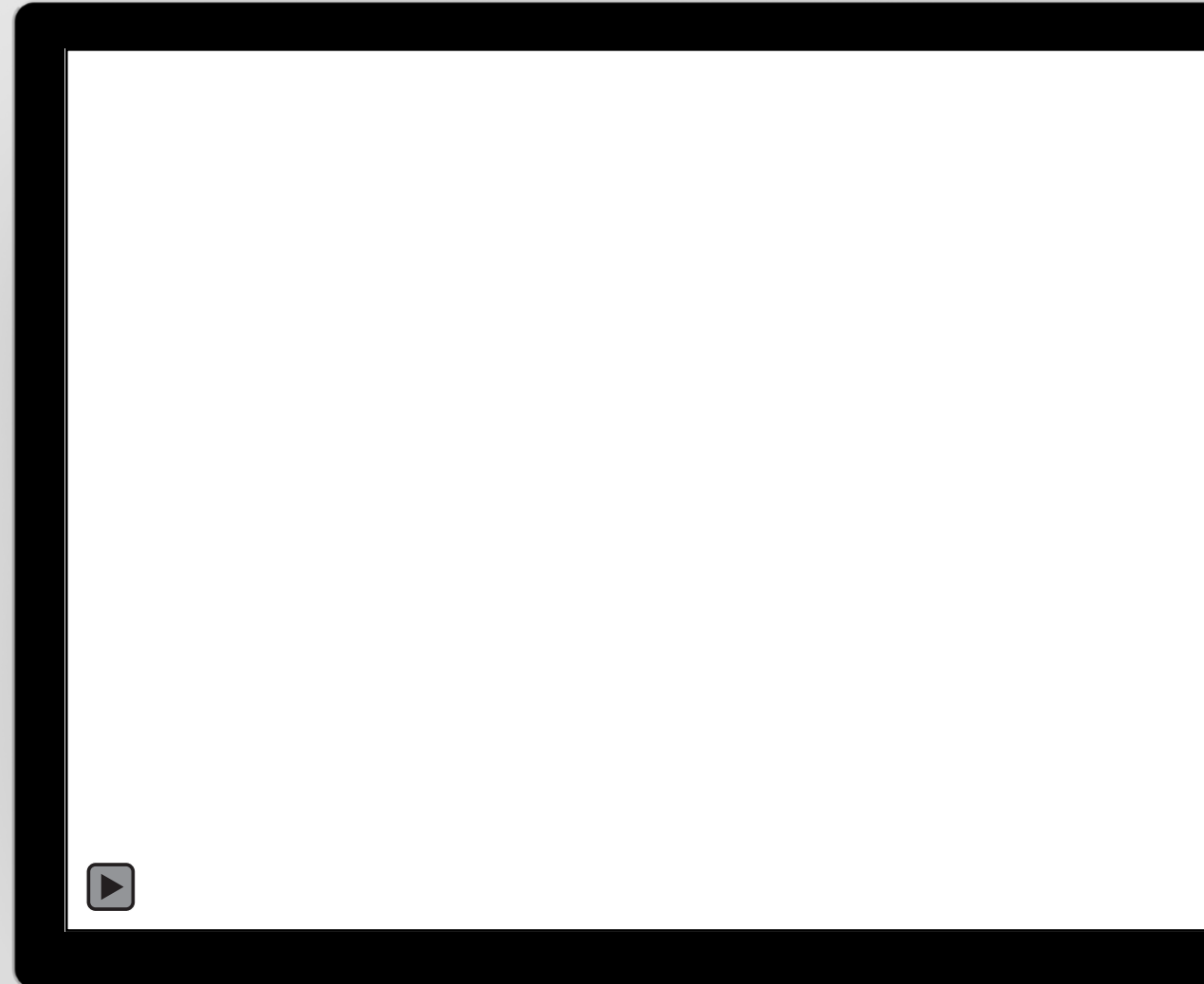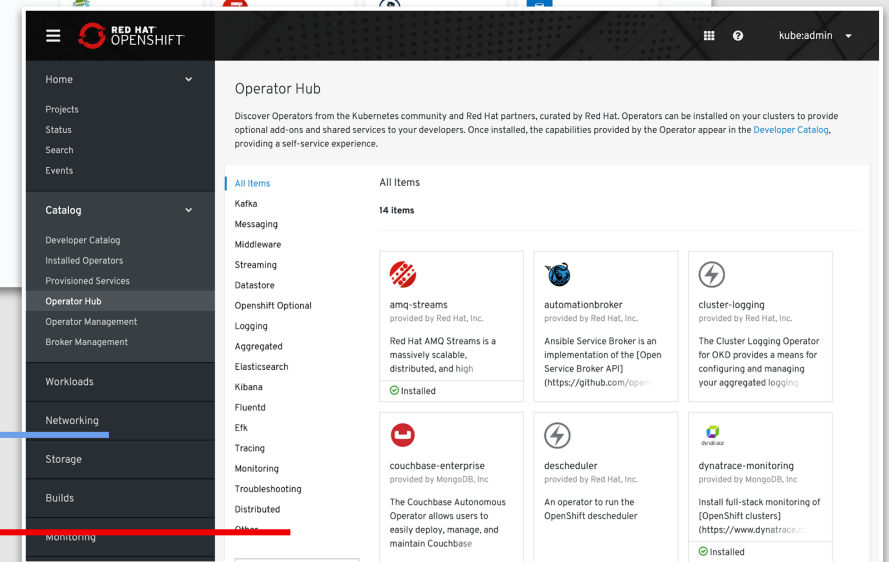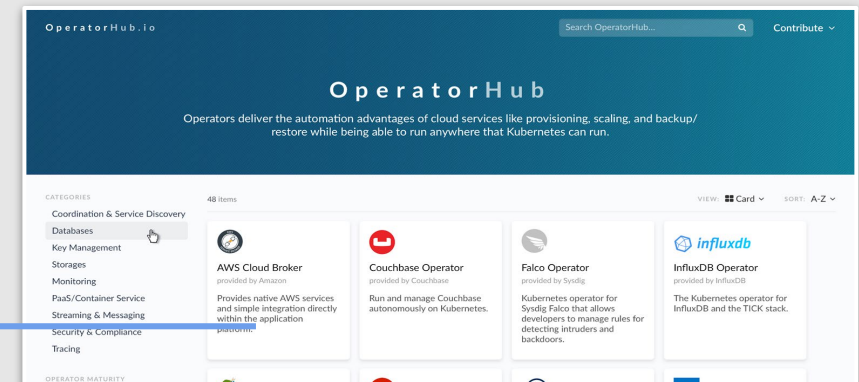
Operator Hub and certified operators

OperatorHub.io launched by Red Hat, Microsoft, AWS and Google

OpenShift Operator Certification

Operator Hub integrated into OpenShift 4
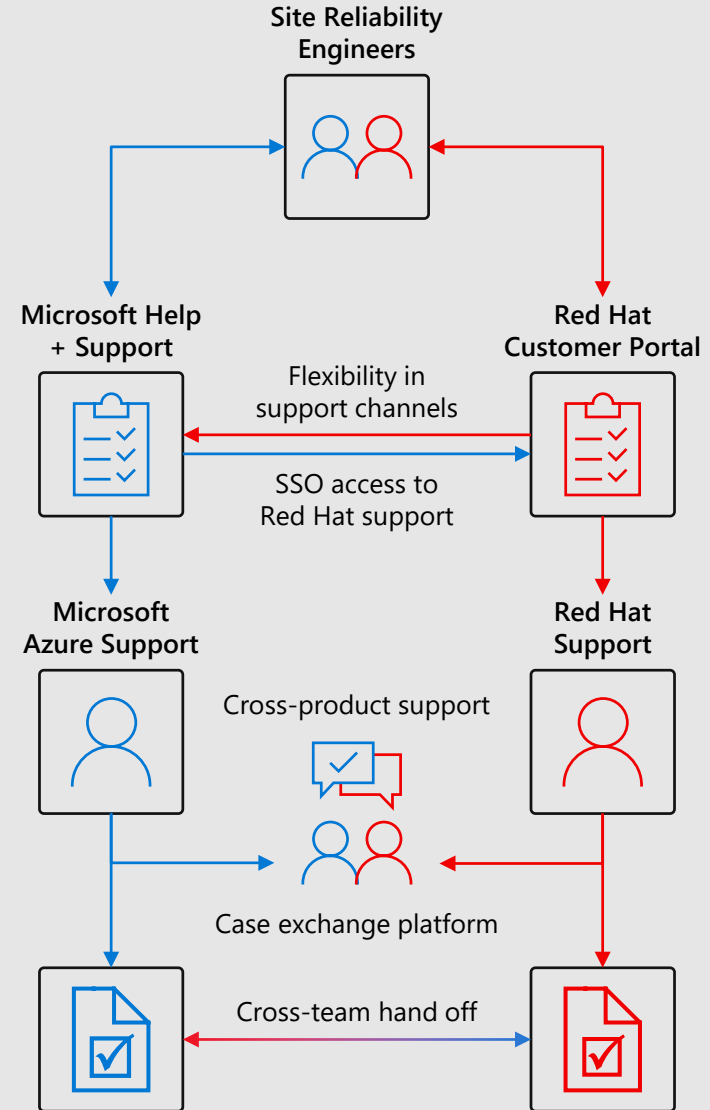
Community Operators

OpenShift Certified Operators

Unified support and operations

Jointly engineered, operated, and supported by Microsoft and Red Hat

- In-portal integrated support experience is available 24x7
- ISO 27001 compliant B2B communication channel
- Co-located support with Red Hat on-site team
- Integrated case systems
- Microsoft and Red Hat security response team collaboration

Site Reliability Engineers

Microsoft Help + Support

Flexibility in support channels

SSO access to Red Hat support

Red Hat Customer Portal

Microsoft Azure Support

Cross-product support

Red Hat Support

Case exchange platform

Cross-team hand off

Empowering developers to innovate

Microsoft | Red Hat

Integrated developer workflow

Build → Test → Deploy

Self-service Provisioning · Consistent environments · Automated build & deploy · CI/CD pipelines · Configuration management · App logs & metrics

Code ← Review ← Monitor

Spring & Java EE	Microservices	Functions
Languages	Databases	Application services

Red Hat OpenShift
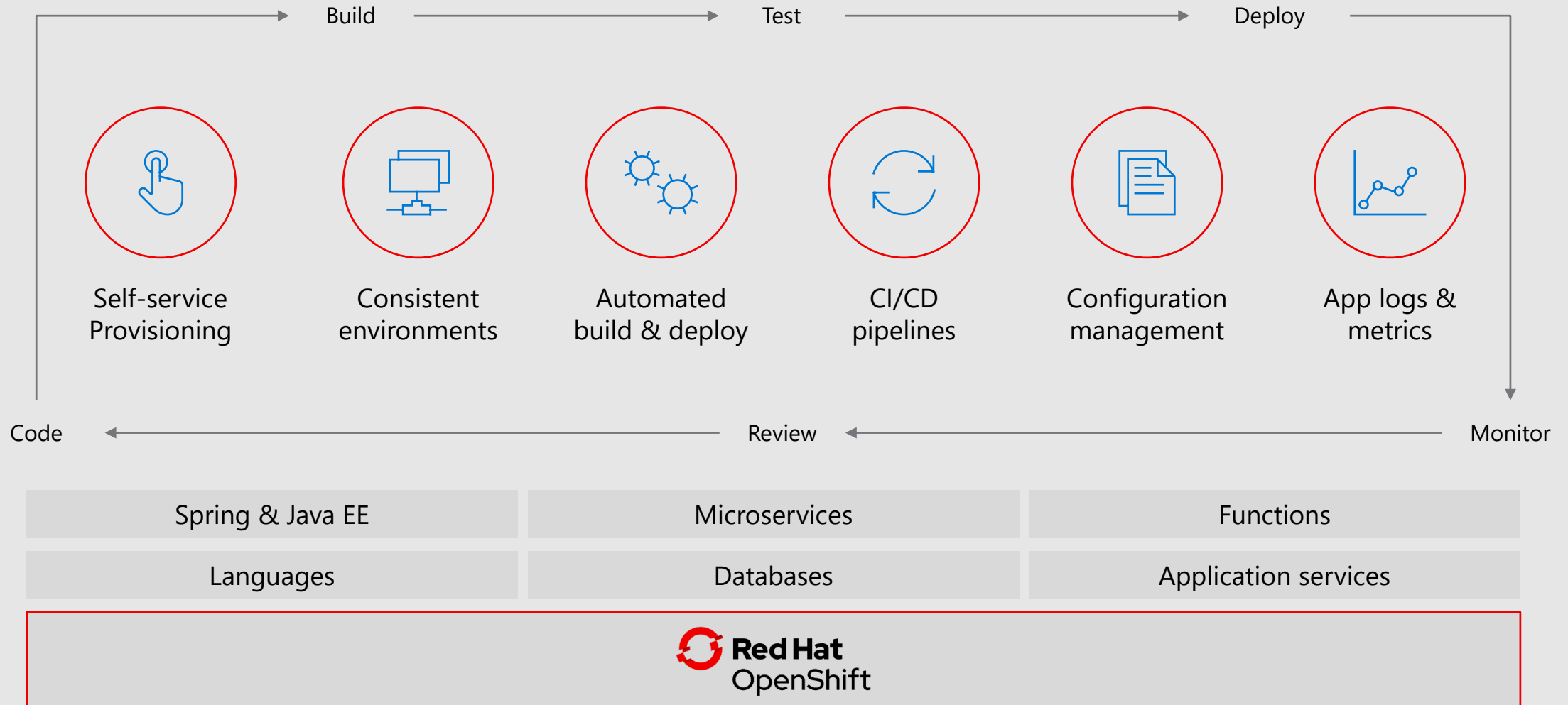
OpenShift developer console

Streamlined console
A developer centric perspective that offers a simplified view of Kubernetes concepts so developers can focus on what really matters

Create and manage applications
Import source from Git, view and manage app configuration and workload details, and deploy applications

Application topology
View structure and status of app components, drill into component connections and workload details, quickly navigate to pod logs
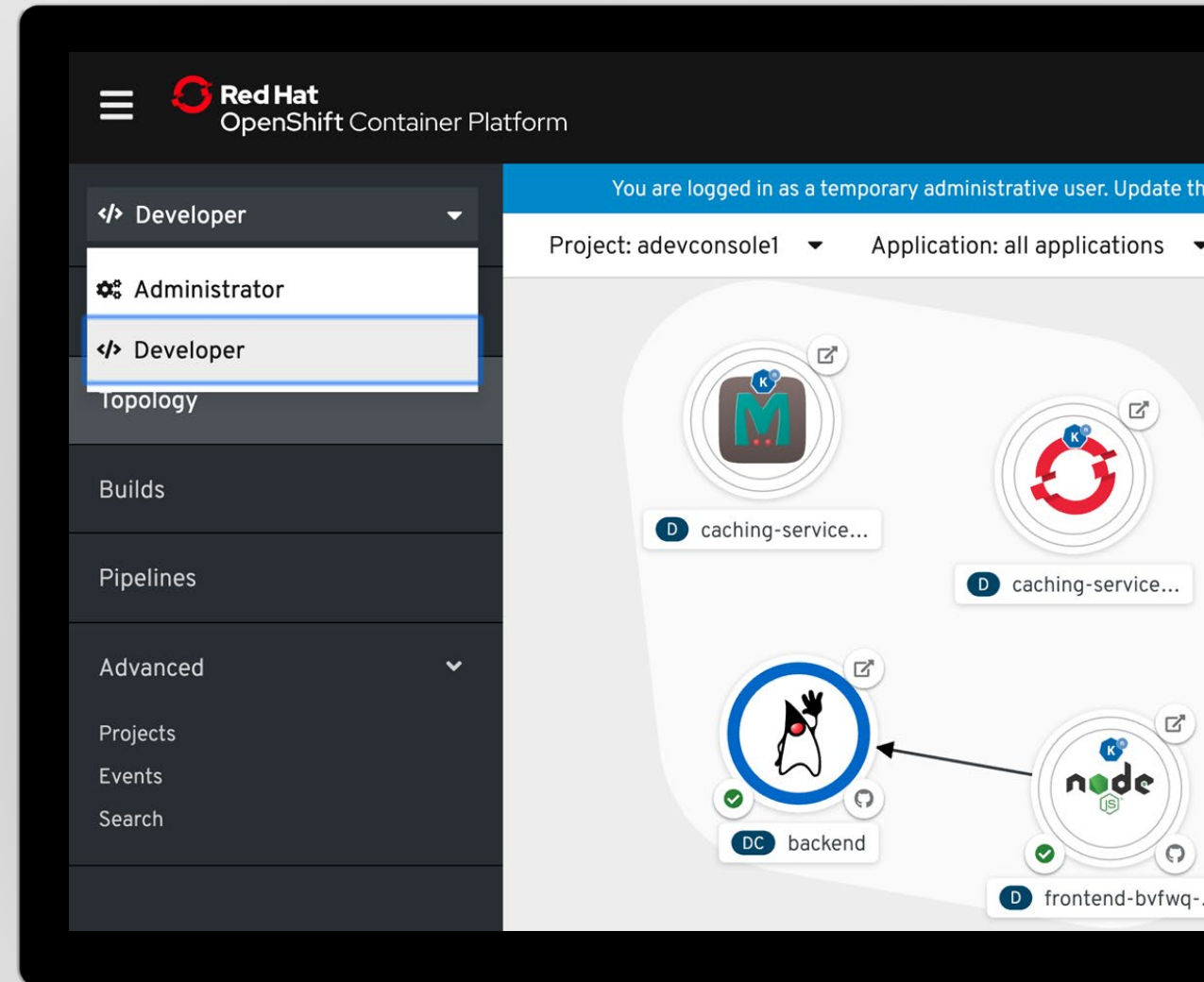
Enabling greater developer productivity
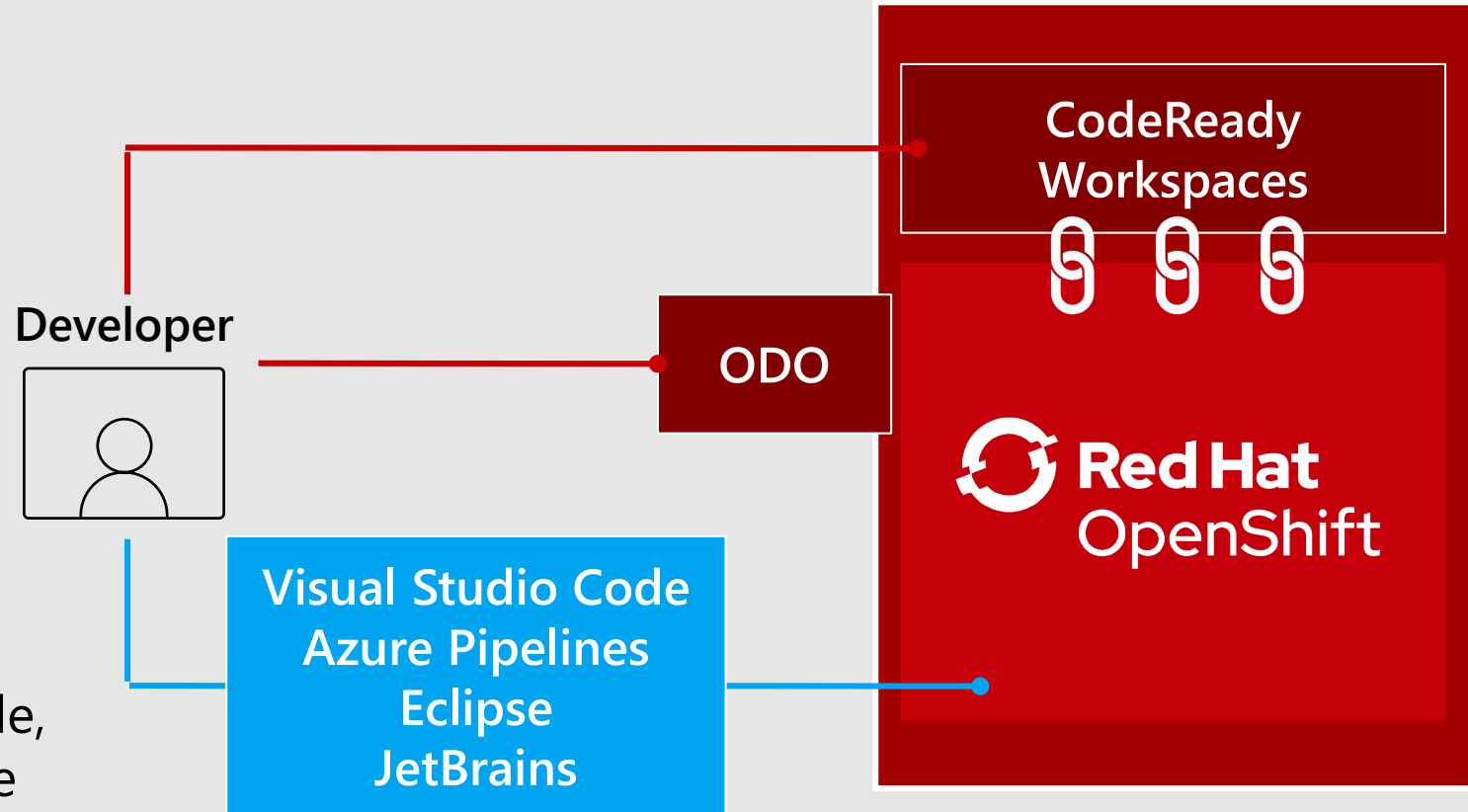
CodeReady Workspaces

Web-based IDE (Eclipse Che)
Collaborative development
Integrated with CI/CD

OpenShift ODO

Advanced developer CLI

Plugins

Integration plugins – Visual Studio Code,
Azure Pipelines, GitHub Actions, Eclipse
IDE, JetBrains

Developer

ODO

CodeReady Workspaces

Red Hat OpenShift

**Visual Studio Code
Azure Pipelines
Eclipse
JetBrains**

Microsoft | Red Hat

OpenShift Do (odo)

A fast, iterative, and straightforward CLI tool for developers who write, build, and deploy applications on OpenShift.

Existing tools are more operations-focused and require a deep-understanding of Kubernetes and OpenShift concepts.

odo abstracts away complex Kubernetes and OpenShift concepts for the developer, thus allowing developers to focus on what is most important to them: code.

```
$ odo create wildfly backend
Component 'backend' was created.

$ odo push
Pushing changes to component: backend

$ odo create php frontend
Component 'frontend' was created.
To push source code to the component run 'odo push'

$ odo push
Pushing changes to component: frontend

$ odo url create
frontend - http://frontend-myapp.192.168.99.100.nip.io

$ odo watch
Waiting for something to change in /dev/frontend
```

Building next-gen applications
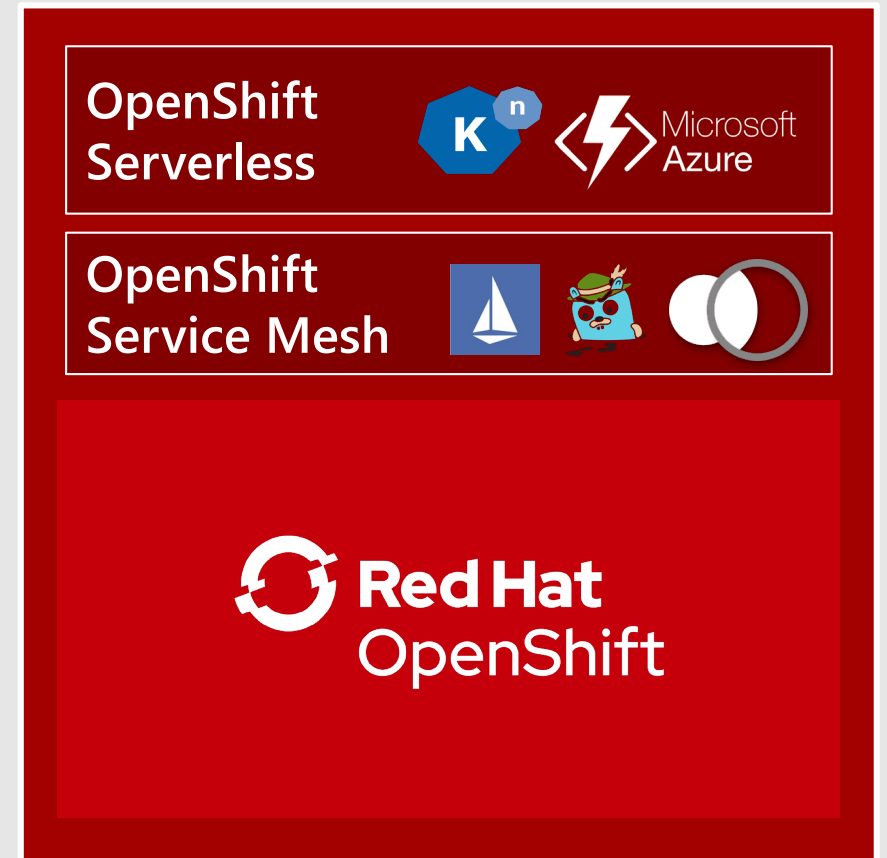
OpenShift Serverless (Tech Preview)

Integrated serverless, enabling scale-to-zero function-based apps and event sources – built on the Knative framework.

Support for Azure Functions

Integrated with Camel-k for rich set of initial event sources: HTTP, Kafka, AMQP

OpenShift Service Mesh

Integrated service mesh for enhanced security and network segmentation of microservices applications. Combines Istio, Kiali (UI), and Jaeger (Tracing) projects.

OpenShift Serverless

OpenShift Service Mesh

Red Hat OpenShift

Microsoft | Red Hat

OpenShift Serverless (Tech Preview)

Familiar to Kubernetes users

Scale to 0 and autoscale to N based on demand
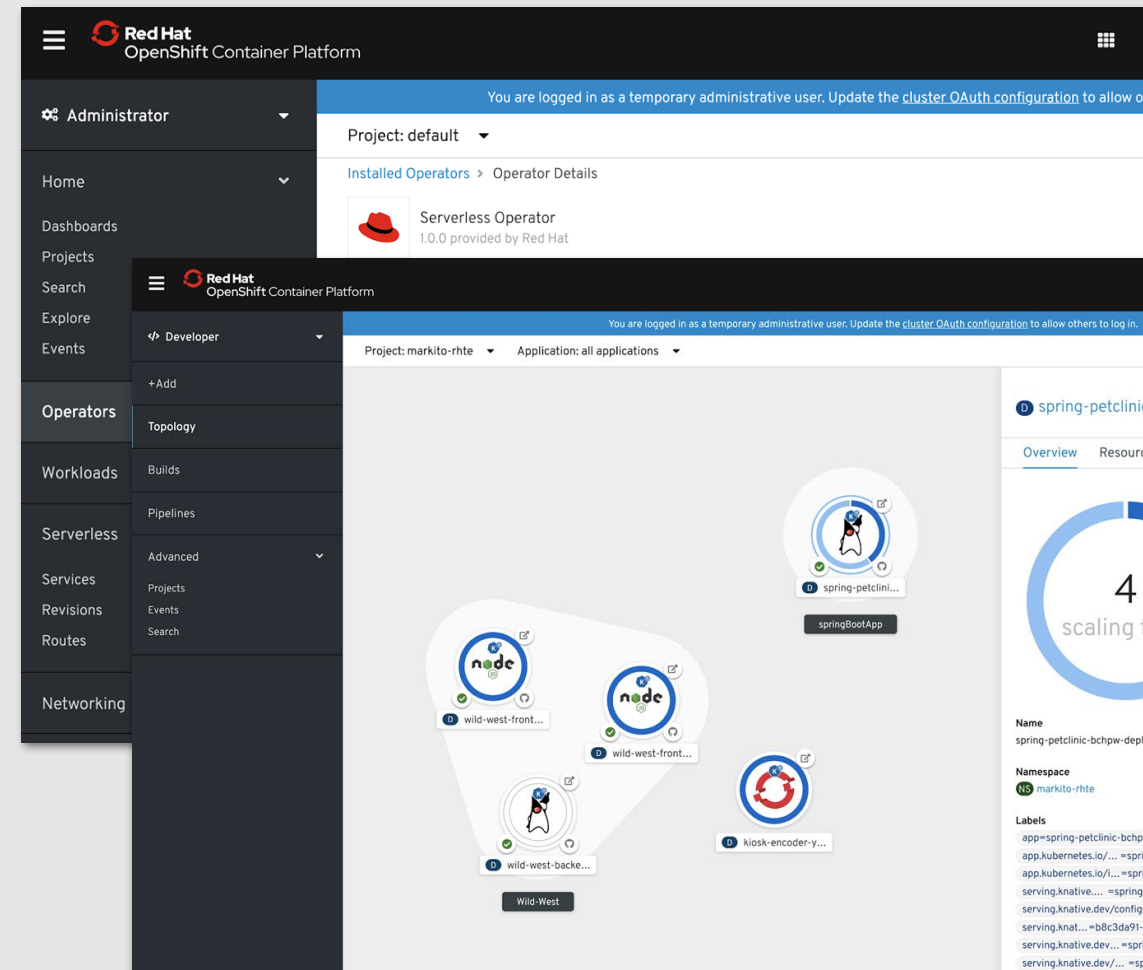
Applications and functions. Any container workload

Powerful eventing model with multiple event sources

Available via OperatorHub

Learn more

https://openshift.com/learn/topics/serverless

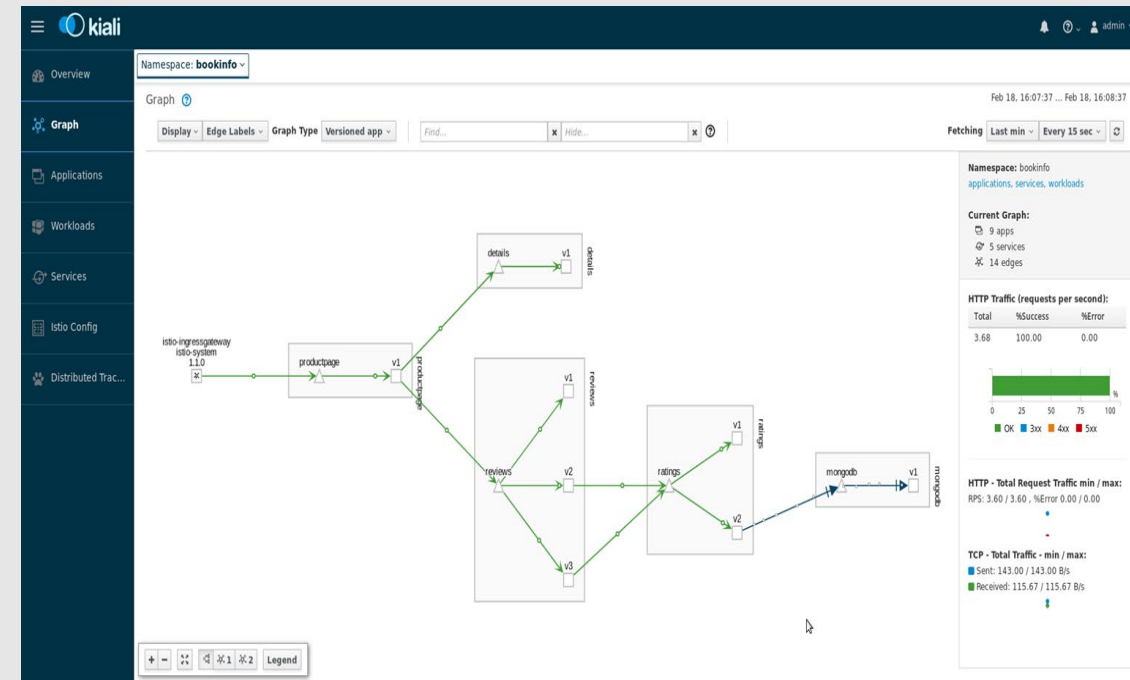https://redhat-developer-demos.github.io/knative-tutorial

OpenShift Service Mesh

Complete service mesh, including tracing and visualization capabilities, packaged for ease of use

Policy-driven security with a dedicated network for service to service communications

Available via OperatorHub

Scale on your own terms

Get Azure Red Hat OpenShift
through your existing Azure subscription

	Master nodes pay as you go	Starts at * $0.384/hour per node
REDUCED PRICE	Worker nodes pay as you go	Starts at * ~~$0.953/hour per node~~ $0.363/hour per node
NEW 3-YEAR OPTION	Use 1-year or 3-years Reserved Virtual Machine instances to save costs	●
	Choice of standard, high-memory, or high-CPU application nodes	●
	Integrated support and operations	●
	Pay through your existing Azure commitment	●
IMPROVED SLA	99.95% uptime Service Level Agreement (SLA)	●

Master node (D8s v3 – 8 vCPU and 32 GB RAM). Worker node (D4s v3 – 4 vCPUs and 16 GB RAM) in East US.
Minimum cluster has 3 masters and 3 workers. Excludes networking and storage.
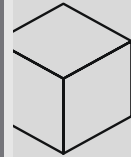For full pricing information, go to https://aka.ms/openshift/pricing

■■ Microsoft | 🎩 Red Hat

Resources

Learn more and stay connected

Learn more
aka.ms/openshift

Hands-on workshop
aroworkshop.io

Documentation
aka.ms/openshift/docs

Feedback
aka.ms/openshift/feedback

Microsoft | Red Hat

Thank you.

Red Hat

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For additional Red Hat solutions:

carah.io/RedHatPortfolio

To purchase, check out the contract vehicles available for procurement:

carah.io/RedHatContracts

For upcoming events:

carah.io/RedHatEvents

For additional Open Source solutions:

carah.io/OpenSourceSolutions

To set up a meeting:

redhat@carahsoft.com or 877-RHAT-GOV