Red Hat - Future Technologies

Bled - Oct 18th 2024

Wojciech Furmankiewicz
Head of Technology Sales CEE
wfurmank@redhat.com

Red Hat

The world's leading provider of open source enterprise IT solutions

MORE THAN
90%
of the
FORTUNE
500
use
RED HAT
PRODUCTS &
SOLUTIONS*

~20,000
EMPLOYEES

105+
OFFICES

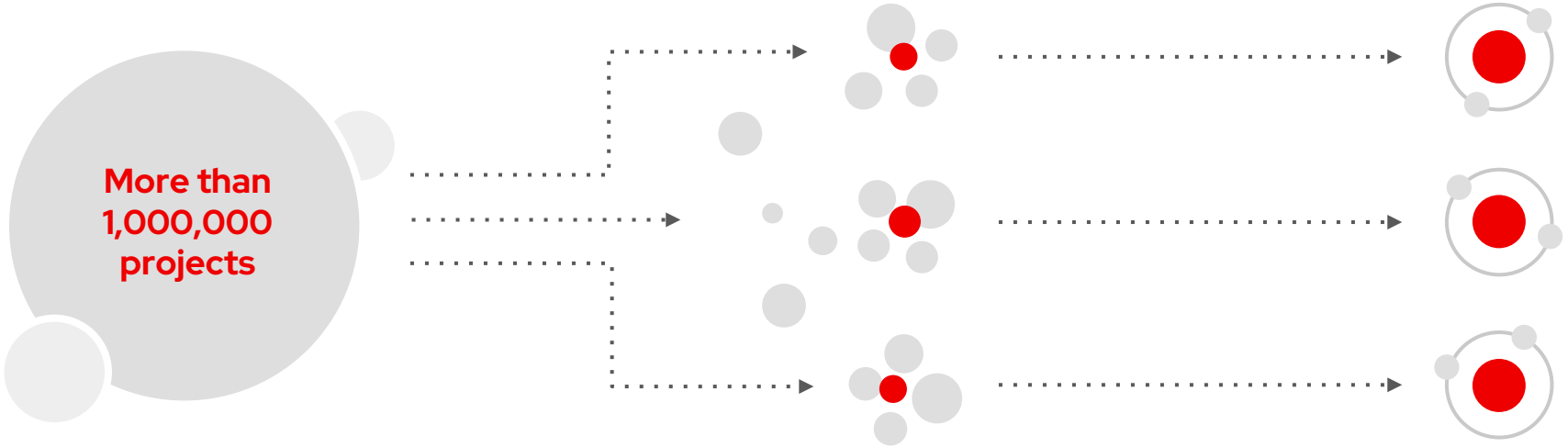
40+
COUNTRIES

THE FIRST
$3
BILLION
OPEN
SOURCE
COMPANY
IN THE WORLD

*Red Hat client data and Fortune 500 list, October 2019.
Note: Currency in U.S. dollars.

Red Hat

Product Development Model



Participate

We create and participate in community-powered upstream projects.

Integrate

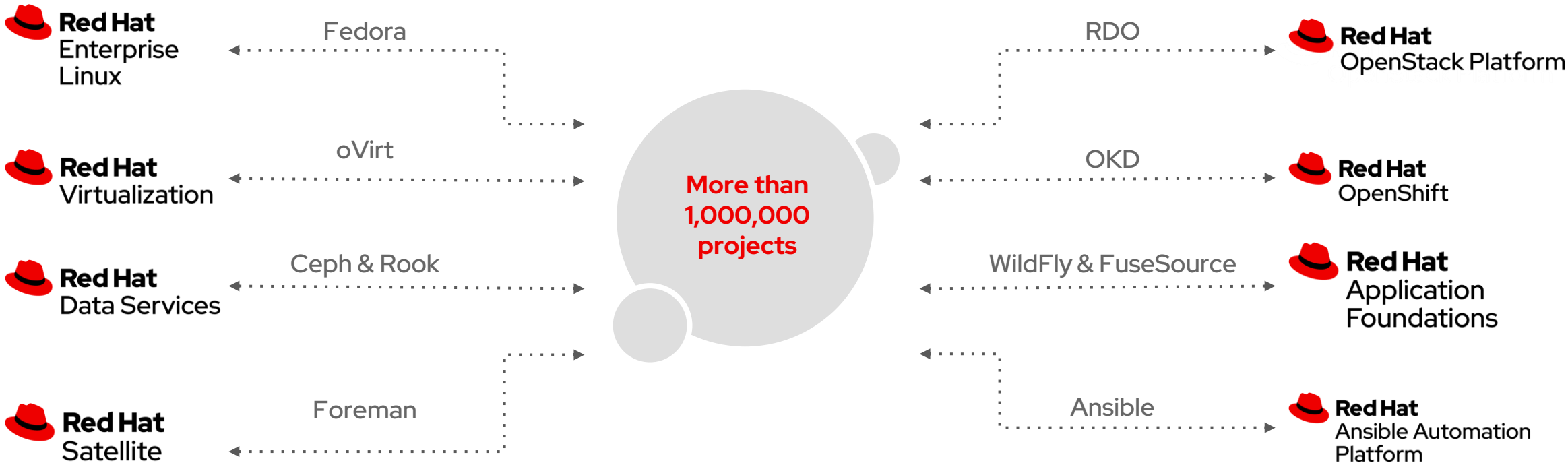
We integrate upstream projects, fostering open, community platforms.

Stabilize

We commercialize these platforms together with a rich ecosystem of services and certifications.

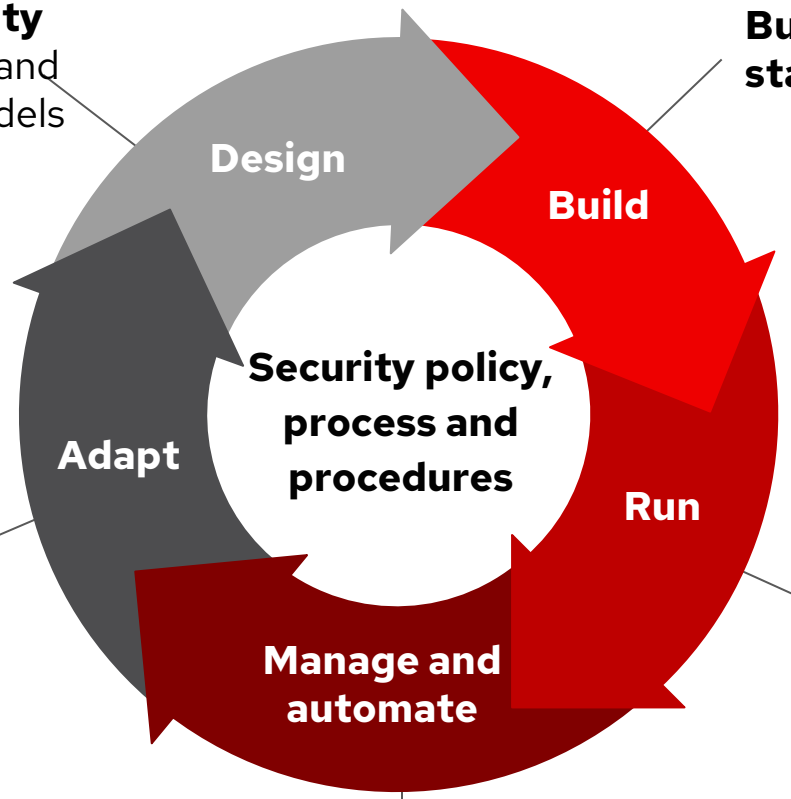
Red Hat

From Community to Enterprise



Red Hat

Security is a Continuous and Holistic Process



Identify security requirements and governance models

Built-in from the start; not bolted-on

Revise, update, remediate as the landscape changes

Deploy to trusted platforms with enhanced security capabilities

Automate systems for **security and compliance**

FedRAMP

CIS Center for Internet Security

PCI Security Standards Council

MITRE ATT&CK

National Cyber Security Centre

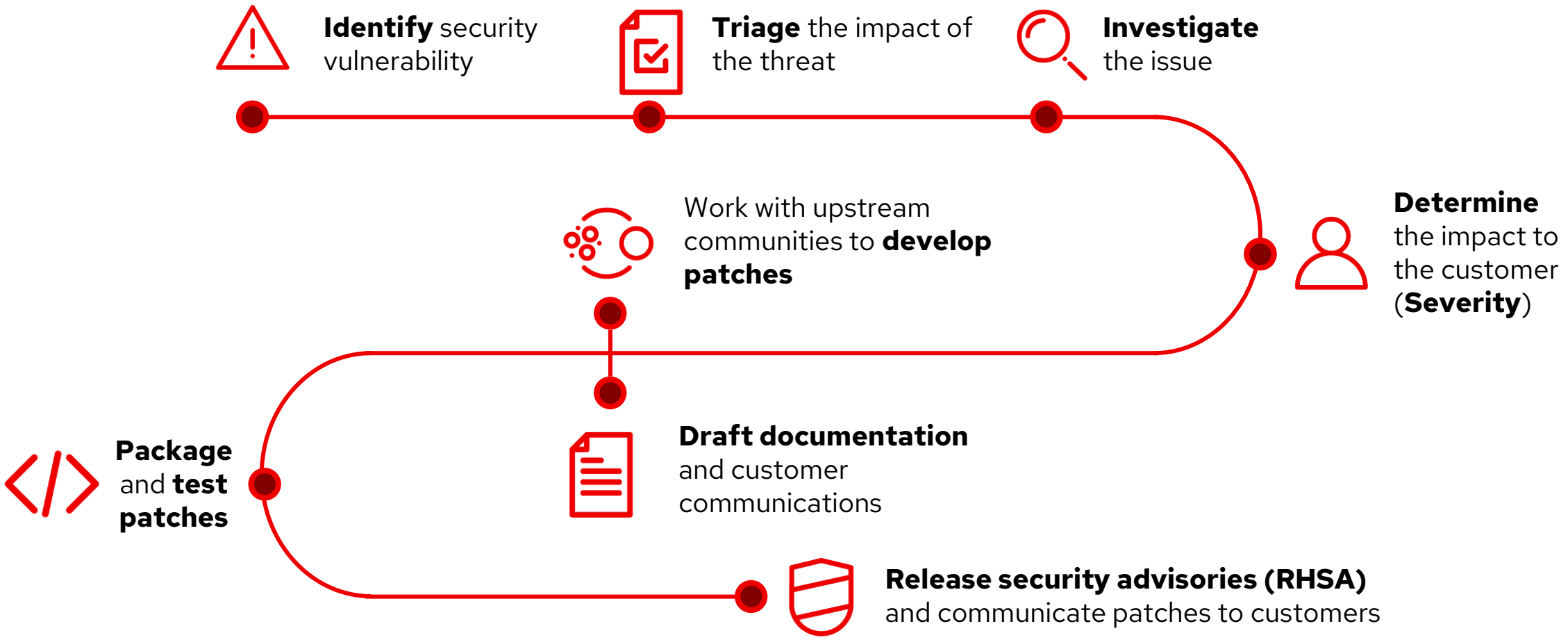
NIST National Institute of Standards and Technology U.S. Department of Commerce

HIPAA Health Insurance Portability & Accountability Act

ANSSI

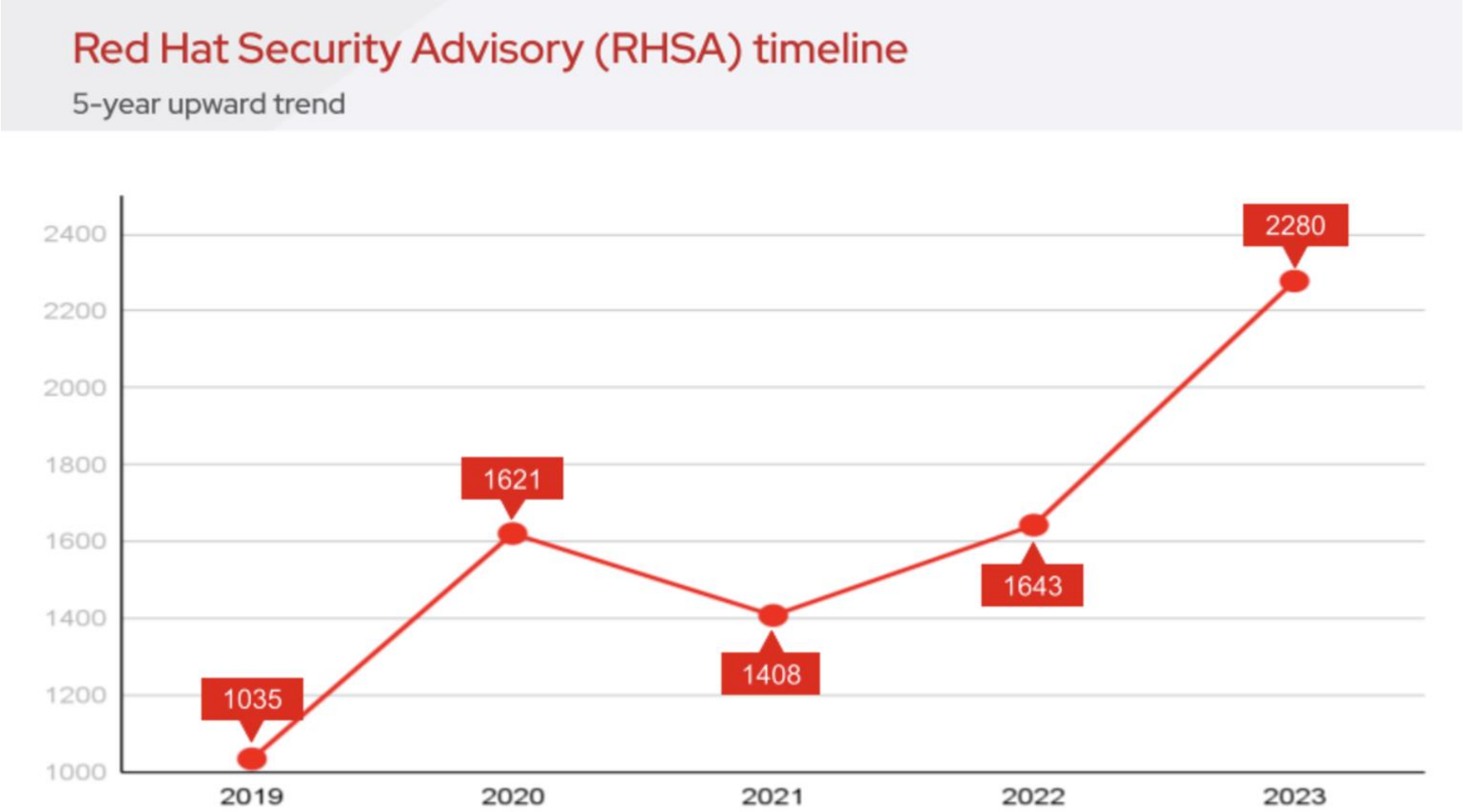
Red Hat

Customer Security Awareness Workflow



Red Hat

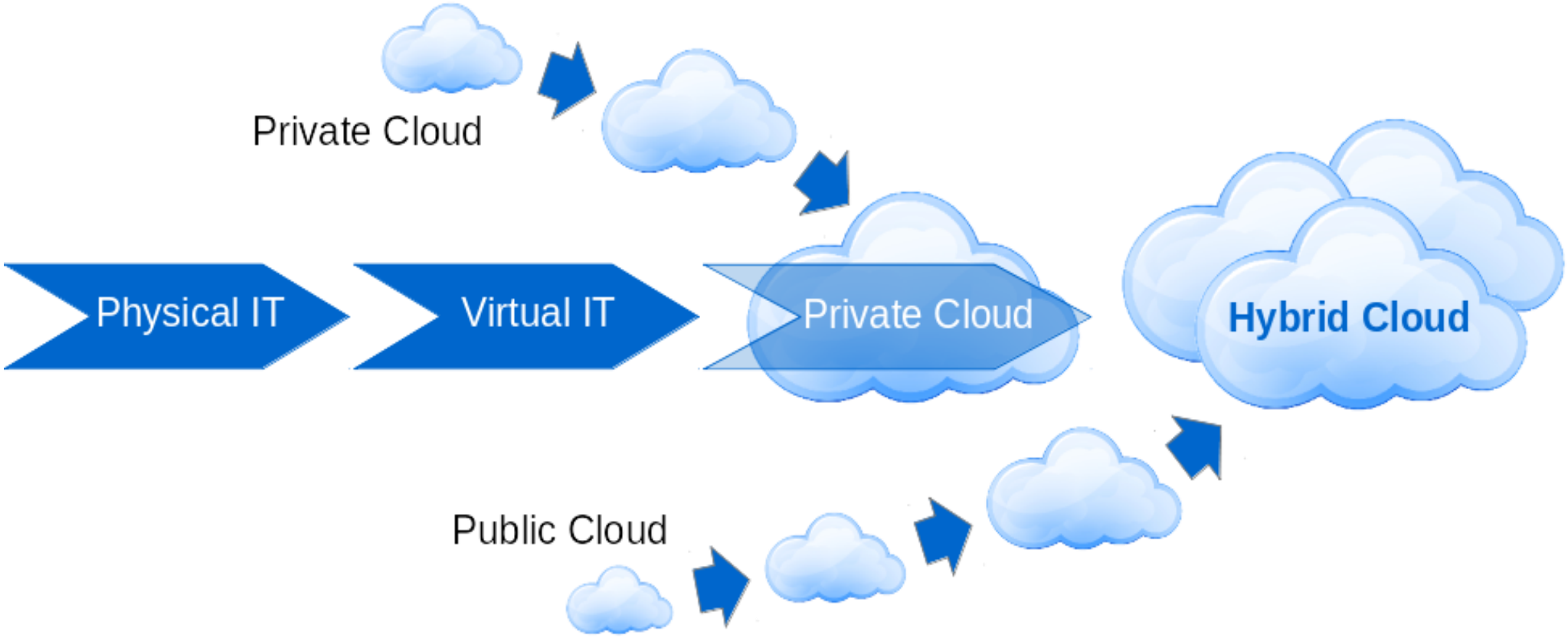
Red Hat Product Security Risk Report 2023



https://www.redhat.com/en/resources/product-security-risk-report-2023

Red Hat

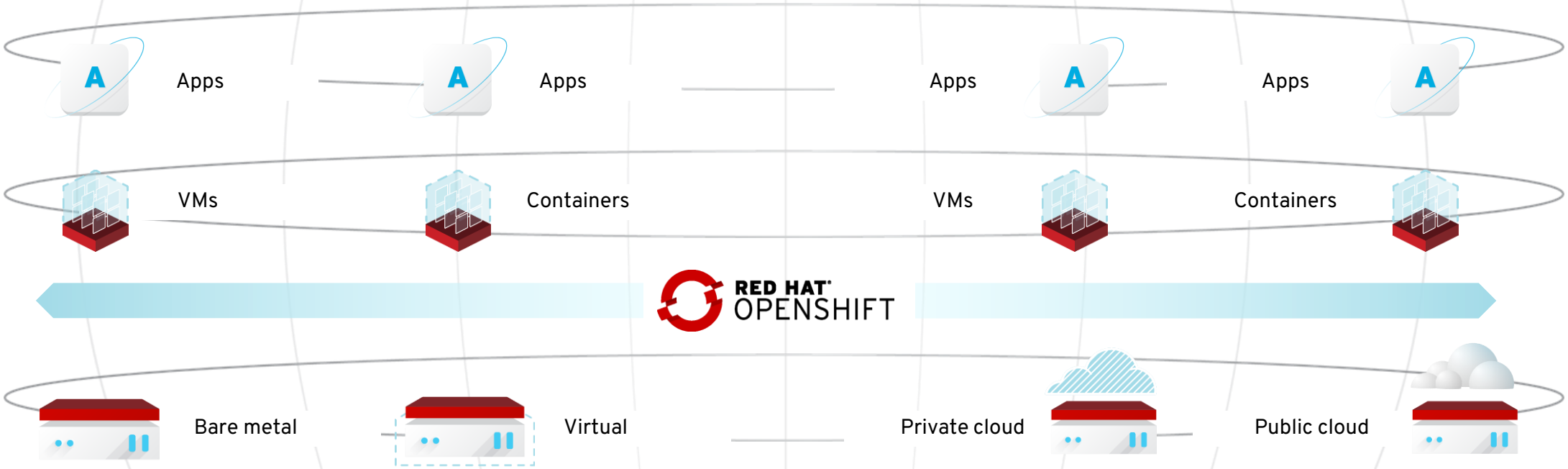
Open Hybrid Cloud



The Ultimate Scenario

Red Hat

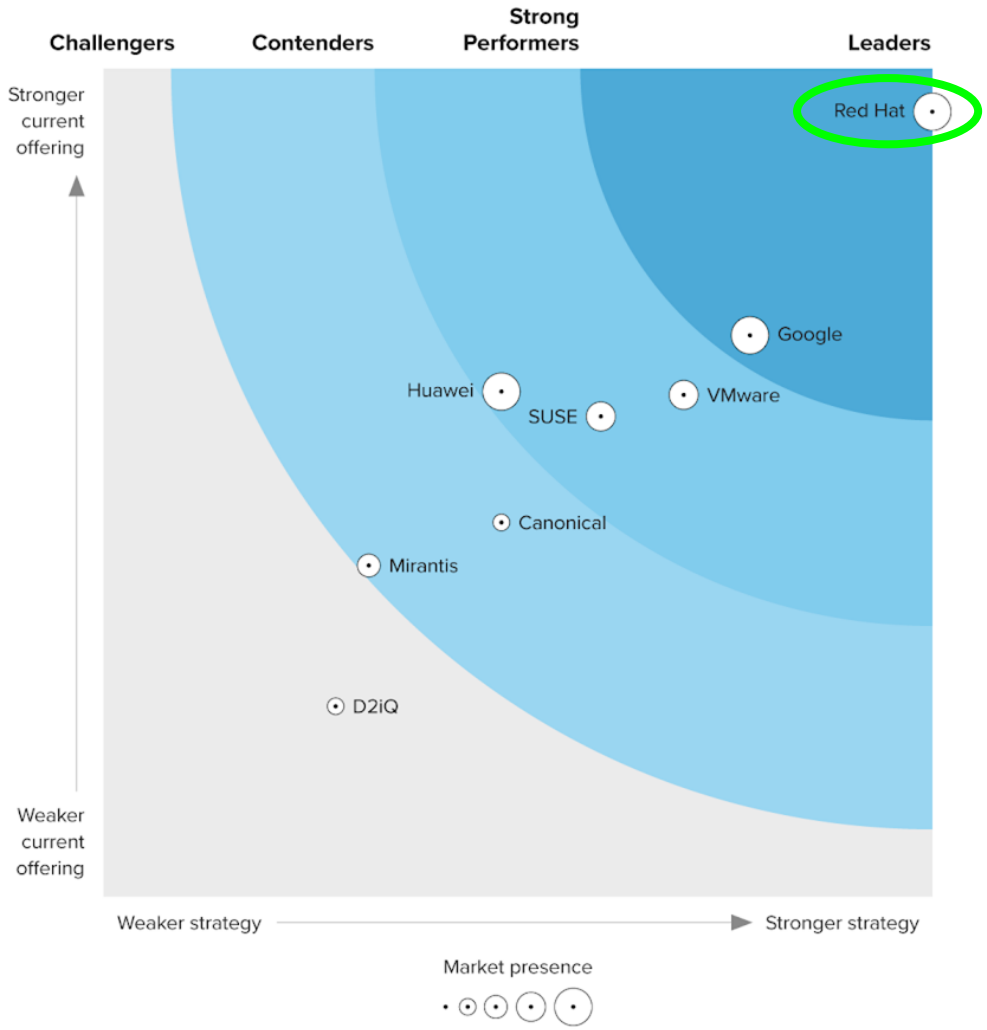
Unified Platform



Operating system of the future

Red Hat

The Forrester Wave™: Multicloud Container Platforms, Q4 2023



"**Red Hat sets the pace with enterprise IT capabilities and massive market presence.** With OpenShift's systematic innovation and development on multiple fronts, Red Hat has helped transform the MCP market segment."

"The demand for OpenShift prompted AWS and Microsoft Azure to sell OpenShift as a managed service, despite having their own Kubernetes-based container services. Red Hat's differentiated strategic vision is to up the ante on enterprise-grade open source computing."

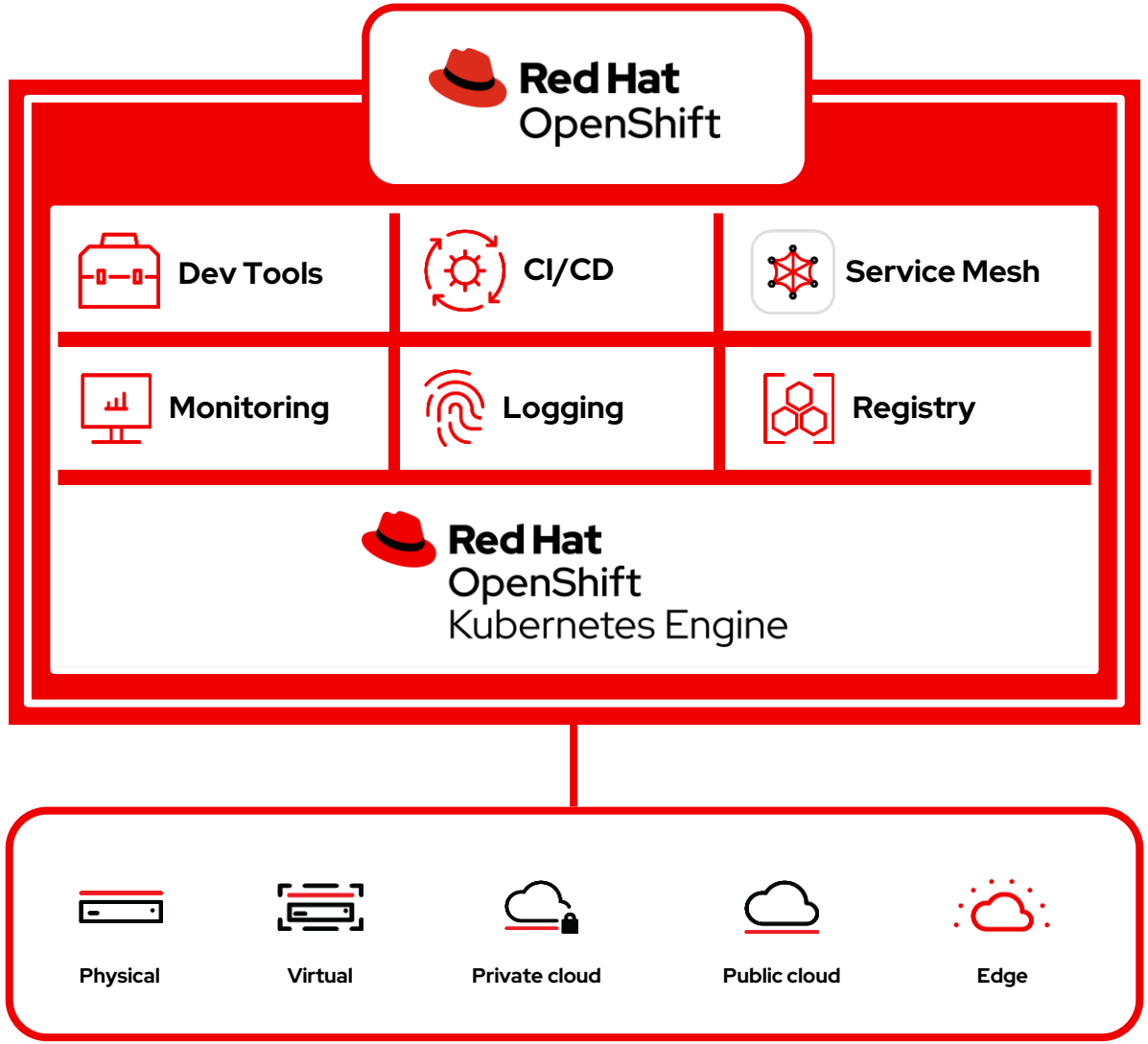
The Forrester Wave™: Multicloud Container Platforms, Q4 2023: The Eight Providers That Matter Most and How They Stack Up
Oct 2023

Source: Forrester Research, Inc. Unauthorized reproduction, citation, or distribution prohibited.

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Red Hat

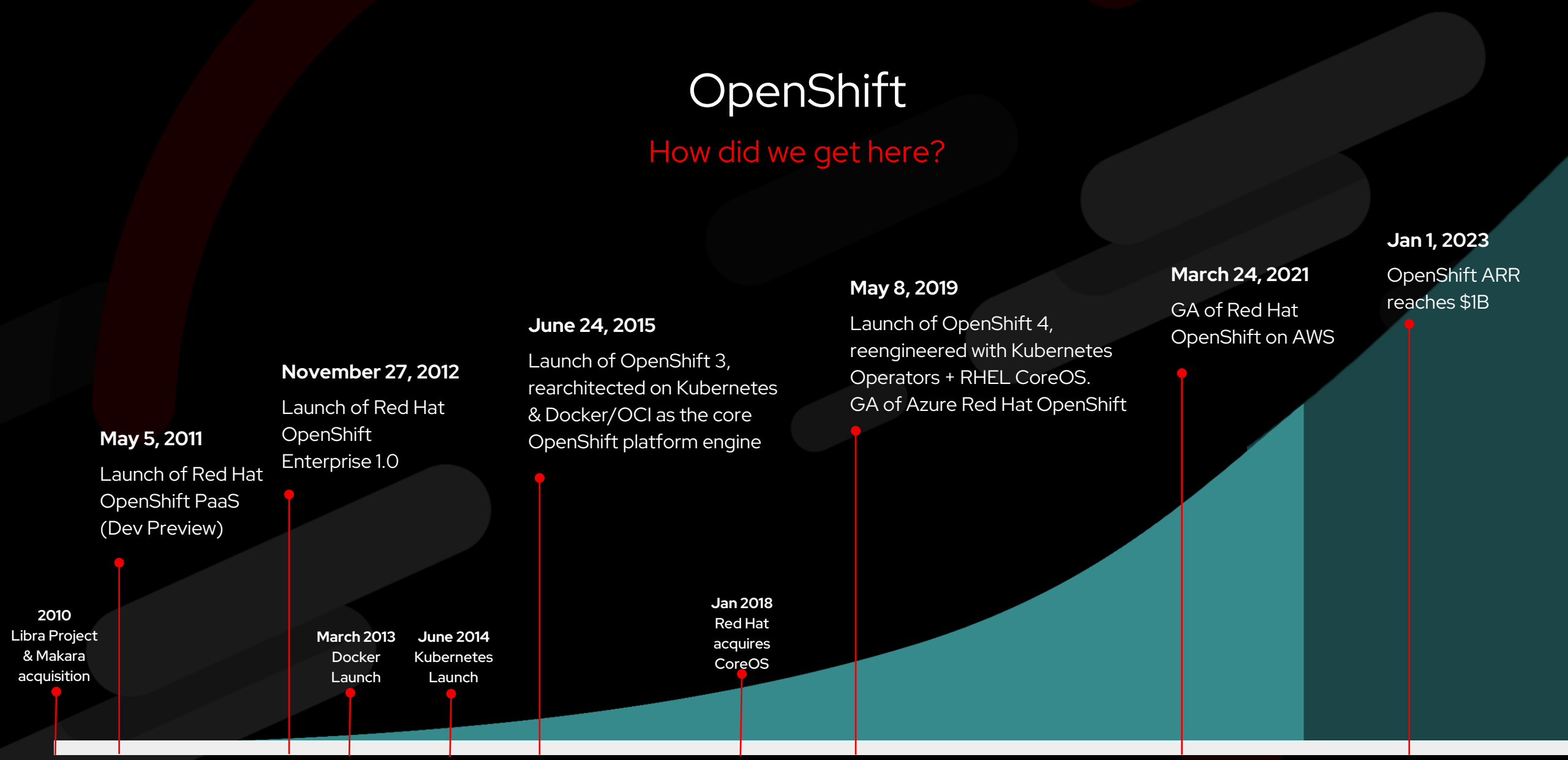
OpenShift Delivers a Comprehensive Application Platform



Red Hat

OpenShift

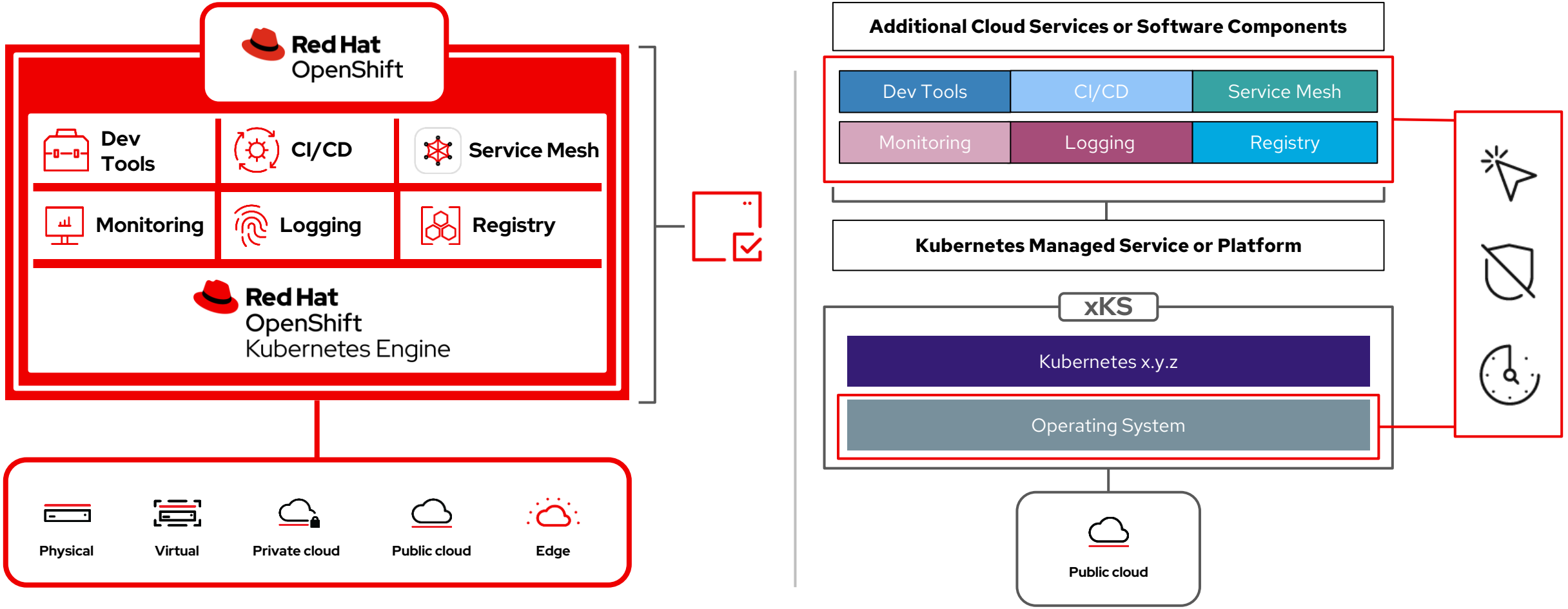
How did we get here?



"Platform as a Service" → "Container Platform" → "Enterprise Kubernetes" → "Application Platform"

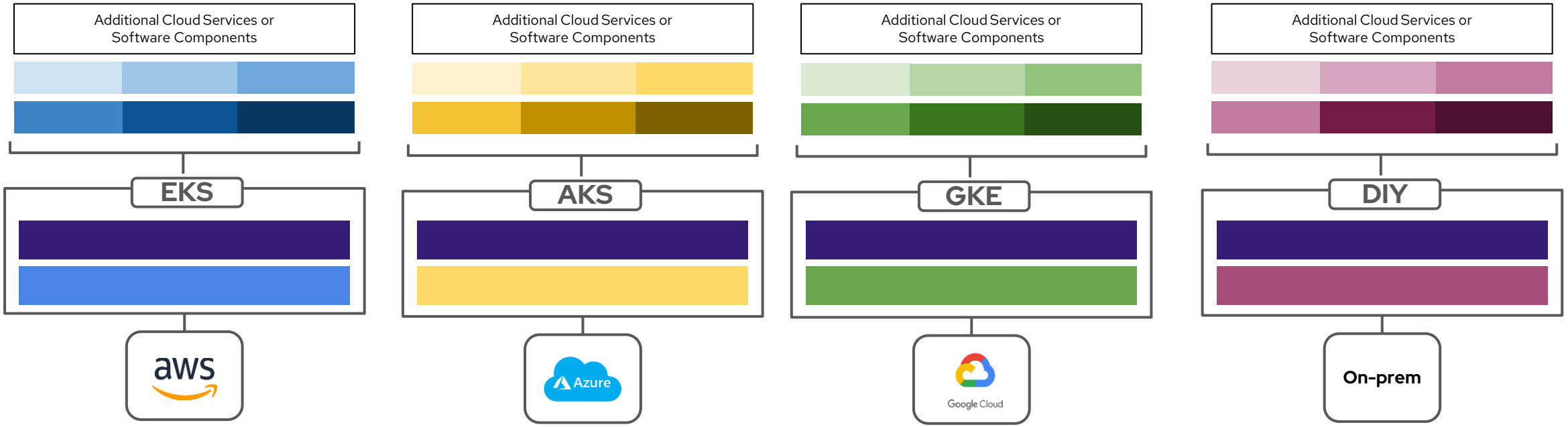
OpenShift Consistency Across the Hybrid Cloud

Versus managing different stacks across each environment



Red Hat

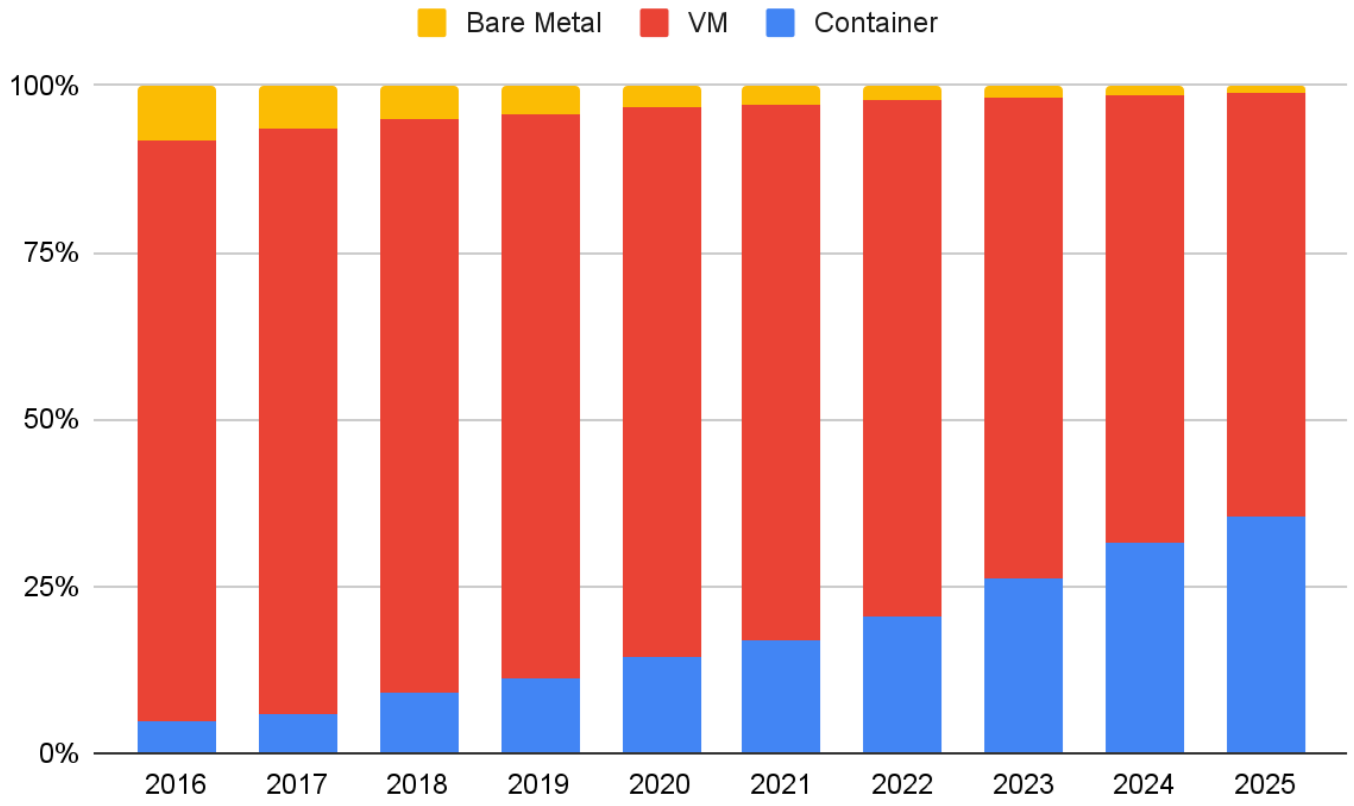
And that's just for one Public cloud...



Red Hat

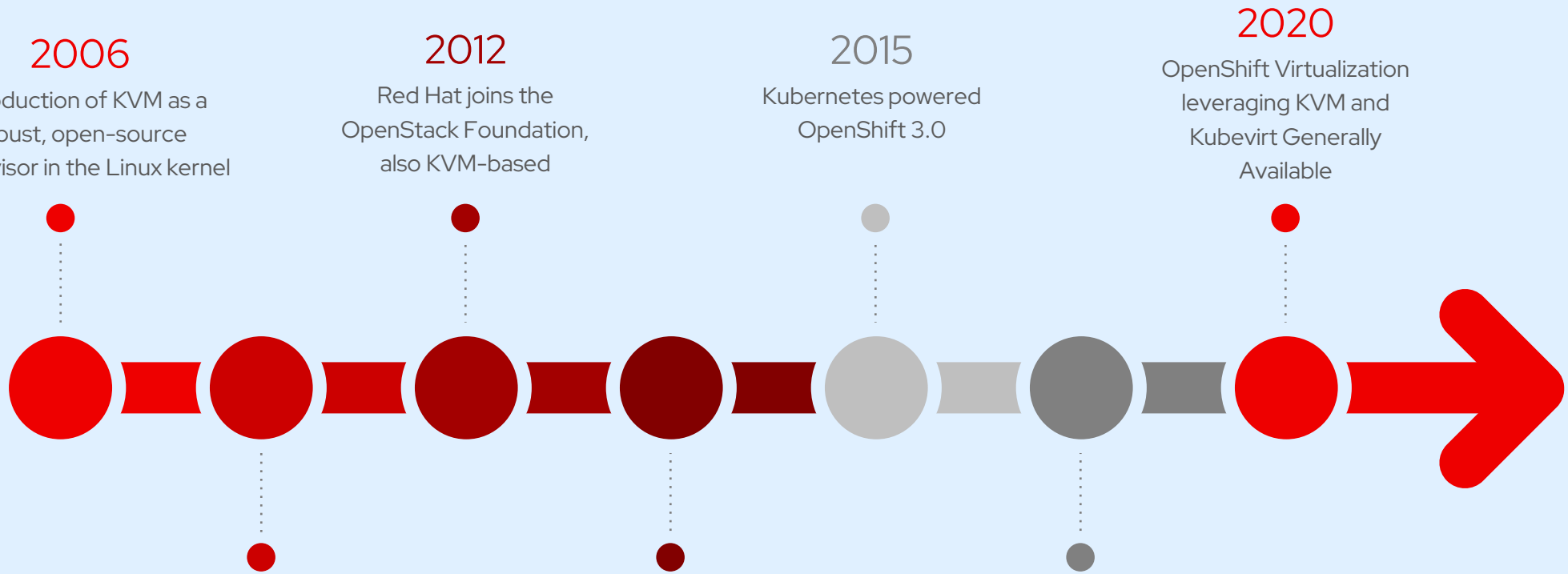
Virtualization is here to stay

But not as we know it today



Source: IDC Container Infrastructure Software Market Assessment: Container Deployment Forecast, 2022–2025 (IDC #US48670722, January 2022)

Red Hat has a long history with Virtualization



Red Hat



KubeVirt

KubeVirt is mature and key

200+ Contributing companies

60 Releases

Top 10 CNCF active projects

50% increase in Contributing companies in CY23

Source:
https://www.cncf.io/blog/2022/04/19/kubevirt-becomes-a-cncf-incubating-project/
https://www.cncf.io/reports/cncf-annual-report-2022/
https://all.devstats.cncf.io/d/1/activity-repository-groups?orgId=1&var-period=y&var-repogroups=All&from=1438380000000&to=1659391199000

Red Hat

Proven performance and scale with KubeVirt

NVIDIA GEFORCE NOW™



28 million
Users

1500+
Games

100+
Countries

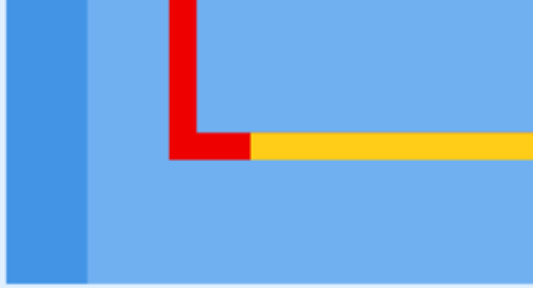
30+
Data centers

Source:
Powering GeForce NOW with KubeVirt, from OpenShift Commons Gathering, Amsterdam 2023

Red Hat

Red Hat OpenShift Virtualization

The modern option for general purpose virtualization



Linux VMs	Windows VMs	Migration Tools

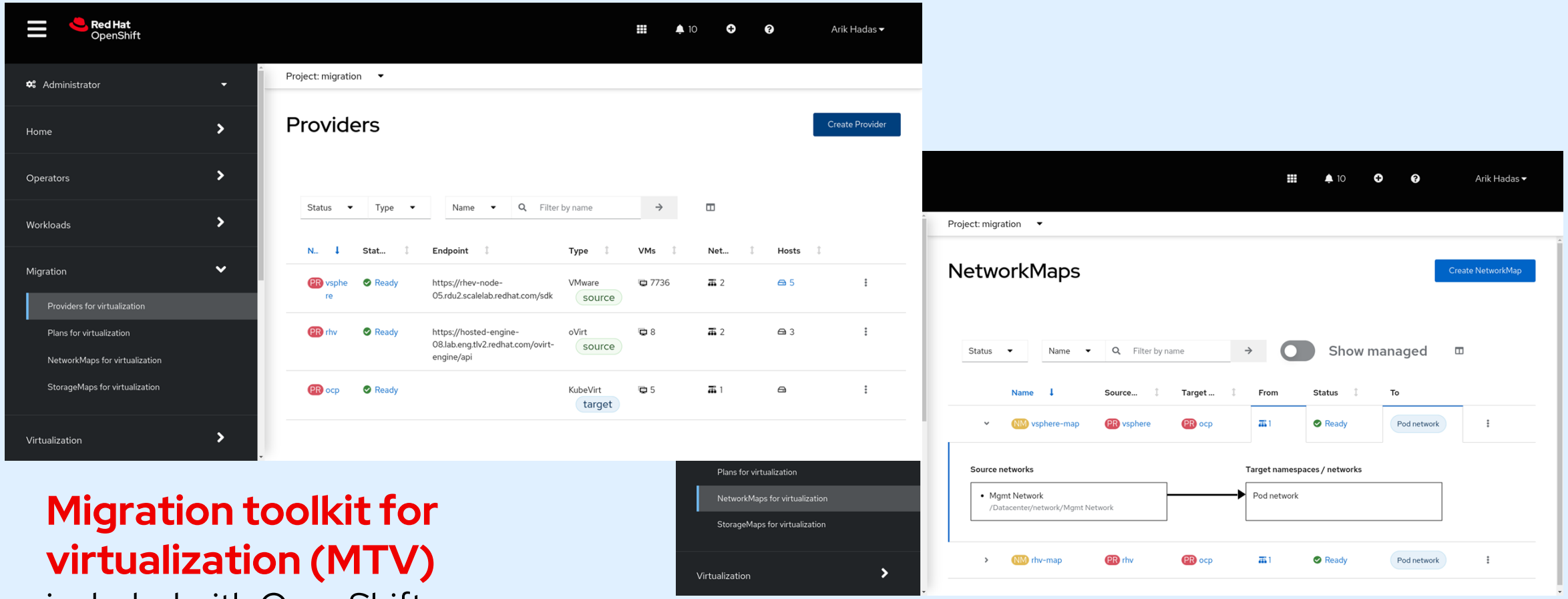
Unified management	Consistent operations	Performance Stability	Robust open source community	Diverse partner ecosystem

Unified platform for virtual machines and containers

Open Hybrid Cloud Platform

Red Hat

Migrating VM-based applications with minimal disruption



Migration toolkit for virtualization (MTV)
included with OpenShift

Red Hat

Use your existing ISV Partners

Storage

Products for OpenShift Virt using CSI (container storage interface)

- HITACHI Inspire the Next
- portworx by Pure Storage
- DELL Technologies
- Red Hat OpenShift Data Foundation
- Hewlett Packard Enterprise
- NetApp
- IBM

Backup/DR

Products for OpenShift

- storware BACKUP AND RECOVERY
- veeam
- portworx by Pure Storage
- TRILIOVAULT
- IBM
- VERITAS

Networking

Products for OpenShift Virt using CNI (container networking interface)

- ISOVALENT
- TIGERA
- CISCO
- f5

Cloud Services

Current public cloud providers offering OpenShift virtualization

- aws

Compute

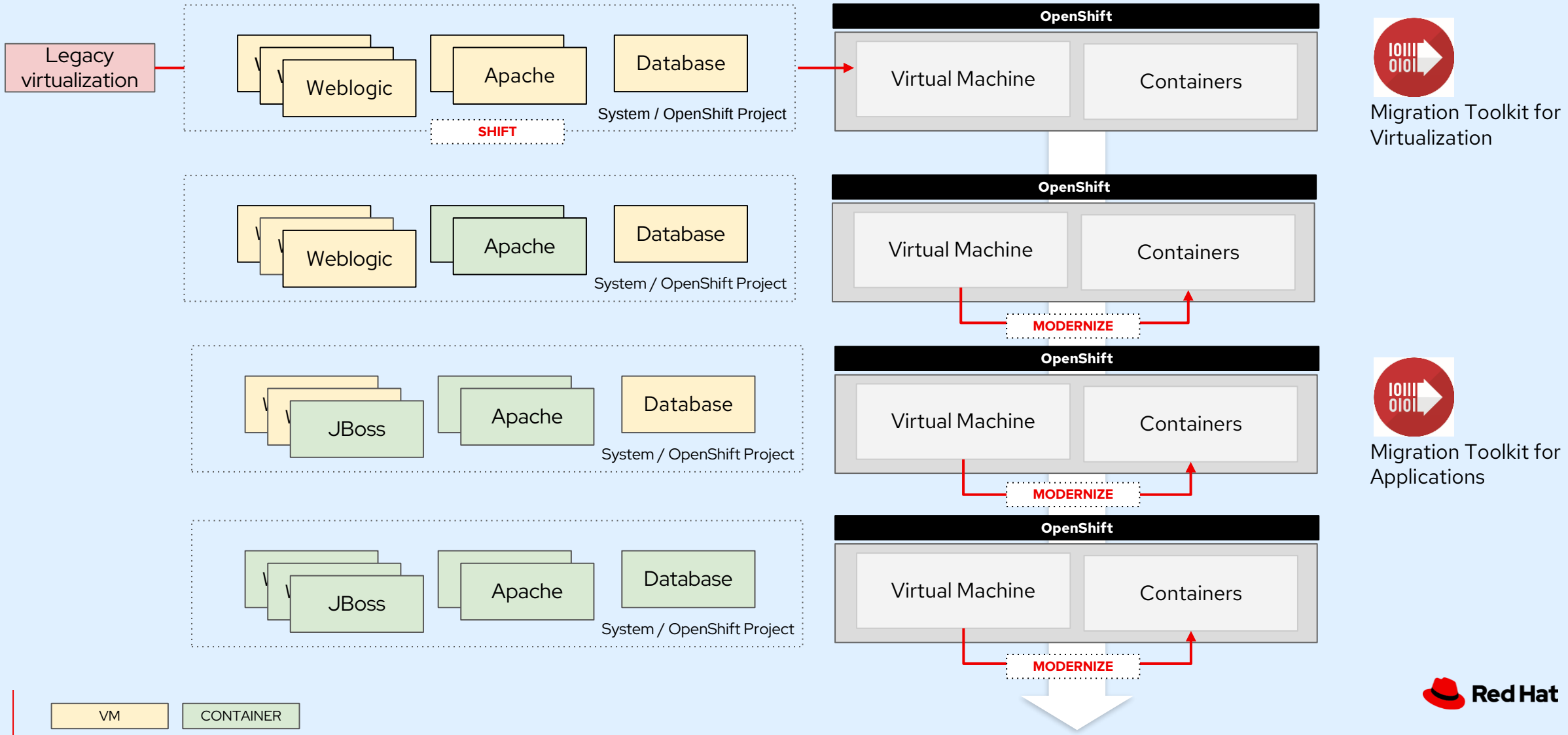
Current on prem providers offering OpenShift virtualization

- IBM
- Hewlett Packard Enterprise
- DELL Technologies
- Lenovo
- CISCO

Red Hat

* This is not an exhaustive list of ISV partners, with new partners being added all the time.

Modernize at your own pace



The Cloud-Native Way

A matter of minutes

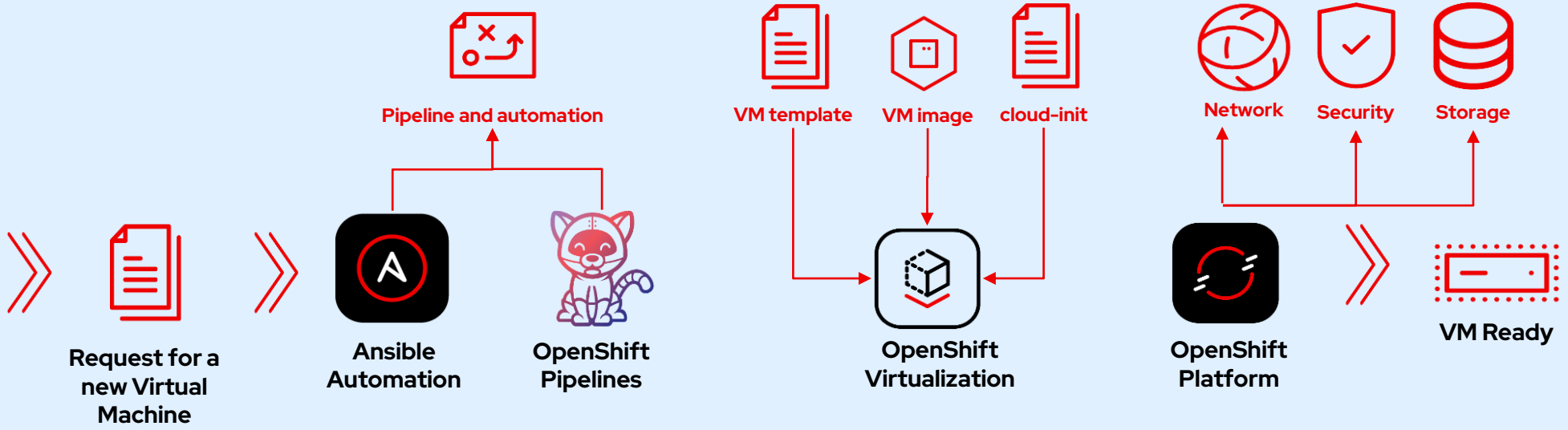
Virtual Machine
- CPU: 4 vCPU, 1 core
- Memory: 16GB
- Disk: 30 GB
- OS: RHEL

Additional filesystems
- data: 500GB, disk
- logs: 100GB, partition

Application platform
- JBoss 7.4 Update 11

Firewall rules
- Ingress: SSH, HTTPS
- Egress: *.redhat.com

DNS & LB
- api.service.org
- Healthcheck: HTTPS port



Automate VM image builds & updates

Automatically deploy VMs from code (Git repos)

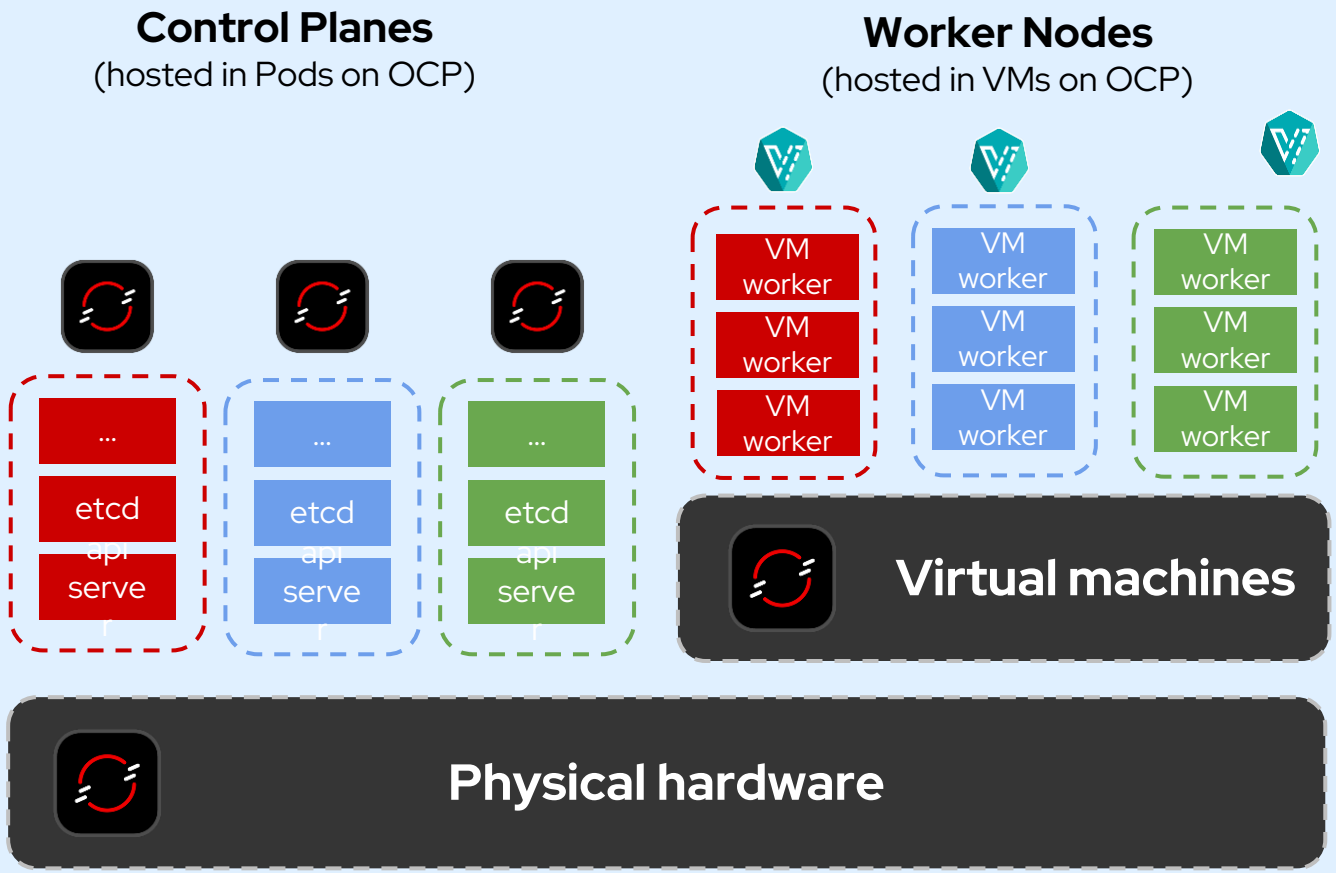
Manage networks, storage, load balancers, etc.

Red Hat

Use OpenShift Virtualization to consolidate your OpenShift clusters

Increase utilization of infrastructure

Reduce dependency on legacy virtualization



Red Hat

Runtime -> Development -> Enterprise Hybrid Cloud Platform

Red Hat OpenShift Kubernetes Engine

Essential enterprise Kubernetes Infrastructure

Includes:

- Enterprise Kubernetes runtime
- Red Hat Enterprise Linux CoreOS immutable container OS
- Administrator console
- OpenShift Virtualization

Red Hat OpenShift Container Platform

Opinionated application development platform

Adds:

- Developer console
- Log management and metering/cost management
- Red Hat OpenShift Serverless (Knative)
- Red Hat OpenShift Service Mesh (Istio)
- Red Hat OpenShift Pipelines & Red Hat OpenShift Gitops (Tekton, ArgoCD)

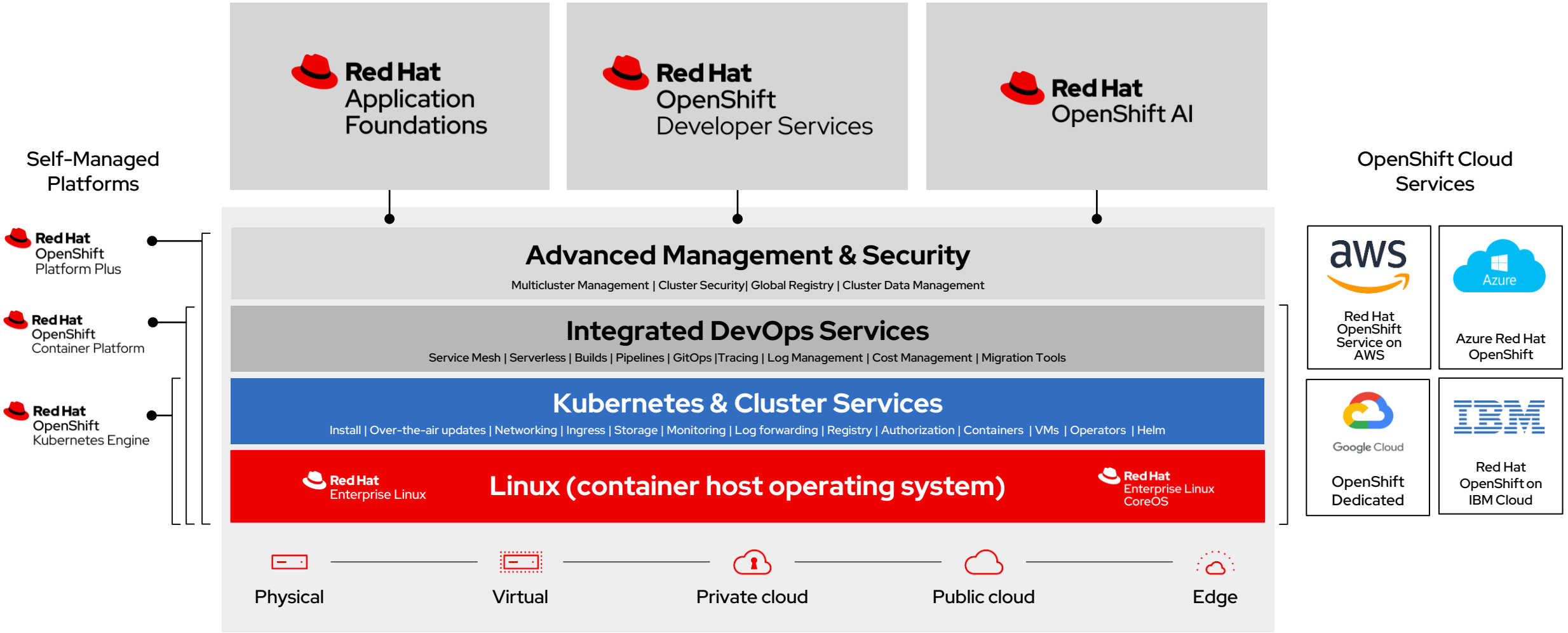
Red Hat OpenShift Platform Plus

Manageability and consistency across hybrid and multi cloud with advanced security for DevSecOps

Adds:

- Red Hat Advanced Cluster Management for Kubernetes
- Red Hat Advanced Cluster Security for Kubernetes
- Red Hat OpenShift Data Foundation Essentials
- Red Hat Quay

The OpenShift Developer Experience



Red Hat

Red Hat Application Foundations

- Application servers
- Data integration and transformation
- Runtimes and frameworks
- Single sign-on
- API management
- Migration toolkits
- Enterprise integration
- In Memory Cache
- Service composition
- Real-time messaging and event streaming

A comprehensive set of components to **modernize** and **accelerate** application development

Red Hat Application Foundations is engineered to help build, deploy, and manage applications seamlessly across hybrid cloud environments

Red Hat

Red Hat OpenShift Developer Services

IDP: Internal Developer Portal

Red Hat Developer Hub

Kube Developer Desktop Experience : **Podman Desktop**

Migration Services

Red Hat Migration Services

IDE Tools

Red Hat IDE Plugins

Red Hat Dev Spaces

Trusted Software Supply Chain

Red Hat Trusted Application Pipeline

Red Hat Trusted Artifact Signer

Red Hat Trusted Profile Analyzer

Application Networking Services

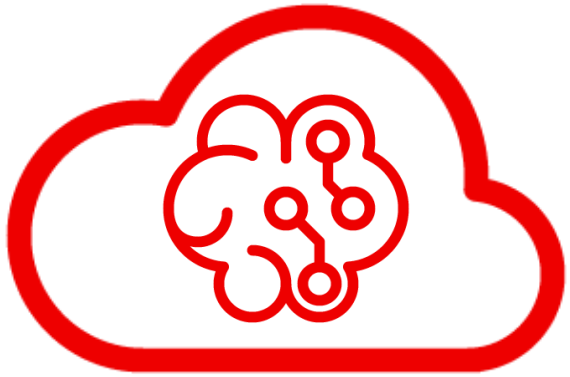
Red Hat Service Interconnect

Products that allow developers to **quickly and securely deliver applications to production**

Enabling platform engineers to more easily enforce operational controls and compliance across hybrid multi-cloud environments

Red Hat

Red Hat OpenShift AI



Train, serve, monitor and manage the lifecycle of AI/ML models and applications, from experiments to production

Red Hat OpenShift AI builds and expands upon the proven capabilities of Red Hat OpenShift to:

- Provide a unified platform for data scientists and intelligent application developers.
- Scale to handle workload demands of foundation models (volume of data, duration of training run, size of model, acceleration required, and scalability).
- Deliver consistency, ease-of-use, and cloud-to-edge deployment options.
- Power generative AI services for IBM watsonx.ai and Red Hat Ansible Lightspeed with Watson Code Assistant

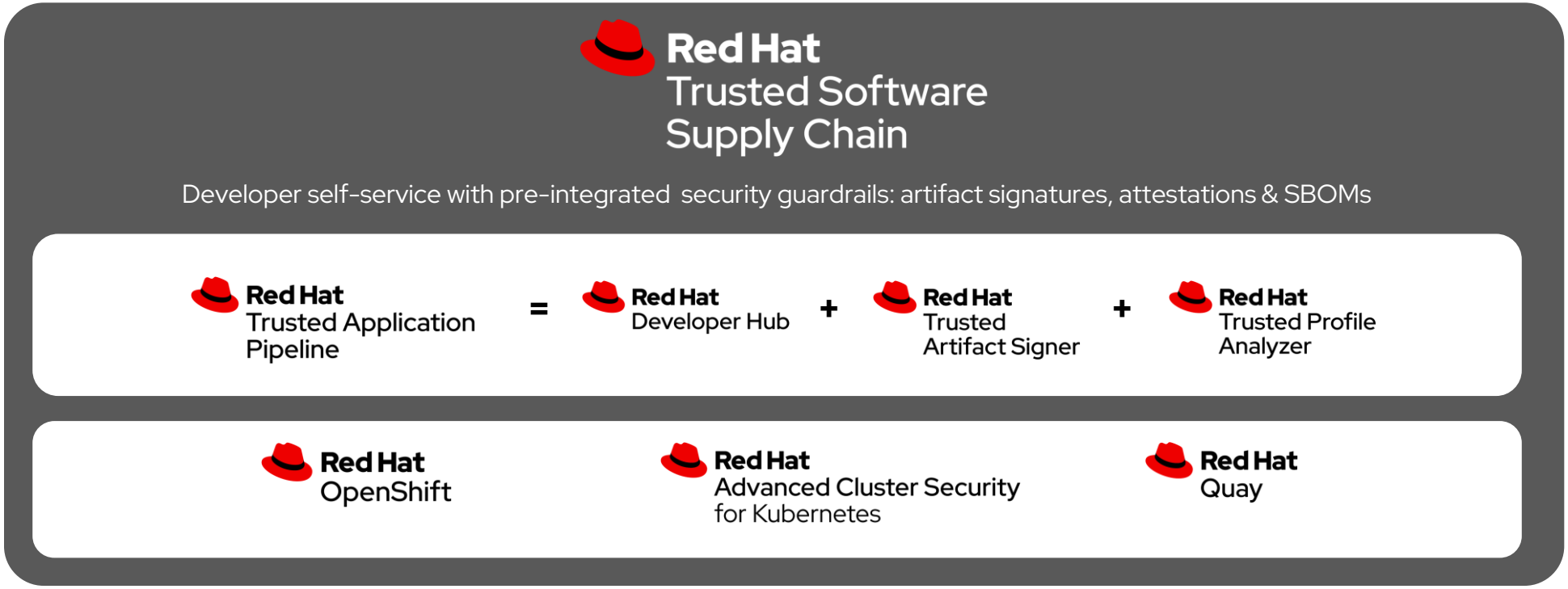
Red Hat OpenShift

Red Hat OpenShift AI

CONFIDENTIAL Red Hat associate and NDA
partner use only, No further distribution

Red Hat Trusted Software Supply Chain

Shift Left Security early in the Software Supply Chain



*Red Hat Trusted Application Pipeline is a single product SKU.
Includes Red Hat Developer Hub, Red Hat Trusted Artifact Signer, Red Hat Trusted Profile Analyzer capabilities with its own installer

Platform Engineering



Gartner named Platform Engineering as one of the top 10 strategic technology trends for 2023 and predicts that by 2025, **75% of organizations** with platform teams will provide **self-service developer portals** to improve developer experience, accelerate product innovation and reduce risk.

Source: Gartner

What is Developer Hub?

Developer Hub Benefits

Backstage Benefits

Single Pane of Glass

Software catalog provides developer teams with a centralized self-managed location

OpenShift Integrated

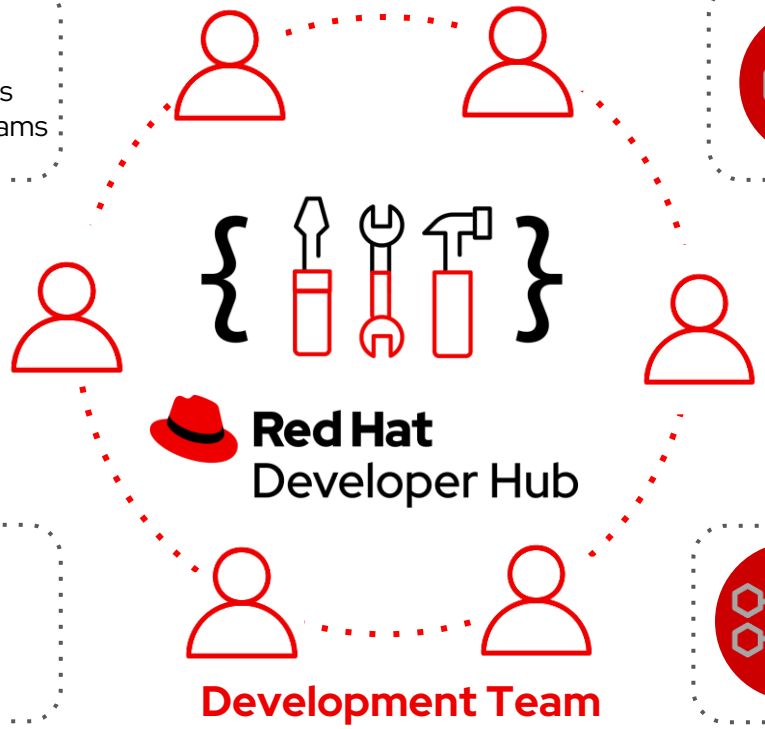
Integrated with our our certified Pipelines and Gitops plugins to accelerate your teams

Supported

Red Hat professionals can assist to help your
team's success and ensure business continuity.

Simplified onboarding

New members in the organization to quickly initiate new projects



Self-service

Developer workflows run smoothly by providing the right tools, validated environments and services

Enterprise RBAC

Simplify the rollout and adoption of Backstage within their environment organization.

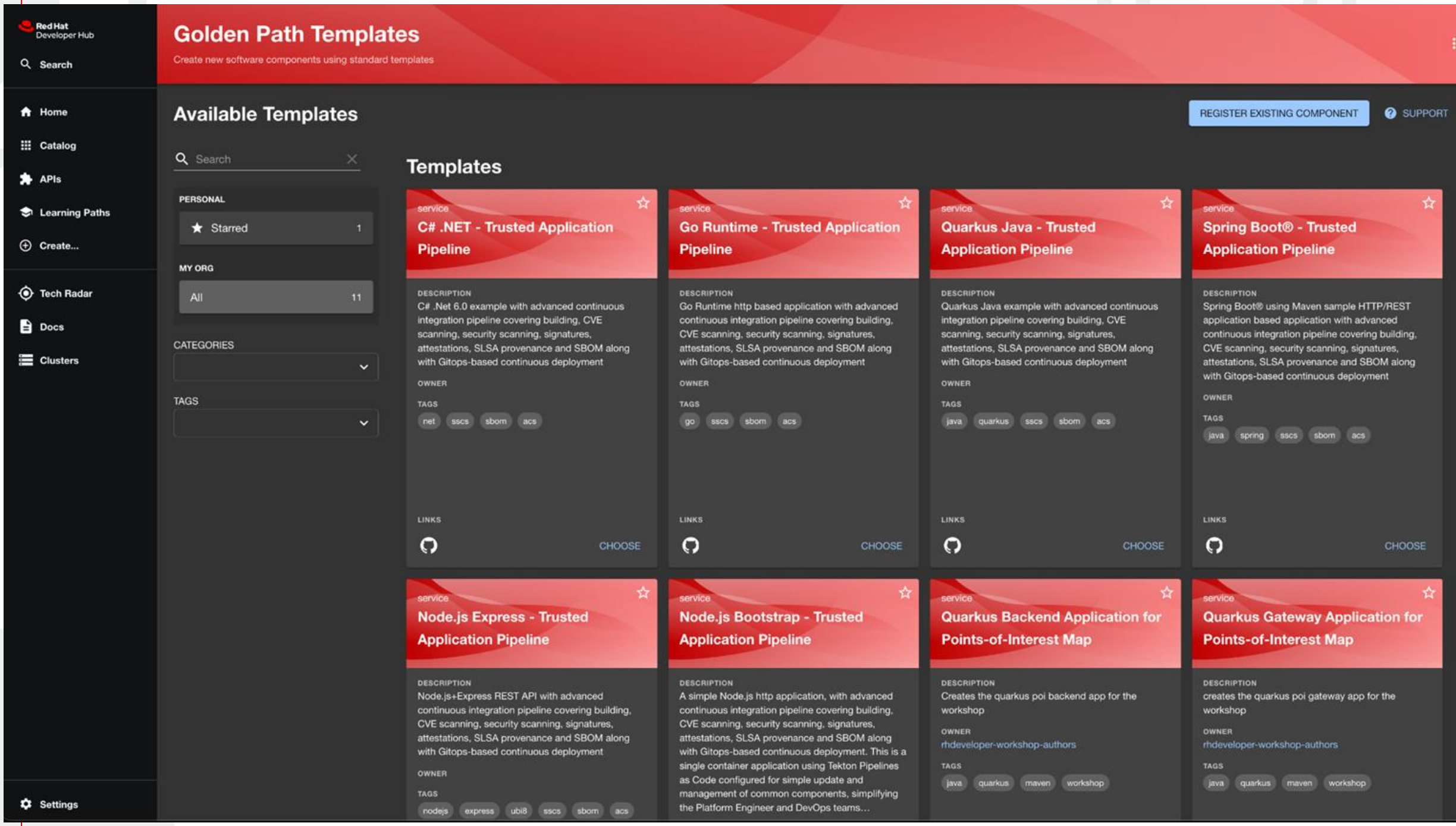
Dynamic Plugins

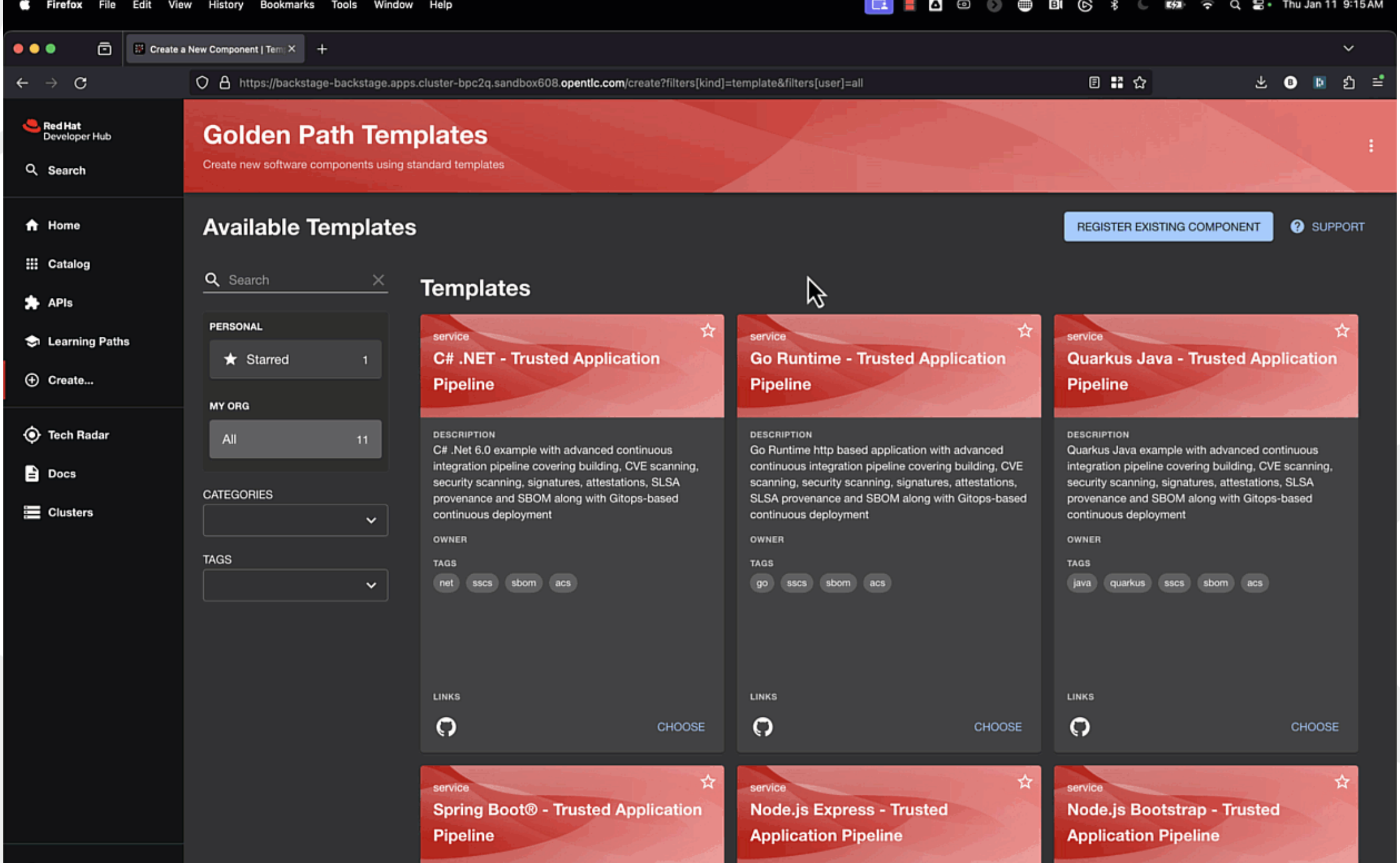
Install, update, and remove plugins anytime without requiring a rebuild or significant downtime

Extensible

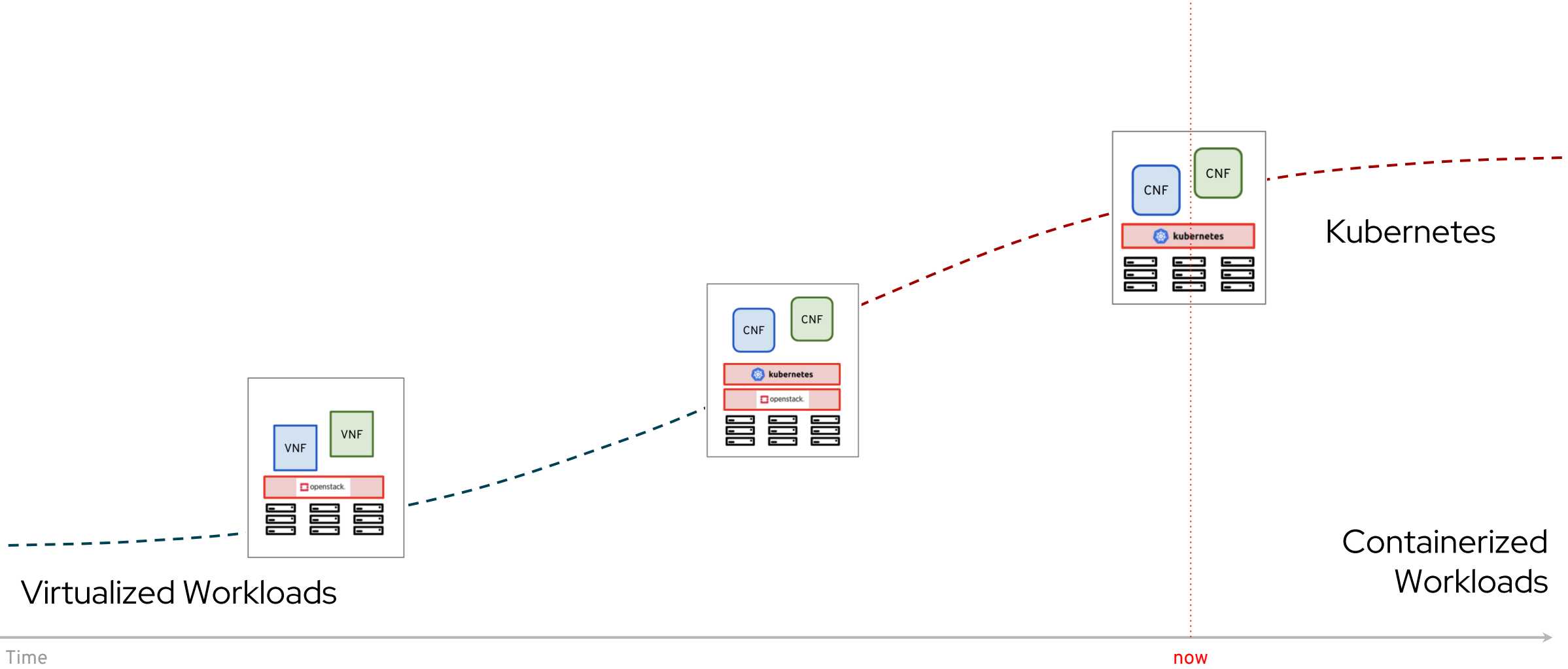
Allows the development team to customize and extend through an ecosystem of plug-ins

Red Hat


Red Hat Developer Hub
Search
Home
Catalog
APIs
Learning Paths
Create...
Tech Radar
Docs
Clusters
Settings
Golden Path Templates
Create new software components using standard templates
Available Templates
REGISTER EXISTING COMPONENT
SUPPORT
Search
PERSONAL
Starred 1
MY ORG
All 11
CATEGORIES
TAGS
Templates
service
C# .NET - Trusted Application Pipeline
DESCRIPTION
C# .Net 6.0 example with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
net sscs sbom acs
LINKS
CHOOSE
service
Go Runtime - Trusted Application Pipeline
DESCRIPTION
Go Runtime http based application with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
go sscs sbom acs
LINKS
CHOOSE
service
Quarkus Java - Trusted Application Pipeline
DESCRIPTION
Quarkus Java example with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
java quarkus sscs sbom acs
LINKS
CHOOSE
service
Spring Boot® - Trusted Application Pipeline
DESCRIPTION
Spring Boot® using Maven sample HTTP/REST application based application with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
java spring sscs sbom acs
LINKS
CHOOSE
service
Node.js Express - Trusted Application Pipeline
DESCRIPTION
Node.js+Express REST API with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
nodejs express ubi8 sscs sbom acs
service
Node.js Bootstrap - Trusted Application Pipeline
DESCRIPTION
A simple Node.js http application, with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment. This is a single container application using Tekton Pipelines as Code configured for simple update and management of common components, simplifying the Platform Engineer and DevOps teams...
service
Quarkus Backend Application for Points-of-Interest Map
DESCRIPTION
Creates the quarkus poi backend app for the workshop
OWNER
rhdeveloper-workshop-authors
TAGS
java quarkus maven workshop
service
Quarkus Gateway Application for Points-of-Interest Map
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java quarkus maven workshop


Firefox File Edit View History Bookmarks Tools Window Help
Thu Jan 11 9:15 AM
Create a New Component | Tem
https://backstage-backstage.apps.cluster-bpc2q.sandbox608.opentlc.com/create?filters[kind]=template&filters[user]=all
Red Hat Developer Hub
Search
Home
Catalog
APIs
Learning Paths
Create...
Tech Radar
Docs
Clusters
Golden Path Templates
Create new software components using standard templates
Available Templates
REGISTER EXISTING COMPONENT
SUPPORT
Search
PERSONAL
Starred 1
MY ORG
All 11
CATEGORIES
TAGS
Templates
service
C# .NET - Trusted Application Pipeline
DESCRIPTION
C# .Net 6.0 example with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
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TAGS
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LINKS
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Go Runtime - Trusted Application Pipeline
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Go Runtime http based application with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
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Quarkus Java - Trusted Application Pipeline
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Quarkus Java example with advanced continuous integration pipeline covering building, CVE scanning, security scanning, signatures, attestations, SLSA provenance and SBOM along with Gitops-based continuous deployment
OWNER
TAGS
java quarkus sscs sbom acs
LINKS
CHOOSE
service
Spring Boot® - Trusted Application Pipeline
service
Node.js Express - Trusted Application Pipeline
service
Node.js Bootstrap - Trusted Application Pipeline

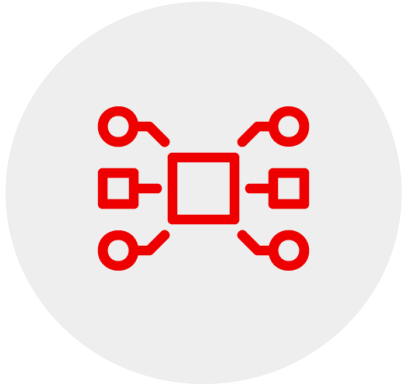
Network Telco Cloud Evolution



Telco Cloud – Evolution Drivers



Service-based
(Microservices)



API

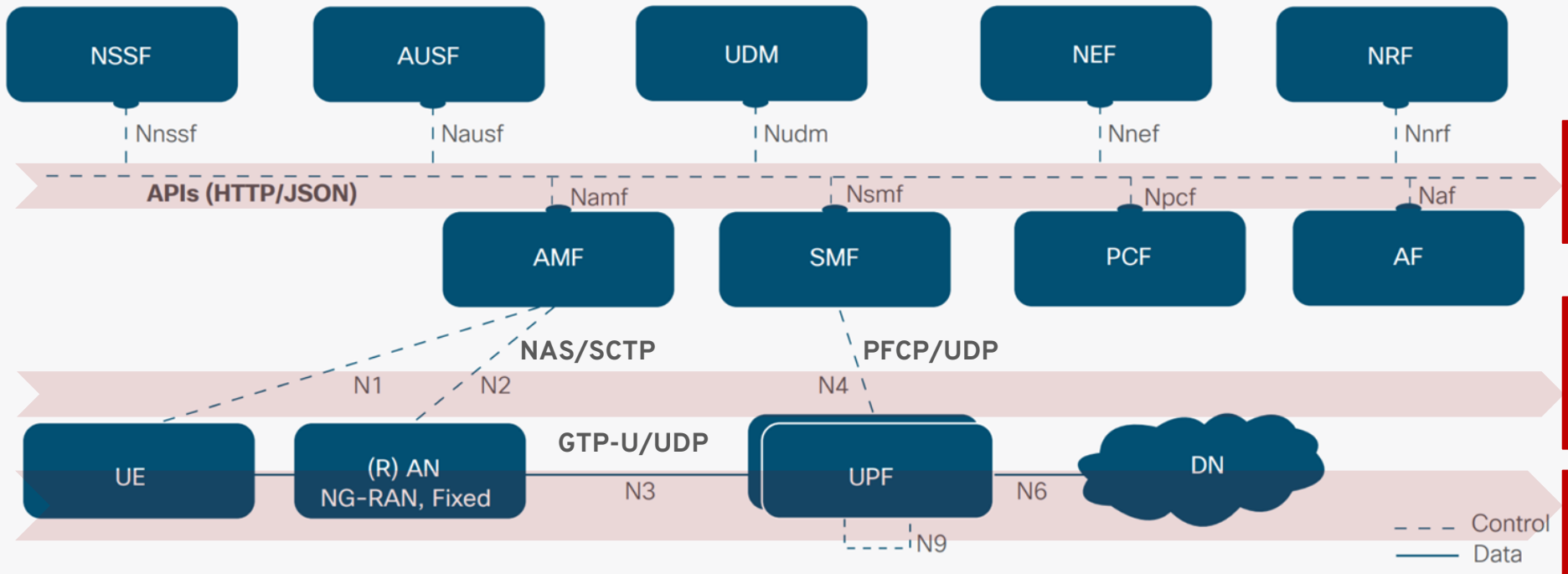


Containers



DevOps

Service Based Architecture (SBA) of 5G Core



AUSF	Authentication Server Function
AMF	Access and Mobility Management Function
AF	Application Function
DN	Data Networks
SMF	Session Management Function
UDM	Unified Data Management

NEF	Network Exposure Function
NSSF	Network Slice Selection Function
NRF	Network Repository Function
PCF	Policy Control Function
UPF	User Plane Function
(R)AN	(Radio) Access Network

Diagram Source

Kubernetes networking (REST): OVN-K, metalLB

Control-Plane networking OVN-K, MAC-VLAN, kernel SR-IOV

Dataplane networking: SR-IOV with DPDK (GTP, SCTP, ...)

Red Hat

Red Hat 5G Platform Enablers



Real-Time, Latency and Sync

- CPU Affinity and Isolation
- **Per-Core Frequency Tuning**
- Topology Management
- Node Feature Discovery
- **Topology Aware Scheduling**
- Time Synchronization - PTP
- **Real-Time Determinism**



Networking

- Acceleration Hardware
- High Performance DataPlanes
- Multiple Networking Interfaces
- High Throughput
- Low latency
- Dual Stack IPv4/IPv6
- **Power/freq reduction based on traffic requirements**



Deployment & Scale

- Multi-Cluster
- **Multi-Cloud**
- **Hosted Control Plane**
- Single node and HA clusters
- Low control plane core count
- Field upgradability
- Zero-touch-provisioning
- **Topology Aware LCM**
- **Node upgrade failure recovery**
- **Cached upgrades**



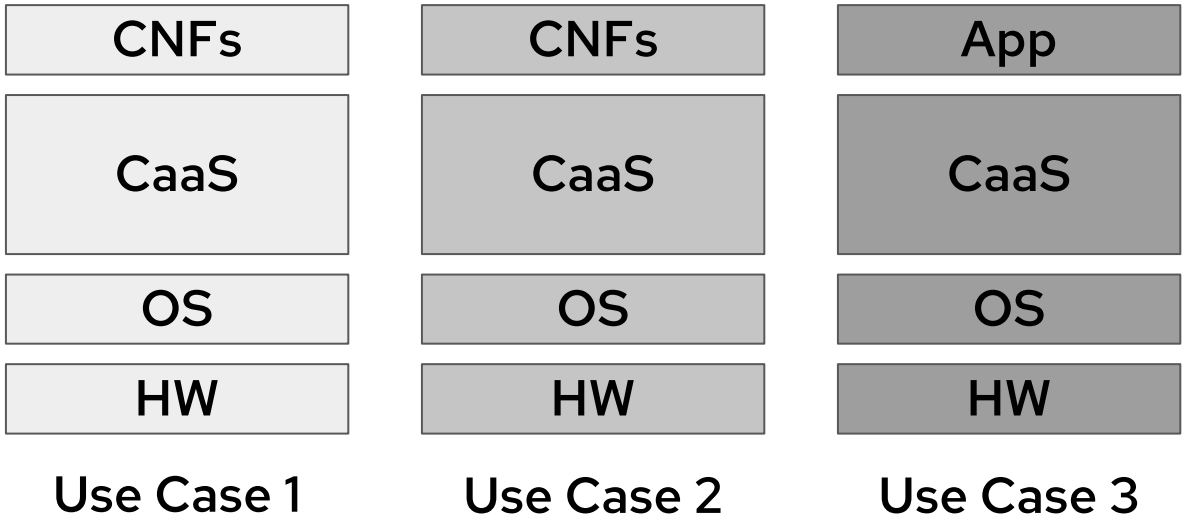
Security

- **Encryption - networking and storage**
- Air-Gap
- SecureBoot
- Signed Images
- Certification Management
- **Immutable OS**
- IPSec
- **SELinux Enforcement**

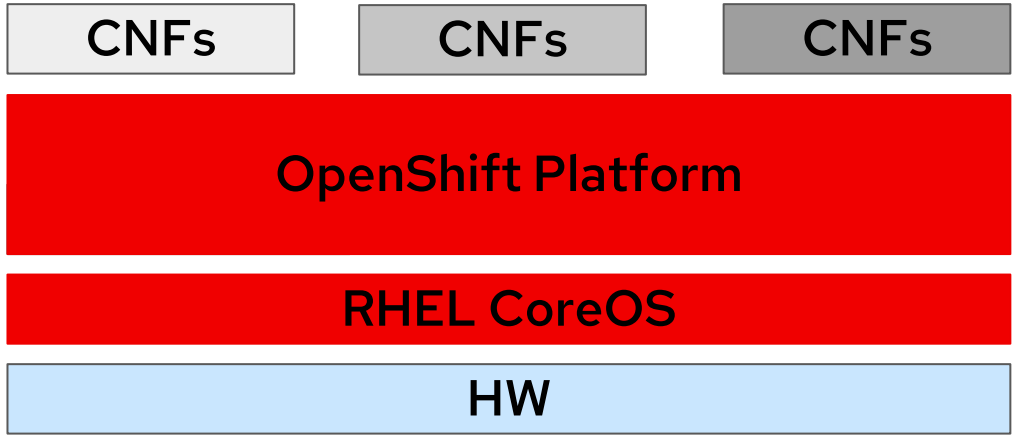
Red Hat

Container Platform Standardization across workloads

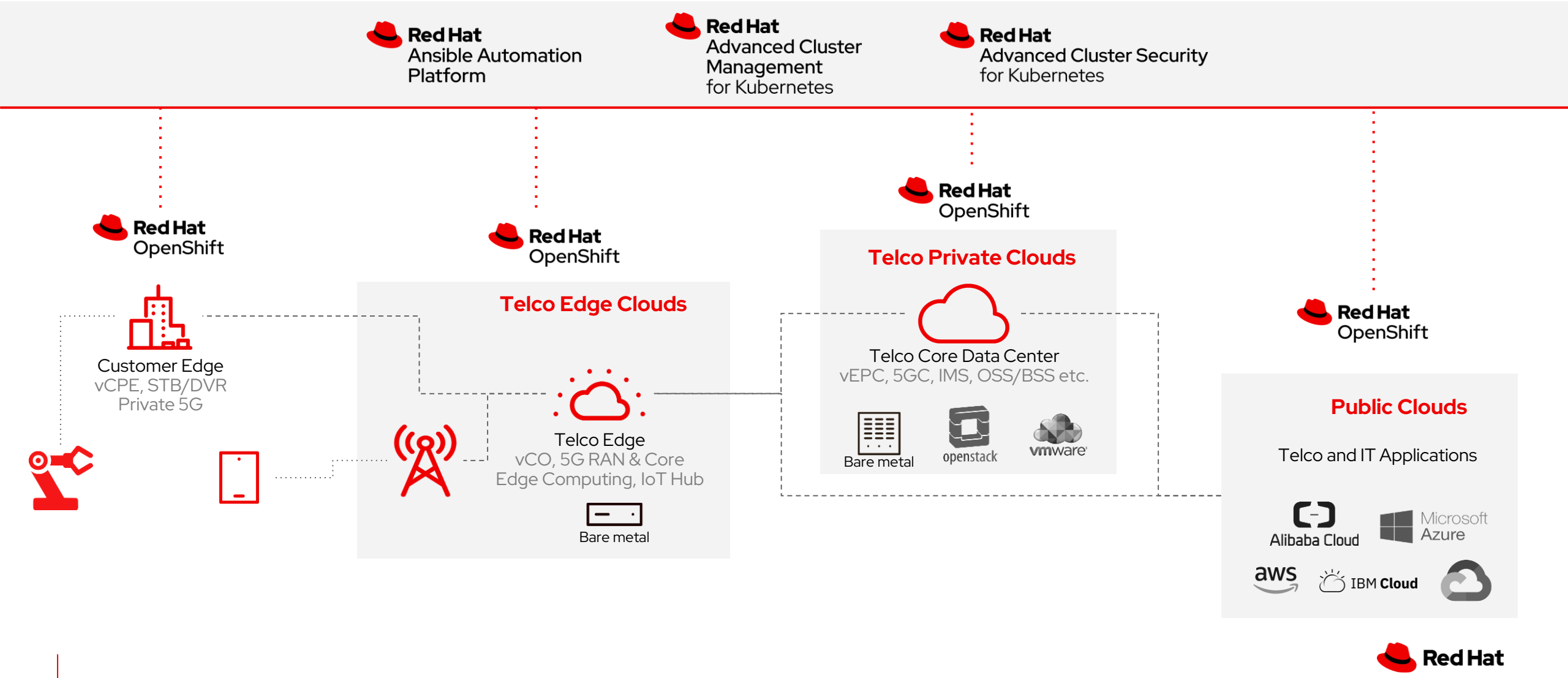
One different stack per use case



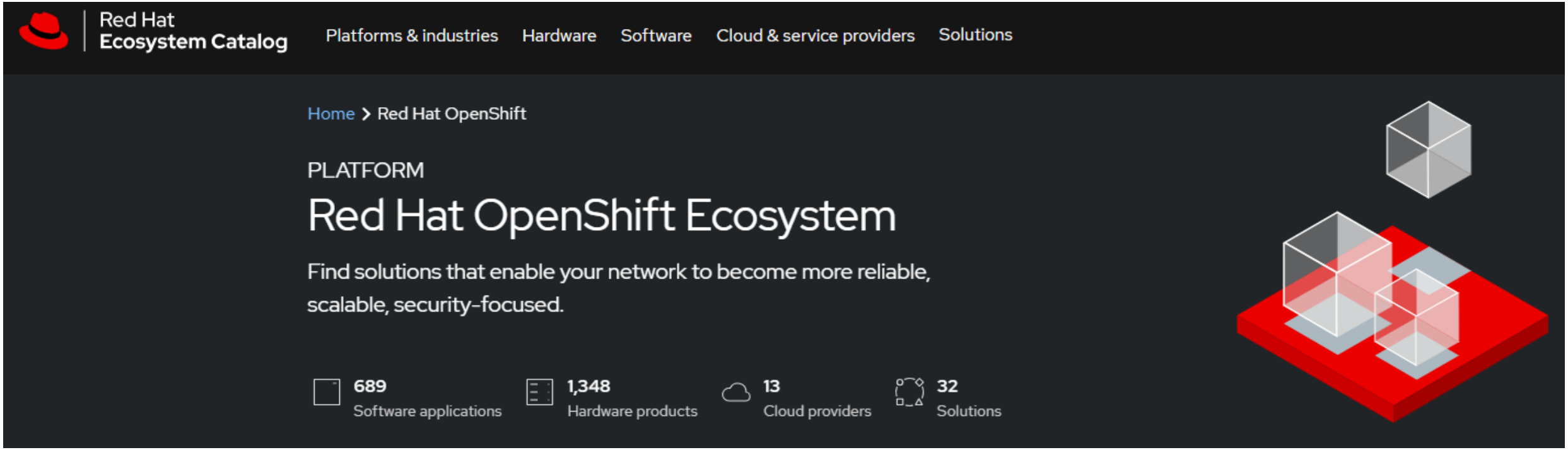
One standard container platform for all use cases



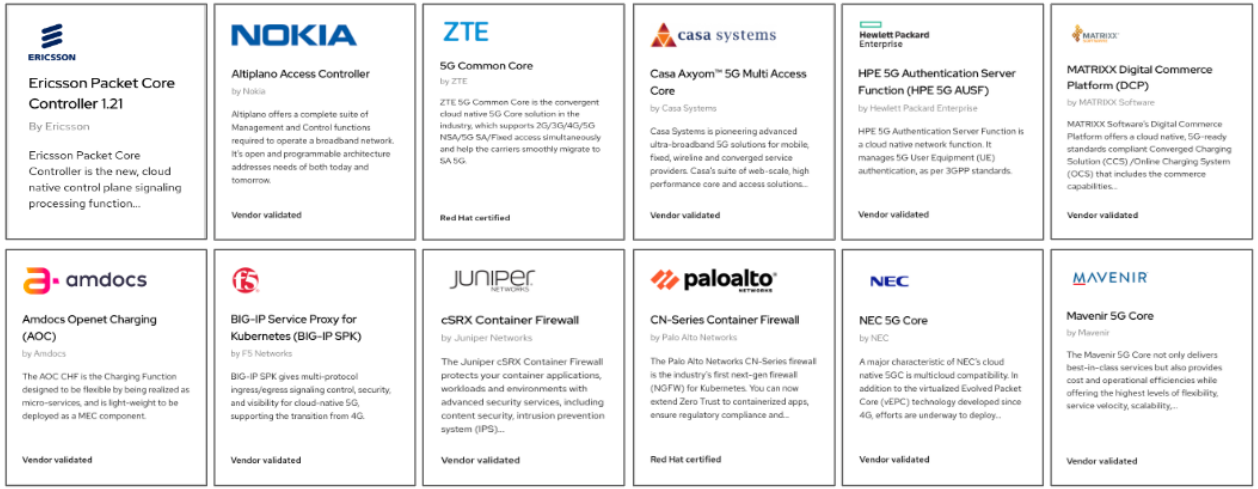
Enabling a uniform telco horizontal cloud



Red Hat CNF Catalog - Validated CNFs for OpenShift



catalog.redhat.com





Red Hat

Red Hat Telco Network Cloud Reference Architecture (TNC RA)

TNC RA is an integrated architecture solution which can host different network workloads (CNF and VNF) from 4G/5G Core to vRAN.
TNC RA aims at **high level of automation and observability of the 5G infrastructure**.

Points of concern addressed by TNC RA:

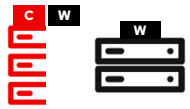
- Centralized multi-cluster management
- Container image and RPM repositories
- Alarm & performance monitoring
- Logging
- Identity management
- Infrastructure automation and zero touch provisioning (ZTP)
- Backup and Restore
- Disaster Recovery

Red Hat Telco Network Cloud Reference Architecture

Management Cluster

- Red Hat Advanced Cluster Management for Kubernetes
- Red Hat Advanced Cluster Security for Kubernetes
- Red Hat Quay
- Red Hat AMQ
- Red Hat Ansible Automation Platform
- Red Hat Satellite
- Red Hat OpenShift Data Foundation
- Red Hat OpenShift

Bare Metal



Workload Cluster (CNF) - 5GC

NSSF	AUSF	UDM	NEF	NRF
UPF	AMF	SMF	AF	PCF

Red Hat OpenShift

Red Hat OpenShift Data Foundation

Bare Metal

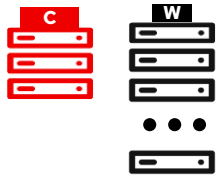
Workload Cluster (VNF) - 4G/EPC/IMS

SGSN	HLR	MSC-S	CSCF	STP
ePDG	AAA	HSS	EIR	PCRF

Red Hat OpenStack Platform

Red Hat Ceph Storage

Bare Metal



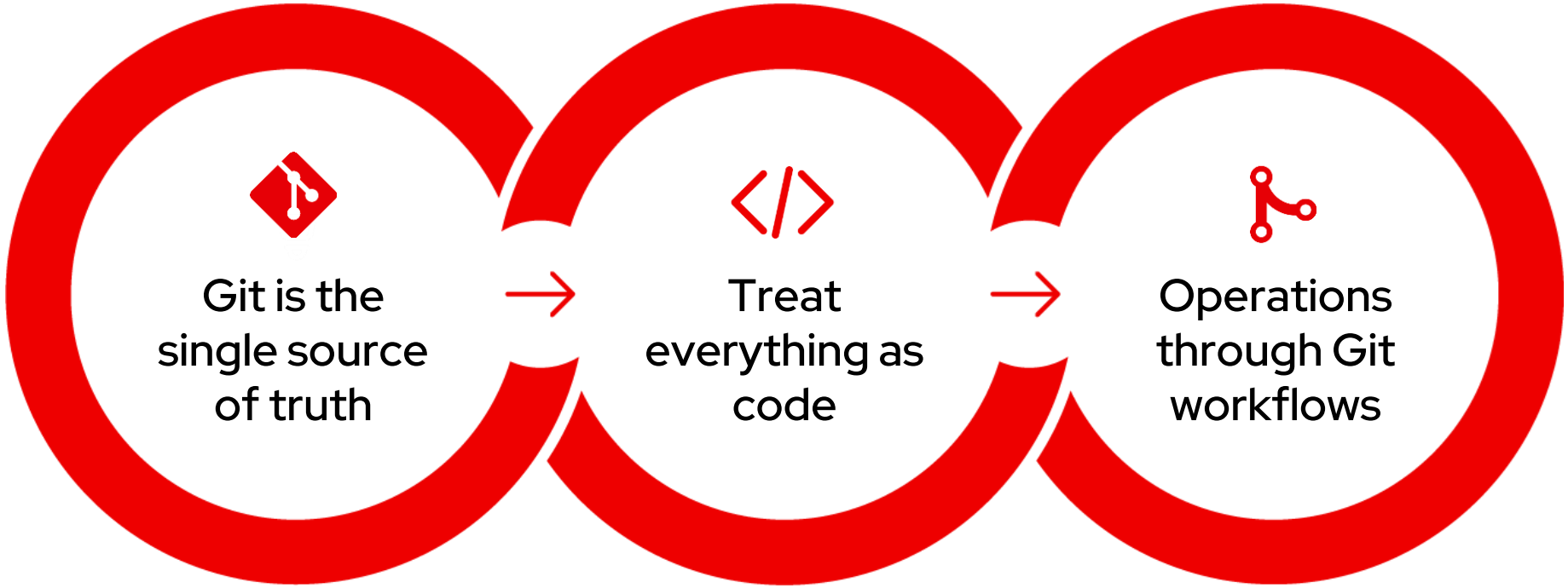
Red Hat

5G Infrastructure Automation

Red Hat

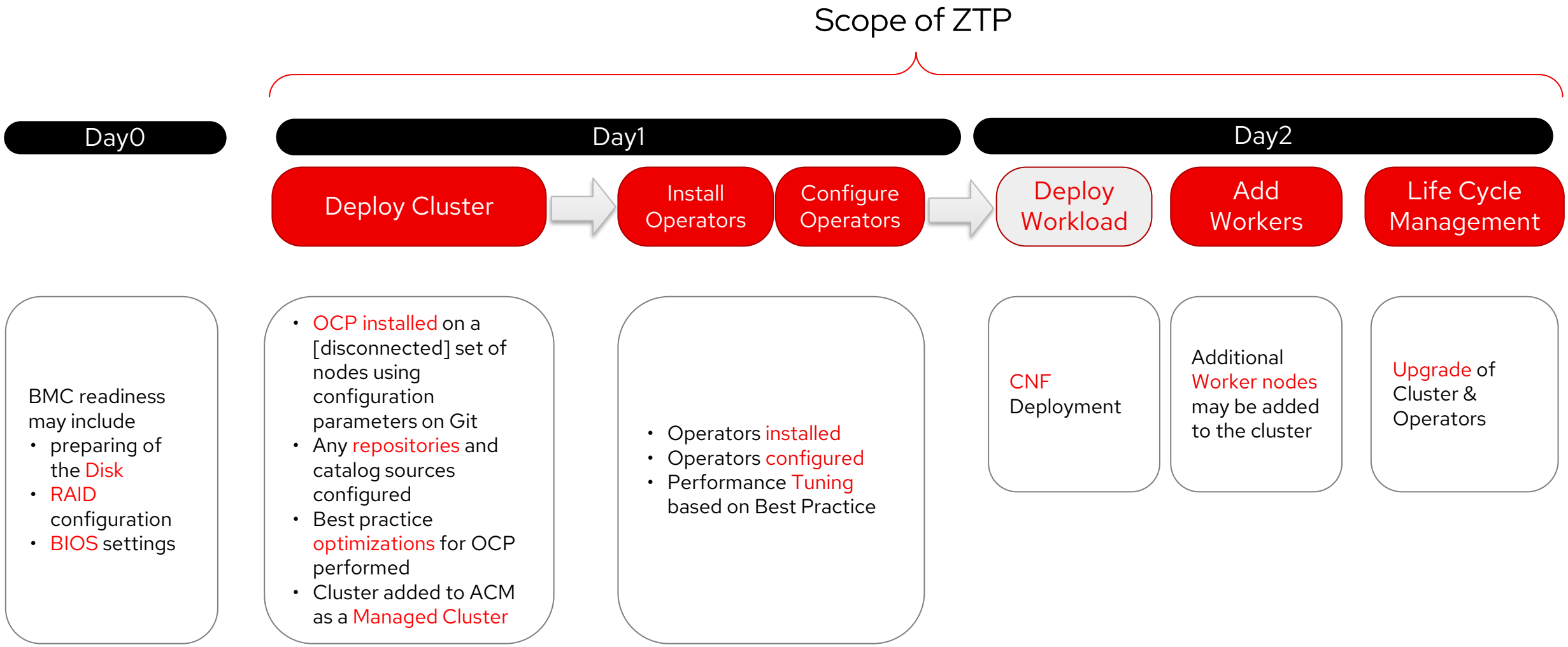
What is GitOps?

A developer-centric approach to Continuous Delivery and infrastructure operation

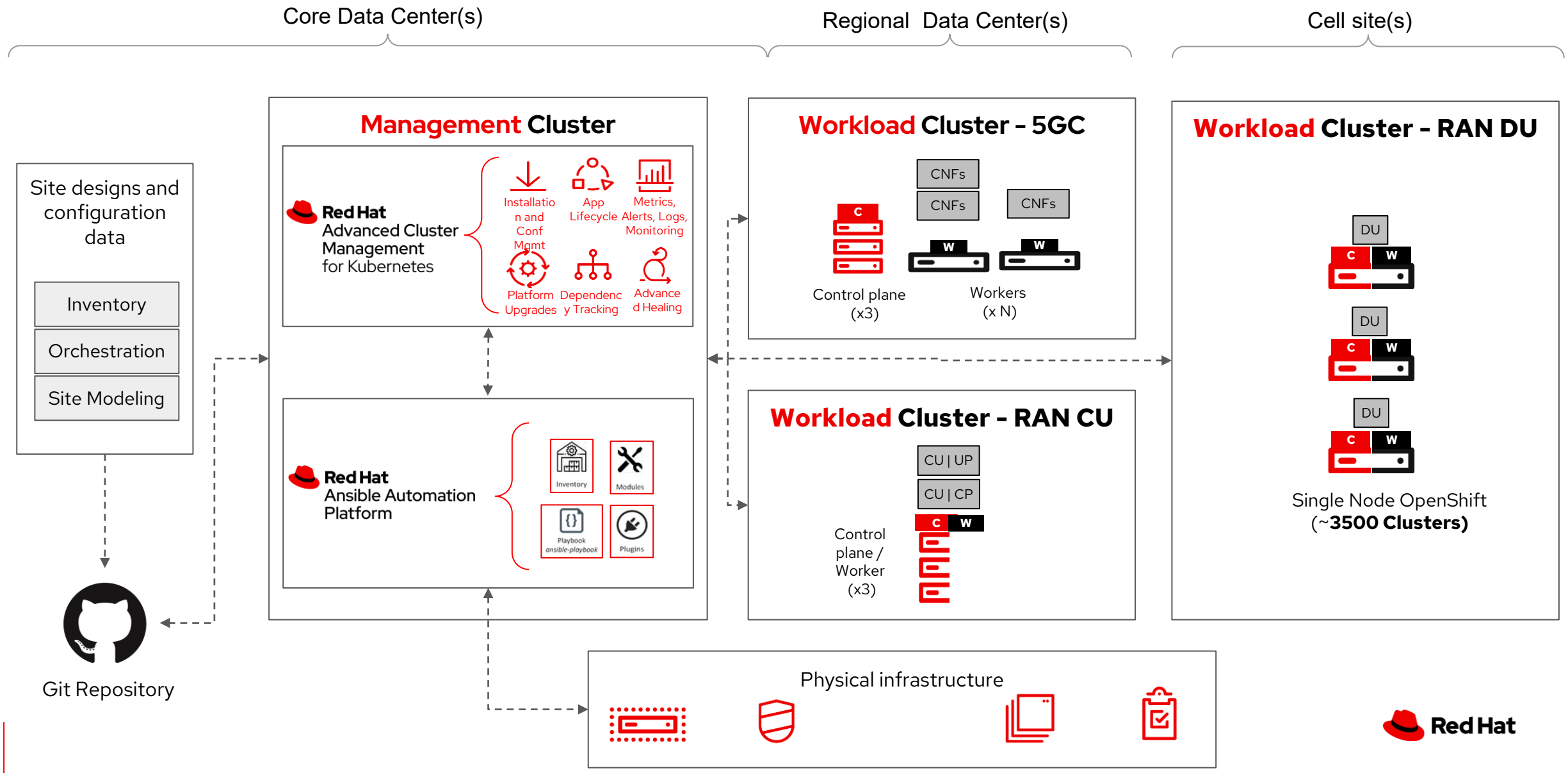


- ✓ Standard workflow
- ✓ Visibility and audit
- ✓ Enhanced security
- ✓ Multi-cluster consistency

Scope and Stages of ZTP (Zero Touch Provisioning)



GitOps - Zero Touch Provisioning and Automation of Workload Clusters

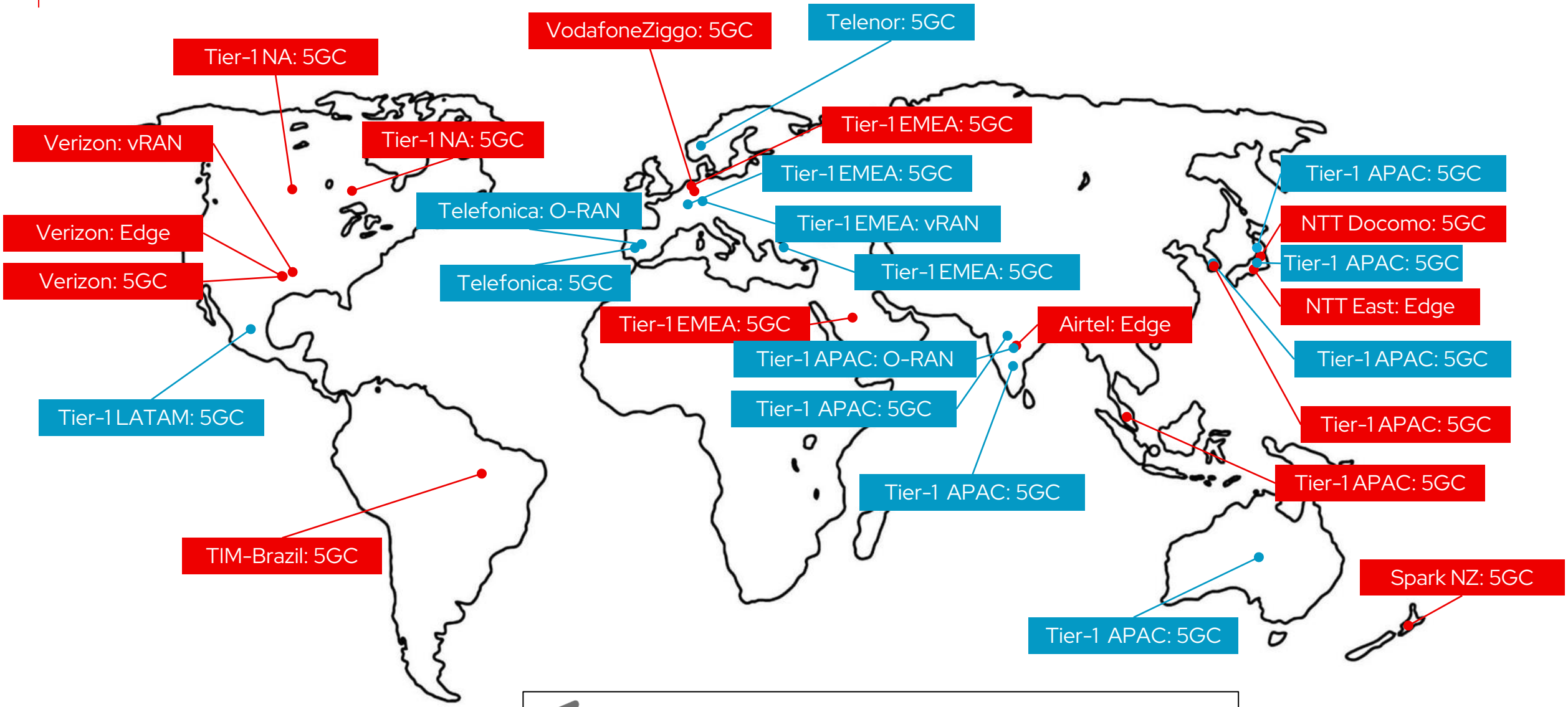


Red Hat is a key player for 5G Core



- **5G Telco Cloud** relies on Containers, where **Red Hat OpenShift** platform is the **world's leader**
- **15+ Worldwide commercial rollouts** based on Red Hat Telco Cloud platform are in place today
- **Top 5G RAN and 5GC vendors integrated** on Red Hat Cloud Platform in 2023

Commercial 5G references based on Red Hat Telco Cloud



ERICSSON NOKIA MAVENIR SAMSUNG NEC ZTE

PoC/Trial Commercial

Red Hat

The Art of the Possible

Telcos & wider Cloud Ecosystem

Deutsche Telekom CEO, Tim Hoettges:

"5G will change CSP roles, allowing them to transform from connectivity enablers to full-fledged partners delivering business solutions meant to take advantage of 5G.
New 5G revenue streams will be reliant on sales generated by solutions jointly developed with clients and partners."

5G solutions MUST be executed at the wireless service provider EDGE to gain 5G performance benefits

- CSPs MUST offer hybrid managed cloud infrastructure and services at their network EDGE
- CSPs MUST attract Enterprise clients & partners to utilize their cloud infrastructure services
  - Red Hat is a pivotal partner to enable this

"From Telcos to Technos"



INDUSTRIAL AUTOMATION



INTELLIGENT HOMES



SMART TRANSPORTATION



PUBLIC SAFETY



SMART AGRICULTURE



SMART CITIES



TELEHEALTH

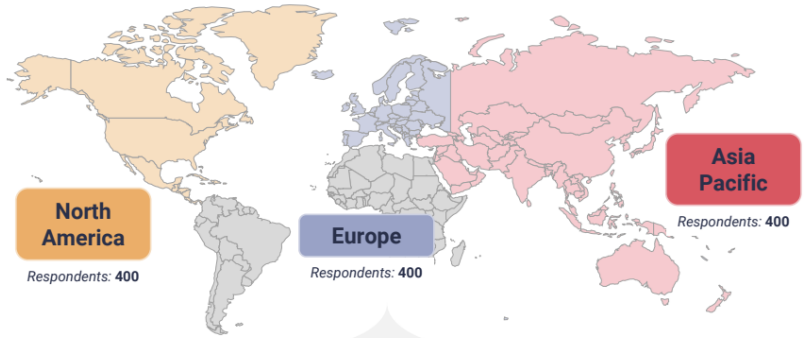


INTELLIGENT GRIDS

What is the Opportunity

for Telcos to become Technos

We conducted a survey with 1,200 enterprise respondents across North America, Europe and Asia Pacific to understand the adoption of cloud ICT services and the role of the CSP.



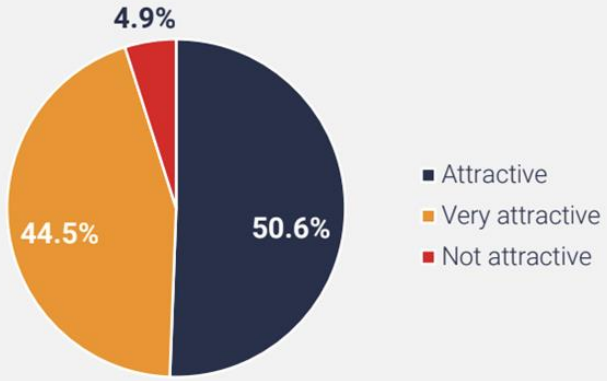
Across four industry verticals

Banking | Retail | Manufacturing | Healthcare

Managed services provide an opportunity for operators to redefine their role as an enabler for cloud transformation

95% of enterprises we surveyed see value in managed services for their organisations' cloud journey

At a general level, how attractive is a proposition of a managed service* for your organisation's cloud capabilities?



Source: STL enterprise survey 2024, n=1200

Through managed services operators can move beyond reselling technologies and create a "stickier" proposition with enterprises

'Telcos are in a good place to build the ecosystem, and managed services are on top of that to help us get closer to customers and facilitating upselling/cross-selling opportunities with them.'

– Global Head of Commercial – Cloud, Tier-1 operator, EMEA

'We aim to provide as much managed services as we can. One of the main triggers on the demand side is the complexity, which is more and more difficult for customers to manage themselves – they are having difficulty getting enough knowledge on board.'

– Vice President, Cloud & Workplace, Tier-2 operator, EMEA

'For us, cloud is managed services around migration – this is the core.'

– Senior Manager, Cloud Products & Services, Tier-1 operator, NAM

**Managed service: Procuring a technology (software, application, networking, infrastructure) and outsourcing the management of that technology to a third party: management includes integration with other systems, issue resolution and service maintenance, upgrading or optimisation.*

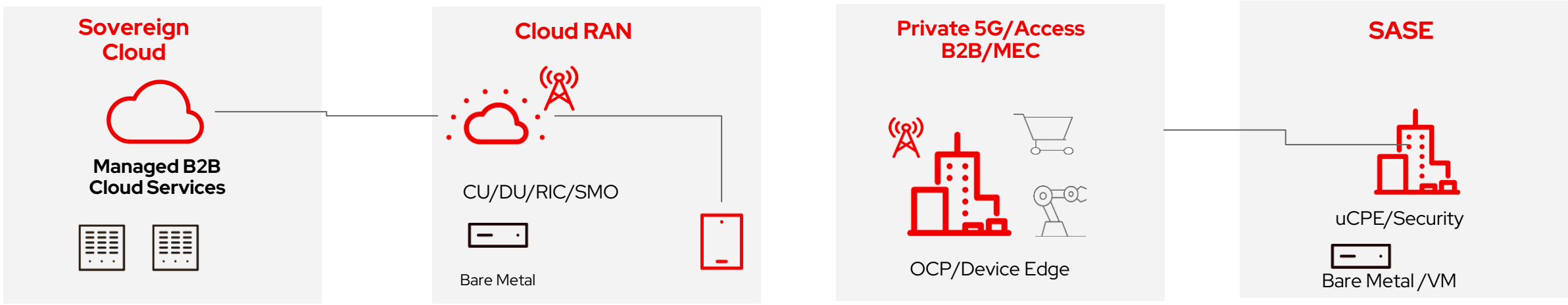
Top 3 Telco Strengths

- **Quality of service** & performance guarantee
- **Trust**worthy from a security / regulatory perspective
- **Reliable** connectivity

STL PARTNERS Red Hat

From Cloud to On-Prem

Consistent OPEN best of breed platform



Red Hat OpenShift AI

Red Hat Ansible Automation Platform

Red Hat OpenShift

Red Hat Advanced Cluster Management for Kubernetes

Red Hat Advanced Cluster Security for Kubernetes

AI Powered Infrastructure

Red Hat

Manage your Cloud Business

with Red Hat

Certified Cloud and Service Provider Program (CCSP)

Program for delivering Red Hat technologies as a hosted, managed and cloud service



Help partners build their business focused on customer needs

- Migrate, modernize and manage apps in a multi-cloud architecture
- Accelerate cloud-native application development



Enable partners to offer managed services using Red Hat technology

- Red Hat Enterprise Linux
- Red Hat OpenShift
- Red Hat Ansible
- Red Hat JBOSS



Provide tools, programs and incentives

- On-demand, flexible pricing
- Management tools
- Free Red Hat Training and Certification
- Premium technical support
- Sales and marketing programs
- Discounts on Red Hat consulting services

Red Hat

Accelerate your Cloud Business

with Red Hat

Cloud partner program opportunities

Provision your own services as a **CCSP partner**

Grow your revenue through AWS, Google Cloud, and Microsoft Azure **marketplaces**

Resell Red Hat **cloud services**, ARO, ROSA, RHOIC and OSD on GCP, and Ansible automation

Execute **sales programs and buying programs**

Sustainable customer and ecosystem growth via cloud partners

Red Hat

Managed Services Engagement

growing market demand

GLOBAL TELECOMS MARKETS (2027)

Cloud RAN	$ 25B (30% CAGR)
Private 5G/Access	$ 21B (50% CAGR)
SASE	$ 4B (25% CAGR)
B2B Edge/MEC	$ 15B (25% CAGR)
Sovereign Cloud	$ 33B (30% CAGR)

orange™ Business Services

kpn

ERICSSON

vodafone

Bell

Rakuten

KDDI

stc

telenor

Telstra

SoftBank

NTT

etisalat by e&

BT

Singtel

Red Hat

Modernize your cloud approach

90% of service providers say it is critical or very important to have a consistent experience – including their operating environment and management – across cloud platforms.[7]

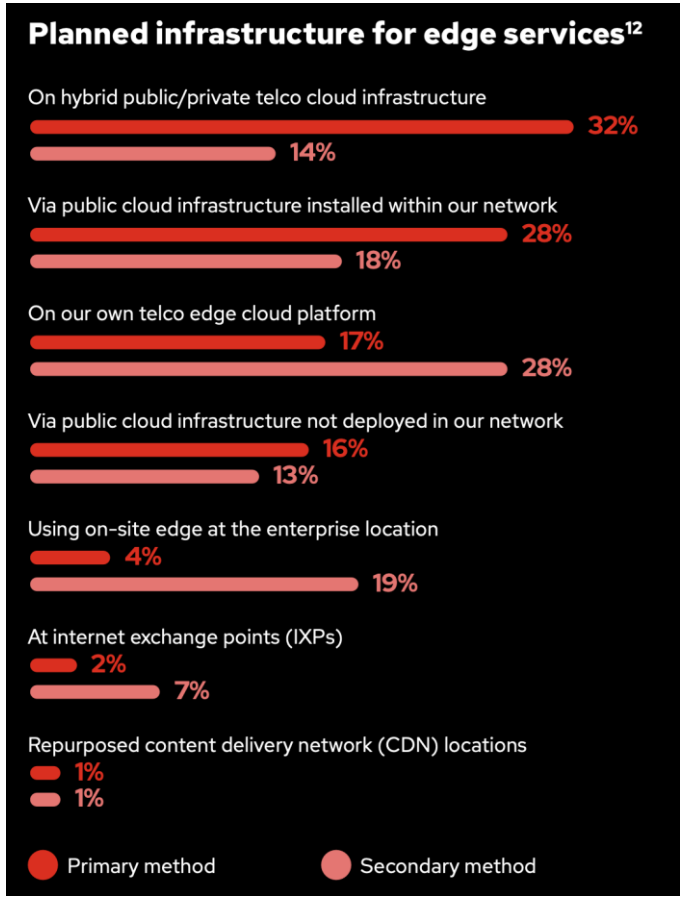
OpenShift Cloud Services

Available as cloud native services on leading cloud providers

aws	Red Hat OpenShift Service on AWS (ROSA)
Microsoft Azure	Azure Red Hat OpenShift (ARO)
IBM Cloud	Red Hat OpenShift on IBM Cloud
Google Cloud	OpenShift Dedicated (OSD)

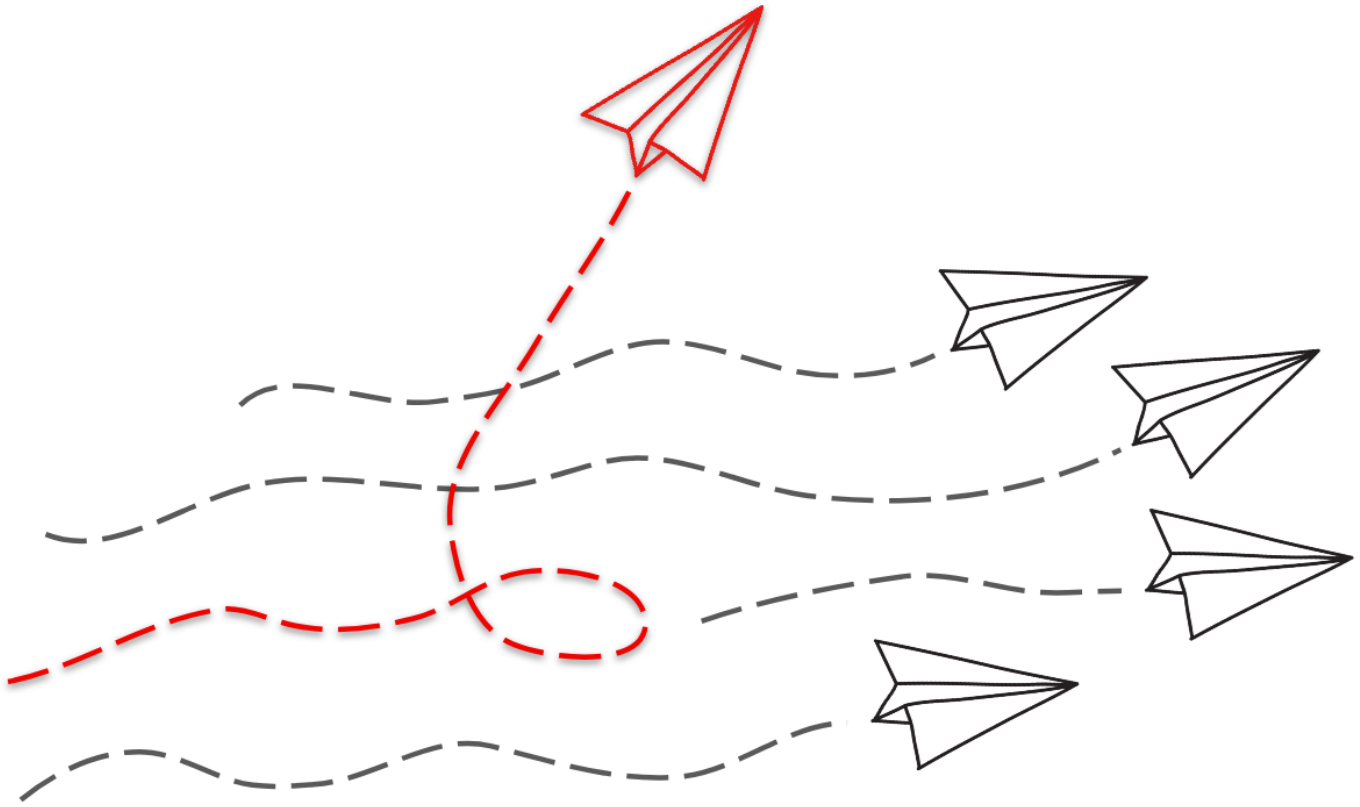
Hybrid Cloud

*" 60% of service providers offer or plan to offer edge services on **hybrid telco cloud** infrastructure or via public cloud infrastructure installed within their network."*



*12 Heavy Reading and Light Reading. "*5G Network Strategies: Operator Survey 2023,*" March 2023.* 11

Enjoy the ride!



Red Hat

Thank you!

Wojciech Furmankiewicz
Head of Technology Sales CEE
wfurmank@redhat.com



Red Hat