



Considerations for the right Hybrid Cloud Architecture

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Sr. Director - OpenShift Product Strategy

WHY HYBRID CLOUD?



What does Hybrid Cloud innovation look like?



“““

We got the idea to have all these tests we do with hardware on virtual test environments, and that's why we've come to OpenShift and containers.

—
Michael Denecke
Head of Test Technology
Volkswagen AG

VOLKSWAGEN
Autonomous Vehicle Testing



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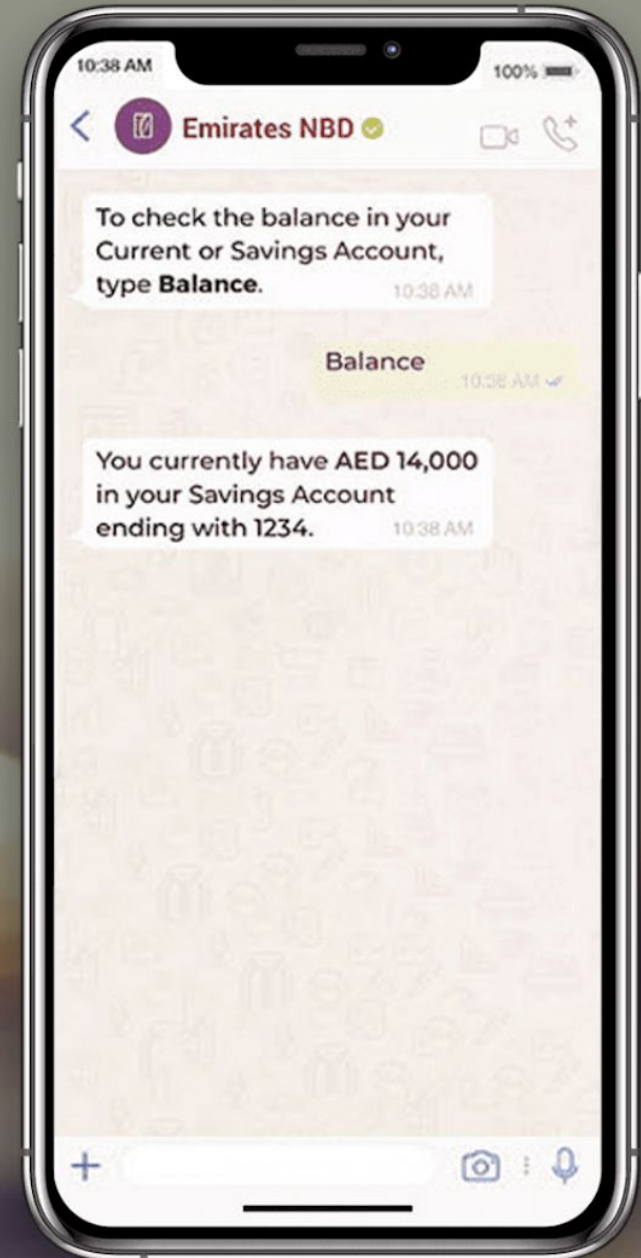
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AUTOMOTIVE

RETAIL



amadeus



LOGISTICS

TRAVEL

HOSPITALITY

MEDIA | TELCO



Support for a broad set of Applications and Use-Cases



MODERNIZE APPS



WEB APPS



CLOUD NATIVE DEV



MULTI-CLOUD



MOBILE



BIG DATA | ANALYTICS



AI | ML



IOT

Business Interactions are Hybrid



DIRECT / PHYSICAL

DIGITAL ENGAGEMENT

MARKETPLACE | APIs

What does Hybrid Cloud technology look like?

Database

A grid of logos for various database technologies, including KV (CNCI Incubating), Vitess (CNCI Incubating), Couchbase, MongoDB, Redis, and others.

Streaming & Messaging

A grid of logos for streaming and messaging technologies, including NATS, Apache Kafka, and others.

Application Definition & Image Build

A grid of logos for application definition and image build technologies, including Helm, Docker, and others.

Continuous Integration & Delivery

A grid of logos for continuous integration and delivery technologies, including Jenkins, CircleCI, and others.

Platform

A grid of logos for platform technologies, categorized into Certified Kubernetes - Distribution and Certified Kubernetes - Hosted.

Observability and Analysis

A grid of logos for observability and analysis technologies, including Monitoring, Logging, Tracing, and Chaos Engineering.

App Definition and Development

Orchestration & Management

Runtime

Provisioning

Cloud

Scheduling & Orchestration

A grid of logos for scheduling and orchestration technologies, including Kubernetes (CNCI Graduated) and others.

Coordination & Service Discovery

A grid of logos for coordination and service discovery technologies, including CoreDNS (CNCI Graduated) and etcd (CNCI Incubating).

Remote Procedure Call

A grid of logos for remote procedure call technologies, including gRPC (CNCI Incubating).

Service Proxy

A grid of logos for service proxy technologies, including Envoy (CNCI Graduated) and others.

API Gateway

A grid of logos for API gateway technologies, including Kong and others.

Service Mesh

A grid of logos for service mesh technologies, including Linkerd (CNCI Incubating) and Istio.

Cloud-Native Storage

A grid of logos for cloud-native storage technologies, including Rook (CNCI Incubating) and others.

Container Runtime

A grid of logos for container runtime technologies, including CRI-O (CNCI Graduated) and rkt (CNCI Incubating).

Cloud-Native Network

A grid of logos for cloud-native network technologies, including CNI (CNCI Incubating) and others.

Automation & Configuration

A grid of logos for automation and configuration technologies, including Ansible, Puppet, and others.

Container Registry

A grid of logos for container registry technologies, including Harbor (CNCI Incubating) and others.

Security & Compliance

A grid of logos for security and compliance technologies, including SonarQube (CNCI Incubating) and others.

Key Management

A grid of logos for key management technologies, including HashiCorp Vault and others.

Public

A grid of logos for public cloud providers, including AWS, Google Cloud, and others.

A QR code and text: "This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path." Logos for Cloud Native Computing Foundation, Amplify, and Redpoint are also present.

Special

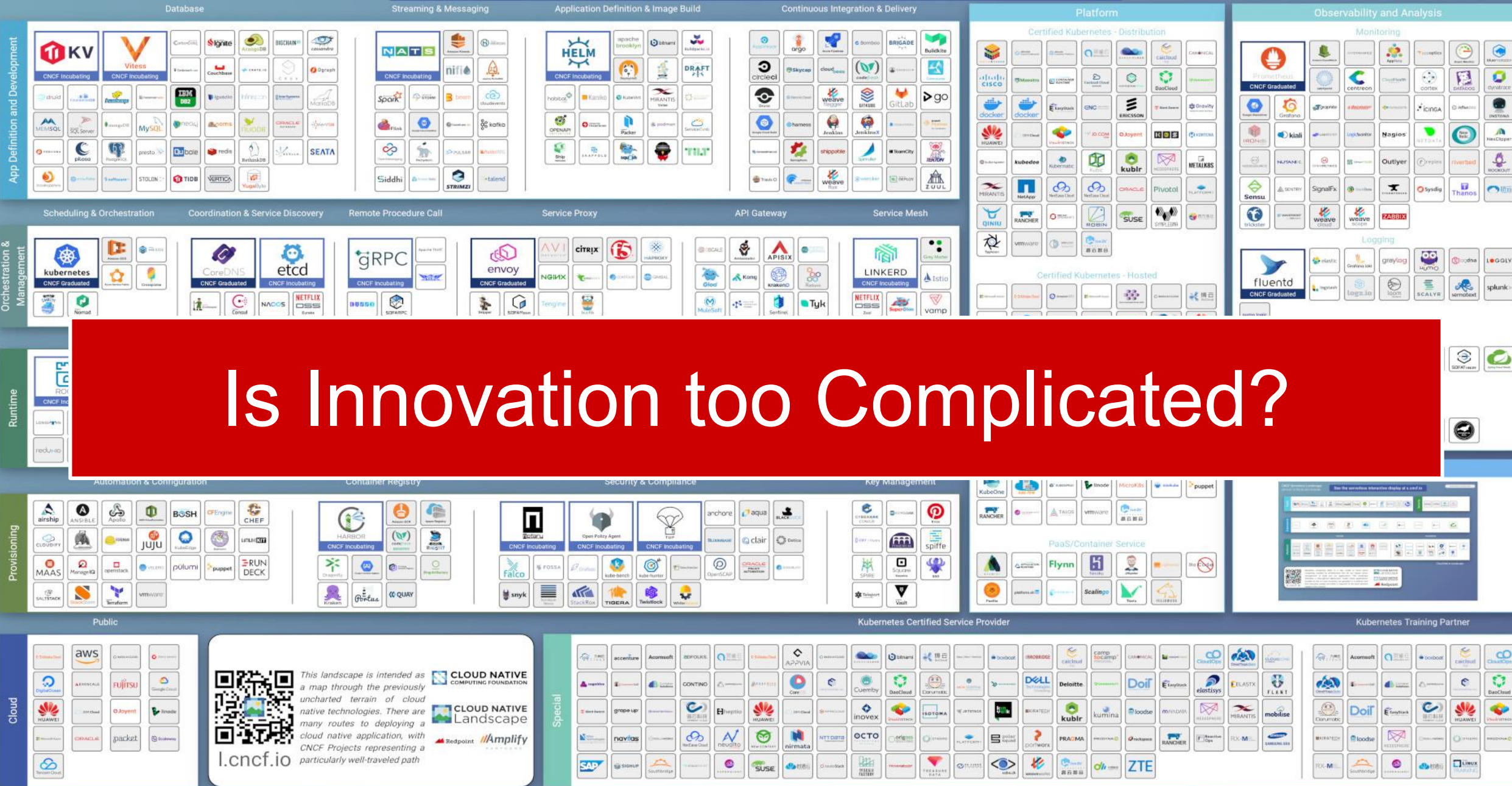
A grid of logos for special technologies and partners, including various vendors and organizations.

Kubernetes Certified Service Provider

A grid of logos for Kubernetes certified service providers, including PaaS/Container Service providers.

Kubernetes Training Partner

A grid of logos for Kubernetes training partners, including various educational and training organizations.



Is Innovation too Complicated?

This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path

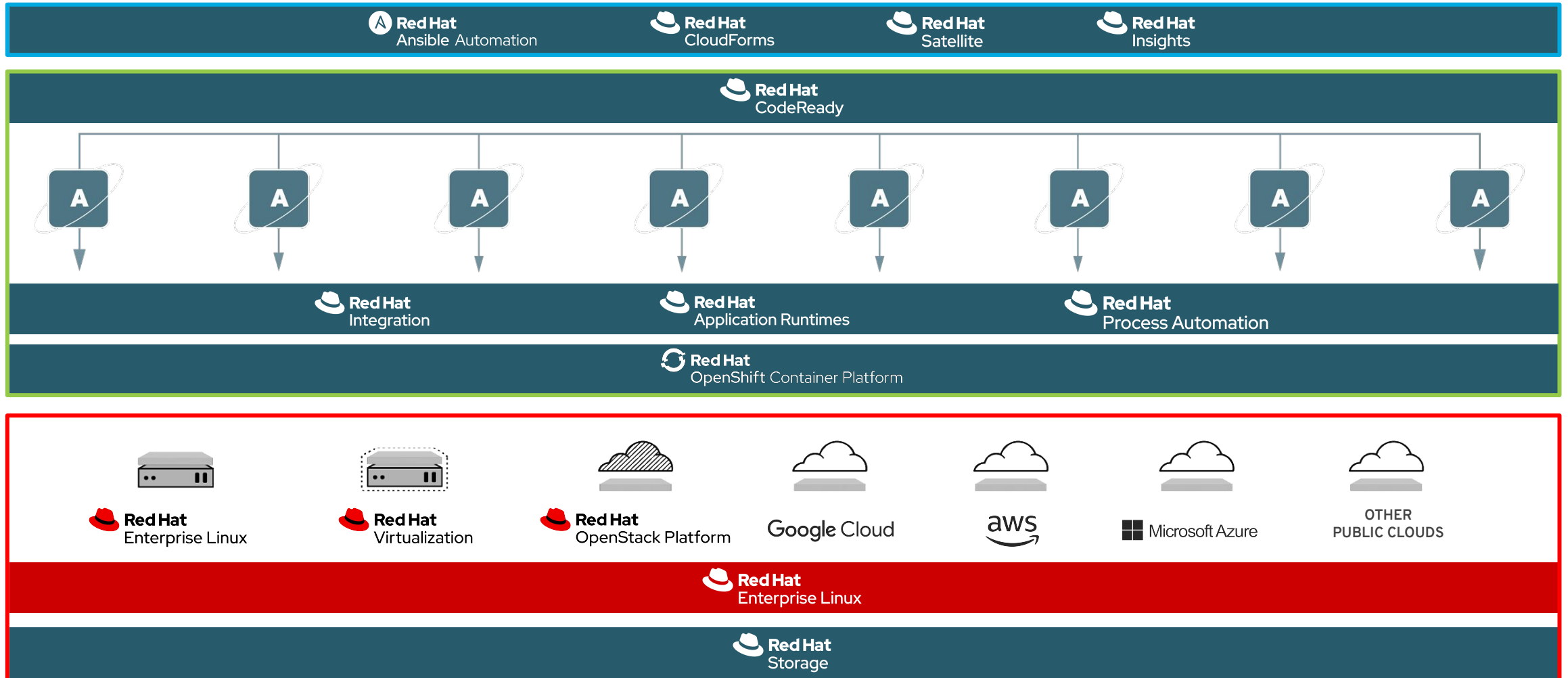
l.cncf.io

CLOUD NATIVE COMPUTING FOUNDATION

CLOUD NATIVE Landscape

Redpoint Amplify

Red Hat - the Open Hybrid Cloud company



Red Hat OpenShift - the Open Hybrid Cloud platform

 **Red Hat**
Ansible Automation

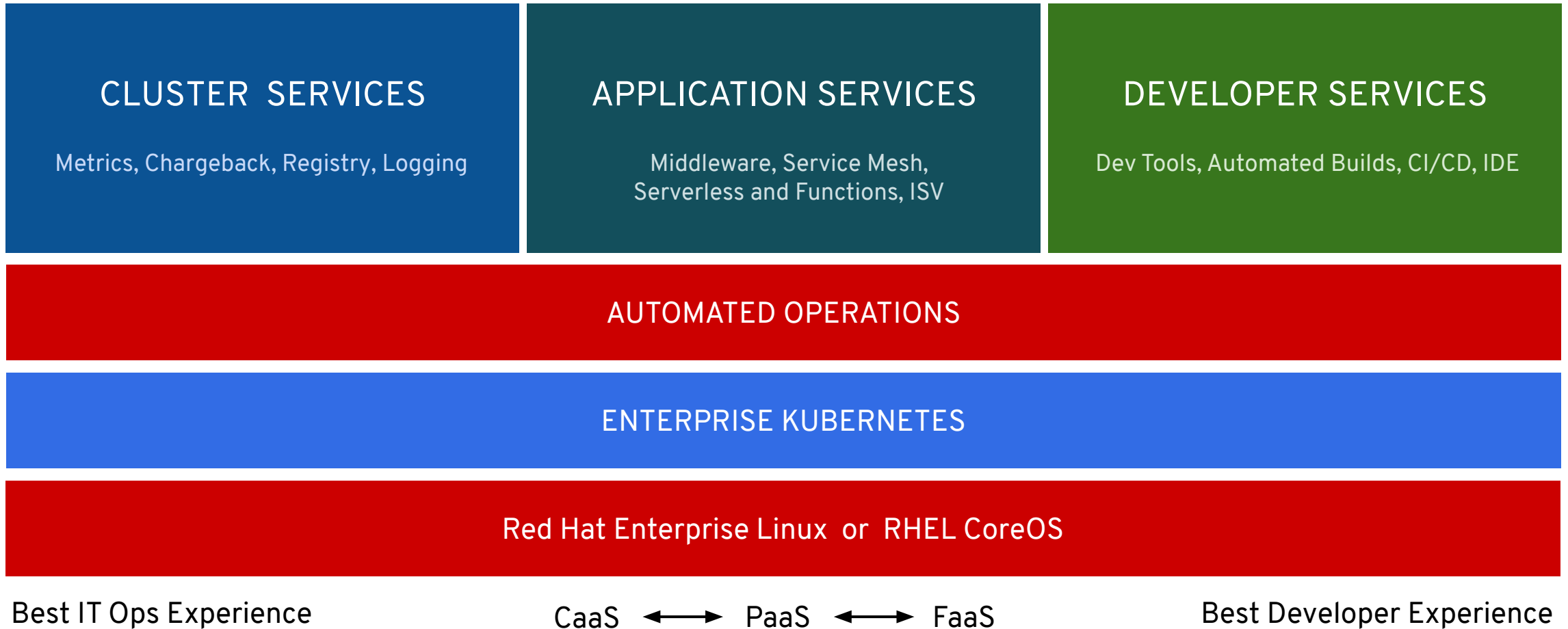
 **Red Hat**
CloudForms

 **Red Hat**
Satellite

 **Red Hat**
Insights

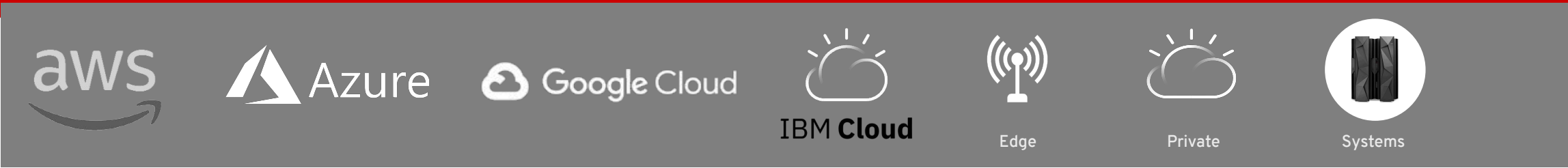


Red Hat OpenShift 4



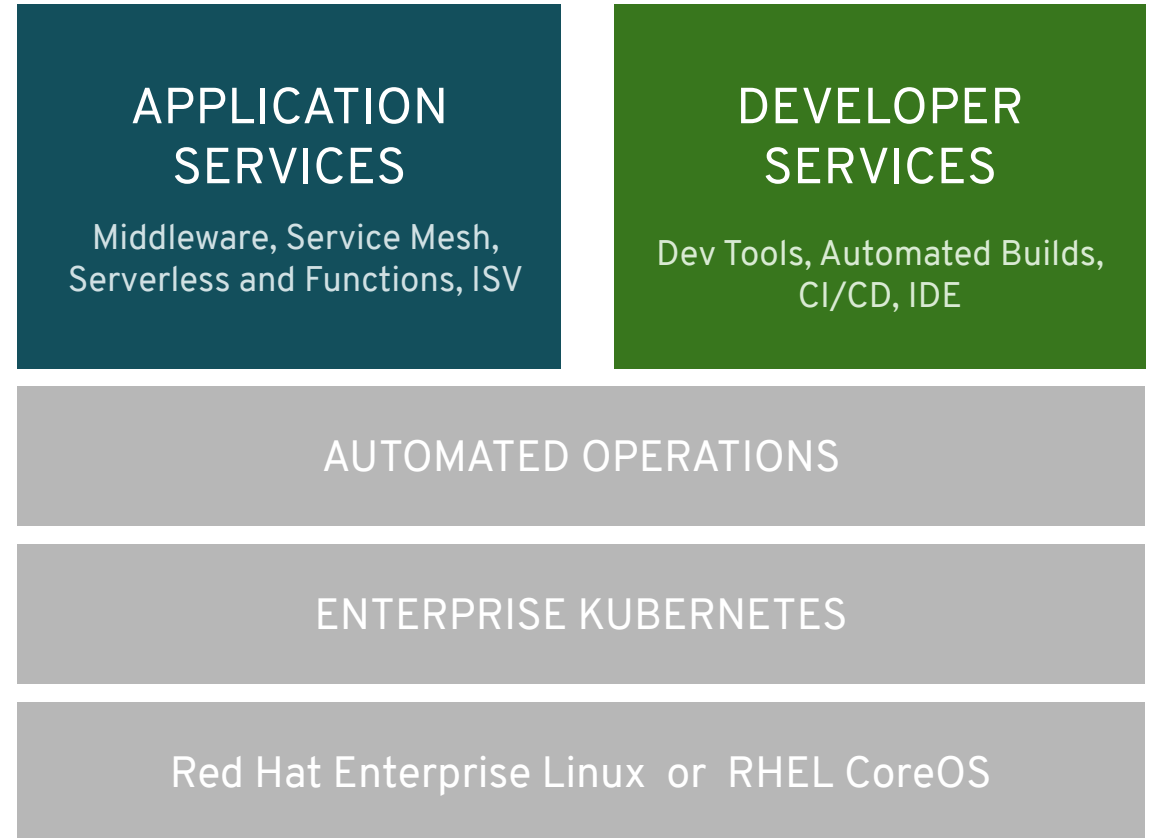


The Red Hat OpenShift logo, featuring the Red Hat logo (a white circle with a red 'R') and the text 'Red Hat OpenShift' in white on a red background.



OpenShift for Devs and Applications

- Support for a broad set of applications on OpenShift.
- Integrated Service Catalog and Marketplace
- Integrated CI/CD pipelines.
- Integrated Red Hat or IBM Middleware.
- Integrated Service Mesh (Istio).
- Integrated Serverless (Knative).
- Integrated web-based IDE (Che).
- Operators, Operator Lifecycle Mgmt, OpenShift Marketplace.



Development tools & processes

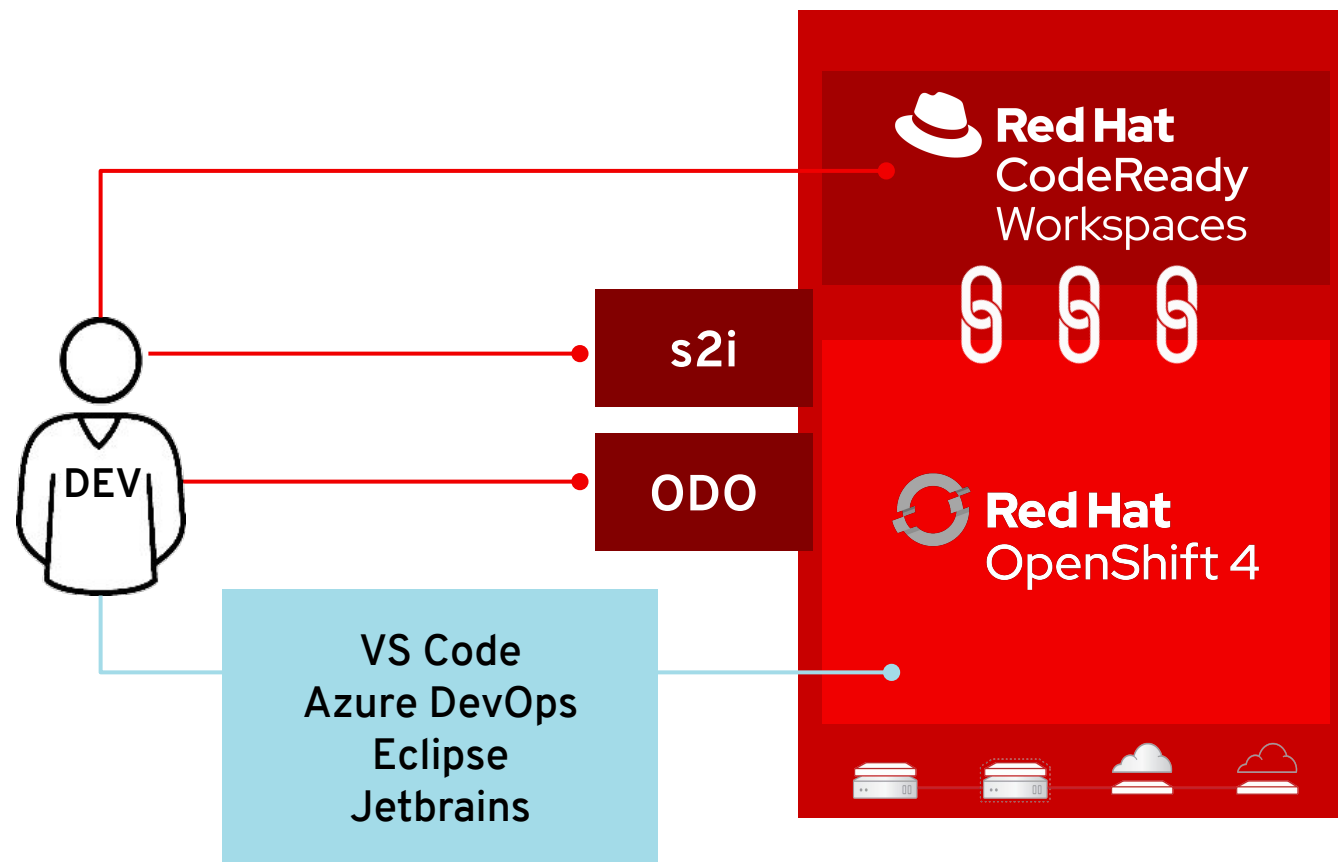
Market trends:

- Agile
- DevOps

Red Hat investments

- Kubernetes-native deployment pipelines
- Cloud-native development tools
- Collaboration

10x developer throughput**

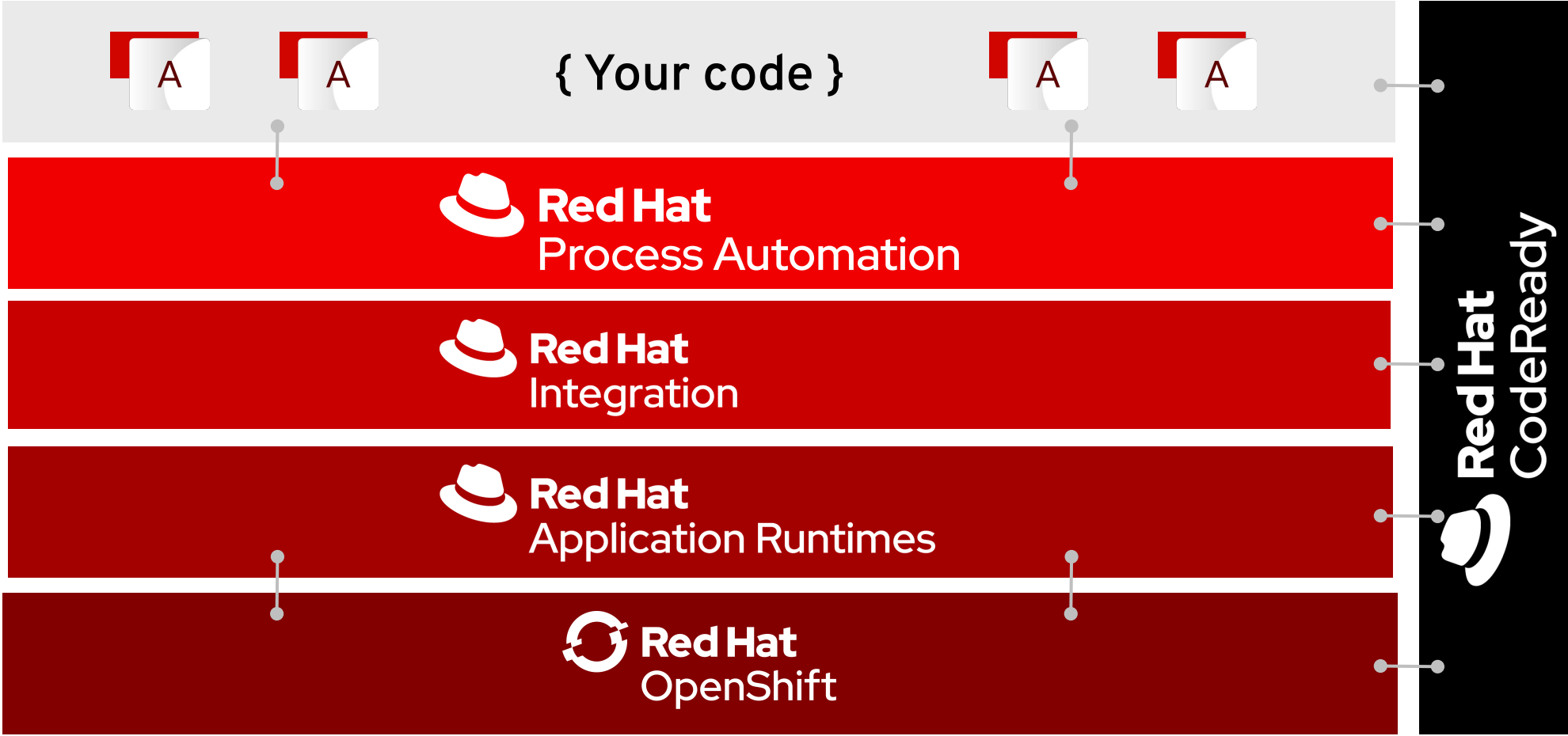


Cloud-native CI/CD with OpenShift Pipelines











The image displays the OpenShift Pipelines console interface. The top navigation bar includes the Red Hat OpenShift Container Platform logo, a user profile for 'siamak', and a 'Tech Preview' badge. The left sidebar contains navigation options: Developer, + Add, Topology, Builds, Pipelines (selected), and Advanced. The main content area shows the 'Project: Project01' and 'Pipeline Run Details' for 'pipelinerun01a', which is currently 'Running'. Below this, there are tabs for 'Overview', 'YAML', and 'Logs'. The 'Overview' tab features a 'Pipeline Run Overview' diagram with steps: 'code compile', 'compile & test', 'unit test', 'security check', and 'image build'. The 'security check' step is shown as a sub-step of 'unit test'. Below the diagram, metadata is listed: Name (pipelinerun01a), Namespace (project01), Labels (app=dummy-mongo-pod-test, bap.me/environment=dev, bap.me/track=experimental, bap.me/tier=backend), Annotations (0 Annotations), and Created At (Aug 9, 4:00 pm). The 'Logs' tab is active, showing a terminal view with the following output:







```
[Plack::Sandbox::_2fopt_2fapp_2droot_2fsrc_2fbin_2fapp_2epsi:54] core @2018-08-23 18:28:53> looking for get /health in extlib/lib/perl5/Dancer2/Core/App.pm l. 36
[Plack::Sandbox::_2fopt_2fapp_2droot_2fsrc_2fbin_2fapp_2epsi:54] core @2018-08-23 18:28:53> Entering hook core.error.init in (eval 306) l. 1
[Plack::Sandbox::_2fopt_2fapp_2droot_2fsrc_2fbin_2fapp_2epsi:54] core @2018-08-23 18:28:53> Entering hook core.error.before in (eval 306) l. 1
[Plack::Sandbox::_2fopt_2fapp_2droot_2fsrc_2fbin_2fapp_2epsi:54] core @2018-08-23
```

Red Hat Middleware and Application Services



IBM Cloud Paks: Pre-integrated for cloud use cases

<p>Cloud Pak for Applications</p> <p>Build, deploy, and run applications</p> <p>IBM containerized software </p> <p>Container platform and operational services </p>	<p>Cloud Pak for Data</p> <p>Collect, organize, and analyze data</p> <p>IBM containerized software </p> <p>Container platform and operational services </p>	<p>Cloud Pak for Integration</p> <p>Integrate applications, data, cloud services, and APIs</p> <p>IBM containerized software </p> <p>Container platform and operational services </p>	<p>Cloud Pak for Automation</p> <p>Transform business processes, decisions, and content</p> <p>IBM containerized software </p> <p>Container platform and operational services </p>	<p>Cloud Pak for Multicloud Management</p> <p>Gain multicloud visibility, governance, and automation</p> <p>IBM containerized software </p> <p>Container platform and operational services </p>
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 IBM Cloud		 Azure	Google Cloud	 Edge	 Private	 Systems
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Openshift 4 enables ISV Innovation

Kubernetes Operators

- Kubernetes is the Hybrid Multi-Cloud standard
- Operator Framework enables Day 2 Operations for ISV Apps
- Operators enable Hybrid Multi-Cloud consistency

TYPES OF OPERATORS

Community
ISV Partners
Red Hat Products

The image displays two screenshots of OperatorHub interfaces. The top screenshot is the OperatorHub.io website, showing a search bar, a 'Contribute' button, and a grid of operator cards. The bottom screenshot is the Red Hat OpenShift Operator Hub interface, showing a navigation menu on the left and a list of operators on the right. Colored lines connect the text 'Community' (blue), 'ISV Partners' (green), and 'Red Hat Products' (red) to specific operators in the screenshots: a blue line connects to the 'AWS Cloud Operator' card, a green line connects to the 'Couchbase Operator' card, and a red line connects to the 'Red Hat AMQ Streams' operator card in the OpenShift interface.

AI ecosystem focusing on OpenShift integrations

Data
Acquisition & preparation

ML model
Selection, training, testing

ML model deployment
in app dev process



elastic

Explore & analyze data



cassandra

NoSQL database



databricks

Unifying data science, engineering, & business, with the Unified Analytics Platform



Kafka stream processing

CLUSTERA

Enterprise Data Hub



PerceptiLabs

Build complex AI/ML models simply



PROPHETSTOR

AI Ops for OpenShift



AI enablement platform for teams at scale



Accelerated AI GPU & NGC

seldon

Deploy machine learning models and experiments at scale

H₂O.ai

Driverless.ai - Everyone can develop trusted machine learning models

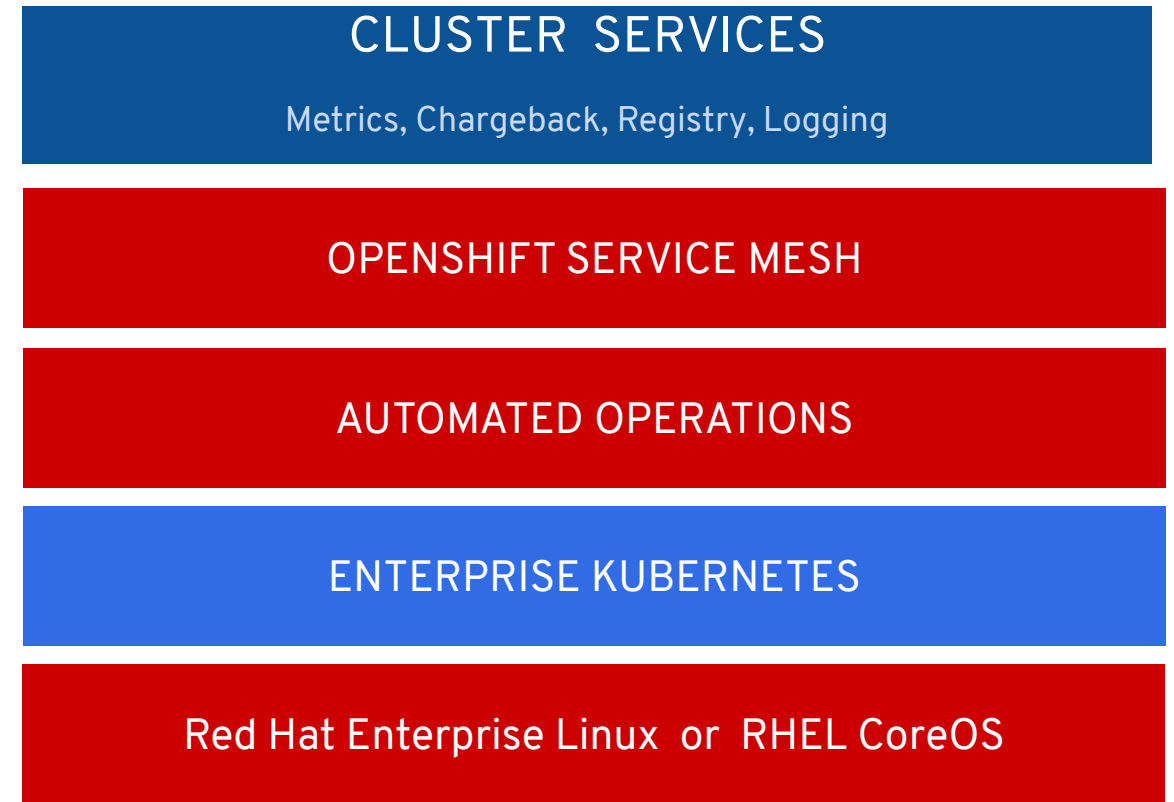


CognitiveScale

Bring business experts deeper into the development of a cognitive business process

OpenShift for Infra/Ops and Security Teams

- OpenShift can be deployed on private and public cloud platforms.
- RHEL and RHEL CoreOS - the industry standard for Linux.
- Containers and Kubernetes provide multi-cloud portability.
- Integrated SDN and Storage
- Fully-automated Day-2 operations.
- Integrated container registry or Red Hat Quay.
- Integrated Service Mesh (Istio).
- Integrated Logging, Monitoring, Metrics.
- Integrated security throughout the stack.



OpenShift - Comprehensive Platform Security



CONTROL

Application Security

Container Content

CI/CD Pipeline

Container Registry

Deployment Policies



DEFEND

Infrastructure

Container Platform

Container Host Multi-tenancy

Network Isolation

Storage

Audit & Logging

API Management



EXTEND

Security Ecosystem

Enable the Federated, Connected Experience

OpenShift Connected eXperience (OCX)
cloud.redhat.com



The screenshot shows the 'Clusters' page in the Red Hat OpenShift Cluster Manager. It features a search bar, a filter dropdown, and a 'Create cluster' button. Below is a table with columns for Name, Health, Type, Subscription status, Version, Provider, and Region.

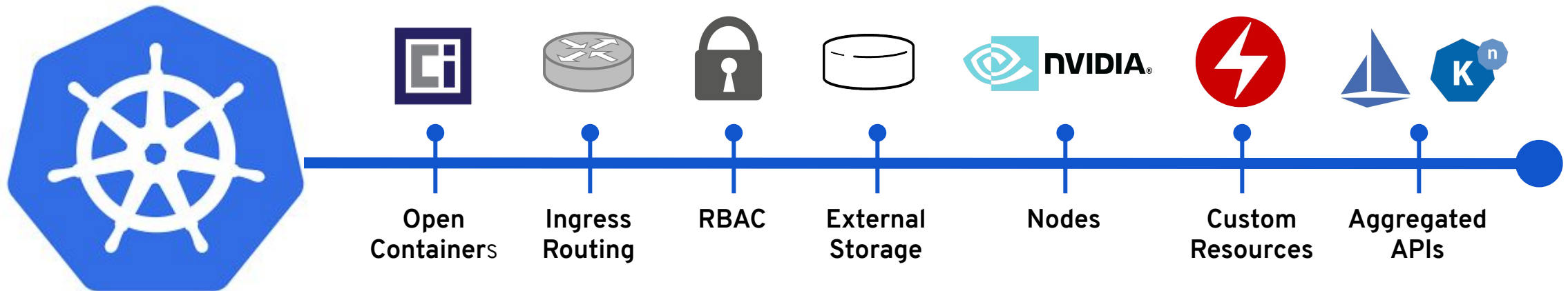
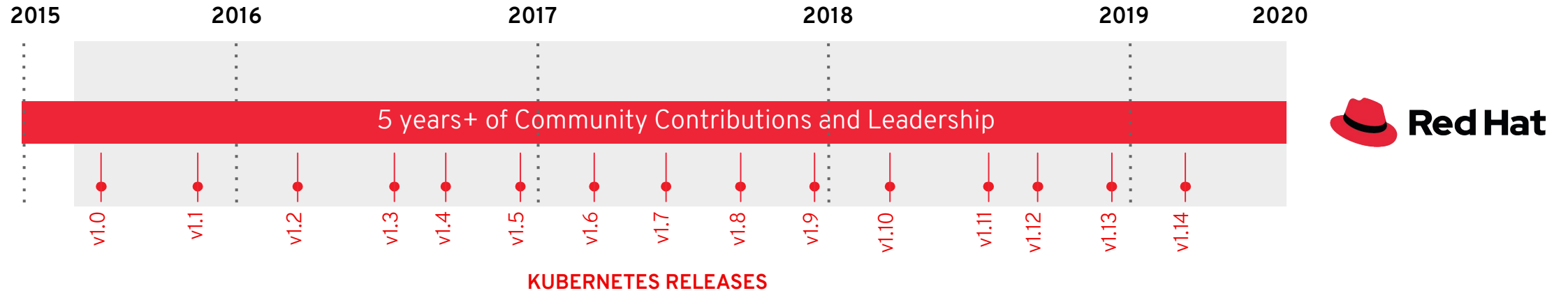
Name	Health	Type	Subscription status	Version	Provider	Region
0041ebad-bbd4-4495-bb44-9a8db79db36d	✔	OCP	✔ Subscribed	4.1.6	AWS	us-east-2
0041ebad-bbd4-4495-bb44-9a8db79db36d	✔	OCP	✔ Subscribed	4.1.6	AWS	us-east-2
0041ebad-bbd4-4495-bb44-9a8db79db36d	✔	OCP	✔ Subscribed	4.1.6	AWS	us-east-2
dev-azure-west	⚠ Issues discovered	OCP	✔ Subscribed	4.1.6	Azure	West US
dev-sandbox	✖ Disconnected	OCP	✔ Valid	Unknown	Unknown	Unknown
dev-aws-east	✔	OCP	⚠ Not subscribed	4.1.6	vSphere	Unknown
prod-east	✔	OCP	✔ Subscribed	4.1.3 Update	AWS	us-east-2
Prod OSD	✔	OSD	✔ Valid	4.1.3	AWS	us-west-1
qe-bangalore-1	✖ Disconnected	OCP	✔ Subscribed	Unknown	Unknown	Unknown
qe-bangalore-2	✖ Disconnected	OCP	⚠ Not subscribed	Unknown	Unknown	Unknown

- Multi-Cloud Management
- Cluster Federation
- Over the Air SW Updates
- Usage Telemetry
- Proactive Support



Kubernetes/ Hybrid Cloud Experience Matters

The Importance of Expertise in Kubernetes



The Importance of Expertise in Hybrid Multi-Cloud

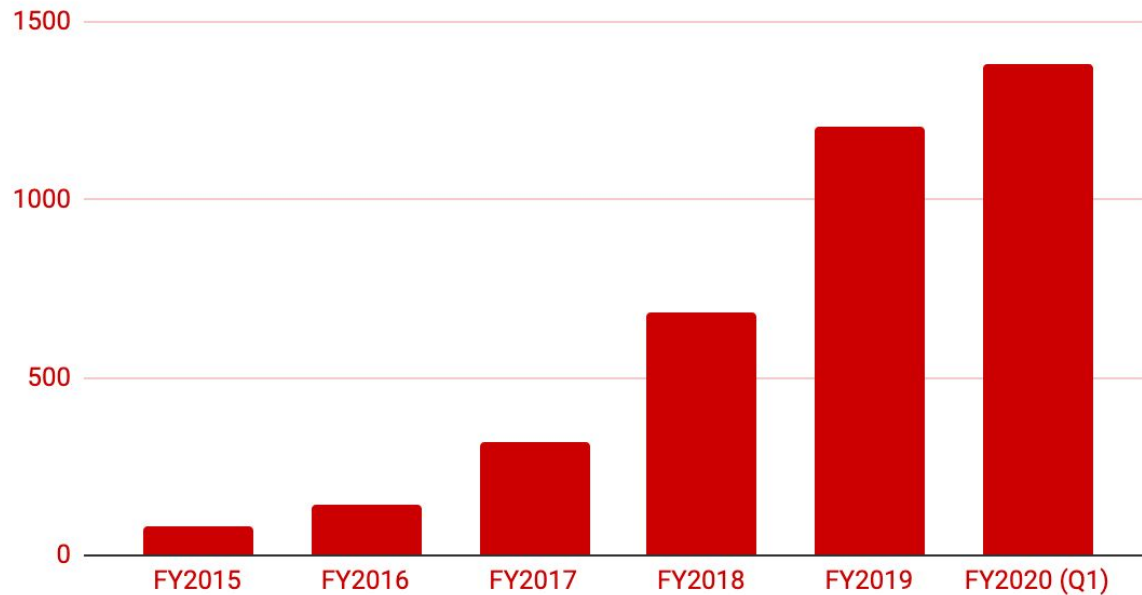


SELF-MANAGED

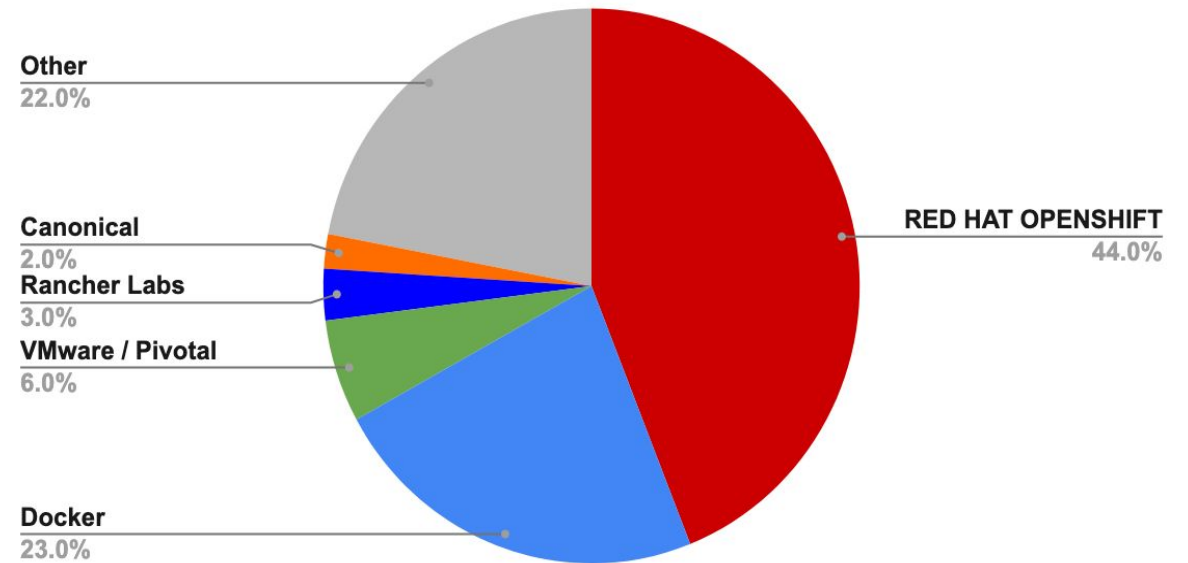
HOSTED SERVICES

OpenShift leads the Container Application Platform Market

Red Hat OpenShift Customers



Container Market Share (%)



IHS Markit Technology Multi-Tenant Server Software Market Tracker.(2019)

Hybrid Cloud enables Innovation Today and in the Future

WHY HYBRID CLOUD?



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.



linkedin.com/company/red-hat



youtube.com/user/RedHatVideos



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