Red Hat Partner Bootcamp

OpenShift Topics

Alfred Bach

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Red Hat EMEA

Red Hat OpenShift

OpenShift Plus

As part of Partner Boot Camp

Alfred Bach
Principal Solution Architect

Red Hat

Red Hat open hybrid cloud platform

Red Hat OpenShift Platform Plus

Red Hat OpenShift Container Platform

Red Hat OpenShift Kubernetes Engine

Red Hat Advanced Cluster Management for Kubernetes	Red Hat Advanced Cluster Security for Kubernetes	Red Hat Quay	Red Hat OpenShift Data Foundation
Multicluster management	**Cluster security**	**Global registry**	**Cluster data management**
Observability | Discovery | Policy | Compliance | Configuration | Workloads	Declarative security | Container vulnerability management | Network segmentation | Threat detection and response	Image management | Security scanning | Geo-replication Mirroring | Image builds	RWO, RWX, Object | Efficiency | Performance | Security | Backup | DR Multicloud gateway
Manage workloads	**Build cloud-native apps**	**Data-driven insights**	**Developer productivity**
Platform services	Application services*	Data services*	Developer services
• Service mesh | Serverless • Builds | CI/CD pipelines • GitOps | Distributed Tracing • Log management • Cost management	• Languages and runtimes • API management • Integration • Messaging • Process automation	• Databases | Cache • Data ingest and preparation • Data analytics • AI/ML	• Developer CLI | IDE • Plugins and extensions • CodeReady workspaces • CodeReady containers

Kubernetes cluster services

Install | Over-the-air updates | Networking | Ingress | Storage | Monitoring | Log forwarding | Registry | Authorization | Containers | VMs | Operators | Helm

Kubernetes (orchestration)

Red Hat Enterprise Linux — **Linux (container host operating system)** — Red Hat Enterprise Linux CoreOS

Physical — Virtual — Private cloud — Public cloud — Edge

* Red Hat OpenShift® includes supported runtimes for popular languages/frameworks/databases. Additional capabilities listed are from the Red Hat Application Services and Red Hat Data Services portfolios.

** Disaster recovery, volume and multicloud encryption, key management service, and support for multiple clusters and off-cluster workloads requires OpenShift Data Foundation Advanced

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HYBRID CLOUD EXPERIENCE

Applications in hybrid clouds and clusters

CORE, PLATFORM & DEVELOPER TOOLS

Self-managed clusters and applications

Foundations for Managed Services and Telco and Edge

TELCO & EDGE

5G CORE and 5G RAN

Near edge and Far edge

From and to the edge

MANAGED CLOUD SERVICES

OpenShift as a (SRE) Managed Service

Managed (SRE) Application, Data and Management Services

Unified Experience

Security Everywhere

Platform Consistency

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Red Hat Advanced Cluster Management for Kubernetes

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Why Red Hat Advanced Cluster Management is important

Why you should care

- App modernization is a top industry priority.
- Kubernetes is platform modernization.
- Enterprises are rapidly adopting Kubernetes.
- There is intense competition for Kubernetes.
- Not all Kubernetes solutions are equal.
- Kubernetes management is complicated.

Key solutions

Move quickly and win the platform

Use the best, most complete solution - OpenShift

Differentiate and win Red Hat OpenShift Container Platform

Recognize VMware as the biggest threat

But Hybrid Multi-Cloud management is really hard

As organizations deploy more across multiple clouds, new challenges arise.

- **Difficult and error prone** to manage at scale
- **Inconsistent security controls** across environments
- **Overwhelming to verify** components, configurations, policies, and compliance

IDC Survey of 200 US-based $1B companies actively using two or more "infrastructure clouds" for production applications

Using multiple infrastructure clouds*

Using multiple public clouds and one or more private/dedicated clouds*

Source:
DC Multicloud Management Survey, 2019: Special Study, Doc # US45020919, April 2019
*IDC Survey of 200 US-based $1B companies actively using two or more "infrastructure clouds" for production applications

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Kubernetes adoption leads to multicluster

"As Kubernetes gains adoption across the industry, scenarios are arising in which I&O teams are finding they must deploy and manage multiple clusters, either in a single region on-premises or in the cloud, or across multiple regions....for a number of reasons, including multi-tenancy, disaster recovery, and with hybrid, multicloud, or edge deployments."

Source:
Assessing Patterns for Deploying Distributed Kubernetes Clusters doc # G00465217, by Tony Iams

Where is the growth in cluster deployments?

Small Scale Dev teams

- Managing and syncing across Dev/QE/Pre-Prod/Prod clusters can be difficult

Medium Scale Organizations

- Retail with small clusters across 100s of locations
- Organizations with plan for growth 10-15 clusters moving to 100s

Large Scale

- Global organizations with 100s of clusters, hosting thousand of applications
- Large Retail with 1000s of stores

Edge Scale Telco

- 100s of zones, 1000s of clusters and nodes across complex topologies

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Reasons for deploying clusters

- Application availability
- Reduced latency
- Address industry standards
- Geopolitical data residency guidelines
- Disaster recovery
- Edge deployments
- CapEx cost reduction
- Avoid vendor lock-in

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Multicluster management challenges

How do I normalize and centralize key functions across environments?

Management requirements

Developer

Build and deploy a container app

- Easy cluster provisioning
- Controlling cluster configuration drift
- Ensuring app deployment from development to production

DevOps

Develop, test, and produce clusters

- Consistent cluster provisioning
- Policy enforcement and governance across development, test, and production clusters
- Finding/modifying resources across clusters

Hybrid multicloud

Clusters deployed across public, private clouds, edge, in different geographies

- Single pane of glass visibility
- Deploying and distributing applications at scale
- Auditing and compliance

Single cluster → Multicluster growth → Distributed multicluster

Robust. Proven. Award winning.

Multicluster lifecycle management

Policy driven governance, risk, and compliance

Advanced application lifecycle management

Multicluster observability for health and optimization

70000000

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Unified Multi-Cluster Management

Single Pane for all your Kubernetes Clusters

- **Centrally** create, update and delete Kubernetes clusters **across multiple** private and public clouds
- Search, find and modify **any** kubernetes resource across the **entire** domain.
- **Quickly** troubleshoot and resolve issues across your **federated** domain

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Policy based Governance, Risk and Compliance

Don't wait for your security team to tap you on the shoulder

- **Centrally** set & enforce policies for security, applications, & infrastructure
- Quickly **visualize** detailed **auditing** on configuration of apps and clusters
- Built-in compliance policies and audit checks
- **Immediate** visibility into your compliance posture based on **your** defined standards

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Advanced Application Lifecycle Management

Simplify your Application Lifecycle

- **Easily** deploy an Application using the **Application Builder**
- Deploy Applications from **Multiple** Sources (GIT / HELM / Object Storage)
- Quickly **visualize** application relationships **across** clusters and those that **span** clusters

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Benefits

Red Hat OpenShift and Red Hat Advanced Cluster Management for Kubernetes

Accelerate development to production

Self-service provisioning allows app dev teams to request clusters directly from a catalog removing central IT as a bottleneck.

Increase application availability

Placement rules can allow quick deployment of clusters across distributed locations for availability, capacity, and security reasons.

Reduce costs

Centralized management of clusters reduces operational cost, makes the environment consistent, and removes the need to manually manage individual clusters.

Ease compliance

Policies can be written by the security team and enforced at each cluster, allowing environments to conform to your policy.

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Architecture

Red Hat Advanced Cluster Management For Kubernetes

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Architecture overview

IT Operations

Hub architecture and components

Red Hat Advanced Cluster Management uses the **multicluster-hub** operator and runs in the **open-cluster-management** namespace

Managed cluster architecture and components

Red Hat Advanced Cluster Management managed clusters use the **multicluster-endpoint** operator which runs in the **open-cluster-management** namespace

Tech preview

Architecture Overview

for Application Lifecycle

Red Hat Advanced Cluster Management for Kubernetes

1. Managed Clusters install resources based on the channel it subscribed
2. RHACM Hub calls Red Hat Ansible Automation Platform with Template Job ID defined in Application Pre & Post Action
3. Red Hat Ansible Automation Platform executes the Job
4. RHACM Hub receives feedback from Job execution and shows all Kubernetes Resources in topology, including Ansible Job status

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Red Hat
Advanced Cluster Security
for Kubernetes

StackRox | Red Hat ACS

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Kubernetes is the standard for application innovation…

- Microservices architecture
- Declarative definition
- Immutable infrastructure

…and Kubernetes-native security is increasingly critical

- Secure supply chain
- Secure infrastructure
- Secure workloads

DevOps → DevSecOps ← Security

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Benefits of a Kubernetes-native approach to security

Lower operational cost

DevOps and Security teams can use a common language and source of truth

Reduce operational risk

Ensure alignment between security and infrastructure to reduce application downtime

Increase developer productivity

Leverage Kubernetes to seamlessly provide guardrails supporting developer velocity

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Red Hat Advanced Cluster Security for Kubernetes

A cloud workload protection platform and cloud security posture management to enable you to “shift left”

Shift left	Cloud security posture management (CSPM)	Cloud workload protection (CWPP)
Secure supply chain	Secure infrastructure	Secure workloads
Extend scanning and compliance into development (DevSecOps)	Leverage built-in Kubernetes CSPM to identify and remediate risky configurations	Maintain and enforce a “zero-trust execution” approach to workload protection

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Red Hat OpenShift provides a secure foundation

Detect	Protect	Respond
Trusted content	Kubernetes platform lifecycle	Container isolation
Container registry	Identity and access management	Network isolation
Build management	Platform data	Application access and data
CI/CD pipeline	Deployment policies	Observability
Build	**Deploy**	**Run**

DevSecOps

A layered approach to container and Kubernetes security

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RHACS delivers security depth to entire application lifecycle

Detect	Protect	Respond
Trusted content	Kubernetes platform lifecycle	Container isolation
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CI/CD pipeline	Deployment policies	Observability
Vulnerability analysis	Image assurance and policy admission controller	Runtime behavioral analysis
App config analysis	Compliance assessments	Auto-suggest network policies
APIs for CI/CD integrations	Risk profiling	Threat detection / incident response

Build — **Deploy** — **Run**

DevSecOps

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Quay

RED HAT QUAY

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Red Hat Quay

Industry-leading, **trusted, and open source registry platform** operating at scale since 2014

Built to **efficiently manage content** under governance and security **controls** globally

Runs **everywhere**, easy to **integrate** and **automate** but works best with **OpenShift**

Developed in **collaboration** with a broad open source, customer, and ecosystem **community**

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Red Hat Quay Key Features

SCALABILITY

Massive Scale Testing Quay.io
Real Time Garbage Collection
Automated Squashing

BUILD AUTOMATION

Seamless Git Integration
Build Workers
Webhooks

INTEGRATION

Extensible API
Webhooks, OAuth
Robot Accounts

REGISTRY

High Availability
Full Standards / Spec Support
Long-Term Protocol Support
Application Registry
Enterprise Grade Support
Regular Updates

SECURITY

Vulnerability Scanning
Logging & Auditing
Notifications & Alerting

CONTENT DISTRIBUTION

Geo-Replication
Repository Mirroring
Air-Gapped Environments

ACCESS CONTROL

Authentication Providers
Fine-Grained RBAC
Organizations & Teams

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Data Services

Red Hat OpenShift Data Foundation 4.x

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How Red Hat Data Foundation services fit

Multi-cluster management
Discovery • policy • compliance • configuration • workloads

Platform services	Application services	Developer services	Data Foundation services
Manage workloads more effectively	Simplify building cloud-native apps	Increase developer productivity	**Realize the full value of data**

Red Hat OpenShift platform and cluster services
Automated ops • over-the-air updates • persistent storage • monitoring • telemetry • logging • registry • networking • router

Physical

Virtual machines

Private cloud

Public cloud

The Red Hat Data Foundation opportunity

Red Hat Data Foundation

Data efficiency	Data resilience	Data security	Data governance	Data discovery

Red Hat Data Foundation in a nutshell

Data efficiency

- Erasure coding
- Compression
- Performance

Data resilience

- Snapshots
- Clones
- Backup
- Recovery
- Business continuity
- Disaster recovery

Data security

- At rest encryption
- In flight encryption
- Key management

Data governance

- WORM
- Auditing
- Compliance
- SEC & FINRA
- GDPR

Data discovery

- Cataloging
- Tagging
- Search

Data Foundation: a change of mindset

Traditional, static approach

- Focus on improving efficiency
- Infrastructure-up view
- Poor performance at scale
- Disconnected
- Manual, monolithic and rigid

Dynamic, data foundation approach

- Focus on innovation
- Application-oriented view
- Highly scalable
- Always-on
- Automated, on-demand, and flexible

Data is the most significant asset in today's businesses—give it data foundation

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Data Foundation

- Data foundation focuses on infrastructure and application needs so they can run and interact with ease and efficiency
- Provides a foundational data layer for applications to function and interact with data in a simplified, consistent and scalable manner
- Red Hat Ceph Storage is a foundational component to drive data services

Red Hat open hybrid cloud platform

Red Hat OpenShift Platform Plus

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OpenShift Partner Education Plan

Infrastructure / Architecture

INITIAL

OpenShift Architecture Workshop

or **OpenShift Infra Arch DLP**

or GLS/PTP DO280

ADVANCED

OpenHybrid Cloud Architecture Workshop (2-day HC Workshop)

or OCP PLUS Week

or GLS/PTP DO380*

*(not the complete content covered in DO380)

EXPERT (each one Day)

ACM Workshop

Storage Foundation Workshop

Security Workshop (focus on ACS)

Hybrid Cloud NetWorking WS (Service Mesh, Cillium, Scupper ....)

Thank you

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