Modernize mainframes with Red Hat OpenShift Platform

Fabio Alessandro Locati

Red Hat

February 2023

Session 6D

Containers advantages

- Less overhead
- Increased portability
- More consistent operation
- Greater efficiency
- Better application development

Containers usecases

- "Lift and shift" existing applications into modern cloud architectures
- Refactor existing applications for containers
- Develop new container-native applications
- Provide better support for microservices architectures
- Provide DevOps support for continuous integration and deployment (CI/CD)
- Provide easier deployment of repetitive jobs and tasks

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Kubernetes advantages

- Service discovery and load balancing
- Storage orchestration
- Automated rollouts and rollbacks
- Automatic bin packing
- Self-healing
- Secret and configuration management

Kubernetes naming

- **Container**: a group of processes with limited access to the system and resources, leveraging *cgroups*
- **Container Image**: a tar file containing all the required files and configurations to run a container
- **Pod**: a group of container
- **Service**: Kubernetes way to expose Pods ports over network
- **Persistent Volume**: a disk that is usable by a Pod
- **Config Map**: Kubernetes way to set configuration in Pods via file or *ENV_VARS*
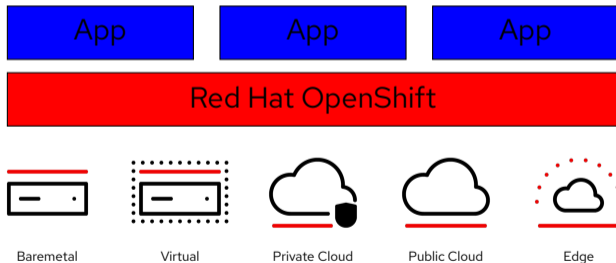- **Secret**: Kubernetes way to store and inject secret strings

Kubernetes components

- **etcd**: a decentralised file storage database
- **api-server**: Kubernets API Control Plane
- **Control Plane node**: a node that controls the cluster by running *etcd* and *api-server*
- **Worker node**: a node that runs workload
- **Infrastructure node**: a node that runs additional system components

Hybrid and multicloud is the new normal

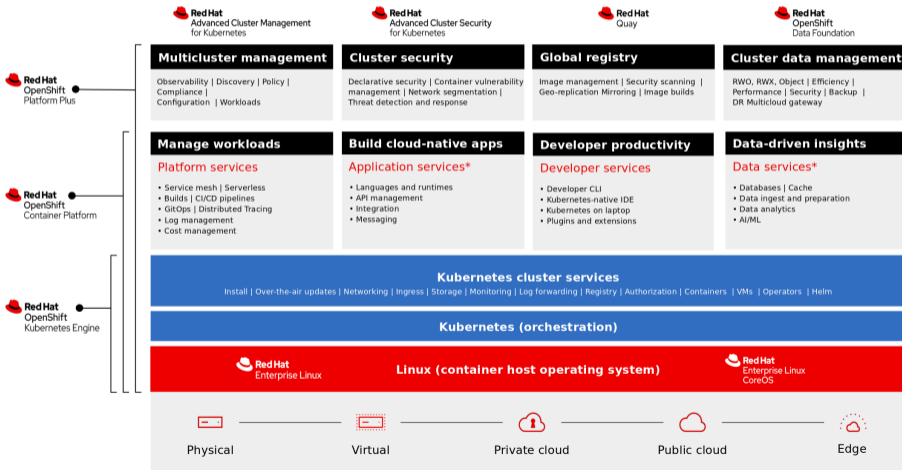- 95% of enterprises will be using a mix of cloud models
- 31% of all compute capacity will be in a Private, on premises cloud in 2 years
- 60% of enterprises will utilize flexible conumption models by 2023

Sources: IDC Cloud Forecast, BCG, and McKinsey

Red Hat OpenShift - an abstraction platform

App	App	App

Red Hat OpenShift

Baremetal Virtual Private Cloud Public Cloud Edge

Red Hat OpenShift, much more than Kubernetes

Red Hat Advanced Cluster Management for Kubernetes

Red Hat Advanced Cluster Security for Kubernetes

Red Hat Quay

Red Hat OpenShift Data Foundation

Red Hat OpenShift Platform Plus

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

Red Hat OpenShift Container Platform

Manage workloads	Build cloud-native apps	Developer productivity	Data-driven insights
Platform services	**Application services***	**Developer services**	**Data services***
• Service mesh | Serverless • Builds | CI/CD pipelines • GitOps | Distributed Tracing • Log management • Cost management	• Languages and runtimes • API management • Integration • Messaging	• Developer CLI • Kubernetes-native IDE • Kubernetes on laptop • Plugins and extensions	• Databases | Cache • Data ingest and preparation • Data analytics • AI/ML

Red Hat OpenShift Kubernetes Engine

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

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Containers will not displace the mainframe, they will enhance it

Why Red Hat OpenShift on the Mainframe

- Application Development Consistency
- Leverage industry knowledge and tools
- Workload portability

Why the Mainframe under Red Hat OpenShift

- Data gravity
- Low latency between LPARs
- Consolidation and TCO reduction
- Business Continuity
- Leverage Mainframe unique hardware capabilities

HA and DR in Red Hat OpenShift and Mainframe

- OpenShift only handles `Pod` failures not `Node` failures
- OpenShift needs a majority of `etcd` nodes running to maintain cluster stability. If a majority of `etcd` nodes go down the recovery might need to be done manually
- Software-defined persistent storage alone cannot achieve zero RTO and zero RPO that mission critical stateful workloads demand

- The Mainframe's HA capabilities can ensure that OpenShift nodes do not go down while providing near zero RTO ane zero RPO for stateful workloads when combined with external storage
- Does not need to be enabled for everything – can be partially enabled for workloads that require it

IBM Crypto Express support for containers on Red Hat OpenShift

- Crypto Express performances
- Crypto Express 8S Quantum-safe Cryptography

The `IBM CEX device plugin` enables OpenShift containers to take advantage of crypto resources on IBM Crypto Express adapters.

Home > Software > Browse products > IBM CEX Device Plugin CM

Standalone image

IBM CEX Device Plugin CM

ibm/ibm-cex-device-plugin-cm

Provided by

IBM

Red Hat

| Architecture | s390x | Tag | 🏷 v1.0.2 | Repository structure: | Single-stream |

Wrapping up

- It is key to focus on portable applications
- Containers can bring new tooling to Mainframe development
- The Mainframe is a great platform to run containerized workloads
- Red Hat OpenShift enables portable applications without giving up the specific platform optimizations

Thank you

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