



GSUK⁺ Virtual Conference
= Mainframe@60 : the diamond Anniversary of Digital Dominance

virtual conference

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Modernize mainframes workloads with
Red Hat OpenShift Platform

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Session 8C

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About me

- ▶ Working in IT since 2004, mostly in consulting roles
- ▶ Author of 5 books
- ▶ EMEA Principal Specialist Solution Architect @ Red Hat





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

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**: Kubernetes 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

- ▶ 89% of IT leaders say they are already running workloads across multiple public and/or private clouds (up from 87% the year before).¹
- ▶ 90% say they now place applications “where they run best” across on-prem, edge and more than one cloud, making hybrid multicloud the “de-facto” standard.²
- ▶ Organizations still expect 43% of their workloads to reside in corporate data-centres in 2025 (it was 58% in 2020 and 48% in 2023).³
- ▶ 65% of tech buyers will prioritise as-a-service consumption models for infrastructure purchases by 2026.⁴

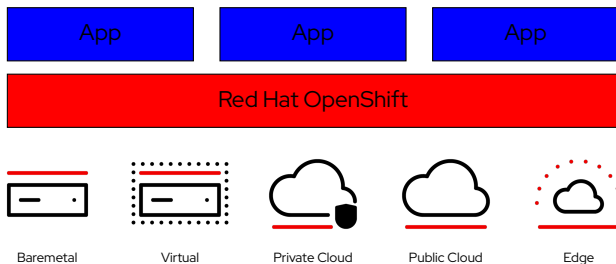
¹ Flexera 2024 State of the Cloud Report

² Nutanix 2024 Enterprise Cloud Index

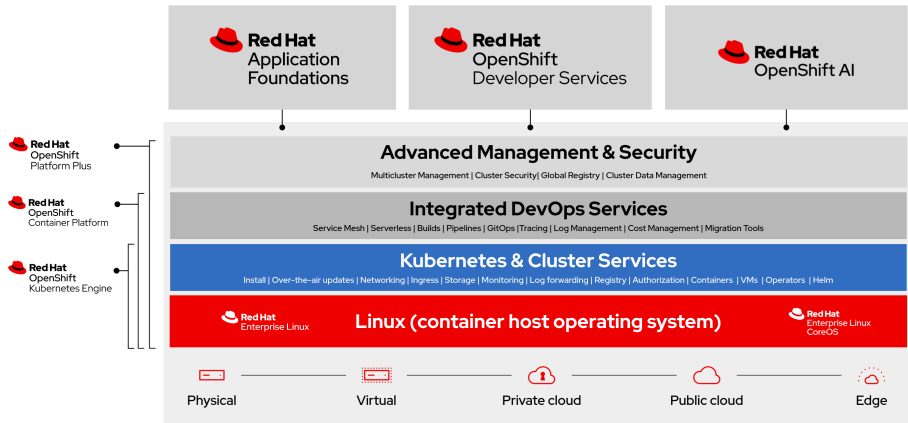
³ Uptime Institute's 2024/25 enterprise study

⁴ IDC's FutureScape 2022: Future of Digital Infrastructure

Red Hat OpenShift - an abstraction platform



Red Hat OpenShift, much more than Kubernetes



Installation options

SNO

Cluster with a single node combining control and compute

- ▶ Pro:
 - ▶ Reduced IFL footprint
 - ▶ Compute can be added
 - ▶ Kubernetes functions available
 - ▶ Good for Dev/Test
- ▶ Cons:
 - ▶ No infrastructure High Availability
 - ▶ Updates contain service interruptions

3 Nodes

Cluster with initially three nodes combining control and compute

- ▶ Pro:
 - ▶ Reduced IFL footprint
 - ▶ Can grow by adding compute nodes
 - ▶ Cluster High Availability given
- ▶ Cons:
 - ▶ Cluster size might be limited for applications and grow cluster might be required

Production

Cluster with a minimum of 3 control nodes and 2 compute nodes

- ▶ Pro:
 - ▶ Full cluster availability
 - ▶ Full Flexibility placing applications and grow
 - ▶ Dedicated control nodes for High Availability
- ▶ Cons:
 - ▶ Cluster IFL footprint highest. But will only slightly grow
 - ▶ Setup for Dev/Test env potentially oversized

Multi-architecture deployment options

- ▶ 4.14
 - ▶ A cluster with control planes and compute nodes on x86 architecture
 - ▶ With additional s390x compute nodes
- ▶ 4.15
 - ▶ A cluster with control planes and compute nodes on s390x architecture
 - ▶ With additional x86 compute nodes

Multi-architecture deployment advancements

- ▶ 4.16
 - ▶ Agent Installer parity for multi-payload
- ▶ 4.17
 - ▶ Hosted control plane support of x86 control plane with either IBM Power or IBM Z nodepools
- ▶ 4.18
 - ▶ Multi-arch Tuning Operator

LinuxOne as Management Hub

- ▶ Hybrid Multi-Architecture Multi Cloud management
 - ▶ Using RH Advanced Cluster Management for Kubernetes
 - ▶ Single Pane of Glass
 - ▶ On-premise
 - ▶ Heterogeneous Kubernetes Container environments
 - ▶ Multi Cloud & Multi-Architecture
 - ▶ Including Kubernetes in public clouds
- ▶ Centralized integrated RH OpenShift Automation
 - ▶ Using OpenShift Pipelines
 - ▶ Across RH OpenShift environments



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 and 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

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

Session feedback

- ▶ Submit your feedback at <https://conferences.gse.org.uk/2025V/feedback/8C>
- ▶ Make sure you are signed into MyGSE
- ▶ This session is **8C**



1. What is your conference registration number?

⚠ This is the three digit number on the bottom of your delegate badge

2. Was the length of this presentation correct?

⚠ 1 to 4 = "Too Short" 5 = "OK" 6-9 = "Too Long"

1 2 3 4 5 6 7 8 9

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3. Did this presentation meet your requirements?

⚠ 1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1 2 3 4 5 6 7 8 9

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4. Was the session content what you expected?

⚠ 1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1 2 3 4 5 6 7 8 9

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