



Red Hat
Data Services

Data Resilience for OpenShift with Red Hat OpenShift Container Storage 4.6

What's New OpenShift Commons Briefing

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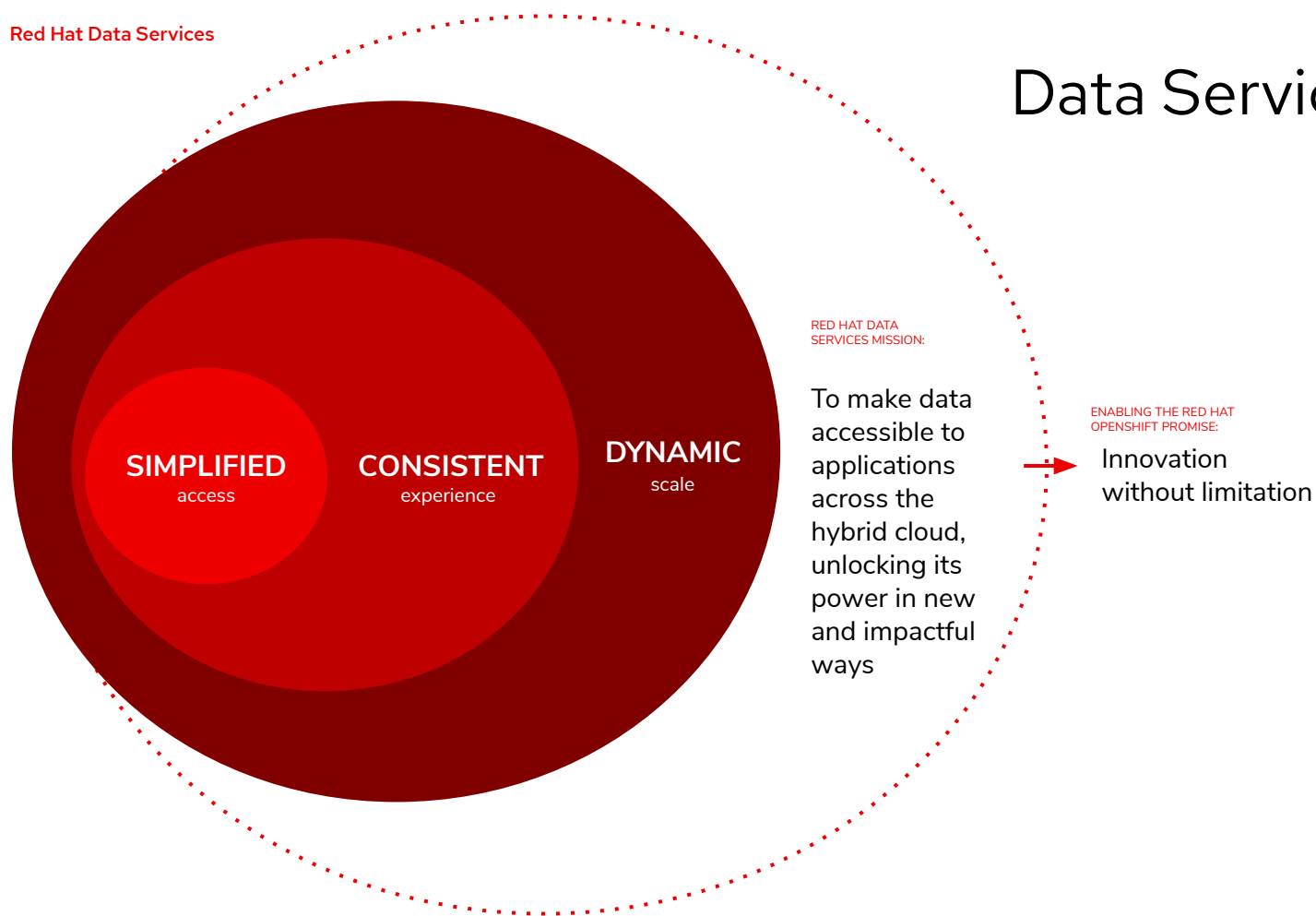
January 4, 2021

Red Hat OpenShift Container Storage 4.6

What's New

- Red Hat Data Services
- OpenShift Container Storage
- Release highlights
- Other new features
- Roadmap

Data Services



Data Services—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 services approach

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

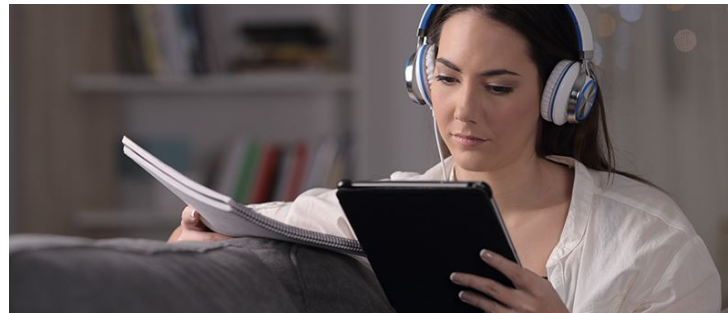
What that means for developers/data scientists

Traditional, static approach



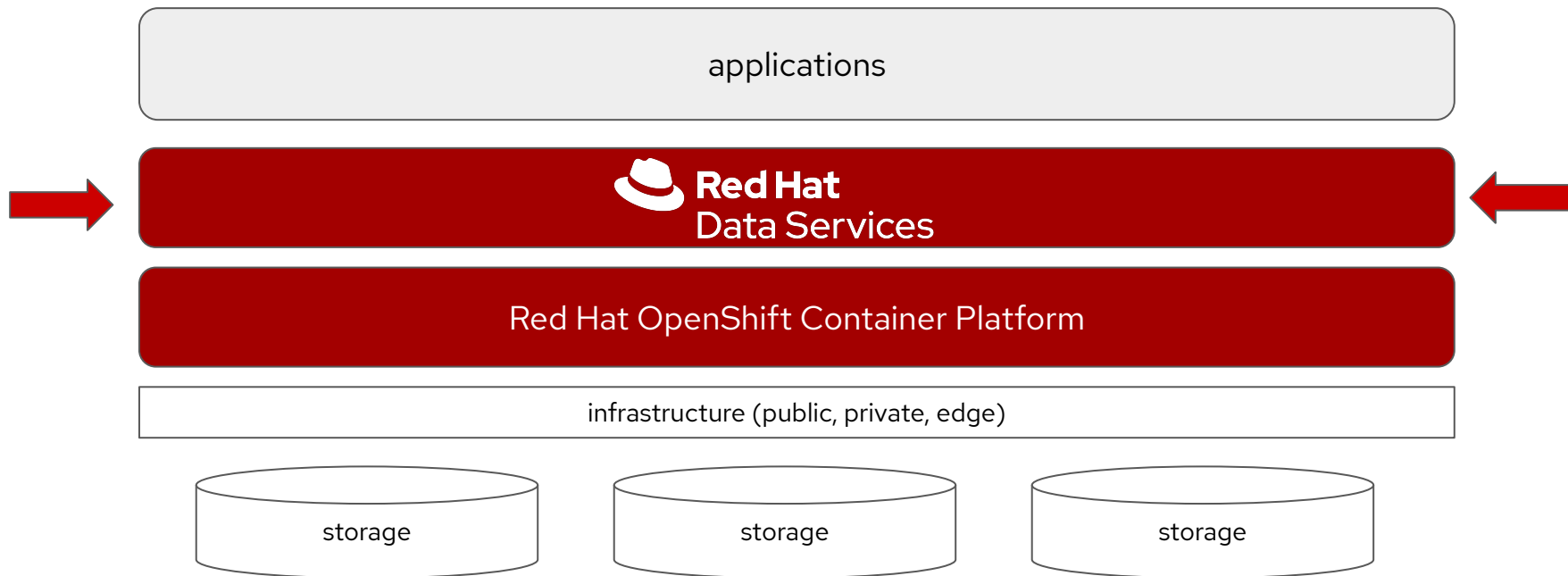
- Must visit the library
- Limited range of content on offer
- Can only check out a few items at a time
- Line to check content out
- Strictly limited usage
- Must regularly revisit to renew

Data services approach

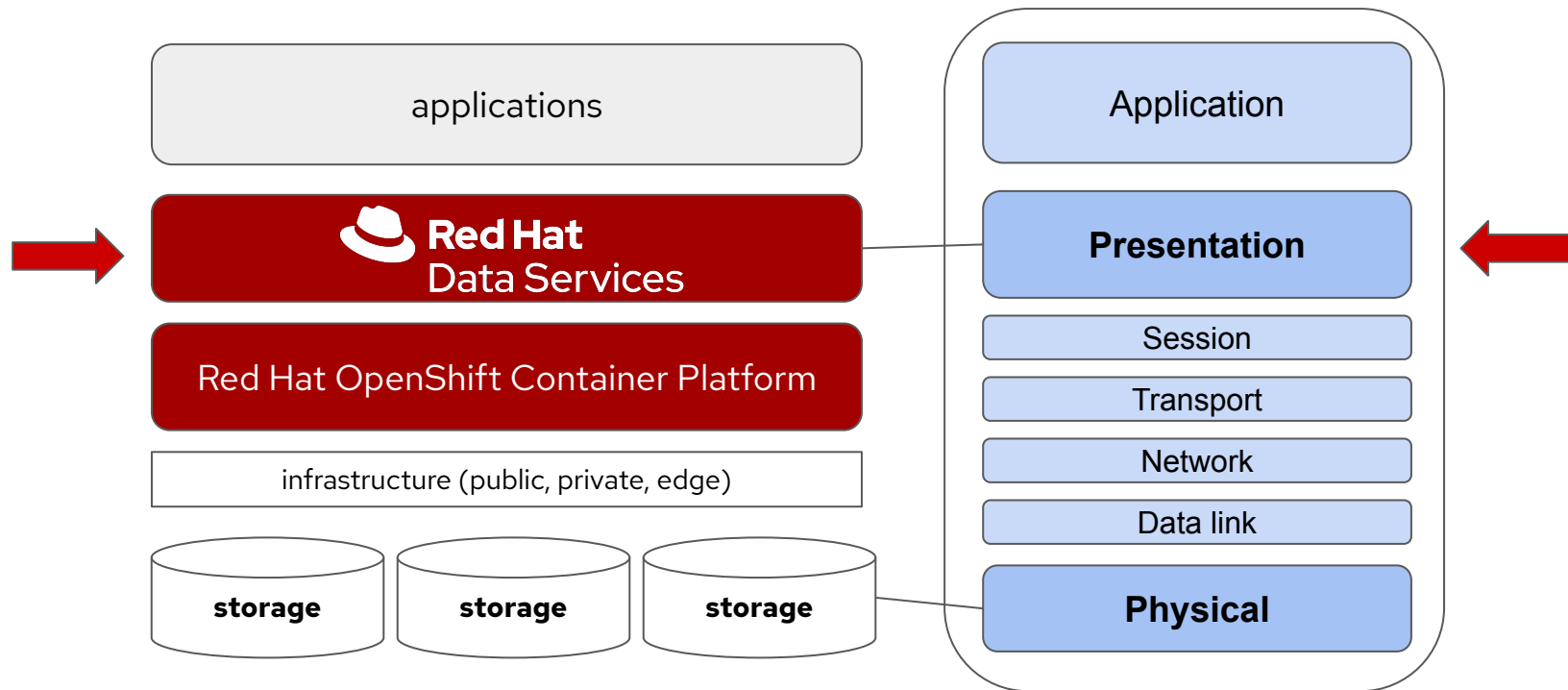


- Access to data from anywhere
- Wide range of rich content on offer
- Simultaneous access to all content
- Self-service—no need for manual supervision
- Almost unlimited usage
- Access can be granted indefinitely

Where do Red Hat Data Services fit?

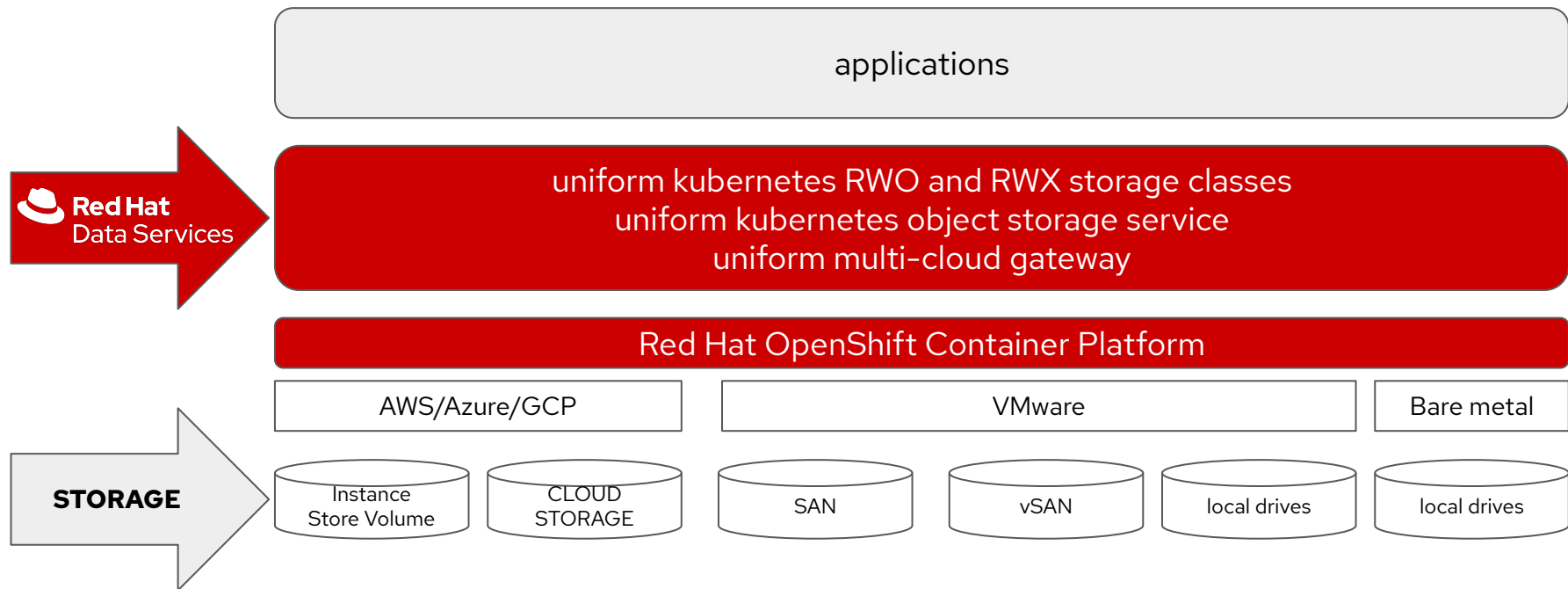


Where do Red Hat Data Services fit?

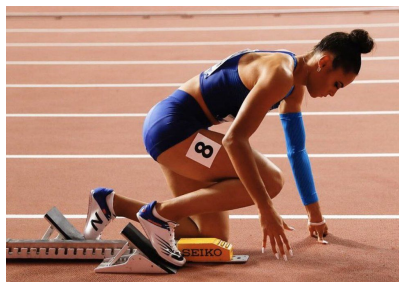


Red Hat OpenShift Container Storage

consumes **storage** to provide
higher-level services.



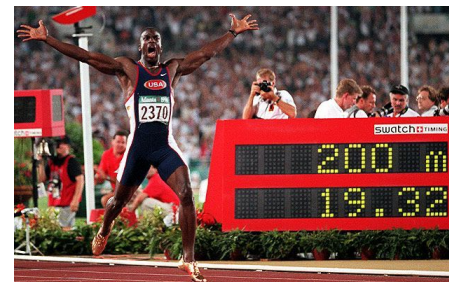
A new vision for Data Services



Data at rest



Data in motion



Data in action

A complete, cloud-native solution



- Persistent storage for containers
- Integrated management from Red Hat OpenShift
- Storage provisioning for all types of data
- OpenShift operator-based easy setup

Any type of data service (block, file, and object)



Any cloud (public and private)



Consistent experience,
regardless of underlying infrastructure



Used and managed through OpenShift



Red Hat
OpenShift
Container Storage



Red Hat
OpenShift



Red Hat
Data Services

Key use cases



Cloud-native apps

CI/CD and
repositories



Structured data

Databases and
data warehouses



Big data

Data analytics
and AI/ML

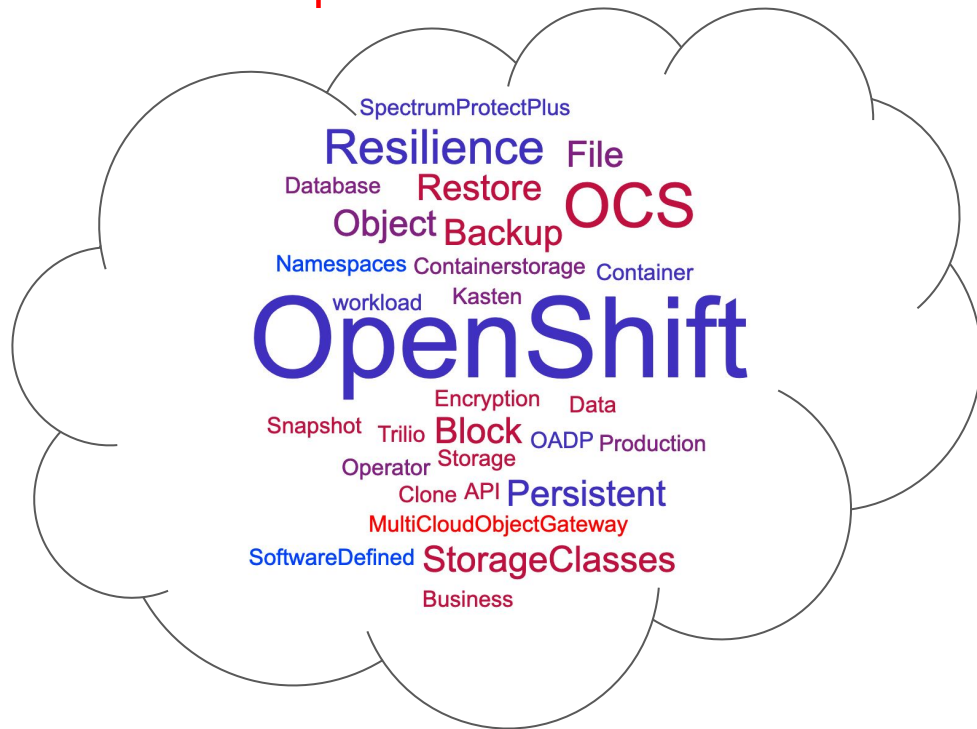
Red Hat OpenShift Container Storage 4.6

Release highlights

**Data
resilience
for
OpenShift**

Data Resilience for OpenShift

Red Hat Openshift Container Storage



New data resilience features with OpenShift Container Storage 4.6



Built on open standards

- Container storage interface (CSI)
- CSI based Snapshots
- OADP
([OpenShift APIs for Data Protection](#))



Container-aware data protection

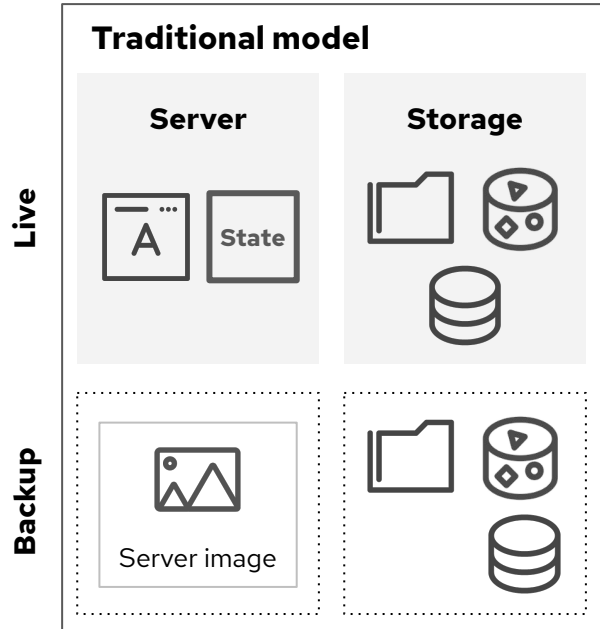
- Application Persistent Volume level backup
- Cluster protection on namespace level
- Restore across OpenShift versions



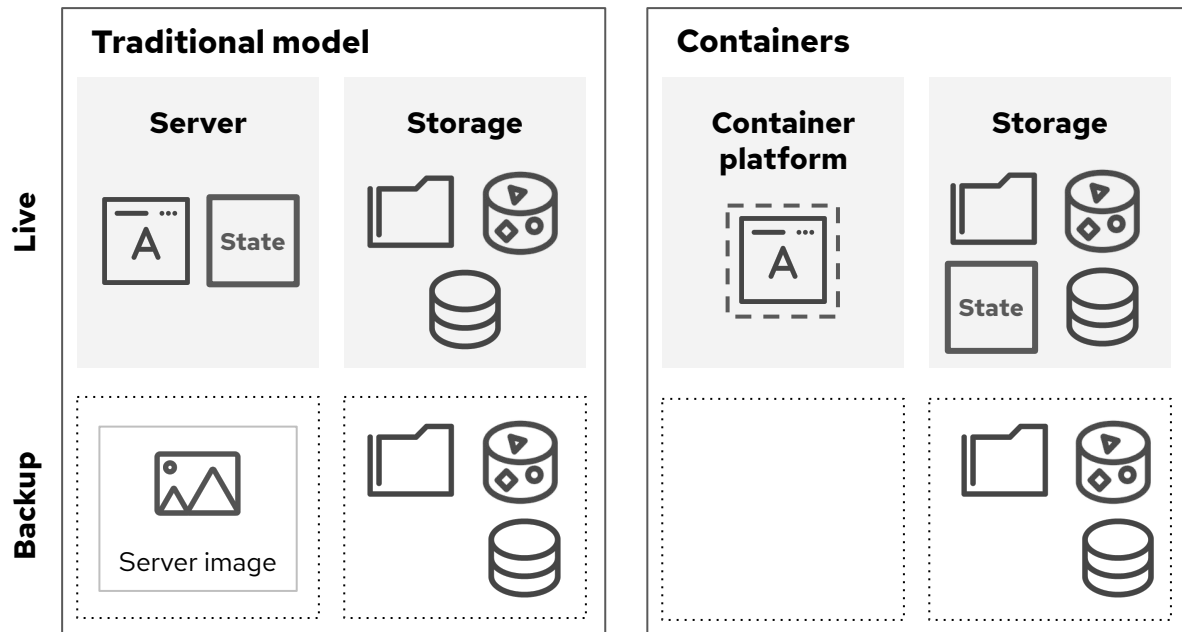
Works alongside existing solutions

- Use existing backup solution
- OCS orchestrates container backup
- No need to replace backup software

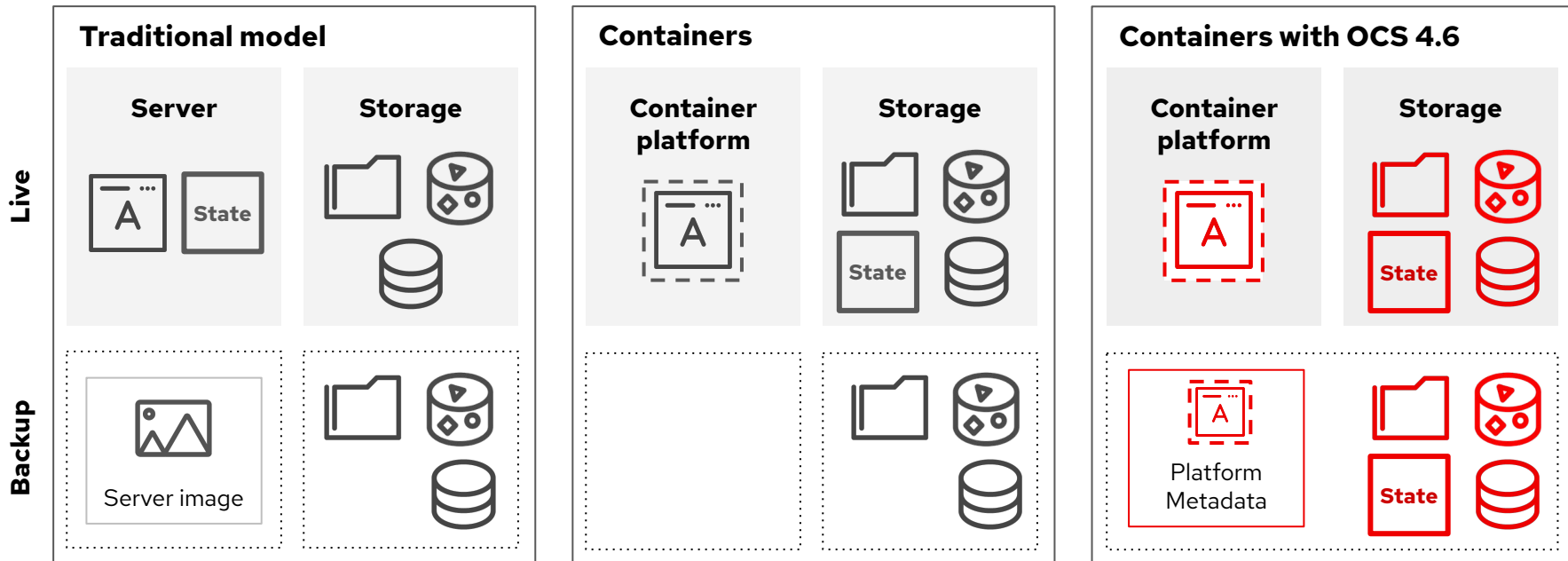
Data resilience for Kubernetes



Data resilience for Kubernetes



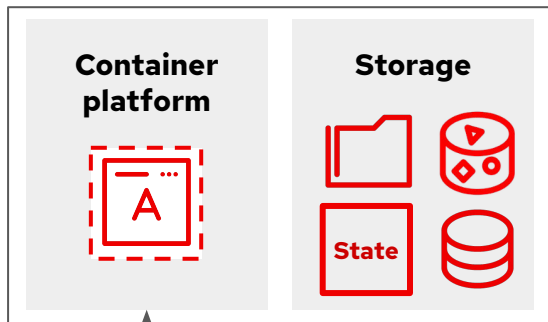
Data resilience for Kubernetes



OADP provides APIs to backup and restore OpenShift cluster resources (yaml files), internal images, and persistent volume data.

Data resilience for Kubernetes

OpenShift Container Platform with OpenShift Container Storage 4.6



**OADP
API**

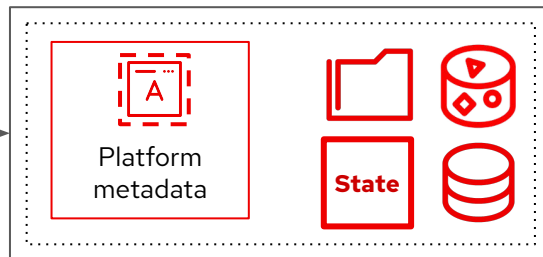
Data protection application



**OADP enabled
backup software**

- Example:
- [IBM Spectrum Protect](#)

Complete data protection set



Demo: <https://youtu.be/KsHT-ZwCsX8>

OADP provides APIs to backup and restore OpenShift cluster resources (yaml files), internal images, and persistent volume data.



OADP: Use what you already have

OpenShift Container Storage 4.6 backup plays nicely with others

- Use existing backup solution
- OADP orchestrates container backup with OpenShift Container Storage
- Provides application consistency versus crash consistency
- Reduced need for training
- Doesn't require additional monitoring

What is OADP?

OpenShift APIs for Data Protection (OADP) is a Red Hat supported operator that provides APIs for:

- Backup
- Restore
- Scheduling
- BackupStorageLocation
- VolumeSnapshotLocation

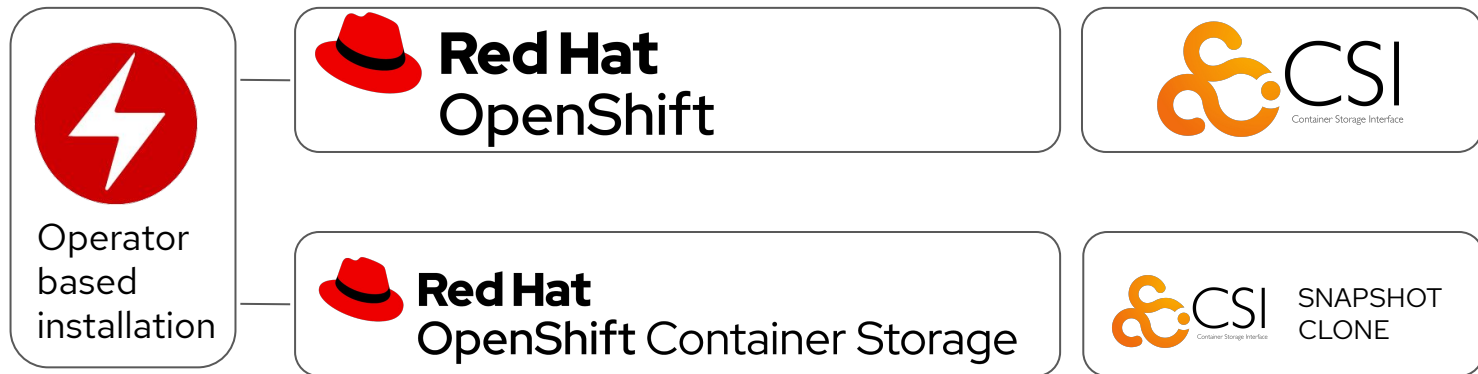
OpenShift Container Storage CSI based snapshot



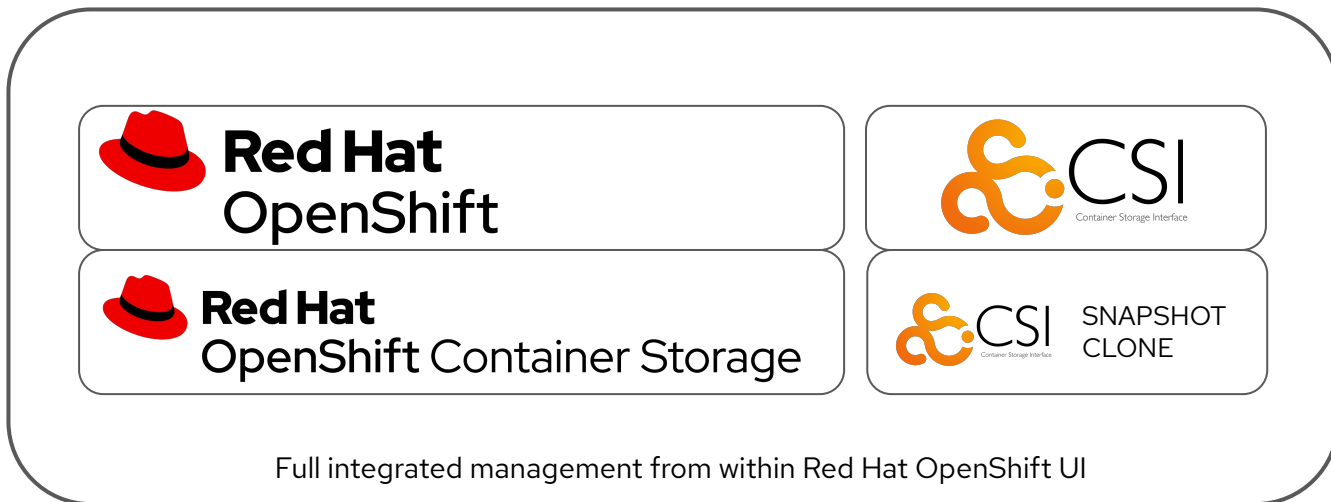
OpenShift Container Storage CSI based snapshot



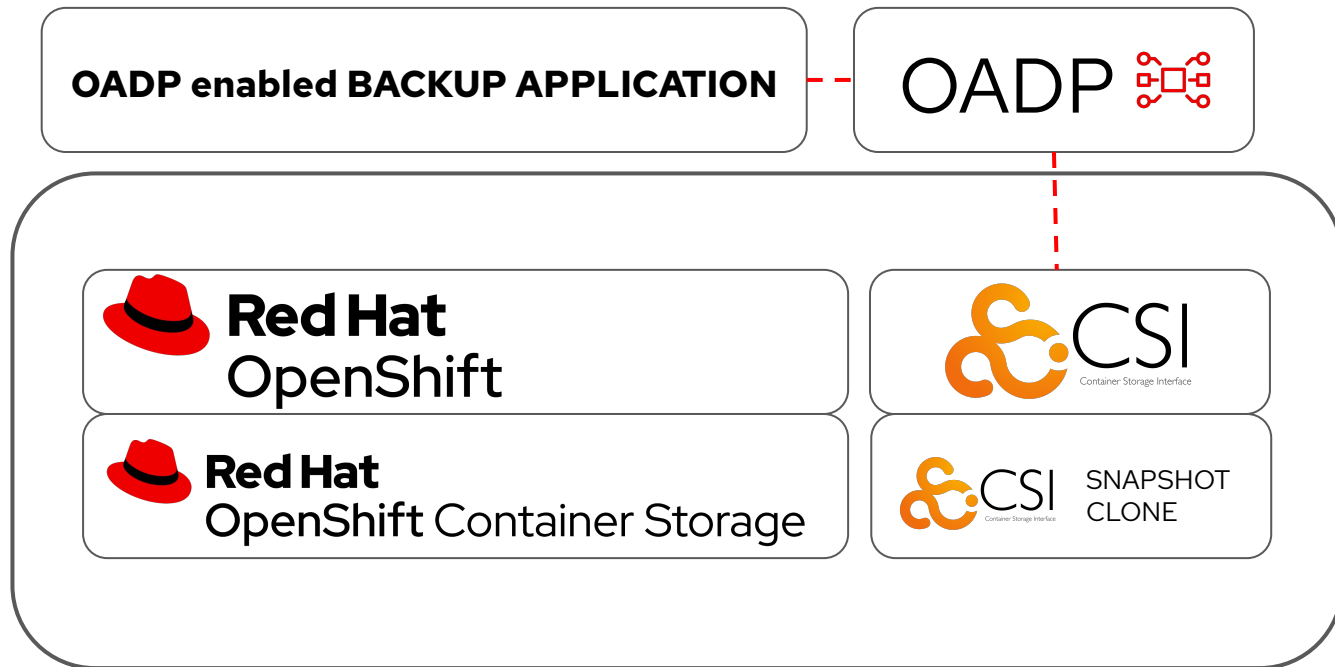
OpenShift Container Storage CSI based snapshot



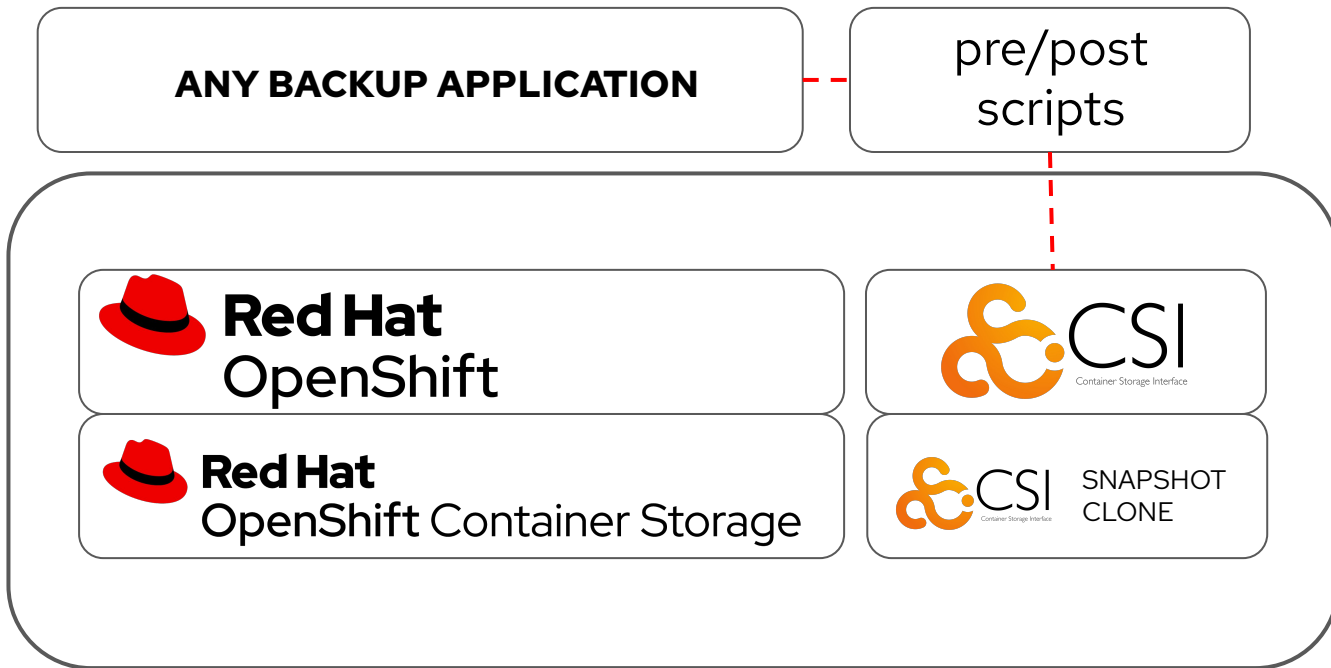
OpenShift Container Storage CSI based snapshot



OpenShift Container Storage CSI based snapshot



OpenShift Container Storage CSI based snapshot



Data resilience tailored to service-level objectives



Backup solution enablement

- Protection against logical failures
- User errors—accidental deletion, bad actors, application software bugs, malicious software, virus
- Restore to the previous point-in-time copy
- Based on snapshots—local and/or remote



WAN DR solution

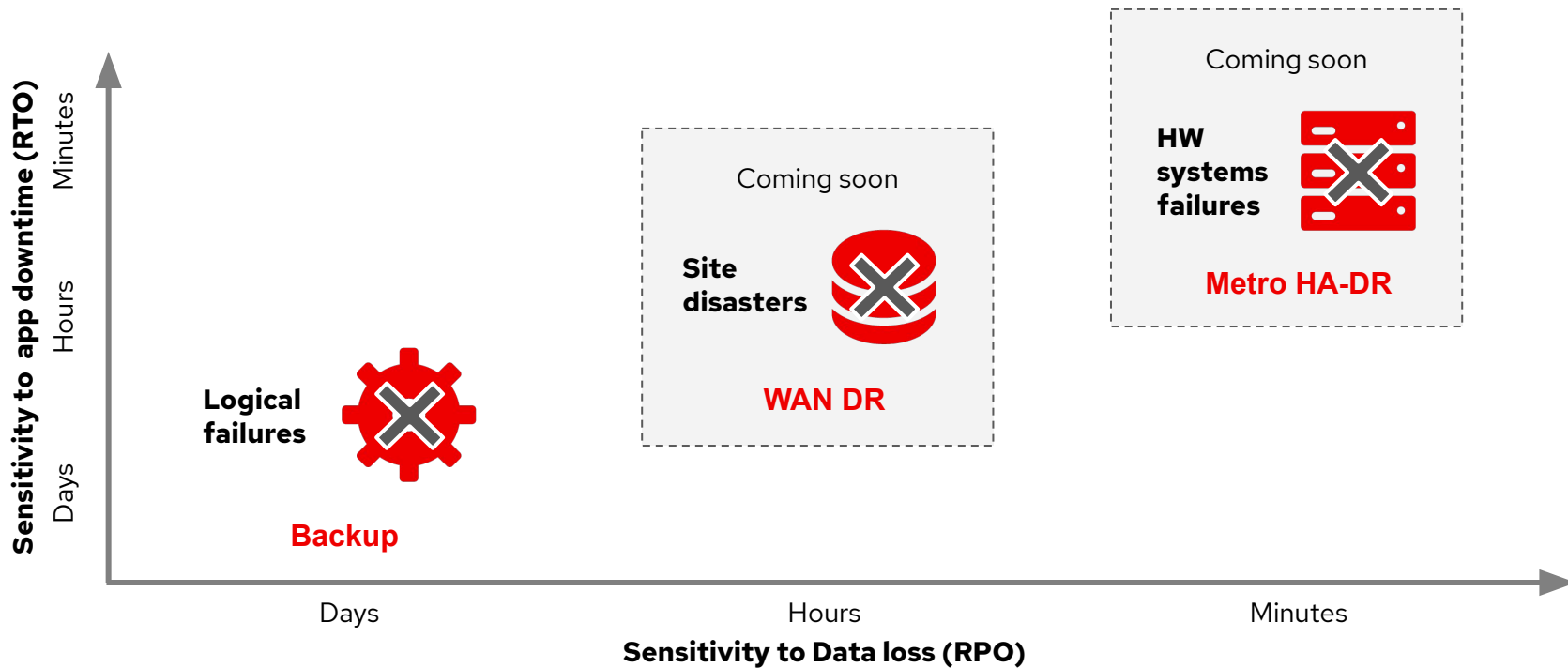
- Protection against datacenter disasters with large blast radius
- Datacenter failures due to power grid or HVAC issues, geographic scale natural disasters—flooding, earthquakes
- Failover to remote standby or hot site with async replication



Metro HA-DR solution

- Protection against HW failures with small blast radius
- Hardware component, systems, or rack level failures
- Automatic failover across availability zones with sync mirroring

Data resilience solutions tailored to service-level objectives



Red Hat OpenShift Container Storage 4.6

Other new features

Other new features in OpenShift Container Storage 4.6



OCS Snapshot and Clone



Encryption at rest for
entire cluster



Multicloud Object
Gateway Namespaces



Multiple storage classes to
introduce new capabilities



LSO enhancement



Improved bare-metal
deployment

Encryption at rest for entire cluster



What

Encryption of all storage devices created by Red Hat OpenShift Container Storage using a self generated encryption key.

Inherent for all storage protocols as encryption is on OSDs.

Why

Protects against disk theft and allow safe RMA of failed local storage devices.

Multicloud Object Gateway namespaces



- A (proxy) bucket that does not digest objects—plain text only
- Connects to existing AWS S3 API compatible buckets AWS S3 and Azure Blob Storage
- Results in an aggregated view of all object resources
- Configures a default writer location

Users can instantly connect to their existing data repositories such as on AWS, Azure, or any other S3 compatible object storage and create a single unified view of their data, via S3 compatible API.

Multiple storage classes to introduce new capabilities



Multiple storage classes enable new features

- **Replica 2**
 - Reduces the burden of replication on top of replication within certain applications or workloads.
 - This type of applications can be assigned to a replica 2 enabled storage class
- **Compression**
 - Enables data reduction.
Can be offered on storage class level

Red Hat OpenShift Container Storage snapshot and clone



- This functionality allows for creation of snapshots and clones through API.
- Customers can use this API directly.
- Enables Backup applications to create OpenShift Container Storage snapshots and/or clones.
- Enables OADP interaction
- OADP provides APIs to backup and restore OpenShift cluster resources (yaml files), internal images, and persistent volume data.

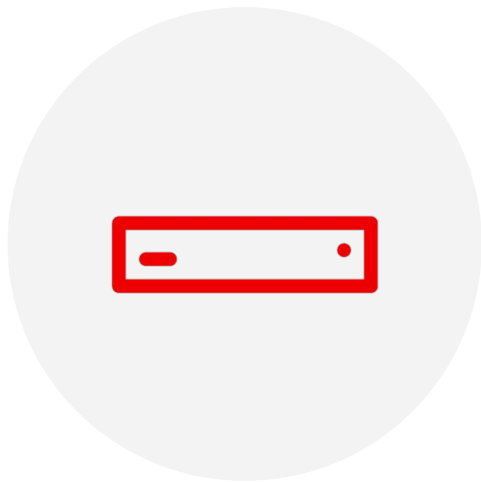
Local storage operator enhancement



LSO

- Within OpenShift Container Storage 4.6 deployment stage, this operator enables automated listing of candidate disk devices and makes them usable for deployment.
- In practice, this means a full automated discovery of all disks without having to go through disk discovery steps manually on node operating system level, outside OpenShift Container Storage.

Red Hat OpenShift Container Storage improved attached devices deployment



The attached devices deployment is improved by using the local storage operator enhancement which comes with OpenShift Container Platform 4.6

- Automated discovery of available disk resources
- No manual disk discovery interactions needed anymore
- Useful in all situations where attached disk devices may apply:
 - Virtual environments
 - Bare metal
 - OpenStack
 - Public cloud

Red Hat OpenShift Container Storage 4.6

Tech preview features

Tech preview in Red Hat OpenShift Container Storage 4.6



Enable multicloud object gateway autoscale of S3 endpoints and performance improvements

Tech preview



Support OpenShift Container Platform compact mode for edge in OpenShift Container Storage

Tech preview



Support OpenShift Container Storage in 8 CPUs, 24 GB RAM nodes cluster

Tech preview



Support expanding OpenShift Container Storage capacity using multiple backend storage classes provided by the platform

Tech preview



Support IBM P and IBM Z OpenShift Container Storage can now be installed and managed using IBM Power Systems, IBM Z and LinuxONE

Tech preview

Multicloud Object Gateway

autoscale of S3 endpoints and performance improvements



Automatically scales Multicloud Object Gateway (MCG) endpoints, as a response to load from apps, using OpenShift autoscaling features

Support Red Hat OpenShift Container Platform compact mode for edge



Compact mode

- New feature, everything runs on a 3 nodes cluster
- Eases proof-of-concept demonstrations for edge or similar use cases
- Only 3 nodes required for OpenShift, OpenShift Container Storage and the workload applications, allowing smaller footprint

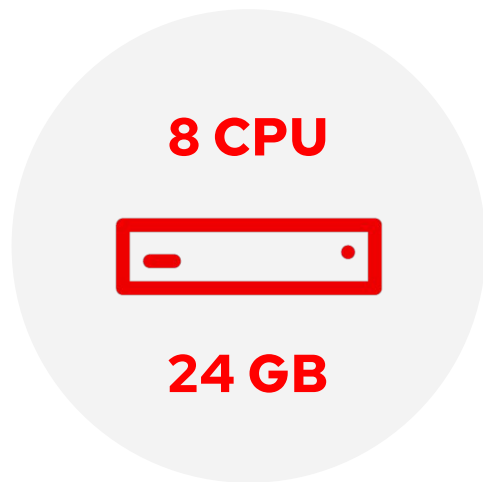
Support expanding Red Hat OpenShift Container Storage capacity using multiple backend storage classes provided by the platform



Customers using VMware infrastructure often deal with datastores of 4 Terabytes sizing as a common practice.

This feature lets those customers use multiple VMware datastores as backend storage for OpenShift Container Storage

Support OpenShift Container Storage in 8 CPUs, 24 GB RAM nodes cluster



- Run OpenShift Container Storage on a lower hardware footprint.
- OpenShift Container Storage will automatically detect the lower footprint and will alert for the same.
- This feature is more convenient for proofs of concept.
- Typically used in edge or similar use cases.

Support IBM P and IBM Z



- OpenShift Container Storage can now be installed and managed using IBM Power Systems
- OpenShift Container Storage can now be installed and managed using IBM Z and LinuxONE
- This feature is Tech preview with OpenShift Container Storage 4.6

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Roadmap

Red Hat OpenShift Container Storage roadmap

4.5

FIPS-validated cryptography

External Mode - use a Red Hat Ceph Storage cluster for OCS source

Object storage by RADOS Gateway Direct option

PV expansion capability

RWX access mode for block storage

unique OCS performance optimization

Cloud scale-proven stability and sustainability with ten billion objects

4.6

CSI Snapshots (GA)

Backup partner base solutions

Three nodes cluster

4.7

Geo-replication for block volumes - Tech Preview

Reference configs for cluster failover - Tech Preview

2 zone stretch cluster

Isolated multi-cluster availability - Dev Preview

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Q & A

<https://www.redhat.com/dataservices>

<https://www.redhat.com/storage>

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