Red Hat OpenShift Container Storage 4

Dynamic, shared, and highly available storage for OpenShift applications

Key benefits

- Agility, scalability, and portability across hybrid cloud and multicloud environments, resulting in lower IT operations costs
- An integrated platform, including container host, Kubernetes, application life-cycle management, and storage, using any infrastructure
- Greater value from operations and development teams, with the ability to easily deploy storage in container-based environments
- Storage that is validated, integrated, tested, and supported with Red Hat OpenShift Container Platform
- Simpler installation and upgrades, leading to faster application development cycles and more frequent software deployments

Overview

Red Hat® OpenShift® Container Storage is persistent software-defined storage integrated with and optimized for Red Hat OpenShift Container Platform. It runs anywhere Red Hat OpenShift does: on-premise or in the public cloud. Built on Red Hat Ceph® Storage, the Rook operator for Kubernetes storage orchestration, and NooBaa multicloud object gateway technology, the platform offers tightly integrated, persistent data services for OpenShift and the hybrid multicloud. Dynamic, stateful, and highly available container-native storage can be provisioned and deprovisioned on demand as an integral part of the OpenShift administrator console.

Red Hat OpenShift Container Storage

Red Hat OpenShift Container Storage is engineered, tested, and qualified to work with Red Hat OpenShift Container Platform on any infrastructure (Figure 1). Together, these technologies provide everything needed for hybrid cloud, enterprise container, and Kubernetes development and deployment. This level of integration removes the guesswork from running Red Hat OpenShift across multiple platforms while providing data storage functionality, data services, and data protection that enterprises require.

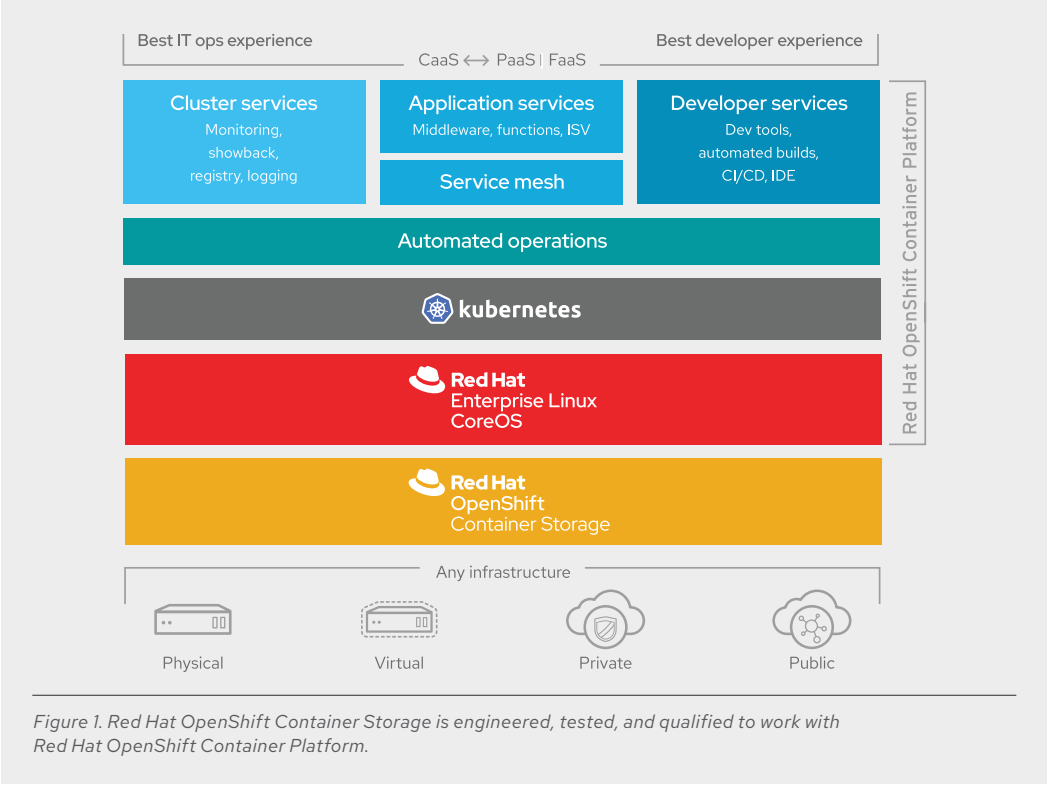

Figure 1. Red Hat OpenShift Container Storage is engineered, tested, and qualified to work with Red Hat OpenShift Container Platform.

Developer-driven agility

To gain agility, organizations need to reduce complexity for cloud-based apps and data, allowing rapid and flexible deployment of application data across any cloud. Red Hat OpenShift Container Platform lets developers move quickly to deliver application programming interface (API)-driven persistent storage at the click of a button. Through container-native virtualization, both containers and virtual machines can be deployed on Red Hat OpenStack® Platform, fully supported by Red Hat OpenShift Container Storage. Rook and Noobaa Kubernetes Operators offer simplified storage management and data portability across public, private, and hybrid clouds.

Performance at scale

Moving to the cloud cannot come at the expense of application performance. Native object support in Red Hat OpenShift Container Storage dramatically increases input/output (I/O) performance, in turn increasing performance for cloud-based workloads. The platform provides high-performance storage for a broad range of Red Hat OpenShift workloads, supporting Kubernetes pods and artificial intelligence/machine learning (AI/ML) workloads.

Multicloud workload portability

You need to be able to move quickly, deploying, scaling, or redeploying apps on your choice of cloud platform as your needs change. Red Hat OpenShift Container Storage provides policy-based administration for scale and automation, providing deployment flexibility that spans on-premise and multicloud footprints. Data can be kept in multiple locations while using a single access point.

Benefit	Features and details
Agility	Fully integrates with Red Hat OpenShift Container Platform for Day 1 and Day 2 installation and management. A single unified platform supports: • Block storage for databases and messaging. • Shared file storage for continuous integration and data aggregation. • Object storage for data lakes, archival, backup, and media storage. Storage nodes are full members of the OpenShift cluster. Red Hat OpenShift Container Storage nodes are managed through the OpenShift administrator console via the Rook Kubernetes storage orchestrator.
Scalability	Supports traditional and emerging OpenShift workloads, allowing easy data-sharing across geographic locations and platforms, and scales to orders of magnitude more persistent volumes (PVs) per OpenShift Container Storage cluster than previous releases.
Portability	Offers easy cross-cloud data placement and access, along with hybrid and multicloud data protection for enterprise applications. Consistent OpenShift management tools work across environments, whether on-premise or in the public cloud. The multicloud object gateway provides data federation across multiple private and public clouds.

Tight integration with Red Hat OpenShift Container Platform

Red Hat OpenShift Container Storage 4 is created for container-based environments and is tightly integrated with Red Hat OpenShift Container Platform.[1] Support for the Rook storage orchestrator for Kubernetes makes storage simpler to install and manage as a part of the container-based application life cycle. With this innovation, Red Hat can provide support for the entire container-based environment, including cloud-native container management, scheduling, and orchestration, yielding:

- **Enterprise-class storage for Kubernetes.** Enterprise applications require storage with enterprise capabilities. For a stateful app to exhibit high availability, its data must first be highly available. Red Hat OpenShift Container Platform supports important features like replication, allowing application data to be placed across different availability zones.
- **A cloud-like experience, everywhere.** Circumstances are constantly changing, favoring one cloud provider over another, or in-house deployment versus the public cloud. Organizations need the ability to move quickly to take advantage of favorable pricing or respond to other business pressures. Red Hat OpenShift Container Storage provides software-defined storage that lets organizations deploy their apps and storage as needs dictate and adjust as they move forward.
- **Increased developer productivity.** Cloud developers want to innovate without arbitrary limitations. Traditional storage has been an impediment to cloud development, requiring separate and time-consuming arrangements. Red Hat OpenShift Container Storage provides common functionality across all cloud platforms, simplifying life for developers.

Embracing diverse workloads

Most cloud providers support data storage for diverse workloads, but they typically do so with different—potentially proprietary—software-defined storage technology. Not only is this complexity time-consuming to understand and manage, but it can effectively lock applications into a given cloud vendor, since other vendors offer a different mix of storage technologies and capabilities. In contrast, Red Hat OpenShift Container Storage provides container-native storage that supports multiple workload types, and it does so uniformly across multiple cloud platforms.

Based on 100% open source technology, Red Hat OpenShift Container Storage supports file, block, and object storage and employs a single set of Kubernetes Operators across all cloud platforms. Organizations can support multiple workload types with a single software-defined storage solution, and applications can move easily between cloud platforms with guaranteed compatibility.

Accelerating application development

Developer productivity depends on agile continuous integration/continuous delivery (CI/CD) pipelines and responsive infrastructure. To perform effectively, developers require self-service storage deployment access, freeing them from having to think about storage provisioning as a separate activity that often causes delays. With comprehensive support for Kubernetes, Red Hat OpenShift Container Storage automates the provisioning of storage alongside the provisioning of application resources, all within the OpenShift administrator console. Container-based tools like Jenkins can run on Red Hat OpenShift Container Storage to automate the CI/CD pipeline with good performance.

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1 *Refer to the latest Red Hat OpenShift Container Storage 4 release notes for supported platforms.*

Supporting databases with high-performance storage

As databases have moved to container-based environments, the need for performant container-based storage has become acute, particularly as the amount of stored data has grown. Databases require persistent storage volumes to support data availability and failover scenarios. If one or more Kubernetes pods representing a database service move from one one node to another, the data they use must remain persistent and available for access after the pods move. Red Hat OpenShift Container Storage provides persistent storage for databases that supports their availability needs, as well as providing simplified portability across multiple cloud platforms.

Simplifying storage for data analytics

Data analytics is evolving rapidly, both in terms of traditional static data analysis as well as dynamic AI/ML environments. Like developers, data engineers and analysts don't have time to become expert storage managers or to on time-consuming storage allocation from other groups within the enterprise. Red Hat OpenShift Container Storage lets data scientists and those who support them deploy and manage cloud-portable storage on demand. Data scientists can deploy the platforms they need to do their jobs without thinking about how data is stored, or what is required to move datasets to another platform.

Conclusion

Container-native Red Hat OpenShift Container Storage storage provides agile, scalable, and portable persistent data services anywhere that Red Hat OpenShift runs—across on-premise infrastructure, the public cloud, or hybrid clouds. The platform offers tightly integrated persistent data services that can serve a broad range of workload types. Deploying Red Hat OpenShift Container Storage simplifies data management and allows storage to be provisioned and deprovisioned on demand as an integral part of orchestrated, container-based environments.

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