

Red Hat OpenShift 4 on VMware vSAN™

With Cloud Native Storage in VMware vSphere® and vSAN through the Container Storage Interface (CSI) Driver

BENEFITS OF RUNNING OPENSIFT ON VMWARE vSAN WITH CLOUD NATIVE STORAGE

- Dynamic and automatic provisioning of persistent volumes
- Consistent data management between VM- and container-based workloads
- Developer self-service APIs to boost productivity
- Rapid application deployment with full stack agility
- Cloud operating model extending across private and hybrid cloud

Red Hat OpenShift 4 on VMware vSAN with Cloud Native Storage through the Container Storage Interface (CSI) Driver on vSAN

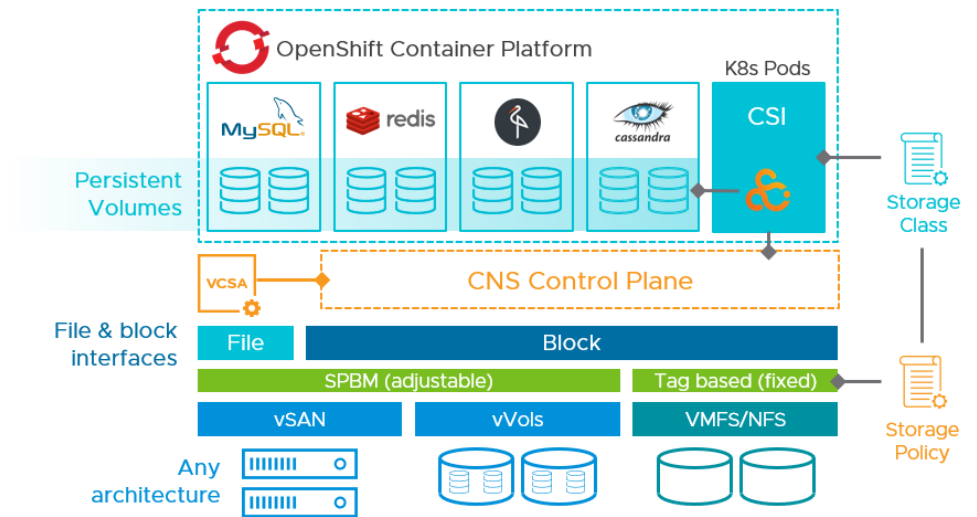
Containers have become a prominent technology to deliver the speed, agility, portability, and scalability required by developers, without compromising the security and visibility required by IT operations. Red Hat OpenShift Container Platform and VMware Software-Defined Data Center (SDDC) technologies are a great combination for delivering an enterprise container platform on a virtual infrastructure.

Red Hat OpenShift is an enterprise-ready Kubernetes container platform with full-stack automated operations to manage hybrid cloud and multi-cloud deployments. Red Hat OpenShift is optimized to improve developer productivity and promote innovation.

The integration between Red Hat OpenShift and Cloud Native Storage through the CSI driver on vSAN enables developers to provision persistent storage for OpenShift workloads on vSphere on-demand in an automated fashion. It also allows IT administrators to manage container volumes through the Cloud Native Storage UI within VMware vCenter® as if they were VM volumes. Developers and IT administrators can now have a consistent view of container volumes and troubleshoot at the same level.

Solution Architecture

Kubernetes clusters deployed on OpenShift Container Platform with vSphere can leverage Cloud Native Storage through the CSI driver on vSAN, a core element of VMware Cloud Foundation™ to provision and manage stateful modern applications.



Red Hat OpenShift

Red Hat OpenShift is an enterprise-ready Kubernetes container platform with full-stack automated operations to manage hybrid cloud and multi-cloud deployments. Red Hat OpenShift is optimized to improve developer productivity and promote innovation:

- Offer automated installation, upgrades, and lifecycle management throughout the container stack—the operating system, Kubernetes and cluster services, and applications—on any cloud.

1. This solution was validated against VMware Cloud Foundation 3.9.1 and it applies to VMware Cloud Foundation 3.9.1 and above.

- Help teams build with speed, agility, confidence, and choice. Code in production mode anywhere you choose to build. Get back to doing work that matters.
- Focused on security throughout the application lifecycle. It includes long-term, enterprise support from one of the leading Kubernetes contributors and open source software companies.

Hyperconverged Infrastructure for Cloud-Native Applications

VMware Hyperconverged Infrastructure (HCI), powered by vSAN, is the market leader in low cost and high performance next-generation HCI solutions. vSAN delivers TCO reduction benefits over traditional 3-tiered architecture by eliminating infrastructure silos. vSAN also allows customers to achieve infrastructure agility and scalability by converging traditional compute and storage silos onto industry-standard servers, dramatically simplifying operations. vSAN is a bundled component in VMware Cloud Foundation.

Cloud Native Storage through the CSI Driver on vSAN

Cloud Native Storage through the CSI driver in vSAN is natively integrated into vCenter. It is a solution that provides comprehensive data management for both stateless and stateful applications. When you use cloud native storage, you can create containerized stateful applications capable of surviving container restarts and outages. Stateful containers leverage storage exposed by vSphere that can be provisioned using Kubernetes primitives such as persistent volume, persistent volume claim, and storage class for dynamic provisioning.

The CSI driver on vSAN is an interface that exposes vSphere storage to containerized workloads managed by Red Hat OpenShift as well as other container orchestrators. It enables vSAN and other types of vSphere storage to support stateful applications.

Key Benefits of Cloud Native Storage through the CSI Driver on vSAN

Cloud Native Storage through the CSI driver on vSAN allows cloud native applications to persist data on all supported vSphere storage backends with the following benefits:

- Unified management for today's and tomorrow's applications: tight integration with Kubernetes through the use of a CSI driver for vSphere storage such as VMware vSAN. Persistent volumes used by these applications can be easily managed by a vSphere administrator, just as easily as managing a virtual machine's virtual disks. The tight integration with Kubernetes brings operational consistency that increases the productivity and efficiency of both developers and IT administrators:
 - Consistent definition of storage policies through the integration between Kubernetes StorageClass primitive (what developers use to dynamically provision persistent volumes for their applications) and vSAN Storage Policy-Based Management policies (what vSphere administrators use to define storage policies and assign to StorageClasses)
 - Consistent labeling of container volumes, allowing admins and developers to talk in the same language and to have consistent visibility into container volumes
 - Consistent method of troubleshooting between virtual machines and container volumes.
- Dynamic and automatic provisioning of persistent volumes: developers can use Kubernetes APIs that they are familiar with to provision storage resources.

- Standardizing on the deployment of storage for Kubernetes while providing the flexibility of using various Kubernetes distributions, with the consistent processes and tools in the cloud environment.

Takeaway

Deploying Kubernetes at scale is made simple through the integration between Red Hat OpenShift and VMware SDDC technologies, which delivers consistent VM and container management, and allows developers and IT administrators to collaborate on building and running modern applications.

Cloud Native Storage in vSphere and vSAN, built on the CSI standard for container storage such as vSAN, enables automatic and dynamic provisioning of persistent volumes for stateful applications, as well as operational consistency between VM and container volume management.

When using VMware Cloud Foundation as a unified SDDC platform, it further simplifies and accelerates the deployment of Red Hat OpenShift by automating the deployment of underlying virtual infrastructure.

Resources

- Read the blog post on [Installing and Configuring vSphere CSI Driver on OpenShift 4.3](#).
- Read the documentation on [Kubernetes vSphere Cloud Provider](#).
- Learn about building, running, and managing cloud native applications on [The Cloud Native Apps Blog](#).
- Learn about [Red Hat OpenShift on VMware](#).
- Check out the one-stop VMware Hyperconverged Infrastructure documentation on [StorageHub](#).
- Learn more about VMware Cloud Foundation on [the website](#).
- Check out Cloud Foundation [Blog](#), [Twitter](#), and [YouTube](#) for the latest updates on Cloud Foundation.

