

# Modernize at the edge

## Two-node OpenShift with arbiter and Portworx

### Red Hat OpenShift and Portworx deliver a compact, high-availability platform for VMs and containers at the edge.

Designed for space-constrained and power-limited environments.

Supports a 2-node architecture with an arbiter to maintain quorum and provide resilience.

Ideal for modernizing infrastructure at the edge without traditional SAN arrays.

Uses Portworx for Kubernetes-native storage, supporting both containers and VM disks.

Offers a unified platform for VMs and container workloads from a single control plane.

### Edge deployment challenges

Many organizations are extending their applications closer to users and data sources by deploying infrastructure at the edge. But running virtual machines (VMs) and containerized workloads outside the datacenter introduces new challenges. Edge environments often face space constraints, limited connectivity, and the need for high availability without traditional infrastructure. At the same time, the broader virtualization marketplace is shifting—vendors are consolidating, licensing costs are rising, and organizations are under pressure to modernize rapidly without increasing complexity.

Red Hat® OpenShift®, with Red Hat OpenShift Virtualization and Kubernetes at its core, combined with Portworx by Pure Storage delivers a unified platform for deploying VMs and containers in the cloud, in the datacenter, and at the edge. This solution lets enterprises manage applications consistently across sites while providing high availability, disaster recovery, and data protection in resource-constrained environments. With support for a lightweight, 2-node architecture and a quorum-preserving arbiter model, Red Hat OpenShift and Portworx simplify edge operations without compromising resiliency.

In combination with the Red Hat OpenShift hybrid cloud application platform, Portworx helps organizations:

- ▶ Automate deployment and operations with self-service storage, automated capacity management, and Kubernetes-native data management, delivering consistency across local storage and third-party storage arrays.
- ▶ Protect the organization with business continuity, container-granular backups, and ransomware protection.
- ▶ Unify the platform with simultaneous data management for VMs and containers, a cloud operating model for data, and a platform for data services.
- ▶ Enforce quality of service with Application I/O Control, reducing storage-performance degradation due to “noisy neighbors” (applications that consume too much bandwidth).

### Modernize at the edge with Red Hat and Portworx

Organizations deploying infrastructure at the edge often face space, power, and connectivity limitations that make traditional storage architectures—like storage array networks (SAN)—impractical. Now, as infrastructure teams modernize and explore Kubernetes, they need a similarly compact, reliable, and scalable solution that works natively with both containers and VMs.

Red Hat OpenShift, with OpenShift Virtualization, provides an enterprise-ready foundation for running VMs at the edge using familiar concepts like live migration, central processing unit (CPU) and memory tuning, and high availability without requiring bulky hardware infrastructure. Combined with Portworx by Pure Storage, organizations can deploy a hyperconverged Kubernetes-native storage platform that brings high availability, disaster recovery, and performance to edge environments—without dedicated SAN or external storage arrays.

This solution is optimized for edge sites that require:

- ▶ Minimal hardware (2 worker nodes and 1 lightweight arbiter).
- ▶ High resilience and local failover.
- ▶ Autonomous operation, even when disconnected from the core.

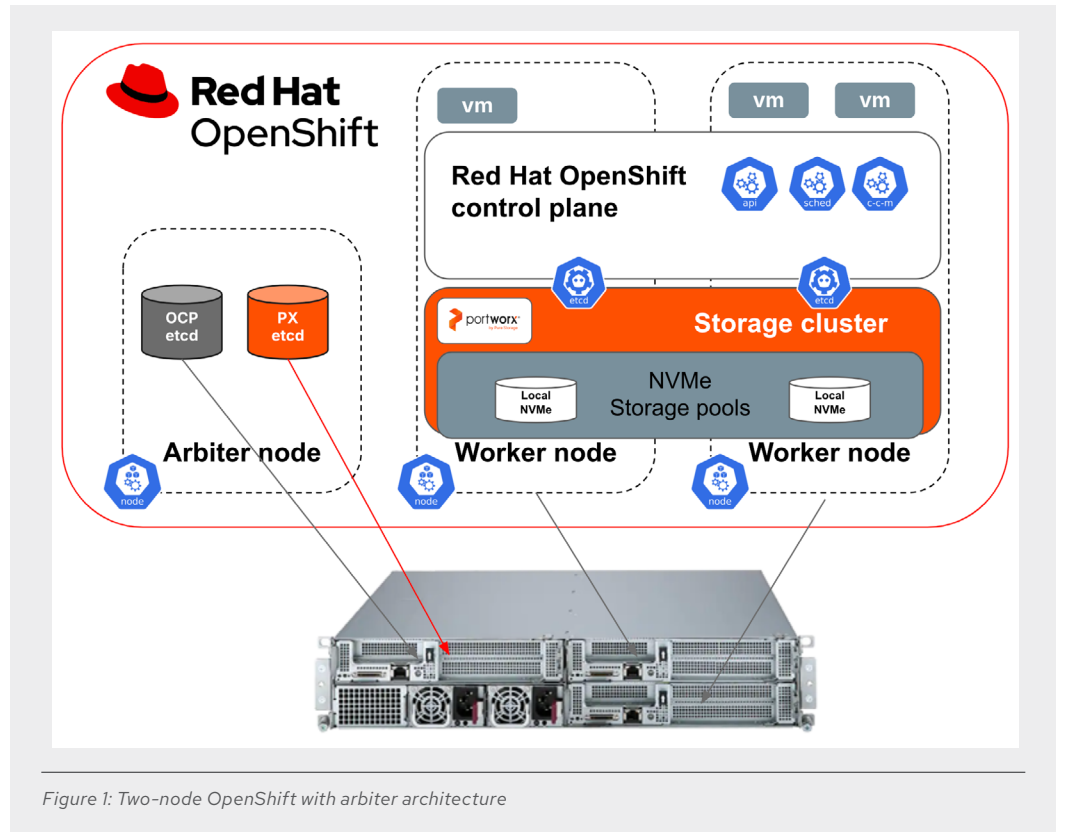
With Red Hat OpenShift and Portworx, you can modernize edge infrastructure on your terms, maintaining VM support where needed, introducing containers where appropriate, and using a single platform for operations across all environments.

### **Edge optimized infrastructure**

This edge-ready solution supports Red Hat OpenShift in constrained environments by using OpenShift Virtualization and Portworx storage in a compact architecture. You can begin with a small Red Hat OpenShift footprint—with 2 worker nodes plus 1 arbiter—and scale operations using consistent tools and processes across your entire organization.

By combining Red Hat OpenShift with Portworx on compact, rugged edge servers such as Dell PowerEdge XR8000, HPE Edgeline Converged Edge Systems, or Supermicro SuperServer SYS-210SE-31A, organizations can deploy a fully functional, high-availability Kubernetes environment that supports both VMs and containers without the space, power, and cost burdens of traditional infrastructure. These small-form-factor, short-depth, modular chassis allow for 2 Red Hat OpenShift worker nodes to run both application workloads and Portworx storage services. A 3rd, small-footprint appliance serves as the arbiter for maintaining quorum for both Red Hat OpenShift and Portworx control planes, without needing a 3rd worker node.

This design minimizes hardware at the edge while preserving high availability for both platform and storage layers. Portworx handles persistent storage for containerized applications and VMs managed by OpenShift Virtualization, providing synchronous replication, automated failover, and application-consistent snapshots. The result is a resilient, production-grade edge configuration with significantly reduced power, cooling, and operational overhead—ideal for constrained or remote environments.



Once the foundation is in place, your teams can modernize incrementally. Whether you are managing a small factory floor deployment or a large network of retail locations, the platform allows for centralized policy enforcement with decentralized resilience and performance. With this solution, organizations have the flexibility to deploy virtual SAN clusters with a modern infrastructure optimized for edge computing.

### Red Hat OpenShift Virtualization

Included in Red Hat OpenShift, OpenShift Virtualization delivers a modern platform for organizations to run and deploy their VM workloads. It lets you migrate and manage traditional VM-based applications onto a trusted, consistent, and comprehensive hybrid cloud application platform. The platform offers a path for infrastructure modernization, preserving investments in existing virtualized applications while embracing hybrid cloud infrastructure and modern management and development principles.

OpenShift Virtualization offers a range of advantages over other approaches, letting you:

- ▶ **Ease migration.** Red Hat OpenShift includes the [migration toolkit for virtualization](#), which provides a simple way to migrate existing VMs from source providers. You can even migrate VMs to the cloud or between Red Hat OpenShift clusters in the hybrid cloud.

- ▶ **Speed time to production.** Red Hat OpenShift accelerates infrastructure and application delivery with a platform that supports self-service options and integrations of continuous integration and continuous delivery (CI/CD) pipelines. Developers can build, test, and deploy workloads in less time with Red Hat OpenShift.
- ▶ **Manage everything from a single platform.** Red Hat OpenShift simplifies operations, providing a single platform for VMs, containers, serverless and AI/ML workloads. Organizations can standardize infrastructure deployment and maintain all workloads using a common and consistent set of established enterprise tools.
- ▶ **Modernize your infrastructure.** Migrating VMs from other platforms to OpenShift Virtualization honors existing virtualization investments. Organizations can then capitalize on cloud-native architectures, streamline operations and management, and explore new development approaches.

### **Portworx Enterprise on Red Hat OpenShift**

Modern enterprises need a hybrid cloud platform with cloud-native storage and data management solutions to keep pace with application volume and customer demand for new products and services. Portworx adds critical cluster-data services to Red Hat OpenShift, providing unique value to critical applications. As an enterprise-grade storage solution, Portworx Enterprise meets the performance and scalability needs of virtualized workloads within Red Hat OpenShift. Portworx reliably manages persistent volumes for VM disks while providing an onramp for stateful, containerized workloads and emerging technologies like machine learning operations (MLOps) and AI. The unified storage solution makes operations more efficient by helping organizations:

- ▶ **Save time** through 1-click deployment and operation of multiple databases and storage, dramatically reducing application deployment time.
- ▶ **Improve application performance** by running critical applications in production with built-in high availability and on-demand scalability.
- ▶ **Build data resiliency** with zero recovery point objective (RPO) disaster recovery across datacenters and regions to reduce failover time, making your Red Hat OpenShift environment globally available and fault-tolerant.
- ▶ **Make data more accessible** through flexible infrastructure so developers can more readily access storage or data services and move data across clouds.
- ▶ **Scale Red Hat OpenShift in production** with on-demand access to storage, high availability, and fault-tolerant performance.

## Learn more

For more information and technical details on running Portworx on Red Hat OpenShift, see the [Portworx on Red Hat OpenShift bare metal reference architecture](#) and the [Red Hat OpenShift Virtualization addendum](#).

[Get started](#) in the Developer Sandbox, launch a trial cluster of Red Hat OpenShift Dedicated, or set up a self-managed Red Hat OpenShift Container Platform trial. You can also walk through an [interactive demo](#) highlighting Portworx storage in a two-node OpenShift with arbiter.

To put your knowledge to work, find out more about Portworx with Red Hat OpenShift Virtualization [workshops](#) and register for an in-person or online [event](#). You will get access to a Red Hat OpenShift cluster with Portworx already installed alongside guidance from a live instructor. The lab lets participants explore the persistent storage benefits that Portworx offers, prove data availability across a node failure, and conduct a live migration.

## About Portworx

Portworx products enable you to run any cloud-native data service in any cloud or on-premise datacenter using any Kubernetes platform, with built-in high availability, data protection, data security, and hybrid-cloud mobility.



## About Red Hat

Red Hat helps customers standardize across environments, develop cloud-native applications, and integrate, automate, secure, and manage complex environments with [award-winning](#) support, training, and consulting services.

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