SOLUTION BRIEF

Enhancing OpenStack Deployments with Pure Storage

Performance, simplicity, and advanced storage features for OpenStack environments.

OpenStack is widely used open-source software for building public and private clouds. Pure Storage® streamlines OpenStack deployments by simplifying integration, enhancing performance, and increasing storage efficiency on all-flash arrays. With sub-millisecond latencies and instant read/write availability, Pure Storage provides a fast, simple, and reliable solution for organizations deploying OpenStack.

Simple and Automated Configuration

OpenStack configuration on FlashArray™ and FlashBlade® products requires minimal effort compared to other vendors' solutions, which may need additional work such as pre-configuration of back-end arrays. With Pure Storage, no pre-configuration is necessary.

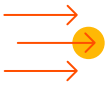
All configuration is controlled by the Pure Storage drivers for OpenStack. Integration with Cinder—the block-storage service for OpenStack—can save deployment and maintenance time. Storage administrators aren't required to learn another tool or graphical user interface (GUI) or waste time setting up multiple back-end arrays. It supports iSCSI, Fibre Channel SANs, NVMe-RoCE and NVMe-TCP dataplanes. All storage activities can be done through the OpenStack GUI, including:

- Creating and deleting volumes
- Attaching and detaching hosts
- Creating, deleting, and reverting snapshots
- Enabling full synchronous and asynchronous replication support
- Using OpenStack generic volume groups
- Creating per-volume native quality of service (QoS)

Integration with Manila—the file-share service for OpenStack—allows management of NFS shares directly from a Pure Storage FlashBlade, with support for snapshots and share ACL control.

A History of Support

Since 2014, Pure Storage has provided premium support for new OpenStack releases with a history of rich feature innovation.



Faster Is Better

Pure Storage accelerates critical OpenStack workloads with robust performance, minimal latency, and proven resiliency

Greener Storage

Pure Storage is a leader in high-density, energy efficient storage, helping organizations meet power and sustainability goals.

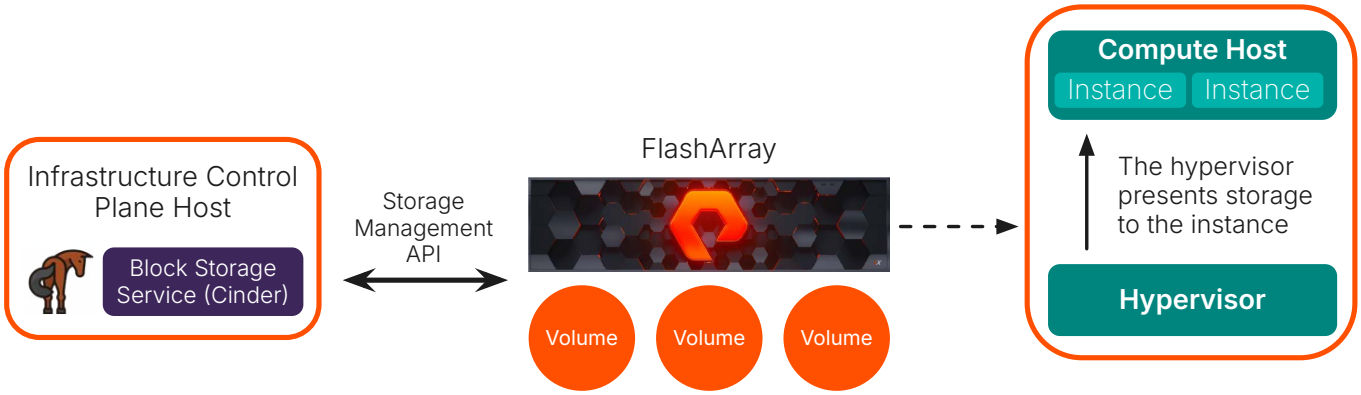


FIGURE 1 Pure Storage FlashArray integrates with the OpenStack Block Storage service (Cinder) to provide storage to OpenStack hypervisors and instances

Orchestration

Pure Storage provides further OpenStack control with the Python automation toolkit. For organizations who want to automate control over their storage, this toolkit—available to all Pure Storage customers via the Pure Storage Open Connect Github—provides access to common storage capabilities using Python, including:

- Automated snapshot policies
- Capacity management and monitoring
- Volume management

Organizations that want full customization control over their FlashArray devices can make use of a comprehensive RESTful API from Pure Storage. This API helps organizations develop custom solutions for managing their Pure Storage arrays using common programming languages, such as PowerShell and Python. Organizations can create custom tools that simplify orchestration and management tasks and streamline workflows. These benefits can help lower OpenStack operational costs while giving OpenStack administrators the tools they need to efficiently manage their deployments.

Efficient, Reliable Storage for OpenStack Deployments

As OpenStack implementations grow, managing storage can become more complex and expensive. Organizations commonly rely on "white-box" direct-attached nodes to provide storage for their OpenStack deployments, commonly in conjunction with Ceph, the open source software-defined storage platform. Yet managing these nodes can be difficult, especially as the number of nodes grows into the dozens, hundreds, or more. White-box nodes are often costly to maintain, as well as slow and complex. Additionally, these nodes can suffer from reliability issues, might not provide data-reduction features that help reduce storage costs, and can drive up power consumption.

Pure Storage uncomplicates your storage environment. The hardware, software, and cloud management experiences are co-designed to make everything just work. Systems never require performance tuning, and all array software and features are included. Pure Storage is the ideal solution for a limited IT staff that wants to spend less time keeping things running and more time innovating.

For the ultimate in performance and array density, FlashArray//XL™ allows you to consolidate more business services—bigger databases, more users, and more app workloads—on fewer arrays. For high performance workloads that don't need the density of FlashArray//XL, the FlashArray//X™ family delivers consistent low latency across a range of size and performance options. Always-on Quality of Service (QoS) provides IOPs and bandwidth limits to ensure applications get the resources they need.

For less demanding workloads and those that are capacity oriented, FlashArray//C™ lets you consolidate workloads with consistent all-flash performance at a lower TCO than hybrid storage. FlashArray//C provides a 100% NVMe all-flash experience for capacity-oriented applications, test and development work, multi-site disaster recovery, and data protection. FlashArray//C can also act as a target for Cinder NFS backups.

Finally, FlashArray//E™ delivers all-flash reliability and energy advantages at the price of disk. It's ideal for archive and repository storage.

Service Resiliency

OpenStack deployments of any size require reliable storage and data protection. The OpenStack Block Storage service (Cinder) provides block storage to virtual machines (VMs), hosts, and containers within the OpenStack ecosystem. If a storage device failure occurs, all OpenStack services that use the storage device are negatively impacted.

FlashArray provides field-proven 99.9999% availability, a number that includes capacity expansions and controller upgrades. Many Pure Storage customers have never had a moment of array downtime. FlashArray provides built-in redundancy, data protection, business continuity, and disaster-recovery capabilities that are all used by OpenStack.

OpenStack often forms the core of critical services, such as telecom 5G infrastructure and financial services regulatory compliance, so data protection and recoverability are crucial. Purity ActiveCluster™ provides fully symmetric active-active bidirectional replication for RPO zero, and transparent failover for RTO zero. For longer distances, Pure Storage also provides asynchronous replication.

With the release of OpenStack 2023.1 (aka Antelope), these replication features can be used together in a fully featured three-site replication setup. A "replication type" called "trisync" allows a single volume to be created and replicated to both a synchronous target and a different asynchronous target concurrently, providing a true 3-site disaster recovery configuration.

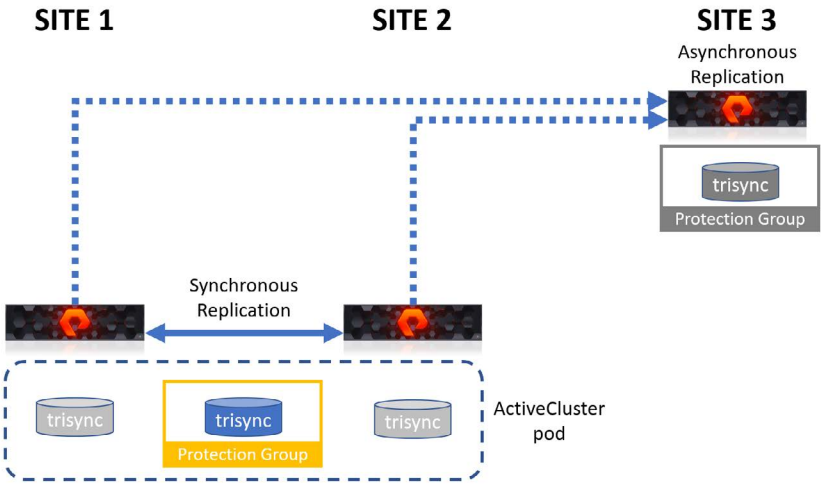


FIGURE 2 A "trisync" volume created in 3-site replication mode.

For local data protection, Pure Storage snapshots are space-efficient, instant points-in-time that can be used to recover data. Pure Storage supports Cinder Consistency Groups with the FlashArray iSCSI/Fibre Channel drivers. Consistency group support allows snapshots of multiple volumes in the same group to be taken at the same point-in-time to ensure data consistency.

Observability Support

Enterprise environments require high levels of observability in order to monitor, measure and analyze the health of systems. Pure Storage provides multiple ways of delivering observability, starting with the Pure1® AIOps platform that gives you a single interface to manage all your storage arrays. In addition to storage array metrics, Pure1 provides workload planning, anomaly detection, security assessments, energy consumption data and much more.

For organizations using third-party tools, Pure Storage has adopted the OpenMetrics and OpenTelemetry standards and has produced OpenMetrics Exporters for both their FlashArray and FlashBlade products. Integrations are available for Datadog, Dynatrace, New Relic, Prometheus, Splunk, and more.

Glance Image Service

Glance is the image service used with OpenStack, responsible for discovering, registering, and retrieving virtual machine images. It allows users to create and manage a catalog of server images, which can be used to launch instances. Ceph is a commonly used solution for storing Glance images, but Pure Storage offers alternatives that are far less complex to deploy.

Pure Storage FlashArray systems can be used as Cinder-backed Glance image stores, including the ability to use multiple FlashArray systems for multi-store support across multiple OpenStack Availability Zones.

Pure Storage FlashBlade is an S3 backend that can be configured to support Glance images. It can make use of the Cinder Image-Volume cache to help alleviate potential performance issues by creating multiple instances from the same image stored on the FlashBlade. Compression technology can also help save storage capacity.

High Density, Low-power Storage across Multiple Industries

Organizations of all kinds are increasingly concerned with the power being consumed by their data centers. Pure Storage has the most power-efficient storage systems in the industry. Optimized for performance and efficiency, Pure Storage utilizes up to 85% less energy than competitive all-flash arrays while using 96% less space than hybrid disk storage. Pure Storage helps OpenStack users in multiple industries, including:

Telecom: Pure Storage helps service providers to deploy OpenStack to meet current and future use cases, including next generation 5G core networks, OpenRAN, VNF, CNF, AI at the edge and more.

Automotive: Pure Storage helps auto manufacturers deliver on autonomous driving, customer experience, digital twins and the promises of Industry 4.0.

Financial services: Pure Storage helps financial services organizations with private and hybrid-cloud implementations, IT operations automation and High Performance Computing for algorithmic trading and risk analysis.

Media and entertainment: Pure Storage helps media companies with use cases such as digital asset management, content delivery, and rendering and post-production.

Continued Investment in OpenStack

Since July 2014, Pure Storage has actively contributed to OpenStack community development with a dedicated OpenStack open-source development team. As an active contributor to multiple core projects, our contributions include:

- More than 1,000 code and patch-set commits
- More than 50,000 lines of code, with 22,200 in Cinder alone
- High-level architectural designs
- Certified JuJu Cinder and Manila Charm for Canonical OpenStack
- Certified Cinder and Manila containers for use with Red Hat OpenStack Platform and Red Hat OpenStack Services on OpenShift
- Fully integrated Cinder driver with IBM PowerVC
- Full Ansible-Kolla deployment integration

Pure Storage contributes to multiple OpenStack projects, including those shown in the following table:

OpenStack Project Name	Function
Cinder	Block storage
Glance	Image service
Nova	Compute
Manila	File service

Additional Supported Features

There are some additional features that OpenStack users may be interested in, including:

- Pure Storage is the first storage vendor to achieve Certification for Red Hat OpenStack Services on OpenShift (RHOSO) v18.0 (Cinder Volume and Manila Share).
- Pure Storage supports OpenStack running on IBM PowerVC.
- IPv6 is supported.
- FlashArray can be used as an OpenStack Swift object storage node. This offers advantages of reduced hardware footprint via efficiencies such as data reduction, reduced energy and space consumption.

Pure Storage Enhances OpenStack Deployments

With years of collaboration on OpenStack projects and complete integration with Cinder, Pure Storage provides a simple, robust, and reliable storage platform for OpenStack deployments. Pure Storage also publicly shares all its OpenStack reference documentation, including best practices, tips, hints, integration points, and group discussions.

Additional Resources

- Pure Storage best practices, release notes and more for OpenStack.
- Learn the details about Pure Storage power savings.
- For details on the OpenStack project, please visit https://www.openstack.org

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