

# Get Better Storage for Your OpenStack Implementation

OpenStack enables organizations of all sizes, from startups to multinational corporations, to set up inexpensive private or public cloud infrastructure to support rapid growth. The different modes and systems available through OpenStack – whether private or public cloud – mean there’s a use case for almost every type of organization. But no matter how you’re planning to use it, you can get the most cost-effective OpenStack when you implement highly cost-effective OpenStack-compatible storage – such as Nexenta solutions.

## The Business Challenge

OpenStack is an open-source cloud operating system that controls large pools of compute, storage, and networking resources throughout a data center. Administrators manage these resources through a dashboard, and other users manage some or all of these resources through a web interface. To meet the majority of an organization's needs, OpenStack supports both object and block storage.

You can integrate OpenStack's distributed, API-accessible platform directly into applications and use it for backup, archiving, and data retention. You can use OpenStack to expose block devices and connect them to compute instances for cost effective scale-out object storage, better performance, and integration with enterprise storage platforms.

## Nexenta

To get the most from your OpenStack implementation, build it on the Nexenta storage platform. Developed on an open source foundation, Nexenta delivers an industry leading, cost effective storage platform for enterprise-grade infrastructures. Its Open Source-driven Software-Defined Storage provides your OpenStack implementations a secure, high performance, ultra-scalable cloud- and virtualization-optimized storage solution.

In keeping with the OpenStack proposition of no vendor lock-in and true software-defined infrastructure, Nexenta products run on industry-standard hardware, allowing you to select the right mix of price and performance for your needs.

The open source drivers for Nexenta products are a part of the OpenStack continuous integration testing framework, which validates our drivers on a continuous basis. Nexenta delivers software-defined unified file, block, and object storage in one complete storage stack that provides the high performance, scalability, flexibility, and security that your OpenStack implementations need. Nexenta's scale-out object and block cluster is fully distributed and isolated from the compute nodes, enabling the full mobility of workloads inside the OpenStack cloud.

## Nexenta Empowers OpenStack Implementations with:

- NexentaStor for scale-up file and block storage
- NexentaEdge for scale-out file, block, and object storage

## NexentaStor

Nexenta's flagship product, NexentaStor, has already proven itself in implementations with OpenStack storage, delivering high-performance block storage virtual machines on industry standard hardware backed by enterprise-class support. Block storage is appropriate for performance-sensitive scenarios such as database storage, expandable file systems, or access to raw block level storage. Nexenta block storage volumes are fully integrated into OpenStack compute resources and the OpenStack dashboard so you can manage your own storage needs.

Open Source-driven NexentaStor eliminates vendor lock-in and delivers unbeatable cost effectiveness. NexentaStor scales up to handle two petabytes of storage per array – enough to meet the needs of most enterprises.

## NexentaEdge

NexentaEdge builds on the strengths of NexentaStor and adds all the object storage functionality you'll want for your OpenStack implementation – in a single storage solution. Its next-generation architecture optimizes both network and storage to deliver scale-out storage, meaning that it can incorporate many additional servers and scale to different degrees for redundant, scalable object storage using clusters of up to thousands of x86 servers on 10GE Fabric. NexentaEdge is capable of storing from 100TB to 100PB, while maintaining its ease of use.

NexentaEdge is ideally suited to be an OpenStack back end. Cluster-wide inline deduplication and compression of all data delivers impressive savings for organizations with thousands of VM boot images. Having a distributed metadata service provides NexentaEdge greater scalability, redundancy, and durability. It offers an easy interface to simplify operations and management, and is self-balancing with real-time data placement optimization. Its advanced features include automatic cluster-wide inline deduplication and compression at chunk/block level and end-to-end data integrity. Its cloud copy-on-write, snapshot, and cloning capabilities enable instantaneous storage operations.

NexentaEdge is fully integrated into the OpenStack framework, providing object storage through OpenStack Swift interfaces, including integration with Glance image repositories. It supports VM block devices through Cinder, and offers a plugin for the OpenStack Horizon dashboard for easy visualization of the status of services.

NexentaEdge provides OpenStack Swift and Amazon S3 object storage interfaces for application storage and iSCSI block storage services with OpenStack Cinder integration for Virtual Machine Boot images. It authenticates requests through Keystone.

Nexenta Software-Defined Storage solutions have been integrated into OpenStack since the Essex release and since then have expanded in their functionality and support as OpenStack evolves. Nexenta file, block, and object store solutions are ideal for creating flexible, easy-to-manage, and efficient-to-operate OpenStack clouds.

### The support for OpenStack currently spans multiple aspects of the stack:

- Block storage with an upstream driver for Cinder supporting latest OpenStack release
- Object storage supporting Swift APIs
- Image repository support through Glance
- Integrated management through a Horizon plug-in
- Serviceable via Rest APIs



#### Performance

NexentaStor provides a superior scale-up storage solution. While storage typically bottlenecks cloud performance, NexentaStor provides customers with unsurpassed levels of performance through:

- IO pooling
- Industry-leading memory-based caching
- High performance inline data reduction

#### High Availability

NexentaStor offers a proven HA solution with transparent failover for NAS and SAN. NexentaStor provides a periodic asynchronous data replication service that can provide remote data copy for backup, disaster recovery, and archiving.

#### Automation

DevOp tools such as Chef<sup>TM</sup> and Puppet allow storage administrators to rapidly react to performance and capacity issues. Integration of these automation tools allows tuning of storage environments based on business needs.

## NexentaEdge

Delivers Cinder Block, OpenStack Swift, and Amazon S3 object storage services required by OpenStack clouds. Integration through a Horizon management plug-in simplifies storage management and capacity planning. Key technologies that make NexentaEdge unique include:

- Cluster-wide inline deduplication and compression across petabyte-scale clusters
- Cloud-Copy-on-Write (CCOW), a completely unique object storage system enabling high performance data and metadata management optimized for cloud-based architectures
- Replicast network optimization minimizes data transfers and improves response time to deliver high performance IOPS
- Flexhash dynamically optimizes data placement/access to load balance stored data across all object stores and improve performance

## NexentaFusion

With NexentaFusion, Nexenta builds on its vision of the Software-Defined Data Center by delivering analytics and orchestration software that automates arrangement, coordination, and management of complex compute systems, data stores, and services without the need for administrators to pre-define the nature and placement of data.

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