QuantaStor SDS Storage Solutions for Virtualization

Storage

OSNEXUS is transforming storage economics through innovations in Software Defined Storage (SDS) by delivering the enterprise SAN/NAS performance and capabilities modern workloads require while simultaneously eliminating the high costs associated with proprietary storage hardware. Server and desktop virtualization enviroments require highly-available block storage that can deliver consistent performance with minimal downtime. QuantaStor Software Defined Storage appliances are designed with high-availability and scale-out features needed for mission-critical desktop and server virtualization solutions.

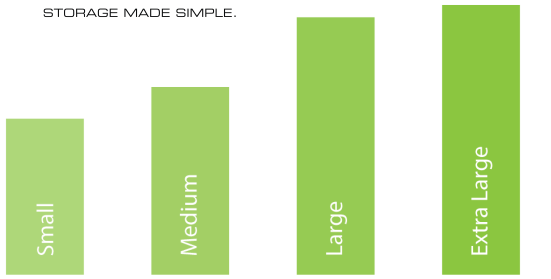
Scale-out Highly Available Block Storage

Virtualization environments are often performance limited by a storage appliance's ability to deliver solid transactional performance as the number of guest VM workloads increase. To solve this problem and the need for high-availability, QuantaStor delivers a scale-out storage architecture that expands up to 2PB of storage per cluster by adding more storage storage appliances with its storage grid technology. With scale-out block storage there is no down time with near instantaneous failover of workloads when an appliance is disabled or turned off. Using enterprise scale-out storage technologies including Ceph and iSCSI, QuantaStor appliances are compatible with existing virtualization infrastructure platforms.

Scale-up Highly Available Block Storage

For applications such as cluster databases that are inherently highly-available, QuantaStor can be configured with scale-up ZFS-based storage pools that deliver both file and block storage via all major protocols including NFS, CIFS, iSCSI and Fibre Channel. QuantaStor's ZFS-based Storage Pools also provide the broadest set of enterprise storage features including data compression, remote replication, snapshots, thin provisioning and encryption.

OSNEXUS® STORAGE MADE SIMPLE.

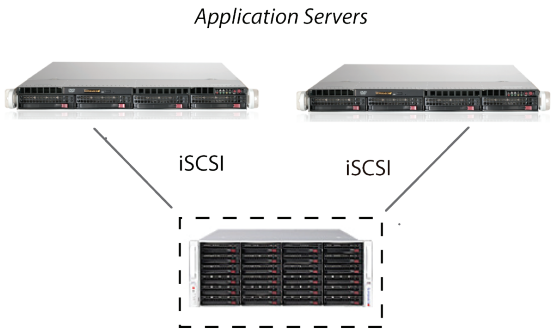


Single-node Storage Appliance Performance

Scale-up vs Scale-out Solution Capabilities

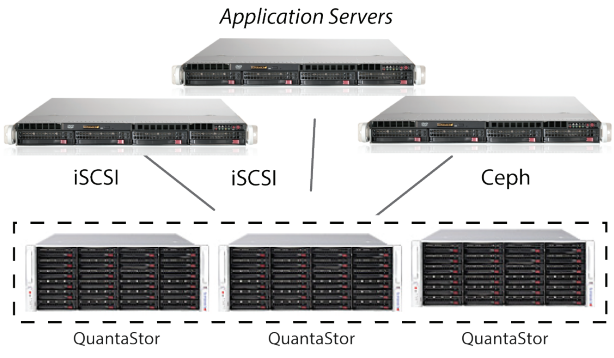
Key Features	QuantaStor Single-node Appliance	QuantaStor Multi-node w/ Scale-out Block
Block Protocols	iSCSI/FC	iSCSI/FC/Ceph
Maximum Capacity	256TB	16x256TB (4PB)
Data Compression	Yes	No
High-Availability	No	Yes
Bit-rot Protection	Yes	Yes
Snapshots	Yes	Available Fall 2015
Remote Replication	Yes	Available Winter 2015
VMware Certification	Yes	Yes

Single-node Appliance



QuantaStor SDS Appliance

Multi-node Appliance Grid



QuantaStor Storage Grid

QuantaStor SDS Storage Solutions for Virtualization

Key Features - Virtualization Storage Solutions

Remote Replication
Replicate storage volumes and network shares over a LAN or WAN to another QuantaStor system with remote replication. Ideal for replicating critical workloads to a disaster recovery site.

Fault Tolerance and High Availability
Both single-node and multi-node solutions can leverage hardware accelerated RAID to ensure fault-tolerance in the event of a diskfailure. Multi-node scale-out configurations are highly available with near instant failover.

Automated Snapshot Schedules
Create automatic snapshot schedules of one or more storage volumes and network shares to enable instant recovery of data at a previous point-in-time. Snapshots are writeable and can be generated via REST APIs and modules like VSS.

Quality of Service (QoS) Controls
QuantaStor offers storage read and write bandwidth limiting, referred to as Quality of Service (QoS) controls, to ensure reliable and predictable service quality for all applications and users of a given appliance. In a shared or multi-tenancy environment, QuantaStor QoS controls are enabled for storage volumes via policy management.

Encryption and Security
QuantaStor supports AES encryption of Storage Pools to ensure the security of data-at-rest to meet the compliance needs of HIPAA and other standards. Other security features include SMB3, CHAP and AES encryption "on-the-wire" for remote replication.

Data Compression
Storage Pools have compression enabled by default which both increases usable capacity and increases performance by reducing the amount of data written to disk. Virtualization deployments typically have compressible data and gain an additional 30 percent or more usable storage space due to compression

Reference Hardware Configuration Guide

Configuration Size	Small	Medium	Large	Extra Large
	8TB	16TB	24TB	36TB
CPU Model	Intel Xeon E5 v2 or v3	Intel Xeon E5 v2 or v3	Intel Xeon E5 v2 or v3	Intel Xeon E5 v2 or v3
CPU Core Count	8	16	16	16
System Memory / RAM	64GB	128GB	128GB	256GB
Boot Disk	2x 500GB SATA	2x 500GB SATA	2x 500GB SATA	2x 500GB SATA
Network	2x 10GbE	2x 10GbE	2x 10GbE	2x 10GbE
HBA/RAID Controller	Avago or Adaptec	Avago or Adaptec	Avago or Adaptec	Avago or Adaptec
NVRAM Write-back Cache	Yes	Yes	Yes	Yes
Data Disk	10x 4TB SATA/SAS	20x 4TB SATA/SAS	30x 4TB SATA/SAS	30x 8TB SATA/SAS
Hot Spare Disks (optional)	2x 800GB/1.6TBSSD	2x 800GB/1.6TBSSD	2x 800GB/1.6TBSSD	2x 800GB/1.6TBSSD
Raw Disk Capacity	8TB	16TB	24TB	36TB
RAID Layout	RAID50/RAID10	RAID50/RAID10	RAID50/RAID10	RAID50/RAID10
Total Useable Capacity Yield	6.4TB	14.4TB	22.4TB	57.6TB
Random IOPS requirement	High	High	High	High
Use Cases:	Virtualization and HPC Storage	Virtualization and HPC Storage	Virtualization and HPC Storage	Virtualization and HPC Storage
License Tier	Small (up to 8TB)	Medium (up to 16TB)	Large (up to 24TB)	Extra Large (up to 36TB)