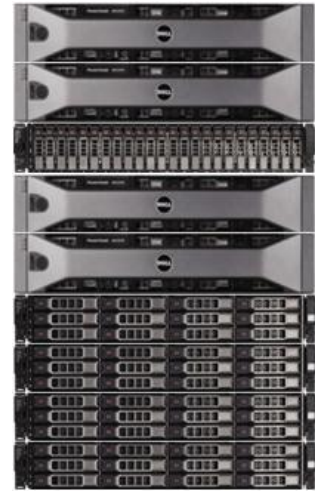




Dell | Terascale HPC Storage Solution

Simplified, High Throughput, Cost Effective Storage for HPC

The Dell | Terascale HPC Storage Solution is designed for researchers, universities and HPC users who are looking to deploy a fully supported, easy to use, scale-out and cost-effective parallel file system storage solution. The Dell | Terascale HPC Storage Solution is a unique new scale-out storage solution providing high throughput storage as an appliance. Utilizing intelligent, yet intuitive management interface, the solution simplifies managing and monitoring all the hardware and file system components. It is easy to scale in capacity or performance or both, thereby providing you a path to grow in future. The storage appliance uses Lustre®, the leading open source parallel file system.



The storage solution is delivered as a pre-configured, ready to go appliance and is available with full hardware and software support from Dell and Terascale. Utilizing the enterprise ready Dell PowerEdge™ servers and PowerVault™ storage products, the Dell | Terascale HPC Storage Solution delivers a great combination of performance, reliability, ease of use and cost-effectiveness. Key features of the solution include:

Procurement and Deployment Simplicity – Fully bundled, pre-configured and tested configurations are available from Dell. Onsite installation, configuration and customer training help minimize deployment time.

One stop management and monitoring - Simplified end-to-end management and monitoring of the entire storage system with easy to use management interface. Single global namespace to manage from a few Terabytes to Petabytes of data.

Superb customer support - All the hardware and software components of the solution are fully supported by experienced Dell and Terascale customer support professionals.

Modular Architecture – Modular building block approach enables ease of design, configuration and scalability. Each storage building block provides up to 384TBs raw capacity and up to 6.2 GB/s¹ read and up to 4.2GB/s¹ write throughput.

Choice of configurations– Using the building block approach, the configuration that meets your capacity and performance requirements can be easily architected. The solution can scale from a minimum of 48TB to Petabytes of raw capacity in a single namespace.

Increased availability - Active/Active object and Active/Passive metadata servers offer utmost availability and outstanding performance. Active/active dual RAID controllers on Dell MD32x0s with hot-swappable disk drives, redundant power supplies and fans provide no single point of failure.

Solution Components

Metadata Server Pair

The Metadata Server (MDS) stores the file system metadata. The Metadata Server Pair consists of two highly available active/passive PowerEdge R710 metadata servers connected to a PowerVault MD3220 with 12TB of raw shared storage. To provide high bandwidth and low latency link for clients to reach user data, each Metadata server provides QDR InfiniBand connectivity for clients. The MDS pair provides a single name space for the user data stored in one or more Object Storage Servers.



Metadata Server (MDS) Pair

- Two PowerEdge R710 servers with Intel® Xeon® 5600 series processors
- 48GB DDR3 Memory
- 6TB of usable RAID 10 space on PowerVault MD3220
- QDR InfiniBand connectivity
- Active/standby high availability with automated failover

Object Storage Server Pair

The Object Storage Server (OSS) stores the user data. The OSS pair consists of two highly available active/active PowerEdge R710 object storage servers connected to two PowerVault MD3200 storage enclosures. Each OSS pair provides up to 6.2 GB/sⁱ of read throughput and up to 4.2 GB/sⁱ of write throughput. From a minimum of 48TB of raw capacity, each OSS pair can scale up to a maximum of 384TB by adding PowerVault MD1200 disk enclosures to an OSS pair.



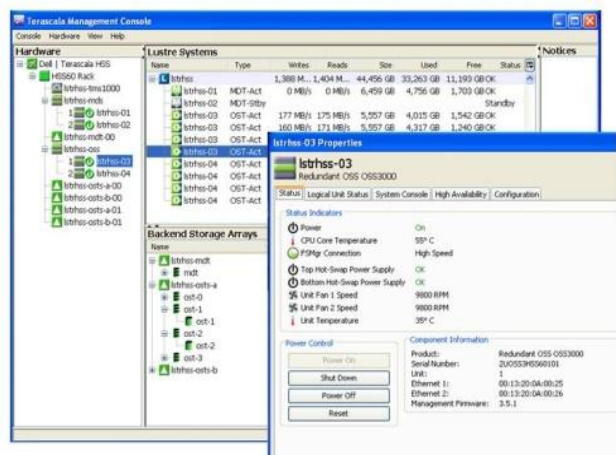
Object Storage Server (OSS) Pair

- Two active/active PowerEdge R710 servers with Intel® Xeon® 5600 series processors
- 24GB DDR3 Memory
- 48TB to 384TB of raw storage capacity using 2TB 7200 RPM Near Line SAS drives
- QDR InfiniBand connectivity
- Active/active high availability with automated failover

Each solution configuration consists of one MDS pair and one or more OSS pairs. Adding more OSS pairs to an existing system scales both the capacity and aggregate performance of the file system.

Terascala Management Solution

The Terascale Management Solution (TMS) is the software interface, monitoring and management agents, and file system that simplifies the on-going support of the overall storage solution. Terascale's Rapid Failover technology leverages the monitoring agents to efficiently detect error conditions requiring failover. This insures that failovers occur quickly when needed, but, just as important, failovers do not occur when not needed. Notification technology delivers emails directly to administrators when issues occur, freeing them to focus on other areas. With a single view of all the components of the solution, system administrators without extensive parallel file system experience can easily manage and maintain this storage appliance.



A Solution That Matches Your Requirements

Using these building blocks, Dell can help you architect a high performance storage solution that meets your budget, capacity and performance requirements. Below are three reference configurations with different capacity and performance characteristics; however a system with custom requirements can be easily architected.

96TB	336TB	768TB
<ul style="list-style-type: none">– 96TB of raw capacity for user data– One Metadata Server pair– One Object Storage Server pair with a total of 48 2TB NL SAS drives– Terascale Management Solution running on a dedicated management server– Installation service and 3-years of Dell ProSupport	<ul style="list-style-type: none">– 336TB of raw capacity for user data– One Metadata server pair– One Object Storage Server pair with a total of 168 2TB NS SAS drives– Terascale Management Solution running on a dedicated management server– Installation service and 3-years of Dell ProSupport	<ul style="list-style-type: none">– 768TB of raw capacity for user data– One Metadata Server pair– Two Object Storage Server pairs, each with 192 2TB NL SAS drives– Terascale Management Solution running on a dedicated management server– Installation service and 3-years of Dell ProSupport

The Dell | Terascale HPC Storage Solution is all inclusive: servers, storage and network hardware, file system and management software, product support and maintenance and deployment service. The solution is delivered as a pre-configured appliance, ready to be integrated into your environment. This saves you valuable time in architecting, acquiring, deploying, integrating and managing storage for your cluster.

In short, the Dell | Terascale HPC Storage Solution delivers all the benefits of a scale-out parallel file system-based storage for your high performance computing needs.

Contact your Dell or Terascale Sales Representative for more information on the Dell | Terascale HPC Storage Solution and discuss how this solution can meet your high performance storage needs.

More information

Dell HPC Solutions: www.dell.com/hpc / www.DellHPCsolutions.com

Terascale: <http://www.terascale.com/dell-terascale-hss.html>

ⁱ Approximate sequential throughput based on testing done in Dell labs with 48, 2TB 7200 RPM Near Line SAS, drives attached to each of the two active/active Object Storage Servers in a Pair. Performance will vary with configuration, customer environment and workload.