

Hitachi NAS Platform for Energy Development

Hitachi NAS Platform, Powered by BlueArc® — Providing Massive Scalability, High Performance and Enterprise Class Reliability, with Compelling Total Cost of Ownership



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Global energy needs require the continued exploration and discovery of new energy sources. It has become apparent that the accelerated discovery of new natural energy reserves is essential to the ongoing vitality of worldwide economies. Increasingly, major energy firms and several other smaller, yet aggressive, companies are determining the commercial viability of tapping new reserves and developing new technologies to meet rising worldwide demand.

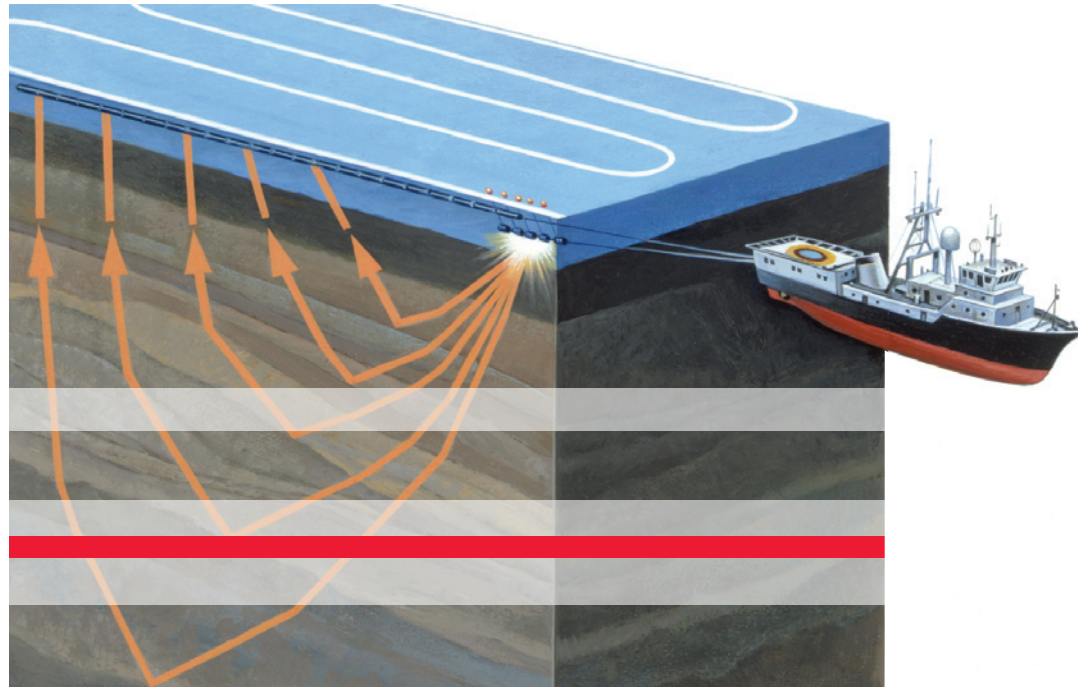
To do so competitively, these companies need storage solutions that offer:

- **Enormous Scale.** A single project can produce data sets that run into multiple terabytes (TB). Whether it is for the data acquisition, processing or interpretation phase, any storage platform has to scale easily to accommodate multiple-terabyte data sets and very rapid data growth, without the need for forklift upgrades.
- **High-performance Capabilities.** Fast data access and high throughput, without the usual hot spots and I/O bottlenecks, are required in the processing phase as well to keep up with the high-performance computing server clusters. Storage must also be able to accommodate a large number of simultaneous reads against the same stored file as calculations are distributed across hundreds of servers, and performance must remain consistent as the number of reads, systems and file sizes scale.
- **Enterprise Class Reliability.** Aside from performance, the other major potential storage bottleneck is downtime, which can add days or even weeks to the discovery process. To avoid downtime, storage solutions must offer a full set of high availability features, such as redundant components and paths, multiple RAID levels and cluster failover across multiple nodes.
- **Reduced Cost of Ownership.** Given these stringent requirements, storage can become a significant source of cost. A storage solution that consolidates terabytes or petabytes (PB) of data under a single platform with a common set of management tools can reduce the costs of exploration significantly. At the same time, deploying the highest performing storage based on application requirements, while leveraging more cost effective storage for capacity centric applications reduces total cost of ownership (TCO) further. As storage and data center space

scales, power consumption also becomes a significant cost consideration.

Solution Overview

The Hitachi NAS Platform provides high-performance network storage with a unique and highly flexible architecture well suited to the needs of the Energy Development industry. Hitachi NAS Platform has been designed for massive scalability, performance and flexibility that is unmatched in the storage market. It is also one of the only networked storage solutions that can support a tiered storage environment, including Fibre Channel, SAS, SATA and archival or data de-duplication devices. Additionally, a comprehensive suite of management, provisioning and disaster recovery tools contributes to a lower TCO.



Solution Benefits

Massive Scalability

The massive scalability of Hitachi NAS Platform is ideally suited to the unique demands of the various aspects of Energy Development environments. Instead of the closed system architecture typical of its network storage competitors, Hitachi NAS Platform connects its nodes to a back end SAN that can hold up to a massive 4PB of storage — more than enough to store several exploration data sets. The virtualized storage pool sits under a single-object-based unified name space that provides global access to all data across the storage infrastructure, regardless of operating system or file location.

The massive scalability of Hitachi NAS Platform makes it an excellent, futureproof platform for consolidating huge amounts of storage under a single storage system, eliminating the need to continually add nodes or divide data among multiple storage systems.

Hitachi NAS Platform also employs a highly virtualized architecture that allows file systems to scale to a massive 256TB each — enough to hold an entire multiple-terabyte seismic data store. Given the virtualized architecture, these file systems are not tied to any physical hardware, so they can be scaled dynamically across multiple disks and RAID arrays in a single storage pool.

The combination of scalability and virtualization across physical hardware makes it easy to provision data quickly, without the need for complex, time consuming storage upgrades.

High-performance Architecture

Aside from massive scalability, as a result of the unique, hardware accelerated architecture of the Hitachi NAS Platform, performance is unmatched in the industry. Instead of the slow, software-based, shared CPU and bus architecture common to most of its network storage competitors, the Hitachi architecture uses scores of field programmable gate arrays (FPGAs), connected point-to-point to do most of its protocol processing.

The combination of hardware accelerated protocol processing and a switched backplane virtually eliminates performance bottlenecks, achieving throughput up to 1600MB/sec per node, and up to 200,000 IOPS per node. This makes the Hitachi NAS Platform an unbeatable storage back end for the high-performance server clusters processing data from the field. FPGA-based processing also accommodates fast simultaneous reads and writes, which means little to no performance hit as data is acquired and written to tape.

In addition, the modular configuration incorporates separate high-performance hardware modules for the network interface, file systems

and back end SAN interfaces. The networking module employs a massive 2.75GB of buffer memory, compared to the typical 64MB found on most competing storage solutions, which, with FPGA-based processing, enables the handling of huge numbers of simultaneous connections with very high throughput.

Reliability

The Hitachi NAS Platform offers a host of reliability features to fulfill the most stringent acquisition, processing and interpretation uptime requirements. The modular design includes high availability components, such as redundant hot-pluggable power supplies and fans, and dual battery NVRAM backup, in a number of different configurations to meet application reliability requirements.

The Hitachi NAS Platform also supports multiple RAID levels and takes reliability beyond the RAID and node level with failover clustering in a configuration spanning up to eight nodes. Unlike typical active-passive clustering architectures found in competing network storage solutions, Hitachi NAS Platform clusters use an active-active configuration.

Reduced Cost of Ownership

Despite its industry leading scalability and performance features, the Hitachi NAS Platform manages to achieve a very low TCO. Simply consolidating multiple petabytes of

storage into a single platform managed as one unit creates significant management and power savings.

The Hitachi NAS Platform has a highly virtualized architecture that allows the division of a single physical resource into multiple virtualized logical resources. This further reduces not only initial hardware purchase costs, but ongoing management costs as well, as there are many fewer server and storage devices to manage. It permits the virtualization of a single node into virtual servers, which can be deployed with VMware or Microsoft® server virtualization technology for a completely virtualized data center. With virtualization, tasks such as provisioning that were once complex and time consuming become fast and relatively simple, and the reduction in physical hardware yields a corresponding reduction in the costs of power and data center space over time.

The Hitachi NAS Platform also provides a suite of management tools for easy provisioning, monitoring and disaster recovery. Additionally, the Hitachi NAS Platform is just about the only networked storage solution on the market that can actually hold a complete tiered storage configuration under a single node — high-performance Fibre Channel, SAS, low cost SATA storage and content archive platform — combining optimal application performance with maximum cost efficiency.

Disaster Recovery

Hitachi NAS Platform provides robust backup and disaster recovery capabilities, including snapshots that can be scheduled multiple times daily, without disrupting application and data access, for instant recovery of corrupted or deleted files and data.

The Hitachi NAS Platform also provides its own NDMP processing capability in hardware for fast backups to a tape library, and it is compatible with most leading enterprise backup platforms, including NetBackup and CommVault.

For more stringent data protection requirements, the Hitachi NAS Platform offers long distance asynchronous replication and synchronous block level replication, which allows a full replica to be held at a data center across

IT Pains and Solution Capabilities

Pain	Hitachi Solution Value
1. Poor performance	Provides consistently high performance, allowing geologists and geophysicists to work more productively
2. Poor scalability	Scales up to 4PB in capacity
3. Growth of unstructured data	Provides dynamic expansion of file systems and volumes as data requirements increase
4. Little or no time to do backups	Reduces backup windows with no need to pause production applications
5. Corrupt data	Allows rapid restoration of data using snapshots
6. Management complexity	Centralizes storage management, eliminating data islands and silos and simplifying data administration
7. Concern about “green” issues	Lowers power, cooling and space requirements

campus, across a region or even across the country. Remote replicas can be used as a source for remote tape backup.

Multiple Operating System Support

The Hitachi NAS Platform supports CIFS, NFS and iSCSI, allowing UNIX-, Linux- and Microsoft Windows®-based, interpretation related applications to access the same data, and providing geologists and geophysicists the flexibility they need to collaborate and produce the best possible interpretive results.

Perhaps more than any other industry, Energy Development is an environment in which performance, massive scalability and reliability

are absolute requirements. Hitachi NAS Platform is architected for speed, scalability and reliability from the ground up. Whether it is for seismic data acquisition, data processing or interpretation, the Hitachi NAS Platform provides a storage platform that meets industry requirements.

For More Information

To learn more about how to effectively plan and deploy Hitachi NAS Platform please contact your Hitachi Data Systems representative or your Hitachi TrueNorth Channel Partner, or visit www.hds.com.

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