

## SYSTEM

# DATA ONTAP® GX SYSTEMS



**High-performance clusters place extreme demands on storage systems. NetApp Data ONTAP GX systems provide massive throughput and scalability for high-performance NFS and CIFS environments.**

### KEY HIGHLIGHTS

#### Highest Performance

Scale to extreme levels of throughput

Scale linearly as nodes are added

Volume striping enables extreme throughput for a single file or a volume

#### Unmatched Simplicity

Scale to multiple petabytes under a single global namespace

Data movement is transparent

Require no client-side software

Deploy easily and rapidly

#### Excellent Reliability

WAFL® (Write Anywhere File Layout) file system proven in over 94,000 installations

RAID-DP™ guards against multiple disk failures

Snapshot™ copies enable rapid recovery

No single point of failure

#### Proven Services

Reduced time to deployment

Integration of best practices

Complete knowledge transfer

High-quality support

### THE CHALLENGE:

#### Scaling Performance with Reduced

#### Management Complexity

Linux®, UNIX®, and Microsoft® Windows® compute clusters running technical applications have demanding storage requirements. Performance requirements are typically in the multigigabyte-per-second range, and capacity can scale into the petabyte class. To avoid hot spots and to optimize economics, it is highly desirable to be able to move data between systems and tiers of storage without disruption. And it is critical that the storage environment can be easily and effectively managed.

### THE SOLUTION:

#### NetApp Scale-Out Storage System

Data ONTAP GX systems are optimized to meet the demanding requirements of high-performance computing (HPC) and digital media content applications that are running on large Linux, UNIX, and Microsoft Windows clusters, while delivering unmatched management simplicity. By combining multinode scaling, global namespace, and a clustered file system with innovative NetApp FlexVol®, Snapshot, mirroring, and RAID-DP (Double Parity RAID) technology, Data ONTAP GX systems provide the highest levels of performance, manageability, and reliability.

Data ONTAP GX systems are based on the Data ONTAP GX operating system and one or more FAS system (FAS3040, FAS3070, or FAS6070) building blocks. Each FAS building block includes a pair of controllers (nodes) that are configured for high availability.

Data ONTAP GX systems consist of two or more nodes, scaling up to dozens of nodes and multiple gigabytes per second of throughput and petabytes of capacity. As nodes are added to a Data ONTAP GX system, performance scales linearly. Clustered file-system technology, delivered via the FlexVol High Performance option (HPO), enables extreme levels of throughput even for a single file or volume. Additionally, Data ONTAP GX systems support any combination of Fibre Channel and serial ATA (SATA) disk drives to ensure the right balance of performance and cost of ownership.

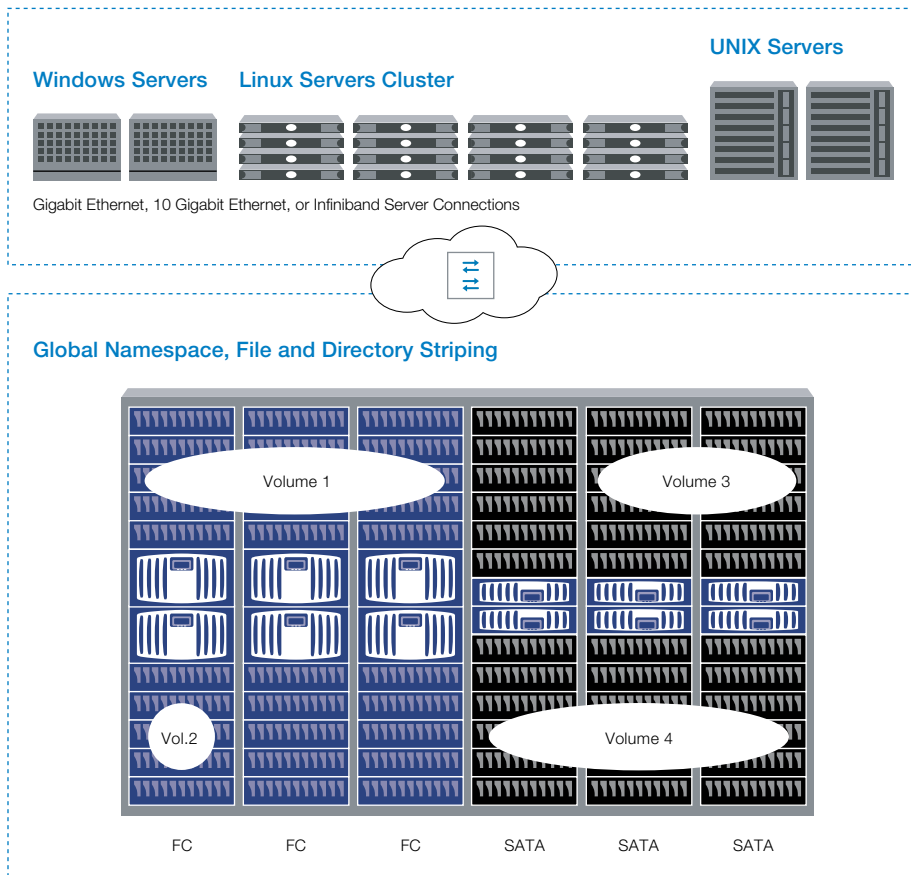


Figure 1) Data ONTAP GX systems provide scale-out storage that supports petabytes of capacity and Gigabytes per second of throughput.

**EXTREME PERFORMANCE**

Data ONTAP GX software meets the extreme performance requirements of Linux, UNIX, and Microsoft Windows clusters. As nodes are added to a Data ONTAP GX system, throughput easily scales to multiple gigabytes per second. Data ONTAP GX software provides multidimensional scaling because the aggregate bandwidth available from the single global namespace scales linearly with the number of nodes in the system. As storage nodes are added to the system, all physical resources (CPUs, cache memory, network I/O bandwidth, and disk I/O bandwidth) can easily be kept in balance. With their advanced load-balancing capabilities and superior ease of use, Data ONTAP GX systems are well matched to clusters with thousands of nodes and extreme NFS and CIFS performance demands.

Data ONTAP GX systems utilize clustered file-system technology to provide maximum I/O throughput. With the FlexVol HPO, volumes are striped across any or all of the nodes in the system, enabling extreme levels of throughput for even a single file or volume. Higher read performance can also be realized by using load-balancing mirrors.

### **MANAGEMENT SIMPLICITY AND TRANSPARENT ADAPTABILITY**

Data ONTAP GX systems are fully integrated solutions that are easy to install, manage, and maintain. Global namespace capability simplifies client-side management by mapping all data volumes into a file-system tree structure. It virtualizes storage at the file-system level, enabling all nodes to mount a single file system, access all stored data, and accommodate physical storage changes that are fully transparent to the cluster.

The global namespace offers a single system image across multiple nodes and eliminates the need for complex auto-mounter maps and symbolic link scripts. Each client is provided with a single mountpoint, which allows access to a huge pool of data residing anywhere in the Data ONTAP GX system.

Data ONTAP GX systems provide a powerful capability to move data between nodes, tiers of storage, or both, nondisruptively and transparently to applications. This enables effective load balancing and elimination of hot spots, without the substantial management intervention that is typically required to perform such activities on other systems.

The use of standard NFS and CIFS protocols means that Data ONTAP GX systems do not require any client-side code to be installed on each compute node or server in the cluster. Therefore the installation and maintenance processes are also greatly simplified. And the Data ONTAP GX system reduces or eliminates routine capacity allocation, along with storage management tasks.

### **HIGHLY RELIABLE**

Along with stringent performance requirements, high reliability is important for technical applications on clusters. Data ONTAP GX systems leverage core software such as WAFL, RAID-DP, and Snapshot, which have been proven in over 94,000 system installations. These systems have been designed to meet high-reliability requirements with features such as RAID-DP and transparent node failover, which ensures that failed components are bypassed automatically, with no interruption in data availability. In addition to having no single point of failure, Data ONTAP GX systems can be scaled and adjusted while online, allowing your applications to run without interruption.

### **MEETING THE NEEDS OF HPC AND DIGITAL MEDIA CONTENT MARKETS**

Data ONTAP GX systems are particularly well matched to the requirements of the HPC and digital media content markets. The primary HPC markets include oil and gas exploration (for example, seismic processing), electronic design automation (chip design, verification, and layout), mechanical design (computational fluid dynamics, crash simulation, finite element analysis), and research labs (intelligence, defense, genomic research, and so on). The primary digital media content market includes digital media archive and rendering and Internet content serving. Both of these markets have a requirement to scale storage capacity and performance to extreme levels, while reducing management complexity. Data ONTAP GX systems are designed to meet these challenges with a solution that is high performance, easy to scale and manage, and highly reliable.

## SYSTEM CONFIGURATIONS

Data ONTAP GX systems are configured for continuous operation with the use of high-performance, modular NetApp storage components. Each system consists of one or more FAS (FAS3040, FAS3070, or FAS6070) building blocks, and each FAS building block is a high-availability pair of controllers (nodes). Multiple controller pairs can be combined into a single, integrated Data ONTAP GX system. Ethernet and 10Gigabit Ethernet technology is used for client connections and for interconnecting FAS controllers, with support for Infiniband client connections through a gateway.

These systems can use any mix of Fibre Channel and SATA disk drives, and data can be moved nondisruptively between nodes or between storage tiers as performance requirements change over time.

## COMPREHENSIVE SERVICES

NetApp Global Services provides the comprehensive support and services required for continuous system operation. NetApp services include installation, implementation, and full support of your Data ONTAP GX systems. As a result, you can expect reduced time to deployment, integration of best practices, complete knowledge transfer, and high-quality support.

Implementation services for Data ONTAP GX systems include:

- Storage layout design
- Global namespace configuration
- HA configuration and best practices
- Volume striping configuration
- Customized “how to” help based on your environment and workflow

In addition, NetApp SupportEdge Premium offers a hybrid approach to support, combining expert on-site resources with innovative remote capabilities. SupportEdge Premium includes hardware and software installation, system monitoring, proactive notification, immediate reactive support, remote diagnostics, and a blend of remote and on-site repair. Quarterly storage availability audits and a software subscription plan are also included.

## TRUSTED ENTERPRISE VENDOR

NetApp is a leading Fortune 1000 company, with over 94,000 successful customer installations worldwide. With a proven world-class global service and support organization, our track record provides the foundation for your future success as you enhance and grow your IT and storage environment.

## ABOUT NETWORK APPLIANCE

Network Appliance is a leading provider of innovative data management solutions that simplify the complexity of storing, managing, protecting, and retaining enterprise data. Market leaders around the world choose NetApp to help them reduce cost, minimize risk, and adapt to change. For solutions that deliver unmatched simplicity and value, visit us on the Web at [www.netapp.com](http://www.netapp.com).



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