

# Storage Scale-Out Delivers Agile Next-Generation Data Center Infrastructure

Cisco and NetApp collaborate to deliver a cost-effective solution with high availability and high performance.

## Executive Summary

Across the board, companies are facing ever increasing storage demands in the data center. Cisco and NetApp have collaborated to develop a storage scale-out that can serve as a key part of an overall enterprise storage strategy. The scale-out approach delivers a dynamic, virtualized highly available storage infrastructure. Furthermore, it integrates the management capabilities across both storage and network environments to improve infrastructure efficiency and agility.

## Challenge

Enterprise storage solutions continue to be challenging on a number of fronts. One of the most basic demands most companies experience is the ability to handle the yearly growth of their storage requirements that comes from simply conducting business. Storage solutions must accommodate this increasing volume of information with the consistently high level of performance that enterprise users expect. Addressing this need in a way that is scalable, cost-effective and resource-efficient is a significant effort. However, the challenges don't end there.

Today's business environment imposes its own set of demands. Foremost among these is availability. Whether driven by service level agreements (SLAs) or by customer expectations, storage services simply must be available. At the same time, current trends in applications and business systems require storage solutions to be agile and flexible, with the ability to quickly respond to rapidly changing business needs. Fundamental to any successful solution are tools that provide the management capabilities to effectively and efficiently address these requirements.

The newest challenge stems from the growing popularity of server virtualization within the data center. With its demonstrated benefits in the industry, server virtualization is expected to play an expanding role in the data center. However, along with its many benefits, server virtualization creates some operational challenges in areas. For instance, storage solutions should ideally be able to provision and manage storage services with virtual machine level granularity. Similarly, server virtualization introduces unique concepts such as virtual machine portability, which need to be accommodated by the management tools of any storage solution.

## Business Benefits

The future of enterprise storage is a scale-out architecture that leverages the superior price and performance of commodity components; provides a dynamic, virtualized storage service for nondisruptive operations; and employs policy-based management for improved efficiency and agility.

The joint Cisco/NetApp storage scale-out solution delivers a number of benefits to customers. The solution design delivers consistent high performance and high availability. The most tangible business benefit of this design is reduced total cost of ownership (TCO). The granular nature of the

scale-out approach makes more efficient use of capital by adding infrastructure over time at a rate that is more tightly coupled to actual requirements. Both the Cisco Nexus 7000 and the NetApp Data ONTAP GX offer highly scalable, highly efficient management tools that help reduce operational complexity and further drive down TCO.

The Cisco and NetApp collaboration has also lead to a highly available storage solution worthy of the most demanding environment. NetApp allows rolling software upgrades so that data never goes offline. NetApp storage clusters can also support mixed hardware and controller configurations. Thus customers can deploy new controllers and disk subsystems and immediately access the new resources through transparent data migration and load balancing on the new resources. Finally, with the appropriate WAN services, NetApp Data ONTAP GX allows non-disruptive data center moves.

Both Cisco and NetApp share a common design philosophy in that the underlying solution architecture is transport agnostic. Solutions can encompass Ethernet (e.g. NFS, CIFS), Fibre Channel, iSCSI and Fibre Channel over Ethernet (FCoE). This approach allows customers maximum design flexibility in delivering a holistic solution across a heterogeneous environment. This approach also allows customers to transition transport in a granular manner.

The Cisco Nexus 7000 provides highly available infrastructure to support the NetApp Data ONTAP GX storage services. The Cisco Nexus 7000 and its NX-OS operating system were designed to meet the availability requirements of the most remanding data center environments. The hardware platform, including redundant supervisors, fans, and power supplies, has no single point of failure. The chassis also includes innovative features such as lights-out, out-of-band management capabilities and the ability to automatically call the Cisco Technical Assistance Center (TAC) and open a trouble ticket if the system detects a fault. Cisco NX-OS is similarly robust. It has highly resilient micro-kernel architecture and also supports rolling software upgrades without service disruption. Cisco NX-OS also supports advanced features such as the ability to individually restart processes in a stateful manner.

Finally, the Cisco/NetApp storage scale-out solution helps customers capture the benefits and agility of data center virtualization. For example, Cisco NX-OS offers a number of virtualization features to provide increased resource flexibility and efficient use of infrastructure. For example, Cisco NX-OS offers hypervisor-like switch virtualization capabilities, termed Virtual Device Contents (or VDCs) for efficient utilization and flexible, secure deployment. Similarly, NetApp has the ability to non-disruptively migrate data as part of a VMotion virtual machine migration.

These features combine for a number of benefits to the business:

- Investment protection and cost-effective growth
  - Both Cisco and NetApp offer the ability to increase capacity and capabilities in a way that is granular, cost-effective and non-disruptive
- Effective resource aggregation
  - Both Cisco and NetApp can effectively aggregate resources for cost-efficiency, yet also quickly and flexibly allocate them for improved business responsiveness
- 'Right-size' provisioning
  - The joint solution allows storage services to be efficiently provisioned without the traditional need for over-provisioning to address inflexible provisioning or because of poor solution granularity

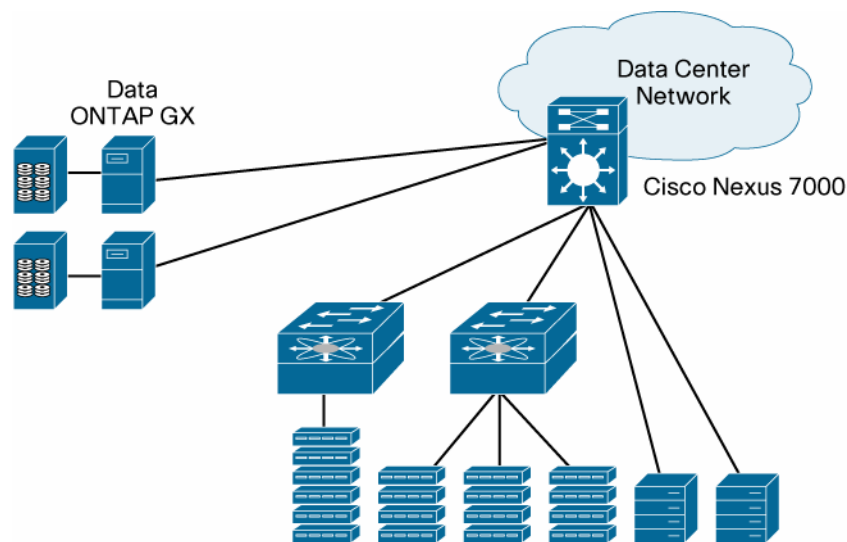
- Consistent service levels
  - A highly scalable and available design delivers consistent performance, services and features to applications and business systems
- Quick response to business changes
  - Both solutions can be dynamically adjusted to meet changes in technology or SLAs without affecting applications or users

### Solution

Most deployments of NetApp scale-out storage (Data ONTAP GX) to date have been in support of high-performance computing, aggressive digital media applications, and other applications that put significant demands on storage with file-based workloads. These include the following.

- Back-end to large compute clusters, e.g. scientific and engineering applications and seismic processing.
- Large-scale, active archives, e.g. large online phone and email applications and picture archiving.
- Dynamic enterprise infrastructure, utilizing server and storage virtualization to create an on-demand infrastructure.

Figure 1.



### Why Cisco and NetApp?

Individually, both Cisco and NetApp have demonstrated market leadership, innovation, and a keen focus on meeting customer's needs. This collaboration between Cisco and NetApp to deliver the storage scale-out solution allows customers to draw on the joint expertise of both organizations for an integrated, validated solution that addresses a pressing customer need. The end result is a dynamic enterprise data center with the ability to rapidly commission and decommission applications, provision and re-provision resources, and nondisruptively migrate applications and data to adapt to changing service-level requirements

## For More Information

- <http://www.cisco.com/go/nexus7000>
- <http://www.netapp.com/us/products/storage-systems/data-ontap-gx/>



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