NetApp

Go further, faster

Systems

NetApp iSCSI Solutions

Performance, Advanced Functionality, Value, and Manageability
Ideal solutions for data center consolidation and storage efficiency

HEIGHTENED PERFORMANCE AND EFFICIENCIES

In today's competitive markets, anything an organization can do to speed information access and secure critical data can mean the difference between success and failure. Storage area networks (SANs) allow you to consolidate your storage resources while also offering increased performance and operational and resource efficiency. NetApp offers a complete family of unified storage solutions that support both file and block protocols, including NFS, CIFS, iSCSI, FC, and FCoE, to allow you to configure your storage according to your specific enterprise requirements. The NetApp® solution is composed of hardware, software, and services that enable any organization to easily consolidate data storage from dispersed systems into a single, high-performance storage pool. This solution improves data availability and application uptime, enables comprehensive data protection, simplifies infrastructure and management, and maximizes existing investments and resources.

AN ATTRACTIVE ALTERNATIVE TO FIBRE CHANNEL SANS

Many companies view SANs based on Fibre Channel (FC) technology as their only available solution. NetApp iSCSI SANs are an effective alternative in situations in which FC SANs are unfamiliar or economically unfeasible yet the data storage consolidation benefits of a SAN remain attractive. The NetApp iSCSI SAN delivers the competitive performance advantages of an FC SAN along with the maturity, ease, functionality, and pervasiveness of SCSI, IP networking, and Ethernet technologies. With a NetApp iSCSI SAN, a company can amplify existing skills and infrastructure and take advantage of IP network assets to build SANs out to the edges of the enterprise.

A FULL FAMILY OF iSCSI STORAGE SYSTEMS

Net NetApp iSCSI storage systems include NetApp's broad set of advanced features and stand on almost two decades of IP-based storage experience. iSCSI protocol support is available on NetApp FAS2000, FAS3200, and FAS6200 series storage systems and on the NetApp V-Series family. NetApp storage systems support applications ranging from the remote office to the data center and, combined with standard Ethernet infrastructure (cables and switches) and iSCSI initiators in servers, form the foundation of the NetApp iSCSI SAN solution. The NetApp iSCSI SAN solution is able to fully interoperate and easily integrate with enterprise environments, using a wide array of NetApp Manageability Software tools, both application specific and general
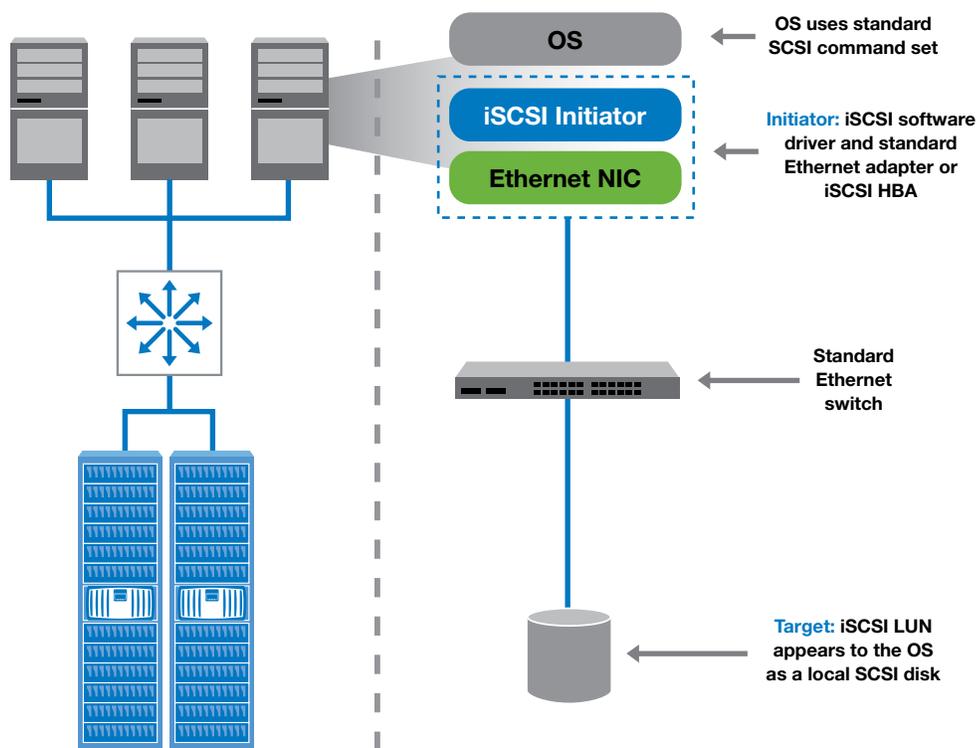
Figure 1) NetApp iSCSI SAN architecture.
A comprehensive and flexible networked storage solution for VMware®, AIX, HP-UX, Linux®, NetWare, Solaris™, and Windows® environments.

purpose. Plus, every NetApp solution is capable of incorporating advanced data protection, disaster recovery, and regulatory compliance capabilities.

NetApp iSCSI SANs provide high availability through redundant storage components and multiple redundant data paths, with greater than 99.999% field-measured availability.[1] High availability and accessibility provide the highest possible support and uptime for applications. And NetApp iSCSI storage systems deliver exceptional performance with 1Gb and 10Gb Ethernet connections. NetApp iSCSI storage can cover a broad range of scale and cost and deliver net-worked storage dependability, performance, and functionality to your enterprise.

ISCSI INITIATORS

To complete a network storage architecture using iSCSI requires the host server to run an iSCSI initiator, either a software initiator with an Ethernet adapter or a dedicated iSCSI HBA. The initiator is analogous to an NFS client in a NAS solution or an FCP worldwide name initiator in an FC SAN solution. NetApp supports iSCSI software initiators from the most popular OS vendors, including Windows (2003, 2008, and

Hyper-V™), VMware ESX, NetWare, Linux (RHEL, SLES, and OEL), AIX, HP-UX, and Solaris. Multiple iSCSI hardware initiators are also qualified for use with NetApp iSCSI storage systems.

iSCSI MULTIPATH I/O

Multipath I/O provides the ability to have multiple paths from a server to a storage array and protects against hardware failures (cable cuts, switches, HBAs, and so on). Further, multipath I/O can provide higher performance by utilizing the aggregate performance of multiple connections. When one path or connection becomes unavailable, the multipath software automatically shifts the load to one of the other available paths.

NetApp iSCSI systems support multiple types of multipath I/O, both native to the host operating systems and vendor specific (Data ONTAP DSM and Veritas DMP DSM). Data ONTAP DSM is designed to work with Windows 2003 and Windows 2008 operating systems, including Hyper-V. In addition to failover and link aggregation functionality, Data ONTAP DSM offers advanced features such as least queue depth, active-active load balancing, and the ability to utilize

both FCP, FCoE, and iSCSI to communicate with a LUN at the same time (multiprotocol LUN support).

REMOTE BOOT

One of the benefits of shared storage is the ability to consolidate and more effectively allocate storage to each attached server. This benefit also extends to the boot volume. Instead of requiring a boot disk drive (or two for redundancy) at the host, remote boot allows the host to boot from a volume on the shared network storage. The benefits of this approach include improved boot performance by striping the boot volume over more spindles, lower cost by reducing disks at the host, redundancy protection of boot images, simplified software management, rapid server deployment, and improved space efficiency with the use of volume cloning.

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[1] FAS Storage Systems: Laying the Foundation for Application Availability, IDC, Feb. 2008.
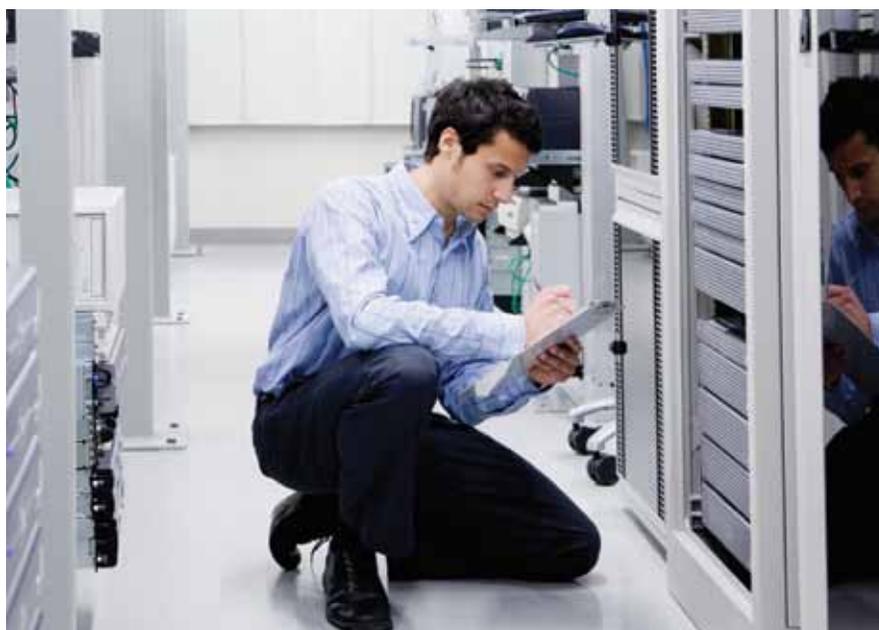
OS VENDOR	INITIATOR	CERTIFIED SOLUTION	MULTIPATH	CLUSTER	NETWORK BOOT
Microsoft Windows/ Hyper-V	Software initiator, third-party HBA	Yes	Active-active NetApp Data ONTAP® DSM, Microsoft® MS DSM, Veritas™ DMP DSM	Microsoft Cluster Server, Veritas VCS	HBA, S/W
VMware	Software initiator, third-party HBA	Yes	Active-active VMware NMP distributed with ESX	VMware ESX vMotion™, VMware HA	HBA
Red Hat Linux®	Software initiator, third-party HBA	Yes	Active-active Red Hat RHEL device mapper (DM-MP), Veritas DMP	Red Hat Cluster Suite, Oracle® Clusterware, Veritas VCS	HBA, S/W
Oracle Linux	Software initiator, third-party HBA	Yes	Active-active Oracle OEL device mapper (DM-MP), Veritas DMP	Red Hat Cluster Suite, Oracle Clusterware, Veritas VCS	HBA, S/W
Oracle Solaris	Software initiator, third-party HBA	Yes	Active-active MPxIO, Veritas DMP	Veritas VCS	HBA
SUSE Linux	Software initiator, third-party HBA	Yes	Active active Novell SUSE device mapper (DM-MP), Veritas DMP	Oracle Clusterware, Veritas VCS	HBA, S/W
IBM AIX	Software initiator, native HBA	Yes	Active-active MPIO	HA/CMP	HBA, S/W
HP HP-UX	Software initiator	Yes	Active-passive PVlinks	No	No
Novell NetWare	Software initiator	Yes	Trunking	Novell Cluster Services	No

Table 1) Available iSCSI initiator support by OS.

SECURITY

Secure storage is increasingly important as storage of business-critical data, personal data, and customer data increases. NetApp iSCSI storage systems offer many security-related options that allow compliance with corporate security policies. NetApp strongly recommends that you use secure administration methods for Data ONTAP, including the following available iSCSI options: host authentication (CHAP), private network (physical and VLAN zoning), array LUN masking, IPSec (optional), and key management (optional).

NETAPP SERVICES AND SUPPORT

A complete integrated network storage solution should include highly available and high-performance storage, integrated management tools, application integration, and a skilled team of support and service personnel. NetApp Global Services and NetApp Support offer a full array of professional services, including enabling a successful transition from direct-attached to networked storage, application integration and planning, storage risk analysis, and reducing and managing services during and after implementation.

ABOUT NETAPP

NetApp creates innovative storage and data management solutions that accelerate business breakthroughs and deliver outstanding cost efficiency. Discover our passion for helping companies around the world go further, faster at *www.netapp.com.*

	FAS6200/V6200 SERIES	FAS3200/V3200 SERIES	FAS2000 SERIES
Maximum Ethernet Ports*	1GbE: 100, 10GbE: 48	1GbE: 52, 10GbE: 24	1GbE: 8
Maximum FC Ports*	96	52	4
Maximum Raw Capacity (TB)	2,880	1,920	136
Maximum Cache (GB)*	192	32	8

* Assumes active-active controller configuration where applicable.

Table 2) NetApp iSCSI solutions range from entry level to high end.

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