



Intelligent IP SANs Made Simple

Improve IT Efficiency through Storage Consolidation and Centralized Server Management

Consolidate Storage Resources to Handle Escalating Storage Requirements

Data growth has exploded driving increasing demands and expectations on an organization's IT infrastructure. To compete in today's global marketplace, organizations are faced with new challenges to store, protect and best leverage the value of their data. IT managers are charged with managing the data with fewer resources, increased demands on time, performance and capacity.

Supported Operating Systems

- Windows Server 2003 and 2008
- Linux
- Solaris

Supported Initiators

- winBoot/i™ Software
- netBoot/i™ Software
- QLogic HBAs
- Intel® PRO/1000

A key benefit of storage consolidation that seems most intriguing to IT managers is the changeover to fewer points of management. Consolidation reduces points of management across the three parts of a storage network; network, servers and storage. With fewer points of management, system administrators require less training and are able to manage more resources. Lower system administration costs enable IT managers to offer increased services with fewer staff.

Storage consolidation offers organizations a sophisticated solution to reduce management and system complexity, improve efficiency, easily grow capacity and reduce overall system costs.

As your company's data volumes continue to grow, increased resources are needed to manage your expanding storage assets. At the same time, the traditional method of housing storage within servers has its limitations. As capacity is reached, application performance and user productivity can decrease. Adding additional storage requires servers to be taken offline, slowing down user productivity that much more.

Storage area network (SAN) consolidation provides IT managers with a simpler and more effective approach to increase storage utilization, break down islands of storage and present a single pool of storage. You will further enhance application availability, leveraging economies of scale to easily increase, or decrease storage capacity. When your storage is decoupled from the server and data is housed in a common pool of shared storage, you can boost productivity, reduce costs and rapidly adapt to changing business needs. Using IP SAN technologies allow organizations to:

- **Reduce Infrastructure Complexity:** Using iSCSI technology allows organizations to utilize existing IP network infrastructure to deploy a storage area network (SAN) to consolidate storage resources into a centralized storage pool. With a centralized storage, administrators are able to provision storage from a single repository, reducing points of failure and management headaches,
- **Reduce Cost-Of-Ownership and Management Overhead:** Operational costs are dramatically reduced including IT support, maintenance and facilities costs with centralized storage infrastructure. By using advanced features like clustering, mirroring, replication and snapshots, building a highly available, mission critical infrastructure is a cost-effective option for all organizations.
- **Increase IT Efficiency and Agility:** With storage virtualization technologies, storage infrastructure is transformed, and quickly adapting and evolving to changing organizational needs; whether it encompasses new hardware, virtual servers or applications, allowing nearly instantaneous deployment.
- **Boost Organizational Efficiency:** With server and storage centralization, administrators are more efficient, increasing the number of applications, terabytes and systems managed without increasing headcount, saving IT resources to drive top-line business growth, without increasing capital expenses.



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Booting from IP SAN Offers Operational, Management and Fiscal Benefits

Booting servers from IP based networked storage provides significant benefits for today's complex data center environments. One of the driving forces behind IP SANs is the need to deliver mission-critical data quickly – at any time, without interruptions, delays, or new infrastructure. Booting from the network streamlines system management, while separating the boot image from the server enables administrators to leverage the built-in high availability, enhanced data integrity and centralized storage management of IP SAN. Consolidating server boot images with network boot technologies offers a range of benefits including:

Reduction of Server Deployment Times

If a server becomes faulty, unavailable or compromised in a boot from SAN environment, it can be swapped out for a replacement server with the same configuration in minutes. Administrators do not have to swap out hard drives, reconfigure arrays, or restore data and applications from backup – saving valuable time during a mission-critical restore, during initialization or replacement cycles.

Centralization of System Administration

Transitioning from a distributed server environment, where the boot device is local to the server, to one, or more storage arrays on a SAN helps reduce the management overhead associated with traditional distributed environments. Centralized systems management can streamline administrative workflow and require fewer administrators to maintain the environment.

Reduction in Server Cost Of Ownership

Booting from SAN enables the deployment of diskless servers. Depending on the network topology and number of servers, organizations can gain significant cost savings by using diskless servers.

Improvements in Business Continuity Processes

Data protection features inherent in SANs such as backup and restore, data migration, data replication and disk capacity expansion features – can be effectively used for the boot drive on the RAID controller without increasing additional cost.

Acceleration of Server Installations and Redeployments

By storing the boot image on a SAN, administrators can create an application instance that includes the logical grouping and associations of a server model, installed applications, the OS image, the actual boot logical unit (LUN) and the data LUNs. A preconfigured application can be used to rapidly repurpose a server to perform a specific job at a scheduled time, or dynamically repurpose the server to sustain the workload of a specific job. This instance can also be used for disaster recovery to quickly replace a failed server.

Consolidation of Disk Images and Management

Multiple homogenous servers can boot from a single volume, reducing storage requirements, and simplifying backup and recovery processes.

iSCSI Initiator Options Supporting Remote Boot Technologies

Hardware-Based

A hardware-based iSCSI SAN boot allows iSCSI HBAs to boot directly from a selected LUN in a method similar to that used by FC with no additional hardware, or management tools required. Other approaches enable iSCSI SAN boot only by first performing a network boot from an additional special purpose server requiring IT managers to learn a new boot method, install additional hardware and endure a slower two-step boot process.

Software-Based

A software-based iSCSI SAN boot provides the ability to boot open systems servers and desktops from an iSCSI target remotely over an IP network without the use of specialized hardware devices.



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StoneFly's iSCSI Boot Options Improve IT Efficiency

StoneFly partners with networking industry leaders, emBoot Inc. QLogic, and Intel®— delivering high-performance iSCSI SAN boot and host bus adapter (HBA) technologies. Costs are significantly reduced and disaster recovery preparedness is dramatically improved with StoneFly's high-performance product options. emBoot, QLogic, and Intel® technologies are compatible across a wide range of operating systems and IT environments.

emBoot winBoot/i™

winBoot/i™ enables iSCSI boot of Windows Server 2003 using the Microsoft iSCSI Software Initiator and standard ethernet adapters. winBoot/i's™ ability to centralize the operating system of Microsoft Windows Server 2003 SP1 and Microsoft Windows Server 2003 R2 provide substantial management benefits and cost reductions via consolidation of IT resources. winBoot/i™ offers a compelling solution for reducing complexity in the server room or data center. Servers

and blades can reduce heat and power consumption by booting from iSCSI eliminating the need for local hard disks.

Efficiency Improvements with SAN Boot Technology

- Reduce server deployment times
- Centralize system administration
- Reduce Server TCO
- Improve business continuity processes
- Accelerate new server deployments
- Consolidate disk image management and administration

emBoot netBoot/i™

Using standard Ethernet adapters, netBoot/i™ offers an iSCSI boot solution without requiring specific iSCSI HBA hardware. Diskless operation of servers, virtual machines and desktops allows network management tasks to be consolidated and streamlined, while data security is significantly improved. netBoot/i™ enables rapid bare

metal deployment, increased utilization of storage resources and virtualized operating system data storage. netBoot/i™ includes a Windows software initiator and all the necessary administration tools to set up a network boot environment over iSCSI.

QLogic iSCSI Initiators

SANblade iSCSI Host Bus Adapters (HBAs) extend QLogic's award-winning line of SCSI and Fibre Channel connectivity products to enable Gigabit Ethernet-based SANs. SANblade iSCSI HBAs help you build a reliable, secure and cost-effective IP storage infrastructure. QLogic iSCSI HBAs provide superior performance for iSCSI storage traffic and complete offload of TCP/IP traffic.

Intel® PRO/1000

Intel® PRO/1000 adapters use native iSCSI initiators to offload traffic without iSCSI HBA hardware -- supporting remote boot and simple administration.

Key Applications for SAN-based Remote Boot Technologies

Server Virtualization Projects

In an era of flat IT budgets, tight space constraints, underutilized resources and increasing competitive pressures that require more agile business practices— virtualization has become the mantra of modern IT architects. Using server IO virtualization, blade servers can be switched without changing a SAN environment configuration. OS and applications are made available on the spare server using the same boot disk as the original server. Multitier enterprise applications can be moved between virtual servers without the need for reinstallation.

Disaster Recovery Implementations

Recovering servers quickly may be the greatest advantage of boot from SAN. If a server fails, IT can easily deploy a new one using the server image on the SAN. That process takes less time than configuring a new server. Likewise, dozens of



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Web servers can be created with a single click of a button once their identity has been created. Rather than reinstalling the operating system, applications, configuration settings and a copy of the data from a backup tape, IT simply drops the new server into the network and configures it to use the SAN boot application and operating system image stored on the SAN.

Conclusion

Storage consolidation with IP SAN technologies offer a smart strategy for doing more with less, enhancing the return on your technology investments and positioning your enterprise to capitalize on business and technology changes. Using iSCSI boot technology is a simple and cost-effective option for organizations looking to reduce the total cost of ownership through improved storage consolidation. Using networked storage and remote boot technologies offers customers the ability to recover servers quickly, as well as deploy diskless and virtual servers, while also making it easier for organizations to centralize IT management. In today's competitive environment, organizations are driven to find new ways to optimize their IT resources. Storage consolidation with IP SANs offers a proven solution to achieving this goal by simplifying management with higher resource utilization. Organizations now have more time to focus on solving their everyday business challenges, while improving bottom-line profitability.

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ABOUT STONEFLY

StoneFly, Inc., headquartered in San Diego, was founded in April 2000 to deliver upon the vision of simple and affordable storage optimization and disaster recovery protection through its pioneering IP SAN solutions. StoneFly is one of the earliest vendors in the iSCSI space, building its product during the first wave of iSCSI. As a result, StoneFly customers have been deploying StoneFusion based solutions since 2002. The StoneFusion powered IP SANs offer key features including active/active clustering, storage virtualization, snapshots, and asynchronous and synchronous mirroring. StoneFly solutions are cost-effective, and offer a range of deployment options to fit every deployment. In 2006, DNF completed its acquisition of StoneFly Networks and StoneFly operates as a wholly-owned subsidiary of Dynamic Network Factory, Inc. (dba DNF Storage), a leading maker of high-performance network attached storage, storage area networks, RAID and iSCSI systems. Founded in 1989, DNF Storage is a privately-held company based in the Silicon Valley (Hayward, Ca.). DNF started as a U.S. subsidiary of the publicly-traded Japanese IT conglomerate, CSK Electronics, in 1989. In 1998, the company refined its strategy and began to focus the hardware group on storage solutions. DNF has thousands of customers ranging from consumers and small-to-medium businesses, to government agencies, universities, hospitals, financial institutions and Fortune 500 companies. Key customers include UC Berkeley, MIT, the Federal Aviation Administration, FBI, Lockheed Martin, Bank of America, Citibank, Wells Fargo, Fujitsu, and Honda.



www.StoneFly.com
toll free: 888.786.6335
fax: 510.265.1565
email: sales@stonefly.com

StoneFly Headquarters
main: 510.265.1616
21353 Cabot Boulevard
Hayward, CA 94545

San Diego Office
main: 858.225.6040
6199 Cornerstone Court
Suite 109
San Diego, CA 92121