



## iSCSI – THE NEW STANDARD FOR NETWORKED STORAGE

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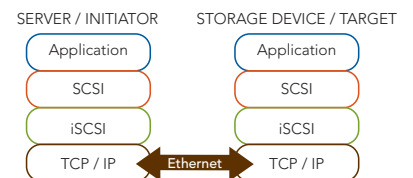
### WHY iSCSI?

Although the price of storage hardware has been decreasing, the voracious demand for data and the accompanying increase in administrative costs threaten to swamp all other factors in reducing the total cost of ownership. The compound annual growth rate for storage is 68%, while administrative costs run seven times the cost of hardware. Mid-range businesses are stuck with inefficient direct-attached storage (DAS) or forced to invest resources in complex and often proprietary technologies. There is also no guarantee that hardware will work together, and storage management remains cumbersome, at best. What is needed is a standard for networked storage that brings the benefits of consolidated storage to a broad range of businesses.

Developed by the Internet Engineering Task Force (IETF) as a response to the need for interoperability in networked storage, iSCSI lets businesses leverage existing skills and network infrastructure to create IP-based SANs that deliver the performance of Fibre Channel, but at a fraction of the cost.

### HOW IT WORKS

iSCSI is built on two of the most commonly understood protocols: SCSI and Ethernet, the dominant standards for storage and networking. Utilizing an ordinary IP network, iSCSI transports block-level data between an iSCSI initiator on a server and an iSCSI target on a storage device. The iSCSI protocol encapsulates SCSI commands and assembles the data in packets for the TCP/IP layer. Packets are sent over the network using a point-to-point connection. Upon arrival, the protocol translates data back to SCSI. Security is provided through iSCSI authentication and virtual private networks (VPNs), as needed.



When an iSCSI initiator connects to an iSCSI target, the storage is seen by the operating system as a local SCSI device that can be formatted as usual. The process is transparent to applications, file systems, and operating systems. By consolidating storage with an iSCSI SAN, different platforms can share the same storage, greatly improving utilization and efficiency. Multi-protocol switches enable co-existence between iSCSI and Fibre Channel SANs.

To access iSCSI storage, all a server needs is an iSCSI initiator connected to a network. An initiator can be an iSCSI driver with a standard network card or a card with a TCP offload engine (TOE) to reduce CPU utilization. Also available are HBAs that offload both TCP and iSCSI. On the target side, storage devices similarly implement the iSCSI protocol stack.

With the advent of Gigabit Ethernet, iSCSI can deliver performance comparable to a Fibre Channel SAN. Recent advances in 10GB Ethernet make iSCSI superior to any other storage solution.

### BENEFITS OF iSCSI

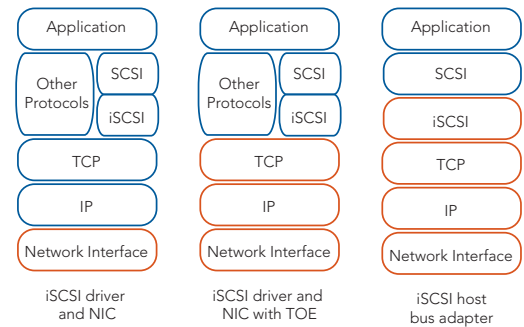
- Simplified deployment and management: appliances can be set up with minimal effort, typically in 20 minutes or less.
- Enables cost-effective, scalable, secure, and highly-available SANs.
- Leverages existing management skills and network infrastructure.
- Delivers performance comparable to Fibre Channel.
- Provides interoperability using industry standards.
- Implemented by the top system, storage, and network providers.

With iSCSI, businesses can get a handle on storage administration expenses without retrofitting their existing network infrastructure or investing in hardware that quickly becomes obsolete. Enabling low cost, interoperable, and high performance SANs, iSCSI is about to revolutionize the world of networked storage.

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#### iSCSI INITIATOR CHOICES

- Processed in server
- Processed in network card



#### STORAGE NETWORKING USING iSCSI



All major operating systems support iSCSI initiators. With dynamic discovery methods, high performance offload engines, and scalable host connectivity, iSCSI provides a cost-effective solution for simplifying and managing networked storage.



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