COMPARING iSCSI INITIATOR IMPLEMENTATIONS

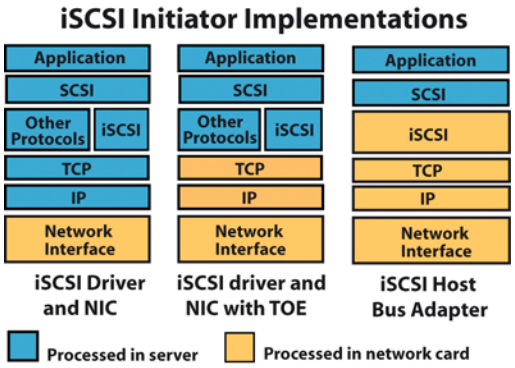
There are three basic types of iSCSI initiators:

- Software-based iSCSI driver with a standard network card.
- Software-based iSCSI driver with a network card that incorporates a TOE to reduce the TCP processing load on the host's CPU.
- Host bus adapter that offloads both TCP and iSCSI processing.

WHAT'S ALL THE BUZZ ABOUT iSCSI?

With the advent of iSCSI as the standard for networked storage, businesses can leverage existing skills and network infrastructure to create Ethernet-based SANs that deliver the performance of Fibre Channel–but at a fraction of the cost. iSCSI enables block-level data to be transported between a server and a storage device over an IP network. An iSCSI initiator is hardware or software that runs on a host and initiates I/O to an iSCSI target, which is a storage device (usually, a logical volume) that responds to read/write requests.

Upon connection, an iSCSI initiator and iSCSI target authenticate each other. After login, the target is seen as a local device that can be used like any other SCSI disk. When accessing data, all initiators run at line speed.



CHOICES, CHOICES

To access storage in an iSCSI SAN, a host only needs an iSCSI initiator and a network connection. Initiator implementations differ in price, performance, and flexibility:

- Software-based iSCSI driver with a standard network card. All iSCSI and TCP processing occurs in the host's CPU. With this type of initiator, hardware costs are minimized.
- Software-based iSCSI driver with a network card that incorporates a TCP offload engine (TOE) to reduce the TCP processing load on the host's CPU. Currently, this type of initiator is not common, but it will become more prevalent over time.
- Host bus adapter that offloads both TCP and iSCSI processing. This type of initiator reduces the TCP and iSCSI processing load on the host's CPU and will be the first to provide boot support. Some iSCSI HBAs can be used for both iSCSI and standard network traffic, while others require a separate network card for non-iSCSI traffic.

INCREASING HOST CONNECTIVITY TO TARGETS

The same solutions that increase network connectivity on a host provide highly-available access to iSCSI targets. Host connectivity can easily scale upwards using hardware or software-based methods, including multi-homing, teaming, or multipath I/O. Host multi-homing using NIC/TOEs provides some failover and load balancing capabilities. Teaming homogeneous NIC/TOEs provides both failover and load balancing capabili-

ties; however, special setup is required. Host-based MPIO provides failover and load balancing capabilities and supports a broad range of network cards and HBAs. An iSCSI HBA can also use MPIO for failover and load balancing.

ACCESSING TARGETS FROM HOSTS

iSCSI is the only storage networking protocol to support authentication, authorization and encryption in the standard. The result is security that is well integrated and easy to use. iSCSI initiators support various methods for connecting to iSCSI targets. All initiators support the static procedure, in which an administrator manually specifies the full target iSCSI name and IP address (portal). However, to facilitate the connection process, most initiators support discovery, which is based on the SendTarget command. Using discovery, an administrator specifies just the portal address. Only targets authorized for the initiator are returned and made available for access.

DYNAMICALLY MANAGING TARGETS AND INITIATORS

Internet Storage Name Service (iSNS) can be used to facilitate the discovery, management, and configuration of iSCSI devices on a TCP/IP network. Instead of an administrator having to constantly configure and reconfigure individual storage devices, an iSNS server dynamically handles device management and authentication services. Targets register properties and access controls with the iSNS server. Upon querying the server, initiators are shown only the targets for which they have authorization. iSNS servers can also provide zoning and login control services and state change notification. In addition, an iSNS server emulates Fibre Channel fabric services, so it can provide a simple method of interoperation (using iFCP gateways) between IP and Fibre Channel networks.

iSCSI – THE BEST SAN SOLUTION AVAILABLE TODAY

With capabilities for booting and discovery–in addition to data access–the iSCSI protocol represents the most comprehensive storage protocol available today. All major operating systems support iSCSI initiators, providing businesses with a range of implementations and features. With dynamic discovery methods, high performance offload engines, and scalable host connectivity, iSCSI provides a cost-effective solution for simplifying and managing networked storage.

"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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