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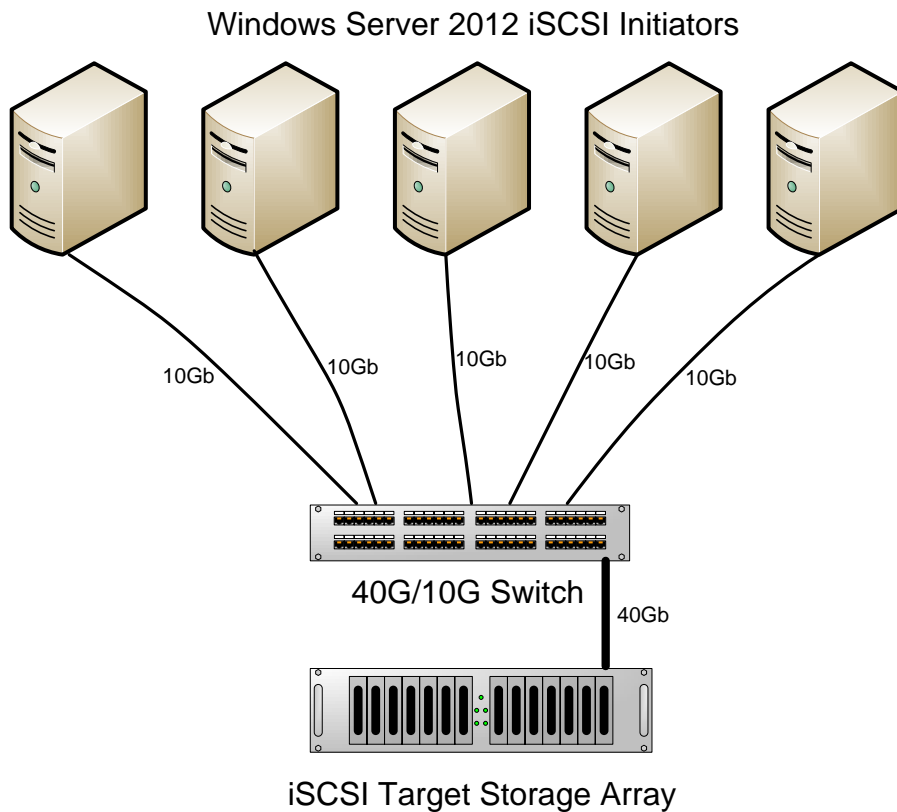
Delivering superior performance with iSCSI over 40Gb Ethernet

Chelsio T5 Unified Wire Network Adapters

Using Chelsio's Unified Wire Network Adapters with the T5 ASIC, Chelsio delivers superior iSCSI SAN performance unparalleled in industry today. The demonstration consists of an iSCSI target running over a T5 Unified Wire Network adapter at 40Gb/sec on a single port with standard 1500 byte Ethernet frames. Throughput performance is in excess of 4160 Megabytes per second of "goodput" data (data delivered to the application) with an aggregate CPU utilization of 17%.

The Topology

Windows Server 2012 iSCSI Initiators

10Gb   10Gb   10Gb   10Gb   10Gb

40G/10G Switch

40Gb

iSCSI Target Storage Array

Network configuration: The network configuration consists of three components; the 40Gb/10Gb switch, the iSCSI target storage array with 40Gb connectivity, and five iSCSI initiator peer machines running at 10Gb. End to end standard 1500 Ethernet frames are used. The storage array runs Chelsio's iSCSI target on Linux taking advantage of the T5 ASICs TCP/IP and iSCSI offload technology at 40Gb. The initiator machines each contain two Intel E5-2687W processors at 3.1 GHz using a single port of a Chelsio T420-CR adapter. The switch, a Dell/Force 10 Model S4810, aggregates the 10Gb connections from the initiator machines to the 40Gb connection of the iSCSI target storage array.

Software configuration: The iSCSI initiator clients run Microsoft Windows Server 2012 Build 9200 with all Windows updates applied and it runs the Microsoft iSCSI initiator for Windows. The iSCSI target storage array runs RHEL6.3 with Chelsio's iSCSI offload target. The load generating tool in use is IOMeter version 2006.07.27 from www.iometer.org, a well known benchmarking tool in industry.

I/O benchmarking configuration: The I/O size used is 64Kbytes with an I/O access pattern of sequential reads. There are 4 IOMeter workers per iSCSI initiator system with a queue of 1 command each, specified in IOMeter as a single outstanding I/O request. The IOMeter management interface is run on one of the initiator systems, and the dynamo.exe load generating tool is run on the remaining 4 initiator systems.

iSCSI target storage array configuration: The iSCSI target array contains two Intel E5-2687W processors running at 3.1 GHz with 64 Gig of RAM. Two iSCSI targets are configured with each initiator reading data from each target, for a total of 10 iSCSI sessions. The system has 16 CPU cores with only 10 used for iSCSI traffic, one core used for each connection. CPU utilization for each core is about 30% with a system average of 17%.

Performance: The following table is the throughput obtained.

Block Size	Transfer Rate MB/sec	% CPU on server
64K	4160	17%

About Chelsio Communications

Chelsio is a leading technology company focused on providing high performance networking and storage solutions for virtualized enterprise data centers, cloud service installations, and cluster computing environments. Now shipping its fourth generation protocol acceleration technology, Chelsio is delivering hardware and software solutions including Unified Wire Ethernet network adapter cards, Unified Storage Server software, high performance storage gateways, unified management software, bypass cards, and other solutions focused on specialized applications.