



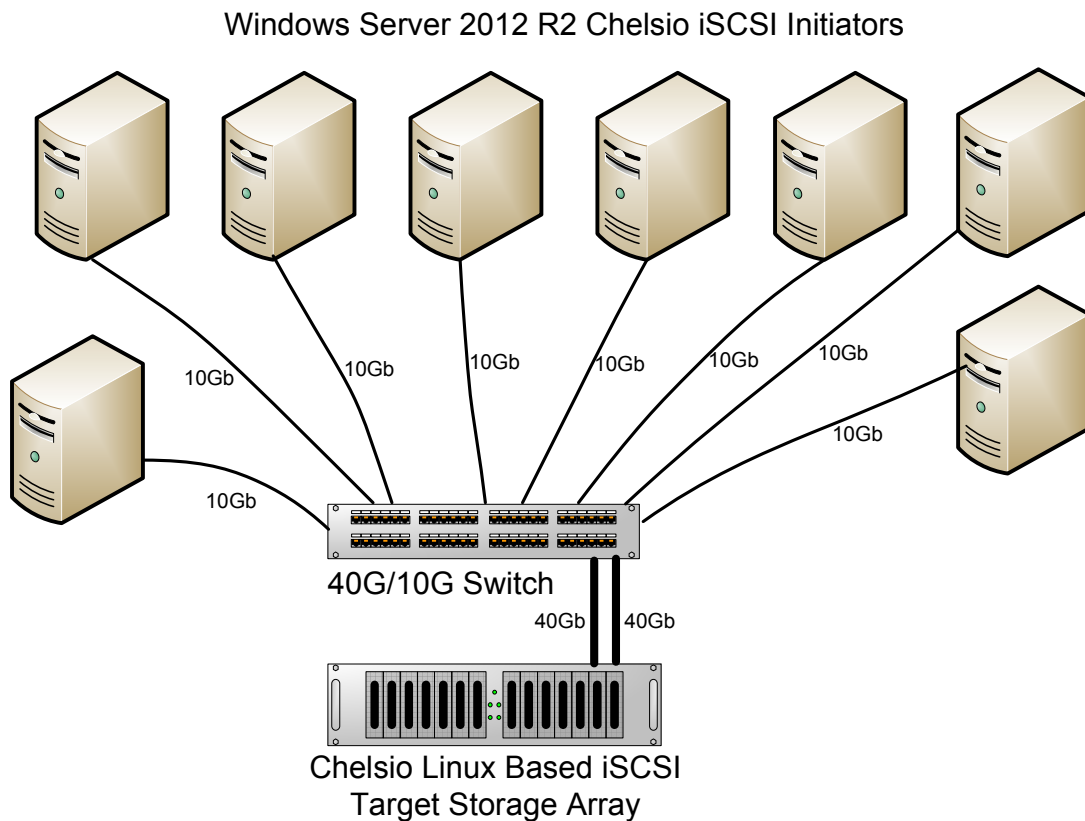
Delivering iSCSI over 40Gb Ethernet

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. Two configurations are used to illustrate the performance. One uses a Chelsio iSCSI target running over a T580-LP-CR Unified Wire Network adapter at 40Gb/sec on two ports with jumbo 9000 byte Ethernet frames. Throughput performance is in excess of 6190 Megabytes per second of "goodput" data (data delivered to the application). In the second configuration, only a single 40Gb/sec port is used with performance in excess of 4690 Megabytes per second.

Dual Port Setup & Data

The Topology

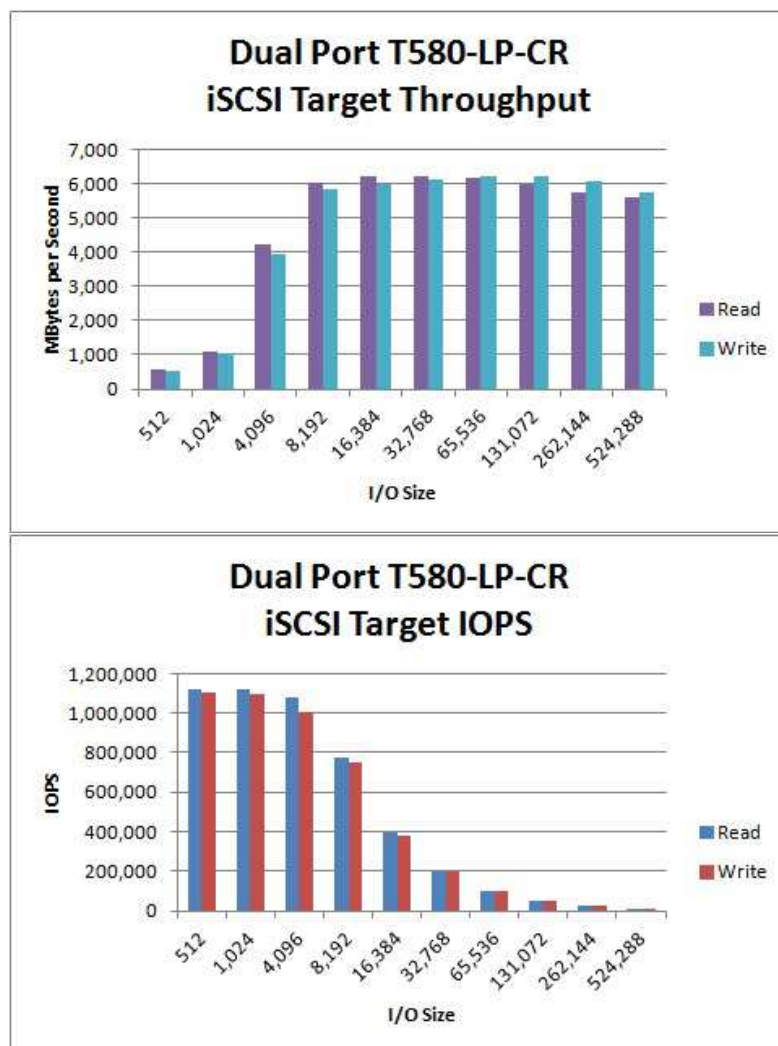


Network configuration: The network configuration consists of three components; the 40Gb/10Gb switch, the iSCSI target storage array with two ports of 40Gb connectivity, and eight iSCSI initiator peer machines running at 10Gb. End to end jumbo 9000 byte Ethernet frames are used.

- The storage array runs Chelsio’s iSCSI target on RHEL6.3 Linux taking advantage of the T5 ASICs TCP/IP and iSCSI offload technology at 40Gb. The array has two Intel E5-2687W processors running at 3.1 GHz with 64 Gig of RAM.
- The initiator machines run on Windows Server 2012 R2, with each server running with two Intel E5-2687W processors at 3.1 GHz using a single port of a Chelsio T420-CR adapter. They all run Chelsio’s Windows iSCSI offload initiator driver.
- The switch is an IBM RackSwitch G8264. It aggregates the 10Gb connections from the initiator machines to the two 40Gb connections on the iSCSI target storage array.

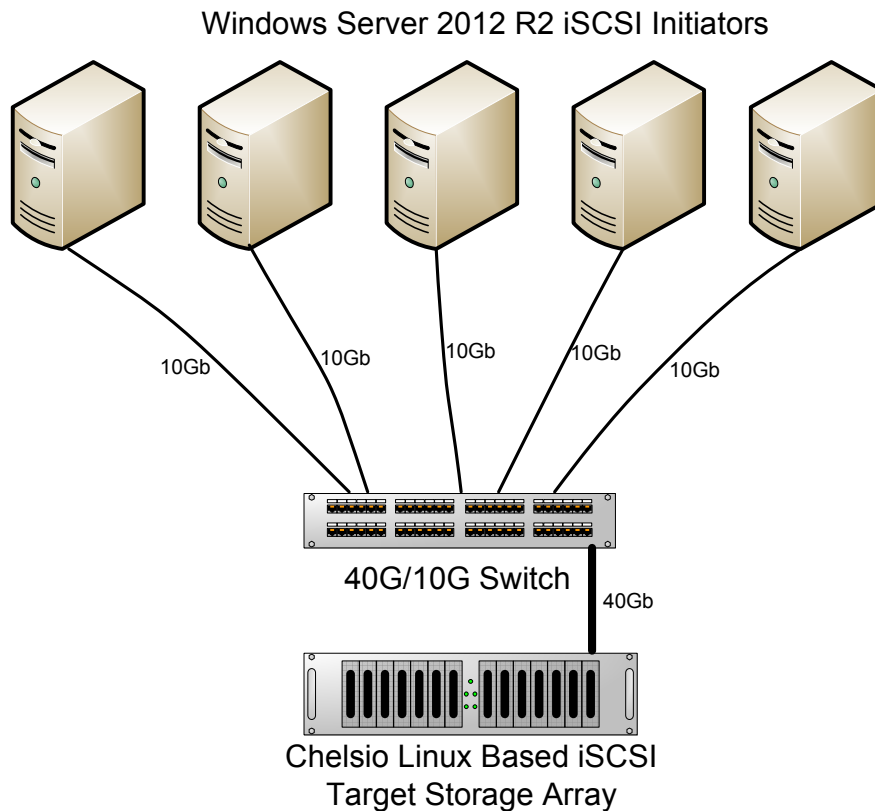
Storage topology and configuration: The storage array contains 32 iSCSI ramdisk null-rw targets. Each of the eight initiators connects to 4 targets. The I/O sizes used varied from 512 Bytes to 512 Kbytes with an I/O access pattern of sequential reads and sequential writes. IOMeter version 2006.07.27 was configured to have 16 workers per initiator giving it 4 workers per disk.

Performance: The following graphs illustrate the benchmarking data obtained across various I/O sizes and with reads and writes.



Single Port Setup & Data

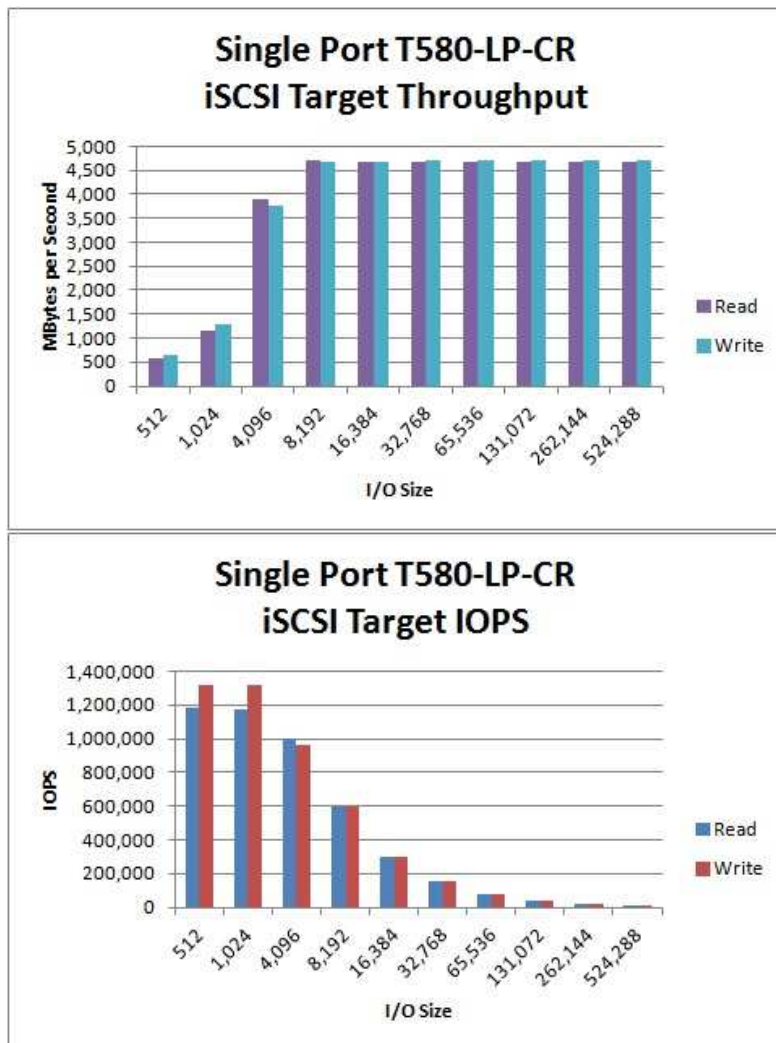
The Topology



Network configuration: The network configuration is identical as the dual port configuration except for two differences. Only one 40Gb/sec port of the T580-LP-CR adapter was used, plus less iSCSI initiator peer machines were used, 5 instead of 8.

Storage topology and configuration: The storage array contains 20 iSCSI ramdisk null-rw targets. Each of the five initiators connects to 4 targets. The I/O sizes used varied from 512 Bytes to 512 Kbytes with an I/O access pattern of sequential reads and sequential writes. IOMeter version 2006.07.27 was configured to have 16 workers per initiator giving it 4 workers per disk.

Performance: The following graphs illustrate the benchmarking data obtained across various I/O sizes and with reads and writes.



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