Chelsio

Chelsio® T420 low latency server connectivity brings cost-effective capacity and versatility to any high-performance computing infrastructure.

HPC CONVERGING ON LOW LATENCY IWARP

High Performance Computing cluster architectures are moving away from proprietary and expensive networking technologies towards Ethernet as the performance/latency of TCP/IP continues to lead the way. InfiniBand, the once-dominant interconnect technology for HPC applications leveraging Message Passing Interface (MPI) and remote direct memory access (RDMA), has now been supplanted as the preferred networking protocol in these environments.

Due to the rapid adoption of the x86 platform in high performance parallel computing environments, 48% of the top 500 supercomputers now use Ethernet as their standard networking technology (source: top500.org), while latency-sensitive HPC applications such as those used in financial trading or modeling environments, leverage IP/Ethernet networks to run the same MPI/RDMA applications using iWARP. Compatible with existing Ethernet switches, iWARP is the proven low latency RDMA-over-Ethernet solution for high-performance computing on TCP/IP, developed by the IETF and supported by the industry's leading 10GbE adapters.

> **...the Chelsio T420 showed Intel MPI Benchmark latency of just 3.7 microseconds...**

Cost-Effective, Low Latency Clustering

Now, Chelsio has delivered iWARP connectivity with the shortest delay available in a network interface card. In recent tests with Chelsio partners, the T420-LL-CR was found to deliver RDMA Verbs latency of 3.4 µs and average latency of 3.7 µs, as shown in the Intel MPI benchmarks in Figure 2. These charts also demonstrate the smooth scalability provided by the T420-LL-CR's 4th generation T4 ASIC—essential to ensuring continuous low latency operation during periods of heavy use.

Capabilities Integrated to Deliver the Best Performance Overall

Chelsio's second generation iWARP design builds on the RDMA capabilities of T3, with continued MPI support on Linux with OpenFabrics Enterprise Distribution (OFED), and Windows HPC Server 2008. T3 is already a field-proven performer in Purdue University's 1300-node cluster, and the T4 design reduces RDMA latency from T3's already low 6.8 µs to about 3.7 µs through its increased pipeline speed.

This demonstrates the linear scalability of Chelsio's RDMA architecture to deliver comparable or lower latency than InfiniBand DDR or QDR, and to scale effortlessly in real world applications, as connections are added.

Enhanced Storage Offloads

T4 offers protocol acceleration for both file and block-level storage traffic. For file storage, T4 supports full TOE under Linux and TCP Chimney under Windows. T4's fourth-generation TOE design adds support for IPv6, increasingly prevalent and now a requirement for many government and wide-area applications. For block storage, T4 supports partial or full iSCSI offload of processor-intensive tasks such as protocol data unit (PDU) recovery, header and data digest, cyclic redundancy checking (CRC), and direct data placement (DDP), supporting VMware ESX.
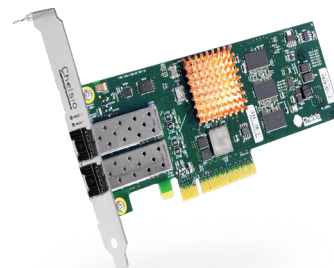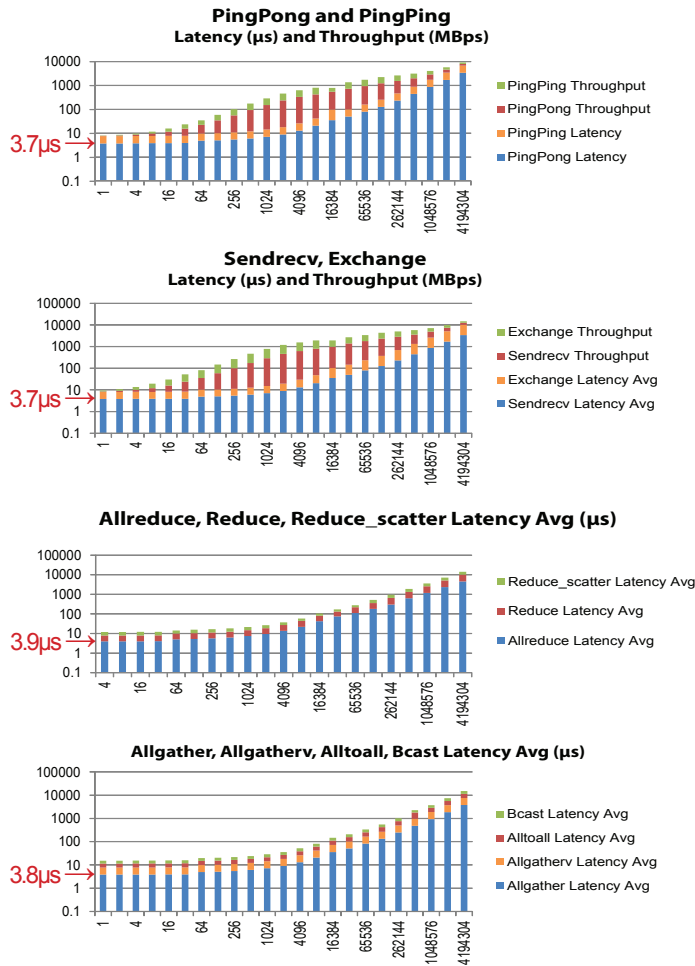

Figure 1.
The high-performance, dual-port Chelsio T420-LL-CR 10GbE Unified Wire Adapter

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Figure 2.
Chelsio's T4 ASIC brings ultra-low latencies to iWARP traffic shown in these results from the Intel Message Passing Interface Benchmark (IMB) suite

Conclusion

These results show how the rigorous requirements of cluster computing and storage can be met or exceeded using iWARP and the Chelsio T420-LL-CR Unified Wire Adapter. Pervasive and reliable 10Gb Ethernet with iWARP delivers a highly scalable ultra-low latency inter-connect solution for all HPC environments.

Why risk investing in technologies with marginal installed base and a limited future, when Chelsio T4-based 10GbE Unified Wire Adapters provide comprehensive support and offloading of iSCSI, FCoE, TOE, NFSiWARP, LustreiWARP for CIFs and NFS traffic, and achieve all the requirements needed for application clustering ranging from dozens to thousands of compute nodes?

So if you prefer to use one card throughout your HPC application, choose the T420-LL-CR; the Unified Wire Adapter that does it all, and does it best.

About Chelsio Communications

Chelsio Communications is the market and technology leader in advanced, low-latency server connectivity, enabling the convergence of networking, storage and clustering traffic over 10Gb Ethernet.

Terminator ASIC technology is proven in more than 100 OEM platforms with the successful deployment of more than 100,000 ports, and now Chelsio is leading the way again, with its recently announced T4 ASIC technology. With Terminator 4, Chelsio has taken the unified wire to the next level, providing full offload for TCP, iSCSI, iWARP and Fibre Channel over Ethernet, relieving servers and storage systems of processing overhead, and bringing its adopters dramatic increases in application perfor-mance.

To learn more, contact your Chelsio sales representative at sales@chelsio.com, or visit us at www.chelsio.com.

Broadening Chelsio's support for block storage, T4 adds partial and full FCoE offload. With an HBA driver, full offload provides maximum performance as well as compatibility with SAN management software. For soft-ware initiators, Chelsio supports the Open-FCoE stack and T4 offloads certain processing tasks much as it does in iSCSI. Unlike iSCSI, FCoE requires enhanced Ethernet support for lossless transport, Priority-based Flow Con-trol (PFC), Enhanced Transmission Selection (ETS) and Data Centre Bridging Exchange (DCBX).