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CHELSIO ANNOUNCES TERMINATOR 6 ASIC

2x1/10/25/40/50/100 GbE iWARP RDMA, iSCSI, TOE, FCoE, L2 NIC, TLS/SSL, IPsec, SMB 3.X crypto, SDN Offload Engine

SUNNYVALE, CA – August 9, 2016 – Chelsio Communications, Inc., a leading provider of Ethernet Unified Wire Adapters and ASICs, today announced Terminator 6, the sixth generation of its high performance Ethernet silicon technology. The Terminator 6 (T6) ASIC is built upon the latest iteration of Chelsio's protocol-rich high speed network processing architecture, and leverages an industry-proven design, which has been widely deployed with hundreds of OEM platform wins and more than 1.3 million ports shipped worldwide. T6 runs all the current generation T5 silicon software without modification and thus enables the customers to leverage their software investment and make a smooth transition to 100GbE speeds.

T6 is a highly integrated, hyper-virtualized 1/10/25/40/50/100 GbE controller with full offload support of a complete Unified Wire solution. T6 provides no-compromise performance with both low latency (sub 1µsec through hardware) and high bandwidth, limited only by the PCI bus. Furthermore, it scales to true 100 Gigabit line rate operation from a single TCP connection to thousands of connections, and allows simultaneous low latency and high bandwidth operation thanks to multiple physical channels through the ASIC.

Support for integrated TLS/SSL/IPsec and SMB 3.X crypto allows for tremendous differentiation for the end product. For example, T6 can encrypt/decrypt network data at line rate and in an in-line fashion (with or without integrated TCP Offload Engine), while concurrently doing encryption/decryption of

storage data in a co-processor mode, thus enabling concurrent secure communication and secure storage, all for the price and power of a typical NIC.

“The Terminator 6 ASIC is an important evolutionary step for Chelsio, bringing all the offload, virtualization, and switching capabilities of the existing T5 chip to 100Gbps performance levels,” said Bob Wheeler, Principal Analyst at The Linley Group. “The introduction of integrated encryption within a NIC price and power envelope should further the migration towards secure cloud networks and storage.”

T6 Target Markets

Designed for high performance clustering, storage, cloud, and data networking, T6 enables fabric consolidation by simultaneously supporting TCP/IP and UDP/IP socket applications, RDMA applications and SCSI applications at wire speed, over legacy switching infrastructure, thereby allowing InfiniBand and FibreChannel applications to run unmodified and concurrently over standard Ethernet. This will result in tremendous savings in the datacenter by avoiding the need for InfiniBand or FibreChannel adapters, cabling, switches and gateways. Thanks to the reliability provided by hardware offloaded TCP/IP, the benefits of T6 RDMA include eliminating the scalability and cabling and noise issues associated with IB-FDR.

T6 establishes a new milestone for SAN performance. With T6, true 100Gb SAN throughput, more than 3x the latest FC speeds, is now enabled via offloaded iSCSI without requiring for specialized FCoE switches. T6 further improves storage IO performance to more than 5M IOPs.

With a specific design focus on low latency and small packet processing performance, T6 also enables a new performance milestone for high frequency trading and other latency sensitive applications such as flash based storage installations.

Given the high integration of T6, the ability to concurrently run all the different protocols at industry leading performance levels, and the rich feature set that addresses all of Ethernet’s market segments, this silicon enables OEMs to converge on a single vendor for all their connectivity needs. These needs

can be as disparate as Financial Services Industry verticals, to cloud, virtualization and SDN/NFV applications, to clustering and storage applications, and to GPU pooling and HPC applications.

"Microsoft's support of Chelsio's iWARP RDMA for Storage Spaces Direct, in addition to Linux and FreeBSD inboxed kernel support of its iSCSI Offload enhance Chelsio's storage focus as the transition to Flash continues," said Seamus Crehan, president of Crehan Research. "The migration to 25/50/100Gb Ethernet speeds will further increase the demand for offload across the industry which T6 is well suited to address."

T6 Architectural Features

The T6 ASIC is built around a highly scalable and programmable protocol-processing engine. Much of the processing of the offloaded protocols is implemented in firmware running on a proprietary pipelined data-flow processor. The pipeline supports cut-through operation for both transmit and receive paths for minimum latency, and the transport processor is designed for wire-speed operation at small packet sizes, regardless of the number of connections.

Key features of T6:

- PCI Express v3.0 x16 host interface
- Optional DDR-3/4 memory interface for high capacity applications
- 2x1/10/25/40/50/100GbE ports
- Designed for very low latency, high bandwidth and high packet processing rate
- TOE/iWARP RDMA/iSCSI/FCoE port to port, and adapter to adapter failover
- SR-IOV 8PF/256VF + VEPA/VEB 802.1Qbg/h offload virtualization
- Integrated OpenFlow ready virtual Ethernet switch (OVS Offload)
- T10-DIF/DIX protection support for both FCoE and iSCSI
- Key Offloads:
    - TCP/UDP
    - iSCSI/FCoE/iSER
    - iWARP RDMA

  - SDN (OVS, NVGRE, VXLAN, GENEVE, etc.)
  - Crypto (TLS/SSL, IPsec, SMB 3.X)
    - AES 128/256, SHA 1/2 128/256
  - Other (Time Stamping, Tracing)
  - Classification/Filtering
  - Traffic Management/QoS/Congestion control
  - Hardware based IO virtualization

Some key software support of T6:

- Windows Server 2012-R2, or 2016
  - SMB-Direct
  - Storage Replica
  - Storage Spaces Direct
  - Azure Stack
  - Network Direct
  - iSCSI Offload Initiator
  - Packet Direct
- Windows 10 Client RDMA
- Lustre-RDMA
- NFS-RDMA
- Hadoop-RDMA
- iSCSI: Open-iSCSI, LIO Target, SCST, FreeBSD and Linux support
- VMware ESX-iSCSI Initiator
- NVMe-Fabrics support
- nVidia's GPU Direct
- OpenPower support
- ARM support

Server Offload

T6 ASIC can support up to 4,000 offloaded connections without requiring external memories. This allows for a small board footprint and cost effective initiator applications. Using external memories enables T6 to offload up to 500,000 connections.

More Details

T6 Architecture: **T6 Architecture White Paper**

T6 Encryption Offload: **T6 Crypto White Paper**

T6 Product Brief: **T6 Product Brief**

Availability and Pricing

T6 is designed in 32nm SOI CMOS process technology and is available in 4 configurations:

	Part #	Description	Package	Power(W)	Sample	Prod.	List
1	T6ASIC2100	All Ethernet speeds, full featured	33x33	14	Sep	Dec	$647
2	T6ASIC2100-SO	All Ethernet speeds, server offload only	33x33	12	Sep	Dec	$556
3	T6ASIC250	1/10/25/50Gb, full featured	27x27	9	Oct	Jan	$461
4	T6ASIC250-SO	1/10/25/50Gb, server offload only	27x27	7	Oct	Jan	$367

Reference design kits are available now. Host software is the same as existing inboxed code for T5.

About Chelsio Communications

Chelsio is a recognized leader in high performance (10Gb/25Gb/40Gb/50Gb/100Gb) Ethernet adapters for networking and storage within virtualized enterprise data centers, public and private hyperscale clouds, and cluster computing environments. With a clear emphasis on performance and delivering the only robust offload solution, as opposed to simple speeds and feeds, Chelsio has set itself apart from the competition. The Chelsio Unified Wire fully offloads all protocol traffic, providing no-compromise performance with high packet processing capacity, sub-microsecond hardware latency and high bandwidth. Visit the company at www.chelsio.com, and follow the company on Twitter and Facebook.

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