R310E-CXA

Active cable capable

Chelsio Communications
Accelerate

High Performance
10GbE iWARP Adapter

RDMA • TCP/IP • Cluster Computing

Highlights

- RDMA-enabled NIC (RNIC) specifically optimized for cluster computing
- Standards-compliant iWARP RDMA plus direct data placement (DDP)
- Seamlessly runs existing InfiniBand RDMA applications
- Reduces host CPU utilization by up to 90% compared to NICs without full offload capabilities
- PCI Express 8x host bus interface
- Line-rate 10Gbps full-duplex performance
- Integrated traffic manager, QoS, and virtualization capabilities
- RNIC-PI, kDAPL, and OpenFabrics 1.2 software interfaces
- Powerful per-connection, per-server, and per-interface configuration and control

Applications

Data-Center Networking

- Scale up servers and NAS systems
- Link servers in multiple facilities to synchronize data centers
- Consolidate LAN, SAN, and cluster networks

High Performance Cluster Computing

- Very low latency Ethernet
- Increase cluster fabric bandwidth
- Deploy Ethernet-only networking for cluster fabric, LAN, and SAN
- Routable infrastructure

CHELSIO'S R310E 10GbE iWARP Adapter is a protocol-offloading 10 Gigabit Ethernet adapter with PCI Express host bus interface for servers and storage systems. The third-generation technology from Chelsio provides the highest 10GbE performance available and dramatically lowers host-system CPU communications overhead.

With on-board hardware that offloads iWARP RDMA processing from its host system, the R310E frees up host CPU cycles for useful applications. The system gets increased bandwidth, improved overall performance, and reduced message latency across all applications.

This combination makes it practical to converge other networks that traditionally used niche technologies onto 10GbE. High bandwidth and extremely low latency make 10GbE the best technology for high-performance cluster computing (HPCC) fabrics.

Benefits

By using Chelsio's R310E, enterprises can cost-effectively connect servers and storage systems directly to the 10GbE backbone over lower-cost CX4 copper or active optical cabling and switching infrastructure.

As an upgrade or alternative to aggregated Gigabit Ethernet links, 10GbE boosts connection bandwidth and simplifies cabling, installation, and maintenance. The R310E also provides additional bandwidth needed to consolidate server functions on fewer, more powerful systems – simplifying management and reducing costs for servers, rackspace, power consumption, and maintenance.

Applications with large data sets benefit from a high-speed distributed platform, including video rendering and distribution, data visualization such as remote medical imaging and climatic modeling, and bioinformatics applications such as DNA sequencing.

Fully Featured Server Adapter

The R310E offers best-of-class performance and features, including IP/UDP/TCP checksum and large send offload, rate control and QoS, virtualization, and rule-based traffic steering and filtering.

Third-Generation Protocol Offload Engine

The R310E employs Chelsio's unique third-generation Terminator 3 ASIC, a high-performance, programmable protocol processor. Terminator 3 processes all connections in a single datapath to deliver line-rate 10Gbps performance with one connection, up to thousands of connections. In contrast, competitive multi-RISC offload engines, which rely on having enough connections to distribute their processing among parallel processors to achieve full performance, are ultimately limited by the performance of each processor.

Upper Layer Protocols

The R310E implements a high-capacity, low-latency, high-bandwidth iWARP RDMA/RDDP, which adheres to the IETF standards. It can also run existing unmodified InfiniBand RDMA applications with lower latency and higher bandwidth.

Robust, Proven Solution

Subjected to thousands of hours of compatibility testing, over two years of stress testing by several OEM test suites and production deployments in servers, storage systems and cluster computing, Chelsio's robust, stable protocol offload technology delivers proven performance in a wide range of environments. The S310E is generations ahead of competing products.

Software Drivers

Chelsio offers a full suite of protocol software and drivers for Linux and Windows with the R310E adapter. The software supports operation in both protocol-offload and non-offload modes.

Product Models

Model:	**R310E-CXA**
Physical interface:	10GBASE-CX4
Distance:	15m
Connector:	CX4
Media:	Twinax copper*

*Supports active optical cables with distances up to 100 meters

Specifications

Host Interface
- PCI Express 1.1 x8, x4, x2, x1
- MSI-X, MSI and support for legacy pin interrupts

Network Interfaces
- 10GBASE-CX short-reach copper

Ethernet
- IEEE 802.3ae (10GbE)
- IEEE 802.1p Priority and 802.1Q VLAN tagging
- IEEE 802.3x flow control
- IEEE 802.3ad load-balancing and failover
- Ether II and 802.3 encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6Kbytes

Stateless Offloads
- TCP checksum offload for IPv4 & IPv6
- TCP Segmentation Offload (TSO) for IPv4 & IPv6
- UDP checksum offload for IPv4 & IPv6
- Receive Side Scaling and packet steering
- Line rate packet filtering and attack protection

TCP/IP Full Offload
- Full TCP implementation including exceptions
- High performance in presence of packet loss
- Extensive RFC compliance, fully featured stack
- Direct Data Placement (DDP)
- Up to 64K simultaneous connections capacity

Integrated Traffic Manager
- Multiple Tx & Rx queues with QoS
- Simultaneous low latency & high bandwidth
- Per-connection and per-class rate control
- Packet loss avoidance

Virtualization and Firewall
- Rule-based packet steering and filtering capability

High Performance RDMA
- Ultra-low latency, line rate bandwidth
- IETF RDDP and RDMAC iWARP compliance
- APIs: RNIC-PI, kDAPL and OpenFabrics 1.2

Physical and Environmental
- Dimensions without bracket: 6.6 in. x 2.5 in. or 16.8 cm x 6.4 cm
- Operating Temp: 0 to 55ºC or 32 to 131ºF
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption: 14W