

Product Brief

NetEffect® Server Cluster Adapter

Network Connectivity

NetEffect® Server Cluster Adapters

Low-latency 10 Gigabit Ethernet adapters for high-performance apps

Intel®'s NetEffect Server Cluster Adapters provide accelerated 10 Gigabit Ethernet processing to benefit some of the most demanding and latency-sensitive applications, including high performance computing (HPC) clustering and financial market data systems. The product line is optimized for scalability to take advantage of the multi-core environments typically used with these high performance computing applications.

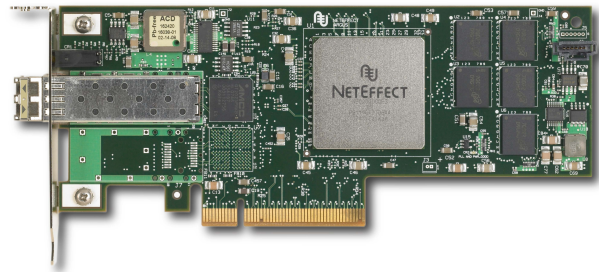
Powered by the second-generation of accelerated 10 Gigabit Ethernet technology, the NetEffect NEO20 network controller provides the protocol processing required to deliver the low-latency, scalable performance that is required.

iWARP and Kernel-Bypass

The NetEffect Server Cluster Adapters support iWARP, or internet Wide Area RDMA Protocol. iWARP provides a low-latency, kernel-bypass solution on Ethernet by using RDMA (Remote Direct Memory Access) semantics. RDMA enables a remote memory capability that can be abstracted to various application APIs. iWARP is built on top of the TCP/IP protocol and therefore provides datacenter-compatible connectivity using standard network infrastructures. And it works on the standard IP-based management software and standard Ethernet-based switches used in datacenters today.

Kernel-bypass (or OS-bypass) is a key element of iWARP because of the RDMA semantics. But kernel-bypass can be utilized without iWARP. The NetEffect Server Cluster Adapters support a mode that implements the bypass operation without the RDMA protocol. This enables standard APIs, like UDP sockets, to be used with existing applications while also benefiting from latency improvements of kernel-bypass.

Both of these modes of operation provide lower latency and more deterministic latency jitter. The end result is a more efficient network implementation that delivers more performance to the application.



Multiple media types are supported:

Connector Type	Interconnect Cabling	Maximum Distance	Notes
CX4	Twinax CX4 Cables	12 meters	Copper
SFP+	850 nm Multi-mode Fiber	300 meters	Requires Fiber Optic transceiver
	Twinax Direct Attach Cables	7 meters	Copper

HPC Clustering

High-Performance Computing (HPC) describes a class of computing that extracts the most performance from the cluster's compute and fabric resources.

The majority of HPC implementations are now commodity x86 server clusters. In turn, Ethernet and InfiniBand are the prevalent commodity fabrics of choice.

Workload examples include: Computational Fluid Dynamics, Computational Chemistry & Material Sciences, Finite Element Analysis, Bio-Informatics, Climate & Weather Simulation, and Reservoir Simulation & Visualization.

iWARP provides a low-latency option for Ethernet. NetEffect Server Cluster adapters deliver an RDMA interface for various Upper Layer Protocols (ULPs) including Intel-MPI, Microsoft-MPI, Open-MPI, MVAPICH2, and uDAPL. For Linux, this is provided through the OpenFabrics Enterprise Distribution (OFED) open-source releases that are adopted from commercial distributors, like Red Hat*. For Windows*, Microsoft* supports the Network Direct interface in Windows HPC Server 2008.

Financial Market Data Systems

The main performance I/O bottleneck in the financial computing sector is latency. High-Frequency Trading (HFT) is the best example of this – the faster the trade in response to a market trend, the more the financial opportunity. Market data systems that can benefit from low-latency acceleration include: Feed Assemblers & Handlers, Matching Engines, Algo Engines, Smart Order Routers, Trading Gateways, and Risk Engines.

Ethernet is the typical interconnect in the financial industry because the exchange interface is Ethernet. This drives Ethernet as the first choice, but it must have the right low-latency characteristics. iWARP has value in the servers within the Exchange or within the Trading House/Security over a messaging layer, like NYSE's Data Fabric or Red Hat's AMQP. In the datapath between the Exchange and Trading House/Security, TCP and UDP sockets interfaces are used and a kernel-bypass solution, like Voltaire's VMA can be employed to accelerate the UDP multi-cast data.

Network-Ready Servers

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Features

Benefits

NetEffect NEO20 10GbE Ethernet Controller	▪ Provides a power and performance efficient implementation of iWARP for low-latency Ethernet applications.
Multi-core scalability	▪ Pipelining enables low-latency performance for applications that use all the cores/compute of the server.
Intel Cluster Ready (ICR)	▪ Compliant with the Intel Cluster Ready program to deliver proven and stable iWARP implementations.
Low profile	▪ Small form-factor enables high-performance compute in dense applications.
RoHS Compliant	▪ Complies with the European Union directive 2002/95/EC to reduce the use of hazardous material.
PXE Boot	▪ Network boot support for bare-metal installations, such as HPC cluster provisioning with Intel Cluster Ready.
Intel backing	▪ Backed by Intel's Ltd. lifetime warranty, 90-day money-back guarantee (U.S. & Canada), and worldwide support

Specifications

Product Offerings

Product Name & Description	Product Code
NetEffect® Ethernet Server Cluster Adptr SFP+ SR 850 nm Multi-mode Fiber with optical transceiver	E10G81GF2SR
NetEffect® Ethernet Server Cluster Adapter DA Twin-ax copper cables with SFP+ connectors	E10G81G2P
NetEffect® Ethernet Server Cluster Adapter CX4 Twin-ax copper cables with CX4 connectors	E10G81GT2CX4

Performance

Latency	less than 6 µsec
Bandwidth	over 18 Gbps (bi-directional)

Layer 2

Checksum offload (TCP, UDP, IP)
Jumbo frame (9 kB)

iWARP (RDMA over Ethernet)

RDMAC v1.0 and IETF specification support
User-level and kernel-level direct access support
Direct payload placement into application memory
Up to 8000 simultaneous accelerated TCP/IP connections

Memory

ECC protected industry-standard DDR2
256 MB standard on-board

Standards

IEEE 802.3-2005: 10GbE, link aggregation, link pause, management

IEEE 802.3ae 10Gb Ethernet over fibre

IEEE 802.3ak CX4

IEEE 802.1p Priority Encoding

IEEE 802.1Q VLAN tagging, support for 4096 VLANs

IPv4 (all connections), IPv6 (unaccelerated connections)

IETF RFCs: 793, 1323, 2581, 3782

Host Interface

PCI Express v1.1 (x8)

Management

ACPI 2.0c and PCI Power Management 1.2 compliant

PXE boot support

APIs & Middleware

Sockets and standard NIC

OpenFabrics* iWARP Verbs

uDAPL

Intel MPI, Platform Computing-MPI, Open-MPI, MVAPICH2, Microsoft MPI

Voltaire Messaging Accelerator (VMA)

NYSE*, Datafabric*

Red Hat* AMQP

Operating Systems

Microsoft* Windows* HPC Server 2008 (via Network Direct)

Linux* Novell* and Red Hat* (via OFED*)

Physical & Environmental

Operating temperature: 0 to 60 °C

Dimensions	
Length	6.6 in.
Width	2.5 in.
Full-height end bracket:	4.725 in.
Low-profile end bracket:	3.12 in.

No fan or heat sink required

Power (typical)

NEO20 SFP+ (SR optical module) 11.0 W

NEO20 SFP+ (pluggable/no module) 10.0 W

NEO20 CX4 (and Powered CX4) 8.0 W

Certifications

RoHS compliant

PCI Express 1.1 compliant

FCC Class A

Intel Backing

Limited lifetime warranty

90-day, money-back guarantee (U.S. and Canada)

For More Product Information

To speak to a customer service representative regarding Intel products, please call 1-800-538-3373 (U.S. and Canada) or visit support.intel.com/support/go/network/contact.htm for the telephone number in your area. For additional product information on Intel Networking Connectivity products, visit: www.intel.com/go/ethernet.

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