



InfiniPath® QLE7140

PCI Express x8 to InfiniBand 4X Adapter

The InfiniPath InfiniBand adapter delivers industry-leading performance in a cluster interconnect, allowing organizations to gain maximum advantage and return from their investment in clustered systems.

The InfiniPath adapter yields the lowest latency, the highest message rate and highest effective bandwidth of any cluster interconnect available. As a result, organizations relying on clustered systems for critical computing tasks will experience a significant increase in productivity.

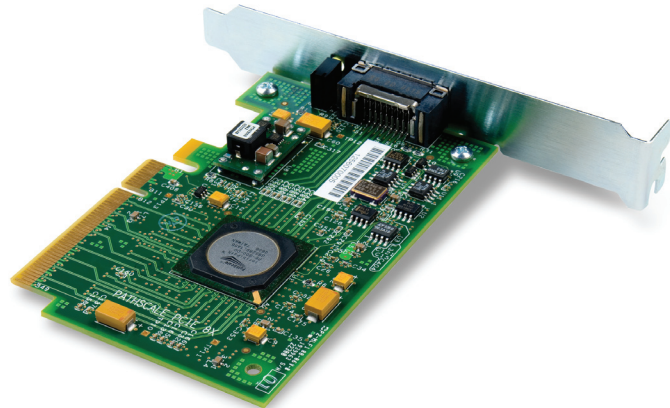
New applications being developed or deployed on very large clusters now can avoid the bandwidth, latency, or message-rate limitations imposed by traditional interconnects. By allowing you to drive up the utilization of your computing infrastructure, InfiniPath adapters increase the ROI of your computing assets.

Benefits

- Increases cluster efficiency and application productivity
- Provides superior application scaling to 1000s of CPUs
- Enables faster application run times for faster time-to-solution
- Increases utilization of computing infrastructure and increases ROI of computing assets

Features

- PCI Express x8 to InfiniBand 4X adapter
- PCI half-height short form factor
- 1.6 μ s one-way MPI latency through an InfiniBand switch¹
- 954 MB/s uni-directional bandwidth¹
- 385 byte $n^{1/2}$ streaming message size (1 CPU core)¹
- 3 year hardware warranty



Superior Application Performance. The InfiniPath adapter's low latency and high message rates result in superior real-world application scalability across nearly all modeling and simulation applications.

Well-known applications that have demonstrated superior scaling and outstanding performance when running on clusters with the InfiniPath interconnect include: NAMD, Amber8, PETSc, Star-CD, Fluent, NWChem, DL_POLY, LS-DYNA, WRF, POP, MM5, LAMMPS, GAMESS, CPMD, AM2, CHARMM, GROMACS and many others.

Highest Effective Bandwidth and Message Rate. Because of its high messaging rate, the InfiniPath bandwidth curve rises faster than any other adapter. The InfiniPath PCI Express adapter delivers significantly more bandwidth at message sizes typical of real-world HPC applications and many enterprise applications.

The InfiniPath InfiniBand adapter also delivers the highest effective bandwidth of any cluster interconnect because it achieves half its peak bandwidth ($n^{1/2}$)² at a message size of just 385 bytes, the lowest in the industry. This means that applications run faster on the InfiniPath adapter than on any other interconnect.

Such superior performance is a benefit of the unique, highly-pipelined, cutthrough design that initiates a new message much faster than competitive alternatives. This approach allows application message transmission to scale close to linearly when additional CPU cores are added to a system, dramatically reducing application run times. Other less effective interconnects can become a performance bottleneck, lowering the return on investment of your computing resources.

Lowest MPI & TCP Latency. The InfiniPath industry-leading MPI pingpong latency of 1.6 microseconds² (μ s) is less than half of the latency of other InfiniBand adapters. Unlike other interconnects, its random-ring latency for up to 256 CPUs, as measured

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by the HPC Challenge Benchmark Suite, is nearly identical to its ping-pong latency, even as you increase the number of nodes.

The InfiniPath adapter, using a standard Linux distribution, also achieves the lowest TCP/IP latency and outstanding bandwidth.³ Eliminating the excess latency found in traditional interconnects reduces communications wait time and allows processors to spend more time computing, which results in applications that run faster and scale higher.

Lowest CPU Utilization. The InfiniPath connectionless environment eliminates overhead that wastes valuable CPU cycles. It provides reliable data transmission without the vast resources required by connection-oriented adapters, thus increasing the efficiency of your clustered systems.

Built On Industry Standards. The InfiniPath adapter supports a rich combination of open standards to achieve industry-leading performance. The InfiniPath OpenIB software stack has been proven to be the highest performance implementation of the OpenIB Verbs layer, which yields both superior latency and bandwidth compared to other InfiniBand alternatives.

- InfiniBand 1.1 4X Compliant
- Standard InfiniBand fabric management
- MPI 1.2 with MPICH 1.2.6
- OpenIB supporting IPoIB, SDP, UDP and SRP
- PCI Express x8 Expansion Slot Compatible
- Supports SUSE, Red Hat, and Fedora Core Linux

PCI Express Interface

- PCIe v1.1 x8 compliant
- PCIe slot compliant (fits into x8 or x16 slot)

Connectivity

- Single InfiniBand 4X port (10+10 Gbps) - Copper
- External fiber optic media adapter module support
- Compatible with InfiniBand switches from Cisco®, SilverStorm™, Mellanox®, Microway, and Voltaire®
- Interoperable with host channel adapters (HCAs) from Cisco, SilverStorm, Mellanox and Voltaire running the OpenIB software stack

Host Driver/Upper Level Protocol (ULP) Support

- MPICH version 1.2.6 with MPI 2.0 ROMIO I/O 126
- TCP, NFS, UDP, SOCKETS through Ethernet driver emulation
- Optimized MPI protocol stack supplied
- 32- and 64-bit application ready
- IPoIB, SDP, UDP using OpenIB stack

InfiniPath Interfaces and Specifications

- 4X speed (10+10 Gbps)
- Uses standard IBTA 1.2 compliant fabric and cables; Link layer compatible
- Configurable MTU size (4096 maximum)
- Integrated SERDES

Management Support

- Includes InfiniBand 1.1 compliant SMA (Subnet Management Agent)
- Interoperable with management solutions from Cisco, SilverStorm, and Voltaire
- Open SM

Regulatory Compliance

- FCC Part 15, Subpart B, Class A
- ICES-003, Class A
- EN 55022, Class A
- VCCI V-3/2004.4, Class A

Operating Environments

- Red Hat Enterprise Linux 4.x
- SUSE Linux 9.3 & 10.0
- Fedora Core 3 & Fedora 4

InfiniPath Adapter Specifications

- Typical Power Consumption: 5 Watts
- Available in PCI half height, short-form factors
- Operating Temperature: 10 to 45°C at 0-3km -30 to 60°C (Non-operating)
- Humidity 20% to 80% (Non-condensing, Operating) 5% to 90% (Non-operating)

InfiniPath PCIe ASIC Specifications

- HSGBA package, 484 pin, 23.0 mm x 23.0 mm 1 mm ball pitch
- 2.6 Watts (typical)
- Requires 1.0V and 3.3V supplies, 33V supplies, plus InfiniBand interface reference voltages.

¹ Ping-pong latency and uni-directional bandwidth are based on the Ohio State University Ping-pong latency test.

² The n^{1/2} measurement was done with a single processor node communicating to a single processor node through a single level of switch

³ TCP/IP bandwidth and latency are based on using Netperf and a standard Linux TCP/IP software stack.

Note: Actual performance measurements may differ from the data published in this document. All current performance data is available at www.pathscale.com/infinipath.php



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