



# Intel® MPI Library 3.2 Update 1 for Windows\* and Linux\*

In-Depth

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## Intel® MPI Library 3.2 Update 1 for Windows\* and Linux\*

Implementing the high performance MPI-2 specification on multiple fabrics, Intel® MPI Library 3.2 Update 1 for Windows\* and Linux\* focuses on making applications perform better on IA-based clusters. Intel MPI Library enables you to quickly deliver maximum end-user performance even if you change or upgrade to new interconnects, without requiring major changes to the software or to the operating environment. Intel also provides a free runtime environment kit for products developed with the Intel MPI library.

### Features

Intel MPI Library 3.2 Update 1 is a multifabric message passing library that implements the Message Passing Interface, v2 (MPI-2) specification. It provides a standard library across Intel® platforms that:

- Focuses on making applications perform best on IA based clusters
- Enables adoption of the MPI-2 functions as the customer needs dictate
- Delivers best-in-class performance for enterprise, divisional, departmental, and workgroup high performance computing

Intel MPI Library 3.2 Update 1 is available for Windows\* or for Linux\* in all of the following packages

- Intel MPI Library 3.2 Update 1 Free Runtime Environment for pre-installation or redistribution
- Intel MPI Library 3.2 Update 1 Software Development Kit including compilation tools, interface (static) libraries, debug libraries, trace libraries, include files and modules, and test codes
- Intel® Cluster Toolkit 3.2.1
- Intel® Cluster Toolkit Compiler Edition 3.2.1

### What's New?

#### Intel MPI Library 3.2 Update 1

- Improved performance for MPI applications
  - Intel MPI Library 3.2 Update 1 is faster than ever
  - Industry leading on low latency and high bandwidths (Linux and Windows)
  - Windows only: Direct interprocess memory copy for increased bandwidth
  - Improved automatic process pinning for more performance on Intel® Xeon® 5500 processor series

- Advanced collective operations for balanced processor and network performance
- Scalable mpdboot startup for faster cluster application launch
- Improved usability
  - Latest Intel® platform support (Intel Xeon 5500 processor series)
  - Windows only: Active Directory-based user authorization for seamless integration into the Windows environment
  - ILP64 support for legacy applications
- Extended interoperability
- Bundled with powerful C++ and Fortran Compiler v11.1 (Intel® Cluster Tool Kit Compiler Edition only)
- Linux\* Standard Base (LSB) compliant RPMs
- Application support in a wider range of Intel® Cluster Ready environments

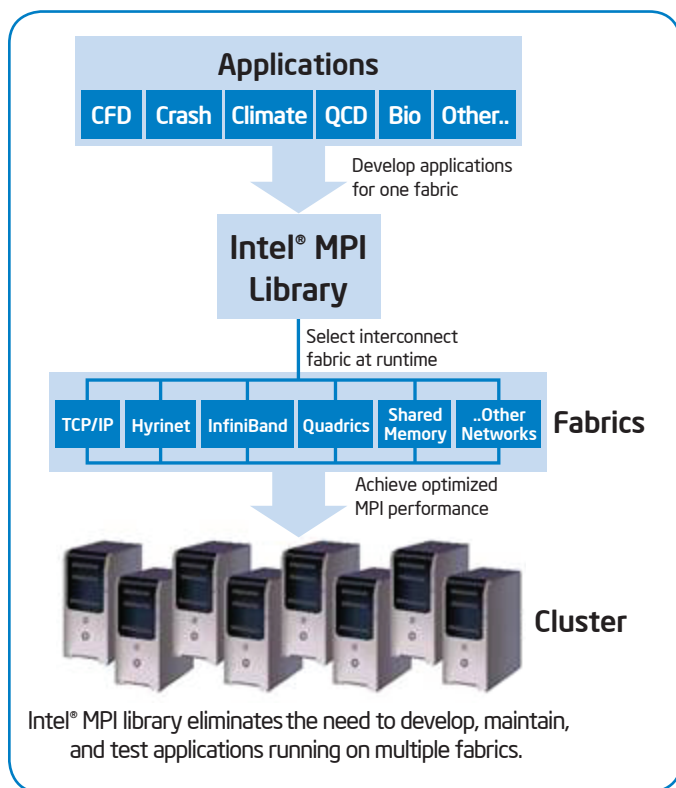


Figure 1. Intel® MPI Library and DAPL-based interconnects multifabric functionality

## Why Intel MPI Library?

- High performance MPI-2 implementation
- Linux and Windows support
- Interconnect independence
- Smart fabric selection
- Easy installation
- Free runtime environment
- Close integration with the Intel and third-party development tools
- Internet-based licensing and technical support

## Intel MPI Library Supports Multiple Hardware Fabrics

Whether you need to run TCP sockets, shared memory, or one of many DAPL-based interconnects, including InfiniBand, Myrinet\*, and Quadrics, Intel MPI Library covers all your configurations by providing an accelerated universal, multifabric layer for fast interconnects via the Direct Access Programming Library (DAPL) methodology (Figure 1). Develop MPI code independent of the fabric, knowing it will run efficiently on whatever fabric is chosen by the user at runtime.

Intel MPI Library dynamically establishes the connection, but only when needed, which reduces the memory footprint. It also automatically chooses the fastest transport available. Memory requirements are reduced by several methods including a two-phase communication buffer enlargement capability which allocates only the memory space actually required.

The fallback to sockets at job startup avoids the chance of execution failure even if the interconnect selection fails. This is especially helpful for batch computing. And any products developed with Intel MPI Library are assured runtime compatibility since your users can download Intel's free runtime environment kit. Application performance can also be increased via the large message bandwidth advantage from the optional use of DAPL inside a multicore or SMP node.

### Supported fabrics include:

- Infiniband: Mellanox Technologies, Inc; Cisco Systems, Inc.; Voltaire; Qlogic
- Myrinet\*: Myricom, Inc.
- QsNet\*, QsNetII: Quadrics, Ltd.
- NUMalink™ - Silicon Graphics, Inc.
- 10 GbE iWarp\* Adapters: Chelsio Communications; NetEffect
- Socket interfaces including TCP/IP over Ethernet\* and other fabrics: Cisco Systems, Inc.; Intel; Dolphin Interconnect Solutions, Inc.; and many other vendors

The following table provides some common DAPL interfaces and links to the latest drivers:

## DAPL Interfaces

Company	Product	Driver Source
Cisco Systems, Inc.	PCI host channel adapters	<a href="http://www.openfabrics.org/downloads.htm">http://www.openfabrics.org/downloads.htm</a>
SilverStorm Technologies, Inc.	InfiniBand	Contact the SilverStorm Support team for the latest version of the drivers ( <a href="http://www.silverstorm.com">http://www.silverstorm.com</a> )
Mellanox Technologies, Inc.	InfiniBand	<a href="http://www.mellanox.com/content/pages.php?pg=products_dyn&amp;product_family=26&amp;menu_section=34">http://www.mellanox.com/content/pages.php?pg=products_dyn&amp;product_family=26&amp;menu_section=34</a>
Myricom, Inc.	Myrinet*	<a href="http://www.sourceforge.net/projects/dapl-myrinet">http://www.sourceforge.net/projects/dapl-myrinet</a>
QLogic	Infinipath 7000	<a href="http://www.openfabrics.org/downloads.htm">http://www.openfabrics.org/downloads.htm</a>
Quadrics Ltd.	QsNet, QsNet II	<a href="http://www.quadrics.com/linux">http://www.quadrics.com/linux</a>
Silicon Graphics*, Inc.	SGI ProPack* 5	<a href="http://www.sgi.com/products/software/linux/propack.html">http://www.sgi.com/products/software/linux/propack.html</a>
Voltaire	InfiniBand	<a href="http://www.voltaire.com/SupportAndServices/Drivers">http://www.voltaire.com/SupportAndServices/Drivers</a> (Login required)

## Berkley Socket Interfaces

Company	Product	Driver Source
Dolphin Interconnect Solutions Inc.	Dolphin SCI*	Contact the Dolphin ICS Support Team for the latest version of the drivers ( <a href="http://www.dolphinics.com/support/">http://www.dolphinics.com/support/</a> )
Intel	Intel® PRO Network Products (Ethernet)	<a href="http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&amp;DwnldId=4275&amp;lang=eng">http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&amp;DwnldId=4275&amp;lang=eng</a>
NetEffect	NetEffect 10Gbps iWARP* Ethernet Channel Adapter	Contact the NetEffect Support Team for the latest version of the drivers ( <a href="http://www.neteffect.com/support-overview.php">http://www.neteffect.com/support-overview.php</a> )

## Shared Memory Systems

Company	Product	Driver Source
Hewlett-Packard Development Company, L.P.	HP Integrity* Server Family	<a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

## Intel MPI Library 3.2 Update 1 Interoperability

Standards Based: Intel MPI Library 3.2 Update 1 is based on Argonne National Laboratory's MPICH-2 implementation and is targeted toward industry-wide standardization of the MPI-2 ABI with maximum performance. All MPI-1 features are supported, plus many MPI-2 features including the following:

- Active target one-sided communication
- Passive target one-sided communication
- Generalized requests
- Full thread support
- File I/O

## Simplified Integration with Leading Linux Job Schedulers

Intel MPI Library 3.2 Update 1 can be easily integrated with:

- Platform LSF 6.1 and higher
- Altair PBS Pro\* 7.1 and higher
- OpenPBS\* 2.3
- Torque\* 1.2.0 and higher
- Parallelnavi\* NQS\* for Linux V2.0L10 and higher
- Parallelnavi for Linux Advanced Edition V1.0L10A and higher
- NetBatch\* 6.x and higher
- SLURM\* 1.2.21 and higher
- Sun\* Grid Engine\* 6.1 and higher

## Support for Process Managers

Intel MPI Library automatically recognizes PMI extension support and provides backward compatibility with older process managers.

## Works with Leading Linux Parallel Debuggers

Intel MPI Library can be integrated at job startup or as a process attachment. It also provides message queue browsing support and is interoperable with:

- Intel® Debugger 9.1 and higher
- Allinea\* Distributed Debugging Tool (DDT) 1.9.2 and higher
- Etnus TotalView\* debugger 6.8 and higher
- GNU\* debuggers
- Valgrind\* 3.2.3 (including suppression rules)

## Integrated Programming Environments

- Eclipse PTP\* 1.0 GUI process launcher for Linux
- Microsoft Visual Studio 2005\* and 2008\*

## Tested Interoperability with Intel Compilers and other Intel® Cluster Toolkit Applications

- Intel® C++ or Fortran Compiler 10.1 and higher
- GNU Compilers 3.3 and higher
- Build and Runtime Linkage with Intel® Trace Analyzer and Collector 7.2 (Linux and Windows)
- Intel® Math Kernel Library 9.1 and higher (Linux and Windows)

## Technical Support

With the purchase of Intel® Software Development Products, you will receive one year of technical support and product updates from Intel® Premier Support at <https://premier.intel.com/>, our interactive issue management and communication Web site. This premium support service allows you to submit questions, download product updates, and access technical and application notes, and other documentation. For more information, visit the Intel Registration Center at: <http://www.intel.com/software/products/registrationcenter>



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