



Intel® MPI Library 3.2 for Windows* and Linux*

In-Depth

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Intel® MPI Library 3.2 for Windows* and Linux*

Implementing the high performance MPI-2 specification on multiple fabrics, Intel® MPI Library 3.2 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 is a multi-fabric 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 is available for Windows* or for Linux* in all of the following packages

- Intel MPI Library 3.2 Free Runtime Environment for pre-installation or redistribution
- Intel MPI Library 3.2 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
- Intel® Cluster Toolkit Compiler Edition 3.2

What's New?

- Automatic application-specific performance tuning
- Faster startup and improved collective operation algorithms for even more performance
- Greater scalability over sockets and shared memory
- Enhanced flexibility and control over:
 - Shared memory segment size for ease-of-use
 - OS, compiler, Python, and DAPL check for higher scalability
- Added support for:
 - Intel® Compiler 11.0
 - Microsoft Windows* HPC 2008 and Vista*

- DAPL 2.0

- Loadable 3rd party process manager (PMI) libraries for tighter integration with leading resource schedulers

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 3rd 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, multi-fabric 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.

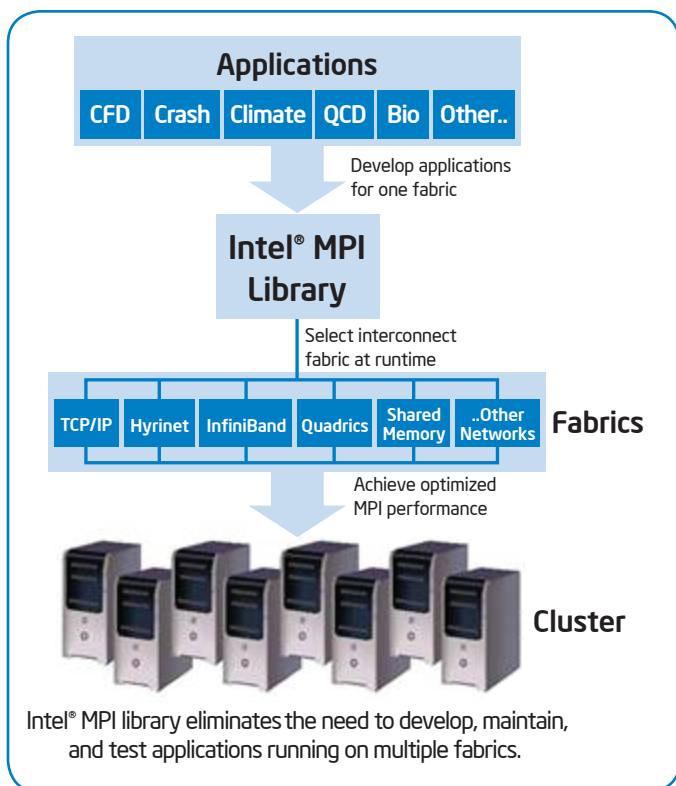


Figure 1. Intel® MPI Library and DAPL-based interconnects multi-fabric functionality

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 also 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 run time 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
- Sockets interfaces including TCP/IP over Ethernet* and other fabrics: Cisco Systems, Inc.; Intel; NetEffect; 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	http://www.openfabrics.org/downloads.htm
SilverStorm Technologies, Inc.	InfiniBand	Contact the SilverStorm Support team for the latest version of the drivers (http://www.silverstorm.com)
Mellanox Technologies, Inc.	InfiniBand	http://www.mellanox.com/content/pages.php?pg=products_dyn&product_family=26&menu_section=34
Myricom, Inc.	Myrinet*	http://www.sourceforge.net/projects/dapl-myrinet
QLogic	Infinipath 7000	http://www.openfabrics.org/downloads.htm
Quadrics Ltd.	QsNet, QsNet II	http://www.quadrics.com/linux
Silicon Graphics*, Inc.	SGL ProPack* 5	http://www.sgi.com/products/software/linux/propack.html
Voltaire	InfiniBand	http://www.voltaire.com/SupportAndServices/Drivers (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 (http://www.dolphinics.com/support/)
Intel	Intel® PRO Network Products (Ethernet)	http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldId=4275&lang=eng
NetEffect	NetEffect 10Gbps iWARP* Ethernet Channel Adapter	Contact the NetEffect Support Team for the latest version of the drivers (http://www.neteffect.com/support-overview.php)

Shared Memory Systems

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

Intel® MPI Library 3.2 Interoperability

Standards Based: Intel® MPI Library 3.2 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 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 9.1 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>

