

# MXM – Mellanox Messaging

## Message Accelerations over InfiniBand for MPI and PGAS libraries

MellanoX Messaging (MXM) provides enhancements to parallel communication libraries by fully utilizing the underlying networking infrastructure provided by Mellanox HCA/switch hardware. MXM is a module that is part of the MPI or PGAS library and is used to provide the best performance and scalability for these parallel programming languages over the Mellanox InfiniBand network.

### A Co-Design Approach

One of the main concepts behind the principles of MXM is to apply a Co-Design approach to the parallel programming libraries. Up until now, the majority of the software and hardware developments have been on separate and disparate paths. Concentrating on the area of communication interfaces and interconnect technologies, the software development has been mainly in the area of algorithms without taking advantage of the underlying interconnect hardware, and the hardware development was done without taking full account of the requirements of the communication libraries. MXM breaks this barrier by pushing Mellanox expertise and network offload technology into the MPI/PGAS layer. This assures the most efficient and highest performance usage of the underlying network by the parallel programming library.



## HIGHLIGHTS

### FEATURES

- Supports send/receive and put/get semantics
- Provides unparalleled scalability and performance for MPI, SHMEM and PGAS/UPC parallel programming languages
- Handles all underlying communication tasks including transport mechanisms and connection

### BENEFITS

- Provides the best performance from the parallel programming library with minimum tuning required
- Selection of best default parameters given job size
- Assures that new features and mechanisms introduced by Mellanox are implemented quickly and correctly by parallel programming library

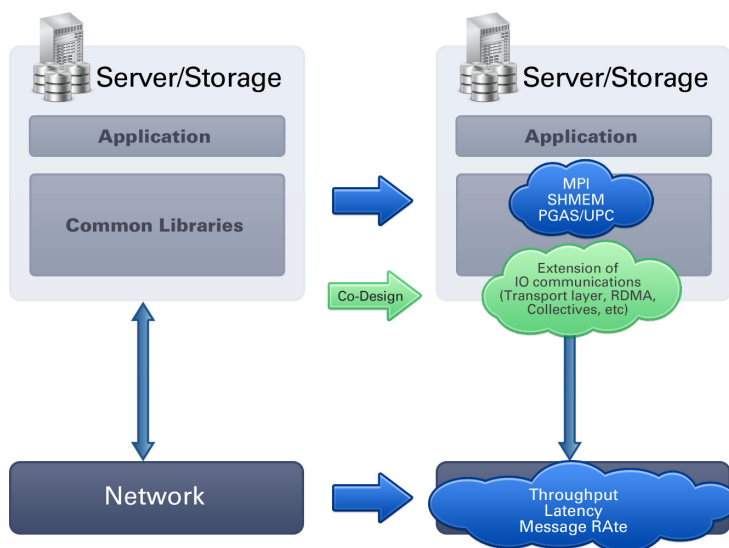


Figure 1.

## MXM Details

MXM has many of the low level network features built-in, such as connection management and handling of transport services. This allow the MPI/PGAS developer to work at a higher layer, allowing effort to be spent on the overall algorithm development and leaving the communication layer to the expertise of the engineers developing the underlying hardware.

The following features are included with MXM:

- Scalable transport services including UD support
- Proper management of HCA resources and memory structures
- Efficient memory registration
- One-sided communication semantics
- Connections Management
- Receive side tag matching
- Intra-node shared memory communication

## MXM Usage

Mellanox MXM is integrated into the Mellanox OFED stack (MLNX\_OFED) as well as provided in a stand-alone package. It is supported by OpenMPI, as well as Mellanox ScalableSHMEM and ScalableUPC.

## Mellanox Advantage

Mellanox Technologies is a leading supplier of end-to-end servers and storage connectivity solutions to optimize high performance computing performance and efficiency. Mellanox InfiniBand adapters, switches, and software are powering the largest supercomputers in the world. For the best in server and storage performance and scalability with the lowest TCO, Mellanox interconnect products are the solution.



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