

MPI I - Standard Introduction

Nicholas Mc Guire
OpenTech EDV Research GmbH
Mistelbach - AUSTRIA

Schedule

At the heart of message passing lies the MPI I standard .
has evolved far beyond this by now - read it !

- Short history of MPI I
- MPI I standardization

MPI1

First shot 1992.

- Focused on Point-to-Point
- No Collective Operations
- Not thread safe
- Assumed distributed memory

MPI1 was incomplete - but it got the ball rolling !

MPI I Time-line

- 1992 - Whillemsburg Workshop
- 1993 - First draft at Super Computing 93
- 1994 - First official release of MPI I as MPI 1.0
- 1995 - MPI 1.1 Cleanup and "bug-fixes" to 1.0

MPI 1.0 was a "state-of-the-art" snapshot standard.

Why a standard ?

- Portability (for OS AND Hardware)
- Simplification of HPC for users
- Entrypoint for developers
 - HPC Hardware implementations
 - Simplified introduction of new code and "external"

MPI I was conceptually a fairly rigid standard (compared to MPI 2.0) and its lack of openness was focused on optimization potentials.

What is a standard ?

Software standard efforts are a crucial step to open-systems. The need to provide is:

- Syntax rules
- Well defined semantics
- Well defined boundary for creativity
- Clear interface for distributed/independent development

If no standard is available - create one .

Standard Goals

- Reference API (interface not function set !)
- UNIX/POSIX class OS
- Support for heterogenous environments
- Language independence
- Language independent semantics

Performance Goals

The MPI I group was very concerned about not mandating the standard that could block optimization concepts. Key

- Failsafe communication model
- Zero-copy-interface
- Concurrency of processing and communication

Content of MPI I

- Point-to-Point
- Collective operations
- Process groups
- Communication domains
- Process topologies
- RTE support functions
- Profiling
- F77 and C language bindings

What MPI 1 does not contain

Not everything made it into the standard - for time reasons or technical reasons.

- distributed I/O
- explicit support for SHM
- MPI tool-chain
- Debugging
- Process management facilities
- multithreading support
- Low level architecture support