Using MPICH for Fun and Profit

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Outline

1. MPI ABI Collaboration
2. MPI Fortran 2008 (VAPAA)
3. ~~MPI-3 RMA (ARMCI-MPI)~~

MPI ABI

MPI ABI Standardization

Goal: interoperability between implementations: build once, run many.

History:

- 2006: users want a common or standard ABI
  - 2016: CEA wi4mpi project began
  - 2021: Erik Schnetter creates MPI Trampoline
  - 2021: ABI standardization effort begins
  - 2023: I created Mukautuva, Hui adds ABI prototype to MPICH

MPI Application Binary Interface Standardization

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MPICH

Current Status

MPICH supports the proposed ABI, as defined in the reference header; tested with mpi4py, etc.

MPI Forum still debating fine details of Fortran support.

As a side effect of the ABI effort, MPICH test suite is implementation-agnostic and can be used to test Open MPI, e.g.

https://github.com/mpiwg-abi/header_and_stub_library/

VAPAA

VAPAA

In Finnish, Vapaa means "free", in the sense of "free-range chickens."

What:

Standalone implementation of MPI Fortran support (**MPI_F08**).

Why:

Workaround Fortran compiler and MPI implementation issues to get all the features everywhere.

How:

Use MPI C API; translate subarrays to datatypes using CFI_cdesc_t.
Use MPICH's MPIX_Type_iov instead of tedious and slow type introspection with MPI API.

When:

Common features are available. Features added based on user interest. Code generation will achieve feature-completeness eventually.

https://github.com/jeffhammond/vapaa


NVIDIA