Open MPI
Join the Revolution

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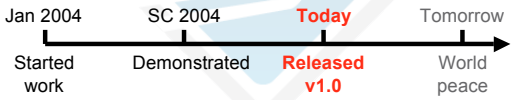
http://www.open-mpi.org/

Technical Contributors

- Indiana University
- The University of Tennessee
- Los Alamos National Laboratory
- High Performance Computing Center, Stuttgart
- Sandia National Laboratory - Livermore

MPI From Scratch!

- Developers of FT-MPI, LA-MPI, LAM/MPI
  - Kept meeting at conferences in 2003
  - Culminated at SC 2003: Let's start over
  - Open MPI was born

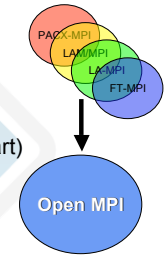


MPI From Scratch: Why?

- Each prior project had different strong points
  - Could not easily combine into one code base
- New concepts could not easily be accommodated in old code bases
- Easier to start over
  - Start with a blank sheet of paper
  - Decades of combined MPI implementation experience

MPI From Scratch: Why?

- Merger of ideas from
  - FT-MPI (U. of Tennessee)
  - LA-MPI (Los Alamos)
  - LAM/MPI (Indiana U.)
  - PACX-MPI (HLRS, U. Stuttgart)



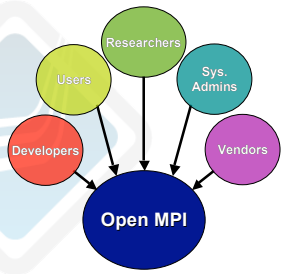
Open MPI Project Goals

- All of MPI-2
- Open source
  - Vendor-friendly license (modified BSD)
- Prevent "forking" problem
  - Community / 3rd party involvement
  - *Production-quality* research platform (targeted)
  - Rapid deployment for new platforms
- Shared development effort

Open MPI Project Goals

- Actively engage the HPC community
  - Users
  - Researchers
  - System administrators
  - Vendors
- Solicit feedback and contributions

➡ *True open source model*



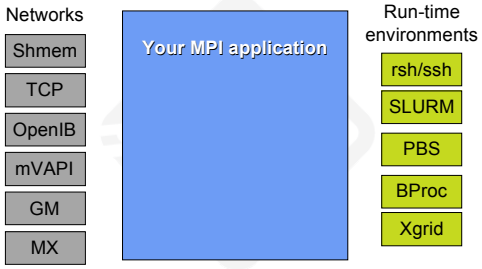
Design Goals

- Extend / enhance previous ideas
  - Component architecture
  - Message fragmentation / reassembly
  - Design for heterogeneous environments
    - Multiple networks (run-time selection and striping)
    - Node architecture (data type representation)
  - Automatic error detection / retransmission
  - Process fault tolerance
  - Thread safety / concurrency

Design Goals

- Design for a changing environment
  - Hardware failure
  - Resource changes
  - Application demand (dynamic processes)
- Portable efficiency on any parallel resource
  - Small cluster
  - "Big iron" hardware
  - "Grid" (everyone a different definition)
  - …

Plugins for HPC (!)



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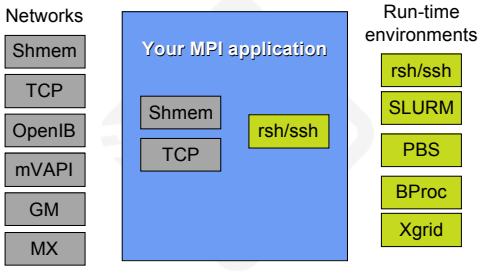

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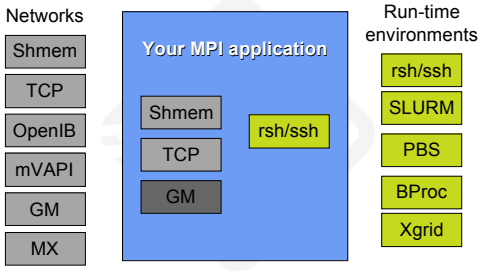

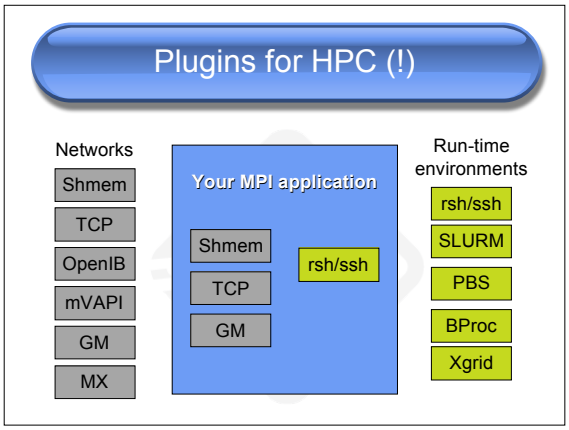
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mVAPI
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rsh/ssh
Run-time environments
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SLURM
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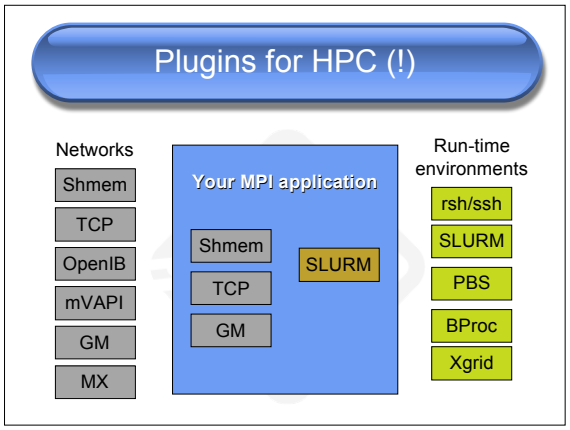
BProc
Xgrid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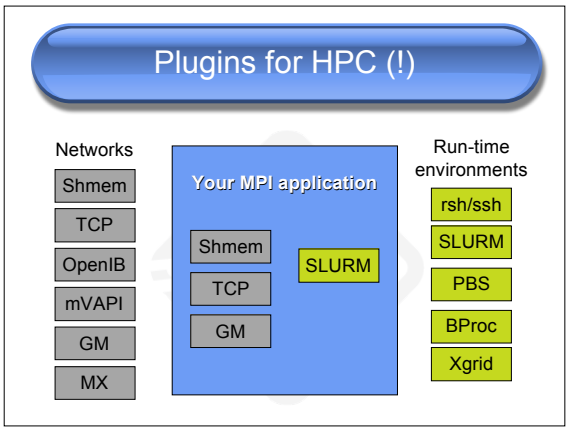
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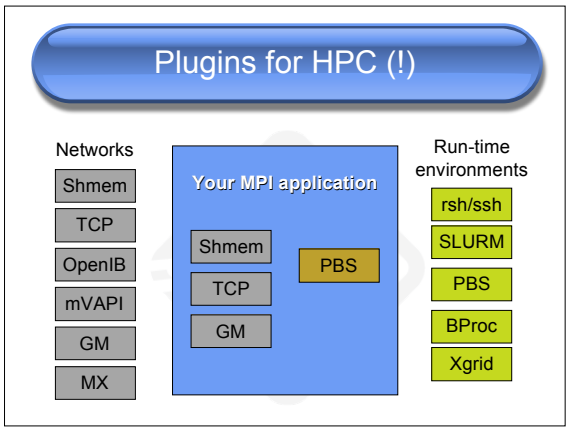
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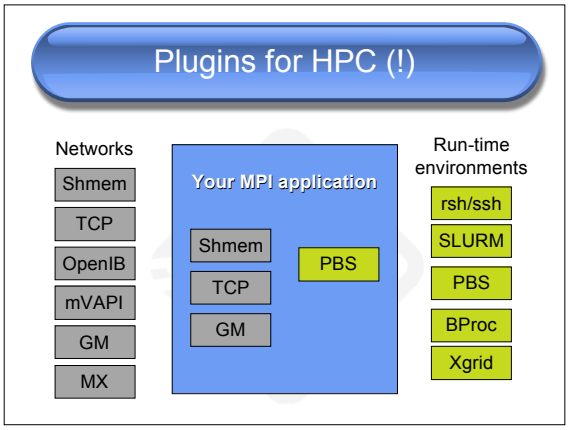
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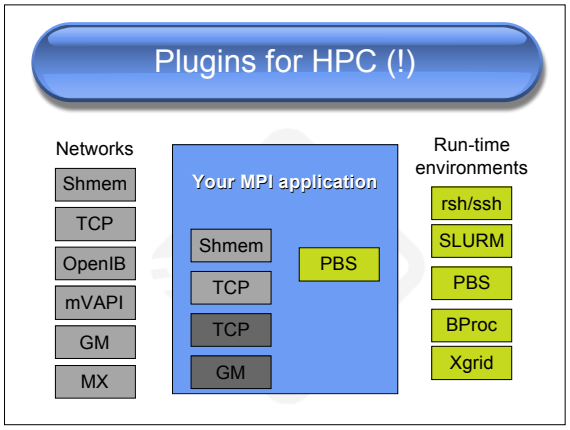
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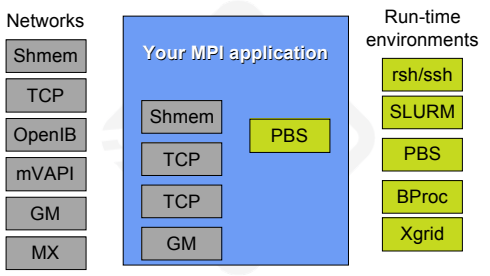

Current Status

- v1.0 released immanently (see web site)
- Much work still to be done
  - Data and process fault tolerance
  - Support more run-time environments (Grid!)
  - Interoperable MPI (IMPI) functionality
  - More external tools
  - …
- *Come join the revolution!*