Open MPI:
10^{15} Flops Can't Be Wrong

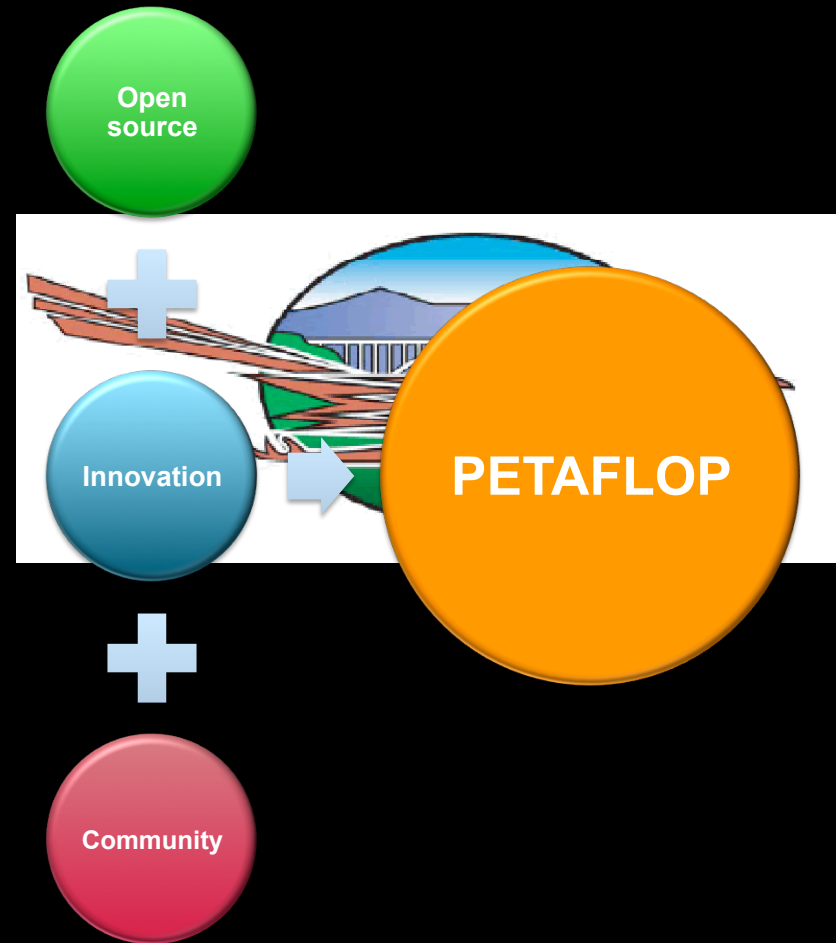## Open Source High Performance Computing
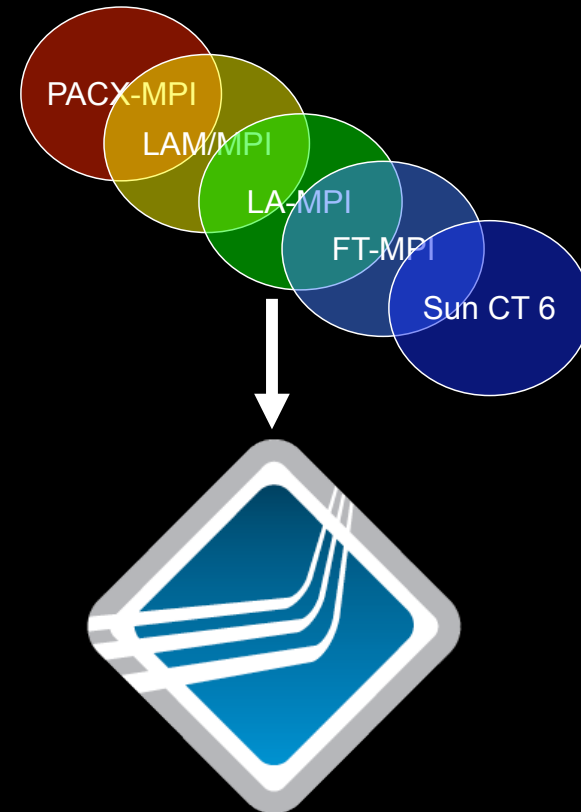
Jeff Squyres

Open MPI Architect

Petaflop!!

- Los Alamos Road Runner

- #1 on Nov. 2008 Top500
  - 1.1 petaflops

- Powered by Open MPI
  - Significant community achievement

Open MPI Is…

- Evolution of several prior MPI implementations

- Open source project and community

    Production quality

    Vendor-friendly

    Research- and academic-friendly

- All of MPI-1 and MPI-2

PACX-MPI
LAM/MPI
LA-MPI
FT-MPI
Sun CT 6

OPEN MPI

15 Members, 9 Contributors, 2 Partners

Why Does Open MPI Exist?

- Maximize all MPI expertise
  - Research / academia
  - Vendors
  - Customers, enterprise
  - …elsewhere
- Capitalize on years of MPI research and implementation experience
- The sum is greater than the parts

 Cisco Public

"Great discoveries and improvements invariably involve the cooperation of many minds."

Alexander Graham Bell, 1877

 Cisco Public

Cisco: Why Open MPI?

- It seems obvious to us!
  - Why re-invent the wheel?
  - Who would want "Cisco MPI"?
  - Combined community resources

- Meshes with Cisco values
  - Standards-based
  - Open architectures
  - Consensus driven
  - Collaborate to innovate

Cisco votes "yes"
for community MPI

Cisco's Community Role

- **Active development**
  - Design, code

- **[Very] Extensive testing**
  - 300-500k regression tests/night
  - Data fed back to community

- **Logistics support**
  - Face-to-face engineering meetings

- **Member, MPI Forum**

Cisco's Open MPI Goals
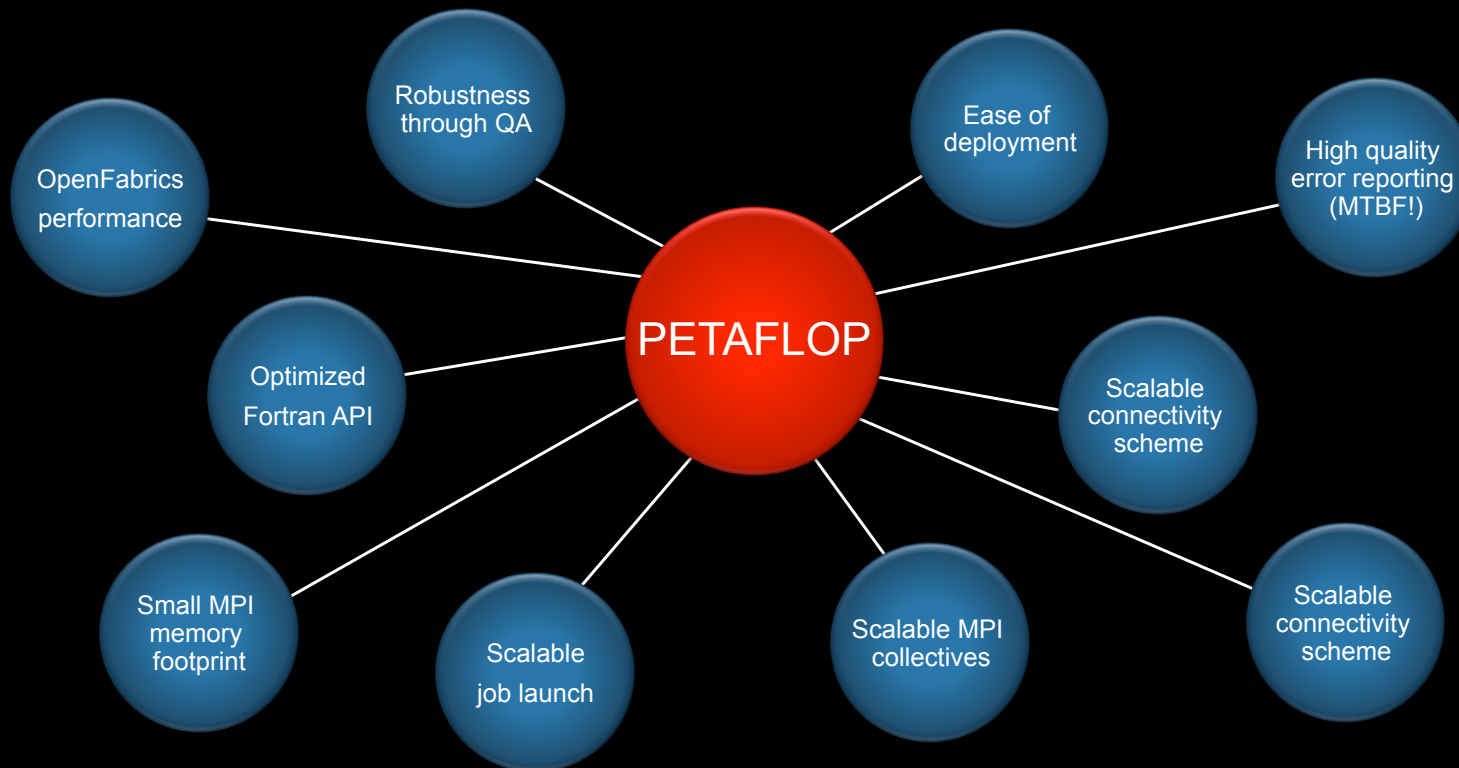
Technical	Non technical

Technical

- Promote standards
  - Ethernet-based technologies
  - Commodity clusters

- Integrate with tools
  - Make parallel programming [a little] easier

- Understand and accelerate applications
  - RAB and DAL two (pseudo-HPC) examples

Non technical

- Promote community
  - Conferences, tradeshows
  - Contribute on open mailing lists

- Partner with academics and researchers
  - Foster cutting-edge research

- Perform "community service"
  - Example: Fortran API maintenance

…But How Does That Equal a Petaflop?

PETAFLOP

- Robustness through QA
- Ease of deployment
- High quality error reporting (MTBF!)
- OpenFabrics performance
- Optimized Fortran API
- Scalable connectivity scheme
- Small MPI memory footprint
- Scalable job launch
- Scalable MPI collectives
- Scalable connectivity scheme

"Open source is decided by those who show up."

Cisco is there. Come join us.

welcome to
the human network.

CISCO