Open MPI: Open Source + Innovation + Community = Petaflop

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Aside: MPI-2.1 and MPI-3.0

- MPI-2.1 is complete
  - Merged MPI-1 and MPI-2 documents (yay!)
  - $22 printed books (586 pages!), HLRS booth #1353
- The MPI Forum needs your help!
  - What do you want to see in MPI-3.0?
 - What do you ***not*** want to see in MPI-3.0?

Petaflop!!

- Los Alamos Road Runner
- #1 on Nov. 2008 Top500
  - 1.1 petaflops
- Powered by Open MPI
  - Significant community achievement

Open source

Innovation

Community

PETAFLOP

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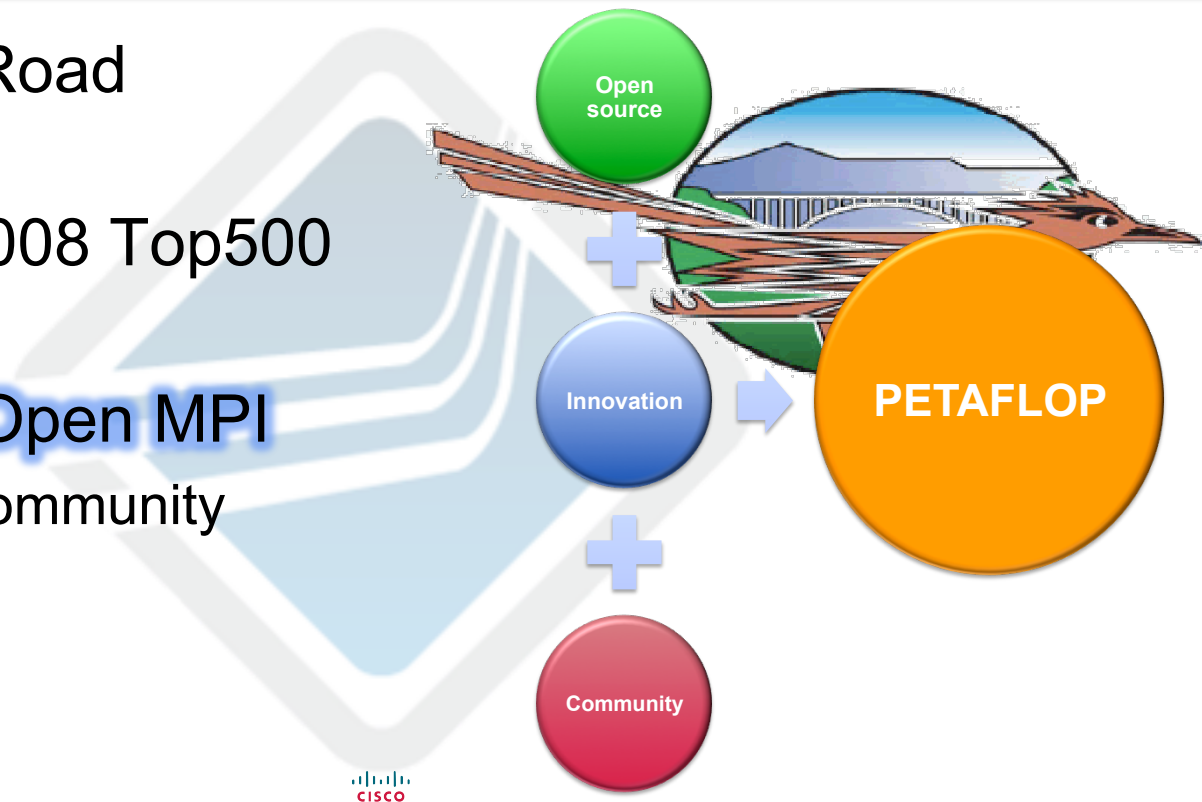
Open MPI Is…

- 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
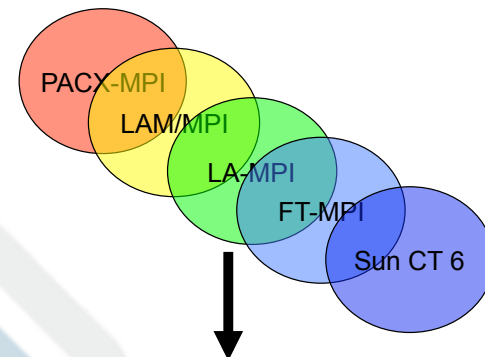
Why Does Open MPI Exist?

- Maximize all MPI expertise, including:
  - Research / academia
  - Vendors
  - Customers, enterprise
- Utilize years of MPI research and experience
- The sum is greater than the parts

15 Members, 9 Contributors, 2 Partners

Why Open Source?

- Open source HPC is good for everyone
  - Room for research / new ideas
  - Open information transfer
  - Feed them back into production / commodity products
- Shorten the cycle from research to commodity
- Researchers have ideas; industry has production capability
  - There are smart people in both!

Open idea → Community development → Production quality product →
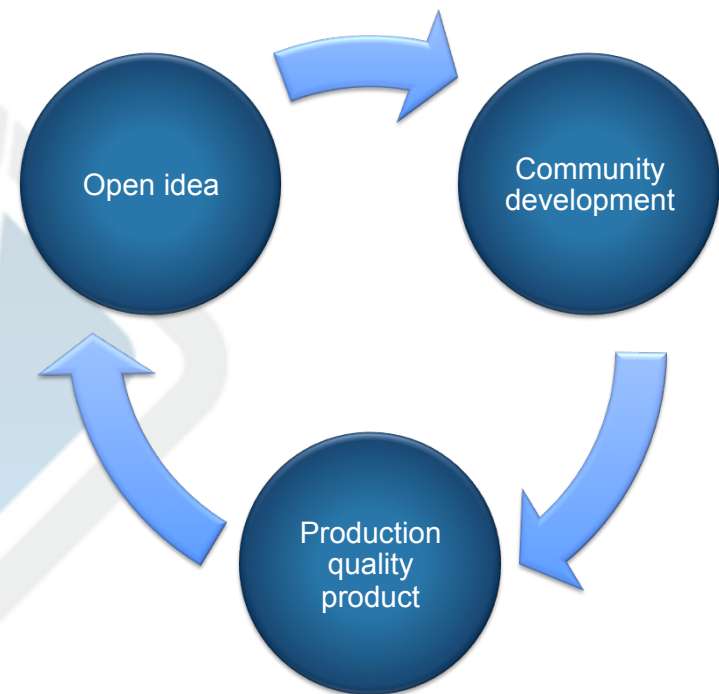
Alexander Graham Bell, 1877

"Great discoveries and improvements invariably involve the cooperation of many minds."
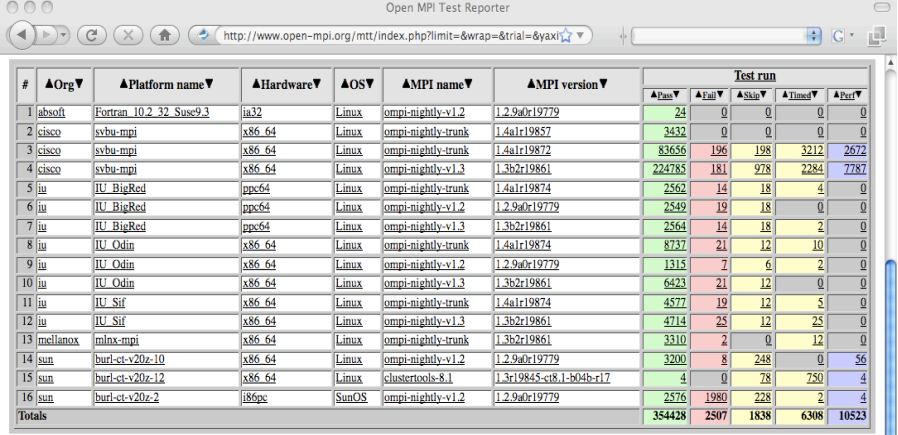
How Does It Work?

- It's all about the collaboration
    - Communicate, communicate, communicate
    - Developers scattered across three continents
- Our greatest development tool:

Give To Get

- **Nightly community regression testing**
  - 300-500k tests per night
  - Web-based analysis tools
- **Strive for consensus**
  - But realize it isn't always possible (or necessary)
- **Perform "community service"**
  - Example: Fortran API maintenance

...But How Does That Equal a Petaflop?

PETAFLOP

Robustness through QA

OpenFabrics performance

Ease of deployment

High quality error reporting (MTBF!)

Optimized Fortran API

Scalable connectivity scheme

Small MPI memory footprint

Scalable job launch

Scalable MPI collectives

Scalable connectivity scheme
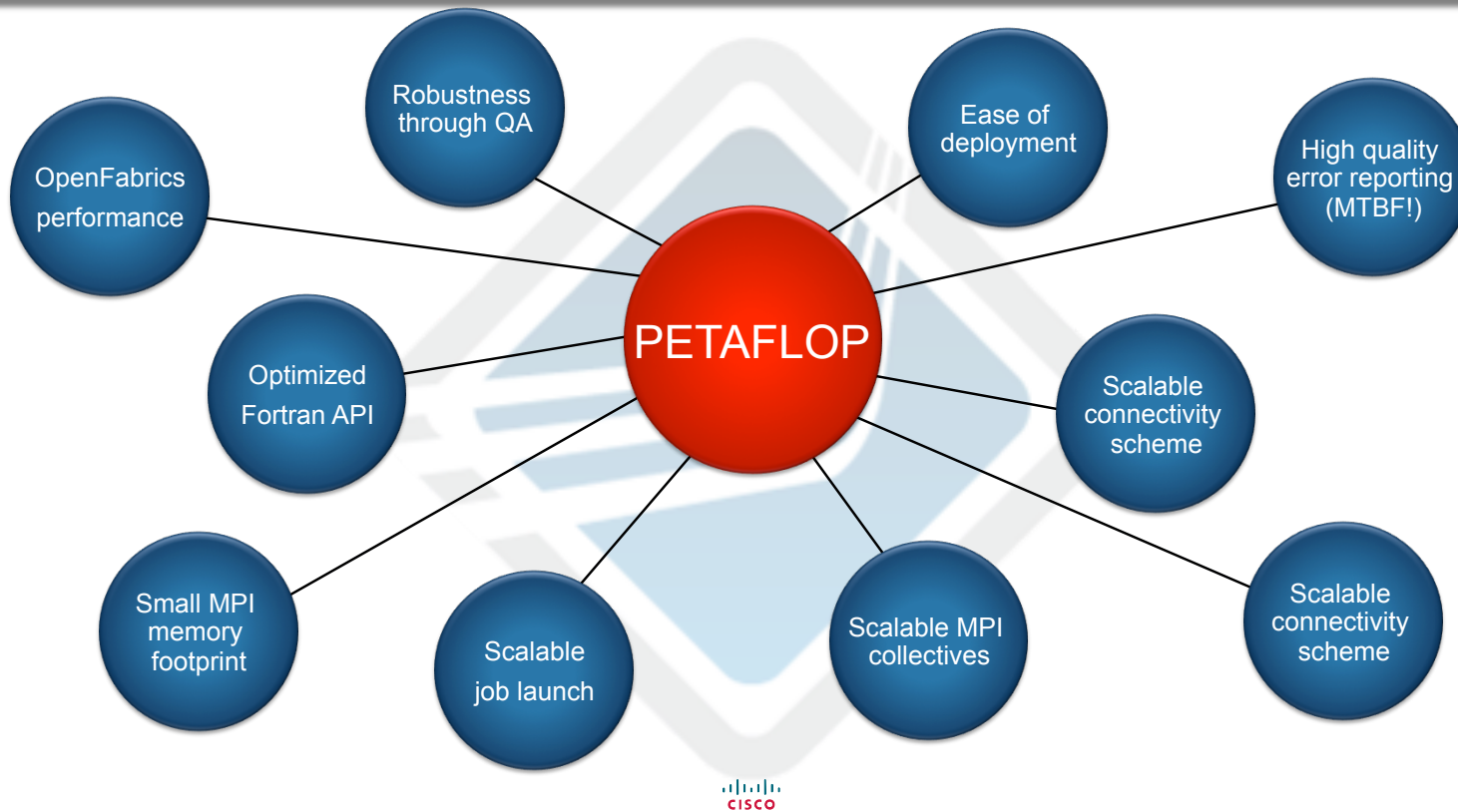
Community Makes It Possible

Come Join Us!

"Open source is decided by those who show up"

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

welcome to
the human network.

CISCO