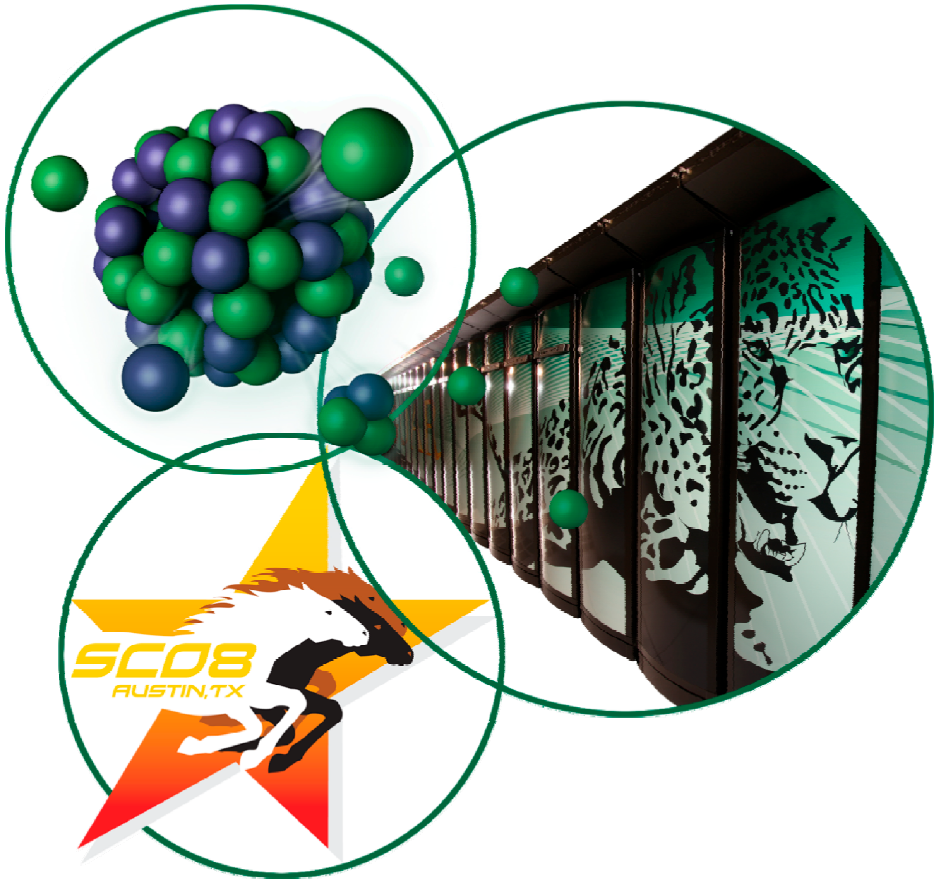
Open MPI on the Cray XT



Presented by

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Why does Open MPI exist?

- Maximize all MPI expertise:
  - Research/academia
  - Industry
  - Elsewhere
- Capitalize on (literally) years of MPI research and implementation experience
- The sum is greater than the parts

Current membership

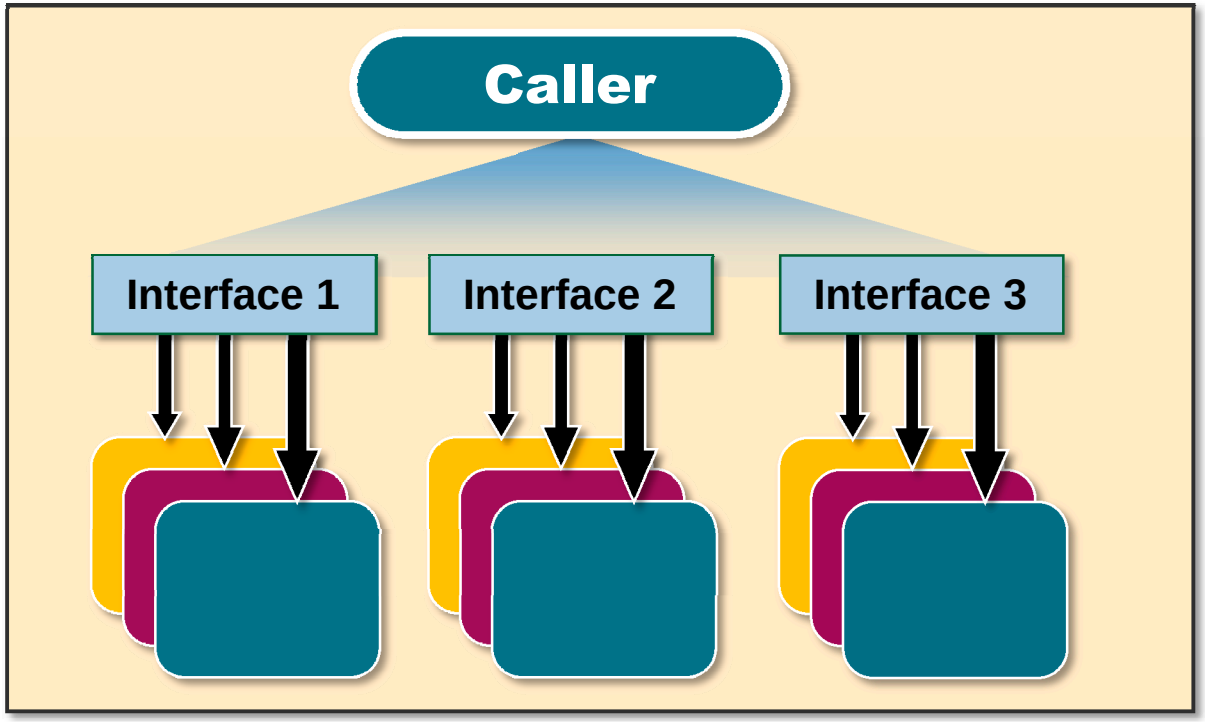
14 members, 9 contributors, 1 partner

- 4 US DOE labs
- 8 universities
- 10 vendors
- 1 individual

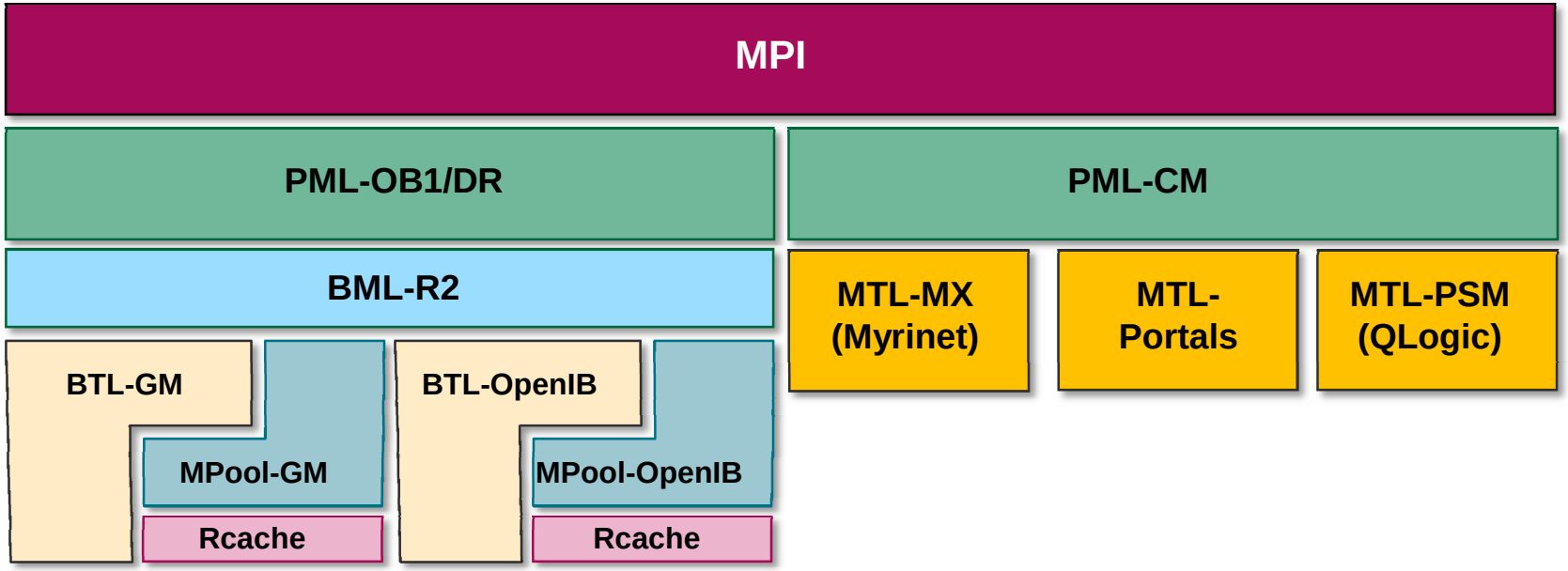
Key design feature: Components

Formalized interfaces

- Specifies “black box” implementation
- Different implementations available at runtime
- Can compose different systems on the fly



Point-to-point architecture



Portals port: OB1 vs. CM

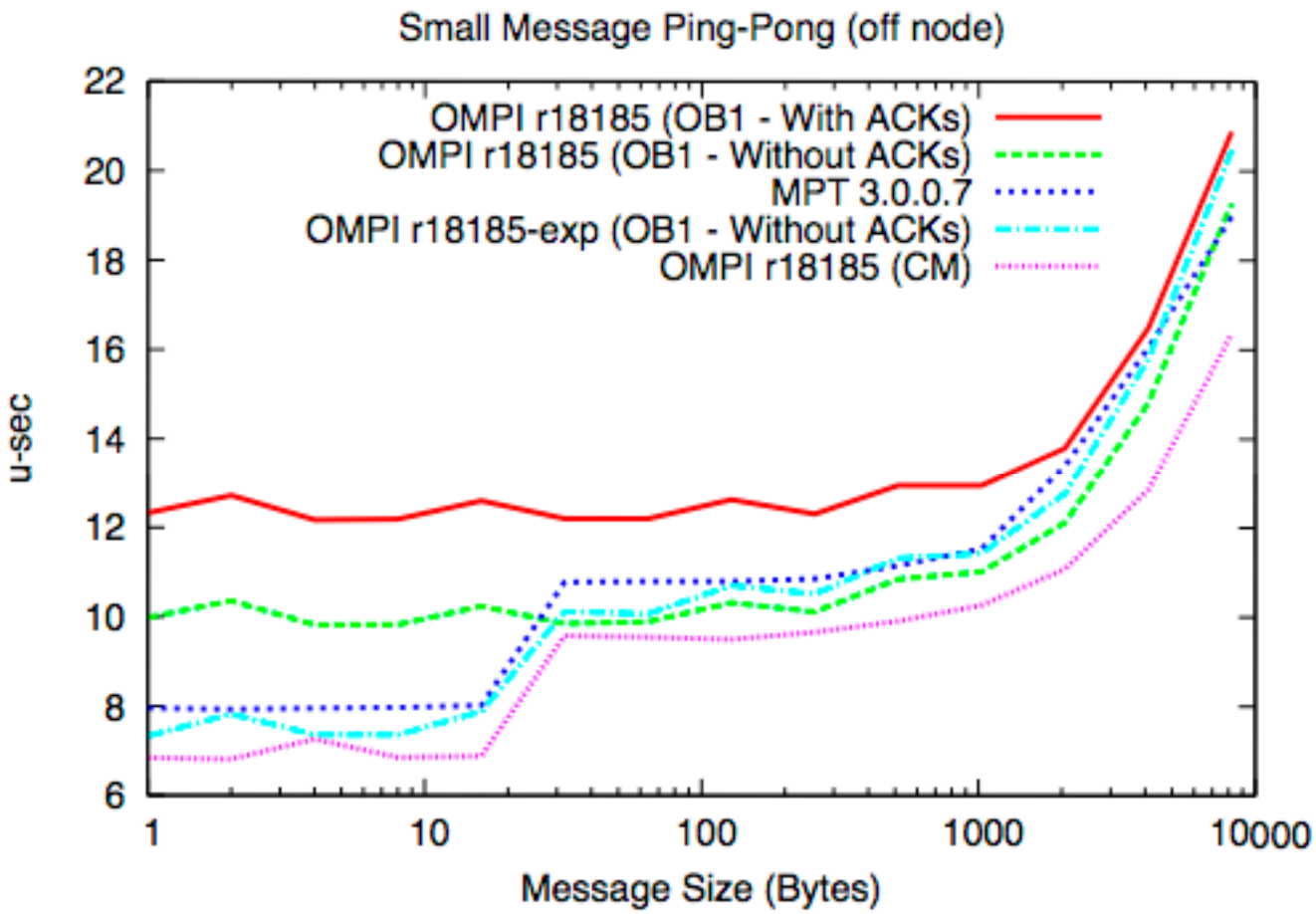
OB1

- Matching in main-memory
- Short message: eager, buffer on receive
- Long message: rendezvous
  - Rendezvous packet: 0 byte payload
  - Get message after match

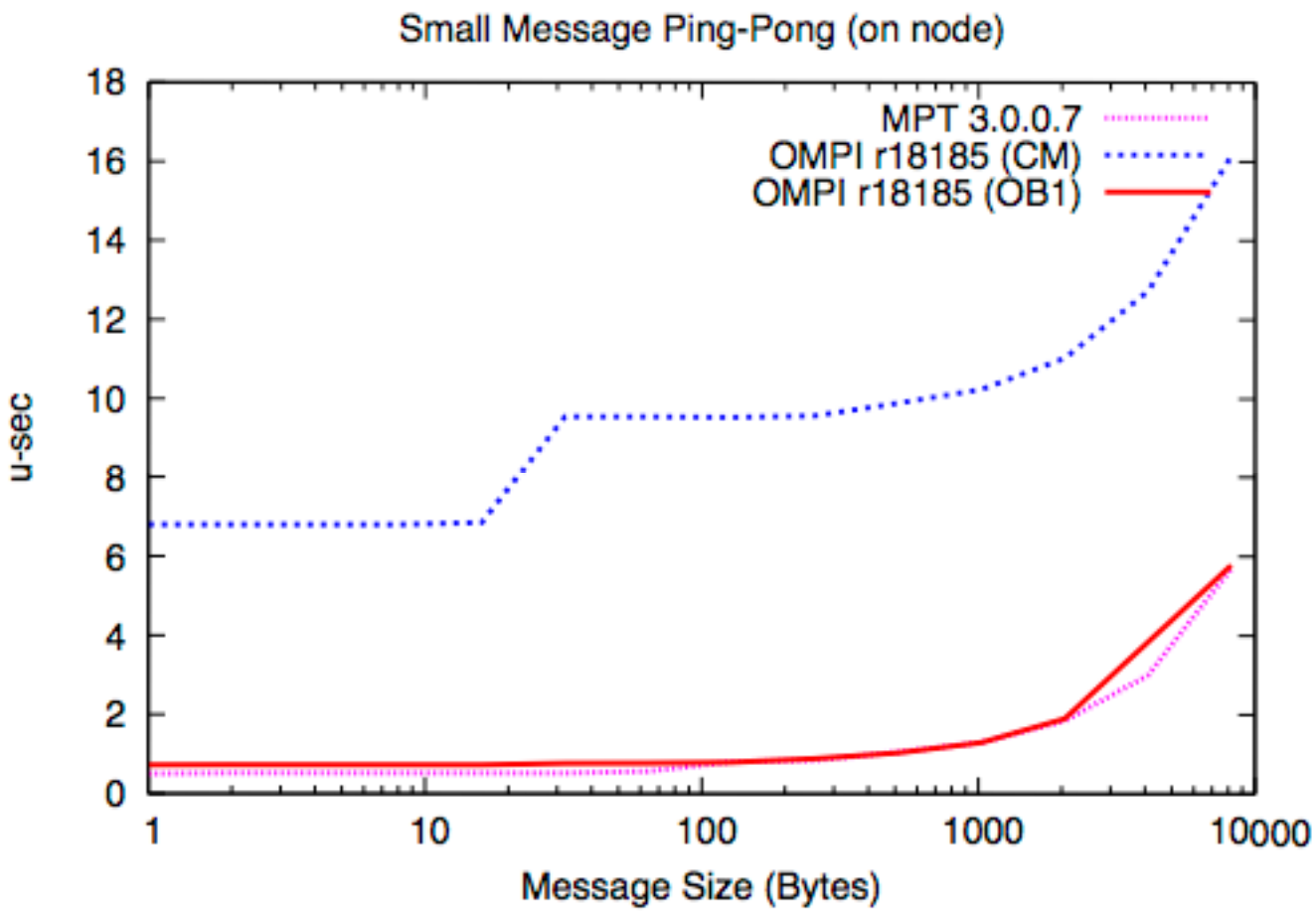
CM

- Matching maybe on NIC
- Short message: eager, buffer on receive
- Long message: eager
  - Send all data
    - If Match: deliver directly to user buffer
    - No Match: discard payload, and get() user data after match

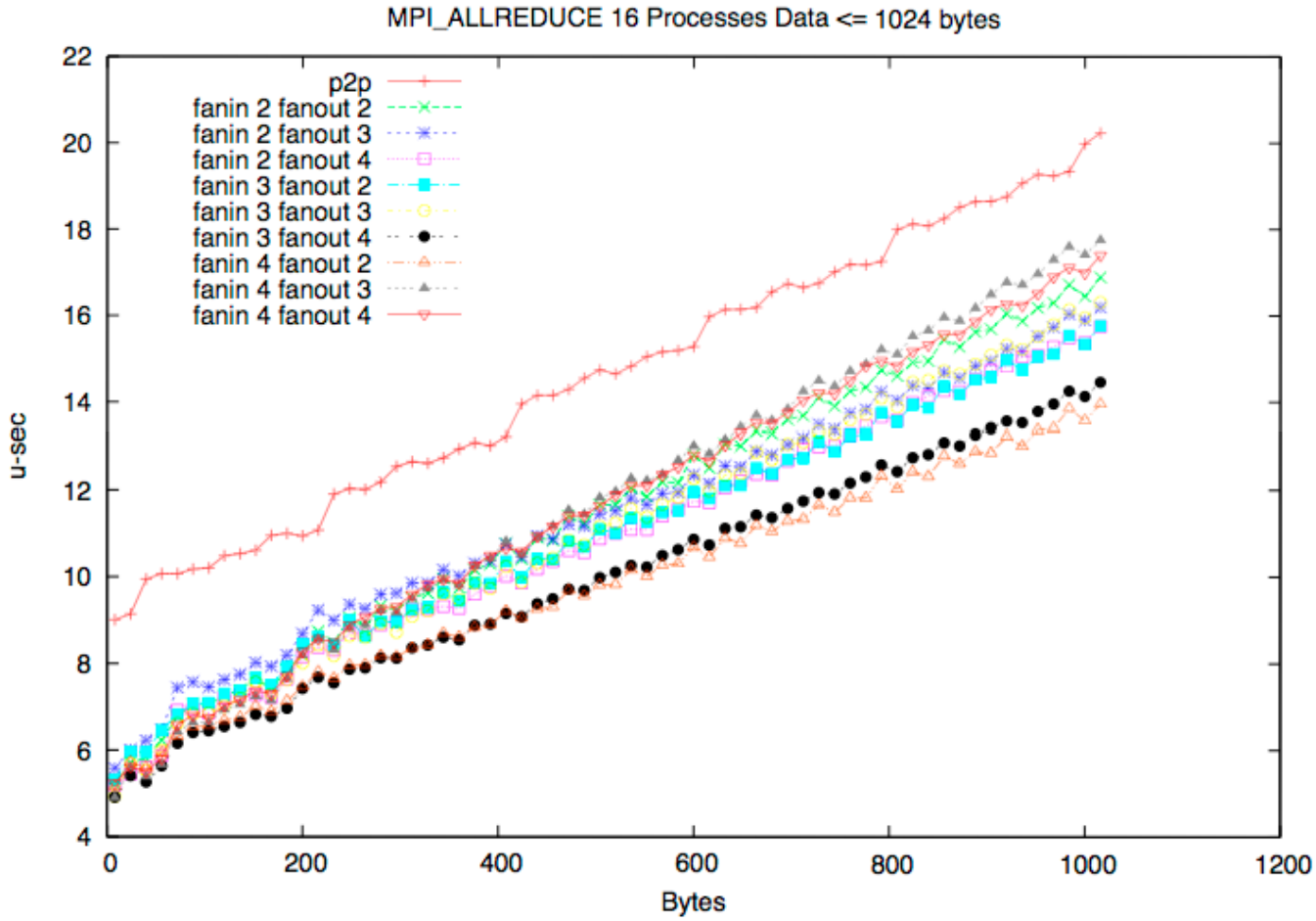
Ping-pong latency data—off Host



Ping-pong data—on host



Collective optimizations: Shared memory allreduce–16 processes



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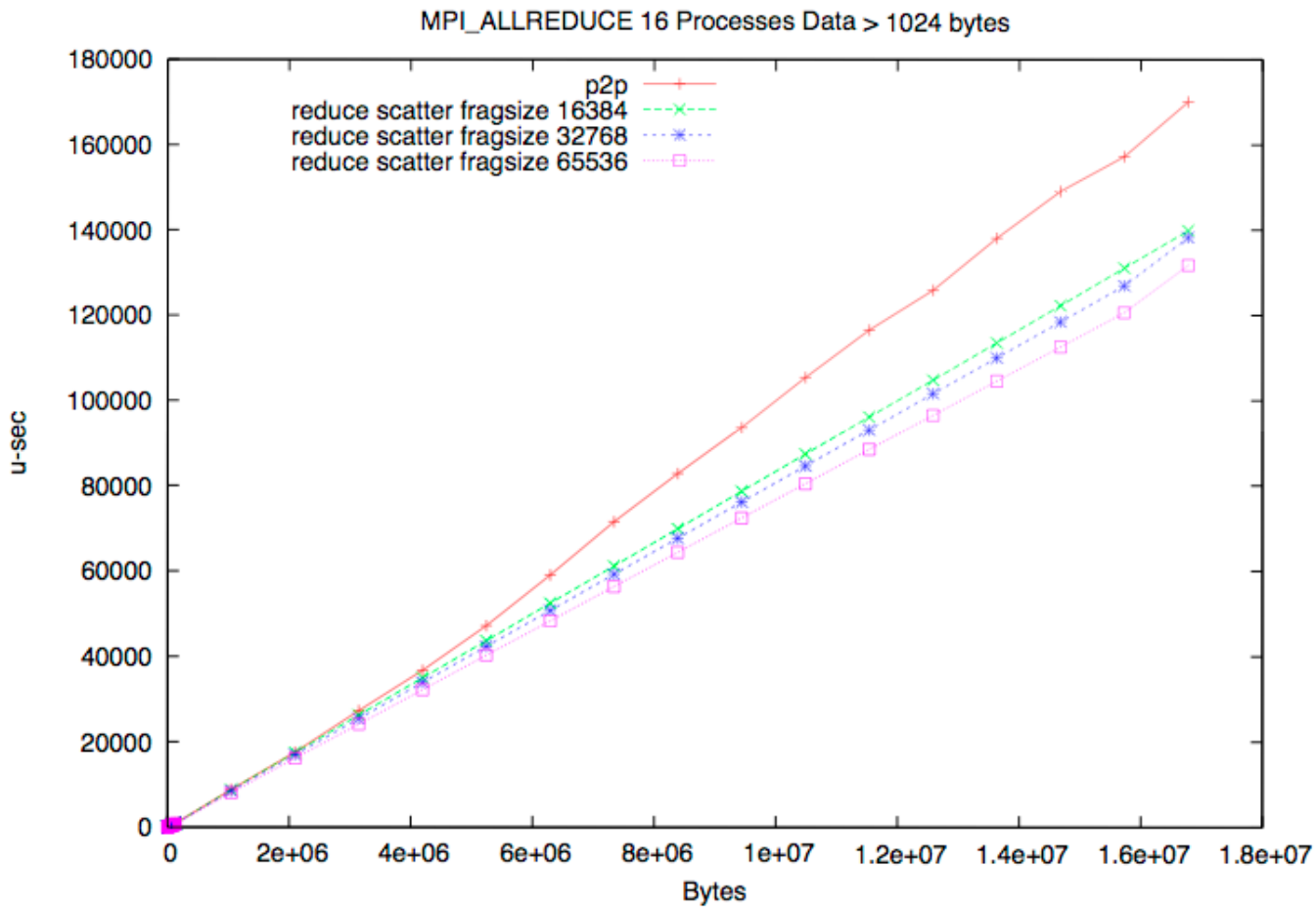

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