

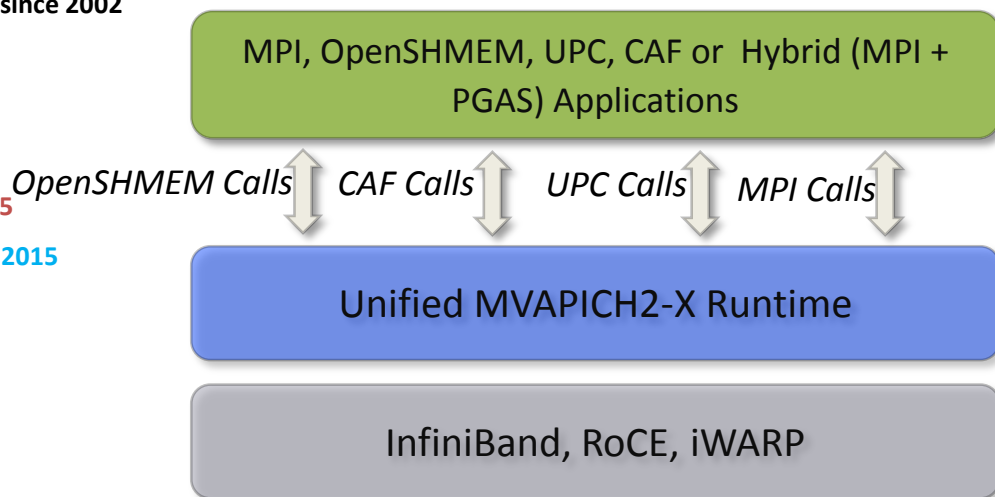
MVAPICH2-X: High Performance MPI+PGAS Unified Runtime

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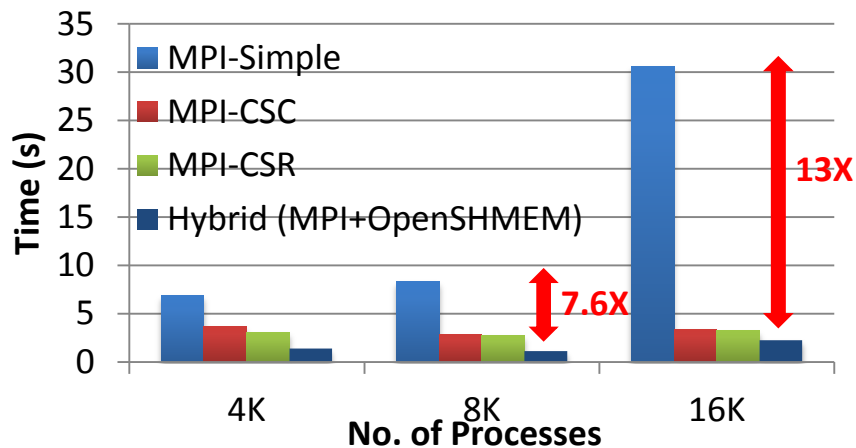
- High performance open-source MPI for InfiniBand, 10-40Gig/iWARP, and RoCE
 - MVAPICH (MPI-1), MVAPICH2 (MPI-2.2 and MPI-3.0), Available since 2002
 - MVAPICH2-X (MPI + PGAS), Available since 2011
 - Support for GPGPUs (MVAPICH2-GDR), Available since 2014
 - Support for MIC (MVAPICH2-MIC), Available since 2014
 - Support for Virtualization (MVAPICH2-Virt), Available since 2015
 - Support for Energy-Awareness (MVAPICH2-EA), Available since 2015
 - Used by more than 2,475 organizations in 76 countries
 - More than 304,000 downloads from the OSU site directly
 - Empowering many TOP500 clusters (Nov'15 ranking)
 - <http://mvapich.cse.ohio-state.edu>

Empowering Top500 systems for over a decade

MVAPICH2-X Architecture



Benefits of Hybrid MPI+OpenSHMEM on Graph500



- 16,384 processes
 - 1.5X improvement over MPI-CSR
 - 13X improvement over MPI-Simple

Next Step for PGAS models: Accelerator Support

Global Address Space with Host and Device Memory

- Extend Memory model for heterogeneous Memory domains
- heap_on_device/heap_on_host
 - (a way to indicate location of heap)
 - host_buf = shmalloc (sizeof(int), 0);
 - dev_buf = shmalloc (sizeof(int), 1);
- Accelerator-Aware MVAPICH2-X support for PGAS models