Portability Improvements

Chapel version 1.20
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Outline

• ofi Comm Layer
• Chapel Module for Cray Shasta
ofi Comm Layer
ofi Comm: Background, This Effort

**Background:** Ongoing development of a libfabric-based comm layer
  - In 1.19, mostly passed testing on linux64 with sockets provider
  - Performance was poor

**This Effort:** Improved both portability and performance
  - Platforms and providers: ✓ linux64 (sockets, tcp)
    ✓ darwin (sockets, tcp)
    ✓ Cray CS, other IB-based (sockets, tcp, verbs)
    ✓ Cray XC (gni, sockets, tcp)
  - Performance is on par with comm=gasnet
    - but with some slow cases and much more variability across benchmarks
ofi Comm: Benchmark Performance

• 16-node Cray CS, InfiniBand network

HPCC: Global STREAM Perf (GB/s) - n=5,723,827,200

[Graph showing performance comparison between gasnet-ibv-large and ofi-verbs]

HPCC: RA-on Perf (GUPS) - n=2^33

[Graph showing performance comparison between gasnet-ibv-large and ofi-verbs]

PRK Stencil Optimized Perf

[Graph showing performance comparison between gasnet-ibv-large and ofi-verbs]

HPCC: RA-rmo Perf (GUPS) - n=2^33

[Graph showing performance comparison between gasnet-ibv-large and ofi-verbs]
ofi Comm: Benchmark Time

• 16-node Cray CS, InfiniBand network
ofi Comm: Microbenchmark Performance

• 16-node Cray CS, InfiniBand network

• Some performance issues still remain
ofi Comm: Next Steps

• Continue improving provider and platform portability
  • Begin nightly testing

• Continue improving performance
  • Fix slow cases
  • Reduce variability
  • Add non-blocking and unordered operations
Chapel Module for Cray Shasta
Shasta Chapel Module: Background, This Effort

**Background:**

- Wanted early-access Shasta customers to have pre-built Chapel
- Chapel module build scripts didn't support the new Cray Shasta platform

**This Effort:**

- Augmented module build scripts to add the Shasta platform
- Arranged for Shasta system images to contain the new Chapel module
Shasta Chapel Module: Impact, Status, Next Steps

**Impact:**
- Shasta customers can use Chapel without having to build it themselves

**Status:**
- Just 2 configs so far: comm=none and ofi with everything else default
- Module build scripting is *ad hoc* in a few Shasta-specific places

**Next Steps:**
- Expand configurations to full supported set
- Clean up *ad hoc* logic in build scripts
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