Portability

Chapel Team, Cray Inc.
Chapel version 1.17
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Outline

- Chapel on Cray XC50 with ARM compute nodes
- Other Cray-specific Changes
- Other Portability Improvements
Chapel on Cray XC50 with ARM compute nodes
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**Background:**
- hardware product announced in November 2017
- adds Cavium ARM ThunderX2 processors to an XC50 system
- uses Aries interconnect
- native, not cross-compiled

**This Effort:**
- made Chapel build and run on XC50 ARM systems
  - included enhancements to topology discovery
- created a pre-built ARM module
- added experimental support for Allinea target compiler
  - ARM’s HPC C compiler
Chapel on Cray XC50 with ARM compute nodes

Impact:
- XC50 ARM users will have Chapel from day one
- Chapel users gain access to a new architecture

Status:
- available on XC50 ARM systems
- uses native ugni comm layer
- see https://www.chapel-lang.org/docs/1.17/platforms/cray.html

Next Steps:
- port Chapel’s LLVM interface to ARM
  - account for ABI differences from x86_64
- study and optimize for ARM
Other Cray-specific Changes
Other Cray-specific Changes

- Improved backwards compatibility of ugni wrt chained ops
- Improved Cray XC code to pass stricter Clang checking
Other Portability Improvements
Other Portability Improvements

- Made CHPL_LLVM=system support Mac Homebrew
  - see https://www.chapel-lang.org/docs/1.17/technotes/llvm.html

- Improved portability to FreeBSD and PowerPC
- More portably compute available memory on a locale
- Made INFINITY and NAN independent of bit patterns
- Made c2chapel Makefile POSIX-compliant
- Improved portability to some versions of gcc and libmvec
- Worked around gcc bug when last line in file is a #include
- Fixed a bug causing control-C to hang compiler on macOS
- Improved portability of re2 for Cygwin
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