

Portability

Chapel Team, Cray Inc.
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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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Chapel on Cray XC50 with ARM compute nodes

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



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Other Cray-specific Changes

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



Other Portability Improvements



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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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