

Other Notable Changes

Chapel Team, Cray Inc. Chapel version 1.14 October 6, 2016



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Outline



- Portability Improvements
 - Chapel on 64-bit ARM
 - Other Portability/Platform Improvements
- Syntax Highlighting Improvements
- Bug Fixes
- Error Message Improvements
- Launcher Improvements
- Third-Party Improvements





Chapel on 64-bit ARM



Chapel on 64-bit ARM



Background: Chapel has not previously supported 64-bit ARM

This Effort: We ported to 64-bit ARM for a single locale

- Created architecture description files
- Enhanced the build environment for 64-bit ARM
- Used a newer release of Qthreads that is 64-bit ARM-aware

Impact: The following environment setting enables the port CHPL_TARGET_ARCH=aarch64

Next Steps:

- Enhance the port to include multi-locale programs
- Study and optimize for ARM
- Add power-aware features





Other Portability/Platform Improvements



Other Portability/Platform Improvements



- Improved the portability of the code base to gcc 6.x
- Improved portability to various UNIX environments:
 - Ubuntu, FreeBSD, Solaris, Illuminos, OmniOS
- on Crays, removed hugepages warning for GASNet
 - previously, generated a warning when craype-hugepage module used
 - combination caused link errors, but was fixed in GASNet 1.26.0
- On Crays, enabled the module to work with CLE 5 and 6



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Syntax Highlighting Improvements



Syntax Highlighting Improvements



- Added alternative vim highlighting install instructions
 - alternatives to .dotfile edits for Vundle and vim-plug users
- Fixed portability of emacs highlighting for emacs 24.x
- Fixed highlighting of nested block comments for emacs
- Fixed highlighting of binary literals in Pygments
- Updated support for Andre Simon's highlighter to v3.x
 - used by Computer Language Benchmarks Game site



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Bug Fixes



Bug Fixes



- CONFIG_SITE broke some third-party builds
- atomic bug fixes:
 - 'compare_exchange' conforms to memory order reqs on failure
 - fixed incorrect 'fetchAdd' and 'fetchSub' implementations
 - fixed incorrect 64-bit atomic loads on 32-bit systems
- privatization had a longstanding, infrequent race condition
- 'ref' bug fixes:
 - fixed a bug in handling of 'ref' return intents
 - fixed a bug involving 'ref's to array elements
- fixed a bug in recursive functions returning records
- fixed a bug in accessing overridden methods
- strided, uint(*) domain/array iteration was broken



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More Bug Fixes



- BlockCyclic array accesses for 3+D arrays were broken
- Membership queries for CSR domains had a bug
- Fixed a bug with storing max(int) in domain(int)
- Arrays in records were being incorrectly localized
- (+/-1)**k was incorrect for negative k
- Fixed a bug in advancing I/O channels
- Fixed bugs mapping GMP routines down to C versions
- Fixed a bug 'use'ing an enum within a library module
- String-to-value casts were not ignoring whitespace
- Fixed back-end compiler warnings about dead code



Yet More Bug Fixes



- I/O bug fixes:
 - readline()s 'amount' argument was being used incorrectly
 - writeln(str) and writef("%s", str) behaved differently for binary I/O
- Added some missing variables to 'printchplenv --sh'
- Reduced auto-'use' of standard modules in user code
- Fixed some issues in copy propagation
- Fixed occasional failures in inserting wide references
- sleep() would sometimes under-sleep by 1 microsecond
- Fixed bugs with the --IIvm-wide-opt flag
- Fixed a bug in locale models and order of resolution



v1.13.1 Bug Fixes



- Released June 2016
 - Motivated by new race condition in 1.13.0 causing lossy reductions
- fixed 'extern' block support for C function pointers/structs
- re-enabled --cpp-lines when not saving generated code
- fixed a bug in 'remove()' on arrays
- vector operations now preserve index sets correctly
- fixed idxType/eltType mix-up in 'shuffle()' in 'Random'
- fixed close-before-wait issue in 'Spawn' channels
- fixed open() when the path was stored remotely
- fixed bug in printing real floating point values
- GMP bug fixes



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Error Message Improvements



Error Message Improvements



- Made string OOB messages print the bad index
- Squashed noisy back-end C compiler warnings
- Errored on declaring constructor/init() procs w/out parens
- Added an error for user fields named 'outer'
- Fixed some spelling errors in error messages
- Removed warnings for assigning serial things to arrays
- Removed a bad warnings about records and forall intents





Launcher Improvements



Launcher Improvements



- Added an --spmd flag to the 'mpirun' launcher
 - Designed for use with new MPI module
- Added new flags to 'slurm_gasnet_ibc' launcher
 - --walltime, --partition, --exclude
- Fixed a race in the 'pbs-aprun' lancher
- Improved handling of backtics in env. vars. for 'amudprun'



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Third-Party Improvements



Third-Party Improvements



- Added 'libunwind' as a new third-party package
 - supports new backtrace capability
- Upgraded jemalloc to version 4.2.1
 - enabled decay-based purging
 - improved detection of 'librt' when using 'cray-prgenv-*' compilers
 - disabled statistics gathering by default
- Upgraded GASNet to version 1.26.4
- Upgraded Qthreads to version 1.11
 - added support for new 'distrib' scheduler
- Upgraded hwloc to version 1.11.4
- Updated MassiveThreads to a new version



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