

Results from the 2011 EPICS Codeathon

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2011 Codeathon

- 22-26 August
- Lawrence Berkeley Laboratory in Berkeley, California
 - Hosted by Eric Norum, Advanced Technology Group
- 8 developers attended
 - Andrew Johnson (Argonne)
 - Michael Davidsaver (Brookhaven)
 - Jeff Hill (LANL)
 - W. Eric Norum (LBL)
 - Kukhee Kim (SLAC)
 - Murali Shankar (SLAC)
 - Shantha Condamoor (SLAC)
 - Till Straumann (SLAC)



Picturesque views



Several workrooms



Projects – Base

- Add prefix to IOC errlog messages (Murali Shankar)
 - A new ioc command `iocLogPrefix` sets a string which is prefixed to all messages sent to the Log Server. This lets sites include an IOC name where multiple soft IOCs are running on the same host and the log viewer can't distinguish them.
 - Status:
 - Documented in Release Notes and Application Developers' Guide
 - Tests added to libCom/test
 - Merged into 3.15 branch
- Support multiple callback threads on SMP systems (Kukhee Kim)
 - On SMP systems, having a single callback thread per priority level can be a bottle-neck as only one callback can be executed at once, potentially leaving CPUs idle. A new ioc command `callbackSetNumThreads` makes the callback system run as many callback threads per priority level as desired.
 - Status:
 - “Experimental”
 - No documentation or tests yet
 - Needs review

Projects – Base

- Add atomic operations to libCom (Jeff Hill)
 - Agreed an OS-independent API for atomic operations on SMP systems
 - Read and Write memory barriers
 - Atomic increment, decrement (int, size_t)
 - Atomic add, subtract (int, size_t)
 - Atomic get, set (int, size_t, void *)
 - Atomic compare-and-swap (int, size_t, void *)
 - Implementations in libCom for all platforms
 - Requires VxWorks 5.5 or 6.x, VxWorks 5.4 not supported
 - Status:
 - Not yet documented
 - Tests added to libCom/test
 - Merged into 3.15 branch
- Implement **epicsThreadOnce** using atomic operations (Jeff Hill)
 - Status:
 - Awaiting review

Projects – Base

- Clean up Callback API (Michael Davidsaver)
 - Add error status returns to many Callback routines
 - Requesters notified if buffer full, error callback for delayed requests
 - New functions to check queue level (full, half-full, empty)
 - I/O Interrupt routine `scanIoRequest` now returns error status
 - Status:
 - Tests added to db/test
 - No documentation yet
 - Needs review
- Remove various `cantProceed` calls from libCom (Michael Davidsaver)
 - IOCs or applications should not freeze as often when problems arise
 - User code must be more careful to check status return values
 - Status:
 - No tests or documentation updates
 - Needs review



Projects – Base

- Added thread pool facility (Michael Davidsaver)
 - General-purpose multi-threaded work queues
 - Configurable priority and maximum number of threads
 - New workers created as needed when jobs get queued
 - Pools can be paused, resumed, destroyed
 - Jobs can re-queue themselves
 - Status:
 - Includes test code
 - No documentation yet
 - Needs review
- Added stack-trace function (Till Straumann)
 - Implemented for Linux and Darwin (VxWorks should be possible too)
 - The libCom `assert` and `cantProceed` functions call this
 - Status:
 - No documentation or test code
 - Awaiting review



Projects – Base

- Perl module for running soft IOCs (Shantha Condamoor)
 - Allows soft IOCs to be controlled and from Perl script
 - Run, stop, load specific databases (DBD, DB files)
 - Execute iocsh commands, collect output
 - Designed for running test scripts under Perl's `Test::Harness`
 - Status:
 - Works on Unix/Linux; some changes needed for Windows
 - No documentation yet
- Bug triage and fixes (Till Straumann)
 - 831648: NTP initialization on RTEMS with Cexp
 - 835138: Real-time priority mapping for Posix
 - 794749: caget array size
- Changes to libCom for VxWorks SMP (Kukhee Kim)
 - Studying new VxWorks APIs for SMP, many changes likely
 - No code written yet



Other Projects

- VDCT enhancements (Murali Shankar)
 - Added support for record `info` fields in DB files
 - Adding support for record aliases (incomplete)
 - Status:
 - Testing in progress
 - Will be submitted to CosyLab for integration
- Make Asyn and synApps 64-bit clean (Eric Norum)
 - Fixed code and compiler warnings
 - Built using clang for additional warnings
 - Status:
 - Will be submitted for integration
- Application Developers' Guide (Andrew Johnson)
 - Documented several API changes in 3.15 branch

Thanks to everyone who took part

