

EPICS 3.14.12 and Beyond!

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Topics

- EPICS Base Release 3.14.12
 - What's new since 3.14.11
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 - What's coming
 - Release Timetable



EPICS Base R3.14.12

- According to ohloh.net:
 - EPICS Base contains 461,000 lines of code
 - It would take 124 person-years to rewrite
 - At \$55,000 annual salary, that comes to \$6,800,000
- 16 development branches merged since converting to Bazaar
 - 250 commits total since R3.14.11
- Diamond have automated build and test
 - Runs built-in test programs and the regression test suite
 - Linux, vxWorks and RTEMS targets
 - Also generates code coverage data during host tests
 - Makes it easy to improve our test coverage



What's New in 3.14.12?

- Dynamic array support over CA
 - Developed by Michael Abbott (Diamond) at the 2010 Codeathon
 - CA clients that call `ca_create_subscription()` or `ca_get_callback()` with an array length of zero will receive the array size as provided by the record
 - Earlier versions zero-fill the data to the maximum size of the array
 - Only works for 3.14.12 CA clients talking to 3.14.12 IOC servers (RSRV)
 - Supported by the catools programs and the Perl CA client library
 - Not supported by dbCa links, CAS tools, PV Gateway, SNC/Sequencer programs
- CA over TCP connections
 - Developed by Ralph Lange and Jeff Hill at the 2008 Codeathon
 - The `CA_NAME_SERVERS` variable provides the CA client library with a list of servers to communicate with over a TCP socket
 - Permits tunneling CA over an SSH link
 - Supported by both servers (RSRV, CAS)

What's New in 3.14.12, cont.

- 80 character CALC expressions
 - Both calc and calcout record types
 - Must use long string support to access over CA
 - Using the 40-character DBF_STRING will truncate longer expressions
 - Long expressions can be used in .db files
- DTYP and INP/OUT field order relaxed
 - Developed by Dirk Zimoch at the 2010 Codeathon
 - Don't have to set DTYP before INP/OUT fields in .db files any more
- configure/RELEASE syntax enhancements
 - Now allows ?= and := assignment in RELEASE files
 - \$(EPICS_HOST_ARCH) is now available in RELEASE
 - \$(T_A) is not available, create a target-specific file instead

What's New in 3.14.12, cont.

- Cleanup of devLib (Michael Davidsaver)
 - See earlier talk
- Fixed bugs in various record types
 - Initialization of “last value” fields (Michael Davidsaver)
 - Run-time set compress.ALG ← “Average” (Ralph Lange)
 - Many enhancements to aai & aao records (Dirk Zimoch at the 2010 Codeathon)
 - Soft Channel device support
 - SIOl link and proper simulation
 - MPST and APST fields, monitor on change
- CA command line tool enhancements (Ralph Lange)
 - Support for printing float values as hex/octal/binary integers
 - Now caput can write enum values with no defined strings

What's New in 3.14.12, cont.

- Added “capr.pl” script, like dbpr command but uses CA
 - Developed by John Maclean at APS several years ago
 - Converted to the Perl CA library by Ronaldo Mercado at the 2010 Codeathon
- Application Developers Guide now in LaTeX
 - Converted by James Rowland at the 2010 Codeathon
 - Maintained as a separate project on Launchpad
 - Bazaar branch is lp:epics-appdev
 - Anyone can download it and propose updates



What's New in 3.14.12, cont.

- Operating System support
 - Apple iOS
 - Developed by Tom Pelaia and Mark Engbretson
 - Cross-build targets for Apple iPhone, iPad and simulator on darwin-x86
 - VxWorks versions up to 6.8
 - Problem with munching GCC 4.x binaries in earlier Base releases
 - Thanks to ORNL and LANL for researching the fix
 - RTEMS 4.10
 - Windows-x64



What's Not New in 3.14.12?

- Reading configuration data from .db files
 - Since 3.14.3 (2003) the IOC has supported Record Information Items:

```
record(ai, "$(user):aiExample") {  
    info("autosave", "2")  
    info("alarmlog", "ON")  
    ...  
}
```
 - They are attached to a record at load time; only for code within the IOC
 - Info items are not record fields, nor visible via Channel Access
 - The dbStatic library provides routines to find, get and set them:
 - `dbFindInfo()`, `dbFirstInfo()`, `dbNextInfo()`, `dbGetInfo()`, `dbPutInfo()`,
`dbDeleteInfo()`, `dbGetInfoName()`, `dbGetInfoString()`, `dbPutInfoString()`
 - Each item also has an associated void* pointer for application use:
 - `dbPutInfoPointer()`, `dbGetInfoPointer()`
 - Anyone writing code that lives in the IOC and needs per-record configuration data should consider using info items
 - Autosave from synApps does
 - Device support can use them too, but it's not very convenient

3.14.12 Release Timetable

- 3.14.12-pre1 was released last Friday, October 8th
 - New 3.14.12 web-page on EPICS site
 - Please download and test this version
 - Report any issues to tech-talk
 - Please update the Application Developers' Guide
- Plan to release 3.14.12-rc1 on October 22nd
 - Assuming no major bugs are reported
 - Allowing 2 weeks because of this meeting
- The earliest possible date for final 3.14.12 release is October 29th
 - Will be delayed if any material bugs reported in the -rc1 version

Developing R3.15.x

- The Bazaar 3.15 branch will be derived from the 3.14 branch
 - I will create it some time after the final 3.14.12 release
 - 3.15 will become the development focus on Launchpad
 - lp:epics-base will point to the 3.15 branch
- The 3.14 branch will still exist
 - Bugs fixes for 3.14.12 will be developed on this branch
 - Use lp:epics-base/3.14 to access it in Bazaar
 - It is easy to merge them into 3.15 from here
 - There may be a 3.14.13 release, if enough bugs appear

What's Coming in 3.15?

- JSON Field Modifiers and Server-side plug-ins
 - See Ralph Lange's talk earlier
- Process-Get, developed by Marty Kraimer at the 2008 Codeathon
 - Enhances the put-process mechanism that implements `ca_put_callback()`
 - Provides Asynchronous Soft Channel support for input record types
 - Base 3.14.5 added Async Soft Channel for output record types and CA links only; it waits for completion of all linked actions after putting the value
 - A process-get operation processes the target record, waits for all linked actions to complete, then reads the value from the target field
 - A put-process-get operation is also possible
 - No device support uses this yet though

What's Coming in 3.15, cont.

- Alarm filtering
 - Developed by Eric Norum, Bernd Schoeneburg and Kukhee Kim (2009 & 2010)
 - Adds an Alarm Filter Time Constant (AFTC) field to several record types
 - ai, longin, calc, mbbi
 - Limits how often the alarm severity of the record can change due to the signal value exceeding the threshold fields (HIHI, HIGH, LOW & LOLO)
 - Default alarm behavior (AFTC=0) is unchanged
- Non-VAL Attributes
 - Developed by Dirk Zimoch at the 2010 Codeathon
 - Provides sensible values for the attributes of fields other than VAL for most of the standard record types
 - EGU and PREC are only used for VAL-equivalent fields
 - For fields specifying a delay, return Units string = “s”, Precision = 2, Limits = 0..10 (?)
 - For fields whose values are read in through a link, get the Units string/Precision/Limits from the link target

3.15 Release Timetable

- Those changes *could* become a 3.15 release very quickly
 - Marty provided tests for the process-get code already, just need merging
 - Need tests for the other developments
 - Depends on how much effort is available
- Aim to keep the official branch always working
 - Using a DVCS with code reviews will help this
 - Automated testing is very useful too
- Want to extend our tests to increase the code coverage
 - Writing test code is a (boring but) good way to learn an API
 - Offers of help doing this will be warmly welcomed