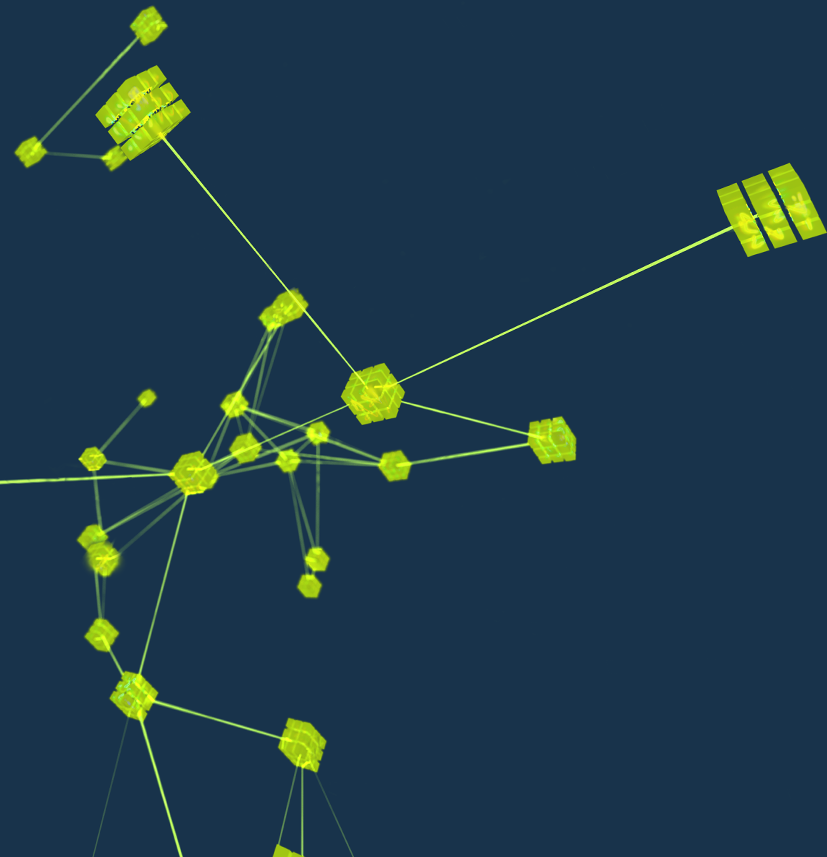


EPICS Collaboration Meeting April 2023

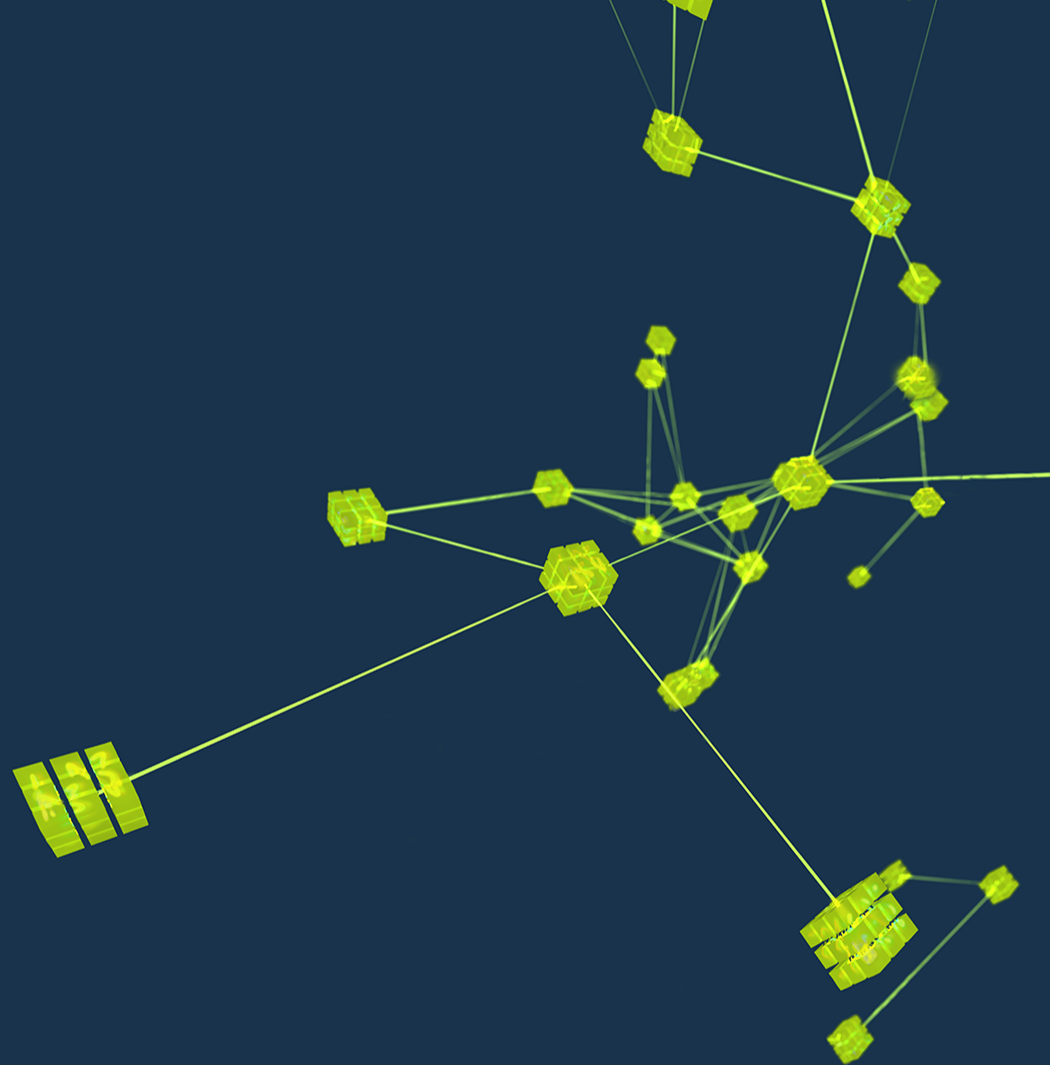


EPICS Base – What's New

Andrew Johnson for the EPICS Core Developers

Outline

- Past
 - Changes included in EPICS 7.0.7 (September 2022)
- Present
 - Changes that have been merged since 7.0.7
- Future
 - Changes under review and development
 - Plans for the EPICS Core
 - Longer term ideas



PAST

FEATURES RELEASED IN EPICS 7.0.7

EPICS Releases in last 2 years

- EPICS 7.0.6 4 July 2021
- EPICS 3.15.9 31 August 2021
- EPICS 7.0.6.1 6 October 2021
- EPICS 7.0.7 7 September 2022

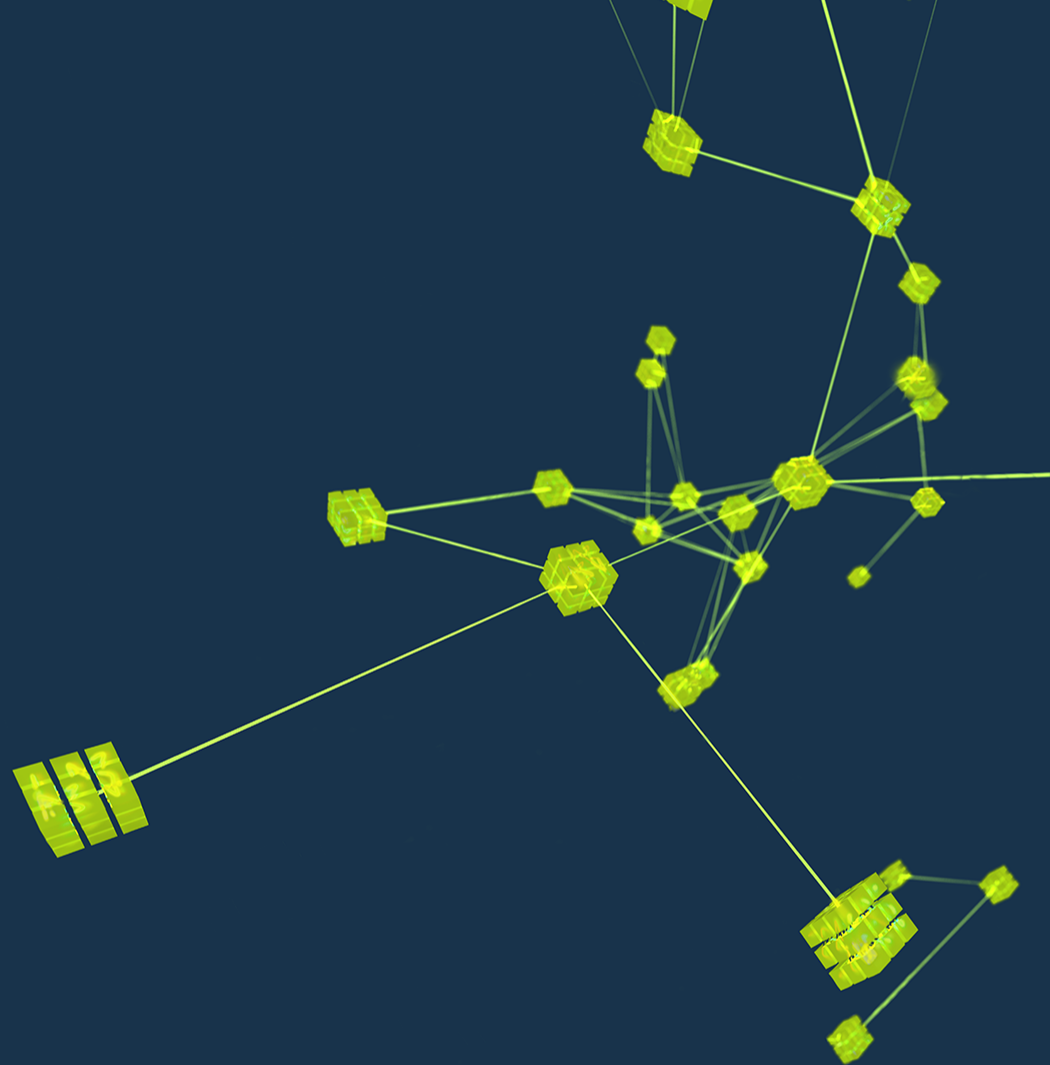
Changes in EPICS 7.0.7

For a full list, see Release Notes on epicscontrols.org website

- Made `epicsInt8` signed on all architectures — was previously unsigned where `char` was unsigned (e.g., PowerPC)
- Breaking change to `db_field_log`, affected IOC channel filters
- Builds with newer compilers can auto-detect GNU Readline
- aao records now have `OMSL` and `DOL`, can copy arrays between records
- IOC's CA server exports `RSRV_SERVER_PORT` (TCP port number)
- Output record types now support RAW Simulation mode (convert `VAL` to `RVAL`, write it through `SIOL`)
- Coloured many IOC warning & error messages, except when logged

More Changes in EPICS 7.0.7

- Accept hex and octal values in hardware links (leading 0 ⇒ octal)
- Fixed time synchronization issues on VxWorks 6.9
- Build system updates to stop a top-level `make uninstall` from triggering the clean target; setting `INSTALL_LOCATION` works again
- More Doxygen annotations in the code (thanks to the 2022 EPICS Codeathon participants)
- `pvAccessCPP`: bug fixes (enum) and performance improvements
- `pva2pva`: access security hooks; `timestamp.userTag` from `UTAG` field



PRESENT

FEATURES MERGED BUT NOT YET RELEASED

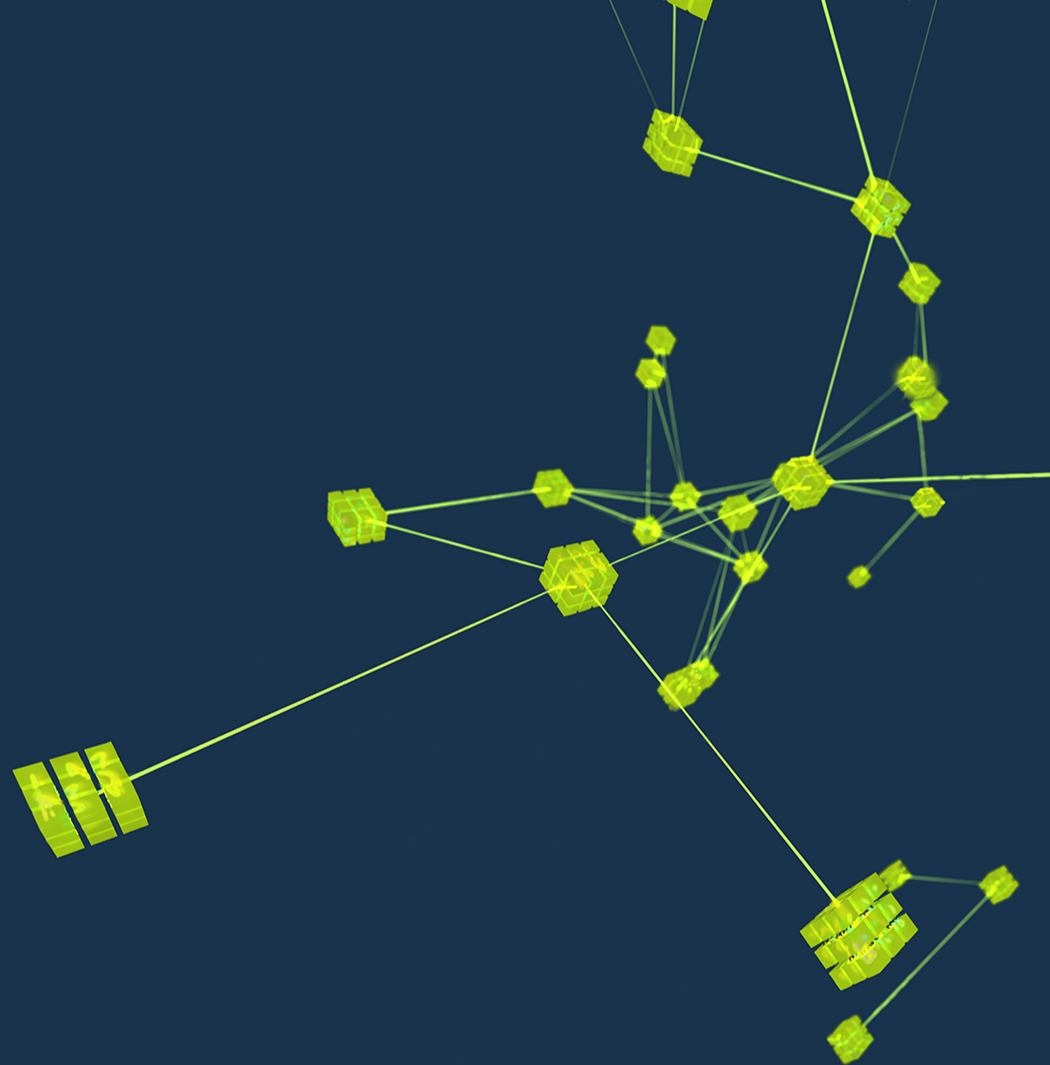
Changes already on the 7.0 branch on GitHub

- pva2pva: Fix for dbLoadGroup (broken in 7.0.7)
- Calc expressions may now use new function `FMOD (NUM, DEN)`
- IOCSH built with Readline supports tab-completion of commands, filenames, record names, var names and `pdbbase`
- MacOS builds will detect and use GNU Readline from Homebrew or MacPorts if it's available; Apple's libedit can't do tab-completion
- Menu fields can hold a value that is not a valid choice. Fetching one as a string now returns the numeric value as a string instead of an error
- The `capr.pl` script has improved significantly since 7.0.6.1
- The new `OOPT` field in the longout record controls whether the output value gets written to device support, similar to the calcout record

Changes on the 7.0 branch from the Codeathon

Some PRs from the Codeathon at Diamond in March have been merged:

- Setting the new compress record `PBUF` field to `YES` enables partially-filled buffers to be processed with the N-to-1 algorithms
- A subroutine record with an invalid `INP*` link no longer fails silently
- Many C & C++ compiler and `ubsan` warnings have been cleaned up
- The code now has a `.editorconfig` file, format checked by CI builds
- The “ts” server-side filter can now fetch a record’s timestamp with a choice of formats. The updated filter documentation has details
- A new `dbCreateAlias` `iocsh` command allows record aliases to be defined (before `iocInit`) without loading a separate `.db` file



FUTURE
WHAT NEXT?

Some Pull Requests still pending

Some PRs, including some from the 2022 and 2023 Codeathons still need completion, reviewing and/or merging:

- Environment variable to set default timeout for catools (caget etc.)
- Generate error on any attempt to alias a record.field
- Unit tests created for standard record types (ai, bi, bo, printf)
- Add CI cross-builds for aarch64 and linux-arm (BE and LE) targets
- More Doxygen annotations for header files in libCom and ca
- More detail and better-formatted IOCSH “help” command output
- New `EPICS_PRINTF_FMT(format_string)` annotation macro to let Microsoft compilers check printf-like declarations

More pending Codeathon Pull Requests

- Support modules may call `errSymbolAdd()` after early initialization
- Fix timestamps on array-record `NORD` field updates
- Many compiler warnings cleaned up, new warnings may fail CI builds
- Additional work on the RTEMS target code, including RTEMS-6

Very encouraged by the attendance and additional work done at EPICS Codeathons — thanks to SLAC and Diamond for hosting.

We now need more Core Developers to help us review PRs!

Ideas in Development

- Explicit `INT` and `EXT` link modifiers to help detect typos in PV names
 - `INT` means link target must be local to the IOC (`EXT` overrides)
 - Additional DB-file syntax can set default to one of these
- Add `OOPT` to more output record types (only write “On Change” etc.)
- Server-side filter to read record `info()` item strings
- Link type that can do file I/O

Longer Term Plans

- Next major release — EPICS 7.1
 - No specific timetable for this yet
 - Will require C99 and C++11 compilers (GCC 4.8.1)
 - No support for VxWorks 6.x or RTEMS 4.x
 - Will replace the original PVA libraries with PVXS and the IOC's PVA server QSRV rebased onto PVXS
 - Includes IPv6 support, implemented in PVXS
 - Should Channel Access also support IPv6?
- I hope to continue releasing updates to the IOC in the EPICS 7.0 series using the older pvData/pvAccess/pva2pva modules

Thank You!

Any Questions or Comments?

