

EPICS Collaboration Spring Meeting 2021



EPICS Core Developments and Plans



ANDREW JOHNSON
Controls Group,
Accelerator Systems Division,
Argonne National Laboratory

TALK OUTLINE

- Developments
 - ♦ Changes in EPICS versions released since October 2020
- Plans
 - ♦ Changes awaiting review or still in development
 - ♦ Future plans and ideas for the IOC
 - ♦ Longer term plans

DEVELOPMENTS



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EPICS RELEASES SINCE OCTOBER 2020

- EPICS 7.0.5 2021-03-01
- Base 3.15.9 2021-06-27
- EPICS 7.0.6 2021-07-03

CHANGES IN EPICS 7.0.5

- Host arch's `linux-aarch64` and `darwin-aarch64` (macOS on M1)
- `undefine VARNAME` allowed in `configure/RELEASE` files
- `softIoc` and `softIocPVA` accept `-v` to show their startup commands
- New `dbLoadGroup` command in PVA IOCs loads definitions of QSRV Group PVs from a JSON file. Give full *record.field* name in `+channel` maps
- IOC suggests the best match for a bad menu field value while loading db files. Uses a new `epicsStrSimilarity()` routine in `epicsString.h`
- New `registerAllRecordDeviceDrivers` command for tests and sites like PSI/ESS that load modules at runtime (not for `makeBaseApp` IOCs)

JSON CHANGES IN EPICS 7.0.5

- `dbpf` accepts a JSON string value, so it can now set array fields
`dbpf wf10:i32 "[1, 2, 3, 4, 5]"` (*JSON must be in quotes*)
- Support for JSON-5 syntax in db files and channel filters. Main changes:
 - ♦ Accepts numeric values `Infinity`, `-Infinity` and `NaN`
 - ♦ Understands hex integers starting `0x` or `0X`
 - ♦ Strings and keys can use 'single' or "double" quotes
 - ♦ Simple map keys don't need quotes – `{This: {is: 'legal!'}}`
 - ♦ Octal character escapes (`"\041"`) are no longer supported in strings, use the 2-digit hex form instead `"\x21"`

MORE CHANGES IN EPICS 7.0.5

- Input DB links can use channel filters, no need to use CA links
- Base output record types now set the record's timestamp *before* putting the value to the OUT link field (and again afterwards for async device support)
- Arrays of type CHAR (wf, aai, aSub) can be set to a long string, using JSON `field(INP, {const:"Long string value"})`
- IOC, Base record types and libCa can now handle 0-length (empty) arrays
 - ♦ External code (autosave?) and record types might need fixing, `dbGetLink()` returns success after setting `*pnRequest` to 0
- Various bug fixes and clean-ups, some described against 3.15.9

CHANGES IN BASE 3.15.9

- Code fixes and clean-ups reported by static code checkers.
- Bug-fix to PHAS ordering of record processing.
- Many changes to improve builds and testing on public CI services.
- Several code clean-ups and fixes from the Codeathon in March 2021.
- `'make inc'` now generates and installs just the dbd, header and html files.
- Higher resolution timer API now used on MS Windows, requested delays should be more accurate.

ARCHITECTURE CHANGES IN EPICS 7.0.6

- Changes to support RTEMS 5 – major OS release, SMP support
 - ♦ Should still build and work on RTEMS 4.9 and 4.10; please test!
 - ♦ RTEMS 4 and 5 targets cannot coexist in the same Base installation
 - ♦ New targets for BeagleBone Black, pc686, MVME2500, ZedBoard
 - ♦ libbspExt no longer needed; most BSPs need the legacy network stack
- Various obsolete target architectures deleted
 - ♦ darwin-ppc, darwin-ppcx86
 - ♦ linux-[3456]86, linux-athlon, linux-cris* (cross-build)
 - ♦ RTEMS at91rm9200ek, gen68360, mcp750, mvme167, psim (cross-build)

FUNCTIONAL CHANGES IN EPICS 7.0.6

- CA clients now start `caRepeater` as a thread if it's not running and no executable is found in `$PATH` (instead of showing a warning message)
 - ♦ This repeater dies when the client exits; other clients may be affected
 - ♦ We still recommend explicitly starting `caRepeater` at boot-time
- The IOC's `cd` command now updates the `$(PWD)` environment variable
- `var` and `epicsEnvShow` understand glob patterns for variable names
- Marty Kraimer's `pvDatabase` module supports Access Security over PVA
- The `pvaClient` module has several bug fixes & performance enhancements

OTHER CHANGES IN EPICS 7.0.6

- New dbCommon fields for PVA `alarm.message` and `timeStamp.userTag` (although the code to use them hasn't been merged into QSRV yet)
 - ♦ `AMSG` is a `DBF_STRING` which may give more information about the record's alarm state. New `recGblSetSevrMsg()` routine sets this
 - ♦ `UTAG` is a `DBF_INT64` and can hold a site-specific value closely related to the record's timestamp (`TIME` field). Copied by `TSEL` links (except CA)
 - ♦ Macros defined to allow external modules to support these while keeping compatibility with older Base versions

PLANS



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CHANGES AWAITING REVIEW OR STILL IN DEVELOPMENT

- More server-side filters:
 - ♦ Access to a record's `info` item strings
 - ♦ Access to a record's timestamp (`TIME` field)
- Record enhancements:
 - ♦ Support for `SIMM=RAW` in analog output (`ao`) records
 - ♦ Add `OOPT` field to output records (only write On Change etc.)

FUTURE PLANS AND IDEAS FOR THE IOC

- Features being considered:
 - ♦ Server-side filtering of put operations (semantics tricky)
 - ♦ How to support complex structures as database fields
 - ♦ JSON link addresses for device support

LONGER TERM PLANS

- Next major release – EPICS 7.1
 - ♦ No specific timetable for this yet, probably 2022 or later
 - ♦ Will require C99 and C++11 compilers (GCC 4.8.1)
 - No support for VxWorks 6.x or RTEMS 4.x
 - ♦ Support for IPv6?

THANK-YOU,
ANY QUESTIONS?



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