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EPICS Core News & Outlook

EPICS

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TALK OUTLINE

- News
  - Changes in all EPICS releases since October 2019
- Outlook
  - Changes already in the 7.0 branch
  - Changes approved to merge
  - Changes awaiting review or still in development
  - Future plans for the IOC
  - Longer term plans

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NEWS

EPICS RELEASES SINCE OCTOBER 2019

- Base 3.15.7   2019-10-31
- EPICS 7.0.3.1   2019-11-01
- Base 3.15.8   2020-05-15
- EPICS 7.0.4   2020-05-29
- EPICS 7.0.4.1   2020-08-14

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CHANGES IN BASE 3.15.7

- New server-side channel filter "decimate": PV.`{"dec":{"n":10}}`
  - Discards $(n\text{-}1)/n$ monitor events
- Record Reference Manual text imported, converted from 3.14 wiki version
- Linux: Build-time detection of GNU Readline
- VxWorks: `EPICS_TIMEZONE` is replaced by `EPICS_TZ`
  - No need to update DST start/end dates every year!
- DBD file parser accepts some files that it used to reject
- Other minor build issues and internal clean-ups

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CHANGES IN EPICS 7.0.3.1

- Optional: CA Security can now check client IP addresses, using DNS
  - New behavior must be enabled before `iocInit`
  - When the IOC checks a client's access rights it compares IP addresses, not the hostname received from the client itself. The access security configuration file may list IP addresses, or client hostnames which are resolved to an IP address when the AS configuration file is loaded.
- New epicsThread APIs with the ability to join threads
  - `epicsThreadCreateOpt(), epicsThreadMustJoin()`

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MORE CHANGES IN EPICS 7.0.3.1

- Build system supports relocatable builds, using `$ORIGIN` in RPATH
    - Uses relative paths to find shared libraries and other files
    - New functions `epicsGetExecDir()` and `epicsGetExecName()`
- New iocsh commands for error handling, useful in startup script fragments
    - Use `on error break` to exit script on failure, `on error wait` *n* to delay n seconds on failure, `on error halt` to suspend the IOC
    - Registered commands must call `iocshSetError()` to raise errors
- Changes inherited from Base 3.15.7; updates in the PVA modules

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CHANGES IN BASE 3.15.8

- Improvements to the `tapfiles` and `test-results` build targets
  - Remember which directories had failed tests, list them at end
- Logging subsystem improvements, fewer lost messages
- New CALC expression operator >>> (from Java); logical shift right
- Remaining record type reference documentation added or written
- The `camonitor` program no longer crashes if a PV's data type changes
- Other minor build and internal issues fixed

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CHANGES IN EPICS 7.0.4

- Base record types publish `struct dset` definitions in Record.h files
  - Release notes explain how to use these while keeping your device support code compatible with older Base releases
- Text from iocsh `help <cmd>` prints descriptions of many IOC commands
  - Any registered iocsh command can add its own description text
- Variable names used in `configure/RELEASE` are more restricted
- Many source files in Base no longer use `shareLib.h` or the `epicsShareFunc` `epicsShareClass` or `epicsShareDef` macros for decorating symbols. A new script `makeAPIheader.pl` creates a per-library header file for name decoration
- Other changes inherited from Base 3.15.8 and the PVA modules

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CHANGES IN EPICS 7.0.4.1

- New cross-build target files for `linux-aarch64` (64-bit ARM)

- Some important bug fixes for a few other architectures

- Record and record alias name validation

  - Warnings given since 3.14.12.3 about using illegal characters `.$'"` or *space* in record names now give an error, `dbLoadRecords` will stop

  - New warnings given for names beginning with the characters `-+[{`

    - These characters can still be used elsewhere in the name

- Mark Base source files with the new EPICS SPDX License ID

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OUTLOOK

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CHANGES ALREADY IN THE 7.0 BRANCH

- Waveform and aSub arrays of `CHAR` can be set with a JSON const input link

  `field(INP, {const:"`*Long string value*`"})`

- Support for `undefine` *VARNAME* in `configure/RELEASE` files

- The `linux-aarch64` target can be used as a host architecture to build itself

- For sites using the PSI/ESS method of creating IOCs by loading shared libraries at runtime, a new `registerAllRecordDeviceDrivers` command is provided that uses `epicsFindSymbol()` to register support modules

  - This doesn't work with normal (makeBaseApp) IOCs

CHANGES APPROVED TO MERGE

- Output records will set their timestamp *before* the new value is output
    - This allows records in PP chains use TSEL to get the new timestamp
    - For async device support the timestamp is set *again* after completion
- Allow 1-element constant arrays in input links `field(INP, [1])`
- Bug-fix related to adding records to scan lists in PHAS order (3.15.9)

CHANGES AWAITING REVIEW OR STILL IN DEVELOPMENT

- Make the IOC handle empty (zero-element) arrays properly

- Support for server-side filtering of DB input links

- Support for RTEMS 5.1 using the Posix APIs

- Upgrade JSON parsers and generator to handle JSON-5

  - Even more "relaxed": Hex and ±Infinity; single quoted strings; quotes optional for many map keys

  - Octal character escapes `"\123"` conflict with JSON, use `"\x7b"` instead

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FUTURE PLANS FOR THE IOC

- Features being considered:
  - Server-side filtering for put operations
  - Add PVA metadata fields: Alarm message; User tag for timestamp
  - How to support complex structures as database fields?
  - JSON link addresses for device support?

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LONGER TERM PLANS

- Next major release – EPICS 7.1
    - No specific timetable for this yet, late 2021 or beyond
    - Will require C99 and C++11 compilers (GCC 4.8.1)
        - No support for VxWorks 6.x or RTEMS 4.x
    - Earliest EPICS release that *could* incorporate PVXS (next talk)
        - No guarantee that PVXS *will be* included
        - No discussions or decisions about pvData/pvAccess etc.

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THANK-YOU,
ANY QUESTIONS?

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