

EPICS Core Meeting
BESSY
May 21, 2002

Agenda:

- 1) New Link Fields
- 2) Memory Usage
- 3) IOC CPU resources used on NAME resolution
- 4) devLib – needs to be platform specific
- 5) Flavored data
- 6) EPICS solutions document
- 7) Out of range actions to field values
- 8) CA Proxy Gateway Issues
- 9) Timing
- 10) Data Access Update

Attendees:

Stephanie Allison
Bob Dalesio
Kazuro Furukawa
Jeff Hill
Andrew Johnson
Timo Korhonen
Marty Kraimer
Juraj Krempasky
Ralph Lange
Steve Singleton
Till Strauman
Dave Thompson

1) New Link Fields:

Background: Andrew is working on new link fields to support configurable structures that can be checked at data entry time and use a shared parser from base at initialization. With the parm fields “@ text....” the only checking is done at initialization. In addition, the new link fields will support the 3.13 feature of changing links – by adding optional calls to device support before and after the address field is changed. The dbd file reader is complete. This feature will be in 3.15. It will support the existing device support interface. Date for completion?

2) Memory Usage:

Background: Newer versions of EPICS (3.13.7) and vxWorks are taking more and more memory. We discussed different ways to limit memory usage – record size, number of record instances, ca client size, vxWorks image, unloading memory that is only used at initialization. It is believed that the compiler for Tornado II is producing bloated binaries. Who is to verify this topic?

3) IOC CPU usage on name resolution:

Background: IOCs are going into the red on idle time when new IOCs reboot. A new IOC rebooting generates a beacon that tells all CA clients that a new IOC has come online. Any outstanding channel names are then rebroadcast. This is creating some havoc when there are multiple IOCs down e.g. during shut down periods.

There are four approaches that will help fix this situation.

- 1) Change the hash table size for large databases. The default is 512 entries in the hash table. If you are using more than 400 records in an IOC, you should change this number – using the Application Developer’s Guide – “Record instance names are stored in a process variable directory, which is a hash table. The default number of hash entries is 512. dbPvdTableSize can be called to change the size. It must be called before any dbLoad commands and must be a power of 2 between 256 and 65536. If an IOC contains very large databases (several thousand) then a larger hash table speeds up searches for records.”
- 2) Jeff will modify the channel access client to reduce the beacon period when the CA client is rebroadcasting because of a beacon and send a note to tech-talk.
- 3) In version 3.14 we will automatically enlarge the hash table.
- 4) Use of the Jlab name server would eliminate this problem as well.

4) devLib – device library to support driver writing

Background: devLib is a library used to support driver development. Initially, all driver development was on vxWorks in VME. Now that we are supporting many different bus and OS platforms, we need to have devLibs for each of these.

Till Strauman will reorganize devLib – into OS specific portions (vxWorks/RTEMS/etc..) and Backplane specific solutions and produce a library that is like the VME/VXI one to support PCI and IPAC.

5) Flavored data

Shared instrumentation that is selectively used by clients aka. “flavored” data.

Background: Channel access clients may need to share instrumentation for different applications. An example of this is the use of a Beam Position Monitor for many different types of beams where each type of beam is only interesting to certain clients. With the existing software, you could create different records that each read the same hardware for different events. Each client would know which channels contained his “flavor” of data. This has the advantage of being extendible. However, it bloats the name space and the database.

LANL developed a demux record that allows a user to set up to 8 expressions that will post monitors for the corresponding field of this record when the expression is true. This has the obvious limitation of only handling 8 different “flavors” or events. It produces 1 extra record instead of 8 extra records. BESSY needed more flexibility and produced one record for each flavor and they find this approach adequate until the channel access protocol supports the ability directly.

Channel Access modifications that will be available in version 3.16 will provide the infrastructure to specify conditions on the monitor from the channel access client. This is still several years away.

6) EPICS solutions document

Background: Users documents have different levels of usefulness. It is recommended that a solutions document would help many beginning users by allowing them to look up their problems from the problem's perspective – not the EPICS tools perspective. Frequently, a similar problem has many different solutions. They sometimes require one or more of the EPICS tools.

It would be nice to have one. Volunteers?

7) Rejection of out of limit values on control points

Background: In the EPICS analog output records, there are limits for drive high and drive low. If a channel access client attempts to set a value outside of these limits, the value is clamped. These limits are intended as hardware protection limits. It has been pointed out by many, that a mistyped entry could cause a value to change in an unintended way. It was suggested that we include the ability to reject a value that is out of range.

It was a clear consensus, that this problem should be handled in the channel access clients. So all of you operator interface developers should handle the case in some sensible way when an operator changes a value to something that is outside the drive_high and drive_low properties that are returned from channel access when you connect.

Existing database solutions include:

- 1) make the HIHI limit INVALID and set the IVOA to Hold Value – will cause the record to ignore values that are out of range and it will put the record into INVALID
- 2) set the DRVH and DRVL limits and the value will be clamped.

Suggested modifications to handle this situation include:

- 1) modify the Analog Output record to include a new field that allows the user to configure the action to take when the value exceeds DRVH – either throw away the VAL or clamp at DRVH.
- 2) modify the Analog Output record to include an IVOA that checks if the value has exceeded the limit and throws away the VAL.

8) CA Proxy Gateway Issues:

Background: The reliability of the Gateway is improving, but not 100%. The code also does not build against the standard base release. It requires a modified version of base to build. The modified base provides channel access statistics that have been very useful in monitoring the state of gateways.

The plan is to have:

- 1) Ralph get 3.14 building on HP
- 2) Jeff put the statistics into CAS in 3.14
- 3) Ralph to build the Gateway against a standard 3.14
- 4) Jeff and Marty will make fixes indicated by their regression tests on 3.14.

9) Timing System

Background: The timing system library is not in the condition we would like. Timo Korhonen has been working to bring this up to a reasonable state. 3.14 release did fix some of the issues. In addition, there is a need to have recGlobalGetTime (the routine called in record processing that interfaces to the timing system to select a time stamp for the database record) take no action when the device support layer places the time stamp directly into the database record. A related issue is to have records forward linked from this record use the same time stamp.

Remaining are

- 1) the separation of SNTP and drvTS. and
- 2) have drvTS recognize some EVNT that means to take no action. In this case, the device support layer will use its pointer to the record to fill in the time fields. Marty will make this change to 3.13 and 3.14. The original suggestion of -1 does not work as it is in use to select the "best" available time stamp. Timo Kirhonen will solve this in the general some general way. Dave Thompson from SNS will work with Timo to have some fix available soon.

10) Data Access:

Background: Data Access is a replacement for GDD and will be the basis for all future channel access protocol changes. The first version of the interface is defined and some code to support it is written.

The next steps in the process are

- 1) Finish array support in the data object / EPICS database interface library
- 2) Ralph to produce - documentation and simple examples for large array use
- 3) Jeff (and Ralph) to have CAS work with Data Access instead of GDD.
- 4) Jeff and Ralph to replace RSRV with CAS and the interface library on the IOC.
- 5) Agree on a list of attributes, their names and definitions for the Data Access version of the existing CA access types.
- 6) Jeff (and Ralph?) to have CAC work with Data Access instead of GDD. At this point the attribute list is not allowed to change anymore.