Roadmap for IOC Core 3.15/4.0

EPICS Collaboration Meeting

December 8-10, 2004

- **Outline**
  - How did we get here
  - Control System Goals
  - Resources
  - Design Slides for Global Systems
  - Tools/ Standards to adopt from the community for LCLS
  - Next 6 months
  - Conclusions

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How Did We Get Here

- There was a series of EPICS 2010 meetings that were organized to develop a grand plan and secure funding
- A large list of capabilities and technologies were collected, however we were not able to generate any serious funding.
- The control group at Argonne and I met to discuss these issues and determine how we could start moving.
- A long list of interesting items was produced.
- It was reduced it to compelling IOC Core issues.
- That list and plan is now to be presented for comment/support/participation.

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Feature/Plan for 3.15

- compile the DBD into the database
  - Andrew – Jan-March 05
  - Include the dbd file into the db file
- Device support for online add
  - Andrew – March-Sept 05
  - Add calls before and after addresses change
  - Support addition of new hardware during operation
  - Add calls to support removal of hardware
- Online Add
  - Andrew – March-Sept 05
  - Add new record instances during operation
  - Connects to existing hardware
  - Connects to existing records (or they become ca links)
- Remove Annoying Things (REALLY ANNOYING THAT IT)
- Jan 01-06 release

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Plan for 4.00

- CA V4 Functional Specification
  - Func. Spec. Team - Jan-March 05
- CA V4 Design
  - Small Design Team – March-June 05
- CA V4 Implementation
  - Small Implementation Team – July – July 06
- Extensible Links
  - Andrew – July – January 06
- Database V4 Functional
  - Func. Spec. Team – Jan- March 05
- Database V4 Design
  - Design Team – March – June 05
- Database Access V4 Implementation
  - Small Implementation Team – July – July 06

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Features in 4.00

- Everything we have now and…..
- Arbitrary Strings
- Array support to include: subarrays, frequency, offset, dimensions
- Aggregate Data - a set of channels treated as one variable; get/put in one IOC
- Client priorities
- Monitor options to include: on another value, rate, rate if changed, %change, dev
- Transaction support – multiple actions with acknowledge in a single transaction
- Group metadata into types and request independently: time, graphics, alarm, ctrl, statistical
- Redundant Clients to a server
- Redundant Name Server, Aggregate data source, metadata source
- Redundant IOCs to a PLC
- Opaque or complex data support
- Provide simple data records that can build complex records
- History data requests??

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Everything We Have Now

- Performance must remain (or improve)
- Name resolution
- Get/Monitor/Put/Put w/ Callback/Put completion
- Events for notification: value, archive, alarm
- Conversion to native type
- Automatic reconnect
- All Current Metadata Supported

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Arbitrary Strings

- Database fields
- Menu items
- Record names
- String fields
- State Names

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Expand Array Support

- Subarrays (include element of 1)
- Frequency between samples
- Offset
- Dimensions for multidimensional array support
- Initial value

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Aggregate Data

- Define a set of channels treated as one variable
- Get/Put in one IOC as a single item

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Client Priorities

- Allow the client to set the priority
- Priorities should interleave database execution

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New Monitor Options

- Post channels on the value of another channel
- Rate
- Rate limited
- %change since last change
- Deviation from another value

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Transaction Support

- Multiple actions with acknowledge in a single transaction
- Timeout support
- Command / Response

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Metadata Modifications

- Group metadata into types and request independently
  - Time
  - Graphics
  - Alarm
  - Display
  - Control (as we now have)
- New metadata to support
  - Statistical
  - Array metadata
  - Timing metadata

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Support Redundancy

- Redundant Clients to a server
  - Include a flag that indicates if a response is from a secondary source
  - Support connections to both
  - Support puts to both
- Redundant Name Server
- Support multiple data sources for a channel for
  - Aggregate data source
  - Metadata source
  - Dynamic data
- Redundant IOCs to a PLC
  - Database support for being a secondary (no writes)
  - Monitor the status of the primary for fail over

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Data Communication

- Opaque or complex data support
  - Provide a means for transporting arbitrary data and the description of the data
- Provide simple data records that can build complex records
  - Examine the ability to define devices as a series of simple records – remove the need for new records.
- History data
  - Do we support this as we support all channels?
- Messages: Alarm, Informational
  - Do we support this as we support all channels?

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Features that are not included in the plan

- Regular meetings with key collaborators
- Fund living expenses for short term collaborators
- Linux real-time performance enhancements/evaluation
- Improve control package for the database
- Record management
- Operating System support
- Device/driver verification
- Platform support
- Solution support for devices
- Error handling / logging
- Secure Channel Access
- Ease of use – ala labview
- Solicit annoyances from the community
- Tools extensions –
- Framework for tightly coupled applications
- Relationship between EPICS and Access Grid
- Include standard functions in most used utilities
- (edm/medm, alh, stripTool, archiver, save/restore, warm reboot, pvgateway,
- Nameserver, consistent configuration across these tools, high level api (XAL?)

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Features that are not included in the plan

- VDCT
- IOC applications IDE (esp. 3.14)
- rdbCore
- Collaboration support
- Enhance web site
- Enhance training
- Enhance documentation
- Improve release testing
- Centralize device support
- Coordinate release distribution
- Consistent format for contributed modules
- Maintain rec Ref Manual
- Organize regular training
- Keep current on CPUs/BSPs
- Develop EPICS primer
- Coordinate collaboration meetings
- Develop automatic test suites
- Quality contributed modules
- Support and enhance popular extensions
- Provide exhaustive cross-platform testing ad development hardware
- Searchable database and supported devices and record types

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Conclusions

- This is an attempt to restart the development effort in IOC core
- APS has dedicated some limited resource to this and this effort. More support is needed.
- Many items are not included in this list
  - Many have contributed as part of their project development
  - Our ability to provide new direction, improved tools are dependent on projects to contribute on a continuing basis

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