synApps Update

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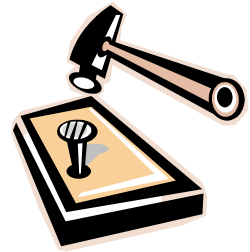
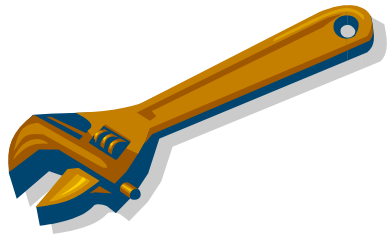
synApps ?

- synApps is a distribution of EPICS modules
- synApps is designed to provide a compatible collection of software that can be used to run 80% of a beamline
- synApps provides generic tools that have proven themselves useful in the development of custom support
- synApps consists of software from many people and institutions





What's in synApps

- Custom EPICS records
- Custom EPICS device-support modules
- Other custom infrastructure (e.g., autosave, recDynLink, saveData)
- Custom EPICS databases, MEDM displays
- Matched to a version of EPICS base
- 540 files
- ~200k lines of source code

Basic record/device support

- Motor
- Scaler
- Multichannel analyzer
- Multichannel scaler
- Serial (RS-232)
- GPIB
- ADC's
- DAC's
- Encoders
- Optical table
- String calc, sequence
- Complex expressions
- Enhanced PID
- Scan
- Scan parameter
- Generic VME

Layered devices, techniques

- **Databases, SNL programs, …**

  - Optical tables
  - Slits
  - Mirrors
  - Monochromators
  - Piezo controller
  - Digital Multimeter
  - Current preamplifier
  - Interpolation
  - N-step measurement
  - Serial I/O block
  - GPIB I/O block
  - Autocollimator
  - Temperature controller
  - X-ray microscope
  - Insertion device
  - Filter/shutter

Other support

- **Autosave (save parameters through reboot)**
- **saveData (store scan data to disk)**
- **Clients to display scan/MCA data**
- **Programs to handle MDA, NeXus data files**
- **recDynLink (adds notify-when-done link)**
  - used by sscan, swait records

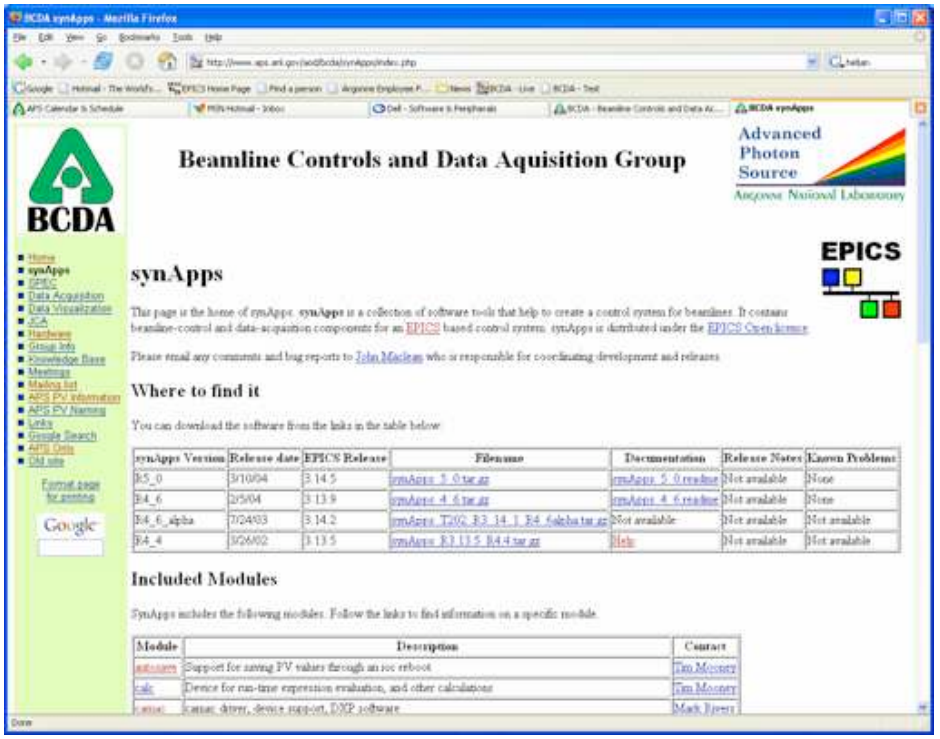
What's not in synApps

- **To build you will also need*…**
  - EPICS base R3.14.6 — Base, of course
  - allenBradley2-1 — If you intend to connect with Allen Bradley PLC's
  - ipac2-7a — Required for IndustryPack support
  - Asyn4-0 — Required by mca, dac128V, ip, ip330, motor, quadEM
  - seq2-0-8 — For SNL programs in synApps
  - vxStats1-7-2a — vxWorks statistics
  - genSub1-6 — The genSub record

* Required for synApps 5.1

What's new

- **Latest versions (5.x) work with base 3.14.x**
- **Increased modularisation**
  - Previously 10 modules
  - Now 18 modules
- **New web page**
- **Released under the EPICS open license**
- **MPF replaced with asyn**



And…

- **Documentation**
  - Some now exists!!!
  - Every module has documentation
- **MEDM screens**
  - Improved
  - Extensive help screens now available

Modules

Module	Description	Contact
autosave	Support for saving PV values through an ioc reboot	Tim Mooney
calc	Device for run-time expression evaluation, and other calculations	Tim Mooney
camac	camac driver, device support, DXP software	Mark Rivers
ccd	CCD control	Mark Rivers
dac128V	Industry Pack digital to analog converter	Mark Rivers
dxp	DXP digital-signal processing spectroscopy systems	Mark Rivers
ip	Device support and databases for some serial Industry Pack devices	Tim Mooney
ip330	Industry Pack analog to digital converter	Mark Rivers
ipUnidig	Industry Pack digital I/O	Mark Rivers
love	Love serial digital controllers	Tim Mooney
mca	Multi-channel analyzer support	Mark Rivers
motor	Motor support	Ron Sluiter
optics	Support for x-ray optics	Tim Mooney
quadEM	APS Quad electrometer support	Mark Rivers
sscan	Support for moving positioners, triggering detectors, acquiring and storing data	Tim Mooney
std	Miscellaneous support	Tim Mooney
vme	Device support and databases for some VME devices	Tim Mooney
xxx	Sample user application, which builds, loads, and runs software from all the other modules listed here.	Tim Mooney

Array Support

- **Base 3.14 allows larger array sizes via CA**
- **MCA arrays**
  - Were limited to <= 4000 points
  - Now unlimited
- **Scan data arrays**
  - Were limited to <= 2000 points
  - Now unlimited (65k points tested)

Scan Support

- **Scan double buffering now works**
  - New scan can start before previous scan has completed uploading
- **Any detector can now be an array detector**
  - Scaler and array detectors can be mixed
- **Array triggering**

Auto Save

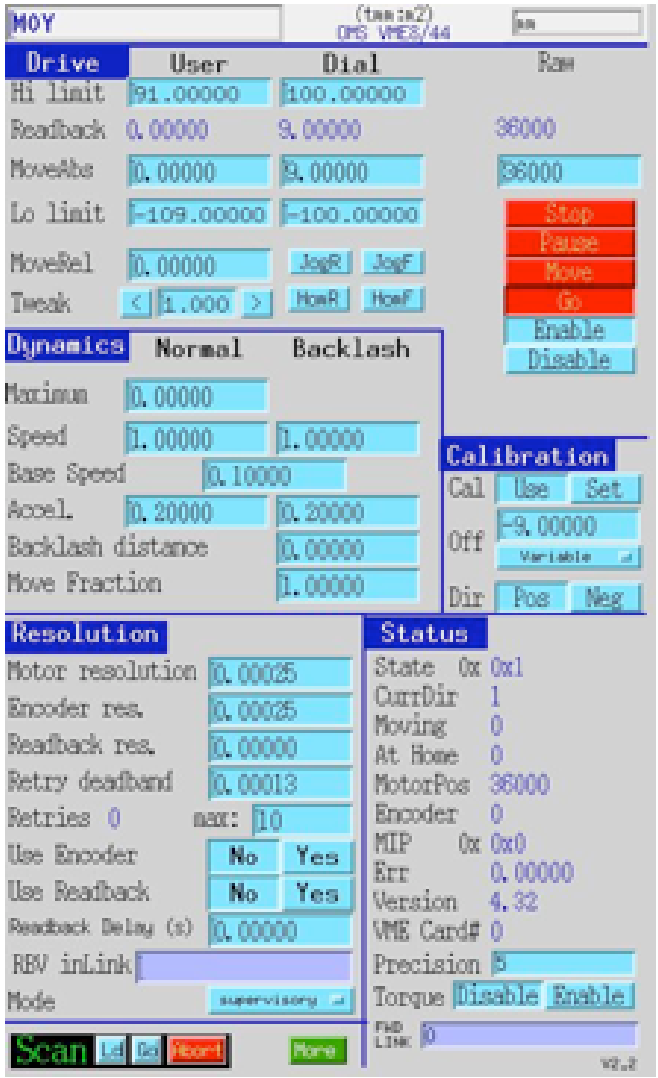
- **Much more robust**
  - Previously it trusted NFS files server
  - Now it assumes server can misbehave
- **Can now save arrays**
  - Changing array sizes is ok
- **Sequenced save**
  - A series of backup save files
- **Autosave status PVs are available**

Strings and Things

- **StringCalc can have device support**
  - Output device type and address changeable at run time
- **Optical table**
  - Previously one point of rotation
  - User can now select between several
- **Serial O/I replaced by Device Command/Reply**
  - Allows build – send – receive – parse sequences
- **Interpolation support**
  - Routines for gensub record
  - Linear and polynomial interpolation
  - 3k point limitation removed
  - Now uses un-copyrighted code

More Motors

- **Support for many motor drivers added**
  - PMAC
  - Piezo
  - Soft motor
  - e.t.c.



ccd module

- **Support for area detectors (CCD's and image plates)**
- **Supported devices**
  - MAR 165 CCD
  - MAR 345 image-plate reader
  - Roper (all WinView-supported CCD's, including former Princeton and most former Photometrics devices)
  - Bruker SMART CCD
- **Can control, at minimum**
  - exposure time
  - file name
  - data-acquisition start
  - wait for acquisition to complete
  - much more for most devices

dxp module

- record, device support, databases, and MEDM displays for XIA DXP and Saturn spectroscopy systems
- dxp record for setting DXP parameters
- device support for the mca record

ip330 module

- **device support, databases, and MEDM displays for the IP330 ADC IndustryPack module**

- **16/32 channel, 16-bit ADC**
  - ip330Scan for periodic, averaged reads of ADC channels
  - ip330Sweep, with the MCA record, for using ip330 as a waveform-digitizer
  - ip330PID for using the ip330 in a fast-feedback loop

Clients, Libraries and Visualization Tools

- ***IDL:***
  - *scanSee*
  - *dataCatcher*
  - *mca display*
  - *ezcaIDL*
  - *ezcaScan*
  - *HDF translator/browser*
  - *Ascii-format plotter*
  - *ez_fit*
  - *etc.*
- **Some python support**
- **Most IDL tools now available for the IDL Virtual Machine – No license fee to run IDL tools**

Summary

- **Taking advantage of changes in base to give better array support**
- **Taking advantage of asyn to simplify device support and st.cmd files**
- **Improving documentation**
- **Improving ease of build and os independence**
- **Improving distribution**
- **Improving maintainability**
- **Released under EPICS open license**
- **Web page**
  - http://www.aps.anl.gov/aod/bcda/synApps/