



synApps: EPICS Application Software for Synchrotron Beamlines and Laboratories

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synApps

- Mostly general-purpose EPICS software
 - Record types, device support apply/extend capabilities of EPICS base
 - “Front-panel” support for selected instruments
 - Runs on vxWorks, Linux, Solaris, Windows
- Support for run-time programming
 - Also useful for diagnostics and rapid prototyping
- Support for data acquisition
 - Also useful for diagnostics and automated testing

synApps modules

- General purpose:
 - autosave, busy, calc, sscan, std
- Hardware specific:
 - areaDetector , camac, dac128V, delayGen, dxp, ebrick, ip, ip330, ipUnidig, love, mca, modbus, motor, quadEM, softGlue, vac, vme
- Synchrotron specific:
 - optics

Run-time programming

- Notion of a *userCalc*
 - EPICS records, databases reserved for users
 - Calculations
 - Sequences, scans
 - PID loops, PV-value averaging
 - Enabled by EPICS run-time-modifiable links
- Infrastructure
 - Displays, online docs, autosave
- softGlue
 - Run-time programming for digital hardware

Data acquisition

- Set conditions
 - WAIT for conditions to obtain
- Trigger acquisition
 - WAIT for acquisition to complete
- Read data
 - WAIT until read is complete
- Store data
 - WAIT until data are secure
- Repeat



Lots of waiting going on

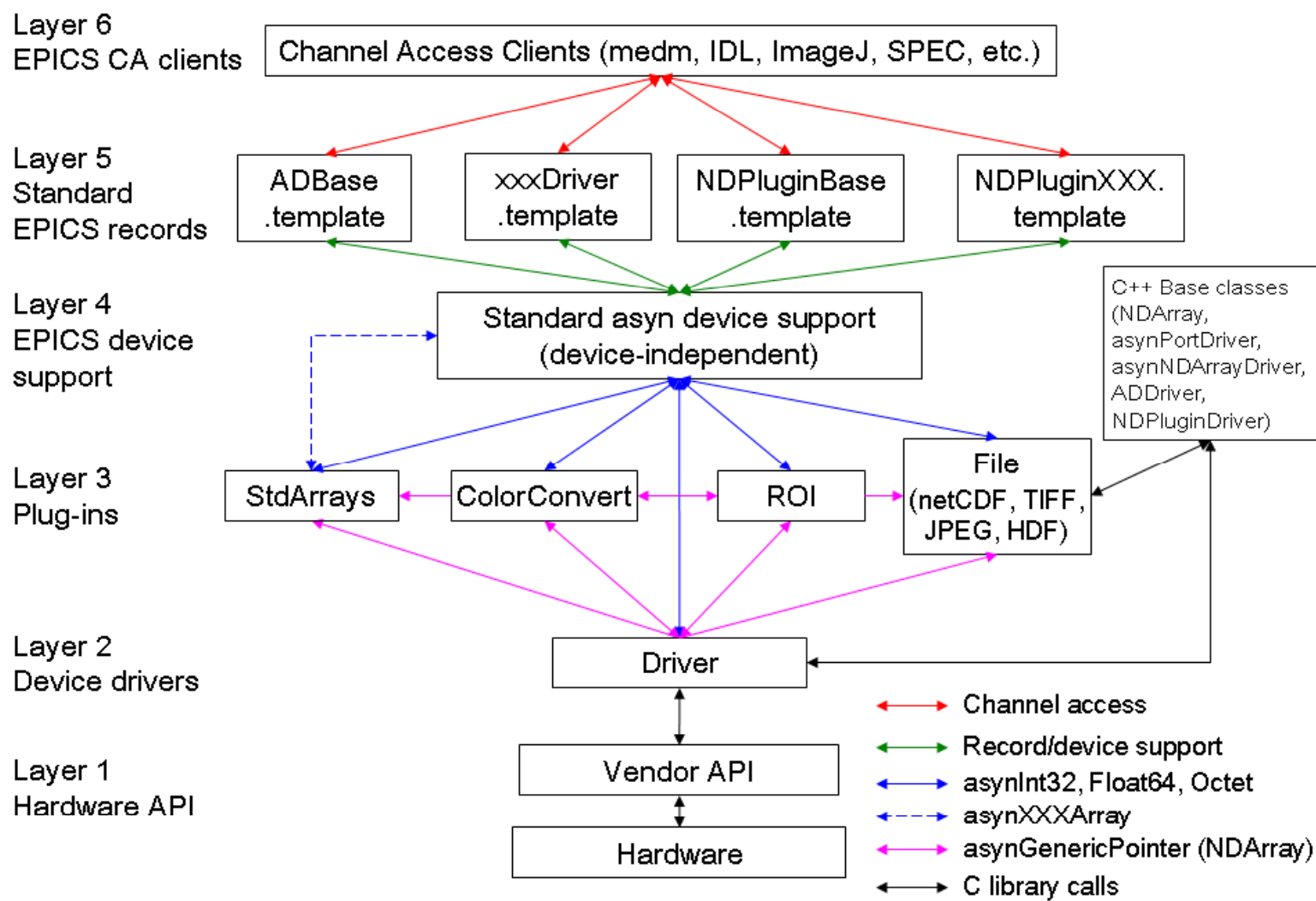
Support for waiting

- EPICS *putNotify* execution tracing
 - Only within an IOC
 - Only database links are traced
 - Only clients can ask for trace
- synApps provides record types with client-like links
 - Extends trace to multiple IOCs
- synApps provides mechanism for clients to participate in traced execution
 - Extends trace to non-EPICS processing

Recent work in synApps

- areaDetector
 - General-purpose interface and support for 2D detectors and cameras
 - Plug-in support for device-independent run-time analysis
- softGlue
 - User programmable digital hardware
 - Digital I/O support

areaDetector architecture



areaDetector displays, clients

ADBase.adl

Area Detector Control - 13SIM1:cam1:

Setup

asyn port **SIM1**

EPICS name **13SIM1:cam1:**

Manufacturer **Simulated detector**

Model **Basic simulator**

Connected

Connection **Connect** **Disconnect**

Debugging ☐

Shutter

Shutter mode **None**

Status: Det. **Closed** EPICS **C**

Open/Close **Open** **Close**

Delay: Open **0.000** Close **0.000**

EPICS shutter setup ☐

Collect

Exposure time **0.010** **0.010**

Acquire period **0.010** **0.010**

Images **100** **100**

Images complete **535**

Exp./image **1** **1**

Image mode **Continuous** **Continuous**

Trigger mode **Internal** **Internal**

Collecting

Acquire **Start** **Stop**

Detector state **Acquire**

Time remaining **0.000**

Image counter **0** **535**

Image rate **43.0**

Array callbacks **Enable** **Enable**

Attributes

File **simDetectorAttributes.xml**

File

Driver file I/O ☐

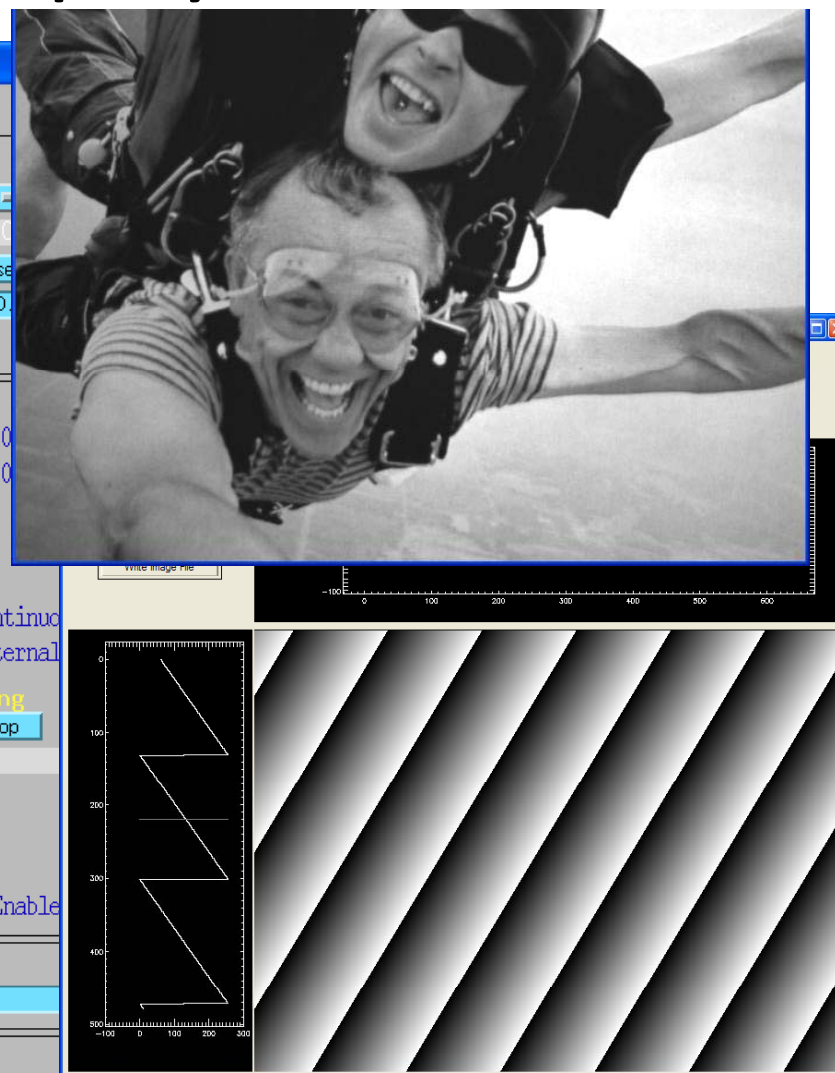
Plugins

File ☐ ROI ☐

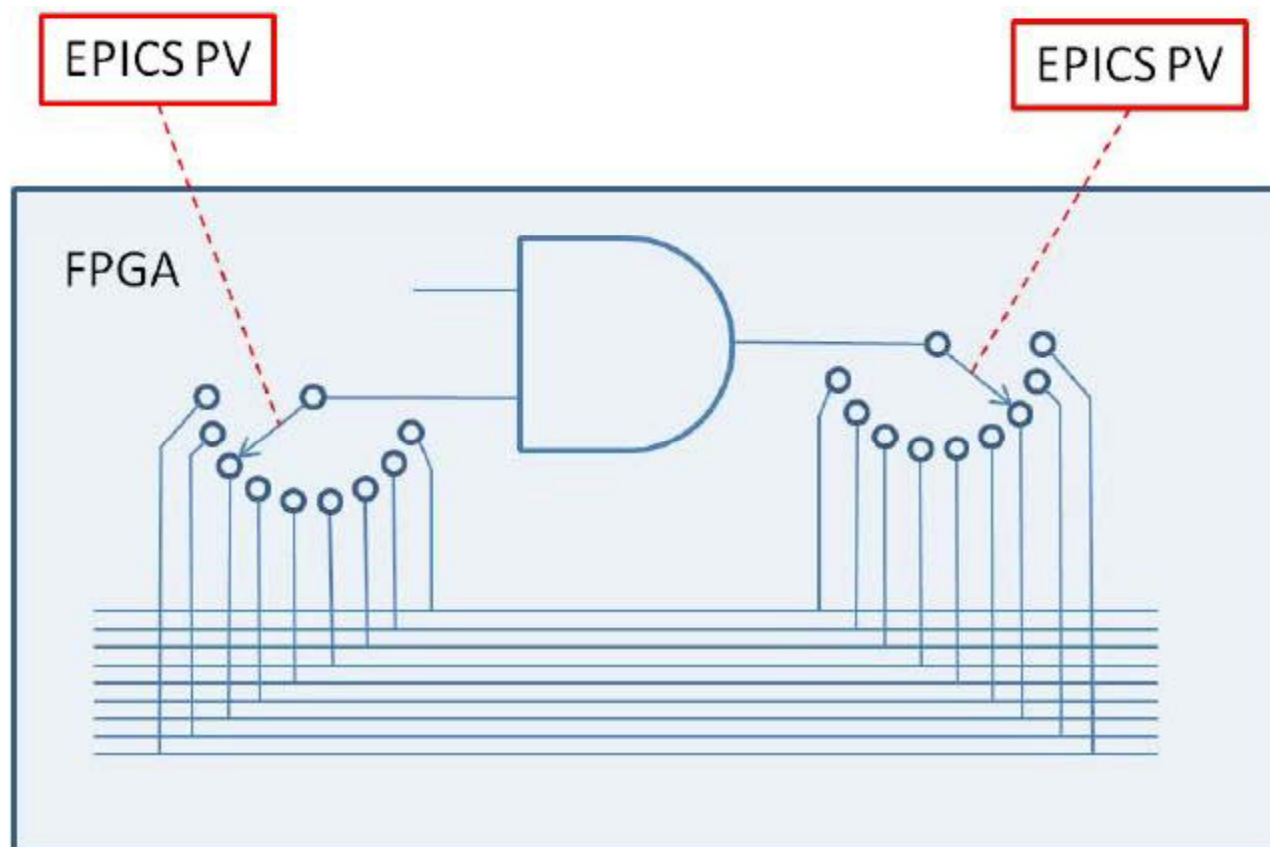
Statistics ☐ Other ☐

Readout

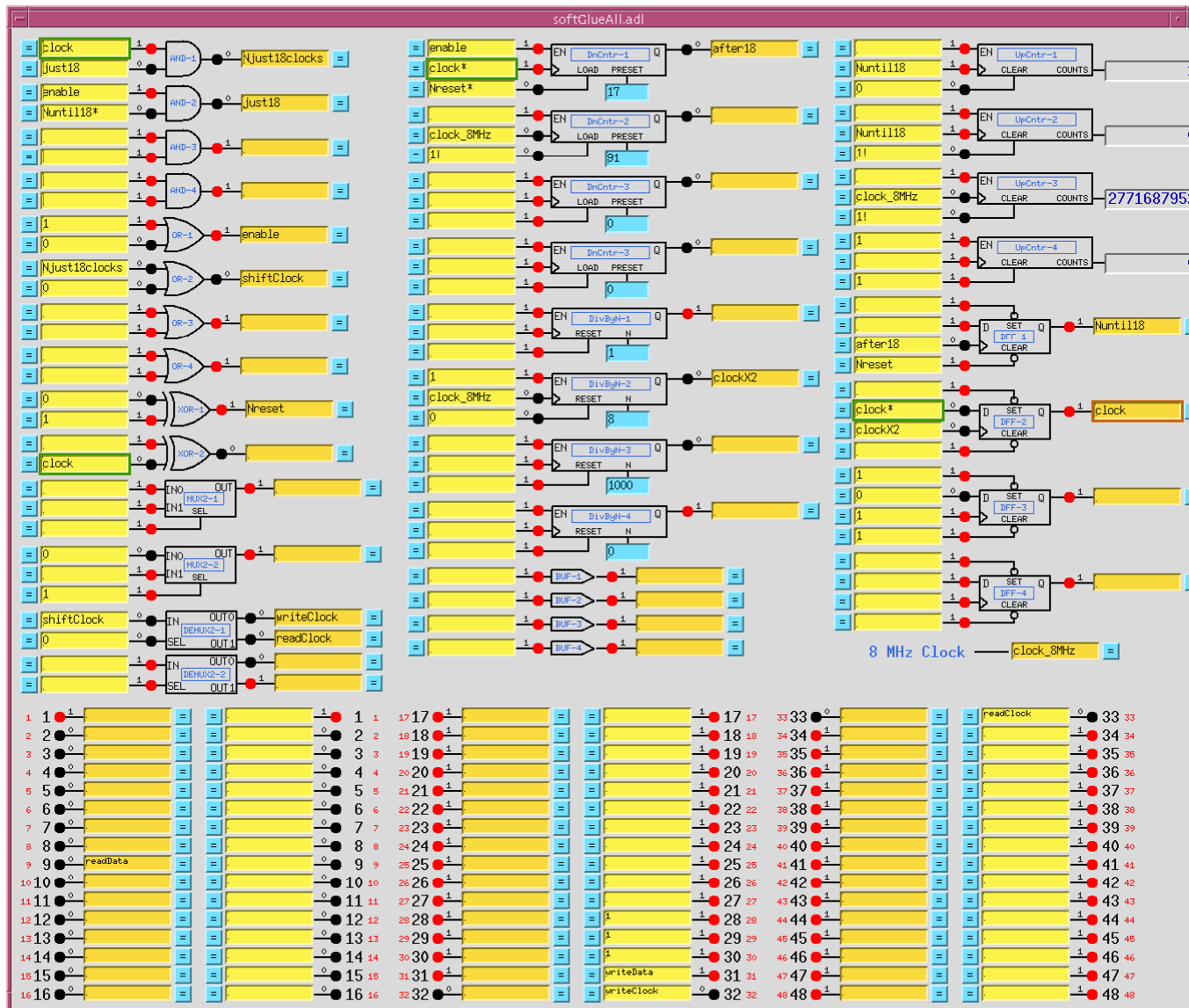
	X	Y
Sensor size	640	480
Binning	1	1
Region start	0	0
Region size	640	480
Reverse	Yes	No
Image size	640	480
Image size (bytes)	307200	
Gain	0.500	0.500
Data type	UInt8	UInt8
Color mode	Hono	Mono



softGlue implementation



softGlue circuit elements



synApps distribution

- Web page
 - <http://www.aps.anl.gov/bcda/synApps>