Accessing NI Network Shared Variables from EPICS IOCs

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NI Network Variables

- Provided by National Instruments (NI) to simplify data exchange between applications and hardware
- Abstracts low level communication protocol
- Publish/subscribe system
- http://www.ni.com/white-paper/5484/en/

Hardware to Control

- Spin echo system supplied and supported by TU Delft
  - NI PXI-express system running LabVIEW RT
- System uses NI shared variables for communication between internal components
- Need to integrate this “black box” into our EPICS instrument control system
  - Requires an agreed interface

Software Interface

- TU Delft are more familiar with LabVIEW than EPICS
  - so named SVs are a convenient interface
- Could use LabVIEW EPICS I/O server
  - but not a full IOC implementation
  - run where? On RT “black box” or external system?
  - an additional component to start/manage
  - non-RT systems require purchasing DSC module

Shared Variable EPICS support

- Uses LabWindow/CVI Network Variable Library
  - Runtime support for Windows and Linux
- Fully configured via text files
  - XML file maps SVs -> asyn driver parameters
- Subscribed SV events trigger EPICS DB I/O Intr
  - Can use “buffered reader” to limit callback rate
- Can also read variable inside an SV struct

Example Configuration

- Associate SV “var” with asyn param “c1”

  <param name="c1" type="float64" access="BR,BW“ netvar="//localhost/example/var" />

- Load section “sec1” from XML, associate params with asyn port “nsv” and set 100ms as maximum update rate for buffered readers

  NetShrVarConfigure("nsv", "sec1", "$(TOP)/data/netvarconfig.xml", 100)

- See http://epics.isis.stfc.ac.uk/