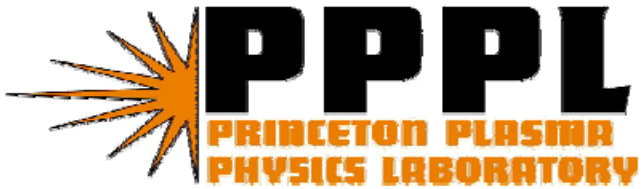
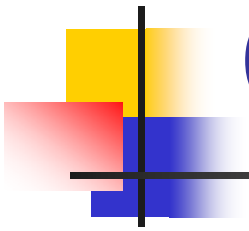


Integrating EPICS and MDSplus

Fifth IAEA Technical Meeting on Control, Data Acquisition, and Remote Participation for Fusion Research

Dana Mastrovito, PPPL

July 14, 2005

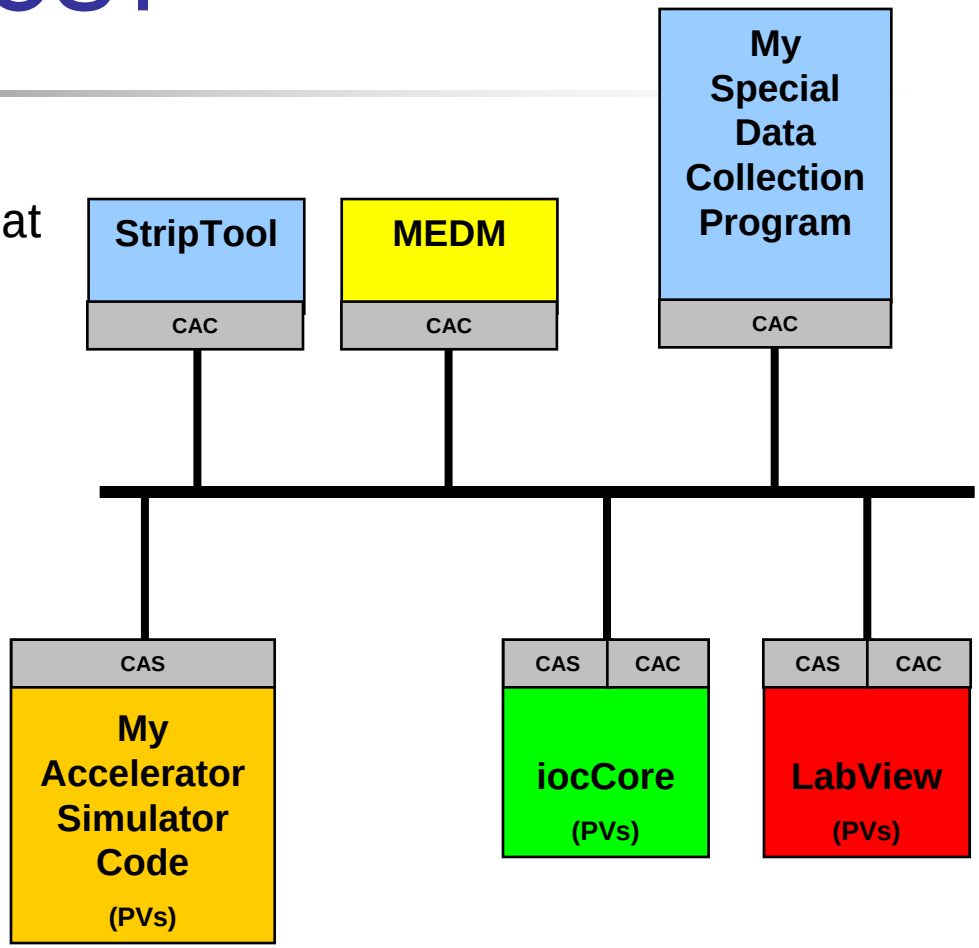


Outline

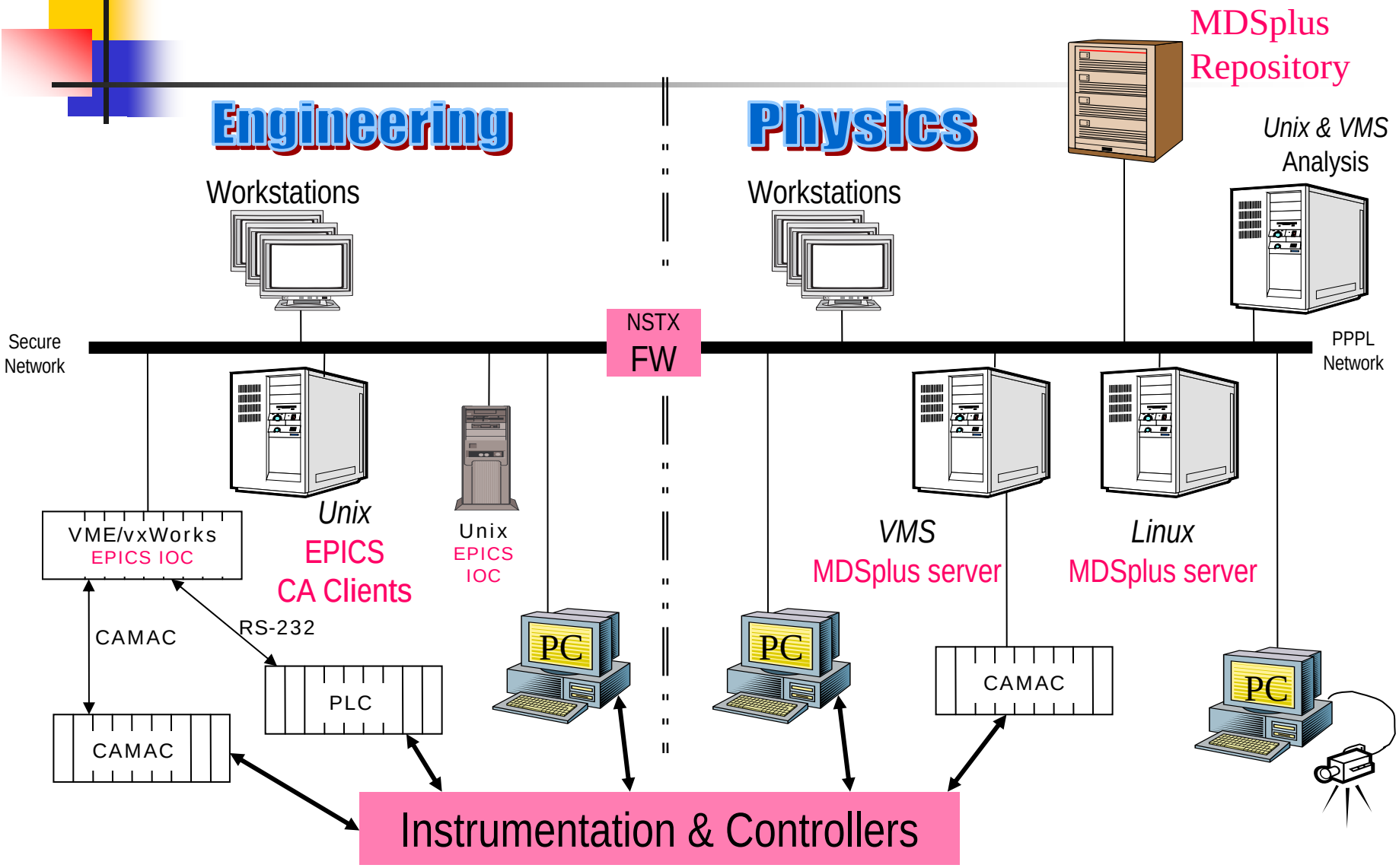
- What is EPICS
- EPICS and MDSplus on NSTX
- Data interface for EPICS and MDSplus
- Event interface for EPICS and MDSplus
- EPICS Channel Archiver
- Future Plans

What is EPICS?

- Any tool/program/application that abides by the **Channel Access** protocol could be described as “EPICS Compliant”.
- EPICS can be viewed as a “toolkit” of EPICS compliant programs. One can select the appropriate tool for their need or develop their own.



EPICS and MDSplus on NSTX



EPICS and MDSplus on NSTX

NSTX

EPICS

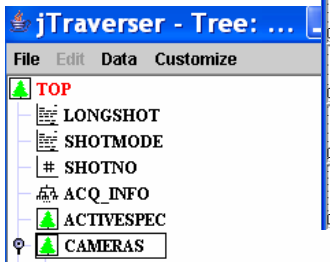
Collaboratively developed control systems for scientific instruments

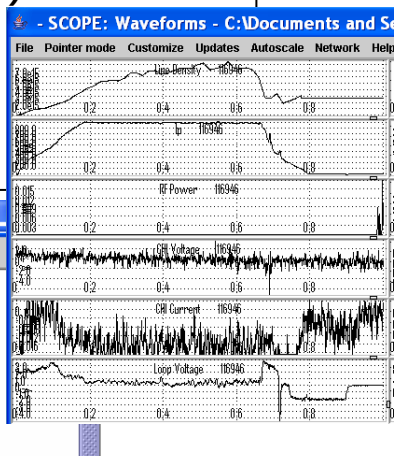
- 4 IOC's
- 135 process displays
- 1800 I/O points
- 8,500 records

MDSplus

Data and Device Management system and for engineering and physics control systems

- 3 MDSplus servers (VMS) 1 linux
- 140 MB per shot
- 5500 waveforms
- 25,000 parameters

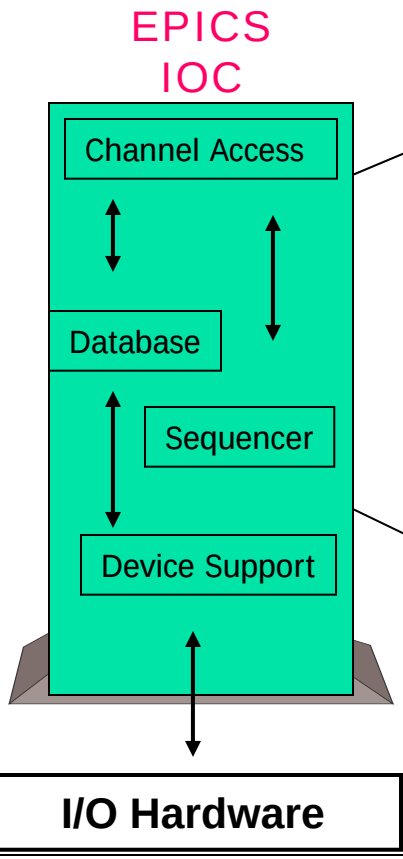


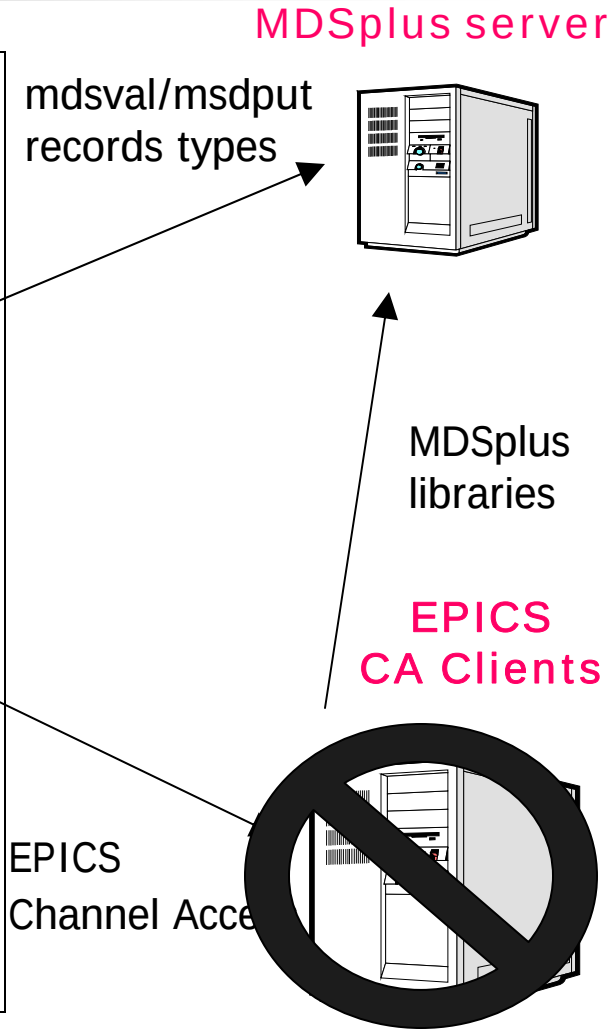


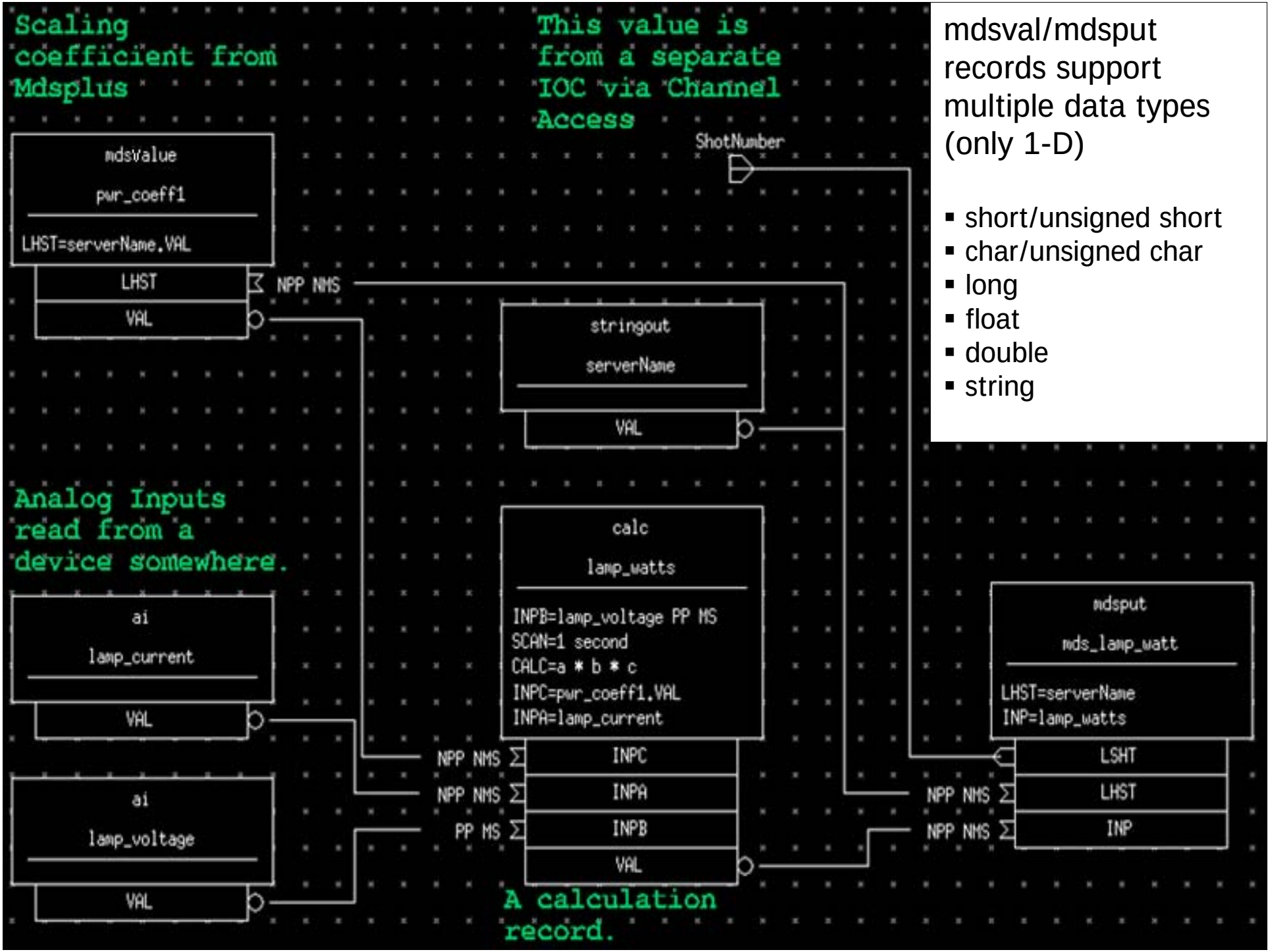
Moving Data between EPICS and MDSplus

The IOC is any platform that can support EPICS software components

- Database
- Database access routines
- Device drivers
- I/O record types
  - longin/out
  - Waveform
  - Event records
  - CAMAC and other device support
- Scanning and monitoring functionality

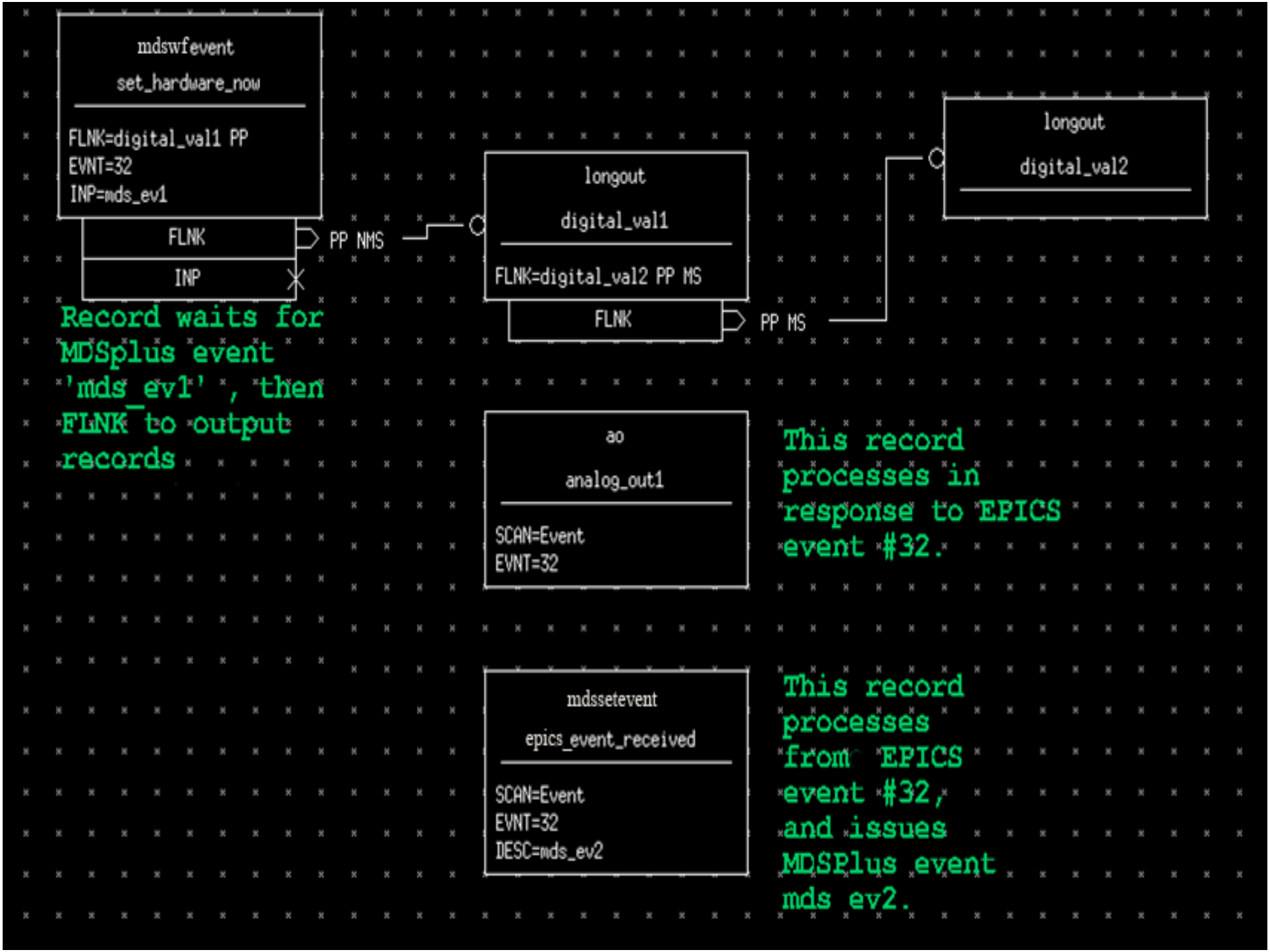


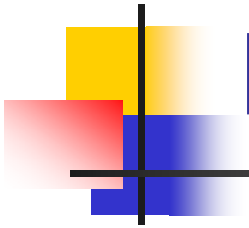




mdsval/mdsput records support multiple data types (only 1-D)

- short/unsigned short
- char/unsigned char
- long
- float
- double
- string


mdswfevent
set_hardware_now
FLNK=digital_val1 PP
EVNT=32
INP=mds_ev1
FLNK
INP
PP NMS
longout
digital_val1
FLNK=digital_val2 PP MS
FLNK
PP MS
longout
digital_val2
Record waits for MDSplus event 'mds_ev1', then FLNK to output records
ao
analog_out1
SCAN=Event
EVNT=32
This record processes in response to EPICS event #32.
mdssetevent
epics_event_received
SCAN=Event
EVNT=32
DESC=mds_ev2
This record processes from EPICS event #32, and issues MDSPlus event mds_ev2.



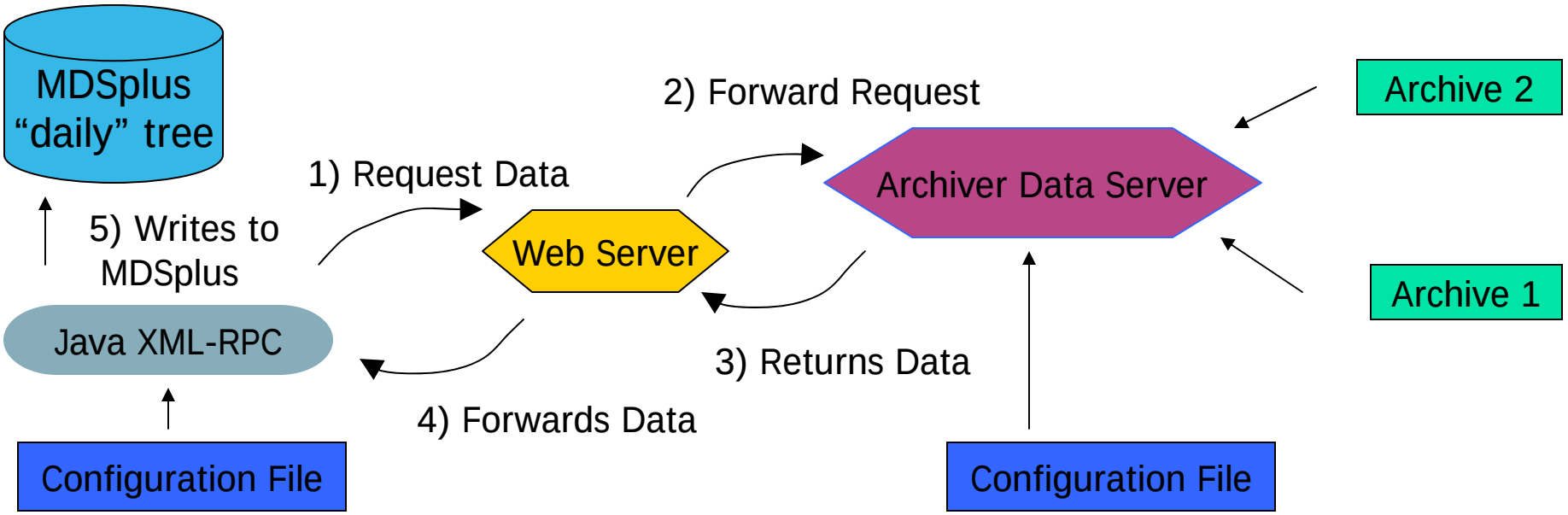
EPICS Channel Archiver

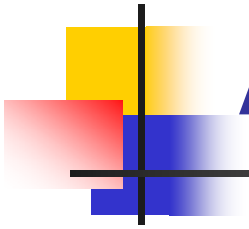
- Uses CA protocol
- Samples data and stores it in a binary file format
- Configurable via XML file
- Java Archive Viewer client
- Values available from Channel Archiver web server from any XML-RPC client

Putting EPICS “Trended Data” into MDSplus

- Save EPICS Archiver (Trended) Data acquired by the EPICS Channel Archiver into MDSplus Daily ‘Shot’ Trees.

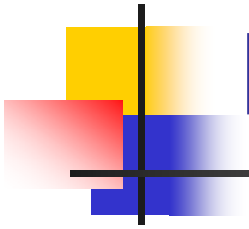
- Permit Trended Data access through familiar MDSplus methods.





Applications

- Read device setup parameters from MDSplus
- Values read from any hardware controlled by EPICS can be written to central MDSplus repository
- EPICS record processing can now be synchronized with MDSplus software events
- MDS event aware processes such as scopes or other analysis codes can respond to events in the EPICS system



Future Work

- Add asynchronous device support to mds type records
- Build records for use on real-time OS (vxWorks)