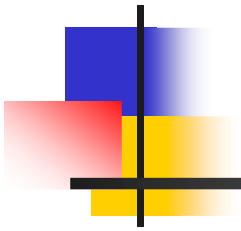


# EPICS Configuration @ FNAL

With emphasis on ILCTA

# Why Am I Here

- Lively discussion at EPICS training taught at FNAL by ANL
- Different philosophies on how to make toolset available
  - ANL – available on a per system basis
  - FNAL (ilcta) – available on a per session basis
  - How do we log/track specific environment
- How do we specify object file location to VxWorks boot scripts

# Current EPICS Projects

- Run II Experiments
  - D0 Controls.
- ILC Test Accelerator (ILCTA) @ FNAL
  - Vertical Test Facility (IB1)
  - Horizontal Test Facility/Coupler conditioning (MDB)
  - Beam test (NML) using photoinjector currently at A0
- Other
  - Proton Driver – EPICS only control system
  - Nova – Seriously evaluating EPICS as control system for DAQ. Maybe also for controls itself?
    - Will decide in next few months.
- Not exclusive Epics

  ACNET, DOOCS, Matlab, Labview, IFIX

# ILC Tests Areas

- IB1 – Industrial Building 1
  - Vertical test stand (horizontal later)
  - Will be primarily EPICS
  - Mostly TD Personnel
- MDB – Meson Detector Building
  - Horizontal test stand
  - Will most likely be all EPICS
  - Mostly same software personnel (AD) as proton driver
- NML – New Muon Lab
  - Mix of DOOCS and EPICS
  - Evaluating possibility of an EPICS -> DOOCS interface so applications can be either one.
  - CD/TD/AD personnel

# EPICS Environment

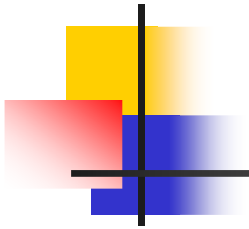
- Test Areas are on different networks, managed under different organizations
  - Often firewalled off
- Most of ~10 FNAL EPICS developers are new to EPICS
  - Small core comfortable with base configurations/compilations of toolset and extensions
- Need a methodology to make a core set of EPICS tools available to everyone without individual developers needing to know the specifics

# UPS Digression

- Unix Product Support
- Infrastructure to support distribution/installation of software packages (source and/or binary)
- FNAL written/supported
  - http://www.fnal.gov/docs/products/ups/
- Mature
  - Invented before RPMs
  - Variations of this have been around for ~ 20 years (VMS)
- Used by Computing Division, FNAL HEP experiments and collaborators
  - Never fully adopted by other divisions at the lab
- End of life?
  - No active development in several years.
  - Ideas for upm (ups/rpm, uber rpm)

# UPS Feature Highlights

- Support of installation of multiple versions of same package by modifying user environment
  - Environment variables, aliases
  - Easily supports preinstallation of newer versions and roll backs to older versions
  - Uses $PROD_DIR, eg, $EPICS_DIR
- Support of dependency tree
- Root privileges not required for package installation
- Shell agnostic
  - sh family (sh, bash, ksh)
  - csh family (csh, tsch)
- Operating system (aka flavor) aware



# Table files

- Product environment behavior defined in table files
- ASCII file in UPS meta language
  - Rudimentary in terms of flow control
- Generally stored in CVS as part of the product itself
  - Versions are tagged
  - Records release environment
- Can separate build environments from use environments

# Table file example – epics_edm

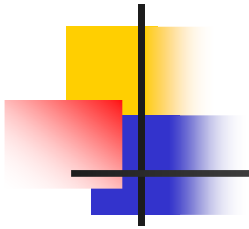
```
...
QUALIFIERS = ""
ACTION = SETUP
    doDefaults

    pathPrepend( PATH, ${UPS_PROD_DIR}/bin/`[ $(uname -s) = Linux ]  &&
     echo linux-x86 || echo solaris2`, :)

    envSet( EPICS_HOST_ARCH, `[ $(uname -s) = Linux ] && echo linux-x86
     || echo solaris2` )

    envPrepend( LD_LIBRARY_PATH, ${UPS_PROD_DIR}/lib/`[ $(uname -s) =
     Linux ] && echo linux-x86 || echo solaris2` )

     setupRequired( "epics" )

     envSet( EDMHELPFILES, ${UPS_PROD_DIR}/src/edm/helpFiles )
...
```

# Table file example – epics_edm

```
...
QUALIFIERS = "build"
ACTION = SETUP
    doDefaults

    pathPrepend( PATH, ${UPS_PROD_DIR}/bin/`[ $(uname -s) = Linux ]  &&
     echo linux-x86 || echo solaris2`, :)

    envSet( EPICS_HOST_ARCH, `[ $(uname -s) = Linux ] && echo linux-x86
     || echo solaris2` )

    envPrepend( LD_LIBRARY_PATH, ${UPS_PROD_DIR}/lib/`[ $(uname -s) =
     Linux ] && echo linux-x86 || echo solaris2` )

     setupRequired( "epics v3_14_7" )

     envSet( EDMHELPFILES, ${UPS_PROD_DIR}/src/edm/helpFiles )
...
```

# Example Setup Commands

- setup epics_edm
- setup epics_edm –q build
- setup epics_edm v1_0
- setup epics_edm –f SunOS
- Doesn't stop people from overriding package post setup
  - setup epics_edm; setup epics –q devel
  - Generally makefiles output logfiles



# EPICS extensions

- Had to "tweak" to not use the expanded epics base in the path, but to use environment variables to point to epics base.

# VxWorks Downloads with UPS

- Only used at a few FNAL locations
- Two different approaches
  - Custom "switch system" command
  - Rsh booting and environment variables
- Switch system
  - Target nodes load code from a "current" directory.
    - Eg, /usr/epics/current/lib
  - "current" is a symbolic link to a specific version
    - Eg v3_14_7
  - "switch system v3_14_8" establishes symbolic links to current version for package and dependencies

# RSH with UPS

- Requires rsh boots
  - All FNAL vxWorks nodes run behind a firewall
  - Have a customized and restricted rsh deamon
- Performance penalty
- Vxworks boot account needs to setup appropriate list of products
  - Nodes load based on environment variables
    - ld < $EPICS_DIR/lib/mylib.o
- Startup script never need to change

# Summary

- ILCTA will continue to use UPS for management of software installations for the near term.
  - Helps ease learning curve for new people
  - Facilitates sharing of binaries across all test areas
  - End users can easily switch between versions at their convenience.
- Looking for suitable replacement.

  Volunteers?