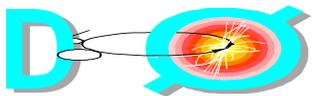

DØ Controls and Monitoring Status

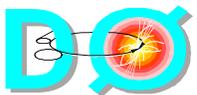
**Fritz Bartlett,
Stan Krzydzinski,
Geoff Savage,
and Vladimir Sirotenko**



Introduction



- **Controls Tutorials**
- **EPICS Tools**
- **EPICS Access Security**
- **Significant Event System**
 - ◆ **Alarm and State Reporting System**
- **HV System Upgrades**
- **COMICS Download System**
- **EPICS Hardware Database**
- **Secondary Data Acquisition System (SDAQ)**



Controls Tutorials

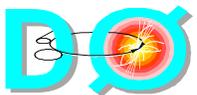


- **Available**

- ◆ Channel Archiver
- ◆ DØ Clock
- ◆ COMICS Download System
- ◆ EPICS Hardware Database
- ◆ DØ High Voltage System
- ◆ Significant Event System (SES)

- **Future**

- ◆ Python Base Classes for GUI Construction
- ◆ Secondary Data Acquisition (SDAQ)



Controls Tutorials

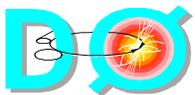


- **Location**

\\D0SERVER4\projects\Online_Computing\
Tutorials

[www-d0online.fnal.gov/www/daq/tutorials/
daq_tutorials_guide.html](http://www-d0online.fnal.gov/www/daq/tutorials/daq_tutorials_guide.html)

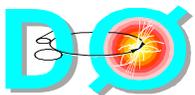
At Work -> Online -> Global -> DAQ ->
Tutorials DØ



EPICS Tools



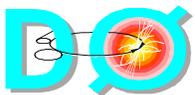
- **Archive data from EPICS records**
 - ◆ Channel archiver
 - ◆ 12,000 records
 - ◆ 1.2 GB/week to SAM
- **Access cryo system data through EPICS**
 - ◆ Portable channel access server working on NT
 - ◆ CA is the EPICS communication protocol
- **EPICS channel access ported to python**
 - ◆ Used in the GUIs shown later
 - ◆ Just fixed some memory leaks
- **StripTool – time vs. value plots**



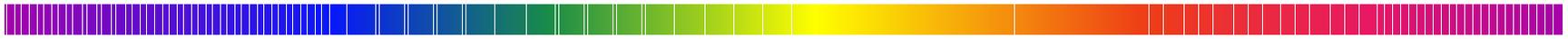
Access Security - Requirements



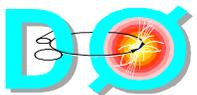
- **Access security requires the following elements:**
 - ◆ **Access security is based upon a list of Access Security Groups (ASG) composed of a list of accounts (UAG) and a list of host nodes (HAG)**
 - ◆ **Required components**
 - **An access security file (ACF) that defines the Access Security Groups (ASG)**
 - **An ASG value assigned to the ASG field of each record instance in the IOC database**
 - ▲ **Default ASG is DEFAULT**
 - **Access security enabled on an IOC by defining an access configuration file (ACF)**
 - ▲ **asSetFilename(<acf-file>)**



Access Security - Status



- D0 clock IOC has access protection enabled now
- HV IOCs will have access protection enabled next week
- Other IOCs will follow

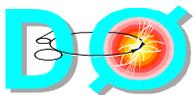


27 July 2001

Significant Event System - Update



- Core functionality near completion
- New functionality
 - ◆ Filter messages
 - ◆ Alarm display provides detailed info on each alarm
 - Current value and alarm limits
 - ◆ Send alarms from front ends
 - vxWorks sender client
 - ◆ EPICS sends alarms
 - Added alarm fields to all EPICS records
 - ◆ Fixed bugs in server
 - Thanks to Scott Snyder and Maarten Litmaath

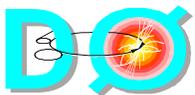


27 July 2001

Sig Event System - Directions



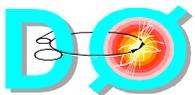
- **Complete core functionality**
 - ◆ **C++ sender client**
 - Synchronize with Python sender client
 - ◆ **Monitor the server**
- **Integrate system into running environment**
 - ◆ **Reduce the number of alarms sent**
 - ◆ **Alarm display**
 - Information to resolve problems
 - Manage the number of alarms sent
 - Update the documentation



HV - Planned Extensions



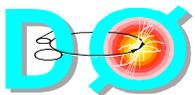
- **Slow history buffer**
 - ◆ ~ 0.05 Hz
 - ◆ Filtered
- **Fast history buffer**
 - ◆ ~ 40-50 Hz
 - ◆ Voltage, current, and state
 - ◆ Buffer update frozen after a trip



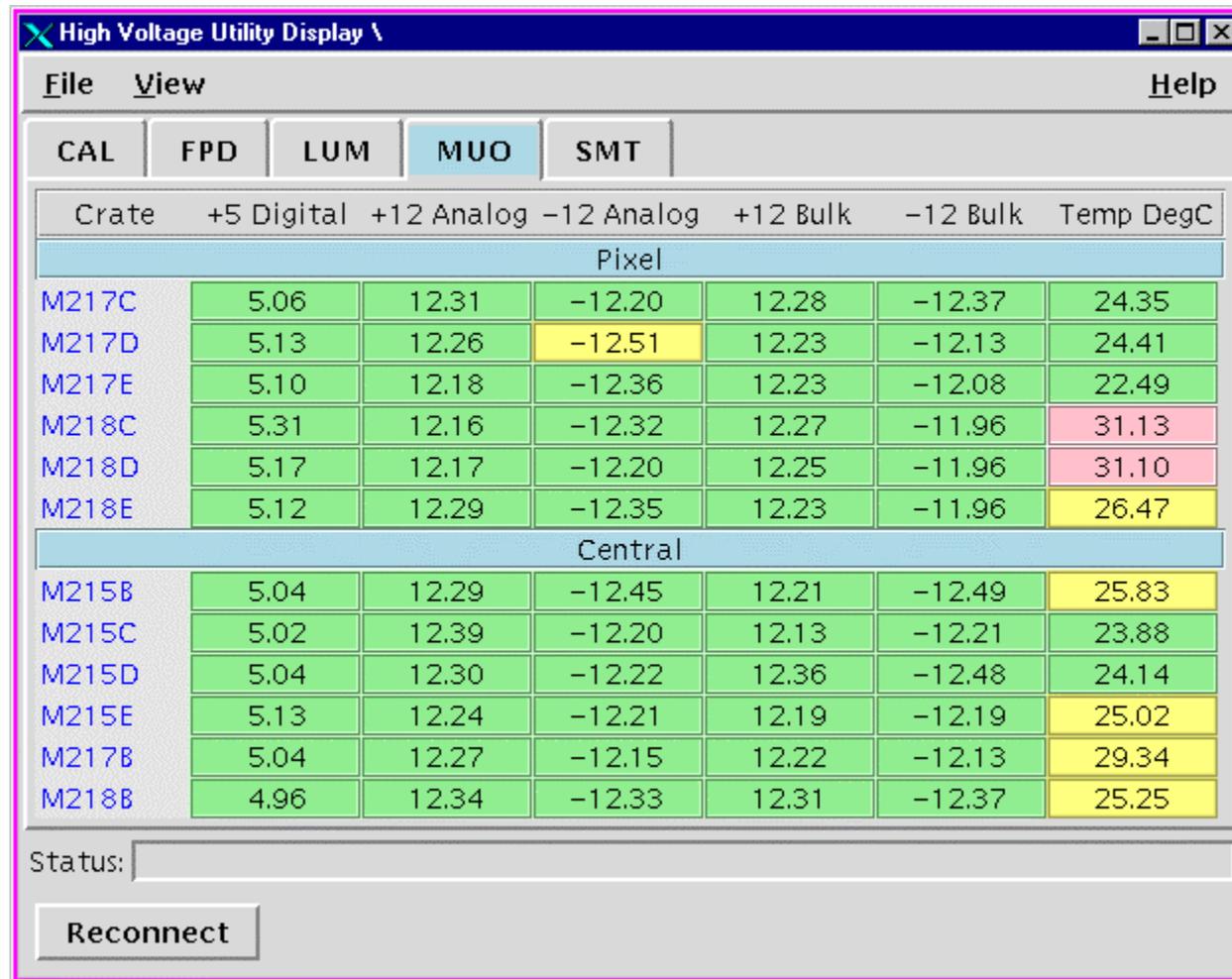
HV - Operator GUI Programs



- **Utility display**
 - ◆ Monitor crate parameters (backplane voltages and temperature)
- **Detector display**
 - ◆ Monitor channel state for multiple crates
 - ◆ Control state change for multiple crates
- **Crate display**
 - ◆ Monitor channel parameters for a single crate
 - ◆ Control state change for single channel or all channels



HV - Utility Display

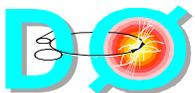


The image shows a screenshot of a software window titled "High Voltage Utility Display". The window has a menu bar with "File", "View", and "Help". Below the menu bar are tabs for "CAL", "FPD", "LUM", "MUO", and "SMT", with "MUO" currently selected. The main display area contains a table with columns: "Crate", "+5 Digital", "+12 Analog", "-12 Analog", "+12 Bulk", "-12 Bulk", and "Temp DegC". The table is divided into two sections: "Pixel" and "Central". The "Pixel" section lists modules M217C through M218E. The "Central" section lists modules M215B through M218B. The "Temp DegC" column has a pink background for M218C and M218D, and a yellow background for M218E, M215B, M215E, M217B, and M218B. The value -12.51 in the "-12 Analog" column for M217D is highlighted in yellow. At the bottom of the window, there is a "Status:" label and a "Reconnect" button.

Crate	+5 Digital	+12 Analog	-12 Analog	+12 Bulk	-12 Bulk	Temp DegC
Pixel						
M217C	5.06	12.31	-12.20	12.28	-12.37	24.35
M217D	5.13	12.26	-12.51	12.23	-12.13	24.41
M217E	5.10	12.18	-12.36	12.23	-12.08	22.49
M218C	5.31	12.16	-12.32	12.27	-11.96	31.13
M218D	5.17	12.17	-12.20	12.25	-11.96	31.10
M218E	5.12	12.29	-12.35	12.23	-11.96	26.47
Central						
M215B	5.04	12.29	-12.45	12.21	-12.49	25.83
M215C	5.02	12.39	-12.20	12.13	-12.21	23.88
M215D	5.04	12.30	-12.22	12.36	-12.48	24.14
M215E	5.13	12.24	-12.21	12.19	-12.19	25.02
M217B	5.04	12.27	-12.15	12.22	-12.13	29.34
M218B	4.96	12.34	-12.33	12.31	-12.37	25.25

Status:

Reconnect



27 July 2001

HV - Crate Display

Standby Entry

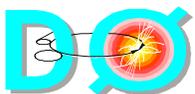
Paging Tabs

State Change Buttons

Channel	V_Trip	L_Max	V_Max	V_Set	V_Read	L_Read	State
SA01	-1969	2500	-1680	-1680.0	-1679.2	1707.7	Holding
SA03	-1968	2500	-1680	-1680.0	-1677.7	1700.7	Holding
SA05	-1968	2500	-1680	-1680.0	-1678.8	1699.6	Holding
SA07	-1964	2500	-1680	-1680.0	-1679.9	1702.1	Holding
SA09	-1971	2500	-1680	-1680.0	-1679.1	1704.7	Holding
SA11	-1973	2500	-1730	-1730.0	-1728.3	1750.6	Holding
SA13	-1974	2500	-1630	-1630.0	-1629.5	1652.5	Holding
SA15	-1970	2500	-1730	-1730.0	-1729.4	1750.1	Holding
SA17	-1971	2500	-1680	-1680.0	-1680.7	1701.4	Holding
SA19	-1970	2500	-1680	-1680.0	-1679.9	1704.8	Holding
SA21	-1968	2500	-1730	-1730.0	-1728.9	1751.4	Holding
SA23	-1967	2500	-1680	-1680.0	-1680.9	1702.8	Holding
SA25	-1968	2500	-1730	-1730.0	-1729.1	1753.8	Holding
SA27	-1968	2500	-1630	-1630.0	-1628.3	1644.1	Holding
SA29	-1966	2500	-1730	-1730.0	-1728.9	1741.0	Holding
SA31	-1966	2500	-1730	-1730.0	-1729.3	1750.9	Holding
SA33	-1969	2500	-1590	-1590.0	-1589.5	1606.7	Holding
SA35	-1950	2500	-1550	-1550.0	-1548.9	1568.5	Holding
SA37	-1963	2500	-1630	-1630.0	-1629.8	1652.2	Holding
SA39	-1968	2500	-1680	-1680.0	-1678.2	1701.8	Holding
SA41	-1590	2500	-1590	-1590.0	-1589.1	1509.6	Holding

Status: GUI initialization complete

Reconnect Offline Online Off On Ramp Pause Resume Lock Unlock Reset



HV - Stripchart Plot



Scale Selection

Channel Stripchart

Navigation Buttons

Channel	V_Set	V_Read	I_Read	State			
SA00	1680.0	-1679.6	1702.2	Holding			
SA01	1680.0	-1678.5	1701.6	Holding			
SA02	1680.0	-1679.4	1702.4	Holding			
SA03	1680.0	-1680.5	1699.6	Holding			
SA07	-1967	2500	-1680	-1680.0	-1679.4	1702.4	Holding
SA09	-1972	2500	-1680	-1680.0	-1680.5	1699.6	Holding
SA11	-1971	2500	-1680	-1680.0	-1680.5	1654.1	Holding
SA13	-1972	2500	-1680	-1680.0	-1679.4	1651.2	Holding
SA15	-1974	2500	-1680	-1680.0	-1680.5	1696.9	Holding
SA17	-1969	2500	-1680	-1680.0	-1680.5	1700.0	Holding
SA19	-1969	2500	-1630	-1630.0	-1627.6	1651.7	Holding
SA21	-1971	2500	-1630	-1630.0	-1627.9	1691.1	Holding
SA23	-1971	2500	-1680	-1680.0	-1679.3	1650.2	Holding
SA25	-1967	2500	-1550	-1550.0	-1549.6	1699.8	Holding
SA27	-1969	2500	-1500	-1500.0	-1500.0	1568.1	Holding
SA29	-1968	2500	-1500	-1500.0	-1500.0	1700.6	Holding
SA31	-1968	2500	-1500	-1500.0	-1500.0	1670.5	Holding
SA33	-1972	2500	-1500	-1500.0	-1500.0	1652.9	Holding
SA35	-1970	2500	-1590	-1590.0	-1589.1	1651.0	Holding
SA37	-1973	2500	-1590	-1590.0	-1589.1	1534.0	Holding
SA39	-1970	2500	-1680	-1680.0	-1673.3	1697.6	Holding
SA41	-1961	2500	-1630	-1630.0	-1658.7	1680.0	Holding
SA42	-1976	2500	-1590	-1590.0	-1589.1	1502.4	Holding

MUOC_HVC_SC29 Graph

MUOC_HVC_SC29

MUOC_HVC_SC29/VOLT (868.992, 878.992)

MUOC_HVC_SC29/CURR (934.971, 944.971)

944

942

940

938

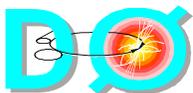
936

-20 -10 09:44:58 Jul 23, 01

(Seconds)

(09:44:51, 938.94)

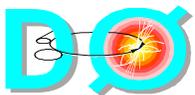
Reconnect Offline Online Off On Ramp Pause Resume Lock Unlock Reset



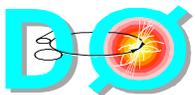
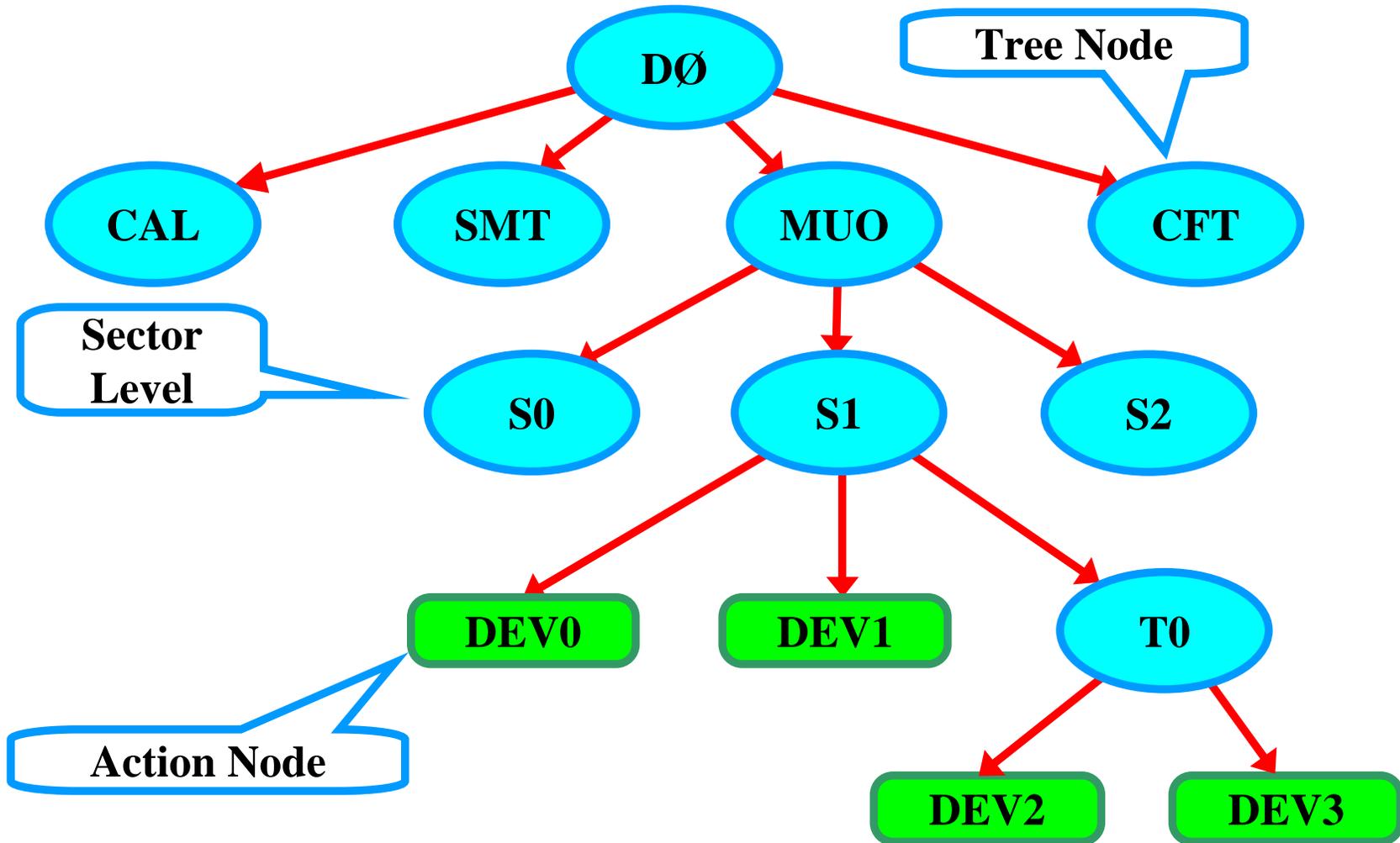
COMICS - Status



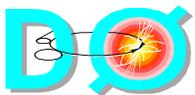
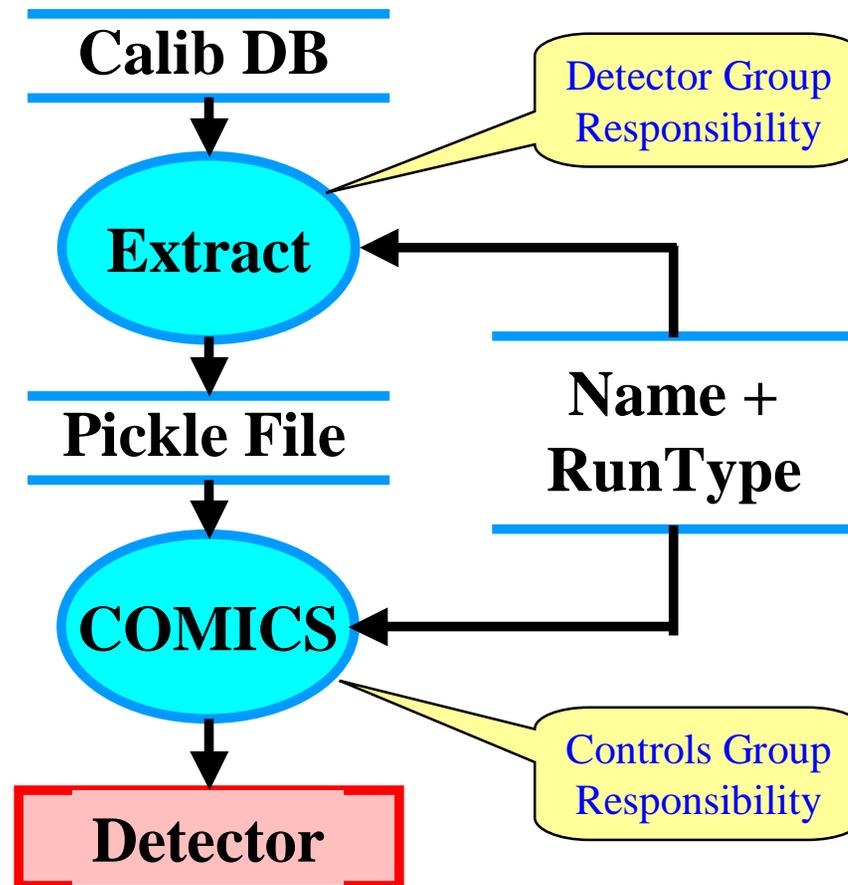
- **Integration schedule**
 - ◆ Calorimeter fully integrated
 - ◆ Muon partially integrated
 - ◆ CFT being tested
 - ◆ SMT ?
- **Planned upgrades**
 - ◆ Complete detector integration
 - ◆ Geographical sectors loaded in parallel by separate threads (Phase 1)
 - ◆ Geographical sectors loaded in parallel by separate processes on multiple nodes (Phase 2)



COMICS - Download Tree Structure



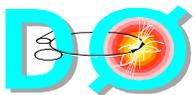
COMICS - Database Extraction



EPICS Hardware Database



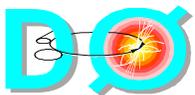
- Database design has been stable for more than a year. A number of fixes, improvements and enhancements were put into 2 user interfaces: hdbWeb and hdbBatch. Remain few issues to be solved in hdbWeb, as well as work on its compatibility with Netscape.
- Population of the database continued, the data put in represent now:
 - ◆ 64 FE nodes (IOCs)
 - ◆ 108 templates
 - ◆ 3919 devices
 - ◆ 65507 EPICS records
 - ◆ 623123 EPICS fields



EPICS Hardware Database



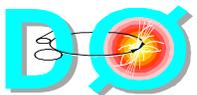
- 19 FE nodes configured to use of database, instead of .dbg, in generating epics.db files (HV muon and calorimeter, clock)
- hdbBatch was tested under python v2_1 and dcoracle2 beta 4
- Fixes and improvements in “Find Existing Device” function of hdbWeb



SDAQ - Status



- **Currently in use:**
 - ◆ By SMT and CFT
 - ◆ Early version of SDAQ customized by users and integrated into the users code
 - ◆ Send to host calibration data only
- **Goals in upgrading SDAQ**
 - ◆ Improve communication with COOR
 - ◆ Provide ability to work in calibration, monitoring and data taking modes
 - ◆ Provide users with SDAQ framework to make use of SDAQ easier



SDAQ – Status (2)



- **What is done:**
 - ◆ Requirements to SDAQ and SDAQ Supervisor were revised
 - ◆ First version of SDAQ reply mechanism
 - ◆ Internal SDAQ processes functionality changed
- **Work to do:**
 - ◆ Implementation of SDAQ state machine
 - ◆ Finalize and test SDAQ - COOR communication
 - ◆ Implement and test SDAQ – DataMerger path for different types of data (raw events, calibration, monitoring)

