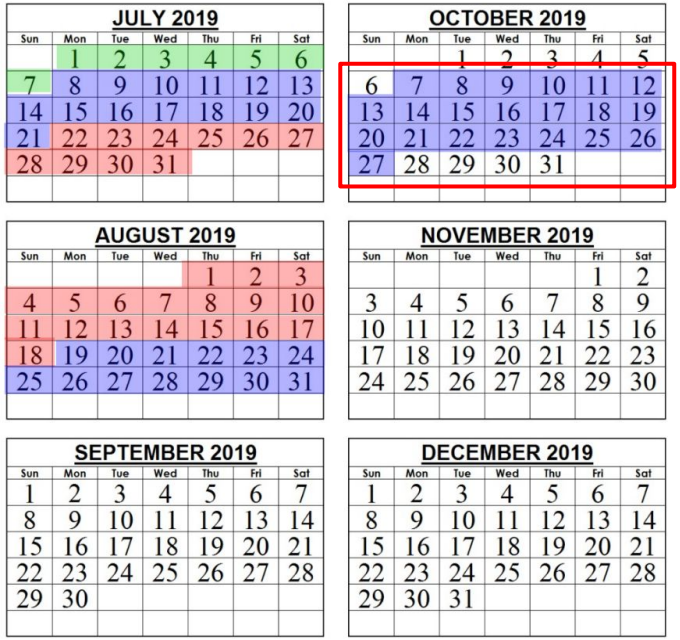
TDAQ testing period October 2019

Roland Sipos for DAQ developers
(CERN)

ProtoDUNE-SP Operation Meeting
11th October 2019

Development period - October

Longest (3 weeks) and last development and testing period of 2019



JULY 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

NOVEMBER 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Based on the discussion from the DF meeting:
https://indico.fnal.gov/event/21942/

JIRA aggregator link:
https://its.cern.ch/jira/browse/NP04DAQ-135

Daily brief meetings on DUNE DAQ Zoom:
https://fnal.zoom.us/j/975993198

Scheduling spreadsheet:
https://docs.google.com/spreadsheets/d/1GQBmgGXIOZ6n9XIzDBI31pitbVjEUa3pcUwHy-3HfkQ/edit?usp=sharing

Operations

Main goals:

- ColdBox readout with FELIX
  - Hardware and software is ready
- Revive CRT readout
  - np04-crt-001 is back online
    - ixgbe parameter needed for allowing unsupported SFP+ for 10Gb NIC
  - Dedicated talk from Camillo
- Time shift on APA5
  - We seem to have a hardware problem on APA5 - WIB5
- Long readout windows
  - Request again due to wire tension studies
  - Ongoing work to find a sampling solution

System administration

There were multiple power cuts during the year. DAQ cold-start procedure failed, physical presence near DAQ barrack is still required. Nonetheless, cold-start and automation procedures improved a lot.

- IPMI management
  - WOL for broken BMC (007)
  - DONE: Configured IPMI for new FELIX servers (027, 028, 029, 030)
  - CRT server's configuration is way too old and obsolete
- Network consolidation is ongoing
- FELIX host automation rules for DMA buffer, affinities, monitoring and control elements
- Update and cross-check of Ansible roles
  - Roles for missing services (CeSI, Prometheus, etc.)
  - Remove obsolete roles and tag np04online by the end of the sprint

Upstream DAQ

Main effort is on FELIX and PBM FPGA firmware integration

Ultimate goal:

- Test new HitFinding FELIX firmware

Other important items:

- Integrate necessary code for “Hits” links in FELIX BoardReader
- Compression in OnHost BR
  - Introduce multi-threaded session layer for QuickAssist
- Finalize the extension of FELIX readout (in collab. with sysadmins)

Self-triggering chain + Data selection

Plenty of planned activities for October:

- Integrate HitFinding working with OnHost BR
- HitFinding on induction channels
- Characterization of the full chain
  - Cross-check efficiency (trigger with CRT, compare with self-trigger)
- Forward “hardware” triggers for the MLT
- Ensure that data is not dropped (include/improve monitoring)
- Cathode-crossing trigger (trigger on full detection volume)
- Michele trigger algorithm implementation in PTMP

Data selection:

- Collect continuous 5 minutes of raw data (or 2 minutes, as long as we can)
  - Can trade off fewer APAs to get longer time

Dataflow

Substantial improvements in the DAQ software framework and development operations during the year

Few remaining goals for the year:

- New gcc and art versions
- Use the new configuration feature of invalidating configurations
  - Mark all configs <= 2019 June as invalid (near the end of the sprint)
- Improve the way for creating and building UPS packages

DevOps and testing

Testing: generally, DAQ testing during CEST timezone, system administration during the Fermilab day

Main tests to carry out:

- Individual integration tests in parallel
- Full system tests
  - Stress/performance tests (check rates above 35Hz)
  - EB thread CPU behavior (profiling)
  - Fault tolerance for the DFO (killing EBs and BRs)

Goals

Goal for the end of the year, and start of 2020:

- Rollout: Stable October2019 software release for detector operations
- Maintain stable slice for ColdBox testing
- Documentation update of TWiki
    - We will go through every item, close to the end of the sprint

Conclusions

The October sprint is our longest (3 weeks) and last TDAQ Development and Test series of 2019. It carries a lot of potential for integrating planned and new features, and has a requirement to finish with a really stable system for operations.

Side note:

- The DAQ should also get extra focus on other fields
  - CCM improvements are urgently needed
    - Mostly on configuration and alarm/notification handling
      - The DAQ needs to be able to answer the question: "Are we taking **meaningful** data?"
  - Lost manpower of readout systems should be compensated
    - SSP, CRT

- Create/update JIRA tickets for the ongoing progress
- Document final products and procedures on the TWiki

Thank you for your attention!