



Online Computing Installation for ArgonCube 2x2 Demonstrator

Geoff Savage

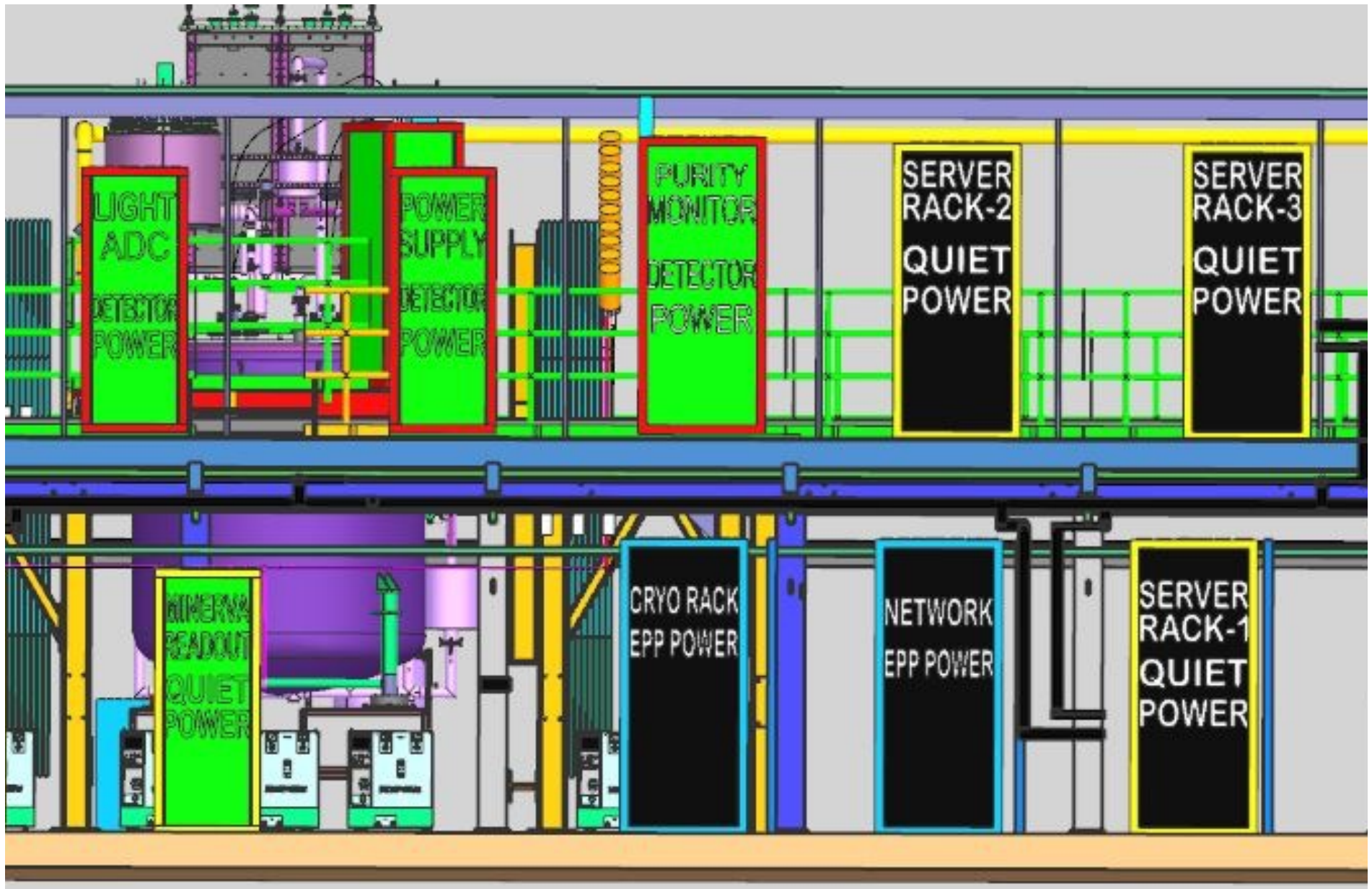
13-Mar-2023

DUNE docdb #



2x2 Demonstrator Online

- Hardware
 - Racks (4) – network, server 1,2,3
 - Server 1 in use now with rack protection
 - Rack protection – rps, switch box, smoke sensor, cabling (x3 sets)
 - UPS for network rack
 - PDUs
 - Network router and switches
 - Computers
- Groups
 - Electrical – install rack protection
 - Experiment liaison – coordinate moving equipment
 - Networking - installers and architects
 - Fermilab system administrators – OS install and configure
 - 2x2 collaborators



Status

- Computers
 - Solicitations for quotes went out Tuesday 07-March to three vendors
 - Vendors have 2 weeks to respond
 - Created requisition from requirements and a quote from KOI computing providing a cost estimate
 - Requirements - <https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=27297>
 - Consultations with system administrators - RITM1578764
https://fermi.servicenowservices.com/nav_to.do?uri=sc_req_item.do?sys_id=4d4ca3e41baf1d107319ea41f54bcbac%26sysparm_view=ess
 - Select a quote from the three vendors and generate a PO
 - KOI computing had an 8 week delivery in the quote.
- Networking
 - Network equipment ordered October 2022
 - Requirements - <https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=25558>
 - Need to check in with networking to understand if we are lucky and the 2x2 network equipment arrived early. – no answer yet.
 - Working with network infrastructure group to determine lengths for fiber uplinks, light readout fibers, and copper jumpers
- Racks
 - Located two unused computing racks at DAB
 - Only need one more underground so there is an unused computing rack
 - Computing racks are deep (36 inches) and have square holes in the vertical supports
 - Leave rack at LArTF – testing can continue while racks are installed underground
- Installation planning in progress

Requirements?

- Take data first week of July
- AC power available mid-May
- Leave the computing setup at LArTF
 - Test a 5th module
- Test the four-module configuration before installation in the cryostat? No.
 - Testing starts when the 4 modules are in the warm cryostat
 - Not enough electronics at LArTF to test 4 modules at the same time
- Computing and networking racks need a pORC.
 - To get the current draws from the computers for the pORC they need to be installed, connected to the network, and powered.
 - Chicken and egg thing.
- Remote cryo operations are not available until the networking rack is operational.

Installation Options

- For computing and networking, we could move forward faster if the AC power installation was split in two.
- Assuming the network equipment and computers are in hand and ready for installation.
 - Install AC for EPP and quiet power.
 - Energize EPP and quiet power.
 - Install AC for detector power.

Computer Goals

- Support the software used at Bern for module testing
 - High disk write rates during testing
 - Low disk write rates with beam data
- Modernize Minerva readout servers (~8 years old)
- Computing for underground operations
 - Gateways
 - Console servers (vnc/novnc)
 - Slow controls
- Eventually support DUNEDAQ but not immediately
- Some servers not included
 - Network file system servers
 - Database servers
 - Use NFS and DB from Fermilab central services

Computers

- 2x2 DAQ Server and Bern Slow Controls (5)
 - ~20TB Hardware RAID 10
- Minerva DAQ Server and Nearline (3)
 - ~20TB Hardware RAID 10
 - PCI slot, serial port
- Gateway, Operations, and Ignition (4)
- Need to fit 12 computers into 3 racks
 - Server 2 (4) – 2x2 DAQ servers (4)
 - Server 3 (5) – Slow controls (1), gateways (2), operations (2)
 - Server 1 (3) – Minerva DAQ and Nearline (3)
 - Leave acd-srv03 running until new servers are commissioned
- <https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=27297>

Installation (1/2)

- Get rack from DAB to Minos then underground for Server 3
 - Network, server 1, and server 2 racks are already underground
- Place racks
- Rack protection in racks (electrical)
- Power in racks (electrical)
- UPS in network rack (electrical)
- Router in network rack (networking)
- 48-port 1 Gb switch in Server 1 rack
 - Remove 24-port switch that is already in Server 1 rack
- Select, purchase, and receive Linux servers
- Computers in Server 1,2,3 racks
- Network cabling (networking)

Installation (2/2)

- Operating system (sys admins)
- Configure networking on computers and pdus (sys admins)
- Determine current draws of computers (geoff)
- Safety documentation and walk through (pORC)
 - Operational Readiness Clearance (ORC)
 - <https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=16355>
 - Simpler for computing racks compared to electronics racks
- Networking to electronics racks (networking)
- Update IP addresses for all 2x2 devices (collaboration)
 - RPIs
 - Pacman

Conclusions

- Schedule is tight
 - Can EPP and quiet power be installed sooner?
 - Many steps with uncertainty in duration of each step
- 2x2 needs to coordinate with other Fermilab groups
 - Networking will need a few weeks
 - Sys admins will need a few weeks
 - ND electrical
 - ND operations support
- Computers could be selected this week
 - Time to generate PO
 - ~8 week delivery to Fermilab
 - 1 week delivery underground
- Safety documentation and review (pORC)
- Commissioning follows installation