Computing at the Cyclotron Institute

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We have continued to expand the computational cluster with the addition of three new DELL R610 computers, each of them having 64 GB of RAM memory, 2 CPU with 6 cores/2 threads each, adding 72 available computing job slots to the cluster. These new servers are available to all lab personnel. CentOS 8 is the operating system and ROOT 6 is installed and available to all users upon login. These machines currently serve as test machines to enable Cyclotron users to transition to root 6 and the new compilers before the full CentOS-8 deployment on our systems scheduled for the coming months.

As mentioned above, the ROOT 6 implementation will coincide this year with the upgrade to CentOS 8 operating system on all the Cyclotron Linux computers. We have been working on this upgrade preparation since the new OS release in September 2019. CentOS 8 had to be configured and tested to be fully compatible with our identification (ldap) and authentication (Kerberos) systems as well as our centralized home directory configuration (autofs). All of those are now managed by the sssd central service.

During summer 2019, the old Cyclotron web server was replaced by a new computer (Protectli Vault Intel quad core Mini PC). This new server is running on CentOS 7 and is hosted at the West Campus Data Center. We have also implemented our web pages on a machine running CentOS-8 to be used as a backup in case the active web server fails.

There has been significant development of the data acquisition systems. Coincident with the computational server upgrade to CentOS-8, we have also upgraded the data acquisition front end as well as back end systems to CentOS-8. The upgrade of front-end computers which utilize the Struck 3104 controller connected via the PCI-e interface presented a challenge to identify the correct hardware driver for that board. Once the driver was identified, we also learned that the driver is very sensitive to the kernel version in that the driver, which had a clean build and worked for CentOS-8.0 did not even compile on CentOS-8.1.

We made the strategic decision to employ the latest version of ROOT 5 on the data acquisition front-end machines. The reasons for this include allowing more time to test the data acquisition software, but also importantly to be able to read the files acquired during an experiment with root 5 since there continues to be a fair number of users who utilize ROOT 5.

One of the backend servers was replaced, and the new one was installed with CentOS-8. The other backend server continues to run Scientific Linux 6 (SL6) in order to be sure that all software has been successfully ported to CentOS-8 before eliminating the possibility of using SL6 for experiment in case the port to CentOS-8 is not fully achieved.

In addition to upgrading the acquisition operating systems there has been significant development in the slow control of various devices. A control GUI was developed for the SIS 3316 Flash ADCs and is more or less complete although tweaks at a low level continue. In addition, a GUI for the MASE system borrowed from Indiana University Cyclotron Facility (IUCF) for NIMROD experiments was developed. Both of these control GUIs have increased the stability of the system and made its behavior more uniform

across experiments. This is because the GUI now controls the devices as opposed to the users writing the setup functions which were easily changed in very non-transparent ways. The GUIs also keep a log of which parameters changed and when.

There was significant activity for Windows Desktop computers. Windows 7 reached End of Life (EOL) on 14-Jan-2020. It was therefore necessary to upgrade all desktop computers to Windows 10. Many users at the Cyclotron Institute had continued to employ Windows 7 and that made the upgrade a significant effort. Coincident with that effort, it was announced early in the year that the University had dropped the contract with Symantec for the campus wide virus protection and replaced it with CrowdStrike. This required again accessing all machines in order to remove Symantec and replace it with CrowdStrike. This effort is in progress.