

## Computing at the cyclotron institute

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During the winter, an upgrade has been performed on the slave nodes of the GR group cluster. The group users were running out of space in the HDFS file system and the cluster was very unstable since the drives were getting full. We took the decision to remove all the 2TB drives from the height nodes and replace them with 2x14TB drives per node to increase the cluster total storage capacity to 224TB. We also installed 500GB SSD drives as system drives on each node and did a clean OS install, replacing Scientific Linux 7 with CentOS 7. The operation was successful and the cluster is now stable and running without issues.

The configuration of the Linux cluster was changed during the past year. Scientific Linux 6, the work-horse of our computing effort officially went end-of-life on 14-Nov-2020. To allow systems to have proper security updates, we upgraded the entire cluster to CentOS-8. As noted, this allowed us to continue to receive security updates. But in addition, the new compilers included in CentOS-8 allow for the use of root 6, whereas old compilers had prevented the upgrade to root 6, and so we had continued with root 5.

Ansible, a system we have been bringing online for some time, was brought to full utilization during this upgrade. Once we settled on the system configuration appropriate scripts were added to ansible. The upgrade process using this system consisted of bringing up a minimal system using PXE. After that, the scripts executed by ansible configured the system to the running configuration in a very short period of time. In addition, many systems could be upgraded in parallel. Whenever a system configuration needs to be changed from now on, the change is added to ansible and then the configuration change is performed through ansible on all cluster machines.

We also added significant computing capability to our cluster as we were beneficiaries of the decommissioning of the Brazos Cluster and acquired 26 SuperMicro compute servers as well as 6 file servers. We were able to implement these computers by installing CentOS-8 using ansible in a short period of time. All of the newly commissioned computers were immediately completely loaded to capacity by various jobs from various groups in the Institute.

In addition, we rearranged the racks in the computer room to make room for the three racks from the Ada Cluster that were awarded to us as a result of a proposal for its acquisition upon its planned decommissioning.