Final Research Report

Last semester, the cluster was set up again and the CMSSW software was attempted to be installed. First, I reviewed the requirements and documentation provided by Mehdi. Then I attempted to install CMSSW versions 10.2.16_patch2 and 10.2.5, though issues getting SCRAM to work prevented the software from functioning properly. It was reported that "scramv1" was not installed. Even after verifying the scarm installation and installing a different version, the issue persisted. Running "scarm list" to display current scram projects appeared to work, though the CMSSW did not recognize the scram installation.

This semester, the first steps I took were to try to configure SCRAM while I discussed with Bockjoo about how to resolve the error. In the meantime, I worked on training Andrew and Zack and fixing the Tripplite UPS that had low batteries. Andrew and Zack were not familiar with working in a terminal, so first they had to learn a bit of Bash, and then basic terminal usage. The UPS batteries had just been replaced, but one of the F2 connectors was bad, so it had to be replaced. Originally, the wrong size was purchased, but after the right size came in, the connector just needed to be crimped on and it was done. Another side task that needed to be completed is a vulnerability patch. This also led to discovering some yum configuration errors on the cluster, but those were resolved so the patch could be implemented.

Bockjoo got back to me with a resource to install the Cern VM filesystem, CVMFS, which when installed should resolve the previous error I had been having. I started to read through the documentation and the instructions to prepare. At this point in time, Andrew and Zack completed their bash training and I started showing them around the cluster more in-depth than before and starting them on minor tasks. I showed them the then-current list of tasks, and we ended up working on a drive replacement in Nas-0. This took longer than expected, because the names on the drives in Nas-0's zpool and the physical drives are not matched up properly

and are not in order. After some trial and error, we discovered the correct drive to replace and did so. The hot spare was added back in and functioning properly. A few other minor issues popped up on Nas-1 and the CE though; Nas-1's raid controller went down briefly again and the ssh service was not functioning on the CE. THese issues were resolved soon after their discovery.

For installing CVMFS, first I had to configure the yum package manager repositories and install Frontier-squid. It installed quickly, but figuring out the configuration took a while. The option to enable http access to "localnet" needed to be enabled, as it was disabled by default. Then, the ports 3128 and 3401 had to be added to the iptables rules and it should have run with no issues. This did not work, however, and the documentation was not enough to figure out the reason why. It took lots of digging, error messages, sifting through vague log files, and trial and error before it was configured correctly. First, the configure script had to be filled in with the correct addresses and additional variables. Then, iptables had to be restarted as it had failed to start on a requested service restart. Then, the correct ports needed to be allowed in iptables. Then, the httpd service which had also failed to restart had to be repaired and restarted. Next, an error regarding httpd's access to the database needed to be resolved. Then, each node had to have their yum configuration updated to utilize the squid server.

While fixing the httpd service, a side issue between the ROCKS database and the website was fixed. Whenever the website was set up, ROCKS became unable to access the cluster information database for an unknown reason. It was discovered that there was an incorrect configuration between rocks and the database, and after this was resolved, it could access the database without causing the website to not be able to do so.

However, issues arose when attempting to install CVMFS. It was listed that there was a dependency error with the selinux-policy package on CentOS releases before 7.5 (7.4 uses version 3.13.1-16, and 7.5 uses the required v3.13.1-268). Since the most current (and thus all prior) ROCKS releases were based on CentOS versions prior to 7.5, this meant that all ROCKS

systems would have this incompatibility. Bockjoo invited me to join the uscms Slack channel, and here I was advised that, "If the RPM installs, it might just be a matter of disabling SElinux." However, this did not work as it would not even install without the required package version. Thus, the project was left with a few options: find a workaround, utilize virtualization techniques to run the required CentOS version inside the current installation, or set up the nodes using CentOS 7.5+ and find a different method of configuring the cluster. Virtualization was undesired since it would place a heavy load on the nodes, and reduce the processing power available to run jobs. Thus, the first solution attempted was to find a workaround. In parallel, communication with Bockjoo ensued about alternative setups for the cluster on a CentOS version above 7.4. Bockjoo said that they use 7.7, but not how they set it up to work as a cluster.

The Tripplite UPS also continued to have issues. Even after the new batteries were placed inside and the F2 connector replaced, it still would not turn on even when plugged in. After leaving it plugged in, it remained off but the batteries were starting to be drained. The wires inside the battery box were tested and found to be functional. Then, the UPS was switched to a different outlet that was known to be working, though this also did not resolve the issue. Remaining options for hardware failures lie in the main unit itself, which might not be serviceable.