Revamp of High Energy Physics Laboratory's Computer Systems: Milestone 4

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Contents

1 HEP Senior Design

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2 Faculty Sponsor

Eraldo Ribeiro - eribeiro@fit.edu

3 Client

Marcus Hohlmann - hohlmann@fit.edu
Head of the Florida Tech HEP group

4 Meeting with Faculty Sponsor

5 Meeting with Client

- 07 January 2019
- 14 January 2019
- 28 January 2019
- 04 January 2019

6 Progress of current Milestone

Task	% Completion	Eric	Josef	Ryan	To Do
Integrate cluster components.	0%	0%	0%	0%	find new solutions
Rewire the existing MTS.	90%	70%	20%	0%	miscellaneous touch ups
Resolve software issues with development MTS.	60%	0%	40%	20%	reinstall AMORE

7 Discussion - Current Milestone

7.1 Existing MTS Progress

Although the FEC firmware has been slow coming, we have been able to improve the MTS. Its cabling is quite messy, which makes rearranging components and diagnosing issues fairly cumbersome. We have exchanged some uncharacteristically long cables for more appropriate shorter ones, and generally cleaned up the other cables to be more presentable.

7.2 Development MTS Computer Progress

In an attempt to deal with the ROOT and AMORE issues plaguing the development machine, we have opted to reinstall both packages. We replaced the installed ROOT with a slightly newer version, which has solved the issues surrounding ROOT. After attempting to get AMORE to work with the new version of ROOT, we eventually decided to reinstall AMORE as well. Unfortunately, however, the repository on which AMORE is hosted is no longer available. The repository maintainers, though, have agreed to send us the packages we need.

We are working with the researchers working on the MTS to put together a document detailing the operation of the existing system. Once we have a through understanding of the MTS's system, we can begin work on the software wrapper for the development MTS.

7.3 Computing Cluster

The integration of the nodes into the cluster has been proving itself to be very challenging. The process as it is detailed in the ROCKS installation manual begins by booting the node with the ROCKS Kernel CD used to created the head node. A tool on the head node, `insert-ethers`, then listens for a DHCP request sent by the node when it starts up. This catalogs the node in the head node's database. The node is then supposed to request a kickstart file from the head node in order to be installed with all the appropriate software and configurations. Unfortunately, we are having a rather difficult time coaxing that request from the node. The ROCKS Kernel CD seems only interested in booting the node as a new head node without requesting a kickstart file.

A ray of hope had shone, however, when, while performing the unrelated task of installing CERN CentOS 7 onto a machine, we discovered that if a certain URL is provided in the "Installation Source" section of the Anaconda installer, shared by the ROCKS Kernel CD and the CERN CentOS CD, a long list of software packages is made available to customize what kind of system we would like to install, including a "Compute Node" package. Enlivened by this discovery, we immediately tried the URL in the ROCKS Kernel CD on the node, but no such list revealed itself. We then booted the node into the CERN CentOS 7 CD and tried the URL. The list appeared! We selected "Compute Node" and began the installation. The node, however, never requested a kickstart file from the head node.

7.4 GEM Machines

There was a major failure in the Truth PC, this PC is an integral part of the GEM machine systems as it is one of the few PC's with ROOT and AMORE properly installed. However, getting other systems to run RAID has proven well, as most machines already have 2 drives installed that are the same size, they just were not adjusted to run in RAID 1 in the bios in OS, so a few tweaks allows them to work.

It seems as though there are other small issues that are impacting the usability of the lab right now, one of them being that the Beauty PC has some hardware troubles. Upon the installation of a new OS on this PC 2 of its 4 monitors refuse to work properly for some reason. After some testing it seems to be an issue with the drivers, and the proper drivers have been downloaded but not yet installed as the computer needs to reset for proper driver installation and we have been unable to reset it. After a reset the Beauty PC should provide a more productive experience to the GEM team.

8 Parts Worked On

8.1 Josef Bostik

- reinstallation of ROOT on the MTS Development Machine
- reinstallation of AMORE on the MTS Development Machine

8.2 Eric Pereira

- Recabling the existing MTS
- Exploring backup solutions
- Saving data from Truth PC.
- Beauty PC repair.

8.3 Ryan Wojtyla

- integrating compute nodes into the cluster
- reinstallation of AMORE on the MTS Development Machine

9 Task Matrix - Next Milestone

Task	Eric	Josef	Ryan
Continue to Care for Existing MTS	60%	20%	20%
Compile Instructions for MTS Operation	20%	40%	40%
Prepare Development MTS Machine	20%	50%	30%
Integrate Nodes into Cluster	10%	10%	80%
Assist Researchers	70%	10%	20%

10 Discussion - Next Milestone

10.1 Existing MTS

While we wait for the FEC firmware to be made available to us, we can continue to clean up the physical detector. We will also be creating a manual in collaboration with the MTS's researchers detailing the operation of its software.

10.2 Development MTS Computer

Once the new AMORE package arrives, we will resume the process of completing the construction of the development MTS's software environment. We will also be able to begin construction of the wrapper once key parts of the manual have been completed.

10.3 Computing Cluster

Further efforts will be made to integrate the nodes into the cluster. Once the nodes are integrated, the storage element (SE) and storage units (NASs) must also be integrated.

10.4 GEM Machines

The Truth PC has been an example to the GEM team as to what can occur if data is not backed up properly. It seems that the Truth PC, one of the few designated PC's with AMORE and ROOT properly installed, and it has suffered a RAID issue, and seems to have a complete drive failure preventing the computer from working properly. Although The GEM team has lost one machine it can be prevented from doing so in the future, so all machines will have backup disks and run RAID 1 systems until the cluster is back up online, once the cluster is back up online the systems can be backed up on the computer clusters storage.

11 Sponsor Feedback

11.1 Existing MTS

11.2 Development MTS Machine

11.3 Computing Cluster

11.4 GEM Computers

11.5 Sponsor Signature

Sponsor Signature

Date

12 Sponsor Evaluation

Josef Bostik	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Eric Pereira	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Ryan Wojtyla	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10