Upgrade and Update of Computer Systems within Dr. Hohlmann's High Energy Physics (HEP) Research Group Progress Evaluation: Milestone 3

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Contents

1 HEP Senior Design

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2 Faculty Sponsor

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3 Client

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

4 Meeting with Faculty Sponsor

5 Meeting with Client

29 October 2019

6 Progress of current Milestone

Task	% Completion	Ryan	Eric	Josef	To Do
Repair Existing MTS	70%	20%	40%	10%	FEC firmware
Prepare Development MTS Machine	70%	20%	10%	40%	repair software
Boot Cluster into ROCKS	80%	60%	10%	10%	fix boot issues
GEM Machines	80%	10%	60%	10%	continue reorganization

7 Discussion - Current Milestone

7.1 Existing MTS Progress

Part way through the month, one of the MTS's Front End Controllers (FECs) failed to transmit any data; it was broken. Fortunately, we had a spare FEC that we could put in its place. Unfortunately, however, this FEC was of a different model, and it was not working properly with the rest of the hardware. After some troubleshooting, it was determined that this newer FEC has a newer version of firmware that is incompatible with the older version installed on the other FECs. Since we do not have the firmware's binary laying around, we are asking former graduate students and other researchers familiar with the MTS if they happen to have a copy to send us.

7.2 Development MTS Computer Progress

While trying to use the required software we had just installed, namely AMORE, it became apparent to us that there were some serious compatibility issues. Turns out, the latest version of AMORE depends not on the latest version of ROOT, ROOT 6, but the previous version, ROOT 5. After we had discovered this issue, we began the task of uninstalling ROOT 6 and installing ROOT 5. The process of installing ROOT 5 presented us with another issue: it was having a hard time building. After some troubleshooting and research, we discovered that we were simply attempting to build the software in the incorrect directory. With this solved, ROOT 5 was built and it is installed. AMORE, however, is still giving us trouble.

7.3 Computing Cluster

A considerable amount of time was spend playing with the CentOS 7 images discovered on the drive in the CE. It was discovered that, with the correct GRUB configuration, the images can be loaded onto the machine. The images, however, do not work; they kick the user straight to "emergency mode". The reason for the boot failure is cited to be "Failed to start Switch Root". A meeting has been scheduled with the IT department to explore possible causes of the original internet connectivity issue with Anaconda,

and perhaps some insight into this new problem can be gleaned from the meeting as well.

7.4 GEM Machines

Working on the GEM machines it seemed there was a problem with a script designed to install a certain version of MySQL on the PC 'Truth'. The script was reworked, and edited in order to fix this issue. Moreover all other hard drives in the closet were tested to see if they worked, and had 0's written on them to make sure there was no data left on them so they would be available for reuse. Lastly, there is a raspberry pi that the GEM team requested would run EQUIP. This software processes information coming from their QuarkNET project (a project similar to what the MTS does but on a smaller scale), and graphs the data accordingly. A script was successfully created for this and the data was automated.

8 Parts Worked On

8.1 Josef Bostik

- Installing and building ROOT 5 on development MTS machine.
- Troubleshooting AMORE on the development MTS machine.

8.2 Eric Pereira

- Testing/fixing hard drives for GEM Computers
- Fixing MySQL installation error on GEM computers
- Created script and automated graphing data on Raspberry PI for GEM computers

8.3 Ryan Wojtyla

- Assisted with existing MTS troubleshooting.
- Troubleshooting AMORE on the development MTS machine.
- Attempted to boot into found images on the cluster.

9 Task Matrix - Next Milestone

Task	Ryan	Eric	Josef
Repair Existing MTS	40%	30%	30%
Prepare Development MTS	40%	20%	40%
Begin Wrapper Planning	30%	20%	50%
Boot Cluster into ROCKS	80%	10%	10%
Reorganize Highbay	10%	20%	70%

10 Discussion - Next Milestone

10.1 Existing MTS

Once the new FEC is inundated with the correct version of firmware, data collection in its present state may resume. The MTS, however, is stilled marred by its prior issues of potentially faulty detectors and bugs with data processing. The existing MTS also has incredibly messy wiring, this has caused issues when unplugging and replugging different cables. Reorganizing these wires would make it easier for the GEM group, and for us to work on it.

10.2 Development MTS Computer

The development MTS machine still needs two critical components to be completed before serious work on the wrapper application can begin: AMORE needs to be made functional and drivers for the MTS hardware need to be installed. While these two issues are being worked on, however, work can begin on planning how the wrapper application will be constructed, at least at a high level.

10.3 Computing Cluster

With the discovered images found to be nonfunctional, we are running out of options for what we are able to do. Aside from the scheduled meeting with the IT department, we are left to investigate the images' "Failed to start Switch Root" boot errors. If the original internet connectivity issue is solved during the meeting, or if the boot error is resolved, we will finally be able to install ROCKS onto the cluster.

10.4 GEM Machines

Wiring issues seem to be a large problem with the GEM machines. One such machine is 'Graviton'. This computer is connected to a power strip, and that power strip is connected to another power strip, which is then connected to an outlet. Not only does that cause random shutdowns because Graviton is not getting the energy it needs, but it is also a fire hazard. It also seems that the GEM Machines may need to reallocate and resource certain I/O tools, specifically keyboards and mice. It seems that there are many computers that need keyboards and mice and never have them. Some computers have PS/2 ports available and the physics department has old keyboards and mice that can be used to fill up these slots.

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