

# Progress Evaluation 2

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## **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**

29 October 2018

## **5 Meeting with Client**

01 October 2018

08 October 2018

15 October 2018

22 October 2018

## 6 Progress of current Milestone

| Task                       | % Completion | Ryan | Eric | Josef | To Do           |
|----------------------------|--------------|------|------|-------|-----------------|
| Repair MTS Data Collection | 100%         | 40%  | 40%  | 20%   | none            |
| Install DATE and AMORE     | 100%         | 40%  | 20%  | 40%   | none            |
| Install ROCKS              | 50%          | 30%  | 10%  | 10%   | boot into ROCKS |
| Testing Hard Drives        | 100%         | 30%  | 50%  | 20%   | none            |

## 7 Discussion - Current Milestone

### 7.1 Existing MTS Progress

At the beginning of this Milestone, the MTS was unable to collect data due to software issues. We were able to locate the faulty script and edit it accordingly to eliminate the issue. This, however, brought to light a hardware problem: one of the Front End Controllers (FECs) was not transmitting any data. After some troubleshooting, it was determined that the FEC was working properly, but its Analogue to Digital Converter (ADC) was not. Fortunately, we had an extra ADC, so we replaced the faulty component. The MTS is now capable of taking data! Data collection is not entirely fixed, however. There are some software issues regarding how the data is processed and some hardware issues regarding the data collection detectors.

### 7.2 Development MTS Computer Progress

Our first challenge was to find the repository from which we could obtain the software to be installed, DATE and AMORE. While AMORE was present in the CERN CentOS 7 repository we had access to, DATE was not. The latest version of DATE is only found in the CERN Scientific Linux 6 repository. Since we did not have that repository, we manually created the repository file using the CERN CentOS 7 file as a blueprint; we changed all instances of `cc7` (**CERN CentOS 7**) to `slc6` (**Scientific Linux CERN 6**). Miraculously, we were able to access the repository and install the software we needed! The current challenge is installing the drivers for the MTS's hardware.

## 7.3 Computing Cluster

The cluster continues to be an incredible challenge. Since the Anaconda installer does not recognize the internet while on the cluster, we figured it might on another machine. As long as ROCKS is installed properly onto a drive, we can copy everything over to the cluster's drives. We loaded the installer onto a separate machine and attempted to install ROCKS onto a flash drive. While Anaconda recognized the internet and began the installation process smoothly, it failed partway through. It does not seem this method will work.

For the sake of investigation, I loaded a Ubuntu LiveCD onto the cluster to examine the contents of the drives, and what I found surprised me. There are CentOS 7 images loaded onto the drives already in the cluster! Perhaps the original installation was not completely botched. The drives are having a very hard time booting, however, so the next step is to investigate GRUB, the boot loader.

## 7.4 GEM Machines

The GEM Machines are behaving well. The current XRay-PC issue is not much of an issue, we were not able to set up the initial PC with the XRay drivers, however there is another computer that runs the XRay fine so it is not an issue. We also tested some hard drives for the machines, with the intent that writing 0's may repair some damaged hard drives. Sadly this did not work, however there are still a few more hard drives to test.

# 8 Parts Worked On

## 8.1 Josef Bostik

- software installation on development MTS computer
- software configuration on development MTS computer
- software repair of existing MTS computer

## 8.2 Eric Pereira

- test hard drives for the compute cluster and GEM machines

- software repair of existing MTS computer
- hardware repair of existing MTS computer

### 8.3 Ryan Wojtyla

- troubleshooting the computing cluster
- hardware repair of existing MTS computer
- software installation on development MTS computer

## 9 Task Matrix - Next Milestone

| Task   | Ryan | Eric | Josef |
|--|------|------|-------|
| Repair the existing MTS.                                   | 30%  | 40%  | 30%   |
| Install hardware drivers onto the development MTS machine. | 40%  | 40%  | 20%   |
| Boot the cluster into ROCKS.                               | 80%  | 10%  | 10%   |
| Continue setting up the GEM team's machines.               | 15%  | 70%  | 15%   |

## 10 Discussion - Next Milestone

### 10.1 Existing MTS

Although the MTS is once again (mostly) capable of collecting data, it is having trouble processing it. A script is run on the raw data file that transforms the data into a form usable by data visualization tools, namely ROOT. The processed data, however, is not being stored in the expected location, or any location for that matter. The current challenge is to diagnose the issue and remedy the situation.

### 10.2 Development MTS Computer

With the required software installed, the next step is to prepare for the attachment of MTS hardware. The installation of the drivers for that hardware, however, is proving to be quite an obstacle. Throughout the software installation, we have been following a guide put together by a researcher

setting up a system similar to our own. While he experienced issues while installing his drivers, ours are different. The current challenge is to figure out what is wrong with the system's configuration that is preventing the drivers from being installed.

### **10.3 Computing Cluster**

With the discovery of CentOS 7 images on the cluster's drives, the question has changed from "How do we install ROCKS onto the cluster?" to "How do we get the cluster to boot into ROCKS?". We have been conducting extensive research into the operation of the boot loader, GRUB, so that we can better understand how a working system is constructed in order to more effectively diagnose booting issues on the cluster. The current challenge is to load ROCKS from the cluster's drives.

### **10.4 GEM Machines**

The GEM computers are optimal for the most part with very minor issues. All the parts are working, resources have been allocated successfully, drivers are optimized and working. Currently the largest issue is with one of the computers (named Charm) has issues connecting to a keyboard on occasion. This is a strange bug, and resetting usually fixes the problem, however it, on the occasion, will have this error. It is unknown whether this is a hardware or software issue, will be investigated. There are also some hard drives that still need to be tested, they are currently not in use and sitting in a cabinet, and it is unknown if they work or not, they need to be tested and have 0's written on them.

## 11 Sponsor Feedback

### 11.1 Existing MTS

### 11.2 Development MTS Machine

### 11.3 Computing Cluster

### 11.4 GEM Computers