Revamp of High Energy Physics Laboratory's Computer Systems: Milestone 6

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Contents

1 High Energy Physics (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 Institute of Technology HEP group

4 Meeting with Faculty Sponsor

- 12 April 2019

5 Meeting with Client

- 15 March 2019
- 22 March 2019
- 29 March 2019
- 1 April 2019
- 8 April 2019

6 Progress of current Milestone

Task	Progress	Notes
Polish Cluster Documentation	100%	
Polish MTS Documentation	100%	
Create MTS Automation Script	70%	
Integrate Remainder of Cluster Components	50%	NAS-0 still must be included
Assist Researchers	100%	helping out with general problems as they arise
Create GEM computer Backups	50%	issues with hardware requirements

7 Discussion - Current Milestone

7.1 Development MTS Computer Progress

7.2 Computing Cluster

We have discovered that the source of NAS-0's troubles is several hard drive failures! The RAID array was rebuilt as well as it could be with the spares part of the array. New hard drives have arrived, and, although adding them to the array is proving problematic, their addition to the RAID array will provide us with an environment suitable for cluster unification.

Additionally, although we had been contributing to a manual detailing our progress, it was in much need of polish. That polish has been applied, and the style conventions of the document have been set.

7.3 GEM Machines

A few of the GEM machines are picking up a new purpose, and are having some software installed on them. These newfound machines are having quite a bit of trouble installing the right packages and using the proper software. These issues have been delaying the progress of the team, but with some assistance from us they are getting all the packages they need and the software necessary to help them out.

The GEM machines also need stable backups as most of the machines are running on hardware RAID 0. The problem is, however, that most of the storage on these machines is used up, which makes creating a ZFS software RAID quite difficult. In order to create a software RAID 1 on a system with 1Tb of storage I would be able to only use 500Gb of it in RAID 1 because exactly half of the disk is uses to mirror original storage. The problem is that if, for example, one of the machines in the lab has 1Tb of storage 800Gb of that will be in use, which then makes it impossible to run RAID 1 on it. The solution to this is to get more hard drives, but without more hard drives it is impossible to do unless you delete a large portion of data on each of the drives.

8 Parts Worked On

8.1 Josef Bostik

- MTS Documentation

8.2 Eric Pereira

- Assisting researchers with general issues
- Fixing storage issues

8.3 Ryan Wojtyla

- MTS Documentation
- Cluster Documentation

9 Discussion - Future Work

9.1 Development MTS Computer

The development MTS needs more to have to final installation of AMORE be put in place, and needs to be modified in a way where the GEM team is

able to update the system without having to worry about potentially damaging AMORE or ROOT based software on the system (the inability to update the system is a major issue with the existing MTS).

Once this is finalized all that is needed is to completely connect it to the MTS, which in theory will not be too hard, we planned on simply switching the hard drive from one machine to another instead of moving and replacing the entire machine as a whole.

9.2 Computing Cluster

Although the cluster is mostly put together with Rocks, there still remains a good deal of work to be done. The job submission software on the CE still needs to be properly configured, and the SE needs to be set up. After those two tasks are completed, the cluster may then be reintegrated with the Open Science Grid.

9.3 GEM Machines

The GEM computers are absolutely going to need more maintanence in the future, There is very little documentation on the lab computers as a whole so the creation of some sort of documentation (most likely some sort of documentation stating the hardware they have, and if they have a backup system in place) might be able to help any administrators in the future.

Moreover, it seems the lab, as a whole, lacks someone with CS experience that is able to support and assist researchers in creating scripts that can more efficiently help them do work, as well as maintain and fix old pieces of software that they may have trouble working with. Targeting more CS students may be in the best interest of the lab.

10 Sponsor Feedback

10.1 Existing MTS

10.2 Development MTS Machine

10.3 Computing Cluster

10.4 GEM Computers

10.5 Sponsor Signature

Sponsor Signature

Date

11 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