Cyclotron computing

R. Burch and K. Hagel

Our mission is to provide the Cyclotron Institute personnel the computational and network resources necessary to execute their research programs. This past year we increased the Institute's computing capacity by adding two additional computational servers to the lab's cluster, four computational servers to sjy-group's cluster, and two computational servers to the star-group's cluster. We also upgraded the mail, backup, and vm servers. We are continuing the pursuit of virtualizing[1] administrative servers to allow us to better utilize server room rack space, power and cooling by reducing our physical machine count. Procedures to build and deploy these virtual machines are still under development.

The Institute's computational power was greatly enhanced by retiring two machines and adding four new machines to the lab computational cluster, increasing our capacity from 80 to 128 concurrent jobs, while sjy-group's cluster, with four new machines went from 58 to 132 concurrent jobs, and star-group's cluster, retiring three and adding two new machines, went from 14 to 56 concurrent jobs. The server room's concurrent job capacity increase of 110 to 316 jobs (223%) allows research groups to execute computational jobs in a more timely manner. Each new server included a minimum of 16GByte RAM enable jobs with larger memory requirements to execute more efficiently.

Responding to user comments, we analyzed the mail server/mail client responsiveness and in the process we identified a bottleneck. The server was unable to place user mailboxes fully in memory and so swapped parts of the mailbox to disk which slowed the processing considerably and delayed delivery for all users. Quadrupling the memory of the mail server allowed the server to place user mailboxes, some approaching 1GByte, fully into system memory, hence removing the bottleneck and speeding mail retrieval.

During the past year, one drive on the home disk fileserver failed. The RAID system worked as advertised and removed the failed drive and activated the hot spare, transparent to our users. On a day of our choosing, we installed the replacement drive into the RAID system and provisioned it as a hot spare. With this experience, we re-provisioned disks on our test vm server as a RAID system. We also added two 1TByte user data disks to our cluster.

As the institute adds new research groups and personnel, the quantity of data requiring backup increases. We found that we were growing short on backup disk space and therefore replaced the two 500GByte drives with two 1TByte drives to cover the institute's continuing data growth. We also replaced the USB2 offsite backup drive with an eSATA drive which is considerably faster, accomplishing the backup in nominally 4 hours instead of the previous 6 hours. This change resulted in fewer backup failures due to the previous backup not completing before a new backup would start.

The enhancements and general maintenance allows us to supply the Institute with the resources it needs to execute its mission by increasing our computational and data serving capacity while enhancing

backup capacity, eliminating slow mail service, and provisioning RAID setups for critical servers. Additionally, we plan to push to deploy a VM infrastructure this coming year.

[1] R. Burch and K. Hagel, Progress in Research, Cyclotron Institute, Texas A&M University (2009-2010), p. V-5.