

## **Cyclotron Computing**

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The Cyclotron Institute began in the last year to migrate the central Institute wide computer system from a primarily VMS system to a UNIX system. Over the last several years many groups in the Cyclotron Institute have moved their day to day computing from the former VMS centralized computers to a combination of Windows and UNIX machines. The main functions that the VAX has been serving in the recent past is the function of a centralized mail server from which users can pop e-mail to their PC's as well as for running some legacy code that for various reasons has not been ported to UNIX or Windows. Data acquisition is also done solely on the VAX as our main data acquisition program, GOOSY, is written only for VMS and cannot be ported to another architecture in any reasonable way. In the following we will discuss the changes we have been making to the analysis computers as well as the changes we have in progress for the data acquisition.

### **Analysis and General Computing**

To provide a centralized computing resource for those in the Institute who either do not have their own computers or who need more computing power than their desktop provides, we have put together a simple unix cluster which consists of one

server and two compute boxes, all running RedHat Linux. The server functions as an NIS server, an NFS server, a DNS server, a DHCP server as well as a web mail server.

This configuration provides a convenient way to centrally managed this multi-node system. As new systems are added, it is simply necessary to add the account on the NIS server and all of the machines are automatically updated. User backups are also therefore convenient as they are done from the central server. Having an in-house DNS server provides the capability to have node to node access in-house in the rare instances when our connection to the campus DNS servers is severed.

These systems have been in general use for a little over a year for those individuals who need their capabilities to do their work. The systems have proven quite stable over long periods of heavy stress. We are in the process of assessing the security of these machines. Once we have assured ourselves that the systems are secure, we will move the general users to these machines, use the centralized server as a mail server and slowly retire the VMS systems.

### **Data Acquisition**

As noted above, our main data acquisition system, GOOSY, was brought from GSI about 10 years ago. This system was written only for VMS and cannot be ported. As noted in previous reports [1], our frontend system consists of Motorola 68040 processors which have a system developed by IUCF running under PSoS. This system sends buffers of events to the backend system using TCP/IP. In principle therefore, we can use any software that handles TCP/IP that we can either find or develop. In contemplating how we might use inexpensive Linux boxes to do our data acquisition, we developed a simple code based on the ROOT system [2] from NA49 at CERN to acquire all of the event buffers from the frontend system using a nice GUI interface. A lot of the code was taken from the BRAHMS Monitor system described in this report [3]. This system, yet in its infancy, is organized in a way similar to GOOSY in that there is a "Transport Master" which defines the communication interface to the frontend described above and ships the data to a disk file. In addition there is an "Analysis Master" which takes a

sampling of the data from the Transport Master and performs user defined analysis and array incrementing. Both of these programs are GUI driven and are run strictly under ROOT. This gives us the ability to easily port this to any system that is supported by ROOT. In addition, because we rely on a strict TCP/IP interface to the frontend, this system is designed to simply plug in any frontend data acquisition system that we might wish to use in the future.

### References

1. H. Dejbakhsh *et. al.*, *Progress in Research*, 1993-1994, p V-134.
2. Rene Brun and Fons Rademakers, ROOT - An Object Oriented Data Analysis Framework, Proceedings AIHENP'96 Workshop, Lausanne, Sep. 1996, Nucl. Inst. & Meth. in Phys. Res. A 389 (1997) 81-86. See also <http://root.cern.ch/>.
3. K. Hagel *et. al.*, *The BRAHMS Experiment at RHIC*, This report.