Online Data for Experiments

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Abstract

We report on a new project just getting underway at Fermilab to provide data acquisition for the next generation of experiments at the lab. These experiments are in the early stages of detector and data acquisition architecture design. ODE will incorporate components from DA systems already in use at Fermilab, specifically DART and the Run II collider program. DART, the existing Fermilab standard system, has proven robust and versatile over the last five years and has been used by many experiments and test beams beyond those which provided the original requirements for its development. Additional components from Run II of CDF and D0 are also being used. ODE includes components to provide of "paperless counting room" "remote and distributed access and control" "large scale system administration, instrumentation and monitoring" "remote archiving of the data" "integration of data bases for bookkeeping and tracking". We provide a scripting language in python to define test sequences and acquisition steps. NT and Linux are supported. Java is the implementation language of choice. We plan to reuse the message logging, vme readout and resource management components from the CDF Online system, and the data archiving and staging components from the D0 Run II data handling system. We are integrating LabView for test stands and small scale data acquisition environments. We describe our first integrated test system within the ODE framework, targetted for use in early 2000, for a BTeV data acquisition pilot project.

Keywords: dummy,chep,size,style

1 Introduction

With the end of data taking of the current generation of Fixed Target Experiments, the maturing of the developments for the Collider Run II data acquisition systems, and new proposals for experiments in the Fermilab Main Injector era, we are making the first steps towards evaluating and developing the first components for a new data acquisition system in support of future experiments data taking.

As reported in previous Cheps, parts of the DART system has been used by more than eight experiments over the past five years. DART has proven to be a scalable, flexible and robust system for these experiments, and one of the collider experiments - DZero - has been using it extensively in their test stand systems during the development of the electronics and detectors for Run II. However, it is clear that we should move to the next generation of technology choices from those of DART - VxWorks, IRIX host, tcl/tk GUI, gdbm database system.

Table 1 gives a summary of the data acquisition requirements of the Run II experiments and future experiments at the Main Injector.

The DART team is collaborating with CDF and D0 on components of their data acquisition and online systems - especially in the area of SVX diagnostics and run control with CDF and the data logging and database subsystems for D0. This work is providing a further basis for the next logical step towards a new da system to replace DART.

We report here on the first steps towards this new Fermilab DA system - ODE. While experiments now in the initial planning stages will not be in full data taking mode for several years, the development and testing of detector elements and readout architectures is starting now, with test beam activity already occuring in the current Fixed Target Run and likely to continue at least yearly from now on. It is an appropriate time to start evaluating and developing components of a new system which can be used now for testing and then extended later to the full data acquisition system.

The approach will be one of incremental development and release of Versions of ODE as needed for detector development and testing. The initial components of ODE are shown in figure:

It is clearly premature to start designing the components of the final online systems for BTeV, CKM etc. However, we are starting to evaluate and explore the application of newer technologies in this environment. Additionally ODE will be the first da system fully supported on PCs - both on NT and Linux.

Components of ODE V001

Data Acquisition The acquisition of CAMAC and GPIB data is supported through using LabView. We have interfaced the Jorway SCSI branch driver and crate controller to LabView using a DLL (?). This allows us to continue to use the existing installed hardware base. Data acquired through LabView can be viewed directly or sent through shared memory (?) to the rest of the ODE system. Data from VME is acquired in ODE through a modification of the Fision (ref Vision) package in use for CDF. We are replacing the CDF specific "real time corba" implementation with a public domain Corba package (probably...) We are also evaluating the use of Linux or Real Time linux as a replacement for VxWorks in the module testing environment.

Archiving of Administrative and Control Information The initial version of ODE will incorporate MySQL databases for the storage of and access to detector and module information. The database interface will be standardized and allow either Mysql or Oracle to be used.

Run Control/Message Logging Iniitial versions of ODE will use the message logging facility delivered to CDF - merlin (ref). We plan to provide the "glue" run control and monitoring layer using the flexible, extensible GUI described in poster paper... (ref). the test sequences are defined in python and integrated..

"Paperless Test Stand" We are evaluating various existing online electronic log books - to whit... We are acting as beta testers for the new Fermilab HepNRC log book..

The first integrated Rich detector system will be ... get Forsters diagram.

And so on. Let's try with a rather long Url: `http://www-ese.fnal.gov/ode`

References

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