

## **DØ Remote Reprocessing**

The Fermilab RunII program is the world-leading elementary particle physics program colliding protons and anti-protons, until the LHC program takes over at the end of this decade. The physics program for RunII is testing the limits of the “Standard Model” of particle physics (known to be incomplete), investigating the nature of the electroweak interaction, and CP symmetry violation. The RunII experiments (DØ and CDF) each have about 700 physicists participating from around the world. One of the significant challenges of the RunII program compared to the previous run is a greatly increased luminosity and data rate from the experiments, leading to a much greater need for computing resources to process and analyze the data.

The strategy adopted by DØ to meet this challenge is to integrate advances in grid computing technology with a distributed computing model so that data analysis and simulations activities can be shared at many computing facilities around the world. A major milestone achieved, in January 2004, on the path to this goal is the successful reprocessing of over 500 million events using a distributed system with integrated grid technology, using six computing facilities in six countries, with 20% of the resources coming from outside of Fermilab. This repeated reconstruction of all its recorded data created a homogeneous dataset for physics analysis based on an up to date understanding of the detector and enabled analyses to show improved results at conferences in March 2004.

As participants in the Particle Physics Data Grid and in collaboration with the Condor team at the University of Wisconsin, matchmaking for grid scheduling was enhanced and integrated with Condor-G as part of the SAMGrid distributed computing system along with additional existing grid technology (DAGMan, Globus Gatekeeper, GridFTP, MDS). This was tested and hardened into a real production system that could be deployed, maintained and monitored. Additional deployments are continuing beyond the six sites in January 2004. The failure rate of the grid job planning and management infrastructure of <1% is very good and the overall end-to-end application job failure rate is tolerable compared to that achieved in a non-grid local cluster environment. The result being that DØ is well on it’s way to the expanded and distributed computing resources that enable to most effective scientific results for the RunII program.

URL’s:

DØ – [www-d0.fnal.gov](http://www-d0.fnal.gov)

PPDG – [www.ppdg.net](http://www.ppdg.net)