

## **Application of Grid-Computing to Real Time Detector Monitoring with a Visualization tool**

Interactive Grids implementation offers an improved solution to the problem of remote detectors monitoring and control. A visualization tool implemented on such a grid could allow more efficient monitoring due to the increased number of computing resources available and possibility to reach all the experts everywhere in the world.

CMS Tracker detector has a complex structure consisting of around 17000 modules (silicon sensors). Each module is a complete detector with more than 500 channels. Building and monitoring this detector is a complex task shared by a few hundreds people distributed in about ten laboratories spread in the world. Visualization tools are essential to let people in charge have an immediate notification of problems and take the proper actions. This task requires continuous analysis and display of a big amount of data generated by the detector and in the past was done in a counting room near to the detector.

In this application of grid computing we would like to see if this task could be performed not only using the computing resource available in the counting room but also profit of the distributed resources located in the different laboratories.

Grid computing would enable the creation of a virtual counting room with the possibility of remote control of the detector.

The benefits of the grid computing are:

- The possibility of creating a Virtual Organization (VO) constituted from all institutions participating to the tracker project.
- All the experts can interact with the detector from everywhere in the world;
- The monitoring efficiency, which depends from the amount of analyzed data, can increase a lot with the usage of grid technology.

For such application to be really useful an interactive and real-time grid is essential. Problems should be found as soon as possible and the expert must have the possibility to control remotely the detector. For example the remote people that have built a part of the detector can ask for additional data in order to diagnose faster additional problems.

Some of the research issues that could be addressed by implementing this visualization application on the grid are:

- The remote real time monitoring of the tracker requires the transfer of a huge amount of data to the remote labs. Will the grid be enough fast for this?
- Will the grid be able to manage the communication between detector experts at the remote labs?
- Could the grid be used to train new detector's experts?

The feasibility of grid enabled remote instrumentation would open a lot of opportunities to small labs with insufficient resources to own their instrumentation.