

# Trainee's Project Report

Job Code	PH112
Department	PH
Discipline	Accelerator Physics
Supervisor	CITTOLIN Sergio

## Description



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Develop WEB tools based on XML transport and SOAP protocol applied to the control and operation of High energy physics experimental apparatus driven by distributed PC clusters. The CMS experiment in construction at CERN is expected to take data from the CERN Large Hadron Collider which is scheduled to produce high-energy proton proton collisions in 2006. The data acquisition and data handling systems, required in this kind of experiment, are based on large farm of servers (several 1000s) interconnected by high-speed networks (1 Tbit/s). The processors are used to read in parallel the data produced by the detectors, to format them and transmit the event packets to farms of PC clusters where the events are analyzed, selected and saved in large databases. One important aspect of the system is that related to the management of all the processing elements, their configuration, their control and user interfaces. A new project has just started to develop a set of web-based services suitable to configure, maintain, debug and run a large experiment made of a grid of PC clusters. The aim is to access the experiment hardware and software equipment via a portal, which allows the handling of all resources, the securities, the job and info management and the history database. Physicists and engineers all over the world should be able to inspect, configure, modify, start and stop the part of the apparatus under their responsibility and in full security. Interactive tools for tables, plot and graphics presentation should allow the interaction with the data via a browser. The project exploits the most advanced technologies available today in the e-business web services world. This project offers many opportunities in term of participation and the role of the participant. More information of CMS data acquisition system may be found at: <http://cmsdoc.cern.ch/cms/TRIDAS/html/tridas.html> concerning the Run control and monitor see also at: [http://cmsdoc.cern.ch/cms/TDR/DAQ/pdf/Control\\_and\\_Monitor.pdf](http://cmsdoc.cern.ch/cms/TDR/DAQ/pdf/Control_and_Monitor.pdf) The CMS DAQ Portal Project The trainee will be asked to design and implement a Web based portal service for the presentation of dynamically changing data that comprises the health status of a distributed data acquisition system and the data that are generated by the software that is deployed on such a system. The service shall provide mechanisms for collecting data from the various programs in the cluster. The system shall incorporate the means to plug in user supplied analysis tasks and mechanisms to visualize this data. The portal service must allow for personal customization, security and authentication features. The trainees tasks will include proposing existing industry solutions that match the user requirements. All work shall, however, be performed using standard Web technologies (SOAP based communication, SQL database access, graphical data presentation formats like SVG, etc). The deployment platform of the system is Linux. Interfaces to Oracle, MySQL and XML based persistent data storage shall be provided. All work must be documented according to the MIL 498 standard. The projected time frame for a fully functional software package is one year.

## Special Requirements

Scientific programmer/engineer. Knowledge in object orientated programming, JAVA, C++



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**Training Value**

Null

