



Contribution ID: 182

Type: oral presentation

## Grid Enabled Analysis : Architecture, prototype and status

*Thursday, September 30, 2004 3:40 PM (20 minutes)*

In this paper we report on the implementation of an early prototype of distributed high-level services supporting grid-enabled data analysis within the LHC physics community as part of the ARDA project within the context of the GAE (Grid Analysis Environment) and begin to investigate the associated complex behaviour of such an end-to-end system. In particular, the prototype integrates a typical physics user interface client (ROOT), a uniform web-services interface to grid services (Clarens), a virtual data service (Chimera), a request scheduling service (Sphinx), a monitoring service (MonALISA), a workflow execution service (Virtual Data Toolkit Client), a remote data file service (Clarens), a grid resource service (Virtual Data Toolkit Server), a replica location service/meta data catalog (RLS/POOL), an analysis session management system (CAVES) and a fine grain monitor system for job submission (BOSS).

For testing and evaluation purposes, the prototype is deployed across a modest sized U.S. regional CMS Grid Test-bed (consisting of sites in California, Florida, Fermilab) and is in the early stages of exhibiting interactive remote data access demonstrating interactive workflow generation and collaborative data analysis using virtual data and data provenance, as well as showing non-trivial examples of policy based scheduling of requests in a resource constrained grid environment. In addition, the prototype is used to characterize the system performance as a whole, including the determination of request-response latencies in a distributed service model and the classification of high-level failure modes in a complex system.

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**Session Classification:** Distributed Computing Systems and Experiences

**Track Classification:** Track 5 - Distributed Computing Systems and Experiences