



Contribution ID: 184

Type: oral presentation

## The Clarens Grid-enabled Web Services Framework: Services and Implementation

*Wednesday, 29 September 2004 14:40 (20 minutes)*

Clarens enables distributed, secure and high-performance access to the worldwide data storage, compute, and information Grids being constructed in anticipation of the needs of the Large Hadron Collider at CERN. We report on the rapid progress in the development of a second server implementation in the Java language, the evolution of a peer-to-peer network of Clarens servers, and general improvements in client and server implementations.

Services that are implemented at this time include read/write file access, service lookup and discovery, configuration management, job execution, Virtual Organization Management, an LHCb Information Service, as well as web service interfaces to POOL replica location and metadata catalogs, MonaLISA monitoring information, CMS MCRunjob workflow management, BOSS job monitoring and bookkeeping, Sphinx job scheduler and Chimera virtual data systems.

Commodity web service protocols allows a wide variety of computing platforms and applications to be used to securely access Clarens services, including a standard web browser, Java applets and stand-alone applications, the ROOT data analysis package, as well as libraries that provide programmatic access from the Python, C/C++ and Java languages.

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**Session Classification:** Distributed Computing Services

**Track Classification:** Track 4 - Distributed Computing Services