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Grid3: An Application Grid Laboratory for Science

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The U.S. Trillium Grid projects in collaboration with High Energy Experiment groups from the Large Hadron Collider (LHC), ATLAS and CMS, Fermi-Lab's BTeV, members of the LIGO, SDSS collaborations and groups from other scientific disciplines and computational centers have deployed a multi-VO, application-driven grid laboratory ("Grid3"). The grid laboratory has sustained for several months the production-level services required by the participating experiments. The deployed infrastructure has been operating since November 2003 with 27 sites, a peak of 2800 processors, work loads from 10 different applications exceeding 1300 simultaneous jobs, and data transfers among sites of greater than 2 TB/day.

The Grid3 infrastructure was deployed from grid level services provided by groups and applications within the collaboration. The services were organized into four distinct "grid level services" including: Grid3 Packaging, Monitoring and Information systems, User Authentication and the iGOC Grid Operations Center. In this paper we describe the Grid3 operational model, deployment strategies, and site installation and configuration procedures. We describe the grid middleware components used, how the components were packaged and deployed on sites each under its own local administrative domain, and how the pieces fit together to form the Grid3 grid infrastructure.

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