



Contribution ID: 346

Type: **Parallel contribution**

The Tiers of US ATLAS: Integrating a Distributed Computing Facility for LHC Physics

Friday 12 August 2011 10:50 (20 minutes)

DRAFT

We discuss the US ATLAS experience in deploying, integrating and operating a set of distributed computing centers into a single, logical computing facility suitable to meet the simulation and analysis requirements for the first years of LHC physics. Particular attention is paid to the Tier 2 layer in the LHC computing hierarchy, which is a focal point of activity supporting centrally managed tasks from CERN, managed data transfers to and from the Tier 1 center at Brookhaven National Laboratory as well as Tier 1 and Tier 2 centers in Europe and Asia, sporadic user-driven transfers to university-based Tier 3 clusters, as well as chaotic analysis activity from a globally distributed collaboration. The Tier 2 centers provide a resource at an intermediate scale in HEP: larger than typical physics departmental computing clusters but smaller than facilities at the national laboratories, and therefore present a unique set of challenges. We describe new challenges emerging as the computing model evolves to meet the needs of ATLAS physics, implying Tier 2 computing scales reaching multiple-Petabyte storage systems and many-thousand computing cores.

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Session Classification: Computing in HEP

Track Classification: Computing in HEP