

A Flexible, Distributed Event Level Metadata System for ATLAS

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The ATLAS experiment will deploy an event-level metadata system as a key component of support for data discovery, identification, selection, and retrieval in its multi-petabyte event store. ATLAS plans to use the LCG POOL collection infrastructure to implement this system, which must satisfy a wide range of use cases and must be usable in a widely distributed environment. The system requires flexibility because it is meant to be used at many processing levels by a broad spectrum of applications, including primary reconstruction, creation of physics-group-specific datasets, and event selection or data mining by ordinary physicists at production and personal scales. We use to our advantage the fact that LCG collections support file-based (specifically, ROOT TTree) and relational database implementations. By several measures, the event-level metadata system is the collaboration's most demanding relational database application. The ROOT trees provide a simple mechanism to encapsulate information during collection creation, and the relational tables provide a system for data mining and event selection over larger data volumes. ATLAS also uses the ROOT collections as local indexes when collocated with associated event data. Significant testing has been undertaken during the last year to validate that ATLAS can indeed support an event-level metadata system with a reasonable expectation of scalability. In this paper we discuss the status of the ATLAS event-level metadata system, and related infrastructure for collection building, extraction, and distributed replication.

Primary authors: Dr SCHAFFER, Arthur (LAL ORSAY); Dr MALON, David (ARGONNE NATIONAL LABORATORY); Dr CRANSHAW, Jack (ARGONNE NATIONAL LABORATORY); Dr HRIVNAC, Julius (LAL ORSAY); Dr KARR, Kristo (ARGONNE NATIONAL LABORATORY)

Presenters: NICHOLSON, Caitriana (University of Glasgow); NICHOLSON, Caitriana (Unknown); Dr MALON, David (ARGONNE NATIONAL LABORATORY)

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