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A Programmatic View of Metadata, Metadata Services, and Metadata Flow in ATLAS

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The volume and diversity of metadata in an experiment of the size and scope of ATLAS is considerable. Even the definition of metadata may seem context-dependent: data that are primary for one purpose may be metadata for another. Trigger information and data from the Large Hadron Collider itself provide cases in point, but examples abound.

Metadata about logical or physics constructs, such as data-taking periods and runs and luminosity blocks and events and algorithms,

often need to be mapped to deployment and production constructs, such as datasets and jobs and files and software versions, and vice versa.

Metadata at one level of granularity may have implications at another.

ATLAS metadata services must integrate and federate information from inhomogeneous sources and repositories, map metadata about logical or physics constructs to deployment and production constructs, provide a means to associate metadata at one level of granularity with processing or decision-making at another, offer a coherent and integrated view to physicists, and support both human use and programmatic access.

In this paper we consider ATLAS metadata, metadata services, and metadata flow principally from the illustrative perspective

of how disparate metadata are made available to executing jobs and, conversely, how metadata generated by such jobs are returned.

We describe how metadata are read, how metadata are cached, and how metadata generated by jobs and the tasks of which they are a part are communicated, associated with data products, and preserved. We also discuss the principles that guide decision-making about metadata storage, replication, and access.

Primary author: ATLAS, Collaboration (Atlas)

Co-authors: Dr MALON, David (Argonne National Laboratory (US)); GALLAS, Elizabeth (University of Oxford (GB)); STEWART, Graeme Andrew (CERN); Dr ALBRAND, Solveig (Universite Joseph Fourier (FR))

Presenter: Dr MALON, David (Argonne National Laboratory (US))

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