21st International Conference on Computing in High Energy and Nuclear Physics **CHEP2015** Okinawa Japan: April 13 - 17, 2015

Contribution ID: **172** Type: **oral presentation**

ATLAS Metadata Infrastructure Evolution for Run 2 and Beyond

Monday 13 April 2015 17:00 (15 minutes)

ATLAS developed and employed for Run 1 of the Large Hadron Collider a sophisticated infrastructure for metadata handling in event processing jobs. This infrastructure profits from a rich feature set provided by the ATLAS execution control framework, including standardized interfaces and invocation mechanisms for tools and services, segregation of transient data stores with concomitant object lifetime management, and mechanisms for handling occurrences asynchronous to the control framework's state machine transitions.

This metadata infrastructure is evolving and being extended for Run 2 to allow its use and reuse in downstream physics analyses, analyses that may or may not utilize the ATLAS control framework. At the same time, multiprocessing versions of the control framework and the requirements of future multithreaded frameworks are leading to redesign of components that use an incident-handling approach to asynchrony. The increased use of scatter-gather architectures, both local and distributed, requires further enhancement of metadata infrastructure in order to ensure semantic coherence and robust bookkeeping.

This paper describes the evolution of ATLAS metadata infrastructure for Run 2 and beyond, including the transition to dual-use tools—tools that can operate inside or outside the ATLAS control framework—and the implications thereof. It further examines how the design of this infrastructure is changing to accommodate the requirements of future frameworks and emerging event processing architectures.

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Session Classification: Track 2 Session

Track Classification: Track2: Offline software