Contribution ID: **194** Contribution code: **TUE 19**   Type: **Talk**

Impact of RNTuple on storage resources for ATLAS production

Thursday 24 October 2024 14:42 (18 minutes)

Over the past years, the ROOT team has been developing a new I/O format called RNTuple to store data from experiments at CERN's Large Hadron Collider. RNTuple is designed to improve ROOT's existing TTree I/O subsystem by improving I/O speed and introducing a more efficient binary data format. It can be stored in both ROOT files and object stores, and it's optimized for modern storage hardware like NVMe SSDs.
The ATLAS experiment plans to use RNTuple as its primary storage container in the upcoming HL-LHC.
There's been significant progress in integrating RNTuple into the ATLAS event processing framework, and now all production ATLAS data output formats support it. Performance studies with open-source data have shown substantial improvements in space resource usage. The reported study examines the I/O throughput and disk-space savings achieved with RNTuple for various ATLAS data output formats, including RDO, ESD, AOD, and various DAOD. These measurements will have an important impact on the computing resource needs of the ATLAS experiment for HL-LHC operation.

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Session Classification: Parallel (Track 1)

Track Classification: Track 1 - Data and Metadata Organization, Management and Access