



Contribution ID: 192

Type: Talk

ATLAS WLCG Data Challenge 2024 planning and implementation

Monday 21 October 2024 16:15 (18 minutes)

ATLAS is participating in the WLCG Data Challenges, a bi-yearly program established in 2021 to prepare for the data rates of the High Luminosity HL-LHC. In each challenge, transfer rates are increased to ensure preparedness for the full rates by 2029. The goal of the 2024 Data Challenge (DC24) was to reach 25% of the HL-LHC expected transfer rates, with each experiment deciding how to execute the challenge based on agreed general guidelines and common dates. The ATLAS challenge was designed to test the ATLAS distributed infrastructure across 66 sites and was carried out over 12 days, with increasing rates and more complex transfer topologies, putting significant strain on the system. It was also the first time the new OAuth 2.0 authorization system was tested at such a large scale. This paper will discuss the planning of the challenge, the tools used to execute it, the agreed-upon transfer rates for the connections, and finally, the achieved results and any unachieved goals, along with an analysis of the bottlenecks. We will then describe how the challenge itself was executed, the results obtained, and the lessons learned. Finally, we will look ahead to the next challenge, currently scheduled for 2026, with 50% of HL-LHC rates.

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Session Classification: Parallel (Track 1)

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