Contribution ID: **182** Type: **Poster**

Study of columnar data analysis methods to complete an ATLAS analysis

Thursday 14 March 2024 16:10 (30 minutes)

As the LHC continues to collect larger amounts of data, and in light of the upcoming HL-LHC, using tools that allow efficient and effective analysis of HEP data becomes more and more important. We present a test of the applicability and user-friendliness of several columnar analysis tools, most notably ServiceX and Coffea, by completing a full Run-2 ATLAS analysis. Working collaboratively with a group using traditional methods, we show that our columnar workflow can be used to achieve publishable results. Additionally, we will discuss the difficulties in adapting the workflow to ATLAS procedures, and our experience deploying this workflow at a supercomputer center.

Significance

This study is to our knowledge the first use of serviceX + coffea to complete a full, publishable analysis at ATLAS. Our methods allow a look into how future physicists might approach analyses and provide valuable insight into the needs of users looking for more modern tools to complete the research goals of the collaboration.

References

Experiment context, if any

The physics analysis this poster is based on is an ATLAS study. We are anticipating that our paper will be on the arXiv before the start of ACAT 2024.

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Session Classification: Poster session with coffee break

Track Classification: Track 2: Data Analysis - Algorithms and Tools