

# Data Analysis in ATLAS from a Developer/User Point of View

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The analysis model has changed a fair bit in ATLAS since the beginning of data taking in 2009. Our original model, in which analysers would start their analysis from centrally produced Analysis Object Data (AOD) files, which they could process on the grid using the ATLAS offline software, Athena, and then use the Athena environment until the very last steps of the analysis, was only used in a very few analyses. In our current model a dedicated production team provides simple ROOT ntuple files (called D3PDs) for most physics groups, and most analysers only ever see the ATLAS data in such a format. Also, most analyses are currently done outside of the ATLAS offline software framework, using a simple compilation environment (which we call RootCore) that helps us organise these analysis packages.

In the presentation I will show the upsides and drawbacks of this current model, showing the software techniques that we had to develop to handle LHC data in such simple ROOT files efficiently, and how we organise our analysis code at the moment. This software environment forced us to develop some of the functionalities provided by our offline software in some much simpler format, so that they could be used in a "ROOT only" environment. I will show some examples where additional features from ROOT could help us write analysis code more efficiently/robustly.

There are a number of established features provided by ROOT (for instance PROOF) that only a limited number of ATLAS users take advantage of at the moment. I will try to summarise how these various more advanced ROOT features are being used at the moment in physics analyses.

At the same time, the ATLAS analysis model is under serious discussion at the moment, because the current model is known not to scale to the conditions that we expect for after 2015. One of the most pressing issues we have is to re-think how to organise the ATLAS Event Data Model, preferably taking advantage of the ROOT developments that only appeared in the last couple of years. I will outline the current plans that the experiment has in this area.

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