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Lossy compression in ATLAS offline analysis formats

In view of reducing the disk size of the future analysis formats for High Luminosity LHC in the ATLAS experiment, we have explored the use of lossy compression in the newly developed analysis format known as PHYSLITE. Improvements in disk size are being obtained in migrating from the 'traditional' ROOT TTree format to the newly developed RNTuple format. Lossy compression can bring improvements on top of the backend technology. A system has been developed which allows to specify the desired level of lossy float compression independently for the different sets of physics objects being written out. We will discuss some observed implications for physics measurements as well as the level of size reduction one observes with the backend technologies of TTree and RNTuple.

Significance

This presentation covers the investigation of using lossy compression to help in the size reduction of the stored analysis data format in the ATLAS experiment. This is the first exploration in ATLAS of lossy compression, as opposed to non-lossy compression. There are implications on the physics measurements and as well as interesting effects when coupled with the different ROOT output formats.

References

Experiment context, if any

ATLAS experiment.

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