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Analysing I/O bottlenecks in LHC data analysis on grid storage resources

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We describe recent I/O testing frameworks that we have developed and applied within the UK GridPP Collaboration, the ATLAS experiment and the DPM team, for a variety of distinct purposes. These include benchmarking vendor supplied storage products, discovering scaling limits of SRM solutions, tuning of storage systems for experiment data analysis, evaluating file access protocols, and exploring IO read patterns of experiment software and their underlying event data models. With multiple grid sites now dealing with petabytes of data, such studies are becoming increasingly essential. We describe how the tests build, and improve, on previous work and contrast how the use-cases differ. We also detail the results obtained and the implications for storage hardware, middleware and experiment software.

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