

## Modelling Resource Utilization of a Large Data Acquisition System

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The ATLAS 'Phase-II' upgrade, scheduled to start in 2024, will significantly change the requirements under which the data-acquisition system operates. The input data rate, currently fixed around 150 GB/s, is anticipated to reach 5 TB/s. In order to deal with the challenging conditions, and exploit the capabilities of newer technologies, a number of architectural changes are under consideration. Of particular interest is a new component, known as the Storage Handler, which will provide a large buffer area decoupling real-time data taking from event filtering. Dynamic operational models of the upgraded system can be used to identify the required resources and to select optimal techniques.

In order to achieve a robust and dependable model, the current data-acquisition architecture has been used as a test case. This makes it possible to verify and calibrate the model against real operation data. Such a model can then be evolved toward the future ATLAS Phase-II architecture.

In this paper we introduce the current and upgraded ATLAS data-acquisition system architectures. We discuss the modeling techniques in use and their implementation. We will show that our model reproduces the current data acquisition system's operational behaviour and present the plans and initial results for Phase-II system model evolution.

### Summary

(Summary material in attached PDF file)

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