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The ATLAS Trigger Simulation with Legacy Software

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Physics analyses at the LHC which search for rare physics processes or measure Standard Model parameters with high precision require accurate simulations of the detector response and the event selection processes. The accurate simulation of the trigger response is crucial for determination of overall selection efficiencies and signal sensitivities. For the generation and the reconstruction of simulated event data, generally the most recent software releases are used to ensure the best agreement between simulated data and real data. For the simulation of the trigger selection process, however, the same software release with which real data were taken should be ideally used. This requires potentially running with software dating many years back, the so-called legacy software. Therefore having a strategy for running legacy software in a modern environment becomes essential when data simulated for past years start to present a sizeable fraction of the total. The requirements and possibilities for such a simulation scheme within the ATLAS software framework were examined and a proof-of-concept simulation chain has been successfully implemented. One of the greatest challenges was the choice of a data format which promises long term compatibility with old and new software releases. Over the time periods envisaged, data format incompatibilities are also likely to emerge in databases and other external support services. Software availability may become an issue, when e.g. the support for the underlying operating system might stop. The encountered problems and developed solutions will be presented, and proposals for future development will be discussed. Some ideas reach beyond the retrospective trigger simulation scheme in ATLAS as they also touch more generally aspects of data preservation.

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