



Contribution ID: 19

Type: Oral

Leveraging the checkpoint-restart technique for optimizing CPU efficiency of ATLAS production applications on opportunistic platforms

Monday 21 August 2017 14:00 (20 minutes)

Data processing applications of the ATLAS experiment, such as event simulation and reconstruction, spend considerable amount of time in the initialization phase. This phase includes loading a large number of shared libraries, reading detector geometry and condition data from external databases, building a transient representation of the detector geometry and initializing various algorithms and services. In some cases the initialization step can take as long as 10-15 minutes. Such slow initialization, being inherently serial, has a significant negative impact on overall CPU efficiency of the production job, especially when the job is executed on opportunistic, often short-lived, resources such as commercial clouds or volunteer computing. In order to improve this situation, we can take advantage of the fact that ATLAS runs large numbers of production jobs with similar configuration parameters (e.g. jobs within the same production task). This allows us to checkpoint one job at the end of its configuration step and then use the generated checkpoint image for rapid startup of thousands of production jobs. By applying this technique we can bring the initialization time of a job from tens of minutes down to just a few seconds. In addition to that we can leverage container technology for restarting checkpointed applications on the variety of computing platforms, in particular of platforms different from the one on which the checkpoint image was created.

We will describe the mechanism of creating checkpoint images of Geant4 simulation jobs with AthenaMP (the multi-process version of the ATLAS data simulation, reconstruction and analysis framework Athena) and the usage of these images for running ATLAS Simulation production jobs on volunteer computing resources (ATLAS@Home)

Authors: ELMSHEUSER, Johannes (Brookhaven National Laboratory (US)); HEINRICH, Lukas Alexander (New York University (US)); LAVRIJSEN, Wim (Lawrence Berkeley National Lab. (US)); TSULAIA, Vakho (Lawrence Berkeley National Lab. (US))

Presenter: TSULAIA, Vakho (Lawrence Berkeley National Lab. (US))

Session Classification: Track 1: Computing Technology for Physics Research

Track Classification: Track 1: Computing Technology for Physics Research