

Backfilling the Grid with Containerized BOINC in the ATLAS computing

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Virtualization is a commonly used solution for utilizing the opportunistic computing resources in the HEP field, as it provides an unified software and OS layer that the HEP computing tasks require over the heterogeneous opportunistic computing resources. However there is always performance penalty with virtualization, especially for short jobs which are always the case for volunteer computing tasks, the overhead of virtualization becomes a big portion in the wall time, hence it leads to low CPU efficiency of the jobs. With the wide usage of containers in HEP computing, we explore the possibility of adopting the container technology into the ATLAS BOINC project, hence we implemented a Native version in BOINC, which uses the singularity container or direct usage of the target OS to replace VirtualBox. In this paper, we will discuss 1) the implementation and workflow of the Native version in the ATLAS BOINC ; 2) the performance measurement of the Native version comparing to the previous Virtualization version. 3) the limits and shortcomings of the Native version; 4) The use case and harvest of the Native version which includes using it in backfilling the ATLAS Grid Tier2 sites and other clusters, and using it to utilize the idle computers from the CERN computing centre.

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