

# Lightweight on-demand computing with Elasticcluster and Nordugrid ARC

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The cloud computing paradigm allows scientists to elastically grow or shrink computing resources as requirements demand, so that resources only need to be paid for when necessary. The challenge of integrating cloud computing into distributed computing frameworks used by HEP experiments has led to many different solutions in the past years, however none of these solutions offer a complete, fully integrated cloud resource out of the box. This paper describes how to offer such a resource using stripped-down minimal versions of existing distributed computing software components combined with off-the-shelf cloud tools. The basis of the cloud resource is Elasticcluster, and the glue to join to the HEP computing infrastructure is provided by the NorduGrid ARC middleware and the ARC Control Tower. These latter two components are stripped down to bare minimum edge services, removing the need for administering complex grid middleware, yet still provide the complete job and data management required to fully exploit the cloud resource. The ARC architecture delegates all the grid-related interactions (e.g. data staging, communication with workload management system) to the edge service so that no grid middleware or sensitive credentials are required on the rest of the cloud. This model can be applied not only to cloud computing, but also to restrictive environments such as High Performance Computing centres. We show how to configure Elasticcluster to automatically create the cloud resource and run these services at the click of a button and present results of the setup running real payload for the ATLAS experiment.

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