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Optimizing Provisioning of LCG Software Stacks with Kubernetes

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The building, testing and deployment of coherent large software stacks is very challenging, in particular when they consist of the diverse set of packages required by the LHC experiments, the CERN Beams department and data analysis services such as SWAN. These software stacks comprise a large number of packages (Monte Carlo generators, machine learning tools, Python modules, HEP specific software) all available for several compilers, operating systems and hardware architectures. Along with several releases per year, development builds are provided each night to allow for quick updates and testing of development versions of packages such as ROOT, Geant4, etc. It also provides the possibility to test new compilers and new configurations.

Timely provisioning of these development and release stacks requires a large amount of computing resources. A dedicated infrastructure, based on the Jenkins continuous integration system, has been developed to this purpose. Resources are taken from the CERN OpenStack cloud; Puppet configurations are used to control the environment on virtual machines, which are either used directly as resource nodes or as hosts for Docker containers. Containers are used more and more to optimize the usage of our resources and ensure a consistent build environment while providing quick access to new Linux flavours and specific configurations.

In order to add build resources on demand more easily, we investigated the integration of a CERN provided Kubernetes cluster into the existing infrastructure.

In this contribution we present the status of this prototype, focusing on the new challenges faced, such as the integration of these ephemeral build nodes into CERN's IT infrastructure, job priority control, and debugging of job failures.

Consider for promotion

No

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