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Kubernetes testbed cluster for the Lightweight Sites project

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Аннотация:
The Worldwide LHC Computing Grid (WLCG) is a global collaboration of more than 170 computing centres in 42 countries and the number of sites is expected to grow in the next years. However, provisioning of the resources (compute, network, storage) at new sites to support WLCG workloads still is not a straightforward task and often requires significant assistance from WLCG experts. Recently, a large fraction of the WLCG community has expressed that such overheads could be reduced at their sites through the use of prefab Docker containers or OpenStack VM images, along with the adoption of popular tools like Puppet for configuration. In 2017, the Lightweight Sites project was initiated to construct shared community repositories providing such building blocks. These repositories are governed by a single Lightweight Site Specification Document which describes a modular way to define site components such as Batch Systems, Compute Elements, Worker Nodes, Networks etc. Implementation of the specification is based on popular orchestration technologies-Docker Swarm, Kubernetes and possibly others. Here we discuss how the use of Kubernetes was pioneered on a testbed cluster for deploying Lightweight grid sites. The research was mainly focused on controlling the lifecycle of containers for compute element, batch system and worker nodes. Also, some parameters for benchmarking and evaluation of the performance of different implementations were introduced.

Ключевые слова:
Container, Docker Swarm, Kubemetes, Master Node, SIMPLE Grid project, WLCG, Worker Node