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EKaaS - Elastic Kubernetes as a Service in EGI Federated Cloud

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The use of Docker containers for packaging applications is
becoming extraordinarily popular. With more 100.000
applications, Docker Hub is becoming the de-facto standard
for application delivery.
In the last years, Kubernetes has also become a highly convenient solution for deploying Docker containers in
a multi-node backend. Kubernetes is, therefore, a suitable platform for many types of application topologies,
such as
microservices applications, function-as-a-service deployments,
high availability services or even high-throughput computing.

Kubernetes applications can be described as services embedded into Docker containers and their configuration
dependencies, with convenient tools for scaling up and down,
publishing endpoints or isolating traffic. Kubernetes manages the resources
where the Docker containers are deployed and run. Kubernetes installation and configuration requires some
system administration knowledge, especially concerning the
overlay network plugins.

EKaaS aims at developing a service to deploy self-managed
and customised Kubernetes clusters as a service with additional
capabilities to support specific hardware backends in the EGI
Federated Cloud. In such aim, the proposal will provide the user with
a convenient and user-friendly interface to customise, deploy and
manage the Kubernetes cluster, including the integration of software
management components such as Helm for managing applications on
the cluster. The clusters will be self-managed thanks to CLUES, an
elasticity management service that powers on and off physical or
virtual resources on demand, according to the workload.
Infrastructure Manager, an orchestration system already integrated
into the EGI Federated Cloud infrastructure will perform the
deployment of the cluster. The cluster definition will be coded into
TOSCA documents, to maximise portability. We will integrate Helm to
offer a catalogue of ready-to-deploy applications inside Kubernetes,
to be able to deliver a fully deployed application on a customised
Kubernetes cluster to the user. Finally, a convenient, user-friendly
user interface will be developed and integrated into the Applications
on Demand service of EGI. A set of application examples will be
developed and integrated into the catalogue to address common
problems arising in scientific communities.

The solution addresses mainly the long-tail-of-science
researchers who find it difficult to find resources for
medium-scale processing or want to expose a processing
service for a specific research problem. In such cases, there is
a need for a moderated amount of computing resources and a
simple way to manage them, as the resources and expertise
on system administration are low.
Finally, it also serves system administrators to ease end-users
to access the resources and to reduce the misuse of resources.

Type of abstract

Presentation

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