DEPARTMENT HEAD

BSc Thesis Task Description

Domonkos Pálvölgyi
candidate for BSc degree in Computer Engineering

Performance and useability analysis of virtual clusters in Kubernetes

Due to the proliferation of cloud computing, Kubernetes has become the leading choice as an open-source container orchestration platform. It can manage multiple tenants, allowing service separation through namespaces. However, this separation is not absolute, as there are cluster-scoped elements that cannot be fully isolated, and the control plane components are shared. These shortcomings can be addressed, for instance, by introducing virtual clusters.

The student's task is to explore, create, and analyze virtual clusters within a Kubernetes environment.

Tasks to be performed by the student will include:

- Present the Kubernetes container orchestration platform!
- Describe the advantages and disadvantages of creating virtual clusters in Kubernetes!
- Establish a Kubernetes test environment!
- Demonstrate and deploy a tool to create virtual clusters!
- Use well-designed measurements to demonstrate the use of virtual clusters!
- Based on the measurement results, analyze the performance of the virtual clusters, and investigate the resource overhead they cause in the Kubernetes system!
- Document the work in detail!

Supervisor at the department: Dr. Balázs Sonkoly, associate professor
Balázs Fodor, PhD student
External supervisor: Zsolt Krämer, Ericsson Hungary

Budapest, 3 October 2023

Dr. Pál Varga
head of department

Dept. of Telecommunications and Media Informatics
Faculty of Electrical Engineering and Informatics
Budapest University of Technology and Economics

H-1117 Budapest, Magyar tudósok krt. 2.
Phone: +36 1 463 2401 – Web: http://www.tmit.bme.hu
E-mail: pvarga@tmit.bme.hu