

Master Thesis: Extending the ONE Simulator to Support Simulation of Edge Computing Environments

Topic Description and Goal

Edge computing has emerged as a new computing paradigm in which the execution of services is pushed as close as possible to the user. At the same time, serverless computing has become widely adopted among cloud service providers, providing end users with the Function-as-a-Service (FaaS) programming model. FaaS is gaining traction and expected to become widespread in the future. However, this programming model is currently better supported (in terms of performance) in cloud environments, thanks to the architecture of cloud systems. To achieve a comparable performance of FaaS-enabled services, edge computing systems are required to rethink service placement in a decentralized manner. The goal of this thesis is to, by means of simulation, establish and/or devise efficient algorithms for the placement of computational tasks at the edge. To this end, the thesis work entails designing and implementing an extension of the ONE simulator as the main deliverable.

Thesis Tasks

- Perform literature review (on edge and serverless computing)
- Get acquainted with the [ONE simulator](#)
- Devise and implement distributed solutions for job spreading/task placement in an edge environment
- Execute a series of experiments and evaluate the performance of the proposed solution
- Analyze* the algorithmic complexity of the proposed solution

Qualifications

- Education: Master studies in the field of computer sciences or comparable.
- Knowledge: strong background in computer networking, understanding of distributed systems architectures and protocols, OOP programming skills in Java.
- Experience: hands-on experience with network simulators (e.g., OMNeT++, the ONE) is a plus.

Contact

- If you are interested in this topic, please send an email including a **letter of motivation**, **CV**, and a **transcript** of your completed courses to Ljubica Kärkkäinen (email: kaerkkal@in.tum.de).

* The task, if required, may be carried out in cooperation with the supervisor.