Master Thesis (CS or INFOCOM)
Subject Areas: Software Defined Networking; Edge Networking; Fog Computing
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Title: Orchestration of containerized applications in a distributed cloud

Different platforms have been released in the last few years for automating deployment, scaling, and management of containerized applications on a cloud infrastructure.

User mobility, Internet of Things-enabled functions (e.g., sensors, actuators) and other advanced emerging scenarios require computational nodes to host their containerized applications close to the users. As a consequence, the cloud infrastructure is evolving to manage not only large cloud nodes (e.g., data-centers) but also smaller edge computing nodes close to the users.

Heterogeneous and geographically distributed cloud solutions pose new challenges to the management of cloud infrastructure, in terms of previously neglected network-specific service parameters (such as bandwidth, latency, security, etc.) which, unlike within the confines of a single data-center, cannot be assumed to be arbitrarily large, small or available in the context of a large network.

The scope of the thesis is to enable the convergence of innovative networking and container orchestration platforms to effectively manage containerized applications in a geographically distributed cloud, by ensuring that applications' needs (compute, storage but also networking) are catered for.

Technologies:
Kubernetes, an open-source orchestrator for containers originally designed by Google.
OpenContrail or ONOS, SDN open source orchestration solutions supported by different network vendors.

Candidate's requirements:
- Development experience in C++ or Java
- (Desirable): knowledge of containerization platforms
- (Desirable): knowledge of configuration/installation of router (e.g., Juniper routers) or virtual switching (e.g., OpenvSwitch)