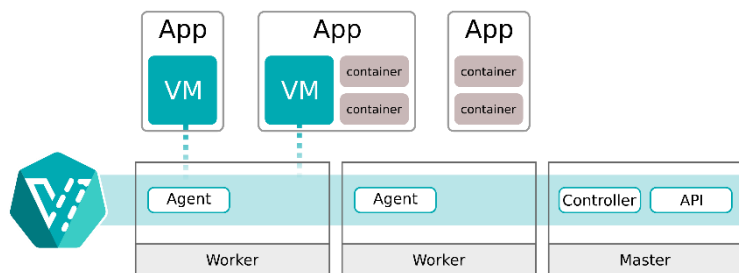




Task Description for Student/Diploma/Master Thesis

Topic: *Improving Performance of Orchestration for Cloud-Native Applications*



KubeVirt

Description: Unlike traditional monolithic applications, [cloud-native applications](#) are the collection of small and independent services, which are so-called microservices. As cloud-native applications have gained tremendous interest in recent years, many cloud vendors such as Google Cloud and Amazon Web Service already provided cloud platforms for cloud-native applications. Cloud-native applications are realized as containers, which are provisioned by container orchestration platforms, such as Kubernetes. Telecom operators such as AT&T advocates to containerize their existing applications. However, this containerization processing comes with challenges. First, for the security concern, many existing applications run on top of virtual machines. KubeVirt, which is the extension of Kubernetes, has been introduced to orchestrate both containers and virtual machines. Second, to better utilize hardware capabilities, many existing applications run on bare-metal servers. Metal3, which is also the extension of Kubernetes, has been proposed to orchestrate both containers and bare-metal hosts.

However, the bare-metal hosts are typically equipped with CPUs that introduce lower processing rate than emerging hardware acceleration technologies such as DPDK and SmartNICs.

This topic investigates the performance of cloud orchestration under the support of the hardware acceleration technologies.

Tasks:

- Literature review
- Find a research problem (optional)
- Propose a solution
- Evaluate the proposed solution
- Write up a report

Requirements:

- Basic knowledge of computer networks
- Basic knowledge of Linux
- Programming languages: C, Python, Go (preferably)

Language: English

Our offer that helps students focus on their work:

- Testbed
- Measurement tools and scripts

Keywords: cloud-native applications, cloud orchestration, containers

Contact: M.Sc. Tung Doan (tung.doan_van@tu-dresden.de)