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TECHNISCHE UNIVERSITÄT DRESDEN

VODAFONE CHAIR

5G Lab GERMANY

Motivation:

Upcoming fifth generation (5G) cellular networks will support more features than just an increase in data rate. In particular, multi-service architectures, massive connectivity and ultra-reliable-low-latency communications (URLLC) will be supported. In these regards, software defined networking (SDN) and network function virtualization (NFV) will play a central role in fulfilling the requirements.

In addition, the extreme short response times of URLLC require the most time-critical time processing to happen close to the base station. Here, the concept of the edge cloud becomes central, where the cloud appears at the edge of the core network, i.e. close to the base station. The edge cloud is integrated into the network via NVF or SDN techniques and performs time-critical tasks. Additionally, the edge cloud can cache commonly used data such as viral YouTube videos, such that the core network can be unloaded. It is expected that the edge cloud will become a unit of major importance in deployed 5G networks.

Objective:

Analyzing performance and designing efficient algorithms for edge cloud computing, ranging from URLLC control tasks to network virtualization functionalities.

Approach:

In a first phase, the computing performance of the provided HPE edge cloud servers will be analyzed and it will be investigated, how the servers can be combined with already available hardware and software. Second, the servers will be used to implement common 5G and edge cloud architectures and services, such as URLCC processing, MAC-layer processing, NFV or SDN. The results will be presented as demos at a diverse set of trade shows, conferences and project meetings.

Vodafone Chair Contribution:

The Vodafone Chair for Mobile Communications Systems concentrates on the following aspects within the project:

- Integration of the HPE EL4000 PXI-chassis with available National Instruments USRPs
- Employing edge cloud computing for MAC processing on top of the available GFDM physical layer.
- Development of demos regarding multi-user, multi-connectivity and low-latency communications.