Converged Resource Management over Software Defined Virtualized 5G Networks: Opportunities and Challenges

Fifth-generation (5G) cellular wireless networks are envisioned to predispose service-oriented, flexible, high spectrum- and energy-efficient edge to core infrastructure, aiming to offer diverse applications such as Internet of things (IoT), tactile Internet and critical mission applications. To cater desirable quality-of-service (QoS) experience for end users of such diverse applications, 5G networks must be designed in highly dynamic structure to provide appropriate configuration based on each services. End-to-end convergence of software-defined networking (SDN), software defined radio (SDR) compatible with multiple radio access technologies (RATs), and virtualization concepts over 5G is providing the main framework to reach this dynamic architecture where the principal technique behind them is to separate the control and traffic planes, from the deep core entities to the edge of wireless access points (APs). This separation also allows the abstraction of resources as transmission parameters of each user over the 5G where the pool of resources can be allocated to each services based on QoS requirements. Besides, 5G resorts to new trends of physical layer technologies such as millimeter-wave transceivers, massive multiple input multiple output (MIMO) scenarios, and non-orthogonal transmission, to improve its own resource utilization, energy efficiency, and decrement of end-to-end delay transmission. Consequently, the pool of resources in 5G contains diverse physical to network layer parameters where it can enable converged multi-layer (CML) resource management over the portfolio of resources. In this talk, we will investigate the CML resource management in 5G, highlight its advantageous, and discuss about its implementation challenges.