Week 25

Software-Defined Networking (SDN) as an Edge Solution

In order to realize the envisioned pervasive computing scenarios, we must come up with a solution that hides all internal complications from the users, especially from the application developers and the service providers. To this end, Software Defined Networking (SDN) with its network programming capabilities stands out as a natural candidate for orchestrating the network, the services and the devices by hiding the complexities of this heterogeneous environment from the end users.

SDN is the most promising proposal so far for the programmable networks which separates the control from data plane and enables the programmable control mechanism. It can easily simplify the management of the network, define network flows, increase network capability and facilitate virtualization within the network. The control mechanism that is provided by SDN can lower the complexity of the Edge Computing architectures and implementations by bringing a novel approach to the networking and utilizing the available resources in a more efficient manner. In a system that incorporates edge servers into the traditional cloud data center, the traffic originated at the edge can be dynamically routed to the tier and server that may provide the highest quality service to the user by using the available SDN mechanisms. Since the SDN paradigm concentrates the network intelligence at the central software-based controller, it will relieve the relatively simpler edge devices from executing the complex networking activities such as service discovery and orchestration.

When we gather all these features and advances together, we see that a multi-tier Edge Computing infrastructure that is managed by SDN has a significant potential for mitigating the barriers and restrictions that edge devices encounter. It has the capability to meet the QoS requirements such as performance and delay, and improve the user satisfaction.

There are recent surveys on cloud computing and MCC. Most of these works focus on accessing the traditional cloud services over mobile devices and do not cover this area from a broad perspective and hence, managing the novel services and orchestrating the dynamic environment are not addressed so far. In the context of Edge Computing, there are surveys for Cloudlets, Fog Computing and Mobile-Edge Computing. However, these studies remain incapable to discuss the common Edge Computing proposals together by focusing on their requirements and differences among them, and depict the general view over Edge Computing concept.