PRISENODE: Privacy- and secuRity-aware solutIons in SoftwarE-defiNed fOg Data cEnter

Major technological trends in information technology such as cloud computing, big data, and mobile computing are based on powerful computing resources. The ever-increasing demand for computing resources has led companies and cloud service providers (CSPs) such as Google, Amazon, and Microsoft to build large warehouse-sized data centers called cloud data centers (CDCs). CSPs incorporate software-defined networking (SDN) and virtualization in their CDCs to ensure full utilization of server resources and reduce the power and electricity that are consumed. Applying SDN in CDCs provides reliable Quality of Services (QoS) and satisfying the user-centric Quality of Experience (QoE) in CDCs that are called software-defined cloud data centers (SDDCs). SDDC faces resource management problem and under threaten of security and privacy issues. To the best of my knowledge, no any practical tool can provide robust solutions to these problems, and further investigation is needed.

In this project, I integrate fog technology with SDDCs and design a scalable fog network to manage the cloud service demands as well as providing secure processing and traffic data privacy in SDDC. I named this project PRISENODE: Privacy- and secuRity-aware solutIons in SoftwarE-defiNed fOg Data cEnter. My project targets fog data center (FDC) which consists of SDN-enabled switches that are instantiated on an SDDC server and serving as edge switches (Fog Nodes; FNs).

FNs accommodate small-size flows with limited response time and deliver high user QoE. In this way, I design a fundamental tool (open-source software) together with a holistic business model for privacy- and security-aware data traffic passed through SDN-enabled switches FDCs/CDCs. The salient feature of my project is to jointly monitor network traffic, validate network traffic policies, and detect malicious entities in the cloud system as well as introducing related security- and privacy-aware defenses in SDDCs.

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