



Tutorial 4

on

QoS and QoE analysis for IoT Multimedia Applications in Software Defined Network

Abstract:

Presently, the network is flat and everything goes to back to the core. But in 5G technologies, contents are cached at the network edge or regionally for faster and reliable delivery in Content Delivery Network (CDN). That's why 5G requires to manage the traffic and orchestrate by the huge number of nodes so that the devices can communicate with each other simultaneously. In this consequences, Software Defined Networking (SDN) decouples software plane from the hardware plane in 5G network devices that supports network monitoring, scalability and resource management capabilities efficiently. Both SDN and Network Functions Virtualization (NFV) are playing crucial roles for 5G to achieve 1,000-times higher system capacity, 100-times increased data rates, 100-times devices connectivity, reduction of latency to $1ms$ from $5ms$ and energy savings in different network topologies. These technologies are the effective part of 5G for creating multiple hierarchies. However, existing IoT multimedia applications suffer from QoS and QoE issues in traditional network system. To overcome these limitations, SDN offers improved QoS and QoE for IoT multimedia applications. In this tutorial, we, at first, configure the network topologies, simple web server and client interaction using Mininet WiFi tool and then, will demonstrate QoS and QoE performance analysis for real time video streaming in terms of different performance matrices.

Agenda:

1. Introduction to SDN Based IoT Application
2. Installation to Mininet WiFi and Wireshark
3. Implementing a LAN and WLAN network using Mininet WiFi
4. Multimedia Streaming (e.g DASH) over SDN
5. Traffic monitoring, QoS and QoE performance analysis

Targeted audience and prerequisite:

Scientist seeking to enhance the 5G networking using Software Defined Network. Participants are expected to prepare the to prepare the following for their own hands-on session:

1. Download the Ubuntu 14.04 LTS desktop version from <http://releases.ubuntu.com/14.04/> then make it dual boot in your laptop.
2. Make ensure your internet connection on the workshop day for some installation purpose.
3. After installation the Ubuntu please update your OS by typing the command in terminal without the quotation "sudo apt-get update".
4. Every participant should bring his/her own laptop, charger and other required equipment's.

Short Biographies:



Dr. Rahamatullah Khondoker is working as a Substitute Professor, Telecommunication Networks, Darmstadt University of Applied Sciences, Germany and Project Lead, Automotive Security & Privacy, Security & Privacy Competence Center, Continental Teves, Frankfurt, Germany. Before that, he worked as a Researcher in Fraunhofer Institute for Secure Information Technology (Fraunhofer SIT) located in Darmstadt, Germany, and Lecturer, TU Darmstadt, Germany. Moreover, he also worked as a Researcher and Lecturer at the Department of Computer Science in TU Kaiserslautern, Germany. From this university, he completed Doctor of Engineering (Dr.-Ing.) in Computer Science with the topic "Description and Selection of Communication Services for Service-Oriented Network Architectures". Before that, He completed M.Sc. in Computer Science degree from the University of Bremen, Germany. He received several awards until now. He was selected as a top 10 researcher in 2015 by the academics.de Germany. He was awarded from Ericsson, Germany in the year 2008 and from the FIA Research Roadmap group in October 2011. On 8th July 2015, he completed "University Teaching Certificate" course from TU Darmstadt, Germany. He worked in several National and International projects including DFG project (PoSSuM), BMBF projects (G-Lab, G-Lab DEEP, FutureIN, IUNO - an Industrie 4.0 project), EU projects (PROMISE, EuroNF, PRUNO), and several industrial projects. Currently, he is focusing on the Automotive Security, Security of Software-Defined Networking (SDN), and Network Function Virtualization (NFV) which are considered for use cases in IoT, 5G and Industrie 4.0 domains.



Nazrul Islam is a Ph.D. Student in the School of Electrical and Computer Engineering (FEEC), University of Campinas (UNICAMP), São Paulo, Brazil. He is holding M.Sc degree in Electrical Engineering with emphasis on Telecommunication Systems from Blekinge Institute of Technology (BTH),

Karlskrona, Sweden. Now he is working as an Assistant Professor in the Department of Information and Communication Technology at Mawlana Bhashani Science and Technology University, Tangail, Bangladesh. His research interest includes smart control plane loop of SDN, 5G, cloud computing.



Md. Ahsan Habib is serving as an Associate Professor in the Department of Information and Communication Technology in Mawlana Bhashani Science and Technology University, Bangladesh. His research interest includes wireless sensor network, SDN, routing protocols, 5G, mobile cloud computing, internet of things, bioinformatics etc. He is a member of IEEE Computer Society, ACM, IEB, ISOC and Lions Club International.



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