Master's Thesis: Modelling Time Translators for UDP based TSN over 5G Time Synchronization

Time Sensitive Networking (TSN) over 5G is a hot topic for research and development today. Private 5G network vendors are trying to provide TSN over 5G solutions as quickly as possible. With that said, there is still a lot of 5G and TSN over 5G functionality missing in the network simulators. Network Simulators are very important because they provide the possibility to test the new algorithms and different scenarios in varying environments.

For TSN and 5G simulations, OMNeT++ provides a discrete event simulation environment with the help of INET framework, for TSN, and Simu5G framework, for 5G. Therefore, this thesis focuses on modelling Time Translators for 5G networks using Simu5G and INET simulation frameworks. And as TSN is an Ethernet based technology and 5G has a completely different layer stack, thus not supporting Ethernet frames, this thesis considers UDP encapsulation for Ethernet frames over 5G. Therefore, allowing us to focus on modelling the Time Translators in OMNeT++.

Fig 1: Time Translators in 5G-TSN Integration

Your tasks:

- Model UDP based encapsulation and decapsulation for Ethernet frames over 5G networks.
- Model Device Side and Network Side Time Translators for 5G-TSN Integration.

This thesis will provide you the opportunity to:

- Acquire a deeper understanding about Time Sensitive Networking.
- Learn about Integration of TSN and 5G from Time Synchronization's perspective.
- Learn OMNeT++ simulator, INET framework, and Simu5G framework.
- Develop the skills to simulate TSN and 5G networks in OMNeT++.
- Acquire critical thinking necessary for scientific research.

Supervised by:

	Anas Bin Muslim, M.Sc.	*Prof. Dr-Ing. Ralf Tönjes*
Room	UA 0313	UA 0308
Email	a.bin-muslim@hs-osnabrueck.de	r.toenjes@hs-osnabrueck.de
Telephone	0541 969-3332	0541 969-2941