SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

The STSM applicant submits this report for approval to the STSM coordinator

Action number: CA15127
STSM title: Towards resilient zero-touch network slicing
STSM start and end date: 07/10/2019 to 13/10/20189
Grantee name: Poul Heegaard

PURPOSE OF THE STSM/

The focus of the STSM was defined to be study of aspects related to the network slicing concept proposed in 5G networks. The goal was to identify the key constituents of a slice (in terms of physical and logical resources), analyzing the main aspects of automated (zero-touch) slice orchestration and management, and investigating the challenges of slice isolation in the interplay between commodity (non-critical) and critical services running on top of shared physical communication infrastructure with QoS differentiation in the presence of failures.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSM

The STSM was implemented at Optical Networks Unit at Chalmers University of Technology, Department of Electrical Engineering, hosted by Marija Furdek.

Two presentations were given during the stay:
1. "Approaches for assessment of cyber physical systems" – talk for the Departments of Electrical Engineering and Computer Science
2. "A modelling approach to network survivability quantification" – an introduction to Survivability modelling, linked to Dependability modelling

The original scope of the STSM was changed because another idea popped up during the brainstorming the first day. This was followed by a long and fruitful discussion with Marija, Carlos Carlos Natalino Da Silva, and Poul on the content and structure of a potential paper on "Evaluation of Disaster Recovery Strategies". Chalmers has expertise in security and resilience of optical networks, while NTNU (together with Duke University [1]) has expertise on survivability (the performance and recovery) of a network after a fixed disaster scenario.

The objective of the paper is to provide a modelling framework for evaluation of the recovery phases (the transient behaviour) of (networked) services after a disaster, considering and comparing different recovery strategies. The idea is to evaluate the transient survivability performance of a service (e.g., CDN) by adding the time dimension representing the recovery phases / steps. The Network survivability modelling will be based on what was developed by Heegaard and Trivedi [1].

[1] Poul E. Heegaard and Kishor Trivedi. "Network Survivability Modeling," Computer Networks, Volume 53, Issue 8 (2009), pp. 1215 -1234. Elsevier. http://dx.doi.org/10.1016/j.comnet.2009.02.014

DESCRIPTION OF THE MAIN RESULTS OBTAINED

A clear objective and scope is defined, and an outline of a paper on "Evaluation of Disaster Recovery Strategies" has been drafted, and part of the mathematical fundamentals have been done.

FUTURE COLLABORATIONS (if applicable)

Ass. Prof. Marija Furdek, Post Doc Carlos Natalino Da Silva, (PhD student Marija Gajic), and Prof Heegaard will continue the work on the paper with the goal to submit to a conference.