PROJECT FACTSHEET

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5G-INSIGHT

Towards secured 5G vehicular networks in cross-border areas

Inspiration

The automotive industry is undergoing numerous technological developments in terms of vehicle-to-everything (V2X) communication capabilities and automated driving features. However, these major advances for tomorrow's connected mobility are highly dependent on the deployment of 5G technologies along with new service-oriented architectures enable through network slicing.

Network slicing allows physical 5G networks to be broken down into multiple virtual networks – each of them addressing a specific use case and thus having its own capabilities (latency, throughput, connectivity). The benefit: providing a more personalised network service that adapts to the needs of connected applications, which may have different latency, throughput, scalability or even network resource allocation needs. While the deployment and adoption of such technologies is not yet tomorrow, many questions and challenges are emerging regarding data security and privacy. There are indeed still many gaps in this area, and recent advances in data-driven network planning, design and security have the potential to provide new solutions.

Innovation

5G-INSIGHT aims at providing advanced security mechanisms to detect and mitigate slicing attacks for 5G and beyond vehicular networks with special focus on the France-Luxembourg cross-border area. Through this INTER project co-funded by the Agence Nationale de la Recherche (ANR - FR) and the Fonds National de la Recherche (FNR - LU), researchers will make use of advanced Machine Learning algorithms to propose new techniques for detecting as well as predicting attacks and anomalies within 5G vehicular slices.

To this end and as work package leader, LIST researchers will be responsible for generating realistic datasets on vehicular-slicing attacks to develop reliable prediction models. They will need to collect real network datasets, on a testbed implementing 5G-V2X technologies, and then artificially augment them using techniques that combine simulation and Generative Adversarial Networks (GANs, and other related deep learning approaches). In addition to this, LIST will make benefit of its expertise to propose privacy-preserving defence and mitigation mechanisms based on blockchain and deception security paradigm. In close collaboration with its partners, LIST will also contribute to the development of orchestration and management security services to achieve automated response and mitigation at both edge and core networks.

The project will validate the proposed approaches by implementing simulations as well as a demonstration platform that will integrate the specific characteristics of the France-Luxembourg cross-border area. Three use cases will be studied: automated lane merging/splitting and overtaking, real-time traffic flow regulation, and network assisted vulnerable road user protection.

Impact

5G-INSIGHT will not only contribute to the current state of the art on cross-border 5G vehicular networks and network slicing, but also to the creation of synergies with other national, European, and cross-border 5G projects. The platform to be created internally will also be linked as much as possible with other ongoing 5G initiatives, so as to create a seamless picture on network planning solutions - considering here the security and privacy aspects. Finally, the development of a proof of concept will demonstrate the ability of 5G-INSIGHT solutions to alleviate security threats, network vulnerabilities and attack risks in a virtualised cross-border environment.

Partners

La Rochelle Université (FR) , SECAN-Lab (LU) , Université Bourgogne Framche-Comté (FR) , Université Gustave Eiffel (FR)

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Contact

5, avenue des Hauts-Fourneaux
L-4362 Esch-sur-Alzette
phone: +352 275 888 - 1 | LIST.lu

Dr Sébastien FAYE (sebastien.faye@list.lu)
Qiang TANG (qiang.tang@list.lu)

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST