TECHNISCHE UNIVERSITÄT DRESDEN

ComNets
Deutsche Telekom Chair of Communication Networks

Faculty of Electrical and Computer Engineering Institute of Communication Technology

Task for the preparation of a Diploma Thesis

Name:
Matriculation number:

Title: Enhancing Security Mechanisms for Low-Latency Communication in Network Coding

Objectives of work

Network coding holds great promise for resilient communication, but security remains a critical concern. While Homomorphic MAC (HMAC) is recognized as an effective technique for securing random linear network coding, its inherent complexity and associated overhead can degrade system performance, rendering it unsuitable for low-latency communication applications.

This task focuses on conducting an extensive literature study on HMAC, comparing different methods based on computational complexity, overhead, and security aspects. The primary objective is to propose strategies and approaches that reduce the complexity of HMAC procedures while taking into account the necessary trade-offs between complexity reduction and security measures. The ultimate goal is to enhance communication latency in network coding systems.

As a requirement, the student must document the outcome of the project work in a scientific report. Additionally, the diploma thesis should be written in English.

Focus of work

- Performing an in-depth and thorough literature review of HMAC and its application
- Reviewing and comparing the state-of-the-art HMAC techniques considering diverse factors such as overhead, computational complexity, and security.
- Providing a list of suggestions or proposing an HMAC method with lower complexity
- Discussing the potential benefits and challenges associated with implementing the proposed complexity reduction methods
- Presenting and discussing results
- Preparing an intermediate presentation and a final report for the thesis.

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Issued on: TBD
Due date for submission: TBD

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