



Task for the preparation of a Student Thesis

Name:

Matriculation number:

Title:

**Hybrid Packet Recovery and HMAC Verification in Network
Coding Systems**

Objectives of work

Packets in network coding can become corrupted either through deliberate adversarial pollution or accidental bit flips caused by the communication channel. Such corrupted packets jeopardize the decoding process and may significantly reduce the reliability of the overall system.

The main focus of this work is to investigate strategies that combine packet recovery mechanisms with HMAC-based verification. The objective is to detect corrupted packets early and, where possible, recover them without retransmission. This includes evaluating approaches for mixing recovery strategies with lightweight cryptographic checks, and comparing them against conventional mechanisms such as ARQ (Automatic Repeat reQuest). The task includes measuring the speed and effectiveness of detection and recovery, assessing the impact on latency and throughput, and identifying the trade-offs between additional overhead and reliability gains.

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

- Conducting a literature review on packet pollution in network coding, recovery strategies, and HMAC-based verification.
- Implementing combined packet recovery and HMAC verification mechanisms.
- Evaluating detection speed and recovery effectiveness compared to conventional ARQ.
- Measuring performance metrics such as latency, throughput, and computational overhead.
- Analyzing trade-offs between additional overhead and reliability gains.
- Preparing an intermediate presentation and a final report for the thesis.

Referee:

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Issued on:

TBD

Due date for submission:

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