Universität Rostock

Traditio et Innovatio

**Topic for a Bachelor/Master/Pre-Thesis, Master Project,
or to work on as a Student Research Assistant**

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Extension of the FLExible Network Tester (FLENT) Tool Suite for IEEE 802.11s WLAN Mesh Networks

WLAN mesh networks, specified by the WLAN standards amendment IEEE 802.11s, provide for a flexible and low-cost wireless interconnection of embedded systems for various use cases. Besides spontaneous link establishment, mesh nodes also support multi-hop communication by implementing the routing mechanism Hybrid Wireless Mesh Protocol (HWMP) and its Airtime Link Metric (ALM) for assessing path costs. Although IEEE 802.11s ensures mesh interoperability at the WLAN MAC layer, the interplay with higher network protocol layers and applications still bears room for optimizations.

To assess the real-world performance of WLAN mesh networks and potential optimizations, suitable test environments are required. The tool suite FLExible Network Tester (FLENT, https://flent.org/), developed for automated throughput and latency experiments in Linux networks, comes as an interesting candidate. However, so far FLENT does not consider performance metrics specific to WLAN mesh networks, such as the HWMP routing metric ALM, among others.

Consequently, the aim of this work is the design of extensions for the FLENT framework that allow to capture the 802.11s-specific HWMP information and metrics as part of the automated performance tests. For the evaluation of these FLENT extensions in simple mesh scenarios, the network virtualization framework Mininet-WiFi (https://mininet-wifi.github.io/) shall be used.

Summarized, the following tasks have to be solved:

- Familiarization with the fundamentals of IEEE 802.11s WLAN mesh networks

- Familiarization with the frameworks FLENT and Mininet-WiFi

- Conception and implementation of FLENT extensions for the integration of HWMP routing information

- Experimental evaluation in adequate mesh scenarios using Mininet-WiFi

- Detailed documentation of all work steps

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