



Evaluation of NS-3 for IEEE 802.11s based WLAN Mesh Network Simulation

Description:

The development of distributed wireless embedded systems has become a challenging topic of today. Communication of such systems plays an important role and there is an increasing trend towards flexible and low-cost wireless interconnection. One of the main technologies for consumer grade communications is Wi-Fi according to the IEEE 802.11 standard.

The network topology of a wireless mesh network is a field of intensive research and interesting applications, which resulted into the amendment IEEE 802.11s, which describes a standardized way for mesh networking over IEEE 802.11 networks.

The modern development of distributed embedded systems including the implementation of hardware and software solutions gains many benefits of model-based methodologies. Therefore many systems are simulated in early stages to make design decisions.

NS-3 (<https://www.nsnam.org/>) is a widely-used open source network simulator for research and industry, which also incorporates a model for IEEE 802.11s mesh networks.

In this thesis, the current capabilities of NS-3 regarding IEEE802.11s simulation should be investigated. This should cover the existent modeling features such as physical & MAC layer parameters, adjustable channel effects and mobility constraints. The student should also design appropriate simulation experiments to test the precision and performance of NS-3 for mesh network simulations.

The following tasks have to be conducted:

- Learn about the NS-3 framework
- Design and implementation of mesh network simulations (e.g. investigate adjacent channel interference between nodes or multi-hop frame forwarding effects)
- Test and evaluation of the developed approach
- Discussion and documentation of the results

Highly recommended skills for working on this topic:

- Advanced C/C++ coding
- Advanced knowledge in radio communications and networking

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