NS-3 simulation of Wireless Mesh Networks (WMN)

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Introduction

Wireless Mesh Networks (WMN) are a type of network, in which multiple devices form an all-wireless multi-hop network. In WMN data forwarding is performed completely on air without any need for additional wiring except for a power source. Additionally, WMN can integrate other wireless or wired connection types, e.g. 3G/4G, WiMax or Ethernet. Using these capabilities WMN can for example be used as community internet access points for whole neighborhoods.

Recently the 802.11s amendment has been included into the IEEE standard for wireless LAN. This amendment standardizes support for mesh networking using common WLAN hardware as found in routers as well as laptops and smartphones. For those battery-powered devices it is necessary to maintain a low power consumption to stay online. To keep up with this requirement 802.11s includes new power saving mechanisms.

The network simulator ns-3 is a discrete-event network simulator. It is an open-source project for simulating network environments, both cable-connected and wireless. ns-3 already includes a radio energy model for simulating energy consumptions and has a set of classes for simulating 802.11s mesh networks. What is yet missing, are the specific 802.11s power save schemes. The task of this work will be to implement and test these power save schemes in ns-3 and to determine their efficiency in different network simulation setups.

Challenges

- analyzing the current simulator structure and the required amendments
- open-source software development
- designing suitable test setups and strategies

Requirements

- C++ programming knowledge
- English language skills (for understanding the respective parts of the IEEE standard)

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