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{Semester|Master|Diploma} Thesis

Reliable Routing in MANETs

Subject

In the past, a huge variety of routing algorithms for ad hoc networks has been developed. However, these protocols do not provide reliable communication with guaranteed delivery in case of node failures, packet loss or broken links. Wired networks mostly rely on TCP for reliable communication. The 802.11 wireless networks come with some additional retransmission policies, to reduce end-to-end retransmissions.

In this thesis, we are interested in the development and *formal* analysis of reliable ad hoc routing protocols for MANETs that have the following properties:

- The algorithms should be simple enough that you can prove performance properties, and that they can be implemented on restricted hardware and software, such as the Berkeley sensor nodes running TinyOS. (The implementation on physical nodes is not part of this thesis.)
- The routing protocol should be reliable, i.e. resilient to packet loss, node failure, link failure and take into account the properties of MANETs.
- The algorithm should be fully distributed, i.e. there is no central authority in the system.
- In contrast to most papers that describe routing algorithms for (sensor) networks, your algorithm should run on dynamic graphs, whose edges are not stable. Alternatively or additionally, you might consider mobile networks, where nodes change their physical position.
- Performance. The reliability should not significantly increase the number of sent messages or the end-to-end delay.

For a proof of concept, you might run some simulations of your algorithms using our simulation framework that is currently being developed. However, the simulation and programming part will make up a tiny part of your work.

Skills

Interest in designing and analyzing distributed algorithms.

Contacts/Advisors

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