

Master's Thesis

« Evaluation of Simple Fragment Forward Recovery for the 6LoWPAN Protocol »

Background

To realize the vision of the Internet of Things, various efforts are undertaken to bring the internet protocol even to the most resource-constrained devices such as wireless sensor nodes. One important building block is the 6LoWPAN protocol which enables transmission of IPv6 datagrams via link layers such as the 802.15.4 protocol.

Although 6LoWPAN has reached RFC status in the meantime, there exist some unsolved questions, especially concerning fragmentation, which has to be used to send large IPv6 datagrams over link layers with small MTUs (e.g. 802.15.4 with 127 bytes). Sending a large number of fragments over multiple hops of an unreliable channel exhibits an increasing probability to lose a fragment and thereby the whole datagram. Additionally, this may lead to situations, where consecutive fragments are still transmitted uselessly by nodes farther away from the occasion of the datagram loss.

Work Description

To overcome such problems, an addition to the 6LoWPAN RFC describes a mechanism for Simple Fragment Forward Recovery (SFFR). This mechanism uses acknowledgements to add end-to-end reliability to the fragmented transmission of datagrams, both for mesh-under and direct route-over routing schemes. Within this Diplomarbeit or Master's Thesis, this mechanism has to be implemented for the existing CometOS 6LoWPAN stack and evaluated against the standard stack without such a mechanism using different modes (Assembly, Direct). The work can be broken down to the following tasks:

- Literature research for existing evaluation and similar reliability mechanisms
- Implementation of an end-to-end reliability mechanism for the CometOS 6LoWPAN module
- Evaluation of the implementation by simulation and in a testbed

Technologies

- 6LoWPAN
- OMNeT++, CometOS

Prerequisites

- Solid knowledge of the C++ programming language
- Basic knowledge of embedded systems and communication networks
- Experience with OMNeT++ is helpful, but not mandatory

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