Bachelor's Thesis

« Design and Implementation of an IPv6 Border Router for an 6LoWPAN-enabled Framework for Wireless Sensor Networks »

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 the forwarding of fragmented IPv6 datagrams via multiple hops. For this reason, an implementation of the 6LoWPAN protocol was created for the CometOS framework to enable the evaluation of performance-improving mechanisms. At the moment, however, this implementation only enables IPv6 communication within the wireless network.

Work Description

Aim of this Bachelor's Thesis or Project Work is to design and implement a border router which acts as a bridge between the wireless 6LoWPAN-network and the Internet. Possible solutions have to be found and evaluated with the requirement to re-use as much as possible of the existing implementation. As a proof of concept, a demo appliation has to be implemented for the hardware platform available at the institute. Summing up the tasks:

- Find and investigate possible solutions to the given problem; a possible approach can be a tun/tap virtual interface
- Make use ofthe existing IPv6/6LoWPAN Implementation for CometOS
- Create a proof-of-concept implementation which demonstrates the readout of some sensor data via a remote PC using UDP

Technologies

- IPv6, 6LoWPAN, Linux
- CometOS

Prequisites

- Solid knowledge of the C/C++ programming languages
- Basic knowledge of embedded systems and communication networks

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