# Bottleneck Analysis in Multi Hop Ad Hoc Networks

The availability of cheap yet powerful wireless access technology, most notably IEEE 802.11 ('wireless LAN'), has given an impulse to the development of wireless ad hoc networks. In such networks, the stations that are in reach of each other, help each other in obtaining and maintaining connectivity. At the same time they are also competitors, as they all contend for the same resource, i.e., the shared ether as transmission medium. Research has shown that, effectively, the DCF tends to equally share the capacity among contending stations. Although this appears to be a nice fairness property, this fairness does lead to undesirable situations in case on (or more) of the nodes happens to function as a bridge toward either another group of nodes or to the fixed internet.
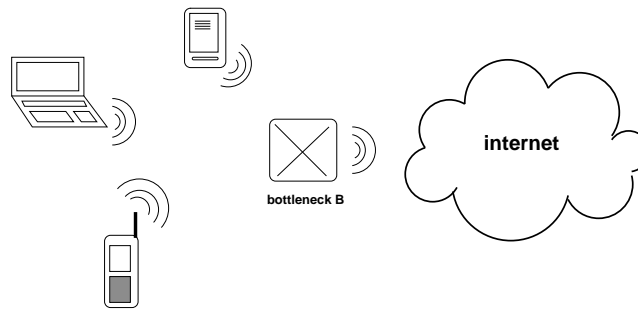
It is interesting to analyze alternative capacity sharing strategies, that is, different ways to allocate radio capacity to contending stations: Such strategies have been made possible through the recent QoS-extension of the IEEE 802.11e standard.

Recently, we presented results for bottlenecks in two-hop ad hoc networks. The goal of this assignment is to extended this research to a multi-hop scenario. The following steps should be taken:

- literature research on existing work in two hop and multi hop ad hoc networks

- extend the two-hop model in Opnet to a multi-hop scenario;

- find out in what way the results for the two-hop setting are applicable to the multi-hop setting,

- find alternative ways to model / analyze the multi-hop scenario

- verification of the results with simulation using a network simulator (i.e. Opnet)

- interpretation of the results

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