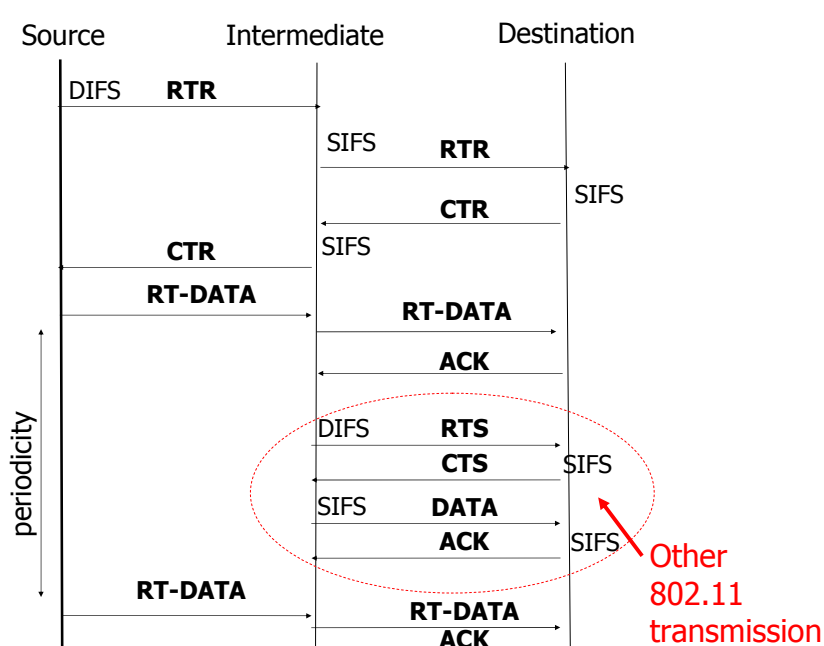


MAC for Real-Time Traffic in Distributed Multi-hop Wireless Networks: Protection of an End-to-End Resource Reservation

Industry motivation: Design of a multi-hop radio access network with support for real-time traffic

DARE protocol: End-to-end allocation of time slots on a multi-hop transmission path [1,2]

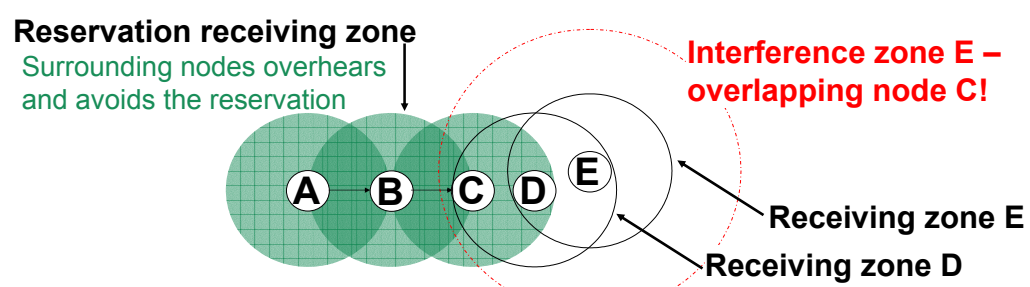


Reservation protection:

a) Basic protection:

Surrounding nodes retrieve reservation information by overhearing SETUP, DATE, and ACK messages

But: For some scenarios, the basic scheme is not sufficient to ensure protection



b) Enhanced protection:

Spread information also via CTS:



Simulation model:

- Area size: 700mx700m
- 100 nodes uniform randomly placed
- Node on/off times: exp. distribution
- One reservation 5ms/100ms
- 50 ns2 simulations a 3600s

End-to-end packet delay:

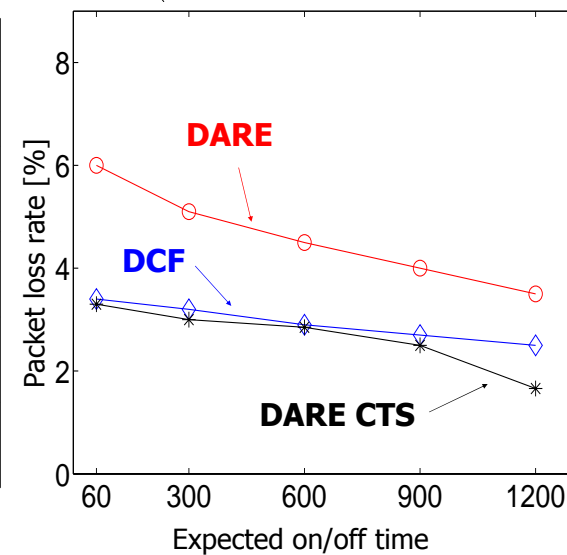
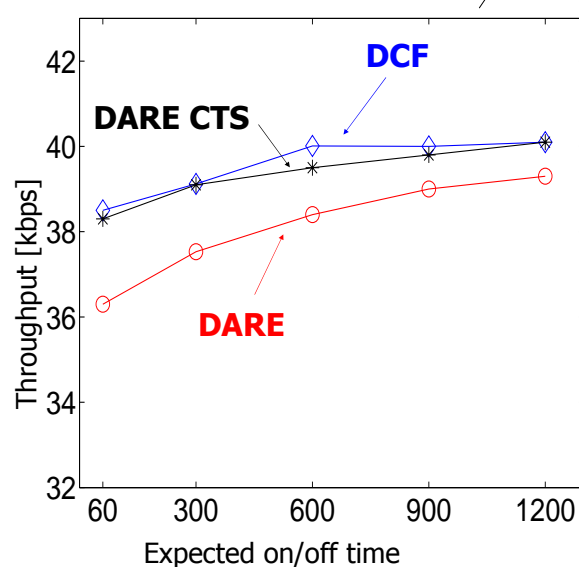
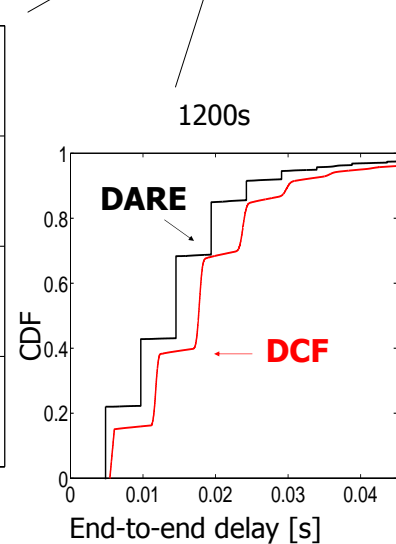
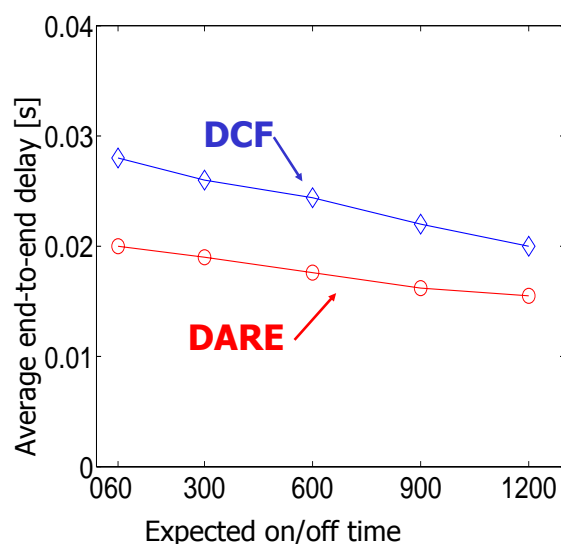
DARE outperforms DCF

- Much lower jitter
- Lower average delay

Independent of CTS information

Throughput and packet losses:

- DARE without information on CTS: Worse performance than DCF
- DARE with information on CTS: About the same performance as DCF



Ongoing work:

- Comparison with 802.11e
- Support of multiple reservations
- Performance analysis with real traffic traces

References:

- [1] E. Carlson, H. Karl, A. Wolisz, C. Prehofer, "Distributed allocation of time slots for real-time traffic in a wireless multi-hop network." In *Proc. European Wireless*, Feb 2004.
- [2] E. Carlson, C. Bettstetter, H. Karl, C. Prehofer, A. Wolisz, "Distributed maintenance of resource reservation paths in multihop 802.11 networks." In *Proc. IEEE Veh. Techn. Conf. (VTC)*, Sep 2004.