Humboldt University Berlin
Computer Science Department
Systems Architecture Group

Rudower Chaussee 25
D-12489 Berlin-Adlershof
Germany

Phone: +49 30 2093-3400
Fax: +40 30 2093-3112
http://sar.informatik.hu-berlin.de

**Multi-Channel Opportunistic Routing in Multi-Hop
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Authors:
Anatolij Zubow, Mathias Kurth, Jens-Peter Redlich

Multi-Channel Opportunistic Routing in Multi-Hop Wireless Networks

ANATOLIJ ZUBOW, MATHIAS KURTH and JENS-PETER REDLICH

Humboldt University Berlin

Unter den Linden 6, D-10099 Berlin, Germany

(zubow|kurth|jpr)@informatik.hu-berlin.de

Abstract. We propose and investigate Multi-Channel Extremely Opportunistic Routing (MCExOR) which is a protocol that extends Extremely Opportunistic Routing by utilizing multiple RF channels in multi-hop wireless networks. Large numbers of transmissions per end-to-end delivery combined with interference are the main reasons for the low capacity of wireless multi-hop networks. MCExOR reduces the overall number of transmissions in wireless multi-hop networks by opportunistically skipping nodes in a packet's forwarding path. The use of multiple non overlapping RF channels contributes to the reduction of overall interference.

In contrast to other approaches MCExOR only needs one RF transceiver per device. We present algorithms for route discovery and packet forwarding. A significant benefit of MCExOR is that the selection of RF channels is independent of the routing function. Finally, with the help of simulations we show that MCExOR outperforms traditional protocols like ad-hoc on-demand distance vector routing through the simultaneous use of multiple RF channels. In combination with realistic radio propagation models an increase in the throughput is observed due to the opportunistic feature of MCExOR. With the increasing number of RF channels the overall throughput increases superproportionally. Unlike other multi channel approaches even a single packet flow can benefit from the existence of multiple channels.