



Multi-Hopping VANETs and Security

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Do we need multi-hopping?

SEVECOM

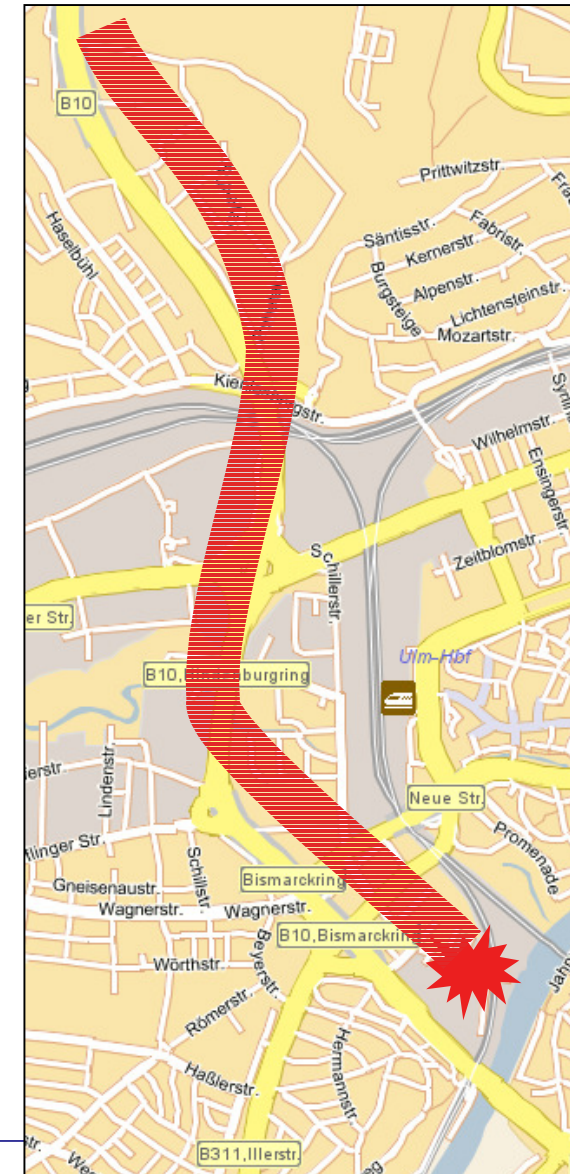
- Range requirements
 - 802.11p a few hundred meters (unobstructed)
 - City-scenario: maybe less (obstruction)
 - Applications may require longer ranges (e.g. crash warning, telematic applications, ...)
 - Multi-hop may extend the range of infrastructure
 - Sending at restricted power/range may enhance overall throughput
 - Depends on traffic density



Position-based Routing

Often position based addressing:

- **GeoBroadcast:** send to all nodes within a region
“All cars in the area of Ulm/B10:
Accident on Adenauerbridge when heading
towards Neu-Ulm”
- **GeoAnycast:** send to arbitrary node within a region
“How are traffic conditions three km ahead?”
- DC Fleetnet Routing Protocol:
 - Address surrounding nodes:
→ Direct flooding of message in target region
(“Area-Forwarding”)
 - Address remote nodes:
→ First „Line-Forwarding“,
then Area-Forwarding
 - Cached Greedy Geocast (CGGC)

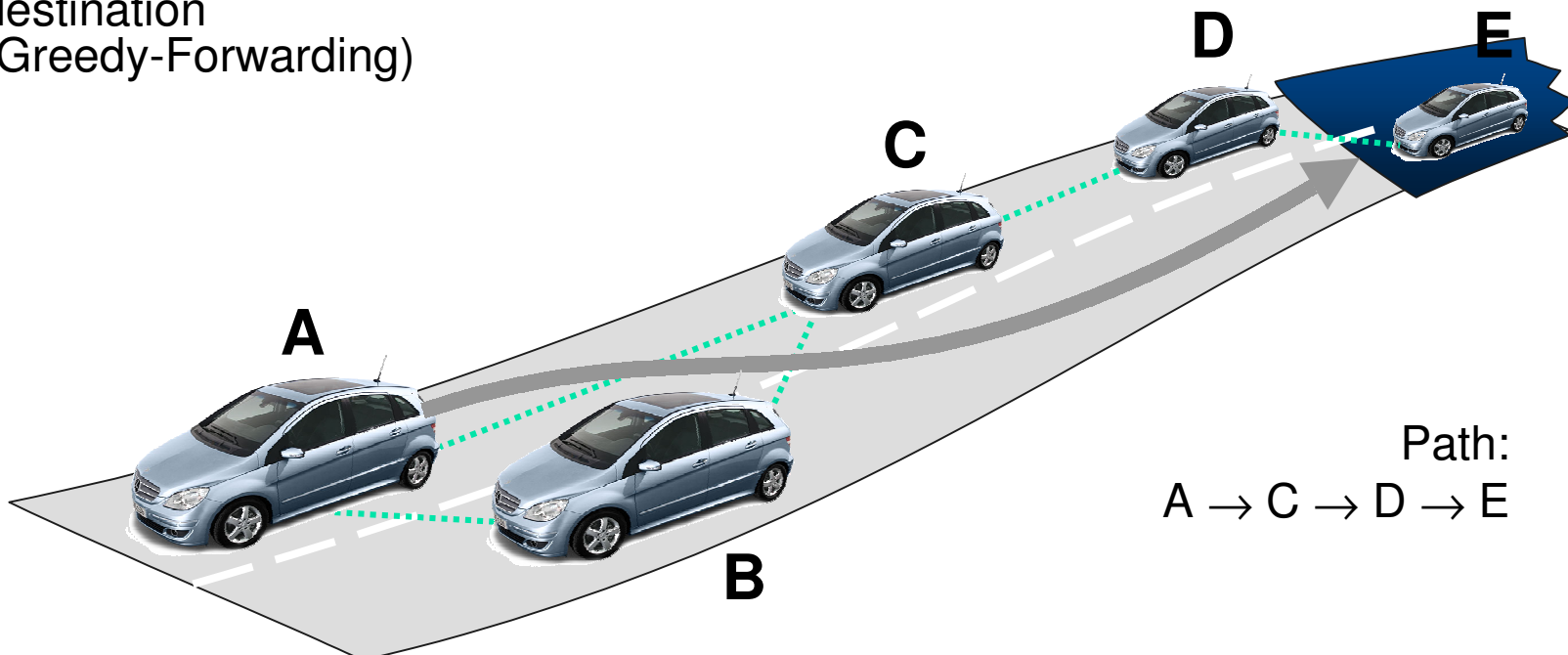




Position-based Routing

Line-Forwarding

- Destination: remote geographic position/region
- Each node announces its position periodically via broadcast to all reachable neighbors (Beaconing)
→ each node knows all other nodes and their position in its neighborhood
- Routing: if target region is not reached, nodes forward packets to neighbor which is nearest to destination (Greedy-Forwarding)





Questions

- Do we need multi-hop in C2C/C2I?
- What will the routing protocols be?
- What are the security trade-offs between one- and multi-hop?