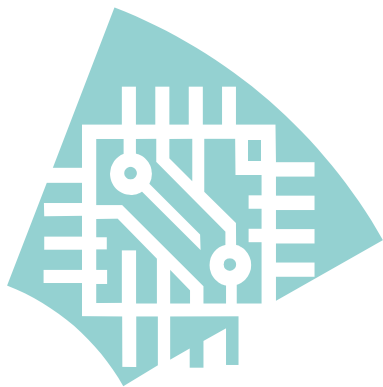# Corridor Routing in Mobile Ad-hoc Networks

Christian Vogt, University of Karlsruhe

Michael Gerharz, University of Bonn

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Overview

- Advantages of Multi-Path Routing

- Existing Multi-Path Protocols

- Corridor Routing

- Simulation Results and Analysis

- Conclusion and Future Work

Advantages of Multi-Path Routing

- **Bottleneck Circumvention**

  Choosing paths with low traffic

- **Efficient Bandwidth Usage**

  Disperse traffic over multiple paths

- **Reduced Destination Discovery Frequency**

  Reducing signaling overhead

Existing Multi-Path Protocols

Ad-hoc On-demand Multi-Path Distance Vector Routing, AOMDV

> Das, Marina:
>
> "**On-Demand Multipath Distance Vector Routing in Ad-hoc Networks**," IEEE ICNP, Nov. 2001.

Split Multi-Path Routing, SMR

> Gerla, Lee:
>
> "**Split Multipath Routing with Maximally Disjoint Paths in Ad-hoc Networks**," IEEE ICM, June 2001.

- Disjoint paths
- Paths of different length
- Limit on number of routes
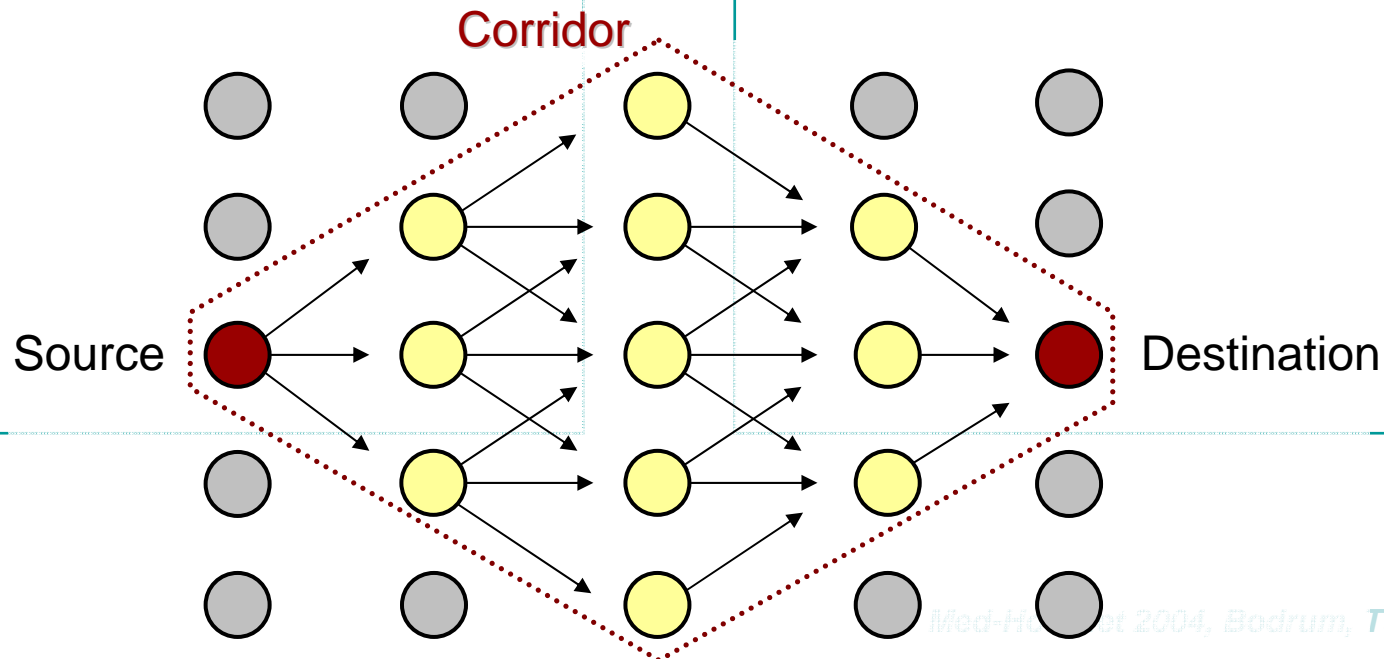- Unicast Route Reply messages

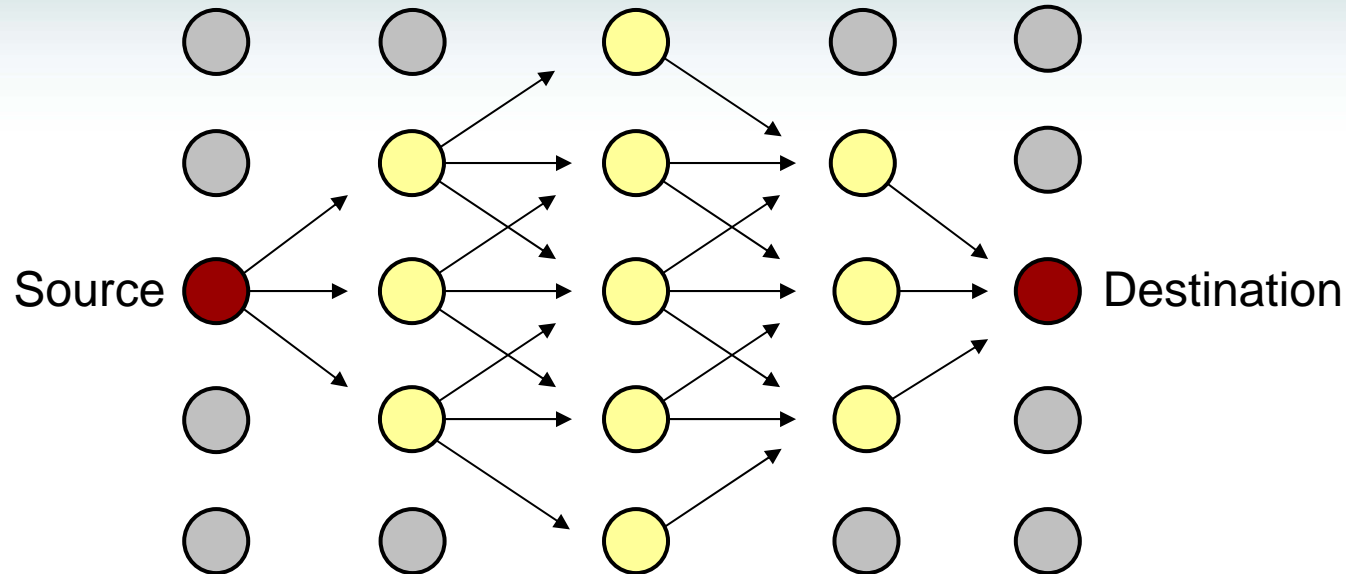# Corridor Routing

Existing MP Protocols

- Disjoint paths
- Paths of different length
- Limit on number of routes
- Unicast Route Reply messages

Corridor Routing

- Paths may overlap
- Paths are minimum-hop
- Number of routes unlimited
- Broadcast Route Reply messages
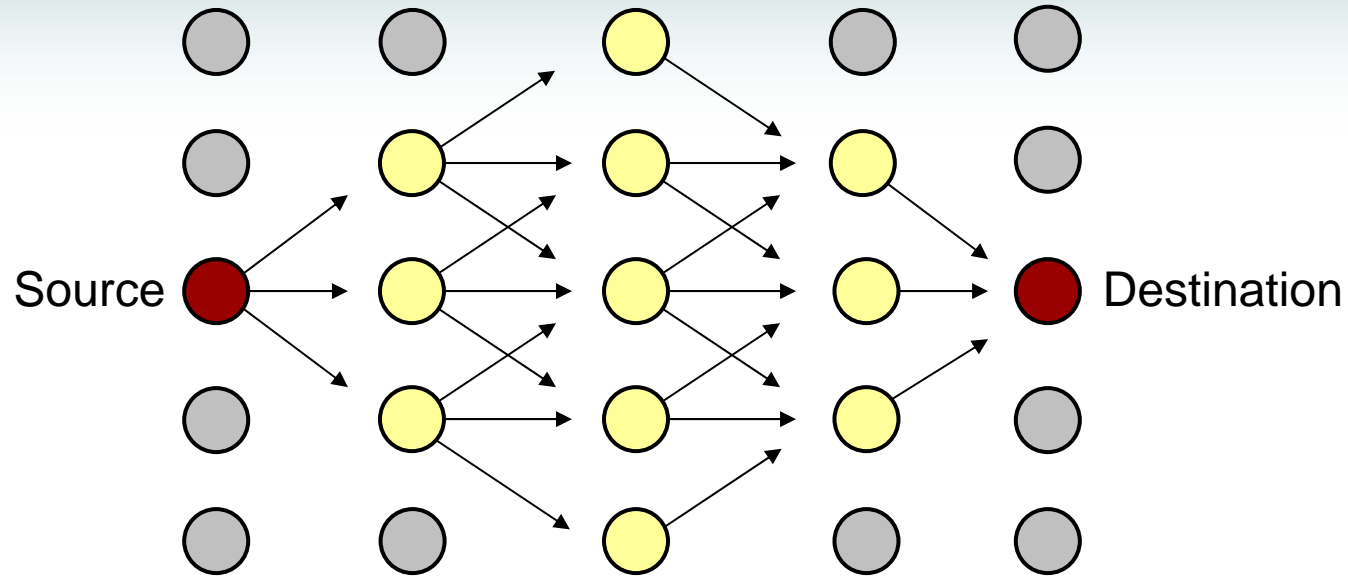
Corridor

Source

Destination

Destination Discovery

Route Request message…

- is flooded into the network

- holds a Hops-to-Source field

Route Reply message…

- is regionally broadcasted

  along the corridor

- holds a Hops-to-Destination field

- holds a Total-Hops field

Destination Discovery (2)


Intermediate router is on a minimum-hop path

$\Leftrightarrow$ Hops-to-Source + Hops-to-Destination = Total-Hops
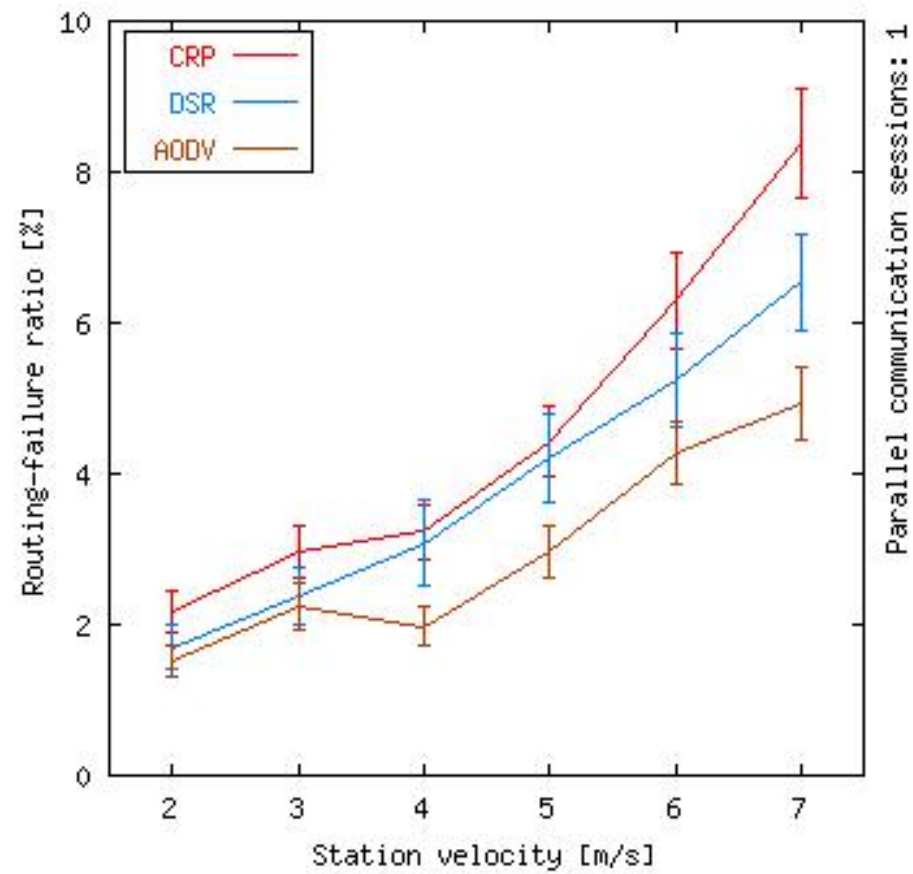
Simulation Results and Analysis

- Network Simulator 2

- 50 Mobile Nodes

  50 m Transmission Range

  300x60 m² Movement Area

  $\varnothing$ 2 ~ 7 $^m/_s$ Movement Speed

- DSR, AODV, and

  Corridor Routing Protocol (CRP) at L3

  IEEE 802.11b at L2

- VoIP, 12.2 kbps (AMR Codec)
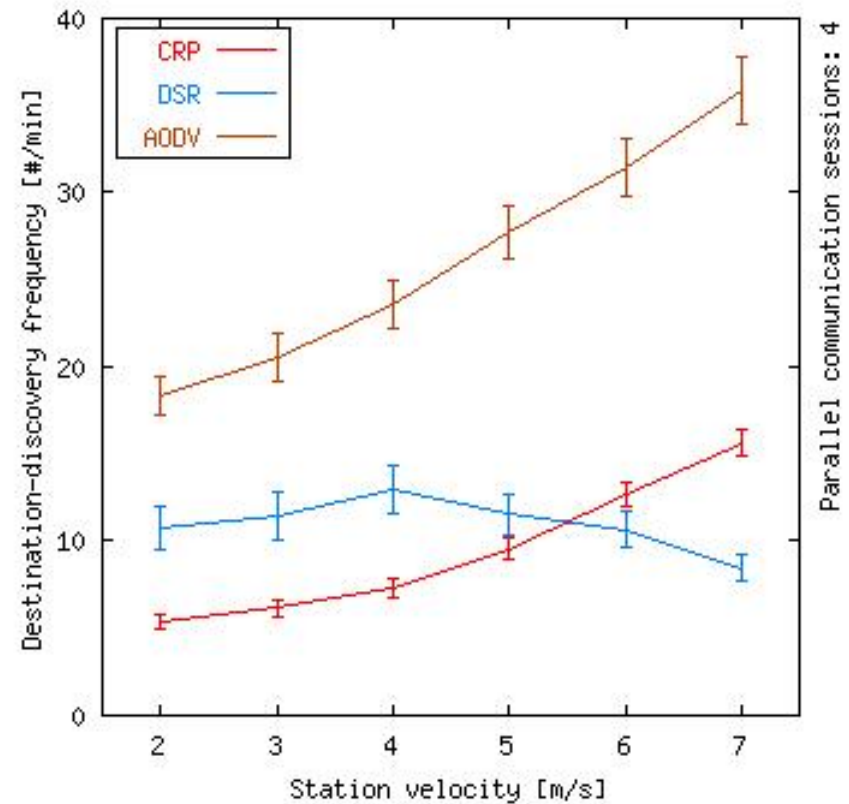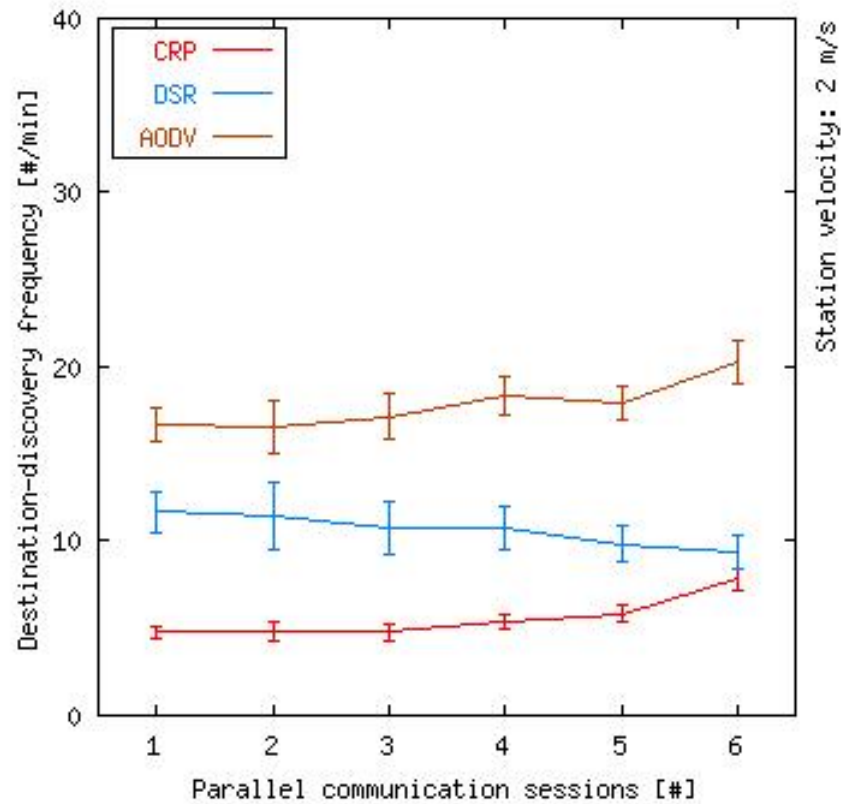
  60s Call Holding Time

  1 ~ 6 Parallel Calls

Datagram Delivery Ratio
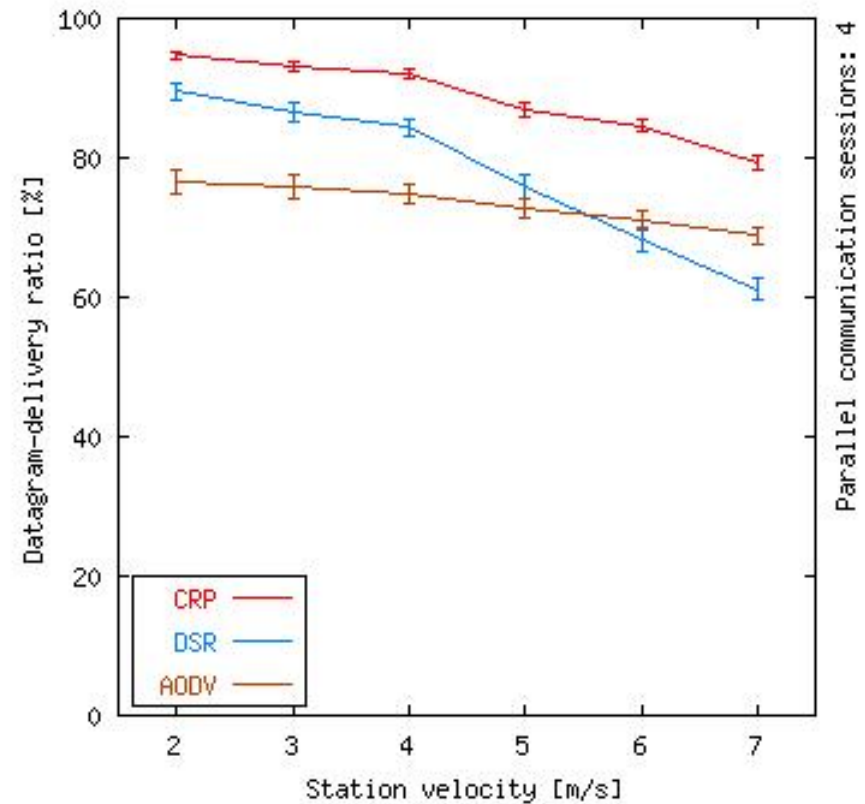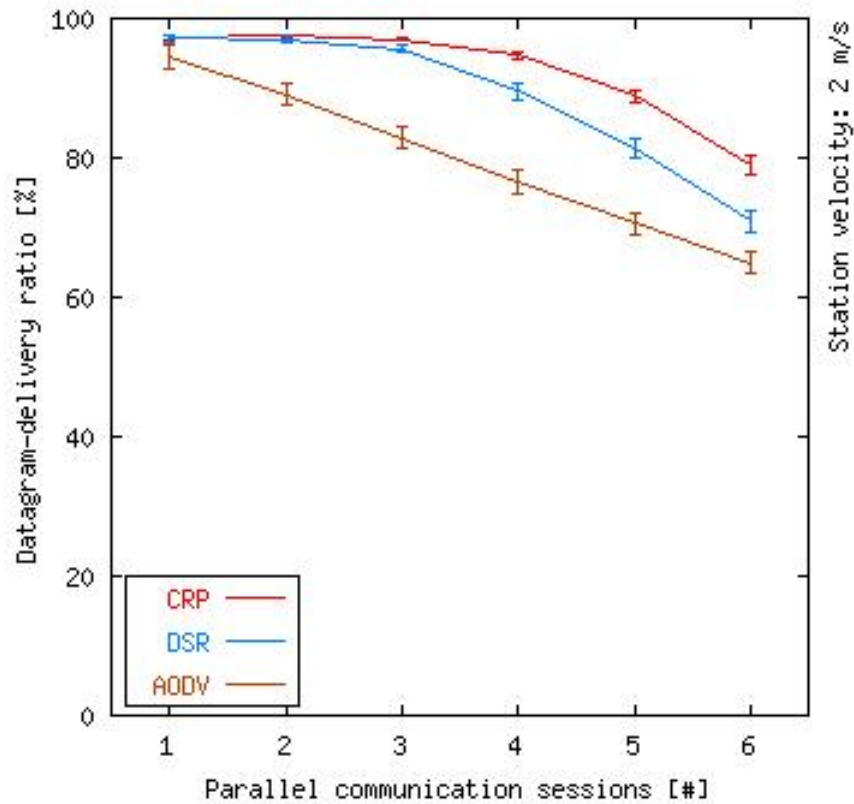
Routing Failure Ratio

Destination Discovery Frequency

More Analysis

- Datagram Delivery Ratio

- Routing Failure Ratio

- Destination Discovery Frequency

- Datagram Delivery Delay

- Buffer Overflow Ratio

Conclusion and Future Work

- **Corridor Routing**

  Use of All Minimum-Hop Paths

  Unlimited Number of Paths

  Paths are Not Necessarily Disjoint

- **Performance**

  Increased Packet Delivery Ratio

  Reduced Destination Discovery Frequency

  Adverse Impact of Routing Failures

- **Future Work**

  Comparison to Multi-Path Protocols

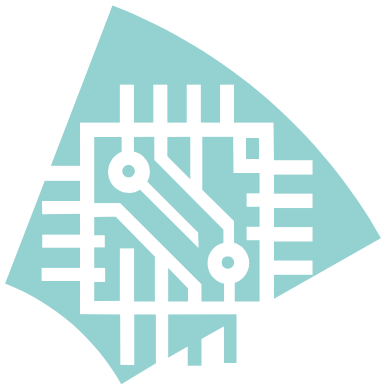# Corridor Routing in Mobile Ad-hoc Networks

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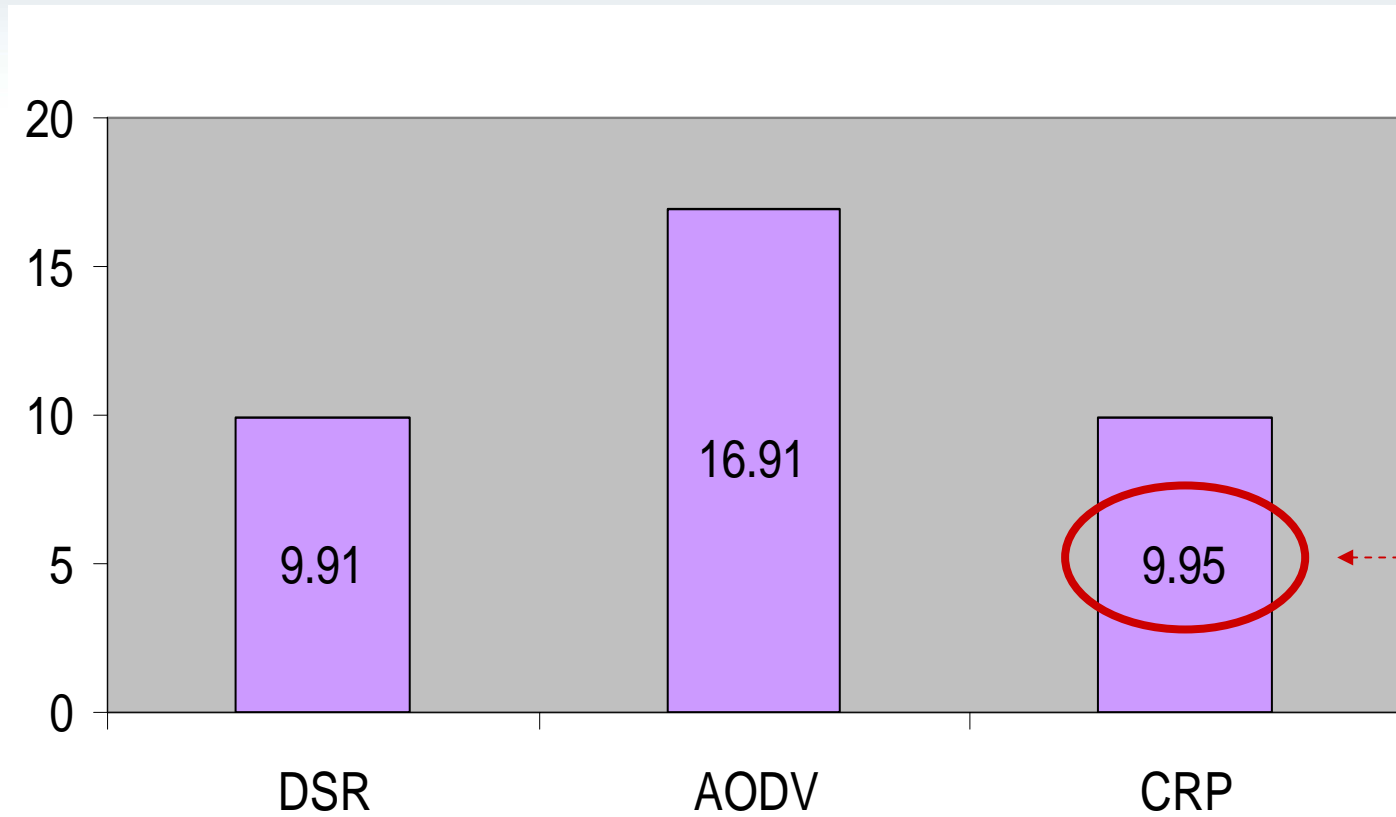# Corridor Routing in Mobile Ad-hoc Networks

Supplementary Presentation

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Christian de Waal, dewaal@cs.uni-bonn.de

Destination Discovery Frequency

per Call (60 seconds)
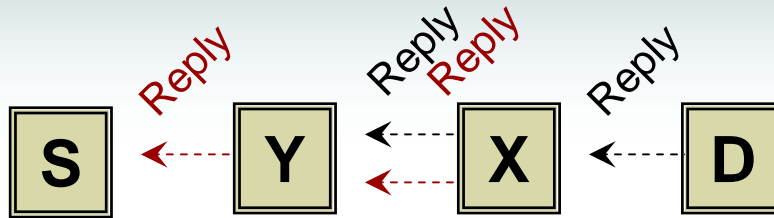
Analysis: Loss of Reply Messages

- Reply messages are broadcasts

- Broadcasts are unprotected by acknowledgements

- Increased risk for collision

- Some discoveries terminate prematurely

Solution: Propagation Monitoring

- X broadcasts Reply

- X listens whether Y propagates

- If Y does not propagate, X re-transmits

Destination Discovery Frequency, revisited

per Call (60 seconds)