

Efficient Broadcasting, through Irresponsible Forwarding, in Intelligent Transportation Systems

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Efficient Broadcasting, through IF in ITSs
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- o **Topology information dissemination**
 - Weak QoS requirements
 - One or two hops
 - Used by unicast (multicast) routing protocol

- o **Event-driven information dissemination**
 - Strong QoS requirements
 - Multiple hops
 - Broadcast storm problem

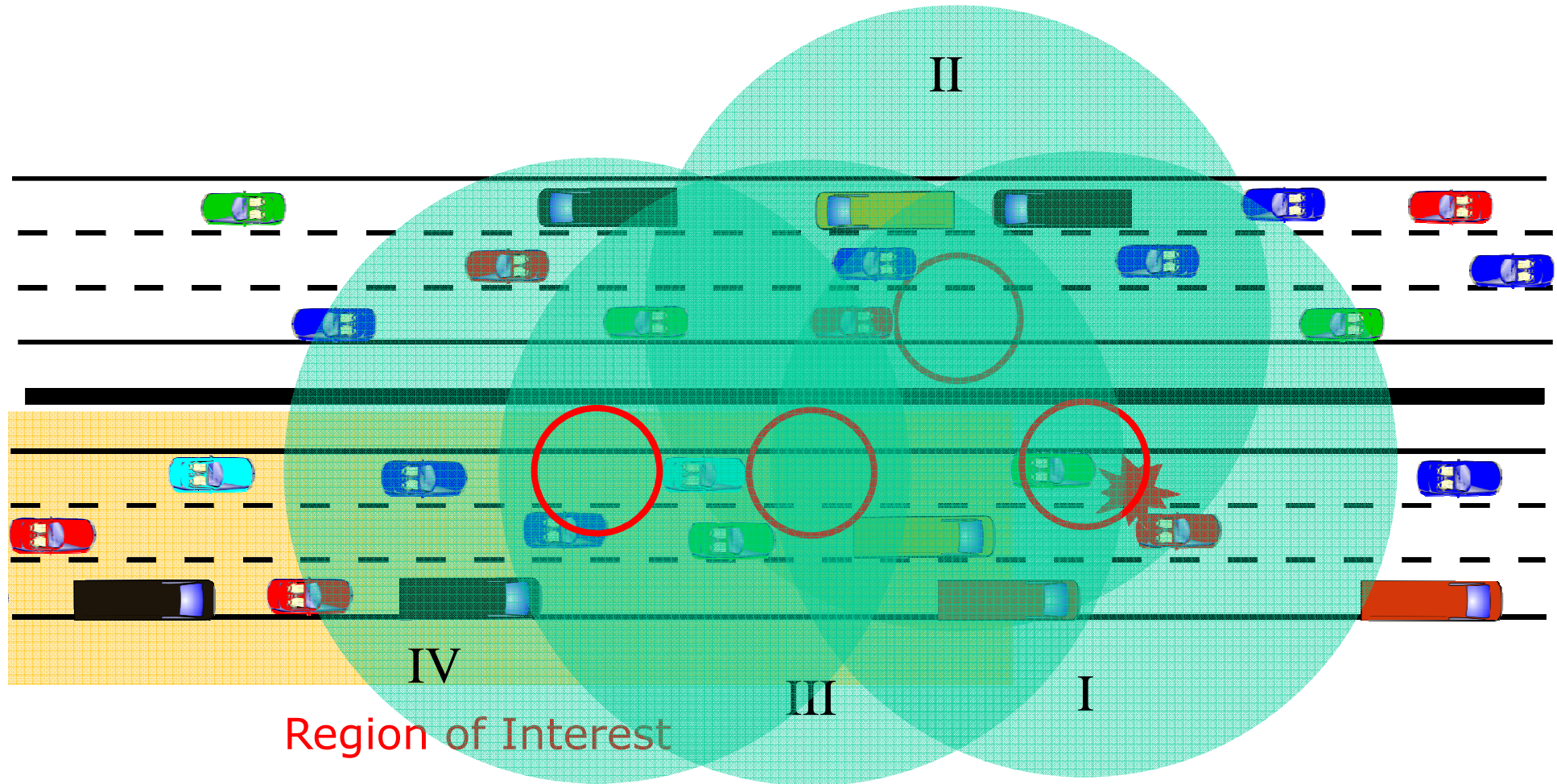
A “simple” question for each node: to rebroadcast or not to rebroadcast?

- We propose a probabilistic distance-based approach
- Nodes answer the question in a probabilistic way
- The retransmission probability is

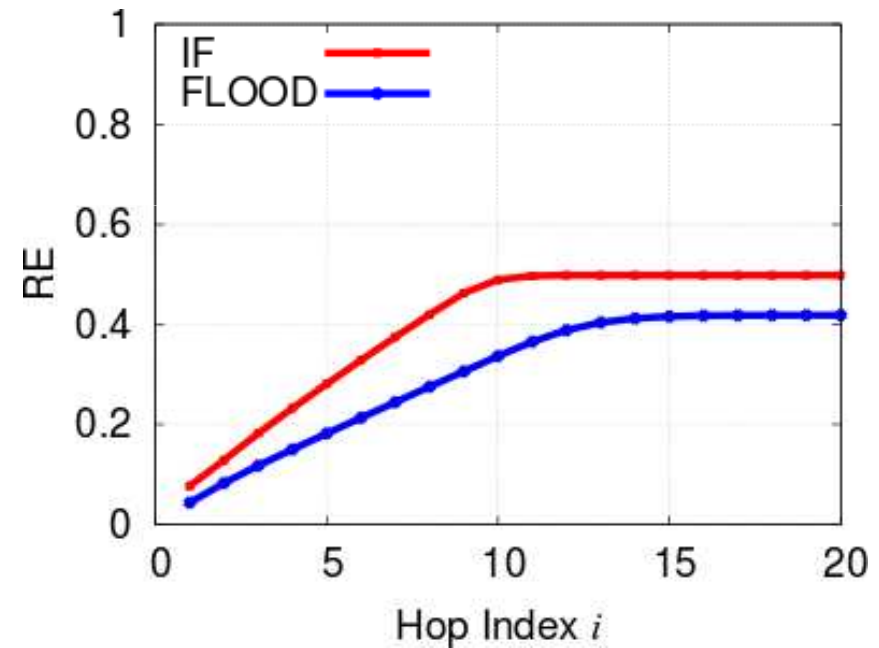
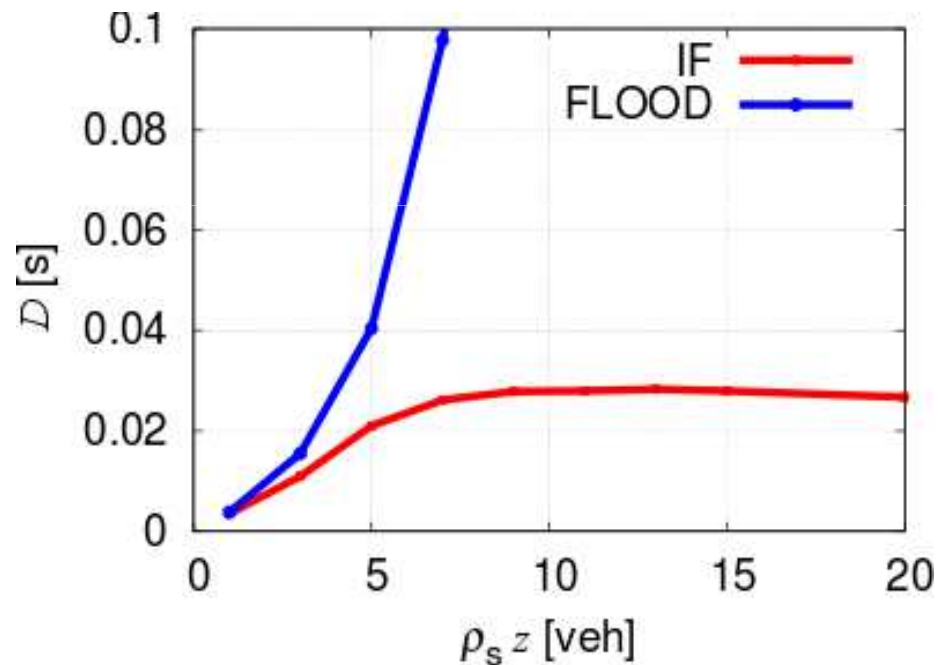
$$p_{retx} = \exp\left\{-\frac{\rho(z-d)}{c}\right\}$$

- The distance from the source & the node spatial density are taken into account

Irresponsible Forwarding: a possible application



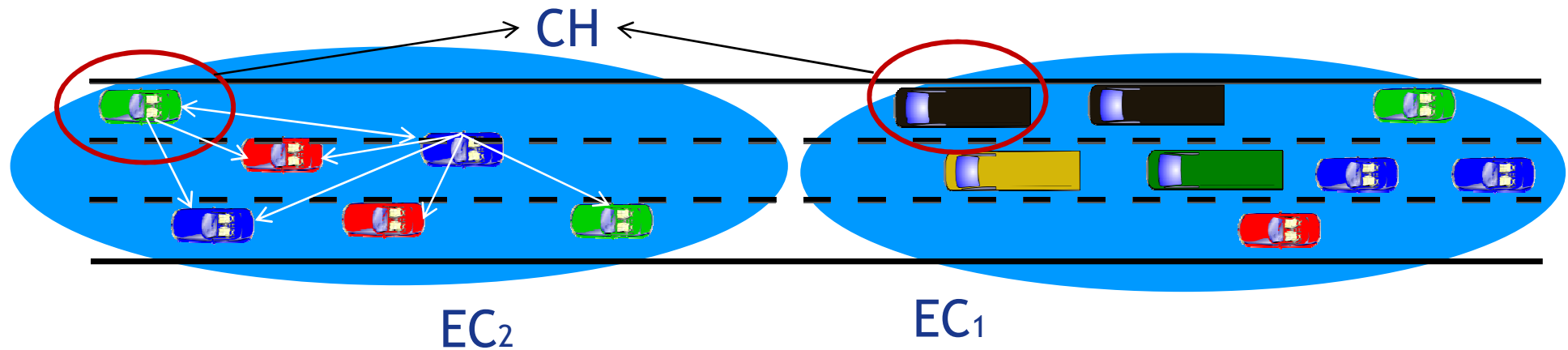
Performance in IEEE 802.11 linear networks ($\lambda = 100$ pck/s and IF with $c=5$)



An Improvement: Cluster Irresponsible Forwarding (CIF)

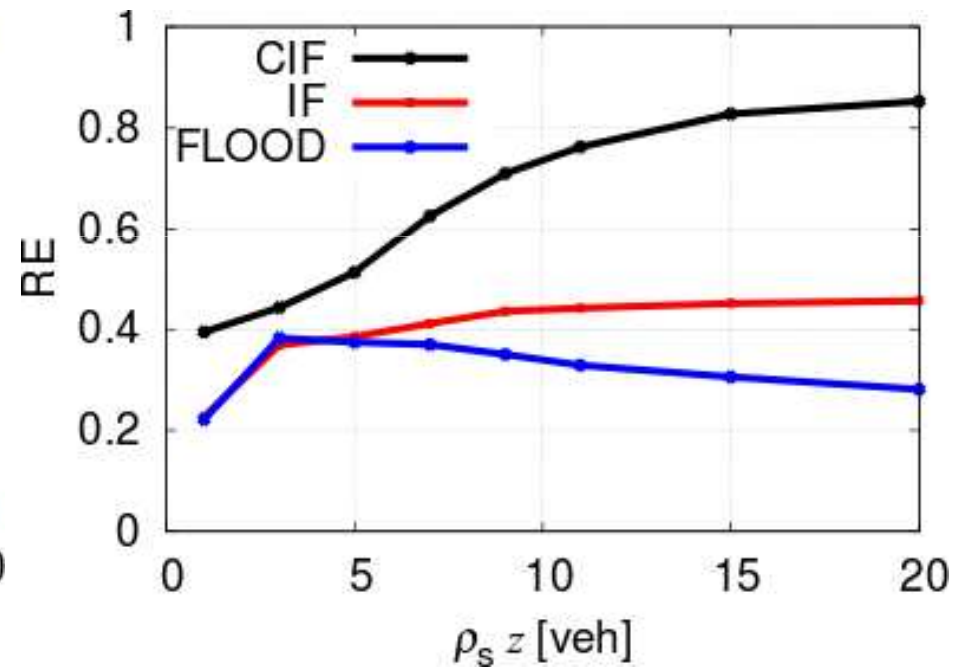
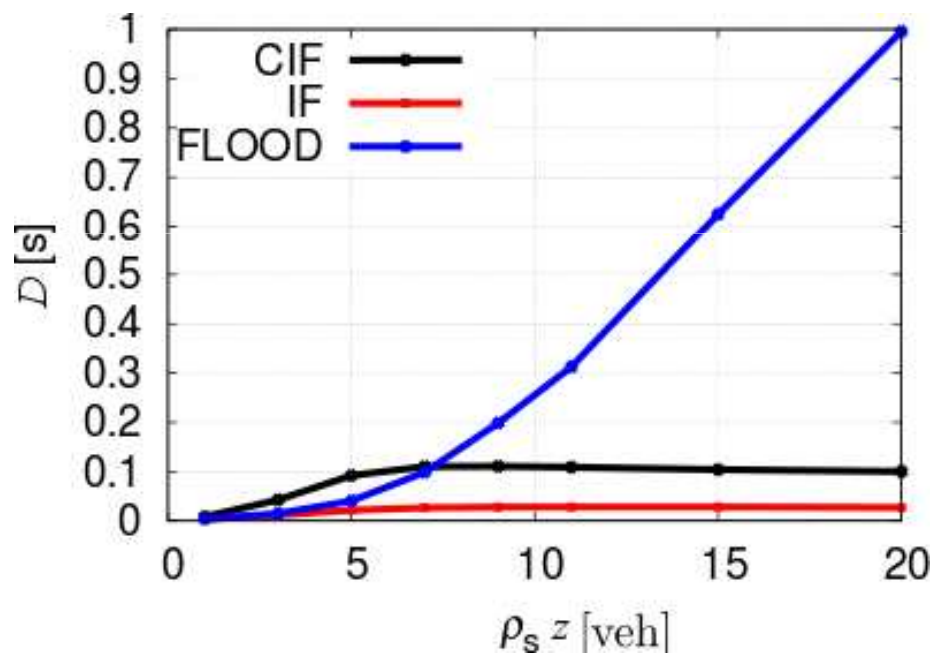
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Concept of **Ephemeral Cluster (EC)**



- The logical abstraction of “a cluster” coincides with the underlying topology
- Per-cluster **virtual** selection mechanism (based on IF)
- Cluster head (CH) election through a **real** contention mechanism
 - Decentralized
 - With short low power probe packets

A better reachability for a higher delay
 ($\lambda = 100$ pck/s, IF and CIF with $c=5$)



Conclusions

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- The use of **efficient broadcast** transmissions is a **key factor** in VANETs
- In **safety-related** applications latency is a critical issue
- An outdated information is **useless**
- Tradeoff between **reliability**, **latency**, and **efficiency**



- IF uses “**easy to retrieve**” information -> No need for a dedicated control channel
- **No additional delay** is introduced by IF
- **IF**, with a few adjustments, can be **the** solution

Thank you for your attention!

...Questions?