

# Simulating the Behavior of Opportunistic Network Protocols at Mass Events with ns-3

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## Goal

Comparing and analyzing different opportunistic routing protocols through simulation using real-world mobility traces

## Protocols

Opportunistic routing protocols route messages by passing them on via intermediate devices within range

### Buffer management

- Maximum buffer size
- Message retaining priority

### Sending frequency

- Depending on current neighbors
- Depending on history

### Number of copies

- Limit the number of message copies in the network
- Enforce a maximum per message among nodes

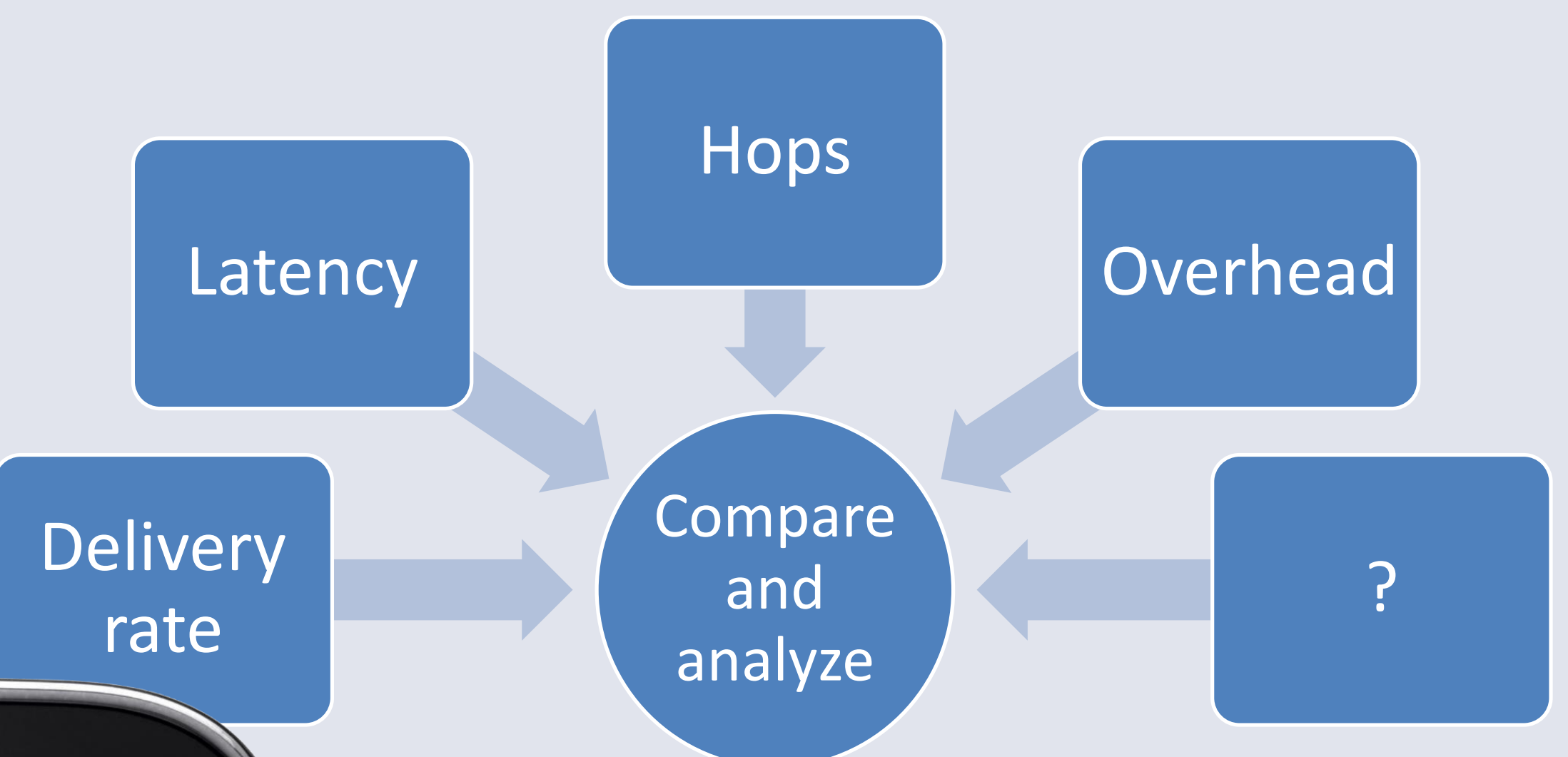
### Predictions

- Predict probability of contact between neighbor and recipient
- Forward to neighbor according to this probability



## Protocol metrics

Evaluate protocols using objective metrics



## Simulations

Simulations are performed in two different network simulation environments

ONE

ns-3

Opportunistic protocols already implemented

Better real-world modeling

Fast prototyping

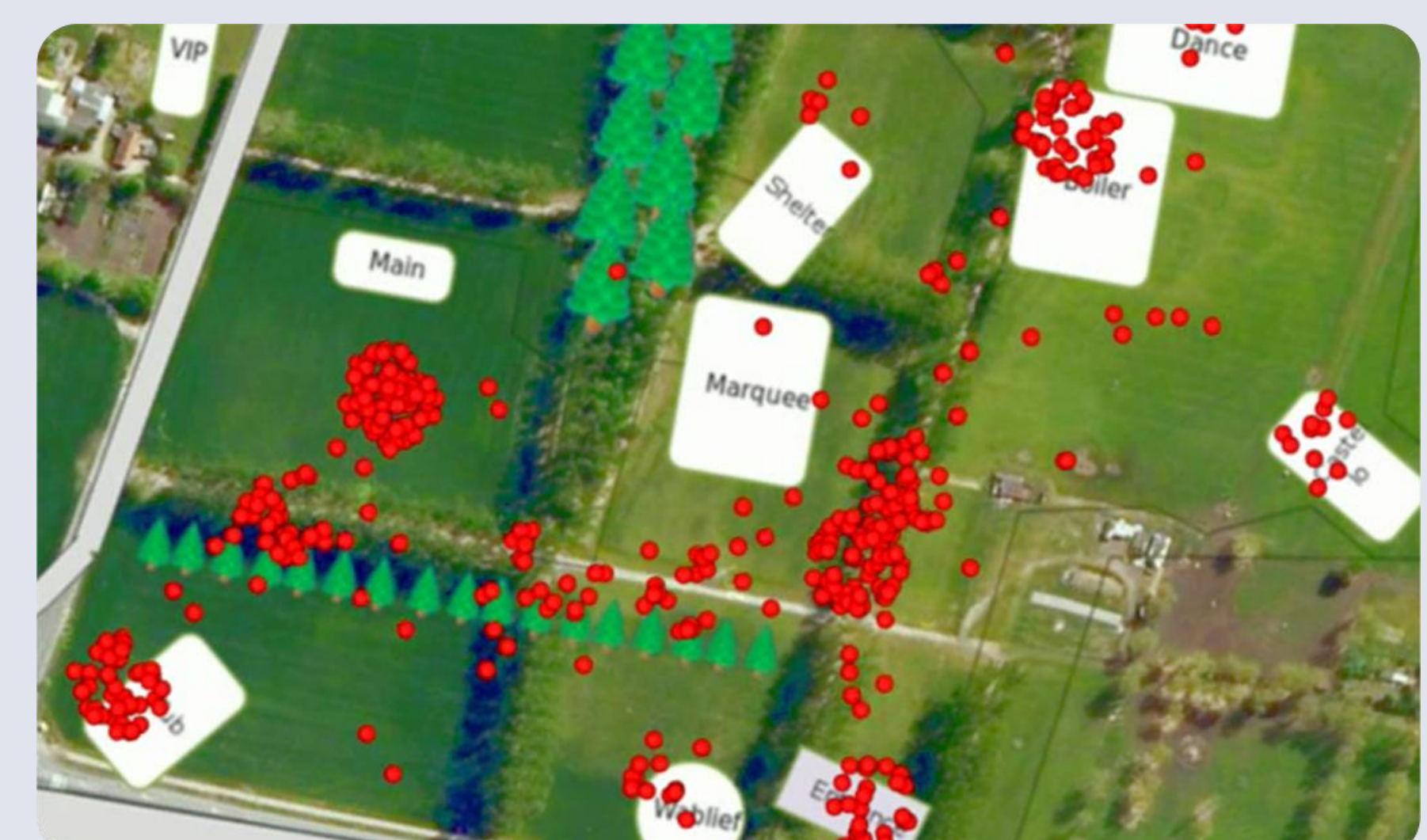
Advanced tracing capabilities

## Acquiring mobility data

Bluetooth tracking of visitors at a mass event: the Pukkelpop 2012 music festival



Protocol evaluation in music festival scenario



## Possible improvements in ns-3

→ More robust handling of mobility traces ←

→ Enhance IPv6 multicast for easier neighbor communication ←

→ Readily available opportunistic network protocol implementations ←