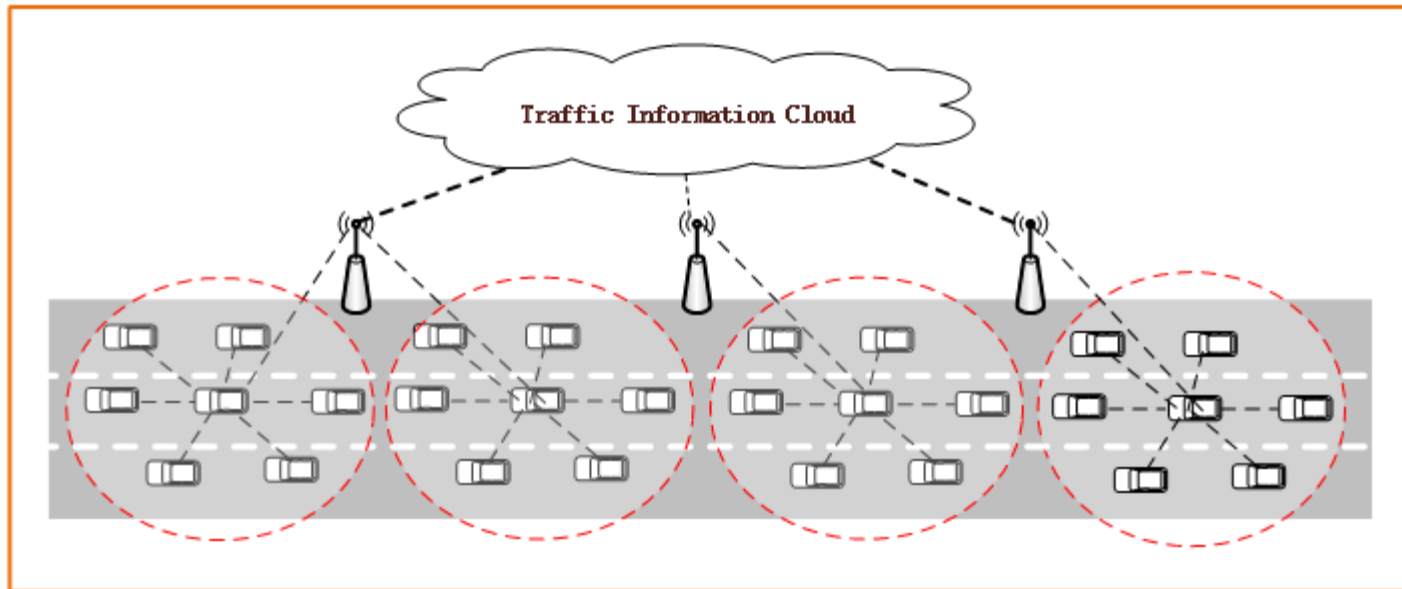


Clustering and Traffic Data Collection

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Clustering Architecture



Motivation (1/2)

- Vehicular Ad-hoc networks consist of the following types of communication
- Short-range communication between vehicles (V2V)
- Communication based on using preexisting network infrastructure such as Road-Side Units (RSUs) for longer communication range (V2I)

VANET applications

- Safety
- Traffic Management

Motivation (2/2)

However:

- Congestion and thus communication failure may occur when having large number of devices cooperating in this band
- Clustering schemes might be a solution to the network congestion problem by reducing data volumes exchanged.

Clustering Method:

In general, each vehicle

- periodically broadcasts information messages
- Categorize its neighbors as stable and non-stable according to their velocity vectors → only stable neighbors may form clusters

Clustering mechanism comprises the following processes

- Cluster Formation
- Cluster Maintenance

Clustering Model – Cluster Maintenance

- Cluster Maintenance supports:

- Vehicle joins to a cluster

 - Select most suitable cluster according to RT (Remaining Time)

- Vehicle leaves a cluster

 - Select most suitable cluster according to RT, if any

 - Set current status to Standalone, if no cluster in range

- Merge of two Clusters (When two CH in range):

 - CH with less CMs becomes CM of the other CH

 - CM of the old CH also attempts to join the new CH

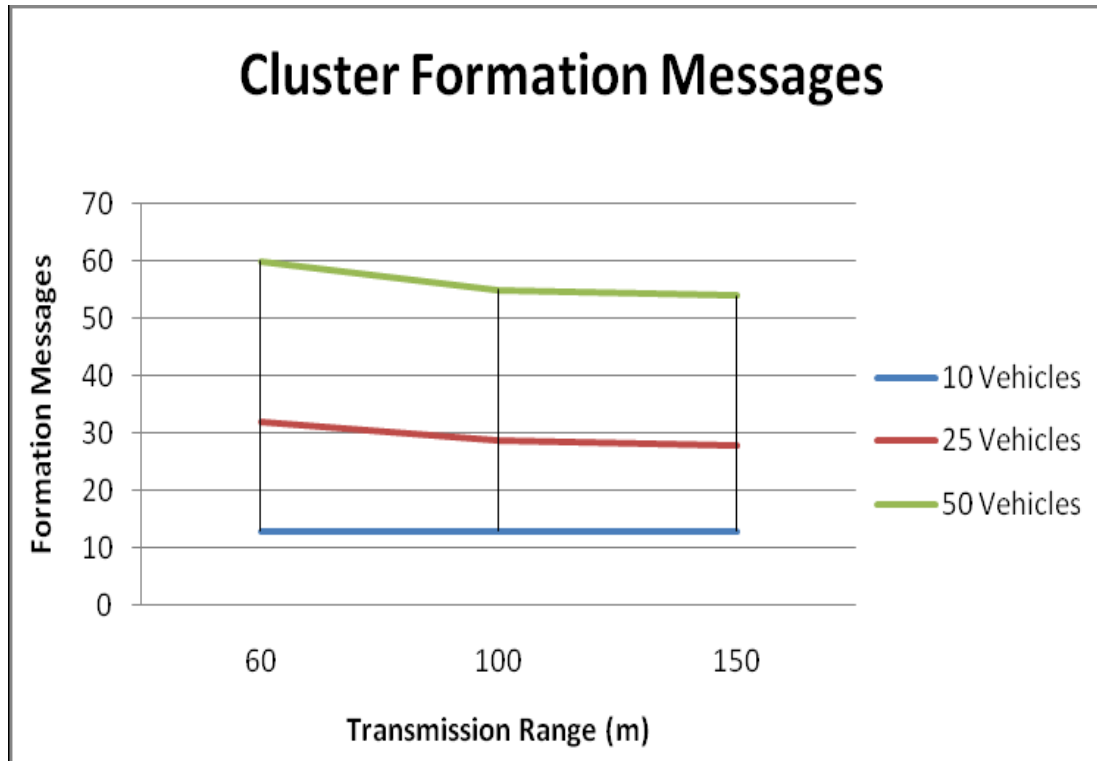
 - If new CH is not in range, then vehicles select other cluster

 - If no cluster in range, vehicles turn to Standalone state

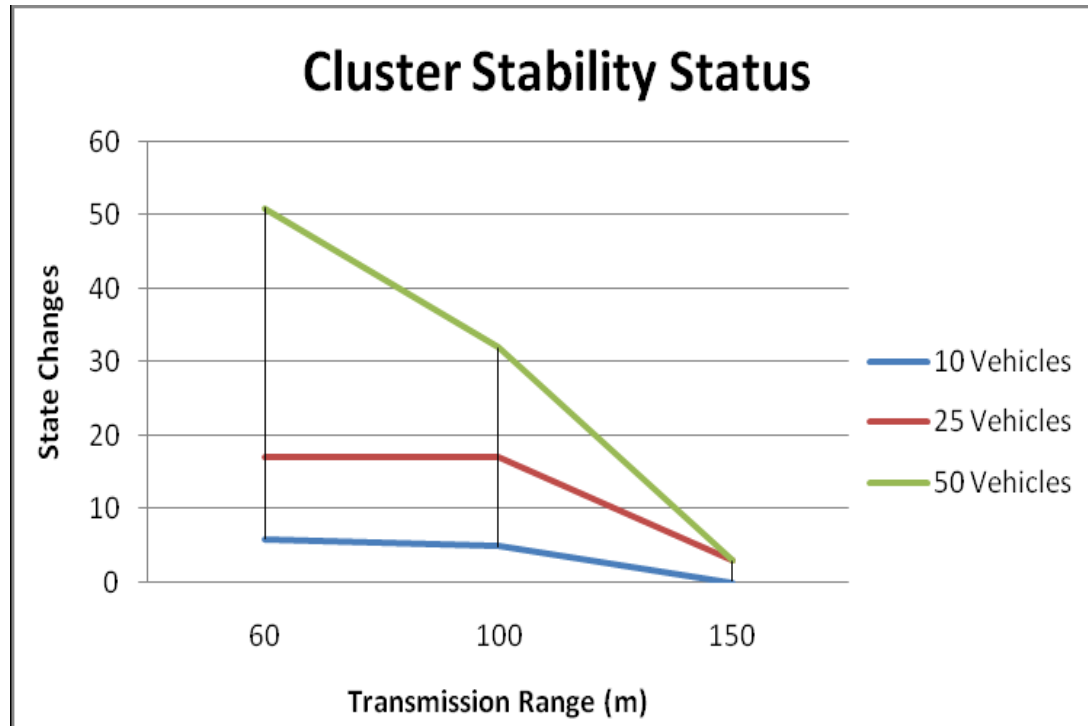
Evaluation

Evaluation of our implementation by calculating:

1. Number of messages during formation process
2. Number of state changes of vehicles



Evaluation



Thank you