MEC-based Stable Topology Prediction for Vehicular Networks

Blueprint

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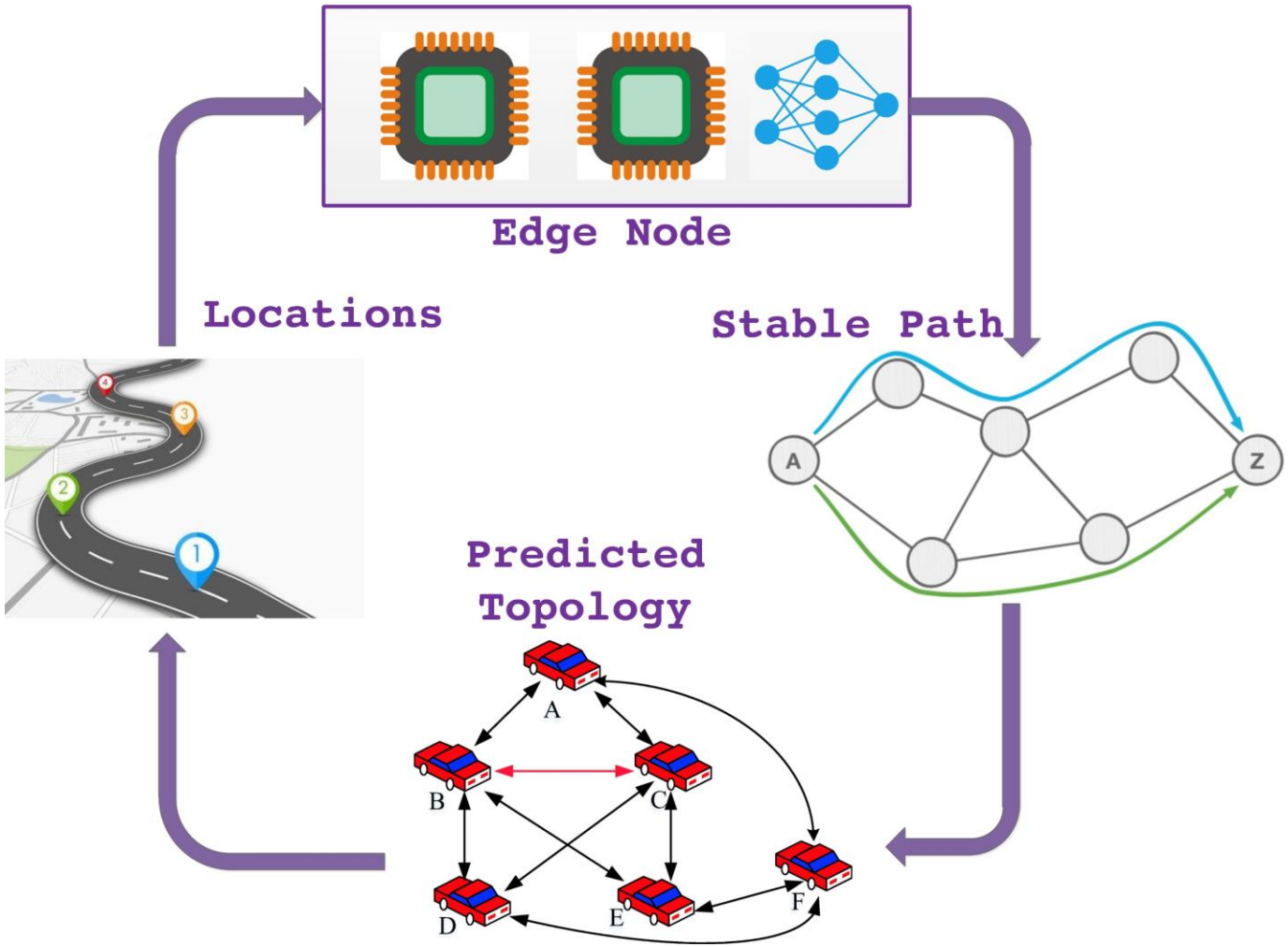
Motivation

Motivational aspects are:

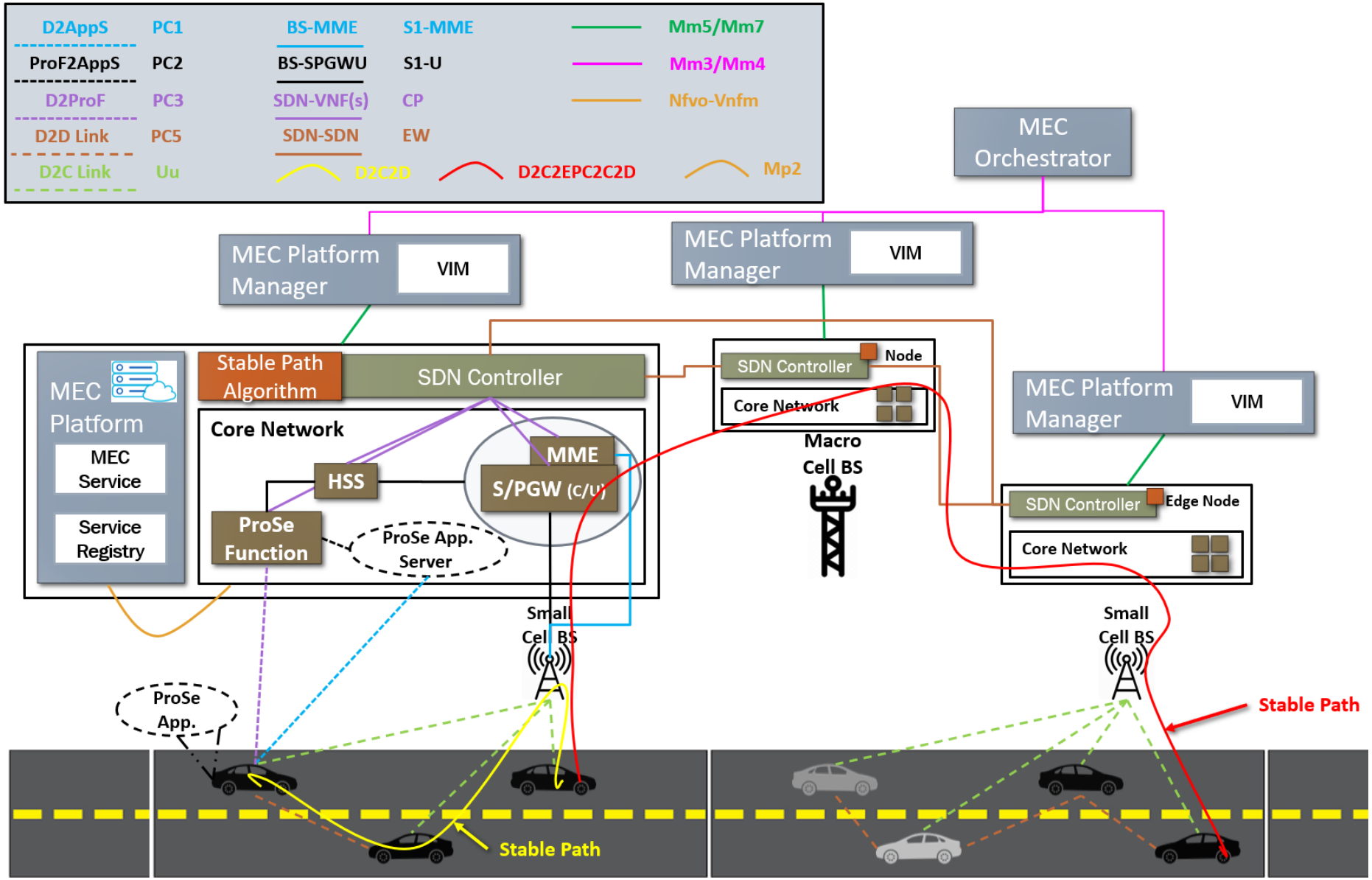
- The topology in a vehicular network is updated and retrieved frequently
  - This causes path instability
- Vehicular networks are wireless
  - However, Software-defined networking (SDN) is originally designed for wired networks
- Leads to the need for topology stability in vehicular networks

To this end, we introduce:

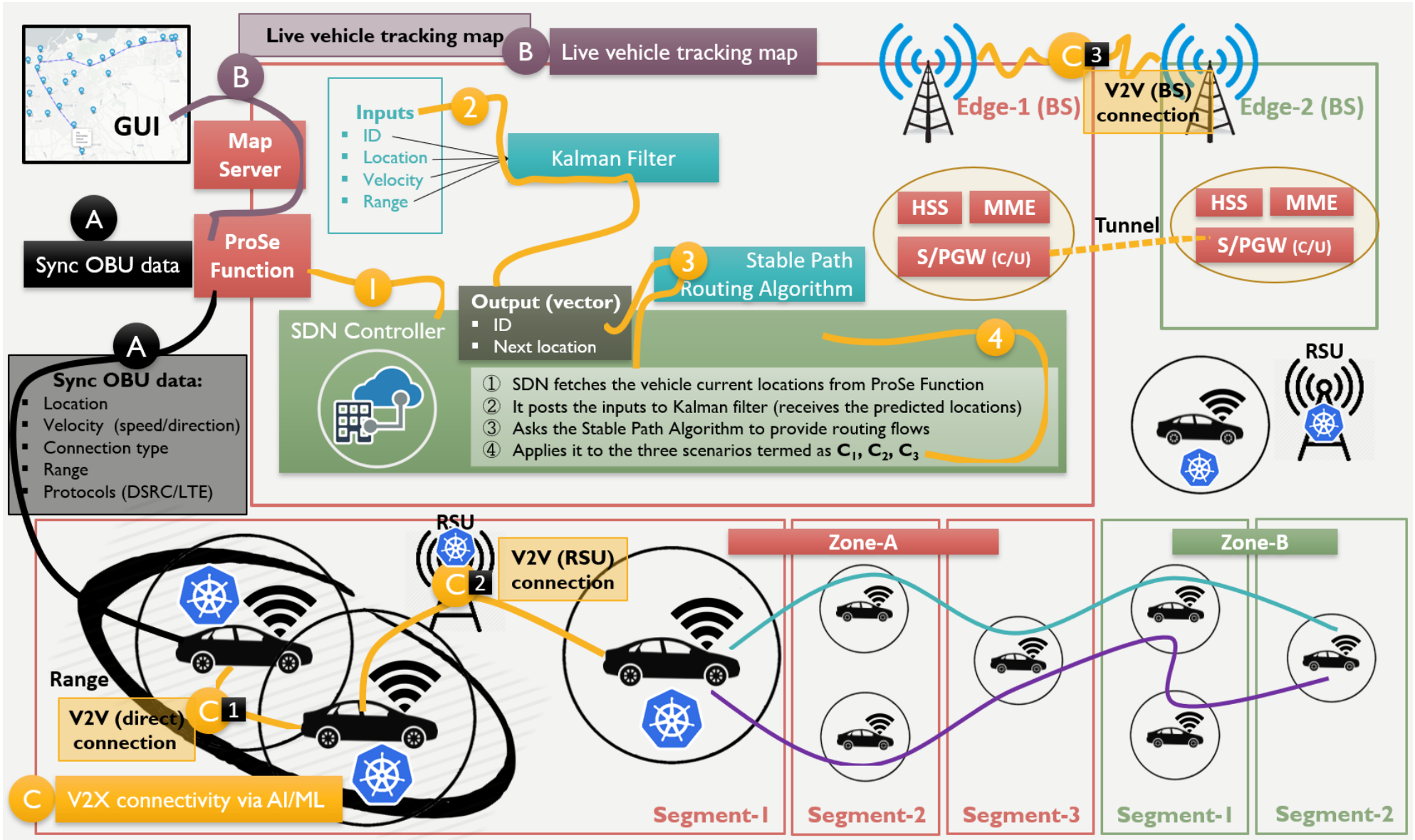
- Computation at the Edge
- Topology prediction to proactively stabilize the paths in vehicular network
- Proximity Services



Architecture Overview

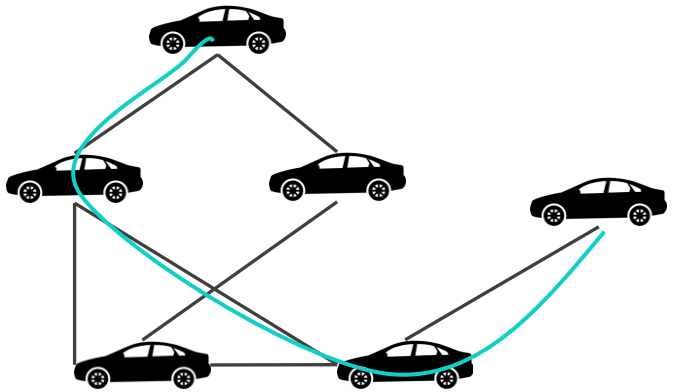


Architecture In depth

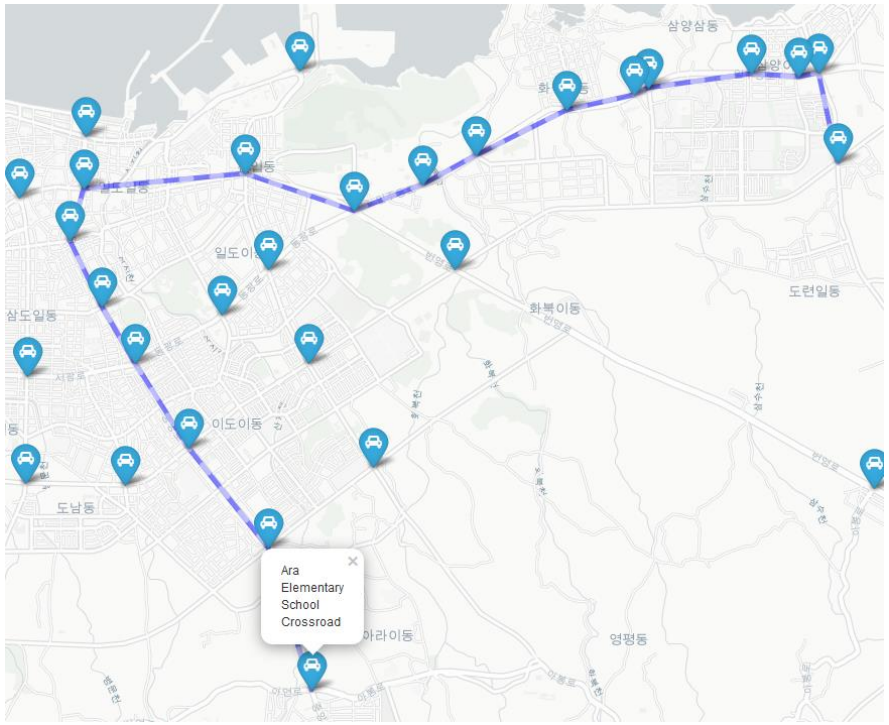


Stable network topology in IoV (Attributes)

Stable network topology in IoV
Stable network for vehicle communication
Reliability of network connectivity for a longer time period
Less routing management overhead

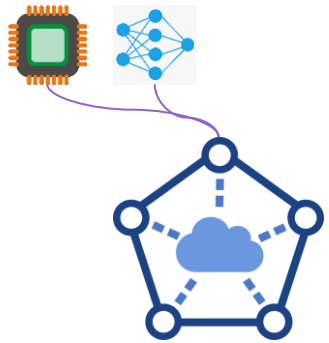


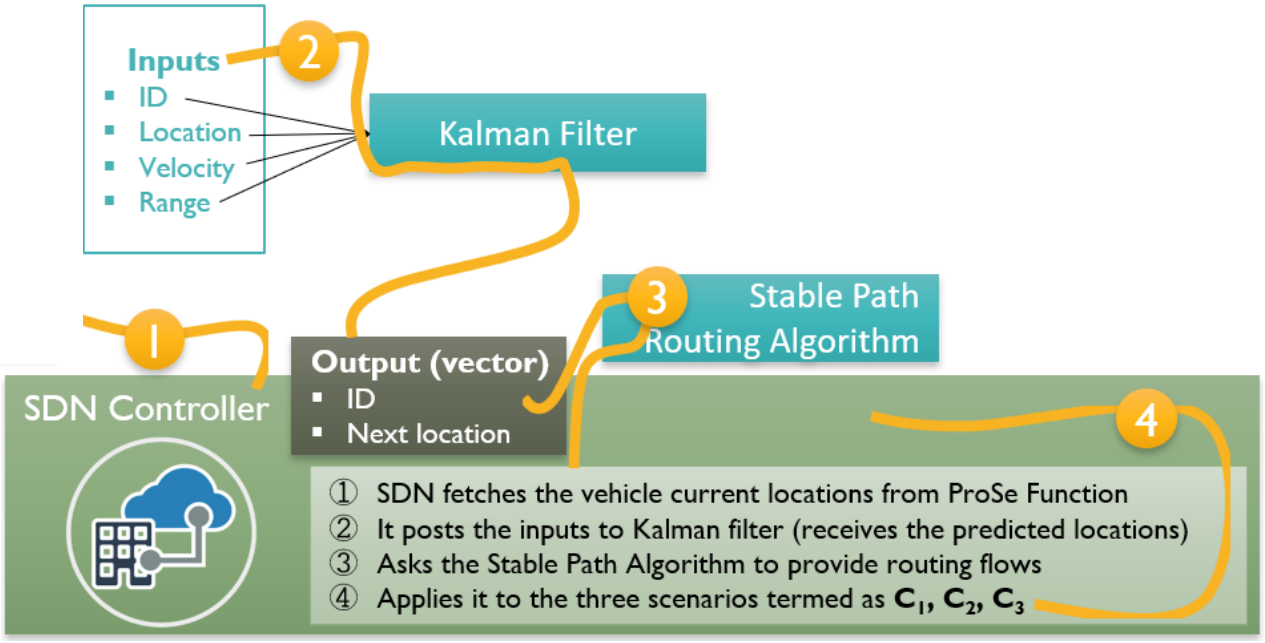
Stable network topology

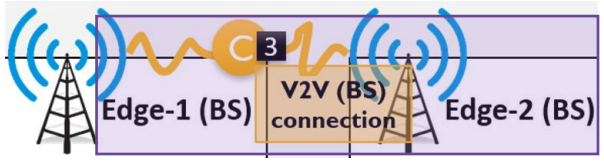


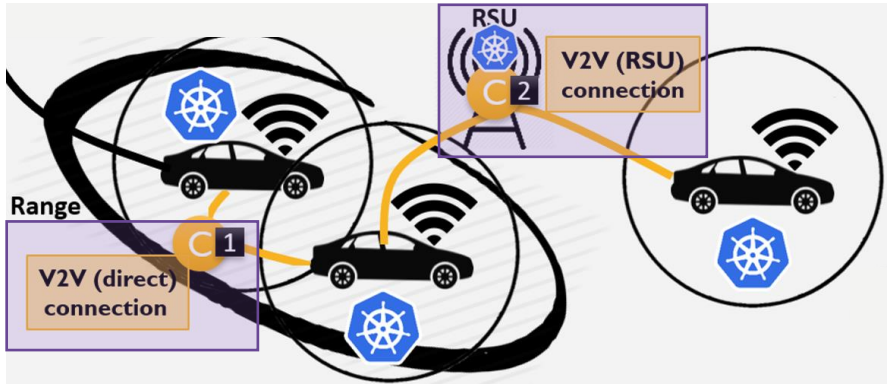
Road aware, proactive, and proactive connection (Attributes)

Road aware, predictive and proactive connection
The network management is road aware
Machine learning based prediction is used in this work
The connection is reestablished before unavailability
Different connectivity scenarios





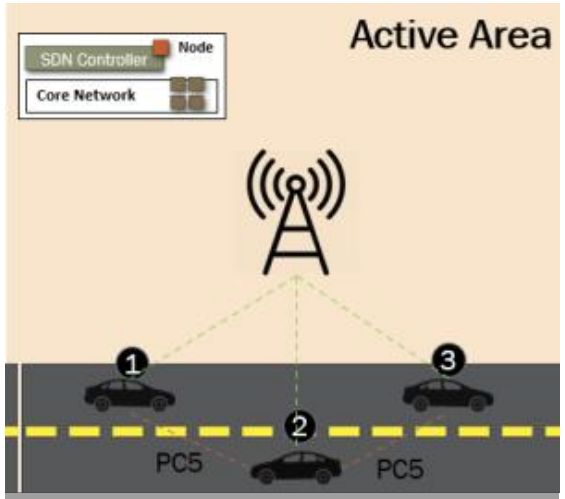




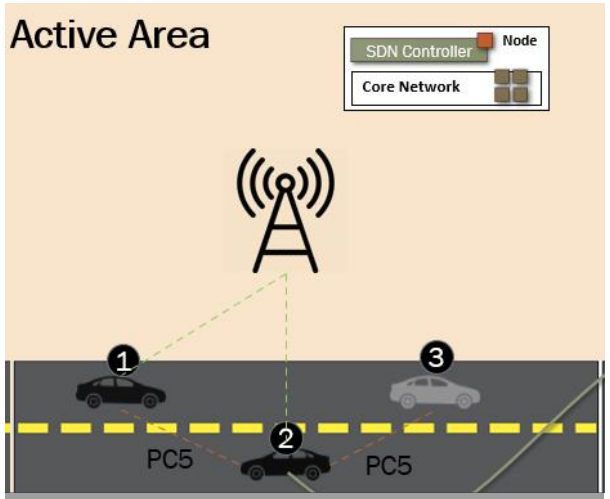
Stable Path Scenarios

#	Cell	In Coverage/ Partial Coverage	Description
1	Same	In Coverage	Cellular assisted D2D
2		Partial Coverage	Cellular assisted D2D/Cellular
3	Different	In Coverage	Cellular assisted
4			Road aware D2D 
5		Partial Coverage	Cellular assisted D2D/Cellular
6			Road aware D2D 

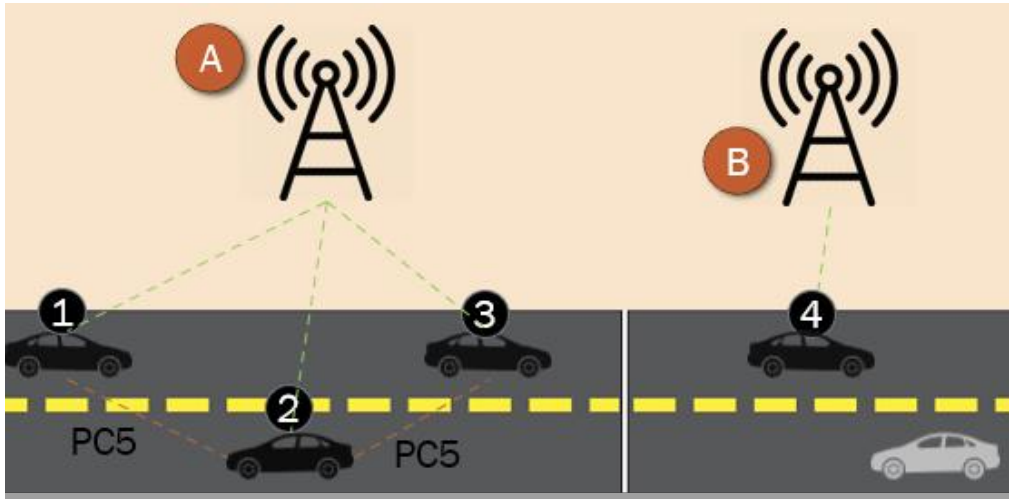
Stable Path Scenarios



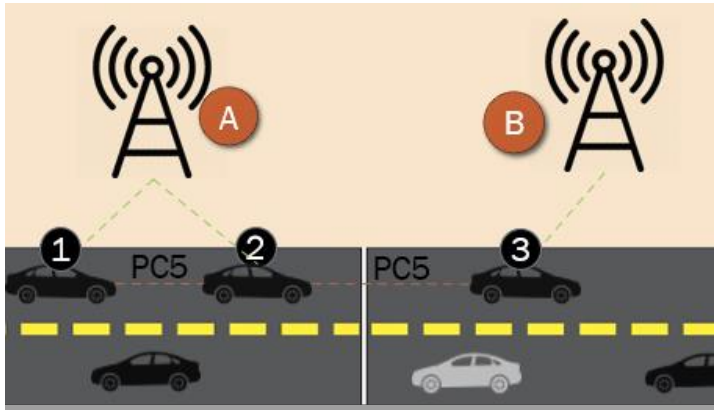
Same cell and in coverage



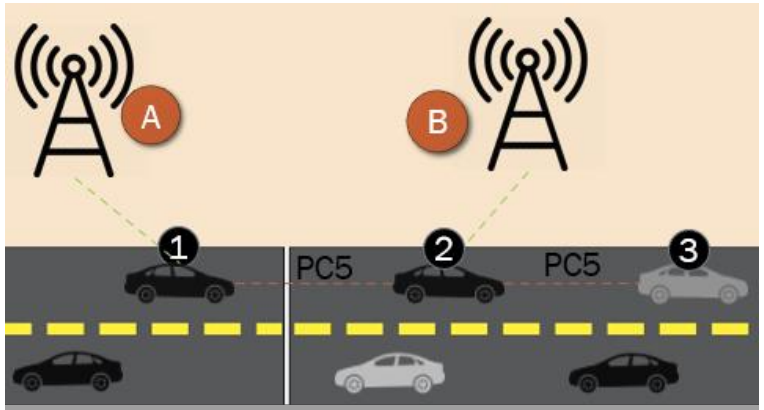
Same cell and out of coverage



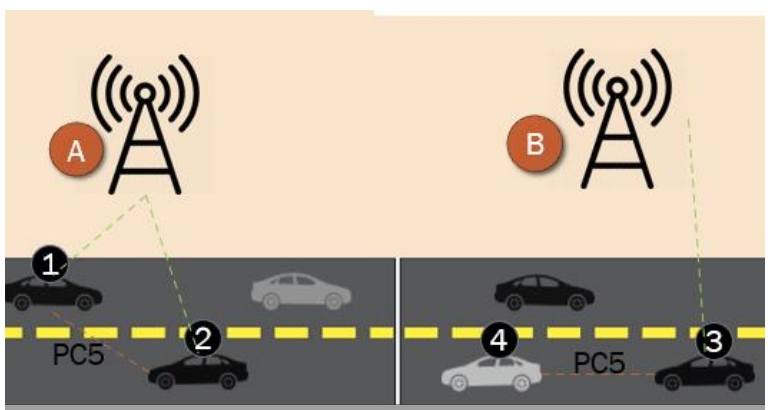
Different cell and in coverage



Different cell and proactive connection (in coverage)

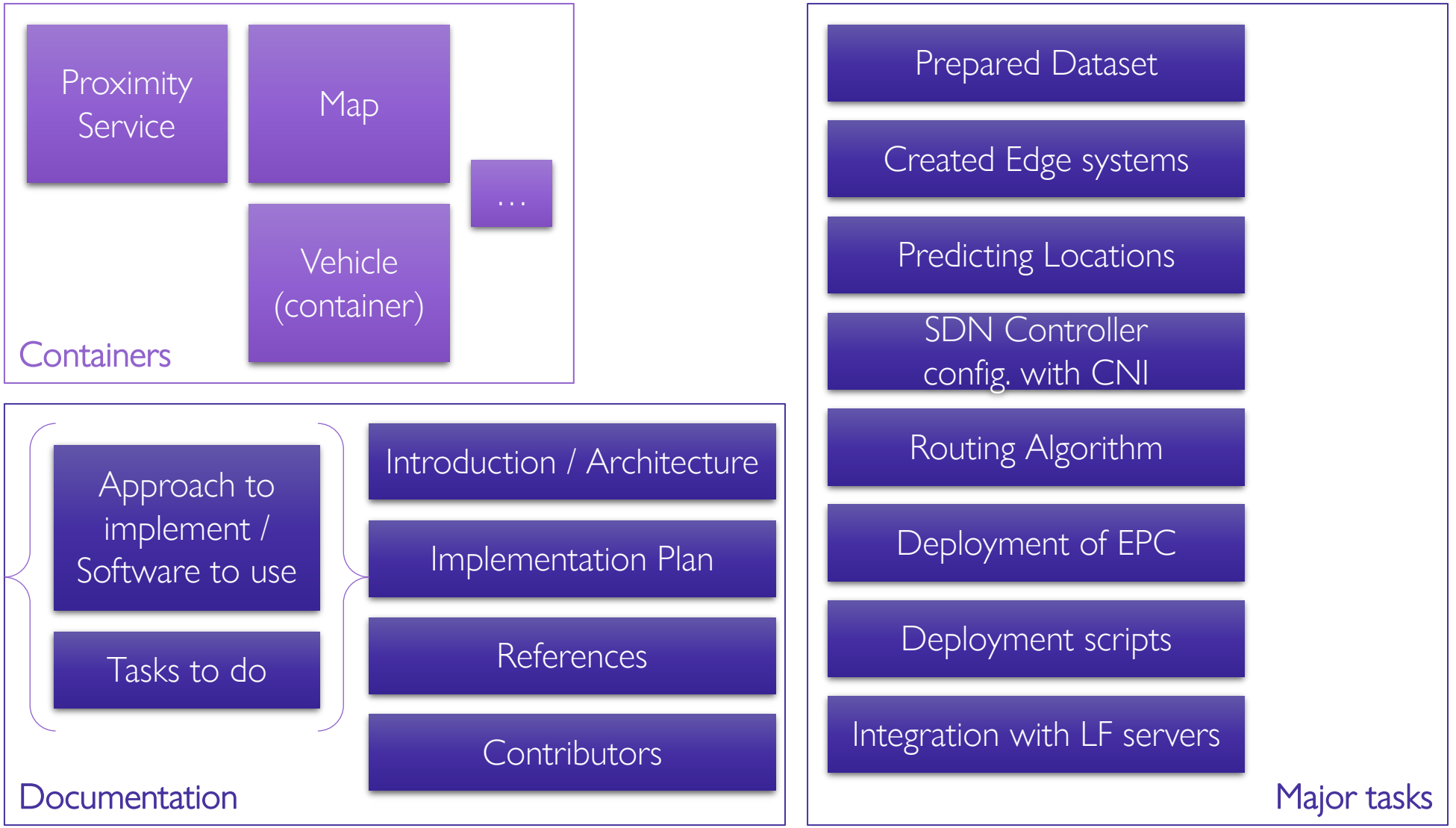


Different cell and proactive connection (out of coverage)



Different cell and out of coverage

Progress


Proximity Service
Map
…
Vehicle (container)
Containers
Approach to implement / Software to use
Tasks to do
Introduction / Architecture
Implementation Plan
References
Contributors
Documentation
Prepared Dataset
Created Edge systems
Predicting Locations
SDN Controller config. with CNI
Routing Algorithm
Deployment of EPC
Deployment scripts
Integration with LF servers
Major tasks

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References

- ATTO Research
- Website - Akraino
- Wiki - Akraino
- Gerrit - Akraino
- Mailing lists - Akraino
- Blueprints - Akraino
- Calendars - Akraino