all V2V communication is done via DSRC while the V2B communication is happening via LTE. As can be seen in Figure 4c, this yields a much higher success rate. Nevertheless, there is a certain amount of unsuccessful transmissions even if we rely on LTE for V2B communication. As expected, the load on the DSRC channel could be observed to remain roughly constant, at 30 %, independent on the aggregation factor (cf. Figure 4d).

The underlying cause of the described effects can be tracked down to resource sharing in the LTE network. This is also observable in an increased delay when transmitting larger files as can be seen in Figure 6. This strongly indicates that it is important to focus very much on the last hop, i.e., the one between CH and AP. If this hop fails, far more data gets lost compared to a failing hop between a CM and its CH. Improvements can be done either by adapting the scheduling algorithm to this uneven distribution of priority or by adapting the upload process to work around a generic scheduling algorithm.

5 CONCLUSION

We propose the use of vehicular micro clouds as virtual edge servers for efficient connections between cars and backend infrastructure for future Intelligent Transportation System (ITS). In addition to the underlying micro cloud architecture, we investigate the use of map-based clustering techniques to cope with the dynamicity of vehicular networks. In our evaluations, we explored intersections as these positions to optimize the data flow between a Cluster Head (CH) and its Cluster Members (CMs). Initial simulation results indicate that the concept is sound and beneficial. Using aggregation functionality at the CH, we further demonstrated the need for such vehicular micro clouds.

Table 1: Simulation Parameters.

Parameter	Value
IVC technology	IEEE 802.11p
Channel	5.89 GHz
Transmission power	20 mW
Bandwidth	10 MHz
Cellular technology	LTE
Number of available RBs (Up- & Downlink)	15
LTE scheduler	MAXCI
UE transmission power	26 dBm
eNodeB transmission power	45 dBm
Investigated Area	150 m × 150 m
Average number of vehicles	60
CM to CH data	10 kB every 2 s
CH to AP upload interval	4.5 s
Simulation duration	120 s
Repetitions	200
Aggregation factors	0.1, 0.25, 0.5, 0.75, 1
Control information collection interval	1 s
CH interval	10 s

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