A-VIP: Anonymous Verification and Inference of Positions

Goal: Collecting vehicle positions in an anonymous, verifiable way
Applications: e-tolling, fleet control, liability attribution

Beaconing and Reporting

Step 1: vehicles register with a Location Authority (LA)
Step 2: vehicles broadcast a beacon with (i) a precomputed secret shared with the LA; (ii) their encrypted position
Step 3: nearby vehicles report overheard beacons to the LA

Position Verification and Inference
LA processes reports to:
• determine the locations announced by cars
• verify such locations
• infer the actual positions of vehicles advertising an incorrect location.

Cooperative position identification

Reporting vehicles
• disclose their own locations
• report reception quality of beacons

LA compares several reports to identify where the beaconing vehicle could be and if it was telling the truth.