Anonymous Key Agreements for V2X Communication

Gautam Singh

Indian Institute of Technology Hyderabad

May 1, 2024

1. Introduction
2. Preliminaries
3. Our Proposition
4. Conclusion

V2X Related Terminology

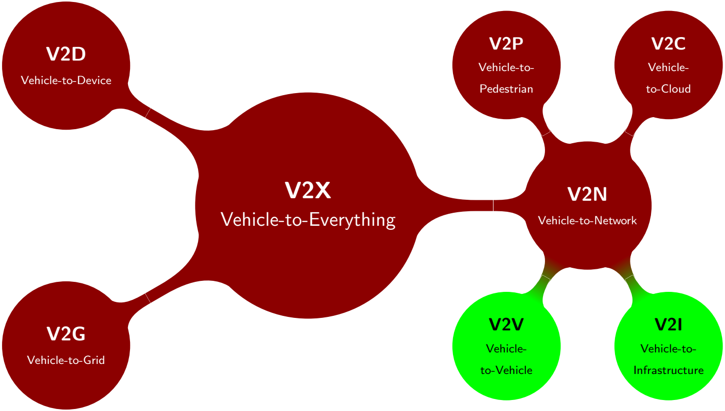

Figure 1: A breakdown of V2X.

Message Types in V2X

1. **Cooperative Awareness Messages** (CAMs)[1] and **Basic Safety Messages** (BSMs)[2].
    1. Exchanged between vehicles to create awareness and support cooperative performance of vehicles in the road network.
    2. Includes status information such as time, position, speed, active systems, vehicle dimensions, etc.
    3. Broadcasted unencrypted in 5.9 GHz channel (ETSI ITS-G5).
    4. **Huge privacy concerns and threats!**

[1] European Telecommunications Standards Institute. "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service". In: ETSI EN 302 637-2 V1.4.1 (2019). URL: https://www.etsi.org/deliver/etsi_en/302600_302699/30263702/01.04.01_60/en_30263702v010401p.pdf.

[2] *J2735_202309: V2X Communications Message Set Dictionary - SAE International*. URL: https://www.sae.org/standards/content/j2735_202309/ (visited on 04/15/2024).

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2. Other types of messages
    1. **Signal Phase and Timing** (SPaT)
    2. **Roadside Infrastructure Information** (MAP)

[1] European Telecommunications Standards Institute, "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service".

[2] *J2735_202309*.

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3. Negligible storage and bandwidth overheads.
4. Better security guarantees (privacy, authenticity, confidentiality).

Pairings

Anonymous Key Agreements

Proposed Security Flow

Analysis

Conclusion