

Privacy in a Connected Vehicle Future

US Department of Transportation

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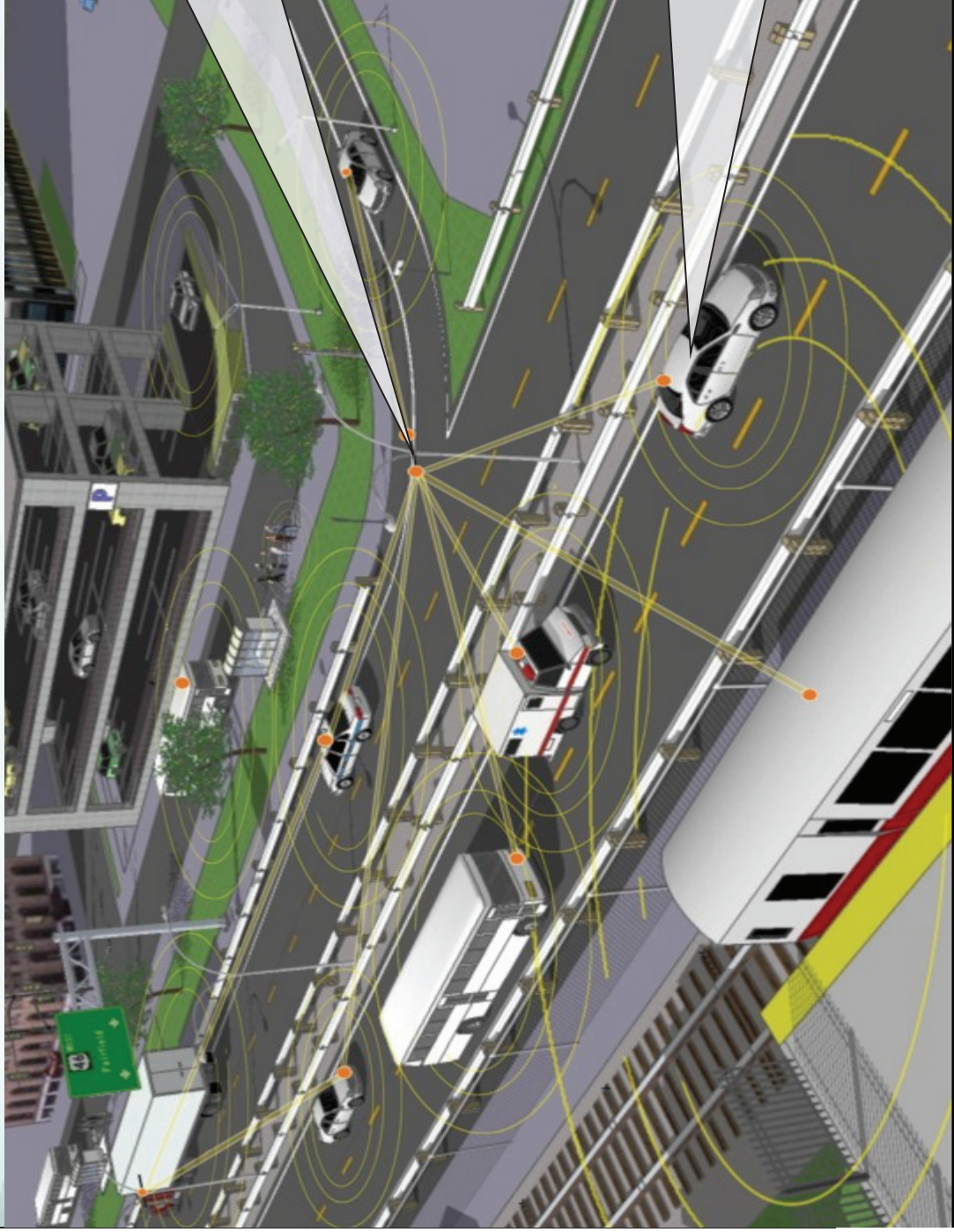
What are Connected Vehicles(CV)?

Infrastructure Data

- Traffic Signal Data
- Maneuver Assistance
- Speed Limit
- Parking Availability
- Road Weather Data

Vehicle Data

- Position & Vector
- Speed
- Acceleration
- Steering Angle
- Brake Status
- Vehicle Size



Problems where CV can help



Safety

33,561 highway deaths in 2012
5,615,000 crashes in 2012
Leading cause of death for ages 4, 11-27



Mobility

5.5 billion hours of travel delay
\$121 billion cost of urban congestion



Environment

2.9 billion gallons of wasted fuel
56 billion lbs. of additional CO₂



Sources: Traffic Safety Facts: 2012 Data, National Highway Traffic Safety Administration (Nov 2013)
2011 Annual Urban Mobility Report, Texas Transportation Institute (Feb 2013)

Basic CV Technologies

Radio

- 5.9 GHz for safety and mobility
 - Vehicle Radio – On Board Units (OBU)
 - Infrastructure Radio – Road Side Units (RSU)
- Integrated and retrofit options

Standards

- IEEE 802.11p
- IEEE 1609.x
- SAE J2735



Role of Privacy

Our success depends on public acceptance

- Show Personally Identifiable Information (PII) are protected
- Show safety information and warning can be trusted

Improvements to Safety, Mobility, and Environmental Impact happens when CV technologies are used

Privacy, security, and operational choices have to be balanced

How is Privacy Created?

Security Controls

- Physical protection of devices
- Technical protection of information
- Policy guides organizational procedure and processes; for instance, access controls, policies on acceptable uses of data

Standards Based Approach to Guide CV Implementation & Operations

- NIST SP 800-53 for Federal Government
- National Association of State CIOs (NASCIO) offer State-based best practices
- FTC's Fair Information Practice Principles (FIPP)

Maintaining Privacy in CV

Probe Data Privacy

- Information used to improve regional mobility
- Information used to measure environmental impact and conditions

Real Time Data Privacy with the Basic Safety Message (BSM)

- Information used to improve Safety
- Information used to improve mobility

Probe Data Protection

Experiment with vehicle data from Safety Pilot Model Deployment

Results are begin analyzed for:

- Maximize usefulness of data while preventing release of PII.
- Better understand vulnerabilities

Samples available

- <https://www.its-rde.net>

Real Time Data Protection

Identification and authentication using encrypted credentials

- Very short live span credentials
- Used in a randomized manner

Structural protection of Credential Management Authorities

- Structured to obfuscate requests for credentials
- Divide stored data at an institutional level to ensure that no one database is comprehensive

Within a CV environment, data does not contain PII.

Within the institutional Authorities, PII is minimized just enough to support a recall

Privacy Policy and Operations

Federal Policies

- CV systems will be operated by State and Municipalities
- Limits to what Federal Privacy Protection must be adopted

Commercial Practices

For More Information

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