Real World V2X Uses to Improve Vulnerable Road User Safety

ITS-A Webinar
May 28, 2025

About Bellevue

Population: 155,000

Employers: Amazon, T-Mobile, Meta

University of Washington STAR Lab
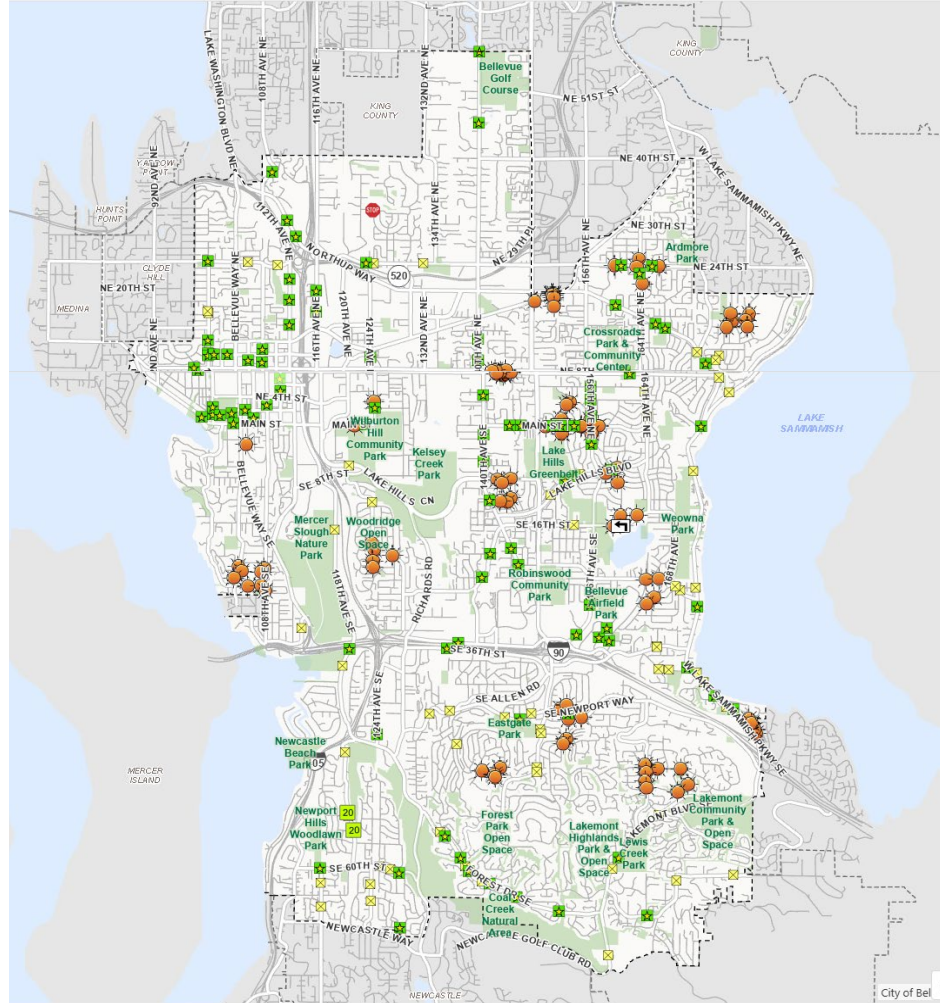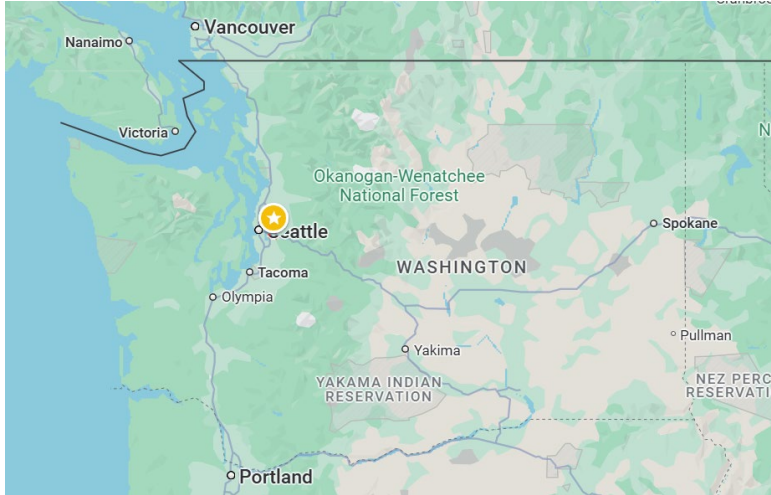
V2X Focus

220 signalized intersections

school zone beacons

radar feedback signs

RRFBs

Leader in Smart Mobility

NETWORK: 10 GB SPEED

Adaptive Signal Control

360 HD CAMERAS: 100% COVERAGE

V2X Partnerships

School Zone

Slow Speed Zone

Mid-block
Pedestrian Crossing

CITY OF BELLEVUE WASHINGTON

a1 applied INFORMATION

T-MOBILE FOR BUSINESS

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School Zone

Data Exchange

Network V2X

Direct V2X

SCHOOL SPEED LIMIT 20 WHEN FLASHING
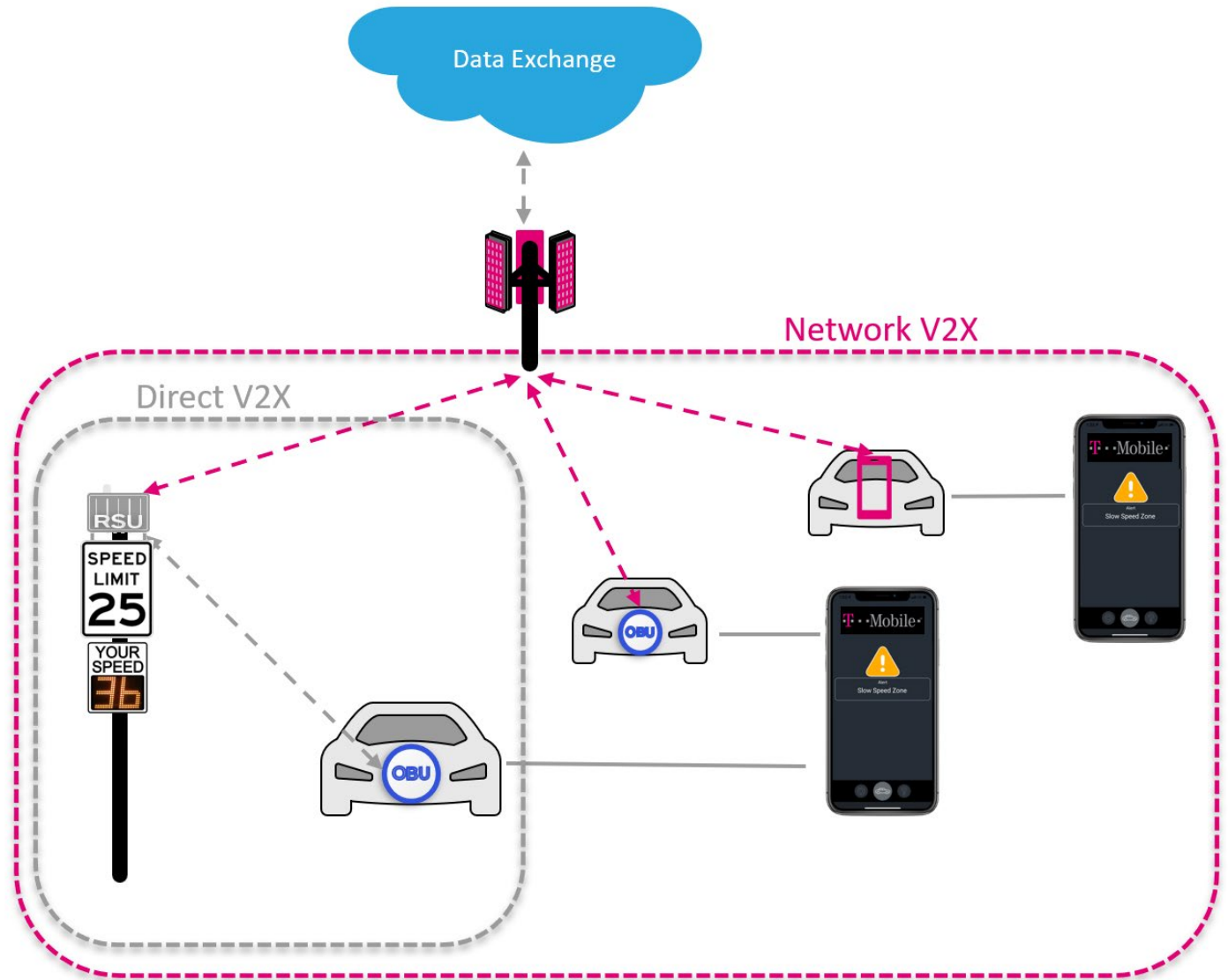
RSU

OBU

OBU
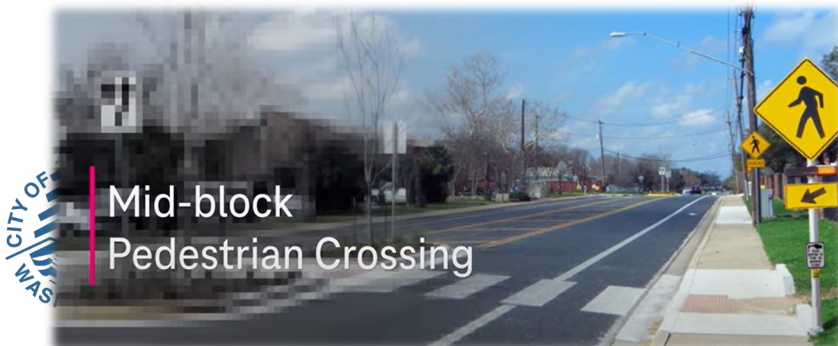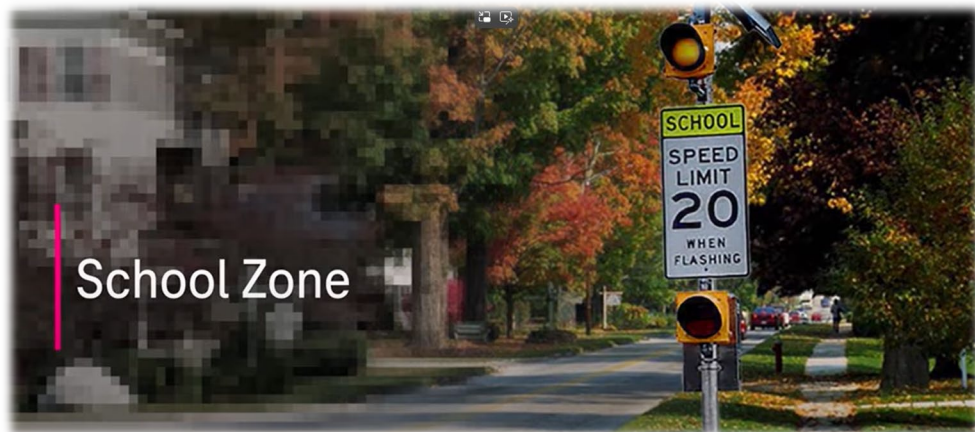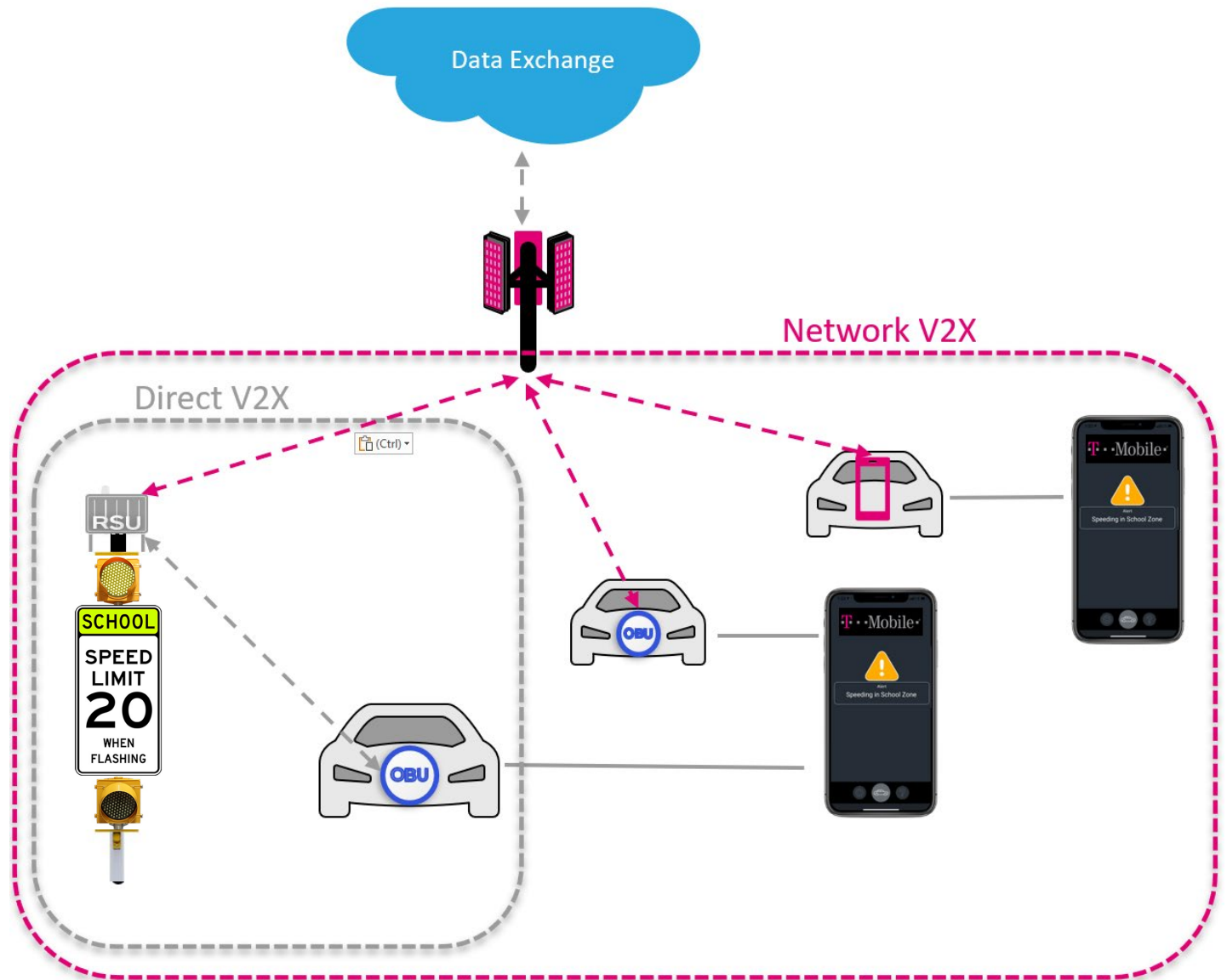
School Zone
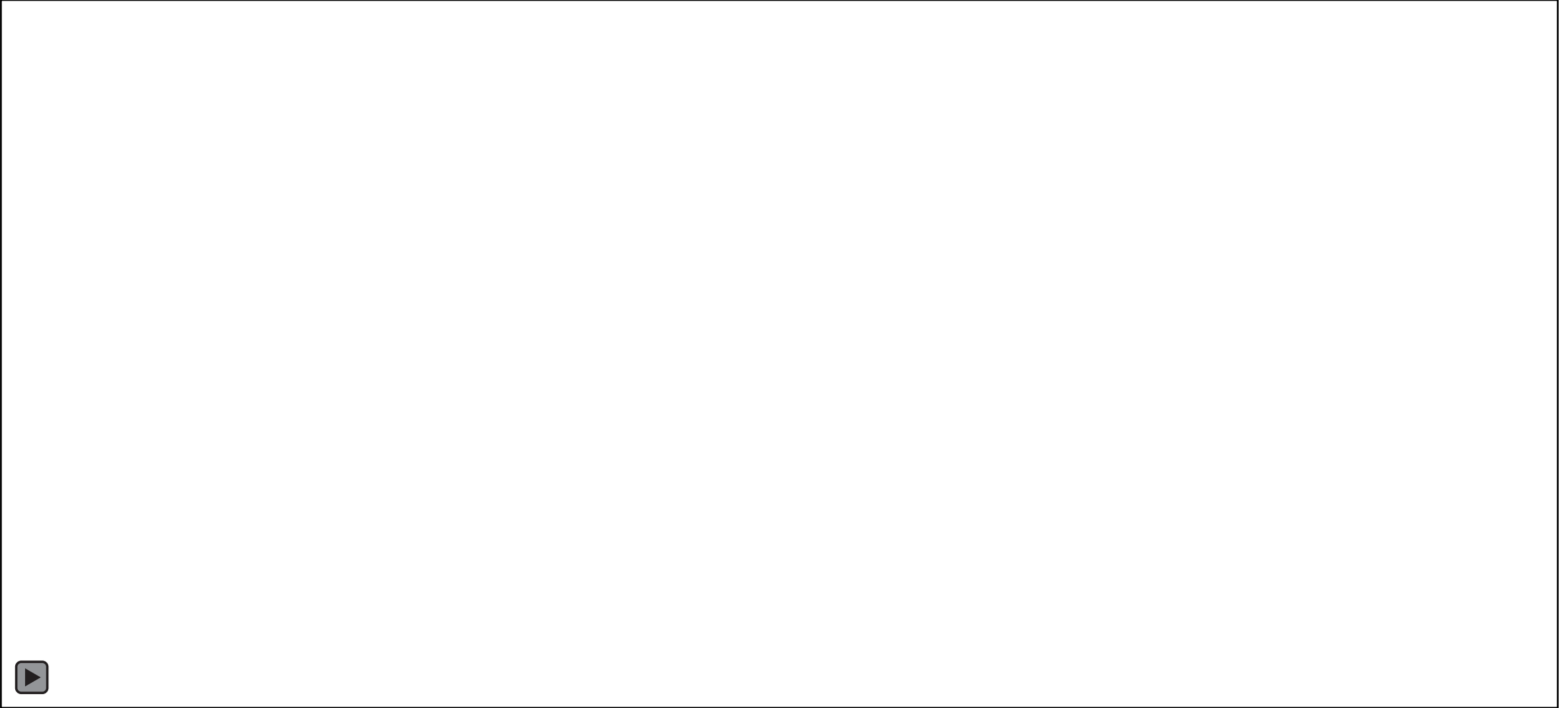
Slow Speed Zone

Slow Speed Zone

Mid-Block Crosswalk
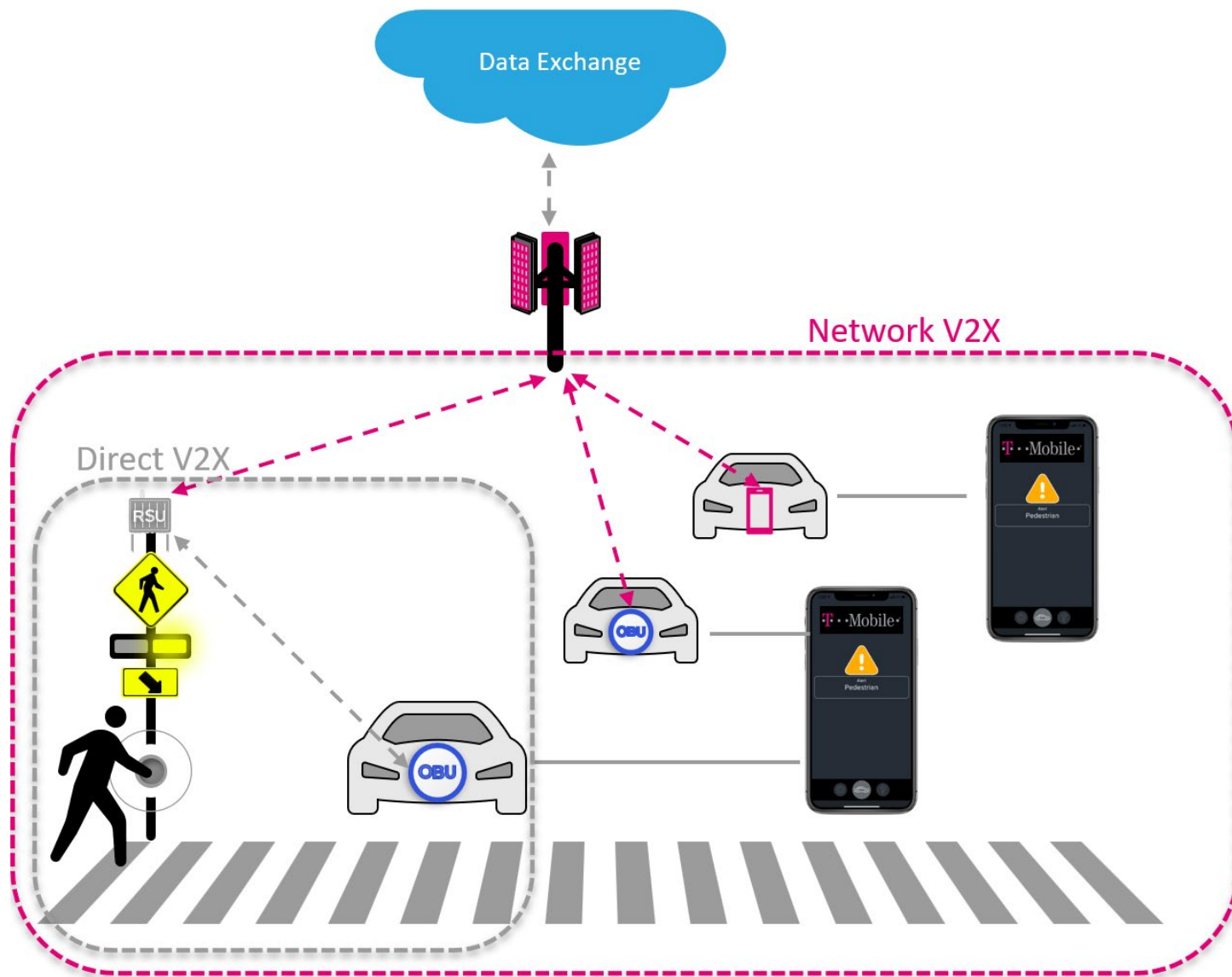
Mid-Block Crosswalk

Whitepaper

T-MOBILE FOR GOVERNMENT

NAVIGATING THE INTERSECTION:
VEHICLE-TO-EVERYTHING TECHNOLOGY CAN MAKE PEOPLE AND TRAFFIC SAFER.

Prevent pedestrian fatalities and serious injuries by using a T-Mobile 5G cellular network.

In 2023 alone, 40,990 people died due to motor vehicle traffic collisions on U.S. roads and highways[1]. While it's a 3.6% decrease from 2022, it's still a drastic uptick from traffic deaths at pre-pandemic levels.

As cities and technology advance, we need to effectively identify ways to leverage these innovations to keep our residents, commuters, and visitors safe. **It's possible with vehicle-to-everything (V2X) communication powered by the strength and consistency of our 5G network.**

This whitepaper addresses how connectivity—specifically network V2X—can improve safety-aware applications in technology forward or aspiring cities.

KEY HIGHLIGHTS INCLUDE:

- Defining safety-aware applications
- Understanding network V2X vs. direct V2X
- The role of latency
- The consequences of not doing something now
- Network V2X solutions and use cases
- Real world example: City of Bellevue

DEFINING SAFETY-AWARE APPLICATIONS

Before diving in, let's clarify what safety-aware applications are. The main difference between failures in safety-critical and safety-aware applications lies in their outcomes. Failures in safety-critical applications can result in death or serious injury, whereas failures in safety-aware applications lead to less severe consequences.
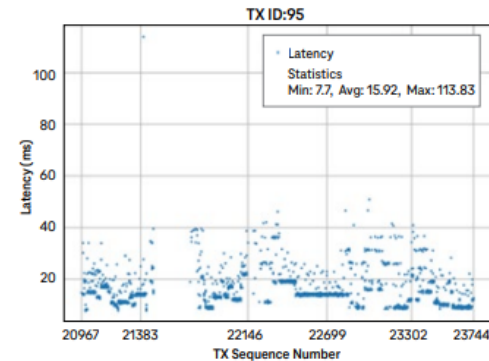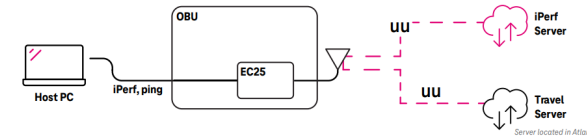
EXAMPLES INCLUDE:

- Lane closure signs
- Wrong way signs
- Excessive speed warnings
- Pedestrian crossing warnings

THE LATENCY TEST:
NETWORK V2X VS. DIRECT V2X

NETWORK V2X

We conducted a network V2X test incorporating an onboard unit and cellular device to gauge latency levels.

TX ID:95

Latency Statistics
Min: 7.7, Avg: 15.92, Max: 113.83

TYPE OF COMMUNICATION	LATENCY
DIRECT V2X	20 ms
NETWORK V2X	125 ms

Challenges

Direct V2X

Slow RSU deployment

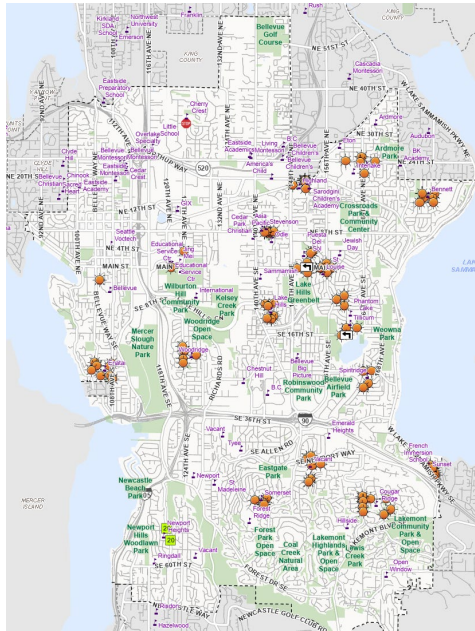Agencies waiting for equipped vehicles

OEMs waiting for infrastructure

Low OBU penetration

Network V2X

Last mile

V2X Expansion

Thank You

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BellevueWa.Gov

54 cohort members