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SHAPING FUTURE TRANSPORT WEBINAR



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Telstra



Qualcomm

4G / 5G for High Performance ITS

An industry view on Cellular V2X

ITS-Australia Webinar 27 May 2020

Program

Moderator

Jamie Smith, Executive Lead - Smart Transport, Telstra

Qualcomm

Jason Ellis, Director Business Development, Qualcomm Automotive

Ericsson

Stefano Sorrentino, Principal Researcher, Ericsson

Telstra

David McKechnie, Senior Technology Specialist, Telstra Labs

Ford

Craig Greene, Senior Technical Engineer, Ford Motor Company





Cellular V2X

Jamie Smith

Executive Lead – Smart Transport



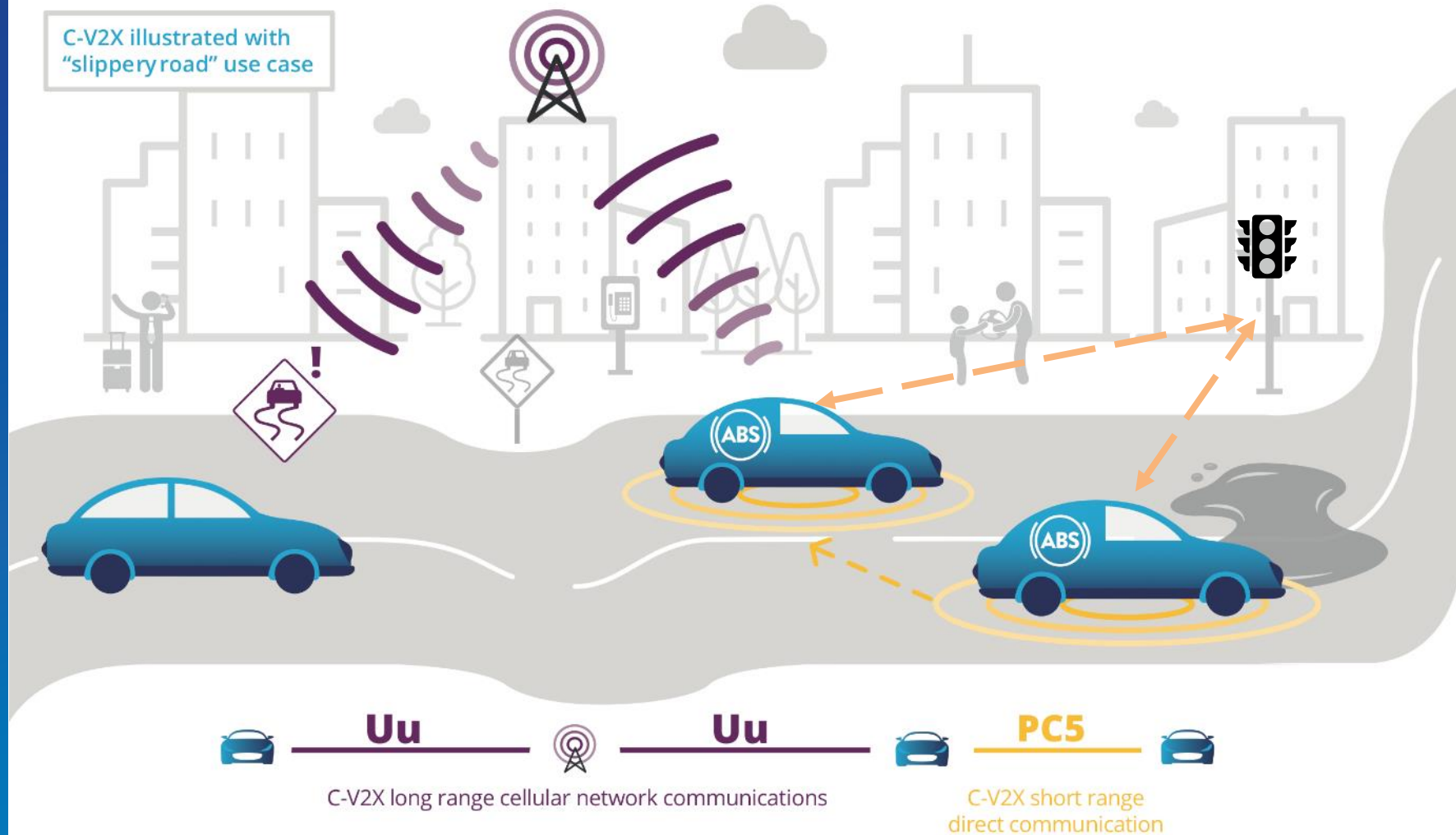
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Why Cellular V2X (C-V2X)?

C-V2X is a unified technology platform including both:

- Short range direct communications (4G LTE-V2X PC5 & 5G-V2X PC5)
- Long range cellular mobile network communications (LTE-V2X Uu)

Provides clear evolution path to 5G, with technology backwards compatibility safeguard







Qualcomm

Jason Ellis

Director, Business Development
Automotive BU – Connected Car



Qualcomm

Qualcomm has a Vibrant Ecosystem of C-V2X Solutions



Qualcomm offers 3 chipset platforms with C-V2X

MDM9150 (PC5, GNSS, Apps Processor)

<https://www.qualcomm.com/products/qualcomm-9150-c-v2x-chipset>



SnapDragon 4G Automotive Platform (4G/3G/2G Uu+PC5, Multi-Freq GNSS, Apps Processor)

<https://www.qualcomm.com/products/snapdragon-automotive-4g-platform>



SnapDragon 5G Automotive Platform (5G/4G/3G/2G Uu+PC5, Multi-Freq GNSS, Apps Processor)

<https://www.qualcomm.com/products/snapdragon-automotive-5g-platform>



Qualcomm SA2150P is a fully integrated V2X platform, complementing above modems, along with OBS Aerolink security for complete and mature C-V2X solutions

<https://www.qualcomm.com/news/releases/2020/01/06/qualcomm-introduces-comprehensive-platform-roadside-and-onboard-units>

Module manufacturers are shipping products today (Automotive Tier2); others not listed due to NDAs:

Gosuncn

<https://www.prnewswire.com/news-releases/geely-announces-work-with-qualcomm-and-gosuncn-to-launch-the-first-domestically-mass-produced-5g-and-c-v2x-enabled-vehicles-300802382.html>

LG Innotek (LAM-V500)

http://www.lginnotek.com/en/itk_news/lg%ec%9d%b4%eb%85%b8%ed%85%8d-%ec%b0%a8%eb%9f%89%ec%9a%a9-c-v2x-%eb%aa%a8%eb%93%88-%ea%b0%9c%eb%b0%9c/

Neoway (A90)

<http://www.neoway.com/news/article/47/170>

Quectel (AG15, AG520R, AG550Q)

<https://www.quectel.com/product/list/AutomotiveModule.htm>

SimCOM (SIM8100)

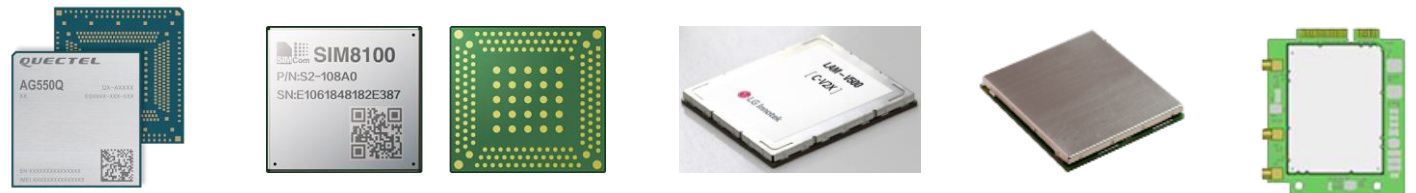
<https://www.simcom.com/product/SIM8100.html>

WNC (WNC C-V2X)

http://www.wnc.com.tw/index.php?action=pro_cate_third_close&top_id=26&scid=123&tid=145

ZTE (ZM8350)

<https://www.zte.com.cn/global/about/news/2-26-5>



Commerical C-V2X RSU and OBU products are shipping today from:

Applied Information

<https://appinfoinc.com/applied-information-cv2x-testing-in-metro-atlanta/>

Chemtronics

<http://chemtronics-automateddriving.co.kr/en/home-2/>

Cohda Wireless

<https://cohdawireless.com/cohda-wireless-c-v2x-evaluation-kit-prepped-for-real-world-trials/>

Commsignia

<https://www.commsignia.com/hardware/>

Danlaw

<https://www.danlawinc.com/v2x-hardware/>

Ficosa

https://www.ficosa.com/wp-content/uploads/2018/12/Ficosa_On_Board_Unit_C_V2X.pdf

Genvict

<http://www.genvict.com/en/product/Default.aspx?id=10000566>

iSmartWays Technology

<http://ismartways.com/solution.php>

Kapsch TrafficCom

<https://connectedvehicles.kapsch.net>

Lacroix City

<https://www.lacroix-city.com/activities/v2x/products/>

Nebula Link

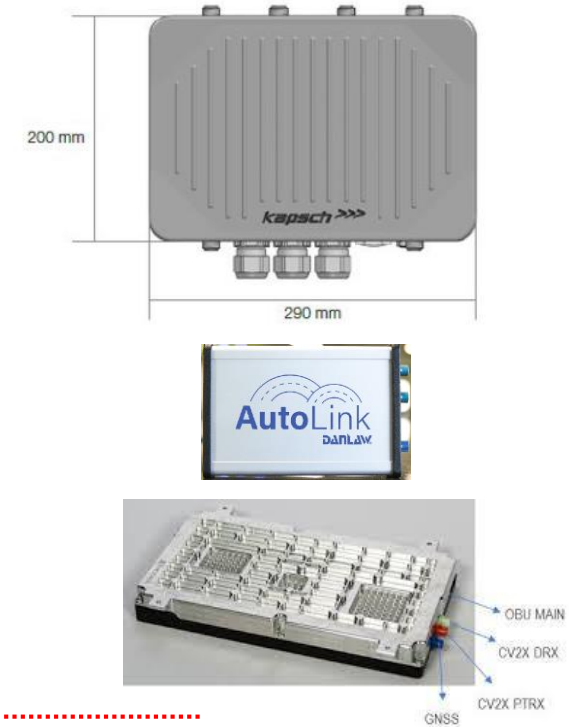
<http://www.nebula-link.com/Product/view/id/4>

Neusoft

<https://www.reachauto.com/>

Savari

<https://savari.net/technology/road-side-unit/>



RED certified products bring C-V2X commercial readiness to Europe

<https://www.qualcomm.com/news/releases/2020/03/10/qualcomm-announces-significant-progress-toward-commercial-introduction-c>

Some product announcements were delayed due to COVID-19, which are not yet listed because the PR was postponed. Even more solutions are NDA-only, and a number are in development. C-V2X connected cars are also coming shortly.

Products include aftermarket OBU, factory-fit Telematics/C-V2X TCUs, RSUs, Dual-Radio RSUs, RSU+eNB



Ericsson

Stefano Sorrentino
Principal Researcher



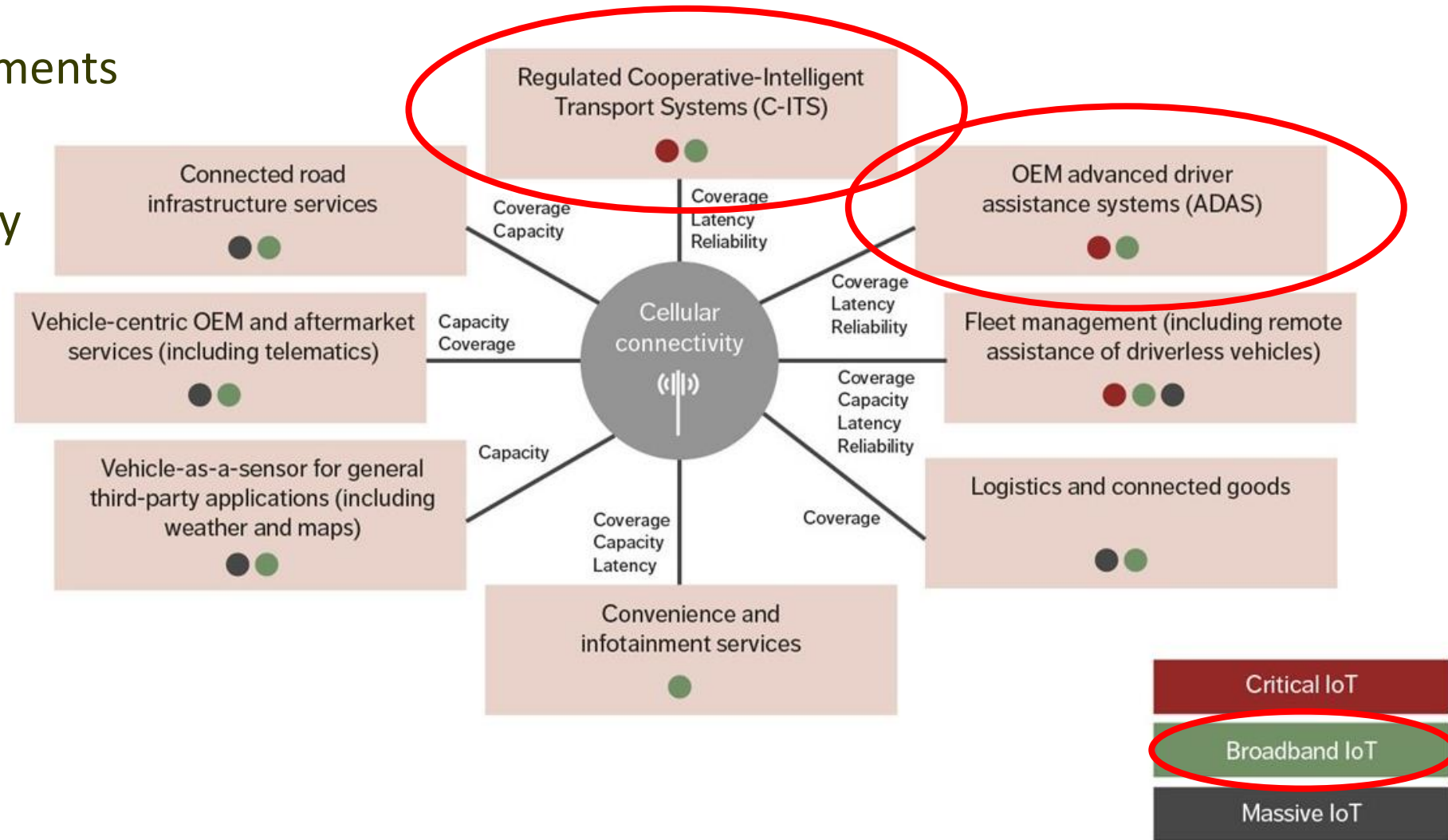
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Perspective 1: the cellular Automotive ecosystem

Heterogeneous requirements

Many different services

One cellular connectivity



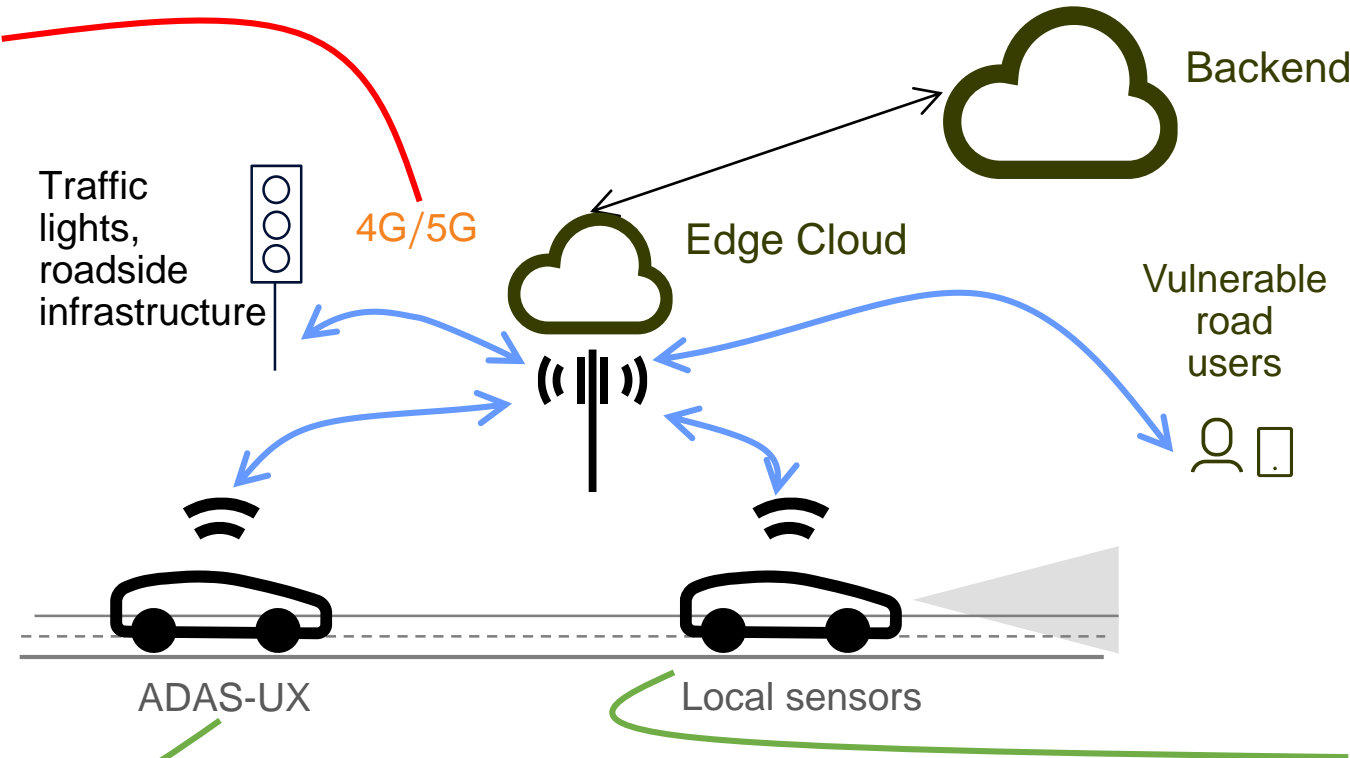
Perspective 2: proven potential of 5G-Advanced Driver Assistance Services



Commercial 5G network



In-vehicle augmented reality



Cyber-tires connected to 5G

[LIVE demo @ 5GAA, Italy, Nov 2019]

Perspective 3: Cellular for critical services in other industries

Well designed Cellular networks successfully deliver critical services:

Public Safety

- Firstnet (USA) relying on AT&T's commercial Cellular network, **with traffic prioritization** for First Responders
- Replacing dedicated networks, similar deployments in other Countries

Railways

- Future Railways Mobile Communication System (FRMCS) based on 5G will be deployed in the coming years
- Supporting critical train signaling
- Both dedicated networks and **network sharing (5G slicing) with commercial Mobile Network Operators**



C-V2X ecosystem

David McKechnie

Senior Technology Specialist | Telstra Labs
Chapter Lead | Global Connectivity and Platforms



Qualcomm

The size of the challenge

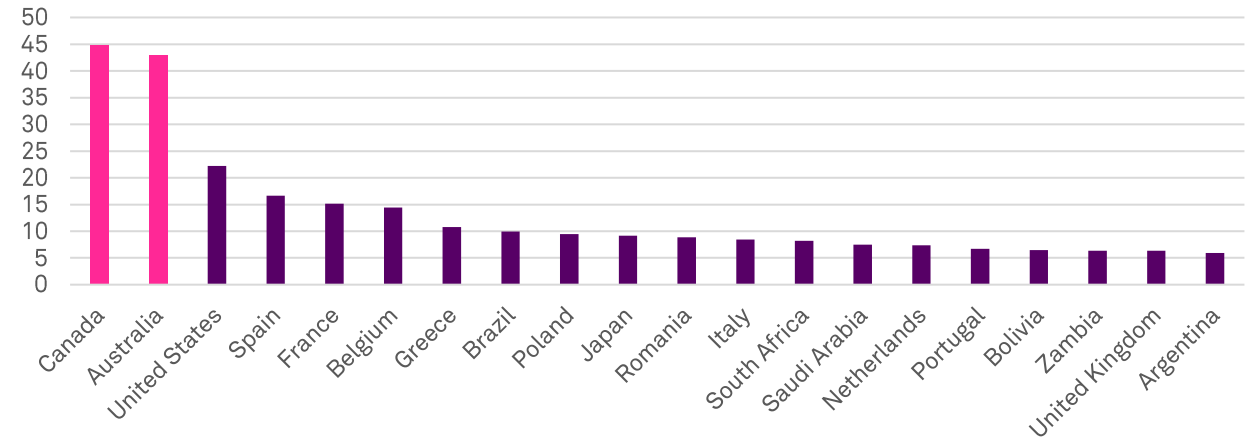
We switched on 4G in 2011, with around 30 regional and metropolitan centres at launch.

Today we have more than 99% of the population with 4G coverage: the result of 10 years of building.

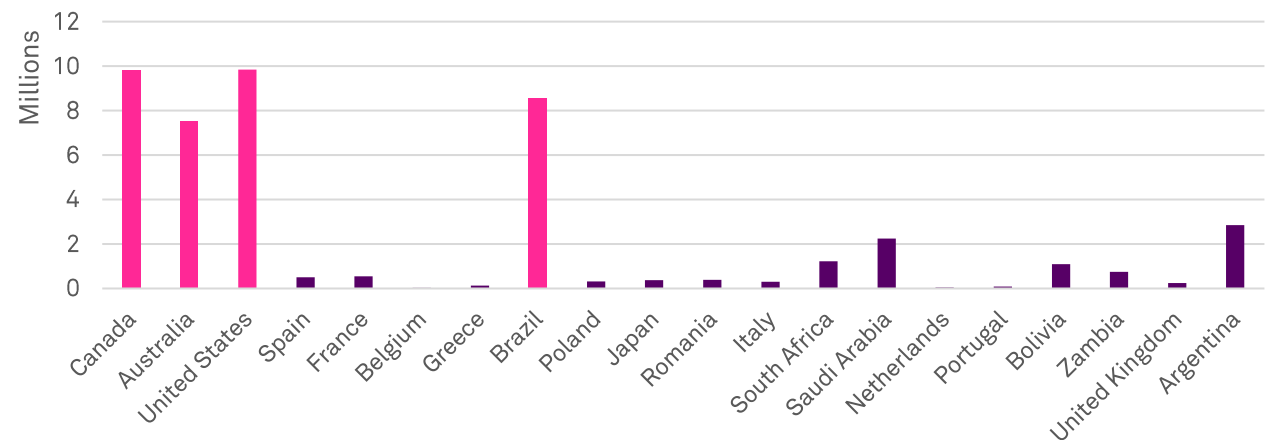
We've launched 5G in 30+ cities, and are building as quickly as we can.

But Australia is a very big place, with a lot of roads!

Road km/1000 pop



Landmass (sq km)

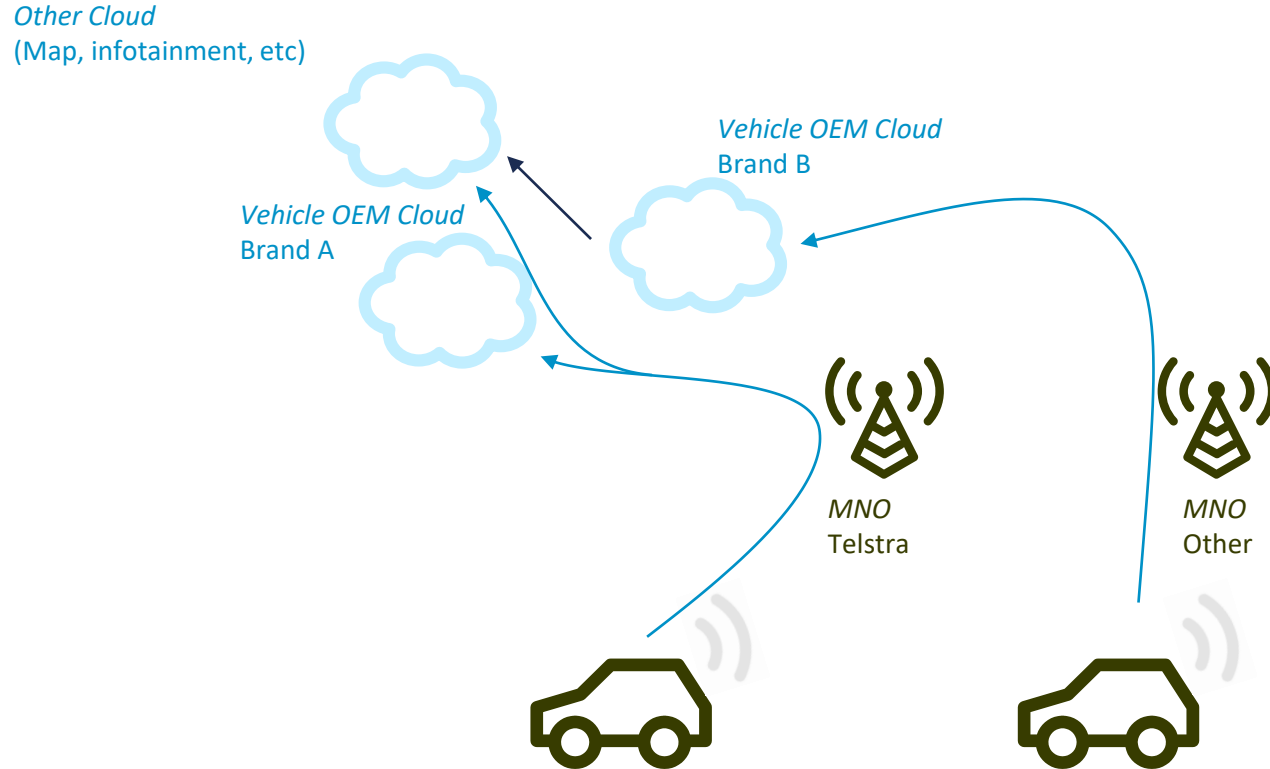


Top 20 road/pop, countries > 1 m pop
nationmaster.com

The C-V2X Future

V2N Connectivity Services

Telematics, infotainment, brand specific safety features

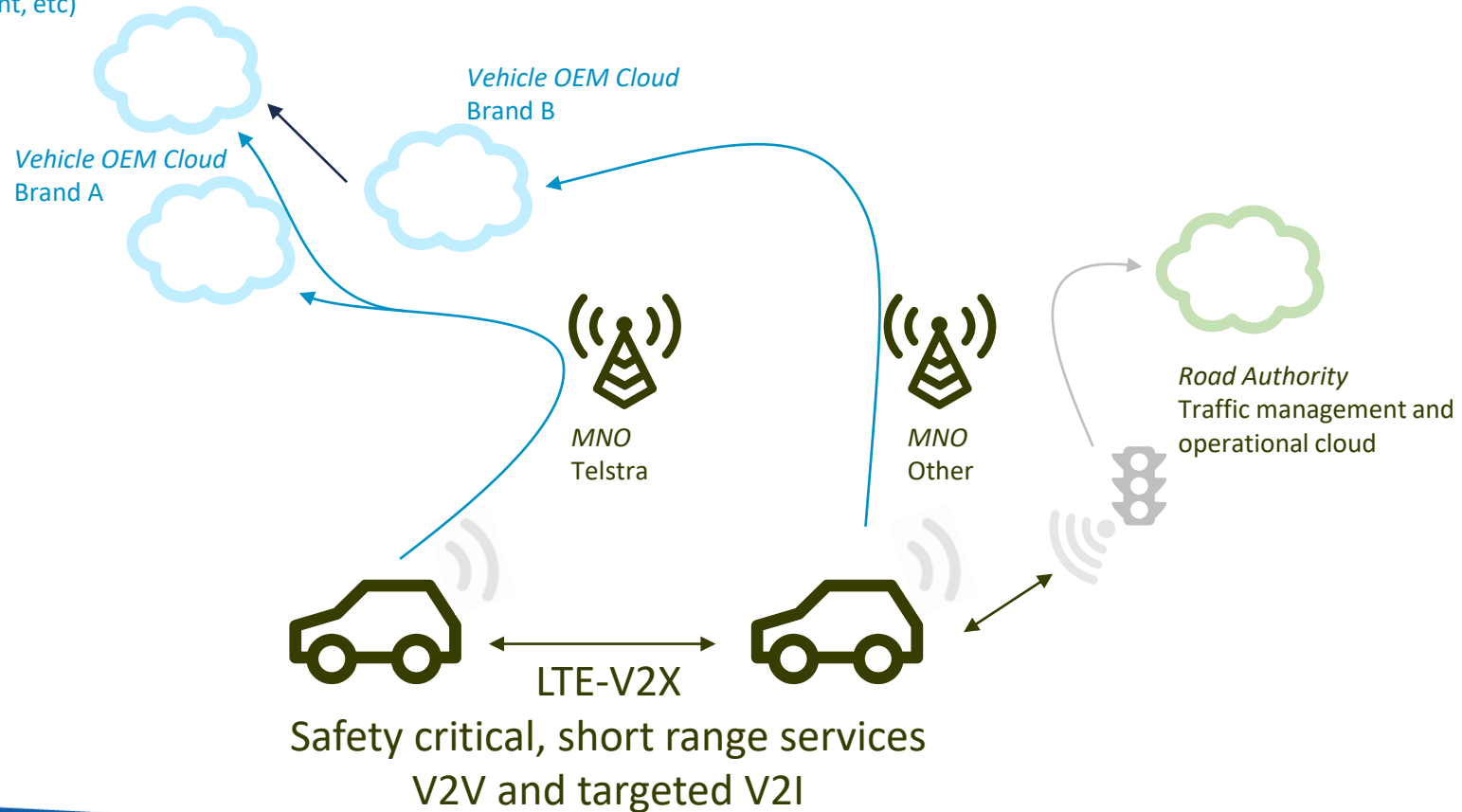


The C-V2X Future

V2N Connectivity Services

Telematics, infotainment, brand specific safety features

Other Cloud
(Map, infotainment, etc)



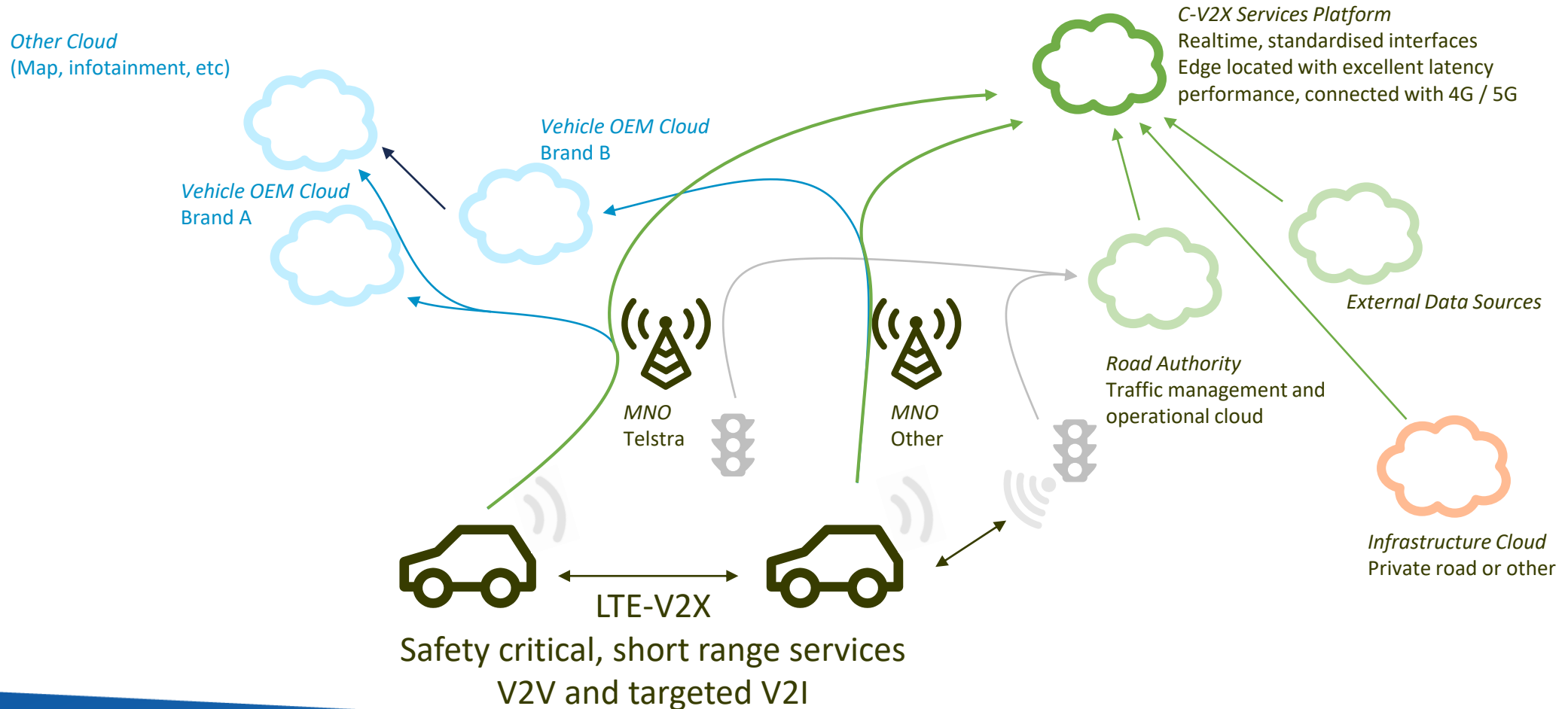
The C-V2X Future

V2N Connectivity Services

Telematics, infotainment, brand specific safety features

Co-operative ITS V2X Services

Informational and real-time safety services
Cross brand, complementary to short range V2V/V2I services

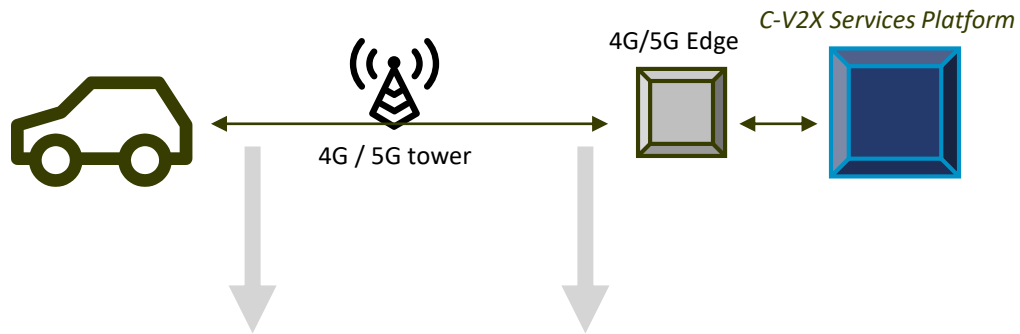


4G is ready for V2X

C-V2X Wide area

V2N2V Latency ~50 ms (Round trip)

I2N2V Latency ~30 ms (One-way)

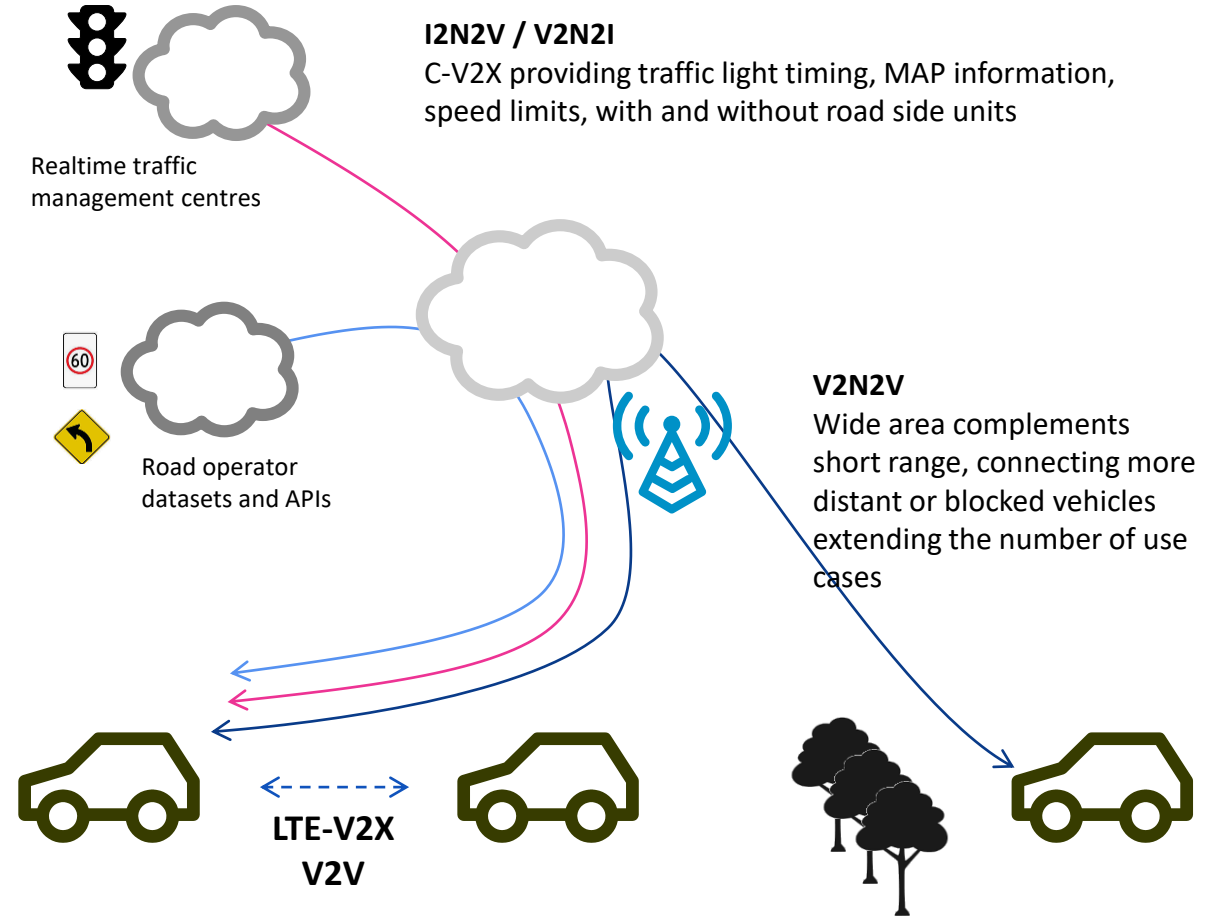


V2X performance on 4G

- **Deterministic latency** for V2X users
- **Minimum rate** for V2X users to sustain priority traffic
- **Partial priority** to maintain performance at busy times

E2E QoS across entire mobile Network

- **Same Quality of Service (QoS)** system that exists for Voice over LTE (VoLTE)
- No "internet transit" with unpredictable quality





C-V2X - An Automotive OEM's Perspective

Craig Greene

Senior Technical Engineer

Ford Motor Company



Qualcomm



“ It’s clear that the mobility model we have today simply will not work tomorrow.

We are going to build smart cars, but we also need to build smart roads, smart parking, smart public transportation systems, and more.

”

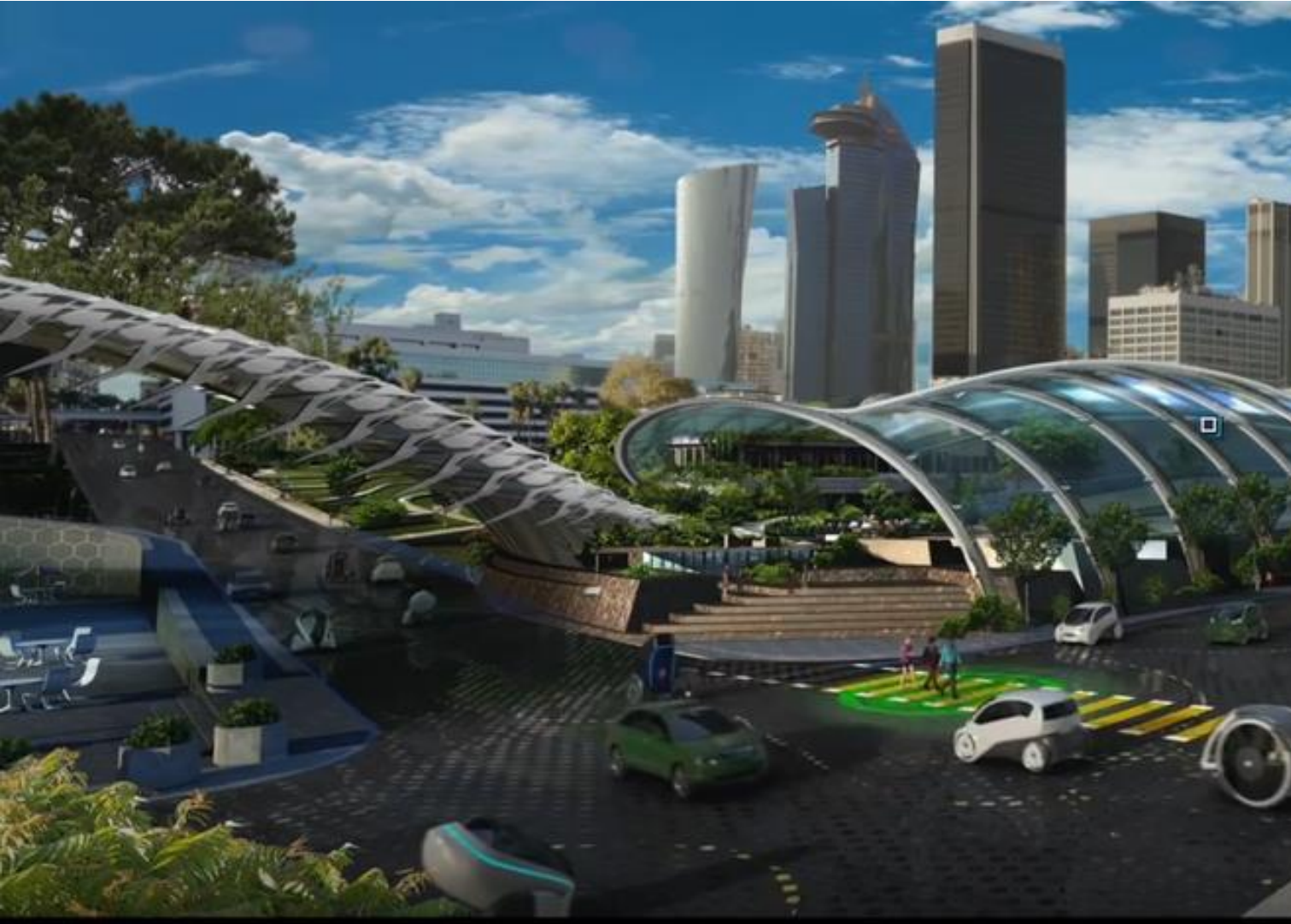
BILL FORD



C-V2X – Capability & Vehicle Communications



C-V2X – Ford's Perspective



- **Implementation Efficiency** by building off OEM cellular platforms
- **Global Footprint** given consistent and predictable deployment / standards
- **Evolution** to 5G and backward compatibility
- C-V2X delivers superior **Performance**

C-V2X – Readiness

Significant support and reach across
5GAA membership

Deployment reflects readiness

- All new Ford vehicles in North America from 2022
- Selected new Ford vehicles in China from 2021



Questions?



Contact details

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Thank you

