

# 5G for Connected Vehicles



IoT Week  
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#IoTWeek2019  
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**NOKIA**

# Vehicles need communication



Traffic safety and automated driving



Traffic efficiency

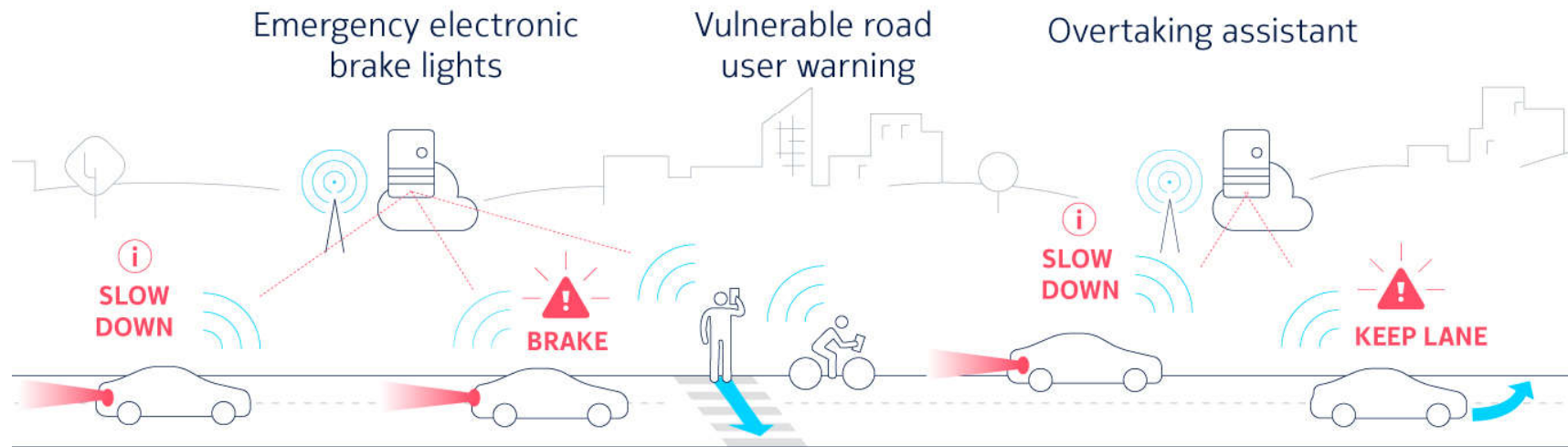


Infotainment

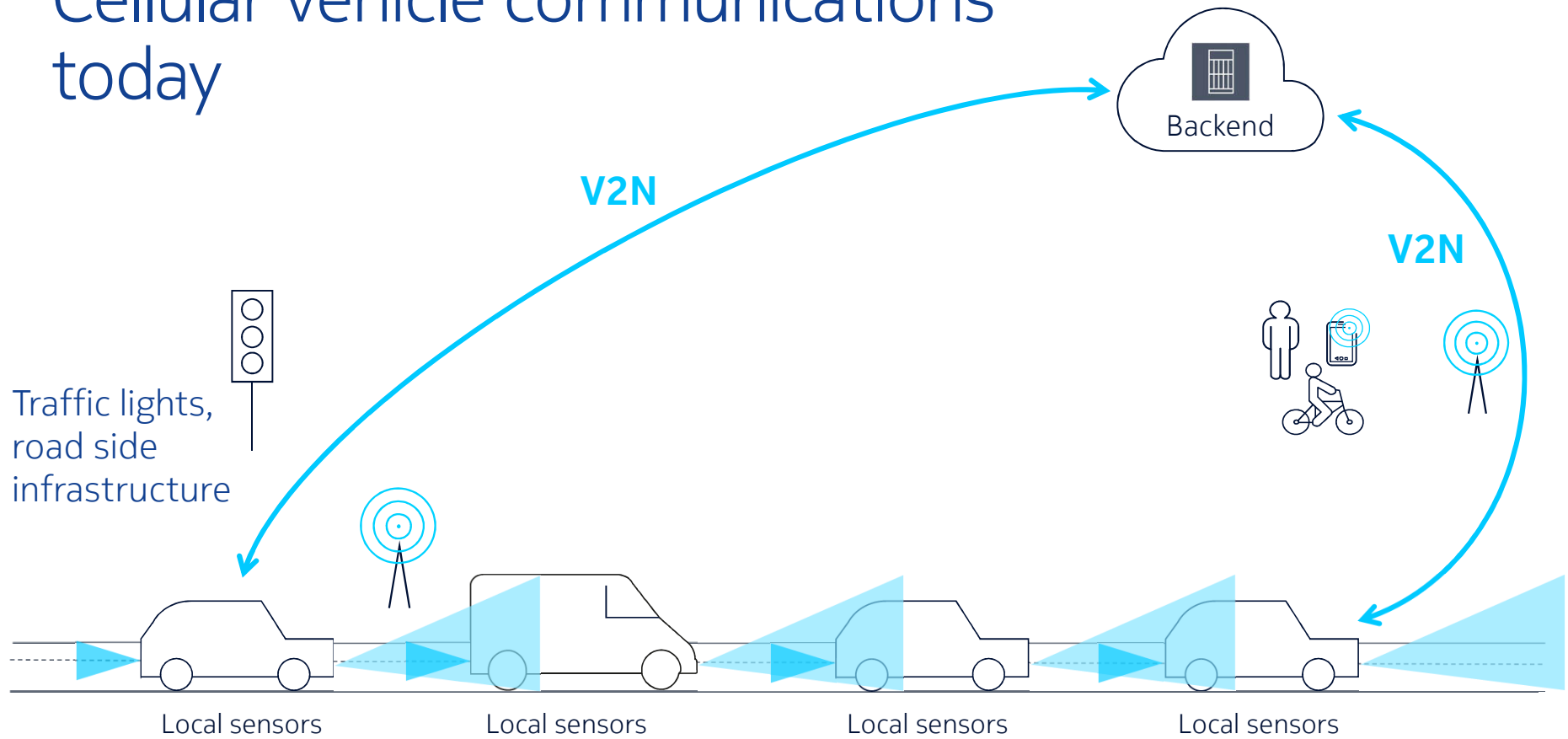
# Towards automated driving and traffic safety

- Intersection collision warning
- Traffic condition warning

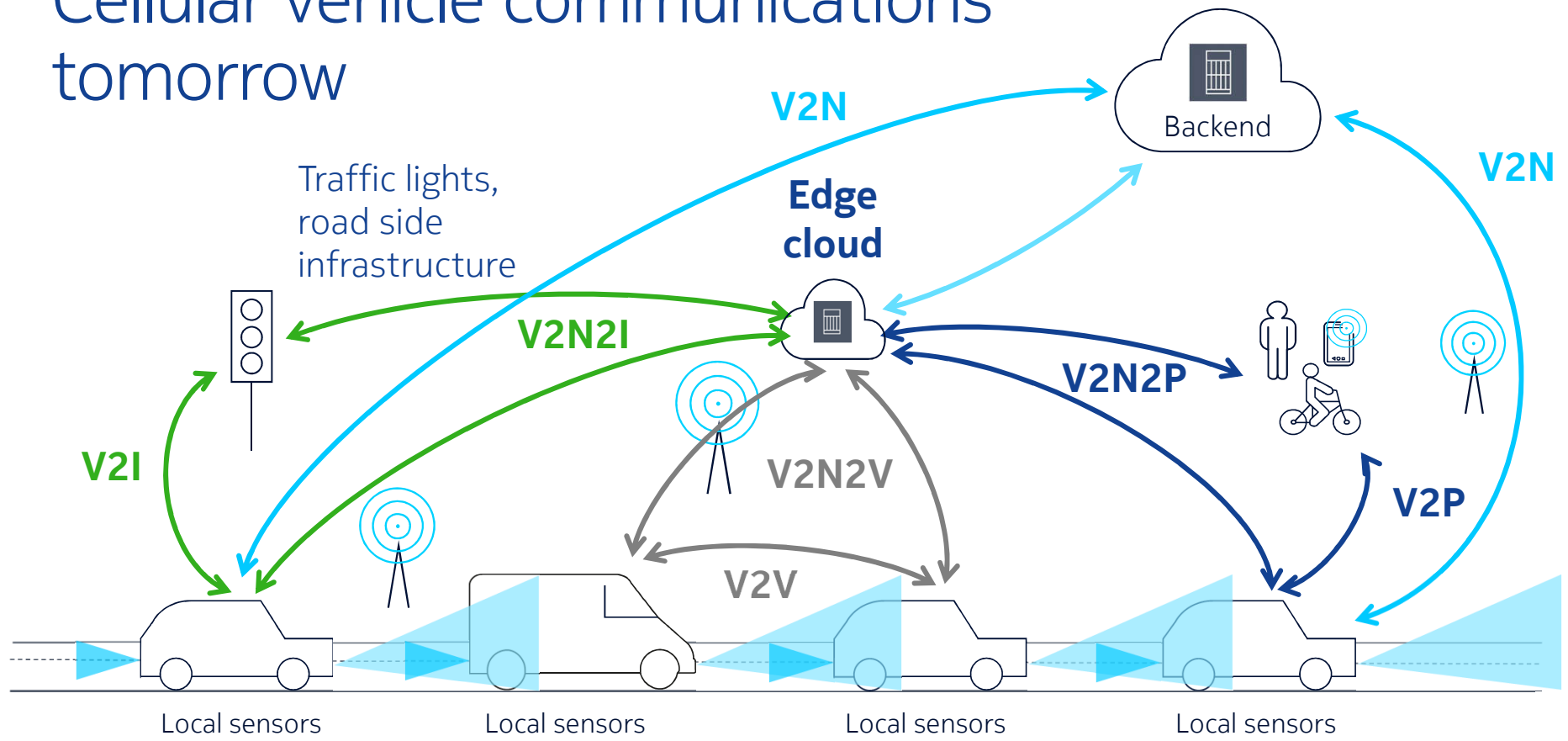
- Co-operative merging assistance
- Overtaking vehicle warning



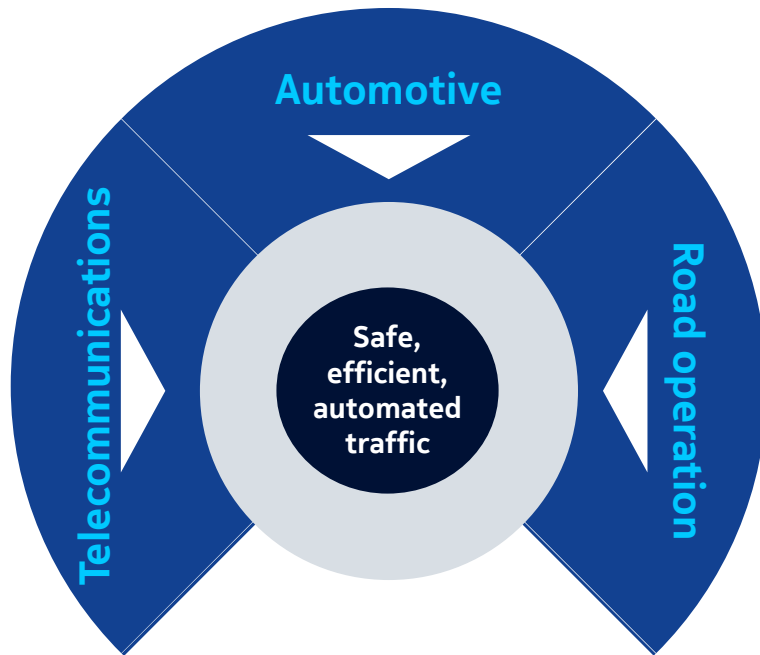
# Cellular vehicle communications today



# Cellular vehicle communications tomorrow



A new ecosystem needs to address the challenges



**Key elements:**

- New business relationships as well as business and financing models
- Collection, processing, correlation and exchange of data
- Use of new technologies
  - Sensors & HD maps
  - 5G & C-V2X
  - Machine learning and AI
- Global cross-all interoperability



5G: It is the architecture that matters

Cloud  
native

Scalable

Automated

AI driven

Open



# 5G Automotive Association: Automotive and telecom companies join forces to address society's connected mobility needs



Develop, test and promote communications solutions, initiate their standardization and accelerate their commercial availability and global market penetration

Mission

Road safety  
 Infotainment  
 Automated driving  
 Smart City Transportation

Use cases

Car Manufacturers  
 Telecom Operators  
 Telecom Suppliers  
 Chipset and Device Vendors  
 Automotive Suppliers

Teamwork

Use cases and requirements  
 System architecture  
 Standards, spectrum and policy  
 Testbeds and pilots  
 Business models and go-to-market

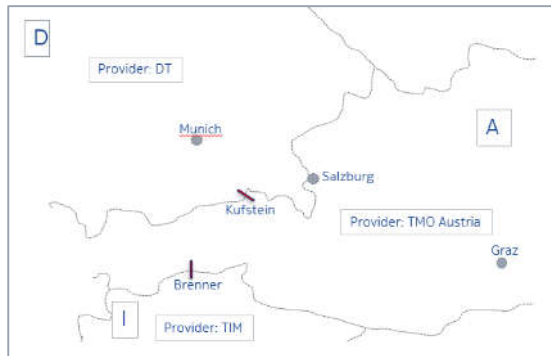
End-to-end solutions



See also: <https://www.audi-mediacycenter.com/en/press-releases/telecommunications-and-automotive-players-form-global-cross-industry-5g-automotive-association-6817>  
<http://5gaa.org/>

# 5G Carmen Project

5G Cross border trials for connected and automated mobility (CAM)



UC1: Vehicle maneuver negotiation  
 UC2: Vehicle smart living SAE lev. 3/4  
 UC3: Vehicle SAE level 3/4  
 UC4: Vehicle emission control

Use cases



- Total project budget  $\approx$  19M€ with  $\approx$  15M€ EU funding
- Project duration: 36 Months
- EU corridor:

Italy Austria Germany

Overview

- Design a federated 5G system architecture and deployment model supporting CAM use cases
- Advance the enabling technologies for a 5G corridor including the network-embedded cloud, NR, ...

Objectives



See also: <https://www.5gcarmen.eu/>