WHAT IF …

WE COULD MAKE EUROPEAN ROADS SAFER FOR EVERYONE?

….

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vodafone business

Vodafone launches platform to improve road safety in Europe

STEP | Introduction

Vodafone is committed to make European Roads safer for all

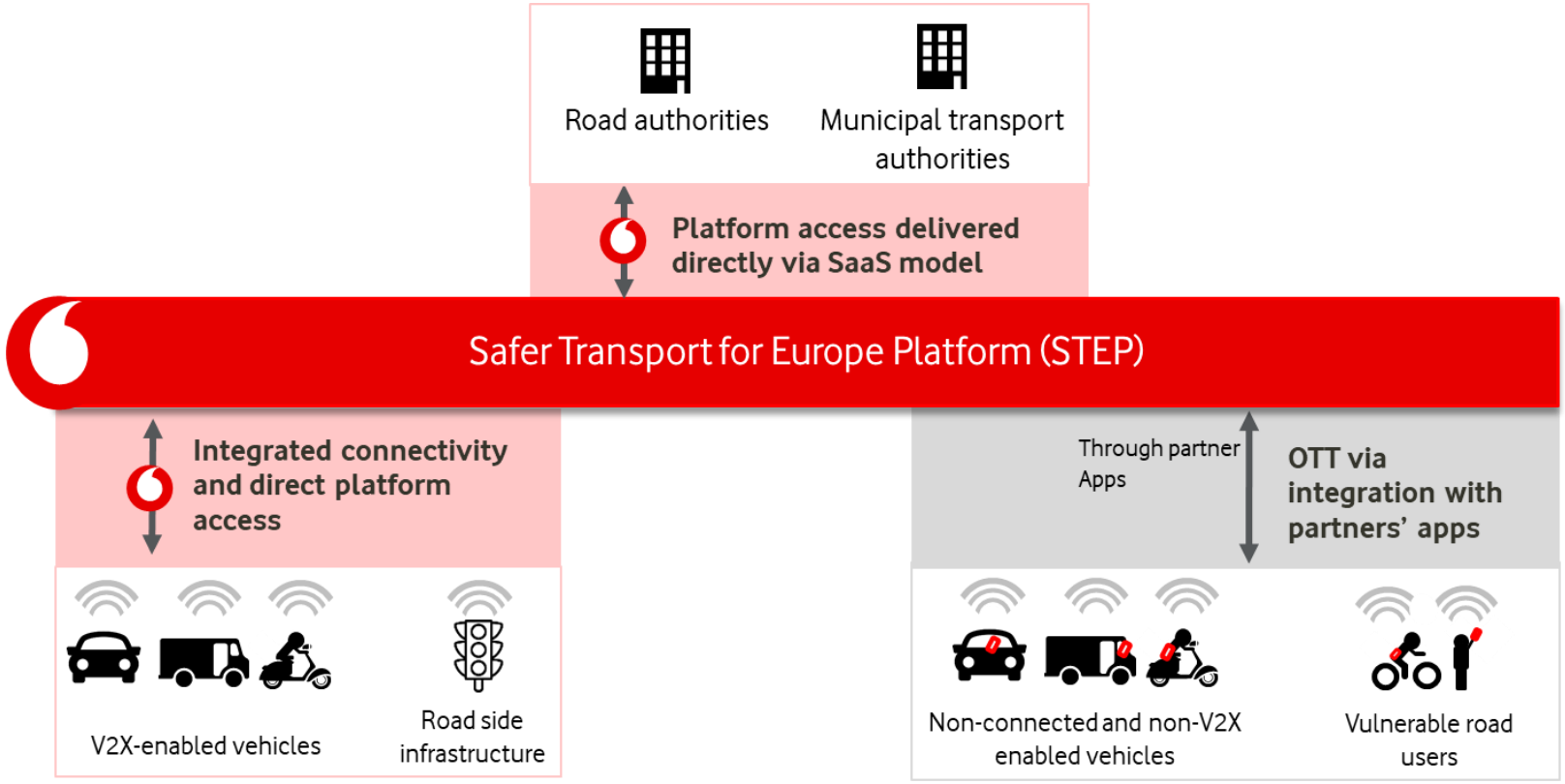
Platform to distribute, broker and validate **V2X messages in real-time leveraging 5G and Edge Cloud**

Hazard Warnings

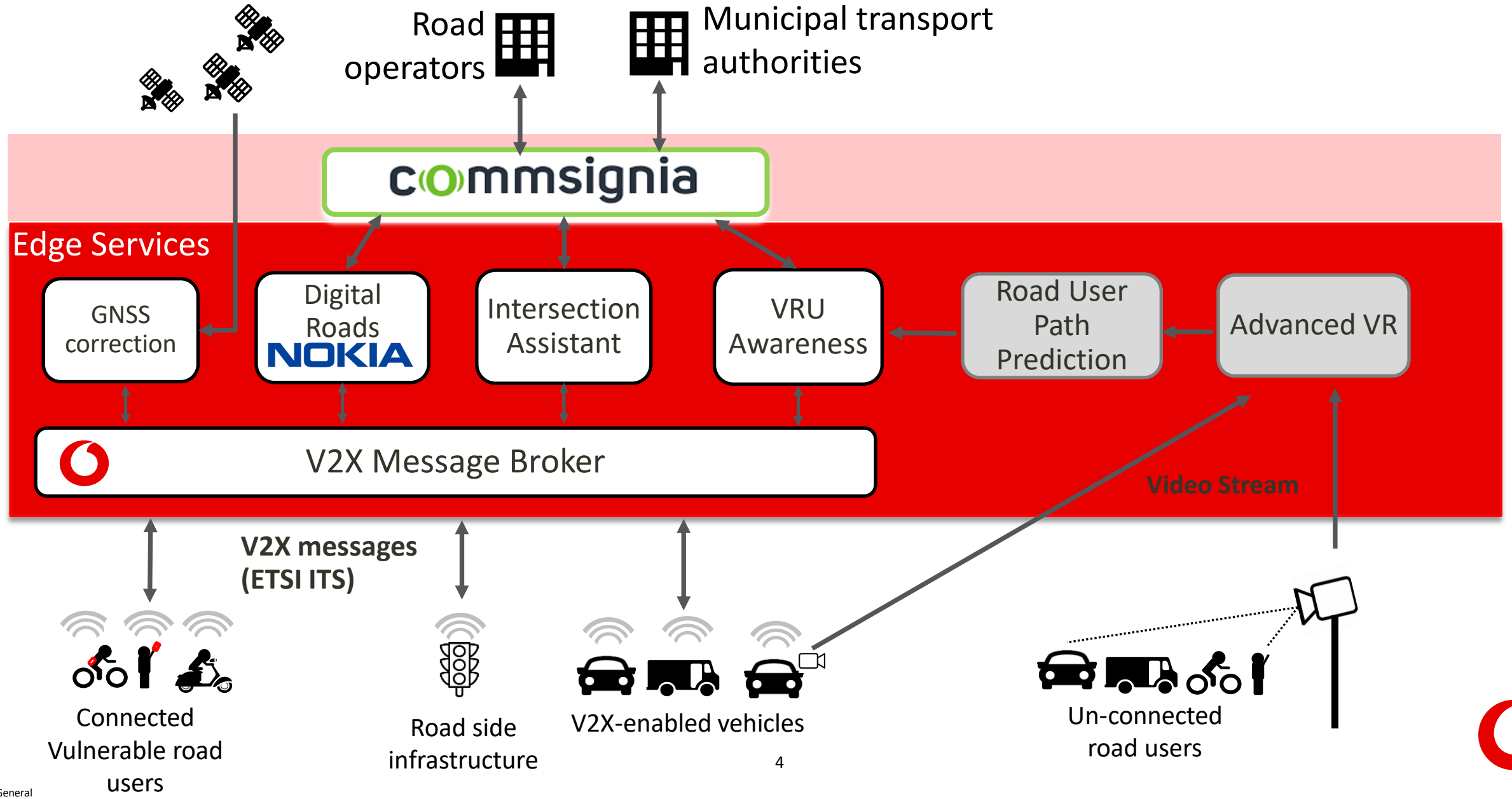
VRU Assistance

Infrastr. to Vehicle

STEP aims to scale – Starting in the V2X / Connected Mobility space and using it for all types of real-time data broker applications



V2X Platform at the Edge



Why network edge? Scalability and reliability

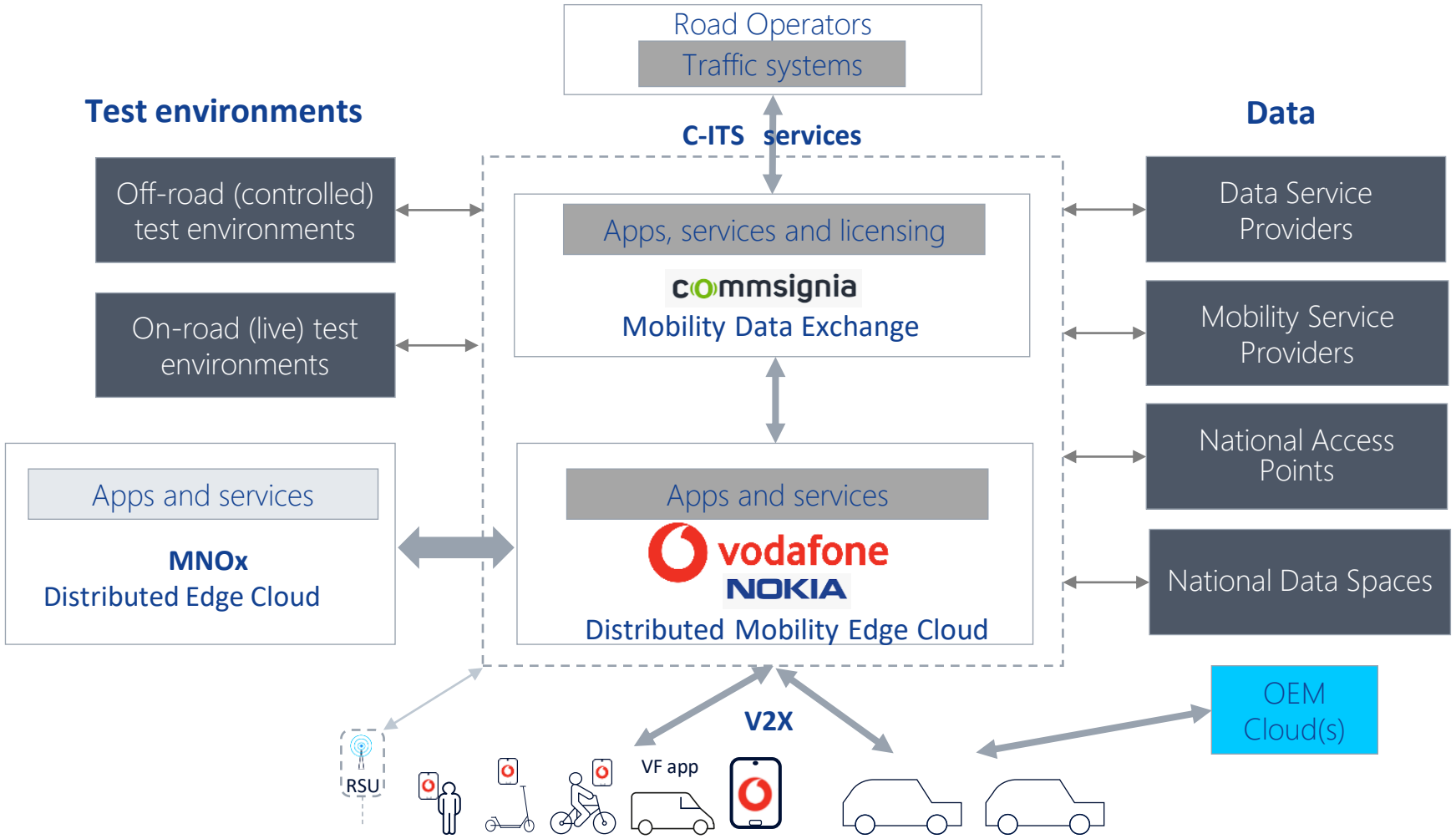
Scalability

- V2X type C-ITS messages (CAM, DENM) are sent from the vehicle to the STEP platform
- As the number of participating vehicles/devices increases, the amount and associated transport cost of data will increase – costs can be minimised if the data path is minimised
- STEP functions (MQTT and data processing) are deployed at the mobile edge and so all data originating from vehicles is terminated at the edge, thus reducing the data transport costs
- Without the network edge, much of the value of collecting data from vehicles will be spent on data transport

Reliability and service assurance

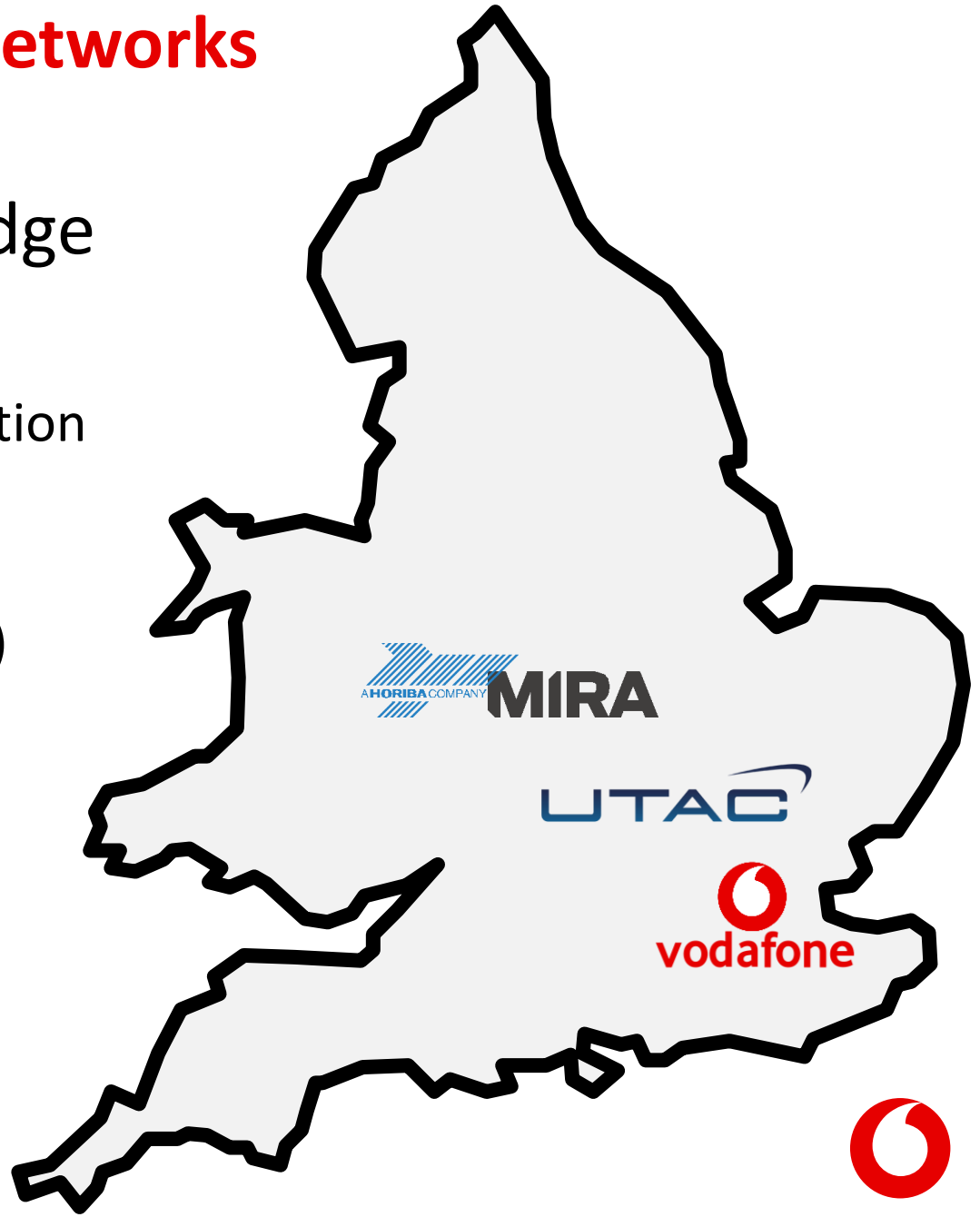
- The Mobile Edge enables the whole of the service (servers, client, connections) to be kept within the mobile network and so the potential for moving towards a QoS-enabled, targeted QoS approach is enabled
- Services outside the mobile network are generally provided by Best Effort means
- QoS enabled service have predictable, low latencies during network congestion and so timely delivery of C-ITS data is always reliable

Connecting vehicles, VRUs and infrastructure seamlessly



V2X services optimised for mobile networks

- STEP hosted at Vodafone's Mobile Edge in London (AWS Wavelength)
  - A dedicated test track (private road) configuration for UTAC and Horiba-Mira
  - STEP will also be used to support public road-based services (testing & customer/consumer)
- Local hosting enables
  - Lowest e2e latencies
  - Data remains in country
- STEP will be deployed across Vodafone's major European markets during 2022



V2X services optimised for mobile networks

- V2X through UTAC and HORIBA-MIRA mobile private networks, live commercial networks for public roads
- Data partitioning
  - Private road data only viewable by individual test track customers
  - Businesses can only see their own data on public roads
- V2X service evolution – OEM/Fleet applications can be hosted on STEP
  - ADAS integration
  - Sensor fusion
  - Vehicle autonomy support

Next steps

Phase 1

- Use UTAC and Horiba MIRA as a practical (hands-on) education facility for eco-system stakeholders – spread the word on what can be achieved today
- Discussions with OEMs/Tier1s about connectivity via in-vehicle unit and presentation via head-unit / infotainment system and additional use cases
- Discussions with Road Operators about additional use cases and connection to their road network data
- Discussions with other 3rd party app developers about integration of V2X SDK

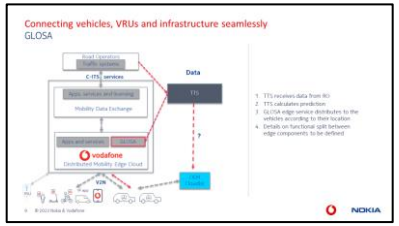
Phase 2

- Testing of vehicles connected via TCU – head-unit
- Testing of interface to road operator data
- Testing of additional use cases
- Testing of 3rd party apps

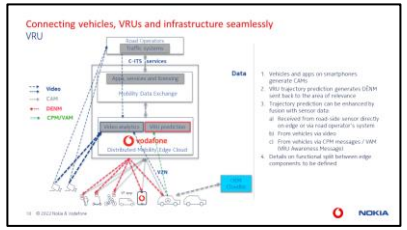
Outlook: Edge-based use cases

Candidate proposals

GLOSA

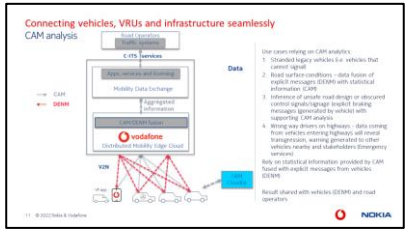


VRU



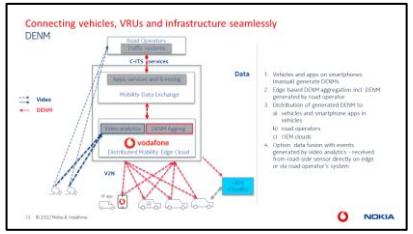
- VRU (car → VRU & VRU → car)
- VRU incl. fusion with road side sensors (cameras)

CAM
data analysis



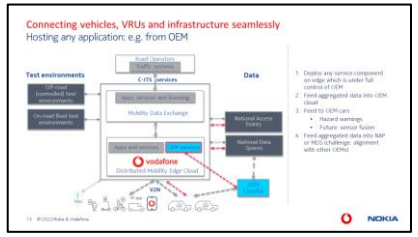
- Road Obstruction
- Stopped/broken-down Vehicle
- Real-time lane restriction
- Aggregated CAM (coop. awareness mesg.) data to be offered road operators (rev. share)

DENM
aggregation & distribution



- EEBL as an info service
- Local weather-related events

Any App
(hosting)



Prepare the future for

Data fusion to support cooperative automated driving