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Pilot on **Fair and equal data sharing for cooperative, connected and automated mobility**

Big Data and B2B platforms: the next big opportunity for Europe
EASME/COSME/2018/004

ICCS-NTUA

EASME - European Commission Executive Agency for Small and Medium-sized Enterprises

European Commission

Final Conference
26 Nov, 2020

Setting the scene

A European strategy for data

Projected figures 2025

530%

increase of global data volume

From 33 zettabytes in 2018 to 175 zettabytes

€829 billion

value of data economy in the EU27

From €301 billion (2.4% of EU GDP) in 2018

10.9 million

data professionals in the EU27

From 5.7 million in 2018

65%

Percentage of EU population with basic digital skills

From 57% in 2018

- Data is at the core of digital transformation
- Data-driven innovation can bring major and concrete benefits to the citizens
- People, businesses and organizations should be empowered to make better decisions based on insights from data

Source: European Data Strategy

A Common European mobility data space

A Common European mobility data space, *to position Europe at the forefront of the development of an intelligent transport system, including connected cars as well as other modes of transport. Such data space will facilitate access, pooling and sharing of data from existing and future transport and mobility databases.*

It includes data in the following domains:

- ✓ **Automotive** (*Including data generated by vehicles , used for diagnostics and other services)*

- ✓ **The full transport system** *(Logistics, traffic management systems etc.)*

A Common European industrial (manufacturing) data space, A Common European Green Deal data space, A Common European health data space, A Common European financial data space, A Common European energy data space, A Common European agriculture data space, A Common European data spaces for public administration, A Common European skills data space

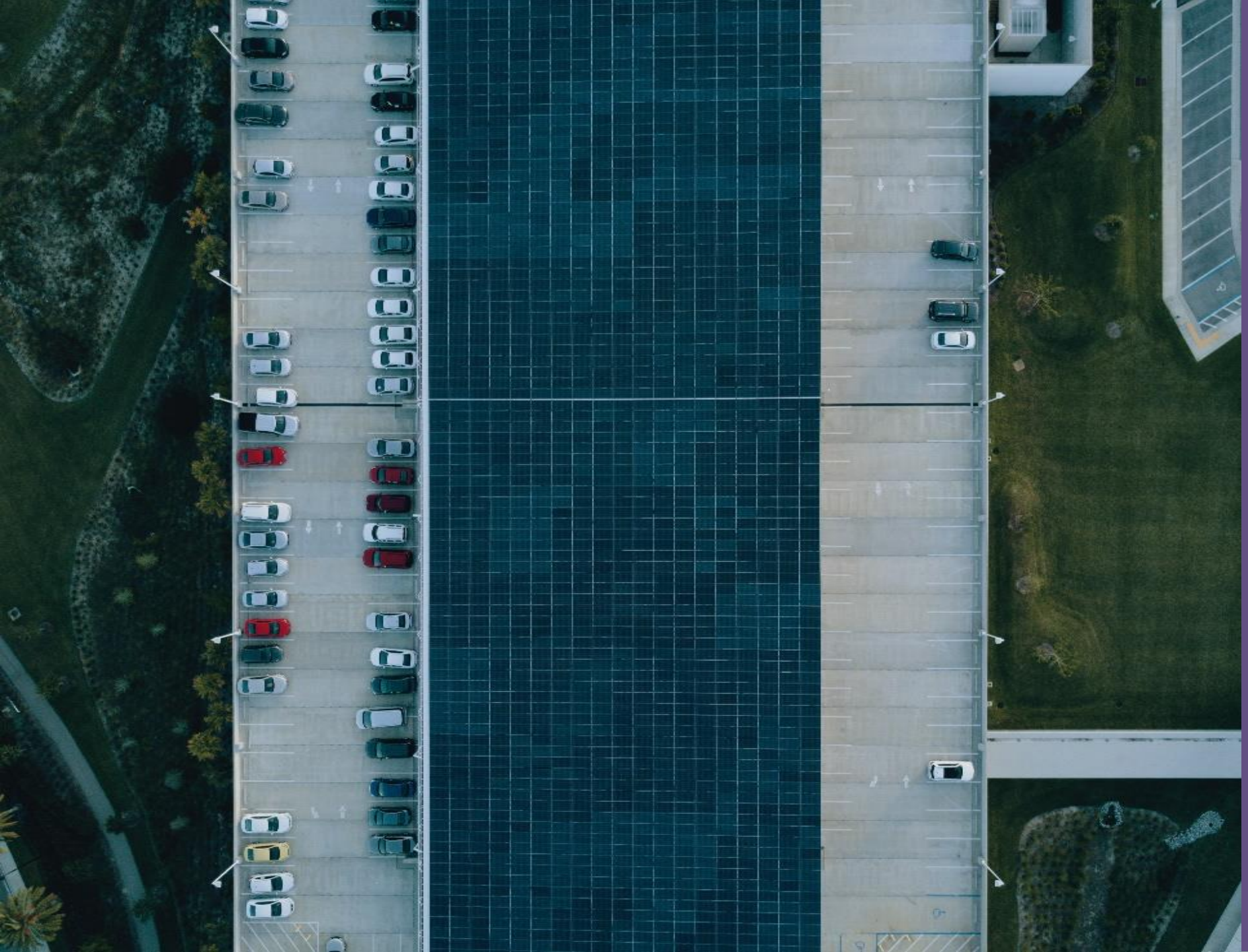
Back in 2016, the C-ITS platform introduced:

- The **Extended Vehicle (Ex-Ve)** supported by ACEA
- The **Shared Server solution** introduced by FIA and supported by several organisations as an interim solution to facilitate fair and equal data sharing
- The **On-Board Application Platform** that could be encouraged in the longer term, because it provides all market participants with access to real-time data (source: https://ec.europa.eu/transport/themes/its/studies/its_en).

The situation nowadays

In recent years, after the broad adoption of Extended Vehicle ExVe –Neutral Server (ISO/IEC ISO20078-2:2019) concept by the OEMs, several solutions arose:

- Data Market place and Neutral Server from **HERE**,
- ExVe from **BMW-IBM**,
- Neutral Server from **Otonomo**, and **Wejo** in US



Objectives

Main Objective 1

Prove the concept of a possible solution that can help improving fair and undistorted competition **using a shared data platform**.

Main Objective 2

To **provide input** for studying and demonstrating its potential impact to the European market **analysing opportunities and benefits for independent third-party service providers,** as well as **potential risks of market distortion** by **"**the winner takes all" effect.

Main Objective 3

Provide insights into a set of required capabilities **of third-party service providers and repairers** to help further develop the European market for connected and automated vehicles: **data privacy, cyber security, liability risks, legislative frameworks for operation, data ownership and IPRs protection**.

Main Objective 4

Deliver an architecture that will help industry stakeholders and policy makers **to formalise a common position** based on a set of principles **for the creation of shared EU-wide in-vehicle data platforms.**

Main Objective 5

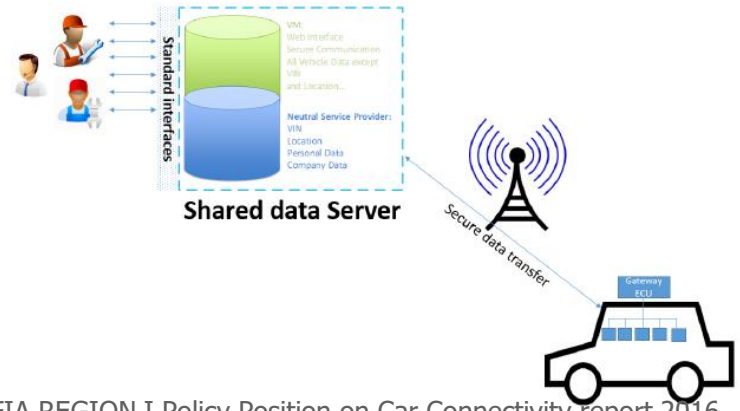
Provide technical input for drafting sector specific recommendations to the **EU and national policy makers, as well as to the industry**.

How does the Shared Server offer fair and equal data sharing for service provisioning?

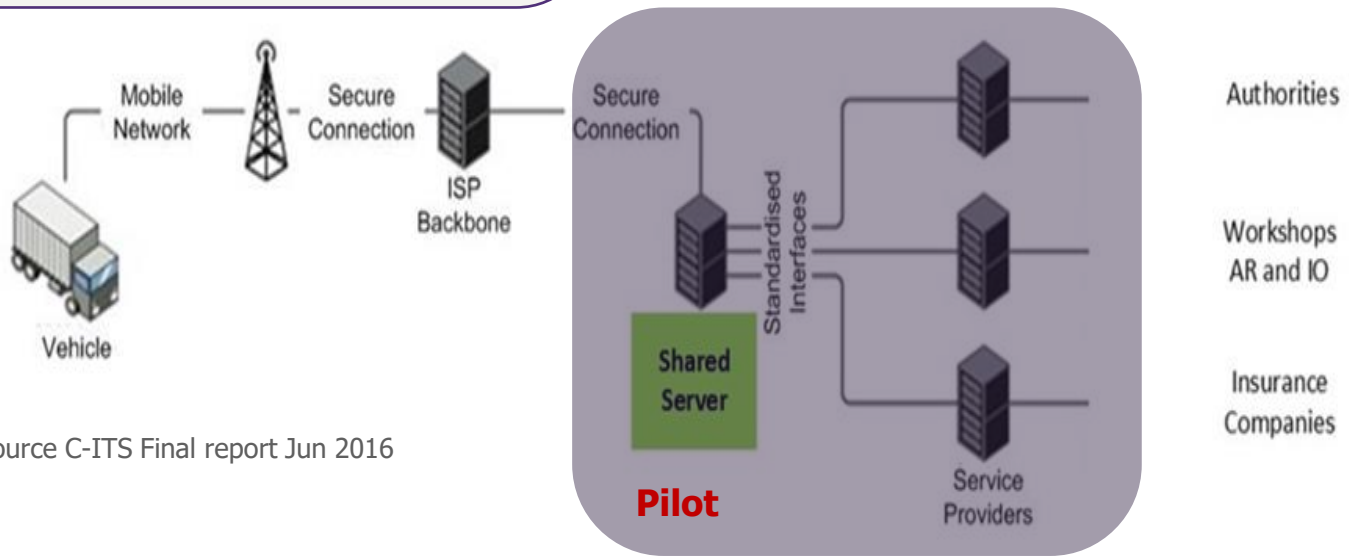
We started **from the initial Shared Server Concept**

…that ensured for a level playing field for the access to in-vehicle data

Access to In-Vehicle Data and Resources, Final Report, TLR, May 2017



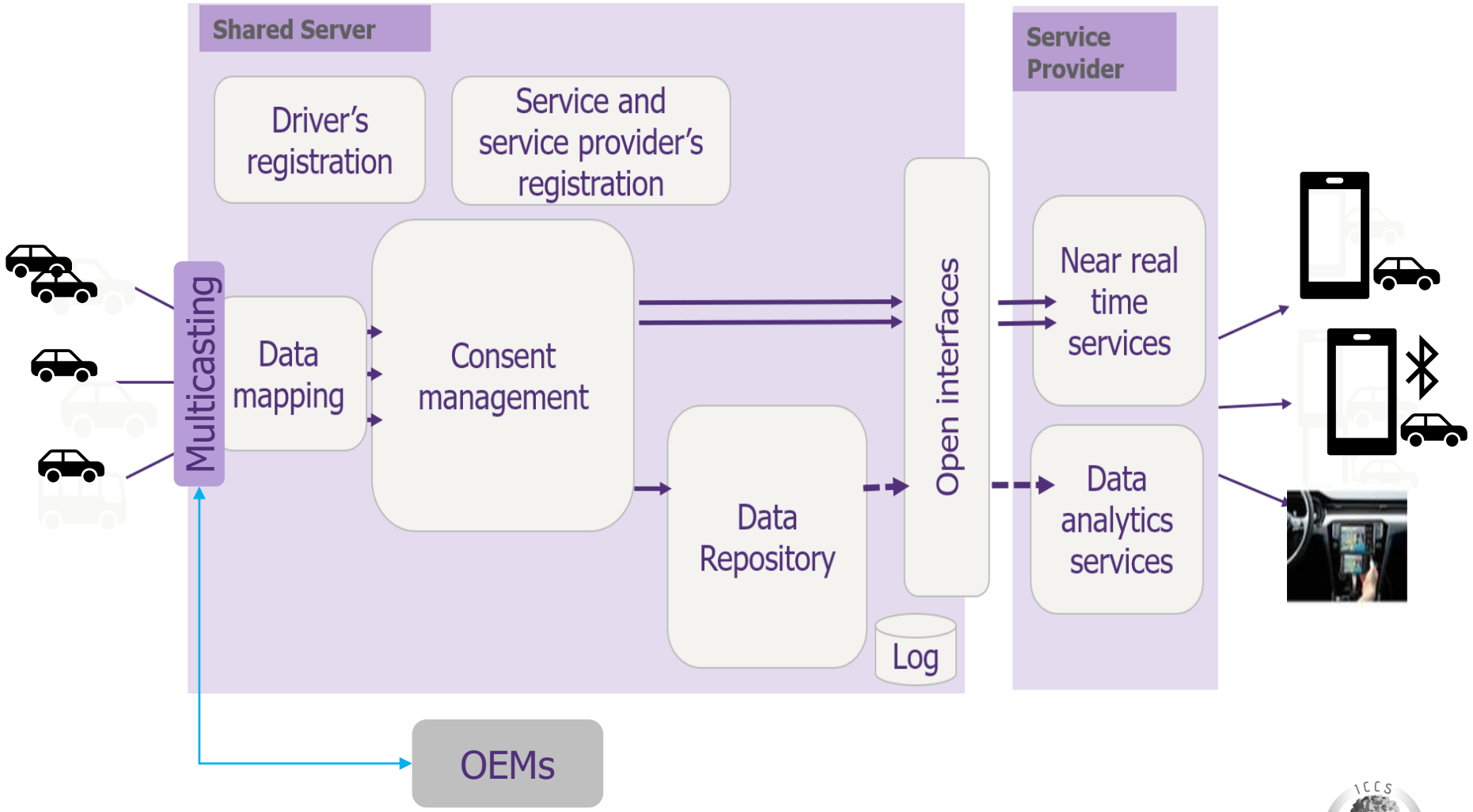
FIA REGION I Policy Position on Car Connectivity report 2016



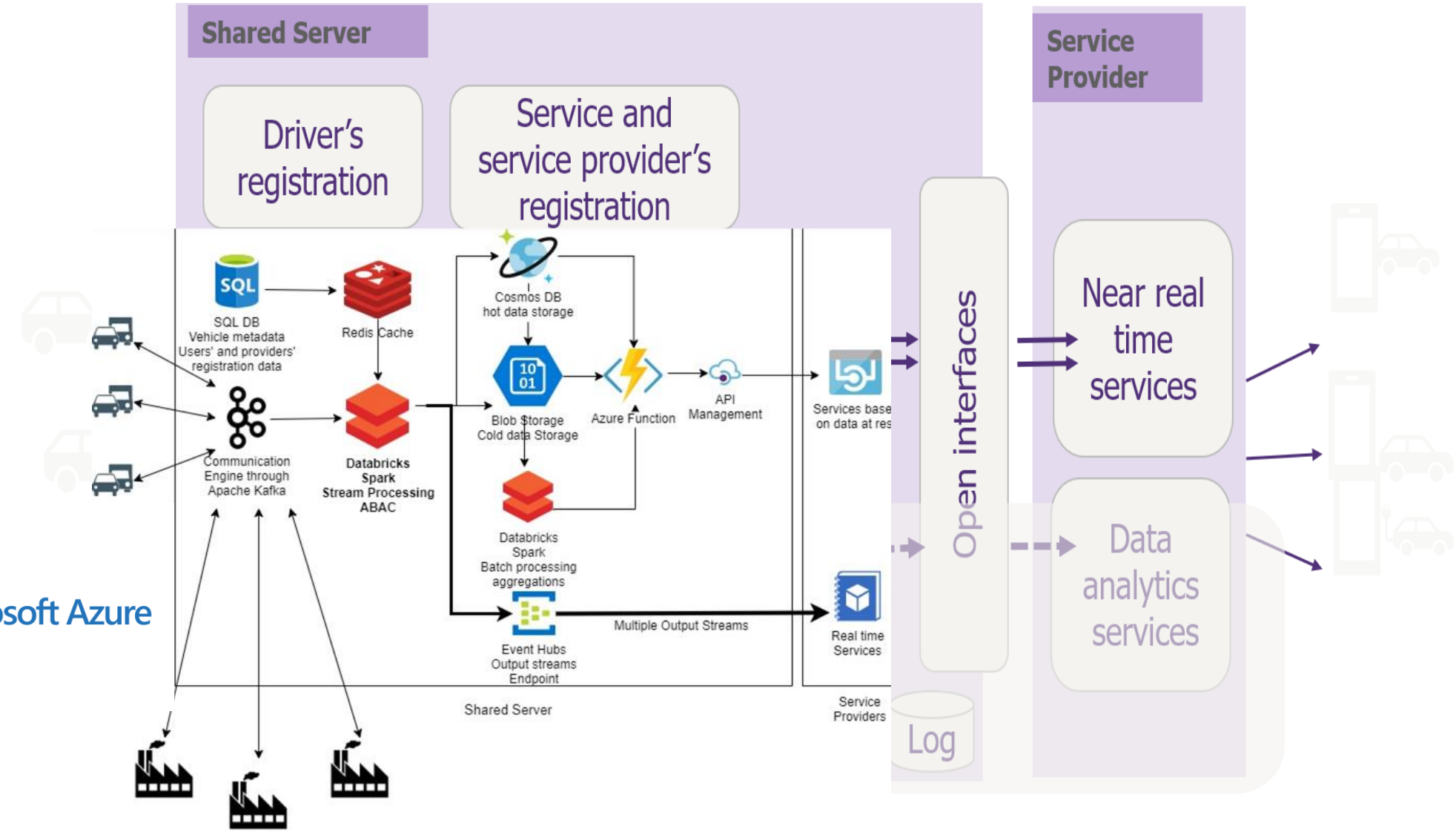
Source C-ITS Final report Jun 2016

Cloud capabilities
High availability, security,
low latency,
geo-distributed computing
streaming data
Kafka, Spark

We implemented a **Shared Server Pilot** that facilitates **a secure, low latency and high-throughput**, transmission to OEMs and Service Providers following **privacy by design** principles



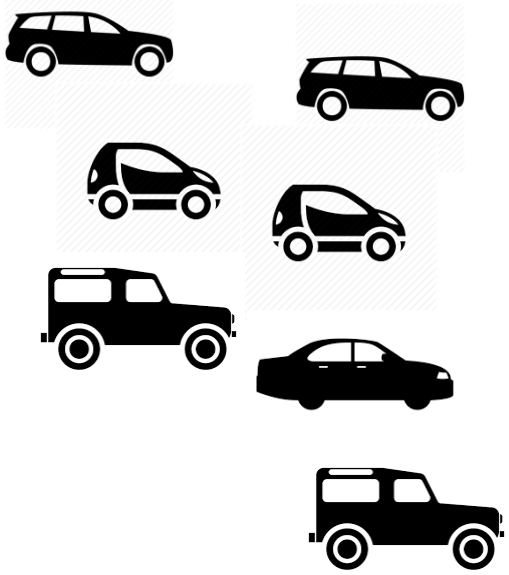
Streaming Data – **An Internet of Things (IoT) approach**

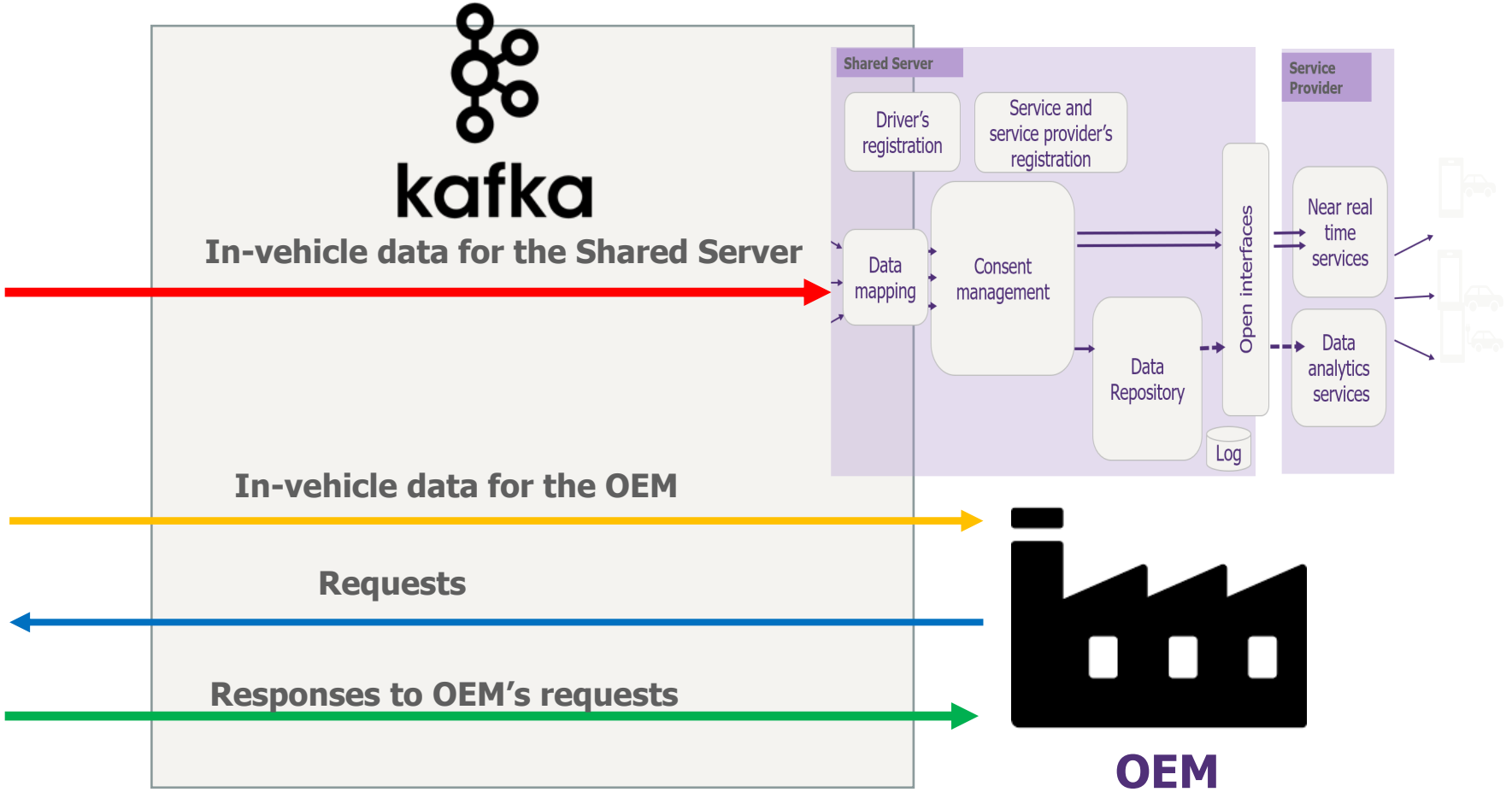


Microsoft Azure

Kafka to the Shared Server Architecture

Fleet of vehicles of specified OEM



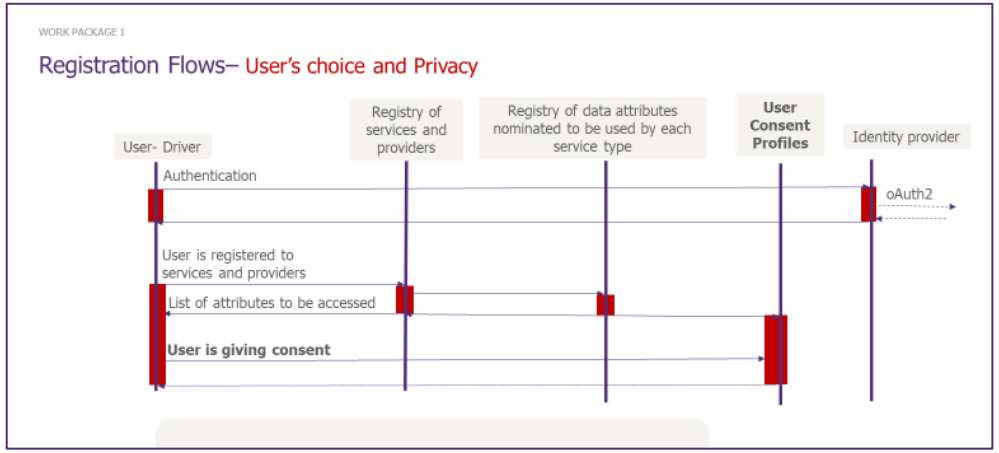


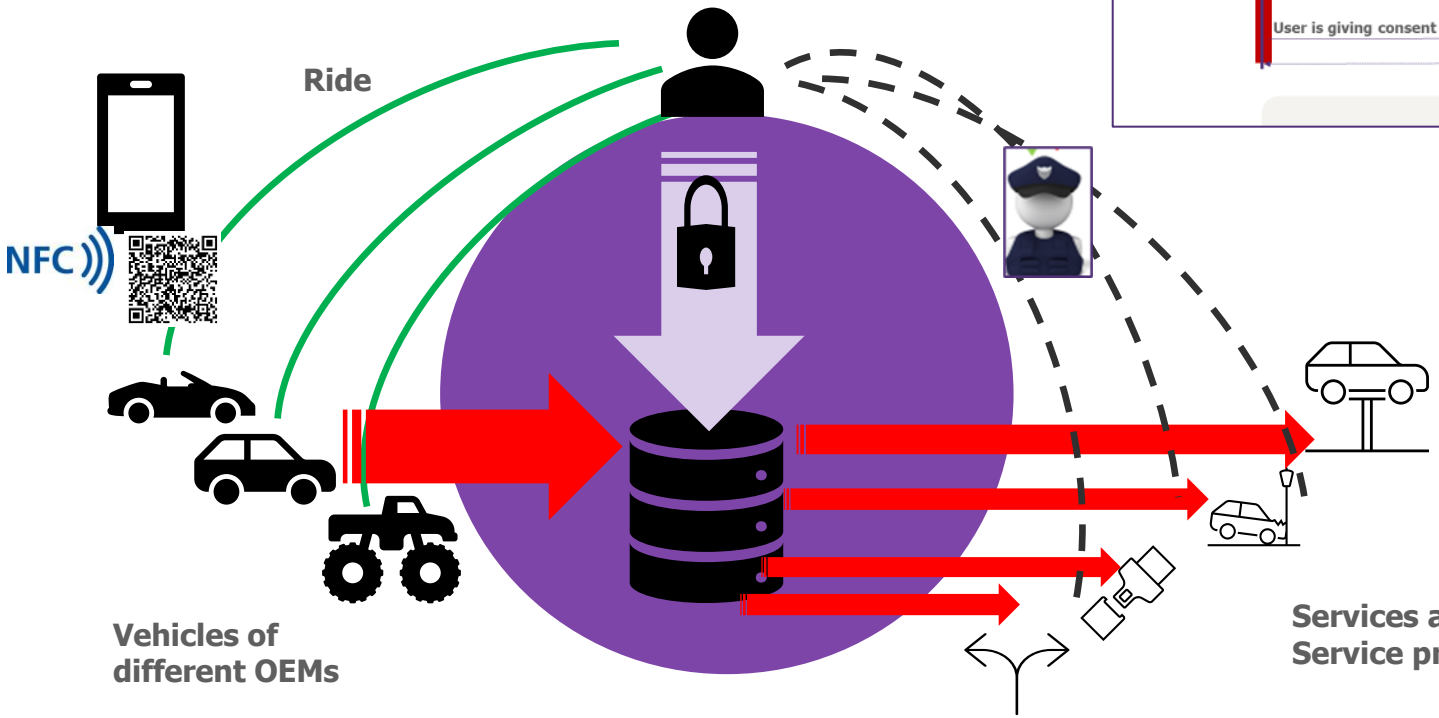
How does the Shared Server protect privacy for the users and data subjects?

How does the Shared server provide security for the in-vehicle data?

Privacy –The Shared Server as a unified platform for user authentication and consent management where the user has the overview

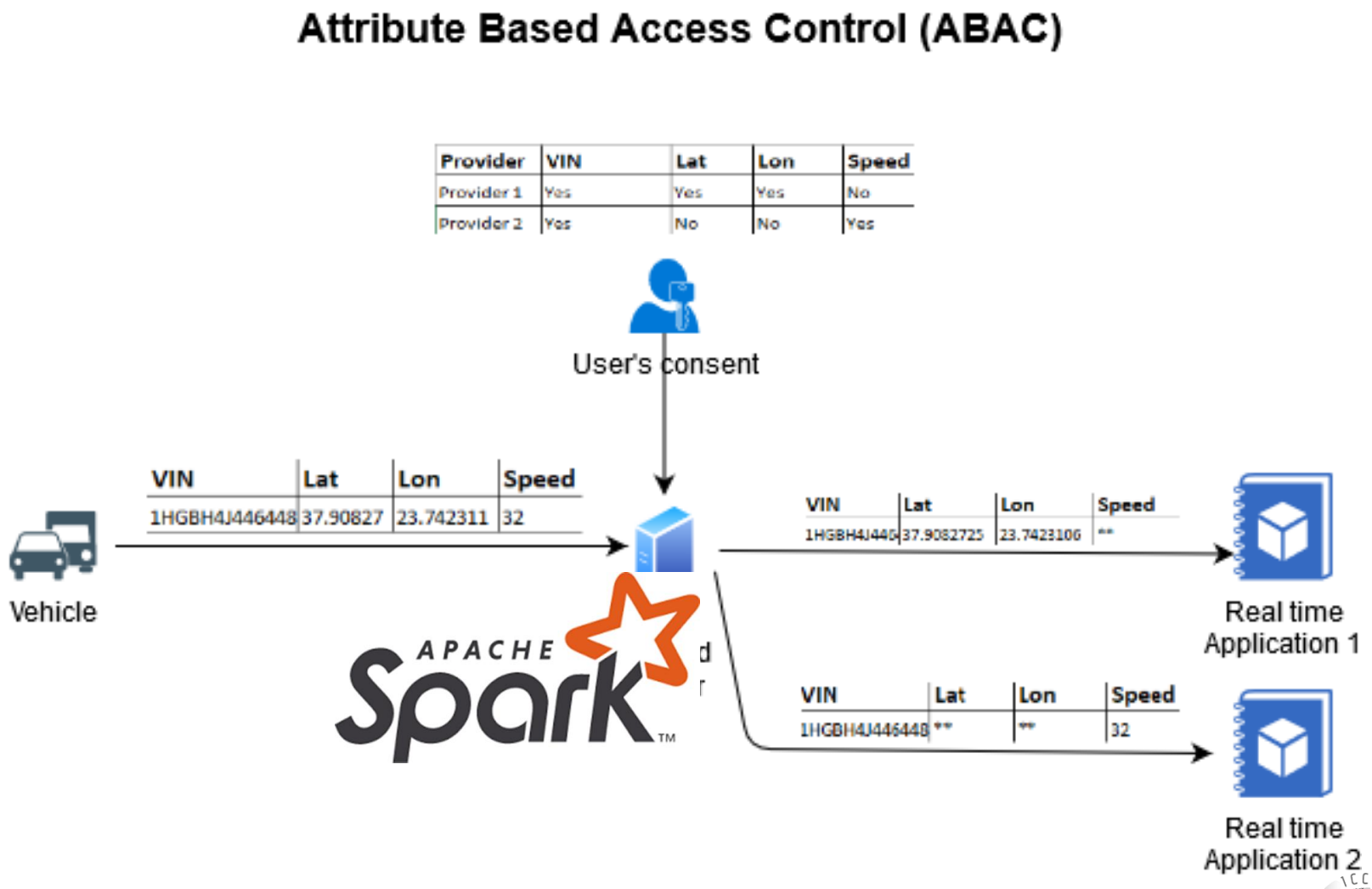
Consents





Is becoming user centric while further fosters the open business environment, discourages unfair practices and reduces costs

Privacy – The study team implemented a user consent management mechanism based on the Attribute Based Access Control of the streaming data of the vehicles



Security

Data in motion

Data from vehicles to OEMs through the Shared Server

Data are sent **encrypted** to the Shared Server

Kafka requires an additional security layer asking for a Virtual Private Network (VPN) with each OEM

Data from the Shared Server to Service Providers

Streaming data as well as data at rest are provided by the Shared Server with Transport Layer Security (TLS) protocol, according to the **provisions of ISO20078**.

Data in the Cloud

Integrity, availability and access control

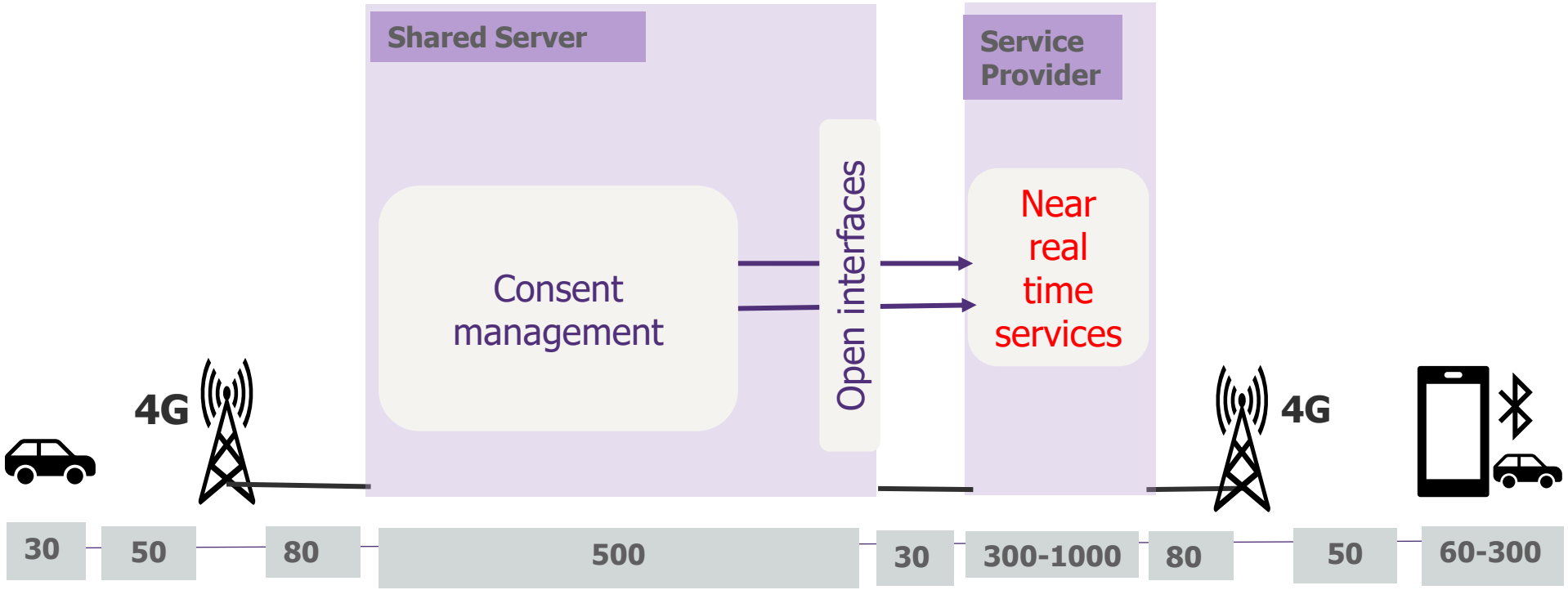
Would be provided by the cloud provider

Authentication and Access Control Management in Shared Server pilot

It is facilitated by the **Azure Active Directory Services**

What type of services can be provided with streaming technology?

The challenge of latency barriers – The Shared Server pilot introduces streaming data technology for deployment of near-real-time services

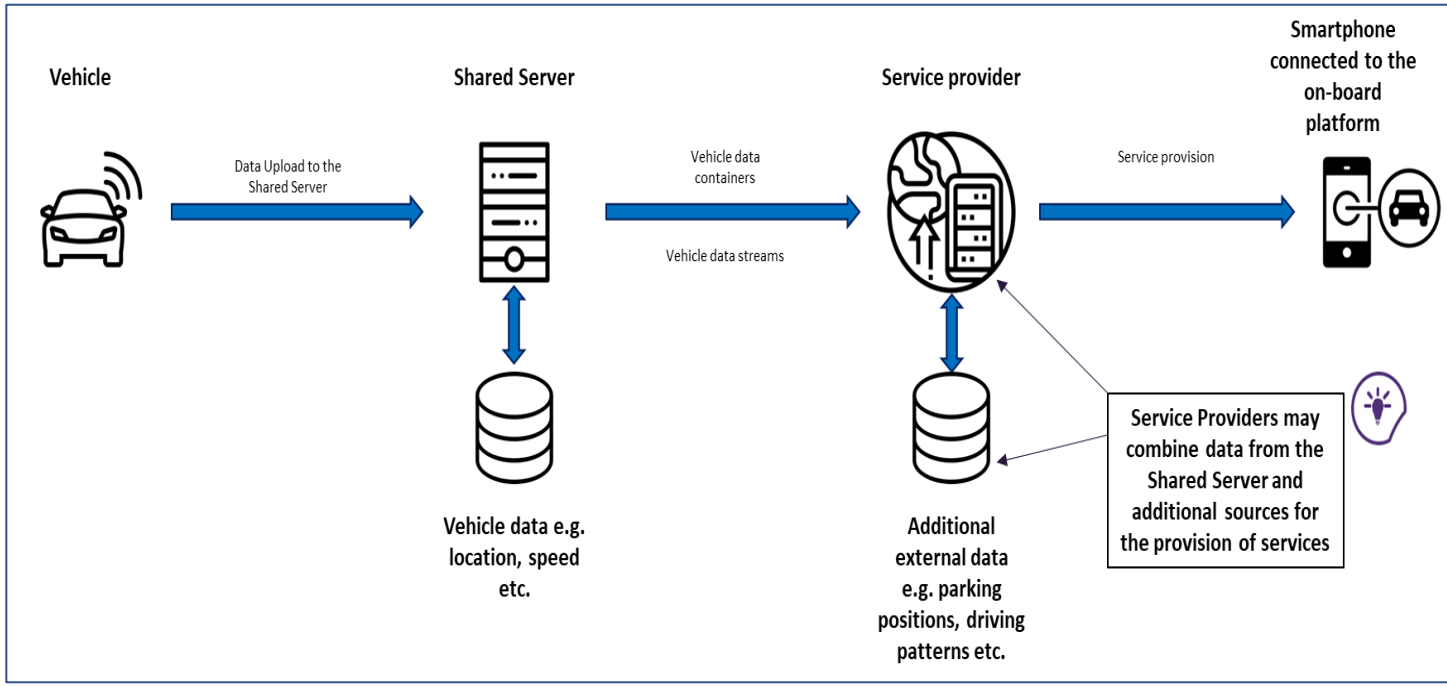


Most of the C-ITS services of "day 1" and "day 1.5" may be deployed with 4G communication network

What is round the corner? What is going on a few hundred meters ahead ?

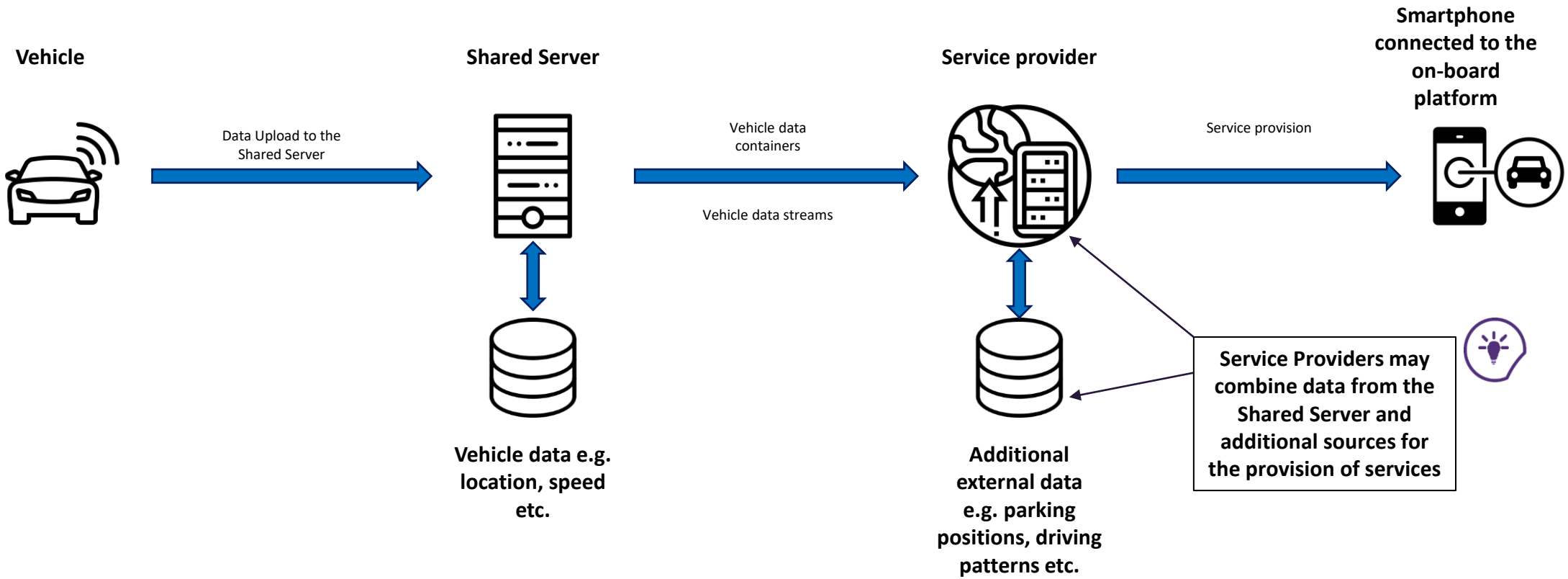
Services that could be deployed using the proposed Shared Server architecture with streaming capabilities

- Warning for **Bumpy or Slippery Road ahead**
- Warning for **Traffic Congestion ahead**
- Warning for **a possible road collision ahead**
- Suggest the speed to catch the **"Green Wave"**



How and what type of services can be provided through the shared server?

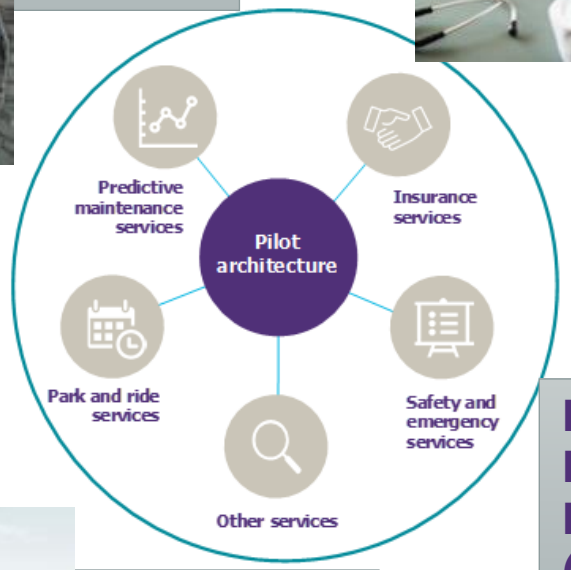
Service provisioning with the Shared Server Architecture



Most Important Services identified and implemented

Park and ride service

Usage-Based Insurance (UBI)



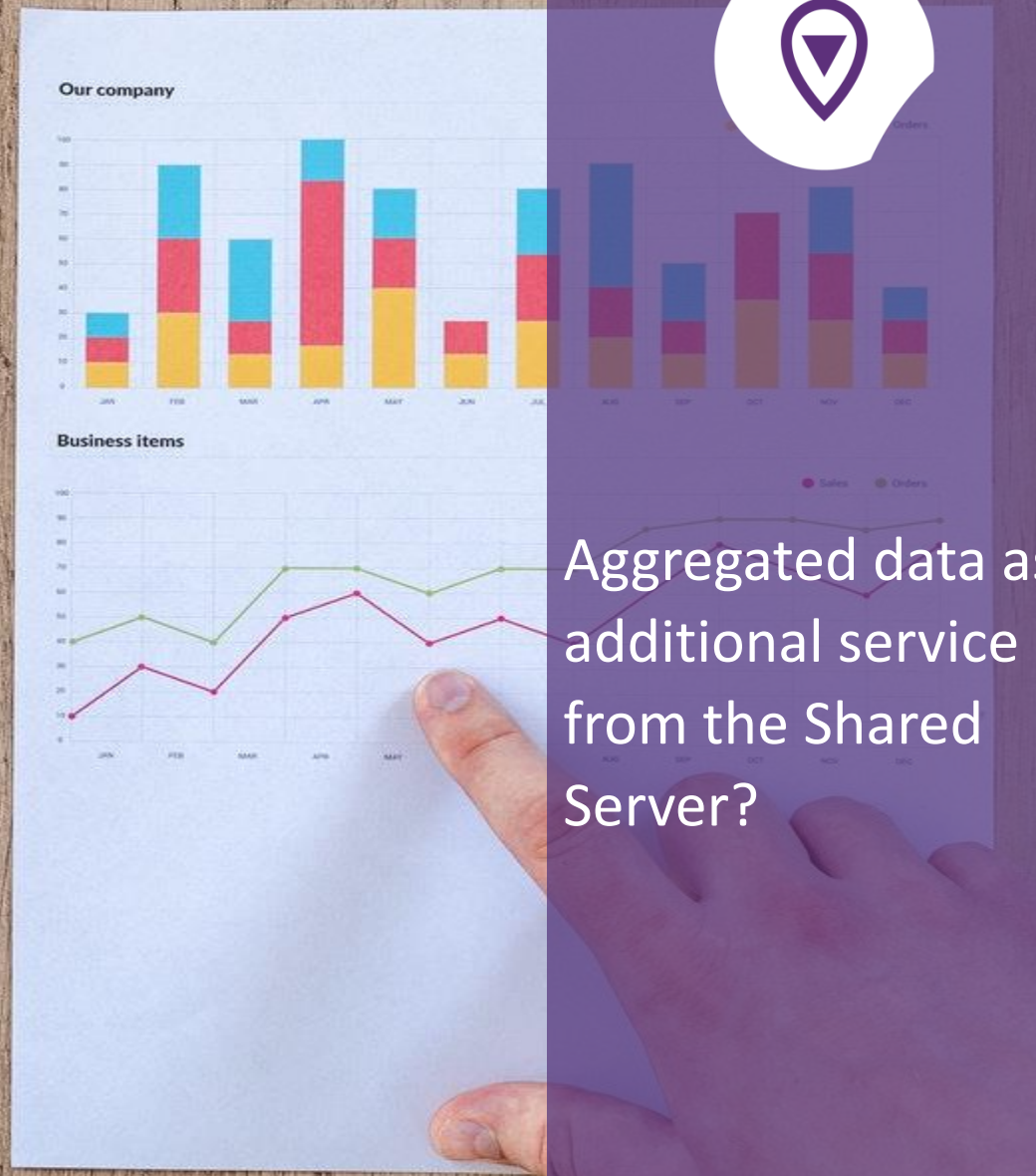
Hazardous Location Notification (HLN)

Usage monitoring and scoring

A Shared Server solution could be a **faster way to empower SMEs,** as the access of the data is made easier

Safety emerges to be of **high importance**, and it goes beyond pure monetisation

The **monetisation** of new services is needed to apply **a viable model for the Shared Server solution**

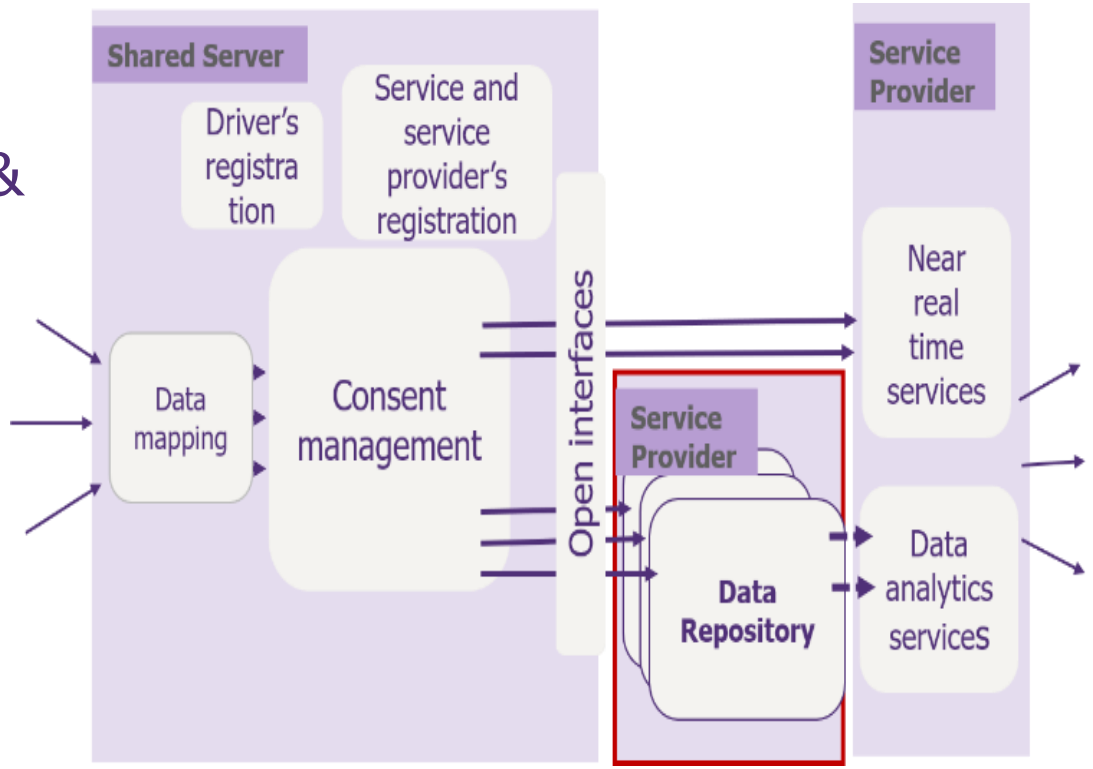


Aggregated data as an additional service from the Shared Server?

"The winner takes it all" effect. What is the problem?

Responding to the increased demand of Shared Server data, we propose setting clear boundaries

- Old data and data for secondary use should be **moved to external repositories** for curation & further exploitation.
- Data repository services and anonymisation services for in-vehicle data **might be available in open competition** for the service providers



Aggregated/Anonymized Data and Secondary use of data

Anonymous mobility data can help make many services we have today better, by offering macro-level lens :

Predictive Maintenance :
car companies can detect early part failures to avoid major recalls;

Services for Electric Vehicles :
energy analysts can pinpoint where to best place EV charging stations;

Smart Cities/Urban Planning :
Your city can reduce car idling carbon emissions;
retail stores can better match store hours to traffic

Which are the most important data points for the creation of services ?

Data Points in the Shared Server

MyCarMyData : *The exact number of collected data per manufacturer is not currently defined, as more and more sensors are added in the cars. However a first list is defined .*

CarDataFacts : *The type of data cars generate – and which thus can be used for providing certain services – differs from brand to brand, and even within brands, from model to model , but a first list is provided .*

Proposal for data in the Shared Server

Car Data	Value
Car Identifier	VIN
Time	Date / Time
Longitude	Quantitative Value
Latitude	Quantitative Value
Tyre pressure	PSi
Speed	Km/h
Fuel consumption instant	KMs Per Liter
Fuel consumption average	KMs Per Liter
Mileage	KMs
Oil	Quantitative Value
Start/Stop Engine	True or False

Car Data	Value
Engine Load	Quantitative Value
Acceleration	m/s2
Engine RPM	RPM value
Battery charge status	(%)
Bearing	Quantitative Value
G(calibrated) (Cornering force)	Quantitative Value
Outside temperature of the vehicle	Celsius Degrees
ABS activation	True or False
ESP (Electronic Stability Program) activation	True or False
Error codes	Specific error code
CO_2 Emissions	Gr/KM

What are the advantages of service provision through the shared server?

HLN Implementation

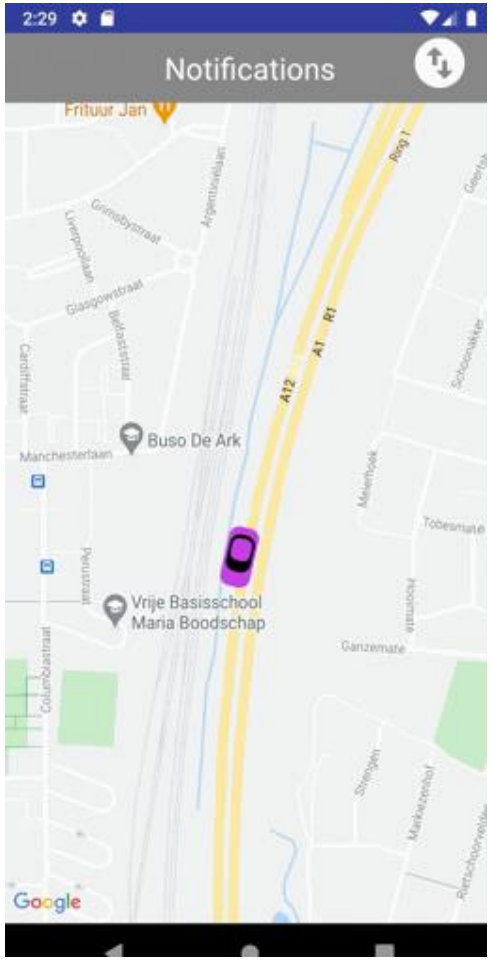
Hazardous Location Notification (HLN): a safety system that provides a warning notification to the driver in order to direct his attention to a potential hazardous situation or area. These areas have a higher risk of collision or incident

Key points:

- Stream data used for the identification of cars around the hazard point , limited latency
- Identification of Hazard points with a hybrid possibility:
- i) manual annotation on the map ii) identification of Hazard Points based on multiple ESP/ABS activations around a specific area

Advantages of the Service with Shared Server Data:

- ✓ All the vehicles contribute το the identification of hazard points
- ✓ Improve the safety for the whole ecosystem with a common view of hazardous locations



Park and Ride Implementation

Park and ride (or incentive parking): facilities are parking lots with public transport connections that allow commuters and other people heading to city centres to leave their vehicles and transfer to a bus, rail system (rapid transit, light rail, or commuter rail), or carpool for the remainder of the journey

Key points:

- Data at rest are sufficient for the implementation of the service
- The notification to the drivers should be personal
- Consent is needed

Advantages of the Service with Shared Server Data:

- ✓ Unique ways to identify available parking slots based on traffic data
- ✓ Common services for Smart Cities and traffic allocation around the city

O7 Service –Eco Rating/Fuel Consumption

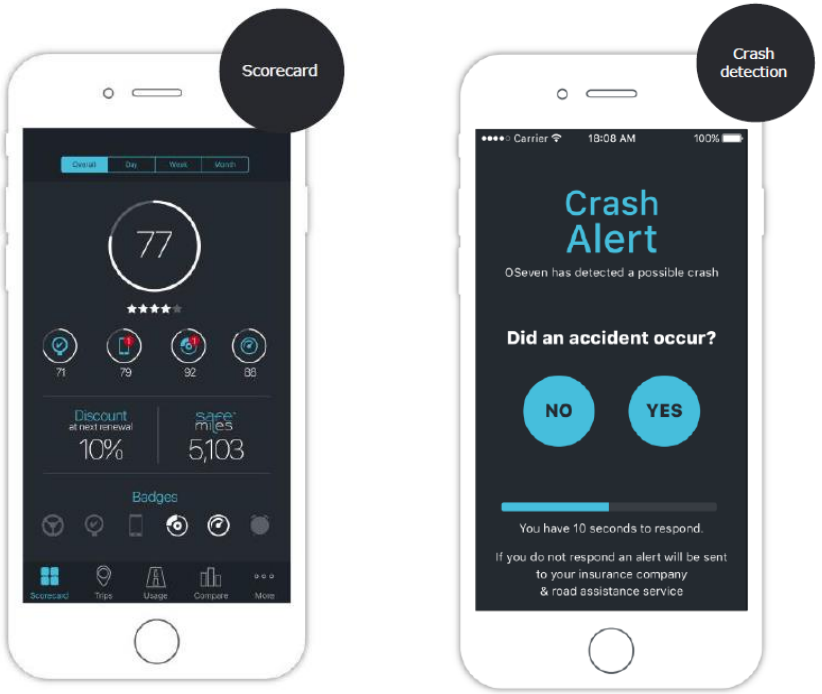
Eco rating / Fuel consumption : Driving data has been successfully processed producing driving behaviour metrics, scores coaching features and gamification data.

Key points:

- Data format has been customized so that it can be processed by theO7PLATFORM
- Trip data has been processed with the OSeven filtering, signal processing, machine learning and scoring algorithms

Advantages of the Service with Shared Server Data:

- ✓ Increase driving behaviour **data accuracy**
- ✓ New features using additional data from connected vehicles
- ✓ Provide data on vehicle maintenance and engine faults- **New products**



THANK YOU

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