Car 2 Cloud

Connected Vehicle Data Architectures

Gerald Spreitz | May 15th, 2019

GENIVI®

Car 2 Cloud BoF

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Connected Car and Cloud
Variants of V2X, Connected Car, Cloud and IoT for the car

- **Safety related C2C, C2I, C2N or in the US V2V, V2I and V2N**
  - Based on dedicated radio technology
  - Limited standardized data protocol
- **Car status related connected car systems**
  - Based on standard mobile radio IP connection
  - Car maintenance and Comfort oriented function
  - Target is the individual car or driver
- **Automotive IoT**
  - Based on standard mobile radio IP connection
  - Heterogeneous car data and sensor information
  - “Big Data” style of data usage to generate new services

Connected Car and Cloud
Radio technology standardization organisations

- C2C-CC - Car-to-Car Communication Consortium www.car-2-car.org
  - Objective: Development and contribution to C-ITS standardization, demonstration of technical and commercial feasibility
  - Technology: (pWLAN / 802.11p; dedicated band at 5.9 GHz
  - Standardization Body : ETSI
  - Partners: 80 members w/ 17 vehicle manufacturers, 39 suppliers and 30 research organizations
  - Foundation in 2007
- 5GAA - 5G Automotive Alliance
  - Objective: Evolve, test and promote communication solutions, to support their standardization and accelerate their commercial availability
  - Technology: (C-V2X/5G)
  - Standardization Body : 3GPP
  - Partners: > 40 members, founding members
  - Foundation 09/2016

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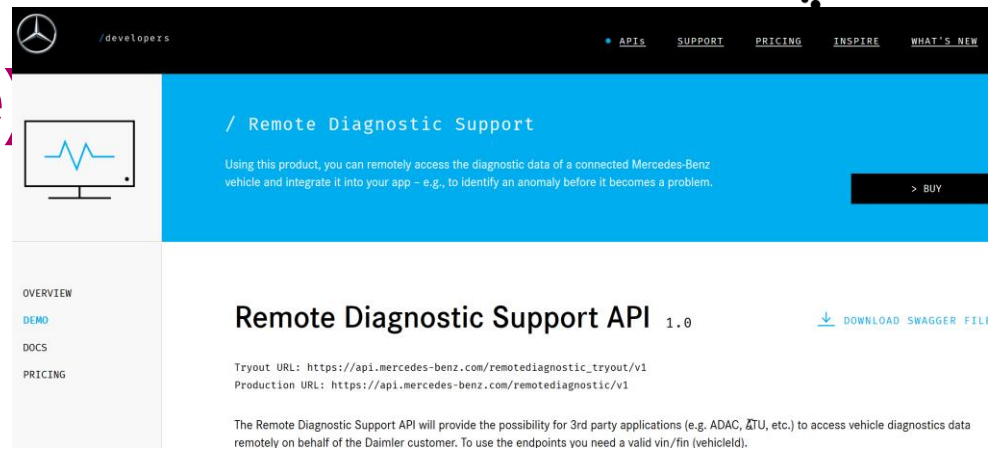
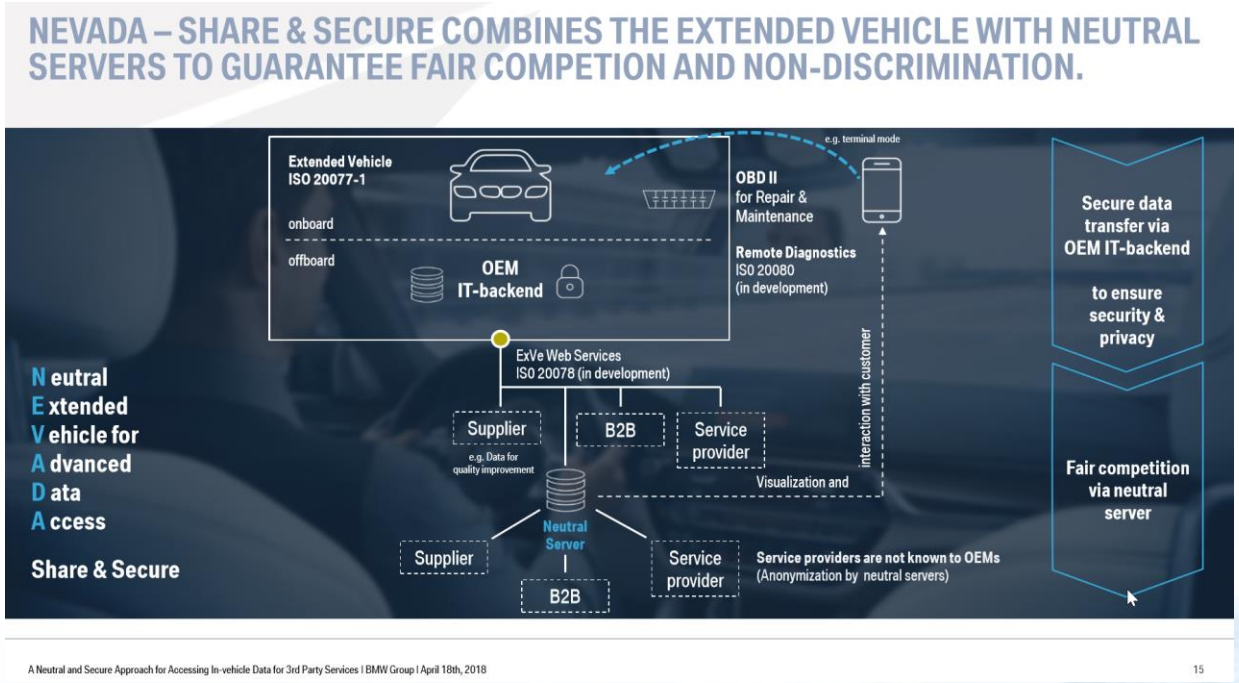
ISO 20078-80 Extended Vehicle (ExVe)

- Standard for collecting car status data
- Maintenance use cases.
  - Remote Diagnostic Support
- Access for 3rd part and aftermarket service supplier via Neutral Server (VDA concept)
- Rules for data access still open





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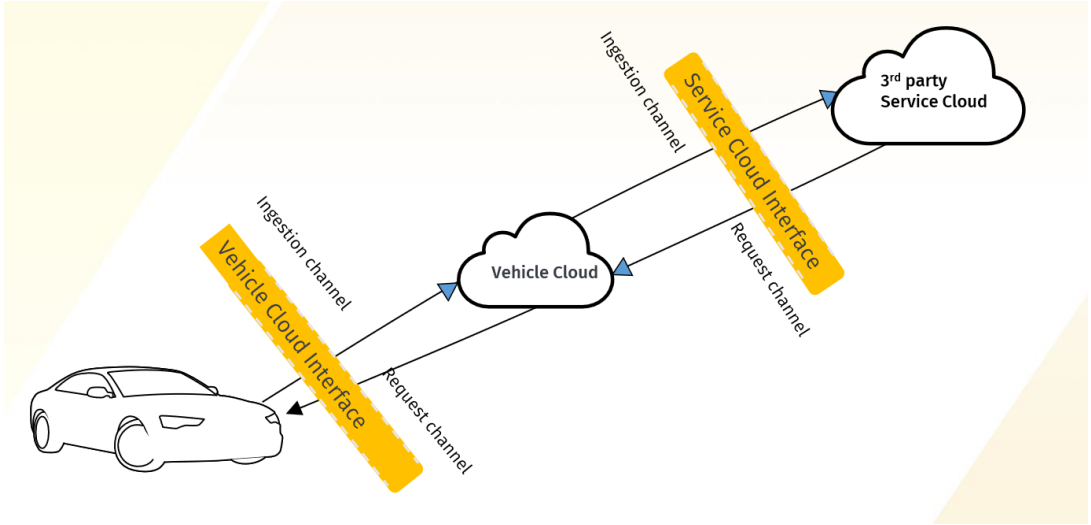
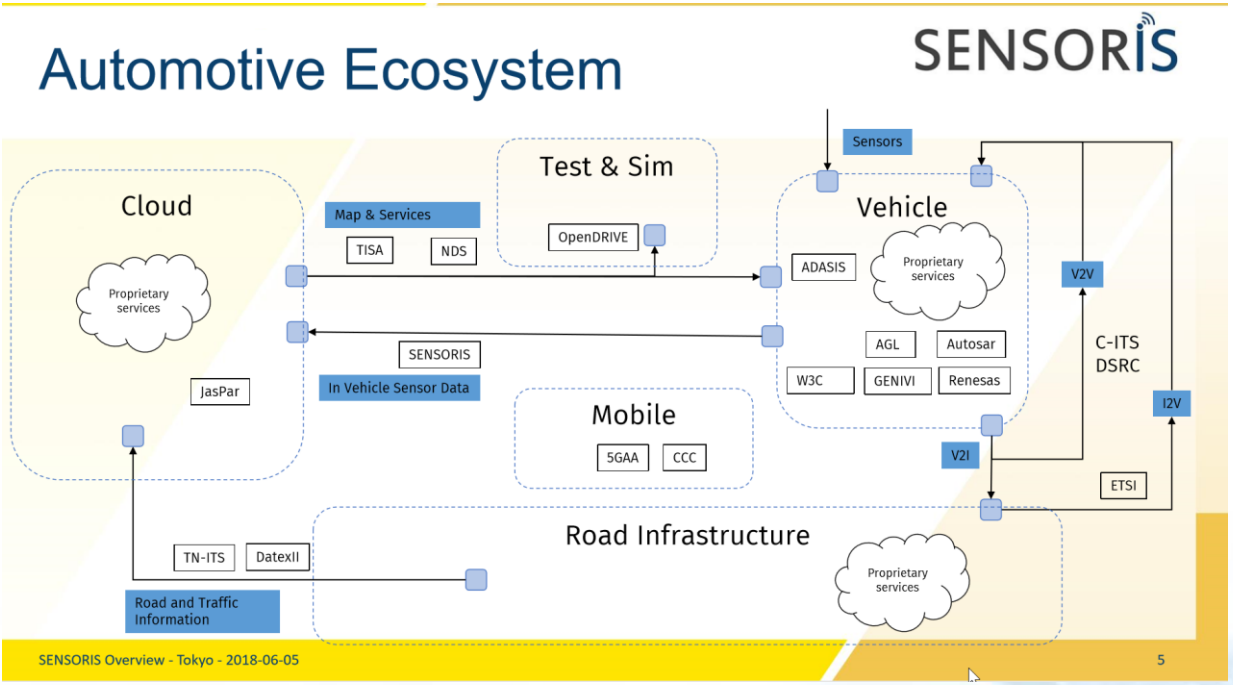
SENSORIS

- Standard for collecting car data and sensor data.

- Focus on vehicle surrounding:
  - Street signs
  - Lanes

- Capability to distribute sensing task to car fleets.





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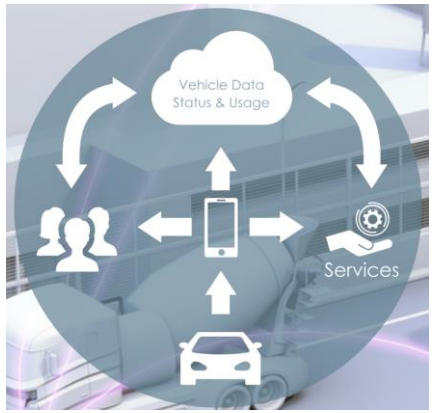
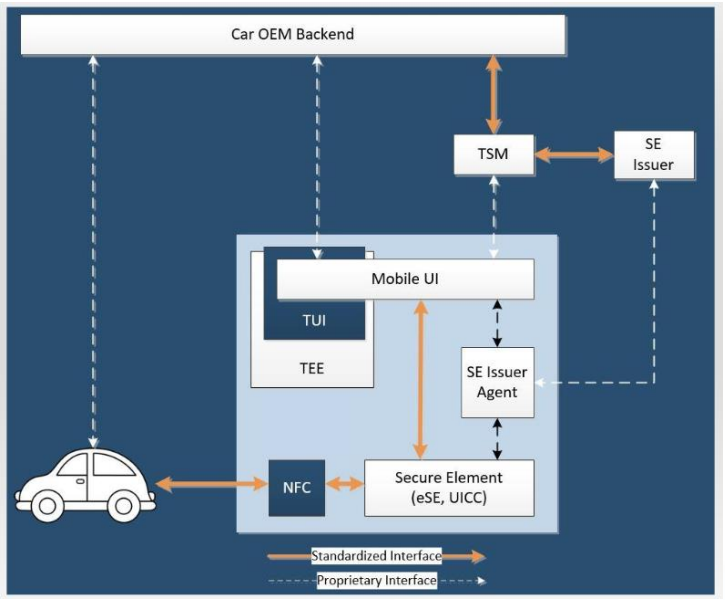
CCC

- Used to be Mirrorlink

- They added
  - Car Data
  - Digital Key
  - Car sharing





Source:
www.carconnectivity.org

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Protocol, Data and Application oriented organisations To be analysed

- SENSORIS (Protocol for sensor data, Vehicle surrounding and internal car data)
- Automat Project http://automat-project.eu/
- W3C (Vehicle Signal specification) / existing GENIVI cooperation for VSS
- ISO 20078 Extended Vehicle (ExVe)
  - Use cases, Aftermarket data access
- CCC (Mirrorlink, Car Data, Digital Key) https://carconnectivity.org/
- Open Connectivity Foundation (OCF) https://openconnectivity.org

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SW for V2X and IoT oriented organisations

- Eclipse Kuksa
  - System SW components for Vehicle IoT solutions for the vehicle and the cloud.

- Autosar
  - SW supporting safety features and automated driving.
  - Based on C-ITS

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What about GENIVI ?

- Possible fields of action
  - SW Architecture and SW components integrating non-safety C2X / IoT for in-car & infrastructure
  - Framework which facilitates the integration of open and closed APIs from different organisations
  - Reuse of existing SW components from the Eclipse Kuksa project
  - Based on standard mobile radio IP-links
  - Cooperation with Eclipse Kuksa, Sensoris, W3C
  - Perspective: CCC, ExVe

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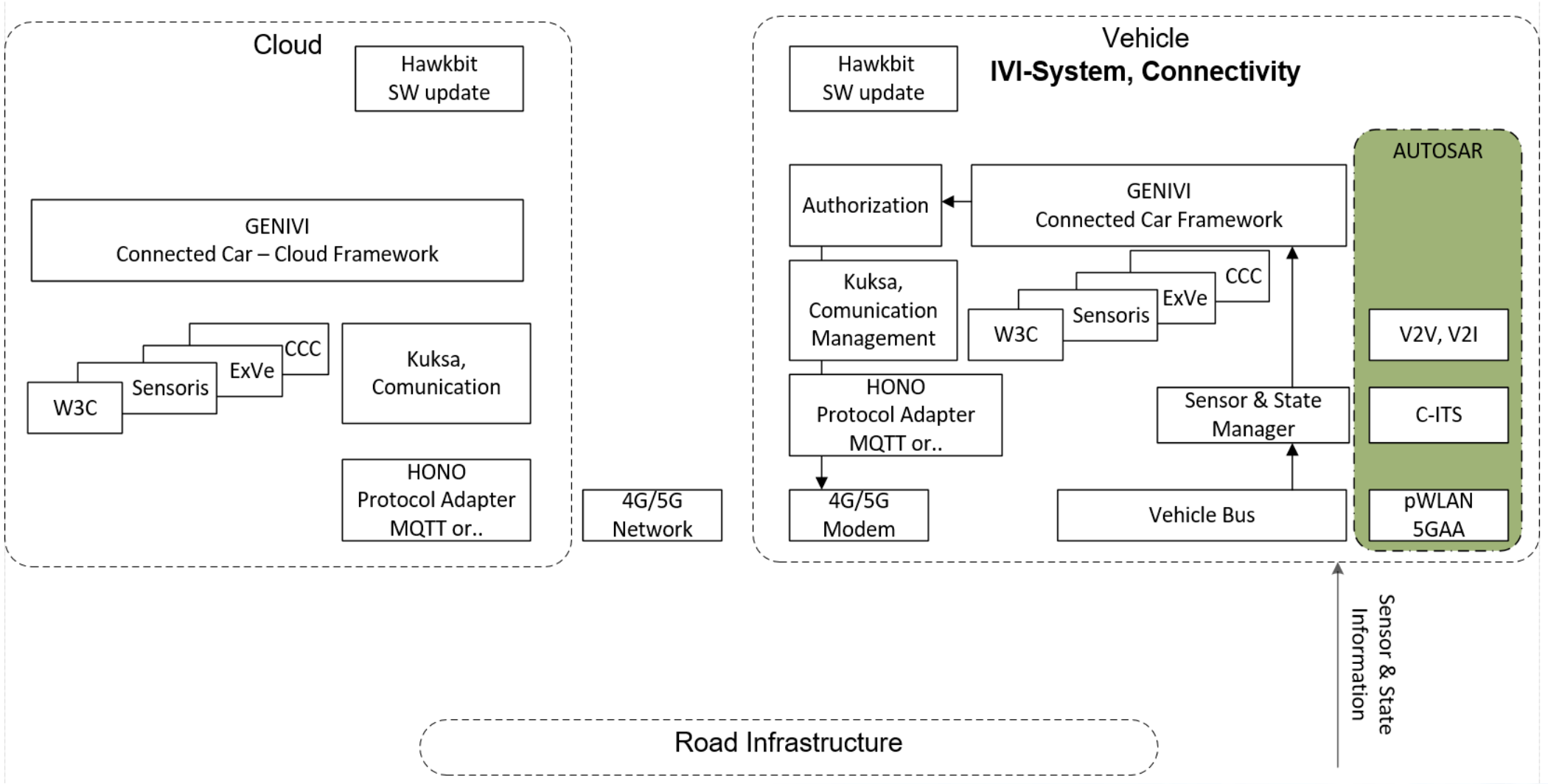
Exemplary SW Reference architecture



Header of section

Draft Workplan & sprint planning with 2 month iterations

Kick-off and call for participation GENIVI AMM MAI ´19

- Project Backlog filling and Definition of done Mai ´19 and June ´19

ANALYSIS PHASE (from Jul ´19)

1. Sprint

- Analysis of existing data and signal specifications
- Review of other project charters and architecture

2. Sprint

- First requirement collection
- Business case selection

3. Sprint

- Analysis and definition of architecture building blocks
  - E.g. authorization, protocol adaptors, cloud and vehicle architecture

Dec 19: **Retrospective**

- Verified Overview/Reference System Architecture
- Selection of prototype scope

Header of section
Draft Workplan

DESIGN PHASE

1. Sprint

- Identification of communication and interface structure

2. Sprint

- Selection of possible SW and communication technologies for the building blocks
- Requirement update

3. Sprint

- Definition of reference System and SW Architecture

Jul ’20 **Retrospective**

Definition of prototype architecture

Header of section
Draft Workplan

IMPLEMENTATION PHASE

1. Sprint

- Selection of prototype building blocks
- Selection of prototype platform

2. Sprint

- Implementation or Integration of mandatory components

3. Sprint

- System Test

DEC ’20 **Retrospective**

Prototype testing and presentation (CES Jan 2021)

Thank you!

Visit GENIVI:

http://www.genivi.org

http://projects.genivi.org

Contact us:

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