FG-VM use cases and requirements

Overview

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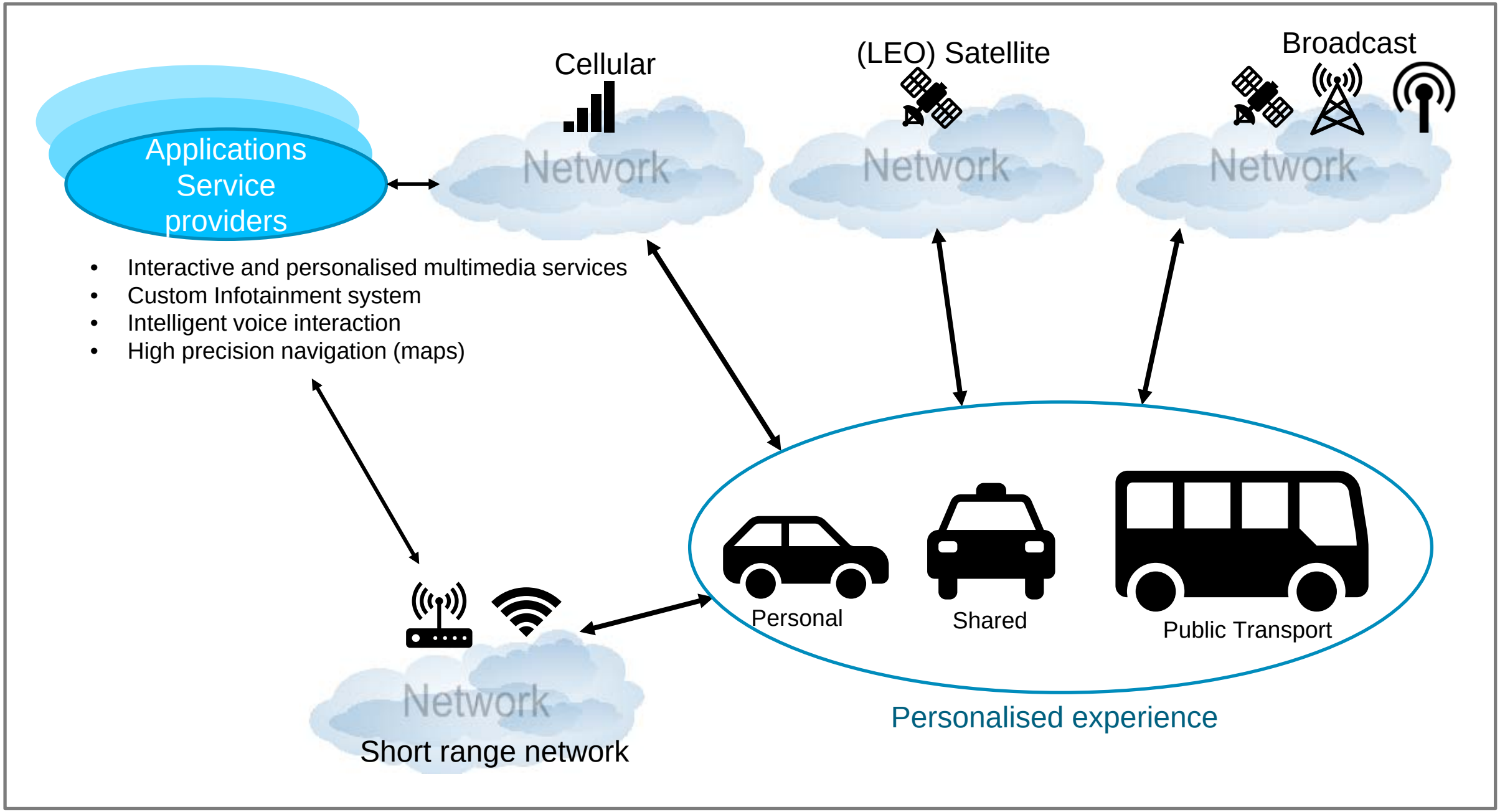
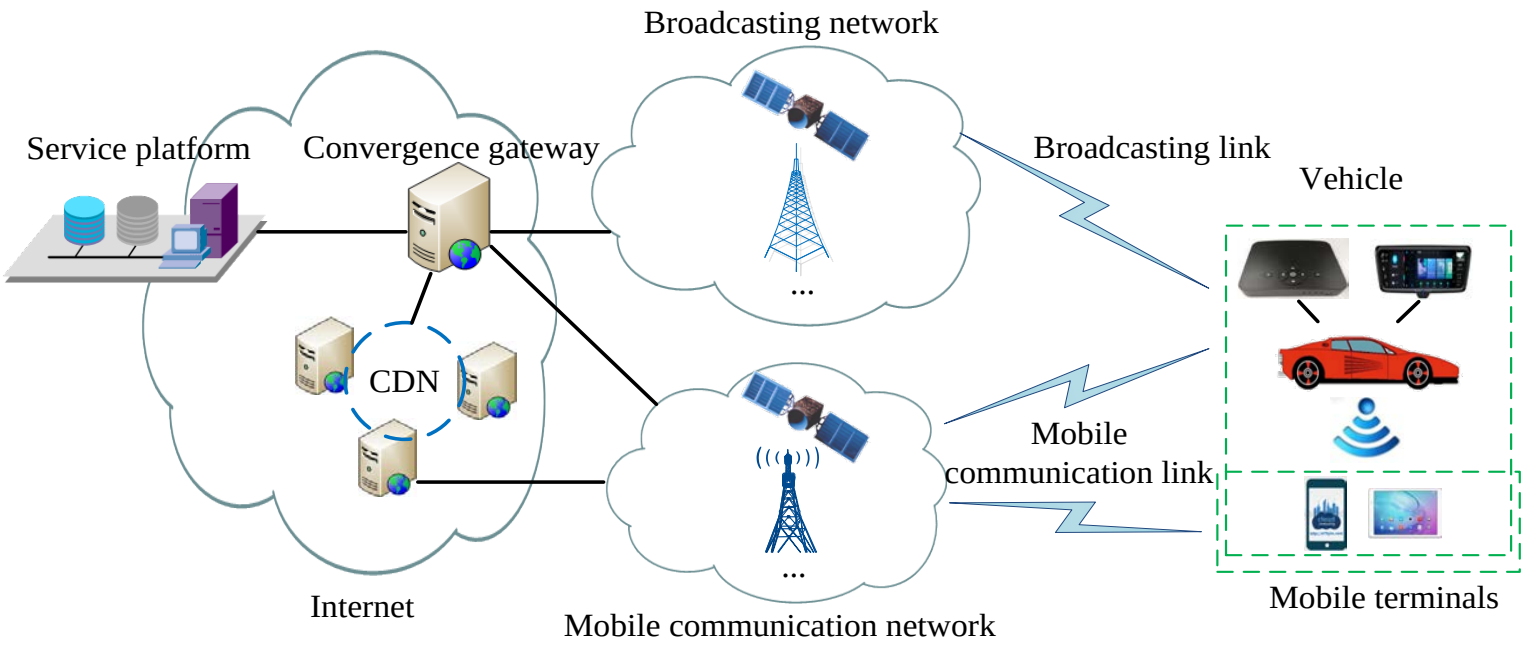
Use Cases

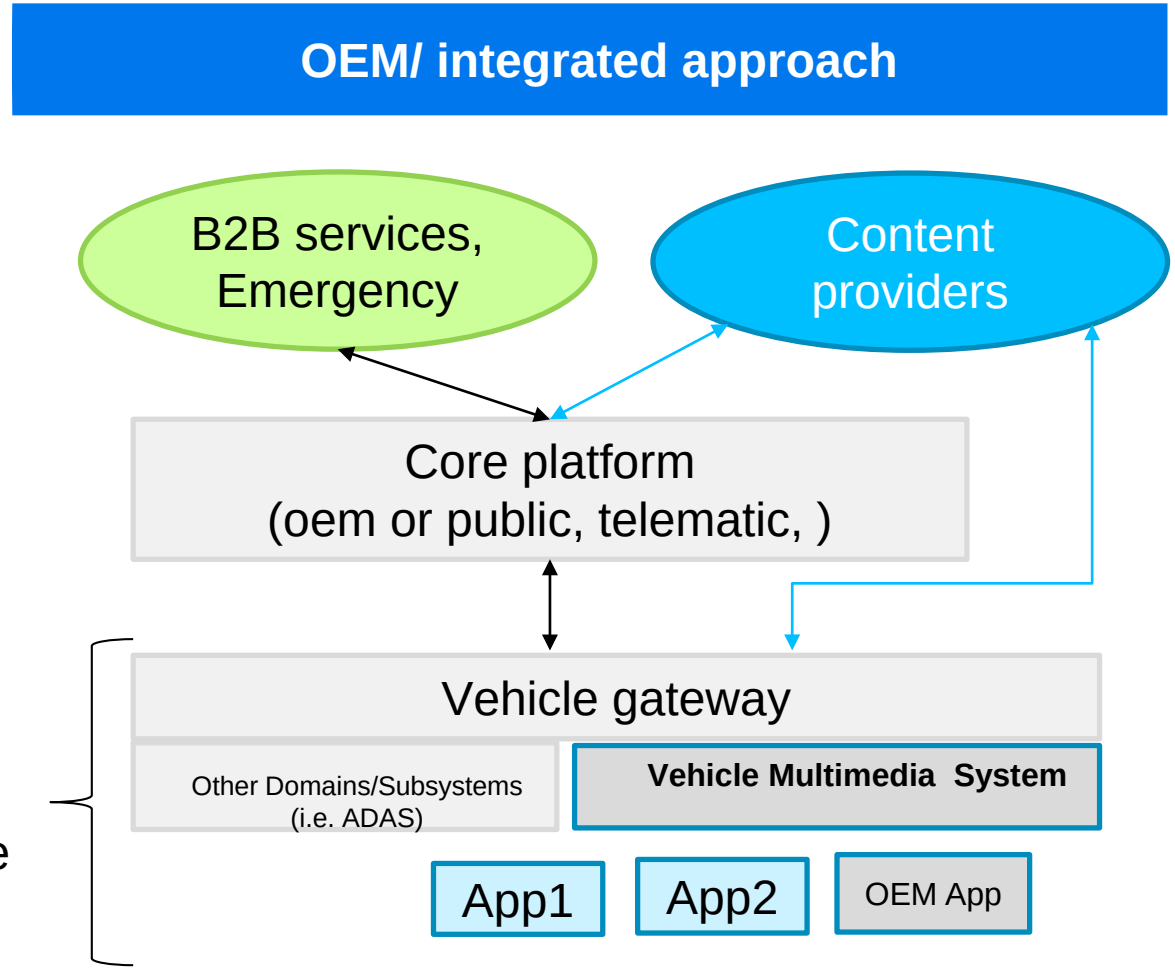


Platform considerations

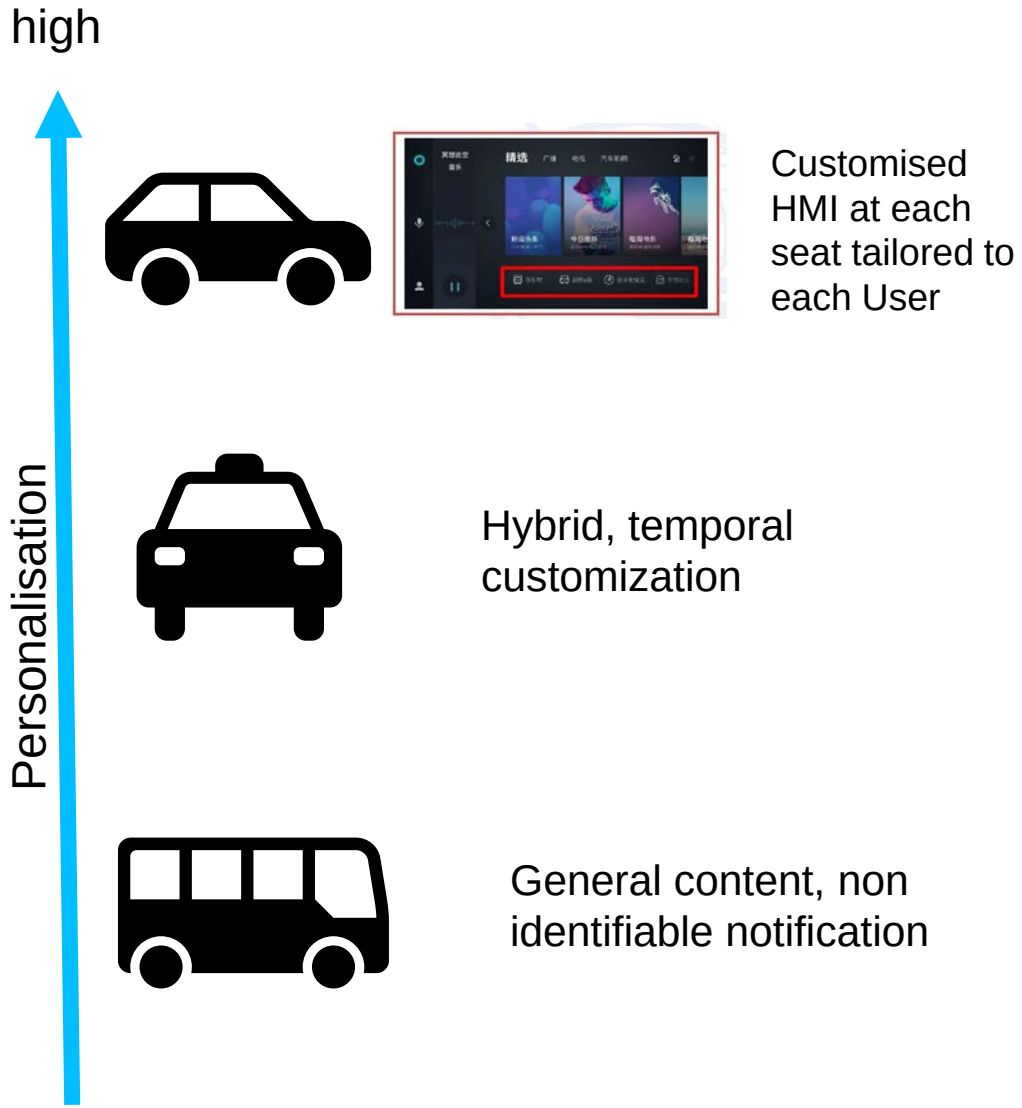
Multimedia service provider approach



Platform considerations



- Control
- Configure
- Customize



Connectivity within the vehicle

Brought-in

- Vehicle has no own connectivity
- User will connect through his brought-in mobile device
- Mobile device will connect through Bluetooth, USB or other to VMS
- Content will be made visible on VMS using e.g. MirrorLink, Apple CarPlay, Android Auto
- All apps and mobile services are accessible through VMS (mobile phone can stay in the bag)

Built-in

- Vehicle is fully equipped to connect internet and other connected services to the vehicle
- All apps and services are accessible through VMS

Hybrid Connectivity

- Mix of brought-in and built-in connectivity
- Vehicle has own connectivity
- Some mobile services/ apps are only accessible through mobile device brought into the vehicle
- Mobile device connects to vehicle VMS through Bluetooth, USB or other
- User accesses all vehicle connected services and apps through VMS

Vehicle Connectivity (with credit to Tesla, GM)

Use cases versus data privacy legislation

https://www.its.dot.gov/factsheets/pdf/Privacy_factsheet.pdf

US Department of Transport

- Vehicle shall not be tracked
- Personally Identifiable information shall not be collected and shared

https://ec.europa.eu/commission/priorities/justice-and-fundamental-rights/data-protection/2018-reform-eu-data-protection-rules_en

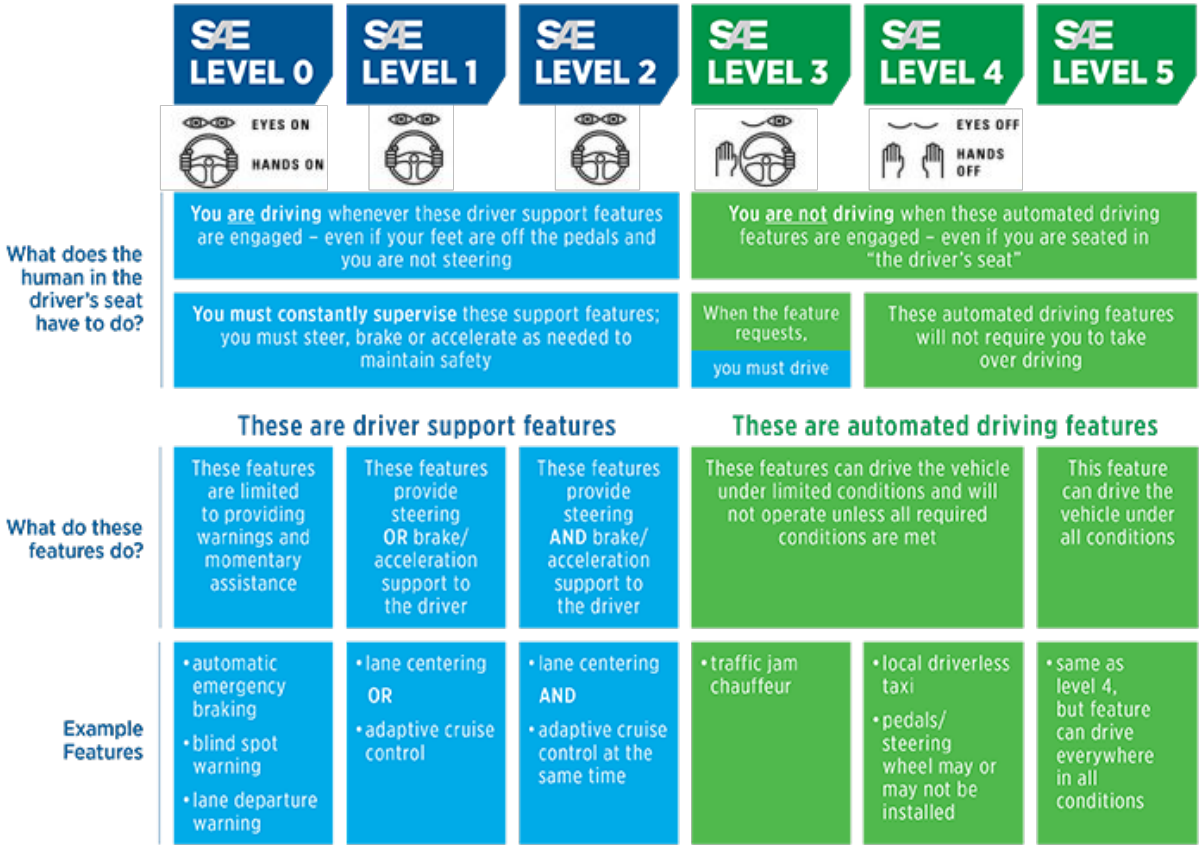
Europe GDPR

- Protection of personal information
- Obligations on service provider
- Right to be forgotten
- Etc…

China:

- Vehicle are equipped with an RFID chips
- Vehicle tracking is required

Use cases vs autonomous driving levels



SAE J3016 Definition of Driving Levels

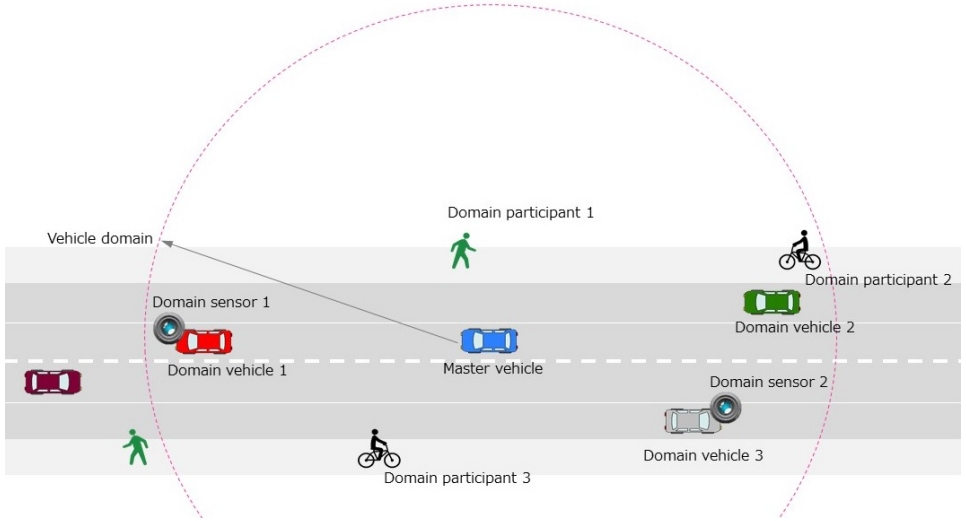
	SAE LEVEL 0		SAE LEVEL 1		SAE LEVEL 2		SAE LEVEL 3		SAE LEVEL 4		SAE LEVEL 5	
Use Case	**D**	**P**	**D**	**P**	**D**	**P**	**D**	**P**	**D**	**P**	**D**	**P**
Listen to audio services	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Use video, TV and gaming services		✓		✓		✓		✓	✓	✓	✓	✓
Use mobile devices		✓		✓		✓	(✓)	✓	✓	✓	✓	✓
Use mobile devices through VMS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phone conferencing (handsfree)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video conferencing		✓		✓		✓		✓	✓	✓	✓	✓
Reading in vehicle (books, mails, news, etc.)		✓		✓		✓		✓	✓	✓	✓	✓
Getting read content (text-to-speech)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Working in vehicle (office applications)		✓		✓		✓		✓	✓	✓	✓	✓

✔ = Allowed

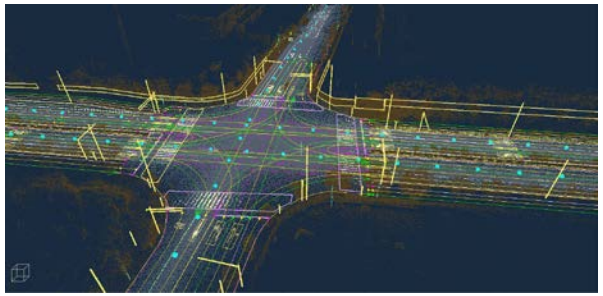
(✔) = Partly Allowed (in autonomous driving mode)

Matching of Generic multimedia use cases with SAE Driving Levels

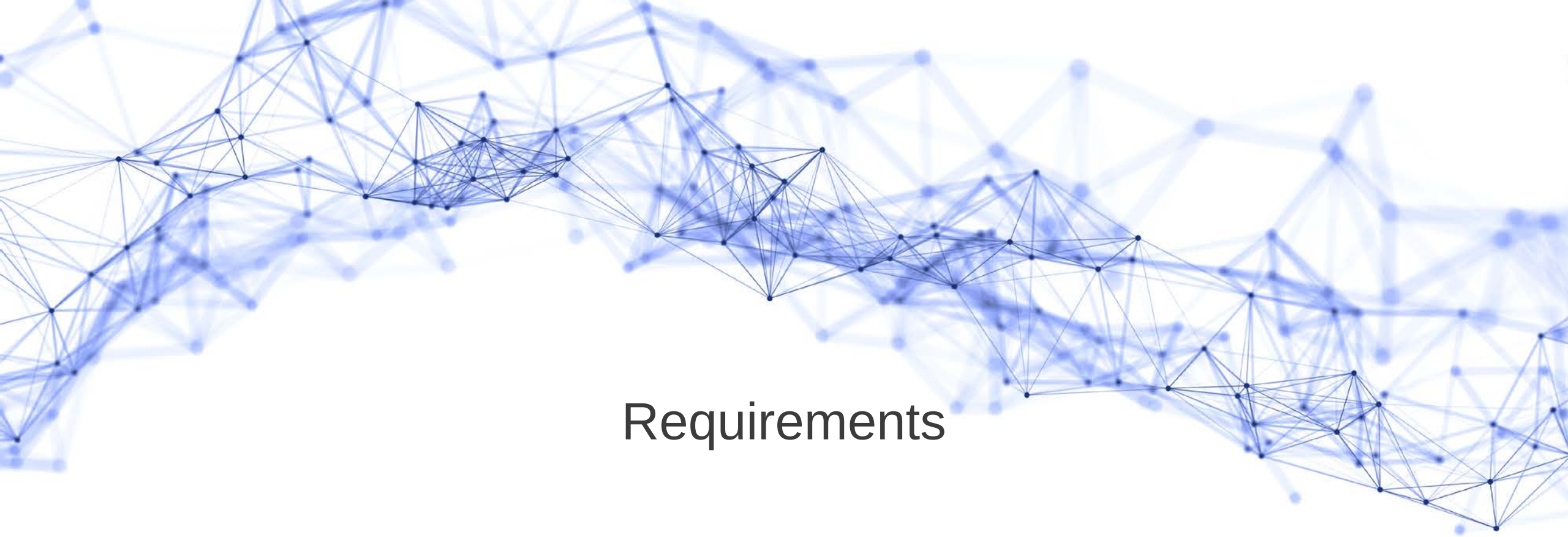
App and service integration



Vehicle domain dynamic map service



- Sharing:
  - oNetwork connectivity,
  - oSensor data
- Integrated HMI
  - oSynchronization
  - oInteractive functions



Requirements

Connectivity and Content delivery requirements

Connectivity

- Connect simultaneously and provide seamless handoffs between communication networks
- inclusive of bi-directional and broadcast communication networks
- transmission and reception functions shall be agnostic to the underlying physical layer transmission standards and transparent to the upper layer applications
- shall require none or minimum modifications to the existing broadcasting and mobile communication infrastructures and shall be compatible with major media streaming and broadcasting protocols

Content delivery and protection

- Deliver different channels, to different user/screen
- Content sharing within the vehicle (e.g. from phone)
- Conditional Access and DRM
- Parental control
- User controlled, upload and download of user viewing history.
- Content subscription link to user, to the vehicle, to device
- Content right and privilege management system

Personalisation, Integration requirements

Personalisation

- Complete customization of the HMI based on User ID (password, biometrics, etc).
- Portability of personalized HMI in different vehicles
- Seamless integration of applications in the multimedia system (broadcast app, calendar, wallet, maps, etc)
- Preloaded content/dedicated content link to the vehicle
- ID management and Account management
- Driver/passenger differentiated customization

Integration

- Voice command, speech recognition, speech to text
- Gaze sensor/command
- Sensor input and command in and outside the vehicle
- Various projection/screen types
- UI and sensory integration of various systems (IVI, Maps, HVAC, Apps, ADAS)
- Modular architecture

Privacy and safety/security requirements

Privacy

- Design should allow for different privacy regulations
- Opt-in/ opt-out
- Secure log-in/log out via phone, screens
- network-layer identifiers shall not be used as PII
- Protect private conversation when voice recognition is used (particularly cloud base)

Safety/ Security

- end-to-end data protection, including data protection at rest in local terminals, during transmission over different channels and when processed at the cloud platform.
- protect any permanent hardware identifiers and only allow access for authentication purposes
- isolated from other vehicular control systems
- Modular architecture → hypervisor
- Trusted apps, data wipe ?
- On hold for emergency

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