ITU-T FG-VM Working Group 2 (Architecture) Tasks, Progresses, and Future Plan

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Outline

❑ **Tasks of ITU-T FG-VM WG2**

❑ **Progresses of ITU-T FG-VM WG2**

❑ **Future Plan of ITU-T FG-VM WG2**

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Objectives of ITU-T FG-VM

- **Homepage of ITU-T Focus Group of Vehicular Multimedia**

 *http://www.itu.int/en/ITU-T/focusgroups/vm/Pages/default.aspx*

- **Objectives of ITU-T FG-VM (Term of Reference, 2018-07-20)**
  - ✓ To study, gather information and develop a standards research orientation and standards research plan related to vehicular multimedia in the fields of intelligent voice interaction, interconnection between vehicular terminal and smart phone, connectivity for high precision navigation and various other applications;
  - ✓ To develop corresponding use cases and requirements of vehicular multimedia enabled by converged networks;
  - ✓ To study architectures, interfaces, protocols, data formats, interoperability, performance evaluation, security and protection of personal information for vehicular multimedia;
  - ✓ To produce a gap analysis of vehicular multimedia standardization in order to identify the relevant scope of possible future ITU-T Recommendations on these topics and develop a roadmap for vehicular multimedia;
  - ✓ To establish liaisons and relationships with other organizations which could contribute to the standardization activities for vehicular multimedia.
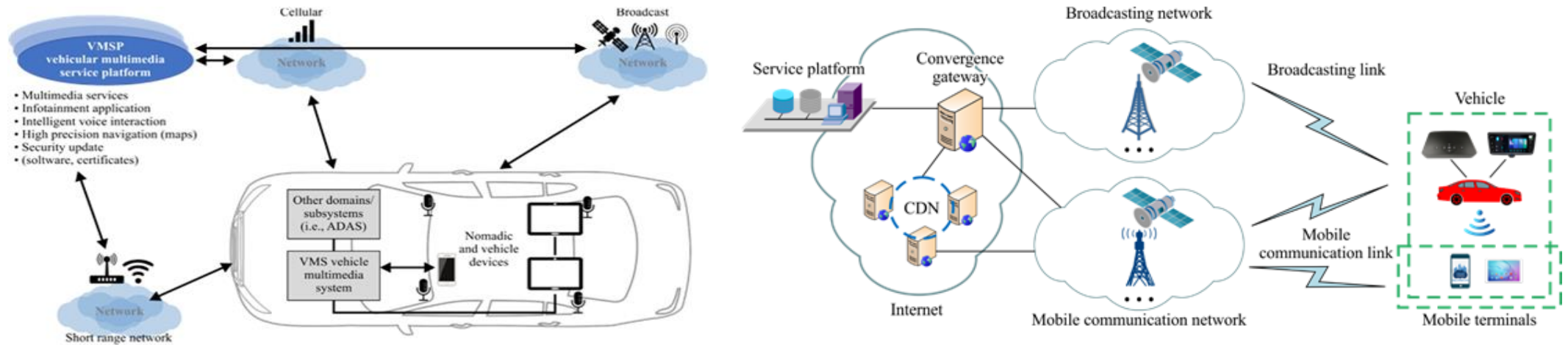
Structure of ITU-T FG-VM

- **Three working groups were established in Oct. 2018.**

WG1: Use Cases and Requirements

WG2: Architecture

WG3：Implementation
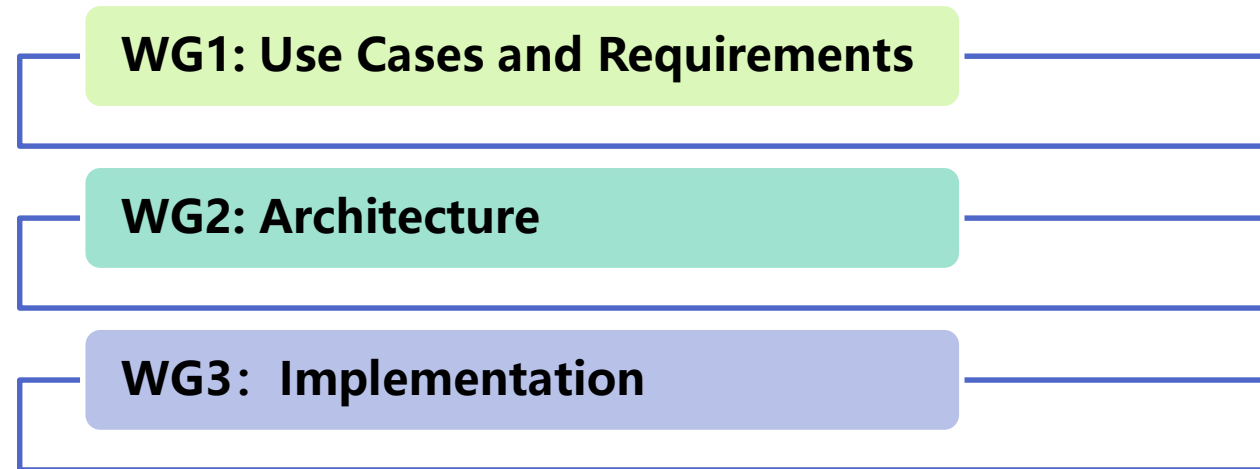
Tasks of ITU-T FG-VM WG2

● **Specific tasks of ITU-T FG-VM WG2 (Call for Proposals v2, 7th FG-VM Meeting)**

- ✓ Architecture of the VMS
- ✓ Architecture of the vehicular multimedia service platform
- ✓ Convergent network transmission protocols
- ✓ In-vehicle communication and network protocols
- ✓ Intelligent human to machine interface (HMI) technologies
- ✓ Copy right management technologies
- ✓ Security technologies

Outline

Progresses of ITU-T FG-VM WG2

- **From Sep. 2019 to Dec. 2020, dozens of contributions were received by WG2 during the last five meetings, with focuses on the following topics:**

  - ✓ Configurations of VMS configurations

  - ✓ Overall architecture of vehicular multimedia network

  - ✓ Network architecture for vehicular telematics connectivity services

  - ✓ VMS architecture

  - ✓ Network architecture for vehicular multimedia streaming services

  - ✓ VMS security

  - ✓ Personally identifiable information protection and privacy

- **An ITU-T Technical Report on Vehicle Multimedia Architecture was drafted based on these contributions and the related discussions.**

 - ✓ *https://extranet.itu.int/sites/itu-t/focusgroups/vm/input/FGVM-I-207.zip*

Overall Architecture of VMN

- **Vehicular multimedia network (VMN) consists of cloud service platforms, heterogeneous networks, and in-vehicle devices.**
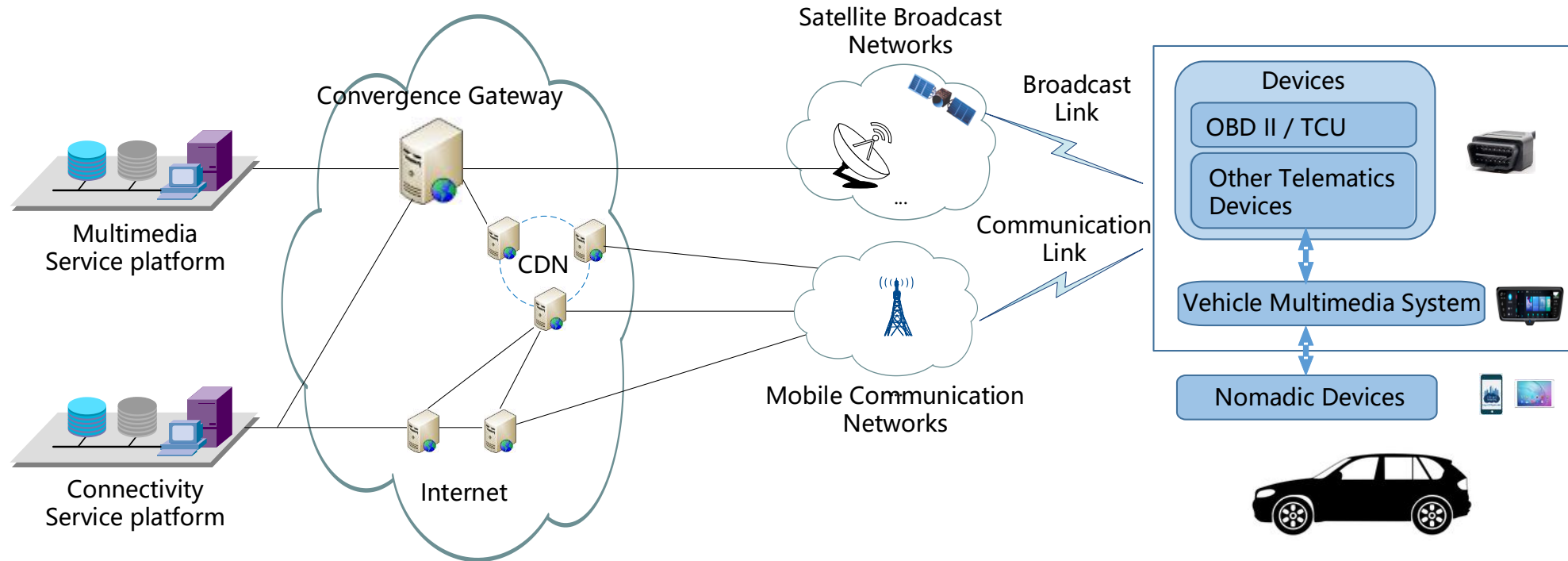
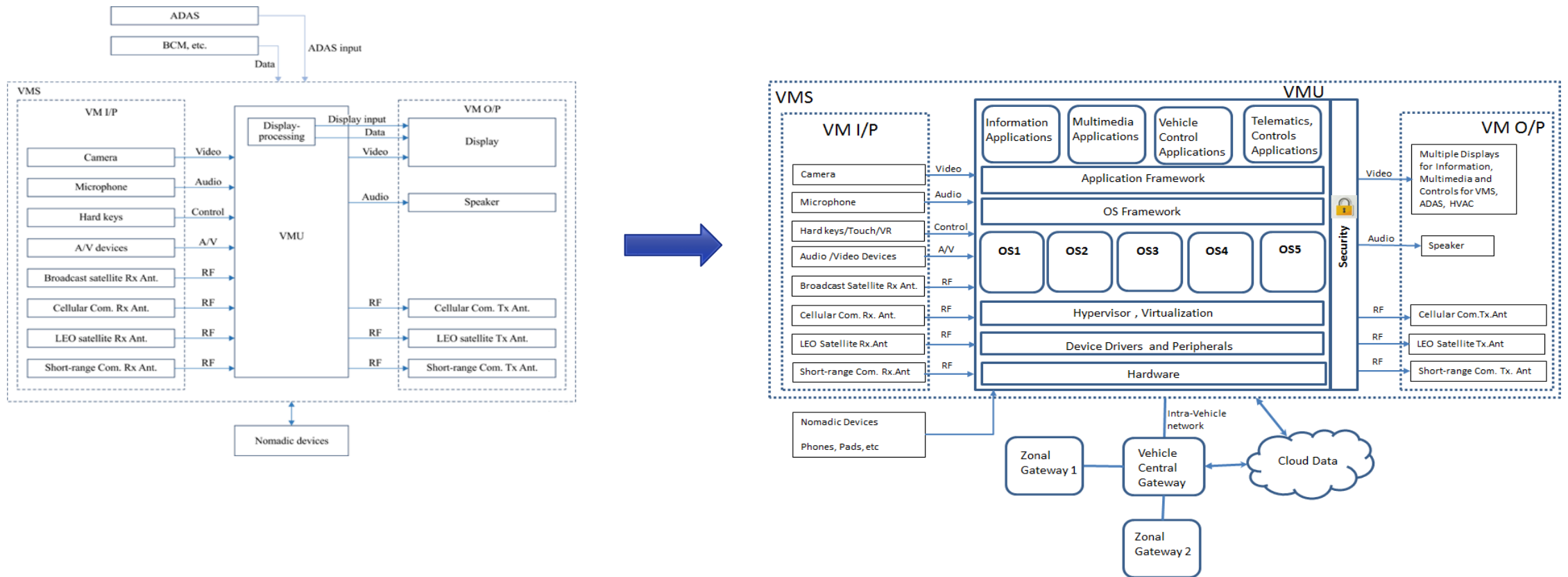# Network Architecture for Vehicular Telematics Connectivity Services

- **The network for vehicular telematics connectivity services consists of OEMs, service providers, mobile network operators, devices, and etc.**
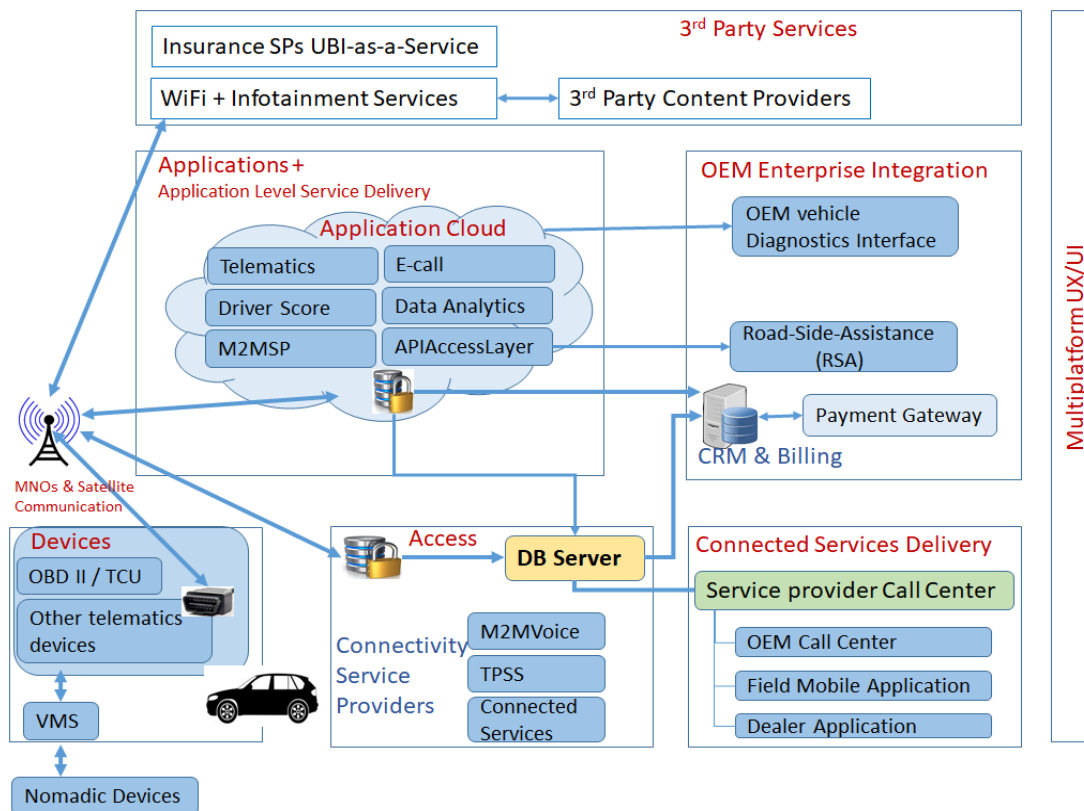
- ✓ Support OEM aftermarket services
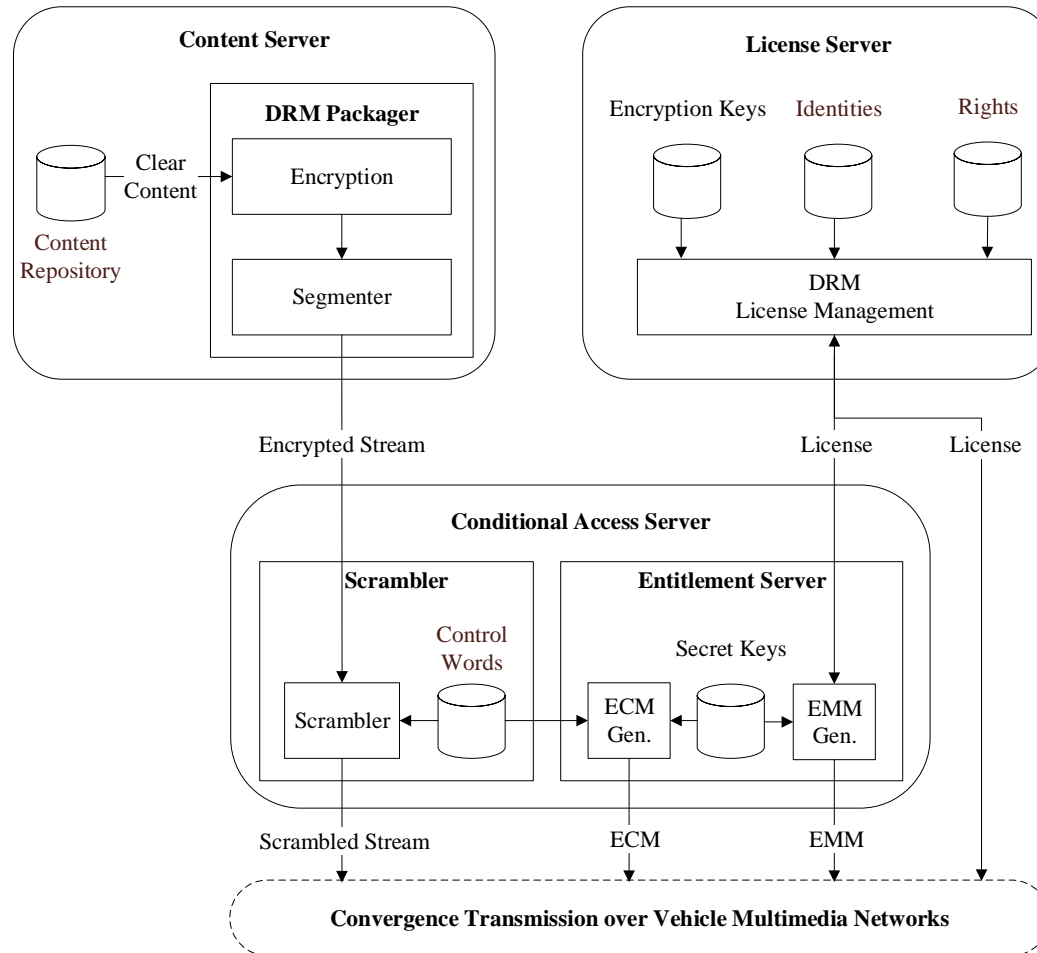- ✓ Support E-call services
- ✓ Support third-party services

VMS Architecture

● **A reference model of VMS architecture is designed.**

Network Architecture for Vehicular Multimedia Streaming Service (1)

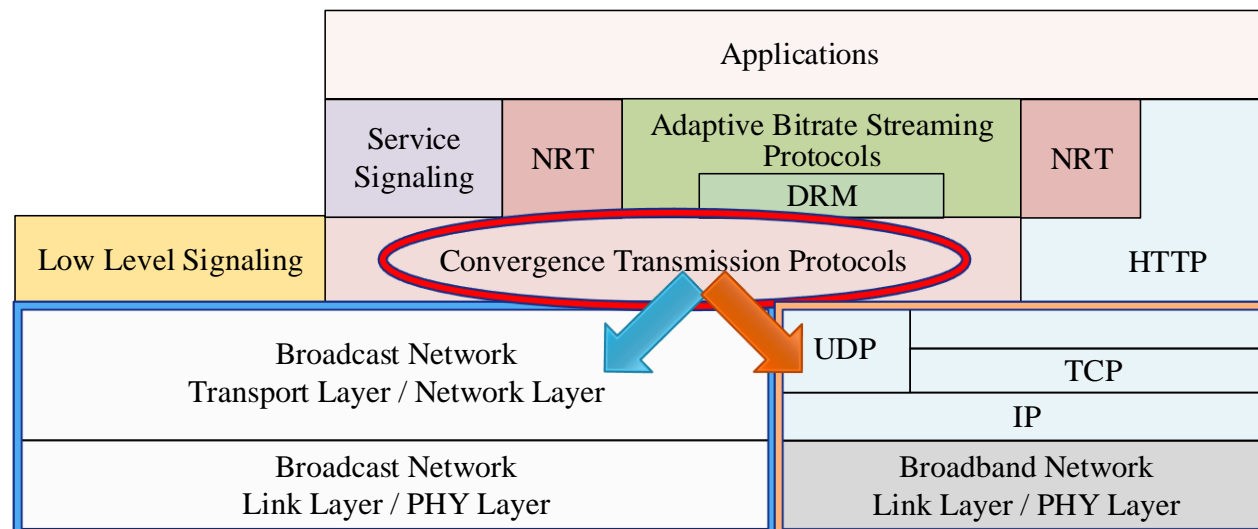- **Reference architecture of vehicular multimedia service platform**

✓ Support various DRM schemes, i.e., Google Widevine, Apple Fairplay, Microsoft Playready, and ChinaDRM

✓ Support various adaptive streaming schemes, i.e., MPEG-DASH, HLS, and etc.

✓ Support conditional access schemes for satellite broadcast link

# Network Architecture for Vehicular Multimedia Streaming Service (2)

- **Reference protocol stack for convergence transmission**

  ✓ Convergence transmission scheme takes advantages of the complementary strengths of broadcast networks and mobile communication networks, and the system efficiency of multimedia streaming services is optimized.

  ✓ Convergence transmission protocols are agnostic to the underlying lower-layer standards and are transparent to the upper-layer standards, which guarantees minimum modifications to the existing broadcast or mobile communication infrastructures.

Network Architecture for Vehicular Multimedia Streaming Service (3)

● **Reference architecture of receivers of in-vehicle devices**
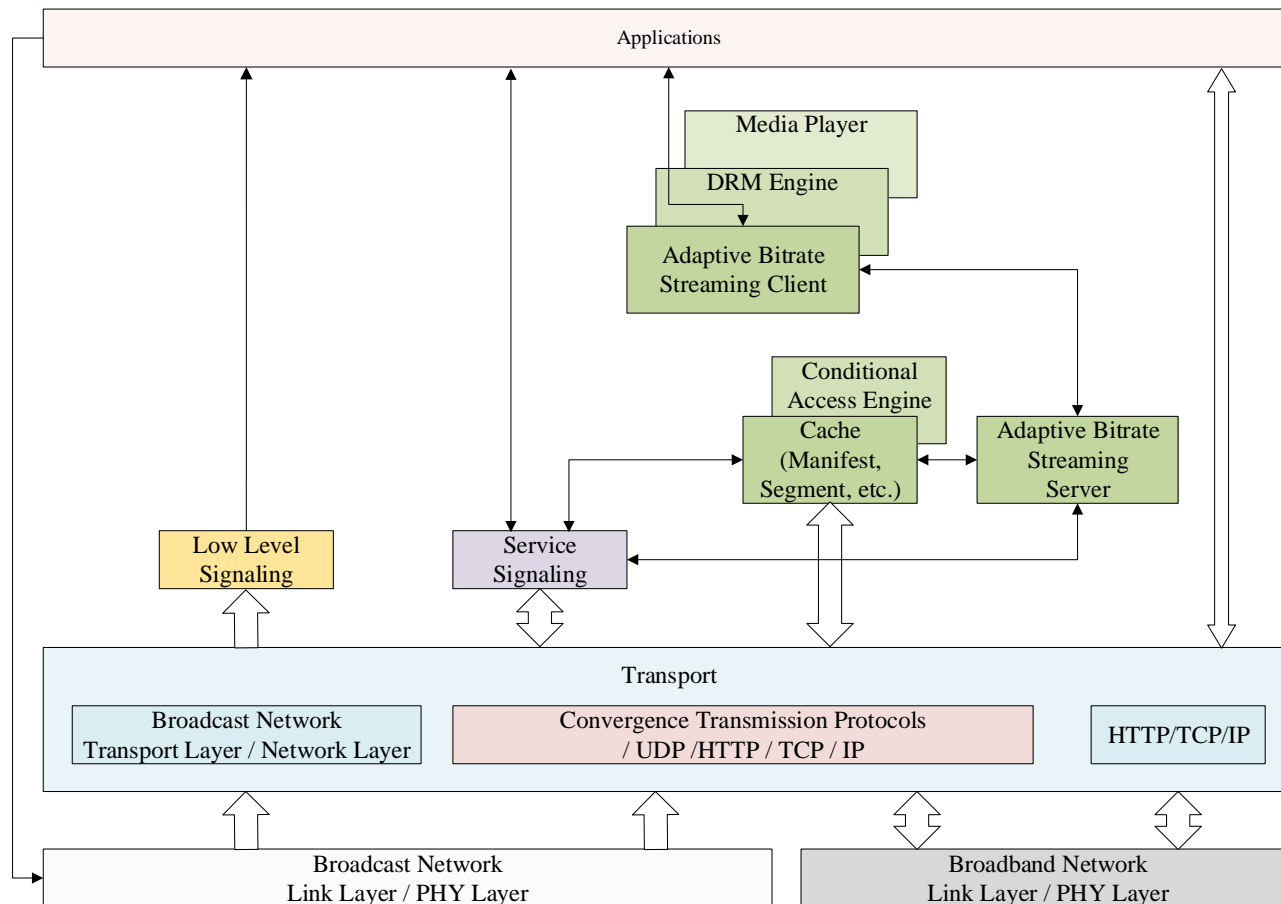
✓ Functions of the receivers of in-vehicle devices for multimedia streaming services are described.

✓ A typical bootstrapping sequence of the receivers is given.

VMS Security

- **Assumed threats to VMS and its eco-system are identified**
  - ✓ Threats regarding back-end servers (VMSP)
  - ✓ Threats to vehicles regarding their communication channels
  - ✓ Threats to vehicles regarding their update procedures
  - ✓ Threats to vehicles regarding their external connectivity and connections

- **Security capabilities based on identified threats**
  - ✓ Interface security
  - ✓ Virtualization security
  - ✓ Network security
  - ✓ Operational security
  - ✓ Software and firmware update
  - ✓ Application security
  - ✓ Incident management
  - ✓ Cryptography
  - ✓ Hardware security
  - ✓ Security assessment and audit
  - ✓ General security capabilities

Personally Identifiable Information Protection

- **General considerations**
  - ✓ Personalized access based on user selection of services and interest
  - ✓ VMS designed to allow for its use as per difference privacy regulatory requirements
  - ✓ VMS software, hardware and network design allow only authenticated access.
  - ✓ VMS PII and privacy protection designed for private vehicle with one single user and shared vehicle with multi users

- **Detailed considerations**
  - ✓ Protection – data visibility and transparency
  - ✓ Protection – data accuracy
  - ✓ Protection – confidentiality
  - ✓ Data integrity
  - ✓ Data availability

Outline

Future Plan of ITU-T FG-VM WG2

- **Work on ITU-T Technical Report on Vehicle Multimedia Architecture**
  - ✓ The draft of the TR is almost finished and the first version of the official TR is expected to be published in the first half of 2021.
  - ✓ However, new contributions on related topics are still welcomed by WG2 in future meetings. And, the TR may be updated to include these new ideas/designs if consensus could be achieved.

- **Work on new ITU-T Recommendation on Vehicle Multimedia Architecture**
  - ✓ A new ITU-T Recommendation on Vehicle Multimedia Architecture will be proposed to Q27/SG16 in the second half of 2021.

Thank you !