Fahrzeugvernetzung: Anwendungen, Funktionen und Möglichkeiten

Kurt Eckert
Robert Bosch Car Multimedia GmbH
By 2015 more than 6 billion devices will be connected to the “Internet of Things” resulting in new business models and IT based services.
Bosch Vision: Future Mobility

Connected mobility

Electric driving

Automated driving

Multimodal transport systems

Parking management
Our Target: **Integrated Connected Vehicle Services**

**Bosch Integrated Connected Vehicle Services**

- **Diagnostics & Fleet Management**
  - Remote Diagnose & Repair, Fleet, Remote Services

- **Safety & Security Concierge**
  - eCall, bCall, iCall, Stolen Vehicle Tracking

- **Connected Infotainment & Navigation**
  - Smartphone Integration, Local Search, RT-Traffic, Entertainment, Offboard-Navi

- **eMobility & Service Brokering**
  - EV Charging, Multimodal Transportation

- **360° Parking**
  - Automatic/ Remote Park Assist, Valet Parking

- **Driver Assistance & Automated Driving**
  - Community based Driver Assist., Highly automated driving, Conn. Parking

- **Connected Validation**
  - Systematic Field Data Retrieval, Increase Development Efficiency

**Gateway / Communication Control Unit (CCU)**

**Bosch Internet of Things Platform & Bosch Internet of Things (IoT) Cloud**

- Bosch Data and Content
- External Content Providers
- External Service Providers

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Communication systems and related functions

**V2X with ITS G5**
- Direct communication between vehicle and vehicle/infrastructure
- Intersection assistant
- Platooning
- Cooperative ACC

**Mobile Radio with geocast**
- Communication between vehicle and Server (push service) for latency critical functions
- Mobile barrier warning
- Emergency vehicle warning
- Traffic Light Information
- Traffic jam ahead
- Road works information
- Wrong way driver
- Road condition warning (black ice)
- Diagnosis

**WLAN/Mobile Radio**
- Communication between vehicle and Server (pull service)
- Diagnosis
- FOTA
- Map update

**C2X 2016**
V2X Applications Roadmap

Basic V2X Communication
- Emergency Vehicle
- Dangerous Situation
- Stationary Vehicle
- Traffic-Jam
- Pre-/Post-Crash
- Hazardous Location
- Adverse Weather
- Motorcycle Approaching
- Roadworks 1.0

Advanced V2X Communication
- GLOSA 1.0
- In-Vehicle Information
- Roadworks 2.0
- ACC Adaptation
- ...

Cooperative V2X Communication
- GLOSA 2.0
- Roadworks 3.0
- Lane-Merge Assistance
- Hazardous Area
- Cooperative ACC VRU Warning
- Platooning
- ...

Active Coordination over V2X
- Cooperative Merging
- Overtaking Assistance
- Intersection Assistance
- Dynamic Platooning
- VRU Assistance
- ...

Take-over of the driving functions
- Fully Automated Driving
- Optimal Traffic Flow

Installation on select new vehicle type of luxury and upper middle class vehicles

Phase 1
Basic Warnings

Phase 2
Advanced Warnings

Phase 3
Cooperative Warnings

Phase 4
Cooperative Agreements

Phase 5
Accident-free Driving

Dissemination
Cooperation

100% installation of new vehicle sales
100% installation of new vehicle plattforms
10 year ramp-up to 100% installation of new vehicles
Installation on select new vehicle type of luxury and upper middle class vehicles

Corporate Research and Car Multimedia
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IoT Suite: Support for the Connected World

**UI & Portal** (Web, Mobile)

- **Identity Mgmt** (IdM Security)
- **Business Process Mgmt** (BPM)
- **Business Rules Mgmt** (BRM)
- **[Big] Data Storage Analytics Reporting**

**M2M Device Management**

One IoT platform for all domains:

- Smart Mobility
- Smart Home
- Smart Energy
- Smart Industry
- Smart City

Bosch Software Innovations
Our Target: **Integrated Connected Vehicle Services**

### Bosch Integrated Connected Vehicle Services

<table>
<thead>
<tr>
<th>Category</th>
<th>Services</th>
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Diagnostics and Fleet Management: Use Cases

**Advanced**
- **Fleet Productivity**
  - eLogBook
  - Pool Optimization
  - Car Sharing

**Connected**
- **Driving Characteristics**
  - Eco Driving
  - Geo Fencing
  - Safety Driving
  - Car Theft Protection

- **Vehicle Condition**
  - Optimized Contract
  - Proactive Maintenance
  - Vehicle Diagnostics
  - Accident Recorder

**Basic**
- **Fleet Administration**
  - Multi-Tenancy
  - Reporting, Controlling

**Integration**
- Data & Process Integration
- Always on board

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**Automotive Aftermarket**

Our Target: Integrated Connected Vehicle Services

Bosch

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Bosch Data and Content

External Content Providers

External Service Providers
Bosch Service Solutions – Safety & Security

Broad service portfolio ensures one partnership for all demands

- We offer the whole range of **networked mobility services** for the automotive business

- Service scopes **from standardized entry-level solutions up to integrated high-end concepts**

- **OEM individual service solutions** meeting your customers demand

- **One Service platform** meeting highest demands regarding **robustness**, **availability** and **reliability** for all applications
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Bosch Approach “360° Parking Provider”

**Digital**
- Parking spot reservation
- Rent/Sell/Buy parking spots
- Navigation to parked car
- Payment
- Parking Fee calculator
- Live Data Parking spots
- Reminder parking time end

**Physical**
- Self Parking Assistant
- Parking spot scanning
- Automated Valet Parking @ Bosch

**Parking Suite**

**Data- / Service Brokering, Smart Parking Content Provisioning**
Community Based Parking (CBP)

Sensing

- Sensing vehicle
- Unslotted parking
- Slotted parking

Data Aggregation

- Parking space map
- Parking space counts
- 10 spots
- 2 spots

Applications

- ParkNet Online
- User at home
- Navigation devices

Drive or take public transport?
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Automated driving – supported by the automotive cloud

- Highly robust in all use cases
- Protection against technical failure and deliberate attacks
- Global standards and clear liability

- Surround sensing
- Safety and security
- Legislation

- System architecture
- Map data

- Redundancies for sensing, ECUs, and actuation required (fail operational)
- Always precise and up-to-date

Highly robust in all use cases.
Protection against technical failure and deliberate attacks.
Global standards and clear liability.

Surround sensing.
Safety and security.
Legislation.

System architecture.
Map data.

Redundancies for sensing, ECUs, and actuation required (fail operational).
Always precise and up-to-date.
Automated Driving needs Connectivity…

**Embedded ADAS* ECU(s)**
(Need information about vehicle environment)

- Partially and highly automated driving support
- Optimized energy management along route

**Electronic horizon**
(Provides location dependent information)

- Access to map data, enhanced by dynamic cloud based data

**Cloud services/data**
(e.g. traffic flow, congestion end, road surface condition)

**Digital map**
(Street network and attributes, e.g. slope, curvature, lane geometry)

**Vehicle sensors**
(Object information around vehicle)

The electronic horizon serves to feed ADAS* systems with location dependent data from digital map as well as highly dynamic cloud based data

*ADAS = Advanced Driver Assistance System
Thank you for your Attention

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