Connecting Cars: Behind the Code

Why is an open connected platform so critical?

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GENIVI Development Platform
The GENIVI Focus: In-Vehicle Infotainment (IVI) and Car Connectivity

Software that performs features like...

- Hands-free Telephone
- Driver Assistance Alerts
- Connection to Internet-based services
- Navigation and Points of Interest
- Email and Text
- Entertainment
- Car Information

Software that performs features like…
What makes a car go... software

• “It would be easy to say the modern car is a computer on wheels, but it is more like 30 or more computers on wheels.”
  Bruce Emaus, chairman of SAE International’s Standard Committee

• Some cars have more lines of software code than jet fighter airplanes; some have nearly twice the number of lines as make up the entire logic behind Facebook

• Car software extends your mobile device, your office, your home entertainment, and your entire digital life to the car
Three Challenges of Automakers

• Increase speed and decrease cost of developing IVI products
  – Mobile devices release in 18 months; Cars in 3-5 years
  – Drivers expect just released smartphones and apps work in the car
  – Over 100 million lines of code in a high-end IVI product … and growing

• Supplement existing IVI offerings with innovative approaches
  – Automotive ecosystem has been largely self-contained and very proprietary
  – Platform and tooling for experimentation and rapid prototyping are missing

• Take full advantage of the connected car opportunity
  – No technology platform for car-to-anything communication
  – Assisting drivers with cloud-based information has huge potential
An Open, IVI Community

Nonprofit industry alliance
135 members from across
global automotive ecosystem
Delivering open software for the
connected car to reduce costs
and accelerate innovation
25+ products deployed on
five continents
Focused on Responding to Consumers

- **DEFINE**
  Provides standard open source architectures, tools and software

- **LEVERAGE**
  Allows flexible definition of IVI systems that fit customers’ latest needs

- **PARTNER**
  Supports business model evolution and networking to facilitate innovation

- **REUSE**
  Allows reuse of software and re-deployment of solutions, with no royalty fees
Connected Car:
A foundation for innovation
Consumers expect a connected lifestyle

• Cars are just another participant in their digital life
  – Everything they can do on a smartphone, they should be able to do in a car…plus more

• Cars are becoming active participants in a peer-to-peer network consisting of…
  – Smart homes
  – Smart cities
  – Smart infrastructure
  – Other smart vehicles
But standards and a car connectivity software platform are missing

- Homes, cities and cars speak different “languages”
- Current automotive standards primarily aimed at safety
- Intelligent transportation solutions are unique to a region
- Solutions from different automakers may not interoperate
- Cellular connectivity does not scale
- Concerns over car security in a connected world
An open infotainment and connectivity platform for the transportation industry - Remote Vehicle Interaction (RVI)

<table>
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<tr>
<th>Platform</th>
<th>Specify, Standardize, and Implement Core connectivity protocols and services between the IVI system and remote entities.</th>
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<tr>
<td>Open</td>
<td>Use proven open source technologies to ensure that all protocols and services can be implemented securely and robustly.</td>
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<td>Collaborative</td>
<td>Work with existing organizations (OCF, OMA, IEEE, etc) to ensure broad adoption and acceptance, and to avoid duplication and competition.</td>
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Rapidly delivering Remote Vehicle Interaction

• Proofs of concept (code) complete for:
  – Car control (e.g. temperature) from smartphone
  – Transferring car data to the cloud (big data uses)
  – Software updates over the air (SOTA)
• Integrated into GENIVI Development Platform (GDP)
• Yesterday: Demonstration of connecting a car and a home (with Open Connectivity Foundation)
• Exploring other “smart connections” (cities, vehicles, etc.)
GENIVI Platform Accelerates Innovation

Automakers  
T1 Suppliers  
T2 Suppliers

Innovation for the Automotive Market

Start-ups  
Academia  
Non-auto S/W vendors

GENIVI Development Platform  
Remote Vehicle Interaction (RVI)
GENIVI RVI reference

Control  Big Data  SOTA

RVI
Connected Car:
A vision for the future
V2I
V2V
V2I + V2V
Smart Cities
US DOT Smart Cities Challenge

1,400 local officials, companies, academics and non-profits joined our webinars

800 people participated in our Smart City Forum

300 companies have expressed interest in partnering

77 applications received for the Smart City Challenge

5 Smart City Challenge Finalists to be announced in March at SXSW

1 Smart City Challenge Winner announced in June

#DOTSmartCity

www.transportation.gov/smartcity
Today’s Use Cases
How can we accelerate?
How to get involved

• **Technical:**
  – Engage with the RVI Expert Group within GENIVI
  – Contribute code
  – Build future concepts on the common platform

• **Business:**
  – Discuss future needs with customers and partners
  – Contribute use cases to the Expert Group
  – Encourage others to join GENIVI

We can learn a lot from each other!
Thank you!