GENIVI 14TH ALL-MEMBER MEETING

MARRIOTT, PARIS 14
APRIL 27, 2016
Agenda

Software is becoming more and more key in industry
What’s wrong with In-Vehicle Infotainment systems?
Renault/Nissan experience over the last ten years
New approach: partnerships and software architecture
Cybersecurity
Connected car benefits

So what is expected from GENIVI?
And then?
Software is becoming key in the industry

Continued growth & value of electronics in the car, with simplification of hardware:
- huge increases in software complexity

**Value of digital products of a car**

![Pie chart showing value of digital products increasing from 35% to 50% from 2015 to 2020.]

**H/W simplification: Eg consolidation of ECU’s**

- Infotainment (IVI)
- Audio Controller
- TCU/Gateway
- Instrument Cluster
- Head up display

Consolidated to:
- IVI/Audio/TCU
- IC/HUD
- Cockpit controller

Source: Roland Berger

Increasing software complexity, compounded by multiple customer options and build configurations (limited use code)

- Boeing 787
- Mars Rover
- F-35

100M+ Software lines of code

Source: Strategy& analysis

Source: Roland Berger
What’s wrong with In-Vehicle Infotainment systems?

✓ Too many constraints to deal with:

- Automotive grade applications
- Consumer Electronics features
- Size and development scheme totally different

They are still quite bad at Start Of Production
- Unreliable schedules
- Questionable quality levels

It remains hard to bring new features with reasonable Time To Market
## Renault/Nissan Experience over the Last Ten Years

<table>
<thead>
<tr>
<th>Tier 1 SW Platform</th>
<th>Core Technology</th>
<th>Schedule/Quality</th>
<th>Ease of Feature Innovation</th>
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<tbody>
<tr>
<td>Old -</td>
<td>Proprietary</td>
<td>--</td>
<td>+</td>
</tr>
<tr>
<td>Brand new - LPN</td>
<td>Proprietary</td>
<td>cancelled</td>
<td>++</td>
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<tr>
<td>Porting of mature PND - NFA</td>
<td>Linux</td>
<td>+</td>
<td>-</td>
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<tr>
<td>Brand new – RLink1</td>
<td>Android</td>
<td>---</td>
<td>++</td>
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<tr>
<td>Portability of proven techno - ULC</td>
<td>WinCE</td>
<td>+</td>
<td>-</td>
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<tr>
<td>Brand new – RLink2</td>
<td>Android</td>
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<td>++</td>
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<tr>
<td>Mature – RLink3</td>
<td>GENIVI</td>
<td>Hoping ++</td>
<td>Probably +</td>
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<tr>
<td>Next generation</td>
<td>Hoping GENIVI</td>
<td>Hoping +++</td>
<td>Hoping +++</td>
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### As a Rule of Thumb:
- New platform ➔ trouble, but potentially nice feature sets
- Mature platform ➔ less trouble (usually) but limited innovation
Collaborative work: mandatory for development, with key partners in each field and Alliance as System Integrator

New approach: Partnerships
New approach

Software architecture

- Use of open source software, supplier based platforms & industry standard protocols to reduce time to market and cost and increase quality.

Renault Nissan Multimedia platform developed with Bosch to cover multiple brands
Security measures must of course be end-to-end

Only area were Renault/Nissan has been intrusive in IVI SW design for quite some time: everything is in the details…

Security enablers and reasonable security pre-testing must be part of any shared SW platform

ASIL B safety is the next challenge, but will likely require far better (but cost effective) HW support (hypervisors alone are not a panacea)
Cybersecurity

Action levers

More services and more wireless links: 3 levers:

- Norms, governance, training
- Technologies and Architecture
- Management of identity, traceability and configuration / update

→ Constant evaluation of new technologies and processes to protect our customers
Connected car benefits
A new relationship with our customers

- Full digital interaction
  - Extended car usage
  - New mobility enablers
- Tailored-made services & offers
  - Direct & continuous relation with the Brand
- Data for optimising product & up-to-date cars
Connected car benefits
Supporting Autonomous Driving through real-time data flow
Off-board services while autonomous mode engaged

- HD mapping with live updates
- 'Car to Car' and 'Car to Infrastructure' communication (V2X)
- Cloud based self-learning driving support
- Video-conferencing, cloud based services…
Connected car benefits

End to End mobility services and car access/sharing

In-Car delivery
(Volvo+PostNord, Audi+DHL, Aftermarket ‘Cardrops’)

Car sharing

Send to car
Navigation

Find and book services

Remote access
So what is expected from GENIVI?

Statements well known by GENIVI, Linux Foundation, and Autosar members:

✓ Most trouble comes from developing, porting, and tuning SW platforms (kernel + middleware);

✓ Both OEM and Tier1 suffer from this, wasting time and money;

✓ The ultimate solution is off-the-shelf, shared, continuously evolving and tested SW platforms;

✓ Hardly feasible without Open Source or with market fragmentation
And then?

✓ GENIVI boldly went a long way in that direction;

✓ Most IVI players acknowledge this, but many still behave as if they didn’t;

✓ Google Android Auto Embedded, LF Automotive Grade Linux and even QNX try to go one or two steps further;

✓ GENIVI Demo Platform is a promising initiative;

✓ GENIVI must (and will) still go further down this path.
Thank you!