Vehicle Interface Layer (VIL) on Linux Mobile Platform

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Mobile devices\(^1\) have enough software, hardware and connectivity capabilities required for vehicle head unit.

Vehicle head units offers below advantages comparing with mobile devices:
- Vehicle bus access (Like CAN, MOST)
- External Antennas (Like GPS, DVB)
- Vehicle centric sensors
- Vehicle / Driver centric UX.

Bridging these gaps through VIL can make mobile devices fully integrated mobile cum head unit device.

\(^1\) Smart phones, Tablets etc...
• VIL exposes set of standardized automotive software service interfaces on mobile platform.
• Underlying VIL Interface plug-ins interacts with its counter part at vehicle head unit side.
• VIL transport layer provides seamless communication based on any of underlying interfaces like USB, BT, WiFi.
• Mobile Interface Layer (MIL) at head unit abstracts the vehicle’s communication, software systems and provides unified interface to the mobile platform.
Layered View of Mobile Interface Layer on Linux IVI Stack
Layered View of Vehicle Interface Layer on Linux Mobile Stack
• VIL modes
  – Basic: Minimal vehicle property² set - read mode.
  – Intermediate: Full vehicle property read + Limited vehicle property set - write mode.
  – Advanced: Full vehicle property set - read/write mode.
• Sensor/Antenna stream access on all modes.
• Based on DAP authentication, VIL and MIL negotiates and agree for the mode.
• Mobile to Head unit authentication/Pairing.
  – Private mode – Own/privately used vehicle.
  – Public/ Rented vehicle.
• Seamless usage of underlying connectivity mechanism (USB/BT/WiFi)
• Selection of access mode (Basic, Intermediate, Advanced) based on active connectivity mechanism and its bandwidth.
• Sensor/Antenna stream data: More accurate feed from head unit to mobile.
• MIL at Head units can be customized by OEMs
  – Full Genivi compliance
  – Light weight Genivi compliance
  – Proprietary Interface

• VIL at mobile side interacts through appropriate plug-in
  – Default Genivi Plug-ins
  – Vendor Specific Plug-ins.

Disclaimer: Just thought process. No such thing exist as of now.
• Mobile devices computing, communication & platform capabilities are leveraged to mix with static & runtime Vehicle data.

• Single personalized device: User can use single personalized mobile device for Vehicle infotainment along with normal mobile features.

• Enables vehicles with basic capabilities /simple head units, to have rich vehicle infotainment solutions.

• Takes advantage of frequent mobile device upgrade cycle vs. Car & Infotainment system upgrade cycle.

• Downloadable Apps: Vehicle Interface can be exploited by innovative 3rd Party Applications and provide rich vehicle experience.
• Enables vehicle centric User Experience development on Mobile.
• Enables the mobile to change into Drive Mode and enable VX once the mobile is docked into vehicle.
• Car control can be made safe and only required interfaces are exposed through head unit MIL Service.

• Critical features are not exposed to 3rd party applications directly.

• Different application/profile configurations depends on Runtime state of vehicle (Ex: Speed)
• OpenXC - Promoted by Ford with Android interface (http://openxcplatform.com)
Q & A