

Automotive Connectivity with Open Source and Commercial Software

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Automotive Market Discontinuities....

Open Source
Software
Integration



CE
Integration



Software
Functional
Safety



ADAS
Telematics



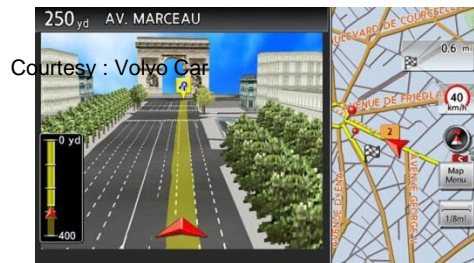
Standards



Driver and Passenger Connectivity Needs

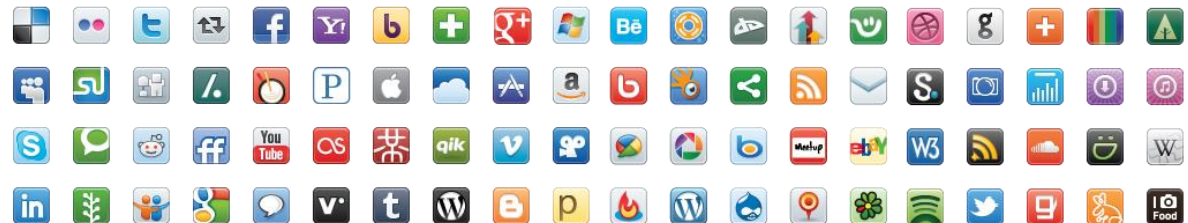
Driver

- Navigation
- Radio / Media Player
- Concierge Services
- Phone
- Real-time travel information



Passengers

- Social Media
- Streamed Services
- Web Browsing
- Android Apps



Vehicle Infrastructure Communication

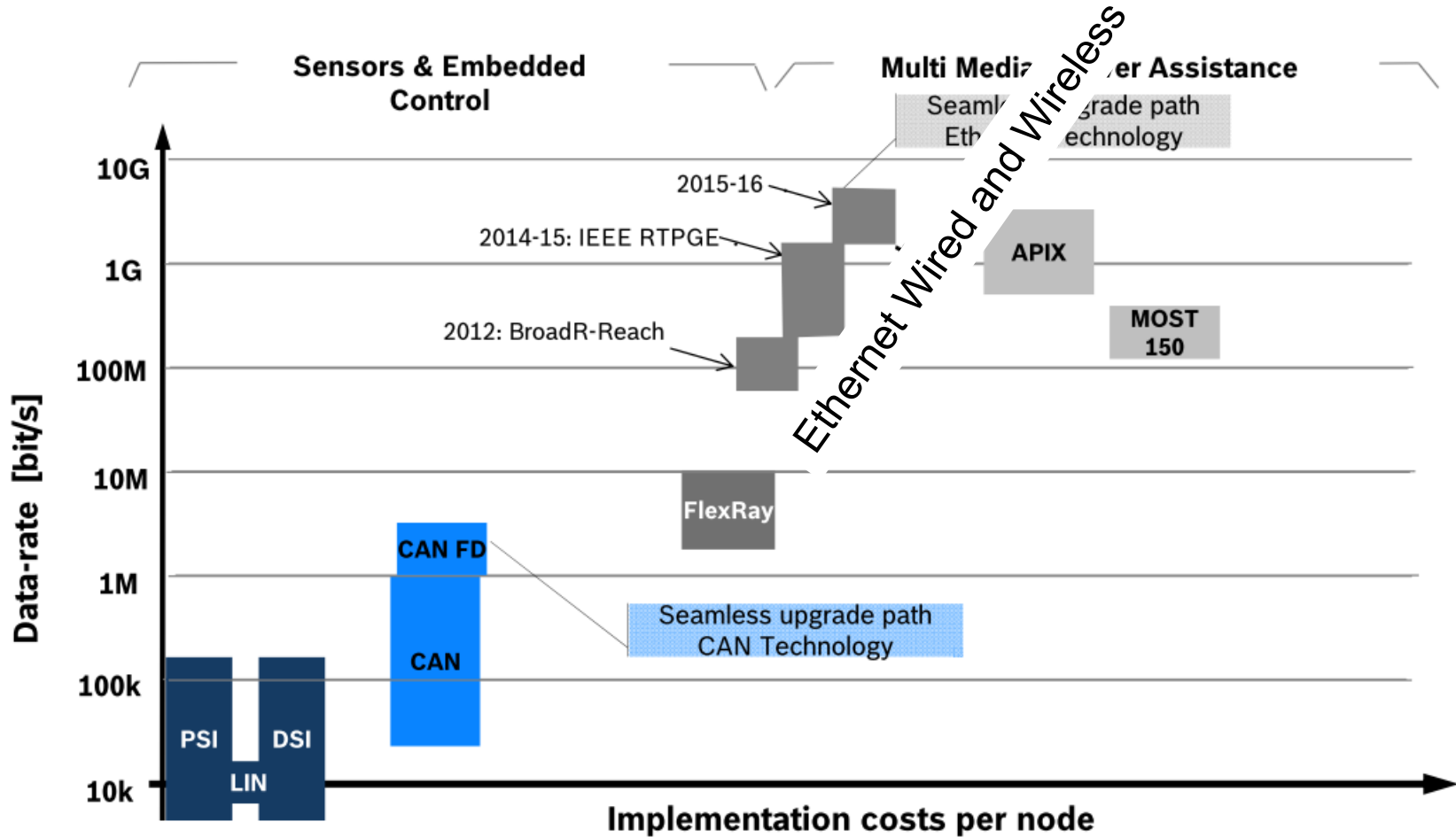
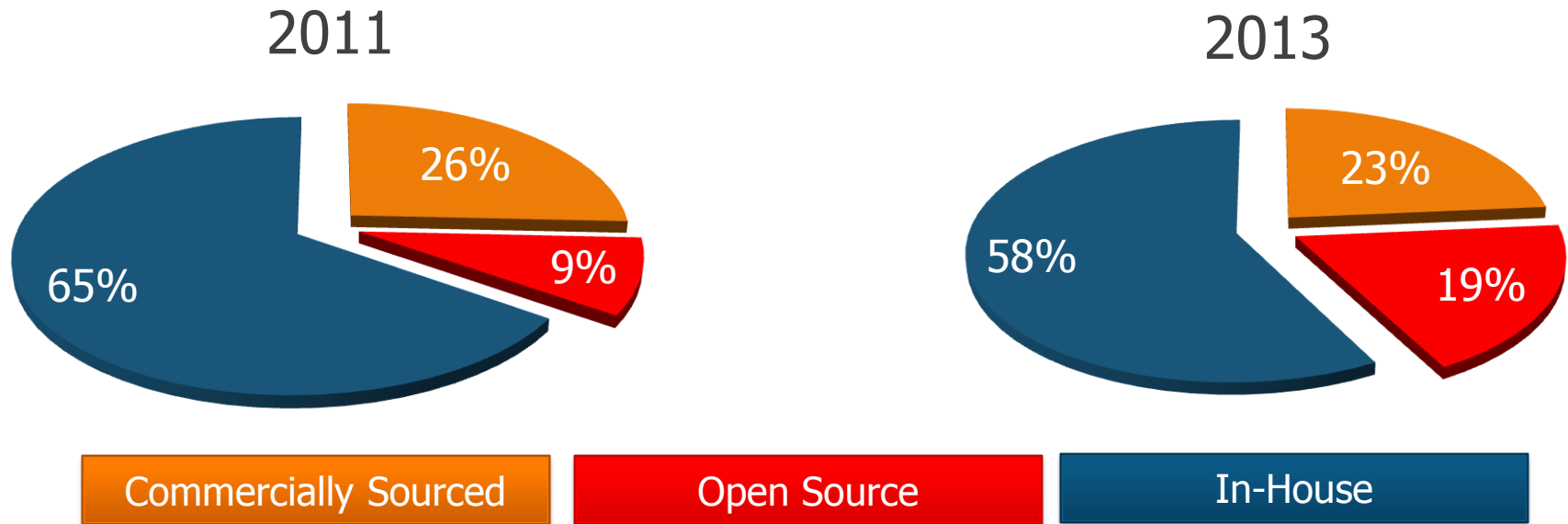
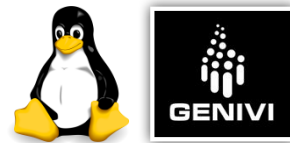


Image : Courtesy Robert Bosch

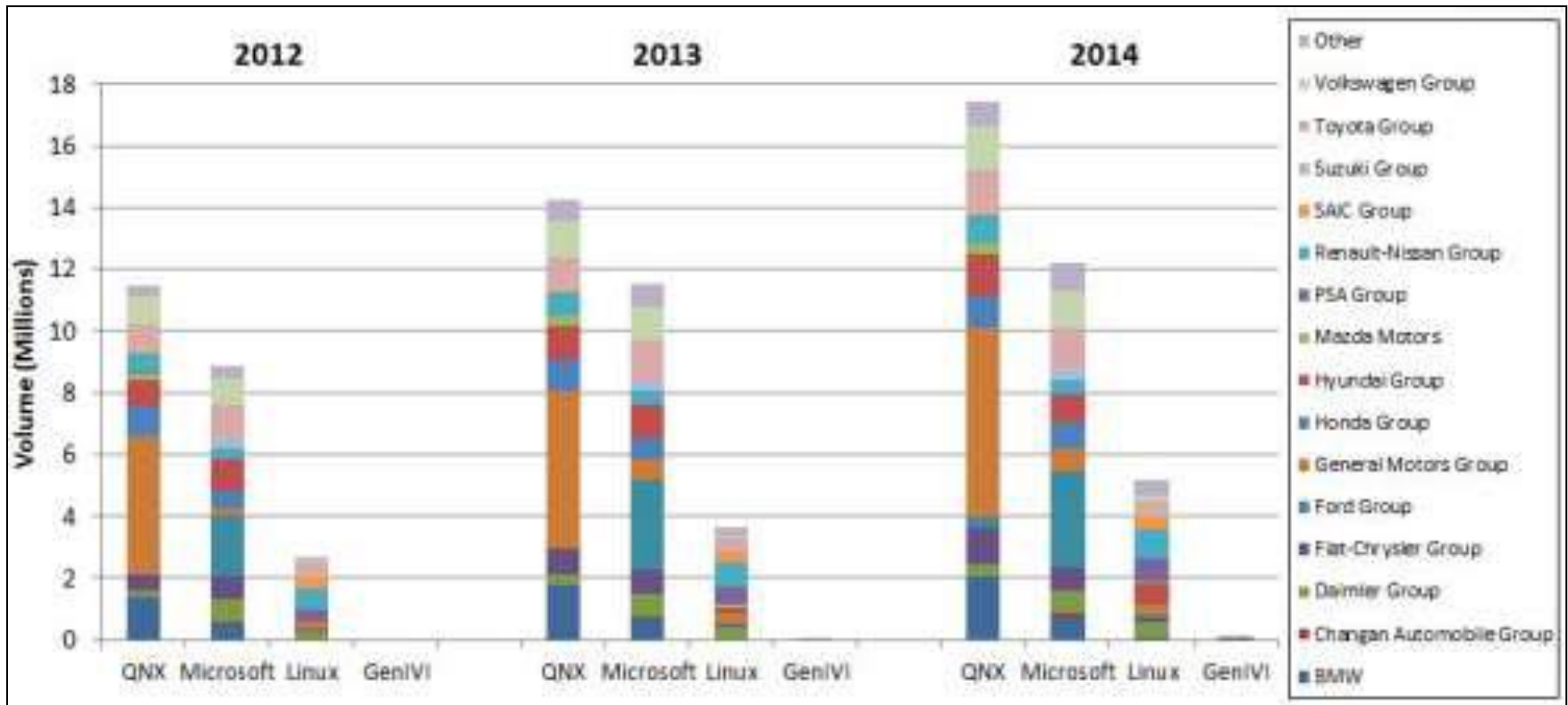
Growth of OSS for Automotive Innovation



- Use of Open Source software has doubled 2011-2013
- New challenges :
- Licensing, Copyleft, Security, Integration, Maintenance & Updates



Linux Operating System will dominate



- Linux Infotainment design-starts are increasing
- GENIVI uptake is growing slowly

Semiconductor Platform Requirements

- Infotainment / ADAS
 - Multi-Core, high-performance
 - GPU Support
 - Communication and Connectivity hardware
 - Security Model
- Instrument Cluster
 - High Performance Graphics
 - GPU / GPU Sharing
- ECUs
 - Low-cost MCUs
 - Secure Communications
 - Design Tool support
 - Vehicle Network Integration / AUTOSAR



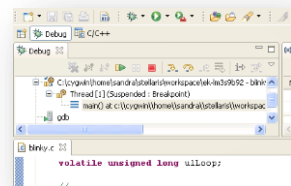
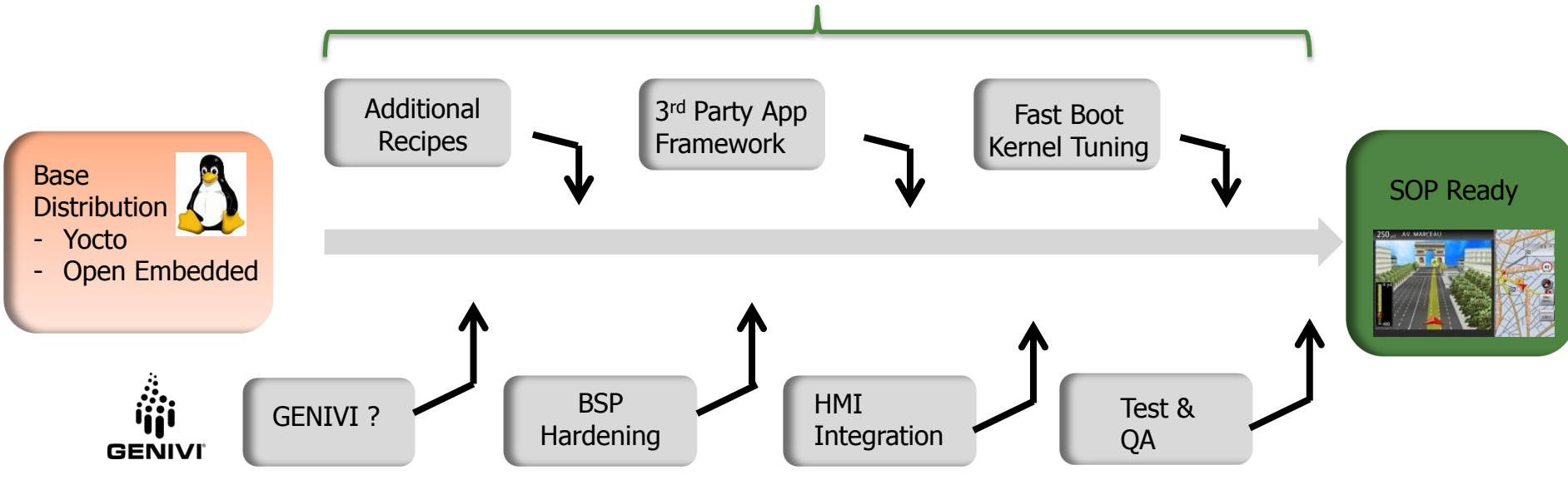


OSS for AUTOMOTIVE

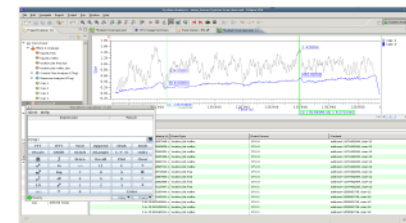
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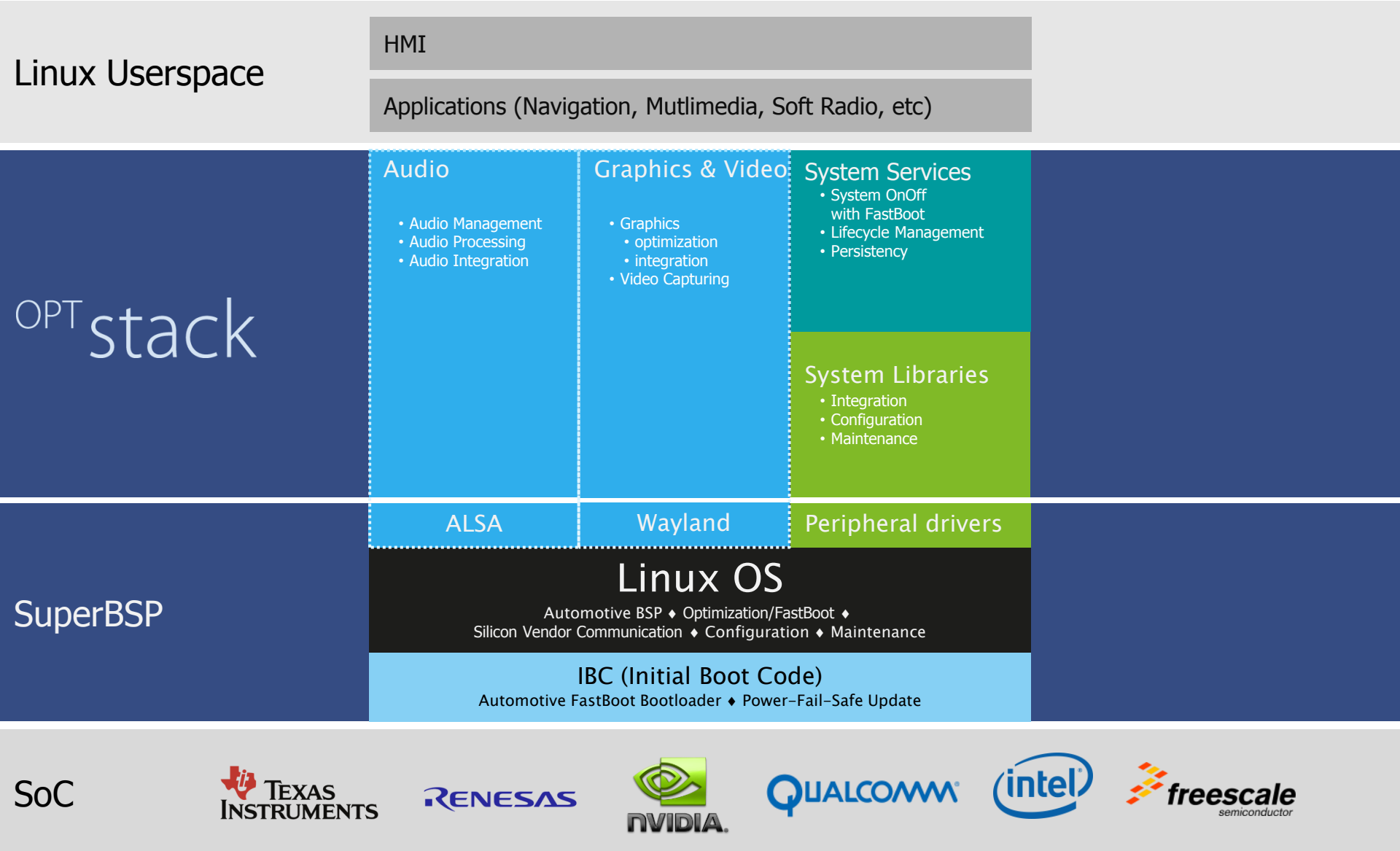
Example : Taking Linux to SOP ..



Development toolchain and IDE
gcc / glibc / gdb ♦ JTAG ♦ Kernel debug ♦
Libraries ♦ Application Analyzer



Mentor Linux Platform - SuperBSP and OPTstack[®]





Connectivity Platforms

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Connectivity Requirements

- Connectivity in the Vehicle

- Connectivity between ECUs / Data sharing
- Connectivity between passengers / WiFi Hotspots
- Tethering of consumer devices

- External connectivity

- Data and voice channels over the cellular network
- Dedicated Short Wave Radio (DSCR) V2X devices
- Internet connection via Wi-Fi, LTE, or some other means
- Wireless connection to a remote keyless entry (RKE) fob, NFC, Bluetooth, Wireless
- Radio..

- Keywords :

- Cost Optimized
- Secure
- High Quality

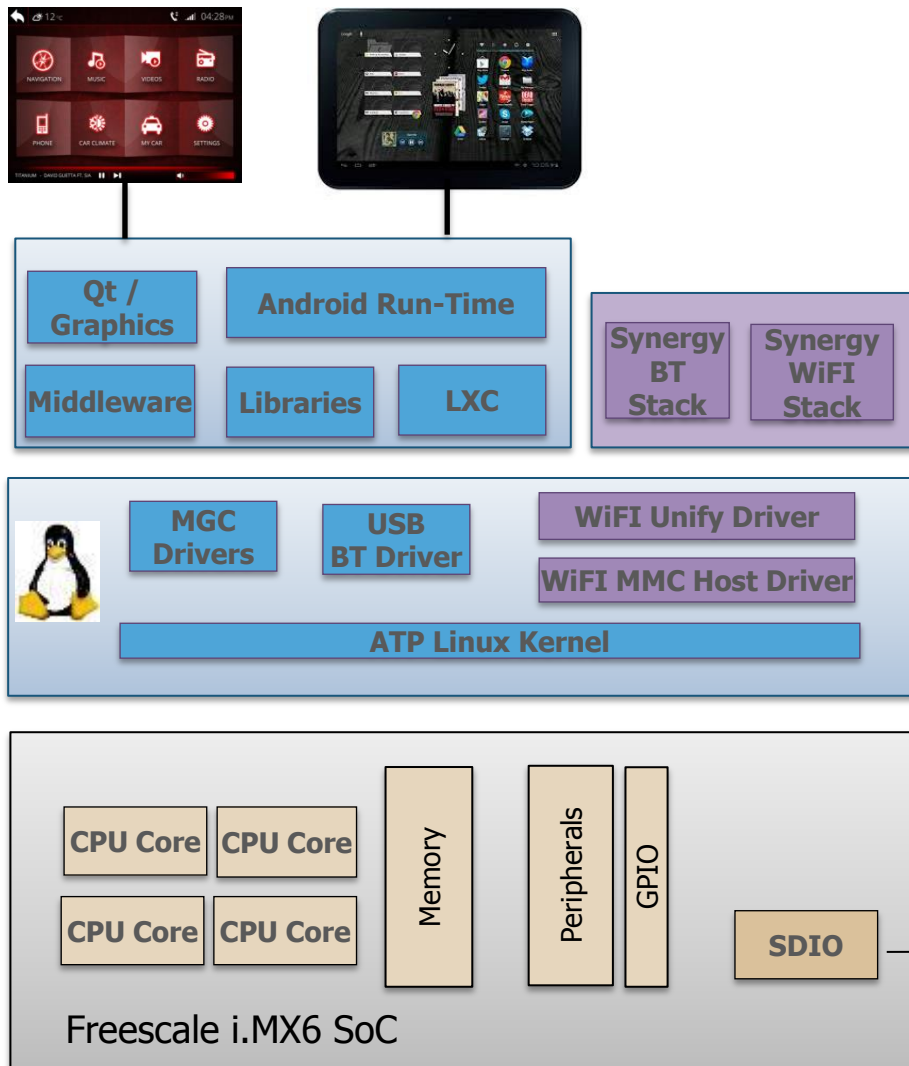


DSRC Example – Cohda Wireless

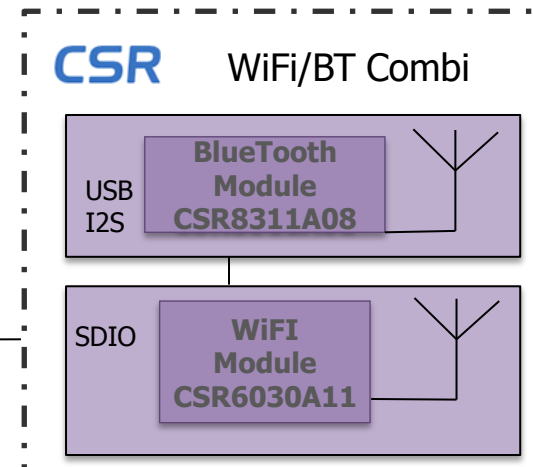
- Dedicated module
- Integrates into vehicle network (CAN)
- Non-line of sight
- Uses on-board RTOS



WiFi / BT Integration - CSR



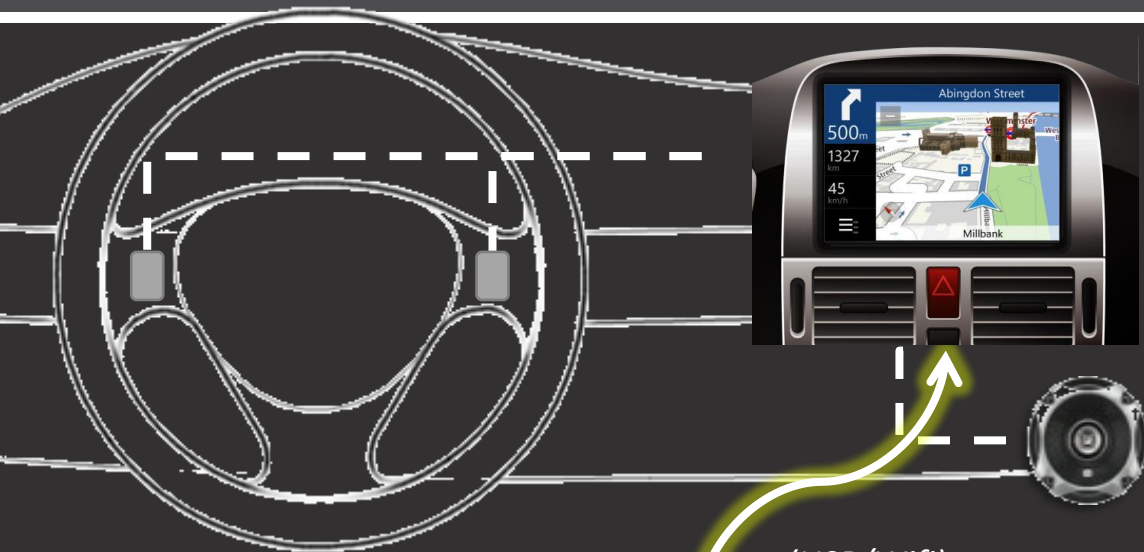
Bluetooth & WiFi Module
STA and AP modes (WiFi)



Tethered SmartPhone

- Use SmartPhone capabilities for
 - Navigation, Music/Movies, Phone
 - External Data Services
- USB or WiFi connection to head unit
- Apple CarPlay and Google Android Auto are both emerging
- MirrorLink provides Open Source option for Android – promoted by CCC





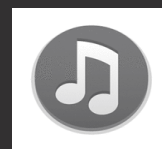
MirrorLink™

*Once connected, no
need to touch or look
at your phone*



(USB/Wifi)

Allows (new) smartphone based apps to be used in the car



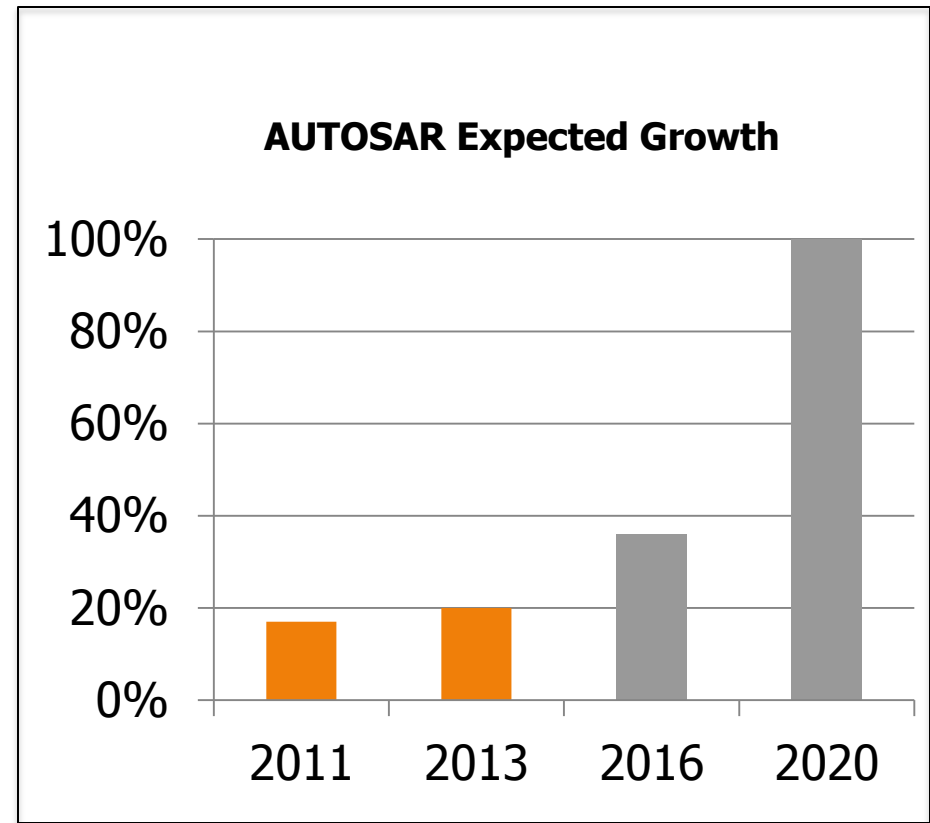
Safer use of Smartphone apps by using vehicle controls



Automakers in control of what apps are allowed from smartphone

ECU Connectivity

- AUTOSAR consortium
 - Established 2003 :
Daimler, VW, Bosch...
 - Now has strong global support, mandated by many OEMs in RFQs
- Provides standardized interface for ECU interface and architecture
- Improve reusability, reduce cost, offer wider market choice



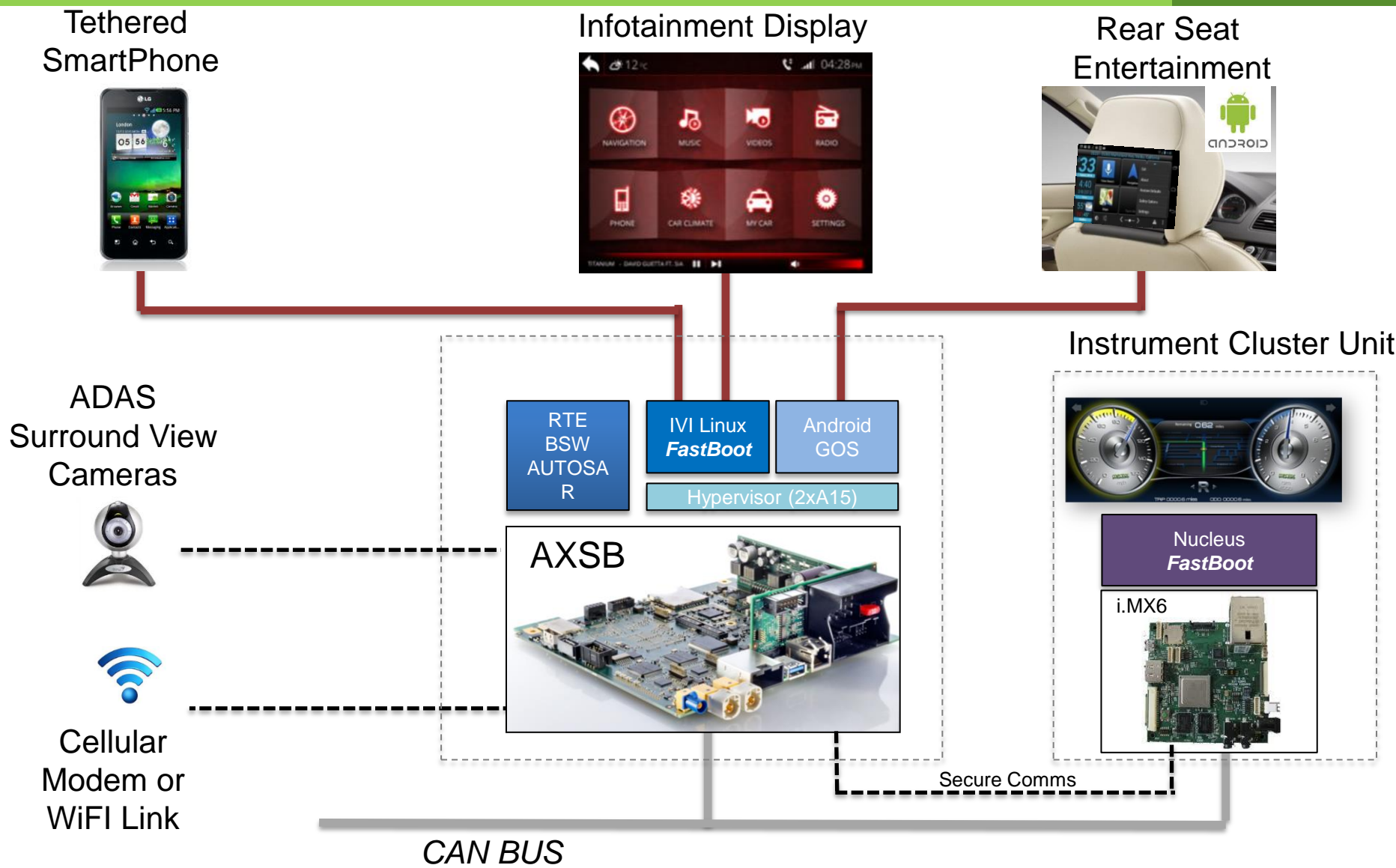


Architectures

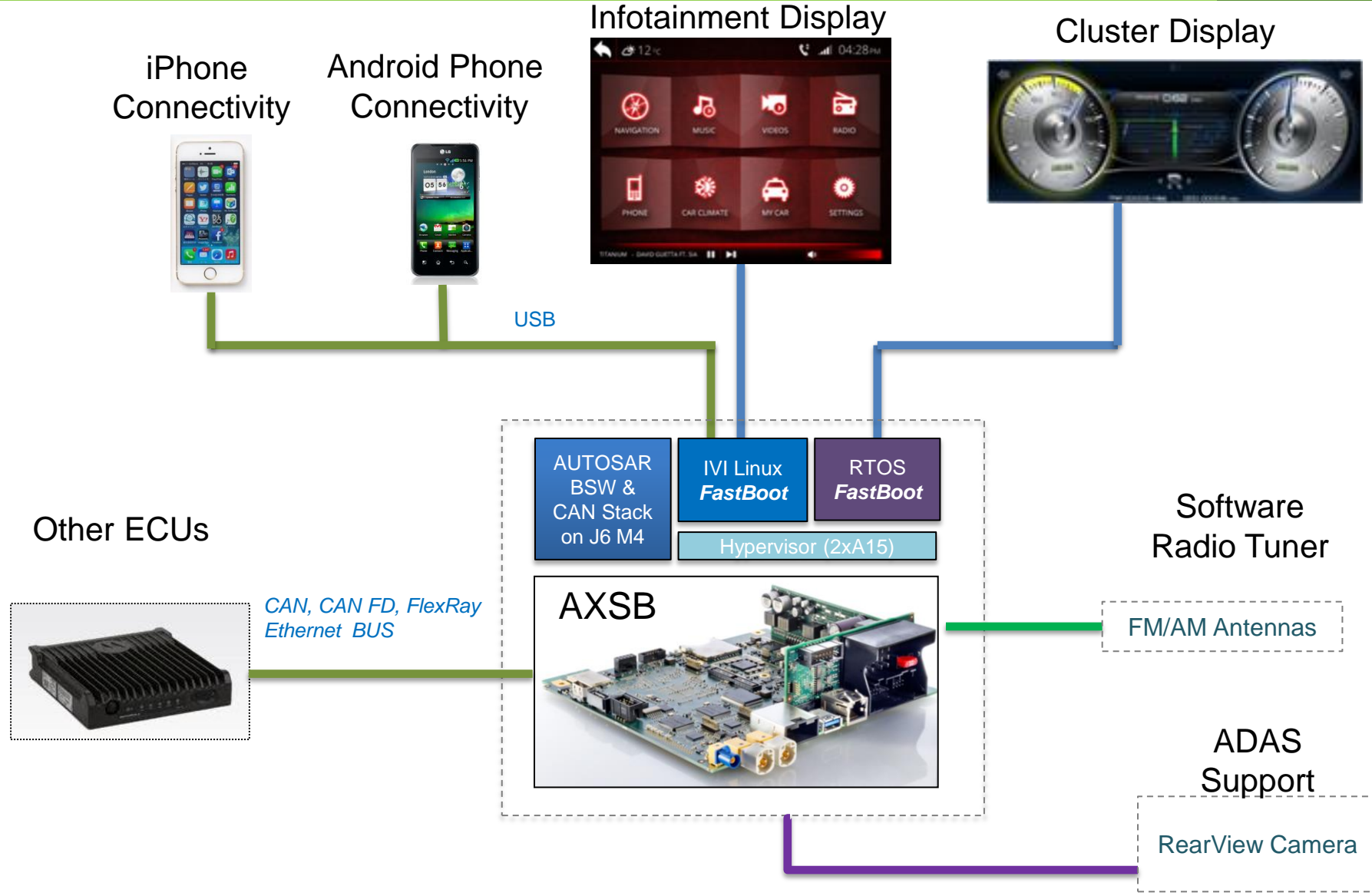
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Typical Infotainment and Cluster Architecture



Instrument Cluster, ADAS, AUTOSAR & Infotainment





Thank You

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