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Emerging Trends and Business Models for the Connected Car

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Where will you find QNX?



Extensive automotive experience



Silicon relationships

Suppliers



Middleware

Auto OEMs



QNX is in over 200 vehicle models

- **Connectivity trends**
- **The automotive application store**
- **Interaction between cars and mobile devices**
- **The cloud**
- **Rear-seat entertainment challenge**
- **Instrument clusters transition into cockpit displays**
- **Green trends**
- **Evolution of the value chain**
- **Example of business model evolution: RIM**



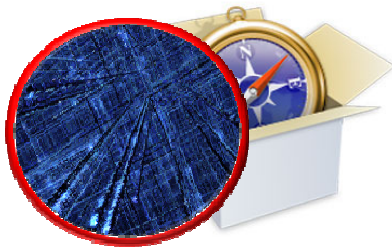
“Car” applications

- For features that consumers expect in a vehicle: navigation, driver safety, security
- Applications are enhanced by connectivity, but may not require it



“Pocket” applications brought into the vehicle on smart phones and other consumer devices

- Application logic resides on consumer device
- Integrated into the automotive experience



“Cloud” applications

- Application logic resides in cloud
- HTML 5 engine to render content in vehicle
- Browser or lightweight web app in vehicle

Embedded



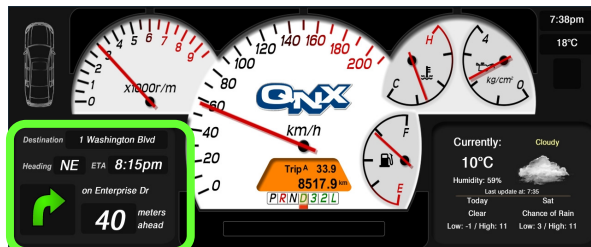
- Application and connectivity implemented completely in car
- Available today, platform dependent

Tethering



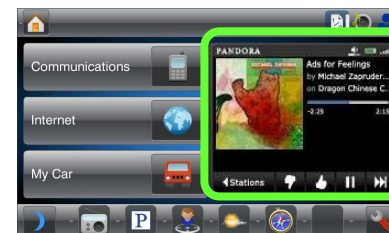
- Application resides only in car
- Smart phone provides connection to cloud
- Connectivity: USB or Bluetooth rSAP/DUN

Remote skin



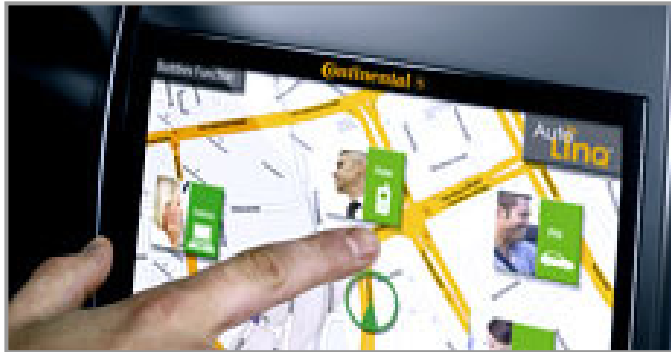
- Application resides in phone
- Remote skin resides in car, controls phone application
- Connectivity: USB or Bluetooth SPP

Remote terminal



- Application resides only in phone
- Remote terminal client (such as VNC) in car replicates phone HMI
- Connectivity: USB or Bluetooth SPP

Tier 1 application stores



“Continental will unveil an application store concept in the second half of 2010.”
— *Continental FAQ*

Disadvantages:

- Creates vendor lock-in by being “open” but proprietary

OEM application stores



“Openbeak Pandora and Stitcher are first to use Ford Sync API, bringing Twitter, Internet radio control into vehicles”
— *Ford Press Release*

Disadvantages:

- Disrupts supply chain
- OEM must make large up-front investment
- Difficult to attract development community

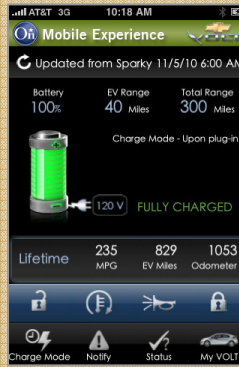
Mobile devices playing new roles

OEM device replacement

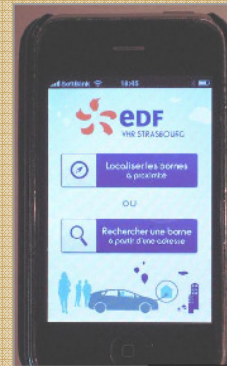


iPhone integration concept system

Remote interaction with vehicle



Mobile Onstar BlackBerry



Strasbourg EV iPhone

Hybrid OEM + device-based systems



MINI Connected Infotainment System

Denso example:



Download free app from app store



Operate map in iPhone



Scroll map, Zoom in or out, Input your destination

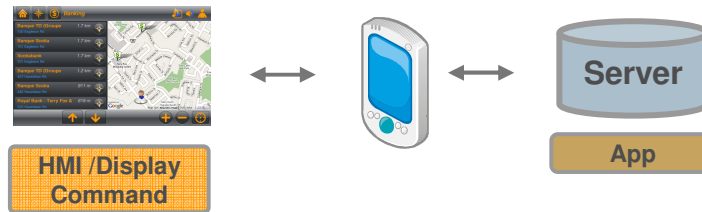


Map in car navigation system makes the same moves

QNX is a leader in device connectivity supporting Apple, MS, RIM, BT, ...

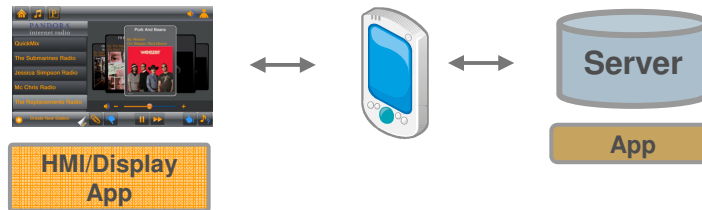
Smart phone application trends

Cloud-based application



- Uses smart phone as modem
- App runs on server
- Car accesses data on server

Smart phone download type



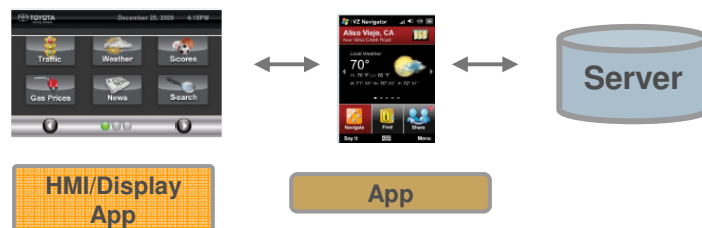
- Uses smart phone as modem
- App runs in car
- Car accesses data on server

Smart phone link, type A



- App runs in smart phone
- App can be controlled from the car

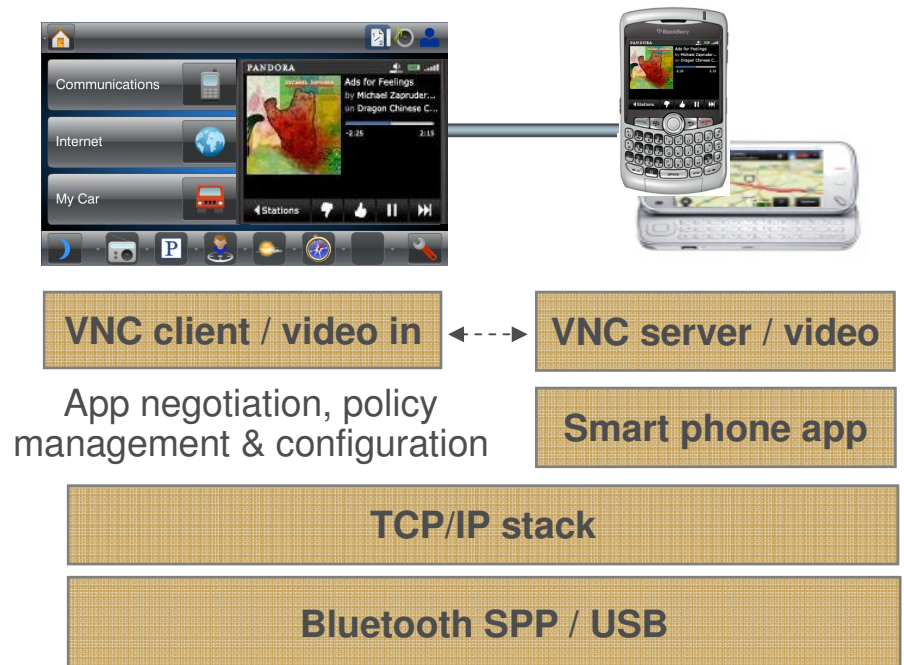
Smart phone link, type B



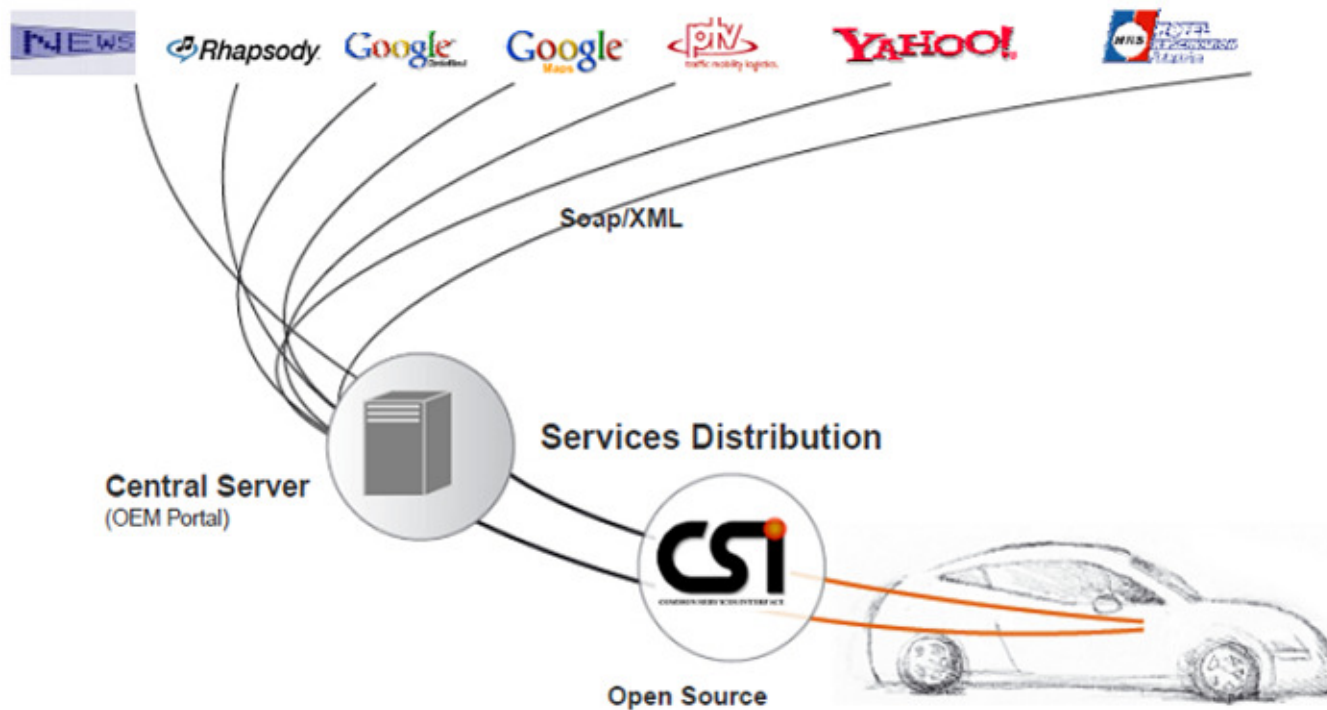
- Partial app runs in smart phone
- Partial app runs in car
- Smart phone app and in-car app work together

iPod out / terminal mode integration

- **Device display integration**
 - Consumer device provides simplified “car mode” user interface
 - Restricted access to device applications
 - Car and device negotiate display characteristics and scaling
- **Benefits**
 - Simple integration
 - When app becomes available on phone, it also becomes available in the car
- **Drawbacks**
 - Developer community might not have appetite to create “car mode” HMI
 - Possible fragmented user experience
 - Policy management and driver distraction issues
 - Pressure on OEM brand

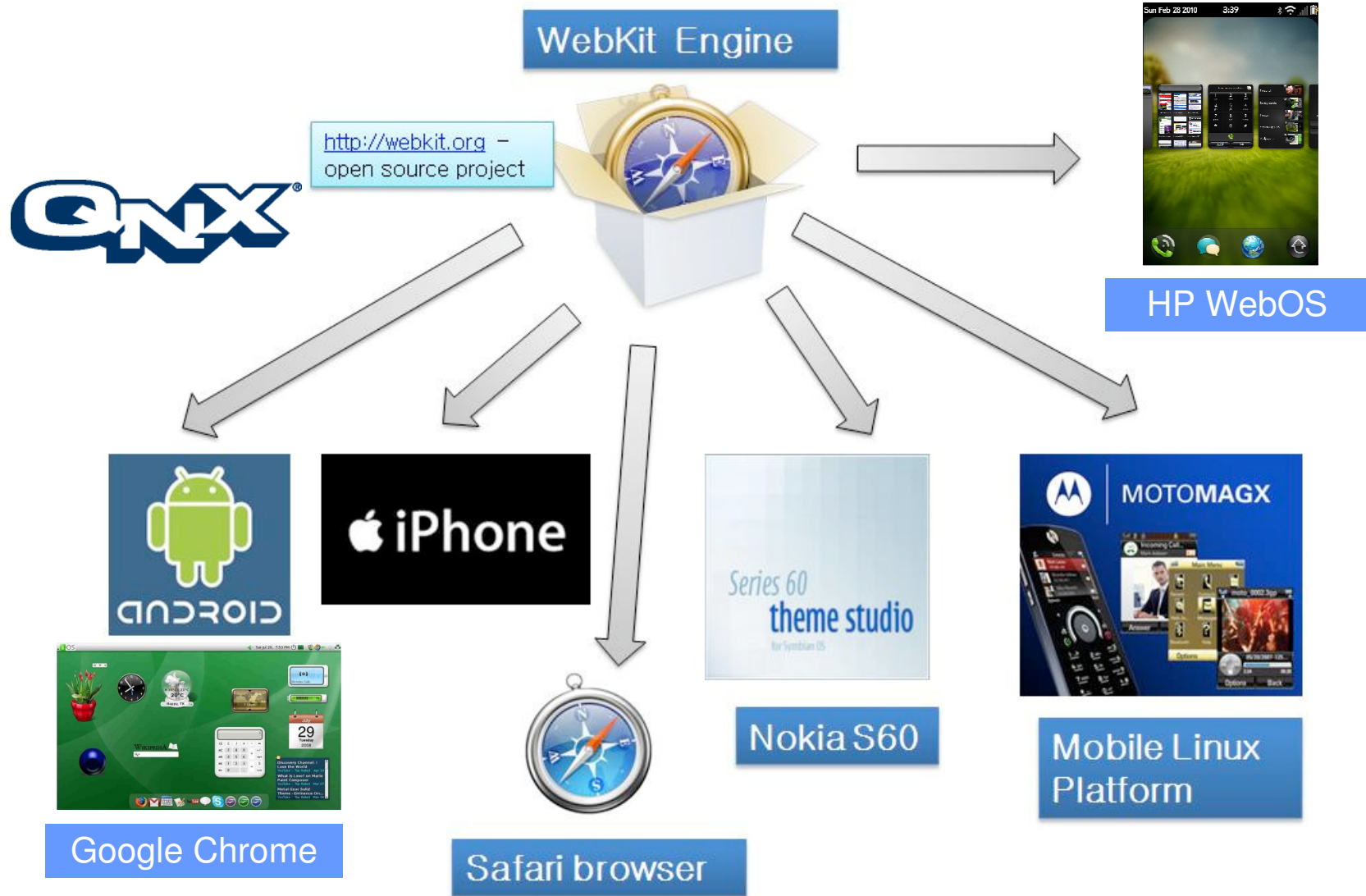


Connecting the car to Internet applications



QNX support for HTML 5, Adobe Flash 10.1, and Adobe Air

WebKit — Used everywhere



Cockpit displays — The next ‘big thing’



**QNX provides advanced graphics support:
Silicon (Imagination, Fujitsu, ATI, Nvidia, etc.), Standards (OpenGL, VG, OpenCode)**

Heads-up displays



QNX advantage: Composition manager layering / graphics

Problems for rear seat entertainment: \$499 tablet versus \$1,999 OEM system



The importance of “Green” in automotive electronics

- As more electric and hybrid vehicles launch, the need to manage power consumption will increase dramatically
- Current is now effectively fuel; every bit of current draw decreases total vehicle range
- Suppliers are already developing and marketing solutions



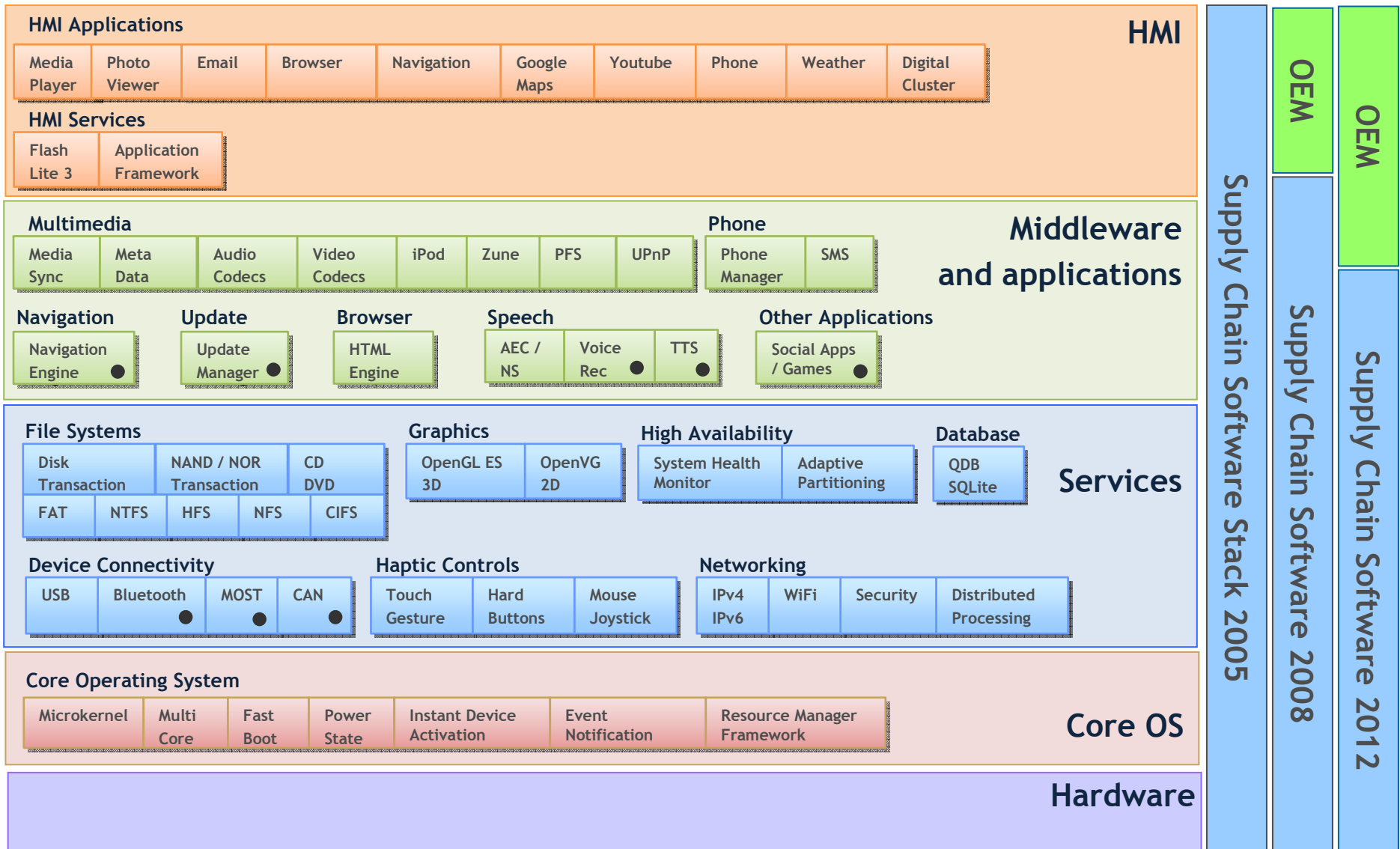
Example: Harman/Becker GreenEdge

30% smaller. | 40% lighter. | 50% less energy. | 100% Bose sound.

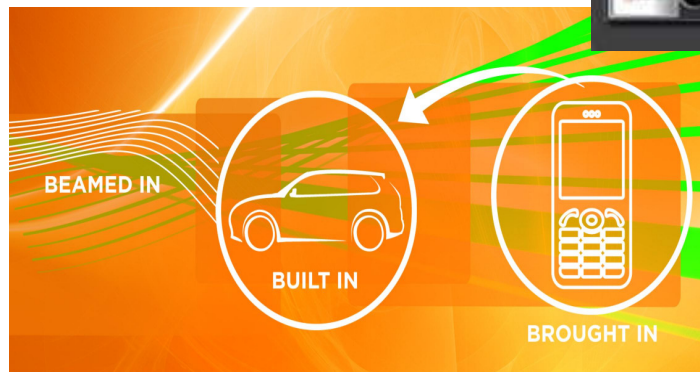
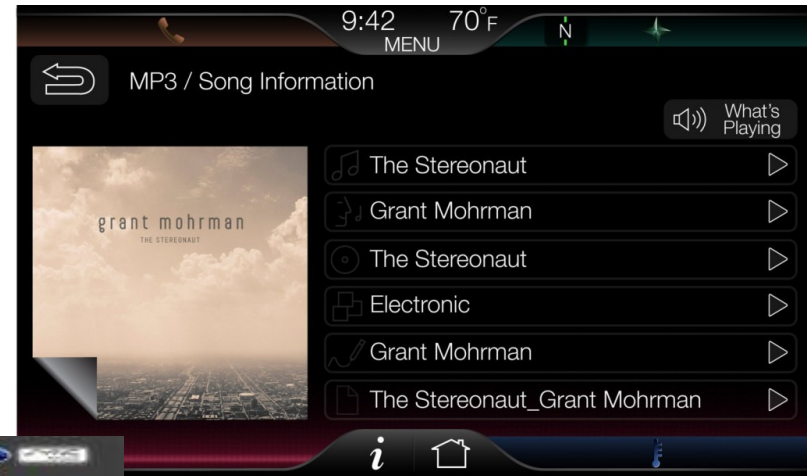
Example: Bose

QNX fast boot and power management solutions

Software value chain: moving towards OEMs



Ford example



Disadvantage – High upfront engineering cost (over 150 contracted engineers)

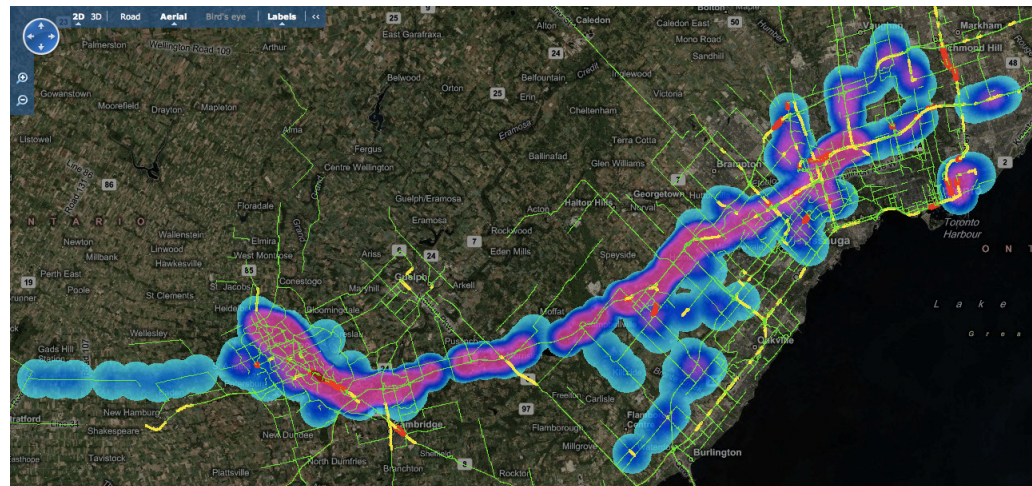
Quick facts about RIM

- **#4 mobile phone maker worldwide — shipped 294.9M phones in Q1 2010**
- **41 million BlackBerry subscribers today with 65% year-over-year growth**
- **10.5 million BlackBerry phones sold in Q1 2010**
- ***FORTUNE* magazine's fastest growing company in the world in 2009**



Example of business model evolution: BlackBerry Traffic

- Cloud connectivity and mobile devices may have huge impact on OEM business models
- Device integration with OEM systems can reduce BOM costs; for example, traffic, navigation, local search, Internet radio
- Example: In North America real-time traffic information can cost as much as \$2 per month per vehicle
 - Some mobile devices (e.g. BlackBerry Traffic) provide this service for free



Universal application platform

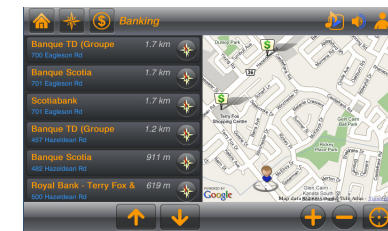
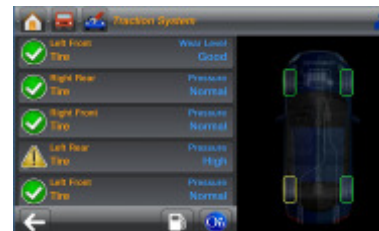


QNX CAR platform overview

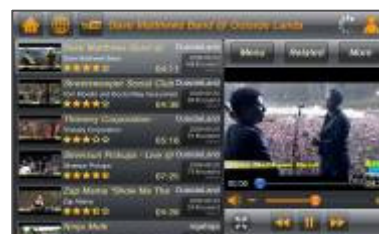
“Dashboard 2.0”
Wired



“The car of the future”
LT Wire



“Future ride pimped with Internet”
CNN Money



Inside the connected car



- **Driver:** Access to advanced navigation, vehicle safety and wellness, hands-free communication, automatic dealer appointment scheduling, and other driver-centric services.



- **Front passenger:** Access to applications, home control, my PVR, and other management and control services.



- **Backseat:** Free to enjoy a wide range of services: on-demand video, gaming, social networking, and web-based applications.

- Wi-Fi modem creates a hotspot inside the car, providing connectivity for netbooks, personal media players, smart phones
- 3G or LTE provides high bandwidth, for both upstream and downstream content and data delivery

Addressing the challenges



- QNX understands automotive requirements and challenges
- Focused on bringing customers to production
- Over 200 production models to date
- Full support for automotive silicon (ARM, SH, PowerPC, x86)
- Design, planning, and integration services anticipated and built in
- Integration not left to you: team of QNX senior automotive engineers working on QNX components — no one is more qualified
- Open and integrated — select from a wide array of hardware and middleware components, depending on your design

- **QNX Software Systems**
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Thank you