Choosing the Right Application Platform for Your Infotainment System

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Agenda

• Importance of software and application platforms
• Overview of potential platforms
  - Android
  - Microsoft
  - HTML 5
  - Adobe Air / Flash
• The impact of pocket application platforms on the vehicle
• QNX approach: universal application platform
Consumers want cars to work seamlessly with their mobile devices

- Software strategy is key to market differentiation

Benefits of application platforms

- Rapidly integrate new applications to keep vehicle up to date
- Enable new business models and revenue opportunities
- Leverage rapid development cycles of mobile device market

Characteristics of application platforms

- Connected to the Internet and to mobile devices/services
- Offer compelling user experience
- Enable large developer community
- Dynamically support new technologies
- Scale across low-end, mid-range, and high-end systems
Application Platforms
Android

Benefits

- Free to use and distribute
- Leverages Java
- Thousands of apps
- Widget-based HMI development tools for Eclipse
- Safe, upgradable environment

Drawbacks

- Boot times can be long
- Designed for mobile phones, not cars
- Limited ability to influence Google – especially outside of the mobile market
- Android virtual machine is not quite Java
  - Java code must be recompiled
  - Java environment can be challenging for graphics designers
  - No solution for sharing display with native applications
- Linux only (GPL, etc.)
- Google’s future direction: HTML 5/Chrome?
Microsoft

Benefits
- Many developers familiar with Windows API
- Choice of device drivers
- Full-featured automotive stack with Bluetooth, multimedia, etc.
- Large third-party ecosystem
- Core (basic) WinCE inexpensive
- Inexpensive tools

Drawbacks
- Fragmented approach
- Features such as multi-core not consistently supported across products
- All or nothing: core WinCE not enough, but full automotive stack much more expensive
- Embedded browser not HTML 5 compliant
- Customer must develop all iPod interfaces
- Limited ability to influence Microsoft
- Currently lacks application store support
HTML 5

Benefits

- Built on open industry standards
- Supports multiple operating systems
- Wide industry adoption
- Create once, deploy on multiple devices
- Huge development community

Drawbacks

- Poor development environment for rich user experiences*
- Poor application environment*
- Standards not yet ratified
- Limited stand-alone applications and application store
- Difficult to leverage native operating system resources
- No full-featured media player that can integrate with mobile devices

* New suppliers trying to address this. Example: www.sencha.com
Adobe Air / Flash

Benefits

- Flexible: Can be an application platform, HMI solution, or browser plug-in
- Supports multiple operating systems
- HMIs are very easy to design
- ActionScript-based HMIs can be accelerated with OpenGL ES
- Lots of built-in application, multimedia, and graphics functionality with ActionScript 3
- Adobe Air framework can interact with native resources and applications
- Flash plug-in enables full Internet experience
- Adobe Air Marketplace application store

| 98% of Internet-connected PCs worldwide have Flash Player installed |
| 95% of top 20 smart phones will support Flash Player this year |

3.5 million HMIs develop using the Flash Platform

85% of Alexa 100 top websites use Flash Player

98% penetration rate in enterprises - Forrester

70% of web games are delivered using Flash Player

75% of enterprise professionals will seek Flash Platform development skills in 2010 – Society of Digital Agencies

Drawbacks

- Proprietary solution
- Open to developers, but the Adobe Flash / Adobe Air engine isn’t “open”
- No full-featured media player that can integrate with mobile devices (e.g. Apple)
- Limited ability to influence Adobe
Devices as Application Platforms
Emergence of pocket application platforms

Benefits

- Leverage rapid rollout of new applications developed for the consumer market
- Reduce time to introduce new, connected applications into the car
- Large ecosystem of apps and services appeals to all demographics
- Improve personalization – what is more personal than a personal device?
- Off-load hardware / BOM costs
  - For example, Internet radio can eliminate need for expensive satellite radio chipset

Mobile development cycles

- Develop & deploy 2 years

Automotive development cycles

- Develop 2 - 3 years
- Deploy 8 - 10 years
Benefits

- Simple integration
- When app becomes available on phone, it also becomes available in the car
- Keeps the vehicle up to date and allows end-user to leverage personal devices

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

Pocket applications
- Internet radio
- Navigation
- Local search
- Traffic

A2DP, AVRCP
Application control
policy management

Bluetooth SPP (Serial Port Profile)
USB / WiFi

A2DP, AVRCP, Video (iPod Out)

Application on smart phone
policy management

Bluetooth SPP
USB / WiFi

2.5G, 3G, 4G
Wireless

Device application
store

Server application
(optional)
QNX Approach: Universal Application Platform
Modular components consisting of Adobe Air, Adobe Flash, HTML 5, OpenVG, OpenGL, and Java
Universal application platform

Around the car
Within the car
To media sources
Connected devices
To the cloud
Putting it all together

Adobe Air Video / OpenGL HTML 5 + Adobe Flash

Composition Manager

Device Integration
Universal application platform

Protect core applications and offer consistent user experience

Safe & Secure
Browse, Download, Install

Partition 1
Core Apps

Partition 2 (Sandbox)
Other Apps

Flash

Composition Manager

Separate Flash environments;
Common display and user experience

QNX Neutrino RTOS
Secure Kernel

Common Criteria
EAL 4+
Certification

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QNX architecture

HMI Applications
- Media Player
- Photo Viewer
- Email
- HTML 5 Browser
- Navigation
- Google Maps
- YouTube
- Phone
- Weather
- Digital Cluster

HMI Services
- Adobe Air Mobile
- Application Framework

Multimedia
- Media Sync
- Meta Data
- Audio Codecs
- Video Codecs
- iPod
- Zune
- PFS
- UPnP

Phone
- Phone Manager
- SMS

Navigation
- Navigation Engine
- Update Manager
- HTML 5 Engine

Browser
- AEC / NS
- Voice Rec
- TTS

Speech
- HTML 5 Engine

Navigation
- AEC / NS
- Voice Rec
- TTS

File Systems
- Disk Transaction
- NAND / NOR Transaction
- CD DVD
- FAT
- NTFS
- HFS
- NFS
- CIFS

Graphics
- OpenGL ES 3D
- OpenVG 2D

High Availability
- System Health Monitor
- Adaptive Partitioning

Database
- QNX Neutrino Services
- QDB SQLite

QNX Neutrino Services
- Networking
- Distributed Processing

Networking
- IPv4
- IPv6
- WiFi
- Security

Core Operating System
- Microkernel
- Multi Core
- Fast Boot
- Power State
- Instant Device Activation
- Event Notification
- Resource Manager Framework

QNX Neutrino Core OS

Device Connectivity
- USB
- Bluetooth
- MOST
- CAN

Haptic Controls
- Touch Gesture
- Hard Buttons
- Mouse Joystick

QNX Neutrino Core OS

Networking
- IPv4
- IPv6
- WiFi
- Security

Automotive BSPs
- Freescale PPC
- Freescale ARM
- Renesas SH4
- Texas Instruments ARM
- Others / Custom

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- Denotes QNX Automotive partner solution

A subsidiary of Research In Motion Limited
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 senior QNX 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
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Thank you