

Automotive: new frontier for mobile Linux



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Advertisement: who wants to bus-pool to [SCALE?](#)



Katy's shuttle bus

100-Member auto SW alliance endorses Linux

3 August 2011, 13:38

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First four GENIVI compliant solutions approved

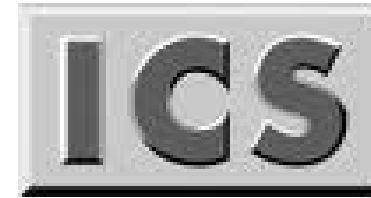
The GENIVI alliance for In-Vehicle Infotainment has announced a new compliance programme for member companies and the first four companies to offer approved compliant solutions: Canonical's Ubuntu IVI Remix, Mentor Graphics' Embedded IVI Base Platform, MontaVista's Automotive Technology Platform and Wind River's Platform for Infotainment.

All of the approved solutions run on Intel Atom and ARM architectures, except for MontaVista's

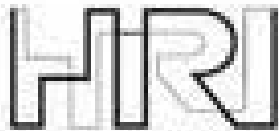


<http://www.h-online.com/open/news/item/First-four-GENIVI-compliant-solutions-approved-1317701.html>

Bay Area IVI participants



Integrated Computer
Solutions Incorporated



Honda Research Institute USA

New L.A. factory



BOSCH



TATA

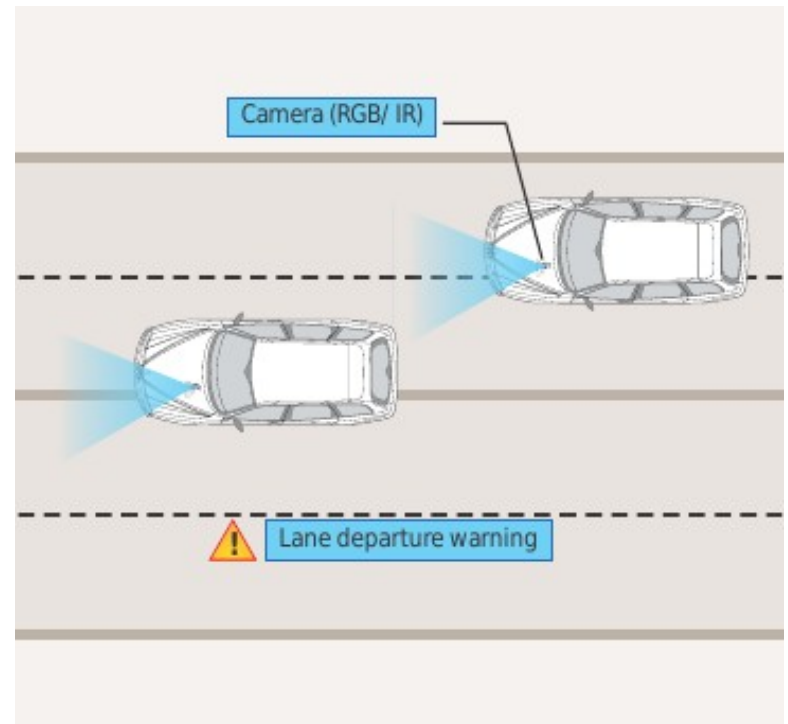
TATA CONSULTANCY



Outline

- Automotive software systems: IVI
- Major IVI projects and platforms
- HW platforms for IVI development
- nOBDy and ExoPC demos

What is “in-vehicle infotainment”?

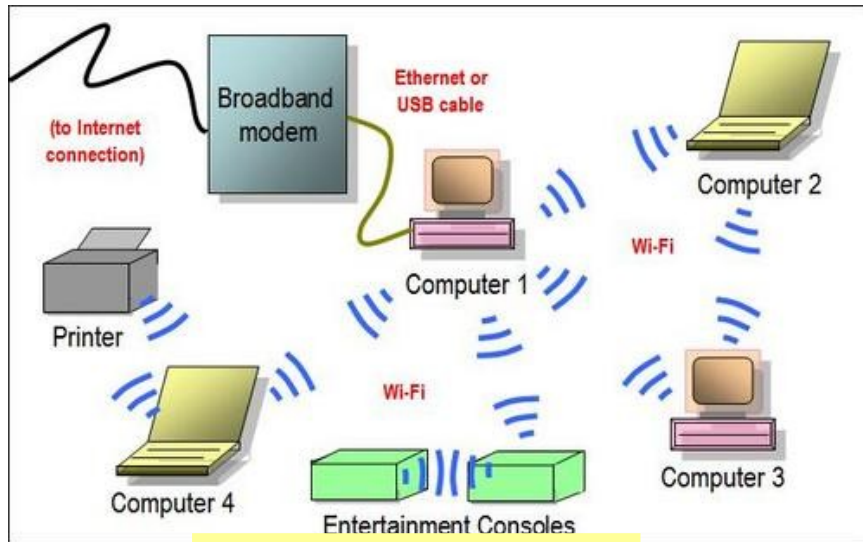


Courtesy Tata Consultancy Services

What “infotainment” calls to mind

What IVI could be

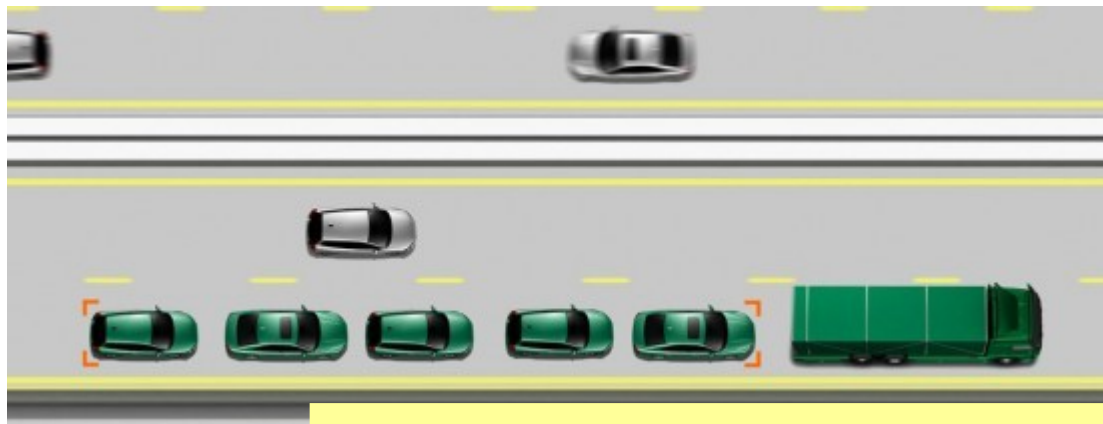
Opportunity: save energy through *ad hoc* networking



Use this . . .

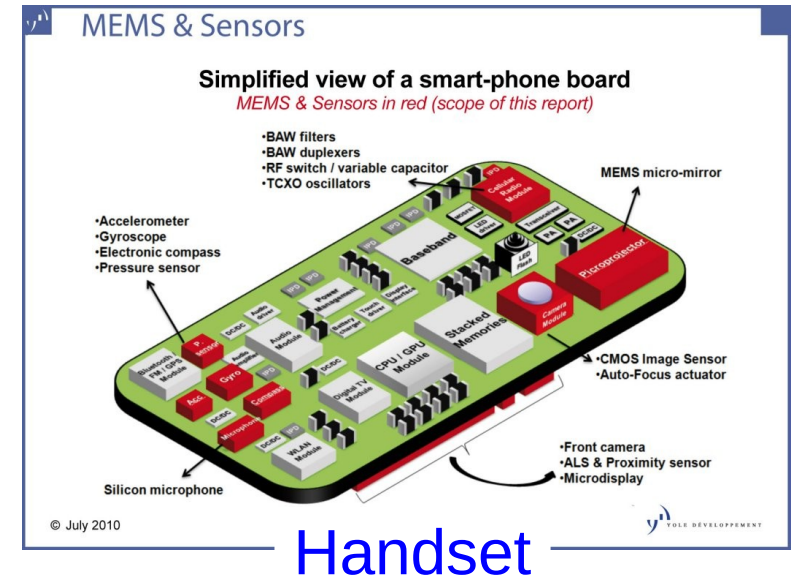
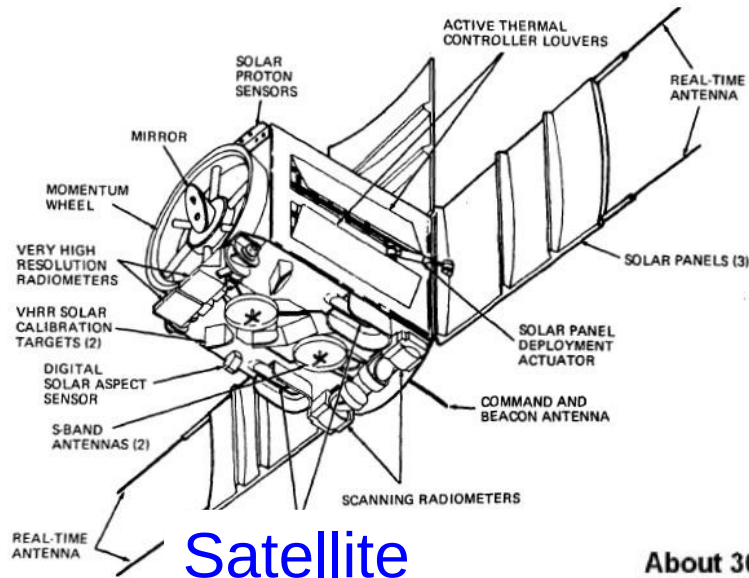


to save energy . . .



with cars, too: 802.11p WAVE.

Opportunity: Mobile sensor platform data fusion/mining



About 30 electric/electronic systems and more than 100 sensors



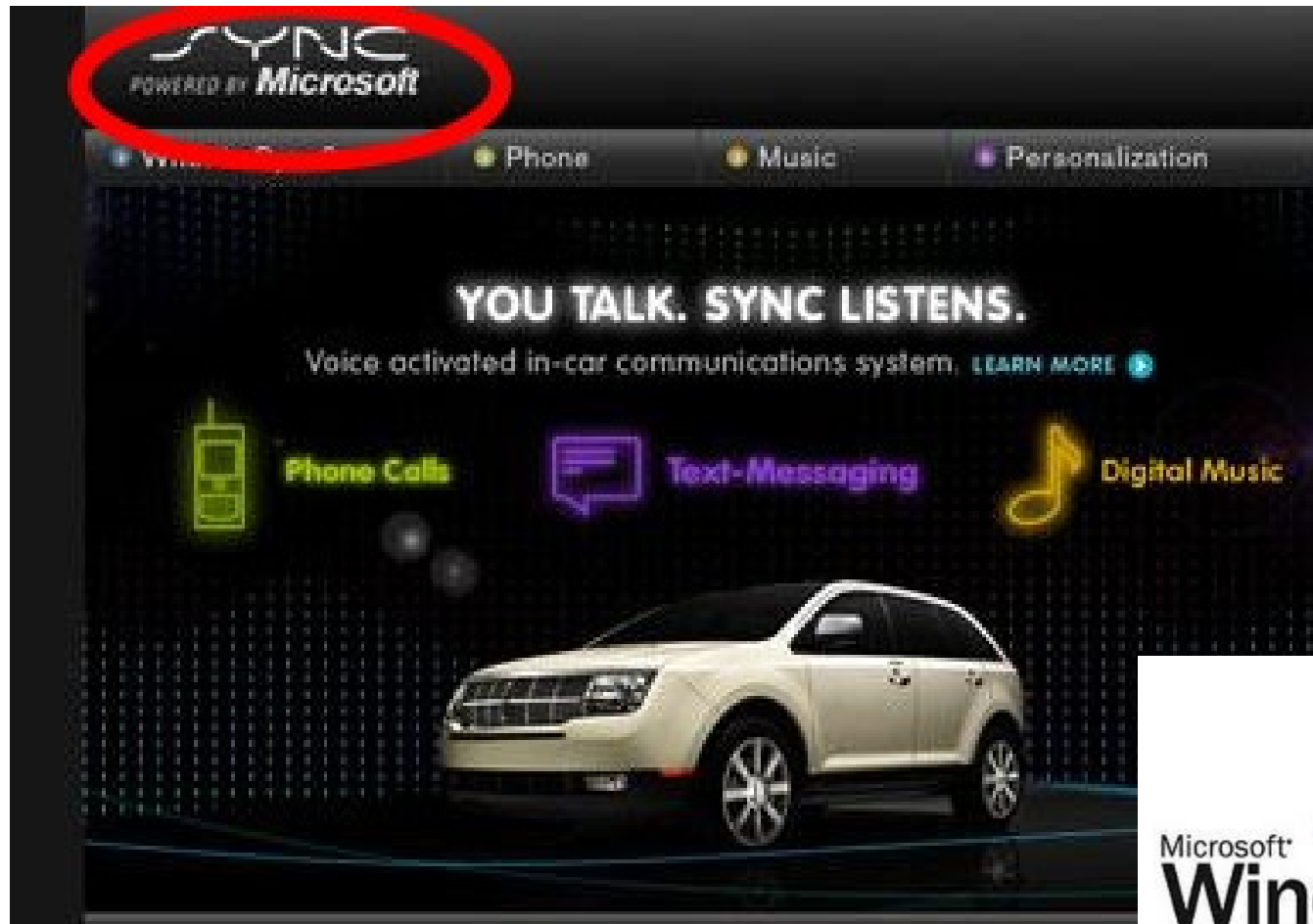
System	Abb.	Sensors		
Distronic	DTR	3	Common-rail diesel injection	CDI 11
Electron. controlled transmission	ECT	9	Automatic air condition	AAC 13
Roof control unit	RCU	7	Active body control	ABC 12
Antilock braking system	ABS	4	Tire pressure monitoring	TPM 11
Central locking system	ZV	3	Elektron. stability program	ESP 14
Dyn. beam levelling	LWR	6	Parktronic system	PTS 12

Figure 1: Car functions and the respective sensors (source: based on DaimlerChrysler)

4 challenges for IVI

- Security in a multi-user, mobile, often unattended device
- Safety: not “kill -9” but kill dead!
- Unique hardware: device drivers?!
- Not a phone or desktop: little-understood UI/UX

Challenge 1: security



Backseat kids changing nav system's destination . . .
mechanic at body shop installs malware.

Challenge 2: safety

Driver gets alarms and has read-only access to many parameters.



Prevent entertainment system from hogging resources (incl. Driver!).

Challenge 3: HW needs

CAN bus, MOST bus, wheel rotation sensors, oil level . .



Not just RT audio, but RT video too!

Game-like Controls, Real Cars?

- Touchscreen, video gesture, joystick, voice, haptic?



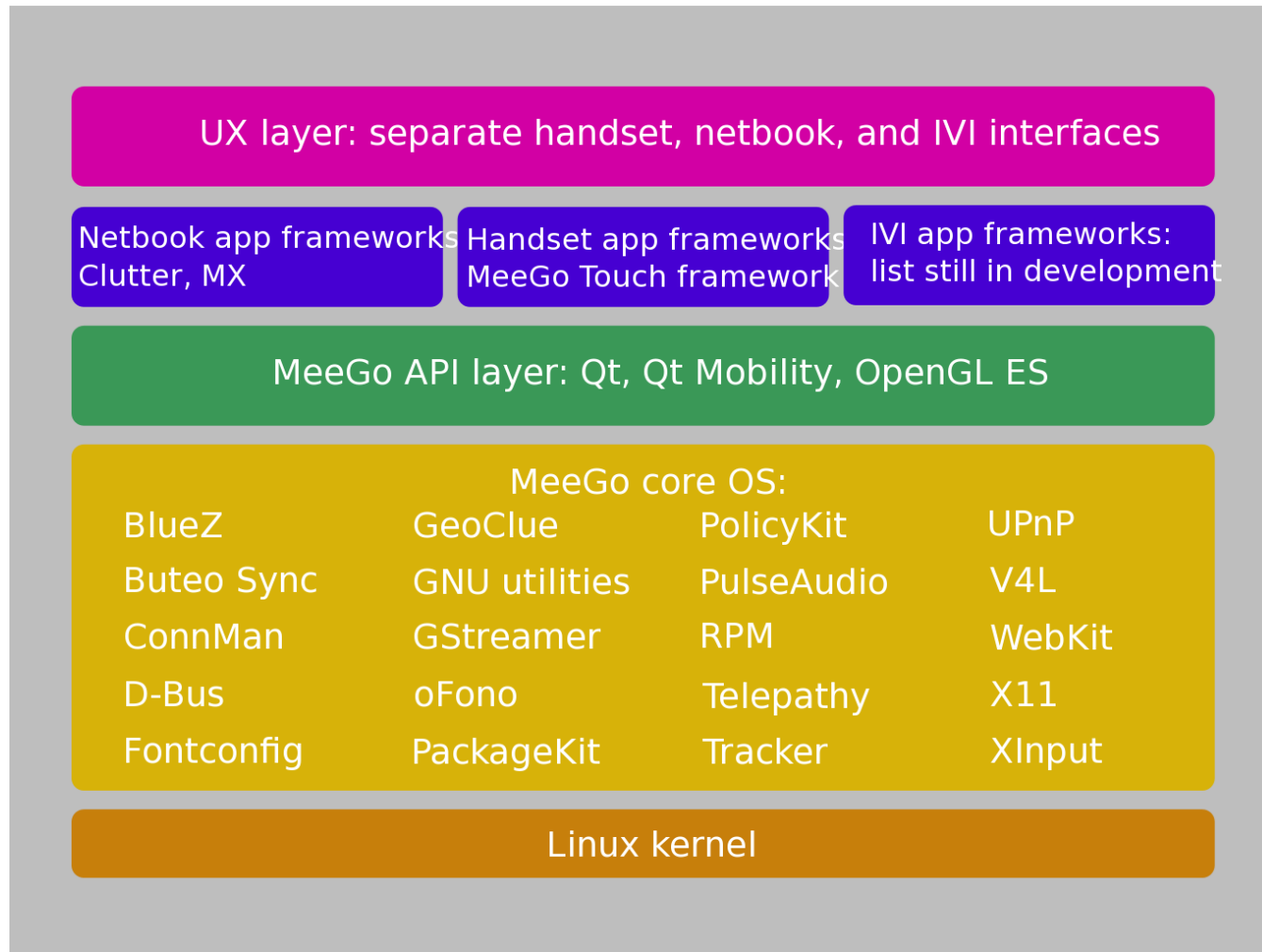
<http://funktion.catalystexhibit.com/2009/11/is-our-future-joystuck/>

Maybe what we want is Android . . .



from the Open *Handset* Alliance?

Why consider MeeGo? (or Tizen)?



Courtesy
Nathan P. Willis,
<http://tinyurl.com/3m4loer>

Closer to traditional GNU/Linux distro than Android.

IVI UX Additional Features

IVI UX: media player, instrument cluster, RSE, navigation, diagnostic surround view, hands-free phone

IVI app frameworks: vehicle sensor data access, vehicle control, Terminal Mode, touch and gesture input

IVI API layer: multi-screen video, multi-zone audio, consumer electronic device connectivity, inertia-based application control

Core OS layer:

Sensor framework	Noise suppression
Split-screen video	OTA software updating
Speech recognition	Tethered device indexing
Speech synthesis	Phone synchronization
Acoustic echo cancellation	Multi-user support

Kernel layer: <250ms boot, power management, vehicle buses

Drivers: automotive button/knob input devices, vehicle data sensors

Courtesy
Nathan P. Willis,
<http://tinyurl.com/3m4loer>

Many automotive players, few public announcements.

MeeGo IVI 1.2 Home Screen

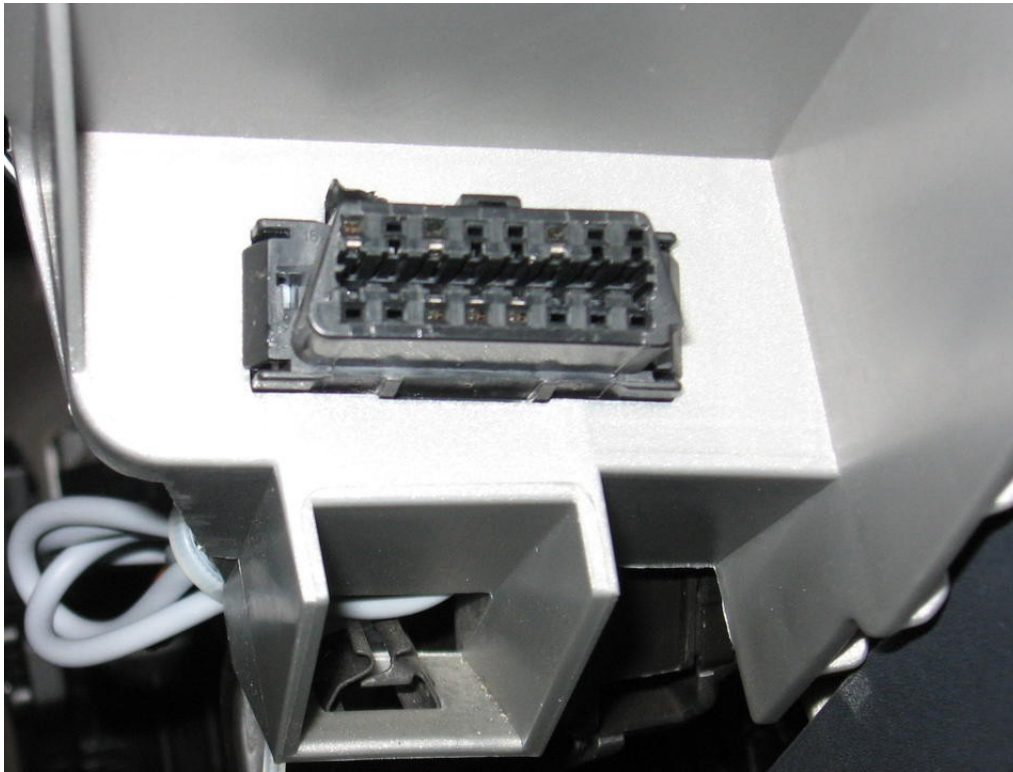


Intended to be reskinned, not as a shipping product.

Problem: what HW platform should IVI devs use?

- ARM set-top box: [Trimslice](#), \$219 with Arch or MeeGo.
- ARM board: [FreeScale i.MX QuickStart](#), \$149 w/ Ubuntu.
- Atom/x86 slate: [Ciara ExoPC Vibe](#), \$699 w/ Windows.
- ARM boards:
 - T.I. [BeagleBoard](#) (\$149), [PandaBoard](#) (\$179), Ubuntu or Android.
- Multiple displays and controls needed.
- Touch, voice, video, joystick, haptic devices and [drivers](#)?
- GPS dongles, CAN daughter cards . . .

Example: tripzero's **nobody** OBDII/CAN scanner



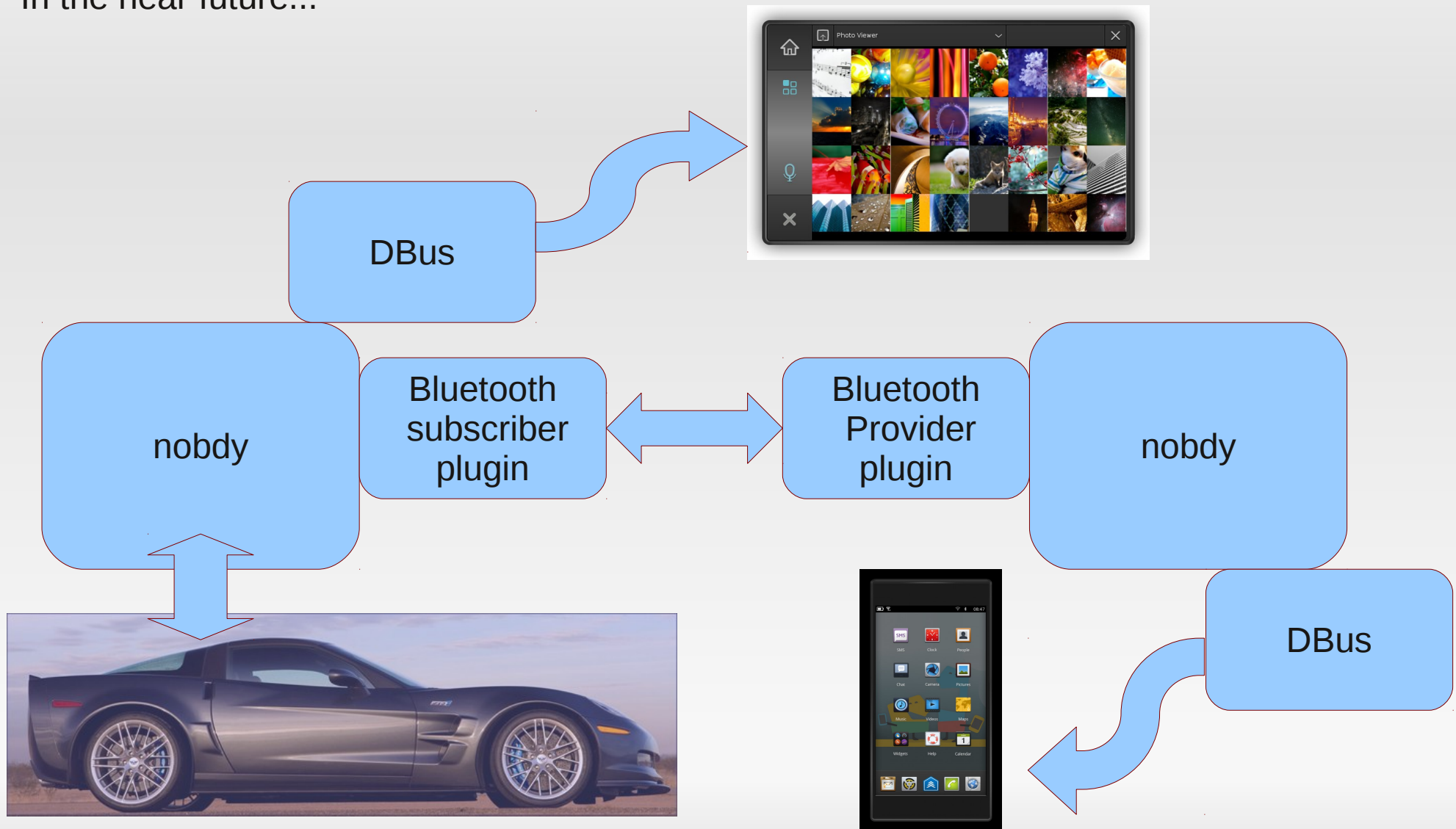
OBD-II connector on left of steering wheel

Scan tool (USB to OBDII) available from Amazon, etc. about \$35

GFDL

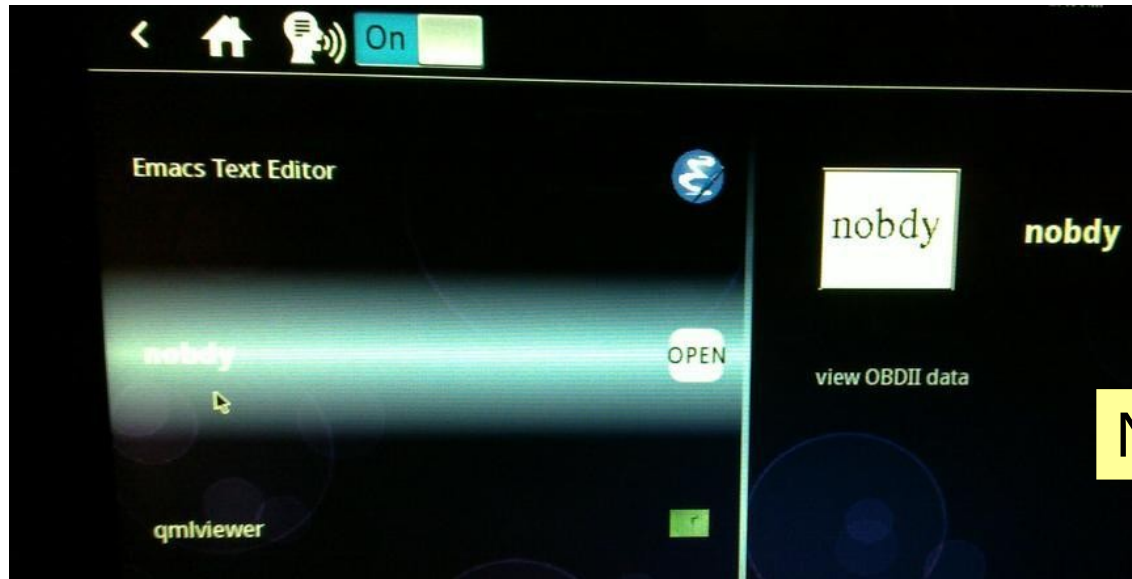
Tripzero: Handset/Tablet + meego ivi

In the near future...

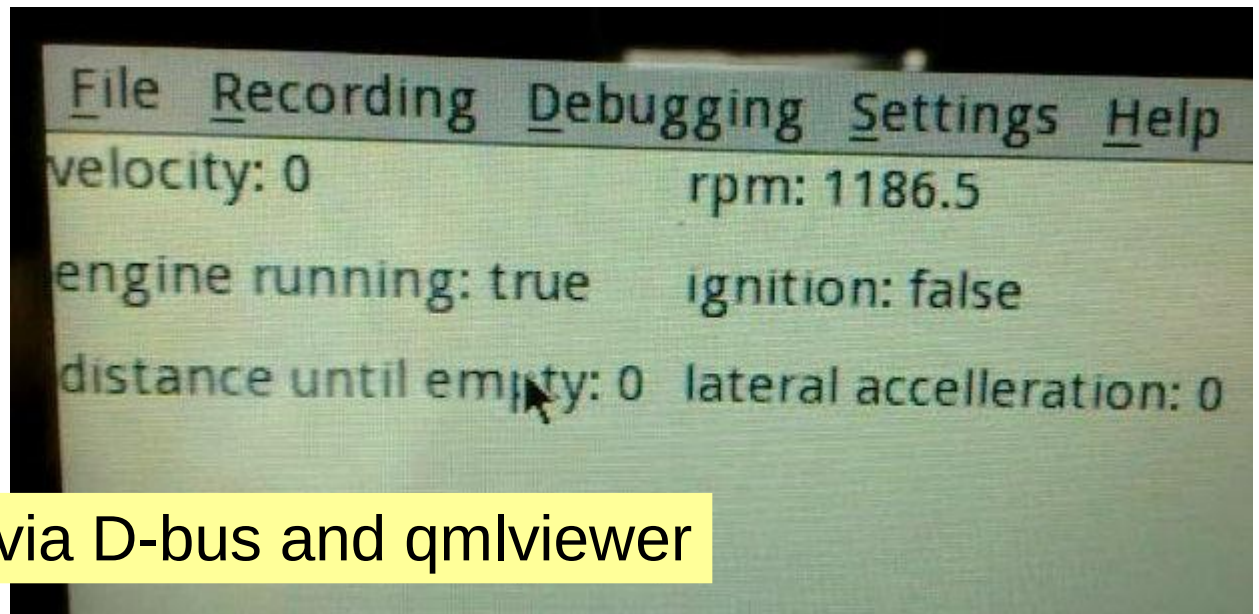


<http://sf2011.meego.com/program/sessions/vehicle-communications-meego>

Nobody on ExoPC



Nobody in scrollwheel menu



Live data stream via D-bus and qmlviewer

Goal for nOBDy



ICS IVI demo by Justin Noel

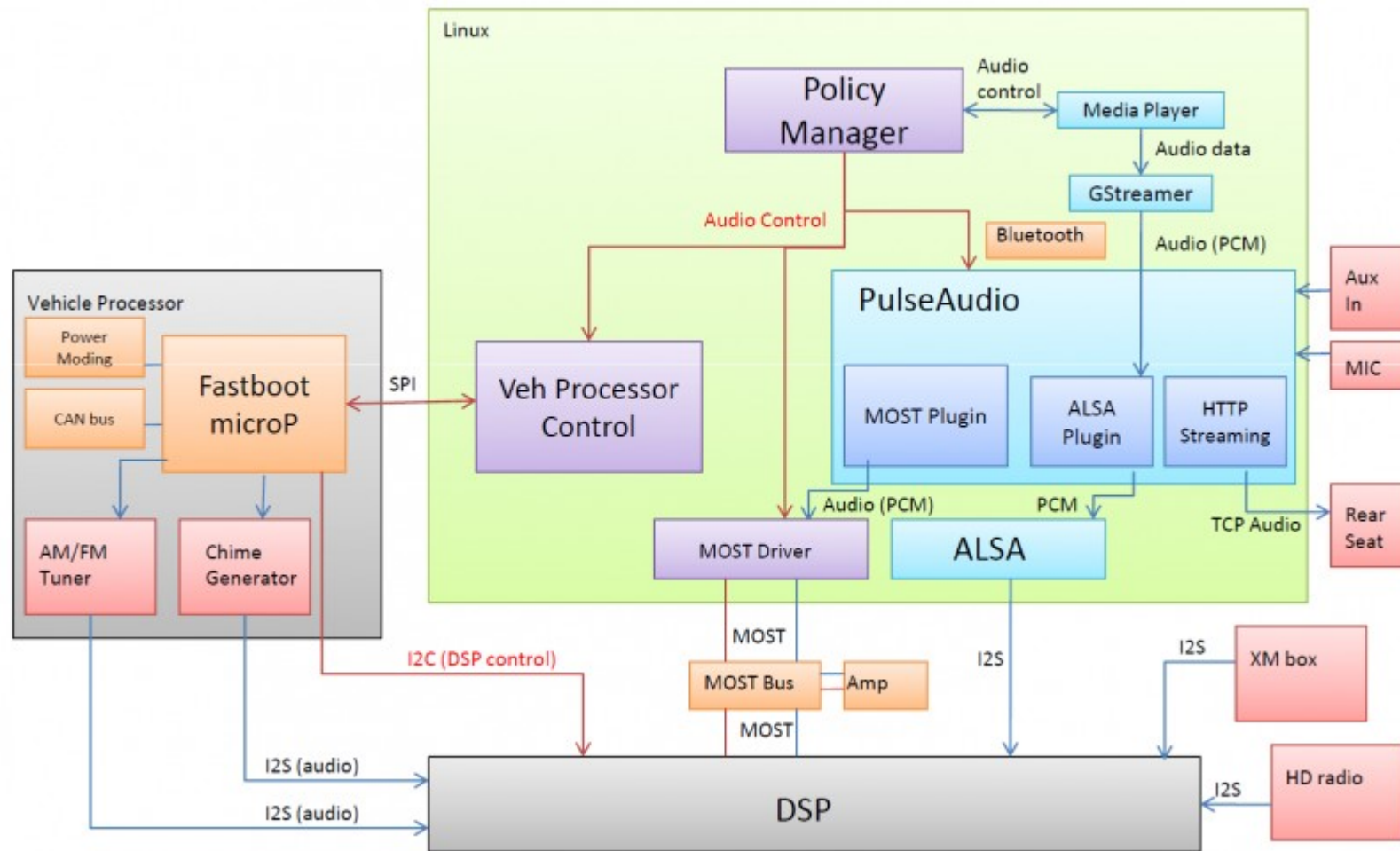
Summary

- Linux opportunities at all levels: HW, accessories, embedded, platform, apps, entrepreneurs and big companies.
- Finding HW for development remains a problem.
- *Many* local companies are participating =>> *jobs*.
- Prediction: automotive is where Linux will show most growth.

Resources

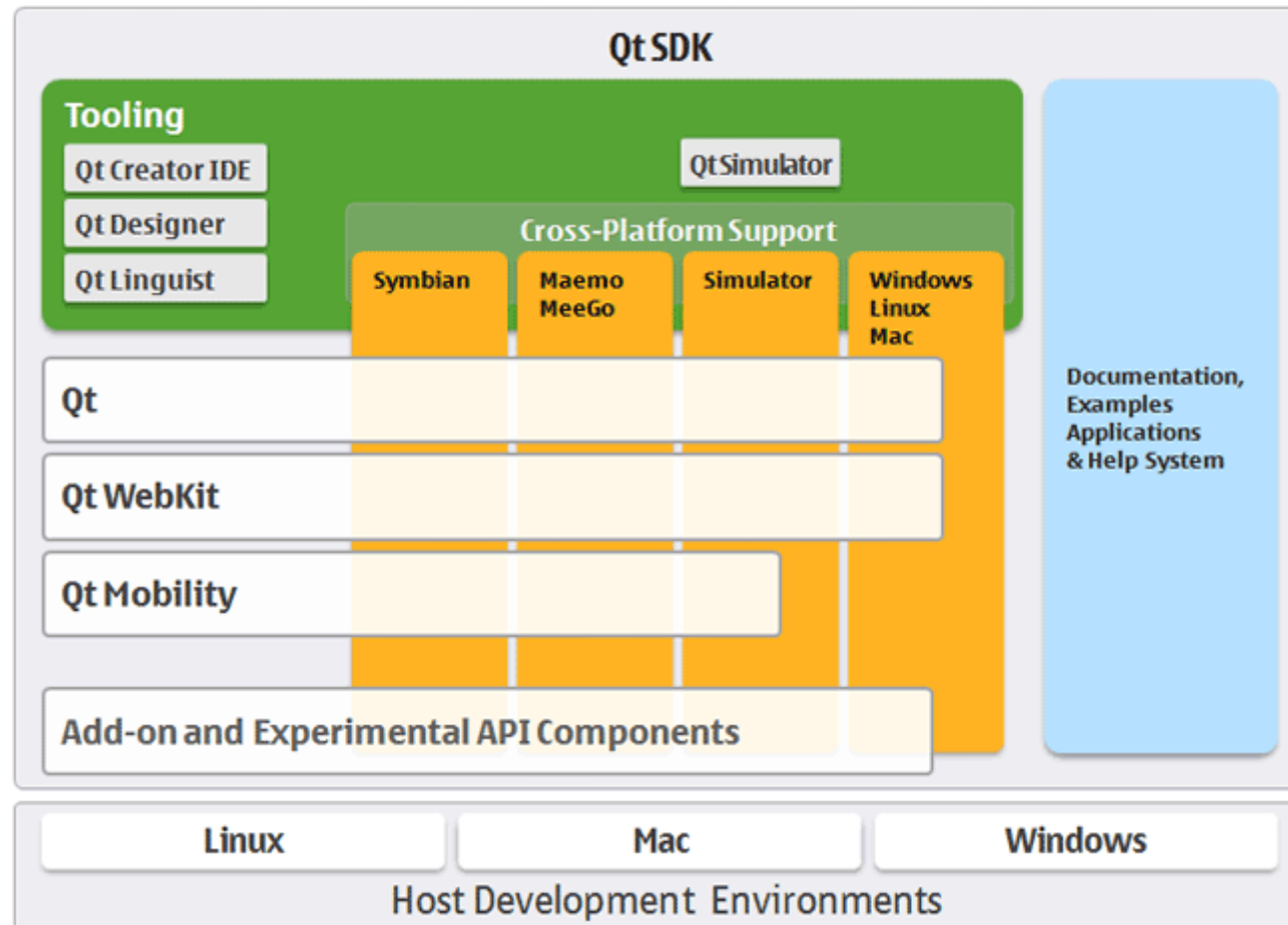
- IVI wiki: <http://wiki.meego.com/In-vehicle>
- Official site: <http://meego.com/downloads/releases/1.2/meego-v1.2-in-vehicle-infotainment-ivi>
- Mailing list archive: <http://lists.meego.com/pipermail/meego-ivi>
- Mp3car.com
- #linuxice and #meego-ivi IRC on freenode.net
- nOBDy: wiki.openice.org/index.php?title=Nobdy
- My notes and instructions
 - on ExoPC: http://wiki.meego.com/MeeGo_IVI_on_ExoPC
 - on Pandaboard: http://wiki.meego.com/Hardware-accelerated_graphics_on_Pandaboard_using_MeeGo

MeeGo IVI Audio Architecture



Courtesy Laci Jalics, Delphi.

How about MeeGo?



MeeGo = lightweight GNU/Linux with a Qt face.

MeeGo-IVI on Atom and ARM Demo HW

- No SW support for HW available to small-medium businesses.
- Running IVI on ExoPC requires a mash-up of “Tablet Preview” and IVI UXes.
- Meego-ivi repos support EMGD graphics only
 - “zypper update” auto-overwrites drivers and X11 SO libraries.
- Stopped work on ARM-based Pandaboard due to missing graphics driver.



MeeGo OS fading fast? Intel says it's 'still committed'



By: [Brooke Crothers](#)

SEPTEMBER 1, 2011 10:45 PM PDT

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An Asia-based report surfaced today that claims Intel will temporarily halt development of its MeeGo operating system for [tablets](#) and smartphones due to lack of interest. Intel, however, says it's still committed.

The DigiTimes [report](#) claimed that Intel plans to "temporarily discontinue development of its MeeGo OS due to a lack of enthusiasm for the platform from handset and tablet PC vendors."

MeeGo

MeeGo hasn't been ignored completely, however. It is also an operating system for the so-called embedded market, such as in-car devices and industrial equipment, where it is doing relatively well, according to Intel. So, MeeGo may be sticking around but don't expect to pick up a consumer device at your local electronics retailer running the software.

MeeGo Hardware Adaptation Process

