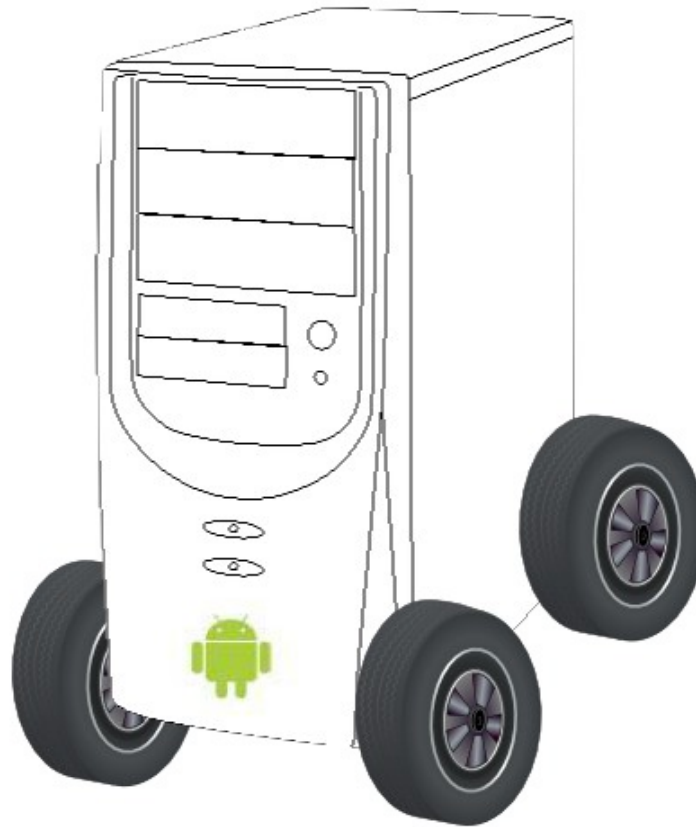


# Tier X and the coming of the whitebox car

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mentor  
embedded



[mentor.com/embedded](http://mentor.com/embedded)

Mentor  
Graphics®

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Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

# Agenda

- Motivation
- Impact of new kinds of smaller players
- Risks of the new ecosystem
- Policy and legal developments
- Summary: implications for automotive industry

# Linux makes the whitebox car inevitable

- Cars are now consumer electronics.
- GENIVI is just the start of changes to the OEM-supplier relationship.
- Phones are identical slabs differentiated only by SW.
- Nokia laughed when Apple announced the iPhone.
- Resisting Silicon Valley has not worked well for entertainment industry.
- Google will sell a “Nexus”-branded autonomous vehicle.

# Autonomous Vehicles Legislation in U.S.

- Enacted at some level in Nevada, Florida.
- Introduced as a bill in Hawaii, New Jersey and Oklahoma.

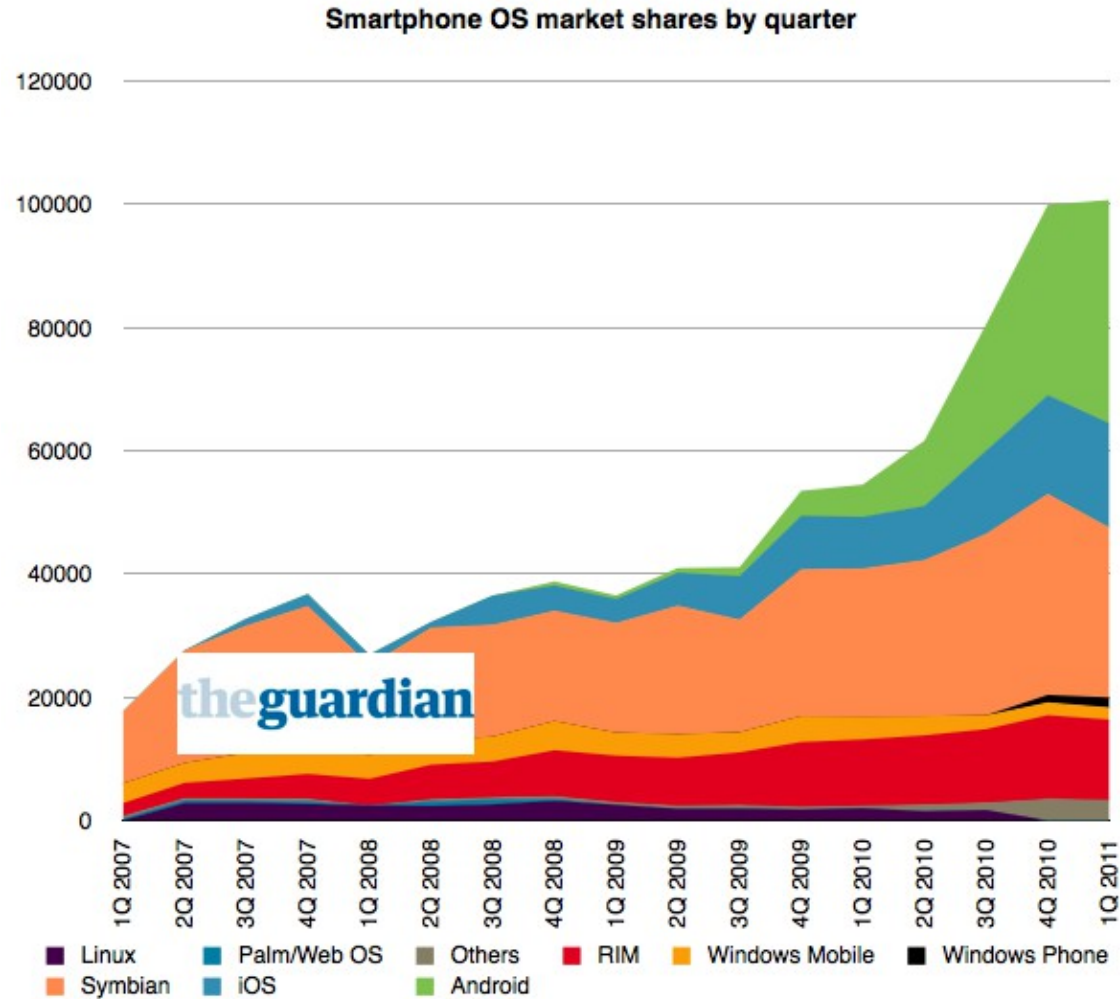


TECH | 9/06/2012 @ 4:40PM | 135 views

## Self-Driving Cars From Google On The Road Toward Approval In California

# Disruption in mobile: a model for automotive?

4 kinds  
of Unix!



[guardian.co.uk/technology/blog/2011/may/19/smartphones-mobilephones](http://guardian.co.uk/technology/blog/2011/may/19/smartphones-mobilephones)

# Why Automotive Linux needs start-ups: localization

- Need goes beyond varying fonts, maps and comms standards.
  - Use cases for cars vary hugely, even within one country.
- Average Chinese new car buyer has been driving for 3 years.
  - “Tutorial” driver mode for new drivers?
- “Co-operative navigation” traffic routing (ETSI TR 102 638) naturally relies on a combination of local knowledge and real-time information

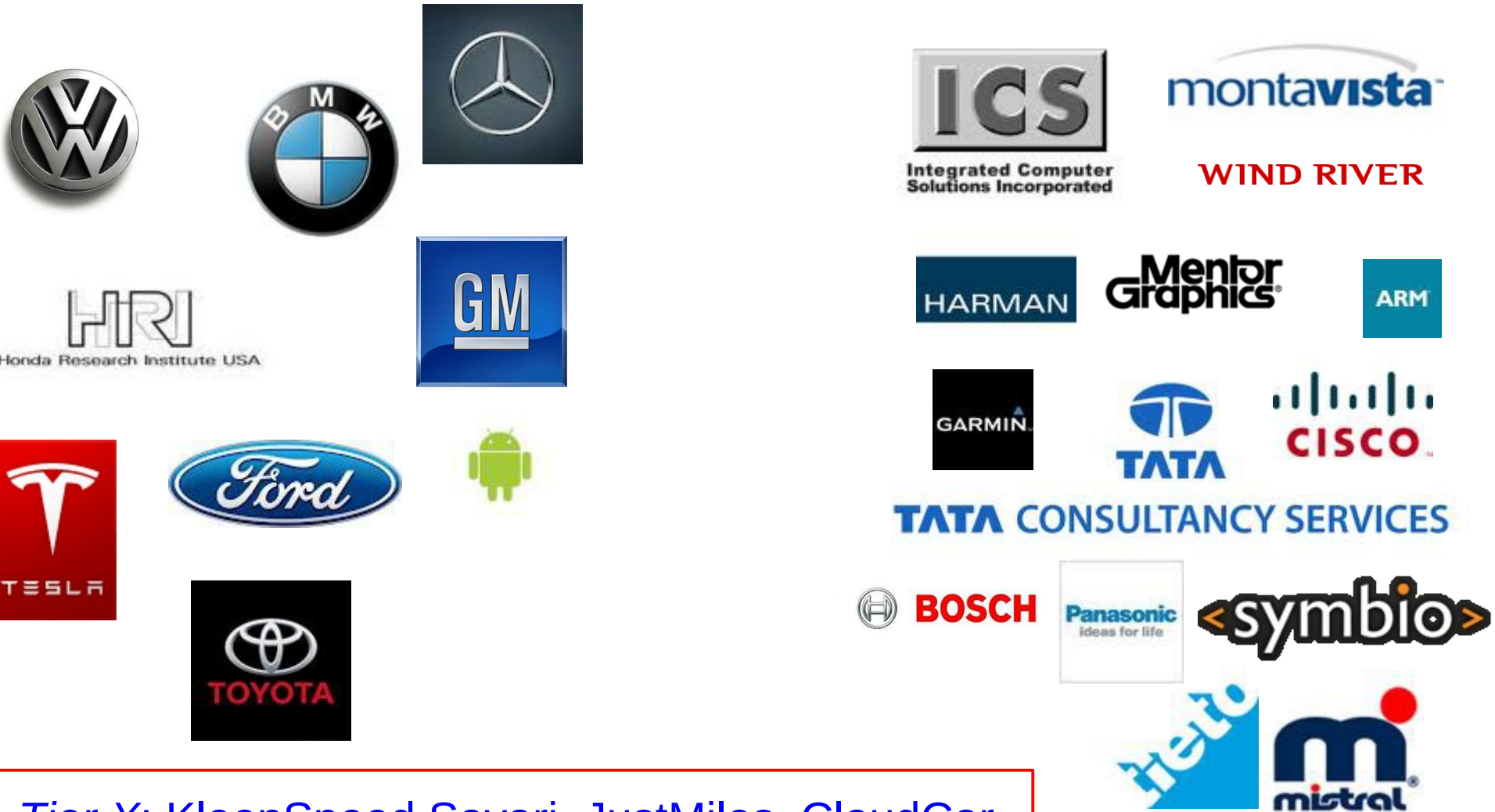
- *Silicon Valley way: free membership, free food, more active than local SAE and IEEE Vehicular Technology groups.*
- Huge interest: over 430 members joined since Oct. 2011.
- Monthly technical presentations:
  - Stanford (CARS), Tata Consultancy Services (ADAS), General Motors (Android, MirrorLink), Mentor Graphics (GENIVI), Intel (Tizen), Nissan BayLeafs (entrepreneur-owners' group), Ford (OpenXC), start-up panel discussion, Savari Networks (V2V and V2I), GM (Android SDK) . . .
- Sponsored by ICS, Intel and Mentor Graphics.

## Tier X: “Start-ups” are different

- Venture-funded ones look for “big score.”
- Insurance companies are making big investments.
- Telematics and data mining are hot.
- Stanford and U.C. Berkeley innovation engines are onto IVI.
- Ride- and car-sharing and EVs are active.



# Bay Area IVI participants: players without logos matter!



*Tier X: KleenSpeed, Savari, JustMiles, CloudCar, JustShareIt, RideJoy, UnifyCar, Phil Sadow . . .*

## Case study: Nissan, Phil Sadow and the BayLeafs



A win for entrepreneur, owners and Nissan.

# Start-up to watch: CloudCar

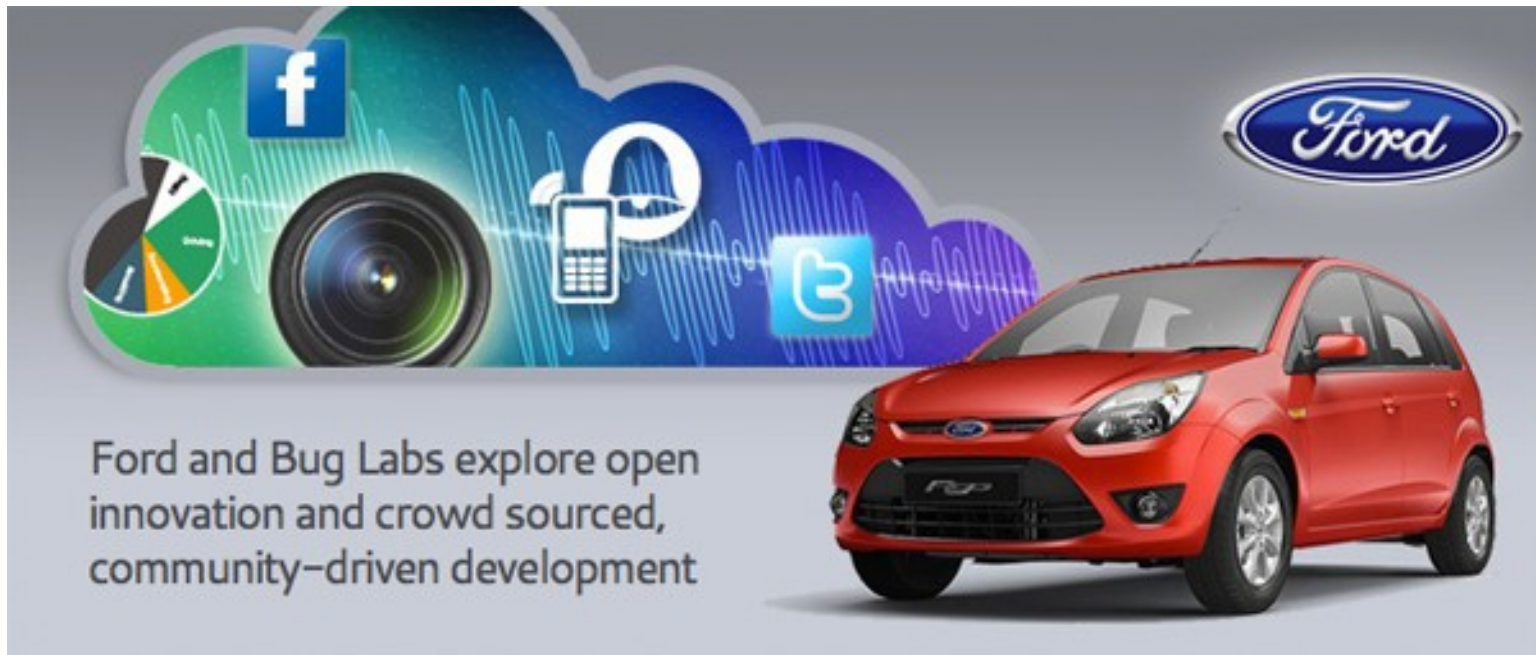
\$ whois [openautomobilealliance.org](http://openautomobilealliance.org)  
Domain Name:OPENAUTOMOBILEALLIANCE.ORG  
Created On:16-Apr-2012 20:18:05 UTC  
Registrant Name:Albert Jordan  
Registrant Organization:[CloudCar](#)  
Registrant City:Los Altos  
Registrant State/Province:CA

*Rumor: new project of Andy Rubin, serial entrepreneur.*

## Hot area: ride- and car-sharing start-ups

- Well-established: Zimride, JustShareIt, carpooling.com
- New entrants: UnifyCars, Ridejoy, DriveNow . . .
- Car-disinterested urban youth with lower means find sharing appealing.
- Not just cars: trucks, boats . . . BMW-funded ParkAtMyHouse.
- Vehicles have OBDII driver monitors installed.

# Tier X outreach: Ford's OpenXC



Indian launch; plans for further roll-out unclear.

# Downside: Malware and simply obnoxiousware

- *Traffic-law evasion software* is an inevitability.
  - “radar detection” made simple by siren indication within the J2735 emergency vehicle alert message?
- *Dangerous ideas: augmented reality games for drivers.*
  - Terrible idea in urban areas and for teens.
  - What about convoys of long-haul truckers on lonely highways?

# Linux best practices can help with security

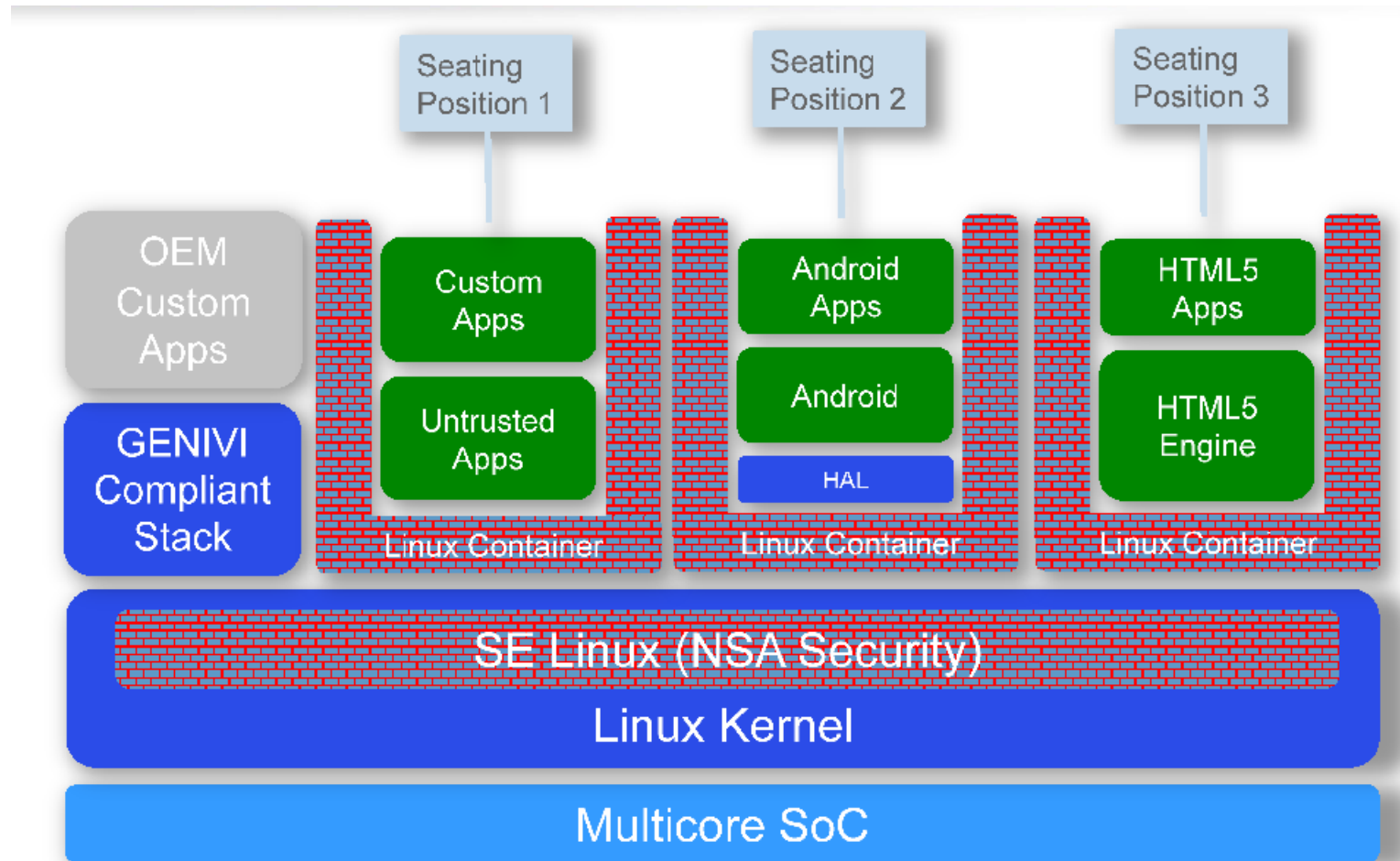
UCSD, UWa, Rutgers: <http://autosec.org/>



but they can't modernize CAN bus design.

# Allow arbitrary user-selected apps in containers?

Source: Iisko Lappalainen, MontaVista, ELC 2011



Help is on the way from GENIVI Alliance.



# Trusted computing: a hot topic in Linux

- Microsoft designated UEFI key-signing bootloader.
  - Controversial due to new post-sale vendor lockdown on traditionally open platforms.
  - Different work-arounds proposed by RedHat (pesign), Canonical and OpenSUSE.
- Automotive modifications are traditionally lightly regulated.
  - Except for emissions, anti-theft and safety systems.
  -
- *Principle:* Systems that implement a standard API and pass a specified suite of safety tests are deemed safe.

## Proposal: Extend Vehicle Inspection Regime to Cover Software?

Any vehicle that passes the new safety and security inspection suite (to include at least black-box testing, static code analysis and coverage tools) is eligible for registration.

*Principle:* specify behavior of safety and security systems, not underlying implementation details.

## Influential Doctorow's “*trusted platform modules*”

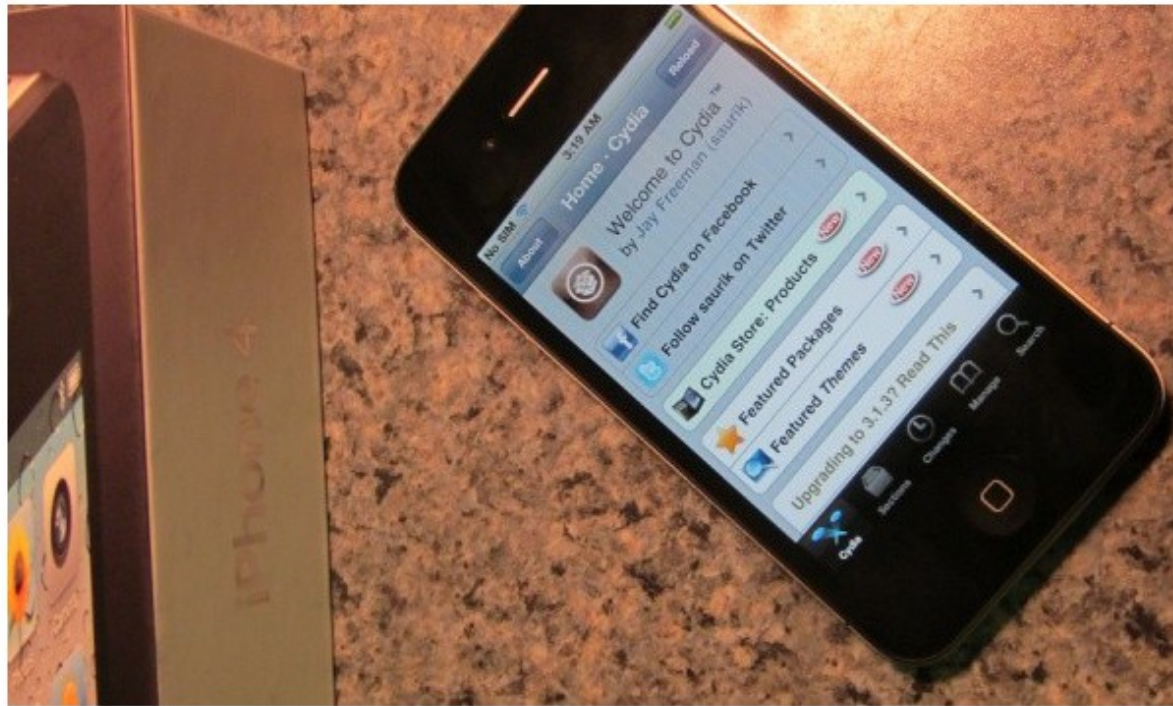
- Cory Doctorow is a reknowned science fiction author and on-line rights advocate.
  - Principal of well-read BoingBoing website;
  - Electronic Frontier Foundation Fellow.
- Doctorow is a newly convinced advocate (Long Now Foundation, Aug 2012) of trusted computing for embedded.
- Specifically cites automotive use case as an example.
- [VIDEO CLIP]

# Watershed in Expectations about Electronic Devices

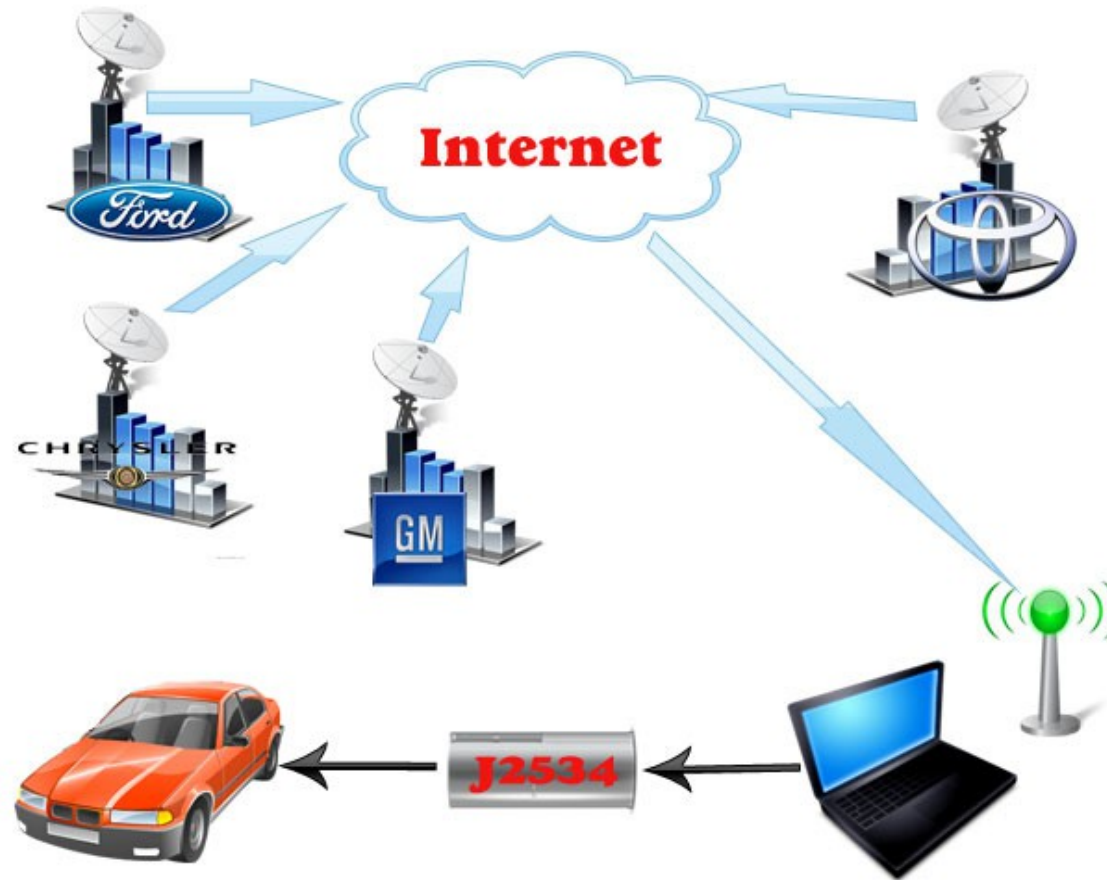
## Library of Congress adds DMCA exception for jailbreaking or rooting your phone

By Paul Miller  posted July 26th 2010 11:33AM

**BREAKING**



# Massachusetts “Right to Repair” made law, 8/2012



“Each manufacturer of motor vehicles [ . . . ] shall make available for purchase by owners and independent repair facilities all diagnostic repair tools incorporating the same [ . . . ] capabilities that such manufacturer makes available to its dealers.”

Federal U.S.



I'm once again a cosponsor of the *Motor Vehicle Owners Right to Repair Act* in the 112th Congress. . . . The Act has been referred to the House Committee on Energy and Commerce . . . Sincerely, *Anna G. Eshoo*

ORGANIZATIONS IN SUPPORT OF THE BILL

CONSUMER GROUPS



AFTERMARKET PARTNERS



# Linux is a key enabler for Tier X's vehicle commodification

- Localization and start-up activity are important drivers.
- Security problems with personalization are hard.
- Controversy over locked bootloaders is rife.
  - Car-modding is a long-standing tradition.
  - Speeders vs. cops predates battles over DRM.
  - Entrepreneurs and start-ups are entering IVI arena.
- R2R and autonomous cars are harbingers of SW domination.

# Summary

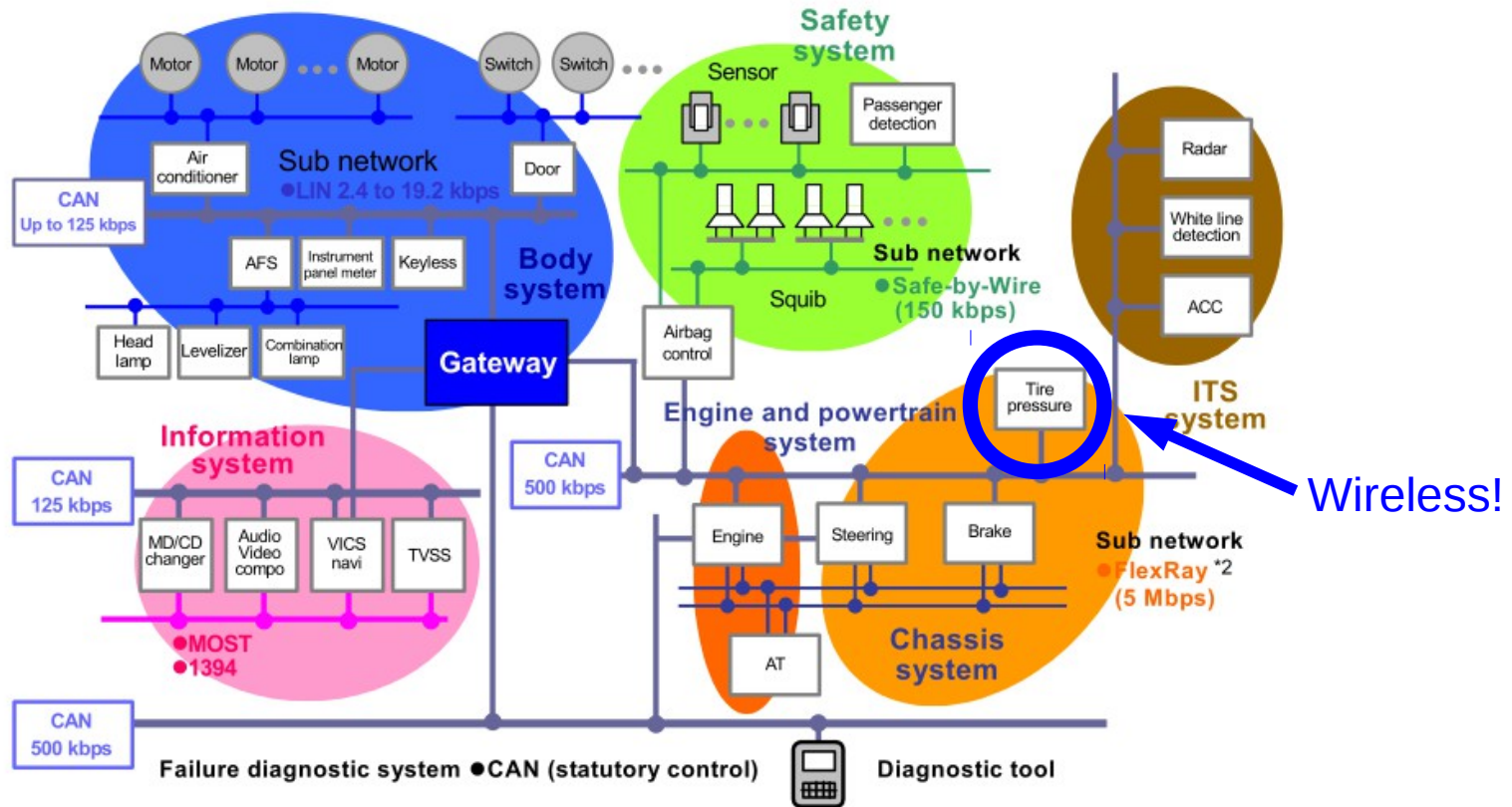
- Linux and globalization will drive commodification.
- Use cases for vehicles are more diverse than most CE.
- *Tier X* start-ups, new consumer movements will play important roles.
- Legal and regulatory situations evolving.
- Finally, a call to action . . .



# Call to action

Raise awareness among OEMs' main customers:  
ask car-dealer salespeople, “What software does  
this car run?”

# Gateways pass information freely among subnets



Source: Renesas' website

# Canadian R2R since 2009

## Right To Repair

Canada's auto manufacturers have acknowledged the aftermarket has a right to certain information required to repair vehicles, making life easier for insurers and their policyholders.

*By: Scott Smith*  
2010-01-01

TEXT SIZE  

By signing an agreement referred to as the *Canadian Automotive Service Information Standard (CASIS)*, Canadian automobile manufacturers finally acknowledged the aftermarket has the "right to repair" vehicles. Signed on Sept. 29, 2009, the agreement between the aftermarket and all car companies that sell vehicles in Canada<sup>1</sup> will open access to original equipment manufacturer (OEM) tools and information to the aftermarket.