

# From Driver Distraction to Driver Augmentation: Open Source in Cars

Alison Chaiken, [she-devel.com](http://she-devel.com)



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AUTOPIA

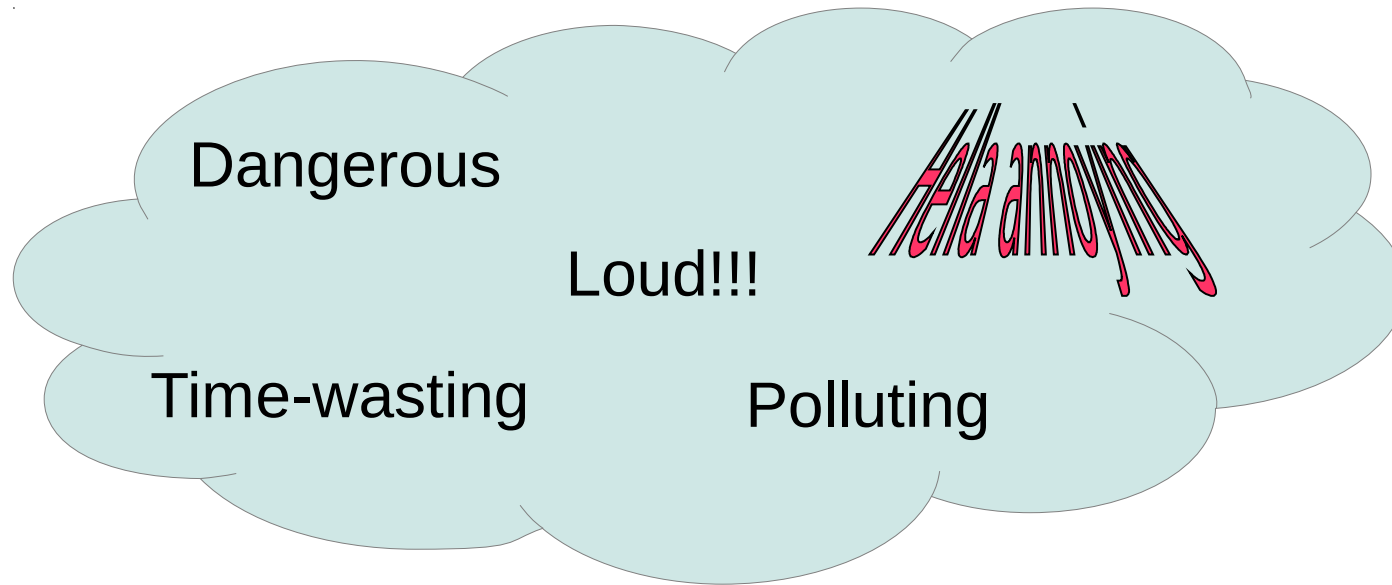
ROAD TO THE FUTURE

## As Congress Mulls Mandate on Car Black Boxes, Data Ownership Remains Unclear

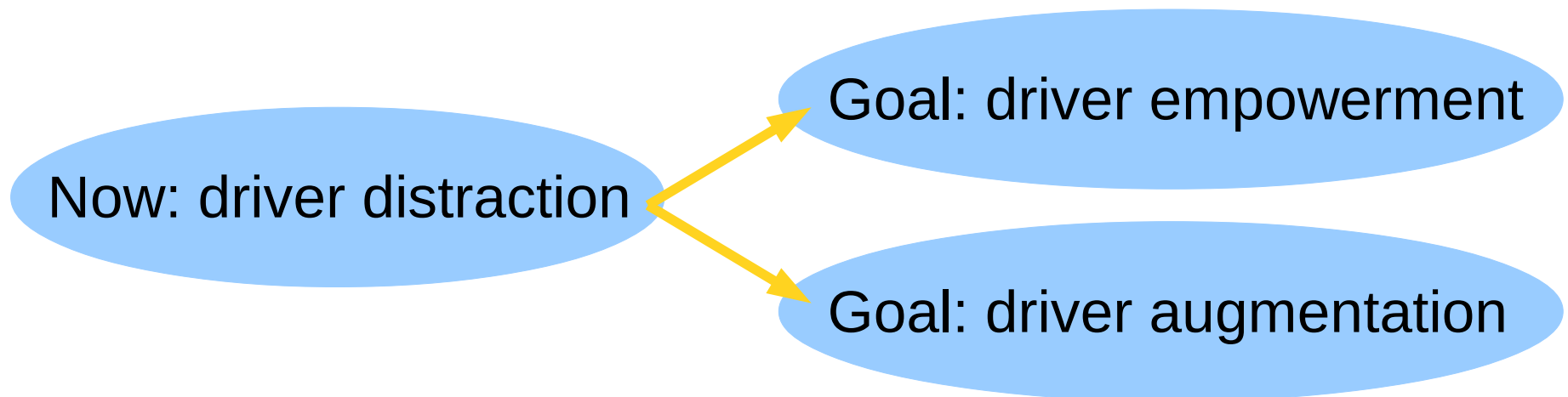
By [Doug Newcomb](#) ✉ May 16, 2012 | 6:15 am | Categories: [Miscellaneous](#)



# Our transportation system is



because *until now* individuals had little power to change it.



# Same old problems, new platform

- ▶ Security
- ▶ Privacy
- ▶ Personal empowerment

Who will make the cool solutions?

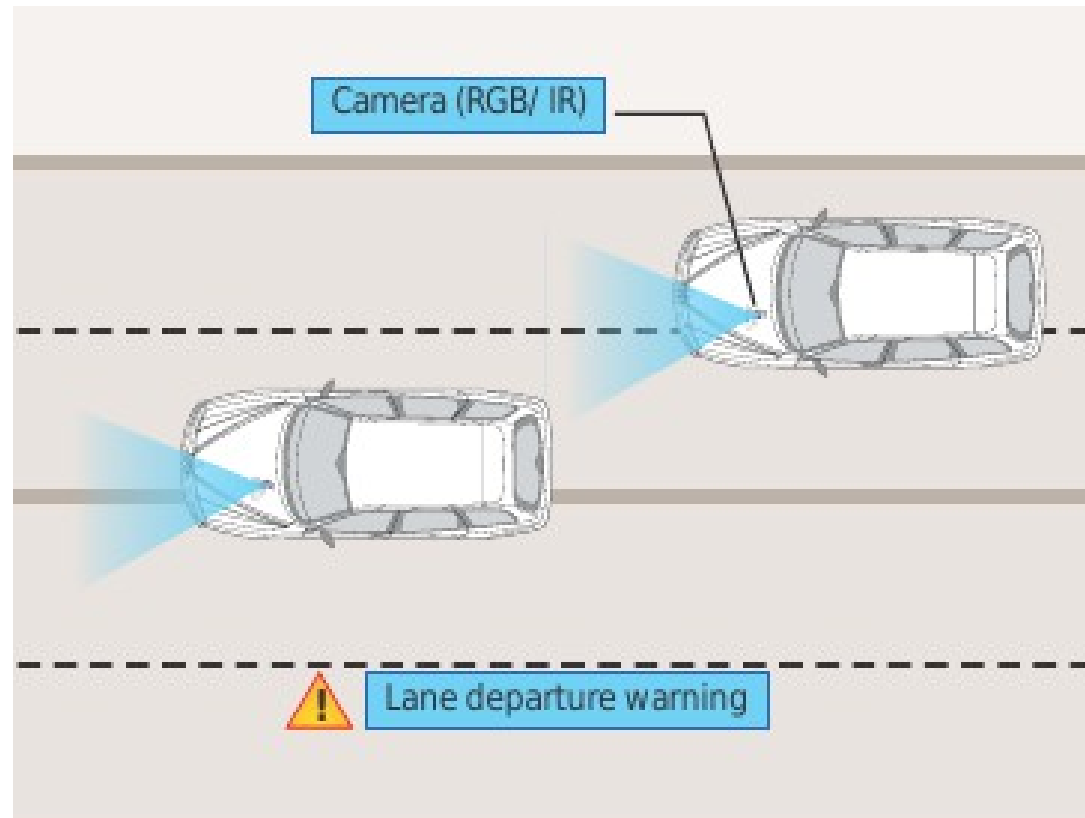
Us!

# Do we need “in-vehicle infotainment”?



BigCo's “infotainment”

## What Drivers Need



Courtesy Tata Consultancy Services

# “Patch Tuesday” hits Cars?

June 23, 2011, 1:01 PM

## ‘Aggravating’ MyFord Touch Sends Ford Plummeting in J.D. Power Quality Survey

By CHERYL JENSEN



The MyFord Touch interface as seen on the 2011 Ford Edge.

New York Times, June 23 2011

# Status of Automotive Software

Manufacturer	Confirmed Operating system
Fiat-Chrysler Blue&Me (500, Delta), Kia Uvo, BYD	Microsoft Windows Embedded Automotive
Ford (all?)	MyTouch/Sync-Microsoft; OpenXC-Android
General Motors/Cadillac User Experience	MontaVista's GNU/Linux
Geely (China); Hawtai (China)	GNU/Linux: Moblin (MeeGo predecessor)
Renault R-Link	Android
Honda (Accord, Odyssey, Pilot), Audi, BMW (7-series and M models), Chrysler, Daewoo, GM (OnStar), Hyundai, Land Rover, Porsche, Saab (9-3) Renault (SM7)	QNX

Linux Foundation members: Toyota, Pelagicore, Symbio, Tieto

Automotive Linux Summit 2011 presenters: Toyota, Nissan, BMW

MeeGo Conference 2011 presenter: Nissan

Volkswagen has a pilot using Maemo (GNU/Linux).



# Is this a “non-traditional” use of FOSS?



## Open Source Information

This vehicle contains open source software, including without limitation, software distributed and/or modified under the GNU General Public License, Version 2, June 1991, and the GNU Lesser General Public License, Version 2.1, February 1999.

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## Open Source Downloads

### 2011 Chevrolet Volt

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# Current Automotive Security Situation is Shaky



Source: <http://www.autosec.org/>

## **Wheels**

**The Nuts and Bolts of Whatever Moves You**

June 16, 2011, 12:49 PM

### Nissan Leaf Telematics May Leak Driver Data to Third Parties

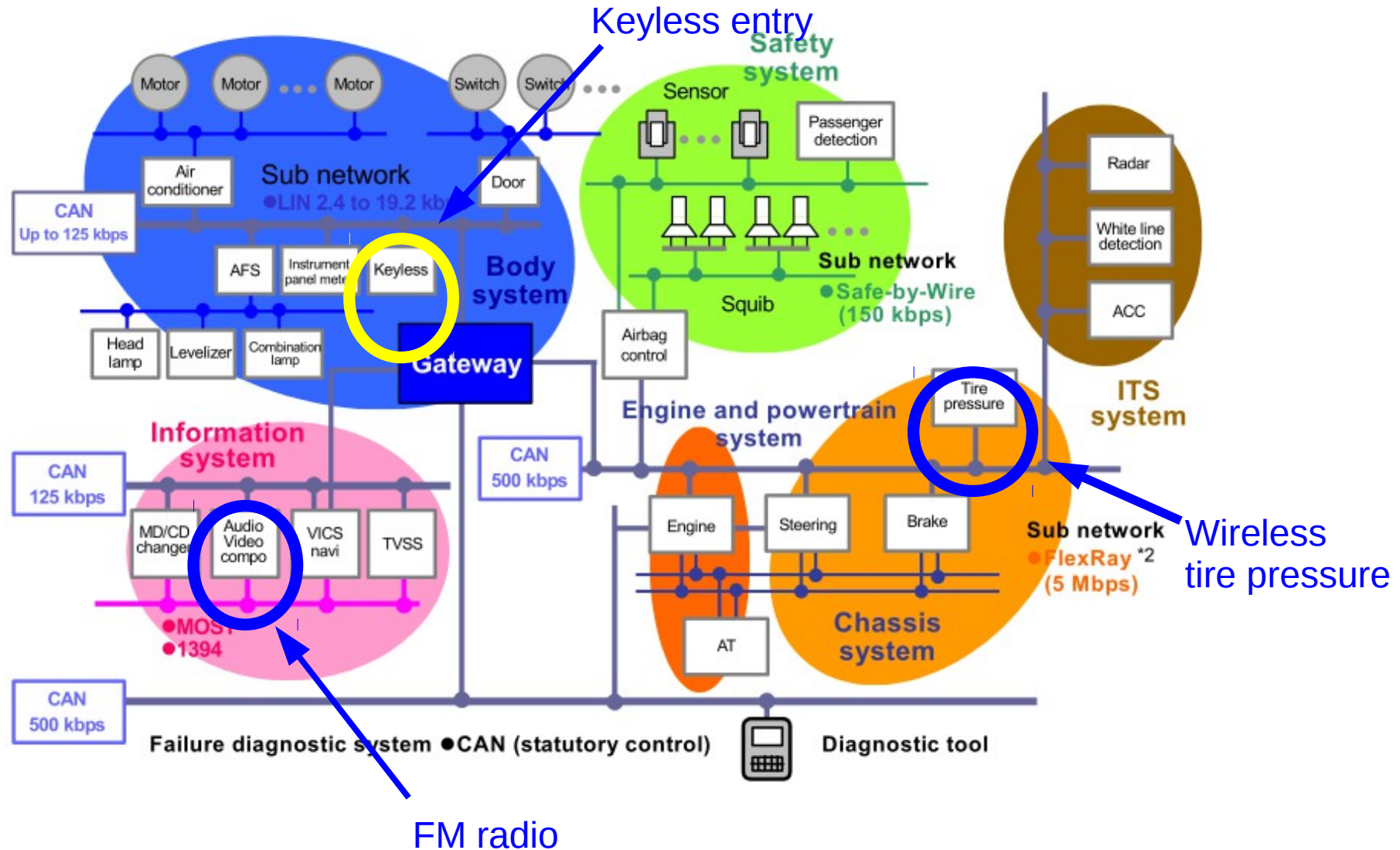
By JOHN R. QUAIN



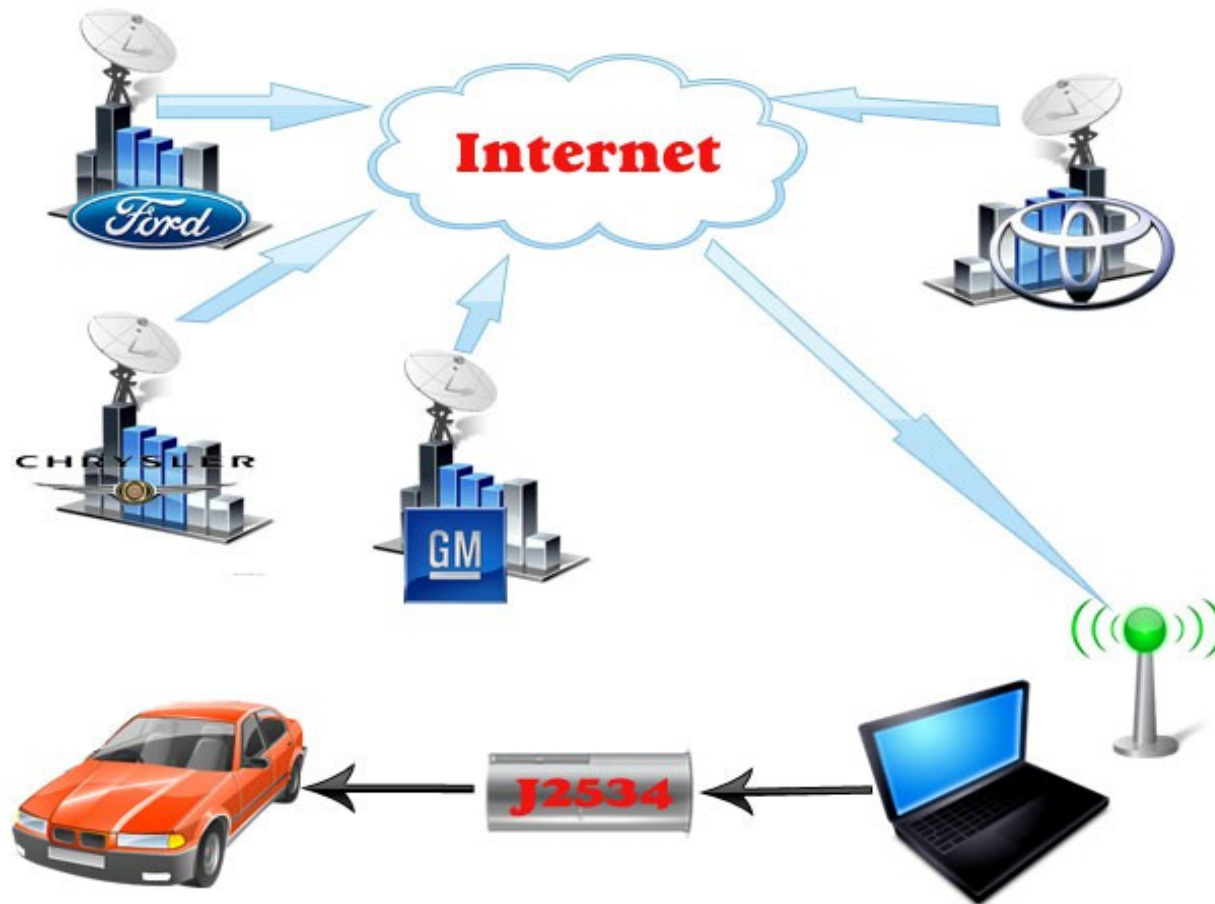
Source: NY Times



# Wireless access to car allows penetration of its data network



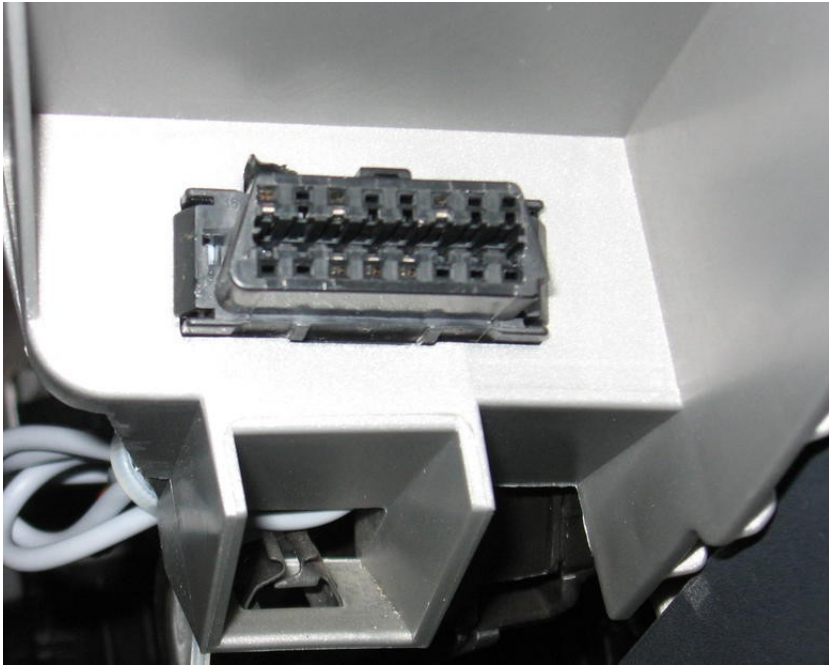
# MA “Right to Repair” Initiative 2012



# Who cares about vehicular data?

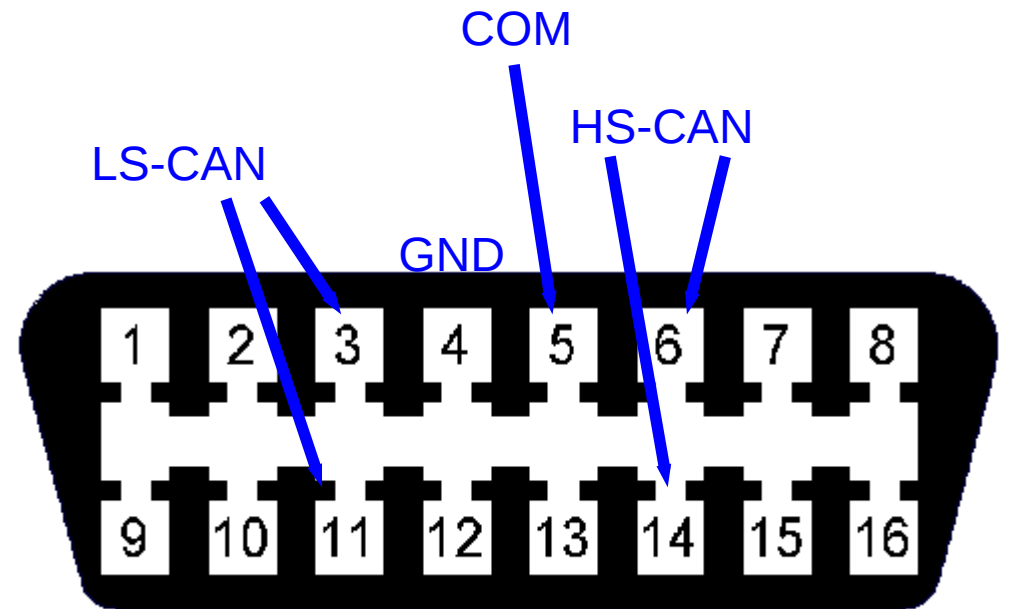
- **Car health report business**: securely record mileage and “trouble codes” over entire history of a car, make available to used-car buyer
- **Personal environmental report card**: integrate subscriber's automotive pollution data with their smart-meter data, credit card data, etc. to assess overall impact
- **Data-based vehicle routing**: suggest route *measured* to be minimum-polluting or fastest *at this time of day*
- **Reality-based performance estimator**: what range do other drivers see for this model E.V. on my route to Tahoe?

# How to access a car's data



OBDII connector found in every U.S. car since 1996.

Determine protocols in use by examining populated pins.



2006 Mazda 3

# How to access a car's data: the scantool

*Entry level:* USB, limited protocol set,  
read-only comms, \$40



*Experienced user:* Bluetooth, expanded  
protocols, some risk, \$250

[Scantool.net](http://Scantool.net) has great documentation and community support.

# Ford and BugLabs' Android Dongle



32-bit ChipKit platform is Arduino-compatible at pin and API levels.

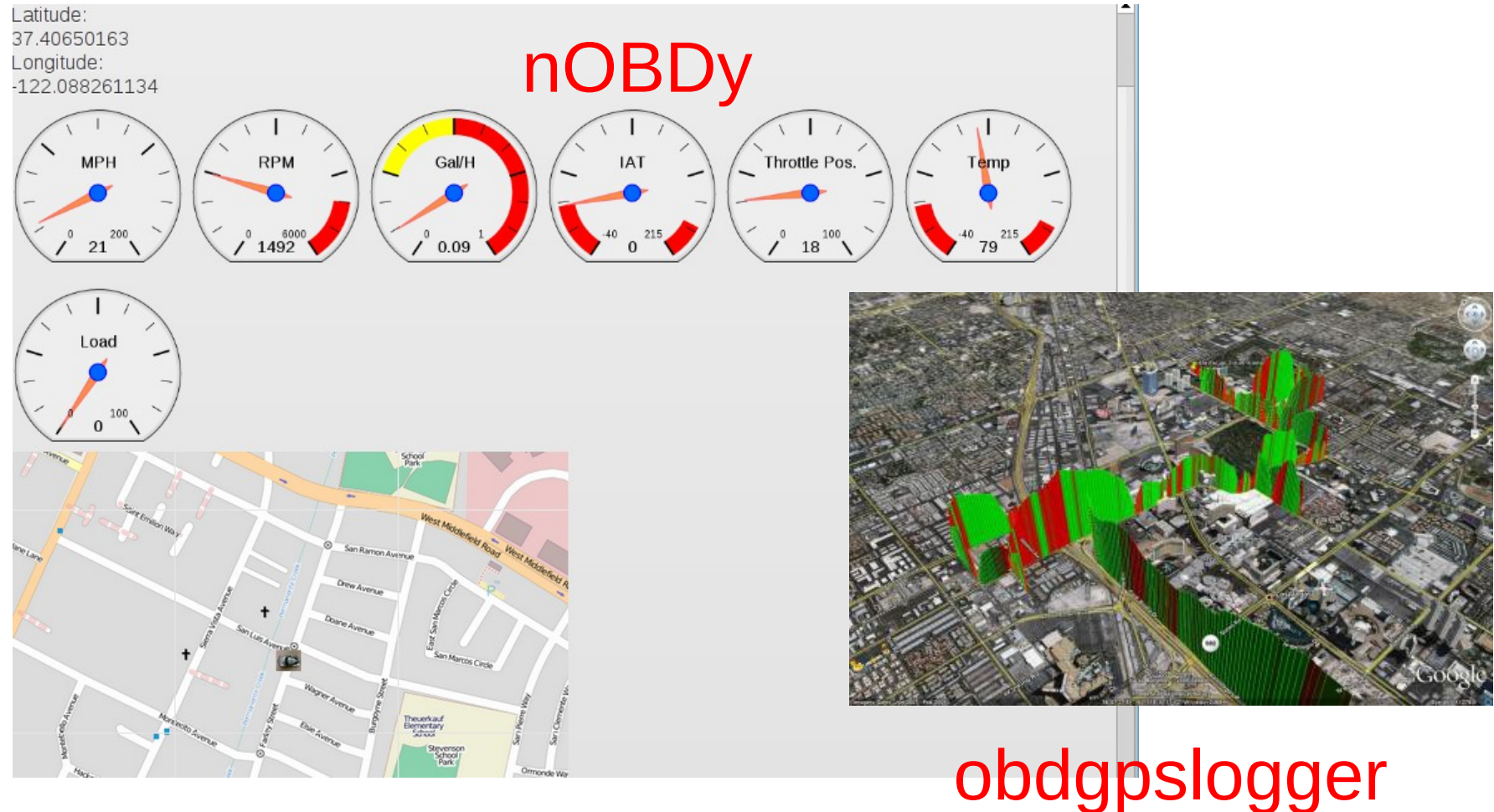


## BayLeafs' State-of-Charge Display, Adopted by Nissan



<http://tinyurl.com/7wngdsj>, <http://tinyurl.com/7ttz24h>

# OpenICE cooperating projects



Simple installation: packaged for popular Linux distributions.

# How can I get involved?

- Ask an auto dealer, “What operating system does this car run?”
- Support the [Right to Repair](#) movement.
- Join one of many employers: engineer shortage!
- Put cool open-source hardware or software in your car right now.
- Roll [your own HW or SW solution](#).
- Join [Silicon Valley Automotive Open Source](#) or come by our booth #7658.

## Summary

- Smartphone and Internet privacy and security battles have come to cars.
- We could lose our existing right to repair our own cars.
- *Or*, cool stuff could be coming from developers and small businesses.
- There are opportunities RIGHT NOW.
- Come by Booth #? to learn more.



# Silicon Valley Automotive Open Source Group

Free monthly meetings sponsored by ICS and Intel



Booth #7658

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Hosted by: Alison Chaiken (Organizer)

## Tizen-IVI: Intel and Samsung's Automotive Linux

### Intel Front Lobby

3600 Juliette Lane, Santa Clara, CA (map)



Joel Clark, Tizen IVI program manager, Open Source  
Technology Center of Intel Corporation Building upon  
the legacy of MeeGo for In-vehicle Infotainment (IVI),  
the... [LEARN MORE](#)

Hosted by: Alison Chaiken (Organizer)

Thu Jun 14  
7:00 PM

✓ I'M ATTENDING

24 attending  
0 comments

## Android, Arduino and CAN: the OpenXC Platform

### Intel Front Lobby

3600 Juliette Lane, Santa Clara, CA (map)



presented by T.J. Giulio, Ford Motor  
<http://openxcplatform.com/> [LEARN MORE](#)

Hosted by: Alison Chaiken (Organizer)

Tue Jul 24  
7:00 PM

✓ I'M ATTENDING

6 attending  
0 comments

## Recent Meetups

Thursday at 7:00 PM, 28 Members attended

Rate this Meetup

### How Bay Area Leaf Owners Group Influenced Nissan Product Development



They rated it ★★★★★ (4 ratings)

“ It was a great  
meeting with a  
great speaker.  
—Gary Lieber



“ Great talk on  
BayLeaf influence  
on Nissan. ...  
—Anton Narusberg



# What does it mean to “own” data?

The creator of the device that generates data that I own ***must*** provide, as a bare ***minimum***:

“any methods, procedures, authorization keys, or other information required” to read the data

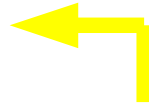
and

“information provided [ . . . ] must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.”



# Privacy Guarantees in Car Environment

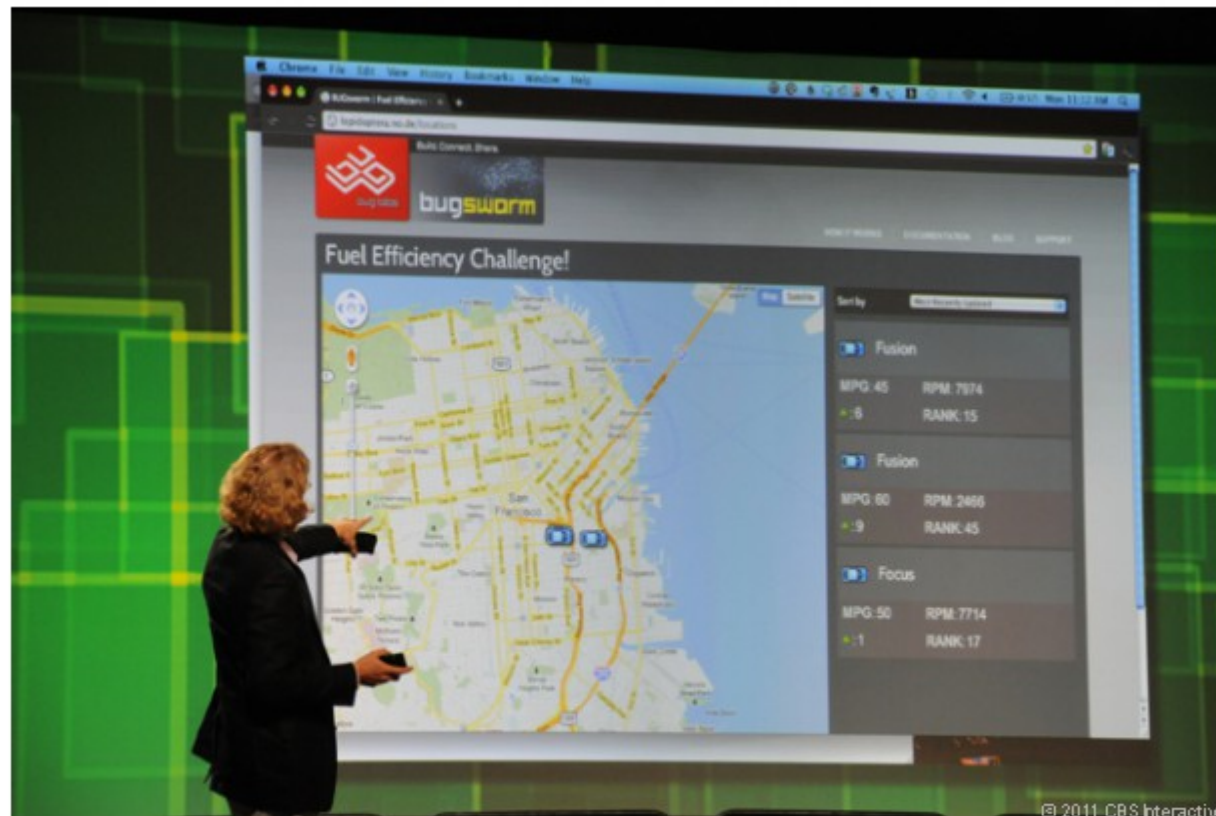
- JM1BK3437512345678



Vehicle Identifier Section: a particular car

- *Proposal*: encrypt the Vehicle Identifier Section of the VIN so that it cannot be remotely transmitted.
- Require “apps” to request access to VIS.

# Vehicle data example: Ford's Fuel Efficiency Challenge



As part of its OpenXC announcement, Ford and Bug Labs showed off the Fuel Efficiency Challenge, which allows drivers of Ford Sync-enabled cars to share their fuel efficiency with others.  
(Credit: Daniel Terdiman/CNET)

Owner-empowering vehicle-data-mining ideas:  
<http://tinyurl.com/7oegrj7>

# Federal Motor Vehicle Owners Right to Repair Act

... requires vehicle manufacturers to provide the same service information to *independent shops* that they offer to their franchised dealers.  
... auto manufacturers protect their proprietary vehicle repair information, requiring consumers to bring their cars to the dealer for expensive repairs. ... allows independent mechanics to compete fairly with dealerships ...

Source: Congresswoman Anna Eshoo

# Howto fix automotive security

- Automotive network protocols genuinely **do** need to be hardened.
- Virtualization-based security, packet filtering, firewalls, cryptographic signing and Android “paranoid network” already exist.
- Any approach that posits the necessity to invent new technologies is **wrong**.
- If NHTSA promulgates new rules, EFF, FSF, SFLC should participate!

# Published UWa/UCSD automotive exploit

<http://www.autosec.org/>

- Use Software-Defined Radio to break in via wireless tire pressure sensors (or FM radio, or keyless entry ...).
- [http://www.ted.com/talks/avi\\_rubin\\_all\\_your\\_devices\\_can\\_be\\_hacked.html](http://www.ted.com/talks/avi_rubin_all_your_devices_can_be_hacked.html)
- Discover all of 8-byte codes by “fuzzing” attack or simply sniff bus traffic.
- Brakes locked and driver controls disabled via use of codes or simple DOS attack.
- But let's not make instrumenting ***our own*** vehicles illegal, too!

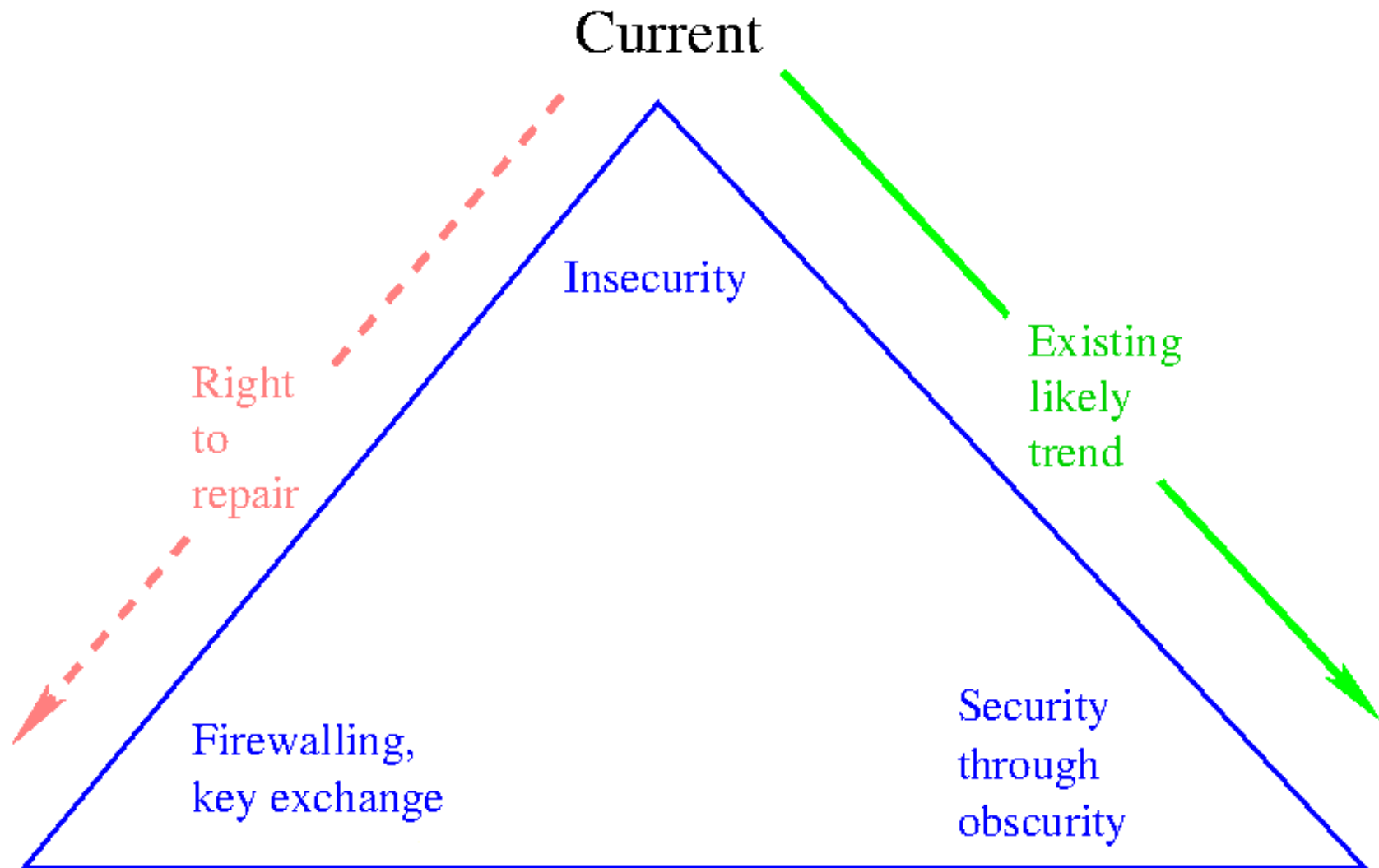
## Ongoing mobile data privacy battle

“For crashes that don't involve litigation, especially when police or insurers are interested in assessing fault, insurers may be able to access the EDRs in their policyholders' vehicles based on provisions in the insurance contract requiring policyholders to cooperate with the insurer. However, some states prohibit insurance contracts from requiring policyholders to consent to access.”

Source: Insurance Institute for Highway Safety,  
<http://www.iihs.org/research/qanda/edr.html>



# Free culture movement needs to get involved in automotive



## CFR PART 563—EVENT DATA RECORDERS

“Each manufacturer of a motor vehicle equipped with an EDR shall ensure by licensing agreement or other means that a tool(s) is commercially available that is capable of accessing and retrieving the data stored in the EDR that are required by this part. The tool(s) shall be commercially available not later than 90 days after the first sale of the motor vehicle for purposes other than resale.”

source: NHTSA website