

Inquiry into the Applications of Computing, Web Access, and Mobile Device Integration in the Automotive Environment

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Motivation

- Smartphones brought uncompromised mobile computing
- Drivers have yet to benefit
- Existing in car technology is primitive



Focusing Question:

What are the **potential applications of computing, web access, and mobile device integration** in the **automotive environment**, how will they **be implemented**, and what implications will this have for automotive computing and mobile computing systems in the internet environment?

Manufacturer's solutions

- MyFordTouch
 - Voice command based
- BMW iDrive
 - Google search features
- Audi MMI
 - Advanced user interface
- Saab IQon
 - Android based



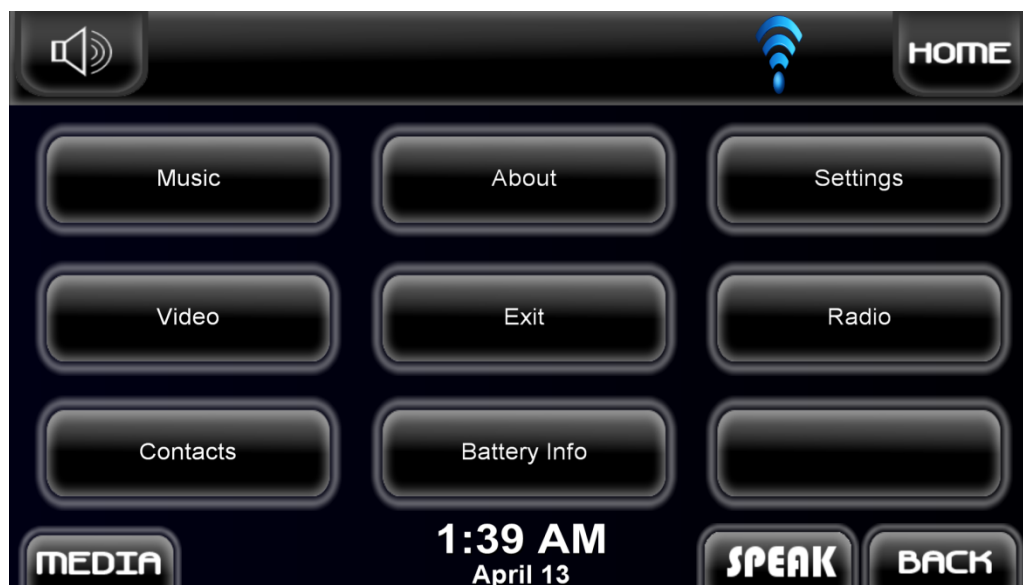
Hobbyist's solution: Hardware

- Standard PC components fitted into the glovebox or trunk
- Specialty hardware:
 - Automotive grade touchscreen
 - “smart” power supplies
 - GPS antennas



Hobbyist's solution: Software

- Open Solutions:
 - OpenMobile
 - LinuxICE
 - RideRunner
- Commercial Solutions
 - Centrafuse

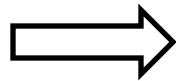


My Goal

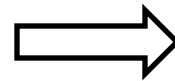
- Standardized platform for application development
 - Initially hardware and software
 - Later: software only

My Research: 3 phases

Method 1:
Improve the
hobbyist's
solutions



Method 2:
Android
based
platform



Method 3:
Cloud based
application
platform

Method 1: Improve the hobbyist's solution

Architecture

- Windows based PC with custom UI
- Supplemental functionality via specialized hardware



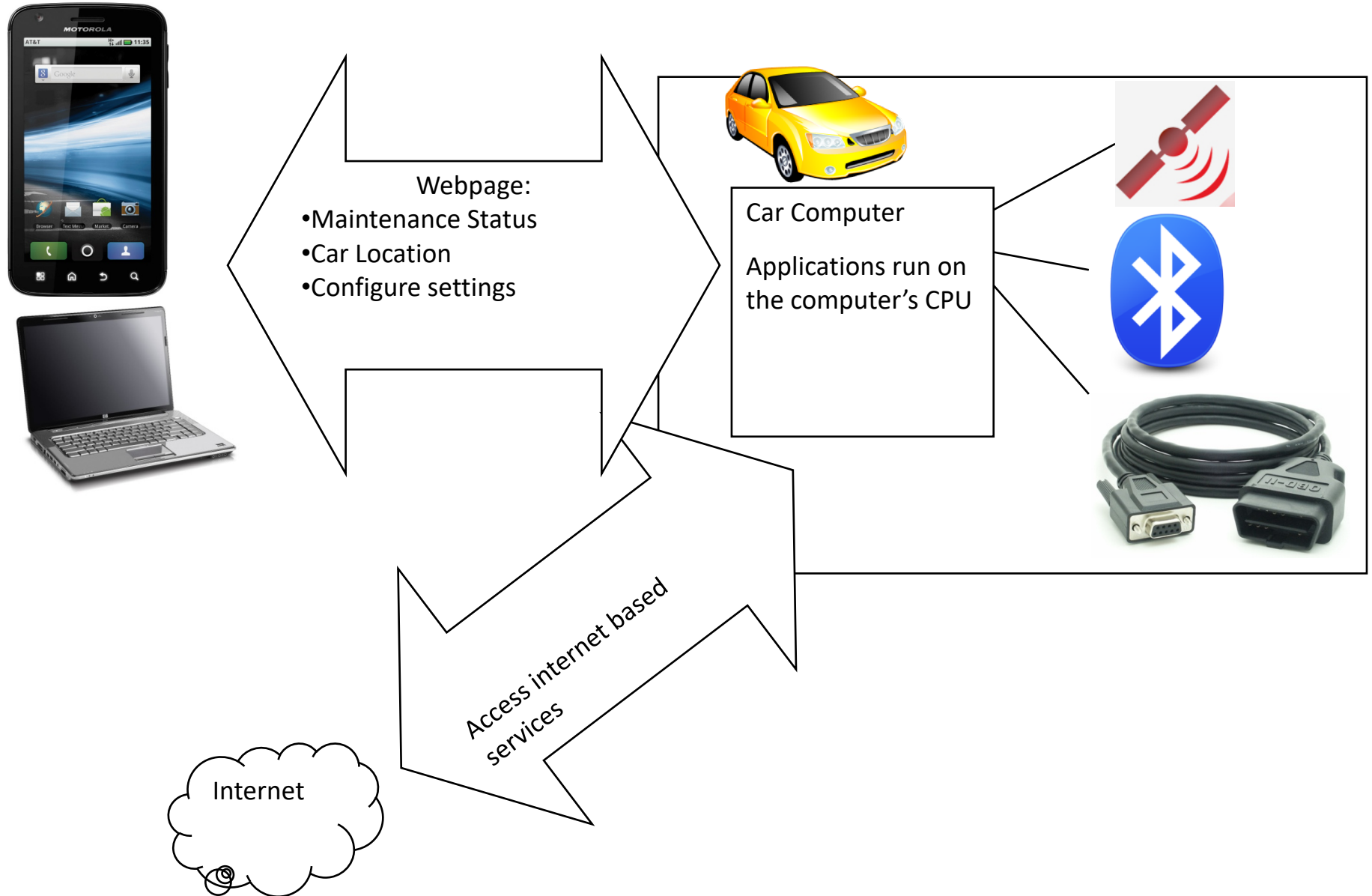
Reasoning

- Reuse existing platform

Drawbacks

- Power consumption
- Software was designed based on the isolated computer paradigm

Method 1: Interaction model



Method 2: Android based platform

Architecture

- Android is cloud native
- Back end APIs handle the low level work – focus on user interface design
- Developer focused

Reasoning

- Tablet form factor
- Mobile device integration

Drawbacks

- Not truly cloud based



Method 3: Cloud based application platform

Architecture

- Servers handle all storage and processing
- Users interact via website or car
- Car checks for changes in configuration or settings on server at every start

Reasoning

- Focus on software
- Reduces obsolescence
- Rich internet application style development

Method 3: Interaction model



Application Developers:

- Develop an application like a rich internet application
- Use a common API to access car features and info



Auto Manufactures:

- Targeted advertising platform based on consumer info
- Value add manufacturer only apps

Car:

- Interact with internet via API
- Send and retrieve car info



Cloud Servers:
Host applications
consumer frontend for
their car

Car Owners:

- Access and update car info
- Schedule service
- Manage applications and settings
- Rate cars and mechanics through relevant portals: Yelp, Cars.com, etc.



Mechanics/Dealers:

- Get limited car info
- Location based ads
- Schedule service/car pickup
- Loyalty programs



Conclusion

- Cloud based solution focuses on the software: the value add
- The cloud architecture's advantages outweigh disadvantages, at least in concept
- Mobile devices must be cloud centric

Discussion

- Business model based on targeted advertising
- Continue to explore:
 - Resources required for implementation
 - Limitations of this architecture
 - Mobile device integration directly with the car?

Acknowledgements

- Mr. James Gerry – Advisor
- Mr. Rajesh Jayarajan – understand cloud computing
- Father
- Dr. Scheppler – Set up investigation
- Dr. Mark Carlson - Create scientific documents
- SIR Department

Thank You