Drive by Wire: Building the Wired Automobile World

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Prelude: Why are we here?

PayPal, an eBay company, is the world's largest provider of online payment services. We provide smooth and easy financial transactions across the Internet, for browsers, mobile devices, payment kiosks, point-of-sale systems, and retail stores, and we do it in a way that makes life better and simpler for our users.

This position paper, submitted in preparation for the 1st W3C Workshop on Automotive and the Internet, briefly sets forth our ideas about the future of automobiles online, and especially how users will pay for products and services directly from their cars. We believe that this is an area where we can contribute and participate with our colleagues in shaping the way users drive and pay, especially where and why. We also discuss some of our ideas regarding the overall architectural challenges that need to be addressed and how PayPal and W3C can help.

Automobiles are Part of the Internet of Things

The Internet of Things (IoT) is a hot topic in the 'Net world [1], and there are many current standardization efforts being conducted by the ITU [2], the IETF [3] and others [4]. Our thinking here is two-fold; first we consider automobiles to be members of the IoT, and one of the most interesting examples, and secondly we feel that the multiplicity of standards (and standards bodies) involved increases the complexity of the situation for implementers and service providers. We hope that W3C, as the premiere standards body for the Web, can play a constructive role in reducing this complexity and fostering co-ordination and alignment among the many players in this space.

The Automobile Fleet is an Example of a Delay-Tolerant Network

Delay-Tolerant Networking [5] [6] is an all-embracing idea for telecommunications that expands on the ideas of today's internet to include the IoT, mobile networks, and even the Interplanetary Internet [7]. The main idea behind DTNs is that they overcome many of the localized assumptions used by our current Internet, including short and predictable round-trip times, a continuous bidirectional path from server to client, and low error rates [6].

Automobiles are mobile devices and they share the same network characteristics as other DTNs. We believe that DTNs (and the IoT) are examples of current thinking that should inform our efforts on how to provide network services to automobile users.

PayPal Can Help by Enabling Financial Services

Many current automobiles provide support for networking, including Honda, Nissan, and BMW [8]. The author's car currently supports Twitter, Facebook, and Pandora among others. While these applications are not truly useful (and possibly quite dangerous) for automobile drivers, a PayPal app that provided easy payments directly from the driver's seat is certainly the best end-goal scenario for PayPal users. There are many challenges ahead; we recognize that we will need to take baby steps, and work closely with other players in the industry, including the car manufacturers, oil companies, electric charging service providers, governments (for EZ-Pass and similar technologies that make paying road tolls easier) and many others. We envision a world where every car is wired for PayPal, not just wired for sound.

W3C Can Help By Establishing Standards and Coordinating with Other Standards Bodies

The W3C can help in this technology space in three ways:

- Establishing appropriate standards in areas such as privacy, identity, data transfer, and usability
- Work with other standards bodies such as ITU and IETF to ensure that there is one reasonably simple set of standards across the entire technology stack for the entire world.
- Help align and co-ordinate existing efforts so that they are compatible with existing standards (where possible) and are the best standards possible for implementers and end users.

In Summary

Twenty years ago the idea of wiring every car on Earth to the Internet would have seemed outlandish; today we're meeting to plan how to make it happen. Together, W3C, PayPal, and the industry can create a new context for automobiles and the Internet that connects them, that will enrich the lives of everyone who drives a car. And maybe, just maybe, when Curiosity 2 [9] lands on Mars, it will be able to use PayPal to fill up.

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References

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