Vehicles in the Cloud: Using Online Services to Improve Safety and Functionality in the Automotive Industry

Far from being pie in the sky, the cloud is already the foundation of hundreds of breakthrough features being implemented in today's commercial and passenger fleets, offering both increased functionality and better safety. By becoming more and more connected with the wireless world is through the cloud – that mysterious virtual world of the internet where more and more, companies and individuals alike are storing their files, their programs, and interacting through social media – automakers, mobile device creators, and software engineers alike are bring the digital world into driving reality.

It should come as no surprise that cloud services are growing in popularity for vehicles of today and concept cars of tomorrow. According to a recent Cisco System's Global Cloud Index report, there is a 12-fold increase in cloud computing expected by 2015. Already, 21% of all workloads are processed in the cloud, with an increase to 51% b 2014 anticipated. The integration of software as a service (SaaS) into the auto industry will only serve to boost this trend even further.[i]

Big Advantages for Automakers and Drivers alike with Cloud Connectivity

In-vehicle infotainment (sometimes referred to as IVI, and alternately as telematics) is the integration of information from the Internet with smartphones and vehicle systems requiring a convergence of cloud technology, software, and connected devices. Bringing all of these systems and technology together offers some profound advantages for the driver, for cities as they plan infrastructure and manage safety, and for fleet managers as well.

The most obvious advantage of the cloud for the auto industry is the ease of upgrade. Consider this: Most consumers replace their smartphones and upgrade their software every couple of years, but keep their vehicles for much longer, which poses a problem for vehicle makers in terms of providing the most up to date technology to their customers.

Yet that's one problem cloud technology solves easily. Cloud programs can be updated and even changed completely on the fly without vehicle owners having to take their cars to the shop for the work to be completed. This is particularly important given the rapid pace at which consumers upgrade their mobile devices

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and how quickly their expectations change and increase when it comes to connectivity and interactivity.

Even better is that SaaS solutions can allow vehicles to slim down the hardware they need on board. By relying on software that's in the cloud rather than stored on vehicle-mounted hardware, automakers can install smaller center consoles which require less hardware yet can offer the same number of features and benefits as a traditional dashboard – if not more.

Cloud Services for Increased Driver Safety

Safety features are another substantial benefit of using the cloud to increase the connectivity of a vehicle. The most obvious example of this is the increased functionality of GPS-enabled devices, which help to guide drivers through the safest route and avoid potential problems on the road. The cloud can also be used to serve up real-time weather and road condition information to the driver to allow him or her to make informed route decisions and to adjust driving speeds and techniques as appropriate.

Another example available today in some luxury vehicles is the lane departure warning system. By using satellite signals through a cloud system, a vehicle can detect when a driver is straying too far from their designated lane because of potential distraction or drowsiness. The system warns the driver of impending doom using visual and auditory stimuli. Similarly, some vehicles use sonar or automated braking to prevent crashes by using cloud services (again, via satellites) to predict collisions with cars ahead.

Yet other cloud innovation allows mobile devices and vehicle systems to disable cell phones and texting systems when the vehicle goes over a particular km-per-hour benchmark. These types of systems are of particular interest to insurance companies who have an interest in lowering the number of vehicle accidents and fatalities.

Mercedes-Benz has over a dozen safety features built into their C-Class vehicle

The concept car Mercedes-Benz F 125! offers an automatic lane-changing assistant

which rely on the cloud. For starters, they have an ATTENTION ASSIST feature which detects drowsy drivers and prevents accidents. Their DISTRONIC PLUS proximity control provides drivers with assistance in parking and maneuvering in tight spaces. These two systems rely on radar, cameras, and sensor technology.

Their F 125 S-Class concept car also makes use of state of the art technology based in the cloud. In particular, their lane-changing assistant will use radar sensors and a stereo camera to monitor traffic behind the vehicle. When the driver presses the button, the vehicle will change lanes automatically as soon as it is safe to do so. Mercedes-Benz also predicts that, using online features such as infotainment playlists and the list, passengers will be able to control all of their cloud information with gestures via systems like Microsoft's Kinect system.[ii]

BMW's ConnectedDrive is another example of cloud-based automotive connectivity. Having recently added a lot of functionality to their existing system, ConnectedDrive now boasts features such as completely 3D rendering of the display. The BMW

BMW's ConnectedDrive 3D rendering

iDrive Touch Controller allows drivers to use a mult-touch touchpad that includes the entering of characters via finger taps and navigation through maps and websites as well. The iDrive Touch is an interface tool that is embedded on the top of their rotary knob controller, allowing for inputting gestures and characters in many languages.[iii]

Theirs is also one of the first to allow fully functional dictation with speech recognition so that drivers can compose short texts for emails and SMS messages while driving. It also assists drivers in the process of creating voice memos which can be sent through email for more complex communications.

Further, SaaS systems can help drivers keep up to date with vehicle maintenance to increase safety even more. By utilizing cloud computing services that monitor vehicle onboard systems such as tire pressure, fluid levels, and brake condition, the

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driver can be notified ahead of time when maintenance needs to be carried out. Some systems will email or text the driver messages in order to make scheduling of maintenance appointments easier.

Even the US Department of Transportation is involved in the development of cloud-based technology that will improve driver safety. They have been behind the drive toward Safety Pilot Driver Clinics which will result in safety applications that help by providing blind spot warnings, slow-down warnings when other vehicles are adjusting speeds, and driver notifications for potential accidents.[iv]

Another way the cloud can assist with the automotive experience is by assisting electric vehicle (EV) drivers with their fuel requirements. Software companies like SAP are keenly interested in this concept and are serving up packages that allow real-time connections, including those between electric vehicles, the electrical grid, and charging stations. SAP's EV Readiness Package is one example, as is Saleforce's Toyota Friend solution.[v]

Cloud Services to Boost Driving Enjoyment

Of course, cloud systems also offer significantly increased connectivity for the driver and passengers alike, which can enhance the experience of travel. BMW's ConnectedDrive features a BMW LTE Car Hotspot feature, for instance, provides drivers with high speed internet connectivity while on the road. They also seamlessly allow for the integration of smartphone applications from third parties through the Software Development Kit (SDK). This allows drivers access to their favourite apps through the vehicle's display.

Ford's Evos Concept Car sensing your health metrics to help guide you through the driving experience

Consider, for instance, Ford's new Evos Concept Car, which is apparently the car that "thinks for you" which premiered at the Frankfurt Motor Show. Using the cloud, the vehicle provides schedule management, weather alerts, driver health and wellbeing information, music intelligence, and more. Pulling all of this information, the vehicle is able to help you plan your day and stay connected all day long.

Using your heart rate and level of alertness, the vehicle will sense your level of stress, so that during more treacherous stretches of road it will display only the most vital information to minimize distractions. There's even a Do Not Disturb mode for your mobile device during such sections of road.

Audi connect is another innovation in cloud computing for the vehicle. Using Bluetooth, Audi vehicles can connect mobile devices to the cloud via a UMTS module or LTE to provide customized services – from online traffic information to Audi's music stream. Audi will also make it possible for drivers to remotely configure a car, which will be of particular interest for future e-tron vehicles with electric drive units.

Owners of the new A3 will see many of these features integrated, including a touchpad, monitor, and Audi Phone Box, which provides a universal interface for mobile phones and vehicles to communicate. Their modular infotainment platform will also be seen in the A3, offering speedy graphics with Nvidia processors.[vi]

Similarly, Harman has recently introduced a Rinspeed DOCK+GO concept car that provides a context-aware driving experience by integrating information from the vehicle, the driver, and the digital world. This infotainment system combines the cloud-based Aha platform, advanced driver assistance features, personalized and situational human-machine interface (HMI), and energy management navigation solutions. The in-vehicle infotainment system connects to the driver's smartphone to recognize saved playlists and preferences for Facebook, Twitter, podcasts, and music.

This information is then served up on the HARMAN HALOsonic Electronic Sound Synthesis system. HARMAN has developed their own embedded application solutions, which allows direct access to things like Google Earth, Google Search, Microsoft Exchange Servers, and more.[vii]

Customization of Vehicles through the Cloud

Increased innovation in this space will no doubt result in a myriad of features and benefits for the driver in the years to come, with the operative word being customization. More and more, drivers will be able to make their vehicles more personalized than ever before. This is most obvious in the ability of cloud services of the future to allow the vehicle to control infotainment systems for separate areas of the vehicle, including front and back zones, and well as driver and passenger seat

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functionality. While the front seat people may want to view maps and traffic information, the back seat passengers will experience video and gaming options. With this kind of customization, some may never want to leave the comfort of their cars!

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A student of all things green, Maryruth has a special interest in cleantech and green buildings. In recent years, Maryruth has worked as the senior editor of The Green Economy magazine, is a regular blogger for several green business ventures, and has contributed to the editorial content of not one, but two eco-living websites: www.ecolife.com and www.GreenYour.com. You can learn more about Maryruth's work by visiting her site, www.jadecreative.com.

Sources:

[i] Meyers, J. (2011, November 29). *Studies Forecast Boom in Cloud Traffic, Gear*. Retrieved from WindowsITPro: http://www.windowsitpro.com/content1/tabid/3591/catpath/cloud-business-issues/topic/studies-forecast-boom-cloud-traffic-gear-141451

[ii] Daimler Technicity. (2012, June 20). *The Future Is Coming – Automatically*. Retrieved from Mercedes-Benz: http://socialpublish.mercedes-benz.com/en/the-future-is-coming-automatically-955/

[iii] Neff, J. (2012, July 11). *BMW adds iDrive Touch and 3D maps to latest generation infotainment system [w/video]*. Retrieved from AutoBlog.com: http://www.autoblog.com/2012/07/11/bmw-adds-idrive-touch-and-3d-maps-to-latest-generation-infotainm/

[iv] Jerram, L. (2012, April 10). *Connected Cars Get Closer*. Retrieved from PikeResearch.com: http://www.pikeresearch.com/tag/vehicle-telematics

[v] Hirsch, R. (2012, September 25). *Revisiting SAP's OnDemand-related job offers - new M2M Global Business Incubator projects and more*. Retrieved from SAP Community Network: http://scn.sap.com/community/cloud/blog/2012/09/25/revisiting-sap-s-ondemand-related-job-offers--new-m2m-global-business-incubator-projects-and-more

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[vi] *Audi connect - The car in the cloud*. (2012, March 8). Retrieved from AudiWorld: http://www.audiworld.com/news/12/cebit/

[vii] *Personalize Your Car*. (n.d.). Retrieved from Harman.com: http://www.harman.com/EN-US/Newscenter/Documents/HARMAN_TECH%20BOOKLET_010312_Fin.pdf