

1. Challenges and Use Cases for Connected Cars

As the value proposition of vehicle manufacturers moves from a product-centric to a customer-centric approach, technology leadership—according to Gartner—will determine the future of the automotive industry. Access to cloud and data resources, as well as real time analytics, is imperative to support 250 million connected cars by the year 2020¹. Once established, these technologies will help to propel the automotive industry to the connected car, the connected driver, and ultimately, to the connected consumer industry (the Internet of Things). This will open a variety of new business opportunities that extend into many adjacent industries.

While more and more functionality is achieved by offloading it to connected consumer devices in the form of smartphones or tablets, basic functionality must still be available even if the external device is not available². This increases the future importance of the built-in head unit and other integrated systems and installed software as the main point of interaction between driver and vehicle. Drivers today are familiar with the functionality of their smartphones and expect to have the same features and functionality—application availability, operating system, and updates over-the-air. This will in turn increase the value of the vehicle to its current and possible future owners.

In a connected world, the vehicle is no longer self-contained, but relies on services provided by an OEM vehicle back end that serves as the vehicle's interface to the online world³. The OEM vehicle back end creates a virtual image of the vehicle in cyber space and must provide highest level of IT and data security. At the same time, the back end must be flexible and scalable enough to accommodate loads created by stochastic user and device behavior. To provide such features, the back-end systems can no longer be manually assembled in a custom fashion, but must be highly integrated and automated to guarantee the highest quality, lowest possible failure rate, 24/7 availability, and fastest time-to-market.. All alterations to such back end systems, whether compute, network, security, or storage, must be logged in an auditable fashion.

The combination of vehicle back end, over-the-air head unit control, and probable connection to electronic control units (ECUs), enables a new quality in provided services. These can be categorized into the two main groups of 1) customer relationship management, including after-sales predictive maintenance and after-sales customization, and 2) vehicle relationship management that enables information feedback about feature usage patterns to product management and sales.

VMware customer-proven technologies can be used to build a highly scalable and secure vehicle backend with real time analytics and over-the-air update capabilities. This paper investigates these technologies and provides example use cases and key takeaway summaries.

¹ <http://www.gartner.com/newsroom/id/2970017>

² Kohler, Stümpfle: „Die Konnektivität als Kernmerkmal von Premiumfahrzeugen“ / Springer, Industrie 4.0, ISBN-10:3-642-36916-2

³ *ibid*