



The Internet of Things and connected cars

IoT on board



Table of contents

- 2 Automotive IoT**
- 5 HPE Universal IoT Platform**
- 6 HPE IoT reference architecture**
- 7 Create new service offerings for consumers and partners, with accelerated time-to-value**

Cars are becoming increasingly intelligent

By 2018, one in five cars on the road will be self-aware and able to discern and share information on their mechanical health, global position, and status of their surroundings. (Gartner)

The rollout of 4G LTE, and subsequently 5G networks, will further increase the capabilities of the connected vehicle, facilitating faster transmission rates and higher volumes of data. Tier-1 Communication Service Providers (CSPs) are ideally suited to provide such connectivity; however, they need an Internet of Things (IoT) solution, and partner to address the needs of the automotive industry.

The car of the future will be safer for passengers and other road users, and offer pay-as-you-go insurance and payment services. In total, the connected car will offer a more compelling ownership and driving experience.

Hewlett Packard Enterprise (HPE) is helping accelerate the arrival of the car of the future through our unique combination of technologies, expertise, and partnerships.

In the two decades since OnStar was formed as a collaboration between General Motors (GM), Hughes Electronics, and EDS (acquired by HPE in 2008), connectivity-based automotive technology has become increasingly ubiquitous. Beyond the basic concept of a connected vehicle equipped with Internet access, new markets have emerged, such as Vehicle-to-Infrastructure (V2I), Vehicle-to-Vehicle (V2V), Vehicle-to-Cloud (V2C), Vehicle-to-Pedestrian (V2P), and Vehicle-to-Everything (V2X).

A recent study by the Centre for Automotive Research highlighted that “the average car now contains 60 microprocessors, and more than 10 million lines of software code—more than half the lines of code found in a Boeing Dreamliner airplane.” Cars are becoming increasingly intelligent, and by 2018, one in five cars on the road will be self-aware and able to discern and share information on their mechanical health, global position, and status of their surroundings. This self-awareness, together with the need to be constantly on, requires reliable connectivity and Internet of Things (IoT) solutions.

The rollout of 4G LTE, and subsequently 5G networks, will further increase the capabilities of the connected vehicle, and facilitate faster transmission rates and higher volumes of data. Tier-1 Communication Service Providers (CSPs) and Telcos are ideally suited to provide such connectivity while needing an IoT solutions partner to address the automotive needs.

Automotive IoT

As the number of connected vehicles continues to grow, automotive use cases can be grouped into five main categories:

- Infotainment: Voice communications, personalized music
- Navigation: Traffic information, online route planning
- Safety: Smart SOS (eCall), roadside assistance
- Cost-efficiency: Insurance telematics, remote diagnostics, and condition-based maintenance
- Payment: Electronic toll collection, parking reservation and payment



The evolution of the connected vehicle from pure V2I to V2V, and increasingly V2X, presents vehicle manufacturers with the opportunity to differentiate from their competitors, based on the digital services available to their customers. Here are several examples:

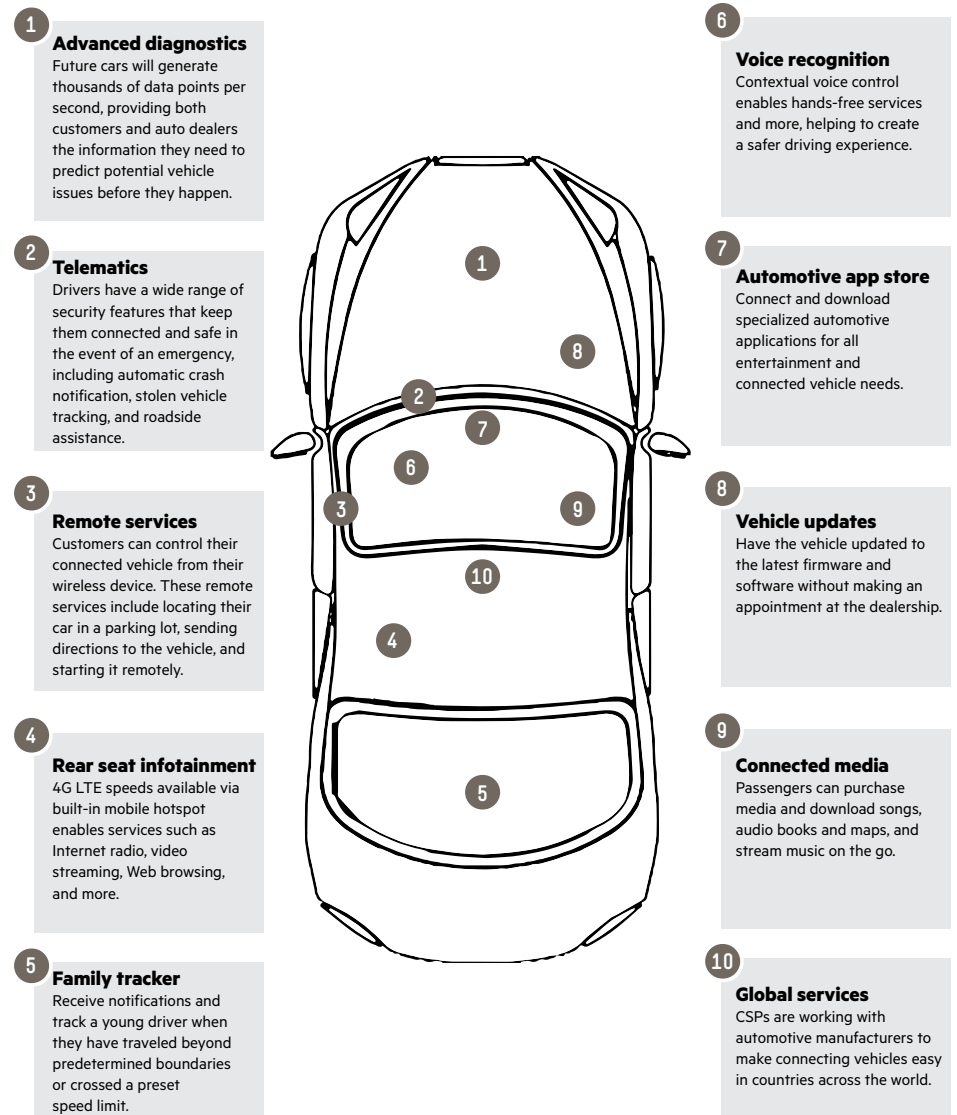


Figure 1. Connectivity differentiation

Although connected cars currently represent a relatively small proportion of total auto shipments per annum (10 percent), they are projected to increase by a factor of 7X over the next five years:

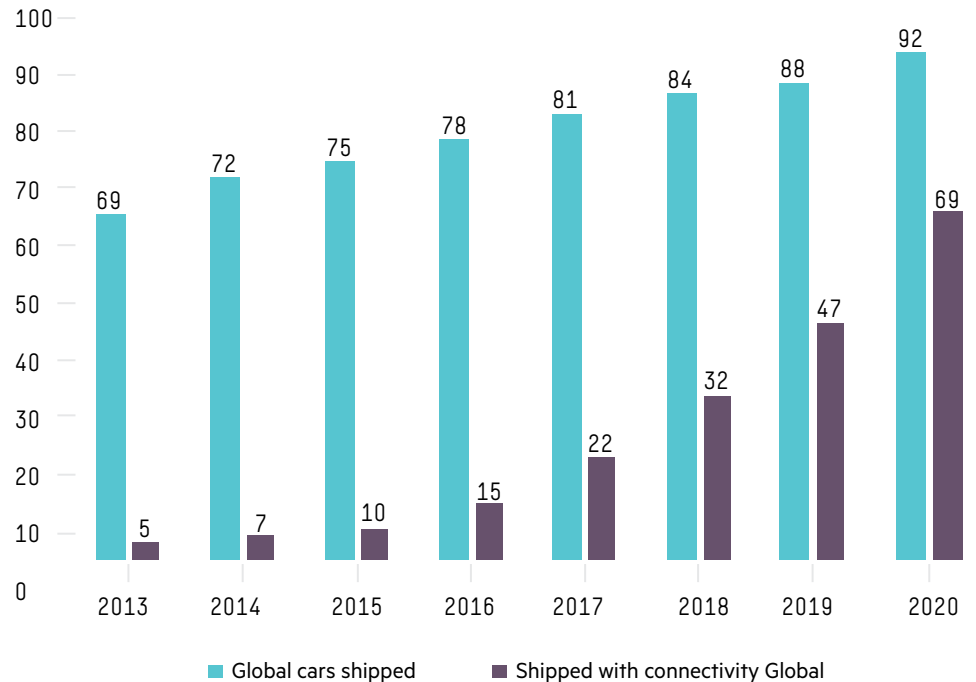


Figure 2. Global connected car growth¹

No surprise then that the increase in use cases and availability of connected vehicles is driving a change in the revenue streams of vehicle manufacturers. Gartner forecasts that by 2020, 70 percent of all auto-related customer interactions will be digital.² These interactions, such as requesting real-time services from the vehicle (i.e., booking a maintenance appointment), will lead to new digital business models for existing and new services.

The car of the future will be safer for passengers, and other road users. Concepts such as Swarm Intelligence will enable drivers to be given accurate real-time information on road and weather conditions sourced from other vehicles already encountering those conditions—imagine knowing not just that there may be ice on the road ahead, but know exactly where that ice is based on information from the cars ahead of you. V2V and V2X communications coupled with high-speed analytics make this a reality.

As well as being able to pay for goods and services like petrol or parking charges from your car, the connected car will also be able to offer not just offer pay-as-you-drive insurance, but pay-how-you-drive insurance, rewarding good drivers and penalizing bad driver behavior. In total, the connected car will offer a more compelling ownership and driving experience—and HPE is helping accelerate the arrival of the car of the future through our unique combination of technologies, expertise, and partnerships.

¹ BI Intelligence, Scotiabank, 2014

² Gartner Predicts 2015: Connected-Vehicle and Mobility Innovations Inspire New Digital Business Opportunities, November 2014



HPE Universal IoT Platform

The HPE Universal IoT Platform makes it easy for CSPs and enterprises to onboard new use cases and rapidly achieve successful outcomes that include:

- Reduced complexity through pre-integrated modules for data acquisition, validation, and analysis
- Reduced risk due to compliance with the oneM2M standard
- Faster time-to-value through “as-a-Service” hosted models
- Lower total cost of ownership (TCO) by eliminating capital expenses, providing scalability, and offering outstanding pricing based on HPE’s global scale, cost-efficiencies, industry-leading components, and deep vertical expertise

The platform supports use cases defined by application and device type from any industry, manages the entire ecosystem from launch through end-of-life, and supports scalability to millions of distributed devices.

HPE Universal IoT Platform enables the connection and exchange of information between heterogeneous IoT devices (standard and proprietary communication) and applications. It also dramatically simplifies the integration of diverse devices with different communication protocols.

The platform can be deployed, for example, to integrate with the Aruba Networks WLAN (Wireless Local Access Network) solution to manage mobile devices and the data they produce within the range of that network, as well as integrating devices connected by other Wi-Fi or mobile networks, including LTE 4G and low throughput/low-power networks, such as LoRa.

On top of this ubiquitous connectivity, HPE Universal IoT Platform provides federation for device and service management, data acquisition, and data exposure to applications. This enables platform customers (e.g., automotive, but also public utilities, municipalities, and home automation among others) to realize tremendous benefits from the consolidation of data that had been previously unobtainable, driving new value in the process.

HPE IoT reference architecture

The HPE IoT reference architecture at the heart of the platform incorporates our own carrier-grade connectivity and applications, custom IP, cloud-based “as-a-Service” distribution, and value-added functions (e.g., Big Data analytics, portals, and services).

The HPE IoT reference architecture is aligned with the oneM2M industry standard and is designed to be agnostic towards industry, vertical, use case, connectivity, and protocol.

HPE Universal IoT Platform layered architecture

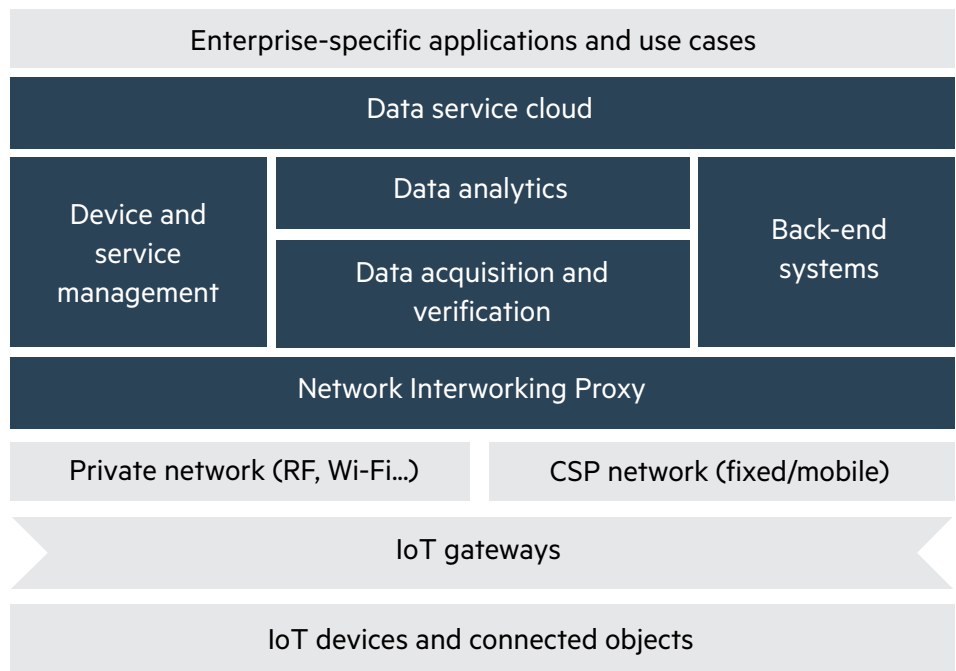


Figure 3. Enterprise-specific applications and use cases

HPE enables service providers and enterprises to build for and capture new value from the proliferation of connected devices. Given its carrier-grade telco applications heritage, the solution is highly scalable and versatile. Components of the platform are already deployed to manage data from millions of electricity meters in Tokyo, for example, as well as being used by over 170 telco enterprises globally to manage data acquisition and verification from their networks and applications.

Alignment with the oneM2M standard and data model means there are already hundreds of use cases covering more than a dozen key verticals that are natively supported by HPE Universal IoT Platform. The platform provides agnostic support for smart ecosystems, and can be deployed on premises or in any cloud environment for a comprehensive as-a-Service model.

HPE equips service providers and enterprises with end-to-end mobile device remote management, including device discovery, configuration, and software management. HPE Universal IoT Platform enables customers to manage millions of IoT devices for smart applications on the same multi-tenant platform remotely.



Additionally, it is device vendor-independent and connectivity-agnostic. The solution operates at a low TCO with high scalability and flexibility, when combining the built-in Network Interworking Proxy and alignment with oneM2M standards. HPE embeds security directly into the foundation of the platform, enabling end-to-end protection throughout the data lifecycle.

HPE Universal IoT Platform is built from the ground up to be data-centric—as data and its monetization is the essence of the IoT business model—and is engineered to support millions of connections with heterogeneous devices. It is modular and can be deployed as such, where only the required core modules can be purchased as licenses or as-a-Service, with an option to add advanced modules as required.

Create new service offerings for consumers and partners, with accelerated time-to-value

With the HPE IoT reference architecture, we enable multiple business applications with multiple data streams—including contextual data (think rain, traffic, car speed, time of day)—on the same platform. The combination of HPE Universal IoT Platform, HPE's Communications Media Solutions Business unit, specializing in providing services to the CSP/Enterprise market, and HPE's automotive industry vertical with its vast and diverse experience in the automotive market is unmatched in the marketplace. This creates a compelling proposition that can help customers accelerate time-to-value for the automotive market.

Central to our ongoing commitment to support the automotive market, we've developed an "Automotive Hub" as part of the data services cloud within the HPE IoT reference architecture. The Automotive Hub contains vehicle manufacturer-agnostic micro services and business logic, which can be used to accelerate the introduction of new and interactive services.

HPE core components are constantly operational, which provides a reliable and scalable platform. We also have a common way to manage devices through one set of APIs (application program interface).

HPE owns our IoT platform IP, and other solution components that help us accelerate time-to-market for our customers. With no dependency on third parties to deliver results, HPE uniquely provides an unsurpassed end-to-end experience that enables you to monetize and collect more of the value derived from the realms of data created by connected devices, including cars.

In addition, HPE helps you:

- Accelerate time-to-market by enabling quick and early “cloudification” of networks to get to cost and agility or automation points
- Utilize industry-leading components for operations in an as-a-Service model
- Quickly launch new capabilities: HPE owns the IP for most of the solution, saving both time and money, compared to carriers that must rely on vendors for application-specific capabilities
- Achieve future enhancements by leveraging world-class research from Hewlett Packard Labs in areas such as Quality of Experience (QoE) solutions and protocol advancements

The end game with IoT is to reliably monetize the vast treasure troves of IoT-generated data to deliver value to enterprise applications, whether by enabling new revenue streams, reducing costs, or improving customer experience.

The complex and fragmented ecosystem that exists within IoT requires an infrastructure that interconnects the various components of the end-to-end solution—from device through application—to sit on top of ubiquitous securely managed connectivity, enable identification, development, and roll out industry-specific use cases (like automotive) that deliver this value.

With HPE Universal IoT Platform you get an industry, vertical, and connectivity-agnostic solution with greater scalability, modularity, and versatility. This enables you to manage your IoT solutions and deliver value through monetizing the vast amount of data generated by connected devices including vehicles and making it available to enterprise-specific applications, and use cases both within a vertical industry sector, and across multiple others to enable new business models and revenue streams.

Working with HPE to enable not just the connected car of today, but also the connected vehicles and services of the future, presents vehicle manufactures with an excellent opportunity to accelerate their time-to-value and deliver new, innovated, and interactive services to their customers through the use of IoT.

Learn more at
[**hpe.com/CSP/IoT**](http://hpe.com/CSP/IoT)



Sign up for updates

★ Rate this document