Tech

Connectivity optimizing the automotive industry

orange™ Business Services

Foreword

The number of connected cars is expected to exceed 700 million in 2025[1]. Technological developments, with the generalization of embedded connectivity and the deployment of high-speed mobile networks (LTE, LTE/V2X, 5G), will provide car manufacturers, fleet managers and insurance companies with constant access to data and lead to the development of new use cases.

In addition to the traditional telematics services used for predictive maintenance and optimizing fleet use, high-speed connectivity has spawned a number of other services, including infotainment services, in-car Internet, navigation and driver-assistance systems and, more recently, secure over-the-air updates of embedded software. The offers and revenue models are changing, and this extensive overhaul of the industry is resulting in the creation of third-party players offering new means of mobility, with the surge in electric cars and car-as-a-service (CaaS) for carpooling and carsharing.

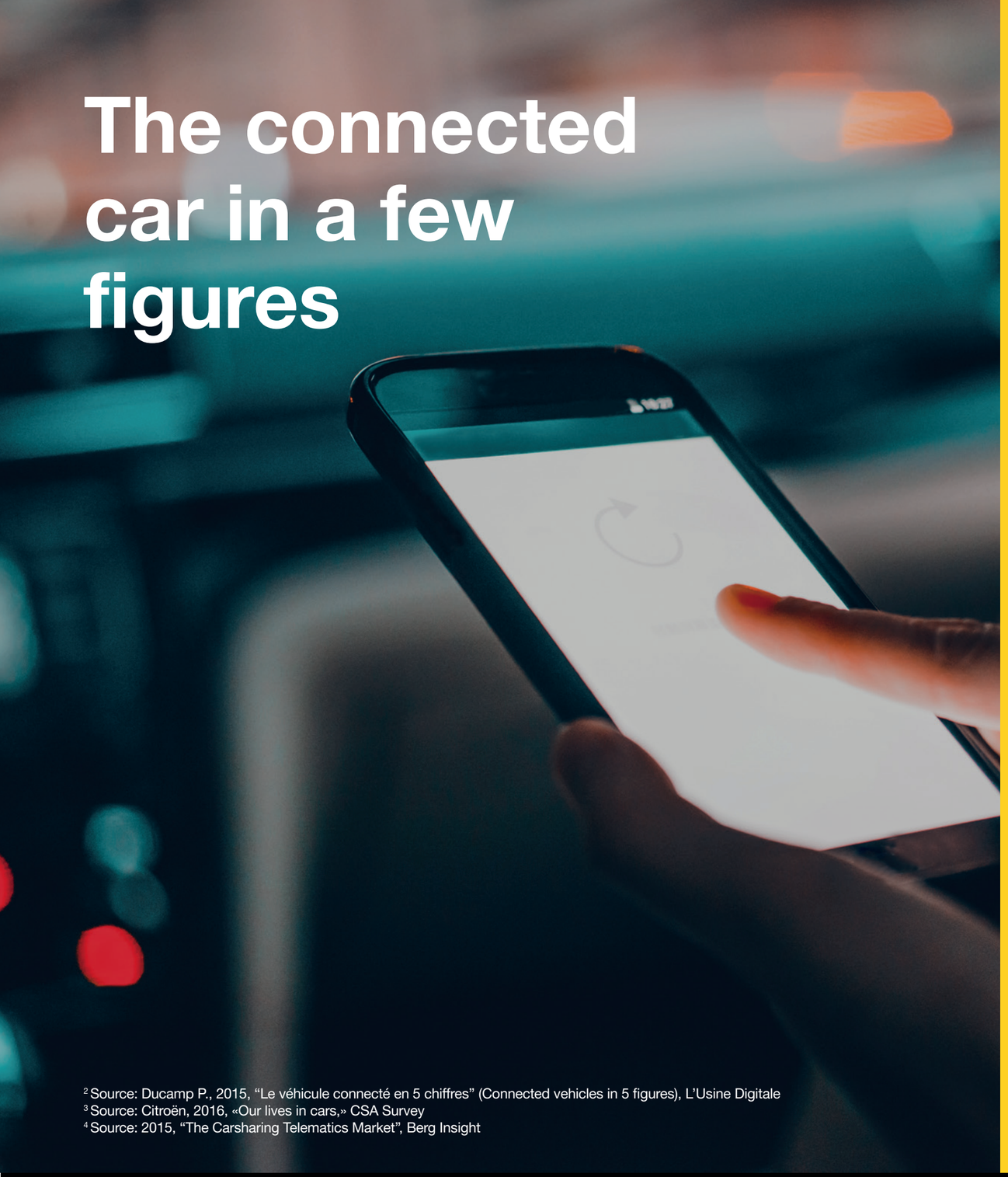
Lastly, connectivity is paving the way for direct vehicle-to-vehicle communication (V2V) and the development of the e-horizon and the autonomous cars of the future. Field data is collected securely in order to create the high-precision databases required for autonomous driving.

With the deployment of autonomous vehicles, passengers' in-vehicle experiences will radically change with uses at least equivalent to those already available in the home and office and service continuity that is crucial for new «mobility consumers.»

Orange is preparing for these future uses, relying on our cutting-edge network infrastructure, our proven understanding and expertise in customer journeys and our desire to work with key partners in the value chain (module manufacturers, vehicle data platform suppliers and managers and content aggregators) to help our customers with the secure deployment of the connected vehicles of tomorrow.

[1] Source: Mackenzie M., Rebbeck T., 2016, "Connected Cars: Worldwide trends and forecasts 2013 -2025," Analysys Mason

The connected car in a few figures



21 million

autonomous cars will be sold each year starting 2025.

4 years and 1 month

spent in their cars over the course of their lives in Europe.[3]

58%

of the vehicles sold worldwide in 2018 would be connected.[2]

26 million

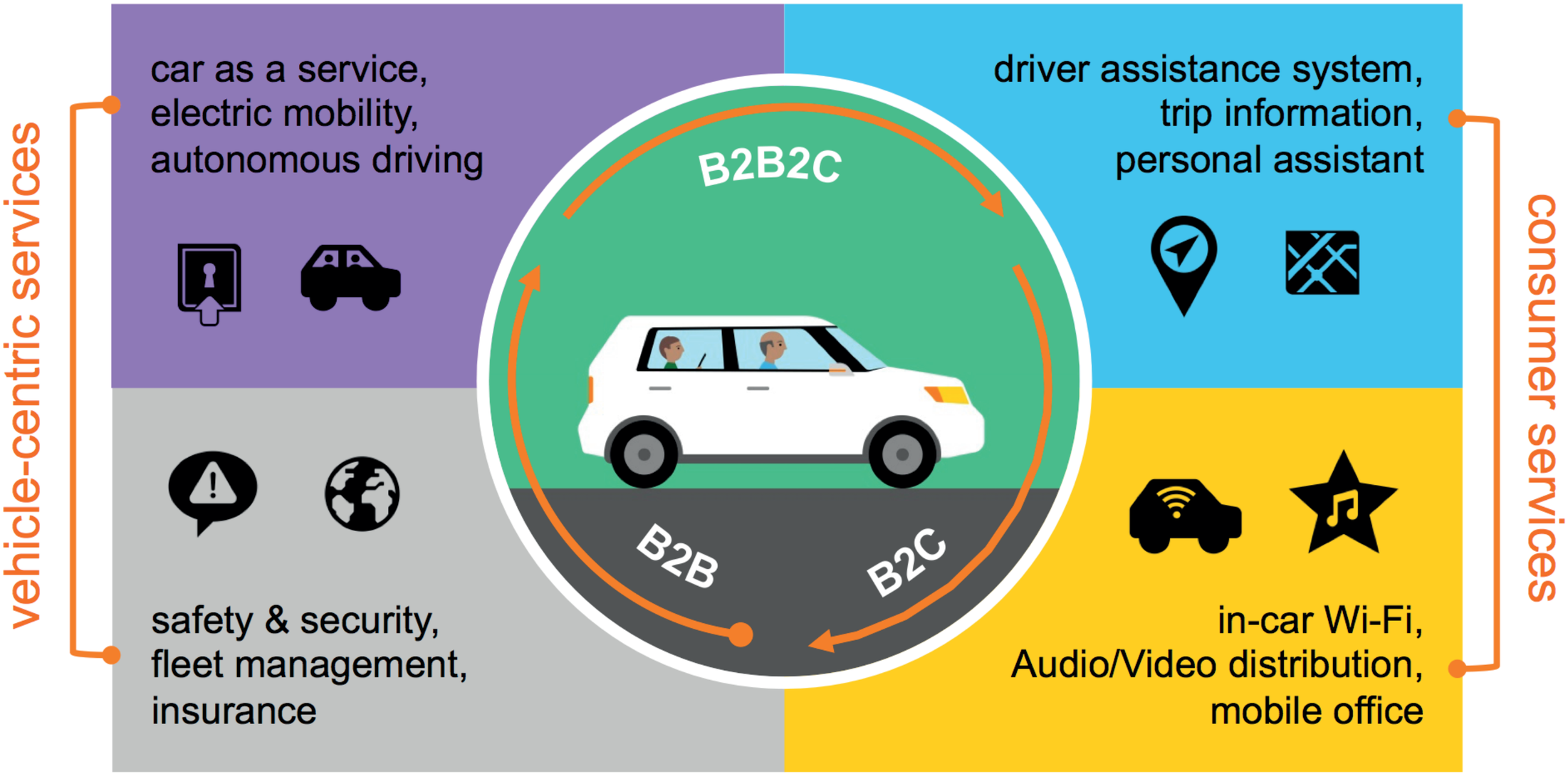
people worldwide will be affected by car sharing, by the end of 2020.[4]

48%

increase of the sale of electric vehicles between 2014 and 2015.

[2] Source: Ducamp P., 2015, “Le véhicule connecté en 5 chiffres” (Connected vehicles in 5 figures), L’Usine Digitale
[3] Source: Citroën, 2016, «Our lives in cars,» CSA Survey
[4] Source: 2015, “The Carsharing Telematics Market”, Berg Insight

Connected Car Services



Challenges in all business sectors

Traditional telematics to optimize operations

Fleet management

The introduction of GPS solutions for fleets responds to the key business challenges of companies that own large numbers of vehicles used by their employees and/or customers (car rental companies, logistics, etc.).

Practical example: Océan

Océan is an Orange subsidiary created in April 2015 specializing in B2B fleet management solutions, eco-driving and GPS solutions. Océan launched O-Direct, an optimized solution for connected car management exclusively available with PSA, Peugeot, Citroën and DS. The solution guarantees the use of data from their fleets and a simplified and secure connection, in real time, to their cars' processors: mileage, consumption and technical alarms.

Insurance and assistance

Data on driving and the vehicle's condition is sent to the insurer who uses a scoring system based on different driver profiles to offer solutions such as Pay As You Drive (PAYD) and Pay How You Drive (PHYD). PAYD uses driving frequency to set the price of insurance, while PHYD rewards good driving – the more responsibly you drive, the less you pay for insurance. In the event of a breakdown or an accident, the insurer is informed in real time and can react by sending the appropriate emergency or vehicle breakdown services.

Practical example: Viasat

Orange provides Viasat – a service operator for Insurance companies – with a connectivity solution that enables telematics devices fitted in vehicles to send and receive data, text messages and calls. Using this in conjunction with a satellite positioning system, Viasat can provide a comprehensive insurance solution worldwide.

Find out more ›

Reinventing the in-car experience

Data interconnection promotes the optimization and deployment of new uses during trips.

Improving driving comfort and experience

Drivers can receive information and advice from the analysis of vehicle use data to improve their driving habits and lower their consumption. This can help improve their comfort and the comfort of their passengers while saving money and providing environmental benefits.

Practical example: WayRay

Orange has helped WayRay to develop a connected box that analyzes the driver's behavior and the security and energy efficiency of the vehicle. WayRay also offers an augmented reality navigation system that projects GPS images and holographic displays onto the windshield. It is the first of its kind in the automotive industry.

Find out more ›

Streamlining traffic conditions

Real-time information feedback using connectivity helps optimize drivers' routes depending on traffic conditions. Many services are being developed based on this dynamic data: intelligent parking solutions indicating the closest available parking spaces and navigation applications offering routes that best correspond to real-time traffic conditions.

Improving the in-car experience

Digitization fosters the deployment of leisure and information services in vehicles. Drivers benefit from better driving conditions, and passengers can use their car journeys for entertainment or work with different applications embedded in the vehicle. Infotainment services (web radio, music and video on demand) and free access to the Internet via in-car Wi-Fi hotspots are developing.

Practical example: Coyote

In order to meet its mobile customers' driving needs and to offer an innovative and distinctive service, Orange has formed a partnership with Coyote. Subscribers in Belgium can download the application onto their smartphones and take advantage of Coyote's driver-assistance service.

Practical example: Renault

With its embedded system R&Go, Renault enables its users to download the Orange Radio application, allowing them to listen to a wide range of web radio stations via streaming.

Find out more >

The car-as-a-service phenomenon

Attitudes toward cars are changing, creating an opposition between “usage” and “ownership”. Urban populations, whose vehicle needs vary, are leaning toward “on-demand” consumption for occasional use or to access the means of transport that best fits their routes.

We are seeing a growing number of rental solutions made possible by the connectivity of the vehicle and its ecosystem, as well as carpooling and carsharing.

The dawn of electric vehicles

New modes of transport are becoming more widespread, including electric vehicles, which are becoming more affordable as manufacturers now offer battery leasing options. The cars’ driving range is improving, and drivers can see their available routes in real time using connected navigation, which calculates routes based on the remaining battery charge, vehicle use, traffic information and the locations of charging stations along the route.

Practical example: Hertz

Orange is helping Hertz, a world leader in its sector, to strengthen its by-the-hour car rental service using its IoT connectivity solutions. Hertz’s 24/7 rental service is currently available via a mobile application for companies and in partner networks, allowing users to pick up their rental car or van at a convenient place, whenever they want and for however long they want.

Find out more ›

Practical example: Car manufacturer

Orange helped a major German car manufacturer to implement a telematics system for collecting and managing usage data from electric vehicles. The manufacturer was able to improve its performance based on drivers’ actual usage and improved maintenance with remote diagnostics and software updates. All of this means that drivers enjoy an optimal experience.

Towards autonomous vehicles

A vehicle design optimized using smart data

Connectivity – and the resulting data – make it possible to use vehicles' actual usage information and to analyze driving behavior to improve vehicle design and prepare for the major changes in the industry (electric propulsion and autonomous driving). Over-the-air software updates for car components are becoming essential for testing and deploying the algorithms of the future. When mass production stage is reached, car manufacturers can update the "car version" remotely without carrying out costly recall campaigns.

Practical example: Tesla

Thanks to the Orange mobile network, French Tesla customers can access driver assistance, web radio and web browsing services in their vehicles. They can also take advantage of remote diagnosis and OTA (over-the-air) updates of embedded software. Using their in-car data plan, which far exceeds current uses of other manufacturers, Tesla regularly updates the autopilot function in order to offer drivers the best automotive innovations.

Find out more ›

Connectivity for autonomous cars

Beyond collecting the camera and radar data essential for the “high definition” positioning databases of tomorrow, network developments expected by 2019, such as LTE-V2X (vehicle to vehicle, vehicle to infrastructure, etc.), will address many use cases in wide-ranging fields like road safety, ensuring smooth road traffic and the comfort of passengers.

The 5G network optimized for vehicle communications or “5G V2X” will take advantage of the V2X ecosystem introduced for 4G, while offering even greater performance in terms of speed, latency and reliability.

The use cases so far tested by Orange include a «see-through system,» in which a driver stuck behind a larger vehicle can see, via a display on their windshield, the road in front of the vehicle blocking them as if they were driving it. “Emergency vehicle” signals that an emergency vehicle is approaching in real time. For this use case, the private mobile radio (PMR) networks used by the police, ambulances and other vehicles could be replaced by a 5G network. Finally, 5G connectivity is also set to turn the truck platooning sector on its head.

Practical example

Orange, Ericsson, PSA and Qualcomm have joined forces to test 5G network technologies for connected cars in the “Towards 5G” initiative. Tests under real conditions will be carried out on a test track in Lure, France equipped with an end-to-end mobile network.

This partnership around connected vehicles aims to improve road safety and provide drivers and passengers with a better experience via new connected services.

Find out more ›

All of the Orange expertise and solutions available to transform automotive products and services

The IoT and Big Data revolution is affecting all areas of activity within the enterprise. For over a decade, Orange has been committed to working with car professionals and manufacturers to jointly explore the opportunities offered by connectivity.

Orange: the lifelong partner for your digitization

- Human skills: 700 IoT and data analytics experts providing end-to-end support
- Unrivaled worldwide coverage with 220 countries and territories served thanks to over 500 roaming agreements
- Global IoT leader with over 12 million connected objects
- Deep understanding of automotive challenges, with 40% of objects connected by Orange coming from this strategic vertical
- Innovative connectivity solutions customized for each use. Comprehensive portfolio of fleet management services with Océan, the French leader in telematics services (120,000 connected vehicles)

An open innovation approach with top-tier partners

- Coordination of a complete ecosystem of partners to strengthen our expertise and offer secure end-to-end solutions
- Participation in V2X (vehicle to everything) co-innovation initiatives and standardization of the eUICC (GSMA)

A trusted operator and security by design

- Orange Cyberdefense, protection for your assets using a global and proactive approach to security
- Guaranteed end-to-end security, from devices and users to data platforms and business applications
- The Orange cellular network, which complies with 3GPP security standards

Our Datavenue offer

Select

Select your objects and your data sources

Connect

Connect your objects securely, based on your needs

Manage

Manage the lifecycle of your objects and data

Control

Control your project's key success factors

Datavenue is our IoT and data analytics offer that combines the best Orange expertise in terms of data analysis and the Internet of Things, while providing a high level of trust and security.
Datavenue includes four modules to meet all your business needs. You can choose one or more modules to best suit your project.

Select

We help you select the connected devices that meet your needs.

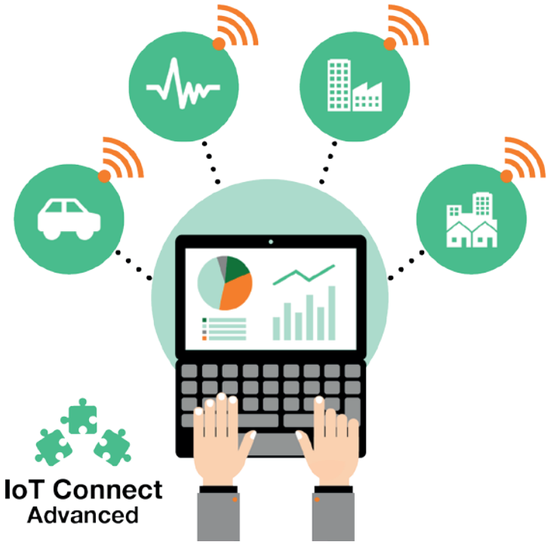
- For original equipment, our teams assess the compatibility and performance of dedicated automotive IoT modules on our mobile network. These results are extended to the footprint of the Global M2M Association (GMA) via a certification program common to its members.
- For retrofit equipment like OBD-II, ADAS cameras, Wi-Fi hotspots and rugged tablets, we provide a catalog of connected objects to help you build the right solution that meets your needs.

Connect

We offer reliable and highly-secure connectivity solutions to transmit your data.

IoT Connect

Through the 500 roaming agreements signed by Orange, IoT Connect provides our customers the best possible coverage, worldwide, with at least one operator per country.



Flexible Lifetime (option)

The life cycle of a car is much longer than a standard connectivity contract. In order to offer manufacturers flexibility in their partnerships and purchasing strategies, we developed the Flexible Lifetime option, which enables OEMs to change their embedded SIM card's operator profile at the end of their contract with complete peace of mind, with eUICC technology.

Bucket Management (option)

Bucket Management (option): Thanks to embedded SIM cards usually used for telematics purposes, users can now take advantage of in-car connectivity to surf the web, stream audio and video, use social networks, etc. With this option, Orange will be able to have a direct relationship with the end user by offering them data through a dedicated online interface.

Multi-Domestic (option)

With the Multi-Domestic option, developed by Orange and GMA members, OEMs will be able to more easily deploy their IoT services to several mobile networks, with a centralized connectivity solution on a single interface with local expertise in every country covered by the GMA and the Bridge Alliance.

Manage

We provide you with platforms to manage the life cycle of your objects and data.

Orange is developing an ecosystem of partners specializing in vehicle data management to meet specific needs related to customers and business sectors: passenger vehicles, light utility vehicles and trucks, fleet management, insurance, carsharing, rental, etc.

The data collected is integrated, stored and managed directly on an Orange or partner platform. You can manage your objects dynamically, in real time, and generate performance indicators tailored to your needs, to optimize your activities.

Control

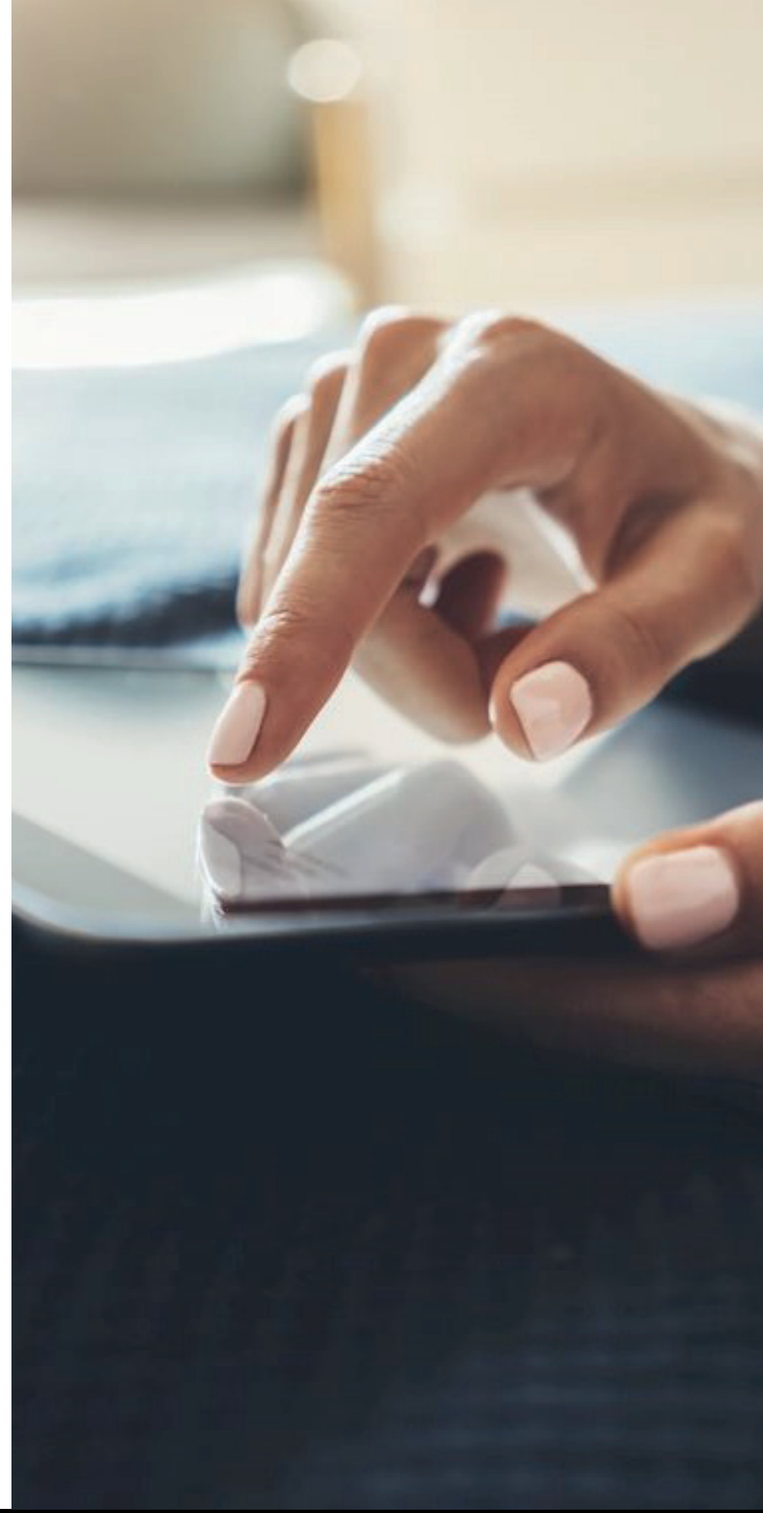
We are at your side at every major step to help you control your project from end to end.

Our 700 IoT and data analytics experts (data scientists, developers, integrators, consultants, etc.) support you at each stage of your project to:

- Provide solution security and sustainability
- Offer advice regarding the implementation of new processes and change management within your organization

Security is particularly critical for professionals in the automotive industry: there are at least 50 generic attack entry points that hackers can exploit in the technical chain of connected cars. To prevent malware or hackers from taking control of connected vehicles, Orange has put cybersecurity at the core of its value proposition with Orange Cyberdefense, a two-pronged security approach:

- The intrinsic integration of security in the services provided by Orange Business Services, whether they are turnkey or tailored solutions, from design to implementation. With specific governance, Orange Business Services can also control the security of the services provided to meet OEMs' needs
- Consulting and audit services. We offer Orange expertise and experience by conducting various assessments and audits for our customers



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