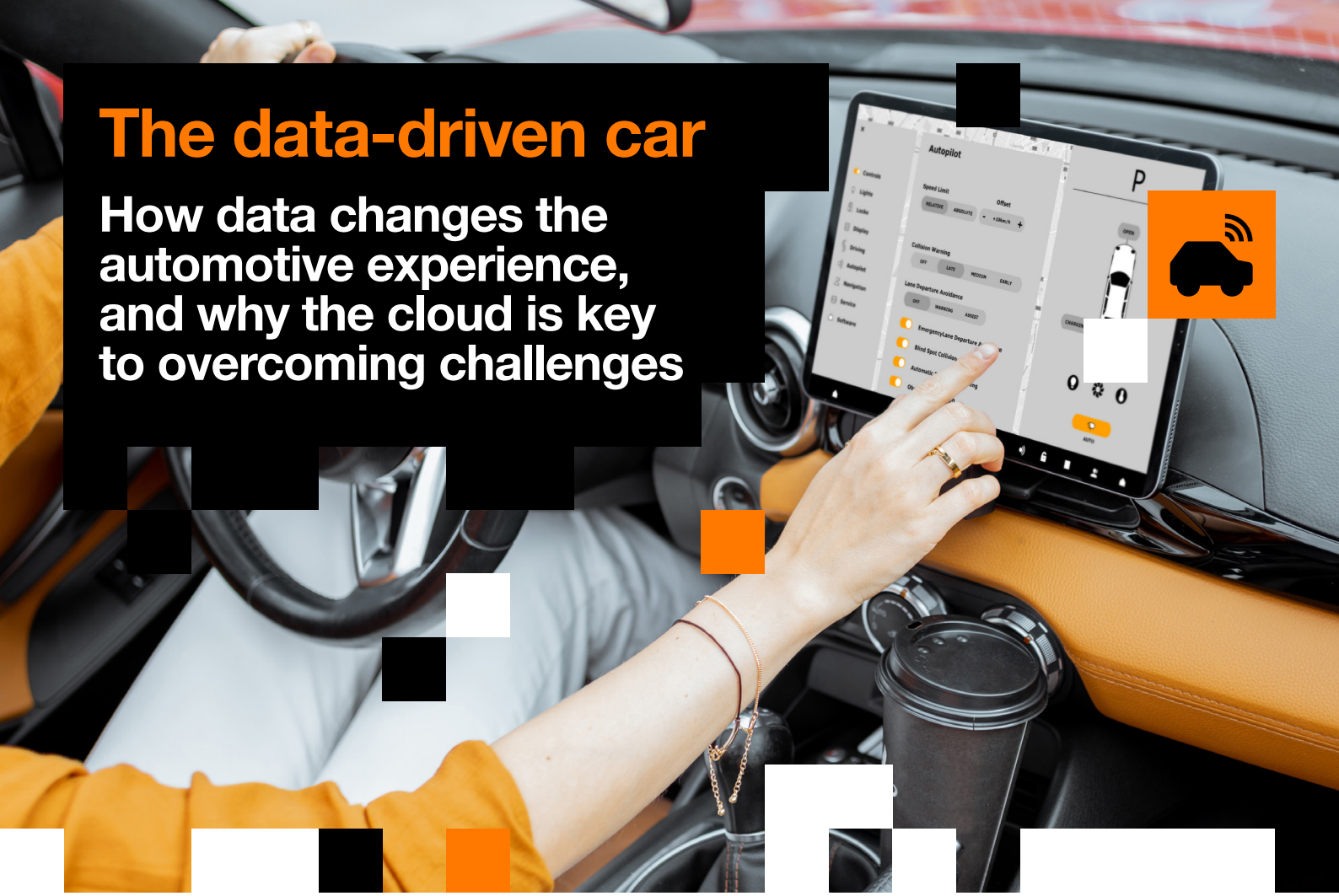

The data-driven car

How data changes the automotive experience, and why the cloud is key to overcoming challenges

Cars have become data-generating machines. Even in 2014, McKinsey estimated that "today's car has the computing power of 20 personal computers, features about 100 million lines of programming code, and processes up to 25 gigabytes of data an hour."[1]

With vehicles becoming less a mode of transportation and more software-on-wheels, those numbers have undoubtedly increased.

The ability to generate, analyze and act upon information is at the heart of the new automotive experience. Innovations and new business models such as electric vehicles, car-as-a-service, and mobility solutions cannot realize their value without OEMs unlocking the potential of their data.

That demands deploying machine learning and artificial intelligence effectively. They need to learn how we use vehicles and inform the development of autonomous driving. Use cases such as hyper geolocation, where positioning can be calculated to within four centimeters, need data, and lots of it.

The challenges of the data deluge

As with other areas of business, there is almost too much data. So much so that finding the right information, analyzing it and then acting upon it is a major challenge.

However, car makers need to overcome that challenge. Accessing data, rapidly understanding it, and using it to trigger responses must happen quickly to realize its full potential. Data must be generated, shared, and responded to immediately for innovations such as targeted advertising, hyper geolocation, and autonomous driving to become viable.

This requires several things to be in place: low latency, scalable storage, and tools operating in a flexible and agile environment.

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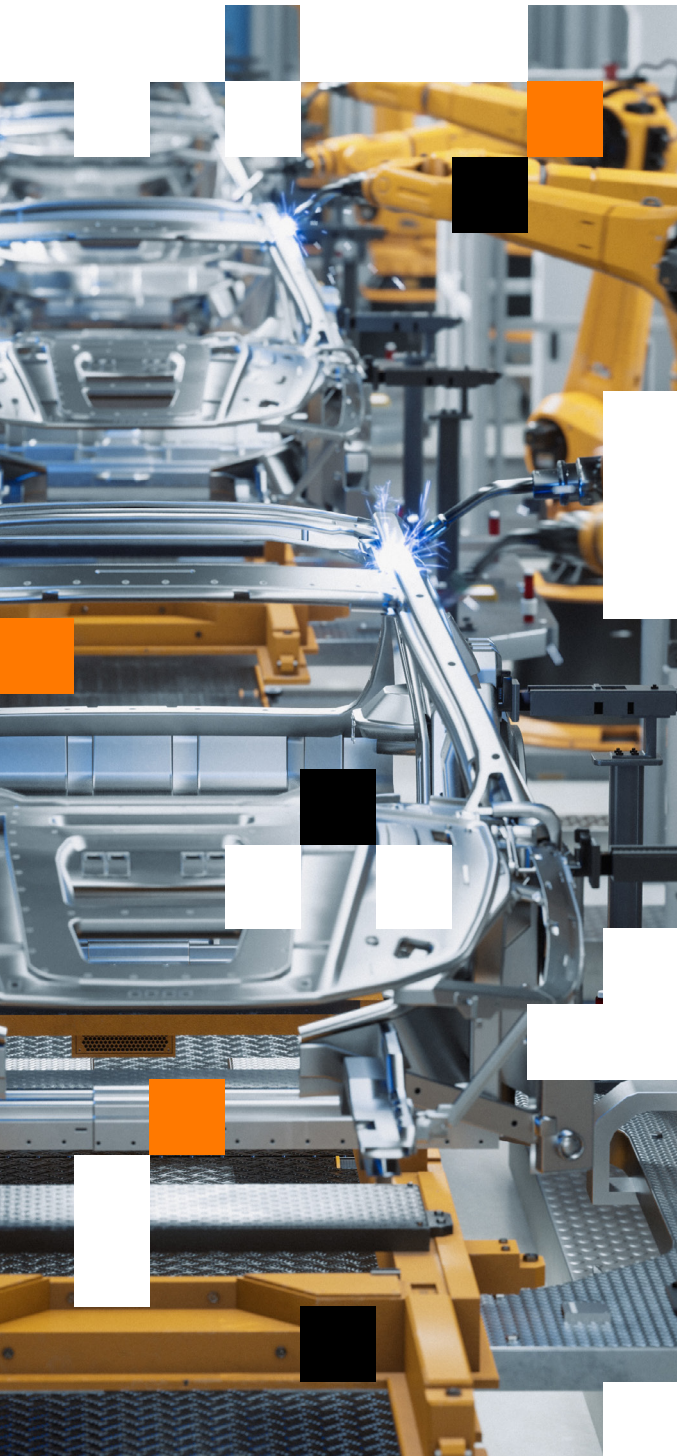
Car in the cloud

On-premises data storage environments do not have the capabilities to meet those requirements. With cars constantly moving, data is being generated continuously at the edge.

Public cloud platforms, however, can deliver the environment needed for car makers to mine the value of their data-generating vehicles, drivers, and passengers. OEMs can deploy virtual storage and compute resources as required, host their databases, and innovate in the cloud using Big Data, machine learning, and AI applications.

And if car manufacturers choose the right cloud providers, questions over data sovereignty can be answered through geographically dispersed data centers. This can ensure that sensitive information is stored in environments that meet regulatory requirements.



Data in action: hyper-accurate location

A public cloud environment is a necessity to enable innovations such as hyper-geolocation. Currently, most location services based on global navigation satellite systems (GNSS) such as GPS and used in devices like smartphones are accurate within a few meters, depending on the surrounding geography.[2] While this is fine for general location and mapping services, it does not have the accuracy that autonomous driving features need.

Hyper-geolocation does. Gathering raw GNSS data into global processing centers, cloud-based GNSS correction tools create new information that can be delivered wherever required. The result is accurate to within centimeters.

Orange Business is working with Geoflex, a leading global hyper-geolocalization provider, to provide this level of accuracy in location-based services. At Linas-Montlhéry Autodrome, a dedicated test center for connected and autonomous vehicles, Orange is developing a proof of concept to evaluate applications in real-time while on the move. Results will be compared with real-time kinematic positioning (RTK) and GPS solutions.

Data in action: training models to improve production and quality assurance

Of course, OEMs can get more from their data than laying the groundwork for autonomous driving; there are significant benefits today.

Using predictive analytics in manufacturing allowed a leading European car maker to accelerate its production of new models without impacting quality assurance.

It built a data platform that allowed it to run machine learning and AI tools, and created a digital twin to retrain and check the deployment of the tools. Machine learning was used to set seat heating, position and radio, while AI let cars drive themselves to parking spaces after production.

Finding the right partners

To deliver all this requires working with the right partners. OEMs need to be working with:

- **Data experts** with demonstrable experience in building and deploying data analytics
- **Machine learning and artificial intelligence specialists** that can specify, develop and integrate the right tools to meet carmaker requirements
- **Cloud providers** that can create the appropriate environments for storing, analyzing and accessing data
- **Digital transformation leaders** with deep knowledge of the automotive sector and access to an ecosystem of other experts

Three steps to using data effectively

1 **Use the cloud:** The only way to access the scale, flexibility, and agility data needs to enable automotive innovation is to use cloud environments. Building your own physical platform is possible but unfeasible. Public cloud services are key to unlocking the potential benefits of data for OEMs.

2 **Data is for now:** The use of data isn't just about laying the groundwork for autonomous driving; applications like predictive analytics, machine learning to deliver enhanced in-car experiences, and digital virtual assistants are viable today.

3 **Build a data ecosystem:** No one can gather all the data they need and transform it into usable insights. We're working with leaders like Geoflex to offer services backed by industry leaders and create ecosystems of partners that OEMs can access.

Why you should choose Orange Business

Orange Business has more than ten years of experience working with automotive leaders, supporting traditional and newer OEMs in developing and deploying new business models. Our capabilities include:

- **Big Data, machine learning and AI expertise**, working with some of the world's most recognizable OEMs to harness the value of their data
- **Flexible Engine,** our public cloud platform, provides the flexible, agile, scalable and secure environment needed today
- **Access to an ecosystem of experts,** including UTAC-CERAM and Geoflex
- **A global presence** to support OEMs in any continent as they access new markets

Orange Business is the digital partner for OEMs seeking a complete connected car solution.

1. https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/whats-driving-the-connected-car
2. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0219890

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