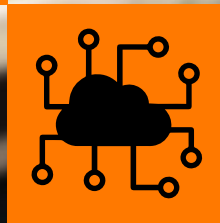


Smart connected products are changing how enterprises work

Transforming the competitive landscape, value chain, and organizational structure



Executive summary

Digital disruption has changed the face of the device market. Connected smart products enable companies to tap into new ways to drive innovation, reduce costs, grow partnership ecosystems, and ignite revenue growth by monetizing new business models.

Connected products are an opportunity for companies across the ecosystem, including chip makers, device gateway creators, OEMs, integrators, software developers, and network and service integrators.

The smart connected products market is growing rapidly: it is forecast that 207 billion connected devices will be in operation by the end of this year¹. These smart connected products range from smart homes devices and connected cars to healthcare, smart cities, smart factories, and precision agriculture.

All smart connected products, be they used in home appliances, smart cars, smart cities, or smart industry, are made up of three key components: machine-driven parts, smart elements including chips, sensors, an embedded operating system and software, data storage, and an interface and connectivity that enable them to connect to the network and the cloud.

They are smart because they harvest and send data within an ecosystem of connected devices using embedded software and connectivity integrated with cloud-based platforms. Data collected is analyzed to support decision-making, enhance operational efficiencies, monitor users' behaviors, and continually improve the product's performance.

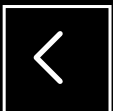
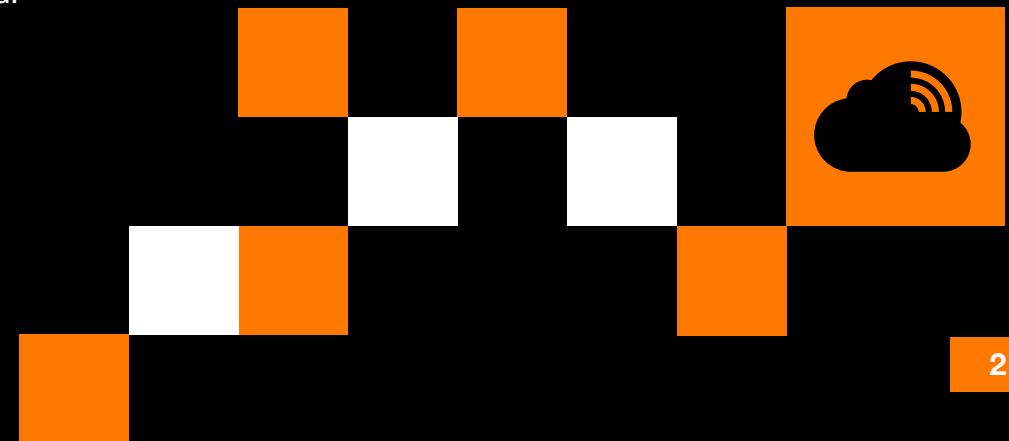
Smart connected products bring significant benefits regarding operational efficiency-enhancing features through software updates, for example. Predictive maintenance addresses failure rates, while product data can also be used to innovate next-generation products, optimizing product lifecycles. Understanding how users use the product also provides valuable information for product development while better managing the user experience.

Maximizing the value of smart connected products

The potential economic value of connected products and IoT is massive and growing. By 2030, McKinsey² estimates the total market value across industries for IoT suppliers could reach \$625 billion to \$750 billion.

With a clear smart connected products strategy, organizations can take a share of what analyst firm IoT Analytics refers to as “one of the biggest market opportunities of our generation”. With such a positive market outlook, organizations need to push ahead with their connected product journeys or risk getting left behind.

This ebook outlines the potential of smart connected products to create differentiation and provide value-added services and new business models across multiple industries.



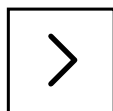
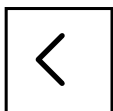
The business of smart connected products

Smart connected products offer significant opportunities for innovative new capabilities and business models across industries. They are already disrupting value chains and inspiring enterprises to rethink the way they work.

Investments in the IoT ecosystem are expected to surpass \$1 trillion in 2026 with a compound annual growth rate (CAGR) of 10.4% over the 2023-2027 forecast period, according to IDC. As the analyst firm explains: “The last few years have shown that connecting with a digital infrastructure is no longer a luxury, but a necessity.”

Consumers are embracing the concept of connected and interconnected devices to improve their daily lives. This includes smart lighting, heating, and security in homes, wearable devices such as smart watches and health monitors, and in-car infotainment and connected safety features.

The availability of inexpensive sensors, increasing computing power, and enhanced mobile connectivity with the arrival of 5G are also fueling market growth. Businesses are leveraging connected devices and are turning to connected devices to streamline operations, enhance productivity, and deliver personalized customer experiences”³.



Smart connected product business models

An effective connected product business model adds value for the customer and enables seamless product monetization.

For example, new business models enabled by smart connected products can replace outright product ownership. Product-as-a-service business models enable users to have access to the product but only pay a small amount.

Connected product business models include:

Data-driven model: This model is based on the value of data the connected products generate. The connected product provides value to the customer and harvests data that can be used for other products or innovations or sold to a third party. For example, energy monitoring devices in large buildings enable the building manager to control energy usage better.

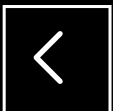
Subscription model: by using a subscription model, companies can create ways of monetizing a connected device via monthly subscriptions and paid upgrades. Examples of services include predictive maintenance as-a-service and car-as-a-service.

Pay-per-use model: Via sensors on connected devices, vendors can monitor a customer's environment, track usage, and charge accordingly. Auto insurance companies, for example, are adopting this model to accurately assess risk and offer personalized insurance, thereby rewarding drivers for safer driving habits.

Asset sharing model: A big worry for enterprises buying expensive machinery is whether they can utilize it to its full potential to warrant the investment. An asset-sharing approach enables the enterprise to sell unused capacity back to the market. IoT trackers can monitor the usage and location of the machine.



“New business models enabled by smart connected products can replace outright product ownership”



Asset tracking: this model uses connected products to track the performance, location, and condition of mobile assets. It enables companies to track assets and their location in real-time. And consumable monitoring makes it easy to know when to replenish coolants and oil in machines so they don't sit idle. Asset tracking can also provide temperature controls on fridges and coolers to protect food inventory.

The outcome-based model: This is sometimes referred to as the razor blade model, which is about selling the consumables that a product uses, just like razor blades. Sometimes, the customer may not realize they have run out and not purchase for some time or go to a competitor.

Upselling model: There is also often a business opportunity to upsell additional products through a connected product; such infotainment in a connected car or video streaming through an EV charging station. Data enhances the value of the connected product, by continuously updating maps in a car, for example.

“There is also often a business opportunity to upsell additional products through a connected product.”



Common reasons to get started with a smart connected products strategy

- 1 Reduce downtime and maintenance costs.
- 2 Boost enterprise growth with new revenue models and improved margins.
- 3 Enhance sustainability and support regulatory compliance.
- 4 Adopt equipment as a service model to grow the customer base and create revenue streams on a recurring basis.



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The technology and ecosystem of smart connected products

There are a wide range of different technologies involved in creating connected products, and the ecosystem involves companies as diverse as chipmakers, systems integrators, and network operators.

Smart connected products are essentially small physical devices with a smart component, usually a sensor, and a connectivity component that allows data to be exchanged and analyzed to create new value chains, business revenue models and use cases.

A connected device typically comprises of the following parts:

- IoT sensor or IoT gateways
- Software embedded in the device
- Antenna design
- Network and connectivity to connect the device to the cloud to transport data
- Cloud service for processing
- Data analytics and AI
- Cybersecurity

What are connected products used for?



Infrastructure: network services, smart lighting, waste and water management



Industry: logistics, manufacturing, distribution, power, construction, mining, safety



Environmental: managing resources, pollution levels, resources



Transport: consumers, commercial, and public transport, including improved driver safety, in-vehicle entertainment, vehicle management, mapping, and traffic pattern reports



Agriculture: crop management, smart greenhouses, climate monitoring, precision farming, irrigation, livestock monitoring



Healthcare: hygiene, telemedicine, wearables, smart hospital, health monitoring



Retail and hospitality: automated checkout, supply chain management, customer service, smart shelves, smart room management



Smart Living space: electronic entertainment, smart homes, electronics infrastructure





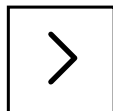
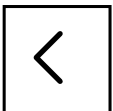
The smart connected ecosystem

The smart connected product ecosystem is a complex system that relies on the interconnectivity of multiple devices, objects, people, and processes that talk to each other to collect and exchange data in real time for further analysis, automate processes, and support smart decision-making. This ecosystem comprises various components, including IoT devices, sensors, networks, cloud platforms, and applications.

In a large system of connected devices, there could be literally hundreds of sensor-controller-actuator processes going on at once, all talking to each other throughout the process. Connected products must seamlessly integrate with applications and cloud systems to connect with each other and other systems through the internet.

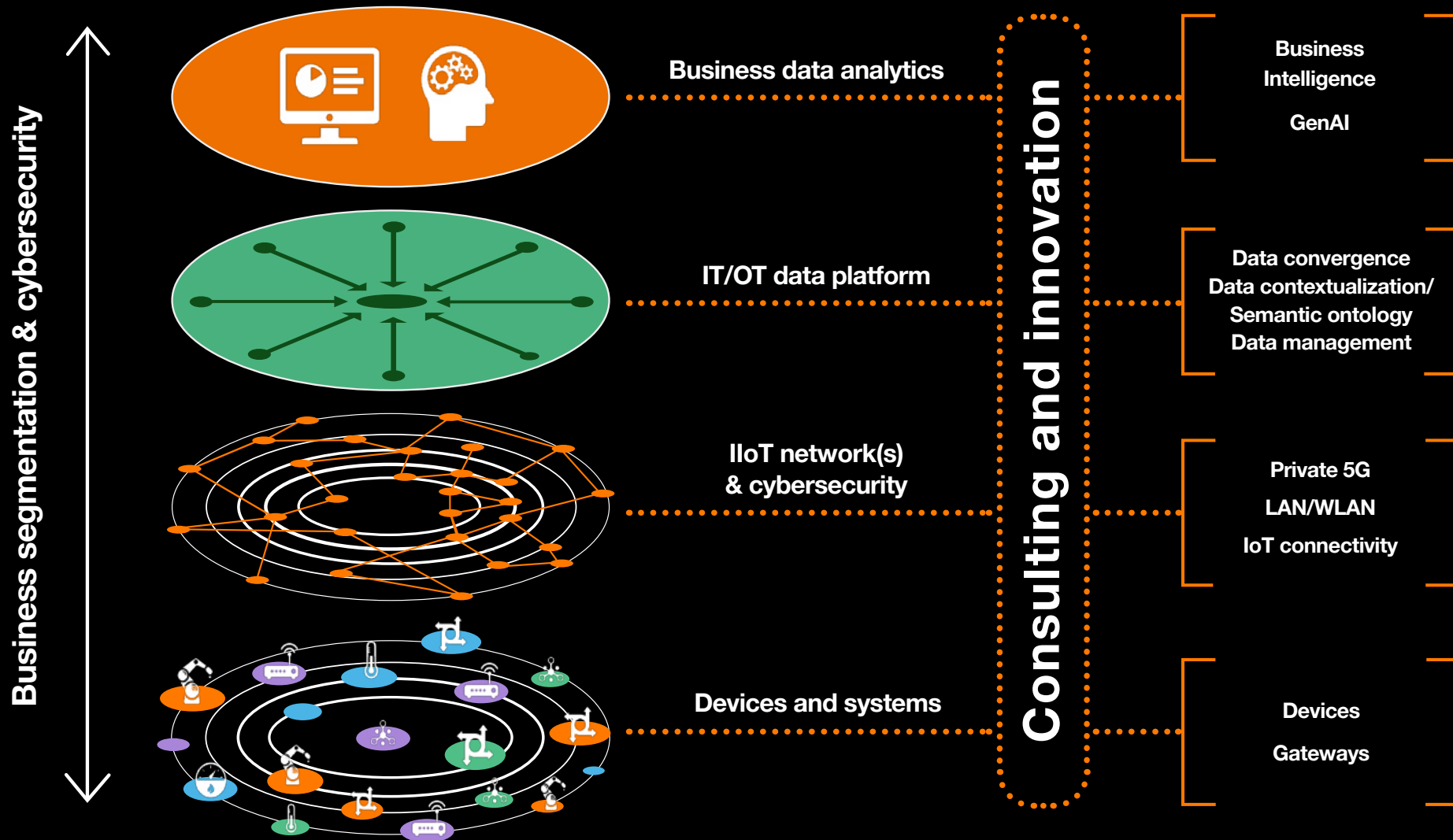
Connected products contain embedded processing chips, software, and sensors. They require connectivity and data processing to collect and process the data. Due to the complex nature of this ecosystem with so many interrelated players, extensive knowledge of wireless networks and communications protocols, including Wi-Fi, LoRA, and 4G and 5G networks, security standards, data processing, machine learning, and analytics is essential to make them do their jobs securely, exchange data and make share decisions. Thus, the ecosystem is made up of numerous players, including:

- Chipset makers
- Device and gateway makers
- OEMs such as car manufacturers who are building the end product
- Network operators
- Service providers
- System integrators
- Software developers
- Antenna providers



Connected products ecosystem

Digital foundation as the key enabler



Challenges facing enterprises deploying smart connected products

Smart connected products are revolutionizing the world in which we live, but they are not without their challenges when it comes to deploying them.

With multiple smart products connected to the cloud, scalability, flexibility, and network connectivity become challenging. For example, an integration that works with one cloud and network doesn't necessarily replicate to another.

Great potential usually comes with significant challenges, and smart connected products are no exception. These issues, which include expanding data sets and lack of standardization to scalability, security, and integration, are outlined in more detail below:

Expanding data sets

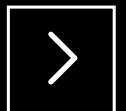
As more devices connect, the larger the data sets that need to be processed. This makes it increasingly difficult for enterprises to pinpoint valuable data assets. To overcome this, a high-performance analytics platform is essential to harvest data that brings the most business value.

Lack of standardization

The issue is that many different manufacturers make connected products, and data protocols can vary and be fragmented, making it extremely difficult to develop a unified standard that works across all devices. This can lead to integration and compatibility issues.

Security issues

Ensuring compatibility and interoperability is not easy with many connected products, protocols, and platforms. This opens up vulnerabilities that attackers can exploit. Default credentials and weak passwords can also leave devices open to unauthorized access. Because connected devices are often small, they are vulnerable to physical tampering, which may lead to system outages and loss of sensitive data. In addition, they are often scattered in physically unsecured locations, which puts them at more risk because of their small format.



Scalability

The rapid growth of connected products demands that cloud platforms can handle data from a large number of data sources while maintaining both performance and reliability. These platforms must be able to scale up and down without causing downtime.

Integration issues between smart connected products and apps

Handling data interoperability across smart connected devices and their ecosystems is complex and requires integration skills. Devices come with connectivity protocols and compatibility requirements that must be considered to avoid frequent disconnects and other integration issues.

Orange Connected Validation program drives IoT innovation

If you are a connected device manufacturer or deploying a connected product use case and want to validate your connected object with the Orange network, you can join the Orange Connected Validation program.

The tests used in the Orange Connected validation process are more extensive than those used by standards organizations. This includes more extensive real-world and operational testing alongside quality and security guarantees.

The program is open to all Orange IoT business partners and provides a single point of contact for several tests. Devices undergo an assessment stage and are then put through compliance and control testing in a laboratory and in the field. This includes interoperability and energy consumption.

If successful, the device is awarded the “Orange Connected” label, which can be promoted on devices, marketing materials, and websites. Validated devices will also feature in the Orange IoT worldwide catalog.



Connected products in action: the Orange Business approach

Along with our extensive ecosystem of partners, we offer complete solutions including sensors, applications, connectivity, data and equipment management platforms.

The approach depends on what the company wants to develop, whether they are an OEM, a device maker, or a trail-blazing end-user. Consultants initially run an assessment to see what solution is required. Once this is agreed a proof of concept (PoC) is created to validate certain precise elements of the concept.

IoT connectivity

Tiko – developing innovative energy consumption optimization solutions



Tiko was looking to extend its energy-saving program. The company has been offering solutions that connect to existing devices, such as electric heaters and heat pumps, turning them into connected ones to help customers save energy

and make substantial savings. The company was looking to create a simplified digital solution.

Orange Business and its IoT Continuum partners Sierra Wireless, LACROIX, and STMicroelectronics are supporting Tiko in producing and deploying a fleet of 800,000 connected devices in France over five years. These devices will control electric radiators remotely via the Orange LTE-M network to optimize consumers' home heating



consumption. LTE-M is a network technology dedicated to connected objects, operating on the 4G network.

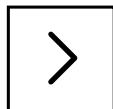
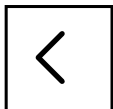
System integration:

Wielton Group takes vehicle monitoring to a new level



Wielton Group, one of Europe's top three manufacturers of semi-trailers and truck bodies, was looking to further develop and implement telematic solutions in vehicles through its subsidiary, Aberg Connect. Using Orange Business integration skills, connectivity, and chips, Aberg has developed a connected Tire Pressure monitoring system (TPMS) to improve safety and satisfy and comply with EU regulations.

Aberg Connect's telematic capabilities also make it possible to track the vehicles' location, speed, and many other parameters, including axle load and other signals indicating the vehicle's condition. The company is now working with Orange Business on future smart connected products that will optimize the performance and longevity of trailer fleets.





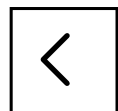
Private cloud

Car maker improves resilience and service offering with private cloud

A car maker wanted to enhance digital service offerings and strengthen resilience and interoperability by utilizing its own private cloud infrastructure.

Orange Business worked with the carmaker to enable it to offer B2C services to customers across Europe. This included providing superior cellular connectivity and access to eCall, an initiative by the European Union intended to bring rapid assistance to motorists involved in a collision anywhere within the region.

Orange Business provided bespoke process design to fully integrate SIM care provisioning within a secure cloud-based management platform and cellular network-based connectivity. Orange Business provides comprehensive roaming agreements for the best possible service accessibility.



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OT & IT security

Veolia Water Technologies – addressing modernization and security



Veolia Water Technologies, the digital solutions arm of French utility services company Veolia, was looking to improve the analytics and security of its Hubgrade water cycle management platform. The Hubgrade product is a visualization platform for utilities and municipalities to manage data related to water treatment plants and equipment remotely.

Orange Business supports the project with more than 25 types of expertise around digital, AI, IoT, data analytics, and cloud, as well as cybersecurity with Orange Cyberdefense to provide end-to-end security. In addition, Orange Business utilizes its extensive knowledge of business data collection solutions from its experience with the industrial sector. The solution will enable the company to digitize water monitoring services securely, enhancing customer service while reducing monitoring costs and shortening diagnosis times.



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Haier Europe

A secure cloud-first platform to maintain a competitive edge



Haier Europe, a leader in the domestic appliances marketplace with household brands Hoover and Candy, was looking for a secure, future-proof platform to support every step of its connected transformation journey and give it a competitive edge.

The multinational has chosen Evolution Platform, combining Orange Business global cloud connectivity and embedded cybersecurity capabilities. The technology combines the cloud-like experience of network-as-a-service with an open ecosystem, enabling Haier to access solutions that best satisfy its business needs and innovate new connected product business models.



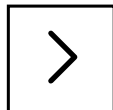
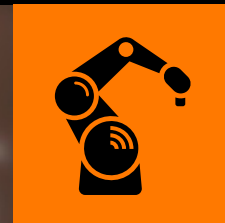
A single solution for data collection and device management

The secure, scalable and open Live Objects IoT platform from Orange features core functionalities required to connect and operate IoT projects, and analyze harvested data. Live Objects is a multi-protocol vendor agnostic platform making it compatible with a variety of communications technologies from 3G and 4G to dedicated IoT LTE-M sensors.

Live Objects is an a la carte service for connecting devices to your data system. Data is secured from end to end and available in the cloud of choice. The Live Objects service hosts and supervises these connectors. By integrating connectivity, cloud, and cybersecurity, Live Objects helps industrial companies achieve significant increases in operational efficiency by streamlining data collection and processing.

Data collected via connected devices can be viewed in both Live Objects dashboards and partner applications via APIs to improve business line processes and optimize equipment management. By placing sensors on devices, Live Objects can provide data on various areas from usage and charging time to wear rate and location.

Live Objects also enable enterprises to create innovative services. An insurance company, for example, can equip its customers with connected smoke detectors and get reports in real-time and interventions triggered automatically. This can improve customer safety and provide a competitive edge.



Why Orange Business

We understand every element needed to build smart connected products. Our extensive experience and skills in this arena will help you make the most of new business opportunities and differentiate with connected smart products.

We know that harvested data needs to be stored and managed. Orange Business provides multicloud integration capabilities and owns device and data management platforms designed to meet your specific needs. Our digital and data experts can help you develop the tools you need to transform raw data into highly valuable insights and optimize processes.

To find out more about how you can enhance efficiencies, deliver real-time insights, and enable seamless customization with smart connected products to drive your business outcomes, visit <https://www.orange-business.com/en/business-needs/operational-experience-optimize-industry-digitizing-processes/connected-smart-products>

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3. IDC Worldwide spending on the Internet of Things <https://www.idc.com/getdoc.jsp?containerId=prUS50936423>

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In addition to our connectivity services, we provide a full set of integrated service options, including data analytics and visualization tools. This enables our customers to make the most of the data they collect from their connected devices. Here is a snapshot of what we offer:



Consultancy-led services to identify the most relevant use cases and define the most appropriate technical solution.



Professional services to design and deploy the solution in the field, taking into account local requirements.



Security is paramount. Orange Cyberdefense has 3,000 cybersecurity experts. It continuously develops cybersecurity tooling dedicated to connected and OT environments.



3,900 digital, data, AI, and IoT integration experts.



30.7 million connected objects managed by Orange Business every day.



Customer Innovation Center testing for the latest technologies.



2,600 experts to conceive, implement, and operate your cloud.



1,600+ data experts.

