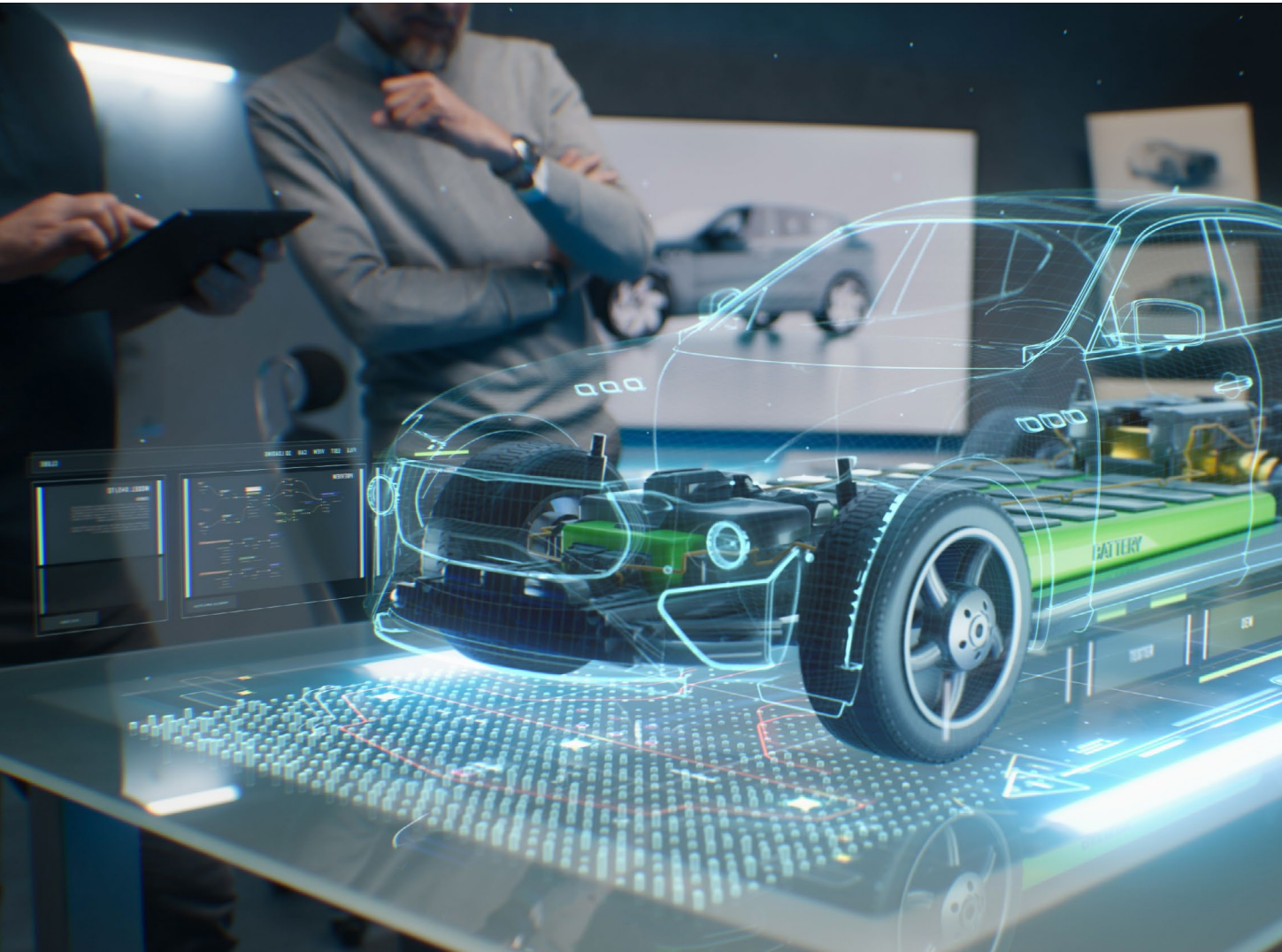


Deloitte.



Revamping Automotive Sales and
Supply Chain Management
Client Success Story





The Ambition

Imagine a future where your customers can always find vehicles in the showroom that meet their changing demands. A future where the automotive supply chain uses advanced automation to detect and resolve potential problems well before they affect the production line. Thanks to our robust cloud platform solution, which is tailored to the specific business needs our automotive OEM client, we are playing an active role in making this vision a reality. The desired outcome is higher client satisfaction and a more stable supply chain, but also large volumes of company-wide data readily available for a wide range of applications. Join us as we explore this journey of transformation.

Before the revolution: the automotive supply chain as it was

Sales and supply chain processes used to pose significant challenges for our client. Much of the workflow relied on manual effort to customize and manage stock vehicle orders, which was time-consuming and inefficient. Trying to predict customer demand was another obstacle; without a data-driven solution, their often inaccurate forecasts led to a growing volume of unsold vehicles and underutilized resources. The client also struggled with its highly complex supply chain and lacked the data visibility and predictive analytics needed to identify potential conflicts in advance. So, when issues arose, they were not only difficult to resolve but often had costly downstream impacts as well.

Recognizing the need for a serious change, our client decided to evolve their planning, ordering and production processes and confront these challenges head-on. The client decided to use

Microsoft Azure Cloud for their new solution, choosing Deloitte's Microsoft Technology Services Practice as the strategic partner to design and deliver an effective cloud solution.

Our vision was to create vehicles today that would be in demand in the future. If we could better align the vehicles with future customer demand, we could shorten the time to sale at the dealerships. Being able to automate processes like these could also drastically reduce the manual effort involved in vehicle customization and order placement. When the orders in the pipeline are already set to match future demand, this would automatically improve the supply chain process and give us ample time to react to any unforeseeable issues down the road.



The transformation: cloud-enabled solution to improve supply chain processes

Building on our industry experience and a deep understanding of cloud architecture, Deloitte designed a secure, scalable platform using Azure technology. Our solution transformed the entire operational value chain for our automotive client, leveraging advanced analytics, intelligent automation, data processing and storage, and cloud modernization to improve delivery and sales prediction, production stability as well as supply chain and capacity management.

We started with a careful analysis of our client's existing processes and a brownfield deployment of the Azure cloud infrastructure to identify specific business requirements and improvement areas. Our solution involved migrating components into the client's existing legacy system as well as developing new applications within their infrastructure to improve component interaction as well as the overall functionality of the system.

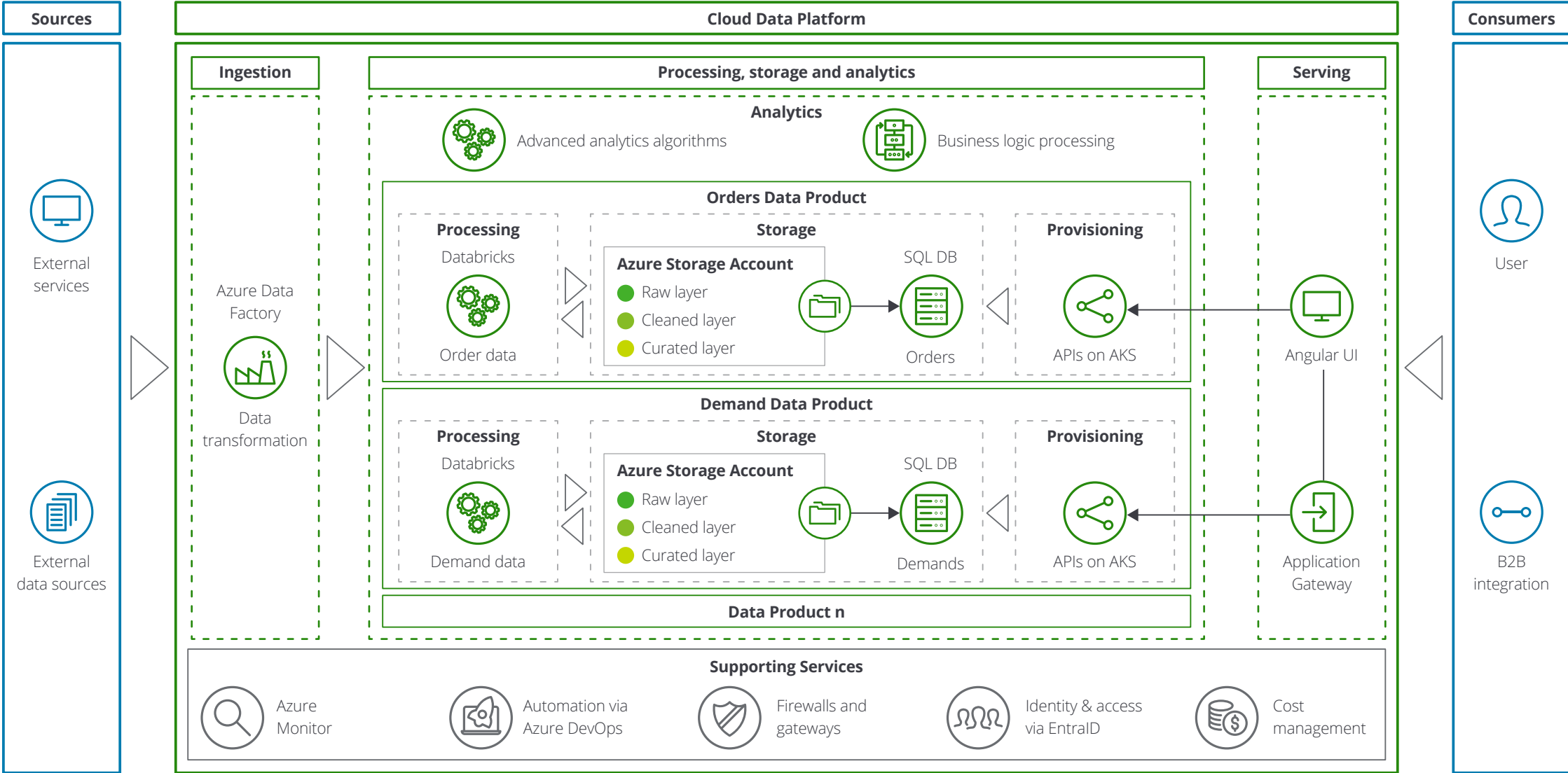
In the diagram below, you can see the architecture we developed to meet the needs of our automotive client. The best way to solve the problems of the present is to look to the past. Relying on a data-driven approach, our architecture ranks the recommended vehicle configurations using both historical data and machine learning to predict market trends, forecast demand, and even optimize for sustainability goals such as a lower carbon footprint. Basing actions on data rather than solely on human judgement empowered the business to make smarter, more precise choices when it comes to configuring vehicles for future order placements.

A central feature of the architecture is data mesh design, which consolidates historical and current data from across the organization into a single, accessible source. This unified data platform makes data available whenever and wherever it is

needed for machine learning models and analytics to streamline processes across sales, production and the supply chain. That way, the client can rely on the system to not only anticipate demand but also actively monitor the potential impact on the supply chain from each vehicle configuration, making adjustments as and when needed to keep operations running smoothly.

Leveraging available market data to plan ahead, our solution helps the client achieve a more stable supply chain, reduce risks due to issues such as part shortages and better align production with sales forecasts. This data mesh architecture keeps our source data up-to-date and centralized, regardless of the business process currently utilizing it.

Fig. 1 – Simplified Architecture



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To meet the various needs of the client's business processes, we created a range of data products tailored to specific use cases. There are four core components to every data product: the storage account, the Databricks notebooks, the SQL database and Kubernetes. We also developed a micro-frontend user interface that communicates with APIs in all our data products. This modular approach ensures that each product is scalable, adaptable and able to evolve as the business grows.

The data ingestion and processing pipeline is built on Azure Data Factory (ADF) and Azure Databricks, giving our solution the flexibility and scalability the client needs to handle large data sets. Using medalion architecture, the data flows through three layers: Bronze (raw data), Silver (cleaned and enriched data) and Gold (curated data ready-for-analysis). Once data is processed and refined, it is stored in

SQL Server databases, making it easy to query and integrate into APIs or other services. The data is well-organized and available when the client needs it thanks to this structured approach.

APIs serve as the bridge between the data and various services in the system. These APIs run on Kubernetes clusters that offer scalable, resilient management of batch and real-time processing workloads. Automation takes this architecture to the next level — monthly demand predictions and other background tasks run automatically with WebJobs and Workers — which means less manual intervention and smoother running operations. For example, the system suggests optimized vehicle configurations for future orders at certain pre-decided intervals over the year, depending on current market trends. With this set-up, we can automatically trigger and execute pipelines without relying as much on manual input and maintenance.



The Angular-based user interface (UI) displays actionable insights in an intuitive way. Users can easily interact with the system, accessing data such as vehicle configurations generated by machine learning models or visualizing how the final vehicle will actually look. We built a secure access to the UI using an Azure Application Gateway, which also supports B2B integrations for seamless collaboration with external partners and systems.

The Continuous Integration and Continuous Deployment (CI/CD) pipelines we included are managed via Azure DevOps and allow the client to automate the deployment of new features and updates. Our CI/CD pipeline design keeps the system up to date, improves time to market for new features and reduces the risk of human error.

The solution also includes a control tower with advanced tracking and monitoring features built using Azure Monitor Application Insights. In addition to centralized oversight and operational effi-

ciency, this approach makes our operations safe, secure and regulation-compliant.

Deloitte worked with the client to roll out the solution successfully in a predefined pilot market and validate the solution with external and internal stakeholders. Based on the market findings, we then used our learnings to tweak the solution, scale it for further markets and add additional features.

The architecture as implemented delivers a secure and scalable solution that not only meets the client's needs but also supports future growth. Relying on cloud services, data mesh principles, medallion architecture and automated scheduling enabled us to create a system featuring easily accessible data, predictive models for better decision-making and automation to reduce the manual workload. Our solution gives client what they need to stay ahead of market trends and achieve efficiency gains in the highly competitive automotive industry.

“Automation and predictive analytics as part of our solution have significantly improved our client's production stability and customer satisfaction, allowing them to stay ahead of market trends and reduce manual intervention.”

Tom Miller, Director, Lead Architect Microsoft Technology Services Practice Germany

The Benefits

The success of our project comes down to several key factors: our deep understanding of the industry and the client's business, our expertise in Microsoft technology and Databricks, and—most importantly—a strong relationship with our client based on mutual trust. Bringing all these elements together enabled us to deliver a solution that made an impact that matters to our client's business.

Technological achievements of our project:

- The robust cloud-based architecture we designed became the blueprint for other projects in the client's ecosystem.
- Our APIs allowed the client to reuse data products across the client's ecosystem and deliver performance benefits to consumers with similar use cases.
- We reduced overhead costs by optimizing the ingestion pipelines using scheduled triggers.
- The client was able to reuse the solution we built on Azure Data Factory and Databricks for global scale-ups, even pivoting to a similar product for other vehicle types.

This new solution is already delivering strong results for our client's business:

- Measurable increase in customer satisfaction, production stability, accurate capacity management
- More reliable order planning up to several months in the future
- Reduction/elimination of human intervention and prediction in the ordering process
- Positive impact on carbon footprint of the overall fleet by factoring CO₂ emissions into production planning



Do some of these challenges sound familiar?

Are you curious to know more?

Don't hesitate to contact our experts and discuss how we can find smart solutions to your business challenges that match your ambition and that of your customers.

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