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Discover how T-Systems is transforming existing landscapes with digital technologies for innovation in the vehicle and the core processes of automotive manufacturers and suppliers. “Automotive” has been an important pillar of T-Systems for over two decades, with many automotive companies relying on its expertise. According to a recent study by the Information Services Group (ISG), T-Systems is one of the front-runners for connected car platform services, with more than 30 million vehicles. In 2022, T-Systems was recognized as the largest IT service provider in the automotive industry in Germany - for the 13<sup>th</sup> time in a row by the trade magazine “automotiveIT”. T-Systems has been supporting some of the biggest automotive manufacturers, dealerships and international suppliers with vehicle software and connectivity, digital customer experiences, the digitization of the company, and secure cloud computing.

With this selection of successful customer projects, we want to inspire you.

What would you like to achieve for your company?

Let's shape the future of Auto, together.

Happy to get in touch,

Hermann Hänle,  
Senior Marketing Manager Automotive

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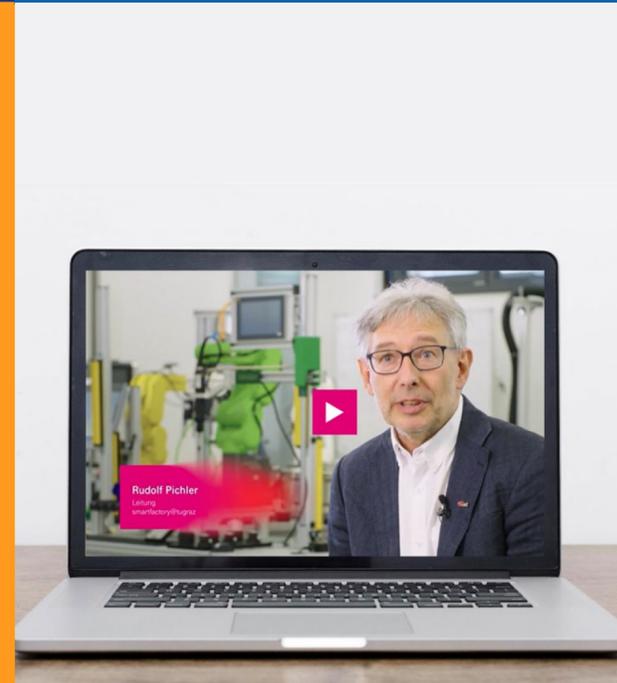
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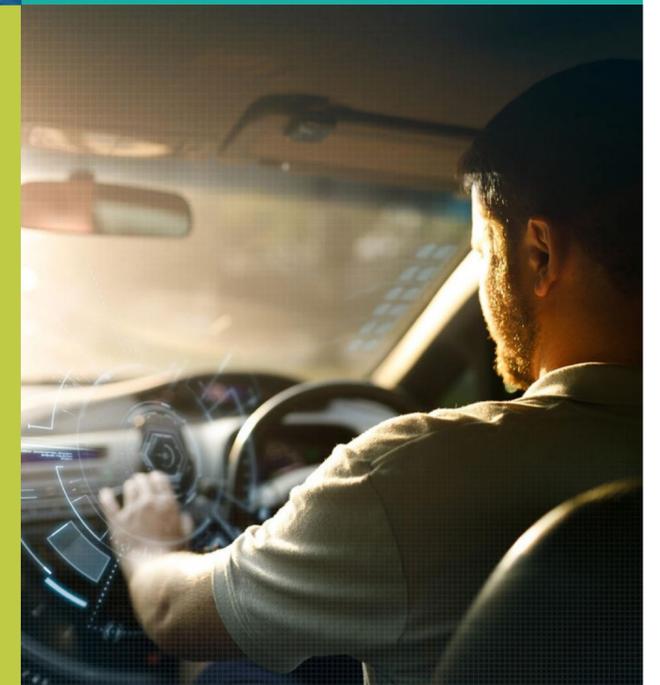
**Continental:** Stability  
and cost efficiency  
with Future Cloud  
Infrastructure for a  
flexible SAP basis  
operation



**Mercedes-Benz:**  
Ensuring product quality  
for premium vehicles  
with a diagnostic  
application for vehicle  
tests in passenger car  
production



**DÜRR:** Universal Data  
Converter optimizes  
processes, leading to  
flexible, high-quality,  
efficient production



# T-Systems and Mercedes-Benz do Brasil develop an innovative application for drivers and fleet owners

Utilizing customer feedback for the development of an advanced solution with monitoring and gamification features

**“Working on the development of an app that has a lot of added value with the agile methodology has brought to T-Systems a very valuable growth and exchanges with Mercedes-Benz.”**

Isis Fioretti, T-Systems Account Manager for Mercedes-Benz do Brasil

Over the years, Mercedes-Benz do Brasil has invested heavily in high-tech services to improve the performance of its drivers, and consequently, improve the fleet owners' businesses. A testament to this is Fleetboard telemetry, a management tool that produces detailed reports on fuel consumption, distance traveled, route difficulty and other conditions related to the registered vehicles.

In other words, Fleetboard is a performance monitoring and evaluation solution that helps in the reduction of operating costs and the risks of accidents. Recently, Mercedes-Benz has joined hands with T-Systems to develop another state-of-the-art solution that aims to monitor the level of driver performance and use of the driver, the “Liga na Estrada” application.

## The solution

Having emerged from the rising demands in the market, the main objective of the Liga na Estrada application is to reduce fuel consumption, extend the life of components and prevent truck accidents. However, it is necessary to track the amount consumed, which is why the application has a monitoring feature capable of generating this data accurately while evaluating the behavior of active drivers.

In summary, Liga na Estrada unifies the information and sends it directly to the driver through the application itself. This ensures that the driver has the necessary information about his performance and an understanding of the aspects that can be improved.

In addition to working with Fleetboard, Liga na Estrada was inserted in Mercedes-Benz do Brasil's intra-entrepreneurship program, the Incubator, to encourage company employees to think about new ideas and solutions to optimize internal processes and apply them in a startup model using Agile Methodology, solving existing problems and identifying opportunities through innovation.

According to Isis Fioretti, T-Systems Account Manager for Mercedes-Benz do Brasil, the Agile Methodology advocates an approach that is not just limited to creating a certain solution to solve specific problems but also understanding the user's pain points to deliver value. This is a focus for Isis as well.

Both the Liga na Estrada app and the Incubator program reinforce Mercedes-Benz's commitment to technology and digitization to facilitate the driver's day-to-day life and ensure the quality of service provided by the fleet.



Customer Experience

## Gamification

Along with the monitoring resources for generating accurate reports, Liga na Estrada also features a gamification functionality which allows drivers and their managers to create competitions and groups within the app itself. This is done to motivate and encourage the drivers to engage and monitor their performances continuously.

Amidst the praise for the “game”, there was also constructive criticism (and even a request) from customers who participated in the pilot. According to them, there was a need for the inclusion of drivers who until then did not have access to the app and would also like to participate and contribute to the dynamics of the tool.

With the constant use of the tool by the drivers to excel in the competition and achieve good performance, the excitement generated with gamification helped in significant improvements in the drivers’ performance. The drivers were able to use the solution to pay attention to the metrics obtained during the trips and make significant performance improvements, particularly conscious fuel consumption (one of the priority items of companies and people) and the reduction of accidents and maintenance costs. Moreover, with the improvements in performance, the trucks now needed fewer emergency repairs.

Gamification has been one of the main attractions of the application, generating high levels of interaction and engagement for drivers, who displayed a lot of enthusiasm for the league and, consequently, a genuine interest in using the tool correctly and constantly.

## The voice of the customer

The Liga na Estrada development process involved Sprint models. With each delivery, the project participants validated the results with customers to make all the necessary changes and make the application compliant with the proposal. Involving the client during project development is fundamental to understanding the end-user’s needs and ensuring a positive experience.

This initiative puts into practice the great motto of this project, which is also the commitment of Mercedes-Benz do Brasil, “The roads speak, and Mercedes-Benz listens to every voice”. According to Isis Fioretti, “The development team embraced the cause and treated the project as if it were a son.”

There were constant efforts taken by both T-Systems and Mercedes-Benz to listen to the customers and understand their needs. These were further discussed with IT teams and presented in the application’s strategic planning meetings. This dialogue helped in avoiding misunderstandings or conflicting information that could jeopardize the development of the app.

With this, Mercedes-Benz and T-Systems teams received feedback regarding the improvement points to be considered during this initial stage of using the solution. This allowed the team to ensure that all possible pain points were mapped during sprints, thus reducing rework and major post-launch modifications.

In addition to the gamification attributes, the application was also praised for its enormous practicality during the performance analysis process. Since the platform is directly accessible by the drivers, it does not require any action by the manager, who previously had to print several reports and constantly share them with his employees.

**“We have to understand the customer and build the solution based on his pain.”**

Luciano Abrahao, Digital Solutions Development Manager at Mercedes-Benz do Brasil

## The challenge

The idea for developing the application came from a real need of those who managed the day-to-day fleet’s activities, whether on or off the road. The creation of Liga na Estrada application was not a requirement of the Board or the leadership team of Mercedes-Benz. Instead, it was developed for the people who worked in the field in operation directly with the customer.

Along with the communication established with customers, the constant interaction between the two companies ensured that the work was properly aligned. This allowed the teams to get the feedback that marked the success of the project at the beginning.

The project needed a lot of robustness during its development phase to meet the expectations – of teams and users – and to show that Mercedes-Benz do Brasil preparedness for the journey of digital transformation, with a 20-year-old partner who breathes innovation and disruption.

**“There was a very productive interaction between all areas of Mercedes-Benz and T-Systems that was essential to the success of the project.”**

Priscila Protásio, Sales Analyst at Mercedes-Benz do Brasil



**“Mercedes-Benz is a structured manufacturing and industrialization company, so the big challenge for teams was to synchronize the manufacturing process in a digital production process.”**

Ivan Martinez, Systems Analyst at Mercedes-Benz do Brasil

## ▶▶ Next steps

Currently, about 215 drivers are using the app. Considering that the project is still in its initial phase, the numbers are expected to grow. The Mercedes-Benz and T-Systems teams have started discussions for a second phase in which they will promote the application intensively to encourage other drivers and managers to use the platform, allowing continuous process improvements. With the widespread acceptance of the app, the managers have now asked for access to not just the overall evaluation of their drivers, but also to their individual performances.

In addition to presenting a system with functions important to the customer, the application also ensures data protection (Vehicle Cyber Security), which occurs through the Data Protection approach and is in line with the General Data Protection Law (LGPD).

## About Mercedes-Benz

Present in the country for 65 years, Mercedes-Benz do Brasil is the largest manufacturer and exporter of trucks and buses in Latin America. It is also a leader in the development of technologies for the transport of cargo and passengers.

The Company has production units of trucks, bus chassis and aggregates in São Bernardo do Campo (SP) and truck cabins in Juiz de Fora (MG), In addition to the Customer Parts and Services unit, Parts Logistics and Global Training in Campinas (SP).

In 2018, the Company inaugurated the first line of trucks in the country's 4.0 concept and launched its Proving Grounds, the largest in the Southern Hemisphere for commercial vehicles. In 2019, in the second phase of Industry 4.0, the Company began operations in a new line of cabs and launched the New Actros, the smartest, well connected, efficient, and safe truck in the country. In 2020, it was time to inaugurate the 4.0 bus chassis factory. Continuing investments in Brazil, the Company is implementing a contribution of R\$ 2.4 billion between 2018 and 2022.

The partnership between Mercedes-Benz and T-Systems began in 2001 and expanded four years later with the signing of a global contract.

T-Systems is currently responsible for the development of Mercedes-Benz technology systems, strengthening its expertise within the automotive industry. With 20 years of relationship, Mercedes-Benz and T-Systems continue to work together on promising projects, including the implementation of the Liga na Estrada app.



# Process documents securely and with little effort

Boasteel Tailored Blanks uses the automated solution Kofax Total Agility for its invoices

Reference project



**“All the relevant data for our invoice process is extracted by the Kofax software, matched with SAP, and forwarded to the downstream systems. That saves time – and, of course, money – in many places in the process.”**

Süleyman Küçük, Team Leader, IT Baosteel Tailored Blanks

How can invoice receipt processes be optimized and automated? Baosteel Tailored Blanks, a specialist in lightweight construction that was founded in 1983, also faced this question. With 17 locations across three continents, more than 400 employees (239 of them in Germany), and revenues of around 148 million euros (data from 2019), Baosteel Tailored Blanks is a successful automotive supplier with expertise in lightweight construction – specifically in the area of laser-welded products. Most business enterprises still work document-based in many areas. Currently portal solutions for the pure electronic processing of information currently primarily exist in the public sector. This applies in particular to invoices and credit notes, which are predominantly still submitted in printed form or, in rare cases, sent to customers as PDF email attachments. By contrast, the processes that are used for invoice and credit note processing are largely completely digitalized. This means that the relevant information, such as the invoice amount, has to be transferred from printed or PDF documents into an electronic, digitally processable format.

In the worst case, this involves an administrator entering the information in the digital system manually and then scanning the documents and importing them into the corresponding systems. These burdensome activities take up a lot of time and staff resources. The processes are also error-prone, because any typos made during the manual transfer of information can impair the process.

## At a glance

- Highly automated solution for processing invoices and credit notes
- Automatic recognition of the type of document involved
- Integration with SAP and the ImageMaster archive system
- Reduction of manual activities and elimination of sources of errors

# The reference in detail

## The challenge

Baosteel Tailored Blanks also has to deal with large numbers of invoices and credit notes every day. The company only receives 20% of them via e-mail as PDF files; all the rest arrive as conventional printed documents. The challenge is to process these specific documents with a minimum of manual effort, with the files having to be digitalized, their content captured, and the original documents archived. In addition, all content must be passed on to an SAP workflow.

## The solution

As part of a project for improving their invoice processing workflow, the company asked about an automated solution based on OCR and similar technologies. According to Süleyman Küçük, the previous process was error-prone, which required a lot of manual intervention by employees in the respective business unit and within Accounting. Since the company was unable to achieve the desired results, they decided to implement a solution from T-Systems, based on the Kofax Total Agility platform (KTA), a product for the digitalization and automation of document-based processes. All printed documents are now scanned and passed on to Kofax Total Agility, which automatically recognizes what type of document (invoice or credit note) is involved and then processes it in a workflow specific to the identified document type. Süleyman Küçük confirms this: “The recognition of data is outstanding. Subsequent corrections are only rarely needed.” The content (meta-data) that is relevant for the invoice process is then extracted and, based on the PO number, a query is started in the SAP database to find the transaction to which the invoice or credit note belongs.

The digitalized documents and metadata are then forwarded to the ImageMaster archive system and from there to SAP. Recognition of the document type and extraction of the metadata are performed with the support of AI (artificial intelligence), which means no rigid set of rules has been defined. Instead, Kofax Total Agility has “learned” how to tell the documents apart and find the relevant data within them.

## Customer benefits

Thanks to the smart solution from T-Systems, Baosteel Tailored Blanks is saving time and money, as the company itself confirms. It now has a platform that makes it possible to process invoices and credit note error-free, with a high level of automation. Only a few manual steps are required to send the documents and other important information to the responsible administrators within Accounting, who can now approve transactions for posting with a few clicks of the mouse. The overall process is accelerated by the automation, giving employees more time to spend on other tasks. Süleyman Küçük underlines: “The solution is very stable. We haven’t had a single outage of Kofax so far.”

### Further advantages:

- A platform is available that can be used for every process and the corresponding documents and content involved.
- Enhancements are relatively simple, which means new processes can be implemented at short notice.
- Thanks to the use of the AI technology, the system improves continuously. New document types or invoices from suppliers that the system has not yet encountered merely have to be taught – no rule sets have to be modified.



# Future platform for connected cars as a managed service based on Microsoft Azure

T-Systems enables rapid rollout of digital services for all of a European car manufacturer's vehicles

**“The modular, standardized architecture of our Connected Car platform enables automotive manufacturers to manage their connected cars efficiently and speed up the rollout of new digital services.”**

Jörg Tischler, Head of Connected Car, T-Systems

Car buyers and drivers are placing greater value on digital services that car manufacturers (OEMs) offer in their cars. Such offerings include vehicle-specific services like remote monitoring of diagnostics data and infotainment services like navigation, as well as location-based services from third parties. With unique, high-quality services and user friendliness, OEMs create USPs in today's modern automobile market that can tip the scales in favor of a specific brand. This applies particularly to the premium segment.

Software is playing an increasingly important role in this, with its share of added value in cars increasing steadily. While such software enables new functions in connected cars, it also increases the need to manage it efficiently, as well as the services that run on it. To achieve this, OEMs need platforms that can serve as management consoles for their connected cars. They make it possible to roll out new services quickly and accurately and to record data from the cars. This, in turn, creates the foundation for new business models and paves the way for software-defined vehicles. A European car manufacturer was already using a connected car platform, but its architecture was no longer future-proof or capable of managing the sheer volume of software-based services and connected cars worldwide.

## At a glance

- Reduction in time-to-market for new in-car services
- Transformation to public cloud infrastructure and DevOps methods
- Automation of all technical processes and workflows
- Coordination of the service provider ecosystem
- Foundation for new business models and service orchestration



Software Defined Vehicle

# The reference in detail

## The challenge

With its platform for connected cars, a European car manufacturer laid the foundations at an early stage for offering digital services in its vehicles. With innovative services and service extensions, the OEM aims to create an outstanding driver experience – a key requirement that the company defined for itself. Time-to-market plays a crucial role here. But the original architecture of the connected car platform was no longer sustainable: the number of managed vehicles had increased 1000-fold in seven years and the number of software-based services had grown to nearly 200. The conventional on-premise installation needed to be replaced by a modern approach, one that supported scalability and automation and offered standardized, agile development environments to the ecosystem of service providers. To achieve a higher level of agility, the OEM decided to source the infrastructures as a managed service from the public cloud – Microsoft Azure in this case. In addition, the company implemented DevOps to establish an agile methodology for software development and operation. With its transformation into the cloud, however, the OEM also needed a forward-looking platform to manage the connected car services. T-Systems played a key role in both innovations: the transformation of the infrastructures to the public cloud and the implementation of the automotive platform that runs on it, including DevOps methodology.

## The solution

As the customer's long-standing service provider for connected car systems, T-Systems had proven itself in two ways: firstly, for the global on-premise operation of the existing platform (Europe, China, Americas), and secondly in the service development environment (architecture, software engineering, operations). In light of this extensive experience, as well as their skills in DevOps, the OEM decided to commission T-Systems to build the new platform as well. The target: the transformation should be ongoing, during regular operations – for all cars and all generations. The project partners chose an agile approach: they started small, tested, and quickly scaled successful concepts. The services were modernized before the infrastructure transformation started, so they could be run in a cloud. Microsoft Azure was selected as the infrastructure. During the project, the public cloud infrastructure posed a variety of challenges, for which solutions had to be found using agile methods. At the end of the transformation process, an extensive, scalable automotive platform had been created that allowed the OEM to manage its connected cars worldwide.

## Customer benefits

With its new automotive platform, the OEM has a standard foundation worldwide for managing its connected cars, which minimizes operating expenses, increases efficiency, and cuts costs. End users didn't notice the change at all: the rapid cloud transformation during regular operations ensured continuously stable in-car services – an excellent user experience worthy of a premium offering. At the same time, the company managed a cultural change to agile development methods, giving a sustained boost to the OEM's capacity to innovate and cutting time-to-market significantly. The platform enables the OEM to manage its partner ecosystem and offer new business models like features on demand. In the future, the platform will also serve as a launchpad for transforming management of cars into management of the customers. With this step, the OEM is intensifying its relationship with the users of its cars.

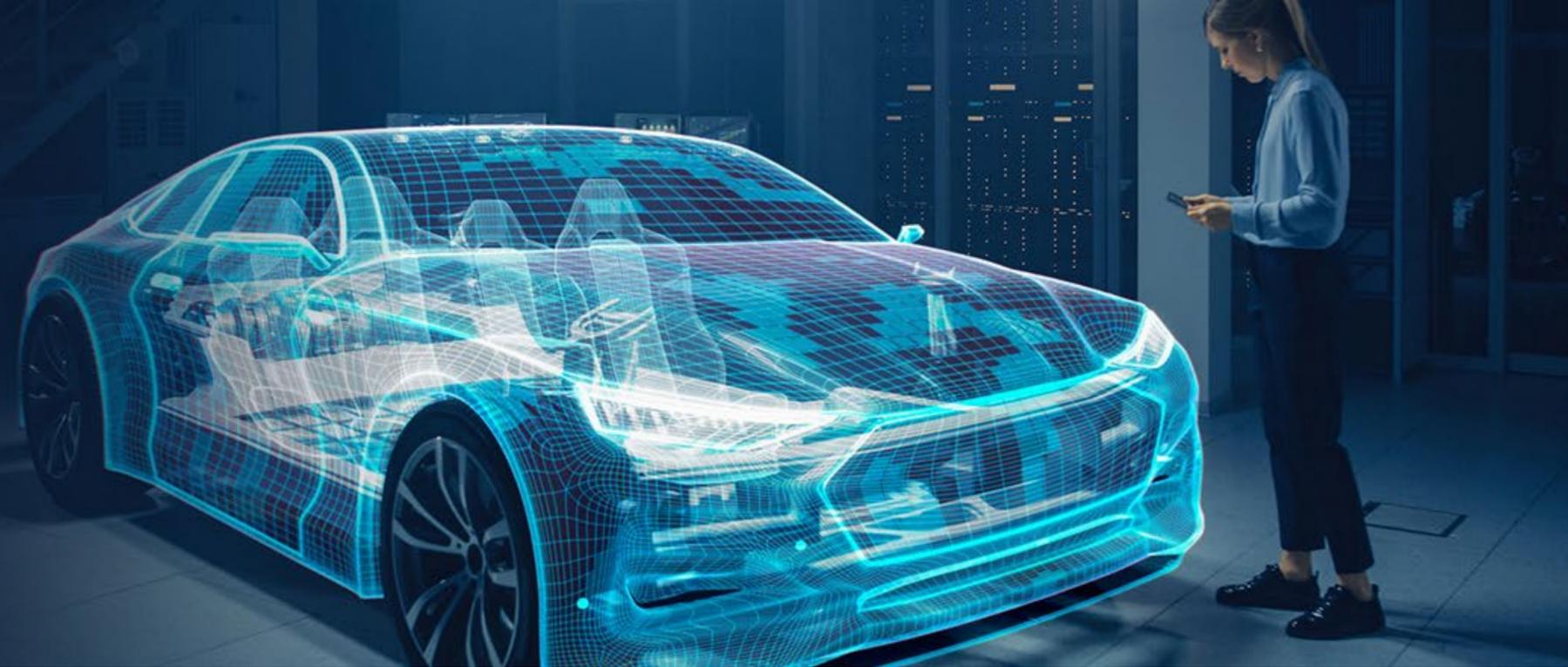


# Technical University Graz benefits from T-Systems' Security Services and PDM WebConnector



## Expertise on demand

T-Systems helps prominent carmaker implement their software strategy for connected cars



**“T-Systems’ expertise in the development and operation of connected car services is in demand throughout the industry, to enable carmakers to implement their future strategies in time and in budget.”**

Peter Robert Zillekens, Project Manager, T-Systems

The car, together with the automotive ecosystem around it, is undergoing fundamental, sustained, radical changes. Many of the achievements from past decades – such as the internal combustion engine – are being called into question. The future of mobility is challenging the automotive ecosystem as never before. Established OEMs are currently laying the foundations for building the cars of the future. The way there leads through connected, software defined cars. The OEMs want to meet the new and future demands of their user groups. For these cars, the focus is no longer solely on performance figures, but also on the services and user-friendliness that they offer – in other words, the driving experience. In this context, digitalization is becoming a major trend in the automotive sector. Digital in-car services are gaining importance, most of all in the context of electrification. They enable OEMs to design new business models, intensify their customer relationships, and better integrate in the digital ecosystems their users utilize outside of cars. Experts predict that automotive value will increasingly be generated from software. So it is no wonder that more and more established carmakers are establishing software competence centers, where they are consolidating the development of services, car operating systems, and connected car platforms. The transformation from manufacturing to software companies requires major culture and methodological changes – to say nothing of the necessary ICT expertise. A European carmaker is relying on T-Systems’ expertise to master these radical changes.

### At a glance

- Resource bottleneck: Urgent need for specific connected car expertise
- Strategic importance of services for the carmaker
- Access to experts at T-Systems for feature development and agile methods (DevOps/Scaled Agile Framework)
- Consulting, development, and operations management
- Rapid achievement of strategic contributions
- Knowledge transfer



Software Defined Vehicle

# The reference in detail

## The challenge

A European carmaker is consolidating its pioneering work on significant, strategic contributions to the digitalization of its vehicles in a software competence center for automotive services. Its goal: Develop a prospective standardized operating system for a simplified E/E architecture – plus the services that the driver and passengers use in-car. The long-term objective of the development activities is to design a (largely) autonomous vehicle fleet. This is a Herculean task, especially given that the labor market makes it difficult to recruit enough talented staff with the necessary skills. How can these tasks be achieved, particularly against the backdrop of the immense time and competitive pressures? How can agile methods be implemented as a new standard at the company?

## The solution

The carmaker found a capable development partner for implementing its connected mobility services in T-Systems. “We have helped companies in the automotive sector to set up and run platforms and services for many years now,” says Peter Robert Zillekens from T-Systems. “In the scope of this contract, we are supporting the customer with our expertise in the connected car environment at a variety of levels.” This includes the development of features –services that the carmakers’ end customers use. They are provided either directly in the car or from a (cloud) back-end. T-Systems also draws on nearshore and offshore capacities in Spain and India. What’s more, T-Systems also provides support with the implementation of new procedure models for software development. Agile methods such as DevOps are scaled up from small teams to large, internationally active development groups. In particular, SAFe (Scaled Agile Framework) has also been implemented company-wide. To do so, the company relies on consultants from Detecon, as well as experienced operations managers and developers from T-Systems. These “external colleagues” support topics like mapping privacy requirements, enabling online remote updates, and integrating vehicles with the automotive backend system. T-Systems is also contributing technical product strategists and project managers, connectivity consultants and experts for process standardization, and the implementation of and training in agile methods.

## Customer benefits

T-Systems is supporting the OEM in implementing its future connected car strategy with contributions toward agile methods, project management, and development services. As a part of internal teams, the experts at T-Systems work closely together with the in-house workforce, which will ensure an efficient transfer of knowledge about methods and best practices in the connected car environment in coming years. The support from T-Systems is enabling the carmaker to pursue its major target of increasing the service depth of the software in its cars from the current 30 percent to 40 percent. Within the scope of the collaboration, the customer will build internal expertise for creating services in a modern, agile development framework. The carmaker can also capture major synergies: The software only needs to be developed once for all its makes. Uniform standards and frameworks will lead to lasting reductions in development and operating costs. At the same time, agile working methods reduce the time-to-market for the new services – which in turn gives the carmaker a USP for its customers and helps it drive its transformation toward modern, software-based vehicles.

### Further advantages:

- Faster access to connected car expertise
- Complete expertise from a single source
- Rapid achievement of strategic goals
- Allocation of state-of-the-art knowledge
- Implementation of agile methods such as DevOps and Scaled Agile Framework (SAFe) services



# The digital car dealership

A digital pioneer: The Autohaus Gitter car dealership has been using VaudisX from the very start



**“Users are guided step by step, from appointment scheduling and planning to order qualification and repair shop planning, even up to invoicing and archiving.”**

Jürgen Ketzler, Managing Director, Autohaus Gitter

“We’re not reinventing the wheel – we’re turning it forward.” As this maxim clearly shows, car dealership Autohaus Gitter looks ahead and is not content with the status quo for either itself or its customers. Providing excellent service for Toyota and VW cars is the top priority at its locations in Erfurt and Weimar, And digital innovations are to make increasing contributions. For the car dealership, “digital” doesn’t only mean modernity and an improved customer experience. They also want the IT support to generate tangible business value. Firstly, they wanted to optimize workflows in service processes. This greater efficiency not only benefits employees, but also sets the company apart from its competition. Secondly, the IT needed to capture specific business potential – in other words, generate additional sales.

## At a glance

- Demand for more efficient service processes
- Replacement of the VAUDIS legacy system with VaudisX
- Higher service quality
- Strengthen customer relationships
- Identify additional business potential
- The data remains with the car dealership
- Connections to external systems possible (sales force, TKP repair shop planner)
- Modern user experience



Customer Experience

# The reference in detail

## The challenge

VAUDIS – it's hardly an unknown among VW service partners. VAUDIS is a dealer management system that has reliably supported process flows at car dealerships for over 30 years. VAUDIS still has a strong presence. Nearly half of all VW dealerships still trust this dealer management dinosaur. However, the system cannot provide sufficient support for modern requirements, such as customer intimacy for an optimized customer experience, that benefit both customers and the repair shop. What's more, the user experience when working with VAUDIS is stuck at the level of the late 1990s. Car dealership Autohaus Gitter in Erfurt didn't want to settle for this situation any longer: "We wanted to make the entire service process as smooth and elegant as possible," explains Heiko Etzhold, one of the dealership's managing directors. It was important to the VW and Toyota partner that any potential replacements both maintain existing links to crucial, established tools and support connections to modern applications like Salesforce in the future. The dealership also wanted to make sure that all its customer data remained on their local servers.

## The solution

T-Systems teamed up with users from dealerships to develop VaudisX, the next generation of VAUDIS. This modern dealer management system comprehensively maps the service processes at the dealership, which runs the software on its own in-house servers based on a user-oriented, monthly payment model. VaudisX serves as the central hub for all service processes, from booking an appointment to returning the car to the customer.

The dealership's employees can find all history information at a glance in the archived customer and vehicle files; all process flows between service consulting, repair shop, and customer are coordinated on a single screen. The new system makes switching between different programs a thing of the past. What's more, VaudisX gives the dealership new options for services. When a service customer arrives at the dealership, their process is already defined and pre-qualified. Thanks to integration with other back-end systems, they can tell at once whether the customer is affected by a recall campaign. Waiting times are eliminated because the service appointment has been optimally planned in advance, including the repair shop resources and necessary spare parts. The digital solution keeps customers in the loop even if they don't stay on site. The repair shop uses a tablet PC for electronic remote check-in. The tablet also makes it possible to document previously unidentified repair needs by taking pictures of the car directly. To extend the order, the photo can be sent to the customer's smartphone, together with a cost estimate. The customer can then decide – again, using their smartphone – whether they want the dealership to include the repair in the current service or wait until a later point in time. Postponed services can then be used to address the customer proactively later, because they are not lost – as

was previously the case – thanks to archiving in VaudisX. In addition to making process flows more flexible, the structured, pooled storage of customer and vehicle information in a database archive also enables other analyses, to get to know the customer better and optimize the customer experience.

## Customer benefits

"Users are guided step by step, from appointment scheduling and planning to order qualification and repair shop planning, even up to invoicing and archiving," says managing director Jürgen Ketzler, full of praise for the system. The diverse customer communication channels that the DMS offers were another convincing argument for the dealership manager. The end-to-end process support increases efficiency, benefiting employees and customers alike. Ultimately, VaudisX also helps Autohaus Gitter get a leg up on the local competition: it lets staff give better, more competent advice, which in turn strengthens customer relationships. What's more, the new dealer management system helps the service consultants at Autohaus Gitter save a lot of time when organizing service orders. At the same time, VaudisX also opens up new business potential, by enabling customer targeting. Facts and analyses provide a much more solid foundation for sales talks, significantly increasing the chances of closing a deal. The software architecture of VaudisX opens the solution up to both the past and the future. Established tools like the TKP repair shop planner can still be integrated or used via an interface. And new applications like Salesforce can be used at any time. And because VaudisX has a brand-neutral design, the dealer management system can also be used for the processes in the dealership's Toyota division.

### Further advantages:

- Fixed price per user per month
- Simple addition and cancellation of users
- Joint further development with the customer
- Potential to run as SaaS from a T-Systems data center



# Master of test data

With Data-as-a-Service, T-Systems is speeding up test drive analyses



**“Data-driven decisions that previously required a huge workload and a much longer lead time are now possible.”**

Bastian Wymar, Portfolio Management Data Intelligence, T-Systems

Many carmakers are convinced that individual mobility will remain a basic human requirement in the future. However, the CASE (Connected, Autonomous, Shared, and Electrified) era is changing the ground rules: Customer experience is becoming the priority. The focus is on sustainability, electric vehicles, and automated driving, as well as the potential offered by digitalization. All of these drivers have a huge influence on the way in which cars are developed. In modern vehicles, driver assistance systems and online value-added services are becoming increasingly efficient, while vehicle electronics, onboard sensors, and bus systems are becoming more and more complex and are collecting more and more data. On test drives, it is important to analyze this data intelligently in order to meet very strict quality requirements further down the line during series production. Mercedes-Benz AG – with its focus on services and the development, production, and sale of cars and vans – is just one carmaker that found existing systems for collecting test drive data had reached their limits.

## At a glance

Development engineers and IT departments have joined forces with T-Systems to create a future-proof end-to-end solution that is setting new standards for the sector. It is based on an intelligent combination of a central cloud and decentralized edge resources. T-Systems has submitted a patent application for a new type of software called Big Data Signal Processing, which runs on big data clusters of edge computers and makes the local analysis of highly complex, extensive measurement data up to 40 times faster. The local resources are connected to a central cloud for uniform, central access to the local clusters (federated Spark).

- Data transcoding of machine signals
- Up to 90 percent data compression rate
- Measurement data available within a few hours
- Data analysis up to 40 times faster
- End-to-end solution: network, cloud, edge, applications



Software Defined Vehicle

# The reference in detail

## The challenge

The test drives for endurance testing are one of the milestones in vehicle development. The engineers in the development departments specify the exact types of data to be recorded for these. Carmakers send a whole range of prototypes for new models to different test routes at the same time – to both deserts and permanent ice zones – to examine their behavior using a three-shift pattern. These handmade vehicles include extensive measurement technology to record the behavior of the different components (including the software) during the endurance test. During one shift, approx. 10 to 100 GB of data accrues in all sorts of data formats. Once the test drive has finished, the data is transferred from the car to a data warehouse and measurement data management system. The engineers at the development sites receive the raw data via file shares and copy it to local file systems. This process not only results in considerable data redundancy, it also takes a lot of time: It can take several days for the engineers to gain access to the measurement results. If errors are then detected, the cars and drivers have already gone to different places. That makes it extremely time-consuming and costly to reproduce the tests. The situation is further complicated by the current trends toward electric vehicles and automated driving, which are increasing the volumes of data recorded to TB levels. T-Systems has developed a new process to reduce the data provision time in the future.

## The solution

T-Systems is winning customers over with a high-performance end-to-end solution that optimizes the entire process and allows “data as a service” to be used. The core components of the solution are edge computing resources, a central cloud platform, the Big Data Signal Processing software, which is compatible with Hadoop/Spark, and the federated Spark system based on it. After the test drive, the measurement data (signals) is transferred to big data clusters via Wi-Fi. These are in the edge computing resources that are permanently installed at the test sites. They are managed and operated by T-Systems. Big Data Signal Processing (BDSP) is also installed locally on the systems. BDSP pre-processes the measurement data, i.e., the different data formats collected are transcoded into standard big data formats. And this is precisely the point: It enables processing to be up to 40 times faster for decoding and subsequent analyses than when using conventional tools. That’s because BDSP allows parallel interpretation of the measurement results recorded from distributed, binary, or textual trace files. In practice, the volume of data is reduced by up to 90 percent. BDSP also supports signal resampling and tagging and has an API for connecting to other systems. The edge part of the solution is complemented by a central cloud with a federated Spark system. This system enables engineers to access the measurement data – regardless of where it is located. The federated Spark system automatically identifies data for the developers. However, the developers not only find the right data, but also

trigger the corresponding analyses on the edge servers via the cloud. That means that only instructions and results have to be transferred between the test sites and developers’ workplaces, rather than the complete raw data sets as in the past. This avoids the need for a costly expansion of the MPLS network. The solution also scores points for security: The measurement data is already encrypted when it is stored in the vehicle and remains highly encrypted and secure at all times. This also applies to the transport layers, including the transport protocols between the vehicle and edge resources as well as to network access points.

## Customer benefits

With the new system, Mercedes-Benz is gaining a groundbreaking and future-proof platform that significantly speeds up work for development engineers and enables a faster time-to-market. The engineers at development sites can now gain access to measurement data within a few hours. On the one hand, they can start working with the measurement results immediately, and on the other hand, they can identify errors directly, allowing them to arrange a repeat of the test drive. This is bringing them closer to testing and reducing development cycles. The new solution has yet another benefit: Detailed measurement plans and precise specifications for the measurement data to be recorded are no longer needed. The engineers have access to the entire measurement data set at all times and can analyze it at a later date if specific questions arise. This creates tangible cost advantages and contributes toward sustainability. The number of test drives is falling and the tests are becoming more efficient – allowing data-driven decision-making, which was only possible with a huge workload and much longer lead time in the past. The engineers can continue using their tried-and-trusted systems and also utilize different tools from the big data community, as the integrated API makes it easy to connect to BDSP. The API also offers another benefit: It now allows the actual use of the recorded data to be analyzed. On top of everything, the introduction of the new architecture is making it easier for carmakers to collaborate with suppliers and to control the data. Until now, suppliers received the raw data for their analyses and had to return their completed analyses back to the original equipment manufacturers (OEMs). Now it is possible for the suppliers to process these analyses directly on the carmakers’ systems, so the raw data no longer has to leave the plant.





## Next step to the hybrid cloud

Future Cloud Infrastructure for flexible SAP basis operation convinces Continental

**“The private cloud is a compelling option for us for operating our SAP systems. It combines stability and cost efficiency. The migration to a next-generation private cloud was logical and T-Systems provided us with the best support in all phases as an end-to-end provider.”**

Christian Eigler, Corporate CIO Continental AG

Founded in 1871, Continental AG from Hanover is one of Germany’s largest multinational companies. The automotive supplier is a DAX 30-listed company. With over 190,000 employees at 561 locations in 58 countries, the company generated sales of just under €34 billion in 2021.

In 2022, Continental AG was split into three independent group sectors: Automotive, Tires, and ContiTech. The group sectors comprise 16 business areas. Automotive develops and produces electronically controlled chassis and safety systems. The Automotive group sector is the company’s largest business segment and offers solutions for driving safety, drive, and comfort. The tire business is bundled in the Tires group sector. ContiTech manufactures other rubber and plastic products for industrial applications, such as hoses, conveyor belts, vibration and sealing systems. Continental AG also grew through acquisitions in the 2000s. Integrated companies or company units included Phoenix AG (2004), Motorola’s automotive electronics business (2006), Matador (2007), and Veyance Technologies Inc. (2015).

Continental AG uses SAP to manage its enterprise processes. The company operates one of the world’s largest SAP landscapes with over 450 SAP systems. The landscape that has grown over time is extremely complex

Uninterrupted availability to support international business is therefore vital for the automotive supplier. Continental chose T-Systems as its partner for operating the SAP landscapes.

### At a glance

- Search for a future-proof SAP operating platform
- Leveraging of cost reduction potential
- Facilitation of hybrid scenarios
- Absolute operating stability
- T-Systems as long-term SAP operating partner
- Migration to next-generation private cloud: Future Cloud Infrastructure
- End-to-end service
- High level of automation
- Increased scalability and flexibility
- Cost reduction
- Basis for system consolidation and S/4HANA transformation
- Optional: operation of non-SAP systems
- Establishment of hybrid concepts (Azure)



# The reference in detail

## The challenge

SAP production systems have hitherto been operated on a classic on-premises infrastructure – with a perfect record: With its operating services, T-Systems has provided Continental with high operating stability and reliable availability of the SAP services for many years. Yet the established private cloud technology was becoming outdated.

Continental was looking for a new operating concept, which, on the one hand, replicates the existing stability, but also offers greater flexibility, increased scalability, and more convenient use of SAP. At the same time, the various company units should be able to integrate their own preferred platforms to pave the way for hybrid working, for instance with Azure. It was particularly important for Continental that the new operating concept or the used platforms offer maximum cost efficiency. In particular, the continuous operation of the production systems should be as cost-effective as possible. It was also important for Continental to outsource all services end-to-end to a single provider. In this way, Continental receives a competent contact for all SAP issues.

## The solution

With the switch to the Future Cloud Infrastructure (FCI), those responsible at Continental decided to retain a private cloud, which also supports hybrid cloud usage, as the pivotal point for SAP operation over the long term. The Future Cloud Infrastructure is a next-generation private cloud. It opens up many functions that users and operating teams are familiar with from the public cloud. These functions include comprehensive automation of regular workflows that allow complete application stacks, for instance, to be provided in less than three hours or make possible seamless resource scaling by a factor of 80. At the same time, the FCI paves the way for integrating public cloud resources, such as for developing and testing new applications.

To use the FCI, T-Systems sets up a landing zone on the shared private cloud platform in the Frankfurt data-center cluster. The VMware basis for both platforms, the old and the new, also simplifies the migration. Three migration steps are envisaged through 2024 where T-Systems will minimize the downtimes. After these steps, T-Systems will operate the SAP landscape entirely on the FCI platform.

## Customer benefits

Continental has a partner at its side with T-Systems that delivers end-to-end expertise for all SAP questions: From the infrastructure, platform operation through to application support. Numerous analyst reports have singled out over many years T-Systems' expertise in private cloud and SAP. Retaining the underlying platform technology based on VMware makes the migration much easier. Sophisticated migration procedures reduce downtimes and, in turn, costs for the migration. Substantial cost reductions thanks to the FCI platform and its efficient management are another advantage when continuously operating the production SAP systems. In addition, SAP operation on the flexible and scalable FCI opens up further opportunities for Continental going forward. These include operating non-SAP systems, some of which work together very closely with the SAP systems, and the introduction of hybrid scenarios (by incorporating public clouds such as Azure). With the new platform, Continental also gains a sound basis for the upcoming transformation to SAP S/4HANA and possible consolidation projects within the group.



# New impetus for production

Universal Data Converter optimizes production processes at Dürr

Reference project



**“Thanks to the UDC, we can take an agile approach to production, enabling us to respond flexibly to customer requirements. Production staff no longer have to waste time searching for the right parts and the quality of production is improving – with less need for temporary storage in the assembly hall.”**

Micha Veigel, Senior Manager Production Planning, Dürr Systems AG

Dürr Group, based in Bietigheim-Bissingen, Germany, is a leading global mechanical engineering and plant construction company. With around 16,200 employees, the company has 112 sites in 33 countries and achieved revenue of almost 4 billion euros in 2019. The Dürr Group has clients in sectors such as the car industry, mechanical engineering, and the chemicals, pharmaceuticals, and woodworking industries. Dürr is a brand with tradition and has been a byword for technological progress and quality since 1896. The company has specialist expertise in automation and digitalization. This has been recognized by independent bodies too: The company was the winner in the large company category of the Deutscher Innovationspreis award in 2020 for its innovative EcoPaintJet robotic painting system. Dürr’s product range includes standardized and highly customized painting solutions – from painting technology and robots to complete turnkey production lines. Efficient project management plays a crucial role in major projects, which are often executed on a tight schedule of just a few weeks. This applies particularly to production units that assemble equipment. Assembly work is not only carried out at Dürr’s own plants: Due to the sensitivity of some components, the final assembly steps are performed on the customer’s premises. The true art of production is to have the right parts and components in the right location at the right time. To optimize its production processes, Dürr brought

in T-Systems’ expertise, introducing the Universal Data Converter (UDC) to automatically create and update production bills of materials.

## At a glance

- Faster configure-to-order processes
- Goal: Flexible, high-quality, efficient production
- Improved IT support for the zone production plan
- Universal Data Converter automates the creation of and updates to production bills of materials and production orders
- Optimized parts dispatching
- Cost reduction
- Agile production

# The reference in detail

## The challenge

Time is money – and Dürr’s customers know it. They have an interest in completing the configure-to-order process with engineering-to-order parts as quickly as possible. The goal is to have the finished equipment ready fast. To achieve this, Dürr uses standard products from its range. But Dürr allows its customers to adapt the individual products and to integrate them individually. To do so, it uses suitable connection solutions between the individual components, which are adapted to each customer’s needs because no two painting lines are the same. To meet the customer’s completion deadlines – which are usually very tight – the production division starts assembly work even while the sales team is still fine-tuning the details of the equipment with the customer. This poses the challenge of incorporating the resulting changes into the production process, which has already started. In the past, this was done manually, making production considerably more complex and costly. In past production processes, all parts to be included in production were delivered from the warehouse to the assembly hall right at the start of the work and had to be distributed to the various assembly stations from there. This led to further disadvantages for the production process: Storage space is tight in production areas and not as well organized as in the warehouse, so the material took up an unnecessarily large amount of space during the weeks-long assembly process; when the material was finally needed, time was wasted searching for and sorting it manually to make it available to the assembly stations. Flexible production also poses another challenge: Last-minute changes make parts obsolete, while additional new parts are needed.

## The solution

Dürr redesigned the IT map of its production processes to resolve the challenges. Production is now mapped in the form of networks in SAP, with the assembly sites mapped as network activities to which the relevant components are assigned. This ensures the relevant parts (and only the relevant parts!) are delivered to the assembly site in question – when they are actually needed. To automate the mapping and assignment, Dürr decided to use the Universal Data Converter (UDC) from T-Systems, an SAP partner solution. The SAP-certified UDC can be integrated into SAP systems that control internal logistics and production. Based on set rules, it automatically creates bills of materials and component assignments for the relevant assembly sites (network

activities) – this creates “parts packages”, which are dispatched to the individual assembly zones. Sensitive parts such as bell disks for atomizers, which have to be installed on the customer’s premises, are dispatched to the shipping zone. The UDC also makes it possible to respond quickly and easily (automatically) to changes in the construction plans. It creates the required “developing” bill of materials, ensuring that new parts are ready for production at the right time. “The manual workload for these sorts of changes was huge and delayed production processes time and again. The UDC relieves a lot of pressure and prevents mistakes”, explains Micha Veigel, Senior Manager Production Planning at Dürr Systems AG. there to SAP.

## Customer benefits

Thanks to the UDC, Dürr can take an agile approach to production, enabling it to respond flexibly to customer requirements. Greater efficiency has led to faster production times. The bill of materials provision process is much shorter. In addition, parts that have to be assembled on the customer’s premises are sent directly to the shipping zone, freeing up space in the production area. The improvements to processes mean HR capacity can be used optimally and costs can be saved. Above all, production staff no longer have to waste time searching for the right parts. The quality of production is improving – with less space being taken up in the assembly hall. Together with T-Systems, Dürr is continuously extending the number of areas where the UDC is used. Currently, the partners are working on rolling out the UDC to other branches in Dürr’s global production network. This will allow production orders to be distributed to multiple sites in the future.

### Further advantages:

- Trust-based partnership
- Flexibility to adapt the solution to the more efficiently designed production process
- Solution can be adapted for other units of the company
- 100% integration into the SAP standard (certified)

# Car electronics you can rely on

T-Systems develops solution for final commissioning testing of produced vehicles

**“With the diagnostic application, our customer has a reliable tool that ensures the quality of its vehicles, even in view of continuous process changes and vehicle innovations.”**

Norman Sanger, Project Manager T-Systems

For decades, electrical and, in recent years, increasingly electronic components have played a decisive role in vehicles. With the rapid development of E/E platforms, cars are increasingly becoming rolling computers, software-defined vehicles. But even in vehicles of earlier generations, electronic components perform essential tasks in the background to ensure important basic functionalities for a smooth ride, and they control information and entertainment services.

As the importance increases, so do the expectations for high availability of background e-services. After all, electronic failures cannot be remedied in Self-Service. Premium brands, in particular, define themselves by the high quality of their vehicles – and that includes first-class vehicle electronics. To ensure this, comprehensive and numerous tests are already necessary during the production of the vehicles.

T-Systems developed a diagnostic testing system for Mercedes-Benz that is used worldwide in all of the customer’s passenger car production facilities for E/E testing and for the final commissioning test of the produced vehicle.

All test scopes and test sequences can be flexibly parametrized and scaled. They can thus be easily adapted to factory specifications and to different vehicle types.

## At a glance

- Increasing importance of electronic and electrical components
- Diagnostic application for vehicle testing in passenger car production
- Test automation without hindering production
- Diagnostic test scopes: assembly, flashing, vehicle dynamics tests, filling with operating fluids, and vehicle EOL release, as well as the integration and control of the test benches in production
- Further development of the diagnostic solution accompanying the introduction of vehicle innovations
- Deployed worldwide
- T-Systems as a reliable partner for software development
- High-quality, certified software
- Ensuring product quality for premium vehicles



# The reference in detail

## The challenge

Manual tests for electrics and electronics? Unimaginable – given the quantities produced and the rapid changes to the vehicles. Since 1995, Mercedes-Benz has relied on an in-house diagnostic platform for testing, with which production staff test the functionality of the electrical and electronic systems in the cars directly on the production line. The diagnostic platform is used at 22 of the automaker's sites worldwide. Each vehicle is put through its paces with the tool. In the process, the tests have to keep pace with production. The main requirement for the solution is therefore: absolute reliability and suitable speed. Under no circumstances should quality testing interfere with production. Continuous process adaptations, new technical possibilities and requirements, but also production staff demands regarding the use, the improvement of the user experience, make the diagnostic platform a very dynamic tool. It must be continuously adapted to the innovations in global automotive production and be ready in time for its rollout. For 25 years, the customer has relied on T-Systems for the further development and management of the software.

## The solution

The diagnostic test system consists of portable diagnostic devices, a backend that processes the data and – of course – diagnostic software. The diagnostic devices are connected to the car's diagnostic socket via a cable connection and read out the data from the car. This is also where the actual diagnosis takes place: Are all components installed correctly, do they work perfectly? Then they radio the data to a server in the backend – for storage and further processing. In a later phase, the solution also checks whether the levels of the fluids in the car are correct – for brake fluid, oil, water, etc. The system makes its final appearance within production on the roller stand when the vehicle electronics are tested under load before the final commissioning test. For this purpose, the system also integrates and controls the test benches. The diagnostic test system is designed to be flexible: All test scopes and test sequences can be parameterized and scaled. They can thus be easily adapted to factory specifications and different vehicle types. The diagnostic tool's diagnostic test

scopes include assembly, vehicle dynamics testing, filling with operating fluids, and vehicle EOL release – testing can also extend beyond individual production stages. In addition, the diagnostic test system also allows flashing, i.e., installing software in the car and configuring the vehicle, for example, setting the operating language for different markets. As part of application development and management, T-Systems is responsible for the architecture design of the software and the development of a diagnostic interpreter that understands and processes freely configurable diagnostic scripts. The team works according to strict processes in line with CMMI Level 3 for ensuring production-critical software quality. For this purpose, a highly specialized development team has been established, including ASAM and MCD 2/3D specialists, working according to the pilot/co-pilot principle.

## Customer benefits

For 25 years, the solution has reliably supported production despite regular updates. The reason for this is the high quality of software development including comprehensive automatic testing before rollout (units tests, regression tests, integration tests) before it is deployed in the production environment. The increasing degree of automation also continuously reduces the costs of software development. “Fast response to new requirements, planning transparency, and closely coordinated cooperation are the ingredients of high customer satisfaction,” sums up Norman Sängler, Project Manager on T-Systems' side. But the most important thing is that the diagnostic test system helps the customer to realize its ambition of bringing high-quality vehicles to the market. The multi-stage test procedure identifies deficits at an early stage and allows them to be eliminated quickly, thus avoiding unnecessary costs and effort as early as the production phase.