Does your heart beat GREEN yet?
CAN'T WE DO MORE WITH LESS?

Let's become greener together. Find out more: rethink-the-system.com
Whether in the automotive industry, freight or public transport, energy supply, tourism or digitalization—companies around the world are paying the utmost attention to the issues of resource conservation, efficiency in the use of their own capacities, and cost discipline. The current events in Europe have once again rapidly accelerated the change in awareness in the behavior of global consumers, companies, investors, and employees. As a result, new climate protection targets and regulatory requirements are prompting companies to focus on their own sustainability. All of our interests, therefore, are focused on one simple question: Can we do more with less?

Indeed, we are living in times in which the rulebook on success-critical factors is being rewritten, despite current developments: a) the call for innovation is being voiced by nearly every industry b) advancing digitalization is becoming a question of survival for companies and c) pauses in investment lead to being left behind in the race to success. But it is also true that cost and energy efficiency go hand in hand now more than ever. However, do our climate targets, with the prudence and care that they require, automatically mean restraint? I say: No, it’s not that simple.

Net-zero emissions, ecological change, and climate neutrality are rightly becoming important strategic goals in the top management of virtually every company. The prerequisites for this are innovations, a green value chain, and sustainable digital transformation, all of which are influenced by ecological factors such as greenhouse gas emissions, CO₂ certificates, and mobility concepts. But where do we stand on exactly this point?

With this in mind, we at T-Systems are fundamentally questioning the challenges of today and the current status quo—that of our clients, but above all, our own. “Rethink the System” is what we call it: it’s a call-to-action if you will, a recommendation too, but at the end of the day, probably a “must” after all. Because tomorrow’s climate targets cannot be achieved with yesterday’s technologies. To combine digital growth with investments in sustainability and actively drive change for the future, T-Systems supports companies in their digital, sustainable transformation.

From consulting and strategy to the operation of innovative technologies, it is about nothing less than making decisions in terms of carbon neutrality and the environment, and combining ecological measures with progress and business success. On a small scale as well as on a large scale. From the multi-cloud environment “down” to the dedicated application. In this sense, we practice “Rethink the System” for clients as well as for ourselves—to make the right decisions, to act more sustainably, and to shape our future.

So can we do more with less? I say yes. And companies from Mercedes to SAP, the energy supplier Bayernwerk to logistics company DB Cargo, and the municipal administration of Adeje in Tenerife, provide impressive examples of this in this issue of our client maxxmagazine. In the sense of smart investments in a more sustainable and carbon-neutral future.

Sincerely,

Adel Al-Saleh
CEO of T-Systems

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Click here to know more about our “Rethink the System” campaign.
8 Adeje rides the Smart Beach wave
Learn more about how a coastal city in the Canary Islands of Spain is embracing “smart tourism” as part of its ambitious smart city project with help from T-Systems’ AERO-PULSE platform.

14 Damaged wagon management reduces downtime
DB Cargo: Data analysis enables more operating time on the tracks.

20 Notching up the miles, smiles, and savings
“Liga na Estrada”—Explore how this innovative application co-developed by T-Systems and Mercedes-Benz do Brasil works and how it helps drivers and fleet owners.

24 “The fare alone won’t drive any bus”
Oliver Wolff, CEO of the Verband Deutscher Verkehrsunternehmen, on the prospect of offering bus and train drivers a uniform public transport experience.

30 Delivery Note 2.0 setting new standards in transport logistics
Gone are the days of paper chaos and red tape in the delivery industry thanks to Cloud4Log, a project created jointly by GS1 and the Bundesvereinigung Logistik.

36 Two-dimensional Sustainability
Using SAP solutions and operations to tackle carbon footprints.

40 “Flower.Power” without any folklore
Goodbye PDF, Welcome AR: How the electricity and gas network operator Bayernwerk AG playfully promotes sustainable energies to its customers.

44 Mobilithek goes mobile
Those who use buses and trains and incorporate other mobility providers are familiar with the problems of overcrowding and searching for connections. But networked mobility with central data management that is mandatory by law offers a way out.

50 The opera diva from the computer
The first-ever AI opera, Chasing Waterfalls, premiered in Dresden.

60 Stable factor at the top of the “Fußball-Bundesliga”
1. FC Köln was able to tackle fluctuating fan footfall on its website, thanks to an AWS solution from T-Systems.

66 Master of the clouds
A T-Systems Personality Check is a fun way of determining how things stand—in technical discussions about clouds, for instance.

68 Alliance against Blackout
How can the integrated security approach help companies from the energy sector struggling with increasingly sophisticated attacks and a shortage of qualified security experts?
Learn more about how a coastal city in the Canary Islands of Spain is embracing “smart tourism” as part of its ambitious smart city project with help from T-Systems’ AERO-PULSE platform.

Author: Durga Godbole

Imagine you’re heading out to the beach for a bit of sun and sand, and the app on your cellphone prompts you to take a detour to a quieter, less crowded beach instead and also guides you to the parking spot closest to your destination! This will soon be a reality in the sunny municipality of Adeje, which is located in southwest Tenerife, the largest of the Canary Islands in Spain.

T-Systems is working with Red.es and the Adeje City Council on a turnkey project—called the Adeje Destino Turístico Inteligente (DTI) initiative—which aims to transform 10 of the coastal city’s beaches into smart beaches for its tourists and also improve the existing civic infrastructure for its citizens. The ambitious DTI initiative comprises 14 service components, which will be developed on the ICT provider’s AERO-PULSE platform.

**The need for smarter beaches**

Adeje derives a major part of its revenue from tourism—this is quasi representative for the whole of Tenerife. Thus, tourism is responsible for about a third of the gross national product of the island and (before Corona) employed 35 percent of the local workforce. Adeje’s city council wanted a solution to address the concerns of the citizens and provide their staff the data and transparency to manage the tourists.

To enable this, the DTI initiative was initially endowed with nearly 6 million Euros as the beneficiary of the Red.es “Intelligent Tourist Destinations” call, with co-financing from the European Regional Development Fund (ERDF) through the Pluriregional Operational Program of Spain (POPE). Red.es is a public corporate entity of the Ministry of Economy and Business. From a functional perspective, it depends on the Secretary of State for Digital Advancement.

By converting Adeje into a smart tourist destination, the goal was to improve resource management, maximize competitiveness, and enhance sustainability using technological innovations and practices. The municipality wanted a single intelligent platform that could benefit all the key players involved—the city council staff, the tourists, and last but not the least, the city’s almost 50,000 citizens.
The technology will also improve the efficiency of the city’s services, such as capacity control on its most-crowded beaches or optimizing the use of shower water consumption during peak hours.

About the project

To enable the Adeje DTI project, T-Systems developed the Adeje DTI Intelligent Destination platform and Smart Adeje App. This project will cover 10 major beaches in Adeje—namely, Troya I, Troya II, Playa del Bobo, La Pinta, Torviscas, Fañabé, Playa del Duque Norte and Duque Sur, La Enramada, and Ajabo—and monitor the influx of people in the beach area, thanks to a camera system with different counting strategies. In addition, data will also be collected on water consumption in the showers or noise levels, among other information that the Adeje City Council will be able to access through a smart beach management dashboard.

In this solution, all the sensors and Internet of Things (IoT) devices are connected and will deliver data into the central platform. This data will be made available on the Adeje DTI Intelligent Destination platform and the Smart Adeje mobile app for the tourists as well as the city council staff. Together with these systems, local citizens and tourists will also have interactive information points available. The data collected and predictive analysis therein can help the city council with active management such as issuing timely notifications and enable the tourists to make smarter decisions—choosing a peaceful location, for example.

The Smart Adeje mobile application is fully configurable according to the user’s preferences and will provide vital information about the tourist spots in Adeje, mobility and transport services or smart parking. Apart from the information about the smart elements integrated with the city management systems, the app will also help tourists with trip planning. The app also has a notification service for users based on their location, enabled by the installation of more than 200 Bluetooth beacons throughout the municipality.

However, the project is not intended to make life easier only for the tourists. Local citizens of Adeje will also benefit from smart irrigation solutions, smart waste management, smart parking systems, improved energy efficiency for public buildings, and so on. All these services will be integrated into the AERO-PULSE platform. The LoRaWAN™ communications network development will enable communication between the 14 different service components of the project.

The Intelligent Lighting component of this project, for example, will see 235 lighting management elements being installed throughout Adeje to collect data on lighting and electricity consumption. It will also enable remote management of the lighting.

The smart irrigation and meteorology component will enable the Adeje City Council to monitor and optimize water consumption in eight parks where weather stations will also be installed to know the weather conditions in the area.

Intelligent waste management will enable optimization of waste collection tasks through the monitoring of 16 collection trucks and more than 644 containers of different fractions.

As part of the Tourist Wi-Fi Network component, the city will deploy 67 free Wi-Fi access points that will provide residents and tourists with access to online services offered by the City Council.

The intelligent parking system, when functional, will guide drivers to 7 public parking lots that will be monitored space by space (approximately 1,360 spaces).

A mock-up image of the smart parking project in Adeje.

Adeje, a city located in the Canary islands of Spain, draws most of its revenue from tourism. ©Adobe Stock

We are investing so that these new digital and technological tools improve our tourist destination and the attention to visitors. But above all, it is about improving people’s lives. We want to do everything in our power to reduce the carbon footprint and emissions, and this project goes along those lines.

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The "energy efficiency management in public buildings" component will help improve the energy efficiency of 37 public buildings through the monitoring of electricity consumption, temperature, and environmental parameters.

Through the CONSUL open-source participation platform and the Smart Adeje App, citizens can also voice and seek faster redressal for their concerns, and participate in consultations and surveys.

As José Miguel Rodríguez Fraga, Mayor of Adeje, says: “We are investing so that these new digital and technological tools improve our tourist destination and the attention to visitors. But above all, it is about improving people’s lives. We want to do everything in our power to reduce the carbon footprint and emissions, and this project goes along those lines.”

The Future of Tourism in Adeje

As is typical with the Digital Age we live in, tourists are no longer content with just visiting a place, but they also want to enjoy unique and real experiences. By making information easily available to different stakeholders and utilizing intelligent systems, the city council can make significant improvements in the integration and interaction of tourists.

The hyperconnectivity through the new mobile application and platform will make the tourist experience in Adeje easier and more flexible. For the municipality of Adeje, the benefits include optimization of resources and capabilities. The platform supports public services management, monitoring of citizen services, and improved experiences for the citizens and tourists.

"As the different phases of the project are implemented, an interconnected and intelligent system will boost resource management while maximizing both destination competitiveness and consumer satisfaction. It will also help in meeting the sustainability demands of the island, such as water conservation, which is vital for the region and for reducing the carbon footprint. As the project moves along, it can pave new roads for further improvement in tourist experiences and additional opportunities for all,” says Pedro Garibi, Project Manager from T-Systems.

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Those who work with disposals are not in the health or legal sector. The specialist term “disposal” comes from the rail industry—and it’s not a very popular term at that. In simple terms, disposals mean “someone else needs to take care of this”. This creates increased workloads every day and puts a strain on the operational business. That was reason enough for DB Cargo to overhaul its inefficient disposal system—together with management consultancy and T-Systems subsidiary Detecon.

“Goods by rail”

But everything in turn. It is estimated that there are around 600,000 freight wagons in use across Europe, transporting primarily high-volume goods such as ore and coal, as well as chemicals, timber, cars, and much more. In 2019, around 400 million tons of freight were transported by rail in Germany alone. It sounds like a lot, but makes up just a fifth of the overall transport of goods. Over 70 percent is still transported by means of the German motorways.

Given the rising petrol prices and a push for greater sustainability, the call for “goods by rail” is getting louder and louder. The German government wants to increase the proportion of rail freight transport in order to meet the climate targets. The plan is to achieve 25 percent by 2030.

The numbers clearly speak for rail: no other means of transport has such an environmentally friendly carbon footprint. Moving one tonne of goods generates 16 grams of CO₂ and 0.03 grams of nitrogen.
oxide (NOx) per kilometre. That’s just one seventh (14%) and one thirteenth (8%) of the gases generated by road transport.

At least two other factors speak in favor of increased transport of goods by rail: the water level of the large German rivers, which regularly sink in summer and impede shipping traffic, and the latest hot topic of securing the energy supply. Dr Sigrid Evelyn Nikutta, Board Member of DB Cargo AG, sees these developments as a great opportunity for her company: “The transport of goods will grow. We now have a chance to bring this growth to the railways.”

DB Cargo—we want wagons that work

DB Cargo is Europe’s largest provider in this segment. Around 200,000, or a third of all European freight wagons go through their hands each year in Germany alone. Around 70,000 of these are the company’s own. The availability of these wagons is essential for business. "Only damage-free freight wagons generate sales," says Christian Kühnast, Project Manager at DB Cargo, in 2021 he implemented a new solution for intelligent damaged wagon management—in order to optimize the processes surrounding damaged wagons.

After all, transporting tons of freight is no small matter for the freight fleet. Numerous reports of damage are made each day. The type of damage includes graffiti, typical wear and tear of parts such as brake shoes and wheel sets, and even wagons that can no longer run.

Damaged wagon management reloaded

"Due to the great operational significance of the rolling wagons, we have been checking our processes annually for 12 years with all stakeholders involved," explains Kühnast. "In 2018, we decided to go one step further, with a new process and new software for damaged wagon management." DB Cargo consulted Detecon for this, which transformed the business requirements into a modern, digital solution. "We were directly involved in the conception stage from the start," adds Tim Herbstrith, who oversaw the development of the application at Detecon.

“Our aim was to increase the efficiency of the damaged wagon management. To this end, we primarily wanted to improve two key things: We wanted to reduce the downtime of the freight wagons and the number of disposals,” explains the DB Cargo Project Manager. With the established process, defective wagons were simply always sent to the nearest local maintenance plant. But each year, 7,000 cases showed that a wagon couldn’t be repaired there.

Typical reasons included a lack of the right repair equipment in the workshops, or the team already had their hands full. It was rarely due to a lack of spare parts. This resulted in the disposal (and the transport involved) to a suitable workshop taking several days before the wagon could be returned to service. But this situation could have been avoided.

“With the new processes and the new iSWM (intelligent damaged wagon management) application, we wanted to
draw a line under this practice," says Kühnast. The cloud-native application had to naturally obtain the existing functions of the solution, which had been in existence since 1986, as well as acquire a good amount of additional intelligence. At the same time, the application was supposed to interact with a whole host of partner systems. Not only was the damaged wagon management system intended to benefit from this, but the operational business was too.

"Today, almost every operational colleague, around 15,000 employees, benefits from iSWM. Most of them without even knowing it. The application pulls the strings in the background and automates many processes."

iSWM uses various current data, such as the location of the defective wagon, the type of damage, and the distance to the workshop, to calculate the so-called "intake score". This score is used to assign the wagons to the most suitable maintenance plant. The parameters are stored in a data lake. This allows the ISWM's decision to assign the repair to be assessed again at a later point in time. This is important in order to check the weighting of the individual factors in the model—were they correct or do they need further fine-tuning?

It all starts with the wagon technician

As before, the wagon technician is there at the start of the process. They check the wagons in use before the freight train departs. If they notice any damage, they document this using a damage code, which is uniform across Europe, in the DB Cargo production system. If foreign freight wagons are used, the uniform damage codes are already transferred to the freight wagons by means of advance reports. This allows iSWM to process findings by wagon technicians in Poland or Italy too.

From the damage code, the application can identify what damage there is, and where it is on the wagon. It matches the damage to the skills of the plants and sends the wagon to a suitable location, if it has been returned to Germany. On average, over 80 percent of the wagons can still complete their transport before being sent to a workshop.

Repair skills and capacity utilization outrun the shortest route

However, the staff capacities and current capacity status in each workshop are important too, as are the overall workload and the location of the damaged wagon. In order to avoid waves where the workshops alternate between having too few and too many jobs, Detecon developed a simulation algorithm. "This has freight wagons break down in different regions based on real data," explains Herbstrith. The defective freight wagons are then assigned to a workshop—once following the old principle of the shortest distance (left image) and once following the new ISWM scoring tool (right image).

A workshop with free capacity (yellow) then draws freight wagons from a larger area. Full workshops (orange) are avoided. Damaged wagons from their area are sent to the nearest workshop with free capacity. The jobs originally assigned to Munich (left image) are sent to Nuremberg or Magdeburg (right image). Over time, this levels out capacity (more workshops become green).

The application also takes account of any planned maintenance, such as inspections (regular checks which are generally carried out every six months), as well as the prioritised repairs. If wagons are urgently required, the repair can be brought forward. Conversely, repairs of tolerable defects such as graffiti can be pushed back. Those in charge at the central disposal site in Duisburg decide this. Once a repair has been made, the application reports the availability of the wagon to the partner systems, and the wagon can be used again.

Tangible benefits

"The project has made a key contribution to increasing efficiency in our damaged wagon management," sums up the Project Manager from DB Cargo. The number of disposals has been reduced by 14 percent, and the capacity utilisation of the maintenance plants has balanced out. Thanks to the use of the application, the workloads of the plants can be managed in line with the available staff. Overall, the number of workshop visits fell, and the downtime reduced significantly. The wagons thereby have more productive use time on the rails, meaning more goods can be transported, and sales can increase.

The sustainability benefit for the company is a welcome side effect: "As we are covering fewer unnecessary kilometres for transport, we are of course also reducing our carbon footprint," shares Kühnast.

What’s next?

“We can use the data lake to expand our big data analytics. After all, every wagon is different," says Kühnast. The level of wear and tear is not just dependent on the wagon’s age, but also where it operates and what it transports. For example, the level of wear and tear is higher on hilly routes than flat routes. By capturing this data, as well as images of components, artificial intelligence can automatically identify and categorise types of damage.

“If we identify anomalies during operation, we are then able to immediately assess whether and when a repair is necessary, and how urgent it is. iSWM might therefore become key to shaping our decisions," says Kühnast.
Mercedes-Benz do Brasil has a presence in the Latin American country for the past 65 years. With its 9,000 employees, the three-pointed star 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. Continuing its investments in Brazil, the Company has been implementing a contribution of R$ 2.4 billion between 2018 and 2022.

A testament to the company’s commitment to customer experience 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.

Levelling up on this, Mercedes-Benz recently teamed up with T-Systems—as part of its more than 20-year partnership—to develop another state-of-the-art solution that aims to monitor driver performance and behavior: the Liga na Estrada application.

Solution for the people

The demand for a solution came not from the Board or the leadership team of Mercedes-Benz. Instead, the application was developed for the people who worked in the field operations directly with the end customers. The fleet operators wanted to reduce fuel consumption, extend the life of vehicle components, and prevent the potential latent risk of truck accidents. To achieve these goals, it is necessary to track certain metrics, which is why the application has a monitoring feature capable of generating this data accurately while evaluating the behavior of active drivers.

Making tracking fun and competitive

The Liga na Estrada unifies the information received from the vehicle and sends it directly to the driver through the application itself. This ensures that the drivers have the necessary information about their performance and an understanding of the aspects that can be improved.

As an added incentive to the drivers to continuously monitor their performances, a gaming functionality was introduced to the application. This functionality allows drivers and their managers to create competitions and groups within the app itself.

The gaming approach not only kept the drivers engaged, but it also prompted them to pay more attention to the metrics obtained during the trips and make significant performance improvements, particularly...
Agility

The close coordination with end customers helped ensure that all possible pain points were mapped during sprints, thus reducing rework and major post-launch modifications. As Luciano Abrahão, Digital Solutions Development Manager at Mercedes-Benz do Brasil, says, “We have to understand the customer and build the solution based on the customer’s pain.”

The application received a positive response for its 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 the reportees.

The next steps

In its current initial phase, 215 drivers are already using the app—and the trend is rising. 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, which will allow continuous process improvements.

Along with the communication established with customers, the constant interaction between the two partners ensured that the work was properly aligned. “There was a very productive interaction between all areas of Mercedes-Benz and T-Systems that was essential to the success of the project,” says Priscila Protásio, Sales Analyst at Mercedes-Benz do Brasil.

The challenge

The project needed a lot of robustness during its development phase to meet the expectations—of teams and users—and to prove that Mercedes-Benz do Brasil has recognized the potential of digital transformation in order to be able to act innovatively or disruptively whenever necessary.

“Mercedes-Benz is a structured manufacturing and industrialization company, so the big challenge for our teams was to recognize the potential of digital transformation and industrialization,” says Ivan Martínez, Systems Analyst at Mercedes-Benz do Brasil.

Benefits for company employees

The application benefited the employees of Mercedes-Benz do Brasil as well. In addition to working with Fleetboard, Liga na Estrada was inserted into Mercedes-Benz do Brasil’s intra-entrepreneurship program, the Incubator, to encourage company employees to think about new ideas 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. “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,” says Fioretti.

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

The customer leads the way

In order to be able to take the needs of future users into account right from the start, it was clear to both T-Systems and Mercedes-Benz that the customer should be on board from the very beginning of the joint project development. The Liga na Estrada development process involved Sprint models, and with each delivery, the project participants validated the results with customers to ensure the application is compliant with the proposal. According to Fioretti, “The development team embraced the cause and treated the project as if it were their child.”

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 at Mercedes-Benz do Brasil

The close coordination with end customers helped ensure that all possible pain points were mapped during sprints, thus reducing rework and major post-launch modifications. As Luciano Abrahão, Digital Solutions Development Manager at Mercedes-Benz do Brasil, says, “We have to understand the customer and build the solution based on the customer’s pain.”

The application received a positive response for its 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 the reportees.

The next steps

In its current initial phase, 215 drivers are already using the app—and the trend is rising. 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, which will allow continuous process improvements.

Along with the communication established with customers, the constant interaction between the two partners ensured that the work was properly aligned. “There was a very productive interaction between all areas of Mercedes-Benz and T-Systems that was essential to the success of the project,” says Priscila Protásio, Sales Analyst at Mercedes-Benz do Brasil.

The challenge

The project needed a lot of robustness during its development phase to meet the expectations—of teams and users—and to prove that Mercedes-Benz do Brasil has recognized the potential of digital transformation in order to be able to act innovatively or disruptively whenever necessary.

“Mercedes-Benz is a structured manufacturing and industrialization company, so the big challenge for our teams was to recognize the potential of digital transformation and industrialization,” says Ivan Martínez, Systems Analyst at Mercedes-Benz do Brasil.

Benefits for company employees

The application benefited the employees of Mercedes-Benz do Brasil as well. In addition to working with Fleetboard, Liga na Estrada was inserted into Mercedes-Benz do Brasil’s intra-entrepreneurship program, the Incubator, to encourage company employees to think about new ideas 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. “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,” says Fioretti.

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fuel consumption and the reduction of accidents and maintenance costs. Another outcome of this was that the trucks now needed fewer emergency repairs.

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Oliver Wolff, CEO of the Verband Deutscher Verkehrsunternehmen, on the prospect of offering bus and train drivers a uniform public transport experience, the digitalization necessary for this, and the federal government’s specifications for getting people to switch from private to public transport.

Interview conducted by Bernd Henseling, Telekom Account Manager Public Sector, and Philipp Greiff, Head of Expert Sales Public Transport at T-Systems.

Author: Thomas van Zutphen

Mr. Wolff, COVID-19 really put the brakes on German transport companies, and saw passenger numbers drop by 34% in two years. How far did this set public transport back in terms of the 2030 mobility transition?

The COVID-19 pandemic definitely had a significant impact on public transport. Just prior to it, people had been preparing scenarios for how public transport needed to develop in order to achieve the federal government’s climate-action targets. This process was brought to a standstill, and, as passenger numbers are still down on pre-pandemic levels, the developments have been set back three to four years. But the pandemic also saw the industry demonstrate its strong capability, almost fully maintaining its service, at the request of policymakers, despite much lower passenger numbers.

The 9-euro ticket that was introduced nationwide over the summer received an overwhelming response from the market — like a “public-transport Woodstock” — as you yourself described it, after three months. You have set the potential basic parameters for a follow-up offer—which is something that, if nothing else, the travelers themselves are hoping for—and the price for this. When and what “add-on sale” do you believe is required as part of the implementation policy?

The federal and state transport ministers defined most of the basic parameters back on October 13th; there is to be a nationwide subscription ticket for 49 Euros a month, ideally paperless. The federal and state governments are initially each putting up 1.5 billion Euros a year for this, with more dynamic equalization starting in the second year to absorb the increases in costs and prices. We believe these are

“The fare alone won’t drive any bus”
appropriate proposals for establishing a solid starting basis for this kind of ticket.

To ensure this type of ticket can now be promptly implemented, however, the industry needs further financing from the federal and state governments, because both the COVID-19 pandemic and, in particular, the dramatically increased energy costs, have put transport companies under massive pressure economically. Coupled with this are the long overdue increases in regionalization funding where, despite making promises, the federal government continues to drag its feet. All of this may result in us having to limit public transport services, while simultaneously being supposed to introduce a cheap, nationwide ticket to gain passengers. That’s quite a contradiction.

At the end of the day, it will also be about determining which transport association or which individual company the ticket will be used at, and to what extent. How would that ideally be achieved?

Ideally just as easily as for ski lifts, even though the ecosystem of just the necessary features we need to offer companies nationwide, as well as our highly diverse fare structures, is disproportionately more complex than what you get on the slopes. Specifically speaking, we initially need comprehensive, sensible passenger information in order to sell a nationwide ticket. It needs to be digital, 99% accurate, and also allow additional use cases, such as a lost & found function for luggage. This pushes prices back up, because quality and improving the service for customers always costs money.

In principle, however, we need to be moving in the direction of switching to digital wherever possible and developing and offering a correspondingly suitable solution nationwide. There’s no changing that.

The German federal government has declared its aim is to increase public transport services by up to 30% by 2030. Coupled with this is, on the one hand, passengers’ desire for a more attractive offering, better frequency, and a significant increase in terms of punctuality. How can public transport meet, initially, the rising passenger numbers, but, in the medium term, also the extensive demands of the mobility transition?

You mention the exact point the federal government continues to neglect. The federal transport minister can’t only be focusing on a fare model; he also needs to take citizens’ demands for a more extensive public transport service seriously. Not only to achieve climate targets, but also to get people to switch from private to public transport. So fares are one thing, that’s clear. But buses and trains do also need to operate—as frequently and punctually as possible. This requires a massive investment package that has been talked about forever, but which is yet to progress under this federal government.

What budgets—and for what, specifically—will be necessary here?

The federal government’s coalition agreement states that 1.5 billion Euros in regionalization funding also needs to be paid to the states for public transport operation. This is where the gloves finally need to come off, along with the considerable investments required for the rail network. Specifically speaking, it’s about buying buses with climate-neutral power units, and replacing the entire depot infrastructure, as this will need to meet different demands in future compared that of the current diesel-powered fleet. Many old metro systems also need to be cleaned up, and there additionally needs to be a focus on expanding even tram systems here in metropolitan areas.

And we mustn’t forget that needs are different in rural areas. The existing bus services, which are primarily geared around school-bus services, need to at least be supplemented with a new digital system to ensure people in these areas have access to transport services meeting their requirements. The on-demand services
therefore need to be expanded and integrated into the public transport system.

In terms of the target time frame for the mobility transition, we’re talking over eight years. This is hardly enough time to expand the current infrastructure to the necessary extent. What kind of leverage could ensure this target is still achieved?

It’s true that it takes many years to establish infrastructure, meaning there won’t be anything more than the current infrastructure available over the next few years. In light of this, the fastest option for expanding public transport by 2030 is to expand bus services. This actually makes sense, as it can be done through flexible routing geared around citizen requirements, ensuring both fast availability and a high degree of flexibility can be factored in when developing the service.

Architecture and interfaces play a key role in accelerating digitalization and automation. What do these ideally look like if digital services are to optimize the network?

As I mentioned, on-demand services are one of the things that need to be expanded, particularly in rural areas, and this really is a digital system in terms of determining routes. This means that the entire digital infrastructure necessary for developing such systems actually needs to be available Germany-wide. It includes real-time data, buses sending their exact location, availability of all fares, and developing systems with client capability/interoperable penetrability.

This means putting an end to a past where industrial providers offered their own system, which then was unable to engage in digital dialog with competitors’ systems, i.e., did not enable data exchange. You can regulate things either through common standards, which then actually need to be followed, or by creating a platform that is available transparently and non-discriminatory to everyone, but which is also mandatory to use.

At the end of the day, would an open data broker, as a central, intercompany mobility platform, be linchpin as we head towards the mobility transition?

An open data broker would be the linchpin for all mobility services if it were run by a neutral party and if connection and usage were also mandatory. These days, unfortunately, we’re still suffering from there being too many providers and transport companies for the customer numbers, and from there not being any mandatory strategy for offering end customers a uniform public transport service, including at a digital level.

Is “Mobility Inside”, the transport industry’s joint platform initiative, paving the way and able to be further developed in this respect?

Mobility Inside is an attempt made by a joint industry initiative to make individual companies’ fares mutually available. For example, Munich’s transport company or the Rhine-Main transport association can sell tickets in Dortmund or Mannheim. In this respect, Mobility Inside is certainly the first step toward consolidating the entire industry. Further investments need to be made here, and more companies need to participate, so that public transport can offer a one-face-to-the-customer service digitally, including for strategic reasons.
Delivery Note 2.0
setting new standards in transport logistics

Gone are the days of paper chaos and red tape in the delivery industry thanks to Cloud4Log, a project created jointly by GS1 and the Bundesvereinigung Logistik.

Author: Victoria Legros

It all began with a beep

We’re all familiar with barcodes; we see them all the time at the grocery store. The cashier runs the product over the scanner and beep: the till registers its price and name. The Universal Product Code (UPC) was first passed under the scanner of a shop till in Ohio on a packet of chewing gum in 1974—a milestone in the development of modern-day retail processes. The pattern of strokes reduced the error rate and saved a tremendous amount of time for grocery store workers and customers alike. And—in a classic win-win situation—retailers could also record the stock leaving the store and reorder some when necessary.

These days, GS1 barcodes are scanned over six billion times a day. They are considered the universal standard in global trade. Some 50 years after the birth of the barcode, GS1 Germany is teaming up with Bundesvereinigung Logistik (BVL) and T-Systems to create a new milestone in the world of transport logistics in the form of digital delivery notes.

Analog, defective, and slow—the original delivery note

GS1 Germany, BVL, and T-Systems have already spent two years tinkering away in a bid to figure out how to replace paper delivery notes. The analog document accompanies all deliveries until the goods are received, and has so far always been passed on and processed manually. In practice, the drivers act as the messenger, handing the paper document over to the recipient together with the goods. In this industry, delivery notes are thus...
The result? Paper chaos, mistakes, and lost time—the last of these being particularly critical for billing when dealing with manufacturers and suppliers. Not to mention the avoidable paper usage. Plus, there are no legal regulations governing the document. Every company issues their own delivery notes following their own methods, making the whole process even less transparent.

One digital delivery note folder rather than a stack of paper

The participants included Beiersdorf, Henkel, Nagel Group, and DHL Freight, as well as four distribution centers for the DM, Rewe, and Penny retail chains.

Andre Gassner, Henkel’s Group Logistics Manager, says, “The joint pilot project in the summer of 2021 demonstrated how much better the digital format is. Twenty retailers, industrial companies, and logistics spent four whole weeks testing the process in practice. The result? Paper chaos, mistakes, and lost time—the last of these being particularly critical for billing when dealing with manufacturers and suppliers. Not to mention the avoidable paper usage. Plus, there are no legal regulations governing the document. Every company issues their own delivery notes following their own methods, making the whole process even less transparent.

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And it was a success in every respect: Some 160 users created a total of 156 “delivery note folders”, thereby saving on 228 paper delivery notes. Apart from the sustainability aspect, the solution also dramatically speeds up delivery processes, which were cut by up to ten days! The contactless handover using QR-code scan, the digital signature, and the fact that no delivery note needed to be printed out also proved to be impressive.

Two-thirds of the participants want to keep using the digital solution and welcome the standardized document format. One such participant is Birgit Heitzer, head of logistics at the Rewe Group.

“We took part in the pilot project at our national warehouse in Lünen and are delighted. Just the simplified process and how much faster the whole thing is (...). There is nothing but benefits for everyone involved, and I really hope with all my heart that we gain more traction in this area and are able to implement it next year, not just in the consumer goods industry but everywhere,” she said.

Open interfaces for better exchange

The name says it all; the digital delivery note is run digitally as a web app via a central, cloud-based platform called “Cloud4Log”. One of its greatest benefits is that users do not have to log in or install any apps, which is something that has proven to be the technical downfall of previous projects, with many drivers not wanting to download apps on their private cell phones.

The web app supports all different roles, from dispatchers to drivers to recipients and even authorities, e.g. in the event of police checks. This is made possible by the system’s three-layer architecture. It consists of a back-end system, a front-end system either created by T-Systems or sourced from third-party systems, and an interface system that connects the two systems. Open interfaces (APIs) ensure multiple software programs, including third-party systems, can exchange data and information without any problem.

What makes our solution special is that we’ve given it an open design, meaning other providers supporting the delivery note processes (e.g. transport management systems) are able to easily integrate these.

Steffen Passmann, PU Digital Solutions at T-Systems
Fast and secure in the Open Telekom Cloud

The process starts with the sender when an order is loaded. Instead of documenting this in paper format, as it was previously the case, the forwarding agent uploads the document online in the cloud in a format defined by GS1 and BVL via the frontend system provided or the open interface.

Before starting the trip, the driver digitally confirms the loaded goods and receives a QR code he or she can use to retrieve the delivery note at any time, e.g. during a general traffic check. Complex processes are also supported. Among other things, logisticians and forwarding agents are able to pool entire folders and individual delivery notes for specific runs.

When the goods arrive at their destination, the incoming goods workers can use the QR code to classify the delivery and submit it to the company’s own inventory management system. Discrepancies in quantity can be noted in the digital delivery folder, e.g. through comprehensive documentation directly in the app or by attaching an incoming goods receipt. Any defects are recorded in a similar manner, with an additional option of being documented with photos. The same applies when changing load carriers, after which the incoming goods department and the driver each digitally sign off on the consignment.

The receipted delivery note is then immediately available to all partners in the supply chain, and further steps, such as issuing an incoming goods receipt or invoices for retailers and forwarding agents, can then be initiated automatically. This not only saves time, but also additional administrative and paper costs, as the invoice does not need to be corrected and re-issued in the event of any discrepancies.

As the developer of the system, T-Systems advocates compliance with the GDPR and data protection throughout the entire process: “Delivery notes contain sensitive information and business secrets for all parties involved. That’s just one of the reasons security is of central importance to us, both in terms of IT and software, as well as participants’ data and privacy,” says Steffen Passmann.

Cloud4Log goes live

The platform has been technically available since the beginning of November and the first beeps are ringing out at German warehouses. This will see GS1 Germany and BVL kill two birds with one stone. The digitalization and simultaneous standardization of delivery notes will decisively increase supply chain efficiency—and very likely in industries beyond just logistics.

Cloud4Log was awarded the Innovation Excellence Prize at this year’s ECR Awards at the end of September. The digital delivery note won the new “Audience Award” for the “Energy Zone” and the “Claim Management” project. “This brings attention to the topic of the digital delivery note,” Björn Hebusch from the Nagel-Group is pleased to say.

GS1 Germany has been presenting the ECR Award for special partnerships in the consumer goods industry for 20 years. The jury consists of representatives from trade, industry, science and the media.
What sustainability-related trends are you observing at SAP’s end?

There are essentially two developments. The more recent of the two is that SAP has recognized the business potential that sustainability offers, and is now also offering software solutions designed to help businesses determine and improve their product footprint. The second aspect—transferring SAP workloads to the cloud—has been widespread for several years now.

Is the cloud a “cure-all”, including for sustainability?

The fact is that on-premises operation of SAP systems can never achieve the same efficiency and economies of scale as professional operations in the cloud. The cloud’s scalability enables resources to be optimally tailored to current operations. Smart capacity usage and cooling concepts give rise to further synergies. Together with the reduced memory requirements of modern S/4HANA systems, server capacities can be freed up by up to 75 percent, meaning a clear reduction in the energy used, and therefore in CO₂.

Are there differences between the public and private cloud?

The deployment model does not play a crucial role. How the data centers behind it operate, and whether they are managed intelligently, is much more important. The PUE or “Power Usage Effectiveness” value, that is the ratio between energy used for pure processing power and the total energy used by the data center, is one of the key parameters here – along with the sources of the power used. We are seeing that hyperscalers are also focusing on “green”, energy-efficient data center operations. All players are pulling together.

How does this work at T-Systems?

We’ve been powering our data centers with 100% green electricity for years. With their LEED Gold certifications, our facilities in Biere/Magdeburg are among the most modern and energy-efficient data centers in Europe with a PUE of 1.3. Moving SAP workloads to our private cloud thus clearly reduces the carbon footprint. This is one of the reasons we’ve been awarded the Green Magenta Label.

Sustainability? Let’s be honest: The only thing we know for sure so far are Germany’s national targets and the EU’s guidelines. There needs to be a 55 percent drop in CO₂ emissions by 2030 in order to prevent climate collapse. But many businesses are still only at the very start of their sustainability journey. What role can SAP play in achieving climate targets? We spoke to Uwe Birkenhauer about this.

Uwe Birkenhauer, Head of SAP Portfolio at T-Systems, has been following SAP trends and developments for years. He’s familiar with user needs, as well as SAP’s plans for further developing its services.
What is this label worth? Can the savings be quantified?

While the Green Magenta Label is a seal granted internally within the telecom industry, the certification process is comparable to awarding external certificates like the Climate Neutral Data Center and LEED. We go through a multi-stage process during which we have to prove what we have done to be more sustainable. One of the results is that, on average, our customers are saving eight tons of CO₂ per SAP system each year.

Editor’s note: The “Leadership in Energy and Environmental Design” certification process was developed by the US Green Building Council, and is the worldwide standard for assessing energy-saving properties.

That sounds a bit like the famous Quick Wins …

That’s exactly what they are. Terminating your own operations shifts the carbon-footprint responsibility onto the service provider—who also has to prove they have cut emissions. But moving to the cloud is of course only one basis for sustainability, and serves to improve IT’s CO₂ footprint. User companies will not be able to avoid setting up their own reporting and management systems for sustainability and examining their entire value chain in order to operate in a truly sustainable manner.

And that’s where the new SAP solutions come in?

Correct. The thinking behind this is simple: if a lot of data and processes are already being provided in the SAP systems, or are flowing into them, why shouldn’t you use this opportunity to also utilize the information for sustainability aspects? SAP now offers a small ecosystem of services for this, designed to help assess data and simulate process changes to the carbon footprint. This includes, among other things, SAP Product Footprint Management.

But that’s not where the sustainability management problem lies.

In my opinion, the greatest challenges lie in actually assessing the carbon footprint of a product or component. There will definitely be major differences—depending on how and where, for example, a kilogram of copper is made. This requires valid data that needs to be fed into the SAP system. Last but not least, there also needs to be a comprehensive concept, a sustainability strategy, to ensure the initiatives are successful and target-oriented. Nevertheless, high-performance software tools are an important piece of the puzzle for professional sustainability management.

So no shortage of work for sustainability consultants, then?

It’s a young market that customers first need to get their bearings around—but it is secure. Our consultancy focus is very SAP-oriented, however. We pool sustainability concepts with the possibilities offered by SAP. And our colleagues at Detecon also take care of the whole thing, developing sustainability strategies and collecting and analyzing the right data.

As such, customers receive a full package from initial concept to implementation in SAP—including with other tools that may be more suitable and, in some cases, are an even better fit for the company.

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Savings of eight tons of CO₂ per SAP system per year

Data is the cornerstone for the development of a sustainability strategy.
Energy revolution with new “Flower.Power” concept

Interactive Energie.Zukunft (energy.future) app: Electricity and gas network operator Bayernwerk AG has come up with a playful, fun way to promote renewable energy to its customers.

Author: Durga Godbole

Ensuring a decentralized energy supply using domestic resources—that’s the declared aim of the Regensburg-based Bayernwerk. After all, the sun, water, wind, and biomass are the future. The rapid transition to renewable energies is also a stated aim for the whole of Germany, in light of ongoing climate change and the current energy crisis.

But what exactly will the energy landscape look like in Bavaria in 2030? And how can you explain the complex issue so that everyone can understand it? In order to answer these questions, Bayernwerk worked together with Telekom subsidiary T-Systems MMS to develop an innovative app. Using augmented and virtual reality 3D content, the app brings the energy landscape of tomorrow to life in a fun but informative way.

The inspiration: a poster in the style of a hidden-picture puzzle

Companies, authorities, and individuals are showing an increasing interest in alternative energy sources, with some occasionally even generating their own power from solar panels. They are actively shaping the energy landscape through their individual decisions with regard to power, heating, and transport.

The “Flower.Power” energy concept from Bayernwerk sees the future energy landscape as locally connected microsystems, much like a wildflower meadow. Cities with high energy requirements are
Future Practice

Energy revolution with new “Flower.Power” concept

The Energie-Zukunft app is free and is also available as a kids’ version, making it perfect for school lessons. In the long term, Bayernwerk AG is planning to use the VR/AR technology in other areas.

“It’s fascinating how easy it is to convey complex issues to the right target group by means of VR/AR content. This app helps declare Bayernwerk’s contribution to shaping the energy landscape of tomorrow in a clear, informative way. The mixed-reality content is fun and makes you curious to find out more about the energy landscape of tomorrow,” says Anna Zwicknagel.

When you download the Energie.Zukunft app onto an iOS or Android device, all you need to do is use your smartphone or tablet to scan a scene from a special hidden-picture poster or hold it over the space you’re in, such as a wall or piece of furniture, and you’ll be transported to a small city in the year 2030. Users of the app can zoom into nine stories, which are then displayed in 3D on a projection space, such as a table. The individual scenes are modular, with AR content from low-polygon models. Users of the app can move through the scene and feel part of the action. For example, there is a highly automated network control station, which controls the flow of energy flexibly. Or a smart local network station, where remote-controlled switches enable the power to be restored in the event of an outage. Or a digital household with smart garbage cans, which report how full they are independently.

Bayernwerk wanted to use a state-of-the-art app for its customers to create awareness about the energy cycle—from generation through to consumption. Furthermore, the company wanted to strengthen its public image as a modern network operator and pioneer of sustainable energy.

“We were looking for a partner with a great deal of experience. We found exactly that in digital service provider T-Systems MMS,” says Anna Zwicknagel, project manager of the Energie.Zukunft app at Bayernwerk Netz GmbH.

In the space of just a few months, nine scenarios were created with VR/AR content. “In this project, we used agile methods such as design definition loops and development sprints; sound development was also iterative,” says Martin Reißmann, xReality Project Manager at T-Systems MMS.

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Mobilithek goes mobile

Traffic jams, long lines, crowds, and stress are part of commuters’ everyday experience. Even those who use buses and trains and incorporate other mobility providers are familiar with the problems of overcrowding and searching for connections. But networked mobility with central data management that is mandatory by law offers a way out.

Transport turnaround: Taming data volumes in intermodal transport

In many places, traveling by car is a nerve-racking experience: daily challenges include getting to work on time, finding a parking space, and keeping appointments. Private motorized transport makes a significant contribution to the global carbon footprint, with more than 150 million metric tons of CO₂ being emitted every year—in addition to all the other negative effects such as accidents, noise, and pollution. Even with the alternative, local public transport, passengers’ mobility is restricted by the overcrowded means of transport, lack of connection options, and too few or uncoordinated intervals between control centers.

New legislative amendments and large-scale subsidy programs are now expected to herald the end of an era: the dependence on fossil fuels and excessive private motorized transport.

But it’s still a vision: inner cities without noise and hustle and bustle, where electric buses, shared cabs, bicycles, and e-bikes guarantee comfortable mobility at all points. Intermodal travel—seamless and well-planned transfers with changing means of transport—is in demand.

From the bistro during lunch break quickly and reliably back to the workplace and finally home—something that can be planned for users at any time, e.g., via the app, depending on traffic volume and weather conditions with a chosen means of transportation.

More mobility throughout Germany with less traffic—is it too good to be true? A major effort is needed to bring about the traffic turnaround.

Simply expanding fleets is not enough. Innovative digitalization technologies improve coordination among the various mobility providers and their control centers. Large and small providers benefit from new, multi-client-capable control systems and can thus provide the real-time data required by law—and offer their passengers more attractive services. But this requires a central point of contact for the cross-provider management of enormous amounts of data—for the benefit of operators and users alike.

Data spaces to the rescue

The first major step towards a centralized data hub with access to vast

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The first major step towards a centralized data hub with access to vast
amounts of mobility data has already been taken. With the Mobility Data Marketplace (MDM), the Federal Ministry for Digital and Transport (BMDD) has created a national access point for all operators and users of mobility data as mandated by the EU. The EU promotes the development of intelligent transport systems (ITS) and in Germany the MDM has this role. It is a neutral B2B platform with defined standards for data exchange. The idea is to consolidate access to mobility data across different means of transport, network elements, and stakeholders and make it available for easy retrieval.

But that is not enough. The task now is to expand and optimize data management. Requirements from the delegated regulations for the European ITS Directive and the amended Passenger Transportation Act stipulate that this first generation of the German national access point for mobility data needs to be ported to a new data space technology. Following a call for tenders, T-Systems was awarded the contract in 2021 to set up a comprehensive ecosystem for mobility data.

“Wishful thinking of many traffic planners—Park&Ride spaces are available, but are not yet used in many places yet. Angela Merkel announced a data space—was planned for the end of 2023. With the Mobility Data Space (MDS), which was launched at the 2021 ITS World Congress in Hamburg. With it, Mobiithek became its first and likely the most important data platform or anchor for mobility data. The MDS was realized by Acatech, the German Academy of Science and Engineering, with the support of several Fraunhofer Institutes. It is solely focused on data exchange. It provides the central services necessary for the operation of a data space according to the IDSA:

- an identity provider to uniquely identify participants
- a vocabulary provider to ensure a common language
- a broker and metadata directory or “marketplace”—a kind of phonebook to look up data offers
- a data app store
- a clearing house

The data exchange is established directly between the participants themselves in a distributed manner by using IDSA-compliant connectors. Both MDS and Mobiithek utilize IDS technology to enable technical interoperability and a linkup, which is planned for the end of 2023.

While Mobiithek will, at least initially, mainly provide mobility data from public providers, it is also worthwhile for private providers to participate in it, ideally using MDS. The clear intention here is to build bridges and fuel data exchange between private and public stakeholders through Mobiithek and its connection to MDS. Furthermore, MDS could provide a conduit for pan-European expansion: other national access points could connect to create a common European mobility data space. To unite all stakeholders, the connected platforms need to have an intelligent architecture and smooth interoperability.

That is why the Telekom DIH is working “under the hood” of this ambitious large-scale project. It essentially functions as a data marketplace that ensures exchange while safeguarding data sovereignty and data rights. Data processing and analysis are designed as a platform-as-a-service in the cloud. Mobiithek, in turn, uses components of the Telekom DIH. As a pioneer in data spaces, the Telekom DIH has translated its previous experiences and insights into a carefully crafted three-step enablement offering to avoid a big leap into the unknown but allow anyone to “think big, start small, and scale fast” (see Figure 2).

“Be Prepared—Advisory”: Deutsche Telekom develops tailored advisory solutions based on a suite of standardized and therefore cost-efficient data space onboarding packages. This suite is composed of packages organized into the two phases of “Investigate & Understand” and “Implement & Scale.”

Once prepared, the second offering following “Advisory” is “Get Connected—Products”, which includes the products “Connect” (Telephony connection) and “Space” (Private branch exchange)—all easy-to-use and conveniently delivered as a managed service in the cloud that shields you from evolving technology under the hood.

The third offering is “Build & Orchestrate on Your Terms—Ecosystem”, which allows clients to build, grow, and nurture their own data ecosystem complete with data space setup and configuration. One innovation here is a one-of-a-kind sovereign stack or “sovereign-all-the-way” solution, which creates a sandwich of sovereign data exchange with the Connect product on top of the T-Systems Sovereign Cloud powered by Google Cloud. This allows for data to be persistent and processed in a sovereign way before being exchanged in a sovereign manner.

Innovations in practice

But what does this mean in practice? Look no further than the Telekom DIH intermodal travel planning application enabled by a data space. The app was built as a minimum viable product (MVP) and demonstrator for planning purposes at RealLab Hamburg and tested with live
The good news is that intermodal travel can deliver impressive speed gains, which makes a shift to other modes of transport and lower CO₂ emissions a lot more likely. Who wouldn’t like to get from A to B faster? "Nothing is more effective with behavioral shift than a better, faster, and cheaper product" adds Sven Löfler. In the future, a link with Mobilithek could further enhance app performance with additional data, such as context and local event data.

Whether it’s the Hertha vs. Union derby at Berlin’s Olympic Stadium, 30,000 people attending a Helene Fischer concert at the Munich exhibition center, or the Hanse Sail in Rostock attracting hundreds of thousands of visitors to the city over the course of several days—major events or even just a storm that lasts for hours can mean it suddenly makes a lot of sense to do without e-scooters or to switch to car-sharing services.

Keeping track of everything amid the confusion of ever new and evolving technological developments is a challenge for mobility stakeholders and often distracts from a focus on the core business and service innovation. As a pioneer and market leader, Deutsche Telekom has a special role to play in the search for strong partners: it has numerous interfaces with its customers. In the automotive sector, it is investing in new infrastructures itself. CASE (Connected, Autonomous, Service-based, Electric) is a key aspect of this commitment.

In addition to connected driving, smart parking, and activities for the highly compatible expansion of charging stations for electromobility, it also has a lot to offer for control centers in public transport with ITCS (Intermodal Transport Control Systems). Last but not least, it awards projects and initiatives with its own recognized #GREENMAGENTA label for sustainability. The company also attaches particular importance to its consistent commitment to data protection and data security. Reason enough, then, to network with a reliable partner.

But there is still more room for innovation in the mobility data space. With Gaia-X Federation Services (GXFS), the next generation of data infrastructure is already in place. GXFS will link data and infrastructure ecosystems together to create a federated ecosystem that is open, transparent, and secure. The goal: the sovereignty of the European digital economy.

Nothing is more effective with behavioral shift than a better, faster, and cheaper product.

Sven Löfler, Tribe & Chapter Lead Data Intelligence Hub
The opera diva from the computer

The first-ever AI opera, Chasing Waterfalls, premiered in Dresden.

September 3rd, 2022—curtain up. At the Semperoper in Dresden, a hitherto unknown singing talent faced an audience of opera professionals. After Andrew Lloyd Webber’s Cats in August and The Magic Flute in mid-September wowed opera audiences, the spotlight turned to artificial intelligence (AI) later in the month.

The Semperoper has added an innovative opera project to its program in the form of “Chasing Waterfalls.” The ensemble includes the Staatskapelle Dresden, six singers, and the algorithm “Ego Fluens,” a piece of artificial intelligence which—unsurprisingly—plays itself. Chasing Waterfalls offers up the first-ever live performance of AI as an opera singer.

Is it a classic opera? That’s open to dispute. Multimedia effects and a host of digital elements have left their mark on the opera. The engineered voices of the six characters came together in an incredibly modern composition, with videos, lighting effects, an eight-meter-high waterfall as the central stage element—and of course, AI.

AI meets the opera

Bringing digitalization to the opera and testing the capacity of AI sounds like an interesting digital experiment. For classical artists, the inclusion of the virtual ensemble member created a host of new challenges. Whereas in a classical opera, the actors respond to one another and the conductor guides the orchestra through the performance at the correct tempo, Chasing Waterfalls followed a strict sequence, with conductor Angus Lee facing the challenging task of not only conducting the chamber orchestra, but also coordinating the human actors with the electronic background sounds and the fixed-time appearances of the AI (via click tracker)—all live and in time.
AI has had on our lives.

Between man and machine. In his latest project, he reflects on the influence that AI has had on our lives, even if we don’t know it or want it. Our social media lives are influenced by it in particular. We create our own digital twins, which is something you can see on stage in our performance.

Will the physical selves be able to assert themselves as real people against the dissolving boundaries? The boundaries between the virtual and physical world become blurred on stage, with the stage design highlighting this effectively.

But what about the real world? Beyer wants to use his work to contribute to the discussion surrounding how digital our personalities are today, prompting age-old questions such as: What is truth (in an increasingly digitalized world)? What makes us human?

How can AI learn to sing?

Over the course of just 70 minutes, Chasing Waterfalls immersed the audience in a world in which opera and digitalization merged. AI had a key role to play in this evening too, before moving on to its next engagement in Hong Kong, the home of composer Angus Lee. Naturally, it didn’t get stage fright and won’t in Hong Kong either—but perhaps it has the mannerisms of an opera diva? How can you make AI actually start singing?

“We tried to bridge the gap and connect our very different soundscapes,” summarizes the musician, who is originally from Hong Kong. Kling klang klong provided the electronic sounds for Lee’s classical theatre will be pioneering in 15 or 20 years,” says Eule. This is why those involved agreed that AI should play a significant role in the creation of the opera.

It’s orchestra 2.0, if you will. Angus Lee also composed a large part of the AI opera in collaboration with the Berlin Studio for Sonic Experiences, kling klang klong.

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Johann Casimir Eule, chief dramaturge at the Semperoper, saw the potential for innovation when Beyer’s proposal landed on his desk around two years ago. “We’ve worked with research institutes for quite some time and have now been able to combine this and bring the ‘old dog’ of the Semperoper into new technical dimensions. Perhaps this type of musical theater will be pioneering in 15 or 20 years,” says Eule. This is why those involved agreed that AI should play a significant role in the creation of the opera.

The real world confronts the digital world

The story might remind some people of Tron, in the pioneering Disney film from 1982, programmer Jeff Bridges finds himself a prisoner within a computer network and, with the help of his program Tron (a kind of alter ego) tried to escape—and put a stop to the Master Control Program, the AI alter ego of his adversary David Warner. What was purely science fiction at the time, now, 40 years later, has a real, somewhat bitter taste of dystopia in Chasing Waterfalls. Norwegian soprano Eir Inderhaug from the cast of the Bavarian State Opera is confronted with not one, but six ‘digital twins’ she needs to grapple with.

Back then it was a laser, now it’s a simple login. When the real, physical selves log into the computer, they are faced with digital copies of themselves: the numerous traces that they leave behind in the digital world of the Internet. They encounter their digital twins, Ego Fluentes, which operate in the virtual world as independent personalities, and eventually even team up against the physical selves and attack reality.

“The opera diva from the computer

Six human singers accompanied the AI on stage.

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“With all the achievements AI can already boast of a ready-made AI opera singer does not yet exist,” smiles Nico Westerbeck, who worked as the technical lead with the AI, training it from a beginner in the girls’ choir to an opera soloist. Westerbeck is a passionate computer and data scientist. He has worked at T-Systems Multimedia Solutions (MMS) in Dresden since 2018. His main focus areas are deep learning for language and text, reinforcement learning, and security. He and the MMS team turned the artists’ innovative ideas into reality and brought the AI to life.

Here, it’s actually not quite correct to say just ‘one’ piece of AI—several were involved, all in all. Librettist Christiane Neudecker worked with GPT 2 and 3 to develop texts, while another learned how to read music, and another how to sing. A team from T-Systems MMS was heavily involved in developing the singing AI.
Origin of the AI voice: A text-to-speech algorithm

“We didn’t start completely from scratch with our opera singers. We used research results from the area of text-to-speech, primarily the work of Chen et al. (‘HiFiSinger’, 2020) and Liu et al. (‘DiffSinger’, 2021), which converted a text-to-speech system into a singing voice synthesis system,” says Westerbeck. As the project progressed, too, the search for up-to-date findings remained a constant companion for the MMS team—after all, singing AIs are new territory. Westerbeck dug through dozens of publications in order to find the key to help make a piece of AI sing.

But there was quite a way to go from ‘Hell, how can I help you?’ to ‘Hell’s venom goes like a bolt.’ And a great deal of code had to be written too. How do you describe a singing voice in precise detail? Language, and moreover singing, are too complex. This is especially true when it comes to mapping them digitally. A typical music file of 44 kHz contains 44,000 individual sound pressures in one second. How many words can a person speak or sing in this time?

American actor Eddie Murphy sounds like he’s speaking 50 words in Beverly Hills Cop, but in an opera, it’s perhaps five. How do you distribute these 44,000 pulses across five words (and the different notes)? Where does each phoneme—the basic units of sound in language—begin? It’s a real puzzle, and a complex one at that.

Wanted: singing models and suitable data

The MMS team decided to take a pragmatic approach. The AI was to learn from a model. Kling klang klong invited Eir Inderhaug, who would play the role of the real self in the opera performance, to the studio in Berlin. There she initially sang 50 children’s songs, which were digitalized and sent to T-Systems MMS. Why children’s songs? “One of the publications we read recommended children’s songs,” explains the AI specialist. “This was an effective approach too. However, at a later stage of the project, it became clear that we wouldn’t achieve our goal this way. Rudolph the Red-Nosed Reindeer is no operatic aria—even when it’s sung by an opera singer.”

A second visit to the studio was therefore necessary. Inderhaug had to go one better, singing 20 operatic arias, which ultimately provided 10 more minutes of training material.

In the end, 70 songs were used by the AI team as a data source, intended to show the AI how singing functions. “We then had a sufficiently wide spectrum of data to avoid overfitting.”

How the neural network learns to sing

The AI experts at T-Systems MMS then developed a piece of architecture for a neural network, which is able to record notes and texts as input and generate a sound output from them. The team decided to spread out the complexity of the tasks in the neural network and generated a pipeline of multiple neural sub-networks. “In a few years, it’ll perhaps no longer be required, but the complexity we were faced with made this strategy necessary,” admits Westerbeck. These networks were initially as musical as a housefly on the hunt for food.

At least that’s what the first result sounded like. This isn’t surprising, as the first parameters for the neural network were initially created by a random generator.

The AI was trained in so-called epochs. Within an epoch, the AI was shown the complete dataset—which had already been split up into 10,000 snippets. In this way, three million ‘training sessions’ were provided over a total of 300 epochs.

During each process (‘forward pass’) within a training ‘epoch’, the AI was scrutinized at the end. The AI ‘aria’ was compared with the professionally sung version by Eir Inderhaug. This ruthless loss review assessed the performance of the model. The quantified results were then played back automatically into the neural network, which adjusted the originally random parameters.

“At the start of the training, a neural network makes huge errors. That’s not unusual,” explains Westerbeck. “The purpose of the training is to reduce these errors and gradually continue to improve.”

The neural network increasingly started to recognize sounds that were too loud or too high, and learned from this so that it sang better on the next attempt. The second product (after 10 epochs) first sounded like singing, “A bit like a radio that isn’t tuned to an exact station, or secret messages from outer space which have been extracted from cosmic background noise,” smiles Westerbeck.

But of course this still wasn’t enough for the operatic artists. Eule sums up the development of the AI—and you can tell from his words the slight dismaya of the...
Future Practice

Classic operatic artists at the beginning of the project: “When we heard the first singing samples, we were unsure as to whether we really wanted to venture into this experiment,” says dramaturge Eule.

Algorithm Ego Fluens passes the improvisation test

Indeed, if you think that the AI would now only ever deliver the same version of the song, you’d be wrong. The neural network is dynamic and is always slightly changing its playback. Neither listeners nor vocal coaches are able to say what they will hear exactly, just that an ‘audible’ result will be created that suitably reproduces the played notes and the text. The neural network will provide ‘just’ an optimized result, which is always slightly different from the original—and rightly so. Whether a singer rolls an R or hisses an S is entirely up to them. The same is true for the AI. It is perhaps a bit more human in this regard than one might think.

But the makers of the opera wanted to go one better. Not only was algorithm Ego Fluens to sing songs, for which it received the (previously unknown) notes and text from the score, a 4-minute passage was also provided in which it was supposed to improvise. An extemporization. For this passage, the AI received no texts or notes from humans. Thanks to the work of the team at kling klang klong, it was possible to combine the AI language model GPT-3 with a note composition model, providing the synthetic vocal model (the singing AI) with different texts and notes for each performance.

For the human performers, singing with the AI was a challenge.

Evolution of the results

Things start to sound more and more melodic: version one after 150 epochs, version four after circa 200 epochs, and version ten with the final AI song. For those in the know: the pipeline parts initially consisted of a transformer-based acoustic model, a diffusion decoder, and a GAN-based vocoder.

The end result was a neural network which not only made few mistakes, but also had a general understanding of how singing works. “In a best-case scenario, it’s therefore able to sing any popular song for people—with the voice of Eir Inderhaug.” A ‘generalization’ like this makes any data scientist happy.

The singing AI received these during the performance—those responsible checked first that the texts did not contain racist or sexist content You never know with AI... The audience of experts shouldn’t have noticed any differences in the passages in which text and notes were fixed beforehand and the AI followed the score and the libretto. “Here, the result within certain parameters was quite clear—and we were quite relaxed,” remembers Westerbeck. And while the AI didn’t deliver world-class soprano-level singing, it sang easily understandable texts with the right notes.

However, the project team was much less relaxed when it came to the live experiment of the ‘improvisation phase’. Would the AI do well here too? Every human actor needs a certain amount of talent for improvisation—the Marx Brothers’ scripts, for example, were said to sometimes contain the stage direction ‘Harpo does something funny’—and he always delivered. “Even though we’d prepared the AI thoroughly, there was no guarantee. We crossed our fingers that it wouldn’t do anything funny either,” admits Westerbeck.

Then it was time for scene 5. The human actors lay down, the red light came on: the stage was free for the AI to sing its solo aria. And it did a great job here too. GPT-3 developed a suitable text, the note model a suitable melody for the harmonies, and the singing AI translated everything into song. The AI developed a rather classic model, which differed quite significantly from the rest of the very experimental opera. The AI, therefore, did very well in the improvisation section as a composer too. It processed
the freshly generated text and the unknown notes in real time into a live aria.

The experiment was a success; the opera AI had proven itself. Even the libretto impressed certain critics. Would you like to hear a sample? And if the AI assures you that “I am so much more than a machine... My heart is just a cold hard drive,” it really does seem like it is worried about its own existence.

**Will the new Maria Callas come from a computer?**

What’s next? Whoever is able to create a new AI Maria Callas from a computer could land on the idea to invent the digital opera too. A new business model—one without prima donnas saying things like ‘I am not in tune today’ and conduct lengthy negotiations over pay. Despite the successful pilot, Sven Sören Beyer doesn’t think this will happen. “I don’t believe that it will replace human creativity, but rather act as a catalyst. However, I do believe that we are on the brink of something huge. Optimization will become more and more creative and give us tools that we can’t even fathom yet.”

Cultural creatives, therefore, have the all-clear—music will remain in the domain of humans, and AI will not be listed with a talent agency, but will find its feet as a support for creatives. AI expert Pavol Bauer also shares this view in the previous issue. Once it returns from Hong Kong this November, algorithm Ego Fluens will take its first holiday to the MMS data archives. We’ve not ruled out an appearance at the Christmas party.

**Watch trailer**

A four-minute extempore by the AI was part of the performance.
Stable factor at the top of the “Fußball-Bundesliga”

For a football club, as many games are lost and won on the football pitch as on the World Wide Web. At the end of the day, it’s always about scoring points—on the soccer league table as well as with the visitors of your own website in terms of user-friendliness, speed, and reliability. After all, a corporate website is the biggest source of revenue as well as interaction with fans. Rightly so, 1. FC Köln, who finished seventh in the Bundesliga table in the 2021-22 season, relies on its website https://fc.de as the central medium for interacting with its 114,000 fans.

For a long time, the performance of the 1. FC Köln website resembled a rollercoaster. Any rush hour during peak season often delivered inswingers that left the web team of the famed Bundesliga Club reeling. T-Systems tackled this issue by leveraging AWS and DevOps strategies. The website not only offers up-to-date information, such as video content, but it is also the central channel for sales related to tickets and fan merchandise.

That’s not all, the website also integrates third-party content, such as its sponsors and sports outfitters, or even the “Foundation 1. FC Köln”. Of course, the site has to be up and running 24/7 to meet the fans’ need for information, but when ticket sales kick off, or around match days, the load on the site increases immensely—more than ten-fold.

Author: Durga Godbole
Naturally, the Club wants to offer a consistently good experience even during rush hours. The performance of the site thus becomes a decisive factor for the digital footprint of the club. With the existing legacy infrastructure, this was becoming a pain point for 1. FC Köln.

Niggling issues

In the past, scalability and capacity management proved to be recurring challenges for web managers at the Club. The CMS was not able to scale to the demands of peak season. Moreover, the legacy environment was neither actively improved by the provider nor was it sufficiently documented. Traditional hosting could only absorb the temporary peaks with long-term increases in infrastructure capacity. The result was high, unnecessary costs for the infrastructures, because the peak load resources had to be operated and paid for continuously.

The web team of 1.FC Köln was looking for a way to dynamically scale the system as per user requests. The system was to be operated in a dynamic mode with the backdrop of continual changes to servers, middleware, and applications. And last but not the least, the system performance needed to be permanently high, at lower costs. This was when 1. FC Köln decided to switch to Amazon Web Services (AWS) and relied on T-Systems as a consulting, migration, and managed services partner.

From legacy to modern

T-Systems helped 1. FC Köln in migrating their website from running on a regional hosting provider to a global-scale cloud platform of AWS. Through several mutual design sessions, FC Köln and T-Systems developed a website modernization strategy and an aligned architecture on AWS to support its migration project. The migration strategy—which replaced the originally planned lift-and-shift approach—was a mixture of re-platforming and refactoring of the existing setup. In the process, both the application level (by the web agency) and the platform and infrastructure level were modernized. The website also received a safety boost with new, up-to-date security mechanisms in accordance with AWS best practices.

First, T-Systems set up the landing zone with central security configurations in the Billy Goats’ AWS account. It allows the management of AWS resources from a single source. Redundant EC2 instances for the backend (in two European AWS availability zones), which are coupled via load balancing or auto scaling, act as the basis of the new website. They serve as a hosting platform for an Apache PHP backend construct on which the website runs. Upstream is a content delivery network for static content. Amazon CloudFront Service is used for this. Also in the backend is an in-memory cache (Redis) that buffers user requests, an
With AWS, we have been able to modernize our website and reduce our costs. We can address the challenges facing sports website operators today. T-Systems’ managed services provide everything our fan base needs to interact quickly and reliably with the content on our website,” sums up Dominik Theißen, the Club’s Head of IT.

This way, 1. FC Köln’s corporate website can not only handle the volleys during peak season, but also contribute to the corporate strategy during lean times.

T-Systems, as an analyst-awarded managed services partner, has the customer’s back. With the re-platforming and access to the AWS ecosystem, 1. FC Köln can now also take the next steps towards digitalization. The evaluation of log files allows the Club to position targeted offers for fans, and much more. As an AWS partner, T-Systems also ensures that best practices such as the Well-Architected Framework are adhered to.

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This way, 1. FC Köln’s corporate website can not only handle the volleys during peak season, but also contribute to the corporate strategy during lean times. T-Systems’ parent company Deutsche Telekom is already the Club’s new technology partner. And this latest successfully delivered solution is in line with their approach of “sustainable, social, and local.”

Now, The Billy Goats’ corporate website can not only handle the volleys during peak season, but also contribute to the corporate strategy during lean times.

The Club’s editorial team now has a modern platform for operating its website that can react dynamically to user requests. When the load is low, the resources are automatically reduced, resulting in significant cost benefits; when the load is higher, the architecture ensures that the performance remains high for the user. At the same time, the web team can manage the platform agilely and dynamically via DevOps approaches.

Dominic Theißen, Head of IT, 1. FC Köln

NFS file share for storing static data (e.g. Java scripts, CSS, HTML, media data), and a relational database service (RDS) that replaced the old MySQL database.

As security functionalities, T-Systems introduced, among other things, a web application firewall and AWS GuardDuty, whose settings were optimized for the website according to the collected logs. They protect the website against common web hackers and bots and contribute to consistent performance. On this cloud-native foundation, the web team was also able to introduce DevOps practices. Amazon Machine Images are automatically generated according to the established Git Flow principle. The GitLab CI pipeline rolls out the deployments to the (new) development environment and—after approval by an admin—to the production environment.

A dynamic outcome

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Master of the clouds

It’s easier to participate in a discussion when your knowledge of the topic is of a similar level to everyone else’s. A T-Systems Personality Check is a fun way of determining how things stand—in technical discussions about clouds, for instance.

Author: Martin Reti

Yes! I am a Magician of Disruption! I used to only be an expert in this, that and the other. Going from expert to magician is a pretty big jump up the career ladder in my book. It sounds great—and has a lot of practical value too. If I say, “Allow me to introduce myself. I’m Martin Reti, Magician of Disruption. Where are you at in the cloud world?” the next time I meet someone, I will literally be able to feel the other person gasping in awe. Or rolling their eyes. It’s actually a shame I can’t whip out a Hogwarts certificate at that point. Maybe that’s a potential market niche or idea for a new cloud business?

How am I able to claim such a status? You can go ahead and ask questions. Or, better still, T-Systems can do the asking. I recently came across the Digital Hero Check. Now I’m not really the type to take personality tests, but I did invest 10 minutes of my time and enjoyed clicking through the 20 questions. Suddenly, I was a cloud magician. And a disruptive magician, at that!

Fun—but with a serious basis

It’s a typical gamification theme that’s gaining ground in more than just marketing. But this gamification serves as more than just a diversion or amusement. Every cloud discussion eventually reaches the point where decisions need to be made. And how these turn out isn’t just a matter of sovereignty, service levels, scalability, reliability, costs, etc.; the other person’s personality also plays a part. It’s a little like financial investments involving extremes: high risk, great potential rewards vs. conservative investment and secure return.

The cloud similarly offers a number of possibilities—and the best cloud strategy needs to fit not only the company, but also the people doing the work. After all, you want to feel comfortable with your cloud decision, right?

If a cloud discussion isn’t progressing, it may be helpful to take a look at the cloud personality. If the “Magician” is dealing with a “Guardian of the Tried and True,” then there’s no wonder they aren’t able to reach a consensus. If you know the kind of person you’re dealing with, however, the discussion will reach productive ground more quickly, and the path to finding the right solution becomes easier and less nerve-racking.

So take the test. You might even learn something about yourself while you’re at it. But, if nothing else, you’ll end up with a cool new title. I’m taking a look to see if I can find other similar tests. Hero of the IoT Universe, Wizard of the Big Data Sphere or at least Keeper of the Seven IT Keys would look pretty good on my business card.
Alliance against Blackout

The energy sector is one of the world’s top 3 targets for cyber criminals. And power grids are still often easy prey for hackers. How can the integrated security approach help companies struggling with increasingly sophisticated attacks and a shortage of qualified security experts?

Author: Dheeraj Rawal

For a long time, the IT teams in organizations were mostly in charge of smooth Internet connectivity and ensuring that people get their emails on time. At the same time, the operation technology (OT) personnel took care of the critical infrastructure systems.

Enter 2022: there’s a drastic change in how IT & OT operate. The connected devices, systems, and industrial IoT (IIoT) have blurred the lines between IT and OT today. Everything that needs to be connected is connected (and more will). This leaves systems more vulnerable to cyberattacks—the organizations know this, and the attackers even better. In other words: OT and IT are now closely linked—but what about security?

Organizations are doing their bit by investing in OT, IT, and even physical security. But, most of the times, all these security systems are not closely connected. Imagine, in the event of an attack, the organization does not even have the data to analyze and respond to it. This is a typical problem associated with a siloed approach, which typically delays the response—giving more space for hackers to gain access to critical systems.

Thomas Tschersich, Chief Security Officer (CSO) at Deutsche Telekom and CEO of Deutsche Telekom Security GmbH, says: “We need to move out of corporate silos. In some companies, I’ve seen one CSO takes care of IT, another CSO takes care of production network security, and another takes care of personal security staff. They are all in different silos and this needs to change. As CSOs, we’ve got the privilege to close these silos, connect them, and bring security closer and make it more organized.”
The events of the recent past expose existing risks across critical infrastructures, including power, while also stressing the need for an industrywide collaboration to better detect and respond to cybersecurity incidents.

Pierre-Alain Graf, Cybersecurity Lead, Hitachi Energy

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But why integrate security?

In integrated IT & OT systems, sharing intelligence and data regularly (using common tools, systems, and platforms) becomes the norm, making it easier to detect unusual activity and respond faster, thereby minimizing risk of damage in the event of an attack.

This is one of the reasons why many companies are now embracing the integrated security approach, such as the ISC (Industrial Security Center), an integrated/converged security concept developed together by Telekom Security, Hitachi Energy, and Securitas.

But what should converged or integrated security look like and what purpose must it serve? Simply put, security integration means people, processes, systems, and data under OT, IT, & physical security are brought under a single operating environment. This allows security teams to have more context and aids decision-making.

However, the following scenario illustrates why contextual information is so important: The cameras of a transformer station record the movements of an external, unidentified person outside a substation. At the same time, the network of the organization detects a new device trying to gain access to the system. Now, if these incidents are seen separately—it may be difficult to correlate them.

But if the inputs from the camera and the network are combined, they create a context for the security teams. Could it possibly be an attack attempt? The standard response from the security team would be to isolate this new device and scrutinize the stranger’s behavior for some more time. When the security team knows the location and actions of the attacker—even if the unit being attacked is located away from the “mother ship”—they can take countermeasures such as isolating that area from the network, and more.

With converged security systems, the defense specialists can elicit a focused, faster, and more potent response—because of the contextual understanding of the situation.

Targets worldwide

There have been plenty of real incidents due to isolated security systems:

On 23rd December 2015, one of the operators in the power grid at the Prykarpattyaoblenenergo control center in Ukraine saw some strange series of actions on his computer screen, and in the next instant, the substation went offline.

The result? Thousands of residents lost their electricity connection (and the use of their heaters) in the freezing temperatures. The attackers forcefully logged out the operator from the system after gaining unauthorized access. They eventually managed to put about 30 substations offline, causing a massive power outage in the western Ukrainian region and impacting 230,000 citizens. Not just substations, even distribution centers were taken down—leaving the operators in the dark too.

In this specific case, the hackers seemed to have meticulously planned the attack for months. They were aware that the company’s SCADA systems were being accessed by some employees remotely, without two-factor authentication. Although the attack lasted for no more than six hours, it’s a typical example of a well-orchestrated attack against a power plant.

Investigations later revealed that the plant operators and employees were targeted by a phishing email campaign, which later created a backdoor entry for the hackers. In the next step of the attack, they gained access to the SCADA systems by hacking VPNs. Reports were doing the rounds claiming that a Russian group was behind these attacks.

In 2010, the Iranian uranium enrichment facility in Natanz was attacked with malware. The facility’s Programmable Logic Controller (PLC) controls were manipulated, leading to a malfunction in the plant. Some investigators blamed the United States and Israel for this attack.

One of the most notorious attacks on critical infrastructure was the attack on Colonial Pipeline’s IT systems, which paralyzed operations for five days in May last year.

That’s exactly what converged security tries to achieve: gather information from control systems, servers, and databases, and then transfer it to a single dashboard. This dashboard enables the security team to respond better as they’ve actionable insights.

For example, if an unidentified person is trying to gain remote access to SCADA systems at the facilities, then the converged security system can check whether it’s an employee physically present at one of the trusted locations or someone else trying to gain access.

This will be validated when the systems check the physical security database. If there’s a conflict, then the system will issue a security breach trigger for the team to respond to this incident. That’s pretty much how the integrated security system is in play.

The urgent need for cybersecurity in the energy sector

The energy sector is just one area whose critical infrastructures and their protection are of overriding, often even national interest.

Anders Gustavsson, Head of Global Connected Solutions, Securitas remarks: “Critical infrastructure such as data centers, power plants or communication base stations are at threat from rising connectivity. The disadvantage of deploying very robust physical security is that attackers resort to cyberattacks.
Today, all physical systems have a dire need to be protected against cyber risks. This stresses the need to create an ecosystem mindset. The physical and cyber worlds are getting closer and becoming intertwined.

What exactly does the ISC do?

With increasing digitalization and decentralized working, security has become complex and the need to harmonize it throughout the company even more important. And this is precisely why the ISC follows an integrated security service for the energy industry as envisaged by three prominent players in their respective fields—Hitachi Energy (OT Security), Telekom Security (Cybersecurity), and Securitas (Physical Security).

ISC can help energy and utility companies to secure their critical infrastructure against cyberattacks. Apart from the risk perspective, these companies also need to meet compliance and regulation standards, such as NIST frameworks, for instance. ISC can also provide assistance with compliance.

With security, compliance, and digitalization initiatives taken care of by the ISC, customers can focus on their core competencies. With an integrated service like ISC, organizations can experience improved security culture, crisis management, and resilience. With its one-contact protection point, ISC also enables cost savings, can be adapted to different levels of complexity, and thus ensures the operational stability of energy companies.

Fundamentally, the administration and management of security measures already require special expertise. Since the threat landscape is constantly evolving, both require experts who can deal with the threats. This can be both time- and cost-intensive. The market today faces a severe shortage of security professionals. According to a report by the World Economic Forum, the industry faces a shortage of about 2.72 million security professionals. In such a tight market, it becomes even more difficult for energy companies to attract and hire the best-fit candidate. Other training costs and time need to be separately accounted for.

As a result, it becomes a natural choice for organizations to give closer consideration to the offer of integrated services such as ISC, which have the right expertise, tools, and experience. ISC offers a single security feed on three different domains with powerful features such as: Incident Detection and Response; Vulnerability Management; Threat Analysis Service; Asset Register Service; Physical Security & Configuration Management; and Asset, Vulnerability & Configuration Assessment.

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Every step leaves its print. What color is yours?