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Safe Battery Storage and Transportation

New MicroNova system enables controlled charging and discharging of batteries

The Optimal Radio Access Network (RAN)

COM5.Mobile redesign for efficient network expansion

Focus Topic IT Security

New ManageEngine solutions protect enterprise data

„SMEs are the key drivers of innovation“



Dear Reader,

MicroNova has always been dedicated to innovation. And what we have been seeing for many years still applies: SMEs are the key drivers of innovation. We prove this with our products and solutions, and we also experience this through the way we are perceived by people who are interested in MicroNova.

I recently welcomed two groups of visitors to our company's headquarters in Vierkirchen. Both had approached us on their own initiative because they had heard of "this innovative company in the region". They were "Treffpunkt 50+" of the charity organisation Caritas München-Dachau, who wanted to learn more about electromobility and artificial intelligence, and a class from the high school in nearby Markt Indersdorf. The school has been designing and building robots for years – they have often been awarded at various competitions such as the "Student Robotics". It is a truly good feeling knowing that our work satisfies our customers and also "reaches the people"!

In order to keep it that way, our employees have once again put in a lot of effort in order to realise innovative projects, and reported on them in cooperation with the editorial team. The Testing Solutions division, for example, is not only concerned with battery-based electrification of the powertrain, including storage and transport, but is even looking a step further – the keyword being "hydrogen". In addition, the annual EXAM UserDay was held in November – you can read a report about the event, too.

Colleagues from Telco Solutions can also offer results worth seeing and reading: over the past few months, the team has aligned the COM5.Mobile product even more closely to requirements – including those relating to the upcoming 5G. The result is a family that now consists of COM5.Mobile Audit, Optimizer and Integrator. I am delighted that we also received a guest article on this topic in the form of an interview with Klaudius Koschella, Head of Central Optimisation & Config Center of our customer Vodafone GmbH, for this issue.

Our partners at ZOHO/ManageEngine prove time and time again that other companies are also capable of innovation. One article from the IT Management division therefore outlines product innovations, a second presents the perspective of satisfied users.

There are also important innovations from the Supervisory Board in this issue – I don't want to spoil anything, so please see the concluding pages of our InNOVAtion.

I wish you, as always, happy reading.

Orazio Ragonesi



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Safe Storage and Transportation of Batteries

As the number of electric cars on the road increases, so does the demand for traction batteries, which manufacturers must store and transport. MicroNova's NovaCarts Charger enables batteries to be placed in a secure state for transport and prevents quality losses during storage.

TEXT: Björn Pröger, Serkan Salli PICTURES: © Roman Zaiets / Shutterstock.com

All batteries currently used in electric cars have one thing in common: certain precautions must be taken to maintain their quality for as long as possible during storage and to transport them safely to their destinations. For example, regularly charging batteries to their maximum residual capacity prevents their service life shortening. Lithium batteries in particular, which are frequently used as energy stores in mobile devices and vehicles, are subject to a certain transport risk: they have a comparatively high specific energy density at a relatively low weight, are insusceptible to the memory effect, and have low self-discharge. However, they are also particularly susceptible to deep discharge

and overcharging, mechanical damage, and external temperature effects. For these reasons, lithium batteries and lithium-ion rechargeable batteries are classified as dangerous goods according to international transport law, and are therefore subject to special transport regulations.

Discharging batteries for transport and charging to extend service life

In order to comply with these dangerous goods regulations and minimize transport risks, vehicle batteries are usually discharged to a required State of Charge (SOC) using a charging and discharging system before being

transported (e.g. max. 30 percent for air freight). The charge state of the battery is documented in a log that contains all the necessary data and information required for air freight transport.

With its new "NovaCarts Charger" (NC Charger) test bench, MicroNova has developed a system to monitor, charge and discharge vehicle traction batteries that optimally supports automobile manufacturers and suppliers to meet the requirements of battery transport and storage. This means that even batteries that, for example, have discharged slightly over time due to being kept in storage can be recharged to defined SOC values in a con-

trolled manner. This not only significantly prolongs the battery's service life, but is also necessary as the battery might not otherwise be offered to the end user as new.

Structure and approach

The NovaCarts Charger has been designed as a compact unit in rack format on rollers. The test bench is operated on a three-phase industrial supply network and can be used flexibly thanks to its design. When a battery is charged, energy is taken from the electrical supply network; when it is discharged, the extracted power is fed back into the network for energy recovery.

During development of the NC Charger, MicroNova's experts focused on the structure of a traction battery: it consists of various components, such as lithium-ion cells, control units, a fuse and high-voltage (HV) contactors, housed in a sealed enclosure. Usually there are two interfaces on the traction battery used to connect it in the vehicle: a two-pin high-voltage interface for DC power transmission and a low-voltage interface for the vehicle electrical system and CAN communication.

When not installed, the high-voltage contactors of the battery are open so that no dangerous voltage is present at the high-voltage interface. The

HV contactors are only closed by the battery control unit once the traction battery is installed and connected to a vehicle and communicates with other relevant control units via CAN.

Simulating voltages and CAN messages

In order to charge or discharge a battery, the NovaCarts Charger simulates the situation described above by supplying the battery control unit with both voltage and the necessary CAN messages. This is done by means of residual bus simulation, which must match the respective traction battery.

All simulations and the CAN-BUS communication run under the NovaCarts operating software on a Linux real-time computer. A main connection unit with a protective insulated input circuit is available to connect transportable units. It protects employees during operation as well as system components from excessive contact voltages and overvoltages.

The built-in DC power supply operates bidirectionally: it combines the functions of a power supply unit (source) and an electronic load (sink). In sink mode, the consumed DC power is fed back into the supply network with an efficiency of up to 95 percent. The power supply unit has a maximum DC voltage of 1,000 volts and can supply or receive a maximum current of up to 40 amps. The output power is 15 kilowatts.

The NC Charger is easy to use via an operating computer built directly into the rack on which the NovaCarts Real-Time Suite is installed. It includes operation during testing as well as the database for controlling the test bench. Alternatively, the system can be

operated via a touch screen, attached to the NC Charger on a swiveling bracket. The charging/discharging device has been specifically designed in such a way that it can also be used easily and safely by technical staff without requiring any special training.



1 The NovaCarts Charger enables controlled charging and discharging of traction batteries for hybrid or electric vehicles.

NovaCarts Charger: technical data

Dimensions in mm (height / width / depth)	1,600 / 800 / 1,000
Weight	approx. 100 kg
AC power connection	
Voltage, frequency	3~ 400 V AC, 50 Hz
Phase current	32 A
Power supply	3~, N, PE (CEE plug, 32 A – 6 h)
DC connection	
Maximum voltage	1,000 V
Maximum current	40 A
Maximum power	15,000 W
Permissible operating conditions	
Ambient temperature	10° – 40° C
Operating altitude	max. 2,000 m above sea level
Relative humidity	max. 80%, non-condensing

Outlook

In the coming years, the number of new electric vehicles on the road will continue to rise significantly. As a result, manufacturers will have to transport more and more vehicle traction batteries to the respective markets or store the batteries directly on site. Both require the use of a charging and discharging system, which ensures simple usability and documentation of the results. Based on MicroNova's extensive experience in the field of residual bus simulation, the NovaCarts Charger has been developed so that all relevant battery and vehicle types can be used on the system.



Alternatives to Refueling from the Power Outlet

Fuel cells and e-fuels: The automotive industry is already looking for alternatives to battery-powered electric vehicles. But what advantages do these technologies offer and how can the NovaCarts platform efficiently support manufacturers in validating the associated ECUs?

TEXT: Abduelkerim Dagli PICTURES: © Polina Krasnikova, Kwangmoozaa / Shutterstock.com

The increasing scarcity of living space and rising real estate prices are driving more and more people out of the cities and into the surrounding regions. However, public transport connections are so far failing to keep up with this trend: high prices, delays, cancellations and overcrowding ensure that most commuters still drive to work by car. The resulting increase in pollutant emissions – coupled with the

corresponding EU fines – is repeatedly leading to bans on cars, most recently in Stuttgart and Hamburg.

The Battery Electric Vehicle (BEV) seems to be an environmentally friendly solution for short trips in large cities and metropolitan regions. Municipalities support the use of BEVs, for example through free parking, and numerous employers, shopping malls

and retail chains now offer free charging points on their parking lots. As for range, however, conventional vehicles with combustion engines are still clearly superior to electric cars. In addition, the fact it takes up to two hours charging time to drive 400 km can't compete with the convenience of five minutes to fill up the tank.



What other possibilities does the market offer if Battery Electric Vehicles are not yet able to meet all demands? MicroNova has taken a closer look at two trends: fuel cells and e-fuels.

Alternative 1: Fuel cells

In Fuel Cell Electric Vehicles (FCEV), a fuel cell supplies the electric motors with energy directly during the trip – instead of indirectly via a traction battery. Hydrogen and oxygen are converted into electrical energy and water by chemical reaction in a small cell. Since each cell emits only a small amount of electrical energy, multiple cells are joined together to form fuel cell stacks. The number of stacks depends on the vehicle's energy demand (passenger car or commercial vehicle). An addi-

tional battery provides support as a range extender or, in case of high loads or accelerations, as an additional source of energy. This battery is recharged from the grid when the vehicle is at rest or from brake energy recuperation.

New FCEVs such as the Mercedes-Benz GLC F-Cell or Hyundai's Nexo offer a range of 400 to 600 kilometers per full refuel with a power of approx. 160 to 200 hp. The refueling process is similar to that of a combustion vehicle and takes only a few minutes – a clear plus in user convenience.

Despite its many advantages, fuel cell technology has not yet established itself in the market because the production of fuel cell stacks is relatively

expensive and the technology still requires further development work.

Validation of fuel cell control units with NovaCarts

The NovaCarts Hardware-in-the-Loop (HiL) platform from MicroNova supports manufacturers, suppliers and service providers worldwide in reliably supporting electronic control units in the development process. With its HiL system "NovaCarts Fuel Cell" MicroNova has developed a modular platform for validating Fuel Cell Control Units (FCCU) installed in the fuel cell stack.

NovaCarts Fuel Cell simulates the environment of the FCCU with the single cell voltages of the fuel cell stack as well as all relevant interfaces, such as the communication interface SAE-J2799 for data exchange between vehicle and hydrogen filling station. Using realistic simulation models, the behavior and correct functioning of the control unit, including water management and coolant supply, can be tested in various situations. Combined with the "NovaCarts Battery" test platform for battery management systems, it can also be used to simu-

late functions of the connected battery, such as State-of-Charge (SoC) and State-of-Health (SoH) controls or cell balancing.

Alternative 2: E-Fuels

E-fuels are synthetic fuels produced by electricity from water and carbon dioxide (CO₂). If the electricity for this production comes from renewable energy sources and the CO₂ is taken from the atmosphere, e-fuels can be a climate-neutral alternative to conventional fuels – at least as far as the manufacturing process is concerned. The main advantage of e-fuels over electric drives is that no new types of vehicles or filling stations are required. Furthermore, drivers of conventional combustion engine vehicles would not have to change their behavior or range.

However, the negative aspects of conventional fuels – such as emissions and lower efficiency – are still present with synthetic fuels. In addition, the high production costs of e-fuels, which currently give a selling price of around 4.50 euros per liter of diesel equivalent, make e-fuels unsuitable for the market.

such as aviation and shipping, there are realistic market opportunities for e-fuels.

Regeneratively produced hydrogen, on the other hand, offers a real alternative that can store energy, generate heat and drive fuel cell cars. The breakthrough has not yet happened, but well-known companies in the automotive industry such as Daimler, Bosch and Toyota are working flat out to develop cost-effective stacks for the mass market. This technology could become a valid alternative to pure battery electric propulsion in urban mobility, especially in the commercial vehicle sector and in the long-distance network.

Conclusion

Although e-fuels are not yet a viable alternative to the mass-produced electric car, they do represent an addition: especially in areas where powertrain electrification is difficult to implement,

Pros and cons of fuel cell vehicles

- + Higher ranges than conventional Battery Electric Vehicles (BEV)
- + Faster refueling than BEVs
- + No exhaust emissions from vehicles besides water (drinking quality)
- At present, hydrogen is still mainly produced using energy from fossil fuels
- Currently very few hydrogen filling stations in Germany
- Relatively high production costs for the fuel cell stacks

- + Existing infrastructure can still be used (vehicles, fuel stations)
- + Climate-neutral manufacturing possible (if using electricity from renewable energy sources and CO₂ from the atmosphere)
- + Market potential in aviation and shipping
- Emissions
- Low efficiency
- Not economically competitive at present

MicroNova Live

Meet MicroNova at the industry events for automotive testing:

Our Testing Solutions experts will be represented at various events in 2020 and will be happy to inform you about current topics and products.

TEXT: Editorial Staff

The following dates are already set for next year, at which MicroNova will hold a presentation for the expert audience:

» **20th Internationales Stuttgarter Symposium**
Automobil- und Motoren technik
March 17 - 18, 2020

Presentation: "Validation of fuel cell control units with powerful fuel cell simulation platforms"

Date: Wednesday, March 18, 2020
Time: 1:30 - 2:00 pm
Location: Haus der Wirtschaft,
Bertha-Benz-Saal

» **CoFAT 2020: 9th Conference on Future Automotive Technology**

Pitch presentation on securing fuel cells.

Date: May 5 - 6, 2020
Location: Veranstaltung forum Fürstenfeld, Fürstenfeldbruck

In 2020, MicroNova will also be represented with a booth at the following exhibitions and conferences:

» **Embedded World**

Date: February 25 - 26, 2020
Location: Exhibition centre Nuremberg, hall 4, booth 4-630a

» **Automotive Testing Expo Europe**
Date: June 16 - 18, 2020

Location: Exhibition centre Stuttgart, hall 10, booth 1228

» **Automotive Testing Expo Shanghai**

Date: September 14 - 16, 2020
Location: Shanghai World Expo Exhibition & Convention Center, hall 1, booth 2051

» **f-Cell Stuttgart**

Date: September 29 - 30, 2020
Location: Haus der Wirtschaft, Stuttgart

Further events and lectures will be added to our schedule on an ongoing basis: Visit our website at www.micronova.de/en/testing-events.

NovaCarts Hybrid Tests

HW assemblies for hybrid applications – from components to the complete hybrid HiL

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Automotive Expertise for Wind Energy

Wind turbines are becoming technically more complex, which requires the introduction of new test methods. Leading suppliers now rely on test systems modeled on the automotive industry in their development work. Enercon GmbH uses the solutions and expertise of MicroNova's testing experts.

TEXT: Martin Flach, Tobias Hamberger, Christian Stangl PICTURES: © ENERCON, MicroNova

HiL simulation on networked systems

MicroNova's testing solutions team therefore developed the following HiL systems:

One HiL simulator tests the safety related functions of the components at the base of the tower, in the nacelle and for the rotor blades. Another HiL system validates the control unit, which ensures controlled starting and stopping of the wind turbine as well as the higher-level power regulation and load control during operation.

Wind energy is one of the most environmentally friendly energy sources. Wind turbines are becoming more popular and their technological development is advancing at a rapid pace. As product cycles in this industry are becoming ever shorter – similar to what is happening in the automotive sector – manufacturers are looking for ways to make development more efficient and faster. Modern and tried-and-tested tools from automotive development are available to help manufacturers cope with the increasing complexity of control unit development.

The wind turbine manufacturer Enercon has already been using a Hardware-in-the-Loop (HiL) system from MicroNova for several years and has carried out initial component tests in the area of blade pitch control. Since these tests were very satisfactory the company, based in Aurich, Germany, decided to integrate a new test concept into its development process and to set up a test landscape with five HiL simulators in cooperation with MicroNova. The electronic control systems should as early as possible be confronted with all the conditions that occur subsequently during operation of the wind turbine and their correct functioning should be validated.



About Enercon GmbH

ENERCON has been a technology leader in the wind energy sector for over 30 years. The company was the first manufacturer to opt for a gearless drive concept, which is characteristic of all ENERCON wind turbines. ENERCON also continues to set technological standards in areas such as rotor blade design, control technology and grid connection.

ENERCON wind turbines are fitted with a grid feed-in system certified according to the latest connection requirements. This means they can easily be integrated into all supply and distribution grid structures.

ENERCON considers it as a major challenge to advance the supply of regenerative solutions worldwide and is playing a key role in future technologies such as energy storage, electromobility and smart grids. Internationally, ENERCON has a presence in the major markets with a decentralized service and sales network.

Three NovaCarts CBP simulators were manufactured for the rotor blade control units. CBP stands for 'Control Board Pitch' and describes the system for blade pitch control, which is mainly used for power regulation in wind turbines. For example, at many wind turbines the rotational speed of the rotor is determined by the orientation of the blades relative to the wind direction. An electric motor rotates one of the rotor blades until it assumes the ideal position for power generation in relation to the incoming wind. This continuous and rapid regulation ensures that the rotor blade immediately finds its optimum position when conditions change.

The three new CBP systems offer two and a half times more I/Os than the existing system. In addition, it is now possible to simulate four electric motors per test bench instead of two, and multiple control units can be distributed over up to three real part plug-in modules. This makes it possible to expand test activities in future to include other control and regulating components of the wind turbine – if required also in synchronized interconnected operation.

Five test benches – interconnected

Enercon has set up its own test area to jointly operate all five new systems. In this test area, it is now possible to validate individual functions of the wind turbines at an early stage in the development process with the aid of corresponding simulation models, such as blade pitch control in thresholds or generator functionality.

The central requirements for the seamless interaction of the HiL systems are precise, time-synchronous data acquisition and reliable, real-time data exchange between systems. To ensure this, a neutral point controller was used in addition to the five control computers already built into the test benches. This acts as a timing master and ensures common mode and a system time that is accurate to the microsecond on all components in the HiL network. In addition, the neutral point coordinates the exchange of data between test benches and in its own simulation model calculates variables that are relevant for all connected HiL systems, such as wind speed.

The scale of the project and the wind energy sector were the main attractions of this task. David Hirschhäuser, team leader for HiL projects at MicroNova, confirms: "For us, it was the first project of this magnitude outside the automotive sector. It was a question of developing a comprehensive concept for a system that was as flexible, efficient and durable as possible. I think we have worked together very well over the last two years, learned a lot from each other and can be very satisfied with the result."

Establishing a professional testing process

The development and delivery of the HiL systems was preceded by a detailed analysis of the test requirements with the turbine manufacturer.

Here, the experts from MicroNova's Consulting & Services department were able to draw on their extensive experience in the automotive testing sector. In close cooperation with the client's project managers, they developed a complete test concept including simulation models as well as test automation and design. Alongside the project, MicroNova also supported Enercon in setting up a corresponding verification and validation department.

In addition to designing and implementing the HiL systems, MicroNova also provided support and maintenance for the test landscape. Another task was to set up test automation. This is where EXAM came in, a software solution for the graphical development of test cases. Since MicroNova has been developing EXAM together with two major automotive manufacturers for more than a decade, Enercon can also benefit from first-hand expertise.

Reduced development times and reliable processes

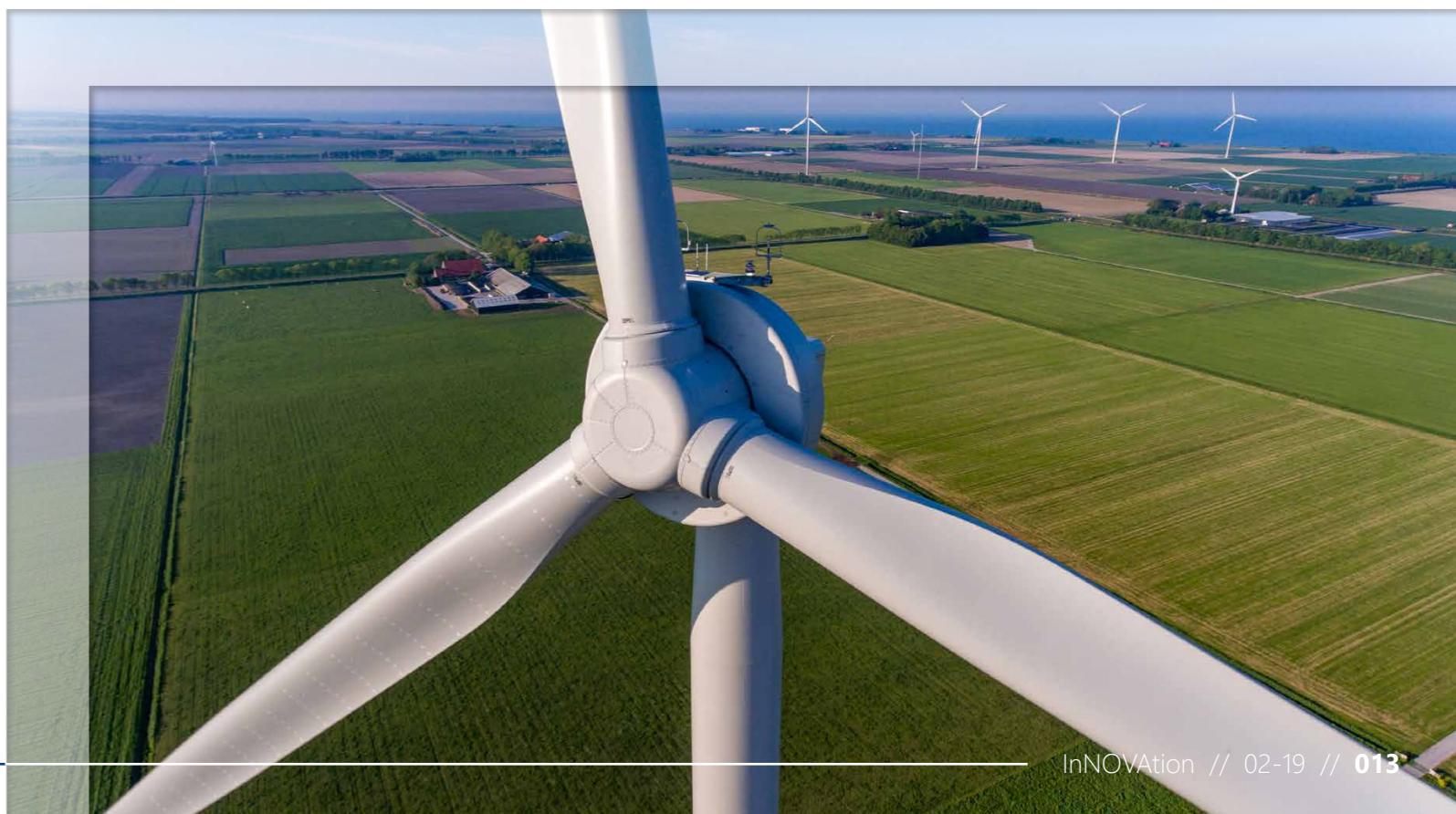
The stakeholders at the Aurich-based wind energy company are very satisfied with the results of the two-year cooperation: "Thanks to our modern and interconnected HiL test landscape, adaptations to the software can now be implemented much more quickly and we get the test results practically overnight. With manual tests and manual analysis of the measurement results, this used to take up to a week," explains PhDr. Monika Dávideková, Team Leader Software Validation at Enercon. "In addition, test cases are now stored more accurately together with their results and can be easily referenced in secondary tools such as XRay or Jira. We were able to learn a lot from the automotive industry and significantly accelerate our development work."

Conclusion

The great advantages of the automated and reproducible tests have convinced Enercon so much that an extension of the test facilities has already been put forward. This will focus more on the modularization and reusability of the test landscape for other projects in order to test the numerous control units and their software even more quickly and more flexibly.

Wind energy in Germany

For more than thirty years, wind power has been used to generate electricity on a large scale. Wind turbines and other renewable energies have become firmly established, not least due to rising oil/gas prices and growing environmental awareness. According to the German Wind Energy Association, wind turbines installed in Germany alone produced almost 112 billion kilowatt hours (kWh) of electricity in 2018 – equivalent to 20.4 percent of German electricity production.





EXAM UserDay 2019

At the beginning of November 2019 the annual meeting of EXAM users took place again. In addition to the new features in the upcoming version, the main focus was on the efficient use of the test automation solution in exciting projects.

TEXT: Rainer Moosburger PICTURES: © MicroNova

In previous years the annual UserDay had been held at VW or Audi, i.e. in Wolfsburg or Ingolstadt. This year's meeting was hosted at MicroNova for the first time. At the company's head office in Vierkirchen, CEO Orazio Ragonesi together with Martin Bayer, Director Testing Solutions, and Christoph Menhorn, Head of Test Automation, welcomed the approx. 60 participants and opened the afternoon. In the first lectures, managers from Audi and MicroNova explained the future roadmap and brought the audience up to date regarding the EXAM distribution.

EXAM 4.8 – facts & news

To kick things off, Franziska Freund, Project Manager at MicroNova, informed the attendees about the most important developments in the upcoming version 4.8. For example, it now also supports displaying the MDF4 format in the Report Manager. Changes have been made in the libraries and in the Report Manager for this purpose. Other innovations concern the storage of measurement data and updates to the basic system. In total, the developers have implemented 49 requests for EXAM 4.8. This was

followed by a glimpse of EXAM 5.0, which led to many interested inquiries. Already certain: some central concepts will be revised (e.g. parameterization, sequence diagram) – more on this at the UserDay in autumn 2020.

EXAM version control and roadmap

The presentation of the roadmap for EXAM is eagerly awaited every year. In his presentation, Sebastian Frixel-Seifert, Head of EXAM Development at Audi AG, first spoke about the more than a decade success story of the

test automation solution and gave an overview on the range of functions available in the distribution version outside the VW Group.

He confirmed that versioning from EXAM 4.8 will be available as an additional feature in the distribution version. "EXAM Version Control" enables model-based versioning of test cases. The versioned elements fall within the model domains introduced in EXAM 4.4. This allows certain work statuses to be fixed. For example, a productive version can be used for tests on the test bench, while another

version is being developed at the same time (e.g. 'Baseline' on the test bench, 'Latest' for development).

However, the most important information for users was that EXAM version 4.8 will again be available free of charge from February 2020 with all previous features and numerous interfaces. The tool is still under a free-ware license, while the core libraries are open source.

EXAM TestSpecSynchronizer – concept and connection

Afterwards Tim Warode, Software Developer for Test Automation at MicroNova, introduced the EXAM TestSpecSynchronizer (TSS), which was previously only included in the group version of the test automation solution. As of EXAM 4.8, the TSS will be available in the distribution version license-free. The tool in effect serves as a universal adapter for test specifications from different source systems by preparing and importing them for EXAM. This means that all data sources in EXAM can be used equally and users benefit from a uniform user interface during configuration. Once centrally configured in the model, the TSS settings apply to the entire test project – making work considerably easier. The TestSpecSynchronizer provides an interface for all EXAM- and all common

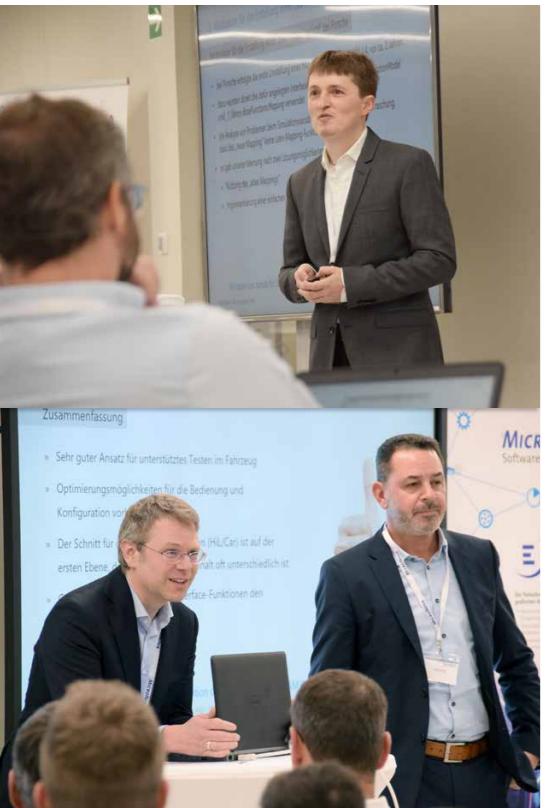
specification tools. The tool can also be flexibly extended for other requirements management solutions.

Focus then turned to exciting projects: users from DANA Belgium, ZF Friedrichshafen and Audi gave insights into their practical work with EXAM.

Hardware in the Loop (HiL) platform at DANA Belgium

DANA Belgium is an international supplier and development company for the automotive industry with a focus on commercial vehicles. Sites in Bruges, Belgium, and in India work together on the validation of transmission control units. Tony Libbrecht, Project Manager at DANA Belgium NV, was looking for a solution to optimize cooperation between the international teams and to make the tests as efficient and standardized as possible. Among other things this required central databases, access management, uniform interfaces, and standardized test procedures. To meet these requirements, a common platform was created that incorporates EXAM into the continuous integration process. The test procedures could be synchronized and test periods significantly extended: while India can use the HiL resources in Bruges at night, test cases from Belgium will also run on Indian test benches starting in the afternoon.





Increased quality at ZF through variant handling

ZF Friedrichshafen AG uses EXAM as a test automation solution for its transmission test benches. Special challenges include the multitude of ECU variants for its different customers, and the standardization of test cases for sites located all over the world. Michael Schriefer and Niko Bobb, both R&D Engineers at ZF Friedrichshafen, explained to interested users the concept and implementation of an EXAM expansion, which reduces the high administrative effort for replicating the different test case variants in an EXAM model and for their maintenance. In addition, the two engineers have developed templates on the basis of which each test case is created – not by testers themselves, but by the library team. Each of these templates contains, for example, a pre- and post-sequence and has some basic rules that apply to each test case. This approach brings numerous benefits: the ease of use reduces the implementation effort and test engineers can create test cases after only a short training period. In addition, the templates are used for quality assurance, because even under time pressure, certain standards are always maintained and thus enable uniform reporting that can be evaluated.

Lean mapping implemented for Porsche

After Porsche switched to the vendor-independent XIL API two years ago, abstract access to bus functions was initially lacking. This was because the mapping concept introduced with the changeover could not correctly map the dynamic variable paths. Rolf Bayer, system and software developer

at MicroNova, explained in his presentation how a temporary “Lean Mapping light” was introduced to avoid having to fall back on the old mapping functionality. In traditional mapping, a path – usually very long – leads to a simulation variable for a signal. Lean mapping means that the respective simulation variable path is built dynamically using “lean” mapping according to defined extensions. This reduces the effort required to assign the signals. After this function was introduced and created centrally in the system, all test processes ran smoothly again.

Interactive testing at Audi: EXAM in the vehicle

Finally, Christoph Kröner, Test Manager at Audi, and Christoph Menhorn, Head of Test Automation at MicroNova, presented a joint project for interactive testing in vehicles. They introduced how EXAM can be extended for use in semi-automated drive tests. Specifically, for checking control units for thermal management in electrified vehicles.

But how can test cases best be transferred from the test bench for guided and reproducible tests to the application in the vehicle? First, there was direct mapping between HiL signals and driver instructions. A key finding here is that a driver needs much fewer detailed instructions – but sometimes it is more difficult to adhere to specifications such as speed or outside temperature with the same precision as a HiL system. So a new approach was adopted: a test catalog served as the basis for the new implementation of the existing function interface for the vehicle. In order to communicate with the test driver, a user interface in the form of an inter-

active website with voice assistant was created to avoid having to use the laptop while driving. In a short live demo, Christoph Menhorn demonstrated the implementation of this approach.

Following the presentations, there was of course plenty of opportunity for professional exchange and networking for users and MicroNova experts.

Conclusion

A great atmosphere, lively participation and informative lectures – the perfect way to sum up EXAM UserDay 2019. The successful mixture of exciting projects, important updates to the solution and the active exchange among users and developers made UserDay a success – and ensures we are looking forward to the next meeting in Wolfsburg in autumn 2020.

New EXAM user area at www.micronova.de

All registered users were contacted by MicroNova via email back in October, because the EXAM website www.exam-ta.de has received an update and has moved.

All information about products and services, as well as the download and user area are now available on the MicroNova company website. The previous address still works of course and directs you to www.micronova.de/exam. Why not drop by?



COM5.Mobile – the Road to the Optimal Radio Access Network (RAN)

With the introduction of 5G, operators are once again facing the challenge of integrating a new radio technology into their existing network. COM5.Mobile offers powerful functions to automate this process in the RAN.

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Besides optimum coverage, the consistent and error-free configuration of the Radio Access Network (RAN) is crucial for both the network quality and the quality ultimately perceived by the customer. Standard software provides mobile network operators (MNOs) with network and service monitoring as well as network optimization, albeit there is usually a gap in network configuration. However, this forms the

basis for an efficient network structure and expansion as well as for the integration of new technologies – and consequently for a high-quality and profitable mobile communications network.

The reason for this gap lies in the complexity and versatility of network configuration, which is difficult for standard software to replicate. Mobile

radio technologies are standardized specifically for UMTS, GSM, LTE and 5G within the framework of the 3rd Generation Partnership Project (3GPP). Yet worldwide cooperation between standards bodies in mobile communications can only ensure abstraction or certain network parameters that are independent of providers. Some figures illustrate this challenge: The 3GPP standard includes about 100 to 150

parameters, but the actual implementation of the specific manufacturer and supplier configuration requires several thousand settings.

Proprietary solutions are not agile

Network equipment providers have already tried to close this gap with various approaches. However, as soon as system boundaries between different vendors have to be taken into account

(multi-vendor capability), the corresponding concepts usually reached their limits. As a result, network operators sometimes take action themselves by developing their own, often complicated, tools. However, the solutions that have emerged over the years are not only complex and expensive, they are also becoming increasingly outdated. This is all the more true when looking at the rapid development of mobile technologies. New functions and network technologies, software

More flexibility through open solutions

The configuration of mobile radio networks and in particular the Radio Access Network (RAN) is becoming increasingly complex for network operators – especially with the introduction of ever newer technologies, namely 5G. Open solutions such as COM5.Mobile are therefore essential: they offer flexible and vendor-independent adaptability to new conditions while at the same time taking into account the main control parameters such as time-to-market, quality and efficiency. COM5.Mobile streamlines the visibility of the often heterogeneous regional network and management structures and allows for growth into a central database for overarching comparisons.

updates, switching to another network supplier – all of these are difficult to implement with concepts of this kind.

What's more, these kinds of in-house creations are often pure one-way solutions: the live network can be configured, but it is not possible to copy data from the live network to the planning network. This functionality, however, is invaluable for network operators when it comes to quality assurance, since reliable network auditing is only possible by alignment with planning data. A complete view of the network is essential for MNOs to both plan investments in the network and comply with quality guidelines.

Newly designed for the optimum RAN: COM5.Mobile

To address these challenges, Micro-Nova has redesigned its tried-and-tested COM5.Mobile. The product portfolio now includes COM5.Mobile Audit for monitoring and reviewing network consistency, COM5.Mobile Optimizer for optimizing the radio access network and COM5.Mobile Integrator for automated support of roll-out and integration processes, for example as part of the introduction of 5G.

The entire product range can be customized to the growing needs and network sizes of mobile operators and is ideally equipped for the integration of future mobile communications generations (5G). Investments can be quickly integrated into the live network, which has a direct positive effect on sales. COM5.Mobile makes network expansion much more efficient for operators, as the maintenance effort remains low even for larger networks.

COM5.Mobile Audit: Keeping an Eye on the Entire Network

A detailed, comprehensive view of the network configuration is not something that MNOs can take for granted. The problem: Incorrect or inconsistent base station configurations lead to considerable quality losses, which can also have a negative impact on end customers and their user experience. An increase in the dropped call rate is just as possible as connection problems or poor voice quality.

With COM5.Mobile Audit, MicroNova offers an out-of-the-box solution for the complete visualization of network parameters. The current live network with all relevant information for the MNOs can be read out independent of manufacturer, region and technology. The corresponding information is written to a central database in structured form so that it is available for audits and analyses at any time.

Network history

An automated delta calculation determines the configuration differences from the previous import and stores them in a cumulative database, which is especially helpful for MNOs. A logged history of the network configuration, including trends, can be displayed as configurable reports according to freely selectable criteria. In addition to logging network growth to manage it, the history database can also be used to troubleshoot specific network areas.

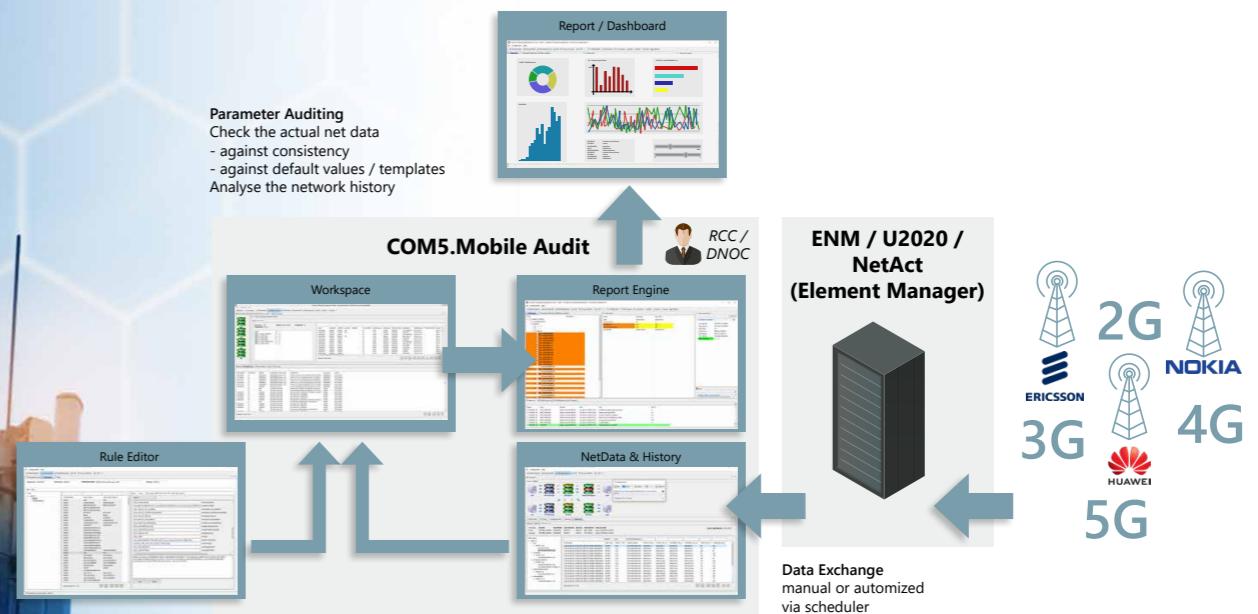
Content consistency check

The first step of network auditing takes place within COM5.Mobile Audit: The system checks the consistency of the imported live data via an integrated rule-based engine; a user-friendly graphical interface makes administration of the corresponding rules an easy task. Any violations are logged according to their severity (blocking/warning) and presented to the user via reporting mechanisms. An optional dashboard also allows the results to be displayed in a configurable overview for even greater ease-of-use and efficiency in troubleshooting.

COM5.Mobile Audit comes ready "out-of-the-box" with a set of standard consistency rules that the user can expand on as needed. The most common rules include checking handover connections (number of handovers per cell, target frequency, etc.), frequency plans, cell parameters, dependencies between param-

Added value with artificial intelligence

MicroNova's years of expertise provide the perfect foundation for mobile network operators' AI projects. MicroNova already successfully carries out corresponding consulting projects in other business areas – however, the large amount of data means it is possible to transform these into valuable information, especially in the mobile phone sector. Industry know-how is the key to transforming our experts' technical knowledge into real added value for users.



rules, MNOs can generate reports and warnings at any time with COM5.Mobile Audit.

Network-wide management of standard templates

eters, user-specific dependencies and compliance with operator requirements. Basic functionality includes the creation, deletion and editing of consistency checks and rules. Users can also create new rules based on copies of existing ones. It is also possible to exchange rules with other users.

COM5.Mobile Audit considers all parameters available through the vendor's standard OSS Northbound Interface (NBI), including parameters that may have been configured automatically by a Self-Organizing Network-System (SON). Thus the solution is "SON-ready", i.e. capable of interacting with and monitoring SON systems. With configurable

Thanks to vendor-neutral and cross-technology comparisons, MicroNova's audit system can exploit its strengths especially in a multi-vendor network. In this case, the standard functions of proprietary systems are usually inadequate. Since COM5.Mobile Audit already stores a complete map of the Radio Access Network (RAN) – including history – in a central database, the system can be used as a cross-network data source for comparison with other systems. Examples include inventory, optimization, and measurement.

Conclusion: Optimum user experience with COM5.Mobile Audit

Knowledge is power – Francis Bacon's axiom applies more than ever in the 21st century. And it also applies to MNOs: it is only with complete knowledge of all relevant parameters of their network that they have the power to maximize the user experience for their customers and – consequently – their own revenues. COM5.Mobile Audit ensures that network providers can get the most out of their network investments.

COM5.Mobile Optimizer – the Next Step toward an Optimized Network

COM5.Mobile Optimizer is based directly on the Audit solution. It is particularly suitable for optimizing radio parameters, which the user can access directly via a powerful data editor. Two different views are possible, either in the vendor-specific standard model or in a model customized to the user's requirements (simplified model).

The editing function also makes it possible to systematically change parameters and make associated global changes. In addition, new radio neighborhoods can be added, and existing ones edited or deleted. By integrating consistency checks, the solution detects deviations and data errors early so MNOs can fix them immediately.

During this process, the consistency of the altered data is checked again and finally reconciled with the current live network ("smart delta"). The system recognizes incorrect neighborhoods or inconsistencies with regard to technical specifications and displays them in this delta; the result is structured as a hierarchical tree and displayed according to use cases. Operators can use filter rules to delimit the set of configuration results, and activate them directly in the live network via the zero touch functionality.

The Radio Designer for better technical efficiency

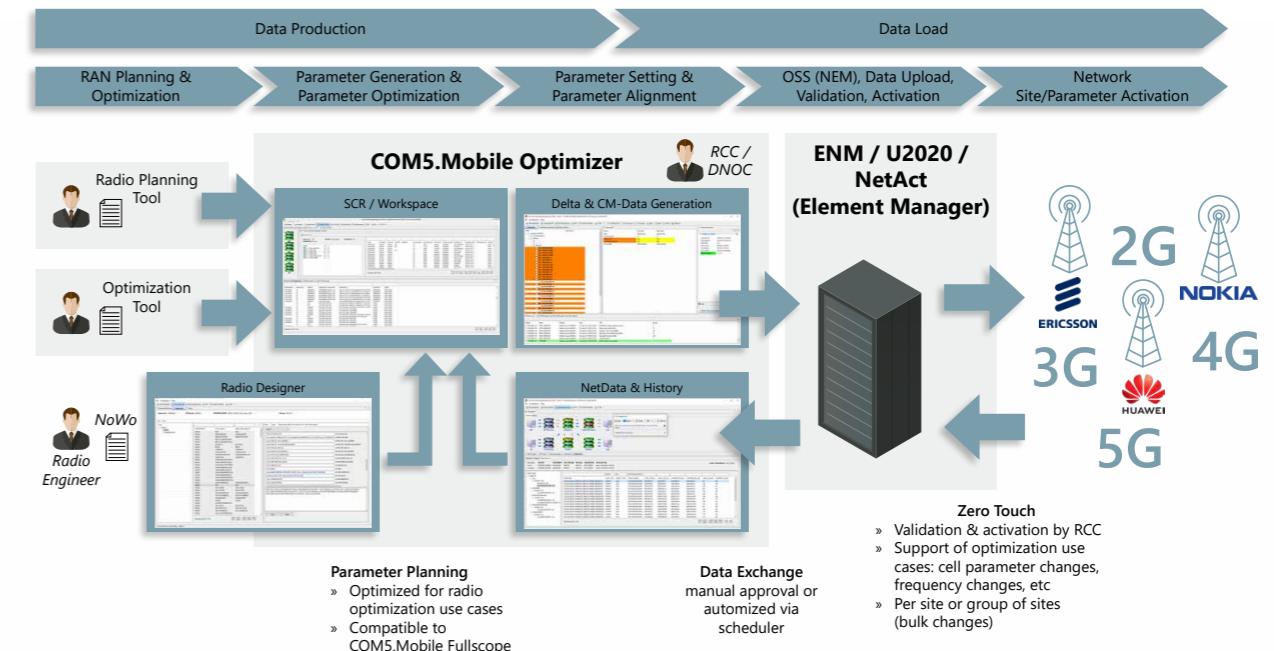
In the Radio Designer, a technician or engineer can directly create or change engineering policies, as well as consist-

ency rules and parameter templates. Classification of parameters reduces the complexity of their scopes, which can be adjusted manually by network planners/optimizers, by up to 90 percent. The basis for this increase in efficiency is the specified rules and standard requirements or network-wide parameter sets (NWP templates).

Before a new parameter configuration is released as a valid data set, COM5.Mobile Optimizer checks the new version for completeness and consistency using predefined and/or user-specific validation rules. The main advantage for mobile network operators is that it shortens development times and minimizes the impact of additional specification changes.

Integration into the MNO's optimization processes

A configurable interface also allows third-party optimization tools or standard radio network planning tools to be connected directly – this simplifies integration into the network operator's processes. Engineering policies control the automated assignment or adaptation of parameters imported from these tools. The use cases supported during import can be completely adapted to the customer's needs or configured accordingly. All dependent parameters are automatically adjusted on the basis of the technical policies defined by the respective network operator. This ensures compliance with the required KPIs.



Conclusion: Multi-vendor approach eliminates vendor dependency

The operator or engineer can make minor changes to design and manufacturer specifications during the test and/or acceptance phase – thereby ensuring a significant increase in flexibility during these phases. This method ensures compliance with the standards prescribed and verified by the network operator, both in the planning process and during the subsequent transfer to the network.

The multi-vendor capability ensures compliance with the engineering rules across vendors, technologies, and regions. This shows that COM5.Mobile in general and COM5.Mobile Optimizer in particular are especially powerful, since tools both from equipment sup-

pliers and SON solutions available on the market are reaching their limits in this regard. It remains to be said, that every MNO that operates equipment from more than one supplier or is active in more than one country benefits from COM5.Mobile in terms of efficiency, quality, and time-to-market.

COM5.Mobile Integrator – for an Automated Network Roll-out Process

Like the Optimizer, Integrator is also based on Audit. This product from the COM5.Mobile family complements the capabilities of its sister solutions and is specially designed to handle use cases relating to the roll-out and integration of radio parameters. Site integrations, rehomings, network upgrades as well as changes in hardware and transmission are examples of areas of application.

To perform these tasks, the tool has connectivity to the radio, transmission, and equipment network planning tools. In addition, the active network can be addressed via the vendor-specific standard NVB interfaces. Similar to COM5.Mobile Optimizer, corresponding engineering policies form the basis for integration tasks in the respective fields of application.

Improving planning consistency

COM5.Mobile Integrator checks the consistency of radio, device and transport planning data during import. If there are variances, users can correct the relevant parameters directly in the tool. The respective data records can only be transferred to the net-

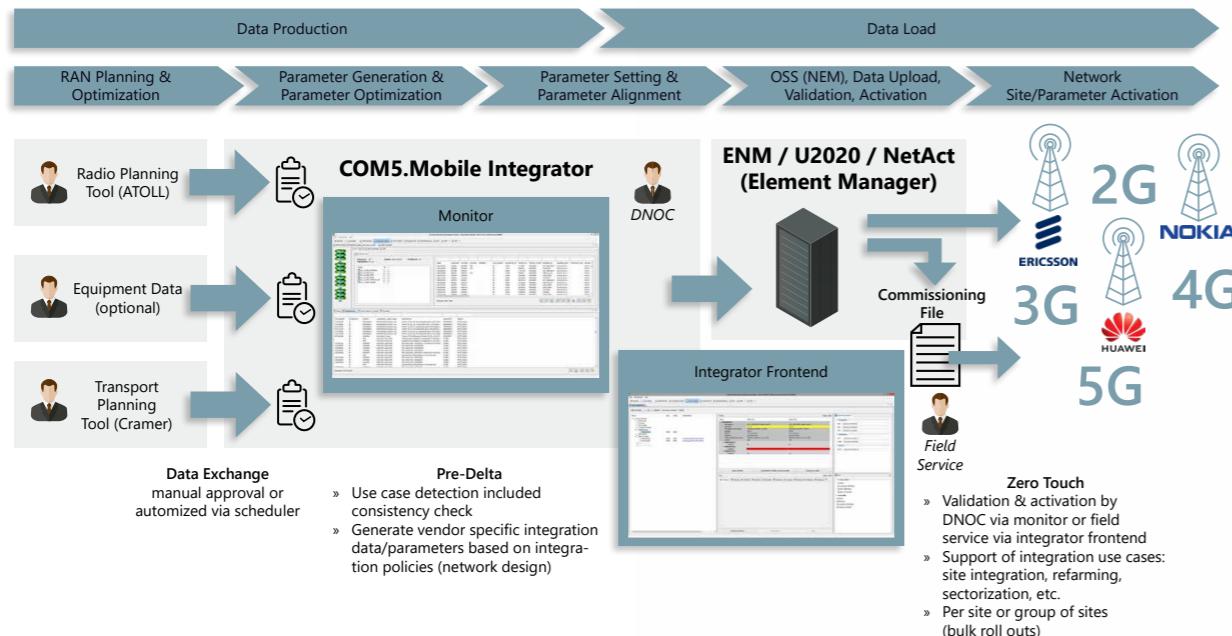
work after this delta analysis has been passed – provided that they have been approved by the respective operator. Additionally, a “pre-delta mechanism” calculates all open and valid integration tasks on the basis of the available planning and current live data.

Then COM5.Mobile Integrator creates the corresponding configuration files, which can be activated in the

network if required. The commissioning file can be accessed remotely via a special front-end, e.g. by a field service technician, and downloaded if required. At the same time, a monitor displays the integration status of the tasks. This can also be provided in report form at any time. An integrated scheduler allows work steps to be bundled, opening up the possibility of automating most processes.

Conclusion: An investment to safeguard quality

Like the other products of the COM5.Mobile family, the Integrator follows the zero-touch concept. With this user-friendly approach and comprehensive functionality, MicroNova has created a tool for MNOs that maximizes roll-out efficiency and quality for current and future 5G networks. Thanks to automation and extensive testing, this is accompanied by a high level of quality in the network.



Interview with Klaudius Koschella

Klaudius Koschella is Head of Central Optimization & Config Center at Vodafone GmbH in Düsseldorf, Germany. The InNOVAtion editorial team talked to him about the use of COM5.Mobile at Vodafone.

TEXT: Editorial Staff PICTURES: © I'm friday, HQuality / Shutterstock.com

InNOVAtion: Mr. Koschella, Vodafone operates mobile and fixed line networks in several countries, managed via the central Network Operations Center, also known as NOC. How does COM5.Mobile help you?

Klaudius Koschella (KK): At Vodafone we are continuously working on measures that will give us addi-

tional scaling effects. We have global organizational structures at our disposal for this reason. They combine the central functions of all Operative Companies, OpCos for short, i.e. the different legal entities in the different countries. With the NOC we can integrate a number of functions for several areas of our network into one central organization and for all OpCos.

These include network monitoring, first level support, back office operations and config management. This results in numerous possibilities for the best possible and most effective deployment of the tools used. COM5.Mobile is used in our Network Operations Center via the so-called Operating Model which organizes our processes and responsibilities.

Local teams have been interacting with the NOC for quite some time for Vodafone Germany and jointly they look after "production" and our mobile roll-out using COM5.Mobile, among other things. COM5.Mobile supports both this process and the associated division of work in the best possible way.



InNOVAtion: When looking at size and scope, questions about automation, zero touch, etc. come to mind almost automatically. What is the status quo here, and where do you want to go?

KK: I'd like to be a little more specific regarding this question. For us, the focus is on digitalization. This includes automation and zero touch, but also the use of Machine Learning (ML) and Artificial Intelligence (AI) on all levels of our processes. We are currently working very hard on digitalization options. This concerns the use of bots, which would allow us to have simple process steps completed by a "machine". We're also using machine learning to access pattern recognition or to identify anomalies in various application areas, and to integrate them successively into existing processes and procedures. With zero touch and automation, we have already handed over work steps completely to being processed by a "machine" in the context of COM5.Mobile. By now, we have some initial experience of how our technical experts can work with a fully automated process and increase their productivity. What's most important in this kind of digitalization hub: we create space for development. If competent employees can focus on more complex topics and ultimately solve tasks for the benefit of our end customers, this will bring much more benefit than a purely internal increase in productivity.

InNOVAtion: You mentioned Artificial Intelligence and Intelligent Automation. What potential and what steps do you expect here in general and in relation to COM5.Mobile?

KK: Currently, artificial intelligence is used maybe a bit hasty and thoughtless as the next logical step towards digitalization. In my opinion, most notably we're starting to get involved in machine learning. But of course this is not the same as AI – we are still a bit away from comprehensive applications. This can be explained by the fact that we do not yet have any experience where machines have made decisions, never mind that we wouldn't let them, unchecked as it were, lead to an action being taken in our networks for example. But we have already achieved good results with ML, and have already incorporated some of these results into production. One example of this is the recognition of image patterns. If we look at the potential, especially in the areas of configuration or general production processes, there are many possibilities for automation. Whether it is to enable tools such as COM5.Mobile in that respect and get them further developed, or to migrate analog processes to digital and automated ones.

InNOVation: What challenges do you see, and not just in relation to COM5.Mobile?

KK: First of all, we will succeed in dealing with the technological aspects for sure. One of the challenges rather is the fundamental decision whether we can make selective adjustments to current processes and tools, and consequently achieve initial automatisms and efficiency gains, or whether an overarching redesign of processes and tools is the better approach. Both approaches are equally valid! In any case, the goal must be to develop an end-to-end concept for digital processes and tool design. But we also have to include employees and stakeholders and consider their dependencies ... This means that with a selective approach, we have enough time and freedom to work with our colleagues to design automation and ultimately digitalization, and not to lose them on the way. I am convinced that digitalization starts in the mind and first has to gain a foothold there. A little more time is still needed in this respect. Nevertheless, we want to keep an eye on the overall end-to-end approach outlined above. In the medium term, the complete automation or digitalization of full process and tool chains must be considered. New technologies and the resulting processes should always be seen as an opportunity to apply all digitalization options from the outset. So we already take this into consideration when inviting tenders on new topics. 5G technology will not work without maximum automation. I am certain that COM5.Mobile will keep pace with a growing share.

InNOVation: Referring back to what has been said so far, what are your expectations and plans, and what are the challenges for the 5G roll-out or network expansion?

KK: 5G will make it possible to explore new horizons. New services and applications will emerge. I'm thinking, for example, of industrial applications that will allow production processes to be more flexible than previously imagined. 5G is also the key to self-driving vehicles. I also see potential in the end customer segment: completely new worlds of experience will become available to users, for example via augmented reality. At Vodafone, we have already implemented some of these new 5G-based capabilities. Many other services will soon follow and present us with new challenges and new potential. We intend to rethink our operating model and our production processes and focus on the corresponding requirements of services and users. It's an exciting and far-reaching task: in fact, we will become part of our customers' core processes. We're also expecting very high expansion figures for the network infrastructure in the coming years. We will meet this challenge by further optimizing our production speed, with automation certainly being a key pillar.

InNOVation: One last technical question: how would you rate Software Defined Networks (SDN) and Network Functions Virtualization (NFV) in the 5G context?

KK: SDN and NFV form the fundamental architectural basis of 5G standardization through 3GPP. The concepts introduced years ago from the "traditional" IT environment are increasingly changing telecommunications providers' network infrastructures and systems. Approaches for software-based networks, such as the virtualization of systems and network components, cloud computing or mobile edge, create the foundation

for getting to grips with the flexibility and new services called for by 5G, both from the point of view of operating costs and capital expenditure. At the same time, operational processes will have to adapt to these conditions and be automated as far as possible. The use of AI methods to secure future 5G services will play an essential role. Of

course, it's a constant process, and further network topologies must be introduced. We will also rely on appropriate tool support, such as COM5.Mobile, for example. Because such tools are there to reconcile functionality and cost.

InNOVation: Mr. Koschella, thank you for this interview.



„With zero touch and automation, we have already handed over work steps completely to being processed by a “machine” in the context of COM5.Mobile. By now, we have some initial experience of how our technical experts can work with a fully automated process and increase their productivity.

**– Klaudius Koschella,
Head of Central Optimisation
& Config Center,
Vodafone GmbH**



From Incident Management to Enterprise Service Management

The 'Evangelisches Werk für Diakonie und Entwicklung' relies on ServiceDesk Plus from ManageEngine

TEXT: Editorial Staff PICTURES: © EWDE

The Evangelisches Werk für Diakonie und Entwicklung, EWDE (Protestant Agency for Diakonie and Development), based in Berlin Mitte, brings development service, disaster relief and national welfare and social work under one roof. EWDE employs around 850 people. 'Diakonie Deutschland' is the umbrella association for a nationwide organization that employs 525,000 people and has more than 700,000 volunteers, providing help and care to around ten million people.

Starting point – Merger triggers need for a ticket system

Currently, a department of 19 people is responsible for EWDE's IT systems. The team is divided into three groups: The first looks after the IT infrastructure and the two redundantly designed in-house data centers. The second group deals with the specialist applications used by social projects for di-

saster relief and the organization 'Brot für die Welt' (Bread for the World). The third team manages the IT organization and interfaces, as well as standard applications such as SAP or the CRM.

EWDE, along with these three IT groups, emerged in 2012 from the merger between the Diakonisches Werk der EKD with its 'Brot für die Welt' fund-raising campaign and the Evangelischer Entwicklungsdienst (Protestant Development Agency). Two years before the merger – which involved relocating to Berlin – the teams drew up a catalog of requirements for a central helpdesk solution. This catalog defined the 'must-haves', such as asset management, a CMDB, and a solution database.

The solution also had to be suitable in the long term and offer, for example, contract and license management, to be implemented at a later date.

Evangelisches Werk für Diakonie und Entwicklung (EWDE):

- » Sector: Charity organization
- » Employees: approx. 850
- » Turnover: €392 million (2018)
- » Head office: Berlin
- » Established: 2012 (merger of Diakonisches Werk der EKD and its 'Brot für die Welt' campaign and the Evangelischer Entwicklungsdienst)



The solution – ManageEngine ServiceDesk Plus

At the end of 2012, the software was initially purchased with a license for ten engineers. Incident Management was the first component to be introduced. "We just installed the tool and got started. It was simple and everything was completed very quickly," says Heike Landwehr, Head of IT at EWDE. The quick implementation was very important, because Incident Management had to work immediately since a relocation was imminent. In order to familiarize users with the tool more quickly, requests were assigned a higher priority via the portal.

Over the years, the organization added more users and IT assets – and found that it could get more out of the solution. However, there was no time to explore and implement everything. In a workshop, EWDE received plenty of tips, e. g. on quicker ticket creation and best practices for SLA management. In addition, the tool was customized with additional ticket creation options.

After the workshop, EWDE also began to make more intensive use of asset and license management. The automation of processes, for example for new hires, was another major item tackled following the workshop. For Heike Landwehr, it is important that there are no media gaps: if a process is electronic, it should be electronic from start to finish. Heike Landwehr says, "We have a self-image of efficiency. Parallel work doesn't fit in with this."

The result – efficient support

Besides IT, other service departments now also work with ServiceDesk Plus. As of mid-2019, around 80 employees solve up to 1,400 tickets per month. A dispatcher receives them all as a

Single Point of Contact. If the First Level Support cannot resolve a ticket in five to ten minutes, it is forwarded the various groups and is thus escalated to the Second Level. ServiceDesk Plus met with a very positive response from staff from the outset. IT saved valuable time as more tasks could be resolved remotely.

"In the meantime, we started capturing our assets in ServiceDesk Plus," explains the Unit Head. "We have also made very successful progress with our processes. ServiceDesk Plus allows you to request a new workstation without paper forms. We use templates and map out the approval process using workflows. It's going very well."

The statistics of ServiceDesk Plus offer an additional benefit. The IT team can see at a glance whether there is still a need for training or adaptation after a new tool has been introduced. Purchasing decisions are also easier to make thanks to relevant information being provided and a license overview that can be created at the touch of a button. The dashboard is another transparency gain. It precisely shows the processing status of tasks, whether and how many SLAs were violated, etc.

Conclusion – Benefits for many departments

EWDE's IT department already has new plans for the future. Next, they want to store all contracts in ServiceDesk Plus and map out the ordering processes. In future, IT procurement will also be mapped out using the ITIL-enabled helpdesk and support solution. At EWDE, ServiceDesk Plus has also established itself as a solution for Enterprise Service Management: procurement, human resources, facility management and other departments also use the tool – it's become indispensable.



„For our organization, ServiceDesk Plus has become a true allrounder that also offers benefits beyond the IT department. It's become indispensable to us.“

– Heike Landwehr,
Head of IT, Evangelisches
Werk für Diakonie und
Entwicklung (EWDE)

Customer benefits:

- » More transparency
- » Intuitive and user-friendly
- » Analyses as a basis for decisions
- » All information at a glance in the dashboard
- » Support from MicroNova

Three Times more IT Security

Vulnerability Management, Data Leakage Prevention (DLP) and secure Single-Sign-On: ManageEngine presents three new solutions for enterprises.

TEXT: Editorial Staff PICTURES: © ZOHO, © ManageEngine, © vs148 / Shutterstock.com



Vulnerability Management

with Vulnerability Manager

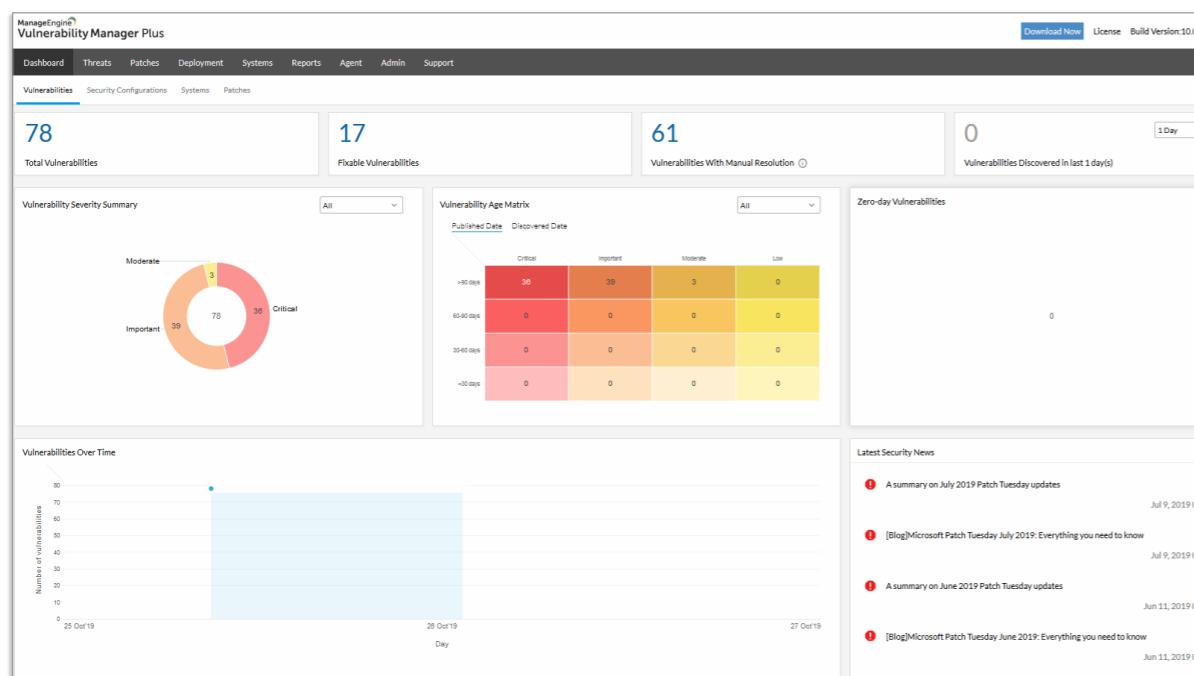
Plus

The new ManageEngine solution Vulnerability Manager Plus helps IT departments comprehensively scan all endpoints in their corporate network for potential security risks. Using attacker-based analyses, any vulnerabilities identified can be assessed

and prioritized accordingly. This allows administrators to focus first on those network vulnerabilities where attacks could be particularly severe.

An integrated patch management module, prepackaged scripts against

zero-day vulnerabilities, and numerous security and web server configuration management features help eliminate such vulnerabilities. Furthermore, the solution offers special features for monitoring software with an elevated security risk.



1 The Vulnerability Manager Plus dashboard provides IT administrators with an overview of known vulnerabilities in the corporate network.

Device Control Plus:

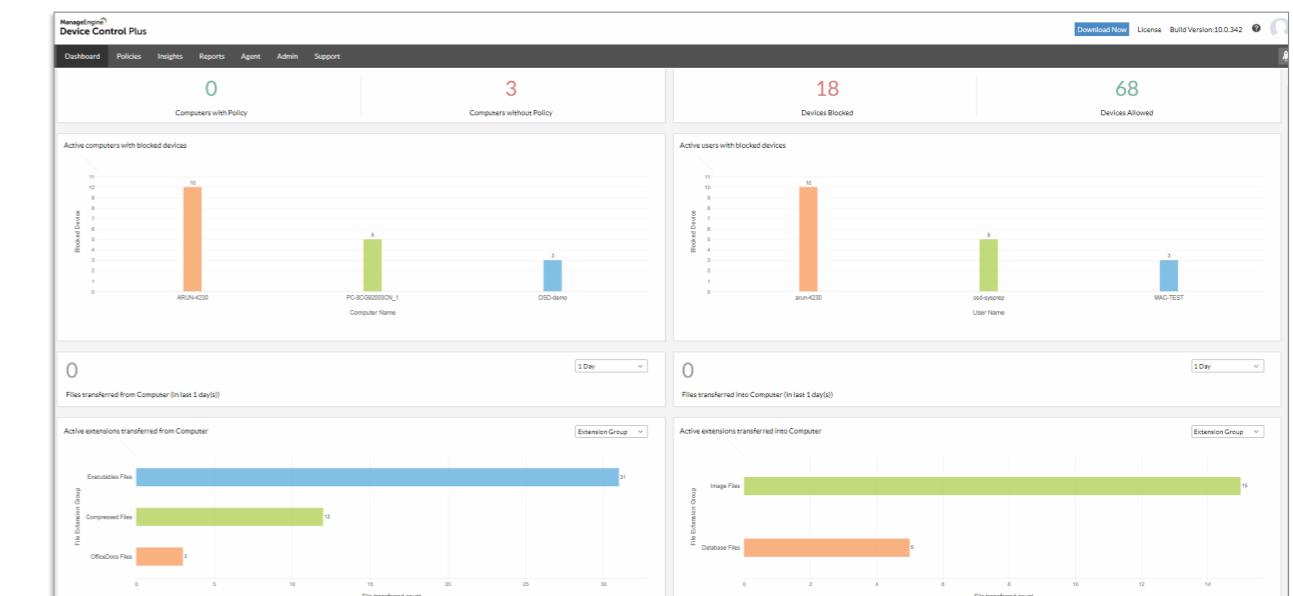
monitoring software for removable devices

Plug into the USB port, copy data, and you're done – there is no easier way to steal corporate information than with removable devices such as USB sticks or external hard drives. This is where Device Control Plus from ManageEngine comes in: With the new Data Leakage Prevention solution to protect sensitive or critical informa-

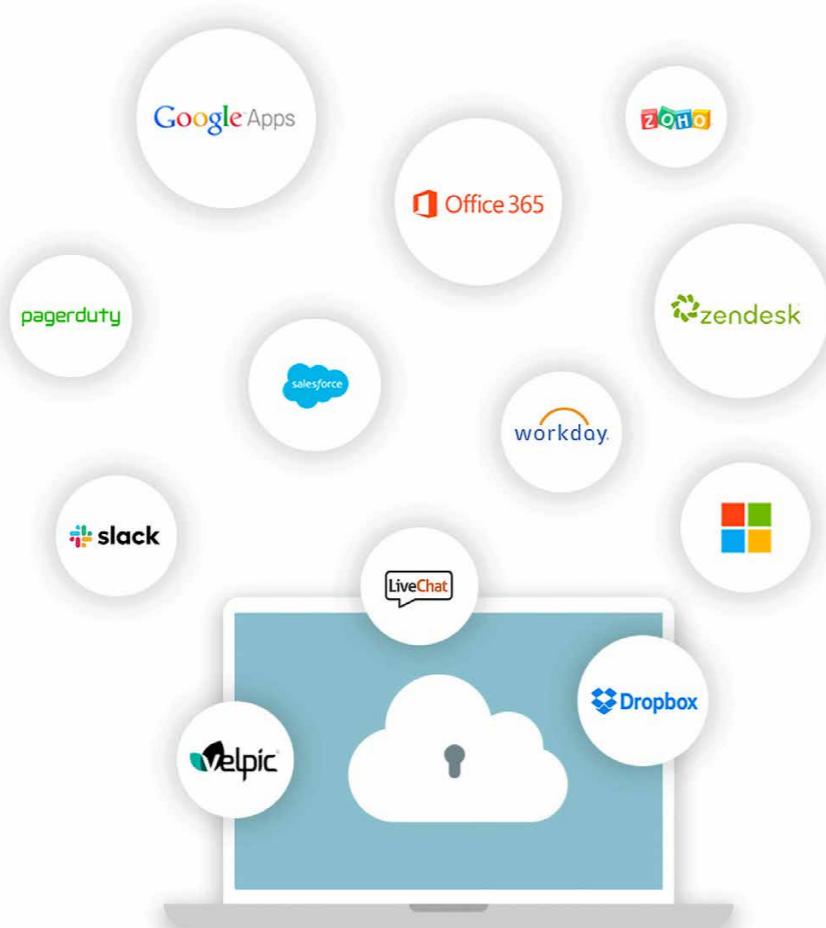
tion, IT administrators can manage, monitor and, where necessary, block all removable devices connected to a computer to prevent unauthorized access to sensitive data.

Pre-configured, easy-to-understand policies allow you to quickly set read-only access for removable media or

disable the ability to copy files. In addition, administrators can define other security relevant settings and be automatically notified of exceptional data transfers.



2 With Device Control Plus, IT departments can control, monitor and, where necessary, disable removable devices.



- 3** Once logged in, Identity Manager Plus gives employees access to all enterprise applications.

Identity Manager Plus:
Secure single sign-on for
enterprise applications

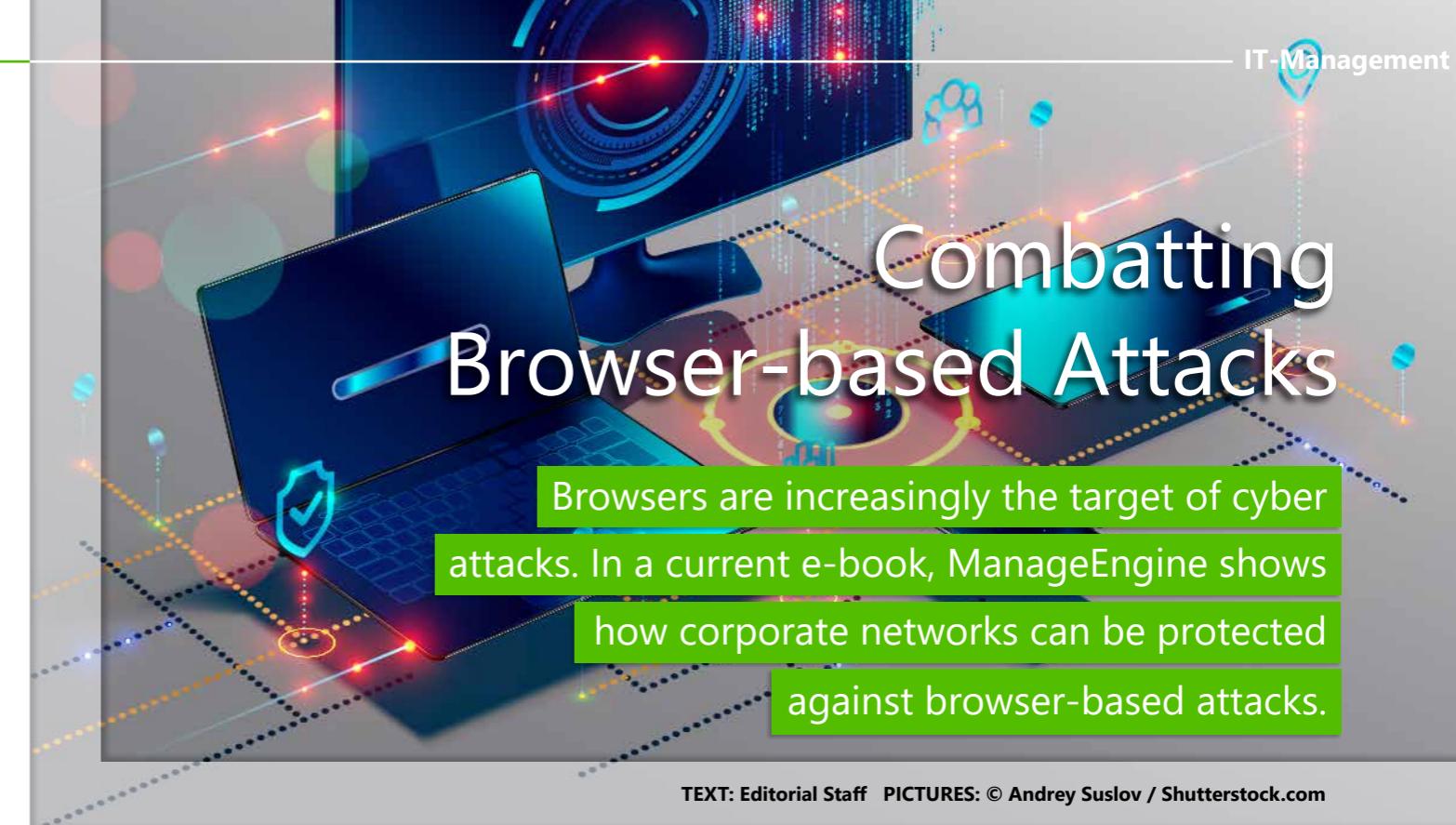
Companies today use a large number of applications where employees sometimes have to log in several times a day, entering their passwords in each case – which is an enormous waste of time. At the same time, administrators are faced with the task of reliably controlling access to these applications to ensure the security of the corporate network at all times.

Identity Manager Plus is a cloud-based, single sign-on service for enterprises that enables users to securely access business applications, whether local applications or software-as-a-service. Users only have to log in once, for example with their existing Office 365, G-Suite or Zoho login, and can then access all their applications.

Free trial versions:

Additional information on the products presented here and free 30-day trial versions are available here:

- » **Vulnerability Manager Plus:** <https://www.manageengine.de/vulnerabilitymanagerplus>
- » **Device Control Plus:** <https://www.manageengine.de/devicecontrolplus>
- » **Identity Manager Plus:** <https://www.manageengine.de/identitymanagerplus>



Unsecured browsers and web applications allow hackers direct access to company data. The increasing use of cloud services has seen them become an attractive target for attacks: according to the statistics portal Statista, browsers were already the second most frequent target of exploit attacks in the first quarter of 2019. In this environment, it is becoming more and more important for companies to optimally secure these programs.

The range of attack tactics targeted at or enabled by browsers extends from malware-based takedowns to social engineering – and new, increasingly complex methods are constantly emerging.

Browser Security Plus

In 2018, ManageEngine launched Browser Security Plus, a browser management solution that allows IT administrators to manage and secure many popular browsers, including Google Chrome, Mozilla Firefox, Microsoft Internet Explorer and Microsoft Edge, as well as their extensions and plug-ins. The solution enables security policies and uniform configurations to satisfy compliance policies to be enforced.

- » Further information can be found at www.manageengine.de/browsersecurityplus.

The e-book contains tips and information on the following topics:

- » Common attack tactics targeted at or enabled by browsers
- » Typical browser vulnerabilities and the associated security risks
- » Mandatory security measures to ensure browser security
- » Preventive measures that can reduce the extent of web-based cyber attacks

E-book download

"Why browser security should be a part of every enterprise's security strategy"

The full e-book (in German) can be downloaded here free of charge:

- » www.manageengine.de/ebook-browser-sicherheit

„Dependable Partner Even in Challenging Times“

Dear Reader,

The mood in the economy generally and in the automotive industry in particular is no longer as rosy as it was a short while ago. This could continue or even intensify in 2020. Politicians, the media and environmentalists are driving the topic of transport transformation with great vehemence. It is currently difficult to assess whether this is correct in terms of consistency and speed or what consequences it may have on prosperity and jobs; let's hope that society will also be aware of possible negative effects. Companies are already dealing with these new general conditions. Hence, it is important that they are suitable and reliable.

However, the current situation might also be an opportunity to draw breath after a long period of growth, to use the time to consolidate and to ensure long-term reliability. In over 30 years in business, I have seen plenty of companies fail because they were overambitious. Growth needs to be shaped sensibly – but of course we won't stand still! Test systems for all electronics in electric vehicles and for advanced fuel cell systems, worldwide testing in the cloud, future applications of artificial intelligence (AI) e.g. in autonomous driving and telecommunications, Car2X also in connection with 5G networks and much more are already on our agenda.

MicroNova is well positioned. Besides Automotive, our other mainstays of Telco Solutions and IT Management are also strongly positioned for the hot topics mentioned above. This diversification was and remains part of our corporate philosophy. The resulting economic stability makes us a reliable partner for our customers even in challenging times. But of course we scrutinize ourselves and our strategy in such phases. That's why we and our Management Board are also using the current environment to do some internal homework in the area of digitalization, which our success of recent years has brought into play. Given the size the company has now reached, this is the ideal time.

My approach has always been "quality before growth". Of course, it is ever important to set goals, to keep up to date. Our Management Board and all our employees address this issue with a steadfast focus. I recently read an interesting article in the business magazine "Impulse" about healthy growth. The author Oliver Wegner warns of three pitfalls: the company's inflating, wanting too much in too little time, and only considering operating figures. We will be very careful not to fall into one of these traps, because we want to put the MicroNova Group on a long-term, positive course for growth. My goal is to lay a good and solid foundation for economic cycles of all kinds.

I'm also working very hard on this in the background. This includes the building in Vierkirchen, which we moved into in 2018, as well as the transfer of shares to my son Maximilian Karl (see interview) and his appointment to the Supervisory Board. MicroNova is to remain a lasting, sound and healthy family-owned company providing innovation and stability for our customers. I also regard this company policy as very important in terms of our employees. It is very important to me that MicroNova is a good employer and is able to continue to be one.

So I am delighted that several colleagues are celebrating their tenth or twentieth anniversary with the company. For which I would like to say congratulations and express my gratitude. I would also like to thank all our employees, who give their best every day for you, dear readers – as dependable partners even in challenging times.

Last but not least, a massive thank you to our long-standing colleague on the Board, Sibylle Dengler, who has been with us providing excellent advice on this committee for many years and who has now stepped aside to make way for Maximilian, so that he can gain the necessary experience for the future of MicroNova. Dear Sibylle, our paths will not part and we remain faithful to you. Our doors are always open for you!

With warmest regards
Josef W. Karl

* <https://www.impulse.de/management/unternehmensfuehrung/gesundes-wachstum/7302341.html>



Founder and Chairman of the Supervisory Board: Josef W. Karl



Sole shareholder and member of the Supervisory Board: Maximilian Karl

The editorial staff of InNOVAtion spoke with Maximilian Karl (MK), new sole shareholder and member of the Supervisory Board of MicroNova AG, about his extended commitment to the company.

InNOVAtion: To take over such a company at just nearly 30 years old is a responsible undertaking ... how did the handover go?

MK: It is important to me that everyone involved knows that this process began some time ago and will continue for some time to come. I'm still pretty much at the beginning of my career. After my bachelor's degree in electrical engineering & information technology, I completed a master's degree in systems engineering and am now working as a systems engineer for a large company in Munich. My position on the Supervisory Board doesn't require that much time yet, and my father continues to hold the chair, which I am very glad about, because the responsibility is obviously quite considerable. Of course, I have healthy respect for this, but I am already looking forward to tackling these tasks together with him and our proven Executive Board team of Orazio Ragonesi

and Dr. Klaus Eder. Working on the Supervisory Board will give me the opportunity to build further experience and competence over the next few years.

InNOVAtion: What does the timetable look like after then?

MK: The legal handover has now been completed. In the past few years I have already had the opportunity to get a taster of the atmosphere at MicroNova, for example in the Testing division. Now it is time for me to earn my stripes in another company and broaden my horizon of experience there. Through my work on the Supervisory Board I will be able to gain further strategic knowledge about MicroNova at the same time. There's no rush; that wouldn't be fair to my current employer either. The path will lead to MicroNova in due course. How and when is not yet set in stone.

InNOVAtion: And what kind of work does the Supervisory Board have in store for you?

MK: My predecessor Sibylle Dengler had the opportunity to scrutinize the company's actions without influence from the day-to-day business. I'd like to continue that. In the Supervisory Board, we work together with the Executive Board to define strategic issues. Of course, we also pay attention to a proper business management line and sometimes represent MicroNova. Above all, however, as an owner family we try to maintain or further strengthen our corporate philosophy and convey it internally and externally. Our values. Reliability, quality and innovation. Which our employees give their very best for every day. That's what my father taught me, and that's how I intend to continue.

Employer Award

The "Partnerstein" is awarded to companies in the district of Dachau that not only promote a good balance between family and career within the company, but also actively encourage it.



1 From left to right: Anneliese Kowatsch (District Chair of the Dachau Frauenunion), Bernhard Seidenath (Member of the Bavarian State Parliament), Christine Unzeitig (District Chair of the Dachau Mittelstandsunion), Josef W. Karl (Chair of the Supervisory Board of MicroNova AG), Ilse Aigner (Member of the Bavarian State Parliament), Orazio Ragonesi (CEO, MicroNova AG), Dr. Klaus Eder (COO, MicroNova AG), Gabriele Gerstl (Vice-Chair of the Christlich-Soziale Arbeitnehmer-Union Dachau), Maximilian Karl (Sole shareholder of MicroNova AG)

The award was presented by Ilse Aigner, President of the Bavarian State Parliament: "From my point of view, successful entrepreneurship is based on three factors: business excellence, care for the environment and social responsibility. MicroNova is a perfect example of this interplay, which is why the award for reconciling family and work life has deservedly gone to Vierkirchen."

MicroNova has been awarded by the Dachau regional associations of the Frauenunion (Women's Union), the Mittelstandsunion (Union of small and medium-sized businesses) and the

Christlich-Soziale Arbeitnehmerunion (Christian-social employees' union). Christine Unzeitig, district chairman of the union of small and medium-sized companies in the Dachau region, explained: "I am glad that we have companies like MicroNova in our region. It's where economic success meets a Christian and social corporate philosophy. That is why the Mittelstandsunion gladly awarded the 15th 'Partnerstein' award to MicroNova."

Some of the benefits MicroNova offers include flexitime and trust-based working hours, digital workstations for the home office and individual

arrangements for parental leave. Part-time work models are also a matter of course: "Around 20 percent of our staff work part-time," explains Orazio Ragonesi, CEO of MicroNova. The proportion of women in the high-tech firm is currently 27 percent – and rising. In addition, the company offers additional voluntary benefits for all employees. This starts with rather small everyday things such as the lunch subsidy for the company canteen, and extends to a comprehensive career program. MicroNova also voluntarily assumes 50 percent of contributions to the company pension scheme for employees.

In many issues we have given insights into our commitment to TSV Jetzendorf. However, this issue of InNOvation is intended to put other activities in the spotlight for a moment.

There is, for example, the "Klasse-2000" sponsorship, which MicroNova took over for the first time a few years ago. The programme, launched in 1991, promotes health and the prevention of addiction and violence among primary school children. At the start there were 234 classes in Bavaria, now there are 22,338 all over Germany. Studies have shown that Klasse2000 positively affects both the later consumption of tobacco and alcohol,

Taking Responsibility in Society

Those who take part in economic life also take part in social life - and are therefore responsible.

That's why we're committed to it.

as well as dietary and exercise behaviour. The program is "free of company influences" and therefore without hidden advertising. Some background information can be found here: <https://www.klasse2000.de/das-programm/evaluation-klasse2000-wirkt>.

Let's look a few academic years higher: Enthusiasm for technology and hunger for innovation are passions that the annually changing members of the robotics team at Markt Indersdorf Gymnasium share with the employees of MicroNova. The school group, located in the neighboring community of the company's headquarters, has been designing and building impressive robots for many years, which

have repeatedly won awards in competitions such as "Student Robotics". MicroNova has been supporting the team as a sponsor for several years.



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