



Complete Simulation of Electric Machines

Powerful test systems from MicroNova for various electric motor technologies

New Solutions for Mobile Network Operators

Additional functionalities for higher service quality and customer satisfaction

Artificial Intelligence in the IT Service Desk

ManageEngine white paper on possible usage scenarios and optimal preparation



„A well-rounded matter“



Dear Reader,

This time I would like to begin with a personal note: At the time when this issue was going to press, I celebrated my 20th anniversary with MicroNova – just as some other colleagues; more about that later in the “Internals” section. In all these years, so much has changed...

20 years ago, MicroNova had about 35 employees. The Automation & Simulation department – today Testing Solutions – had six, and the Vierkirchen location had been in existence for just five years. Mobile phones still had push buttons and at the International Motor Show, Audi was presenting its A2, and BMW its Z8. Both series are now history and today’s mobile phones only have the on-off switches and the volume controls as remaining buttons.

Today, Testing Solutions employs around 160 colleagues, working at nine different locations to develop effective solutions, primarily for

the automobile industry. Back then, the number of control units in an average vehicle was somewhere in the low two-digit range. Today, there are sometimes over 100. And all of these control units have to be tested, including those for electrification. An article on page 4 deals with this topic in depth. Other subjects in this edition include continuous testing as well as a description of what our consulting team has to offer.

From automobiles to mobile radio, which has also been mentioned above: Despite all the discussions about the 5G technology, it is above all long-range and reliable mobile radio networks that count, regardless of mobile radio standards – a differentiated view on this topic is included in this magazine. As a result, information about customer satisfaction is critical to the success of mobile operators. MicroNova, in cooperation with its new partner Expandium, has put together a solution package that addresses exactly these topics: COM5.AddOn. A review of the first User Day of the Telco Solutions Department completes this part of InNOVation.

Back to 1999: It would be another three years before we began our partnership with a company called AdventNet, today’s ZOHO Corp. MicroNova has since become the exclusive distributor of their ManageEngine products in Germany, supporting more than 1,000 German customers using the IT management software. This department has developed splendidly in the last few years, which is why we are not only presenting new products in this issue of InNOVation but why we are also taking a look at ManageEngine’s partner conference in India.

My joy of working for and with MicroNova has not diminished – it is at least as great as it was in 1999. And the sense of rootedness that MicroNova has in its “two hometowns”, Vierkirchen (operations) and Jetzendorf (headquarters), has also remained unchanged. In March, I attended the gymnastics show at the Jetzendorf Athletic Club (TSV) – which we have been supporting for many years – and I was amazed at what can be achieved with passion and commitment; an article about this can also be found in this issue. The last word belongs to MicroNova owner Josef W. Karl: In an interview, he discusses the changes in our society mentioned above and explains what they mean for our company.

And now I wish you, as always, happy reading!

Ihr Orazio Ragonesi

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Complete Simulation of Electric Machines

Different electric motor technologies require high-performance test systems for validation. This requires extensive simulations consisting of hard- and software.

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The rapid progress being made in the electrification of vehicles calls for the development of efficient and reliable electric motors as well as tests of the corresponding electronic control units (ECUs). But because the technology of electric motors for vehicles varies greatly, a multitude of test solutions are required, for example, for the distinct types of motors, such as permanent-magnet synchronous motors (PSM) in their discriminative performance classes; for singlephase or multiphase control; or for different types of position sensors. MicroNova has developed NovaCarts simulators and boards as well as software tools that meet these requirements.

The validation of control units for electric motors is carried out in multiple stages (see fig. 1). In the first of four levels, the control signals are tested in a simulation solution. The following performance stage involves

the motor simulation as well as the measuring of real energy flows within the entire vehicle. The third and fourth stages involve checks of the mechanical functions, with dynamometer test benches and of course the final test in the real vehicle.

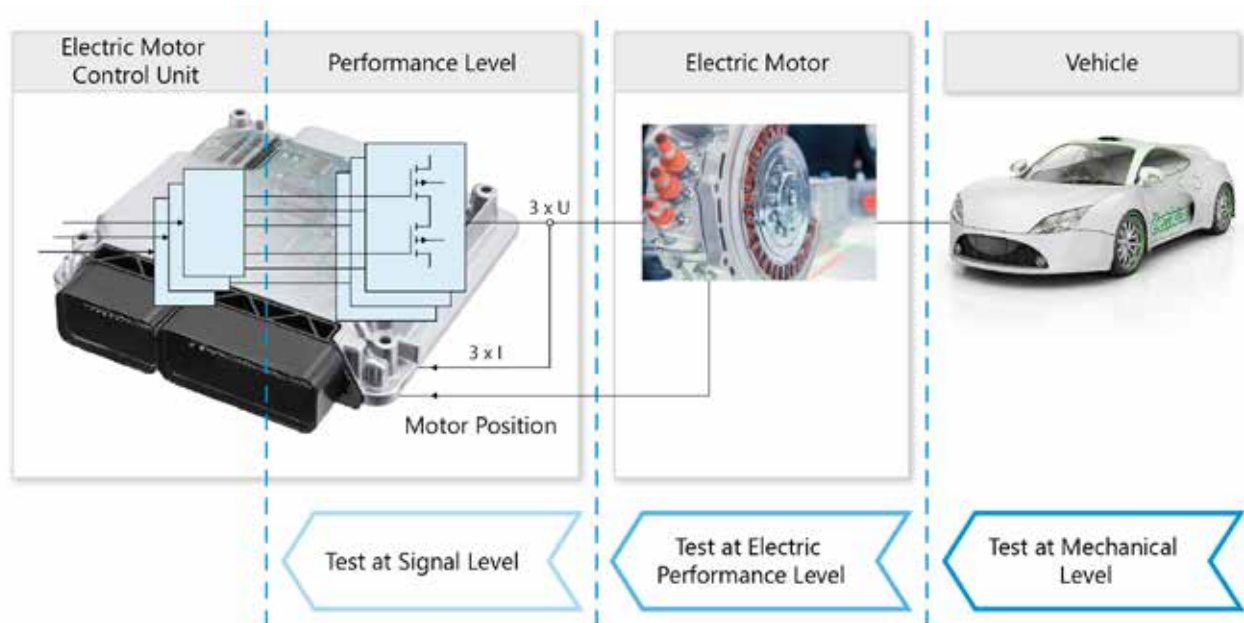
Comprehensive Testing without an Actual Electric Motor

At the signal or performance level, manufacturers and suppliers can conduct tests that, at the mechanical level or in the actual vehicle itself, could be carried out only in a limited manner or not at all. Part of this testing process includes the simulation of tolerances as well as the simulation of error cases, such as asymmetries or motor-winding short circuits. Hence, control units can be reliably validated at an early stage of the signal and performance level without unduly stressing the development budget. A real elec-

tric motor is thus not necessary at this point in the process.

The purpose of the test at the signal level (level 1) is to check algorithms. Here, a simulation solution measures the signals that control the power output stage and then calculates the electrical current vis-a-vis the load situation as well as the current position of the motor. One of the main advantages of this solution is that no high and thus dangerous currents and voltages have to be recorded, which means that operation is not restricted. Additionally, the execution of the test is cost-effective, and the testing can be done right on the developer's desk.

1 The validation of control units is performed on four levels.



For fast, accurate and efficient testing at signal level, the following requirements should be met:

- » Fast hardware for the simulation of the electric motor: Usually simulation times of less than one microsecond are required.
- » Sufficient number of fast I/O connectors: With the introduction of multiphase control in electric motors comes the corresponding need for a greater number of outputs for simulating phase currents.
- » High-resolution, high-precision simulation models for electric motors
- » Support for modeling tools such as Simulink: The simulation models developed in Simulink must be compatible with FPGA.
- » Tools for debugging simulation models and analyzing tests: In this context, it is of central importance to provide high-resolution recordings of I/O and simulation variables in the microsecond range.

For testing at performance level (level 2), MicroNova also collaborates with renowned manufacturers of electric machine emulators. Throughout this collaboration, numerous projects have been implemented, including ones in which the entire vehicle and its real energy flow are simulated. Thus, the NovaCarts portfolio covers all requirements for the verification of control units in electric motors.

Comprehensive Portfolio for the Testing of Electric-Motor Control Units

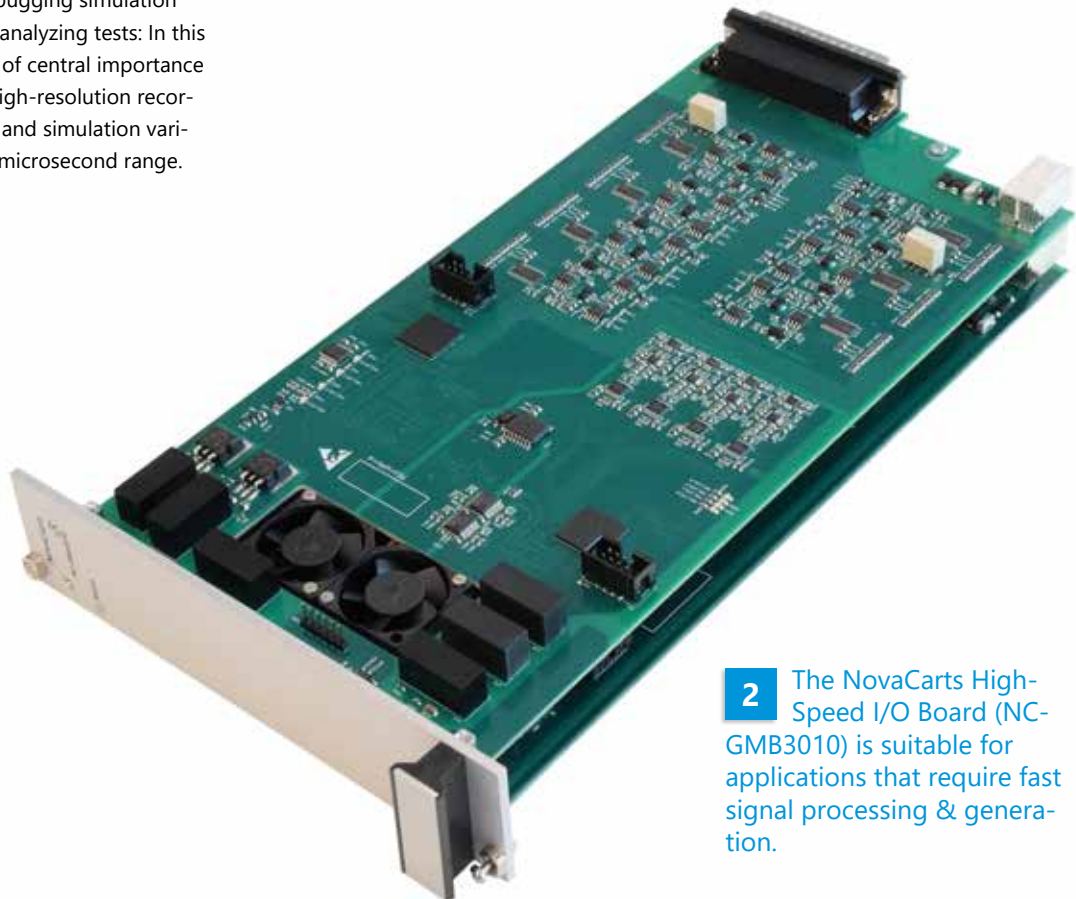
In addition to NovaCarts hardware and the associated simulation models, the test components for electric motor control units also include solutions for convenient implementation of customer-specific Simulink models. Furthermore, NovaCarts High-Resolution

Tracing enables fast signals and model variables to be recorded in very high time resolution.

NovaCarts High-Speed I/O Board (NC-GMB3010)

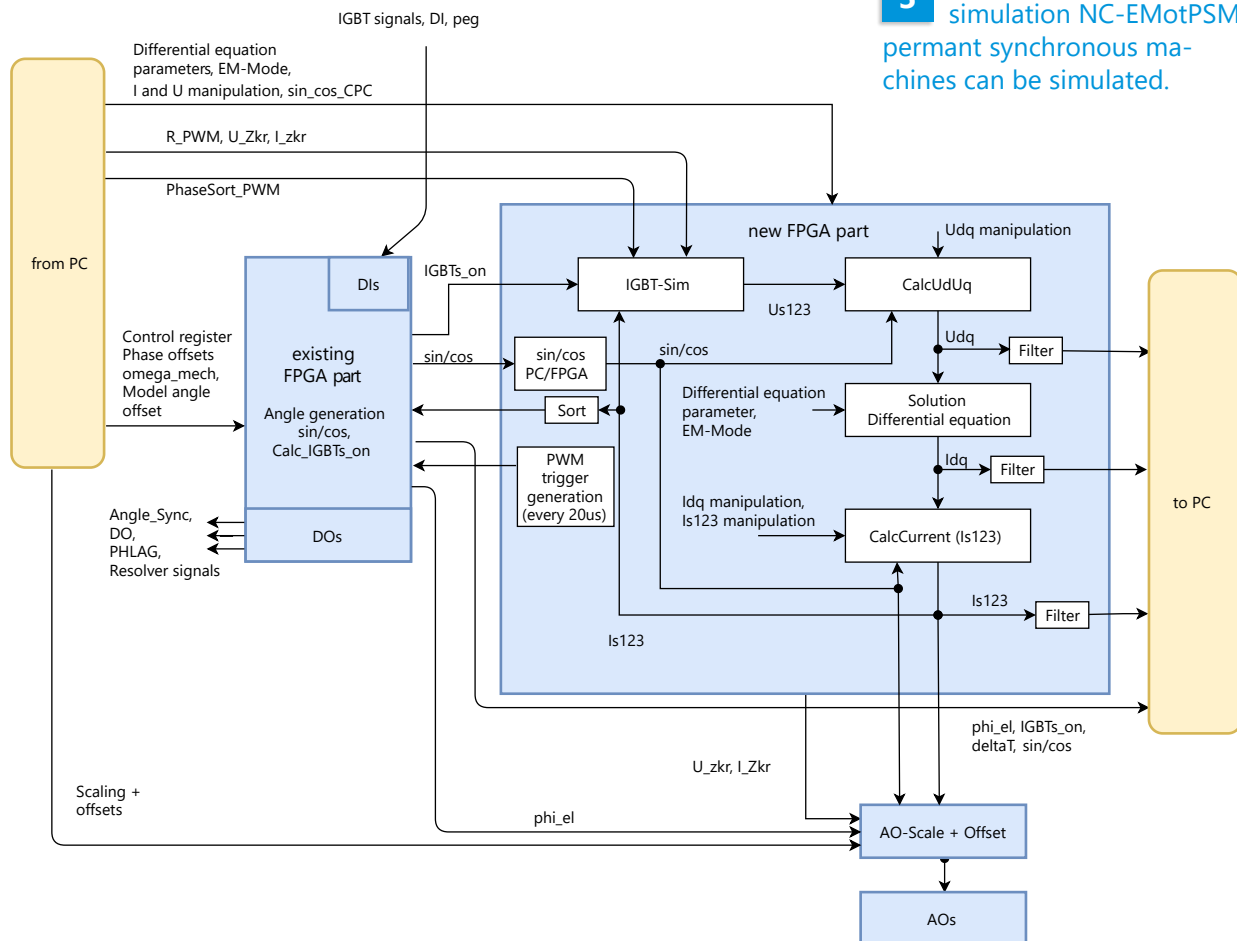
MicroNova has developed the high-speed I/O board “NovaCarts NC-GMB3010” especially for the simulation of electric motors (see fig. 2). The board is also used for the simulation of DC-DC converters or for the testing of control units for inductive charging. Generally, it is suitable for areas of application in which fast signal processing and generation are required.

NovaCarts NC-GMB3010 features a System-on-Chip (SoC) module (Xilinx Ultrascale) consisting of a powerful FPGA processor and a quad-core ARM processor (Zynq UltraScale+). This allows the simulation models for electric



2 The NovaCarts High-Speed I/O Board (NC-GMB3010) is suitable for applications that require fast signal processing & generation.

3 With the NovaCarts simulation NC-EMotPSM permanent synchronous machines can be simulated.



motors to be split into two general areas of operation: The time-critical parts run on the FPGA while the slower parts run on the processor or a separate simulation node. The board can be used to simulate phase currents as well as signals from rotary encoders and inverters, among others. It also offers a large number of other very fast digital and analog signals.

The following I/Os are available:

- » 14 fast analog outputs (8MHz, 14bit), two of which can be used as sin/cos position encoders

- » 8 fast analog inputs (4MHz, 14bit)
- » 32 digital inputs and 32 digital outputs, available at a 3.3V or 5V level, which can be operated at a frequency of up to 20 MHz

All I/Os are directly connected to the FPGA and can be addressed at maximum FPGA speed.

Simulation Model for Electric Motors (NC-EMotPSM)

The exact simulation of electric motors requires tiny increments of a microsecond or less. The simulation done

in the FPGA can thus replace standard processes that no longer meet today's requirements.

For this purpose, MicroNova has developed a corresponding NovaCarts model for permanent-magnet synchronous motors (NC-EMotPSM) (see fig. 3). This model has been used by leading automobile manufacturers and service providers for many years now, and it has proven itself very useful in the development of control units for electric motors.

Simulink FPGA-Toolchain (NC-CAPEFPGA)

Many of the long-term users have developed their own simulation models using Simulink. These users have at their disposal a tool chain for the generation of FPGA images or FPGA bit files from Simulink models. Individual models are realized as Simulink models and, with the help of the Xilinx System Generator, compiled into FPGA-specific bit files. MicroNova provides corresponding Simulink blocks that connect the models to the I/Os as well as to higher-level mechanical simulations, such as driver or transmission models (see fig. 4).

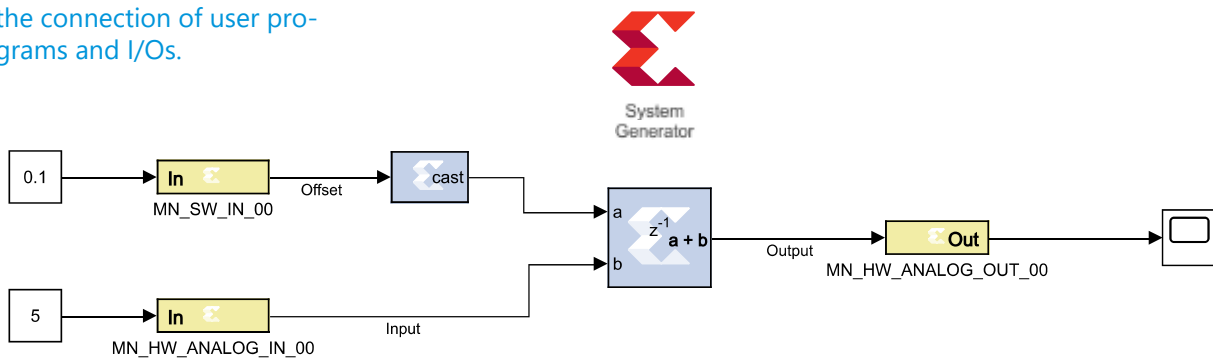
NovaCarts High-Resolution Tracing (NC-HRTRACE)

The increasing complexity of control units for electric motors and the associated simulation models requires high-resolution recording of the time response of these models and the I/Os in order to ensure a fast and precise analysis. Given that the models and time response of the control unit firmware occur within microseconds or even hundredths of a nanosecond, measurement resolution up to such values must be commensurate. NC-HRTRACE provides a solution that supports users in analyzing over the entire bandwidth (see fig. 5).

NC-HRTRACE is characterized by the following features:

- » recording rates of up to 100 nanoseconds
- » recording of all I/Os of the modules
- » recording of up to 32 floating-point variables from the Simulink model
- » freely adjustable increment size of recorded signal in any multiple of the base increment
- » recording over several seconds (even at the highest recording rate)
- » various trigger options (e.g. rising/falling edge, threshold value, etc.)
- » external trigger option (e.g. if a control unit detects an internal error)
- » adjustable pre- and post-triggers (e.g. for analyzing the record of all I/Os as well as the internal variables of the simulation model in case of a ECU internal error)
- » traces saved in MDF4 format for comprehensive analysis using various standard tools
- » control and automation through XiL-API for simple and standardized operation when using test automation solutions such as EXAM

4 The Simulink NC-CAPE-FPGA block set enables the connection of user programs and I/Os.



Conclusion

The MicroNova portfolio for testing electric motor control units supports automotive manufacturers and suppliers in significantly accelerating development while at the same time improving quality. This is all based on the high-performance, high-speed I/O board and its associated simulation models. When combined with the option of creating self-made Simulink models, the recording of signals and model variables in very high time resolution ensures that electric vehicles can be successfully validated. Thus, the driver can later rely on his vehicle functioning as intended in all situations.

Boards and Modules at a Glance

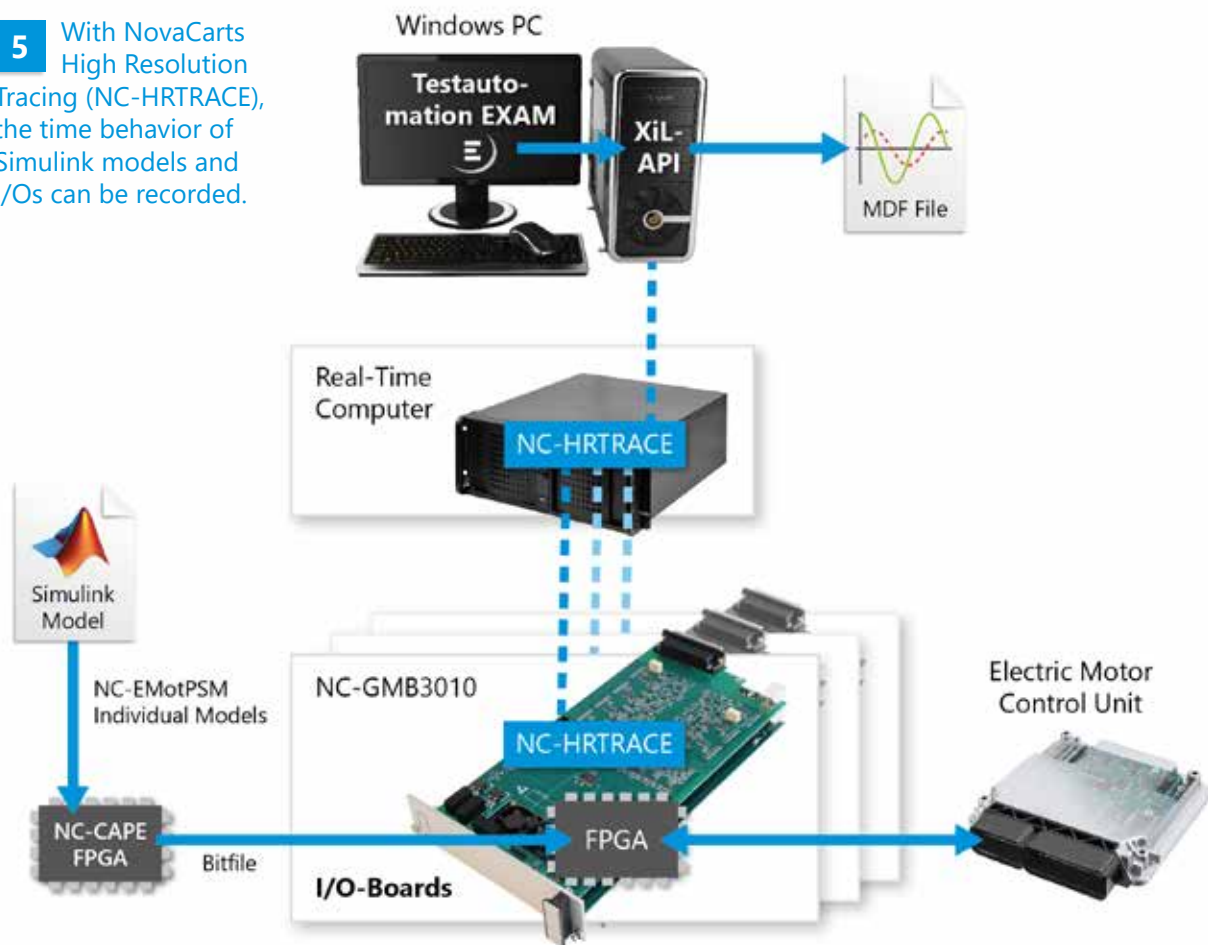
NovaCarts I/O boards offer high computing power and are characterized by their System-on-Chip approach: Each board is equipped with its own processor and algorithm-based intelligence mapped in the software – perfect conditions for fast and accurate simulations.

Detailed information on all NovaCarts boards and modules, including data sheets, is available at www.micronova.de/en/boards-modules.html.

Further information is available for download at www.micronova.de/en/testing/info

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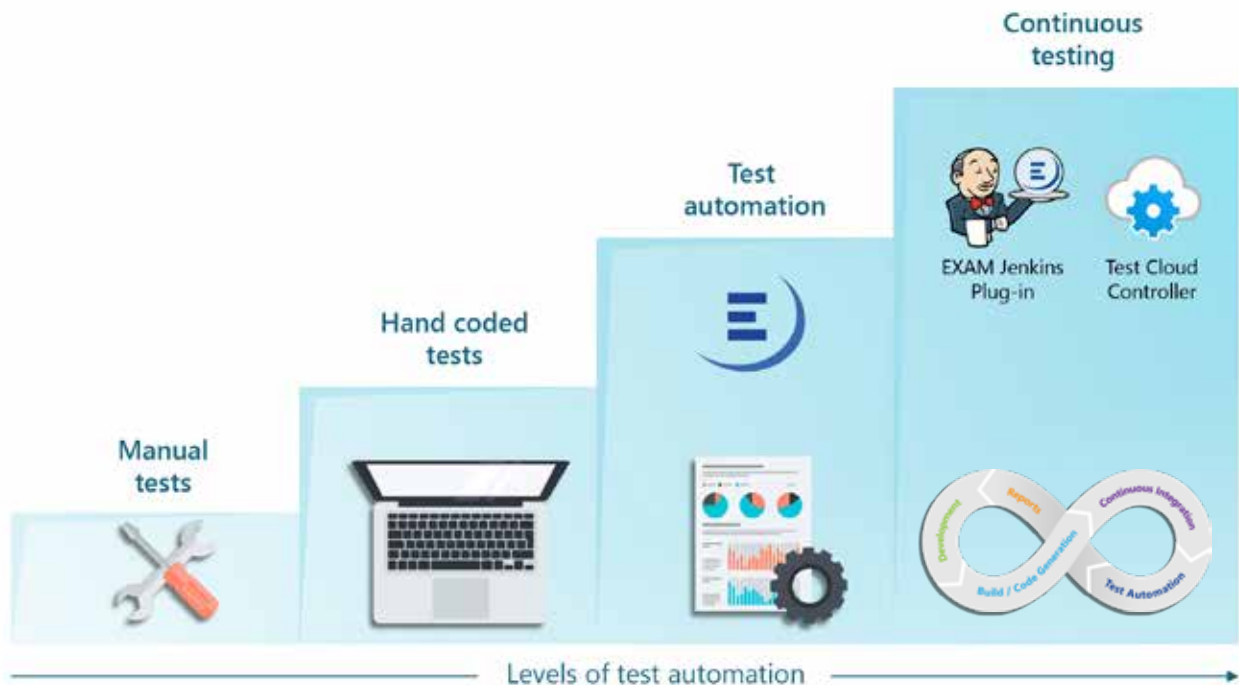
5 With NovaCarts High Resolution Tracing (NC-HRTRACE), the time behavior of Simulink models and I/Os can be recorded.



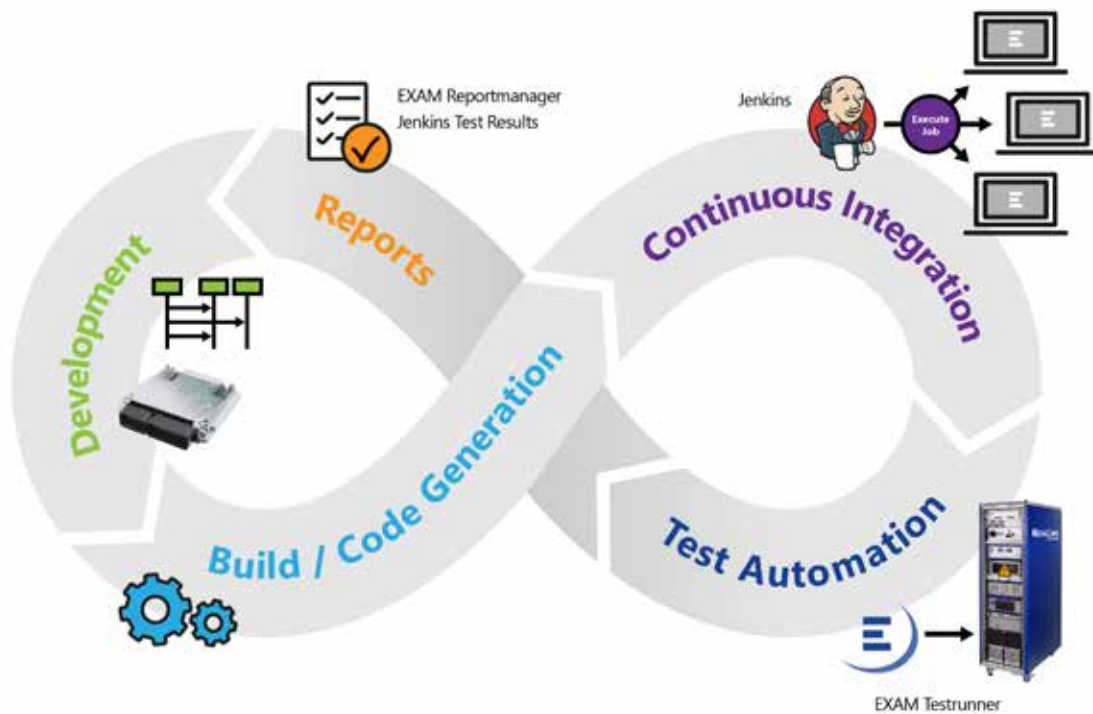
Optimize Development Processes with Continuous Integration

Continuous testing of ECU software – using the build management system Jenkins and the test automation solution EXAM as examples

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1 With the evolution of testing, the demands on test tools and automation are increasing.



2 Continuous Testing: The test results are continuously fed back into the development process.

In the area of ECU development, the continuous increase in vehicle functions raises the complexity and thus the demands on test tools and test automation. The further development of autonomous driving technology and the increase in the number of Car2X functions make it necessary to test an ever-greater variety of scenarios. The development cycles in software programming have become much shorter compared to the traditional V-models, which can lead to more integration errors. These factors require that the automation of test processes become ever more comprehensive, for the large data volumes involved can simply not be processed otherwise.

Against this background, build environments are playing an increasingly important role in securing the corresponding ECU software – a procedure that is already standard in classic IT development. In the field of software development for ECUs (Electronic

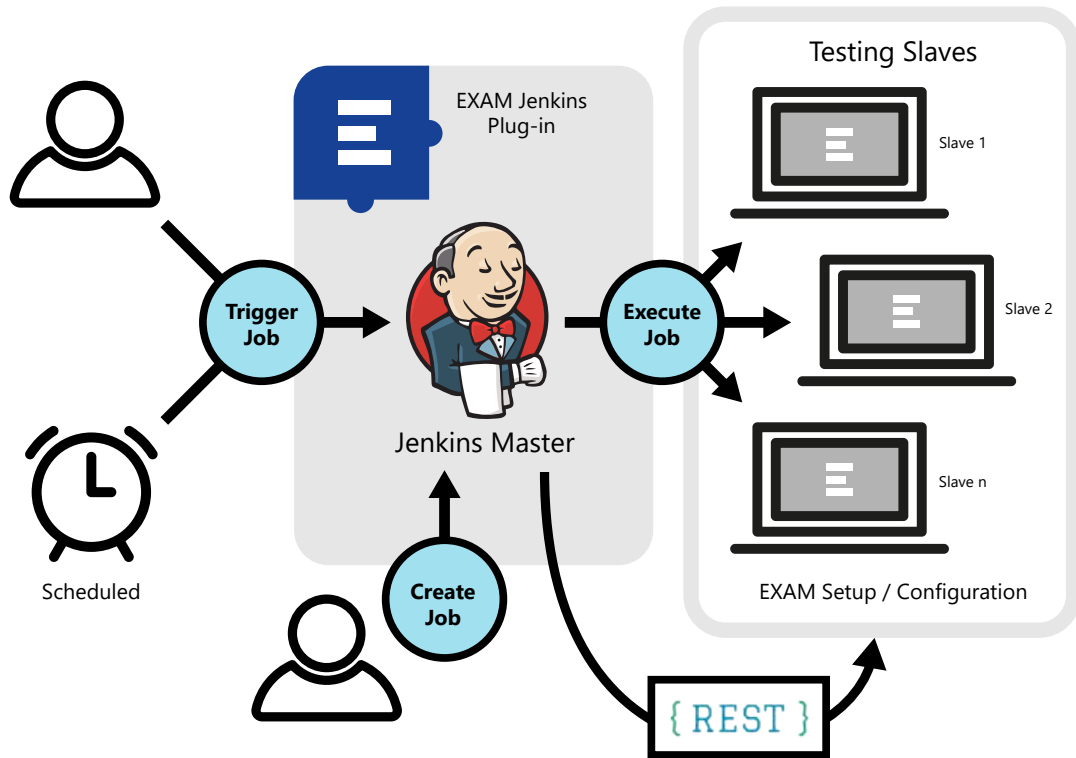
Control Units), test designers and test coordinators usually start test cases on test benches manually. The Continuous Integration (CI) method, however, accelerates this process by running the tests automatically and by continuously feeding the results back into the development process. In this way, the processes used in the development of ECUs are becoming more and more similar to those used in conventional software development.

Continuous Integration in ECU Development

In order to integrate CI into the automotive world, it is necessary to combine existing test solutions with build management systems like Jenkins. MicroNova has done just this with its test automation solution EXAM, which can aid in the graphical development of test cases.

The use of EXAM in the Continuous Integration Process (CIP) requires that developers be able to access the automation tool directly from the build system. Command-line calls or web service interfaces, e.g. REST APIs, make this access possible. Only then can Jenkins fully automate the test process.

For this purpose, MicroNova has developed an EXAM Plug-in for the REST API, which connects EXAM to the CI system, thereby allowing the test automation solution to be remotely controlled directly through Jenkins. In this configuration, it is possible to perform tests both automatically and continuously at different software development stages. This process is known as continuous testing, a sub-process within the larger continuous integration process. Development and testing are thus directly linked.



3 Continuous Integration with EXAM requires two components: a Jenkins Plug-in and an EXAM REST-API Plug-in.

Build System

In software development, the term Build or Build Process refers to a process in which an executable software package is automatically generated. The executing Build Tool (e.g. Jenkins) uses a formal description of the program or function calls to be executed (compiler, linker, etc.) as well as the dependencies between these calls. In this way, the source code is converted into an independent form so that the application can be executed on a computer. This compilation process is one of the most important steps of a software build.

EXAM and Jenkins

The CI solution for Jenkins consists of two components: a Jenkins Plug-in and a REST-API Plug-in for EXAM. To ensure optimal integration with a convenient configuration, an extension for the connection with EXAM was created using the flexible plug-in concept of the build system. This Jenkins Plug-in is available for download at <https://jenkins.io/> under Open Source License (MIT).

The REST-API Plug-in for EXAM, which complements the access layer for the test automation, is also necessary for the operation. For this purpose, a simple integration concept for Plug-ins (Eclipse RCP basis) is available in EXAM which extends the functionality of the test automation.

MicroNova provides the REST-API Plug-in for EXAM users under both node-locked and floating licenses. After integrating these with Jenkins, testers can continue to work with their familiar tools and developers can have easier access to the results.

Deployment and Configuration

The application of the plug-in solution makes it possible to install EXAM remotely on external test systems which can be accessed from Jenkins. The same is true for the deployment of various versions or the updating of test automation solutions. In this way, dynamic EXAM instances can be created or deleted. The configuration of the EXAM installation (Python Code, Report Target, EXAM model ...) as well as the deployment can be carried out in a user-friendly manner, given that it is analogous to the manual operation in the EXAM Client and can be done via the standard Jenkins interface.

Once the installation is complete, the test cases to be executed are selected and compiled. At this point it is possible to dynamically load the test compilations from the EXAM model and apply static specifications. Test cases or test groups can then be activated or deactivated. In addition to that, the depth of detail of the log outputs for all test runs can be manipulated via filters.

During the execution of the test cases, the EXAM console is transferred to Jenkins for "active" monitoring. The results are then converted into the JUnit format so that they can be displayed graphically in Jenkins in the usual way. This gives the user a complete overview of the status of the build, including its history in the form of a trend profile.

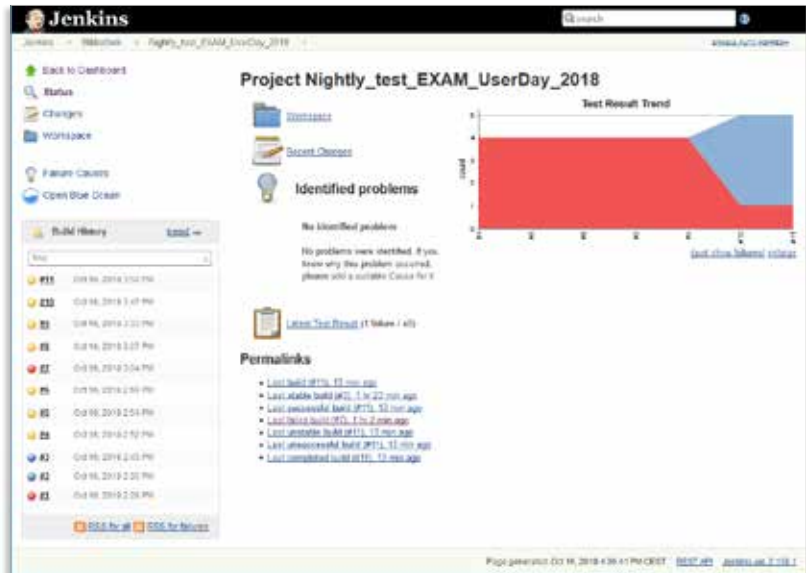
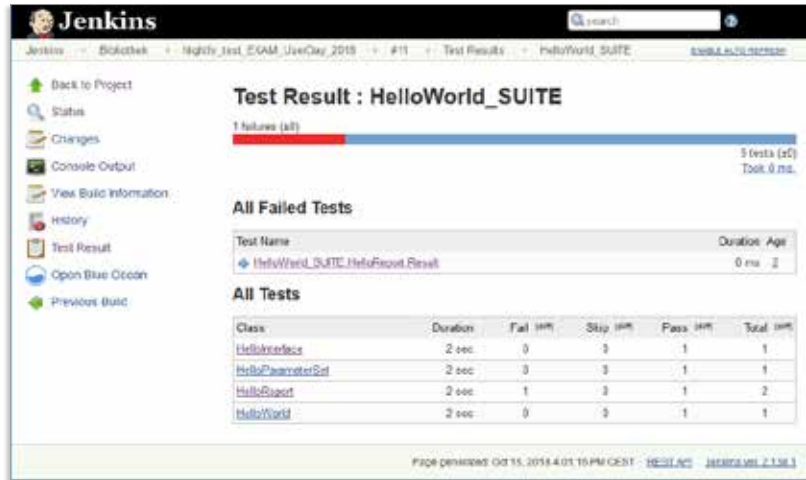
4 Build Tools are displayed in the Global Tool Configuration, in this case EXAM / Python.

5 The EXAM build steps are easy to configure.

**Smart Expansion –
Big Effect**

In comparison to a manual test start which requires considerable effort in its configuration, an automated configuration and start significantly reduce the error susceptibility. Because many of the individual steps are automated in the procedure described above, the extension through the API leads to a significant acceleration of the entire process. The automated execution ensures a faster return of the results to the developer and thus enables early detection of errors. The degree of test effort as well as the sources of error in the process can be permanently reduced, and consequently, the quality of the tests can be constantly improved. In summary, early integration further shortens development times. This versatile concept can also be implemented for other automation solutions in the future.

6 Complete overview of the status of the build, including its history in the form of a trend profile.



Just Asking...



Sven-Jan Neuhaus, Head of Consulting & Services, MicroNova AG

More than a year ago, MicroNova set up its Consulting & Services department to support Testing Solutions customers with technical expertise, process knowledge, and excellent communication skills in the many different challenges they currently face in automotive testing. What has changed since then, and how has the industry adopted the service offered?

We are extremely satisfied with the response received so far. Expanding the portfolio to include strategic testing consulting has been well received by the market, and the positive feedback is confirmation of our approach. We are able to contribute much earlier than previously to optimizing test processes, reaching beyond the classical test procedure. We have also taken on new tasks such as qualifying software tools or structuring complex approaches for reorganizing processes and procedures in testing.

From what we have gathered so far, our approach is meeting the exact needs of the market for high-quality and technically sound advice. MicroNova Consulting enjoys a high degree of credibility among manufacturers and suppliers because our business has its roots in HiL technology. Our consultants use and practice this combination of operational experience and strategic thinking, and find a high level of acceptance among our customers thanks to their holistic understanding of the testing environment.

The combination of expertise in test automation and HiL systems forms the basis of our consulting and enables us to provide a wide range of services – from a well-grounded consulting project and operational implementation to permanent support for test environments. What sets us apart from other consulting providers is our understanding of the interface between planning and realization – we are active on both sides, either separately or in combination, depending on the assignment.

Since the interview in InNOVation 01/2018 (“Success requires more than good testing processes”, p.12 ff) we have completed various projects, for example the development of a steering solution for a leading vehicle manufacturer, all of which began with consulting and then transitioned into operational implementation as part of our services. What quite honestly surprised us is that it also works in the opposite direction, as we saw in a development project for a sports car manufacturer. While providing operational services such as support for the test infrastructure or creating

test cases, we noticed opportunities for improvement that were then in turn incorporated into consulting projects.

The results of the first year of MicroNova Consulting & Services were therefore very positive. We offer services at the right point in time when they are needed by the testing industry. This is of course only possible if you have the right employees. I am really thrilled at the cohesion in the team. Within a period of twelve months, we have succeeded in setting up a department guided by cooperation – with flat hierarchies and a focus on the skills of each and every individual. This combination of exacting testing services and sound consulting is also at the foreground of further developing the Consulting & Services offering for our customers. As already mentioned, each subarea spurs on the other – our services benefit from our consulting expertise and, vice versa, consulting learns a great deal from operational activities.

Portfolio Extended: Telco Solutions Expands COM.5 Offering

Leading mobile network operators rely on MicroNova for network planning and configuration. A solution set for Service Quality Management (SQM) and Customer Experience Management (CEM) now extends this offering. Involved: Partner Expandium.

TEXT: Editorial Staff PICTURES: © Syda Productions, Marko Aliksandr / Shutterstock.com
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About Expandium

Since its founding in 2005, Expandium has provided public network providers and rail operators with tools to build network intelligence. From troubleshooting and optimization to Customer Experience Management (CEM) and Service Quality Management (SQM), the company's offerings range from 2G, 3G, LTE, VoLTE and VoIP for MNOs and MVNOs, as well as GSM-R, ETCS and FRMCS for railway operators, to solutions for 5G that have been in the pipeline for some time – the key to efficient monitoring and optimization of radio networks, planning of expansions and management of SLA services during network build-up and operation. Expandium is privately owned and headquartered in Saint-Herblain, France.

As with any product, COM5.Mobile is of course intended for a specific purpose - and MNOs as well as Mobile Virtual Network Operators (MVNOs) have more than that one task to address in the management of their networks, e. g. the area of SQM. This, in turn, requires dedicated solutions. For this reason, MicroNova has started to cooperate with the French company Expandium, a provider of big data solutions including mobile network monitoring, in the beginning of 2019. The aim of this cooperation is to be able to offer users in companies more functionality from a single source. MicroNova addresses the areas in particular:

- » Quality Monitoring
- » Trouble Shooting
- » Optimisation
- » Roaming and Fleet Monitoring
- » Customer Service and Customer Care as well as
- » Customer Experience Management (CEM)

With Telefónica Germany and Vodafone Germany, two of the world's top five mobile network operators in Germany have been successfully relying on MicroNova's COM5.Mobile solutions for radio access network (RAN) management for many years. Be it vendor-neutral and cross-technology offerings for network expansion and optimization, planning and configuration of the RAN, Network Function Virtualization (NFV) or 5G - the existing portfolio of the Telco Solutions division already included a wide range of functionalities. In addition, MicroNova continuously optimizes and expands COM5.Mobile in close coordination with the above-mentioned customers. With this existing set, Mobile Network Operators (MNOs) around the globe can plan and configure their RANs efficiently and effectively now and in the future.

With this extended portfolio, MicroNova now offers mobile network operators packages consisting of the four components COM5.Mobile (RAN planning and configuration), COM5.Rail (focus on GSM-R), COM5.AddOn (expansion) and COM5.Projects (individualised project development and management by MicroNova). With that expanded base, MicroNova is also increasingly addressing international mobile communications markets, with local presences already planned.

COM5.AddOn: Value added for M(V)NOs and their customers

MicroNova and Expandium now offer joint solutions for efficient monitoring and optimization of wireless networks, planning of extensions and management of SLA services. Instal-

lation, training and support complete this range of services. "When choosing our partner, we placed great value on a mix of competence, experience and passion for innovation," explains Georg Kieferl, Head of Telco Solutions at MicroNova. "We are absolutely convinced that we have found the right company in Expandium. With the accordingly extended solutions range, we can offer our customers more services from a single source. This brings both operational and logistical advantages and ultimately benefits the end users of the mobile networks".

In detail, the COM5.AddOn offering launched by MicroNova is divided into the areas SQM, CEM and Business Intelligence (BI) based on the Expandium portfolio. With the integrated, tailor-made deployment and the inclusion of an own Big Data platform, M(V)NOs can further increase the quality of their offer in the direction of Northbound Interface (NBI). The technological basis is formed by non-intrusive passive "probes" (eProbes), which collect data directly at transmitting and receiving facilities, and high-performance servers, which enable real-time monitoring around the clock on almost all network protocols.

Interfaces and Protocols

With COM5.AddOn, M(V)NOs can collect and process data, combining proven and new methods such as stream processing, machine learning, pattern recognition and parallel processing. The information is provided via a comprehensive and easy-to-use dashboard. Data traffic is captured 24/7 in real time on E1, STM and Ethernet connections, whether copper or optical. Expandium's eProbes are compatible with all signaling interfaces and protocols used in 2G, 3G, LTE, VoLTE, VoIP and VoWiFi networks.



„The offerings of our two companies complement each other very well – they give mobile network operators access to a portfolio that offers them quantifiable added value. Getting both the smooth operation of the network and the supporting services for this very operation from a single source is certainly a great advantage for users. We are absolutely convinced that MicroNova is the right partner for Expandium because of its long track record with mobile network companies operating in Germany.“

– Gilles Henin,
Senior Channel Manager
Expandium

Once all definitions and the 5G path are final, solutions will be available soon after that. "As usual, we will work solidly to have the right solution at the right time. If you start before the standards are finalized, you risk semi-finished solutions that require changes. That is not our policy. We are ready as soon as 5G is really ready. Competence, concepts and roadmaps are there," explains Stefan Gröger, who is responsible for business development in the Telco Solutions division at MicroNova and, together with Georg Kieferl, also for the partnership with Expandium. "By the way, this also applies to related solutions around the Internet Protocol IPv6. It is now picking up speed, but is still a long way from overtaking IPv4."

Possible applications

With this technology stack, MNOs as well as MVNOs can cover more than just activities in the actual network operation. In the SQM environment, for example, it can be used for accounting including billing. Furthermore, scenarios could also be set up for Customer Relationship Management (CRM), in which the data is processed into valuable information: The goal in each case is to better understand the customers and thus identify and strengthen the most profitable areas – right through to marketing. In this way, M(V)NOs can directly influence their earnings in a positive manner. Technologically, the integration of all structured data as well as data from CRM, billing, etc. forms the basis for this, whereby a special interface for different sources is used.

With CEM, it is possible to use a user-oriented platform with which MNOs as well as MVNOs can support the improvement of customer satisfaction. It includes solutions for handling customer complaints, closely monitoring the use of roaming partnerships and their revenues, uncovering fraud potential and much more. The bottom line is a clear picture of the true usability and quality of the network. Advanced solutions make it possible to collect, process and analyze almost all data from an operator's network in a legally compliant manner. This platform can also feed and/or collect data from or for third-party solutions.

Conclusion

For many years, MicroNova has provided mobile operators with a reliable network planning and configuration tool in the form of COM5.Mobile; this will continue, with ongoing enhancement and improvement with regard to upcoming technologies as 5G or those looming on the horizon like 6G. With COM5.AddOn MicroNova extends this portfolio now. Thus, M(V)NOs get a much wider range of possibilities for an efficient operation. Satisfied customers and more profits are the concomitant opportunities – and the basis for investments in the technology generation.



Mobile Virtual Network Operator (MVNO)

MVNOs are providers of mobile communications services for end customers who have a core network, but not their own radio network. The core network includes a so-called home location register (HLR) as well as a corresponding facility for switching voice and/or data connections – usually a gateway mobile switching center (GMSC). As a rule, interconnection takes place with a network operator other than MNO, whose radio network is used, whereby access to several MNOs is possible as well.

Can't Germany Operate Mobile Communications Networks?

Spoiler alert: Of course we can. Still, there is potential for optimization in certain areas – but the providers are by far not the only ones to blame for that.

TEXT: Georg Kieferl PICTURE: © Det-anan / Shutterstock.com

The media landscape in Germany may cause frowns: mobile communications overall was a tragedy; there were too many dead spots as well in the countryside as in the railway system, the stability would be inadequate; and of course the prices were too high when compared with other countries. As clear as it may be that there is room for improvement in the mobile network as a whole – especially when it comes to network availability – in order to deal with this situation constructively, it is necessary to carry out a factual analysis so that this basic prerequisite for economic success can be met.

In order for the further expansion of the mobile communication network to take place, more and more transmission masts must be installed, including ones near residential areas. According to estimates, up to 90,000 additional base stations will be required to improve network availability in the coming years. In general, these antenna-dotted sites are not particularly aesthetically pleasing. For this reason, many communities try to block the construction of transmission masts through citizens'

initiatives, citing design issues. And many residents are concerned about health risks. However, according to the Federal Pollution Control Act, the sites are not even subject to approval so long as the specified limit values are maintained.

Can 5G technology close the gaps?

In the political arena, the further expansion of the mobile communication network is being discussed, not however always competently. Some politicians are calling for all the gaps, i.e. dead spots, to be closed, in the course of the implementation of 5G technology. But even without a diploma in physics or telecommunications engineering, one can tell that this is not technically possible for the current frequency spectrum intended for 5G, since the range of a radio tower is only about one kilometer. Without taking into account uninhabited or unfrequented areas, estimates based on a previous definition of 5G show that some 850,000 base stations would need to be built in order to establish network coverage over the entire area of Germany.

However, given the fact that current mobile radio networks consist mainly of free-standing masts and installations on building roofs, it is hard to see how anyone could seriously believe that this number of base stations is politically feasible. That is why it is worth differentiating among 5G technologies. The sites employing the latest 5G technology distinguish themselves not only through their greater performance capability and density but also through their improved aesthetics. In particular, through the further development of small-cell network architecture, mobile phone units already fit within city streetlamps.

The Real Goal of 5G

When it comes to technology, 5G opens up a lot of possibilities, but what is its real goal? Mobile applications and services are playing an increasingly important role in digitization - and the successor generation of LTE is the technology that will make this quantum leap possible. But it is clear that its primary benefit lies not in its ability to improve the quality of telephony or

streaming of films on smartphones through higher bandwidth, but in its power to support many devices per cell and its low latency. This makes it ideal for supplying data-intensive hotspots. For these reasons, the first applications for 5G networks will be in these kinds of scenarios. Examples include large company sites; production facilities; logistics facilities, such as ports or freight stations; football stadiums, etc...

But also applications in the area of virtual reality and augmented reality are viable with 5G technology. The networking of markets, sectors, industries and society will continue to change: If people are in the center of things today, "things" will be in the center in the future. Terms such as industry 4.0, Machine-to-Machine communication (M2M) or the Internet of Things (IoT) describe just this sort of networking of machines and devices of all kinds.

Are there serious alternatives to 5G?

While 5G and IoT may be on everyone's lips these days, alternatives do exist for the "things" to be networked: via license-free frequency bands. "LoRa" (derived from "Long Range"), for example, is a very cost-effective technology with which IoT devices can be connected wirelessly over long distances. This allows energy companies or municipal utilities, for example, to integrate their smart meters cost-effectively into their own networks without the need for a traditional mobile communications provider. With the announcement of every new mobile communications standard comes a prediction announcing the "end of Wi-Fi", even though it has already established itself as a networking standard in production facilities. Wi-Fi uses an unlicensed spectrum that is available to everyone free of charge, so why should companies choose the expen-

sive 5G for their networked production facilities? So: Do we really need a 5G wireless landscape anyway?

Both alternative approaches show that 5G should not be looked upon as the panacea for all types of applications. The great variety of requirements means that there will be, in the initial stages, no universal 5G network, no "5G for all", so to speak. Rather, it will be that individual, special networks tailored for dedicated applications will become the norm. The existing locations will be gradually equipped with new 5G technology at the hotspots and connected via fiber optics.

Adequate policies are required

So that our German mobile networks can provide the required nationwide infrastructure, new sites and especially adequate frequency spectra will be required. The approval of frequencies in the MHz range would take nothing more than the requisite political will, but it will in the end provide the foundation for better ranges. Our state would do well to establish better framework requirements instead of filling the budget gaps with proceeds from auctions; this would ultimately enable it to generate revenue through greater economic activity. The according policies must, of course, provide network operators with guidelines for network expansion, but at the same time give them enough room for the necessary investments. A wise policy is characterized by targeted investment in the short term, which in the long term compensates for the initial revenue shortfalls many times over through the resulting economic boom.

A realistic look at other industrialized countries shows that they are not really much further along when it comes to similar projects. Of course, there are well-publicized exceptions. For example, South Korea used the

first 5G networks selectively during the 2014 Olympic Games to deploy autonomous buses and ensure video transmissions. This and other examples, especially those coming from China, have little to do with the actual 5G standard, which will, according to expectations, be adopted in 2019. In terms of frequency allocation, too, we in Germany are all but neck and neck with other countries who are supposedly clearly ahead: In the USA, the first spectra were launched in 2018; Japan and South Korea are planning 5G test runs for this year, and China for 2020. The leading network equipment manufacturers (Huawei, Nokia and Ericsson) have also promised the first product releases for the current year.

The timing is important

5G projects are already underway and being tested, but that is also true in Germany. 5G Berlin e.V. (registered association) is a partnership of research and industry to promote innovation in the next generation communications network. The aim is both to test the technologies and to promote new applications. The initiative is dedicated to the development of the 5G test field and the 5G center. As a founding member, MicroNova plays a central role, and in 2019 the first 5G networks will be rolled out to "our" customers. It has already been made clear that Germany has no significant set of backorders. There is also a lack of end devices and business models that enable mobile providers to generate revenues, but 5G must be made worthwhile, especially if the state wants to receive a considerable share of the proceeds. Blind activism, in contrast, can end badly, because at the end of the day the fact is that 5G standards have not yet been fully adopted – timing is indeed important. And whoever takes two steps at once just might stumble on his way.



Review: Telco Solutions UserDay

With the introduction of 5G, the German mobile communications market is facing major challenges. That's why MicroNova invited telco experts to the first COM5.Mobile UserDay in November 2018.

TEXT: Editorial Staff PICTURE: © MicroNova

On November 6 and 7, 2018, MicroNova welcomed team members of Telefonica Germany GmbH & Co. KG, Vodafone Germany GmbH, and partner firms EANTC AG and highstreet technologies GmbH to the Vierkirchen Business Park. In addition to networking and sharing experience among users, the event focused on the presentation of the COM5 product family. An outlook on 5G development and the roadmap for COM5.Mobile was given in cooperation with EANTC and highstreet technologies.

After the guests were welcomed by the MicroNova board members, Ingo Bauer, Head of Product Management Telco Solutions, introduced the agenda for the two-day event. Together with Alfons Mittermaier, CEO

of highstreet technologies GmbH, he then presented the path to software-defined networks (SDN) and network functions virtualization (NFV) as part of 5G architecture. This topic was complemented by the presentation from Gabriele Schenk, Managing Director of EANTC AG about 5G entering the market. A detailed report on cooperation between EANTC and MicroNova in the context of Mobile Service Testing was published in issue 2-2018 of InNOVation.

Before the lunch break, Georg Kieferl, Division Manager Telco Solutions, together with Ingo Bauer, informed attendees about MicroNova's product strategy and marketing concept. At the same time, guests also got to know that the Common Planning & Configuration Manager (CPCM) was being

renamed to the meanwhile established COM5.Mobile. He also presented the roadmap for the product as well as the COM5.Rail product, which is pitched towards GSM-R, as well as COM5.AddOns and COM5.Projects (see pages 16 ff. of this issue).

COM5.Mobile in use at Vodafone and Telefónica

The early afternoon was particularly exciting: Eric Cyrener, Group Leader Radio Configuration & Spectrum (TLOR) at Vodafone GmbH, and then Heike Manshon, OSS Design, with Georgi Dikov, Lead OSS Architect, both at Telefónica Germany GmbH & Co. KG, gave insights into how MicroNova solutions work for their respective employers. Despite the direct competition between the two companies, there



was at all times a very open and constructive dialog about challenges and questions in dealing with the planning, optimization, and configuration of the network. COM5.Mobile being used by both companies and the open and cooperative atmosphere of the UserDay helped all parties to learn and benefit from each other – a prime example of the added value of such an event.

After Ingo Bauer had had the chance to rest his voice a little, he was ready for his demo of the Integration Wizard, which he hosted together with Michael Mai, the Development Head for Telco Solutions at MicroNova. Thomas Reiner, Project Manager Telco Solutions, closed the first day of UserDay with more details on COM5.Rail. Afterwards all participants attended a get-together and dinner in the nearby

Gut Häusern, where the cuisine at the “Alte Gutsscheune” was just as captivating as the location – networking in the right environment is simply more enjoyment.

Further development with user feedback

The first day showed how well cross-company cooperation worked at the UserDay, an impression confirmed during day two. Two moderated workshops on the topic “COM5.Mobile from the user’s point of view” took place in mixed teams. There were two groups each: one focused on usability in the client environment and the other on parameter lists. Feedback from the participants gives MicroNova the opportunity to further develop COM5.Mobile according to user needs and

to optimize it accordingly. At the same time, a roundtable was held between department and group heads and project managers from Telefónica, Vodafone and MicroNova management.

MicroNova’s first UserDay for Telco Solutions ended with a presentation on the workshop results. This allowed all attendees to benefit from the findings and draw their own conclusions. One thing is certain, it won’t have been the last event of this kind – participants eagerly asked for another. So UserDay 2019 has already been penciled in on the calendar. After all, there are vital tasks and major goals for the mobile communications industry as well this year with the introduction of 5G.

ManageEngine: Partner Meeting 2019

New products and developments, future cooperation and exchange: these topics took center stage at the “ManageEngine Partner Conference 2019”.
Also present: the MicroNova team.

TEXT: Editorial Staff PHOTOS: © ManageEngine

102 participants from 48 partners from 42 countries traveled to Chennai, India, in January for ManageEngine’s Partner Conference. The city in the southeast of the country, home to eight million, is India’s fourth largest conurbation and, along with Bangalore and Hyderabad, one of the most important regions for software developers. ZOHO Corp., vendor of the ManageEngine products, also has its development center there.

This year’s global partner meeting was held on the company’s spacious campus, where MicroNova was of course in attendance. For four days, Alexander Fillips, Head of Enterprise

Management at MicroNova, and three employees from Sales, Consulting and Marketing attended numerous product training sessions and learned more about planned product innovations and enhancements.

Following its partners’ wishes, ManageEngine had planned even more time this year for individual meetings with product managers and engineers – an opportunity that the MicroNova team naturally took advantage of: for example, during a meeting with the ServiceDesk Plus team, numerous suggestions and improvements were passed on from customers. One particularly pleasing aspect

is that the face-to-face exchange has already resulted in a possible solution for current issues raised by German ManageEngine users.

Face-to-face exchange

This example again shows the importance of direct and face-to-face exchange between developer and distributor, allowing practicable solutions for users to be found quickly and smoothly. Against this background, it is hardly surprising that this networking with ManageEngine staff and partners from other countries was once again one of the most important functions of this year’s partner event.

1 A total of 102 participants from 48 partners traveled from 42 countries to the “ManageEngine Partner Conference 2019” in Chennai, India.





- 2 The presentation by our consultant Christian Schneegans, who presented a large customer project at the partner meeting, was met with great interest.

Award for outstanding growth

Talks continued at this year's Partner Awards ceremony, which was followed by a party. At the reception, the MicroNova team received an award for outstanding growth and revenue in 2018.

Conclusion

For the MicroNova ManageEngine team, the four days were worthwhile despite the long, exhausting journey: the numerous new suggestions and considerable amount of information will help our consultants and technicians provide better advice and support to German-speaking users of ManageEngine products and potential customers.

- 3 ManageEngine honored MicroNova with an award for its outstanding sales success in 2018.



Artificial Intelligence in the IT Service Desk

Chatbots, virtual assistants and predicting IT problems: artificial intelligence offers a number of opportunities for IT departments. A white paper by ManageEngine looks at deployment scenarios and the right preparation.

TEXT: Editorial Staff PICTURE: © VAlex / Shutterstock.com

Artificial intelligence (AI) is set to penetrate almost all industries and business areas in the coming years, a fact that basically all industry experts agree on. IT Service Management (ITSM) is no exception, because the use of appropriate technologies promises above all to relieve the burden of repetitive routine tasks and deliver a better user experience – so valuable and scarce “admin time” is (finally) freed up for more important tasks. However, AI is not the first promising technology to be attested as having the potential to fundamentally change ITSM. Since previous hopeful candidates have in retrospect proved to be mostly short-lived trends, the question is obvious: can AI really make ITSM simpler and more efficient?

Industry experts such as the analysts from Gartner believe in the massive potential of AI. For example, in its study “Predictions 2018: Artificial In-

telligence” Gartner expects that by 2022 around 40 percent of employees in a customer-facing role and staff in public authorities will be consulting a virtual AI helper to support decisions or processes – mechanisms that can also be transferred to internal service providers such as an IT department. Consequently, Gartner considers that chatbots could also handle customer contact in the service desk segment.

Three categories of tasks

MicroNova partner and ITSM software provider ManageEngine comes to a similar conclusion in its latest white paper “The AI advantage: Use cases and scenarios on how AI will redefine the way IT service desks work”: AI might actually change IT service desks. This requires the IT service desk to take on tasks that humans can only perform with much effort or which humans would rather not do.

According to ManageEngine, these tasks can be divided into three categories: intelligent automation, strategic insights, and predictive analytics. For example, the assignment of help-desk tickets could be significantly improved: instead of using static rules for ticket routing, AI technologies such as Machine Learning (ML) would be able to create categorization models based on historical data. By comparing these models with live data, they would become more accurate over time. As a result, such systems could ultimately distribute tickets more efficiently than manual categorizations or rule-based automation.

With regard to strategic IT planning or predicting IT problems, AI-based models would also be able to provide insights that could otherwise – if at all – only be gained with a great deal of effort and know-how. Suitably trained AI could, for example, identify the ideal



time window for rolling out patches or provide assistance for planning and implementing changes. Correlations between incidents that point to a common problem could also be identified. Another possible function could be the detection of anomalies by highlighting unusual, recurring incidents. A predictive analysis to identify requests that could violate a service level agreement is another possibility. All these functions are expected to find their way into the IT service desk over the next few years.

Chatbots: first AI applications in practical use

Some companies are already using the first AI-based applications in practice in the form of chatbots and virtual support assistants: context-specific chatbots, for example, already support users during simple IT service desk operations. These include crea-

ting a new ticket, requests for new hardware or software, or even password resets. However, in order for the virtual assistants to develop into a noticeable relief for technicians when it comes to simple queries – and eventually become the first point of contact between users and the helpdesk – they need two things: access to as much data as possible and time to learn.

Als are only as good as their database

AI algorithms and applications are based on available, documented knowledge and historical data. This means that AI is only as effective as the analyzable information on which it is based. For ITSM this means that well-documented problem solutions, workarounds, knowledge base articles, and well-maintained historical data must be available for AI-based models. For example, an AI-based categorization or prioritization model requires a database that has been created and maintained according to the above criteria; this database must also contain important parameters such as request type, service level, impact, urgency and location.

In addition, AI-based models cannot be applied in all cases. A particular model may work for one company, but not for another. Categorization and prioritization models are trained with a specific dataset and only work for the company from which the information originates. The models also require live data in order to learn continuously. This is the only way to make them more accurate and efficient over time.

Conclusion

The first AI applications are currently being deployed in the real world and are having to be “trained” with a great deal of effort. Therefore, at the moment they are more suited to special fields. According to ManageEngine, it will probably still be some time before AI significantly changes the work of IT departments. However, due to the huge potential of AI-based applications, IT departments should use the time to prepare and properly document all requirements, issues, and changes today. It is also advisable to maintain an accurate IT service desk database and establish a regularly updated knowledge database. This means that IT teams will be optimally prepared to really benefit from the advantages of AI in ITSM.

White Paper

„The AI advantage: Use cases and scenarios on how AI will redefine the way IT service desks work“

The complete white paper (in German) with further application scenarios can be downloaded free of charge from:

www.manageengine.de/ki-im-servicedesk

ManageEngine Product News

User Behavior Analytics (UBA), Unified Endpoint Management (UEM), and Backup & Recovery for Exchange Online: these are the most important innovations and new features of ManageEngine's products.

TEXT: Editorial Staff PICTURES: © ManageEngine, © Marcello Bortolino / iStock.com

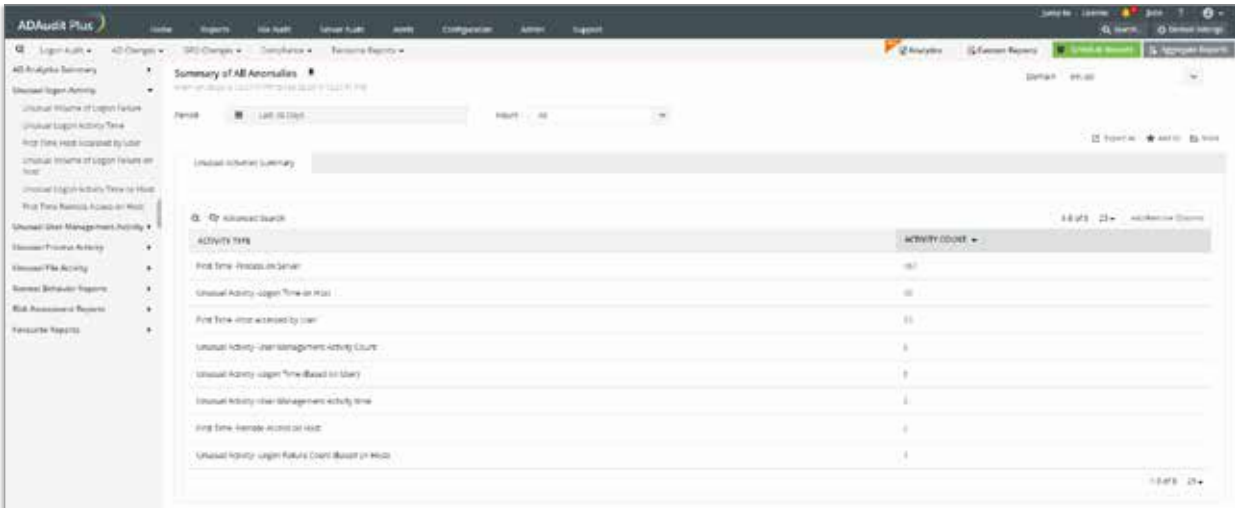
Detect internal threats with ADAudit Plus

Protecting the corporate network from internal threats is not an easy task for IT departments. The challenge here was that in order to be able to identify anomalies in user behavior at all, it is first necessary to define what behavior is "normal" for a particular

user – the baseline, so to speak. Solutions with functions that analyze user behavior help here.

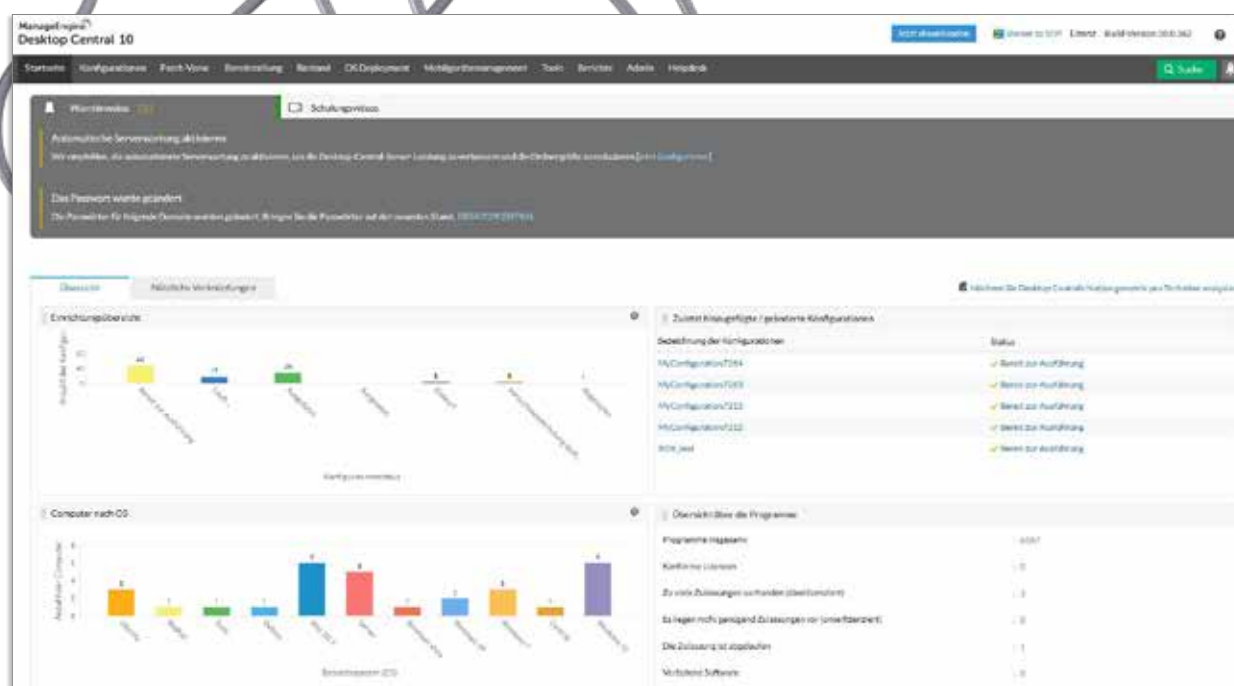
ManageEngine has enhanced the current version of ADAudit Plus, ManageEngine's auditing solution

for Active Directory (AD), to include a User Behavior Analytics (UBA) feature. These analysis reports help IT teams better identify internal threats while reducing the number of false alarms.



ACTIVITY TYPE	ACTIVITY COUNT
First Time Password Reset	10
Unusual Activity - Login Time on Host	10
First Time User Accessed by User	10
Unusual Activity - User Management Activity Count	1
Unusual Activity - Login Time Based on User	0
Unusual Activity - User Management Activity Time	1
First Time Remote Access on Host	0
Unusual Activity - Login Failure Count Based on Host	1

1 The analysis capabilities of ADAudit Plus enable IT administrators to better identify internal threats.



2 With Desktop Central's UEM Edition, all endpoints can be managed centrally with a single solution.

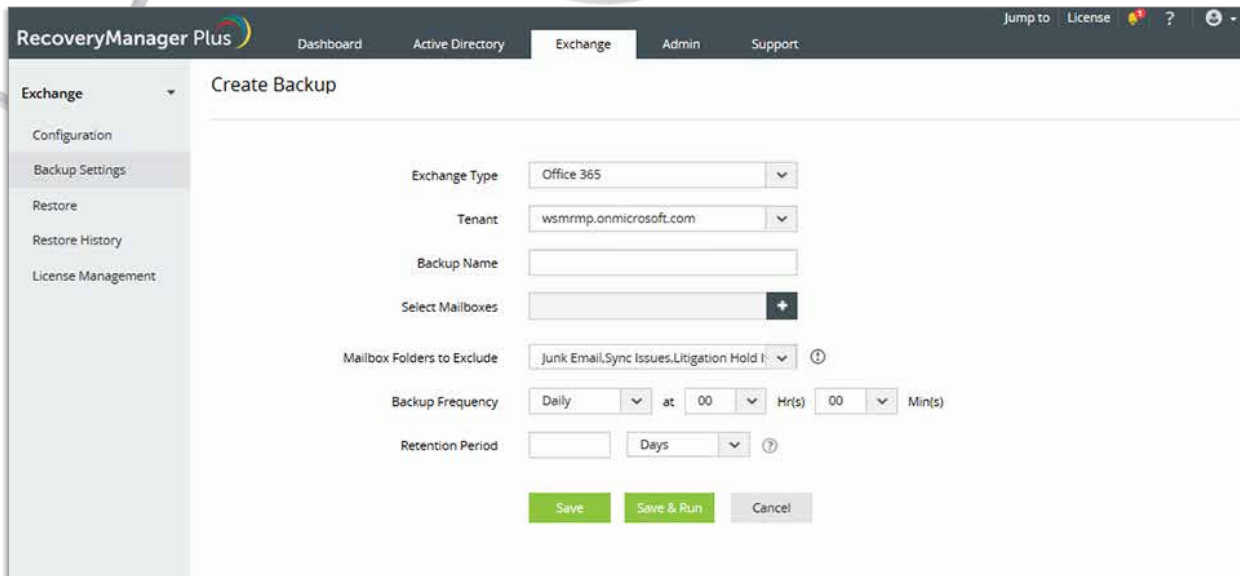
New edition of Desktop Central for Unified Endpoint Management

With the increasing number of endpoints in the company, the number of device types used is also constantly increasing. This trend also makes it more difficult for IT departments to manage the various licenses for PCs and mobile endpoints. Since February, ManageEngine has offered companies a simple and flexible way to manage all types of endpoints – servers, desktops, laptops, tablets, and mobile devices – with a

single solution in the form of the UEM edition of Desktop Central. The new edition combines desktop and mobile device management features, Windows operating system deployment, and modern management functions for managing Windows 10 devices under a single flexible license.

With its new offer for an all-inclusive price, ManageEngine above all

provides more transparent licensing for companies wishing to use the full scope of features of Desktop Central: instead of having to add up the costs for the edition and for different add-ons as previously, the total price can now be determined at a glance.



3

RecoveryManager Plus makes it easy for IT administrators to back up Exchange Online accounts.

Backup & recovery for Exchange Online with RecoveryManager Plus

Many companies have outsourced their email inboxes to the cloud and are using Office 365 as their email platform. While Exchange Online provides comprehensive storage and archiving capabilities to meet regulatory and compliance requirements, the solution does not provide sufficient backup and recovery capabilities.

ManageEngine closes this gap in the current version of RecoveryManager Plus: the backup and recovery so-

lution for Active Directory now also backs up Exchange Online mailboxes and restores them as needed. This allows companies to back up all Office 365 mailboxes and securely store them on-premises on the local network. With a point-in-time restoration feature that Office 365 does not offer, administrators can restore entire email accounts or individual items precisely when needed. The solution also provides the ability to set custom retention policies for backups to meet specific regulatory requirements, for example.

Free Trial Versions

Further information on the products presented here and free 30-day trial versions are available using the following links:

- » **ADAudit Plus:**
<https://www.manageengine.de/adauditplus>
- » **Desktop Central:**
<https://www.manageengine.de/desktopcentral>
- » **RecoveryManager Plus:**
<https://www.manageengine.de/recoverymanagerplus>

Only Flying is Better

Every two years the sportspeople of the TSV Jetzendorf gymnastics club impress with a superlative gymnastics show. In 2019, the amazed spectators again asked themselves: How can this show ever be topped?



In Germany, the here translated slogan “Only flying is better” comes from a 1968 advertising campaign. Had it not been created back then, it could have been spontaneously conceived during the 2019 edition of the TSV Jetzendorf gymnastics show: for over two hours, it seemed the 100 or so athletes spent more time in the air than on the ground. From the very little ones, who can’t yet run properly, but who are already busy doing gymnastics, to the “seniors” (in competitive sports: 30+), whose active competition days now lie behind them – all participants offered the 1,700 spectators a truly breathtaking and thrilling show.

All in all, around 280 people took part in the gymnastics event. This is pretty much the same as the number of employees currently working for MicroNova. Therefore, everyone in the company is aware of the effort the club puts into the show. Our MicroNova teams work passionately all year round on many customer projects – volunteering for two years to “merely” work on four performances is simply a huge achievement.

All the more impressive is the fact that the level of professionalism of the gymnastics show is steadily increasing. There was a multitude of activities beyond the actual gymnastics exercises, from specially shot videos with clever special effects to self-composed music and a script for a framework story.

There are definitely parallels between an event like the TSV Jetzendorf gymnastics show and MicroNova as a commercial business – such a captivating result takes more than “just” gymnasts or developers. People with passion and skill are needed, people who have the will and perseverance to work towards a major goal. We will continue to promote this commitment among TSV sportspeople in the future because we ourselves identify with it. And we’re already wondering: how are they going to top this show in 2021?

80 Years of MicroNova

Five employees are currently celebrating their company anniversary. We would like to thank everyone for their commitment and team spirit!



As a resident of Jetzendorf, where MicroNova was originally founded, it was almost a given that **Martin Demmelmeir** would join the software and system vendor – following in the footsteps of many other long-time employees. Studies in print and media technology at the Munich University of Applied Sciences are what underpinned his work in the ManageEngine team, with a final thesis on the topic of user-friendliness. Martin has been an active member of the Support & Consulting team since 2009. Other

helpful building blocks include his previous training at Siemens as a communications electronics engineer and his fascination with anything remotely computer-like: even during his school days, he enthusiastically got all he could out of his “Schneider Euro PC” with its 8088 processor – reflecting a love of technology that remains undimmed to this day. Martin’s musical talent has similarly thrived, as demonstrated by the annual appearance of the “Novalärm” MicroNova band at the company’s Christmas party.



Dietmar Gauder, from the Telco Solutions team, has also been working for MicroNova for 20 years. It all started with an answer to a job advertisement, right after completing his studies at the University of Stuttgart. Since then, the graduate engineer has worked on many telecommunication projects at MicroNova – from connection management, the relief of network management servers and automatic routing for multiservice networks right up to his current tasks relating to COM5.

Mobile. Dietmar Gauder finds balance in fitness and endurance training. Here, too, he has contributed his qualities to MicroNova, namely to several corporate running events (B2Run). Other hobbies include podcasts from fields of science, media criticism and politics.



Even a Board Member has to start “small” – and **Orazio Ragonesi**, who comes from the “MicroNova land” halfway between Munich and Ingolstadt, did that here in the company. After studying computer science at the University of Applied Sciences in Munich, his career took him from Marketing and Sales (1999) to Head of Automation – now Testing Solutions – (2004) and Deputy Board Member (2009) and Board Member (2015) and finally CEO (2016); he is also Managing Director of the MicroNova subsidiary cz.MicroNova s.r.o. and its sister company ks.MicroNova GmbH. In 2001, he completed a postgraduate MBA (Industrial Marketing & Technical Sales). During his tenure, the Automation Division grew from eight employees to its current total of more than 160. The passionate keyboard player could have had a career as a professional musician – a talent he now brings to the company’s Christmas party as the band leader of “Novalärm”.



Michael Schläfer joins the club of MicroNova employees celebrating twenty years of service in 2019. The multi-talented Vierkirchen native has been working for the company since 1999: first in the Telecommunications division and since 2003 in Automotive Testing. Alongside two colleagues, he is one of the spiritual fathers of the EXAM test automation solution, which MicroNova develops together with AUDI and the Volkswagen Group. He has remained loyal to this project ever since – as well as to “Novalärm”. He has already enriched MicroNova’s in-house band with harmonica, trumpet and conga drums. The multi-instrumentalist is also active in a trombone band and two choirs. All of which makes it all the more astonishing that the computer scientist also finds time for rollerblading and cycling!



Susanne Brauneck’s biography could be called “The Bavarian American Way of Life”: after residing in the USA from 1992 to 2004 – including starting a family and founding a company with her spouse in the aviation industry software field – she returned to Bavaria. Her new home: Vierkirchen. There, she started her own business in 2007, namely for “Office Management & Services”. In the course of this work she met a certain Josef W. Karl, who hired her for the ManageEngine team of his company MicroNova – and the rest is history: Since 2009, Susanne Brauneck has been working for and with MicroNova in the Enterprise Management/ManageEngine division. When not busy with this, she is looking after her family, working on her golf handicap or, in the all-American lifestyle tradition, finding balance in playing a game of bowling or pool.

A Need for Balance

The voice from the Supervisory Board:

In conversation with Josef W. Karl



Josef W. Karl is founder as well as sole shareholder of MicroNova and leads its supervisory board as chairman.

InNOVation: 2019 has so far been marked by a great many topics with considerable potential for change...

JwK: That's totally correct and applies to topics relating to both MicroNova as well as other fields. Autonomous and electric vehicles, digitalization, artificial intelligence, fifth generation wireless technologies (5G), and the Internet of Things (IoT) are of course topics relevant for us. Now more than ever before, we need to show our innovative strength and be a reliable partner for our customers. However, there are so many more topics. I'm thinking here of 3D and bio printing of skin cells through to entire organs, as well as of robots for a broad spectrum of applications or also stem cell research. I have seldom seen so many topics for the future in the course of my career.

InNOVation: How can we deal with them?

JwK: A great many things will change in the coming years. On the other hand, it certainly won't happen as rapidly as it is currently discussed in the press – and as rapidly as some may like. And that's also probably a good thing as there are so many unknown factors. I recently read a statement made by Alejandro Vukotich, who is Head of Driver Assistance and Autonomous Driving Development at BMW. The gist of what he said was that

all development work was taking place in unknown territory. Nobody even knew exactly how extensive the challenges would actually be. They were first being broken down into bite-size chunks. And that this was one of the most complex problems humans were currently tackling. The upshot for me is that such major changes need time, both in terms of technology as well as in terms of society. People need to be able to adapt, and a high quality development must be granted.

InNOVation: How far do people need to be able to adapt?

JwK: Let me give you an example. On the one hand, people are afraid that robots and computers will one day take over. On the other hand, this type of technology can yield great benefits, from healthcare and mobility to environmental protection. There are fears on both sides, although one would be the key to the other. It will take time to solve these types of paradox. During the process, there is certain to be the odd unexpected twist or other, as I don't think we can just speak of technology. Moral or ethical debate will be required. When people gradually notice what this can cause, some of the euphoria may very well turn into resistance, as so often, leading to delays, which will also result in development times for the sometimes incredibly complex thing taking much longer.

InNOVation: Does that actually affect MicroNova?

JwK: Definitely. Let me give you another example. Hannah Fry is a mathematics and associate professor at University College London, one of the top British universities. Autonomous driving is a big topic for our customers and therefore also for us as testing experts, and Hannah Fry wrote an article in the Handelsblatt newspaper in which she explained in detail why she is skeptical about this particular technology – because of the environment, which cannot be precisely predicted. An algorithm cannot solve the problem of suddenly having to swerve onto the sidewalk to avoid an oncoming ambulance, but only ever in this situation. According to her, it is impossible to program the sum total of all complex scenarios. I don't know what advances artificial intelligence will make – perhaps that will be the solution someday. Some things will take a very long time and some things will not be feasible in the foreseeable future. One thing is certain – whatever paths manufacturers take, we will provide test solutions for them.

InNOVation: What does that mean for MicroNova's future in this complex world with its many new challenges?

JwK: We need to take a very close look and choose the right topic at the right moment. Here, I'm thinking for example of the air taxi debate that has currently blown up out of all proportion, whereas the demo air taxi at the world "premiere" of the CityAirbus didn't even work properly... I doubt whether that can be solved even before the major challenges of autono-

mous driving. There's also a lot of talk about 5G even though not all standards have been decided on yet. These issues are highlighted very well in the article on page 20. Like many others, we learned the lesson in the past about how challenging it is to make the right decisions. In over 30 years we have been able to enjoy a great number of wonderful successes, but there were of course also topics that didn't take off as expected. It's always a bit of a balancing act. For me this means taking great care when considering

things that the business risk does not end up affecting our employees. We wish to remain a secure and reliable employer – this is one of our major advantages compared with companies that work focused on dividends and quarterly results. The Executive Board works very well together with me as owner and Supervisory Board Chairman. I am very confident about the future, as we have managed this task so well as a company over the past three decades.

New Employees

MicroNova is buzzing! Two bee colonies have received their own new building in Vierkirchen.

The idea for "MicroNova is buzzing" dates back to 2015: later, during construction in 2018, a flower meadow was laid instead of a lawn. Since early April 2019, two colonies have been collecting nectar within their usual flight radius of three to four kilometers. "Depending on vegetation growth, this can be between ten and 50 kilos of honey per colony," explains beekeeper Philipp Blumenschein. The first yields went into building the colony, but in May 2019 – after our editorial deadline – the first "MicroNova Honey" should be ready in Vierkirchen.

"It's not just buzzing in the company, it's humming too. The bees are another small investment in nature and the site that we really like to make. This is a plan devised way back by our owner Josef W. Karl," explains CEO Orazio Ragonesi. "When the cherry blossoms



come, that's when MicroNova really will be buzzing," adds Josef W. Karl. "Our own flowering meadow between the two buildings will certainly be well visited in summer."

There will also be a raffle towards the end of the first "bee season": More information will be available in autumn at www.micronova.de and www.facebook.com/MicroNova.

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