InNovation

Customer Magazine of MicroNova

MicroNova
Software and Systems

Error-free Test specifications

New Specification Editor for
EXAM Test Case Generator (TCG)

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digital company

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will change 5G networks

Secure end devices

ManageEngine solution protects computers
of a child and youth welfare facility

Finding the right balance

Dear Reader,

The larger the project and the larger the company make it all the more difficult to find the right balance between the factors that influence decisions, as the number of variables increases, and their interrelationships become more complex. The supply chain issue can still be a warning to us, as can geopolitical conflicts; critical factors also include regulatory frameworks, technological risks and so on.

Achieving the right balance is therefore one of the most challenging tasks for all of us, both personally and professionally, as well as for the economy as a whole. We need to weigh up carefully which opportunities we should seize, which projects promise long-term success and which markets and geographical regions are likely to be reliable partners – by also looking at the long-term and "wider" effects. This goes for MicroNova, for our customers and for every company the world over.

So, I am all the more pleased that we have been able to take a number of important decisions since the last issue of InNOVAtion to realize projects that you can now read about. The Testing Solutions area, for example, reveals how two MicroNova tools can be used to produce error-free specifications when preparing directly executable tests. This issue also offers information about the events where you can find us as well as an assessment of cyber security… once again, there's no shortage of topics.

This holds especially true for contributions from the Enterprise Solutions division. Our short guide to successful digitalization is backed up by two reference stories from satisfied customers – one about ManageEngine's IT management solutions and the other about project management with monday.com.

The Telco Solutions division has produced an article on the technological future of the mobile communications world – including the impact of AI-led innovations on network slicing, for example.

Since the start of the year, MicroNova has had a dedicated Consulting division. Its roots lie in testing, but its activities already go far beyond this. We expect to include the first contributions from the team in the next issue of InNOVAtion.

Our Integrated Management Systems (IMS) department provides insights into our current successes relating to our TISAX certification. And this issue also ends with a word from the Supervisory Board, written by MicroNova founder Josef W. Karl.

I am convinced that we have found the right editorial balance with this agenda.

Now once again I hope you enjoy reading the magazine and I wish you health and, of course, a peaceful future.
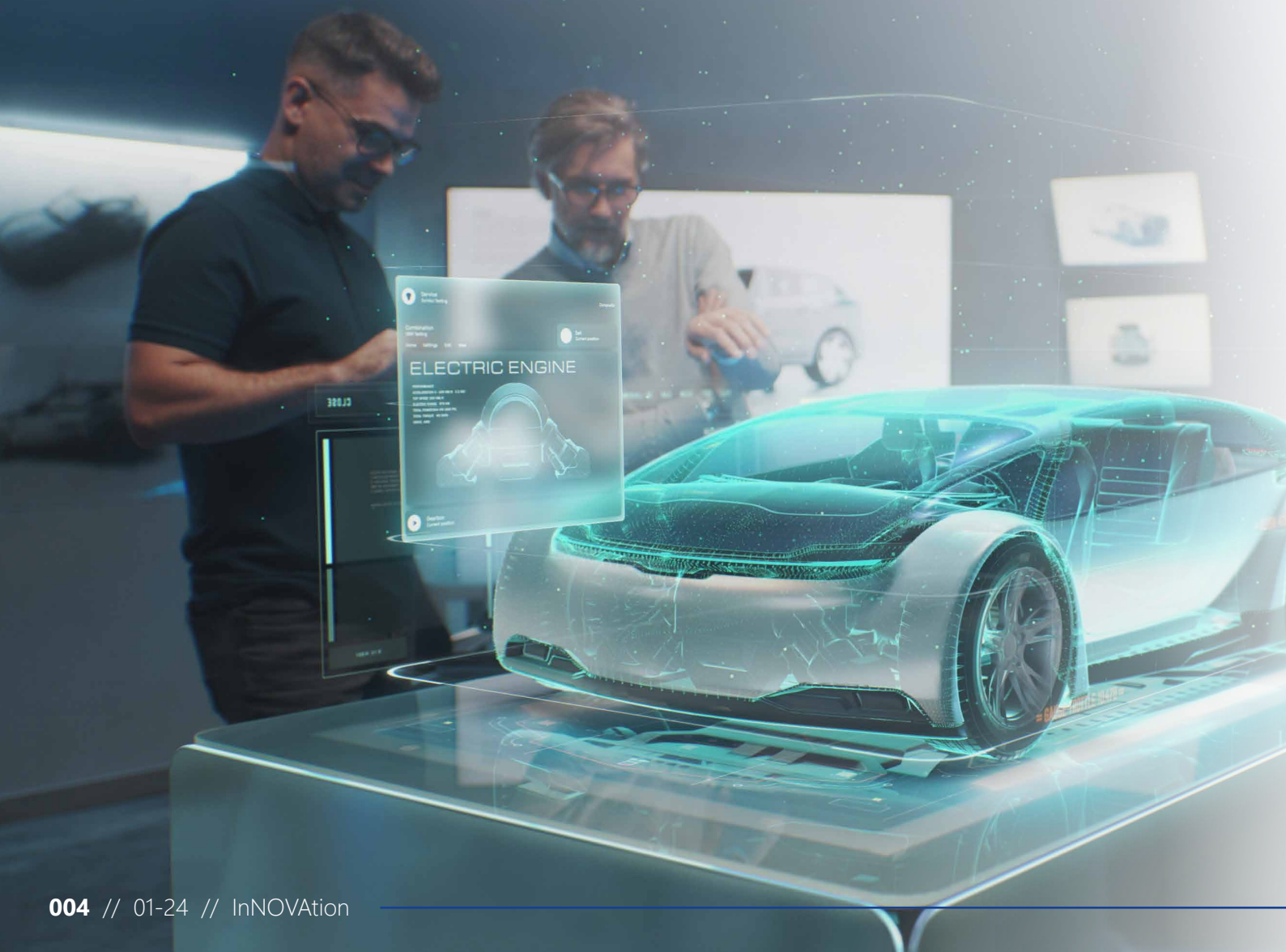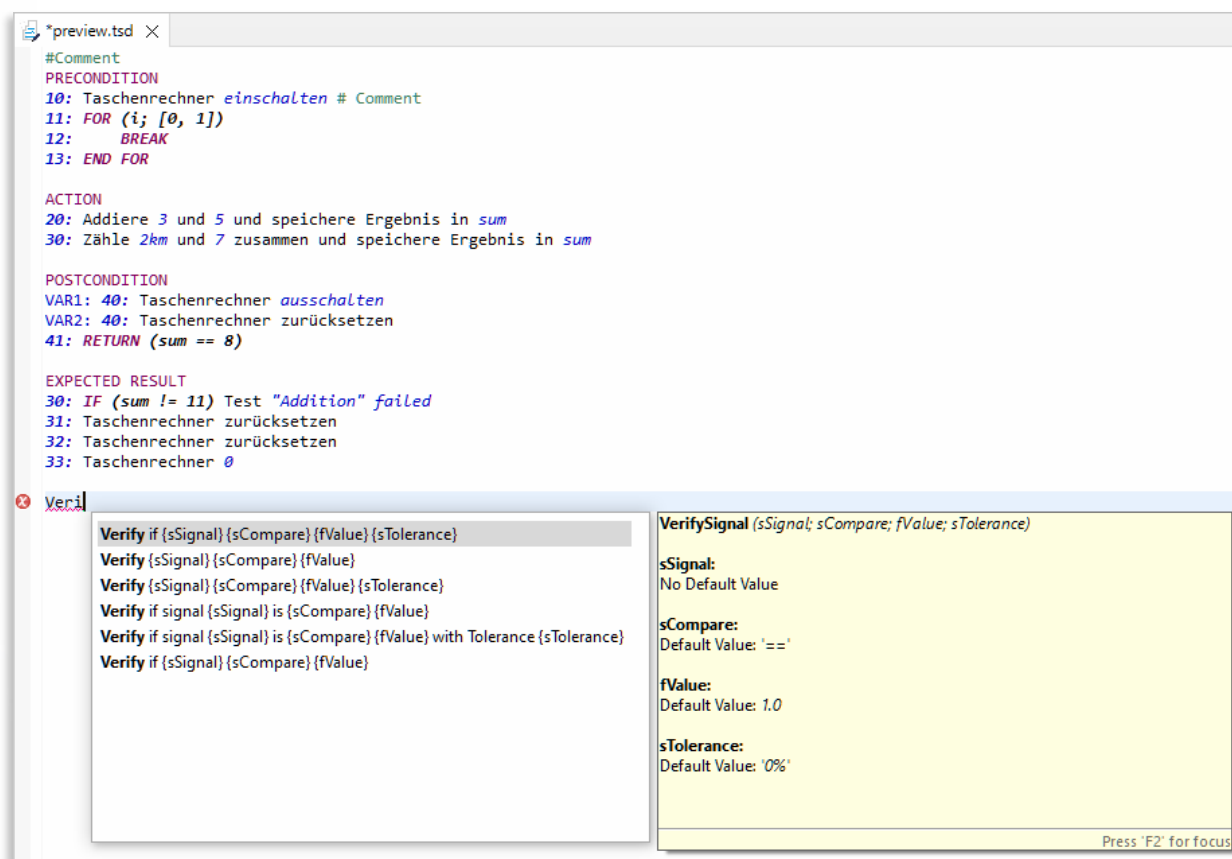
Orazio Ragonesi

Better together!

Fast, reliable, EXAM: The combination of Test Case Generator (TCG) and TCG Specification Editor (TCGSE) helps create directly executable tests with error-free test specifications.

TEXT: Melanie Garbade   PICTURES: © Framestock / Stock.Adobe.com; © MicroNova

```
*preview.tsd   ×
#Comment
PRECONDITION
10: Taschenrechner einschalten # Comment
11: FOR (i; [0, 1])
12:     BREAK
13: END FOR

ACTION
20: Addiere 3 und 5 und speichere Ergebnis in sum
30: Zähle 2km und 7 zusammen und speichere Ergebnis in sum

POSTCONDITION
VAR1: 40: Taschenrechner ausschalten
VAR2: 40: Taschenrechner zurücksetzen
41: RETURN (sum == 8)

EXPECTED RESULT
30: IF (sum != 11) Test "Addition" failed
31: Taschenrechner zurücksetzen
32: Taschenrechner zurücksetzen
33: Taschenrechner 0

Veri
```

Verify if {sSignal} {sCompare} {fValue} {sTolerance}	**VerifySignal** *(sSignal; sCompare; fValue; sTolerance)*
Verify {sSignal} {sCompare} {fValue}	**sSignal:** No Default Value
Verify {sSignal} {sCompare} {fValue} {sTolerance}	**sCompare:** Default Value: '=='
Verify if signal {sSignal} is {sCompare} {fValue}	**fValue:** Default Value: *1.0*
Verify if signal {sSignal} is {sCompare} {fValue} with Tolerance {sTolerance}	**sTolerance:** Default Value: '0%'
Verify if {sSignal} {sCompare} {fValue}	

Press 'F2' for focus

1 New in the TCG: The Specification Editor for error-free generation of test specifications.

Short product cycles coupled with a large number of variants in vehicle development are constantly increasing the need for component tests and valid results. This is why the EXAM Test Case Generator has been assisting engineers to implement test cases for the validation of electronic control units since 2017.

The plug-in for the EXAM test automation solution was developed by MicroNova to allow test cases to be created automatically using keyword-based syntax in the test specifications. The past few years have shown that this significantly increases the efficiency of the testing process. In order to further optimize the reliability of the TCG, its developers have now eliminated a possible source of faulty test cases: If the specification, i.e. the basis for automatically generating "Test-Cases", already contains an error, it is very unlikely that an executable test case will be created. This could simply be due to a typing error or because of missing parameters or keywords. The TCG has therefore included the new Specification Editor (TCGSE) since version 2.0.5 (latest version 2.0.6). The tool supports users in creating test specifications that are TCG-compliant.

Using TCGSE and TCG together therefore results in a standardized and clearly structured approach that significantly reduces the maintenance effort for test cases: traceability, comparability and, reproducibility are significantly improved. This benefits companies from all sectors when testing control units and software. The solution offers considerable savings potential in terms of time, effort and costs – while at the same time increasing quality and test coverage.

Creating test cases automatically

As mentioned above, the basis for generating a test case is its particular specification. This is created in an appropriate tool and then synchronized with EXAM via a corresponding interface using the TestSpecSynchronizer. An initially empty test case is first set up in EXAM using the synchronized test specification as a description.

The TCG understands the description as a sequence of commands, with each line being considered individually. A mapping between commands and EXAM operations then automatically
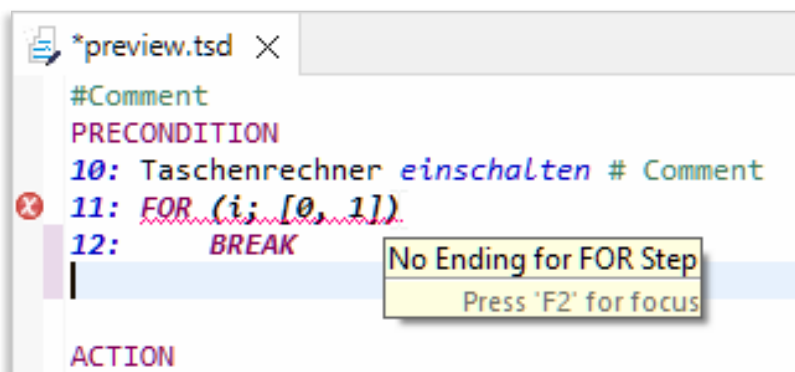
2 Error - The TCG cannot generate this TestSpec.

implements the test case in the form of a sequence diagram. Errors are precluded at this point as the specification does not need to be interpreted. The consistent structure of such automatically generated diagrams ensures that test runs are both traceable and comparable, in this way making a significant contribution to quality assurance.

For this purpose, the TCG is based on proven EXAM concepts such as Shortnames and TestCaseStates and therefore provides many convenient functions that simplify the assignment and processing of test cases. User feedback is also used to continuously improve the TCG and add practical new features to the tool. This allows all interaction frames currently available in EXAM (branches, loops, termination conditions, etc.) to be used. The TCG also recognizes units of measurement and converts them when necessary. The use of enums is also straightforward. Furthermore, generation can also be started just for test cases with certain states, which significantly speeds up the entire process, as manual pre-sorting is no longer required. It is also generally possible to control the TCG remotely via the REST API, whereby the generation can be started automatically after each sync of TestSpecs. These are just a few of the features.

Centralized and specific command assignment

When test cases are created using the TCG as described above, the command mapping, i.e. the aforementioned assignment of the command lines contained in the test specification to the desired operation, is performed centrally in the EXAM model. In this step, text modules (commands) contained in the specification are mapped to operations from the EXAM libraries, preventing potential misinterpretation during implementation and thus ensuring better test quality.

Test specifications as a starting point

The mapping of test specification and operation in the TCG is performed automatically, but only works with standard-compliant and error-free specifications. For example, spelling or typing errors and inaccuracies in the structure of loops can lead to errors when creating test cases using the TCG. In the past, these types of error had to be identified and fixed manually by the relevant test engineer (implementer) in order to then launch a new generation process.

To prevent this and reduce the time lost due to troubleshooting, Micro-Nova has developed the Specification Editor, which is now available in the latest version as part of the Test Case Generator. The text editor offers functions for auto-completion and error highlighting, thereby helping to prevent incorrect test cases before they occur. Existing mappings that are to be used for subsequent generation can be imported so that the editor can then offer the relevant commands for auto-completion. All the sections that would subsequently trigger errors during generation are automatically highlighted in red, since the editor also recognizes the InteractionSteps.

In addition, the editor highlights areas for which it added a "comment" in yellow. The user is therefore made aware of lines that might be interpreted differently. This might be, for example, a single apostrophe, an empty InteractionStep or text in an
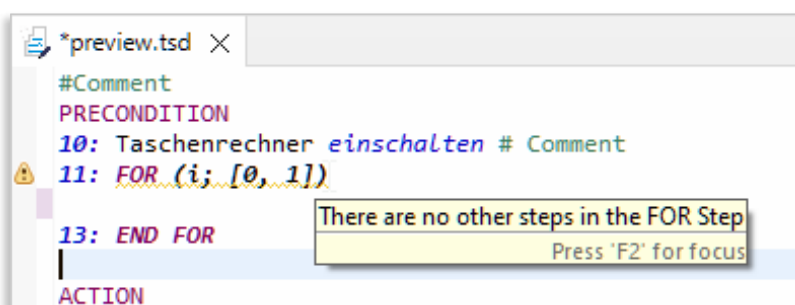
3 Warning - No error during generation, but probably not intended by the test specifier.

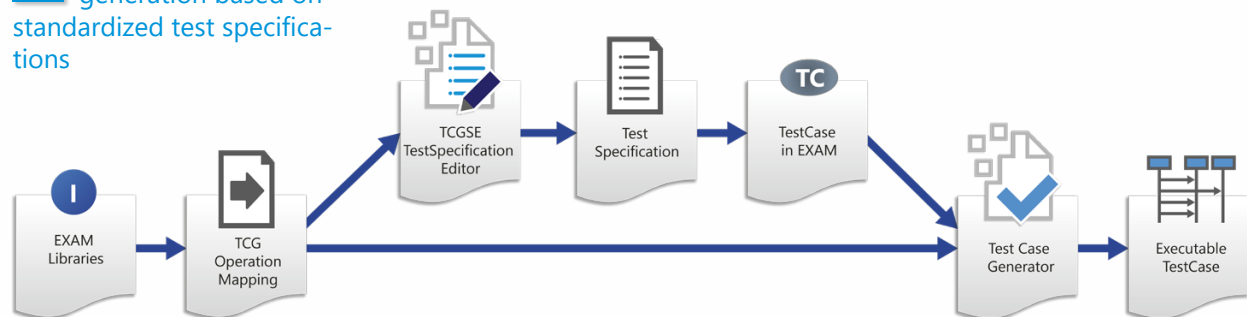unusual position. The TCGSE also provides an overview of existing default values and enums. (See Fig.4)

Efficiency and quality improvement

Combining the Test Case Generator and Specification Editor therefore delivers reusable standardized test specifications that can be implemented in seconds and which generate directly executable test cases. These tools enable development departments to react very effectively to the increasing rate of change in functional development. Always using the same implementation for the same commands provides better comparability of the test results, which in turn means higher quality. This is borne out by the high level of satisfaction among EXAM users, and we at MicroNova will continue to work on further improvements.

4 Automatic test case generation based on standardized test specifications

EXAM Libraries → TCG Operation Mapping → TCGSE TestSpecification Editor → Test Specification → TestCase in EXAM (TC) → Test Case Generator → Executable TestCase

EXAM

Efficient testing with NovaCarts 6.4

Latest version of the HiL software with extended import options, new writer concept and web-based user interface

TEXT: Editorial staff   PICTURE: © Pavel Chagochkin / Shutterstock.com

In the latest version 6.4 of its Nova-Carts operating and control software, MicroNova provides development engineers with new capabilities for testing electronic control units. The new release of the HiL software offers improved import options, a new writer concept and a web-based user interface to increase the user-friendliness and efficiency of test processes.

Enhanced import options for automated tests

One of the focal points of the development of NovaCarts 6.4 was the expansion of import options for models into the test environment. Thanks to a new import tool for the Functional Mock-up Interface (FMU) according to the 2.0 standard for Linux 32- and 64-bit simulations, models can now be seamlessly integrated into the test environment. These extended import options facilitate the exchange of models during the various development stages (MiL, SiL, HiL) and also enable data communication with real components in a HiL system.

New writer concept and improved simulation performance

To further optimize simulation performance, a new writer concept has been introduced that enables and displays parallel write accesses without blocking them. This allows several users to register and write to a variable at the same time, which significantly increases the efficiency of the test environment. In addition to the extended import options for ARXML files, NovaCarts 6.4 supports the new CDFX format for the ASAM-standardized description of simulation parameters.

Web-based user interface for more flexibility

The NovaCarts 6.4 GUI offers a web-based user interface. This allows users to access running test projects via the browser. Not only does this make work easier, it also saves time and increases the resource utilization of the test benches. The web application also provides diagnostic options such as val_show, tableWatch and logs.

„The new features in NovaCarts 6.4 have been developed and integrated in close collaboration with our users. Our goal is to ensure that NovaCarts test systems continue to stand for efficient and high-quality testing."

– Gregor Axt, Director Testing Solutions, MicroNova

Licensing simplified with the Reprise License Manager

From version 6.4, NovaCarts software can be licensed using the "Reprise License Manager" tool in addition to the classic licensing process. The local and cloud-based management solution now gives users a complete overview of used and free licenses. A web interface provides an oversight of license status and usage with just a few clicks in the browser.

With NovaCarts 6.4, MicroNova sets a new standard for efficient testing in ECU development and offers development departments innovative solutions for their test processes. ■

MicroNova live!

The event season has got off to a successful start and we were delighted to welcome many of you to our trade fair participations at the Automotive Testing Expo in Stuttgart and the VDI Conference in Munich. In the second half of the year, you can meet MicroNova's testing experts and consultants in person at the following industry events:

ELIV – Electronics in Vehicles
World Conference Center, Bonn
October 16-17, 2024

Meet MicroNova at ELIV in Bonn and find out about our extensive portfolio of innovative test systems and our consulting services: Functional safety, modeling, virtual ECU, AI and cyber security are some of the focus topics.

Safetronic - International Conference on Holistic Safety for Road Vehicles
Schwabenlandhalle, Fellbach near Stuttgart
November 13/14, 2024

The international conference is dedicated to road vehicle safety and all related aspects, including functional safety, SOTIF and cyber security. Our consultants will be happy to discuss your individual challenges in these areas – and how we can find a tailor-made solution.

12. Internationale Zuliefererbörse (IZB)
Wolfsburg
October 22-24, 2024

At the International Suppliers Fair, suppliers to the automotive industry have been showcasing a wide range of automotive innovations since 2001. Learn more about our comprehensive range of solutions for your current testing projects!

Further events, webinars and presentations will be added to our schedule on an ongoing basis.

Visit our website at:
www.micronova.de/testing-veranstaltungen

5 Steps to Becoming a Successful Digital Company

MicroNova supports companies on their path to effective digitalization: from preparation and planning to software implementation and the continued development of automated workflows.

TEXT: Oliver Kraus   PICTURES: © tippapatt / AdobeStock.com

"Digitalization" has been a buzz-word for decades. The potential and necessity of digitalized and automated business processes are undisputed. However, their practical implementation is fraught with uncertainties and question marks for many companies and therefore progress is slow.

This hesitation is unfounded. Such a project can be broken down into logical – and very achievable – steps using a planned, structured approach and can quickly lead to tangible improvements. MicroNova provides companies with the necessary expertise in software solutions, process optimization, and successful implementation in day-to-day operations in a step-by-step process.

A team that pulls together is also essential for a successful project. Discussions with and surveys of future key users provide a concrete picture of their wishes, fears, requirements and level of knowledge. The early involvement of all stakeholders also builds trust and motivation – especially if management communicates regularly and transparently, demonstrating that it is fully behind the digitalization project.

It is rare for a company to already have specialist knowledge of the technical and business aspects of process digitalization. This is why specialist providers offer support with the necessary expertise relating to software solutions, process optimization, and the implementation of digitalization projects. In its role as an external partner, MicroNova analyzes individual use cases and works with customers to achieve the best results from their processes.

1. Identifying the Current Status

What is the starting point?

An inventory starts by focusing on the status quo of the company's own IT infrastructure. How up-to-date and efficient are existing technologies and systems? What tools are available and where do they overlap? This stocktaking and evaluation provide the essential basis for further strategic decisions.

A close look at established processes also forms part of the analysis. The visual representation of business processes, for example in the form of diagrams and flow charts, highlights the individual steps of a process, revealing their interconnections and dependencies. As a result, bottlenecks and inefficiencies can be identified in the processes. This creates a shared understanding of existing workflows, providing the basis for identifying opportunities for optimization, digitalization, and automation – because only a good process can be a good digital process.

2. Setting Goals

What needs to be achieved?

Successful process digitalization also means setting goals. The focus here is on current weaknesses and the necessary improvements.

Digitalization goals, for example in terms of increased efficiency, reduced costs, and increased sales, become more helpful the more specifically they are formulated. Key performance indicators (KPIs) define the essential performance metrics and make the success of digitalization activities measurable.

Setting priorities is also helpful. Which goals have priority and which processes are most relevant for operations management and the economic outcome? These core processes need to be tackled first in order to quickly achieve noticeable improvements in terms of efficiency, quality, flexibility, etc.

3. ResourcePlanning

What technical and personnel requirements arise from the project?

Choosing the right software is a crucial factor for success. Relevant criteria are functionality, user-friendliness, the possibility of integration into the existing system environment, data protection issues as well as a convincing cost-benefit ratio. Especially important for the future are flexible and scalable tools that can be easily customized and grow with the company. Prototypes can be trialed directly in operation during a test phase.

Requirements planning also includes assessing existing knowledge within the team. This allows companies to assess the extent to which they need to close existing gaps through further training, new hires, or collaboration with external partners.

4. Calculating Costs

What are the costs of the project, including IT infrastructure, personnel costs, and further development?

The direct costs are generally transparent and easy to plan. They mainly include expenditure on software and licenses, but seldom involve necessary modifications to the infrastructure, including new hardware. Costs for installation, configuration and integration of the systems as well as consultancy fees also need to be factored in – they naturally vary depending on the scope of the project.

This is also true for indirect costs, such as training, changes to processes and, depending on the system, any short-term productivity shortfalls during the implementation phase. Ongoing operating costs include, but are not limited to, maintenance and support fees as well as license renewals.

The bottom line is that costs for digitalization projects are generally moderate compared to other infrastructure projects. A detailed budget plan sets out the calculated items as well as an evaluation of various financing options such as internal budgets, loans, leasing models, and subsidies. It may well be worth taking advantage of one of the numerous state or regional initiatives designed to promote digitalization measures.

5. Implementing Measures

What needs to be considered during implementation?

The final phase involves the concrete planning and realization of software implementation, user training, and the mapping of digital workflows. An effective schedule provides clear deadlines and milestones. It also includes the allocation of personnel, technology, and budget resources for the various phases of the project. A certain degree of risk management is also worthwhile in order to identify potential pitfalls and plan appropriate strategies – investing just a small amount of time here can have a big impact.

Continuous coordination with external partners also helps ensure that the project meets requirements in terms of quality and objectives, and remains on schedule. Appropriate monitoring and reporting make performance measurable in relation to the defined KPIs.

Change management and internal communication also play a major role. Keeping employees regularly informed about the progress and objectives of the project as well as appropriate training and workshops promote a positive attitude towards change. In this way, companies can create a working environment that fosters innovation and further development.

Summary

Implementing far-reaching digitalization in companies is a multi-layered project. However, implementation is less complex than is sometimes suggested or expected. When tackled properly, it is possible to achieve tangible relief and measurable success quickly. It is worth taking a structured approach to the project from the outset and "sticking with it". After all, digitalization is an ongoing process that enables companies to adapt flexibly to market changes, thereby remaining truly innovative and competitive. ◼

Whitepaper by MicroNova

Benefit from our experts' knowledge and download one of our new white papers on testing. The QR codes lead directly to the download.

Functional safety:
ISO 26262-compliant self-tests of battery management HiL systems

The issue of functional safety not only affects vehicles and their components, but also the tools used in development and production. For this reason, the ISO 26262 standard contains clear specifications for companies in this regard.

This white paper provides you with a practical use case (HiL self-test) to find out how automotive manufacturers or suppliers can implement rule-compliant tool qualification in five steps.

Validation of software in medical engineering:
what the industry can learn from automotive (Only available in German)

The medical technology industry is undergoing a paradigm shift similar to that experienced by the automotive industry in recent decades: products need to be developed to the highest quality standards in ever shorter cycles while at the same time guaranteeing their reliability. To achieve this, medical engineering companies need to optimize their software tests.

Find out in this white paper what parallels can be drawn with the automotive industry and why it is suitable as a model for innovative verification and validation methods.

Just asking…

Andy Gudera, Consulting Expert, MicroNova AG

In the world of successful technology companies, compliance with rules such as EU regulations is often perceived as a burden: an administration adopts provisions which usually imply restrictions for commercial enterprises. So what is different about the CRA, the Cyber Resilience Act?

The aim of the EU and the CRA is to protect the general public in Europe from the now almost unmanageable potential threats coming from the Internet. The need for such a regulation is not only down to the fact that hacking activities – including those triggered by political conflicts – have increased in terms of both intensity and creativity. The level of Internet connectivity for a wide range of devices – from toasters to cars – also continues to grow.

And it is exactly the automotive sector where MicroNova comes into play: our core competence lies in test systems that ensure the reliability and safety of electronic vehicle components – and a meaningful enhancement of cybersecurity is therefore a logical consequence.

Brussels is calling on distributors of network-compatible products or software to meet harmonized regulations with regard to development processes and product life cycles. So what could be more appropriate than to bundle our capabilities ranging from technological expertise and testing in all conceivable forms to knowledge of components and expand our focus?

We can use our expertise to effectively support companies in meeting the new requirements.

Driven by various negative examples in the press, cybersecurity has not only caught on with the general public, but inevitably also with our customers. After all, the entire vehicle and all its control units are networked, not only within the vehicle, but also via various functions with the outside world, the Internet and other network-compatible devices.

The EU Commission's new CRA confronts our customers in the automotive industry with tasks that will affect their processes and work products and require new solutions from the ISO/SAE 21434, UNECE R155/156 and Automotive SPICE cybersecurity standards.

MicroNova's consultants can successfully support these tasks thanks to their many years of experience, their extensive specialist knowledge in the areas of standards and technology and their long-standing cooperation with various OEMs and system suppliers. We also have a broad network of experts and established partners for

specific issues or as an independent inspection body. For example, we recently entered into a strategic partnership with Autocrypt Co, Ltd, the expert in protecting vehicle communication systems against cyber threats

What links MicroNova with Brussels? The common fight against attacks from the global network on our cherished automobile. For us, the CRA is not simply an act of the nanny state, but rather a driver for harmonizing standards, automating documentation and reporting and providing tools for market surveillance.

We will make the seemingly threatening comprehensible and support you in successfully mastering the legal challenges. Feel free to contact us if you wish to strengthen your compliance strategy and optimize your cyber security.

Contact: consulting@micronova.de

The Future of Telecommunications: The Integration of Network Slicing, Service Management & Orchestration (SMO) and AI in 5G Networks

The connectivity and performance of mobile networks are set to improve dramatically, driven by 5G and the introduction of new technologies such as network slicing, service management orchestration (SMO) and artificial intelligence (AI), and this will revolutionize services and network management.

TEXT: Ingo Bauer   PICTURES: © MicroNova

The introduction of 5G ushered in a revolution in the world of wireless communication. This next generation of mobile networks not only promises a huge increase in speed and connectivity, but will also fundamentally change the way we communicate, work and live. The main advantages are the broad, flexible and diverse use of the frequency spectrum thanks to network slicing. This is only made possible by a fully automated, orchestrated network operation (SMO – service management orchestration).

Combining this with self-organized, closed control loops based on artificial intelligence (AI) will facilitate the introduction of quality-oriented and fail-safe services. The sections below explain how these technologies work and how they will benefit the industry.

Revolutionizing 5G Networks with Network Slicing

Network slicing is a groundbreaking innovation that maximizes the potential of 5G networks. Different use cases with different requirements can be catered for by personalized segmentation of the network into virtual "slices", with each slice acting as an independent network. Network operators can provide customized services for different industries and use cases, ranging from ultra-reliable communication for mission-critical applications to high-bandwidth multimedia operations. This also involves the optimized and efficient use of existing grid network resources to ensure sustainability and cost-effectiveness.
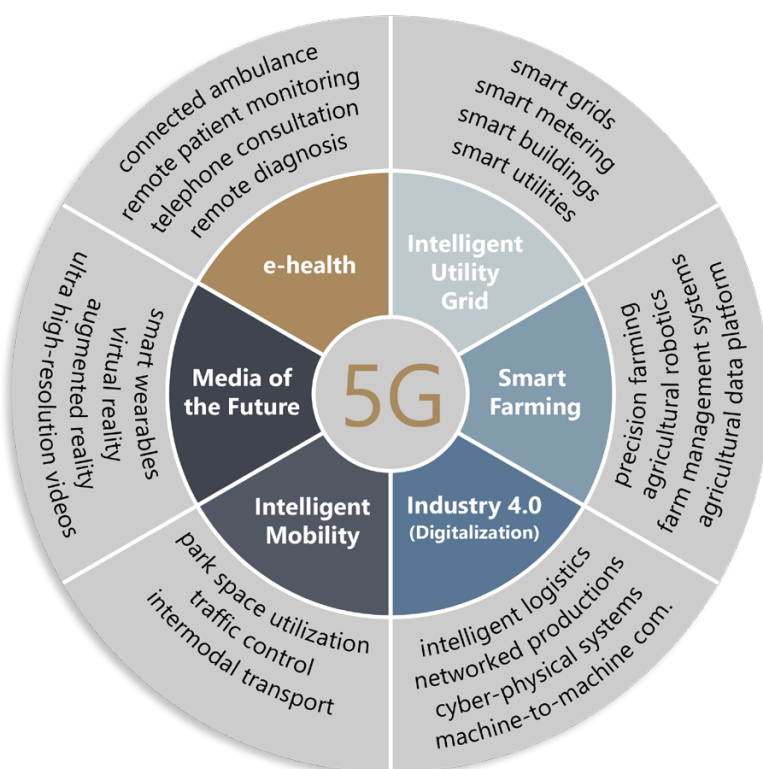
1 Application domains of 5G networks – use case-based utilization of the 5G network using network slicing
© Bundesregierung

The service management & orchestration architecture plays a crucial role in managing and orchestrating 5G networks and network slicing. SMO establishes a central control level that enables service providers and companies to manage network slices dynamically, provide services automatically and use resources efficiently. Such a flexible and scalable network architecture allows MNOs to react quickly to changing requirements and offer customized services.

The structure of an SMO architecture can be subdivided both horizontally into abstraction layers and vertically into network domains (radio access, transport, core). The complexity of the use cases to be supported rises steadily as you move through the horizontal layers. The service layer (service or multi-domain orchestrator) still defines the service very abstractly based on defined KPIs (see figure). This is achieved on the basis of quality features relevant to the end user. Taking this as a basis, the multi-domain orchestrator automatically creates de-
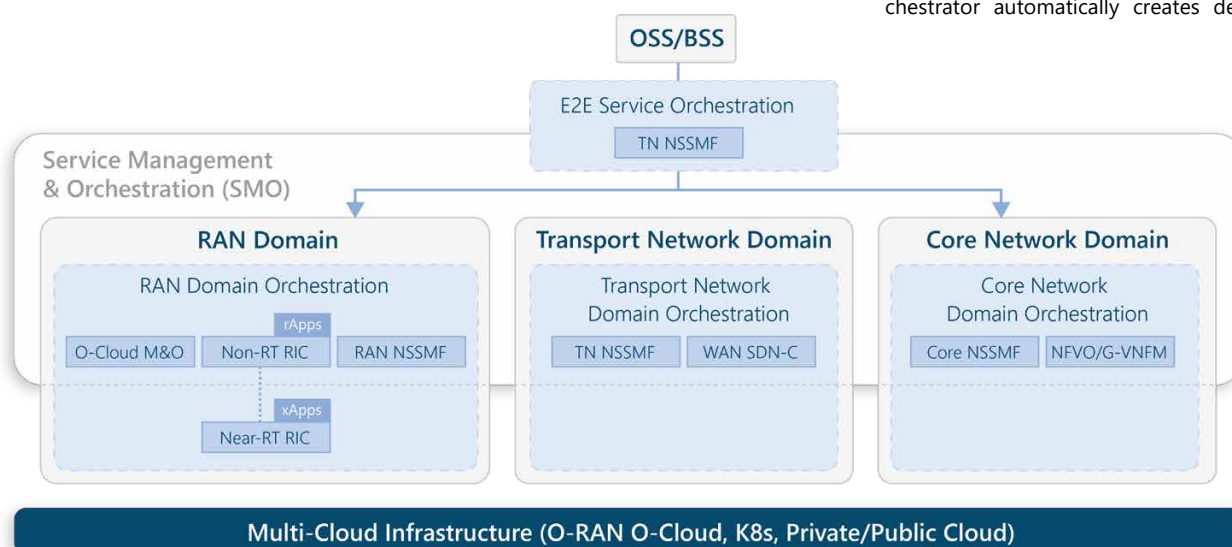
2 SMO architecture as the central core technology for automated 5G mobile networks

-tailed requirements for the relevant network domain that have been prepared for the particular segment. The domain orchestrator receives these and initiates the steps required for service provisioning.

In addition to checking and reserving the necessary network resources, this also includes setting up control loops for subsequent quality assurance and finally activating the service in the network. Communication with the network takes place via the SDN controller. Its close proximity to the network gives it the highest level of detail and it must be familiar with and operate the features specific to each manufacturer and technology. The very specific network design of the particular mobile network operator also comes into play at this level.

Quality-Oriented, High-Availability Services: AI as the Driving Force

Artificial intelligence (AI) plays a pivotal role in this technological ecosystem. The use of modern AI algorithms enables 5G networks and network slicing to be managed and optimized efficiently. AI provides automated resource allocation, predictive maintenance, anomaly detection and personalized, qualitative services (QoS - quality of service). These capabilities not only improve network performance, but also deliver a customized user experience for end users and businesses.

In SMO architecture, AI algorithms are used in what are known as RIC – RAN intelligent controllers. The RIC concept is a key element of SMO architecture and is very much shaped by the 3GPP standardization committee and the O-RAN Alliance. The idea is based on the principle of making the management and optimization functions in a mobile network more flexible efficient and powerful. This development is being primarily driven by mobile communications providers and telecommunications companies, but also by public and private research institutions.

The main tasks of a RAN intelligent controller are the following:

» **Resource Allocation and Optimization:** Allocating and optimizing the limited resources in a RAN efficiently is one of the main tasks of a RIC. This includes the allocation of frequency bands, the management of transmission power and the control of antenna directions in order to maximize network efficiency.

» **Traffic Management and Load Balancing:** A RIC monitors data traffic in a RAN and redirects mobile devices to other base stations as required as part of load balancing. This serves to avoid bottlenecks.

» **Interference Management:** RICs can also detect and minimize interference between base stations. They also coordinate transmission power in order to ensure better overall network performance.

» **Energy Management:** A RIC can, for example, switch off base stations – or parts thereof – when they are not needed in order to increase energy efficiency in a RAN.

KPI / feature	Description	Requirement	5G use case
Peak data rate	Maximum data rate to be supported	20 Gbps	eMBB
User experienced data rate (perceived data rate)	Data rate that should be available for the user experience 95% of the time.	100 Mbps	eMBB
Latency	End-to-end packet delay	4 ms 1 ms	eMBB URLLC
Mobility	Maximum speed for hand-off and QoS	500 km/h	eMBB URLLC
Connection Density	Total number of devices per area unit	10-6 / km^2	mMTC
Energy Efficiency	Energy consumption of data transmitted / received per unit (device or network)		eMBB
Area Traffic Capacity	Total traffic in service area	10 Mbps/m^2	eMBB
Peak Downlink Spectrum Efficiency	Throughput per unit, radio bandwidth and network cell	30 bps/Hz	eMBB

3 KPI definition according to ITU-2020 with mapping to 3GPP service classes
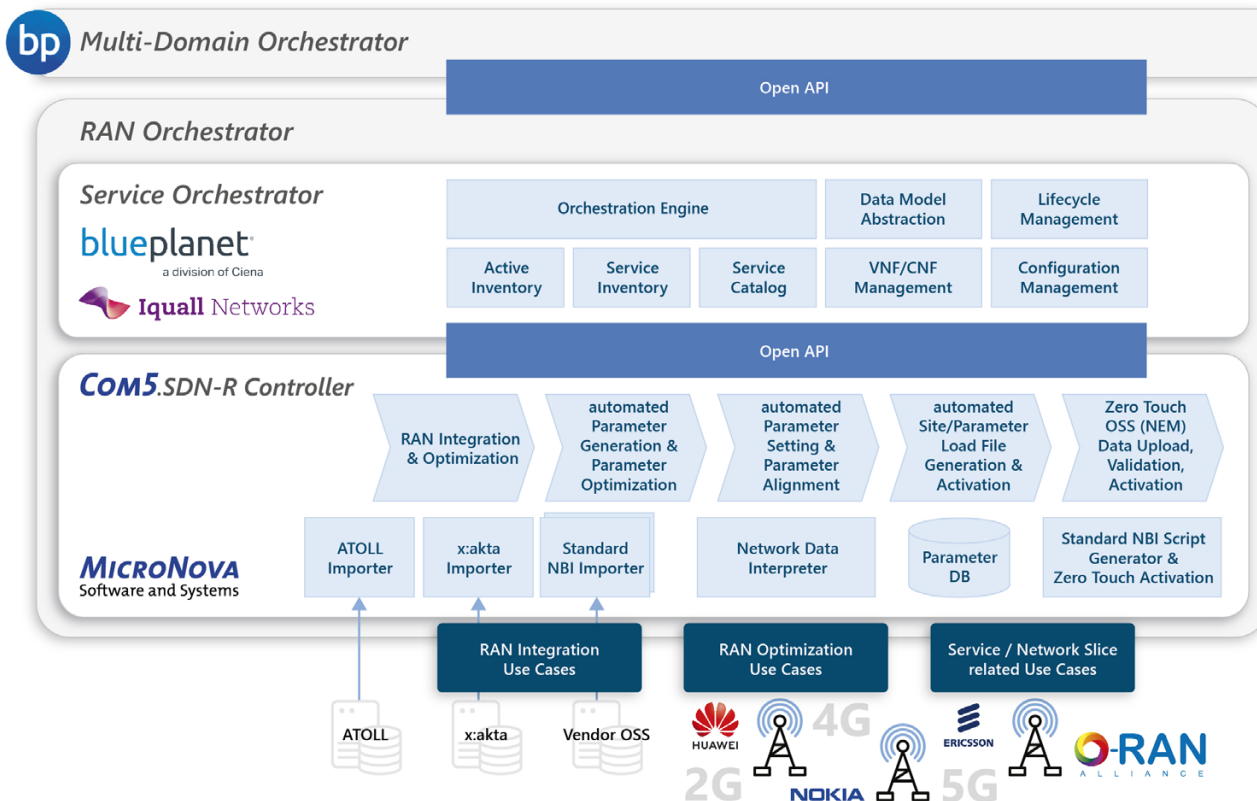
4 Diagram of a multi-domain orchestrator

For the same reason, it can reduce transmission power if the signal is strong enough.

» **Dynamic Adaptation:** The RIC will also dynamically adapt the configuration of a RAN to different network conditions in order to optimize optimum performance and quality of service (QoS).

The Future of Telecommunications: An Integrated Vision

The emerging age of AI, 5G, network slicing and SMO is opening up a wealth of opportunities for the telecommunications industry. From pro-viding highly personalized services to supporting sophisticated applications such as the Internet of Things and autonomous driving, the future of telecommunications is characterized by innovation and progress. The integration of these technologies is creating a holistic vision for the telecommunications landscape, enabling a new phase of connectivity, efficiency and innovation.

COM5.RAN-Controller

MicroNova supports the introduction of these technologies from the very beginning with its fully automated COM5.RAN controller. The ven-dor-independent controller integrates seamlessly into the new architecture thanks to its open, standards-compat-ible interfaces (web APIs). It already covers all necessary use cases, from integration and optimization to fully-fledged service/slice provisioning – for all vendors, including Nokia, Ericsson, Huawei and Open RAN. With expertise gained from two decades of experi-ence in the RAN environment, Micro-Nova also offers comprehensive ser-vices for the implementation of SMO architectures in addition to its COM5. Mobile solutions. This includes consul-ting services as well as the develop-ment of specific AI algorithms. ■

Always Freshly Patched Computers at Diakonische Jugendhilfe Region Heibronn

Endpoint Central automates patch management and software distribution

TEXT: Editorial staff   PICTURES: © Rawpixel.com / Shutterstock.com

Diakonische Jugendhilfe Region Heilbronn gGmbH – Facts & figures:

» Industry: Child and youth welfare services
» Employees: approx. 600
» Head office: Eppingen-Kleingartach
» Established: 1960

The Diakonische Jugendhilfe Region Heilbronn (DJHN - Church Youth Welfare Organization in the Heilbronn region) is a nonprofit organization and a member of Diakonisches Werk Württemberg (umbrella charitable organization of the Protestant Church). It is committed to helping young people in challenging or problematic situations who need special support. Its varied services range from inpatient/partial inpatient care to special school programs as well as support and educational measures for young people. As an independent provider of child and youth welfare services, DJHN has around 600 employees at over 75 locations across the Heilbronn region.

Initial situation – unreliable patch distribution to users working from home

The COVID-19 pandemic and the resulting move of many employees to working from home also presented the IT team at Diakonische Jugendhilfe Region Heilbronn gGmbH with new challenges: Whereas laptops used to be on the move with their owner for a maximum of two to three days – and therefore outside the organization's network – there were suddenly many devices that would no longer log on to the network for lengthy periods.

When Steffen Huber was on the phone to an external IT service provider one Friday afternoon complaining about the failure of patch distribution to users working from home, he learned that the systems vendor was itself facing the same problem and was already looking for a solution. The vendor's employee said that he had already found a promising product and showed Steffen Huber the demo version of Endpoint Central, which is freely accessible to everyone on the ManageEngine website. The IT system administrator at DJHN was so impressed by his first encounter with the solution that he installed the free trial version on a computer at his own home, trialling it over a weekend. Since everything worked as desired, Steffen Huber realized that the unified endpoint management solution would significantly reduce the team's workload.

"Naturally, we also looked at or tried a competitor's product. But when the vendor failed to respond to our inquiry, the decision to go with Micro-Nova and ManageEngine was a no-brainer. We felt and still feel well supported by them," the IT manager adds.

Since patches had previously been distributed over the corporate network, the small IT team led by IT system administrator Steffen Huber needed to quickly switch to a different way of distributing patches in order to avoid security vulnerabilities. The two permanent employees and a vocational trainee therefore tried to distribute updates using existing standard Windows resources. This proved to be not only very time-consuming, but also frustrating, as the team could never be sure whether patch deployment had actually been successful. To make matters worse, the old system no longer supported upgrades for Microsoft Office 2019.

As the nonprofit's IT budget is limited, Steffen Huber's next challenge was to convince his line manager to approve the purchase. "It was great that we were able to test the product live without any restrictions," the IT system administrator says enthusiastically. He was able to show the budget manager at DJHN exactly what relief the software would bring to the team and how the software would help to provide staff laptops with patches during the pandemic when they were away from the office. These advantages ultimately convinced everyone involved and led to the special budget being approved.

"I wouldn't want to be without Endpoint Central anymore. The software simply does what it is meant to do."

– Steffen Huber,
IT system administrator,
Diakonische Jugendhilfe
Region Heilbronn

"Endpoint Central helps us to significantly reduce the time spent on patch management. The design of the system is easy to understand and operate. And what's more, you're always discovering new functions. It's really fun!"

– Joulian Abboud,
IT management assistant trainee,
Diakonische Jugendhilfe
Region Heilbronn

The solution – ManageEngine Endpoint Central

It only took a few weeks from the first tests in mid-October to the purchase. The IT team initially rolled out Endpoint Central (formerly Desktop Central) software to 40 clients at various locations as a pilot project. The subsequent check showed that the Metacom software had been successfully installed on all 40 computers. Steffen Huber and his vocational trainee Joulian Abboud attempted to roll out the software in parallel using Windows group policies in order to draw a direct comparison, but this did not work.

"I wouldn't want to be without Endpoint Central," the IT manager explains. "The software simply does what it is meant to do." Another plus for him is that the solution provides him with feedback if the software distribution fails to work straight away: "It is very helpful to learn whether, for example, a file could not be extracted, the hard disk is full or the device was in standby mode." This information can be easily viewed in the Endpoint Central log. For the team, this represents a huge improvement over Windows Server Update Services (WSUS), which did not provide any feedback on success or failure or the reasons for failure.

The result – Fewer security vulnerabilities, more time

All the software at DJHN is now distributed to the approx. 550 Windows clients and 15 Windows servers using Endpoint Central – from MS Office 2019, Firefox and Chrome to MS Teams, 7Zip and VLC Media Player. The ManageEngine solution is also used for patch management: All updates and patches from Microsoft or third-party providers are distributed directly to the devices – in some cases fully

automated – and installed there. As a result, all computers were updated to the latest version within a very short time and numerous security vulnerabilities were closed after the old system no longer supported Microsoft Office patches.

"Endpoint Central helps us to significantly reduce the time we spend on patch management," reports Joulian Abboud, who is currently training as an IT management assistant at DJHN. "The design of the system is easy to understand and operate. And what's more, you're always discovering new functions. It's really fun!"

Her instructor, Steffen Huber, was particularly impressed by the Endpoint Central dashboard, which shows him at a glance, for instance, whether there are any unpatched computers and where there is an urgent need for action. The solution also provides an excellent overview of licensing, as it is easy to see how many Office licenses are currently in use, for example. The IT manager would also not want to forego the large number of report templates available in Endpoint Central: "We created a list of which computers had the TPM chip and could therefore see at a glance the computers where Windows 11 could be in-

stalled." DJHN used a similar report showing the Office version installed on each computer when preparing an Office migration.

Conclusion – Automation reduces the IT workload

Since its launch, Endpoint Central has reliably provided the computers of the 600 employees of Diakonische Jugendhilfe Region Heilbronn with the latest updates or completely new software – regardless of whether their users are currently working at one of the 75 locations or from home. The fact that the team no longer has to worry about whether its patch efforts were successful or not has significantly reduced both the time required and stress levels.

"We can now invest our time in other things," adds Steffen Huber enthusiastically. Next, the IT manager would like to create a self-service portal using Endpoint Central where employees can download or request certain software approved by the company for themselves. The aim is to further reduce the pressure on the IT department, which also provides first-level support for users. ∎

Customer benefits:

» Transparent pricing model
» Opportunity to fully test the product before purchase
» Automated patch distribution makes day-to-day work easier
» Simple operation
» Option to link to ticketing system
» More time for other important tasks

Project Management: Two Become One

Consolidated and more powerful: monday.com replaces Excel and Co.

TEXT: Felix Bauer, Moritz Bauer   PICTURE: © Linda Vostrovska/ Shutterstock.com

Natsana GmbH:

» Industry: Food
» Employees: approx. 150
» Head office: Monheim am Rhein
» Established: 2019
» Turnover: >EUR 80 million (2022)

Natsana GmbH is a company that provides natural food supplements and brings together three of Germany's strongest brands in 'natural elements', 'Nature Love' and 'Feel Natural'. The company, based in Monheim am Rhein, employs more than 150 people and has turnover is in the high double-digit million range.

Project management with systems discontinuity

Before looking for a new project management tool, Natsana GmbH used Asana and Excel to manage its projects; however, because the two solutions could not work together seamlessly, over time the desire for an integrated and clearer solution grew. This solution also needed to boost efficiency and offer more functions, especially in terms of automation. Moreover, performance had to be improved – especially with regard to Excel.

With these requirements in mind, the company set out to find an alternative. The team entrusted with the task discovered monday.com through their own professional network. After initial discussions with monday.com and partner MicroNova, they decided to launch a trial run in autumn 2021 – partly because the simple licensing model made it possible to continue the free two-week trial version on a permanent basis.

Morris Lange, Manager of Organizational Development, and ten other members of his team were in charge of introducing monday.com as the 'Work OS' for Natsana GmbH. "For me, the usability and functional scope of the new solution we were looking at buying played a major role," he explains. "The goal was to give my colleagues a greater number of options for collaboration, as simply and intuitively as possible."

Integrated project management with monday.com

The team prudently prepared to test monday.com, first defining a number of key users who were trained starting in January 2022, partly in-house and partly by MicroNova according to the train-the-trainer principle. Live use began in Morris Lange's department before other key users received training and established monday.com in their teams – without any hitches thanks to the seamless transition from test to live usage.

Over a period of 18 months, 160 users were given accounts with enterprise licenses as planned. By now, all departments have come to rely on

truth' for project management," Lange continues. Structures have become more transparent, planning in general has been improved and processes have become even clearer, which is an invaluable added value for the company, especially in large projects.

The improvements lie in the details. For example, Natsana has directly linked a significant number of processes to each other; the simple procedure and visual representation allow the company to precisely monitor and understand project progress, budget, team capacities, and much more. The automated processes, which are extremely helpful from Lange's point of view, are used 1,000 times a month; in particular, they simplify standard arrangements that were previously undertaken entirely manually.

The decision to switch from Asana and Excel to monday.com as a central, integrated tool has therefore fully paid off for Natsana: as desired, the team benefits from many more functions, direct communication, and greater user-friendliness. And because what has been achieved so far is so impressive, the next step was taken shortly after the first major implementation wave: improved capacity planning for managers.

Summary

Lange concludes: "We are extremely satisfied with monday.com. The tool delivers what it promises: seamless, integrated project management, as a one-stop portal, on a central platform." Natsana was able to realize these benefits because the company recognized the importance of powerful control over projects and the associated collaboration between people in the teams – and together with MicroNova was able to consistently eliminate system discontinuities. ∎

monday.com: Natsana plans and manages processes and projects within and between teams, including the associated communication, strategic issues and many day-to-day business processes. The integration of Jira also helps. The 'private workspaces' of the enterprise account help to protect sensitive data.

The elimination of repetitive tasks was also taken into account: Natsana uses the desired automation functions to create new project views based on templates, for example. In addition, there are standard automations such as the rule-based moving of content.

Better communication, greater transparency, automated processes

Using monday.com has improved many aspects of project management at Natsana, while enabling seamless, direct communication within and between teams. "For us, monday.com has successfully become a 'single point of

„With monday.com, our teams can simply work together better and drive projects forward more successfully. Direct communication ensures transparency and a clear distribution of tasks. We're also very happy with the support we received from MicroNova and would not want to be without monday.com"

– Morris Lange,
Manager in Organizational
Development,
Natsana GmbH

Customer benefits:

» Intuitive to use
» Wide range of project management functions
» Consolidation of the tool landscape
» Seamless and efficient communication between all project participants
» Clarity of status and completion of tasks
» Simplification of standard arrangements through automation

Information Security at MicroNova

As a successful provider of IT services and solutions, MicroNova attaches particular importance to information security – reason enough to upgrade its TISAX certification to the highest Assessment Level 3.

TEXT: Marcus Stiens

As a matter of principle, and also in view of the growing threat of attacks in the IT environment, MicroNova is both committed to and dependent on operating a mature information security management system – and having this externally assessed by established companies and auditors. This is why the corporate production sites in Vierkirchen, Braunschweig, Kassel and Jablonec successfully met the requirements for TISAX Assessment Level 3 in the third quarter of 2023.

For this, the operational services GmbH & Co. KG conducted detailed audits of the processes and the technical and organizational measures of MicroNova's information security management system on the company's premises. This TISAX Assessment Level 3 certification – and consequently compliance with the highest requirements for an information security management system – means that MicroNova is able to guarantee that it handles information with very high protection requirements in a responsible and appropriate manner.

Add-on for Prototype Protection

At the same time as upgrading TISAX from the previous level 2, MicroNova decided to purchase the add-on module "ProtoParts" for prototype protection at its northern production sites in Braunschweig and Kassel as well as in Jablonec in the Czech Republic. The corresponding verification demonstrates that MicroNova has also successfully designed these processes and premises in accordance with TISAX requirements for the protection of prototype parts and components.

As with MicroNova's operational departments, the same applies here: success spurs us on – it is only natural that we will continue to develop and improve our information security management system. We ensure this through regular internal audits, meticulous risk assessments and a well-engineered process of continuous improvement. ∎

What is TISAX

TISAX stands for Trusted Information Security Assessment Exchange. The mechanism for verifying and exchanging results in accordance with the automotive industry-specific standard VDA-ISA addresses information security in the development, manufacture and operation of vehicles.

Balance & Gratitude

Dear Reader,

You have already read in the foreword written by MicroNova CEO Orazio Ragonesi how important and challenging the right entrepreneurial balance is. Things have certainly not become any easier since I had MicroNova entered in the commercial register in 1987 … The world has grown more complex. It has become faster. And the fact that it is also becoming increasingly bureaucratic does not actually make it any simpler.

We have been working successfully with major players in their industries for many years. This also creates ever greater responsibility for us. Our expertise and innovative strength are also called upon to ensure that business models work, products are brought to market, and sales and profits are generated.

Good cooperation is based on partnership – everyone makes a contribution. And so we are grateful for customers who shoulder their share of the responsibility by enabling us as a company and our employees to plan ahead. I am happy and grateful that we have been able to count on such dependable customers over the years.

It would be implausible for me to say that we have never faced any challenges – so please allow me this candid observation. Whenever things have "stuttered" a little for whatever reason, we have always experienced a willingness and desire to support us. Thank you for this! You, our customers, are an important part of our equilibrium.

The mainstay on the MicroNova side are of course the many people who work at and for MicroNova on a daily basis, contributing their expertise, their desire for innovation, and their passion for their work. A big thank you goes to all of them, too! Together with the entire MicroNova team, we as the Supervisory Board, the Management Board, the company as a whole and the owner family behind it have always done our utmost to find the right balance.

From the Supervisory Board's perspective, this includes in particular the close dialog with the Management Board; it is very important for me personally and with regard to the equilibrium mentioned above that a common line is found that is supported by everyone and that everyone "pulls in the same direction" – naturally after a constructive discussion about this direction. This works well at MicroNova, and all those involved benefit from this united approach, especially our team and our customers.

I hope that my comments above make it clear what I personally believe is important and how we can and should achieve this. I would like to take this opportunity to mention one name in particular that has been shaping this path for a quarter of a century. Dear Orazio, congratulations on your 25 years at MicroNova – and a big thank you to you for showing such commitment to us for so long, and for many years as CEO. I very much hope and wish that we can continue to work together so well and successfully for many years to come.

With warm regards,
Josef W. Karl

Josef W. Karl
Chairman of the Supervisory
Board of MicroNova