



INFORMATION AND EDUCATION FOR THE SAP COMMUNITY

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# Hybrid, agile and resilient: SAP data management

NetApp Summit 2022, from left:  
Robert Madl, Cisco,  
Glenn Fitzgerald, Fujitsu Europe,  
Thomas Herrmann, NetApp,  
Wolfgang Bausch, Red Hat,  
Sander Bleijenbergh, Amazon.  
The in-depth E-3 cover story about  
hybrid data management for current  
SAP customers.

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# Hybrid, agile and resilient:

Back in the days when IT was primarily hardware, a book was published called “The Soul of a New Machine.” It was about a race to develop a new minicomputer between the companies Data General and Digital Equipment Corporation, or DEC. Over time, the “soul” of IT became first the software, and then the data and data structures. This E-3 cover story is all about data, data storage and data management. Starting with the seminal computer science work “Algorithms and Data Structures” by Professor Niklaus Wirth, data has ascended to the peak of the IT mountain.

*By Peter Färbing*

**D**igitizing processes requires a robust data architecture and infrastructure for data storage. “A robust data architecture is essential,” explains Glenn Fitzgerald, CDO Product Business at Fujitsu EMEA, at the start of our exclusive E-3 interview. “Especially when you need both SAP Hana data and non-SAP data to be available on a universal platform for all business needs. This is where the system inspection service comes in really handy.” For users, there are two crucial aspects: data privacy, and data security within the context of overall IT security. This solution uses artificial intelligence methods to facilitate data analysis in order to detect anomalies. “In one specific instance of collaboration with our partners, we defined and installed a suitable IT platform on the basis of Kubernetes, Ceph Cluster, Fujitsu Primergy servers and NetApp NFS servers,” says Glenn Fitzgerald, describing the symbioses in the SAP community.

Whether a company succeeds in the digital transformation depends above all on how well or how poorly it manages its data. Progress is only possible with a consistent data and analytics strategy. That’s why many companies are currently making structural changes to become a “data-driven company” – i.e. a company that consistently uses its own data resources to open up new opportunities and possibilities for their business processes.

“During a digital transformation, data must be prepared, enriched with information, consolidated, and correlated,” says Thomas Herrmann, Manager Business Development SAP at NetApp for EMEA. He organized a conference for SAP customers this September, which was attended by SAP itself, Cisco, Fujitsu, Red Hat and Amazon/AWS. The conference demonstrated how IT providers for data management in SAP systems can interact in a complementary way. Cloud computing was a key topic, with special attention paid to the hybrid cloud and the challenge of S/4 conversion. Thomas Herrmann put it this way at the NetApp event: “So, data management plays a critical and important role in all corporate digitization initiatives. Data management is the sum of all measures necessary to col-

lect, store and provide data. Once digitization is complete, all key business processes will be based on data, which must be optimally managed in order to achieve the optimal effect.” His colleague Robert Madl from Cisco adds: “Data management is definitely an important criterion for success. After all, digital transformation with SAP involves the digitization, optimization and automation of business processes.”

## Data structures

Data management is currently in demand everywhere, as Cisco manager Robert Madl explains: “For example, if I automate processes in production or warehouse logistics using sensors – keyword IoT – a lot of new data is generated that has to be handled in a completely different way than traditional ERP data. If machines are controlled on the basis of this sensor data, for instance, reliable transmission with correspondingly low latency is critical. If you collect sensor data for a “big data” analysis in connection with data from the ERP system, it’s no problem to store this data in a hybrid manner, i.e. distributed in a data lake in the cloud, while keeping the ERP databases on premises or in a colocation data center. But making the right data management decisions is critical to the success of digital transformation projects.”

By 2024, 93 percent of companies in Germany will use their data to drive revenue growth. 42 percent will even use data as a significant source of revenue. This is according to the new study “The Multi-Cloud Maturity Index,” which was conducted with around 3000 business and IT decision-makers in the EMEA region. “The past decade has shown that almost everything around us is data driven. What’s more, data has become a key corporate asset and, if used correctly, can be a significant contributor to a company’s success,” says Glenn Fitzgerald of Fujitsu in a discussion with E-3 editor-in-chief Peter Färbing. Fitzgerald adds: “We are currently living in a world of unstructured data, data silos, exorbitant data growth, and increasing data complexity. This makes the management of this data all the more important to the compa-



# SAP data management



NetApp Summit 2022, from left:  
Robert Madl, Global Strategic Partner Executive at Cisco,  
Glenn Fitzgerald, CDO at Fujitsu PBL Europe,  
Thomas Herrmann, Business Development Manager EMEA/LATIN at NetApp,  
Wolfgang Bausch, Global Head of SAP Business at Red Hat,  
Sander Bleijenbergh, Senior Solutions Architect at Amazon.

ny's success. How sound is a company's data management strategy to ensure that it can respond quickly to market demands at all times?"

## Intelligent Enterprise

There is a key question that must be answered: What methods and tools are needed to successfully use data of any kind? Technologies such as artificial intelligence and machine learning offer possible solutions, says Glenn Fitzgerald, who further explains: "On the one hand, they can significantly improve the quality of the data, and on the other hand, they enable you to detect errors during data collection. This can be supported by automated machine learning acquisition. Supplying business processes with optimal and qualified data – and at the right time – is key to a company's success. One of the main goals is to meet the customer on their terms, identify their challenges and then deliver a solution, which we can accomplish using a number of different techniques, methods and tools. Our goal is to support the customer and work with them to develop their intelligent enterprise."

What are the criteria for data storage in an intelligent enterprise? If the ERP system is on premises, the data should also be on premises? If the ERP system is in the cloud, the data should be there too? Is that right? Thomas Herrmann: "That's not so easy to answer because there are several factors at play: network speed, i.e. sufficient bandwidth to the cloud, location, and distance to the nearest backbone. Also: real time access or batch processing? That is, what are my SLAs in terms of response times, etc.? When it comes to real-time processing of data, the data should of course be located in the same place it is processed. With Hana that would then be in-memory computing. Whether that is in the cloud or on premises is secondary." And Robert Madl from Cisco clarifies: "Hybrid data architectures can be implemented, of course. The challenge is to understand interdependencies between systems. Often SAP landscapes have developed organically over decades, and custom code is implemented everywhere – the creators of which may no longer even be in the company. This often leads to dependencies between systems. For example, maybe one system can access the database of another system directly – or it can make a call to the other system, which in turn grants access to the data tier. In this case it's important to understand which sys-



*Hybrid data architectures are feasible. The challenge lies in the interdependencies between the systems.*

**Robert Madl,**  
Global Strategic Partner Executive,  
Cisco

tems depend on each other and how. In other words, what bandwidths are needed and how time-critical is this communication, i.e., what are the maximum latencies allowed to provide the necessary data in a timely and complete manner?"

## Processes and algorithms

Ultimately, it is a matter of ensuring that the business process mapped in the SAP systems functions efficiently, regardless of where they are running. "You just have to be aware that when you're distributing SAP systems across multiple sites, you're going to have higher latencies and lower bandwidth between sites, and you have to take that into account during your pre-migration planning. This is where AppDynamics can be really useful, as it automatically analyzes and visualizes these dependencies between systems and makes them available for planning," explains Robert Madl.

What does the Cisco manager think about the best way to store data? "That depends on the type of data and how it's used. With databases like SAP Hana, it makes sense to have the data close to the computing resources," explains Robert Madl. "While Hana is an in-memory database – meaning that data is kept in the server's memory – that only helps with read transactions. Write transactions are



*Intelligent enterprise that achieves a holistic view of S/4 data and non-SAP data.*

**Glenn Fitzgerald,**  
CDO,  
Fujitsu PBL Europe

only confirmed when the data has been written to the persistence layer, otherwise known as the data storage system. In this case it is critical to have fast IO between the server and storage location for optimal application performance."

## In-memory databases

The biggest performance boost for OLTP applications came with the introduction of flash memory. In analytics scenarios (typically OLAP), the performance impact at runtime would be lower with in-memory technology, since the data is already available. But it would take a very long time to boot these systems if the data cannot be loaded from a local data store into RAM. Decentralized data storage can be really useful for 'big data' analyses," says Robert Madl, who goes on to explain: "For example, if you have multiple data lakes built on Hadoop close to the data source or sensors, you can – for example, with the MapReduce algorithm – pre-aggregate data for analysis in a decentralized and iterative manner and then transfer only the necessary information to a central system for further processing."

What are the advantages and disadvantages of hybrid data management? Here again Robert Madl: "There are three factors that must be optimized: time, cost and complexity. The place where the data originates is not necessarily the place





*Moving the SAP system to the cloud may be the first contact with this technology.*

*Sander Bleijenbergh,  
Solutions Architect ISV-SAP,  
AWS*



*The flood of data that comes with digitization requires an archiving concept.*

*Thomas Herrmann,  
Manager Business Development SAP,  
NetApp*



*A central pillar of a future-proof, agile IT landscape is end-to-end automation.*

*Wolfgang Bausch,  
Global Head of SAP Business,  
Red Hat*

where the data is used. Transmitting data over long distances costs money and takes time. But having many different storage locations increases complexity. In digital transformation projects, it often proves useful to define a minimum time requirement and an upper cost limit, and then to optimize the complexity dimension first. For example, in a smart factory project, time often dictates how much edge computing is needed, the cost of transmission dictates the degree to which sensor data must be pre-aggregated, and complexity is ultimately the deciding factor for feasibility and overall success.”

### **S/4 and data conversion**

In S/4 conversion projects, data management and data storage are key factors that determine the cost and overall success of the project. How can you guarantee high success rates and low data costs for existing SAP customers? “Together with our customer, we are building a truly intelligent enterprise by taking a holistic view of SAP S/4 Hana data and non-SAP data,” says Fujitsu manager Glenn Fitzgerald in describing the challenge. Precisely how the data is managed and stored depends on the company’s own business processes. “This is where Fujitsu supports its customers with its co-creation approach. In essence, this approach involves conducting a workshop based on the Fu-

jitsu Human Centric Experience Design specifications. We work closely with customers, technology partners and our experts to develop an optimal approach, along with a proof of concept and a long-term plan to overcome specific challenges and continuously optimize IT,” says Glenn Fitzgerald, speaking from experience of many successful projects.

### **Digitization and the flood of data**

Existing SAP customers will likely see their volume of data continue to grow, and with it the cost of data management. “The flood of data that comes with digitization requires an archiving concept,” explains NetApp manager Thomas Herrmann at the end of the E-3 interview. “The first step is to determine what data must be archived due to legal requirements, what data you want to archive, and what data needs to be retained for a specific period of time. Modern data archiving is based on the cloud. All major cloud providers offer an archive tier for object storage. These tiers are increasingly becoming the preferred destination for backup data with long-term retention requirements. This includes all major archiving packages from AWS, Azure and GCP. Cloud archive solutions are the most cost-effective object storage tiers available today, and they can be scaled to petabytes of storage as the volume of archi-

ved data increases. NetApp Cloud Backup, for example, provides a comprehensive service for long-term protection of your data in heterogeneous environments, whether in the cloud, on premises, or in a hybrid combination of these platforms. NetApp Cloud Backup supports the archive tiers from the cloud providers above as destinations for your long-term backup and archival data.”

### **Data and workloads**

Cisco manager Robert Madl has another tip for SAP customers: “SAP workloads don’t usually exist in a vacuum. This means that an infrastructure that is optimal for SAP Hana should be optimal not only for Hana itself, but also for all other workloads, so that you don’t have to build an additional IT management silo for this one workload. There are around 200 reference architectures for the Cisco FlexPod that show how to reliably run workloads on it – not only SAP workloads such as Hana, but also web services, which are often one of the mapped business processes supported by the SAP system. FlexPod XCS is the new version of FlexPod optimized for multiple clouds, which expands on these reference architectures to include scenarios where you can outsource and connect services to the cloud without additional management effort.”



How companies can get the most out of their move to SAP S/4 Hana

# Cloud migration

Support for SAP ERP/ECC 6.0 will end as early as 2027. Current SAP customers should therefore initiate the migration to the successor S/4 system well in advance. It could even replace in-house on-premises solutions.

By Thomas Herrmann, NetApp, and Sander Bleijenbergh, AWS

For many SAP customers, this may mean saying goodbye to on-premises solutions and moving to cloud infrastructures such as Amazon Web Services (AWS). The exclusive managed service collaboration Amazon FSx for NetApp ONTAP ensures a smooth migration from on premises to AWS as well as fast, secure, and privacy-compliant operation of Hana landscapes.

More than two-thirds of all global business transactions are processed in SAP systems in some form. It should therefore come as no surprise that the global migration from ECC 6.0 to S/4 is a challenge for companies of all sizes and in all industries. But it can also be seen as an opportunity. That's because when support for ECC 6.0 ends in five years, companies around the world will be working with the faster in-memory database Hana.

Nevertheless, some SAP IT specialists at certain companies may not view this

development quite so positively. After all, SAP systems and applications such as enterprise resource planning (ERP) are mission critical – meaning that without them, smooth operations cannot be guaranteed. When you are contemplating extensive changes to these systems and perhaps even a hosting change from on premises to cloud, you have to be sure that everything runs flawlessly.

## SAP transformation to the cloud

For some companies, moving their SAP system to the cloud may be their first contact with this technology. To make sure that this first experience with the cloud does not become their last, and to help businesses reap the long-term benefits of cloud hosting on various fronts, NetApp, an international software group with a focus on cloud and data management, has joined forces with cloud specialist AWS to simplify the migration of

complex application environments to the cloud.

And because SAP transformation is such a hot topic right now, the two partners have had Amazon FSx for NetApp ONTAP certified for SAP. This fully managed solution takes the work out of your hands. It allows mission-critical SAP workloads to be migrated to the cloud quickly and seamlessly without refactoring and restructuring. It also combines the familiar benefits of an on-premises system with the scalability of cloud infrastructures like AWS.

## Mastering the switch

When switching to S/4, some companies want to continue hosting on premises – not necessarily because this offers advantages over the cloud, but because the companies do not want to “hand over” mission-critical systems or because compliance requirements forbid this. This is where Amazon FSx for NetApp ONTAP comes in.

The solution combines the ONTAP storage operating system with AWS cloud services. The operating system is the foundation on which SAP S/4 is built, while the AWS cloud is like the real estate on which the structure stands.

But unlike a plot of land, a cloud environment is much more flexible. Are there changes to the required storage volume for the hosted system? No problem, since the storage space can be expanded both upward and downward. Latency and availability in today's clouds can also keep pace with on premises servers. With Amazon FSx for NetApp ONTAP, you can achieve up to 99.99 percent availability. And for an ERP system, that's absolutely necessary!

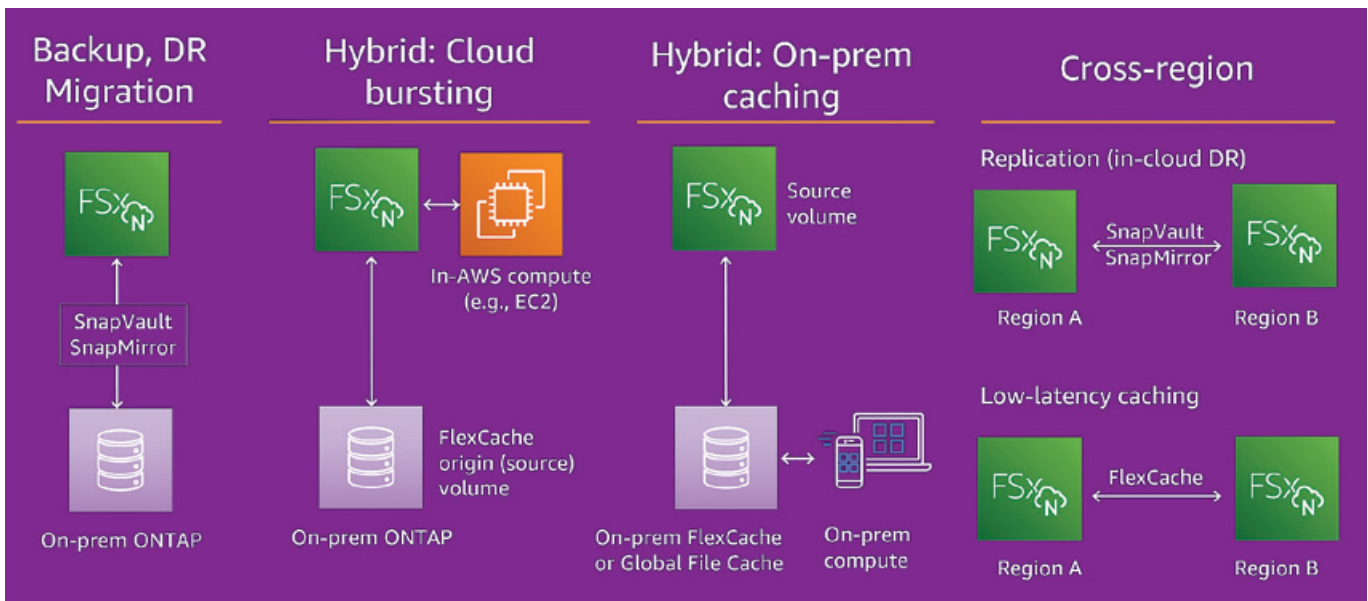
Hosting and storage are included in the solution package. For S/4 to function efficiently, reliably and securely via the cloud, data management must also be guaranteed. Amazon FSx for NetApp ONTAP is fully certified for S/4. This means

## Amazon FSx for NetApp ONTAP

Amazon FSx for NetApp ONTAP is a storage service that enables enterprises to start and run fully managed NetApp ONTAP file systems in the AWS cloud. It delivers the familiar features, performance, capabilities and APIs of NetApp file systems, along with the agility, scalability and simplicity of a fully managed AWS service. SAP environments and applications span many different departments and levels within a company. As a rule, they are deeply rooted in the company structure. Managing them often requires a large amount of resources, and over time this can blow many a budget. But it doesn't have to be this way. IT service providers offer various solutions to simplify SAP operations and minimize the total cost of ownership (TCO).

They enable you to maintain the flexibility and scalability of the system while using IT resources more efficiently. Of course, implementing such a solution is quite a commitment. It should have the following features and functions:

- A cloud-like usage model for local environments
- Payment, subscription and usage-based service options
- A uniform architecture with integrated automation
- An integrated data backup concept
- Native cloud integration
- A fully tested and proven solution
- Automated capacity monitoring and proactive problem detection
- Tools to better understand consumption and costs
- Data de-duplication and compression



aaS is versatile, from on premises to public cloud: but it is almost always based around data management with specialists like AWS and NetApp.

that the Hana database can be integrated without any problems. Extensive data protection functions are also integrated.

### Data recovery strategy

These include point-in-time file system snapshots. This ensures that a company can continue to operate even in the event of a ransomware attack. The snapshots form the basis of the data recovery strategy. Another data protection function is storage replication. Users can use this function to move data packets across different regions, for example when secondary copies are needed because a service has crashed.

The DevOps department also benefits from the solution. At the touch of a button, developers can create instant clones of files. These clones then serve as test environments for new developments. If something doesn't work, the file with the original configuration remains unchanged. The advantage is that the clones only consume additional memory if something in them is changed. All the data and configurations they share with the parent files do not require additional capacity. This allows for faster development and test cycles, which in turn lead to better time-to-market and time-to-value for the business.

To keep track of all data streams, both AWS and NetApp tools can be used. This ensures that users maintain an overview at all times and can detect suspicious activities at an early stage. The intuitive management platforms also provide a place for centrally managing snapshot-based data protection functions. The solution delegates back-up, recovery and clone

lifecycle management to the application owner.

### Compliance

In the past, some businesses shied away from hyperscaler cloud environments because they were concerned about compliance. Companies that have to follow strict data protection regulations may not fully trust the cloud. With Amazon FSx for NetApp ONTAP, that doesn't have to be the case. The solution meets various international security standards, including ISO 9001, ISO 27001, ISO 27017, ISO 27018 and PCI DSS, as well as SOC 1, 2 and 3. It is also suitable for storing data in compliance with the Health Insurance Portability and Accountability Act (HIPAA). What's more, it also allows audits to be conducted smoothly. If the log function is enabled, it records events that users and auditors can then read out with programs such as the Windows Event Viewer.

### Performance and reconfiguration

One of the main benefits of the solution is the reduced "recovery time objective" (RTO). For mission-critical systems such as an ERP, this is necessary because they must be able to function again quickly in the event of a cyber attack. Amazon FSx for NetApp ONTAP provides snapshot technology that enables large datasets to be rolled back to a specific point in the past in just a few seconds. The time to execute a backup copy shrinks from hours to less than a minute. The server CPU and the network do not experience any performance reductions while the backup is

being performed. Restoring and reconfiguring the system take minutes rather than hours. The solution also makes it possible to carry out several backups a day. This lowers the probability of data being permanently lost due to an attack. Systems are back online faster and damage can be minimized.

Small and medium-sized enterprises should use the end of support for SAP ECC 6.0 as an opportunity to accelerate the roll-out of SAP S/4 Hana and the associated cloud transformation. The joint solution from NetApp and Amazon successfully combines the simple and secure management of on-premises solutions with the scalability and speed of the cloud. This saves time, costs and resources. Migrating early to SAP S/4 Hana will ensure that companies are ready for the competition of the future.



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Full-stack observability for a secure digital experience

# SAP in the cloud



SAP applications are just one small part of an expansive digital landscape that is constantly evolving and becoming more complex. With more dependencies, more data, more clouds and more vendors, the danger of blind spots increases.

By Robert Madl, Cisco

The digital experience has become an integral part of our lives – this is true now more than ever. Not only has it made our lives easier, it has become absolutely indispensable in many respects. End users today have little patience for a poor digital experience and are quick to blame the brand providing the application or digital service, regardless of who is ultimately responsible.

In general, companies can afford almost no mistakes: 57 percent of all users say they give brands only one chance – if a digital service does not work as desired, they will stop using it. But your SAP applications are just one small part of an expansive digital landscape that is constantly evolving and becoming ever larger and more complex. With more dependencies, more data, more clouds and more vendors, the danger of blind spots increases. 75 percent of technology professionals worldwide say they face more IT complexity today than ever before, and that they are constantly struggling with overwhelming amounts of data without the proper support and resources.

Using isolated monitoring approaches for applications, infrastructure, security and networks is inefficient and ineffective, and it quickly overwhelms the capacity of staff. A good way to solve this problem is full-stack observability.

## What does observability mean?

In modern technology environments, observability is a process of using software tools to detect problems. With this process, both the inputs and outputs of the technology stack are observed. Inputs include application and infrastructure stacks, while outputs include business transactions, user experience and application performance.

Observability tools collect and analyze a wide range of data, including application health and performance data, business metrics such as conversion rates, user experience mapping and infrastructure and network telemetry. The objective is to resolve issues before they impact the company's KPIs.

Observability is a concept that originates in control theory, and it refers to the extent to which the internal state of a complex system can be understood if only its outputs are known. According to the theory, the higher the level of observability, the easier it is to move from diagnosing a problem to finding the cause and solving it.

Observability was originally used in engineering applications to detect problems in the automatic control of dynamic systems. In the context of modern IT business processes, observability refers to the ability to understand global system function with the goal of mitigating problems that could impede system operations, both by making proactive changes to prevent problems in the first place and by rectifying them quickly when they do occur.

## Or SAP monitoring

What is the difference between full-stack observability and traditional SAP monitoring? Observability differs from tradi-

## Advantages of full-stack observability

### Warnings

Developers are aware of problems more quickly and receive more detailed information about changes made in a system, so that they can fix problems more quickly.

### System transparency

Accurate, real-time data on which applications are experiencing a drop in system performance helps development teams pinpoint exactly where problems have occurred or system performance has declined.

### Development speed

Software development is accelerated thanks to the rapid diagnosis and resolution of problems made possible by full-stack observability. This leads

to cost savings and gives development teams more time to focus on optimizing product features. With an expanded global view of the entire system architecture, including third-party applications and services, developers gain better insight into actual system performance, which then allows them to optimize product design.

### Workflows

Seeing the full history of a request from start to finish makes it easier for development teams to troubleshoot and solve problems in distributed computing environments. This results in faster and improved workflows and eliminates the need to contact third-party providers for information on application performance or responsibility for the server.

### Cooperation

Stakeholders can work together more effectively thanks to the complete overview of the system offered by full-stack observability. Team members and partners gain a better understanding of how the various elements and components interact and how the system performs operationally over time. This makes it easier for system operators, developers, analyst teams, SAP consultants and project managers to collaborate to solve problems, analyze system performance and improve system design. All parties and experts involved in the process can view the detailed system failure logs from these tools. This helps to avoid disagreements about the causes of problems within a system.





onal monitoring in that users can track multiple processes in complex operating environments. Observability tools identify the factors behind the problems that occur in a distributed system, making them easier to fix. The most powerful of these solutions provide full-stack observability of the entire system, so that you can uncover potential problems across all your applications and infrastructure – whether it is in the ABAP stack of an SAP system or in connected non-SAP systems.

Regardless of where they are used, observability tools are typically associated with instruments, i.e., measurement tools used to collect telemetry data from distributed systems. This data can be correlated to provide time series visualizations that offer context to events occurring within the system.

In addition, automatic alerts can be enabled to notify system operators of failures or other system malfunctions. Machine learning tools can also be used to sift through the data to prioritize incidents that require a rapid response, escalating the notification status accordingly.

What are the arguments for using full-stack observability for SAP? With distributed SAP applications and connected systems, the multitude of processes and systems involved can cause problems in unexpected ways. That's why it's usually not enough to monitor selected metrics to detect problems before they occur.

In these systems, requests can trigger a chain reaction of messages to associated services. This makes it difficult to use monitoring tools to diagnose exactly what went wrong when a system error occurs.

By tracking a wide range of events relating to system function, observability tools can identify potential problems be-

fore they impact system performance. The context provided by the observability tools allows team members to see any changes in system performance over time and how those changes correlate with other changes. These tools often employ easy-to-understand visual reports and dashboards. They can also be used to shed light on connections between system elements involved in the problem, and to identify dependencies that need to be explored in order to solve a problem.

## SAP cloud migrations

Full-stack observability as a tool for SAP cloud migrations? Dependency analysis is particularly useful as a planning tool for cloud migrations, as it allows you to understand the dependencies between the various SAP systems in advance. Especially with systems that have grown with custom code over many years, overlooked dependencies between systems can cause problems during a cloud migration. The dashboard function can be used to visualize those processes that are supported by SAP. This is an ideal way to measure and visualize the actual impact that changes to the system will have on business. For example, you can visualize an “order to cash” process and measure a performance baseline before and after a cloud migration in order to assess what impact the cloud migration – or even an S/4 migration – had on the performance of the business process.

## Observability tools

What are the limitations of various observability tools? As useful as observability tools can be, if they don't cover all

applications within your technology stack, they can prevent the proactive identification and resolution of issues. If these tools are unable to provide real-time data from all elements in your system so that you can take immediate action when problems are identified, the resulting blind spots can cause unexpected system events.

This in turn can lead to problems that are not detected by your observability tools. And this leads to the very problems in customer expectations and operational efficiency that observability is supposed to avoid. To allow you to fully optimize your system, observability tools should be able to work with all frameworks and languages present in your environment, especially the ABAP and Java stacks.

What are the advantages of full-stack observability? Full-stack observability lets you know where a problem occurred, why it occurred, and what actions you should prioritize based on their impact on your business.

This key advantage enables you to optimize performance, cost and security for SAP and native cloud applications in hybrid and multi-cloud environments. The ability to monitor the internal health of an SAP application, along with accurate data on system errors, makes full-stack observability a key factor for achieving better outcomes.



*Robert Madl,  
Global Strategic  
Partner Executive,  
Cisco*

SAP Automation combines migration and innovation: continuous integration and deployment

# Simplicity, agility and productivity

Automation is one of the key topics in IT right now, especially in the world of SAP. In this era of digital transformation, companies can only overcome challenges with consistent end-to-end automation of the entire process landscape.

By Peter Körner, Red Hat

When it comes to automation, the universal open source solution Ansible can offer crucial support. No company can avoid IT modernization, and when it comes to ensuring success, open source-based hybrid cloud platforms, integrated end-to-end architectures and automation technologies are essential.

Even SAP users cannot avoid this trend. When modernizing, their key goals are simplicity, agility, productivity and innovation, alongside more basic concerns such as optimizing IT costs and “keeping the lights on.” Unfortunately, they must undertake this modernization at a time when there is a dramatic shortage of skilled workers.

The biggest and most pressing challenges in the digital transformation of SAP workloads include migrating to Hana and S/4 and modernizing applications with a cloud-ready, cloud-first approach – while being mindful of the “keep the core clean” strategy. This strategy recommends – or even requires – a migration of previous custom SAP developments

(which can number into the thousands) to a new architecture and platform that supports the development and operation of SAP applications with native cloud technologies.

## CI and CD

Key aspects to consider include agile integration, CI (continuous integration) and CD (continuous deployment), containers and microservices, and the use of programming languages in addition to or as a replacement for ABAP. Beyond the “keep the core clean” approach, the SAP concept of side-by-side extensions is also important, as it enables companies to implement end-to-end processes much more easily, agilely and quickly.

This also makes it possible to integrate non-SAP systems into the SAP landscape. But only with automation in all stages of modernization will the necessary scalability of such approaches be achieved: self-services, provisioning, integration and much more at the push of a button.

## Hybrid cloud platform as the target architecture

So what exactly should a future-proof IT environment offer? The basis of a modern SAP landscape requires Linux as the fundamental operating system, an infrastructure certified for different infrastructures, high availability and automation. Understanding your target architecture early on is crucial for successful modernization. If a company wants to truly address innovation issues rather than just “lift and shift,” they cannot avoid using new platforms, frameworks, applications and technologies.

The trend is clearly moving toward integrated hybrid multi-cloud platforms and cloud-native applications. These will be one of the key topics for the future of the SAP world as well. The SAP ecosystem is being modernized toward a hybrid cloud architecture, and SAP users will increasingly use a service mix of on-premises, private and public cloud environments from hyperscalers – for both SAP and non-SAP workloads.

In addition, connecting structures such as DevSecOps are becoming the dominant deployment pattern, as they are the most dynamic driver of innovation. But how can a company implement these projects without delaying migration by years? The key to success lies in carefully selecting proven methods and technologies in order to take advantage of synergies in the early stages of the projects.

The core strategic tasks for SAP customers can be divided into the areas Run, Extend and Simplify. “Run SAP” refers to certified use of hybrid cloud infrastructure, which is the basis for secure operation, scaling and management of traditional and cloud workloads in all environments. “Extend SAP” includes cloud-na-

## Automating SAP workloads with Ansible

Day 1 operations focuses on deployment, provisioning, installation, set-up and configuration (customizing for existing SAP customers). Selected day 1 use cases at a glance:

- Activation of S/4 and Hana system replication
- Creation of a high-availability Red Hat Enterprise Linux Pacemaker cluster in the application and database layer
- Activation of Red Hat Insights, a managed service for detecting, analyzing and resolving potential security and configuration issues
- Migration of SAP workloads from Suse Linux Enterprise Server to Red Hat Enterprise Linux

Day 2 operations focus on “keeping the lights on,” maintenance, housekeeping and optimization.

- Selected day 2 use cases at a glance:
- Setting up and deleting new application servers
- Starting and stopping SAP instances
- Updating instances
- SAP kernel upgrades
- Kernel parameter changes
- Database and operating system patching
- Database backup and restore
- Expansion of resources (CPU, memory, hard disk space)
- Cluster management
- Proactive problem solving for SAP servers
- Maintenance of SAP servers with almost no downtime





tive development, which means the design, deployment and management of any application in any environment. Finally, “Simplify SAP” encompasses management and automation, i.e. the simple and seamless management of platforms and automation across hybrid environments, from deployment to daily operations.

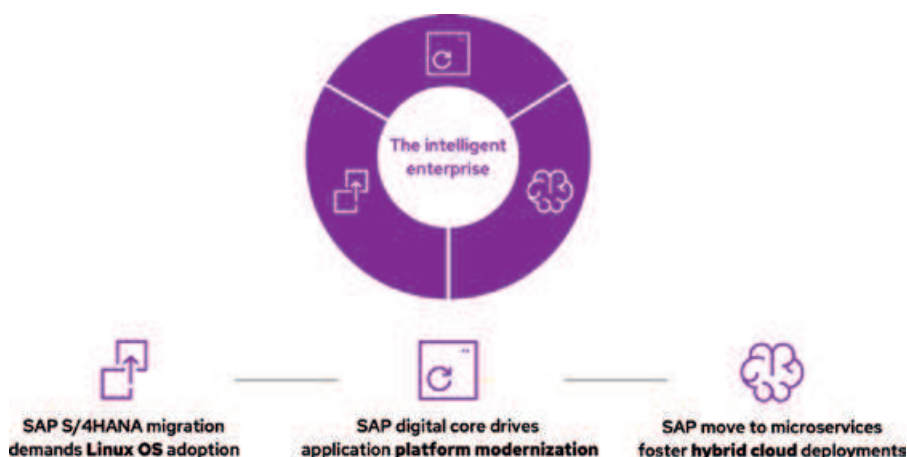
## Automation is the cornerstone

A central pillar of a future-proof, agile IT landscape is end-to-end automation. End-to-end means that automation extends from provisioning all the way to maintenance and operation of an entire IT stack. In other words, the automation projects currently undertaken in enterprise IT are not enough. In many cases, these projects involve only the automation of individual IT silos, for example in areas such as servers, networks, applications, containers or the cloud. But automation within individual silos does not eliminate silos, it merely automates them. The goal must therefore be holistic end-to-end automation of business processes, even across traditional IT boundaries.

The Ansible framework, currently one of the most important open source IT projects worldwide, plays a fundamental role. Ansible supports automation of processes across servers, storage devices, network devices, services, containers, clouds and even “non-IT” functions. This can include provisioning and configuration management, or application deployment and orchestration. Since this involves the automation of mission-critical areas, companies should always employ an enterprise solution with support. Red Hat has just the solution with Ansible.

## Ansible Automation Platform

Using the Red Hat Ansible Automation Platform gives companies the ability to automate the entire IT landscape with a single solution, all the way up to the SAP environment and security infrastructure. In other words, the goal of Ansible is to automate everything everywhere for everyone, that is, to automate everything for all possible use cases. Specific examples of the Ansible deployment spectrum include the automation



The necessary modernization of SAP applications toward an intelligent enterprise. Source: Red Hat.

of the standard installation process for Hana – exactly in accordance with the requirements in the SAP Notes – as well as the optimization and automation of NetApp NFS storage.

On top of the base Ansible technology, Ansible allows organizations to easily incorporate automation into existing tools and processes using RESTful APIs and a self-service portal. The central feature of the solution is the use of playbooks to call modules, which are written in the easy-to-understand YAML language. Specifically, Ansible brings together disparate playbooks and roles into a single workflow. Each IT area, department or even partner and supplier can contribute their competencies to corresponding playbooks and modules, which are then integrated into complex processes. The modules are developed by the community, hardware and software vendors or Red Hat, and are provided in bundles known as collections. In total, over 130 certified and maintained content collections are currently available through Red Hat Ansible, covering numerous use cases across the IT landscape, including automation in SAP environments.

The Ansible Automation Platform offers extensive benefits to SAP users: Automating entire workflows with a single tool enables companies to reduce administrative overhead, eliminate potential mistakes from manual activities, and do away with repetitive tasks. The result is a much more reliable and stable infrastructure, many more use cases, and rapid rollout of environments. It is these automation work-

flows that drastically accelerate all stages of modernization and ultimately help to reduce costs.

## Ansible and SAP

When considering Ansible for SAP, there is one key point that should not be overlooked: The use of Ansible is not limited to infrastructure or pure maintenance activities in the context of deployment, installation or provisioning, and network, storage or security automation. Housekeeping in ongoing SAP operations is also a key aspect, i.e. the automation of processes in SAP applications themselves. Automations in SAP are carried out directly from Ansible, for example with the administration of rights, the creation of users, the reading of system data or even the execution of processes. This is particularly useful in the preliminary project before the actual migration, in order to analyze and consolidate systems. Overall, there is no doubt that more and more companies will be using Ansible on a larger scale as a framework for IT automation. One sub-area of this will be the automation of SAP workloads, which will further enhance SAP modernizations for the long term.



Peter Körner,  
Business Development  
Manager Open Hybrid  
Cloud SAP Solutions,  
Red Hat

Please also have a look at our Community Info entry



Added value for SAP through hybrid data storage and management

# Data management and data authority

Over the past few years, NetApp has established a strong position within the global SAP community. Thanks to clever partner management, SAP users can find NetApp applications on premises and in the cloud.

**T**homas Herrmann handles the European affairs of NetApp in the SAP community, and maintains an office in the SAP partner port in Walldorf. He organizes a highly successful “SAP on NetApp Summit” every year and was kind enough to sit with E-3 Magazine for an exclusive interview.

**E-3:** Mr. Herrmann, NetApp is regarded in the SAP community as a specialist for data storage and management, as well as a partner of many other IT vendors. What is the company’s focus: direct contact with SAP customers, or the indirect channel via your partners?

**Thomas Herrmann, NetApp:** NetApp works closely with partners who value the benefits we provide for SAP, whether large partners such as the global systems integrators Capgemini, Accenture and Kyndryl, or more specialized boutique partners. Our contact with customers is 80 percent via this channel, i.e. our partners, and 20 percent direct sales via our sales and presales specialists.

**E-3:** And what fields do you focus on?

**Herrmann:** We are known for data management. Our focus, or rather our goal, is to provide businesses with “data authority.” Solutions from NetApp provide customers with complete control over their data – and what’s more they are easy to use, efficient and versatile, and they integrate seamlessly into application management. This is very important to our partners.

**E-3:** Digital transformation is having an impact on NetApp as well: Do you make more sales in the SAP community with hardware or software?

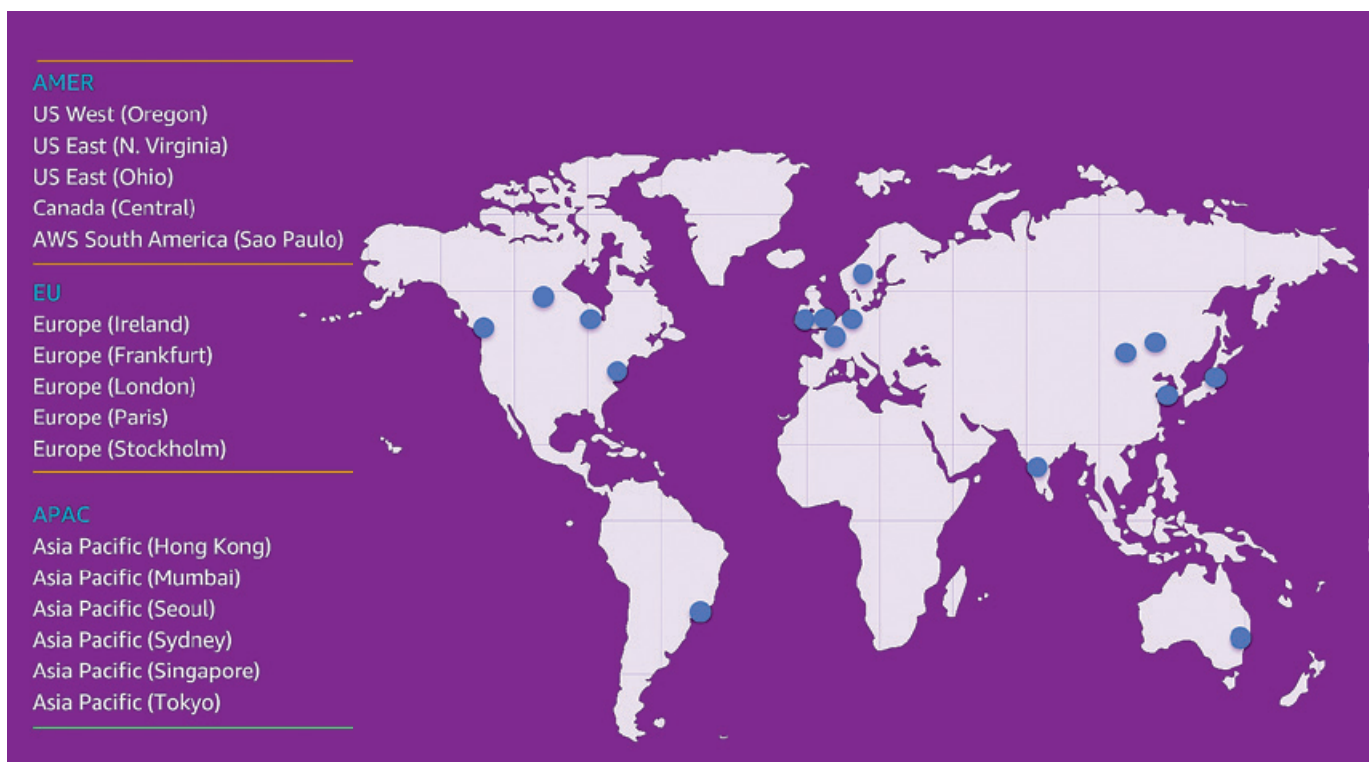
**Herrmann:** NetApp no longer calls itself a hardware company. Our focus and our added value is in our software, while hardware is a commodity. Our hardware comes with a unique software package. In terms of overall revenue, the on-premises business still dominates, but our higher growth numbers are in the cloud through the cloud services that we offer.

**E-3:** And what is the outlook for your company? What will be NetApp’s focus in the future: hardware or software?

**Herrmann:** Definitely software and, of course, cloud services, which can also be a combination of hardware and software.

**E-3:** NetApp has many different partners – from Cisco to AWS, Fujitsu to Red Hat. How do you manage this heterogeneous partner landscape?

**Herrmann:** With each of these partners, Cisco, AWS, Fujitsu and Red Hat, we have a long-standing partnership that is mutually beneficial to both parties. With Cisco, for example, we have built the joint solution FlexPod, which is very successful on the SAP market. Fujitsu has been building 100 percent on NetApp for years, with its PrimeFlex for SAP Landscapes solution. At NetApp, we have Alliance Managers for each partner to plan all the strategic matters. I plan SAP-specific topics directly with my counterparts at these partners.



Amazon FSx for NetApp ONTAP offers global accessibility in cloud computing and is a result of NetApp’s collaboration with hyperscaler AWS, which may also have strategic significance for current SAP customers. Source: Amazon 2021.



**E-3:** And where is the value for SAP customers in this complex web of products and services?

**Herrmann:** The value is always solution specific, and a solution is a combination of several products. NetApp, of course, offers added value in SAP data management, while partners such as Fujitsu can offer the service and the complete package, for example a complete operational concept for SAP landscapes in FlexFrame.

**E-3:** What do hybrid data management and data storage mean to you?

**Herrmann:** Data is the most important thing a company has, but how can customers use it properly? How do they make sure they're realizing the full potential of their data? What is the best way to use and store it? And how do users distinguish between important and unimportant data so that they aren't eventually overwhelmed by it? Companies need to have quick access to operational data, so fast memory is the only option here. On the other hand, data that needs to be stored for the long term and is only used sporadically can be outsourced at lower cost. Does storing and making available data that you don't need only result in added costs? Is hybrid data management the combination of all these questions and their answers? NetApp offers solutions for all these challenges for data life cycle management in hybrid environments.

**E-3:** In the German-speaking SAP community, are you seeing a trend in the direction of cloud, hybrid or on premises?

**Herrmann:** The cloud is being used more and more and for many companies it is already the standard. The trend, I think, is toward a hybrid cloud infrastructure, i.e. the combination of internal on-premises IT infrastructure, private cloud and one or more public clouds – in other words, multi-cloud. Companies will increasingly move to using cloud services and/or using different cloud providers in parallel, depending on how good the offer is. The price/performance ratio naturally plays a major role.

**E-3:** In terms of data management in an S/4 Hana environment, where do you see the main challenges for NetApp and what are your solutions to them?

**Herrmann:** Compared to its predecessors, SAP S/4 Hana relies on a simple architecture. This is true for both the data model and the user interface. The Hana database itself, of course, offers greater



*Thomas Herrmann, Manager Business Development SAP at NetApp for EMEA, knows the SAP community like no one else. He uses his extensive contacts to support NetApp's customers.*

speed due to its in-memory architecture and enables you to work in real time. Accordingly, S/4 Hana environments have special requirements regarding hardware and infrastructure.

**E-3:** What are the specific challenges?

**Herrmann:** NetApp has certified hardware and software, for on-premises S/4 environments or with the hyperscalers. They meet all the KPIs specified by SAP. The challenges for S/4 Hana in data management are not very different from the S/4 predecessors. NetApp's standard portfolio contains solutions for operating SAP landscapes efficiently, cost effectively, flexibly and easily.

**E-3:** What do you expect from SAP in terms of data management and Hana in the future? How will this partnership develop?

**Herrmann:** SAP is one of our largest customers worldwide, and when it comes to SAP's operation of its internal data centers, the added value we deliver for data management is indispensable. With SAP as a partner and a shared go-to-market, I see the potential for joint approaches in the area of industry 4.0, where we will work closely with SAP and other partners.

**E-3:** In the future, which partnerships will be particularly important for NetApp and, of course, for SAP NetApp customers?

**Herrmann:** Our mission is to simplify and modernize data infrastructure. We will retain the strategic partnerships that we have, and we will add new partners. I see more and more partners offering solutions for cloud services, and we are working with them to offer and build solutions and services. With NetApp as your partner, you can control, consolidate and organize everything from the data center to the cloud.

**E-3:** What digital innovations will NetApp surprise the SAP community with in 2023?

**Herrmann:** Transferring applications to the cloud is only the first step on the road to the cloud. Delivering on the promise of the cloud requires a holistic approach to cloud operations that considers cost, resource management, optimization and security. Our growing portfolio offers a compelling suite of solutions for the cloud that allow organizations to focus on their SAP applications, not infrastructure. We will be expanding our portfolio with solutions for 2023 and beyond, so stay tuned.

**E-3:** Thank you for talking with us.