Independent SAP Trends, Analyses, from Business and IT

Platform for E2E Processes and Digital Excellence

Jochen Glaser is the global head of SAP business at Red Hat, where he is responsible for delivering added value to the SAP community from the open source community. In recent years, Red Hat has developed a platform that goes far beyond Linux.

Platform for E2E Processes and

For many years, Linux was the only open source component in the SAP community. Now Red Hat is launching a complete open source platform. Peter M. Färbinger spoke to Jochen Glaser about this unique solution.

Open source has arrived in the German business world. Sixty-six percent of major companies have chosen to use open source software, while only 4 percent of them are skeptical of or will not deploy the software. That means roughly 90 percent of the large companies see the advantages that come with using open source software. The freely available software is already in use at a vast majority of large firms in Germany, and those that are not already using it could do so in the future. These insights were gained as part of a survey commissioned by the German digital association Bitkom of more than 800 companies with over 100 employees in Germany.

"There are a number of new challenges for current SAP customers in view of two key IT-related initiatives currently shaping the market; those being SAP modernization, and the productive implementation of digital innovations and services," states Glaser, outlining why open source and Red Hat are so successful in the SAP community. "The two initiatives are running concurrently, which are driving demand for new, shared architectures and platforms to replace the silos that previously existed."

Red Hat is providing end-to-end support during the development of the new SAP architecture. Along with that, it has been assisting existing customers for years in their efforts to break down silos. "This opens up a number of synergies as well," says Glaser, who has learned this firsthand from past experiences in numerous successful projects. "Our portfolio includes roughly 50 solutions focused on IT optimization, agile integration, hybrid cloud infrastructure, cloud-native app development, and automation. All of these are also key components for future SAP environments. The aim now is to give SAP users the freedom to choose which hybrid cloud architecture they want to use."

According to a Bitkom survey, 75 percent of companies are open to and interested in open source software. Conversely, only 4 percent are fundamentally skeptical of or will not use open source software, while 20 percent of the companies are still undecided. Presently, only 25 percent of firms with 100 or more employees do not use open source, whereas 66 percent actively deploy such software. "It's likely that even more companies use open source solutions without even knowing it, be it as an operating system for smartphones or as the basic software for web servers," says Bitkom president Achim Berg. "Open source is particularly important when it comes to new technologies such as artificial intelligence and blockchain, where the pace of development is very high."

The SAP community is currently facing a unique challenge: Starting in 2025, all SAP applications will run on the Hana database - and Hana needs Linux to run. "Red Hat has been providing official support for Linux platforms for Hana for many years and for many versions," explains Jochen Glaser. "In the SAP environment, a vast ecosystem of Red Hat partners, such as OEMs, GSIs, and ISVs, therefore uses Red Hat Enterprise Linux globally as a platform for private, on-premise, and public cloud offerings." For example, Red Hat also offers an array of smart management tools and automated Hana deployments in any hybrid environment based on Red Hat Ansible. (Go to the next page for more information on Ansible Automation.)

In its own words, Red Hat has positioned itself as follows: Red Hat provides the right answers and solutions to the challenges SAP users face. These are based on a global ecosystem, an extensive range of products and services, and the business expertise it makes available to its customers. Red Hat's line of products and services is also the result of years of close collaboration between the market-leading provider of open source platforms and the leading producer of business software. Dating back to 1999, SAP applications could be run on Red Hat Enterprise Linux. The partnership gradually expanded in scope. This began with Red Hat Enterprise Linux 4, which was already SAP-certified, moving on from there to Red Hat JBoss in combination with a Hana porting contract, integration into SAP NetWeaver, and, lastly, Red Hat Enterprise Linux for SAP solutions and Hana. Since 2017, the number of Red Hat products and services for the SAP ecosystem has grown extensively. A recent example of this is Red Hat Enterprise Linux 8 for SAP Solutions.

What does Red Hat have planned for 2020 and beyond? Where will its focus be when it comes to Hana? "In short, we will concentrate on providing users with the freedom to choose what platform they want to use for current and future SAP workloads and on ensuring there is no vendor lock-in when it comes to cloud providers. By doing so, the SAP community will be able to retain full control," says Glaser, proud of his company's end-to-end package. "Red Hat stands fully behind SAP's technology strategy 'The Intelligent Enterprise.' Practically speaking, the added value is achieved by way of a uniform core: There is no difference - and this I want to stress - between Red Hat Enterprise Linux (RHEL) for Hana and the RHEL standard. All hardware, software, and security certifications apply without restriction. All add-ons, smart management products, and automation solutions from Red Hat's portfolio are identical and result in a number of synergies in the form of a uniform open hybrid cloud infrastructure platform."

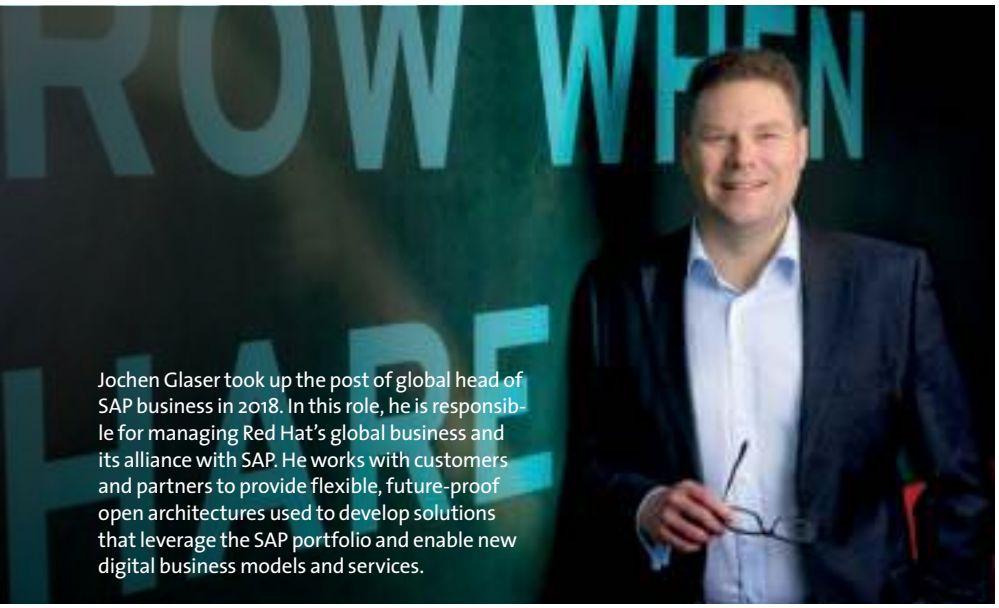
According to Bitkom, 90 percent of companies with 100 or more employees believe there are advantages to using open source software. When asked to describe the number one advantage of open source, 17 percent responded with lower costs thanks to no licensing fees. This was followed, with a wide margin, by the high level of security achieved through fast updates and independence from individual software providers (9 percent each), as well as the wide selection of open source components, access to source code, and the easy customization of the software (7 percent each). In addition, open standards (6 percent), compatibility with other deployed tools, and an active community for sharing knowledge and information (5 percent each) are seen as other key advantages of open source software.

Digital Excellence

"For some time now, companies have been using open source not just because it is free, but also because it can offer many other advantages, ranging from improved security to the ease at which you can customize the software," says Bitkom president Berg, concurring with Glaser on this highly positive trend. Glaser: "Red Hat now supports far more than just Linux for SAP. We essentially offer a fully integrated open hybrid cloud infrastructure platform that matches the needs of the SAP community."

Red Hat appears to be the most successful open source company in the world. Why has Red Hat been less visible in the SAP community in recent years? "This is something I'm only asked in German-speaking countries," says Jochen Glaser, surprised by the question. "I don't think Red Hat has neglected the SAP community - not in Germany or anywhere. We've always been highly committed to the SAP community in all regions. We have been supplying certified Linux platforms for SAP environments since 1999. Red Hat is the world's leading open source provider and also the first choice outside the German-speaking community when it comes to SAP Linux platforms."

Red Hat is considered to be the leading open source provider by the SAP community across all regions, and it is also recognized for its commitment to SAP. With that said, Glaser admits that the German-speaking market is somewhat of an exception. "We nevertheless remain as committed as ever to SAP and the SAP community in Germany," he stresses. There are still reservations when it comes to using open source software highlighted in the Bitkom survey: 79 percent of large companies believe there are also disadvantages associated with open source. Twelve percent of respondents cite a lack of skilled staff at their company who are needed, for example, to customize and upgrade the software to meet their specific requirements as the main disadvantage. This is followed by



Jochen Glaser took up the post of global head of SAP business in 2018. In this role, he is responsible for managing Red Hat's global business and its alliance with SAP. He works with customers and partners to provide flexible, future-proof open architectures used to develop solutions that leverage the SAP portfolio and enable new digital business models and services.

a lack of acceptance within the company (7 percent); a lack of clarity regarding the warranty; a lack of training options; a lack of solutions for the company's specific application; the high cost of migrating from the legacy software to open source; and too many choices in terms of open source solutions that leads to confusion (7 percent each). Finally, 5 percent complain about the high training costs.

Especially in the SAP community, these concerns only apply to a limited extent, says Glaser. "The Red Hat package offers many advantages, such as extended long-term support options, proactive monitoring, and resolution according to SAP specifications such as those laid out in SAP Notes. And, needless to say, all versions offer high availability. Red Hat Ansible, as part of the operating system, allows for automated Hana deployment in just a few minutes fully in line with the specifications set out in SAP Notes. In addition, a certified API management link to Hana makes new services as well as the modernization and migration of in-house developments in S/4 projects possible."

The Hana community is faced with a paradox: While Power 9 from IBM offers the best on-premise server for Hana, and Suse supplies the accompanying Linux operating system, Red Hat would actually be the more logical choice because it is part of IBM. The question now is how to proceed. "Red Hat and IBM share a common hybrid cloud strategy. The necessary technology components are based on Red Hat's open hybrid cloud infrastructure," explains Glaser. "Following the recent announcement that all IBM Cloud Paks will be migrated to Red Hat OpenShift and Red Hat Enterprise Linux, IBM also decided to use Red Hat Enterprise Linux as its platform for Hana on IBM Power. We are expecting the official SAP certifications for Red Hat Enterprise Linux 8 on IBM Power 9 for Hana to be issued shortly."

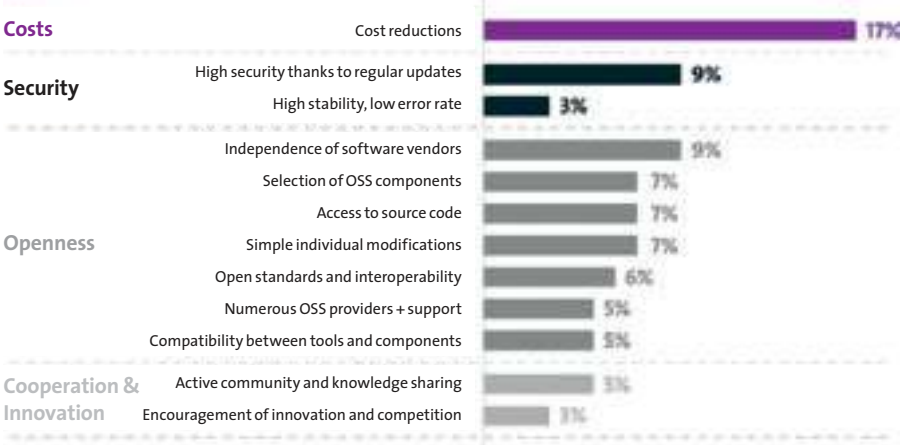
SAP and Red Hat work in close cooperation, and this partnership is deeply established. The team responsible for the global alliance is located in Walldorf, where SAP's headquarters are. In addition, the partnership takes place on many levels. Among other things, Red Hat provides SAP support training in-house as well as global training and partner enablement resources for the expansive Red Hat SAP ecosystem. "As well as being involved with a number of strategic SAP partners, integrators, and ISVs, we are also at the SAP Partner Port in Walldorf and the SAP Linux Lab. Red Hat is furthermore a member of the SAP Benchmark Council. As you can see, our commitment to SAP is extremely wide-reaching and multi-faceted," says Glaser, proudly describing the current situation.

Jon Dorrington, VP of SAP global business development and global ecosystem, says, "Red Hat is a strategic and valuable open source partner of SAP. Red Hat's technology leadership in Linux, container orchestration, and API management will help promote new opportunities to innovate between us and our shared customers." He goes on to say, "Recently, we finalized a new strategic alliance with Red Hat. It expands the platform services and enhances the support portfolio around the flagship operating system RHEL for SAP Solutions."

What's planned for the future? Former SAP CEO Bill McDermott enjoyed using the term „Cloud First." What cloud products does Red Hat offer for existing SAP customers? "Red Hat's global open hybrid cloud strategy based on open source aligns perfectly with SAP's focus, representing the ecosystem of all partners, including IBM," says Jochen Glaser. The goal is to create a streamlined application development process embedded in the platform, achieve strategic flexibility in the selection of the underlying resources, and develop a DevOps capability for SAP workloads and much more. Glaser expounds, "The majority of SAP users will want to use a combination of on-premise, private cloud, and public cloud services for both SAP and non-SAP workloads that are closely integrated. All three layers, including on premise, can be uniformly visualized using Red Hat OpenShift as a proven enterprise Kubernetes platform.

No separate development is necessary for on premise or even custom public cloud platforms - and SAP's ecosystem benefits from this, too. Over 200 certified third-party solutions are already available in Red Hat's container catalog."

Open source opens up new opportunities



What do you think is the main advantage of open source software?
Survey basis: all companies with 100 or more employees (n=804). Source: Bitkom Research

SAP users at the crossroads of migration and digitalization

The Goal is Digital Excellence

SAP is building the intelligent enterprise. Red Hat stands fully behind this strategy. The upcoming modernization will involve drastic changes. They relate to the migration to Hana and the migration of existing SAP applications, including custom code, to S/4.

By Peter Körner, Red Hat

All steps in the migration to S/4 or Hana are closely linked to decisions on IT infrastructure and new hybrid architectures. When it comes to the latest generation of products, SAP is increasingly building upon open source technologies such as Linux for Hana and Kubernetes for SAP Data Hub. Here, companies have to ask themselves which open source partner can best support them during the process of rolling out open source solutions in their IT departments.

2025 may seem far off, but for companies that date is rapidly approaching. As it now stands, they may not have the necessary developers for the task, and unforeseen delays are more the rule than the exception when it comes to large-scale IT projects. Along with that, many companies are likely to find out as part of a strategic reorientation that IT structures have become increasingly complex and opaque, especially in recent years. Where necessary, they were updated and upgraded in many sub-areas, but they are no longer as future-proof due to the increasing number of implemented solutions.

Digital Transformation

The other challenge that will affect all businesses in the coming years is the digital transformation. This process, which has been the topic of much discussion for years, involves a variety of new issues that all companies must take into account in the medium term if they want to remain competitive. These include artificial intelligence and machine learning or data-driven processes that, for example, make it possible to better understand the needs of customers.

Other important topics include Industry 4.0, IoT, RPA, blockchain, and virtual and augmented reality. These modern solutions are now being developed as cloud-native applications, which are created on the basis of containerization, Kubernetes, and cloud platforms. One such solution entails the abstraction of the infrastructure achieved by adding an extra layer.

Peter Körner is business development manager open hybrid cloud SAP solutions at Red Hat.

This is built on Red Hat OpenShift, an enterprise Kubernetes platform that allows for unified, cloud-native application development on any infrastructure, and a hybrid multi-cloud mix that includes on-premise deployments. It is precisely these features that make the open hybrid cloud infrastructure ideal for use for SAP integration. Existing SAP customers will permanently retain freedom of choice regarding their platform.

Legacy IT Systems vs. Innovative New Solutions

A major challenge for companies, especially large ones with legacy IT systems that developed over many years, is how to connect the SAP world on one hand with innovative new solutions on the other and how to integrate them. For many years, Red Hat has been able to offer solutions that go far beyond an enterprise Linux system and support the integration of many different applications. This delivers useful synergies for companies that represent significant added value.

One example of this is the Ansible project, an automation language and a framework for organizing and managing IT environments. After its acquisition by Red Hat, Ansible is now one of the world's largest open source projects. It is a powerful tool that helps companies and, more importantly, partners achieve much higher efficiency when carrying out installations.

SAP and Open Source

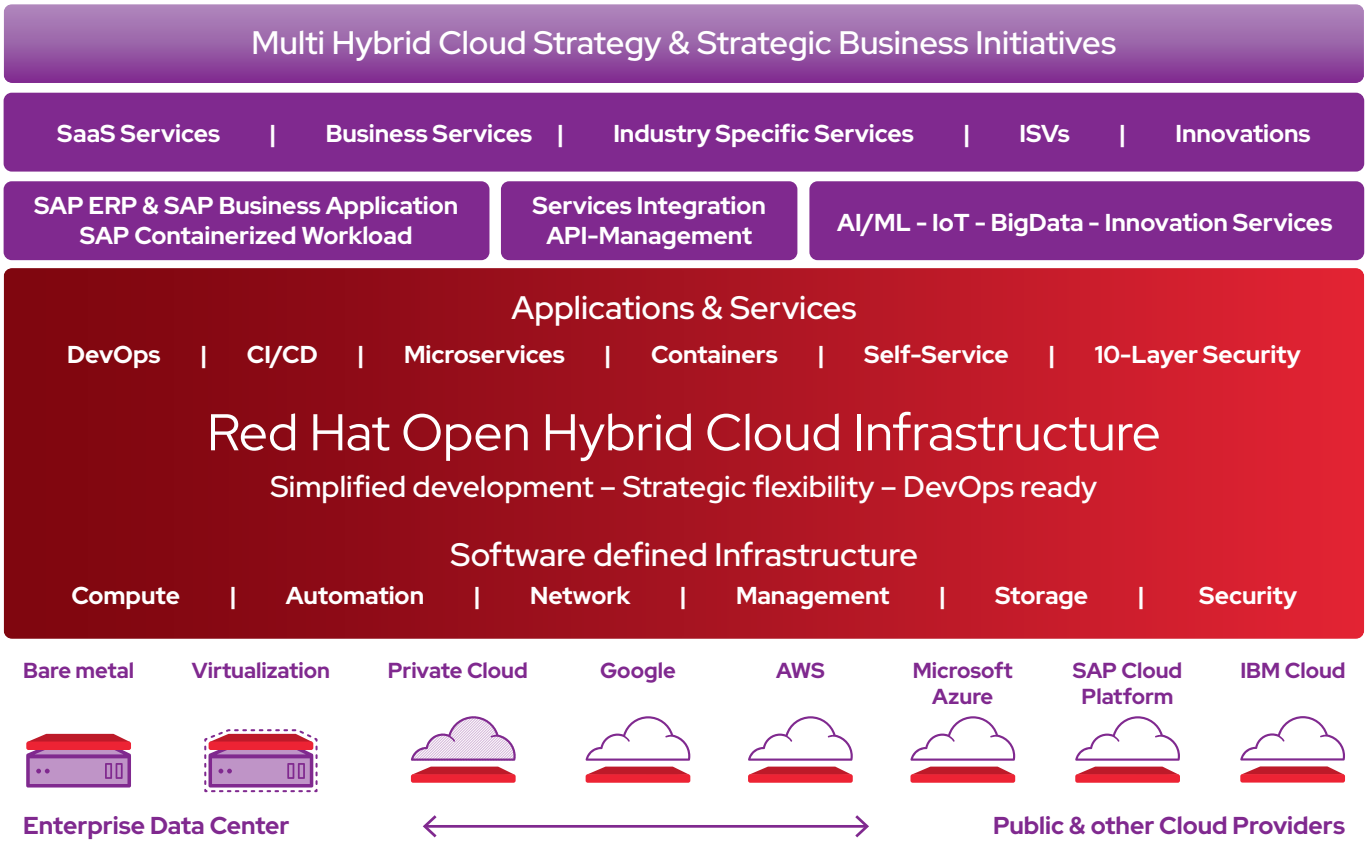
In addition, Red Hat solutions are gaining in prominence because SAP has been focusing increasingly on open source solutions for some time and relies, for instance, on container-based workload strategies. For example, SAP is actively involved in the development of open source projects that are suitable for business use and based on open standards. Like other software vendors, SAP leverages the potential for innovation that open source offers and has developed the Hana and SAP Vora in-memory databases using technologies such as Linux and containers.

Kubernetes:

How Companies Solve the new Challenge

Kubernetes will be one of the most important topics going forward. Yet, many managers have not dealt with the underlying thought processes, especially considering that the use of Kubernetes also affects business-critical applications. Red Hat has published a white paper on the unique challenges of container security that is available for free download ("Ten Layers of Container Security").

https://www.redhat.com/cms/managed-files/cl-container-security-openshift-cloud-devops-tech-detail-f7530kc-201705-en.pdf



For existing SAP customers, Red Hat opens up the whole open source universe, including Enterprise Linux for Hana. The OpenShift container platform, including Red Hat Ansible Automation, is particularly important when it comes to Hana and S/4 customization.

If a company is looking to containerize its services and use Kubernetes clusters by SAP, there is no way around the Red Hat OpenShift Kubernetes container platform, which is certified for SAP Data Hub. SAP users are increasingly asking for OpenShift as the basic tool for processing the SAP workload.

Ansible Automation and OpenShift

Ansible and OpenShift also help demonstrate Red Hat's special position in the SAP ecosystem.

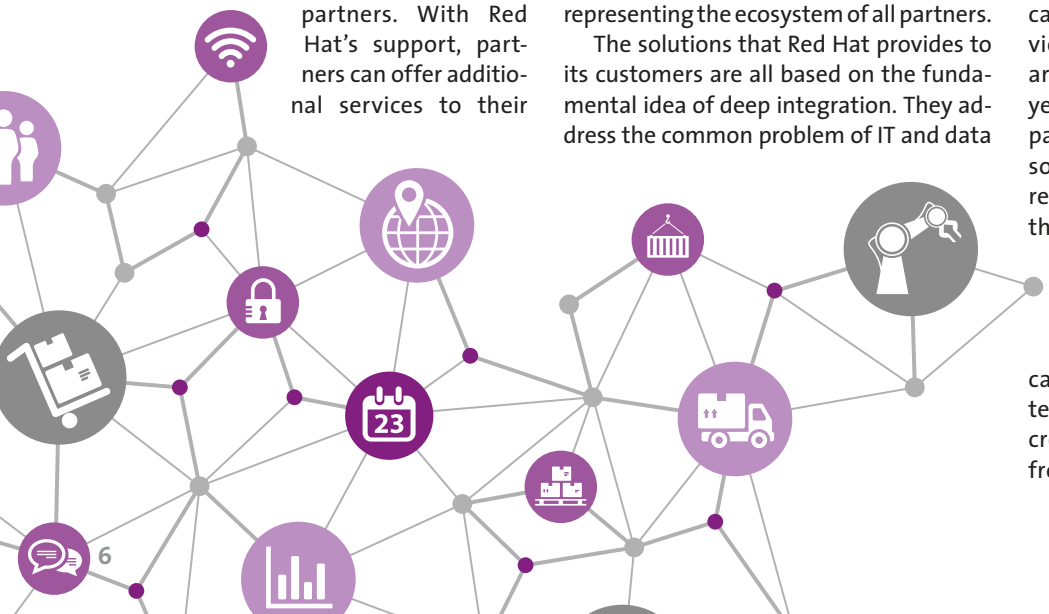
Red Hat is not only a technology provider for consumers but also an important service provider for SAP partners. With Red Hat's support, partners can offer additional services to their customers. For example, an SAP partner that performs Hana migrations can benefit from working with Red Hat in innovative fields like AI, machine learning, IoT, big data, and blockchain. Consumers and partners receive the frameworks and methods as well as individual building blocks and applications that put them in a position to offer new services and cover innovative new topics.

Through the combination of simple, integrated development, Red Hat creates flexibility in terms of IT strategy and a modern IT culture that delivers added value for companies. Red Hat's global open hybrid cloud strategy is aligned with SAP's company orientation and with that of IBM, representing the ecosystem of all partners.

The solutions that Red Hat provides to its customers are all based on the fundamental idea of deep integration. They address the common problem of IT and data silos. As part of its service package, Red Hat offers companies fit-to-strategy solutions and technologies. When it comes to integration, two of the main challenges involve the modernization of interfaces and the large number of solutions developed in-house in the area of supply chain, production, and materials management. They are often based on the proprietary programming language Abap.

Public Cloud and Shadow IT

Because S/4 is based on a different database technology, migrating applications is complex and difficult. The question therefore is whether to develop new applications or customize existing ones in view of the IT structures that developed around the SAP infrastructure over the years at many companies. This issue is partly overcome through the use of SaaS solutions, in which case companies often resort to popular public cloud solutions that lead to a shadow IT developing. Management has often tolerated this because certain cloud solutions, such as test environments or redundancies for peaks, could not or still cannot be mapped from existing IT systems. The problem here is that the IT silos created as a result prevent companies from disrupting and innovating, not to



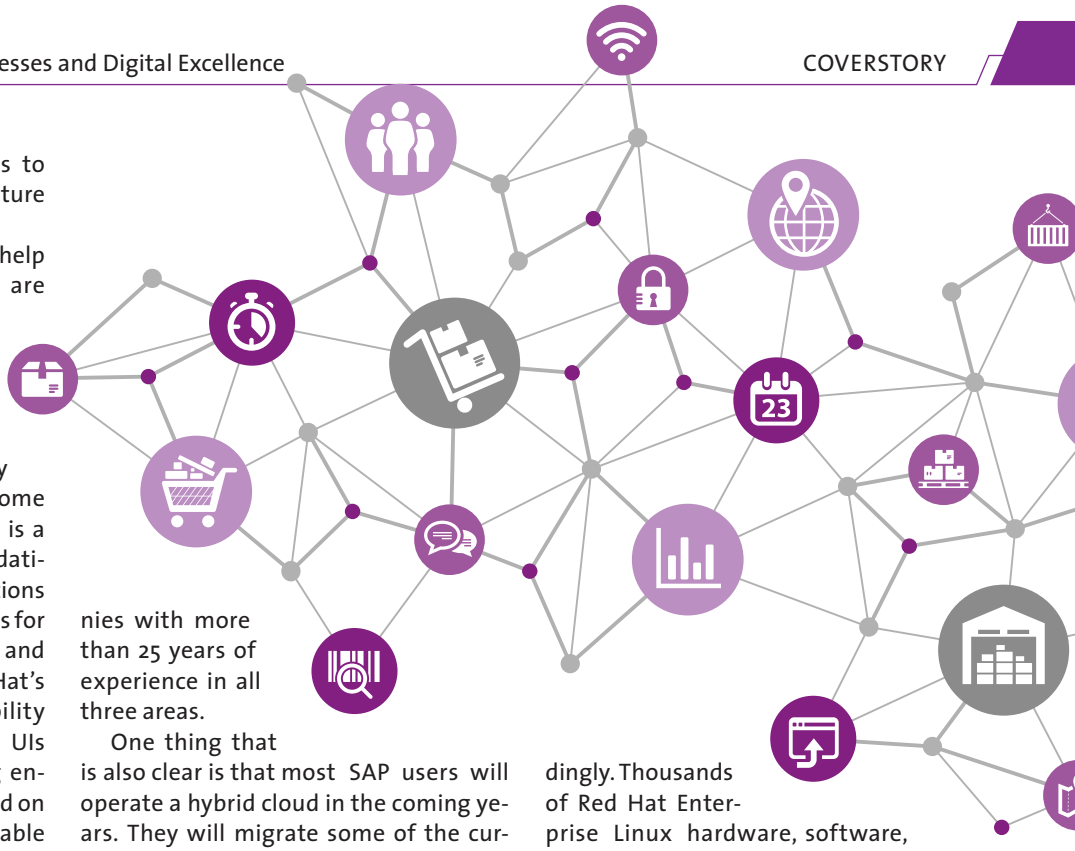
mention from using cloud services to upgrade and make their IT infrastructure flexible.

In Red Hat's view, integration can help ensure that different systems are connected, and it also acts to eliminate media transfer problems. Still, if you were to ask IT managers at companies, they would say there are numerous processes that are not as automated as they could be. What is needed to overcome the existing silos within companies is a uniform and modern technical foundation that helps link all existing applications and services. Open APIs form the basis for interconnecting data, applications, and devices and play a key role here. Red Hat's concept of side-by-side extensibility combines SAP data, processes, and UIs with state-of-the-art programming environments, CI/CD, and DevOps based on Red Hat OpenShift in a uniform, scalable way on any infrastructure.

Open Hybrid Cloud

Data is commonly referred to as the "new oil," and data-driven processes will help companies make better decisions on the basis of IT intelligence in the future. Solutions can be developed and scaled globally on an open hybrid cloud infrastructure, which, depending on the data available, are behavior-based and support high-performance automated customization of services by means of artificial intelligence and machine learning methods. This requires that operational and experience data is not only collected but also consolidated, most importantly in real time using data from SAP instances.

In the future, maximum flexibility will be required in the execution and design of services. In addition to traditional on-premise operation in data centers, modern containerization will make it possible to outsource applications to the public or private cloud or to transfer them to hybrid operation. In such cases, companies benefit from the flexibility to add resources automatically, at the push of a button and based on set rules. Flexibility is absolutely essential here, especially in view of the current, actual customer challenges. Based on Red Hat's general assessment and experience, 70 percent of companies' IT expenditure relate to traditional workloads; 20 percent to brownfield projects such as migration and modernization, for example, via containerization; and 10 percent to innovations such as cloud-native developments. Red Hat is one of the few select companies with more than 25 years of experience in all three areas.



One thing that is also clear is that most SAP users will operate a hybrid cloud in the coming years. They will migrate some of the current applications from SAP as a SaaS, while the other apps will be migrated to S/4. This inevitably increases complexity, and for that reason, selecting the correct tool sets for providing end-to-end services in hybrid environments is particularly important. Here, too, there is no way around open source-based platforms.

SAP, Red Hat, and IBM Team up

The trend towards hybrid cloud is unstoppable, and Red Hat, SAP, and IBM, representative of all Red Hat partners, have joined up to pursue a common strategy. In terms of methods and technologies, it is based on Red Hat's open source solutions and many years of experience in supporting and modernizing traditional workloads. The key is to take a broader approach that includes application services and infrastructures of any type.

While the advantages of open source are now well-known, it should also be clear that simply saying it is "free" would be selling the software short. Users cannot use all the features available with open source software just like that; this requires appropriate administration and customizing. There are also several patches and add-ons every year in the Linux environment that have to be installed and customized, a task that Red Hat performs as an experienced partner for companies as part of end-to-end patch management. For example, the company runs a service that manages its infrastructure components; monitors all critical alerts globally; and delivers or recommends the appropriate patches accordingly. Thousands of Red Hat Enterprise Linux hardware, software, and security certifications also apply without restriction for use as the basis for an SAP platform.

Red Hat Innovation Lab:

An Introduction to DevOps and agility

For many large firms, a corporate culture based on DevOps can be a real culture shock because the well-known development philosophy does not appear to mesh well with it. This is why Red Hat has created Open Innovation Labs, a new type of project that goes well beyond traditional chemistry meetings held at the beginning of a project. It is a service in which a specific use case is isolated from a project task and detailed results are prepared for the client over a period of 6 to 12 weeks. In this way, Red Hat conveys the knowledge and strategies a company needs to implement a project. The goal is to put the customer into a position where they can use agile methods such as Scrum and design thinking to implement complex solutions. Professional and managerial staff looking to discover more about DevOps (development plus operations) and learn how to prepare their team for this innovative method of working can visit

https://www.redhat.com/de/topics/devops#? where they will find further information as well as a large number of videos.

Automation, containerization, and transparency deliver quick wins

Updating E2E Processes from Top to Bottom

Digital transformation, along with the associated new technological architectures, affects most companies. It also makes it necessary to renew SAP as the basis for corporate management that has grown and developed over decades.

By Peter Körner, Red Hat

A range of far-reaching technological changes to SAP environments are lined up for the medium term. They relate primarily to the migration of all databases (AnyDB) to Hana; the migration of existing SAP applications to S/4; and, for instance, the integration of existing data silos into SAP Data Hub. Two examples will illustrate how to quickly and easily modernize SAP.

One of the central innovation projects in the SAP environment is the integration of existing data silos with SAP Data Hub. It is an all-in-one data coordination orchestration solution that identifies, refines, enriches, and manages any form, type, and volume of data across the distributed data landscape. For example, interactive analyses of data sources, such as traditional storage, Hadoop, and Amazon Simple Storage Service (Amazon S3), are also supported. This creates the foundation for gaining new and better insights. Along with that, seamless integration with Hana makes it possible to effectively leverage big data insights and actionable information received in the context of business processes.

SAP Data Hub and OpenShift

SAP Data Hub's distributed runtime engine and the data pipeline engine are provided as container images. Management is carried out by means of Kubernetes. Use of container technology reduces the complexity of deployments and facilitates the installation, maintenance, and updating of applications. In addition, containerization ensures scalability. SAP Data Hub supports on-premise and cloud- and hybrid-based deployments, and thus encompasses the containerization of services and use of Kubernetes clusters. This is also where the Kubernetes container platform Red Hat OpenShift, which is certified for SAP Data Hub, comes into play.

Unlike simple or isolated Kubernetes services, OpenShift offers a container infrastructure solution that includes lifecycle management, automation, security, and high scalability. OpenShift meets the requirements for the productive use of containers on a larger scale. At Deutsche Bank, tens of thousands of containers are in live operation.

Kubernetes and Big Data

Data Hub on OpenShift is a new integrated solution that links Kubernetes with actionable big data insights. The two solutions in combination form the basis for requirements-based, in-memory big data analysis, the streamlined management of large-scale big data analyses, and the simplified integration of SAP Data Hub and Hana.

The main criteria for a professionally designed and managed hybrid IT landscape are scalability, seamless integration, compliance with corporate policies, security, and open interfaces that provide additional business functions. APIs play a key role in open hybrid scenarios.

Red Hat's enterprise-ready API management solutions are open, modular, highly scalable, and compatible with SAP Cloud APIs and with virtually all third-party IT systems. The power of open source is particularly important in hybrid cloud scenarios, as the range of cloud services grows daily and businesses have the freedom to choose which cloud functionality and services best meet their needs.

A characteristic feature of the API economy is that every company is both a consumer and a producer of functions, data, and services. SAP customers could offer IoT data captured by way of a Red Hat Intelligent Gateway via an API, thus opening up new revenue streams. A number of companies across many industries now generate a significant portion of their revenue via APIs - and SAP users should not ignore this development either. The intelligent, professionally managed use of APIs always pays off for them, in terms of implementing innovative business models and generating additional sales.

But what approach should companies take when carrying out SAP modernization? One example worth mentioning is the neutral, independent Red Hat migration assessment for SAP landscapes recommended by SAP, which is based on the KPI Analyzer App powered by West Trax. It has been upgraded to include an analysis of specific system and interface KPIs, allowing Red Hat and its partners to provide detailed recommendations for action, also with regard to suitable infrastructures and integration options.

The app lets users obtain all relevant facts about the current status on the process level of production systems as well as in-house developments, background jobs, and S/4 Hana compatibility all within 1 day. It complements the existing SAP standard resources with detailed drilldowns into clients, company codes, and locations, as well as an industry benchmark with over 1,700 comparative analyses from across 15 different industries. It also contains practical housekeeping information and quick wins. This makes it possible to reduce subsequent migration costs and times by up to as much as 60 percent. The added value lies in the combination of the assessment with the analysis of suitable architectures and technologies for innovation planning based on Red Hat's open hybrid cloud infrastructure.

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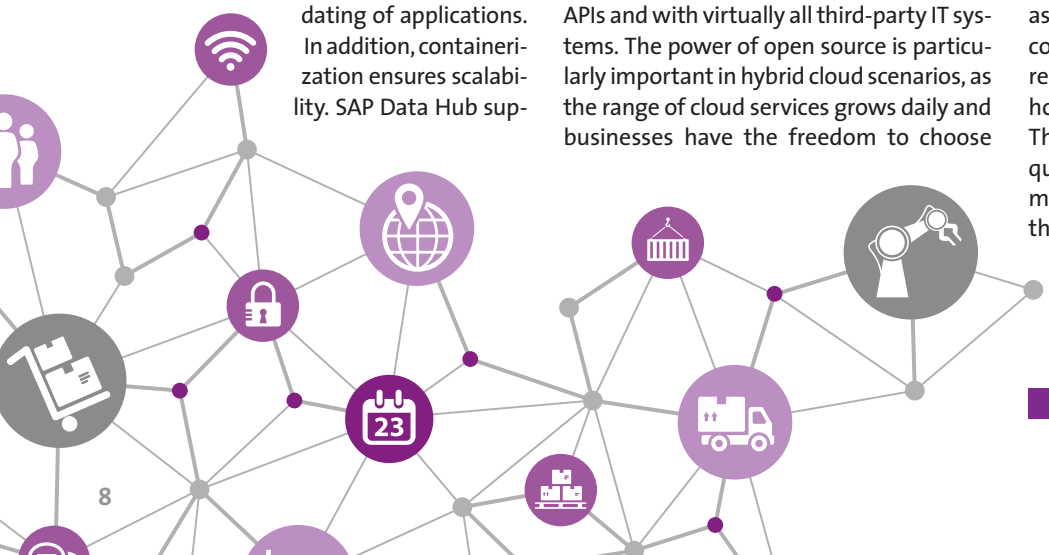


Deploy SAP Hana in a single click with Ansible

Standardization and Automation

Digital transformation requires the standardization of IT landscapes and the automation of processes - and this applies to the SAP ecosystem as well. With standard tools like Red Hat Ansible, it is possible to achieve quick wins.

By Peter Körner, Red Hat, and Thomas Bludau, SVA

IT departments face a common set of problems. The current situation at most of them involves a wide array of different applications and tools, and IT silos are widespread. Company departments often act independently and are not subject to control, which leads to the development of shadow IT. This results in inflexible, slow, and error-prone processes as well as high security risks. What are the options available to address these challenges?

Automation is a hot topic in this area. Companies want—or rather need—to automate. The driving factors are gains in efficiency as well as reliable, standardized reproducibility and traceability. In addition, automation is meant to provide the basis for DevOps and self-service models.

It is imperative that you view automation as a comprehensive approach, because automated silos are still silos and do not lead to the desired results. The stated task is to consistently automate previously fully separate, stand-alone tools. This requires a great deal of independent specialist know-how, which is usually found within a number of different departments and employees. Coordination problems, delays, and incompatibility issues are bound to happen. Red Hat Ansible Automation provides the perfect solution to meet these challenges, which significantly reduces costs in workflow management.

Ansible can combine many different playbooks and roles in a single workflow. This way, every unit of an IT department can map its specific competencies in matching playbooks that can then be integrated into complex processes without affecting other units.

The possibilities available are best demonstrated by the automation of Hana deployments and configurations. The Hana in-memory database provides precise set-up requirements that are documented in SAP Notes. SAP defines all set-up guidelines for all platforms in SAP Notes, which contain many manual steps. This creates the risk that one or more system-specific notes may be missed or misinterpreted. In addition, SAP only supports production systems if the steps outlined in SAP Notes are consistently observed and documented.

Thomas Bludau
is a system engineer at SVA System Vertrieb Alexander GmbH.

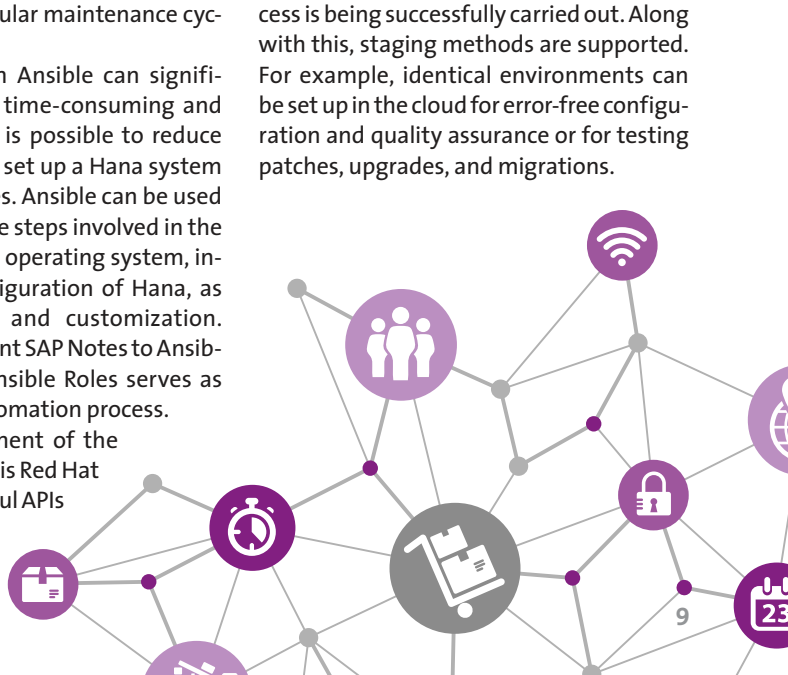
Here are the basic steps involved in the standard installation process for Hana: provision of hardware and/or setup of a VM; installation and configuration of the basic operating system Red Hat Enterprise Linux; installation and configuration of Hana; and system validation and customization. The application can then be incorporated into the regular maintenance cycle.

Automation with Ansible can significantly improve this time-consuming and complex process. It is possible to reduce the time required to set up a Hana system from days to minutes. Ansible can be used to fully automate the steps involved in the configuration of the operating system, installation, and configuration of Hana, as well as validation and customization. Migrating the relevant SAP Notes to Ansible Playbooks and Ansible Roles serves as the basis for the automation process.

The core component of the automation process is Red Hat Ansible Tower. RESTful APIs and a self-service portal are used to integrate the solution into existing tools and processes, making it suitable for use across the entire company. In addition to automating complex workflow scenarios, Ansible Tower offers the central management of inventories, playbooks, and credentials, role-based access control, and an end-to-end audit trail.

Red Hat Ansible is suitable for smaller environments or systems as well as for complex environments. This means the solution supports the dynamic addition of new machines and, with just a few changes, larger environments can be set up and configured. Other Ansible roles let users install scale-up and scale-out environments with Hana system replication and an accompanying high-availability connection via Pacemaker.

In addition to fully automated deployment, Ansible, in combination with Red Hat Satellite, supports configuration management during operation as well as patch and release management. Red Hat Ansible is designed to deliver the best results in terms of user-friendliness and security. Getting started with Ansible playbook development is quick and easy. Changes made to the playbooks are continuously tested using a developer platform. Every change likewise generates multiple scenarios, such as scale-up, scale-out, system replication, and pacemaker, and tests whether the process is being successfully carried out. Along with this, staging methods are supported. For example, identical environments can be set up in the cloud for error-free configuration and quality assurance or for testing patches, upgrades, and migrations.



Molecular Health supports SAP clinical data warehouse with Red Hat solutions

Digital Stability and Innovation

Molecular Health, a biomedicine company, uses analytics to provide comprehensive medical and therapeutic services. The company previously used a Suse Linux platform to support its SAP Hana environment for its clinical data warehouse but faced availability issues.

By deploying Red Hat Enterprise Linux for SAP Hana - supported by backup software from Bacula Systems, a Red Hat partner - Molecular Health gained a high- performance, cost-efficient solution that helps doctors create individualized cancer therapies. In addition, the company simplified operations and management for its IT department.

Molecular Health provides comprehensive medical and therapeutic services to a variety of customers - including physicians, hospitals, research networks, labs, regulators, and pharmaceutical companies - using big data insight.

Its data analytics product, Molecular Health Guide (MH Guide), supports decision-making related to cancer treatments with a highly reliable knowledge database, Dataome. This database hosts curated biomedical data from 26 million scientific and medical publications, as well as data on 273,000 drug interactions, 7,000 biomarkers for drug efficacy and safety, 85,000 gene variants, 56,000 drugs, 126,000 clinical trials, 270,000 protein interactions, 9 million patient medical records for drug safety, and more.

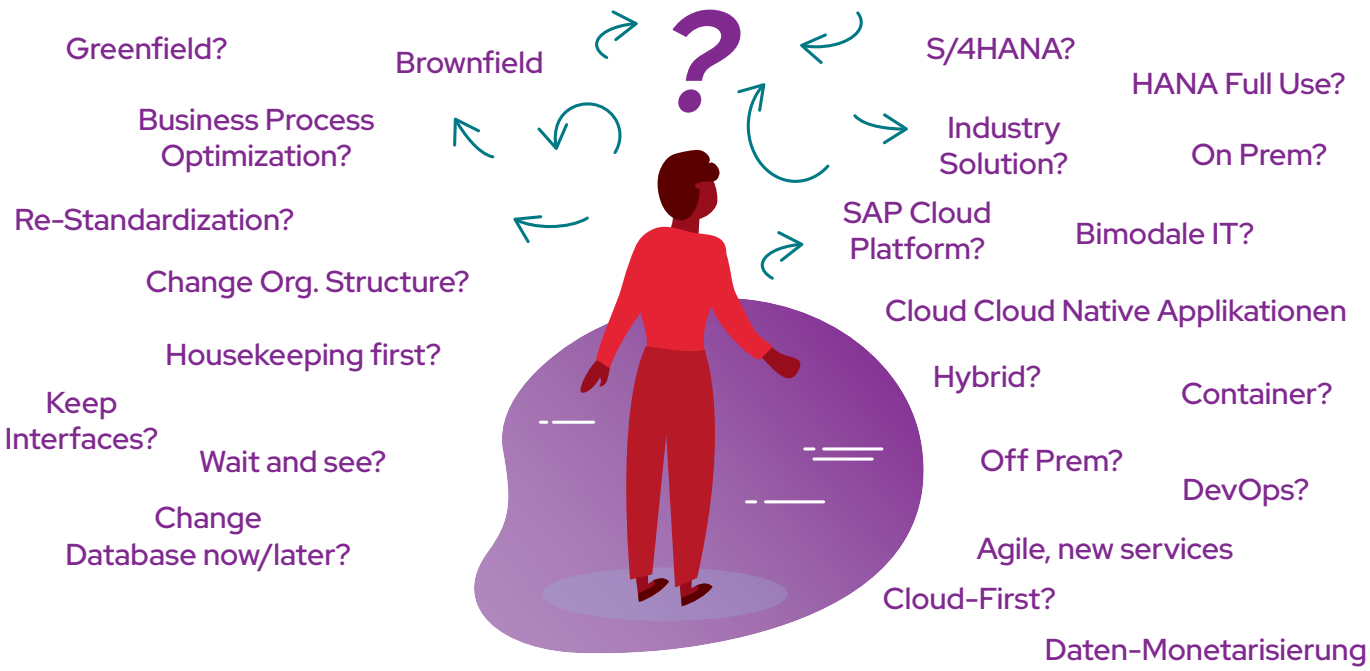
Open Hybrid Cloud

MH Guide connects individual patient data with this body of relevant biomedical knowledge through a cloud-based interface tailored to the needs of various target groups - such as clinical interpretation and recording genetic changes in next-generation sequencing (NGS) at laboratories and hospitals.

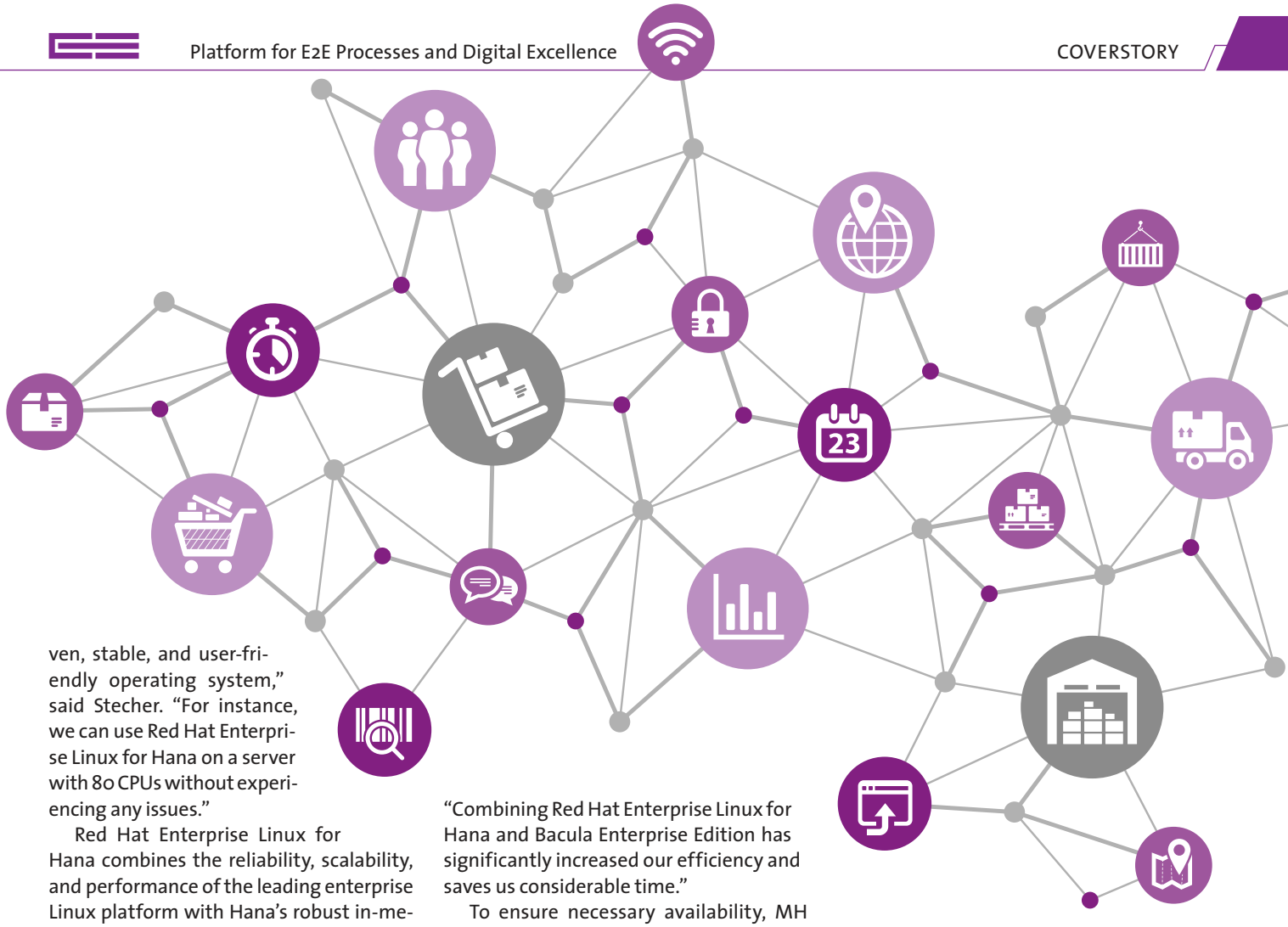
Ensuring the stability and consistency of its operating system and backup environments is key to completing long-term batch processing and data storage for Molecular Health's complex IT environment, including its cloud environment. "We use a diverse range of processor and memory configurations for physical and virtual servers," said Ralf Stecher, senior database administrator at Molecular Health in Heidelberg, Germany. "Depending on the dynamic application profile, we use various databases like PostgreSQL or Hana and run various cluster setups for genomic interpretation. All of these processes need a reliable system foundation." Molecular Health had used Hana on Suse Linux Enterprise Server to process clinical and medical data. Due to occasional availability issues and challenges with consistent operation, the company sought out a new solution for its Hana environment that would offer greater stability and simplify operations and management for its small IT department. Because they specialize in precision medicine and operate a heterogeneous IT system environment, Molecular Health considered many criteria to select a solution. After comprehensive testing using existing data, the company replaced its Suse solution with Red Hat Enterprise Linux for Hana and Bacula Enterprise Edition, an open source backup software from Bacula Systems, a Red Hat partner.

Red Hat Enterprise Linux and Hana

"We chose Red Hat because our tests showed that it was the most technically pro-



Challenge: Modernize processes and technologies. How can you move from a long-established SAP landscape to digital excellence?



ven, stable, and user-friendly operating system," said Stecher. "For instance, we can use Red Hat Enterprise Linux for Hana on a server with 80 CPUs without experiencing any issues."

Red Hat Enterprise Linux for Hana combines the reliability, scalability, and performance of the leading enterprise Linux platform with Hana's robust in-memory database. With this technology, Molecular Health created a high-performance, open environment that offers the necessary consistency and security for its critical data analysis and treatment proposals.

New data warehouse improves support for clinical analysis

Server stability and security are critical to the IT environment that hosts and manages Molecular Health's patient data. With the new Red Hat and Bacula solution, the company can ensure critical reliability and stability for current application scenarios—such as clinical decision-making processes—as well as new use cases, such as collecting, integrating, and analyzing molecular patient results from peer-reviewed publications.

For example, MH Guide provides an overview of potentially effective treatment options, including potential risk of undesired side effects and reactions. It also provides patient-specific, clinically relevant data and treatment options - including reports on clinical and evidence-based treatment options, clinical studies, as well as medication interaction data and other supplementary data. "Red Hat and Bacula's solution offers an organized and stable operating system with markedly lower maintenance overhead," said Stecher. "Combining Red Hat Enterprise Linux for Hana and Bacula Enterprise Edition has significantly increased our efficiency and saves us considerable time."

To ensure necessary availability, MH Guide requires backup support that includes the option to secure data on different media types, such as disks or tapes. With Bacula Enterprise Edition, Molecular Health can quickly back up its network file systems (NFS) as well as its physical and virtual Windows and Linux servers. In addition, Molecular Health uses this solution to remotely monitor and control data backup at its other locations, ensuring users can recover data at any time and that company-wide data backup policies are followed. As a result, Molecular Health can effectively recover data on demand, faster and more reliably than before.

Lower IT Operational Costs

With the Red Hat and Bacula solution, Molecular Health can streamline its IT environment to reduce ongoing operational expenses and other related costs. Previously, the company's R&D employees used Hana on servers with 128 CPUs and maximum main memory, but these highly integrated servers were costly to operate. The company primarily uses servers with just 24-30 CPUs now. Red Hat Enterprise Linux for Hana, combined with Red Hat Virtualization and Bacula Enterprise Edition, have proven to be an efficient, easy-to-manage, and highly stable operating system for Molecular Health. Thanks to this powerful solution, the company is positioned to continue supporting an increasing number of healthcare patients, professionals, and organizations with timely, relevant data and analysis.

About Molecular Health

Molecular Health is a computational biomedicine company focused on big data curation, integration, and analytics to enable precision medicine. The company has developed Dataome, a top-quality curated, interoperable technology system comprising a large set of databases and analytics that allow the integration and referencing of clinical-molecular drug and disease data to generate novel and actionable insights on drug outcomes for stakeholders across the healthcare ecosystem. These include physicians, hospitals, research networks, commercial labs, regulators, and pharma companies. The company is compliant with all relevant regulatory certification and accreditation standards. Molecular Health's scientific and commercial teams are based in Heidelberg, Germany, and Boston, MA, USA.