



INFORMATION AND EDUCATIONAL WORK BY AND FOR THE SAP® COMMUNITY



Michael Jores, Suse Linux, Regional Director Central Europe, starts the digital transformation with Open Source in the Software Defined Datacenter (SDDC). The future IT-architecture paradigm is based on Linux, OpenStack, Cloud Foundry, Hadoop and other open-source innovations, including the topics of Big Data, IoT and DevOps.



Digital Transformation with Open Source

Digital Transformation with Open Source

The launch onto a new path has begun, even if some of the SAP client base still sees the time-span leading up to 2025 as a long one. Topics such as Industry 4.0, IoT, Software Defined Datacenter, DevOps and Big Data require a direct engagement with the latest technologies and, particularly, open source. Michael Jores, Suse Director Central Europe, and Jens-Gero Boehm, Director Suse Partner Sales Central Europe, talked with Peter M. Färbing, Chief Editor of E-3 Magazine, about the digital transformation based on open source.



The advance towards the digital transformation is all-embracing – the challenge cannot be mastered by a change of ERP release or by distributing loads of tablets and smartphones within the company. Even appointing a Chief Digital Officer only partly does justice to the digital transformation needed. One thing is sure: the digital transformation is a challenge in terms of company-management, organisation, finance and technology. An all-embracing, networked mode of thinking is what is needed. “The digital transformation crucially influences the IT environments of the future”, predicts Michael Jores, Regional Director Central Europe at Suse. “Existing environments – of a silo-type, non-cloud-capable, and proprietary – are reshaped by the requirements of the d!conomy, so they become standardised, cloud-capable, and open.

Because only the latter environments can react efficiently to business needs, both technically and hence also in business-management terms.” It’s no coincidence that ‘d!conomy’ – the digital economy – has already been made the key theme at two separate CeBIT trade-fairs.

d!conomy

“Big-data scenarios are inevitable”, Jones observes, explaining a phenomenon of the ‘d!conomy’. “This is because, by 2020, the

data-quantities will acquire an unbelievably vast scale. Similarly, hybrid cloud scenarios make it possible to attain that needed flexibility and efficiency.” With its strategy, based on open-source solutions, Suse is staking everything on providing the necessary flexibility, standardization and efficiency in future data centers. Digital transformation and open source are evidently the two sides of the same coin. “As an open-source-provider, Suse is in effect predestined to play an active role in this”, Jens-Gero Boehm, Director Suse Partner Sales Central Europe, emphasizes. “In the infrastructure for implementing the digital transformation, open standards are an essential requirement, one that can be met almost exclusively by open source today.”

The central starting-point for current IT projects is based on the requirements set by the digital transformation. “The Software Defined Datacenter, SDDC, describes the future paradigm of IT architecture, one that is optimally supported by open standards” - this is how Michael Jores describes the trend, not only in the SAP community. A further challenge is to shorten the distance between development and operations, with the so-called DevOps approach. “Two fundamental directions emerge from this”, Jores notes, “big data and cloud. For big data, the Hadoop project plays a major, interesting role. What comes to the forefront in the cloud is hypervisors, such as XEN and KVM, the infrastructure-management framework OpenStack, and Cloud Foundry for producing a platform-as-a-service, PaaS. What these have in common is that the community is banking on open standards.” This trend – of developing software on the basis of an open-source model - began with Linux’s success and is rapidly growing with that success.

Software Defined Datacenter

The SAP community has had an interesting journey, involving a lot of work: consolidation, harmonization, automation and virtualization are the topics successfully worked-through. The next step is based on open source and takes a bottom-up approach. Based on the available technology, the S/4-Hana future is based on a Software Defined Datacenter. IDC's market researchers ascertained that the transformation of data centers is in full swing. The companies understand Software Defined Infrastructure (SDI) and Datacenters (SDDC) as an approach to a solution for implementing cloud computing, for achieving lower operating costs and for operating information technology more efficiently. Although SDI is still in an early phase, companies and organizations are willing to let business-critical applications run on that system. This is the conclusion in the new IDC study "Software Defined Infrastructure in Germany 2016".

The aim pursued by IDC in the survey, conducted in March 2016 among 252 IT-decision-makers from firms in Germany with more than 250 employees, was to obtain insights into the perceptions, plans for implementation, and the success-factors involved with regard to Software Defined Infrastructure (SDI). The survey was conducted solely among companies that are already engaging with the topic of SDI on a well-founded basis. For 85 per cent of those surveyed, open source plays an important role in SDI. Open source is thereby in many cases an important enabler for SDI in companies. This highlights the innovation potential that can be tapped into in many open-source initiatives. In many cases, the basis for interest in open-source technology is the prospect both of avoiding being locked-in

by a vendor and of reducing costs, and also the need to shape API integration / automation with maximum efficiency.

Viewing this through Suse's eyes: is SAP driving the deployment of open-source products or is the market driving SAP towards open source? As Michael Jores put it, "Firstly, SAP recognized early - as long ago as 1999 - the potential offered by Linux. Accordingly, through the close development cooperation, SAP precisely recognized open-source's added-value for meeting requirements in Linux, jointly and with Suse's expertise, in a way that is fast and matches requirements. An example is High Availability for Hana. Secondly, Hadopp crucially shapes the big-data market; here, it supplies application scenarios to which SAP reacts with Vora. Likewise, the combination of OpenStack and Cloud Foundry is highly interesting for SAP as a PaaS solution."

IDC's conclusion is as follows: many companies are working on the modernization of their data center, to support or to improve the digital transformation. They view Software Defined Infrastructure as a way to make flexible, agile IT resources available to the specialist departments on a favourable cost-basis. The various solution components are at different stages of advancement in their respective life cycles. While virtualization tools have already been in use for many years, Container and OpenStack are still at in an early stage in their maturity. The companies are willing to use these solutions, thereby operating in a tension-field between innovation and the solutions' readiness for use in an enterprise. "Software Defined Infrastructure is an interesting approach to a solution, enabling firms to make IT available as a service, in a fast, efficient and agile way: this is done both by decoupling hardware and software and also by comprehensive automation and

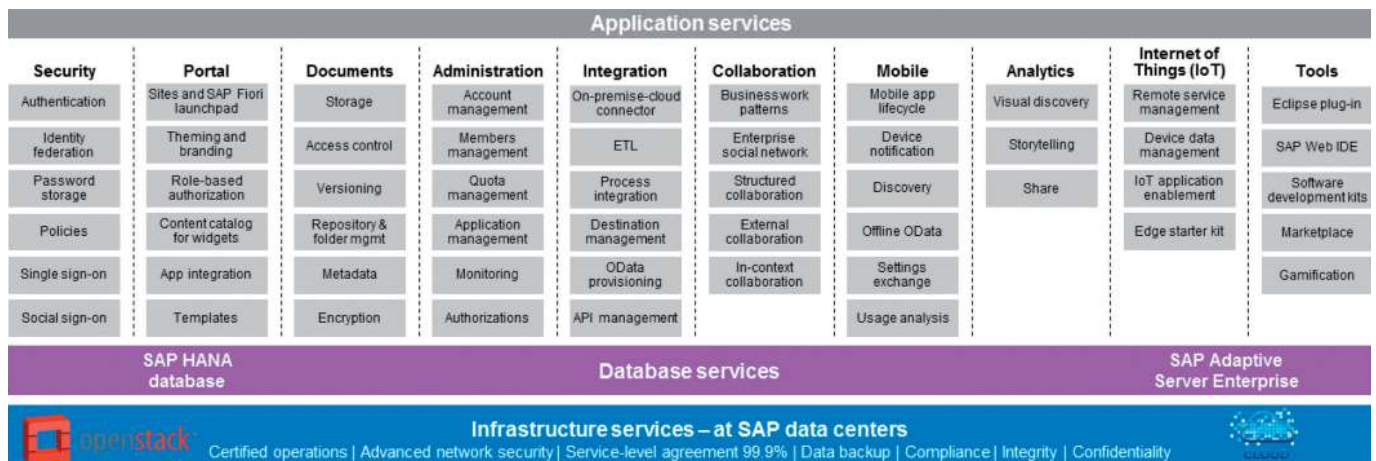


» For a secure path into the future, independent of any particular provider, the choice being made is in favour of mainstream solutions from the open-source world. «

Jens-Gero Boehm, SUSE Director Partner
Sales Central Europe.

orchestration. SDI thereby becomes a key factor and a core element in modern IT infrastructures", emphasizes Matthias Zacher, Senior Consultant and Projekt Manager at IDC.

As a development-reference platform for SAP, Suse supplies innovative contributions to technology, taking the form of datacenter-readiness topics for SAP NetWeaver and SAP Hana. "The most exciting developments are the high-availability scenarios for Hana in all their variants", Michael Jores points out. "Also, with Suse Manager we supply an infrastructure automation for the SAP base."



The infrastructure services for S/4 and the Hana platform are based on OpenStack and Cloud Foundry – there is no greater commitment to open-source!



» OpenStack offers an attractive environment for higher layers of the IT stack. Everything that the cloud heart desires. «

Joseph Reger, Fujitsu Fellow and Chief Technology Officer Fujitsu EMEA.

SUSE OpenStack Cloud with the SUSE Storage makes an IaaS platform available for an SAP data center.

Open Source paradigm

Why is open-source software interesting? Joseph Reger, Fujitsu Fellow and Chief Technology Officer of Fujitsu EMEA, addressed this question: “Perhaps I use the term ‘open-source-software’ a little loosely, but I mean the strict definition of ‘free software’, established by the Free Software Foundation (1985). What is important is freedom to use, share, study and – this is crucial! – modify. In practical terms this is possible only with open-source software. It is of secondary importance here whether the software must be paid for in some way – there are numerous models. The plurality of meaning in English – free, as in ‘freedom’ or free as in ‘free beer’ – doesn’t come into play in German anyway.”

In the strategic approach, Michael Jores distinguishes precisely between paradigm and technology. OpenStack, Cloud Foundry, Linux, Hadoop etc. serve as important IT building-blocks but are not the digital transformation itself. “In the way that the market understands the digital transformation, it takes place at business level. The business models change” – this is how Jores defines the

transition. “Accordingly, the necessary changes also have ramifications for the infrastructures that form their basis. Here, the optimization is called DevOps, that is to say minimizing the distance between development and operations. This is where new paradigms are found for building up SAP data centers, hyper-convergent infrastructures, and the implementation of the Software Defined Data Center.” An example of open-source-based digital transformation is BMW in Munich. In the SAP environment there, they base their work on Linux, Hadoop, Hana and OpenStack. By using Linux, the customer gains the openness for the selection of an x86 platform. Hana and Hadoop make a powerful big-data infrastructure available for SAP. And OpenStack brings the flexibility into the infrastructure for implementing the DevOps model.

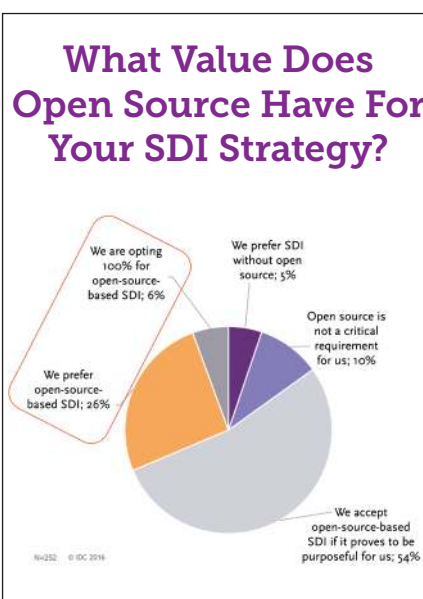
OpenStack & Cloud Foundry

Taken as a whole, the SAP building-blocks serve as the infrastructure basis for SAP data centers: Suse Linux Enterprise Server (SLES) for SAP Applications, Suse OpenStack Cloud together with Cloud Foundry, and Suse Enterprise Storage. “These layers give SAP customers the opportunity to set up a DevOps model for a PaaS infrastructure when using SAP”, Jores explains. Suse – the first Linux distributor, also represented on the Managing Board – and SAP are involved in the OpenStack foundation and the Cloud Foundry community. “With Cloud Foundry, it is established as a goal to make an interface for a

cloud-service-provider available to those hosting SAP; this is in order to be able, based on Linux, OpenStack and Cloud Foundry, to use a platform as a service for SAP”, as Suse manager Jores put it. Suse Sales Director Boehm elaborates: “The digital transition is permeating all industries and business sectors. Common to everyone is the significance that IT acquires within this process – also for those who have hitherto not had to concern themselves much with IT topics. Everyone will have to commit to one infrastructure – be it on-premise or at the cloud-service provider – which is superimposed on the basis of a software-defined architecture. For a secure future, independent of any particular provider, the choice to make is in favour of mainstream solutions from the open-source world.”

In the open-source community, SAP – jointly with its partner Suse – is right at the forefront of this: for supporting open systems and open-source software in the cloud, SAP has published the Hana Cloud Platform (HCP), a starter-edition for Cloud Foundry services. HCP provides support to various Cloud Foundry buildpacks and services, including Java, Node.js, HTML5, MongoDB, Redis, PostgreSQL and RabbitMQ. These services, made available via the HCP cockpit, are intended to help developers in producing new, innovative applications, based on Cloud Foundry and executed on the Hana Cloud Platform. What HCP makes possible, in practical terms, is shown in an extremely impressive way by SAP’s EVP, Björn Goerke, in his keynote speech at the SAP TechEd 2015 in Barcelona, and at the DSAG Technology Days 2016 in Hamburg (both key-notes are on YouTube). In the Hana Enterprise Cloud and HCP, OpenStack and Cloud Foundry are tightly-anchored topics. Here these topics will also flow into OpenStack as IaaS and Cloud Foundry as PaaS.

“OpenStack offers an attractive environment for higher layers of the IT stack”, Joseph Reger re-emphasizes. “Everything that the cloud heart desires – virtualization with VMs, Docker or Rocket; PaaS with Cloud Foundry; big-data platform with Hadoop; cluster-management with Kubernetes or Mesos; orchestration with Tosca; service catalogs with Murano; application-monitoring with Monasca. This can not only be supplied but also operated. This also brings us into SAP domains. It’s no coincidence that SAP is active in some of these OpenStack projects. In particular, there are clear opportunities to use the Hana Cloud Platform and Hana Enterprise Cloud.”



The motivation behind Software Defined Infrastructure and a datacenter with open-source: openness, automation, no vendor lock-in.



» Through Suse Connect, we become part of an expert community that works tirelessly at developing new features. «

Gregor Stöckler,
CEO of Datavard.



» Software Defined Infrastructure is a solution that decouples the hardware from the software, automates, and orchestrates. «

Matthias Zacher,
Senior Consultant IDC.



» With Suse Connect, customers of Hana and S/4 can tie Suse partner solutions directly into their SAP infrastructure environments. «

Friedrich Krey,
Head of SAP Alliances EMEA Central SUSE.

Big Data, Hana & Hadoop

One sub-area of the digital transformation is big data. From Hadoop to Ceph, the open-source scene is well-positioned here. What does this mean for SAP and other providers, such as EMC or Netapp, and what will this ultimately mean for the SAP customer base? "In the future, Software Defined Storage, Ceph, will take over from classic storage", is Michael Jores's view. "This disruption is already in progress and will entail a fundamental change. Companies such as Netapp and EMC will react to this - indeed they already have done." The individual layers in the SAP stack are given support by the respective manufacturer and distributor; SAP provides the integration of the individual layers. "Those wanting to have everything from a single source can make this happen via an outsourcer", Jores points out, based on his experience.

"Those providing the infrastructure components have the task of making this challenge manageable for the application-user", Jens-Gero Boehm observes. "This is an aspect that Suse has always attached much importance to, together with hardware and software partners, especially with SAP. That's because this is the only way to set a limit on the tying-up of resources for IT infrastructure and to ensure that this doesn't diminish in-

novation in IT in terms of applications." There is also the option of operating the service-provider's resources – the latter can make the infrastructure services available with cloud-based product offerings 'straight out of the power-socket in the wall'.

Suse Connect

In mid-May, SAP Sapphire came to an end in Orlando, USA. There were also joint announcements by SAP and Suse. For instance, what strategic significance does the app store have? "The app store, also known as Suse Connect, aims at giving SAP customers the opportunity to see all product offerings that other SAP partners are developing, in a single overview", Michael Jores points out, describing the new initiative. "For instance, Datavard is offering a community edition in Suse Connect - within a certain scope of performance, this enables the customer to use the monitoring for Hana free of charge." The search for SAP-compatible software is made easier. With Suse Connect, companies can find open-source solutions for SAP, tailored to their needs. The platform provides users of Suse Linux Enterprise Server for SAP Applications with an overview of available software, web-services and consultancy services. Time-consuming research work and tiresome compa-

tibility tests are thus consigned to history. Suse Connect also enables free-of-charge test versions of the software offered to be downloaded. "Considering the speed that companies are transforming themselves at today, those running IT departments don't have the time to search the open-source world far and wide, looking for solutions – and then find something that can either only laboriously be integrated into their system, or not at all", said Dirk Oppenkowski, Global SAP Alliance Director at Suse. "Suse Connect provides a remedy here. It makes it possible to search comfortably and practically for solutions that function compatibly and reliably. Simpler access to a wider offering of solutions saves time and money, thus releasing capacity for growth in other business areas." Gregor Stöckler, CEO of Datavard, adds: "Through Suse Connect, we become part of an expert community that works tirelessly at developing new features and at improving the user experience. The collaboration with Suse has proved to be a great benefit to Datavard. Our customers will also gain from it."

In concluding, Michael Jores re-emphasizes: "open source makes the infrastructure available; know-how for recurring activities ought to be built up at the respective SAP customer's premises; know-how for special projects and peaks in use of capacity can be covered via Suse partners."

Needs that infrastructure solutions must meet for the digital transformation

Open Source: a Cornerstone of Digitalization

Applications companies find themselves challenged to embark on a new chapter in the use of SAP, in tackling the digital transformation. What is predestined to be the mainstream in this is the use of Hana and S/4 Hana as “digital core.” Also on the agenda for change: new or different IT-infrastructure technologies and provider-models. These are supported by Suse with several perfect-fit, open-source solutions.

By Friedrich Krey, Suse

The adoption of new, innovative technologies is a process that is being completed in ever shorter time-frames. For instance, the almost-complete market penetration by smartphones, both in the consumer sector and in the business environment, unfolded at a formidable pace. Yet a look back reveals the following: established firms from the telephone and mobile-phone sectors do not rank among today's players in the smartphone sector. Yesteryear's well-worn names were replaced by new names. The change did nothing less than completely turn around the mobile-communication market. A disruptive innovation newly defined the market's rules of the game.

Companies from practically all business sectors need to engage with the digital transformation or with digitalization, in one way or another. Indeed, they have to change their ways – to further reinforce what has been achieved or to expand upon it. The lever pulled to effect this is disruptive innovations – such as using Hana and S/4 Hana as ‘digital core’, including a new user-experience, with Fiori as its foundation. As part of this, the new business suite takes into account both ERP-use and also the deployment of big data, analytics, mobile computing, business networks or the internet-of-things (IoT). It does this in on-premise operation or in cloud-operation, or in hybrid form on-premise or in the cloud.

Naturally, digitalization entails a whole series of changes – in a variety of respects. For the digital transformation also presents new challenges to applications, application development and the operation of data centers – based on the DevOps model. In this, application development and IT operation are interwoven, intelli-

gently and in a way that matches demand, so as to make new applications available quickly. Moreover, with the SAP Core Data Services, Hana and S/4 pull closer together, thereby lending support to the DevOps concept. The core of this, with regard to digitalization and IT infrastructure, is the need to have a dynamic and highly-flexible IT infrastructure and IT components, based on the Software Defined Data Center (SDDC).

In minimizing the distance between application and operation, it is the open-source model that particularly gains significance, through the use of open standards – the SAP environment has been doing this for quite some time. In this, Suse provides support to SAP customers as an open-source pioneer with innovative, high-performance software solutions and services.

New infrastructure technologies

At Hana and S/4 Hana, new or other infrastructure technologies are of major significance. Here, Linux plays an even stronger role as the open-source operating-system platform. Also open-source: Hadoop as an important component for big data, OpenStack for providing the private-cloud / server interaction, or Cloud Foundry as platform for the Hana Cloud Platform - the latter acts as the hub for developing the app and for making it available when S/4 Hana is used. Added to this are cloud-provider models such as IaaS (Infrastructure as a Service), PaaS (Platform as a Service) and SaaS (Software as a Service) - practically without exception, this is all offered with open-source-based software solutions. For a long time now, Suse Linux



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Enterprise Servers (SLES) for SAP Applications (using the current version, no. 12) has been offering a stable, flexible backbone for SAP use – including the integrated Suse High Availability Extension (HAE) as a tried and proven high-availability solution, with disaster-recovery functionality. As part of this, SLES also makes available the open-source virtualization solutions KVM and XEN.

In what, by now, is many thousands of SAP Hana and S/4 Hana installations, SLES has proven its worth outstandingly well. It is as if it were ‘made for’ SAP use, so to speak. What has paid dividends here is the interaction with SAP or, to be more precise, with the SAP Linux Lab. The goal in this has always been to ensure absolutely optimum Hana operation (in on-premise operation and cloud operation) in the mission-critical environment. SLES is additionally complemented by Suse OpenStack Cloud for the orchestration activity and Suse Manager for the system management.

In this context, what was and is at the forefront for Suse, particularly in use of SAP Hana, is three requirements that the solutions provided must meet: firstly, so-called 'Towards Zero DownTime' must be ensured. Secondly, maximum performance must be guaranteed, to attain processing times and response times that match the needs. Additionally, simplified-operations features are needed, enabling Hana installations and Hana operation to work in a simple, effective, cost-efficient way. For many customers, attention is on the use of on-premise SAP in the switch towards Hana and S/4 Hana. A considerable proportion of R/3 conversions or ERP S/4 Hana conversions thereby takes place in company-internal data centers – despite an ever greater transition to cloud use. In this context, it is important that Suse, with the open-source operating-system platform SLES for SAP Applications, and as the sole Linux platform for Hana and S/4 Hana, provides support both to x86-Intel servers and also IBM-Power-on-Hana servers. It does so according to scale-out principles and also scale-up principles. SLES for SAP Business One on Hana is also available and demand for it is rising all the time.

Suse: anchor of stability

It has long been high on the priority list to fulfil requirements with regard to distinctive data-center readiness, in the use of SAP-Hana on-premise; this aim was accomplished in a joint project with the Walldorf software group. SAP customers sustainably profit from Suse - the anchor of stability.

So what are the themes with regard to Hana data-center readiness? What topics do IT managers and IT operations experts have to examine here, as priorities? And which specific features does Suse offer?

As regards data-center readiness, the focus is on the following topics or activity areas - in the Hana and S/4 Hana era, these are by no means wholly new but do need handling differently here and there: high availability, performance, virtualization operations, back-up and security with auditing. The new Suse technology, kGraft, in conjunction with Suse Linux Enterprise Server HAE, and also combined with the Hana system replication, hugely reduces down-time and offers specific and distinctive high-availability functionality in the present-day SAP data center. This renders support in pursuing the "Towards Zero Downtime" objective.

The kGraft technology, developed by Suse, is a live-kernel patching technology that makes it possible to update security patches online, without a reboot and without waiting for the next planned service-window. Emphasis should also be given to so-called Hana Resource Agents (RA), supplied with SLES for SAP Applications 12. These enable Hana database instances and replications to be administered, supervised and controlled.

HA and DR: covering needs

As mentioned, the SuseLinux Enterprise Server High Availability Extension (HAE), already included for years in SLES for SAP Applications, offers a well-proven and lea-

ding high-availability solution for improvement of business continuity/high availability, as well as disaster-recovery functions for SAP solutions. Especially for Hana use, the solution was optimized / further developed, constituting a type of standard for HA and DR in the Hana environment. In particular, SAP makes Hana system-replication (SR) mechanisms available for HA, which are usually managed and used manually. The SLAs regarding an automation are extended so as to encompass use of the Suse High Availability Solution (HAE) of SLES for SAP Applications 12. Generally what is preferred as a central HA solution for Hana is a system replication via a memory preload in a cluster (e.g. two-node cluster).

The switchover can be automated comfortably by means of Suse HAE, e.g.

SAP Linux Lab: Suse und SAP – collaborating closely for more than 15 years

Open Source pioneer

Suse was playing its part right from the start of the SAP Linux Lab, located in Walldorf. The aim back then was to develop an open-source-based Enterprise Linux for mission-critical SAP use. Looking back at SAP and Linux Lab, 2006 was a significant year for Suse. Firstly, Suse Linux Enterprise Server (SLES) for SAP Applications was formally given preference for the use of the Business Warehouse Accelerator (BWA) of SAP. Secondly, SAP decided to use Suse as its development platform for the software development. It was primarily the latter that led to Suse being able to advance into the position of Linux-technology leader in the SAP environment.

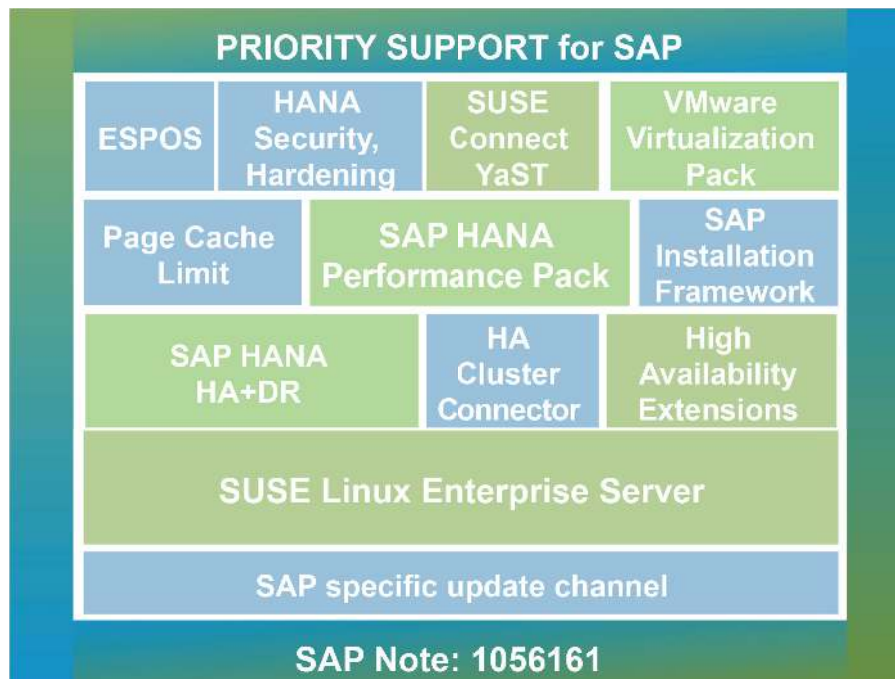
A year later, XEN - the first virtualization platform released for SAP use - saw the light of day; since Version 10, XEN is integrated in SLES. It is significant that the open-source solution was integrated into the support-framework, in accordance with the SAP rules. Also in 2007: in connection with the so-called Business Fast Start programme, the installation wizard was developed for SAP installations and Suse installations.

In addition, SLES was selected by SAP as standard for Business By Design, serving as the sole supported Linux platform, then and now. There followed the integration of Suse into the then-secret 'Hana project' in 2009. The

in-memory project crucially changed SAP's DB strategy, and Suse's exclusivity for Hana spanned a five-year period.

High Availability

Since 2010, the topic of high availability has been pushed ahead, in cooperation between Suse and the SAP Linux Lab. The same applies to the cooperation with Amazon Web Services – namely in relation to SLES availability for AWS. Certainly 2011 was an exciting year, one in which Suse developed the SAP platform, optimized for SAP Netweaver and SAP Hana – "One Codebase from the SAP Private Cloud right through to Hana". A year later, 2012, Suse celebrated 20 years' involvement in the SAP Partner Port. Another factor that was significant then: the certification of the reference architecture for HA in the SAP environment, based on the joint SAP-Suse innovation regarding the Suse Linux Enterprise Server HA Extension (HAE). Over the last year, through the cooperation with SAP and IBM in the SAP Linux Lab, Suse likewise provided sustained support to the availability of Hana and SLES on an IBM Power 8 server. Another innovation: the provision of Hana on Microsoft's cloud-platform, Azure, using SLES for SAP Applications as its operating-system platform.



SLES for SAP Applications with Suse Connect.

in a two-node cluster with a (second) HA system running synchronously for a Hana on-site system (this would then be node number one). For a DR scenario, the Hana system replication makes an asynchronous replication possible onto one further site (e.g. a further data center) so that the disaster-recovery case is covered in this way.

Optimum performance

For quite a while now, SAP and Suse have been addressing the topic of 'optimum performance' in the use of SAP Hana, with specific optimization features or solutions. SAP customers attain advantages in use both from the Linux extension, Page Cache Limit, and also from Hana Pattern, the installation-support instrument. The extension of Suse Linux Enterprise Server, so as to include the Page Cache Limiter, substantially contributes to a constantly high availability and performance being provided by SLES for SAP Applications; this applies even in the event of maximum use of CPU and RAM capacity. So what is possible is to manage the available capacity resources of the working cache in such a way that Linux and Hana, or Hana-based applications such as S/4, optimally harmonize their operations – notably so that there is no downturn in performance. Within the framework of the digital transformation, big data/analytics constitute a core topic. For SAP customers the focus in this is on Hana and on the open-source solution, Hadoop – these are not rigorously divided but rather act in

concert. This particularly applies when the basis used is the SAP solution and the enquiry engine Hana Vora - the latter offers the context-analyses for data in company systems and other distributed data-sources with in-memory technology. SAP application users who take the Hana and Hadoop option, when the topic is big data, or respectively the Hana Vora option, derive benefit from the operating-system platform Suse. This is because SLES supports both Hadoop and also Hana and Hana Vora. As regards

the Hana Patterns made available with Suse Linux Enterprise Server for SAP Applications 12, this is an installation package, including opportunities for fine-tuning - it can also be brought into play for updates, and can be used to attain performance improvements. It also brings about a simplification and a high level of automation, based on best practice and workflows; in turn, this also results in an increased level of security in the case of SAP installations.

Simplified installations

In SAP data centers, virtualization (or virtualization solutions) acts as the standard. Around two years ago, VMware was the first certified virtualization solution for Hana. There is an SLES-VMware integration. It is significant that, in the case of VMware high-availability, the focus is on the hardware or on the server – and not on the Hana services. This means that the server functionality lends itself to being monitored or indeed controlled via VMware. As regards HA Management and HA Feature use of Hana Services, such as database function protection, fail-over mechanisms and others, these are the responsibility of other Hana system elements. With regard to Hana-HA matters, a fundamental hub is the 'SAP Netweaver High Availability Cluster 730 Certification'. With this, for the first time, SAP has provided a cluster-reference architecture in advance; this includes stipulations on clustering, and

Hana, Hadoop and Hana Vora with Suse SLES for digitalization

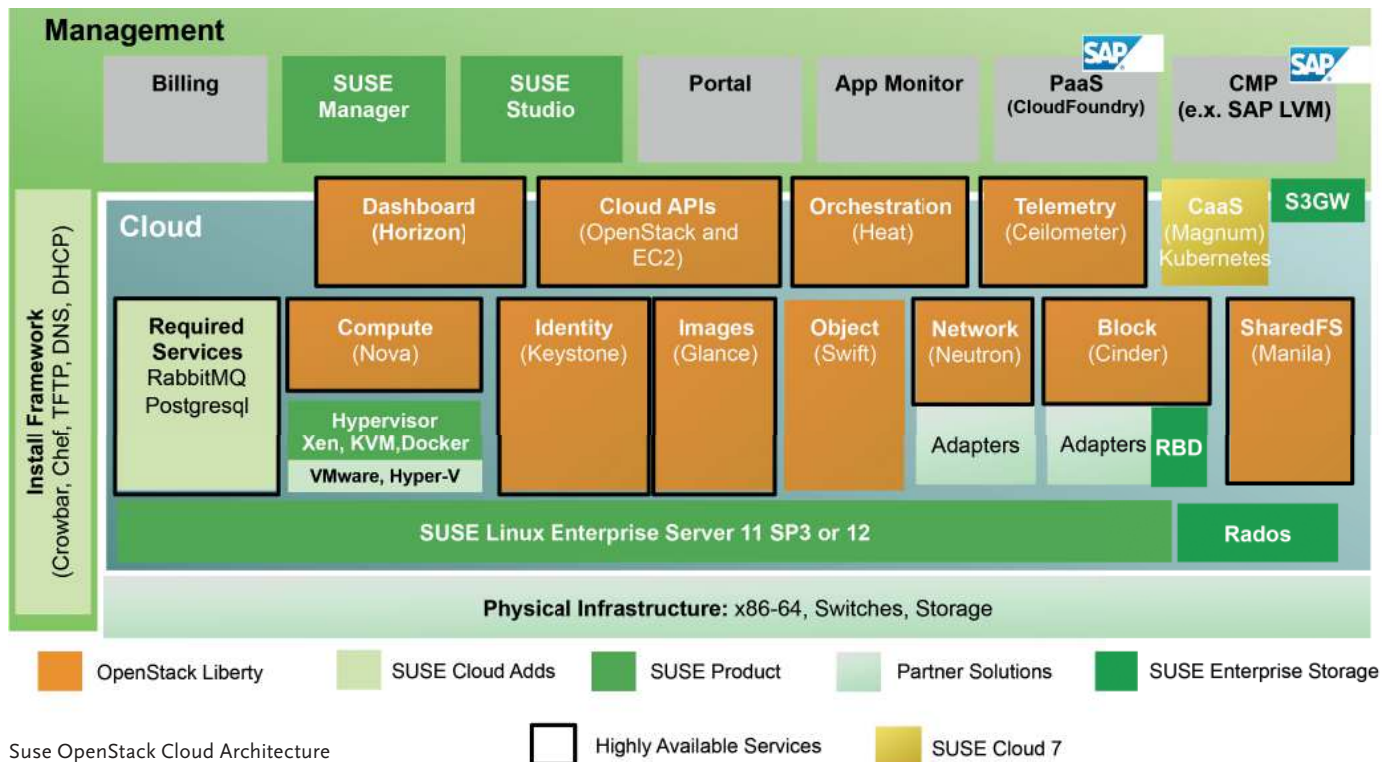
An all-embracing OS from start to finish

On big-data applications, performance plays a major role. Through close co-operation with SAP, Suse ensures that both Hana and a Hadoop cluster, as well as the interlocking of Hana and Hadoop in the case of Hana Vora, are set up so as to produce maximum performance.

This is done based on SLES for SAP Applications, that is to say a comprehensive operating-system platform. Yet that's not all. In the use of big-data applications, much depends on a simple but effective and comprehensive infrastructure management, something that Suse supports to the full extent by

means of its Suse Manager. Hana Vora uses and extends the data-processing framework Apache Spark, in accordance with SAP; in doing so, it makes comprehensive, interactive analyses possible in the Hadoop open-source solution.

As part of this, the central platform, Hana, is supplemented by Hana Vora; the latter makes it possible to gain new knowledge and insights through the analysis of large quantities of operative, context-related data, obtained from company applications, data warehouses, data lakes and IoT sensors in the network periphery.



those offering solutions must adhere to it. Suse participated in the development of this architecture on clustering. It is now years since Suse - as an exclusive SAP-Hana development partner - teamed up with SAP and took on the topic of 'simplified operations' - they discussed it and evaluated it; then there was development work and testing, in order to simplify Hana operation and to shape it efficiently. All important and necessary operations-related subjects on mission-critical use of SAP Hana were taken into account.

Operations for Hana

The outcome was that, with Suse Linux Enterprise Server (SLES) for SAP Applications, tools or services are made available today from which SAP customers also derive benefit in many instances, including the following: the installation of SAP Hana systems; the superimposition of high-availability (HA) for a Hana System Replication; the automated and optimized setting of kernel parameters; automated administration on Linux servers via the web, and the automated process of maintaining care of release-status levels for SAP-base-divisions, right through to reduced workloads involved in upgrades. Specifically, a sophisticated installation wizard provides support in simplified installation of SAP Hana systems. Additionally, the so-called Hana Patterns offer fine-tuning possibilities in

the installation process. In particular, this type of pattern ensures a high level of automation based on best practice and workflows. The outcome is greater security in SAP-Hana installations, but also more generally in an SAP installation.

For instance, (obligatory) parameters are automatically set correctly, as are optimum kernel parameters.

Furthermore, within the framework of Simplified Operations, the High Availability Web Konsole (HAWK) can be used. This brings about a simplification in the process of superimposing high-availability and in monitoring it, based on the Hana system replication (see above).

Also usable are Web Yast, a tool making it possible to automate the administration of Linux servers, and the Suse Manager – this enables a staging procedure to be depicted for the SAP base (TEST, DEV, PROD).

This means no more than the following and also no less: it is simpler and less effort to automate the provision of care to the release-status levels in the SAP base. In this context, a reporting engine supplies evaluations. The latter then provide the foundation for compliance by the SAP base.

With regard to 'Simplified Operations', it is also significant that there is an Extended Service Pack Overlap Support (ESPOS) from Suse; this prolongs the service-pack's supported-status from 24 to 36 months, simultaneously reducing the resource-commitment involved in

upgrades by 33 per cent, over a five-year timeframe of reference. This is because, only by doing it this way, two upgrades are essential instead of three.

Through its involvement on the Hana developments, and also due to much Linux-security experience, Suse is able to make available a far-reaching security-package for Suse Linux Enterprise Server (SLES) for SAP Applications; this covers all conceivable security aspects involved in use of Hana-Suse.

Security Package for SLES

Firstly, SLES fulfils the requirements of numerous important security certificates. Secondly, Suse continuously provides security-updates/security patches for SLES. And thirdly, Hana-Suse customers can make avail of a dedicated security guide – this rigorously describes the specific hardening of the SAP in-memory database in connection with SLES.

A 'Suse Firewall for Hana' can also be used. This counteracts local network attacks or the opening of certain ports from outside. Beyond this, mechanisms can be used that highlight which operating-system packages absolutely need to be available and which are dispensable if so required or wished.

A whole new extension in Suse Linux Enterprise Server for SAP Applications is Suse Connect, presented last month at Sapphire. This enables customers of



Hana or S/4 Hana to make avail of an app store and directly tie-in or use Suse-partner solutions into their SAP infrastructure environments. SLES also interlocks with the partner-solutions.

The first partner-solutions include CanaryCode from Datavard: this is integrated via Suse Connect in SLES for SAP Applications 12 (here also see the feature 'Closely Connected', starting on Page 55 in this E3 cover-story). Further solutions from Suse partners will follow in the near future.

Very often, new cloud-provider models really give a boost to the digital transformation. IaaS, PaaS and SaaS have long since been in vogue. Obtaining and using resources from the cloud frees up space, giving flexibility and faster availability of applications and digital services, or cost-savings. In the SAP environment also, the transition to the cloud is constantly progressing. Yet in many instances SAP customers opt for hybrid cloud environments (a combination of private and public cloud). Hana and S/4 Hana are also available as cloud solutions, alongside the SAP solutions of SuccessFactors, Ariba or Fieldglass.

Transition to cloud-use in the SAP environment

Beyond this, there is the Hana Cloud Platform (HCP) and the Hana Enterprise Cloud (HEC). As with Hana and S/4 Hana, Suse was involved in the SAP developments on the HCP and the HEC, pushing ahead on these jointly with the

Walldorf-based software group. Using HCP - SAP's own PaaS-Cloud solution, including in-memory technology, (web) applications and solutions can be developed and made available or supplied to customers, simply, cost-efficiently and quickly. As we know, PaaS as a cloud-service is based on IaaS. With regard both to IaaS and to PaaS, SAP is taking the open-source option or using open standards – specifically, it is using OpenStack and Cloud Foundry.

OpenStack and Cloud Foundry

Like the OpenStack Foundation, the Cloud Foundry Foundation is a free project, supported by many big-name companies (currently 55) as a non-profit organization, and spanning a range of manufacturers. The number includes SAP and Suse. As the first Linux distributor of all, Suse has been a member of the OpenStack Foundation since 2012; that year, with Suse Cloud, it presented the first Enterprise-OpenStack solution. Suse has been a Cloud Foundry Foundation member since 2015. The foundation produces specific software, with Cloud Foundry and the Cloud Foundry components, in accordance with open-source development principles. The counterpart to OpenStack also certifies the Cloud Foundry members' various PaaS solutions. That way, and above all, it is ensured that cloud platforms are mutually compatible and mutually consistent, based on a uniform and open standard. What Suse and SAP have in their sights

in their interaction is to make available an OpenStack Cloud Provider Interface (CPI). The main goal here is to use a CPI to simplify, or respectively to automate, the communication between Cloud Foundry and the OpenStack infrastructure situated beneath it. This enables apps to be tested more simply and to be immediately rolled out and used in private or public clouds.

Cloud environments and digitalization

Many advantages can be gained by use of an open-source OpenStack-based IaaS-cloud (private cloud or on-premise cloud) for SAP applications – including the fact that SAP solutions can be rolled out efficiently and cost-effectively. This means that, as digitalization progresses, services or applications can be provided quickly and flexibly.

As part of this, the three Suse open-source solutions – namely SLES for SAP applications (for SAP Classic, Hana and S/4 Hana), Suse OpenStack Cloud and Suse Manager – collaborate in an ideal way. This is true especially when the subject is reduction of complexity, minimization of costs, or provision of reliable, innovative services. The three open-sourced-based building-blocks fulfil all the latest requirements governing data-center readiness, with distinctive functionality that is optimized to match SAP customers' necessities in the cloud environment and is oriented towards the digitalization needs of today and tomorrow.

Suse Connect: Partners' additional solutions and services, accessed / made available in SLES for SAP

Added-Value for Hana-SLES Customers

In Suse Linux Enterprise Server (SLES) for SAP Applications, via Suse Connect, Hana additional solutions and services provided by SAP partners / Suse partners are listed or presented, or conversely partner solutions can be accessed via Suse Connect.

With the requirements that the digital transformation has with regard to the 'Next Generation Data Center', the requirements regarding open standards and connectivity also rise. This is why Suse Connect is drawing together all SAP partners' Hana-related offerings, so customers can have a faster Hana adaptation for their SAP Data Centers. In particular, this spares SAP customers a laborious search of additional Hana on SLES inf-

rastructure solutions available, covering special or extended functional requirements. Hana and SLES-customers gain real added-value. The following are among the first partners to take part in the Suse Connect program, introduced by Suse at Sapphire in Orlando last month: Centerity (BSM Business Service Management), Datavard (real-time-monitoring solution), Revelati-on Software Concepts (Automated SAP Change Control/Change Intelligence)

and SEP software (Hana-Backup/Bare Metal Recovery). All partner-solutions are tested and are certified for Suse Linux Enterprise Server for SAP Applications. Trial versions can be installed and tested free of charge, directly via SLES or respectively via YAST, the administration framework. In the case of web services or consulting-services, SLES offers direct connections to the Suse Connect partners' support/solution websites.

Suse-Datavard Integration: Real-Time Monitoring Secures High Availability for Hana

Closely Connected

With 'Connect Framework', Suse Linux Enterprise for SAP Applications proves its merits once again as the de-facto standard for HA and DR with Hana. Datavard CanaryCode, the real-time monitoring solution, ensures that the disaster recovery is available when things get serious. Now there is a Suse-Datavard integration.

By Friedrich Krey, Suse, and Dirk Biehler, Datavard



Dirk Biehler is Chief Architect for CanaryCode at Datavard.

for SAP Applications. As before, this has the so-called high-availability (HA) extension, including DR functionality. Particularly worthy of emphasis is the integration of CanaryCode, the real-time monitoring solution – in the context of a Suse-Datavard partnership, this was adapted to the Suse community's particular needs.

HA and DR

CanaryCode, the real-time monitoring solution, secures high availability to an additional degree. It is available in three versions, including a free-of-charge community version. It monitors the whole system landscape, SAP systems and non-SAP systems alike; it does this independently of database and operating system, proactively and in real-time, from a central cockpit, concerning itself with security and compliance, availability and performance, internal SLAs and user-experience.

Disaster Recovery is also monitored in real-time with the help of CanaryCode. This ensures that, when things get serious and a problem emerges that cannot be prevented by the use of forward-looking monitoring, the disaster-recovery functions smoothly and business continuity is guaranteed – for instance if there is a hardware defect.

The system is supervised on the basis of predefined KPIs. Jointly with SAP and Suse, special indicators for Hana and Suse Linux Enterprise Server (SLES) were decided upon and integrated. Yet users can also define their own KPIs in a simple way. With the data obtained, CanaryCode can analyse trends, correlate indicators, send warning messages, investigate the causes of bottlenecks, and raise the systems' efficiency. The results are shown in a user-friendly format in adaptable UI5 dashboards; they enable both the system administrator and the management to have a real-time overview on system operation.

A CanaryCode customer's example highlights just how important proactive real-time monitoring is for business con-



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tinuity. This company had Suse and Hana in operation since 2013. Because both systems run in the main memory, a storage bottleneck emerged. The Datavard solution sounded the alarm in good time and consequently a system breakdown was avoided. Another customer had the same problem, did not yet use CanaryCode at that time, and was confronted with a system breakdown. It took one day to restore the system. CanaryCode uses machine-based-learning algorithms to document the individual solutions used to eliminate errors and to make the solutions available to the community in an anonymized form. So a pool of knowledge emerges, filled with new experiences each day, significantly simplifying and speeding-up error-elimination. In the Enterprise Edition, this knowledge-pool is further enriched by tips and tricks from Datavard experts.

Via the community comparison, a benchmarking of KPIs (e.g. data-growth or response times for certain transactions and reports) with over 350 other systems yields valuable reference-points for optimization. The KPIs are added to continuous-

In an international survey, Germany's Federal Statistical Office ascertained that IT-component errors were the main cause of data-loss, followed by human error, power cut-outs and cut-outs attributable to weather. Against this background, disaster recovery that is ready at all times acquires the greatest significance.

Especially for Hana, and jointly with Datavard, Suse has now integrated CanaryCode, the real-time monitoring solution, into SLES for SAP Applications 12 – this continuously supervises the system. Thus it is ensured that disaster-recovery (DR) functionalities are operationally ready at any time.

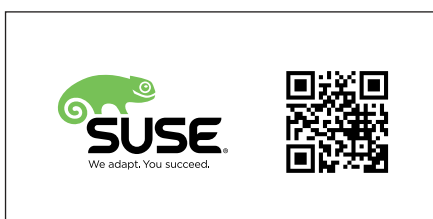
For years now, the SLES High Availability Extension (HAE), integrated into SLES, offers a proven, leading high-availability solution to improve the business-continuity/high-availability functions and disaster-recovery functions for SAP solutions. Specifically for Hana, these functionalities have now been further developed and supplemented. Since May, SAP customers have had the following extension available - Suse Connect in the Suse Linux Enterprise

ly, based on the community experience gained and they cover all relevant cases of use. That way, the KPIs remain up-to-date in relation to business requirements.

Optimum Performance and Security

In the SAP Linux Lab, SAP experts and Suse experts work 'hand-in-hand' to draw up parameters for optimum Hana operation and to make them available to the user community. Dealing with daily business, IT managers do not always find the time to check these parameter lists and to work-in the corresponding parameters. CanaryCode takes over this routine task, continuously checking whether a parameter has to be changed. The administrator then receives a message and can act accordingly. The same goes for security parameters. Datavard's solution automatically checks both the SAP stack and the Suse stack, providing information on important changes that should be implemented in the user's own system. This way, one avoids a situation in which an omission in parameter-updating leads either to the high availability no longer functioning or to the emergency plan no longer being fully up-to-date. Especially with regard to emergency plans, CanaryCode offers very good support, because technical checks can be visually presented in the form of KPIs. These are likewise continuously monitored in real-time. With the help of further Datavard tools, automated tests can be conducted, for example, and successful operation can be documented.

To summarize: with the new Suse Connect Framework, Suse Linux Enterprise for SAP Applications once again proves its worth as the de-facto standard for HA and DR in the Hana environment. The CanaryCode real-time monitoring-solution from Datavard ensures that the disaster recovery is indeed available when the alarm bells ring. So SAP users can take a relaxed view on IT-component errors because the security network functions at all times.



www.datavard.com
www.canarycode.com

Optimized Hana Operation with Innovative Datavard Solution

IT Operations Intelligence

IT Operations Intelligence helps to optimize the use of Hana on a sustainable basis. Gregor Stöckler, the CEO of Datavard, elaborates on this in the E3 interview.

Datavard is pressing ahead with IT Operations Intelligence, offering a solution with that name, especially for Hana. What does this entail?

Gregor Stöckler: The objective is to gain or derive a body of intelligence from data on Hana usage. This information provides effective support in optimizing SAP operations and helps in the task of using Hana systems more cost-effectively.

What does that specifically mean?

Stöckler: Heads of IT or IT Operations Managers obtain precise facts about which SAP data and applications are used, and how - and indeed whether they are used at all. This is highly relevant for optimizing the infrastructure-costs. What people want with Hana is to speed-up important data to the maximum degree. There is a permanent growth of data that either needs or does not need to be stored. So: which data is important? Which is the right data?

The question arises as to the optimum data-storage location in cost-terms: on a Hana system, in an archiving system or in a nearline system?

Stöckler: That's right, it's certainly one of the most important application cases. What's great about this technology is that it makes it possible to automate archiving and the switching of data-location. This intelligence can also be used for fully-automated regression tests, so as to simulate actual user-behaviour.

How does the implementation of IT Operations Analytics present itself?

Stöckler: Intelligent agents are deployed – they operate in the system, calling-off and gathering data. That material is activated and played into the SAP productive system, by means of a transportation assignment. That is where the intelligence used in test systems and development systems is then ultimately generated. Usually the agents involved are anonymized, aggregated and kept in a business intelligence (BI) system.



Gregor Stöckler is
CEO of Datavard.

The data is accessed via a front-end developed with Fiori. With our solution there is no need to install separate hardware and software.

Is there a cost-benefit analysis on IT Operations Intelligence?

Stöckler: We make reference-examples available for the various usage-cases and application-cases of IT Operations Intelligence. For instance, for a bank the solution enabled us to identify 140 reports which were called up around 500 times a day. In each instance the running time lasted approximately one minute or longer. Adding this up reveals a highly unproductive amount of working time – each day. We were able to reduce this unproductive time drastically.

Which SAP customer groups are you addressing with IT Operations Intelligence?

Stöckler: We are primarily targeting it at SAP customers with a system consisting of two TB or more, with a more complex system landscape that involves more than one unit of a given SAP system.