# SAP HANA—A Key Step in Your Digital Transformation

The digital economy is changing everything, driving new business models, new revenue streams and new ways of communicating and collaborating. Digital transformation is now a top priority for both the CEO and the CIO—how best to start, and how does SAP HANA fit into the picture?

# Mission-Critical SAP Solutions: Why They Are an Imperative for Digital Transformation

**Real-time insights and real-time business go hand in hand. In order to run faster than your competition, you need an enterprise that's fully connected (customers, employees, things/devices and the greater ecosystem) and data driven. In short, you need a future-proof Digital Platform.**

In this day and age, your digital platform needs to be designed with the following in mind: cloud, mobility, Big Data, analytics, social media, Internet of Things (IoT), artificial intelligence, machine learning and predictive modeling. This digital core needs to be linked to all your key business processes in a seamless fashion and provide business insights whenever it's needed.

S/4HANA is the next-generation business solution that does exactly that. With the help of S/4HANA, you can achieve a hyperconnected enterprise, enabling real-time decisions that drive instant value to the business. SAP BW/4HANA will be your next- generation enterprise data warehouse: modern, simple and open. It is well suited for supporting high-performing analytics, even in the most demanding data environments.

### Joining SAP in Digital Transformation
SAP has already created a digital transformation roadmap for SAP applications. The company will end support for its current business suite in 2025 and move to a version that runs directly on SAP HANA, the company's in-memory database.

By focusing on a single digital core, SAP's strategy can help you simplify your infrastructure. And to make this simplified infra- structure as robust and interoperable as possible, SAP has chosen to go open source. SAP HANA runs only on Linux, meaning Linux is the future of the SAP data center. The challenge for IT becomes designing a high-performance, highly-available and secure Linux data center. As you'll see, the right Linux can reduce issues for IT and help to make this a reality.

SAP is also making it easier for you to embrace the cloud. Whether your organization is all-in on the cloud or just dabbling with some software as a service (SaaS), it's become reasonable to ask of any application, "Should this be in the cloud?" The same question goes for your platforms and the components of your infrastructure. And when the answer is "yes" and the cloud becomes the way to go, you face choosing among cloud options: Public cloud deployments provide the obvious benefit of enabling you to avoid additional capital expenditures.

Their quick setup offers huge benefits, but connectivity can be a challenge. And complying with certain regulations is difficult in public clouds.

A private, OpenStack-based cloud balances agility and governance requirements. It delivers enterprise-ready technology so you can build infrastructure-as-a-service (IaaS) private clouds in your own data center.

]A hybrid cloud arrangement offers a little of each of the above options. The trick is to balance them to get the most effective solution for your organization.

It might also make sense to embrace a platform as a service (PaaS) offering. With PaaS, you can focus on the applications your business needs, instead of the solutions that support them. One such PaaS offering is the new SAP Cloud Platform. It provides comprehensive application development services so you can collect, manage, analyze and leverage information, or extend and connect your business systems.

SAP Cloud Platform is designed to accelerate your digital transformation without having to maintain or invest in on-premises infrastructure. In fact, SAP Cloud Platform runs on an infrastructure layer provided by SUSE. You will never need to interact with it, but your applications will be supported by enterprise-class open source services such as SUSE® Linux Enterprise Server, SUSE OpenStack Cloud and SUSE Enterprise Storage™, a Ceph-based software-defined storage solution.

SAP's digital core can act as the foundation for the specific digital transformation projects your business users are asking for. To bring big data analytics to your organization, you need to be able to access unstructured data in systems such as Hadoop and the structured data within SAP HANA.

One solution is SAP Vora, which offers distributed query processing capabilities and bi-directional integration with SAP HANA, so you can run queries on Hadoop and SAP HANA data at the same time. SUSE solutions are behind the scenes here as well: SAP Vora 2.0 runs on the SUSE Container as a Service (CaaS) Platform and leverages both a Docker container architecture and Kubernetes.

The potential impact of machine learning continues to grow as it is used in more and more fields. The same is true of Internet of Things solutions. For either endeavor, a unified digital core provides the necessary foundation. Without this core, both projects become more difficult to implement and less impactful. One way to experiment with the extension of your digital core into these areas is through SAP Leonardo, which is SAP's digital innovation system. It is ideal for organizations that want to experiment or are just beginning a digital transformation journey.

## Planning for Migration—Key Considerations

A key consideration in planning your migration is to resist trying to reproduce past business practices. Instead, think "green field" in order to fully leverage all of S/4HANA's capabilities.

As you start this move, you will encounter a few decision points:

- *For enterprises currently running Business Suite on SAP HANA and moving to S/4HANA, a key decision is which customizations to preserve.*
- *For enterprises still running SAP on Oracle, DB2 or SQL server, a first step is the migration of the underlying database.*
- *For enterprises that don't have SAP running today, it's time to consider taking the leap to SAP via S/4 HANA.*

When it comes to a move of this magnitude, it's natural to have some trepidation. Customers are worried about cost, risk and complexity. But with the support of a good partner that has experience and expertise in driving S/4HANA success, a lot of these fears can be alleviated quickly and business benefits will outweigh the risk. And considering that SAP is officially ending support for all non-HANA versions of its products by 2025, it's better to dive in early and have a well-thought-out plan that's synchronized to SAP's roadmap for S/4HANA product releases that will feature new functionalities and different verticals.

A major departure from the past is the switch to Linux. According to IDC, by 2020 Linux will represent 59.3% of all paid server OS shipments worldwide, versus Windows at 40.2%. But because many SAP customers run SAP on Windows instead of Linux, there is another potential hurdle: you will need a proven OS vendor that's able to help with any challenges you might encounter during the transition.

Last but not least is choosing the right hardware platform for your S/4HANA environment: one that's secure, highly available and high performing.

## Trust Your Mission-Critical Workloads to Huawei and SUSE

Together, Huawei and SUSE offer a combined solution that addresses all your SAP HANA Migration needs. This solution helps you to reduce unplanned downtime with advanced high availability and disaster recovery capabilities—and it delivers

next-generation, proactive technologies for reliability, availability and serviceability (RAS) through features such as physical partitioning and fault prediction and isolation.

Both Huawei and SUSE have long-time relationships with SAP. Huawei was the first company in China to partner with SAP. In 2015, the two companies opened the Huawei & SAP Co-Innovation Center in Shenzhen, China. SUSE has also enjoyed a lengthy relationship with SAP, starting in 1999 at SAP's LinuxLab. Today, SUSE Linux Enterprise Server for SAP Applications is the only operating system optimized for all SAP software solutions, and it's the number one Linux platform for SAP applications. And SAP itself uses SUSE Linux Enterprise Server for its development and production environments.

SUSE and Huawei were both named SAP HANA Innovation Award Winners in 2017[1], which highlights their close collaboration with SAP around products and services. In addition, 28 of the other Innovation Award winners use SUSE as their operating system of choice.[2]

Huawei and SUSE have partnered to create one of the most reliable, high-performance platforms for your SAP HANA infrastructure. With FusionServer or KunLun servers from Huawei and SUSE Linux Enterprise Server for SAP Applications, you can support mission-critical workloads for more efficient operations and increased business growth potential. The combined solution is optimized for SAP HANA and enables you to get more out of your SAP investment by delivering fast, reliable performance and outstanding scalability.

Huawei's KunLun server is the world's first 32-socket, x86 mission-critical server. In June 2017, the KunLun 9008 broke a world record in the Phase 2 concurrent pressure test. It processed 7,927 queries per hour, with more than 400 billion records total. That performance represents an improvement of 1.9 to 4 times better than competitors'[3] performance in the same test. Huawei's flexible x86 platform eliminates the need for proprietary mainframe architecture, yet provides the same level of system stability and disaster recovery.

Huawei's industry-leading software and hardware acceleration technologies—including high-performance SSD cards, converged storage software and in-memory cache—enable real-time data processing and can help you harness the power of analytics. The platform can deliver four to six times higher processing speeds, which can help you make faster, more informed decisions and react more quickly to evolving customer demands.

SUSE Linux Enterprise Server for SAP Applications is the preferred standard operating system for KunLun servers. SUSE also offers SAP-integrated support, which means that you can get assistance with SUSE or SAP issues with just one call.

Huawei and SUSE have developed a joint solution that uses technology that complements SAP HANA's capabilities. For instance, the interconnect chips in Huawei KunLun servers maximize CPU resources to process signaling and data in nanoseconds. The SUSE Linux Enterprise OS improves process scheduling to capitalize on the KunLun's hyperscale computing resources. These capabilities are the foundation for SAP HANA's parallel database. SAP HANA can sense the location of data in the memory and assign the nearest CPU for the fastest computation times. That speeds up the performance of SAP HANA databases considerably.

## A Closer Look at the Components

### Huawei KunLun and Fusion Servers

Huawei servers use today's advanced technology to accelerate data processing and decision making. The company supports solutions for scale-up (ideal for running mission-critical applications on SAP Business Suite and Business Warehouse) and scale-out, which are ideal for enterprise data warehouse, data market and real-time analytics scenarios. The Huawei SAP HANA scale-out solution provides a variety of SAP HANA configurations that dynamically expand the cluster scale from 512 GB to 64 TB.

Huawei's SAP HANA systems are the only appliances that use PCIe SSD and 56 Gigabit/second InfiniBand technologies for high bandwidth at low latency (resulting in a write performance with 15 percent less latency and 20 percent more bandwidth)[4]. The hyperconverged infrastructures (HCIs) offer optimized space and computing density.

1 **www.suse.com/communities/blog/suse-receives-sap-hana-innovation-award-2017-industry-disruptor/** *and* **http://e.huawei.com/en/about/huawei-enterprise/honour**
2 **www.sap.com/documents/2017/10/9ab41894-dc7c-0010-82c7-eda71af511fa.html**
3 **www.sap.com/about/benchmark/appbm/netweaver.sap-bw-edition-for-sap-hana-standard-application.html**
4 **http://e.huawei.com/en/solutions/business-needs/data-center/sap-hana**

Support for FusionSphere virtualization simplifies management for rapid provisioning and low total cost of ownership (TCO). Huawei's dynamic, energy-saving features and power management reduce power consumption, making cooling more efficient and allowing higher densities and more capacity at less cost.

KunLun servers use physical partitioning technology to provide a multi-partition feature. This enables you to electrically isolate KunLun server resources into multiple partitions. Compared to virtualization-based software partitioning, physical partitioning delivers a five-fold increase in system reliability.

KunLun servers also support over 100 configurable RAS features to improve server reliability, availability and serviceability. Huawei takes a "2.0" approach to RAS. Where first-generation RAS features were more about reacting to faults, the latest approach is based on features such as fault prediction and isolation that proactively ensure reliability and availability instead of simply reacting to events.

**SUSE Linux Enterprise Server for SAP Applications**
More than 90 percent of SAP HANA customers use SUSE Linux Enterprise Server because of its reliability, resilience, performance and ease of use.

**RELIABILITY AND RESILIENCE**
SUSE Linux Enterprise Server for SAP Applications comes with a high availability extension that enables you to cluster physical servers, virtual guests or any combination of the two. The easy-to-use graphical user interface (GUI) simplifies cluster configuration and management and offers a cluster simulator, which lets you test and validate configuration changes before implementing them.

SAP HANA has a business continuity architecture that replicates the in-memory data, so administrators can initiate failover to a backup in case of a primary system failure. SUSE Linux Enterprise Server for SAP Applications enhances this capability by providing resource agents that automate that failover action. This means failover happens without needing an action from the administrator, so systems stay up and running even when your IT team is focusing on other projects.

SUSE developed the two resource agents involved and currently supports failover automation for all common scale-up and scale-out SAP HANA scenarios. You can find best practices for mission-critical SAP applications, including setup guides for system replication, here.

SUSE Linux Enterprise Server for SAP Applications includes an SAP HANA system-specific firewall. This can help to prevent unauthorized access to your SAP HANA system and the valuable data that resides in it. And automatic file system snapshot and rollback capabilities enable you to quickly jump the whole system, including kernel files, back to a previous known state in the event of operator error.

To aid with encryption key management, SUSE provides a key server for the encryption built into the Linux operating system. Normally, during a mount or reboot, the system would need to decrypt the data and would thus require an administrator to enter the key. SUSE removes this manual task by allowing the system to contact the key server itself.

SUSE also offers a unique guide to help you secure SUSE Linux Enterprise Server for SAP Applications for running SAP HANA: Operating System Security Hardening Guide for SAP HANA.

## PERFORMANCE AND EASE OF USE

The SUSE-exclusive page cache management feature helps to protect system performance. Normally, the Linux kernel will swap out rarely accessed memory pages as cache to speed up file system operations. That can consume memory that SAP applications need in order to run optimally. With SUSE, the system administrator can limit the amount of page cache that the kernel uses when there is competition between application memory and page cache.

The operating system's Installation Wizard provides an end-to-end installation framework that enables an integrated, unattended and automated installation workflow for validated SAP solutions. The installation interface gives administrators a guided workflow, including configuration and tuning parameters for SAP HANA, SAP NetWeaver and more. This enables you to easily optimize your SAP systems for better performance.

For those operating in mixed Linux and Microsoft data centers, the SUSE operating system also supports Remote Desktop Protocol and Active Directory integration, so your administrators can more easily interact with and connect your Linux operating systems to the rest of your IT environment.

SUSE Linux Enterprise Server for SAP Applications comes with priority support and maintenance 24 hours a day, seven days a week. It is integrated with SAP support to help you resolve issues with the operating system and SAP applications simultaneously.

> **"Switching to SUSE Linux Enterprise Server for SAP Applications has enabled us to cut the TCO of our IT infrastructure by at least 80 percent."**
>
> **XI WANG**
> *System Engineer*
> China Minsheng Banking Corporation

Subscriptions for SUSE Linux Enterprise Server for SAP Applications include Extended Service Pack Overlap Support, which extends the overlap between the support periods of two consecutive service packs by one year. This enables you to perform service pack migrations within 18 months instead of only six months, giving you more flexibility in scheduling migrations and more time to test before you perform a migration.

SUSE also offers a dedicated update channel for the SAP-specific features and components in SUSE Linux Enterprise Server for SAP Applications. This is in addition to the update channels for the base operating system and the high availability extension.=

### Learn More

Learn more about how SUSE and Huawei can simplify your SAP HANA deployment and operations at: **www.suse.com/partners/alliance/huawei/**