SUSE, Lenovo and the Future of the SAP Data Center
Executive Summary
SAP HANA has created a monumental shift in the SAP infrastructure landscape. SUSE and Lenovo together can lead the conversation around what the next generation of the SAP business suite, SAP S/4HANA, means for enterprise infrastructure and can lead the effort through platform migration, simplification and consolidation. We can help you plan for growth and extend the value of your SAP HANA investments.

SAP’s Platform Evolves to S/4HANA
SAP HANA is an evolving platform that converges database, application and in-memory capabilities to transform transactions, analytics, and predictive and spatial processing so businesses can operate in real time. SAP HANA has a comprehensive feature set that allows you to simultaneously handle real-time transactions and predictive analytic workloads with extreme speed.

SAP HANA runs thousands of third-party applications on hardware from industry-leading partners. Its cloud offerings are provided by external hosting and management partners on three continents. Independent, third-party application developers and start-ups choose SAP HANA to run their applications and commercialize them via the SAP HANA Marketplace.

The next generation of SAP HANA, SAP Business Suite 4 SAP HANA (SAP S/4HANA), is a highly evolved suite of simple applications running on the SAP HANA in-memory database system. With SAP S/4HANA, the core enterprise resources planning (ERP) business suite is simplified and the underlying table architecture is reengineered to leverage the speed and large volumes of data that SAP HANA can support. Its simplified data models contain no materialized aggregates and no indexes, which simplifies the code because no material aggregates need to be maintained. All this means that SAP S/4HANA is poised to benefit from compression, real-time analytics, landscape simplification and ease of configuration.

New Business Models and Requirements Lead SAP to Linux
The combination of cloud computing, digital business, information, analytics and mobility is creating new technology requirements and driving new business models. This creates a complexity in fast-growing IT systems that becomes a barrier to capitalizing on innovation. As systems become more complex, operation and maintenance costs increase.

To counter this growing complexity, SAP is simplifying its own product portfolio and standardizing all solutions on SAP HANA for the benefit of its customers. SAP partners can develop solutions based on an SAP HANA framework that is more prescriptive and consistent. In addition, SAP will simplify the use of SAP software by offering its entire portfolio in the cloud. Core offerings of SAP will be aligned to the SAP HANA Cloud Platform and be offered as managed services from SAP, as self-service through the SAP Cloud Appliance Library or via partners.
SAP systems no longer need to exist as isolated environments. When SAP customers factor cloud computing into their future internal road maps, they can prepare their infrastructure for the new technologies to come.

Linux and Open Source Are Key to SAP’s Strategy
According to a report from the Linux Foundation (www.linuxfoundation.org/publications/linux-foundation/linux-end-user-trends-report-2014), Linux leads the enterprise shift to the cloud, with 75 percent of enterprises reporting that they use Linux as their primary cloud platform and fewer than 2 percent using UNIX.

SAP HANA Can Be a Focus Platform for the Future
With so much emphasis on SAP HANA, customers running SAP HANA want to ensure that the underlying OS gives them enterprise-level reliability, availability, scalability, manageability and security. Now, applications and analytics can be defined without the barrier of information-processing latency, and sense-and-response solutions can work on massive quantities of real-time data for immediate answers without the need for building preaggregates. SAP HANA helps to:

- **Accelerate everything you do.** SAP HANA can create a “Google-like” search experience within all of your existing solutions, including analytics, mobile and applications, both on-premise and in the cloud. It can help answer any questions you may have, from any data or any system, across 26 different languages. It provides near-instant responses, enabling you to ask iterative questions without computational latency or complex report writing. Case example: With SAP HANA, eBay now automatically anticipates what buyers and sellers want, at speeds that were previously unthinkable.

- **Dramatically simplify IT and deliver incredible cost savings.** As shown in the Forrester Total Economic Impact Study of SAP HANA, the SAP HANA platform can save an organization 37 percent across hardware, software and labor costs.

- **Innovate with new business model breakthroughs.** SAP HANA removes technical and cost barriers so you can innovate like never before. Case example: The University of Kentucky is transforming higher education, improving student retention and experiencing a 500 percent return on investment. Case example: The 2014 German World Cup team scored an unbeatable competitive edge, powered by SAP HANA.

**S/4HANA As the Great Simplifier**
SAP S/4HANA is a new product fully built on the most advanced in-memory platform today—SAP HANA—using modern design principles with the SAP Fiori user experience. SAP S/4HANA delivers massive simplifications (customer adoption, data model, user experience, decision making, and business processes and models) and innovations (Internet of Things, big data, business networks and mobile-first) to help businesses run more simply in the digital economy.

From an IT value perspective, SAP S/4HANA creates unique opportunities to simplify the landscape and help reduce total cost of ownership (TCO) with SAP HANA as the great simplifier.

“By moving to SAP HANA and the two Lenovo System x3950 X6 workload optimized solutions for SAP HANA, we have gained a future-proof solution that helps us turn business data into competitive advantage. Based on accurate data in real time, we can make business decisions quicker and respond faster to changing demand trends.”

BRUNO LARCHER
Manager of Infrastructure & Support
Kwizda Group
Key benefits include the following:

- **Enterprises can now reduce their data footprint and work with larger data sets in one system (for example, by co-deploying ERP and customer relationship management (CRM) software) to save hardware costs, operational costs and time.**
- **Innovation is easier with an open platform (SAP HANA Cloud Platform) to drive advanced applications—for example, predicting, recommending and simulating—while protecting existing investments.**
- **Business users can leverage a simple, role-based user experience based on modern design principles, which minimizes training efforts while increasing productivity. Initial system configuration is simple, and SAP supports customers during its use.**
- **Customers can choose cloud, on-premise or hybrid deployment to drive quick time-to-value.**

**SUSE and Lenovo Align with the S/4HANA Vision**

When you run SAP HANA, you want to ensure your underlying OS gives you enterprise-level reliability, availability, scalability, manageability and security to meet your needs. SUSE® Linux Enterprise Server for SAP Applications is the recommended and supported OS of choice for SAP HANA and SAP S/4HANA. It currently runs in over 7,000 SAP HANA installations, and SAP uses SUSE Linux Enterprise Server and Lenovo systems for its own production and development environment. SUSE Linux Enterprise Server for SAP Applications and Lenovo offer:

- **High availability with automated failover.** Since 2011, SUSE and SAP have been constantly working on improving the scalability and high availability of SAP HANA so that customers can grow their deployments to include multiple nodes for system replication and application failover across multiple geographic locations.
- **OS security hardening.** The security of the underlying OS is just as important as the security of the database, because hackers often target the OS and not the database directly. SUSE has a history of focusing on IT security; its initiatives include an aggressive international security certification program as well as an integrated antivirus solution for SAP environments.
- **Simple management.** SUSE Manager enables efficient management of Linux systems. Use SUSE Manager to package and update sources, which are organized as repositories. SUSE Linux Enterprise for SAP Applications includes the agents to be managed by SUSE Manager. Lenovo also provides XClarity, which integrates easily into Lenovo servers, switches and storage to automate provisioning and operations management for Lenovo’s SAP HANA appliances and TDI infrastructures. This maintains compliance with policy-based firmware level management and can automatically alert the administration team or hardware support via the call-home function. XClarity can be accessed via web-based GUI or a mobile app and can be integrated into your own IT applications via its REST API.
- **Dedicated and Live Patching.** SLES for SAP applications comes with its own, dedicated patch channel. SUSE and SAP support engineers work together to ensure that only the patches applicable for the SLES for SAP applications product are made available. In addition, Live Patching lets you apply kernel fixes without interrupting your service.
- **Unparalleled performance.** SUSE Linux Enterprise Server for SAP Applications consistently provides outstanding uptime and performance—even under full CPU loads and high memory stress.
- **SAP HANA + SUSE Linux Enterprise Server on Amazon EC2.** Get support for a complete SAP HANA instance running SUSE Linux Enterprise Server on Amazon EC2, with minimal effort.
- **A flexible, cost-effective way to run SAP HANA in a company’s landscape with the Lenovo Systems Solution for SAP HANA.**

---

“With the System x solution for SAP HANA, we can now easily provide up-to-date data on time—and we can even load new data during the day if a team needs more current information for its analyses.”

PATRICK ADAMS
Head of IT Services & Infrastructure
Hapimag AG
SAP HANA on SUSE Linux Enterprise Server

Today, SAP HANA is bringing success to hundreds of companies around the world—and they are virtually all running on SUSE Linux Enterprise Server. This means that companies benefit not only from the value of SAP HANA but also the low TCO and easy management of SUSE Linux Enterprise Server.

SUSE has a long history of helping companies gain the value of SAP ERP with the low TCO of an open source environment.

SUSE and the SAP HANA Cloud Platform

SUSE has led in the high availability space for a long time, but today’s enterprises are looking to the cloud. Cloud computing is growing fast, and may be ideal for the changing business environment. SUSE Linux Enterprise Server for SAP Applications is based on SUSE Linux Enterprise Server, a Linux platform that is proven in the cloud and selected for use with SAP cloud solutions such as SAP HANA Enterprise Cloud, SAP HANA One, SAP HANA Cloud Platform and SAP-certified Amazon EC2 instances. Furthermore, SUSE has a strong relationship with the virtualization and cloud market leaders—VMware, Microsoft and Amazon EC2—and works with a broad ecosystem around the world to ensure that customers have access to SUSE Linux Enterprise Server in the public cloud of their choice.

SUSE and Lenovo Systems Solution for SAP HANA

Lenovo provides a unique solution for the SAP HANA Platform Edition software from SAP. The Lenovo Systems Solution for SAP

HANA appliance is the most flexible, cost-effective way to run SAP HANA in a company’s landscape. With the ingenious bookshelf design and the reduction of storage hardware, the Lenovo solution provides the customer with a sleek, reliable option for SAP HANA.

Hardware. The Lenovo X6 line of servers includes the following flagship rack-optimized servers from Lenovo for use with SAP HANA:

- System x3850 X6 (a 4U server that is scalable to four Intel Xeon v4/v3/v2 processors)
- System x3950 X6 (an 8U server that is scalable to eight Intel Xeon v4/v3/v2 processors)

Scalability. The Lenovo solution provides a common server platform for scale-up and scale-out SAP HANA use cases using the System x3850 X6 and x3950 X6 server platforms. The solution supports SAP HANA memory sizes that scale from 128 GB up to 8 terabytes of main memory for a single system in production environments and up to 12 TB in non-production environments.

Storage. The Lenovo Systems Solution for SAP HANA appliance does not require an external SAN storage system. Using Lenovo Networking RackSwitch components and IBM Spectrum Scale software, the solution can support analytical workloads distributed across as many as 94 servers in a single 376-terabyte SAP HANA database instance. The IBM Spectrum Scale clustered file system can be used to expand a scaled-out SAP HANA cluster simply by adding additional Lenovo X6 servers to the existing cluster. These scale-out configurations help reduce TCO 19–31% compared to other implementations.

Compute. In addition, with the new “bookshelf” design of the Lenovo X6 systems, you can retain your investment through a quick and easy upgrade of the Intel Xeon CPU/memory architecture via a replacement of Compute Books, which simply slide in and out of the server chassis. There are Compute Books available for the Intel Xeon v2, v3 and v4 family of processors that include

---

“After comparing operational costs, we found that the SUSE solutions were almost 50 percent less expensive than our existing UNIX and Windows platforms. Moreover, SUSE is the vendor-recommended operating system for SAP ERP, and highly compatible with other key components in our hosting infrastructure such as VMware, which makes it the ideal solution for us.”

RAJESH KS
Delivery Head for APAC
NIIT Technologies

---

1 Lenovo product offerings around SAP HANA are described in the Lenovo Press paper, “In-memory Computing”

either DDR3 or TruDDR4 memory. This means you can upgrade between generations of CPU architectures within a chassis enclosure. Because of this design, a single SAP HANA installation can remain productive in the same server chassis for multiple processor generations.

One company using SAP HANA on Lenovo servers is Kwizda, a life sciences company in Austria. Kwizda uses SAP HANA multitenant database containers running on Lenovo System x3950 X6 servers with SUSE Linux Enterprise Server for SAP Applications. In doing so, the company can use a single solution for its three SAP applications—SAP Business Suite, SAP Business Warehouse and SAP Extended Warehouse Management—complete with separate development, test and production databases.

**Your Journey to S/4HANA**

Discover the five steps that can help you drive your SAP S/4HANA journey—whether you’re an existing or new SAP Business Suite customer.

<table>
<thead>
<tr>
<th>Engage</th>
<th>Engage valued partners or leverage SAP tools such as Business Scenario Recommendation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examine</td>
<td>Examine your existing SAP environment, including cloud versus on-premise options, mission critical installations, and backup/recovery solutions.</td>
</tr>
<tr>
<td>Migrate</td>
<td>Migrate existing databases to SAP HANA systematically or choose to migrate legacy data, later, after installing the new environment.</td>
</tr>
<tr>
<td>Install</td>
<td>Install new SAP S/4HANA code.</td>
</tr>
<tr>
<td>Experience</td>
<td>Experience value with SAP S/4HANA and SUSE Linux Enterprise Server.</td>
</tr>
</tbody>
</table>

The “Examine” step is particularly critical to a successful implementation. When you examine your existing environment, first consider cloud versus on-premise options for your situation, noting that only on-premise solutions support legacy interfaces. There are three main scenarios that might apply:

- **System conversion.** You are an existing SAP Business Suite customer who wants to move to SAP S/4HANA.
- **Landscape transformation.** You are an existing SAP Business Suite Customer who wants to optimize the system landscape and move to SAP S/4HANA. You are merging multiple systems or migrating selective parts of a system (for example, line of business, organizational units) into an SAP S/4HANA system.
- **New implementation.** You are a new SAP customer and want to move from legacy systems to SAP.

If you are an existing SAP customer, you can evaluate your current SAP database modifications and simplify your solutions for SAP HANA. Only SAP S/4HANA or the traditional SAP Business Suite can be run on a single installation. After evaluating, you can plan the order in which your installations will be migrated, define mission-critical installations for a highly available cluster and validate that existing backup/recovery solutions will work with SAP S/4HANA.

**Considerations for Migration from UNIX to Linux or Windows to Linux**

No matter which technology you had before, migration to SUSE Linux doesn't have to be complicated. Consider the following:

- **SAP endorsement.** SUSE Linux Enterprise Server is SAP’s development reference platform for UNIX and Linux. Patches and fixes for an SAP primary software development reference platform have received the greatest level of scrutiny, which reduces the possibility of incompatibilities when patches are applied. Also, look for SAP certification and a proven history of customer success.
- **Optimization for SAP.** Choose a distribution tuned specifically for performance and high availability with SAP solutions.
- **Performance.** Your choice should support large workloads with features such as page cache limit, a parameter that allows SAP administrators to optimize the kernel’s paging behavior.

3. Older Compute Books can be moved to another chassis with similar Compute Books to make way for the next generation of Compute Books. Each individual server can contain one and only one version of the Intel Compute book. Also, Compute Books can be swapped between x3850 X6 and x3950 X6 servers when the processor can support it. These capabilities avoid the need for “rip and replace” in a customer’s SAP HANA landscape.
High availability. Look for high availability certification by SAP, which ensures smooth integration of the clustering software with the new SAP clustering interface. Additionally, be sure you choose a distribution that ensures the OS and clustering software are compatible.

Simplicity. Your choice should provide installation wizards and be easy to manage.

Options. Select a distribution that supports on-premise, cloud and hybrid environments for the most flexibility.

TCO of SUSE Linux Enterprise Server Helps Offset the Risks of Migration

SUSE Linux Enterprise Server eliminates the need to purchase proprietary UNIX servers, letting you fill data centers with commodity platforms instead. For example, the benefits of migration to SUSE for a composite organization with 3,000 servers are:

- Fifty-five percent ROI
- Eight and a half months’ payback period
- Eighty percent reduction in capital expenditure

Why SUSE and Lenovo?

SUSE and Lenovo bring the perfect marriage of software and hardware to best support your SAP installations. It’s the right solution for customers who want:

- Optimization for SAP HANA, validated by SAP
- Faster time-to-value for your SAP Business Warehouse, data mart and SAP S/4HANA implementations with preconfigured appliances
- Reduction in TCO
- Faster overall performance and accelerated time-to-value
- Mission-critical availability
- Faster deployment times
- Seamless 24-hour support

All of this is included in one offering that is already used by tens of thousands of SAP customers. SUSE Linux Enterprise Server is the leading platform for SAP solutions on Linux and is the recommended and supported OS of choice for SAP HANA. It is also SAP’s own development reference platform for Linux and UNIX. Furthermore, SAP and SUSE maintain a joint testing and development relationship that started at the SAP LinuxLab in Germany in 1999. Lenovo systems deliver world-record SAP application performance4 and provide industry-leading reliability5 helping maximize availability of business critical SAP HANA applications.

Learn more at: suse.com/lenovo

Contact us at: lenovo@suse.com

“When we compare Lenovo solutions against those of other vendors, Lenovo SAP HANA appliances are significantly less expensive. The combination of flexibility, cost-effective scaling and commercially attractive pricing makes for a very compelling offer.”

CHRIS SPRUELL
VP of Enterprise Architecture
FIT America

4 www.sap.com/benchmark (SD 2 Tier & BW-EML)