

Lenovo Solutions for SAP HANA

Innovative Solutions for the Intelligent Enterprise

Enabling the Digital Enterprise

Enabling the digital enterprise and developing business analytic solutions are the key to understanding challenges and responding to them proactively. To develop successful strategies in today's challenging environment, you need more access to critical enterprise insights than ever before.

And because data volumes are growing exponentially, your technology solutions must easily scale performance, manage huge volumes efficiently and operate reliably. These are complex demands. But breakthrough technologies can help you meet all these difficult demands now, while still accommodating for future growth.

Lenovo Solutions for SAP HANA® provide outstanding capability for SAP HANA to drive enterprise-critical insights in real time. Powered by a wide range of ThinkSystem and ThinkAgile servers, the solutions are designed to improve your SAP HANA data foundation and help lower total cost of ownership. Available as appliances or custom Tailored Datacenter Infrastructure (TDI), Scale Up or Scale Out, traditional CapEx or OpEx, large enterprise or SMB, Lenovo Solutions for SAP HANA can support the requirements and growth plans of any business and are backed by Lenovo Services expertise acquired from more than 50,000 SAP HANA systems implementations to date.

SAP's Next Generation Data Platform

SAP HANA is a comprehensive data platform. It enables real-time business by converging transactions and analytics on one in-memory database platform for application development, data integration, and data quality. Running on-premises or in the cloud, SAP HANA empowers decision-makers with new insight and predictive power. Manage large volumes of structured and unstructured data efficiently, leveraging the value of your business data while improving total cost of ownership (TCO). SAP HANA provides a single, secure environment for all your mission-critical data assets, supporting compliance with the latest security standards and data protection regulations.

Highlights:

- Gain insights faster with real-time input and analysis of mission-critical data assets while supporting compliance with the latest security standards and data protection regulations
- Lenovo Solutions for SAP HANA support a wide range of server platforms to fit any environment, and are available in appliance, TDI (customized), and private cloud offerings
- Lenovo TruScale IaaS offers an opex-based cloud consumption model for on-premises infrastructure, better aligning expense with business use
- Lenovo server and storage components are listed in the Certified and Supported SAP HANA Hardware Directory

Key benefits include:

- Gain new insights from advanced analytics for business, text, spatial, graph and series data
- Obtain a complete and accurate view of your business by accessing data from any source – internal or external. Process transactions and analytics data wherever it resides using data virtualization, integration or replication.
- Develop next-generation applications that combine analytics and transactions, and deploy them on any device, with best-in-class development tools
- Take action in the moment by using in-memory database services to process high-speed transactions and analytics
- Keep your communications, data storage, and application services secure with robust identity and access management controls

The SAP HANA platform is the next-generation data management foundation for all SAP business applications, with SAP announcing its business application suite will only support SAP HANA starting in 2027. SAP customers currently on SAP R3 or ECC will need to migrate to SAP S/4HANA by that date.

Robust and Reliable Infrastructure Platform

Lenovo offers a wide range of SAP HANA solutions - from appliances to TDI offerings to a private cloud experience with RISE with SAP S/4HANA Cloud, private edition, customer data center option and Lenovo TruScale Services.

The solutions are based on bare metal ThinkSystem and software-defined ThinkAgile servers - high performance systems that currently hold 12 SAP world performance benchmarks¹. Engineered for always-on productivity, ThinkSystem and ThinkAgile servers are ranked high in x86 server customer satisfaction and are #1 in x86 server reliability².

ThinkSystem Server	SAP Certified Appliances		
	S/4HANA OLTP	BW/4HANA OLAP	Scale Out
SR950 V3	Up to 16 TB	Up to 12 TB	Up to 94 nodes
SR860 V3 SR850 V3	Up to 8 TB	Up to 6 TB	
SR650 V3	Up to 4 TB	Up to 2 TB	

Appliance Solutions

SAP HANA appliances combine preconfigured SAP software optimized on proven Lenovo ThinkSystem hardware. This approach offers you a solution optimized for the performance needs of an in-memory data platform with fast implementation and full support from both SAP and Lenovo. Lenovo offers SAP certified appliances with ThinkSystem SR950 V3, SR860 V3, SR850 V3 and SR650 V3 servers.

SAP HANA appliances with mission-critical Lenovo ThinkSystem servers help you make faster more informed decisions, even with escalating data loads. The solution is designed to maximize your system performance to provide a smarter, more efficient approach to resource management. This results in excellent SAP HANA application value.

The ThinkSystem SR950 V3 is a 8U rack server capable of supporting up to 8 4th Generation Intel Xeon Scalable processors. With up to 60 cores per processor, the SR950 V3 supports up to 480 total cores and 960 total threads to maximize the concurrent execution of multi-threaded applications. The server supports up to 128 TruDDR5 memory DIMMs to provide the fastest available memory subsystem and memory capacity up to 32 TB. The SR950 V3 supports up to 14 PCIe channels to maximize I/O capabilities, and Intel Accelerators including Intel QuickAssist Technology (QAT), Intel Dynamic Load Balancing (DLB), Intel In-Memory Analytics Accelerator (IAA) and Intel Data Streaming Accelerator (DSA) to boost performance.

SAP HANA appliances with Lenovo ThinkSystem SR860 V3 and SR850 V3 servers provide the speed, reliability, scalability and workload versatility needed to manage the explosive growth of data.

The ThinkSystem SR860 V3 and SR850 V3 offer considerable adaptability in order to match system configurations to projected workloads. They are a 4U rack server and 2U rack server, respectively, supporting 2 or 4 processors. The system design permits rapid upgrades for processors and memory, resulting in greater system performance to handle growing next-generation workloads. The SR860 V2 has a large, flexible storage capacity to keep pace with data growth, supporting up to 48 2.5-inch drives, 24 of which can be NVMe drives - ideal for latency-sensitive applications and storage tiering.

SAP HANA appliances with Lenovo ThinkSystem SR650 V3 provide extensive flexibility to fit almost any customer environment.

The ThinkSystem SR650 V3 is a 2U rack server capable of supporting up to 2 processors. It is designed to handle a wide range of workloads, providing scalable performance, storage capacity, and I/O expansion. It supports up to 40 hard disk or solid-state disk drive bays, or up to 36 NVMe drive bays (with PCIe retimer adapters) for storage capacity. Support for 32 256GB DIMMs enables up to 8 TB of memory.

Certified HCI Systems

The Lenovo ThinkAgile HX (Nutanix-based) and VX (VMware-based) hyperconverged servers enable you to dramatically simplify your server, storage and virtualization deployments and pool your resources into a single virtualized infrastructure for more flexible and efficient utilization and management.

TDI Solutions

SAP HANA TDI solutions offer more flexibility when integrating an SAP HANA system into your existing data center layout. Costs can be lowered with SAP HANA TDI solutions by using CPUs that better meet business needs using Lenovo expert sizing vs. top tier CPUs required for SAP appliances.



“With the Lenovo ThinkAgile VX platform, we can easily scale up compute or storage resources as needed at any time without interruptions for business users or processes.”

*Jan Spuhler, IT System Administrator at
Krombacher Brauerei*

This approach also enables a reduction in hardware and operational costs through the reuse of existing hardware components and operational processes. With TDI implementations, you are responsible for organizing support with the various vendors.

A wide range of Lenovo systems are available for SAP HANA TDI solutions. Many ThinkSystem servers, ThinkAgile systems and ThinkSystem storage arrays are [Certified and Supported SAP HANA Hardware](#) for TDI implementations.

Lenovo Innovation

Through joint development with other SAP partners, Lenovo is constantly innovating and pushing the boundaries which has resulted in the following exclusives:

- **Scale-out SAP HANA OLTP support up to 48TB in a VMware environment.** That's a 50% increase over the previous limit of 32TB!
- SAP Business One for SAP HANA can run on a **single processor** with the ThinkEdge SE450.

Certified Enterprise Storage

Lenovo offers certified solutions that leverage external SAN and unified storage or maximize internal server storage for your SAP HANA data needs. The result is choice and simplified infrastructure for your SAP HANA applications.

ThinkSystem DM Series

The ThinkSystem DM Series improves customer TCO and time to value with their advanced data management features offered through ONTAP. The Unified Architecture of block and file workloads allows customers to reduce their hardware requirements and utilize one management system for both NAS and SAN deployments.

Users will benefit from backup and recovery based on storage Snapshot copies using ONTAP SnapCenter. The built-in Asynchronous and Synchronous replication provide storage-based Disaster Recovery capabilities. When running SAP HANA on the DM Series All Flash Arrays, customers are protected from unexpected events by simply utilizing the included features on DM Series. The DM7100F significantly improves customer performance with NVMe support.

ThinkSystem DE Series

The ThinkSystem DE Series provides excellent performance at an affordable price, making it the ideal solution for cost-conscious businesses. The DE Series deliver up to 1.0M sustained IOPS and response times measured in mere microseconds. They also generate up to 21GBps of read throughput, enough for even your most bandwidth-intensive workloads.

Availability features on the DE Series include:

- Fully redundant architecture with automated failover
- Intuitive storage management with comprehensive tuning functions
- Advanced monitoring and diagnostics with proactive repair
- Snapshot copy creation, volume copy, and asynchronous mirroring for data protection.

IBM Spectrum Scale

IBM Spectrum Scale™ software allows you to move beyond simply adding storage to optimizing SAP HANA data management. Spectrum Scale allows seamless capacity expansion in order to handle the explosive growth of SAP HANA data.

When Spectrum Scale is coupled with the workload-optimized ThinkSystem SR950 server, you can create multi-node, scale-out configurations that enable you to achieve larger SAP HANA memory sizes by simply adding server compute nodes.

These multi-node, scale-out configurations support up to 94 nodes for SAP Business Warehouse and data mart workloads as well as up to four nodes for SAP S/4HANA workloads.



“With SAP HANA on Lenovo systems, we can provide decision-makers with the real-time insight they need to make the best business decisions.”

Anwar Raafat, Solutions Director at Integrated Diagnostics Holdings

Resilient Enterprise Platform

Speed and scalability are vital to your system's success. Yet unplanned or excessive system downtime can neutralize performance and agility advantages, so system availability and dependability are equally important. That is why you need a highly available solution designed to keep your system up and running and your business thriving.

Lenovo servers offer superior reliability, availability and serviceability features for SAP HANA customers. Self-monitoring, error detection, self-healing, and predictive failure analysis help protect the system against consumed errors that could reach critical applications. Lightpath diagnostics, corrupt data containment and Fault Resilient Boot help predict and quickly identify issues which helps decrease system downtime. The result of built-in system protections is outstanding system resilience.

When Lenovo servers are combined with ThinkSystem DM Series, or Spectrum Scale, the resulting Lenovo solutions for SAP HANA help:

- Ensure business resiliency through integrated high availability and disaster recovery capabilities to/from the cloud
- Perform maintenance and serviceability faster
- Eliminate restarts by minimizing the number of system "touches"
- Reduce downtime with self-healing architectures
- Maintain high availability by eliminating production outages
- Secure information with comprehensive data protection capabilities

Deploying SAP HANA in a modular, multi-node scale-out configuration allows a high availability (HA) approach that is exclusive to Lenovo. Including an additional HA node in your configuration, enables Spectrum Scale replication and automatic failover capabilities using the additional stand-by node to protect against unplanned outages.

Optimized Configurations

Lenovo has designed and tested several configurations of SAP HANA. These configurations are optimized for performance and scalability. They can be used as is, as building blocks for larger installations, or as a base from which customizations can be made. The current Solution configurations include:

Solution Type	Description
Scale-out Appliance	Supporting high growth, memory intensive workloads in a clustered environment
Scale Up Appliance	Simplified and highly performant single node environment. Faster restarts and extended memory available with Intel Optane PMem.
TDI	Cost-effective option with potential use of existing infrastructure and components that are a better fit for business requirements
Hyperconverged	Cloud-like provisioning and management of compute and storage resources
Business One	Ideal for Small and Medium Business (SMB) customers

These recommended configurations can be found on Lenovo's Data Center Configurator tool at dcsc.lenovo.com. Just select "Deployment Ready Solutions" and then "Databases".



"The Lenovo ThinkSystem solution met all our key performance, scalability, and availability requirements for SAP S/4HANA. The SAP benchmarks for Lenovo ThinkSystem blew away the other providers we evaluated."

Zahari Zashev, IT Manager of Sadina 99

Bringing the Cloud to You

For customers wanting to run their SAP applications in the cloud, Lenovo offers a great alternative. **TruScale IaaS** gives you cloud-like agility and flexibility with infrastructure on premises. TruScale gives you the freedom to control your budget and strategic priorities, combined with peace of mind knowing you're getting the latest and most efficient hardware environments tailored to your specific business needs. TruScale offers the merits of an OPEX business model and concierge managed services for your SAP infrastructure. Services span the entire lifecycle, from advising and capacity planning to full deployment of the offering to infrastructure managed services to asset removal.

Lenovo TruScale Hybrid Cloud with VMware is an HCI solution that hosts virtualized workloads and their storage in a hybrid environment. Based on Lenovo ThinkAgile VX Series and VMware's industry-leading software-defined data center offerings, it combines the security of on-premises infrastructure with the simplicity of cloud operations. The solution allows SAP application customers to accelerate cloud adoption and easily migrate workloads across multi-cloud deployments with complete management and visibility.

Lenovo TruScale Multi Cloud with Deloitte is a turnkey hybrid cloud platform as-a-Service solution that delivers a full software-defined data center. Co-engineered between Lenovo and Deloitte, it features Deloitte's best-in-breed Cloud Managed Services and OpenCloud technology to provide single pane of glass management of your multi-cloud environment. SAP application customers can leverage comprehensive migration playbooks to help realize the shortest path to cloud migration to support their business goals.

TruScale is also a feature of an innovative SAP public cloud offering - **RISE with SAP S/4HANA Cloud, private edition, customer data center option**. Available only through SAP, private edition delivers a turnkey, OPEX, cloud subscription on Lenovo servers and storage that are SAP HANA certified and supported. It is less disruptive to operations vs. a move to a public cloud provider, offers the merits of an OPEX business model, and is monitored and managed by Lenovo and SAP white-glove services.

Benefits of Lenovo TruScale IaaS for SAP environments:

- **OPEX model** - TruScale delivers a subscription-based, pay-for-use consumption model, eliminating the upfront capital expense of a classic on-premises solution.
- **Assured Security and Compliance** - Business-critical data remains on site, behind company firewalls, enabling compliance with government/ industry customer/ data privacy laws.
- **Reduced risk** - TruScale helps you eliminate the cost and complexity of application entanglement by simplifying the interoperability without leaving your data center.
- **Better Performance** - Hosting SAP HANA and associated applications together in the same data center provides measurably better performance outcomes.



“Thanks to Lenovo, we benefit from proactive monitoring that has kept our environment running at 100% availability for over a year so far. We used to devote 40% of our IT team to checking systems - now they can work on more valuable tasks for the business instead.”

Afonso Pelegrini, IT Manager, Servimed

Leveraging SAP Services in Microsoft Azure

Lenovo's offers a hybrid cloud solution for SAP workloads using Microsoft Azure. This solution enables SAP customers to leverage Azure SAP cloud services today while maintaining their on-premises environments. It also allows those customers to migrate their SAP applications to the cloud over time when optimal for the business.

Microsoft Azure services can be procured from Lenovo through the Cloud Solution Provider (CSP) program, enabling a single point of procurement and support.

Summary: On-premises Options for SAP Customers

There are many options for SAP customers needing or wanting to keep their mission-critical SAP applications on-premises.

<u>CapEx</u>	<u>CapEx + HANA Managed Service</u>	<u>Azure Stack HCI and Microsoft Azure Services</u>	<u>TruScale IaaS</u>	<u>RISE with SAP S/4HANA cloud, pe cdc</u>
Available from Lenovo	Available from Lenovo	Available from Lenovo	Available from Lenovo	Available from SAP
Self managed	Fully managed, single support model	Self / fully managed	Fully managed, single support model	Fully managed, single support model
On prem control	On prem control	On prem control	On prem control	Full cloud experience, with 'on prem-like' control
			Flexible commitments	Flexible commitments
		Azure innovations	Available with VMware SDDC and Deloitte <u>OpenCloud</u> offerings for Hybrid Cloud	SAP innovations including artificial intelligence (AI) and green ledger. Also, larger function modules and extensions based on the Business Technology Platform (BTP)

Complementary Offerings

The Lenovo solutions for SAP HANA offers a choice of operating system support allowing you to choose the operating system that best fits your datacenter requirements. You can choose **SUSE Linux Enterprise Server for SAP Applications** or **Red Hat Enterprise Linux for SAP HANA**, and the appropriate subscription and support. In addition, you can choose the Spectrum Scale or SUSE Enterprise Storage software license that matches your configuration requirements along with the appropriate software maintenance and support needed to enhance the availability and resiliency required for large production environments.

Single node configurations use the XFS file system included with the Linux operating system. Scale-out cluster configurations use the Spectrum Scale Server and File Placement Optimizer licenses or SUSE Enterprise Storage licenses.

Lenovo XClarity Administrator is a centralized systems management solution that helps administrators quickly deploy, monitor, and manage their data center infrastructure. This solution integrates easily with Lenovo x86 servers, appliances, certified nodes, Top-of-Rack Ethernet switches, and storage systems. When integrated with **SAP IT Operations Analytics**, the combination offers the best way to monitor data centers with SAP applications running on Lenovo servers.

The **Veeam Availability Platform** combined with best-in-class Lenovo data center infrastructure enables businesses to accelerate their digital transformation: simplify their IT environment, reduce risk, and lower costs with one complete solution for SAP HANA. This includes the SAP HANA certified Lenovo compute platforms, Lenovo HCI platforms (ThinkAgile VX and HX), Lenovo storage platforms (DM and DE Series) and the Veeam Availability Suite. This integration provides customers with the level of data protection they really need and end-to-end availability across all SAP certified Lenovo platforms.



“What impressed us most about Lenovo was that they offer pre-configured server models specially certified for SAP S/4HANA. Because all the hardware components came packaged as a single solution, it took a lot of complexity out of what is a major business transformation project.”

Andrés Jiménez, CIO of Aquaservice

Comprehensive Solution Services and Support

To speed deployment and simplify management of your SAP HANA system, Lenovo offers comprehensive solution services and support which include:

- Assessment Services and Design Services
- Hardware installation and deployment services

In addition, Lenovo can provide advanced services including:

- Integrated solution support
- On-going maintenance and updates to hardware, operating system software and Spectrum Scale, ThinkSystem DM Series or DSS-C
- Continuous monitoring of key SAP HANA solution components
- Simplified support processes, with expert consultants assisting with troubleshooting and problem-determination
- Assistance to help improve availability and reduce problem resolution time
- Proactive IT planning and preventative support advice and services

Lenovo Professional Services have an extensive services portfolio to implement your unique SAP HANA solution. Lenovo SAP HANA experts can install, validate hardware and software stack (OS, PFS, SAP), configure networking, basic skills transfer, and provide post-install documentation. You can also ensure your solution is optimized through choosing SAP HANA health-check to assess your environments.

Let Us Help with Old Equipment

Needing to safely and securely dispose of assets? Lenovo Services has the expertise, experience and existing relationships with the best vendors in the ITAD (IT Asset Disposal) industry, allowing us to generate the maximum possible value for your business from this process.

Our expert team will help you meet your corporate and environmental responsibilities, comply with security protocols and **generate unrealized value** from your technology assets.



“Our experience of Lenovo Managed Services has been excellent. We always work with the same dedicated team of consultants, so we have a great relationship with them and they know our systems and our business very well.”

Raul Revilla, SAP Basis Administrator at Cheney Brothers

Agile. Scalable. Reliable.

It is no secret your business depends on technology. Therefore, your success depends on how well your mission-critical technology performs. The Lenovo Solution for SAP HANA provides the seamless, scalable and dependable performance needed to extract strategic insights from exploding information volumes helping deliver the bottom-line business results you demand.

Why Lenovo

Lenovo is a leading provider of data center infrastructure solutions. We partner with you to identify, design, install and support the solution that best ensures your organization's needs are met throughout the IT lifecycle. Lenovo complements a portfolio of leading x86 servers with a full range of storage, software, and comprehensive services that provides excellent performance, reliability, and security for your IT environment from the edge to the cloud.

For More Information

To learn more about Lenovo Solutions for SAP HANA, contact your Lenovo Business Partner or visit: www.lenovo.com/sap



¹ As of February 1, 2024

² ITIC, Global Server Reliability Report, <https://lenovopress.com/lp1117>

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