Break Through to New Levels of Insight in the Cloud

Intel's innovations power SAP's suite of business solutions and intelligent technologies, enabling enterprises to deploy high-performance, highly optimized applications within the cloud.

intel®

Unlock the value of data with increased visibility, focus, and agility

Digital transformation is driving new usages to the cloud. The cloud offers many technological advancements to enterprises, such as operational automation, on-demand elasticity, global presence, security and compliance capabilities, and robust agility and scalability. As a result, cloud migrations are happening at an ever-increasing pace. According to Gartner, 83 percent of enterprise workloads will be in the cloud by 2020 alone,[1] with 68 percent of today's cloud services delivered by hyperscalers.[2]

SAP customers also are moving to the cloud with SAP S/4HANA. Of the 73 percent of worldwide SAP customers that are planning to deploy SAP S/4HANA, 72 percent say they plan to deploy it in the cloud, and 54 percent say they'll make the switch within three years.[3]

These changes in the enterprise IT landscape today are why Intel and SAP are continuing their commitment to helping SAP HANA platform and SAP S/4HANA users overcome the obstacles in their cloud migrations and realize the promise of in-memory computing in the cloud.

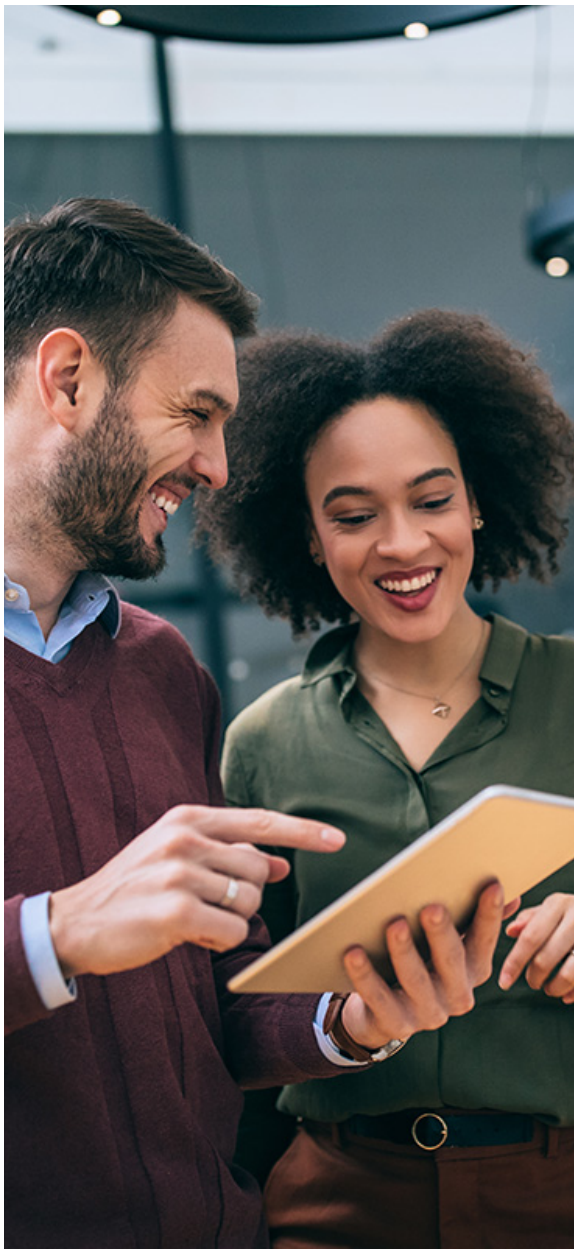
Why Intel and SAP in the cloud?

Certified SAP cloud instances running on Intel® technology allow enterprises to affordably increase their database capacities and grow business value from faster insights in several ways.

- **Enable a single source of truth.**
  With massive memory capacity, in addition to native data-virtualization capabilities, near-real-time analysis is possible at the source without having to make multiple copies of data.

- **Run on pre-validated, certified SAP HANA cloud instances.**
  Enterprises can protect and future-proof cloud investments on modern Intel technology that has been fully tested for SAP HANA workloads to perform optimally and more securely.

- **Simplify the SAP HANA landscape.**
  Enterprises can achieve a high return on investment (ROI) and consolidate the server footprint to realize hardware, dev integration, and other operational efficiencies for quality assurance (QA), high availability (HA)/disaster recovery (DR), and business intelligence (BI).



Choose the right cloud instances with Intel Inside®

By running their SAP landscapes with Intel Inside, enterprises can grow with confidence and meet mission-critical infrastructure needs built on:

- A trusted partnership
- A proven cloud platform built for SAP
- Unmatched security and compliance
- Unlimited insights and innovation

A trusted partnership

Intel's long history of co-engineering with SAP enables cloud providers to offer instances that are purpose-built and optimized for SAP HANA with the latest Intel technologies.

With Intel® Xeon® Scalable processors, the SAP HANA platform is built on leading architecture solutions from a broad ecosystem and backed by 20+ years of co-innovation and co-engineering between SAP and Intel. These solutions encompass 12 OEMs, more than 1,300 appliances, tailored data center integrations, and no vendor lock-in.[4]

All SAP BW/4HANA world records are achieved on Intel Xeon Scalable processors.[5]

A proven cloud platform built for SAP

With Intel-based SAP HANA instances in the cloud, customers have the flexibility to deploy their SAP solutions 100 percent in the cloud or in a hybrid environment, in various regions and zones throughout the world.

Customers have multiple options for scale-up (up to 48 TB[6]) and scale-out (up to 564 TB[7]) deployments, allowing them to expand or contract their resources on Intel-based SAP HANA instances in the cloud.

Customers can quickly spin up new instances at the speed of the business, without long procurement lead times.

Certified, pre-validated SAP instances in the cloud on Intel Xeon Scalable processors allow customers to do more with less overhead and complexity. In-memory databases like SAP HANA use vectorization instructions on the latest Intel Xeon Scalable processors to scan data at blazing speeds.

Certified, pre-validated SAP HANA instances in the cloud offer customers the reassurance that their instances are running on Intel architecture that has been fully tested and validated for SAP HANA workloads for optimal and security-enabled performance.

SAP HANA uses Intel Transactional Synchronization Extensions (Intel TSX) to improve lock scalability and execute transactions efficiently as users scale with multi-user concurrent usages in the cloud.

Uptime is improved with the latest RAS features from Intel, in addition to various HA/DR configurations that are possible in the cloud.

Unmatched security and compliance

Intel technology provides a security-enabled foundation for SAP workloads with built in hardware-enhanced security features.
For cloud-based instances, where mission-critical information leaves the traditional IT environment, a more widely usable and secure encryption standard such as Intel AES New Instructions (Intel AES-NI) is used to protect data in flight and at rest.

Intel Xeon Scalable processors provide real-time encryption with no performance overhead using integrated Intel Advanced Vector Extensions 512 (Intel AVX-512) and additional encryption accelerators.

SAP-certified infrastructure-as-a-service (IaaS) platforms include Microsoft Azure, Alibaba Cloud, Amazon Web Services (AWS), Google Cloud Platform, and IBM Cloud.
See the full listing.

Customers can choose the options that fit their needs when migrating SAP apps to hyperscaler infrastructure:

Transform

- Convert or migrate to SAP S/4HANA, along with the operating system and database, with three transition paths: new implementation, system conversion, and selective data transition.
- With this option, customers gain the benefits of cloud-native features, but they also have a new digital core platform, reinvented processes, and a new user experience (UX). The benefits of transformation often outweigh the effort and costs of adapting to a new system.

Classic lift and shift

- Re-host: Exact copy of app, database, and operating system platform, enabling rapid migration with minimal disruption, but preventing the harnessing of the key benefits of public cloud migration.
- Re-platform: Technical migration of SAP apps, upgrading the underlying database and operating system to SAP HANA.
- Re-architect: Re-imagining of the architecture, developed using emerging application features driven by business needs (features, scale, or performance).

The synergy between SAP HANA and Intel technology allows large amounts of data to be processed and scanned at blazing speeds, giving businesses a single source of truth.

Unlimited insights and innovation

The synergy between SAP HANA and Intel technology enhances application responsiveness, low latency, and performance in the cloud so that large amounts of data can be processed and scanned at blazing speeds, giving businesses a single source of truth that leads to deeper insights.

With powerful SAP HANA instances running on Intel Xeon Scalable processors, users can allocate hardware resources more efficiently and push through a wider variety of workloads for new use cases, including artificial intelligence (AI), machine learning (ML), and Internet of Things (IoT)/edge compute.

Intel Xeon processor–based vectorization instructions, such as Intel AVX, Intel AVX2, and Intel AVX-512, are all used by SAP HANA to enable fast database scans for cloud usages.

The latest generation of Intel Xeon Scalable processors includes several standard and advanced RAS features that support cloud deployments.

Partnerships with cloud service providers (CSPs)

Intel and SAP partnerships with CSPs—Microsoft Azure, Alibaba Cloud, AWS, Google Cloud Platform, and IBM Cloud—allow CSPs to do more with less overhead and complexity. This, in turn, provides numerous end user benefits as digital transformation becomes more pervasive and enterprises migrate to the cloud.

- **Powerful SAP HANA instances.** Intel's long history of co-engineering with SAP enables CSPs to offer instances that are purpose-built and optimized for SAP HANA with the latest Intel technologies.
- **Flexibility.** CSPs can offer customers the flexibility to deploy their SAP solutions 100 percent in the cloud or in hybrid environments in various regions and zones around the world.
- **Scalability and agility.** CSPs can offer options for scale-up and scale-out implementations, while also enabling customers to expand or contract their resources. Customers can quickly spin up new instances at the speed of business, without the long procurement lead times that many are used to.
- **Reliability and better quality of service (QoS).** Uptime is improved with the latest reliability, availability, and serviceability (RAS) features from Intel, in addition to various high availability (HA)/disaster recovery (DR) configurations that are possible in the cloud. Configurations include Intel® Optane™ persistent memory (PMem), enabling simplified landscapes and reducing total cost of ownership (TCO) by shortening recovery times by as much as 22x.[8]

SAP software on Microsoft Azure

With the broadest global footprint, largest compliance portfolio, enterprise-grade service-level agreements (SLAs), and world-class support, Microsoft Azure provides a robust, resilient, and reliable environment for SAP applications. SAP HANA on Azure Large Instances provides SAP HANA Tailored Datacenter Integration (TDI)–certified hardware that is purpose-built bare metal hosted in Azure data centers and specifically targeted at large and extra-large SAP HANA workloads. Microsoft's partnership with Intel allows Azure to provide the largest SAP HANA–certified configurations offered on any virtual machine (VM) in the public cloud—specifically the capabilities of the new second generation of M-series, which provides 6 TB to 12 TB VMs for SAP HANA.

Microsoft now offers Intel Optane PMem to help enterprises overcome the challenges of capturing and storing large volumes of data, so they can save more, do more, and go faster. Companies can migrate to SAP HANA on Azure Large Instances to harness the power of Intel Optane PMem using 2nd Generation Intel Xeon Scalable processors. Intel Optane PMem combines the persistence of solid state drives (SSDs) with access times at DRAM-like speeds to deliver high performance, low TCO, and improved uptime.[9]

SAP software on Alibaba Cloud

More than 150 companies have deployed SAP systems on Alibaba Cloud. Its mature service infrastructure and platforms can help simplify overall IT infrastructure and accelerate digital transformation. SAP on Alibaba offers flexible billing models, ensured availability, and SAP-specific solutions.

SAP software on AWS

AWS has the most SAP instances for scale-up and scale-out deployments, exclusively powered by the Intel Xeon Scalable platform. SAP on AWS offers up to 24 TB of memory, SAP-certified. Management is simple with out-of-the-box integration native to AWS and features such as AWS command-line interface (CLI), console, and AWS Identity and Access Management (IAM). SAP on AWS also provides the flexibility to scale and resize in minutes.

SAP software on Google Cloud Platform

Accelerate decision making with high-performance SAP HANA instances running on the latest Intel technologies and Google Cloud Platform. Google Cloud Platform offers SAP-certified VM sizes up to 12 TB. This certification is the result of a close partnership with SAP and extensive development work, stringent testing, and thorough configuration optimization.

SAP software on IBM Cloud

Improve security and performance with SAP-certified bare-metal servers on IBM Cloud, purpose-built for SAP HANA workloads. SAP on IBM Cloud helps enterprises get up and running faster with a wide selection of single-tenant server configurations and certified operating system and virtualization options preloaded, preconfigured, partitioned, and ready for SAP HANA installations.

SAP HANA Enterprise Cloud, customer edition, powered by Lenovo TruScale and HPE GreenLake

SAP HANA Enterprise Cloud, customer edition, was created for customers in regulated industries or the public sector, enterprises with strict data-sovereignty requirements, and other customers who simply want to keep their data inside their own walls. SAP HANA Enterprise Cloud, customer edition, is a premier, turnkey SAP system landscape delivered directly to a customer's data center and managed remotely by SAP. This solution is provided in partnership with SAP Global Technology Partners:

- Lenovo and the Lenovo TruScale (lenovo.com/us/en/data-center/services/truscale-infrastructure-services) IaaS offering
- HPE and the HPE GreenLake (hpe.com/us/en/greenlake.html) IaaS offering

The ideal platform for hybrid cloud environments

A hybrid cloud environment can be the ideal way for large organizations to move to the cloud, bringing cloud-like infrastructure management into existing data centers and moving existing applications in this virtualized environment. Intel-certified hyperconverged infrastructure (HCI) solutions make it easier for companies to mix and manage this infrastructure. SAP HANA in a hybrid cloud environment powered by 2nd Generation Intel Xeon Scalable processors and Intel Optane PMem enables application portability, virtualized data access, a broad range of licensing options, and various deployment models from on-premises to cloud, and from cloud to multi-cloud.

Act now.
Ask for Intel.

Migrate to the cloud with Intel and SAP.

- Save on costs by moving your legacy SAP landscapes to the cloud.
- Make the transition to the cloud supported by the Intel and SAP partner ecosystem.
- Innovate with IoT and AI services by combining data from SAP and non-SAP sources.

Visit intel.com/sap for more information.

[1] Forbes. "83% Of Enterprise Workloads Will Be In The Cloud By 2020." January 2018. forbes.com/sites/louiscolumbus/2018/01/07/83-of-enterprise-workloads-will-be-in-the-cloud-by-2020/#31f74d006261.

[2] Mission Critical Magazine. "Experts Predict the End Is Nigh for Enterprise Data Centers, Long Live the Hyperscaler." October 2018. missioncriticalmagazine.com/articles/91783-experts-predict-the-end-is-nigh-for-enterprise-data-centers-long-live-the-hyperscaler.

[3] SAP. "Latest IDC Survey: Customers Are on the Move to SAP S/4HANA." June 2019. news.sap.com/2019/06/sap-s4hana-customer-migration-idc-survey/.

[4] Offering server hardware choice for SAP HANA on Intel Xeon processor–based solutions used by 12 OEMs versus SAP HANA on IBM Power Systems used by only IBM. sap.comdmc/exp/2014-09-02-hana-hardware/enEN/appliances.html.

[5] Lenovo. "ThinkSystem SR950 Sets World Record with New SAP BW Edition for SAP HANA (5.2B Records) Benchmark Result." September 2018. https://lenovopress.com/lp0995-sr950-4s-sapbw-52b-benchmark-result-2018-09-27#introduction.
A Lenovo ThinkSystem SR950 4-socket server using Intel Xeon Platinum 8180 processors delivers world-record performance for the SAP BW edition for SAP HANA Standard Application Benchmark Version 3, with 5.2 billion (5.2B) initial records in a single-node setup. Submitted/published results as of 27 September 2018 by Lenovo.

Configuration: Lenovo ThinkSystem SR950, four processors/112 cores/224 threads, Intel Xeon Platinum 8180 processor, 2.50 GHz, 64 KB L1 cache and 1,024 KB L2 cache per core, 38.5 MB L3 cache per processor, 3,072 GB main memory, running SUSE Linux Enterprise Server 12, SAP NetWeaver 7.50, SAP HANA 2.0.

Source: SAP certification number 2018040, sap.com/dmc/benchmark/2018/Cert18040.pdf. Score: Number of initial records: 5,200,000,000; phase 1: data load phase = 28,715 (runtime of last dataset in seconds); phase 2: query throughput phase = 4,970 (query executions per hour/records selected); phase 3: query runtime phase = 156 (total runtime of complex query phase in seconds).

World records for SAP HANA performance on Intel processor–based systems include benchmarks conducted on HPE ProLiant DL560 Gen10 TDI (1.3B initial records), Lenovo ThinkSystem SR950 (1.3B initial records and 2.6B initial records), and Dell EMC PowerEdge R940 (2B initial records). For details and other world records, see: intel.com/content/www/us/en/benchmarks/server/xeon-scalable/xeon-platinum-world-record.html and sap.com/dmc/exp/2018-benchmark-directory/#/bwh.

[6] Intel and HPE. "Unleash the power of Your SAP HANA platform." August 2018. intel.com/content/www/us/en/big-data/hpe-superdome-flex-sap-hana-wp.html.

[7] Intel. "The Intel Xeon Platinum Processor Is Put to the Test and Comes Out Shining." Intel IT Peer Network blog. July 2017. https://itpeernetwork.intel.com/ intel-xeon-platinum-processor-put-to-test/. "SAP has certified the SAP HANA 2 platform for OLAP workloads to support up to 3 TB of memory per 4-socket system on the Intel Xeon processor Scalable family. The certification is for a 4-socket configuration or for 6 TB in an 8-socket configuration. … Now, scale-out implementations for very large SAP BW workloads can support up to 94 6 TB nodes for a total of 564 TB—without the need for a storage area network (SAN), resulting in a lower TCO for large scale-out implementations."

[8] Microsoft. "Next Generation SAP HANA Large Instances with Intel® Optane™ drive lower TCO." April 2020. https://azure.microsoft.com/en-us/blog/next-generation-sap-hana-large-instances-with-intel-optane-drive-lower-tco/. Note: SAP certifications are a work in progress; visit docs.microsoft.com for the latest updates.

[9] SAP certifications are in progress; visit https://docs.microsoft.com/en-us/azure/virtual-machines/workloads/sap/hana-available-skus for updates.

Performance varies by use, configuration and other factors. Learn more at www.Intel.com/PerformanceIndex.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

Printed in USA 0121/VS/PRW/PDF Please Recycle 342571-002US