



Solution Brief

Innovation Is Yours for the Taking

Drive innovation and digital transformation with SAP HANA® 2 powered by the Intel® Xeon® processor E7 v4 family

“Here’s the thing; your customers don’t care about SoE’s [systems of engagement], SaaS, PaaS and IaaS. They do, however, care—sometimes passionately—about getting the information, the product, the service etc., that they want/need—right now!” writes Kristian Thyregod in a post on LinkedIn.¹

In today’s digital marketplace, for your company to deliver the right information, product, or service first, you have to be able to develop and deliver it sooner—and better—than anyone else. And regardless of the format that information, product, or service takes, data is the key to delivering it sooner and better. Data drives digital transformation, or using technology to radically improve your company’s performance or reach.

The technology you need to drive your company’s digital transformation has been co-innovated and co-engineered by Intel and SAP for more than a decade. It is the SAP HANA® platform on the Intel® processor and software architecture. It provides companies like yours with a blazing-fast, in-memory database solution for transactional and analytical applications. And now that co-innovation offers even greater opportunities with SAP HANA 2. An evolutionary update to SAP HANA, SAP HANA 2 is designed to optimize business transformation by letting your company spend less time maintaining its infrastructure and more time effectively innovating, competing, and growing.

SAP HANA 2 takes full advantage of the Intel® Xeon® processor E7-8800/4800 v4 product family’s large memory capacity and high uptime. This helps your company benefit from reduced total cost of ownership (TCO), the power to accelerate application development, and the capability to deliver applications that make use of new types of data while supporting your digital transformation and lowering costs. A recent IDC study found that customers can realize a 575-percent return on investment (ROI) by innovating applications on SAP HANA.²

One New Generation Deserves Another

SAP HANA® 2 is the version of SAP HANA released in late 2016 and the next-generation platform for digital transformation. SAP HANA 2 is optimized to run on Intel® processors. And the Intel® Xeon® processor E7-8800/4800 v4 product family is the next-generation Intel processor family optimized to deliver the performance needed for SAP HANA 2 and the most demanding data workloads.

Together, SAP HANA 2 and the Intel Xeon processor E7 v4 family can drive your business’s digital transformation by keeping your data ready for business decision makers, IT administrators, and developers to continually drive business innovation without interruption.

SAP HANA® 2



The Next-Generation Platform for Digital Transformation—SAP HANA 2

SAP HANA 2 provides your organization with a solid foundation for managing your critical data with an in-memory database that is highly available, scalable, and secure. It is designed to simplify database and data management and facilitate agile application development. Powerful analytical processing lets you build and deliver insight-driven applications to compete more effectively in the digital economy.

Using SAP HANA 2, your organization can:

- Equip developers with tools that empower them to build next-generation applications
- Ensure that business decision makers can take advantage of the latest real-time, in-memory analytical intelligence to uncover deeper insights
- Simplify your IT infrastructure, so technical staff can focus on innovating and on harnessing new technologies and less on maintaining existing operations

Key enhancements in SAP HANA 2 focus on database management, data management, analytics intelligence, and application-development capabilities. These capabilities can help your IT organization build breakthrough applications and analytics to transform your business for the digital economy.

Database Management



SAP HANA 2 helps IT organizations ensure business continuity with high-availability, security, workload management, and administration enhancements.

Feature highlight: An active/active-read-enabled option enables IT organizations to use secondary systems—previously used only for system replication—to offload read-intensive workloads and improve operations.

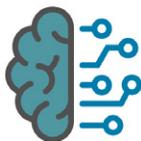
Data Management



SAP HANA 2 helps businesses make use of all data, regardless of where it resides, with enhancements to enterprise modeling, data integration, data quality, and tiered storage. Embedded enterprise-information-management and data warehousing capabilities let you effectively manage data and disrupt the status quo at your company and in your industry.

Feature highlight: The web-based SAP® Enterprise Architecture Designer Edition for SAP HANA 2 enables IT organizations to manage complex information architectures and visualize the potential impact of new technologies before implementing those technologies.

Analytical Intelligence



SAP HANA 2 supports high-speed transaction processing and multi-model data analysis against a wide variety of data to help your business discover the deep insights that drive greater innovation. Advanced data processing engines let you analyze all types of data—from structured data to text, spatial, graph, streaming, and series data—and embed rich insights into your applications.

Feature highlight: Algorithms for classification, association, time series, and regression in the SAP HANA 2 predictive-algorithm library let you use predictive analytics to uncover

Easily Adopt SAP HANA® 2—No Database Migration Required

SAP HANA 2 includes everything in SAP HANA 1.0 SPS 12, along with many new enhancements. With SAP HANA 2, you get technology enhancements two times each year.

Once you are ready to adopt SAP HANA 2, a simple update from SAP HANA 1.0 SPS 10, SPS 11, or SPS 12 is all you need. No database migration is required.

You can continue to run SAP HANA 1.0 SPS 10, SPS 11, or SPS 12 applications unchanged in SAP HANA 2. And, once they are validated, your traditional SAP® applications will run on SAP HANA 2.

patterns, relationships, and opportunities you have never had access to before. Developers can even use algorithms for predictive analysis to incorporate machine learning in custom applications.

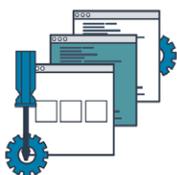
Application Development



SAP HANA 2 helps developers build and deploy next-generation applications with enhanced capabilities for the application server and expanded development toolsets and language coverage. Flexible development and deployment solutions empower developers to quickly prototype, validate, and build the applications that enable your business to compete more effectively. And you have the flexibility to build those applications on the same platform that you use to run existing mission-critical applications.

Feature highlight: A file-processor application programming interface lets developers embed file filters into applications that extract text or metadata from documents to deliver deeper insights.

Easy Administration



SAP HANA 2 includes enhanced administration tools that enable your IT team to simplify operations to reduce overall costs and improve your company's bottom line.

Intel Xeon Processor E7-8800/4800 v4 Product Family

The Intel Xeon processor E7-8800/4800 v4 product family delivers the security-enabled and reliable performance that fuels data-centric enterprises. The processor family provides the real-time, high-capacity data analysis that your organization needs to go from data to actionable insights faster, while making it possible for you to respond to those insights by building innovative services and customer experiences.

The Intel Xeon processor E7-8800/4800 v4 product family has the largest memory footprint of any Intel processor. That footprint gives your organization the fastest path to a high-performing, analytics-ready data center—and optimal performance for in-memory processes. With access to up to 24 TB of memory per 8-socket system, and scale-up systems with up to 32 sockets from select server vendors, you can reduce the number of systems you need, which helps minimize TCO *and* boosts your ability to innovate.⁴

With your SAP HANA 2 environment powered by the Intel Xeon processor E7-8800/4800 v4 product family, your organization's data-management needs benefit from:

- **Up to 33 percent more cores, threads, and last-level cache** than the previous-generation Intel Xeon processor E7 v3 family, which helps support complex, high-volume transactions and queries
- **More memory support for online transaction processing (OLTP):** Up to 33 percent more memory support for OLTP per processor than the previous-generation Intel Xeon processor E7 v3 family, which helps reduce TCO⁵
- **2x more analytics performance** per processor than the previous-generation Intel Xeon processor E7 v3 family⁶



1.41x

better generational performance

SAP HANA[®] SPS 12 run on the Intel[®] Xeon[®] processor E7 v4 family delivers up to 1.41x better generational performance than on the Intel Xeon processor E7 v3 family.³ Similar gains are anticipated for SAP HANA 2.

- **Up to 24 TB of DDR4 3DS LRDIMM memory** per eight-socket server, which provides scalable memory capacity for real-time in-memory analytics across large datasets⁷
- **8-socket platforms that can be scaled up to 32 sockets** with third-party node controllers for increased performance and lower TCO
- **Up to 192 processing cores** per eight-socket server to support large numbers of concurrently running applications
- **Up to 6.3x more transactions per minute** with SAP HANA SPS 12 on the Intel Xeon processor E7 v4 family with Intel® Transactional Memory Extensions (Intel® TSX) enabled⁸

The Intel Xeon processor E7-8800/4800 v4 product family is also designed for 99.999 percent uptime.⁹ Intel® Run Sure Technology, only available on the latest Intel Xeon processor E7 family-based platforms, helps increase uptime compared to previous-generation Intel Xeon processor E7 family-based platforms with specialized capabilities that diagnose and recover from system and memory management failures or errors. Other built-in features provide further benefits, such as Intel® Advanced Vector Extensions 2 (Intel® AVX2), which provides accelerated and pervasive encryption, and Intel TSX, which has delivered increasing transactions per minute with each recent version of SAP HANA and each recent generation of the Intel Xeon processor E7 family.

Co-engineered for Your Business

Intel and SAP have collaborated on SAP solutions and Intel processors for more than 20 years and have collaborated on the SAP HANA platform from its inception. Intel provided the original reference architecture for SAP HANA.

In other words, Intel processors are made to run SAP HANA, and SAP HANA is optimized to run on Intel processors. In addition, Intel Xeon processors power more than 75 percent of all new SAP deployments.¹⁰ And together, Intel and SAP are enabling the enterprise Internet of Things (IoT) with faster access to actionable data insights.

With SAP HANA 2 running on Intel processors, your organization benefits with processing and database solutions maximized to fuel your business innovation and your digital transformation.

With SAP HANA 2 and Intel processors, your organization can:

- Deploy quickly and non-disruptively
- Deliver strategic and tactical business value
- Simplify and consolidate infrastructure and operations

Intel processors support SAP HANA deployments on-premises, in the cloud, and in hybrid solutions (based on open standards). Thirteen original equipment manufacturers (OEMs), including Bull SAS, Cisco, Dell, Fujitsu, HPE, Hitachi, Huawei, Inspur, Lenovo, NEC, Unisys, and VCE, offer appliances certified for SAP HANA and powered by Intel architecture for on-premises implementations.¹¹ And SAP, IBM, HPE, Microsoft, and Amazon offer cloud solutions certified for SAP HANA and powered by Intel architecture.

Take Your Business to the Next Generation of Digital Transformation

There's never been a better time for your organization to seize the new opportunities for business innovation made possible when you employ all the benefits of SAP HANA® 2 powered by the Intel® Xeon® processor E7-8800/4800 v4 product family.

Find Out More

- See how SAP and Intel work together to empower enterprise infrastructure solutions: intel.com/sap
- Learn how organizations have created value by building breakthrough applications and analytics with SAP HANA: sap.com/innovate-with-hana
- Learn more about modernizing your IT environment with SAP HANA: sap.com/modernize-with-hana
- Learn more about the Intel Xeon processor E7-8800/4800 v4 product family: intel.com/content/www/us/en/processors/xeon/xeon-e7-details.html
- Try SAP HANA, express edition for business innovation today with a free trial download: sap.com/sap-hana-express
- Explore the latest SAP HANA releases and updates: sap.com/product/technology-platform/hana/features/whats-new.html
- Frequently asked questions about SAP HANA 2: sap.com/documents/2016/11/82bad2f8-937c-0010-82c7-eda71af511fa.html

¹ Kristian (Kris) Thyregod. "Digital Transformation, Sure. Customer Experience, Critical. Visibility, Oops!" November 2016. [linkedin.com/pulse/digital-transformation-sure-customer-experience-oops-thyregod](https://www.linkedin.com/pulse/digital-transformation-sure-customer-experience-oops-thyregod).

² IDC. "Innovating with Real-Time Data and Insights with SAP HANA for Better Business Outcomes and More Efficient Operations." November 2016. [sap.com/innovate-with-hana](https://www.sap.com/innovate-with-hana).

³ Intel. "Turn Real-Time Analytics into Real Business Advantage: Leadership Performance." June 2016. [intel.com/content/www/us/en/benchmarks/server/xeon-e7-v4/xeon-e7-v4-world-record.html](https://www.intel.com/content/www/us/en/benchmarks/server/xeon-e7-v4/xeon-e7-v4-world-record.html). For more information, go to [intel.com/performance/datacenter](https://www.intel.com/performance/datacenter) and http://global.sap.com/campaigns/benchmark/appbm_bwaml.epx.

Configurations: submitted/published results as of 6 June 2016: 4-socket Intel® Xeon® processor E7-8890 v4 family: Dell PowerEdge R930* with four Intel Xeon processors E7-8890 v4, 2.20 GHz (96 cores, 192 threads), 1.5 TB memory, running SUSE® Linux® Enterprise Server 11, SAP NetWeaver® 7.50, SAP® Business Warehouse Advanced Mixed Load (BW-AML), SAP HANA® 1.0. Source: SAP certification number 2016025, <http://global.sap.com/solutions/benchmark>. Score: 29,557 advanced query navigation steps/hour; 2 billion records. 4-socket Intel Xeon processor E7-8890 v3 family: Dell PowerEdge R930 with four Intel Xeon processors E7-8890 v3, 2.50 GHz (72 cores, 144 threads), 1.5 TB memory, running SUSE Linux Enterprise Server 11, SAP NetWeaver 7.50, SAP BW-AML, SAP HANA 1.0. Source: SAP certification number 2016019, <http://global.sap.com/solutions/benchmark>. Score: 23,690 advanced query navigation steps/hour; 2 billion records. For more information, go to [intel.com/performance/datacenter](https://www.intel.com/performance/datacenter).

⁴ Scale-up systems are built using third-party node controllers.

⁵ 33-percent gain based on memory support of up to 8 TB on systems powered by the Intel® Xeon® processor E7 v4 family compared to 6 TB on systems powered by the Intel Xeon processor E7 v3 family. For more information: SAP "Find Certified Appliances." June 2016. <https://global.sap.com/community/ebook/2014-09-02-hana-hardware/enEN/appliances.html>.

⁶ Up to 2x faster ad-hoc queries' claim based on TPC-H @ 3,000 GB scale factor comparing HPE ProLiant® DL580 Gen9 with Intel® Xeon® processor E7-8890 v4 (4 processors, 96 cores, 192 threads) with Actian® Vencro® 5.0 data base scoring 2,140,307 QphH @ 3,000 GB, \$0.38/QphH @ 3,000 GB available 7/31/2016 (source: [tpc.org/3323](https://www.tpc.org/3323)) vs. Cisco UCS C460 M4 Server* with Intel Xeon processor E7-8890 v3 (4 processors, 72 cores, 144 threads) with Microsoft SQL Server 2016 Enterprise Edition* scoring 1,071,018 QphH @ 3,000 GB, \$0.60/QphH @ 3,000 GB available 6/1/2016 (source: [tpc.org/3322](https://www.tpc.org/3322)).

⁷ Intel. "Accelerate Big Data Insights." May 2016. [intel.com/content/www/us/en/processors/xeon/xeon-e7-8800-4800-v4-product-families-brief.html](https://www.intel.com/content/www/us/en/processors/xeon/xeon-e7-8800-4800-v4-product-families-brief.html).

⁸ Up to 6.3x performance improvement for transactional workloads with new Intel® Transactional Synchronization Extensions (Intel® TSX) claim based on SAP OLTP internal insert and select tests measuring transactions per minute (TPM) on SUSE® Linux® Enterprise Server 11 SP3.

Upgrading to SAP HANA® SPS 09 from SAP HANA SPS 08: scaling improved by enhancing locking with additional compute threads enabling 1.8x more transactions. Upgrading to the Intel® Xeon® processor E7 v3 family from the Intel Xeon processor v2 family: the additional threads and cache, plus the improved microarchitecture, delivered up to 50 percent more performance for a cumulative gain of 2.7x. Adding Intel TSX programming on the Intel Xeon processor E7 v3 family delivered up to 6x additional TPM. Upgrading to SAP HANA SPS 12 on the Intel Xeon processor E7 v4 yielded a total performance improvement of up to 6.3x more TPM, increasing business capacity within the same footprint.

Configurations:

- Up to 1.8x more TPM: 4S Intel Xeon processor E7-4890 v2, 512 GB memory, SUSE Linux Enterprise Server 11 SP3, SAP HANA SPS 09, scoring 26,139 TPM; Intel TSX not supported
- Up to 2.7x more TPM: 4S Intel Xeon processor E7-8890 v3, 512 GB memory, SUSE Linux Enterprise Server 11 SP3, SAP HANA SPS 9, scoring 39,330 TPM; Intel TSX disabled
- Up to 6x more TPM: 4S Intel Xeon processor E7-8890 v3, 512 GB memory, SUSE Linux Enterprise Server 11 SP3, SAP HANA SPS 09, scoring 89,619 TPM; Intel TSX enabled
- Up to 6.3x more TPM: 4S Intel Xeon processor E7-8890 v4, 512 GB memory, SUSE Linux Enterprise Server 11 SP3, SAP HANA SPS 12, scoring 89,558 TPM; Intel TSX enabled

⁹ No computer system can provide absolute reliability, availability, or serviceability. Built-in reliability features available on select Intel processors may require additional software, hardware, services, and/or an Internet connection. Results may vary depending upon configuration. Consult your system manufacturer for more details.

¹⁰ HP, Intel, SAP, SUSE, and VMware. "Virtualizing Enterprise SAP® Software Deployments." June 2011. https://www.suse.com/docrep/documents/o4r7to9d2y/virtualizing_enterprise_SAP_software_deployments.pdf.

¹¹ SAP. "Find Certified Appliances." June 2016. <https://global.sap.com/community/ebook/2014-09-02-hana-hardware/enEN/appliances.html>.

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