EXECUTIVE SUMMARY

Today’s rising flood of diverse, fast-moving data represents one of the greatest business opportunities of our time. Companies that can analyze data and distribute information better and faster than their competitors can act more quickly and intelligently to grow and protect their business.

You can do exactly that with SAP HANA®. This real-time business platform lets you integrate data-driven intelligence into real-time processes throughout your business. Developed in collaboration with Intel and powered by the Intel® Xeon® processor E7 v2 family, this unique in-memory platform is helping businesses bring transactions and analytics together to enable smarter business innovations, faster business processes, and simpler business interactions. Companies are using the SAP HANA platform to complete financial closes in seconds, to identify complex sales trends in real time so they can optimize pricing and promotions, to implement predictive field-maintenance, and much more.

With SAP HANA, you can integrate smarter, faster processes into targeted areas of your business within weeks. And you can extend this open, in-memory platform incrementally and almost without limit to support your entire business.
Break Down Your Barriers to Innovation

For decades, businesses have had to maintain separate databases for their transactional applications and their analytics applications in order to provide acceptable performance for both. This multiplicity of databases not only drives up costs, but also limits the value of data analytics. Moving and shaping large volumes of data delays time-to-insight by hours or even days. And despite all the cost and effort, complex queries can still take hours to complete.

The SAP HANA platform shrinks all these delays to mere seconds. Hundreds of SAP customers are now using SAP HANA as the underlying database for the SAP NetWeaver® Business Warehouse (SAP NetWeaver BW) application or as a blazingly fast accelerator in a “sidecar” configuration. The result is a high-speed, massively scalable data warehouse that ingests data in real time from existing transactional databases and delivers insight at the speeds and volumes needed to support real-time business processes on an enterprise scale.

Many SAP customers are also using SAP HANA as the underlying database for SAP® Business Suite applications, or as a sidecar accelerator for existing databases. The SAP ERP, SAP Customer Relationship Management (SAP CRM), and SAP Supply Chain Management (SAP SCM) applications can all be deployed on top of SAP HANA to introduce new speed and intelligence into core business operations. This approach not only supports real-time analytics, but also delivers on the larger promise of SAP HANA by enabling a single, high-speed, in-memory database to support both transactional and analytical applications. You can gain transformative new business capabilities, while dramatically simplifying your infrastructure and operations to drive down total costs.

SAP HANA® Platform

Move to a Real-Time Business Platform

Intel and SAP have been working together since 1997 to deliver better performance for SAP applications, and servers based on Intel Xeon processors now account for more than 75 percent of all new SAP deployments. The breadth and depth of collaboration has increased in recent years, and the SAP HANA platform has been a key focus.

SAP HANA software is optimized to take full advantage of the Intel Xeon processor E7 family. These processors provide a combination of hardware capabilities not available in any other industry-standard server platform, including large-memory capacity, a large and efficient cache hierarchy, high-core counts, multi-threading, and advanced reliability, availability, and serviceability (RAS) features.

Software optimization across the complete feature set of these processors has proven so valuable that SAP HANA is certified only for servers powered by the Intel Xeon processor E7 family. The latest Intel Xeon processor E7 v2 product family adds to these advantages. These new processors provide up to 50 percent more cores and threads, up to three times the memory capacity, and additional RAS features versus prior-generation processors. They have been shown to improve query performance on SAP HANA by up to two times, while dramatically increasing in-memory data capacity.

Performance for SAP HANA software running on the Intel Xeon processor E7 v2 family is accelerated in a variety of ways.

- Keep all data in main memory. A single eight-socket server based on the Intel Xeon processor E7 v2 family can hold up to 12 terabytes of data in main memory, enough to support many of today’s largest databases. With compression rates as high as 20-to-1, even larger volumes of user data can be accessed and processed without the delays associated with disk access. This innovation alone eliminates the primary performance bottleneck that has plagued database environments for years.

- Speed data flows. Accessing data from cache is even faster than from main memory, a few nanoseconds versus up to 100 nanoseconds. The Intel Xeon processor E7 v2 family provides up to 375 MB of on-die cache, and Intel and SAP have tuned memory-to-cache data flows to make sure this high-speed data repository is used in the most efficient manner.

- Churn through computations with massively parallel processing. Since data is accessed faster, it must also be processed faster. The Intel Xeon processor E7 v2 family provides up to 120 cores and 240 execution threads in an eight-socket platform. Data is partitioned and database computations are heavily parallelized to take full advantage of these parallel execution resources.
Additional and extensive work has been done throughout the solution stack of the SAP HANA platform to optimize data placement, boost core frequencies during peak workloads, and integrate the latest and most efficient Intel libraries and instruction set extensions. The Intel® Performance Counter Monitor is integrated directly into SAP HANA to track fundamental performance metrics. Intel and SAP software development teams also use Intel® Software Development Products to optimize SAP HANA software code more efficiently and effectively.

**Scale Almost Without Limit**

An enterprise data warehouse powered by the SAP HANA platform can deliver real-time query performance acting across petabytes of data. To verify scalability, Intel and SAP ran a series of queries on a 16-node SAP HANA cluster housing 460 billion data records and supporting a data analytics environment based on SAP NetWeaver BW. The system delivered sub-second query performance for the majority of queries, and even the most complex queries, which operated across a full five years of data, were completed in less than four seconds.¹

Intel and SAP have informally tested SAP HANA performance on a much larger scale. SAP HANA’s petascale cloud is an in-memory system with more than 250 TB of main memory, 20,000 threads and 10,000 processor cores—all capable of running a single instance of SAP HANA. To date, research teams have encountered no insurmountable barriers to SAP HANA scalability in this massive computing environment.²

Of course, there are other and far more affordable ways to scale your real-time business platform. By adding the Intel® Distribution of Apache Hadoop® software for SAP HANA, you can cost-effectively store and analyze petabytes of data, including the massive data flows coming into your business from web logs, social networks, bar codes, and other unstructured sources.³

Intel and SAP have worked together to provide a fully-integrated solution with enterprise-class support for security, compliance, and manageability. Users see the data in Hadoop as a simple extension of the SAP HANA data set, and queries are automatically federated across both platforms. The result is uniquely powerful and unified platform you can use to extract real-time business intelligence from all your data.

**Keep Your Mission-Critical Systems Up and Running**

SAP HANA software running on servers based on the Intel Xeon processor E7 v2 family provide robust support for mission-critical enterprise requirements through sophisticated error management, integrated support for back-up and recovery, flexible options for automated failover, and advanced, hardware-assisted data and platform security.⁴ Intel and SAP are working together and with the vendor community to drive down recovery times to a few seconds and, ultimately, microseconds.

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**Enabling Real-Time Business through Tight Platform Integration**

![Image](image_url)

Figure 2. Intel and SAP engineers have collaborated closely to ensure that SAP HANA® software takes full advantage of the advanced features of the Intel® Xeon® processor E7 v2 family.
Next-Generation Mobility

Providing access from anywhere and on any device is a fundamental strength of Intel and SAP solutions, and a perfect complement to the speed and scalability of the SAP HANA platform. The two companies support advanced mobility today, and are working to provide increasingly simple, efficient, and secure options to support the growing diversity of devices and usage models, from smart phones for ultimate mobility to Ultrabooks™ that combine the performance and graphics capability of a business PC with the streamlined mobility of a tablet.1

Achieve Quick, Predictable Value

The SAP HANA platform is available on-demand through the cloud or as an integrated system for on-premise deployments. On-premise configurations range from two-sockets to eight-sockets and are built to support SAP Business Suite applications, SAP NetWeaver BW, or both. Clusters of up to 56-nodes are available for enterprise-scale data warehouses. All these solutions are based on the Intel Xeon processor E7 family and are optimized to deliver the right balance of processing, memory, networking, and storage resources.

Learn More Today

- SAP HANA: http://www.saphana.com/welcome


2 Source: SAP

3 On a 4-socket natively-connected platform: Intel® Xeon® processor E7 family supports 64DIMMs, max memory per DIMM of 32GB RDIMM; Intel® Xeon® processor E7 v2 family supports 96DIMMs, max memory per DIMM of 64GB RDIMM. This enables a 3x increase in memory.


5 Data compression ratios are typically between 3x and 5x, and can be as high as 20x.


9 Failover options differ by hardware vendor. See your preferred vendor for details.

10 No computer system can provide absolute reliability, availability or serviceability. Requires an Intel® Run Sure Technology-enabled system, including an enabled Intel processor and enabled technology(lies). 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.


Software and workloads used in performance tests may have been optimized for other processors. Performance tests, such as SYSmark™ and MobileMark™, are measured using specific computer systems, components, software, operations and functions. Any change to any of these factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to http://www.intel/performance.

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