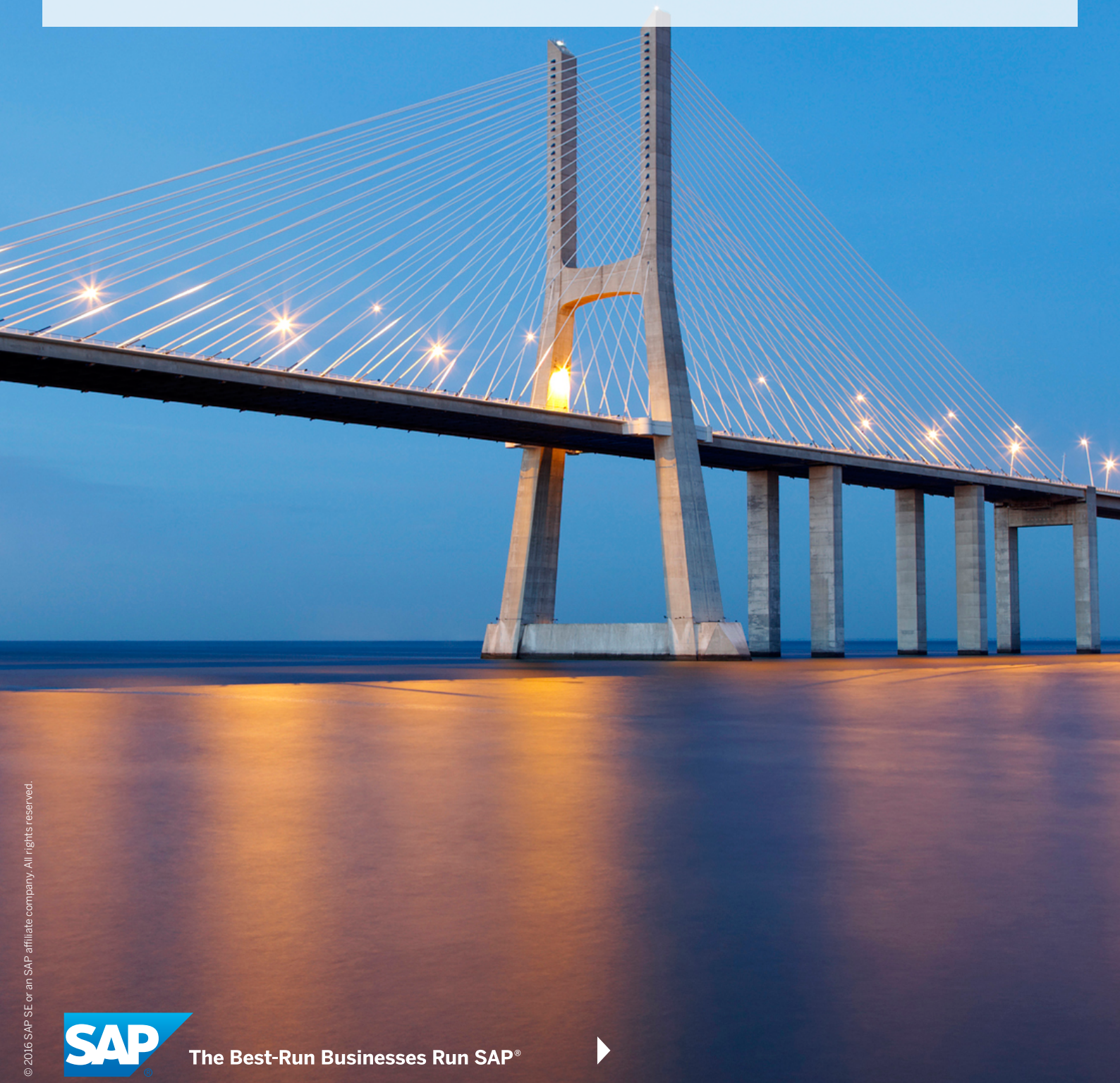
SAP HANA

Rethink the Possible with the SAP HANA® Platform

Transform Your Business for the Digital Economy



The Best-Run Businesses Run SAP®

IT groups no longer need to rely on 20th-century technology while seeking a strategic role in 21st-century business innovation. The revolutionary SAP HANA® platform lets you perform all transaction and analytic processing in-memory and make data immediately available from a single system. Fend off your competition by delivering the real-time insight your business needs to take immediate action and capitalize on change.

INCREASE EFFICIENCY, DEEPEN INSIGHT, AND ADAPT QUICKLY TO CHANGE

Help your business accelerate the pace of innovation by moving to SAP HANA. Choose the game-changing in-memory platform that combines a database that complies with the standards for atomicity, consistency, isolation, and durability (ACID) with advanced data processing, application services, and flexible data integration services. Remove the burden of maintaining separate legacy systems and their silos of data, so you can Run Simple in this ever-changing digital economy, where new technologies and solutions emerge at Internet speed.

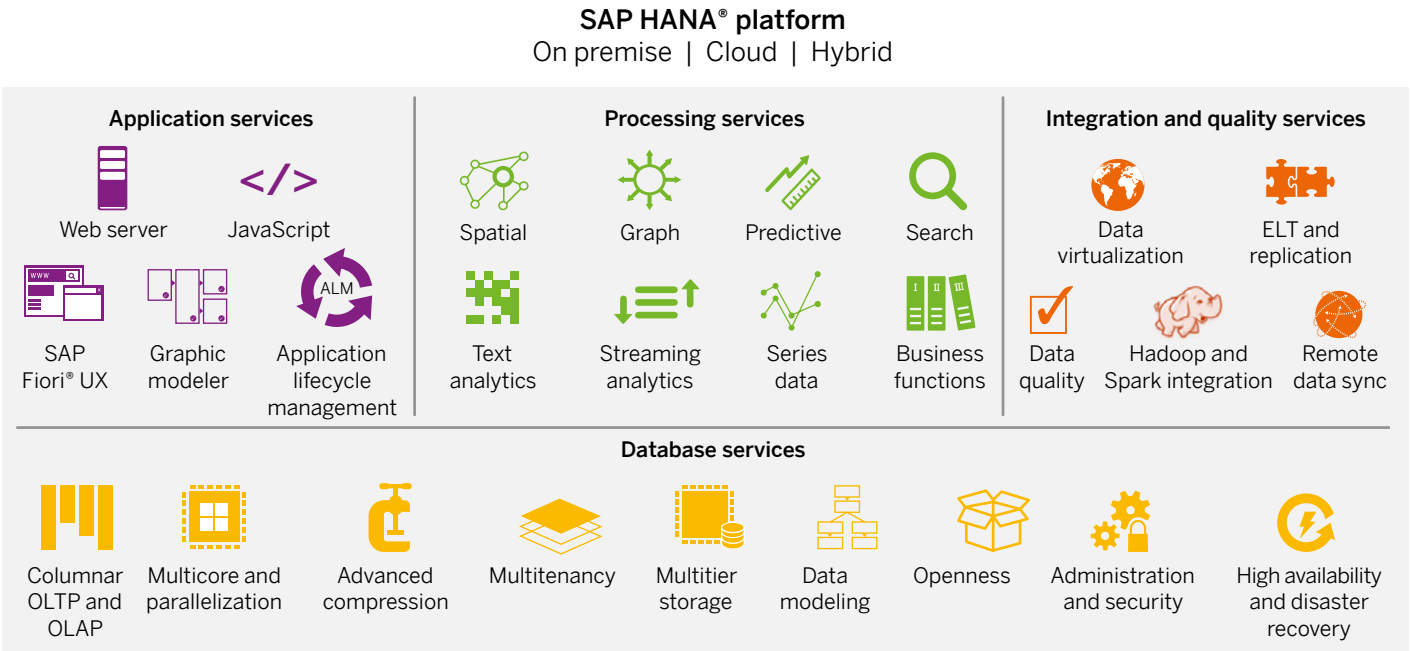
One of the most challenging roadblocks to innovation today is the sheer complexity of IT systems. SAP HANA can help you simplify your infrastructure. As illustrated in the figure, SAP HANA converges database, advanced data processing, data integration, and application platform services in-memory to process transactions; analytics; text analysis; and spatial, streaming, and machine data processing in one system. You can operate in real time and accelerate business transformation by integrating core business processes with customer data, supplier data, and data from the Internet of Things.

The massively parallel, in-memory paradigm underlying SAP HANA speeds information processing by a quantum leap. This architecture converges online transaction processing (OLTP) and online analytical processing (OLAP) operations on a single data copy in one in-memory, column-based data store. SAP HANA, in short, eliminates data redundancy, disk latency, and data movement among applications and analytical tools. And it provides advanced integration capabilities such as data virtualization, replication, bulk loading, transformation, cleansing, and remote data synchronization in the same architecture. This further simplifies application development and processing across Big Data sources.

Perform all transaction and analytical processing in-memory, and make all data immediately available from a single system.

SAP HANA is the platform for all existing applications – your legacy software, third-party software, and SAP® software – and the optimal platform for building and deploying next-generation, real-time applications and predictive analytics. You can perform business operations and data analysis in minutes rather than hours, untangle your data center operations by integrating all data into a single truth, and lay the groundwork for reimagining business models. Plus, you stand ready to help expand and diversify your business with minimal IT growing pains.

Figure: Database and Application Platform Convergence with SAP HANA



ELT = Extract, load, transform, OLAP = Online analytical processing, OLTP = Online transaction processing, UX = User experience

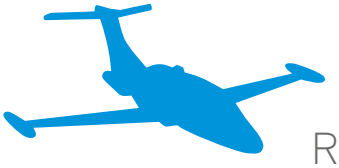
TALLY THE FEATURES AND BENEFITS

The following table summarizes the database features of SAP HANA that contribute to making it unique in the industry.

Database Feature	Description
In-memory, columnar, massively parallel database processing	The SAP HANA® platform permits online transaction processing and online analytical processing workloads using a single data copy on a single platform. It stores data in high-speed memory, organizes it in columns, and partitions and distributes it among multiple servers. This delivers faster queries that aggregate data more efficiently while avoiding costly full-table scans, materialized views, and analytic indexes.
Full ACID compliance	SAP HANA helps ensure compliance with all requirements for the ACID (atomicity, consistency, isolation, and durability) standards. A two-phase commit protocol protects atomicity, while multiversion concurrency control and distributed transactions help guarantee consistency. A built-in transaction manager safeguards isolation, and the logger provides durability by writing commit-log entries to disk.
Multitenancy	SAP HANA allows multiple tenant databases to run in one system, sharing the same memory and processors. Each tenant database is fully isolated, with its own database users, catalog, repository, data files, and log files for maximum security and control. You can move or copy tenants to other systems. Your high-availability and disaster-recovery settings apply for all tenants. Backup and recovery is supported at the tenant level or the system level.
Multitier storage	With the dynamic-tiering feature, you can keep data either in-memory or on the disk in columnar format. No data is duplicated. This feature allows you to process large data volumes at the right price and performance levels. The amount of data you can process in SAP HANA is not limited by the size of the memory in the system. Since disk tables are native to SAP HANA, management, backup, and recovery functions are the same as with in-memory tables. In-memory and disk tables can be joined while accessing data, and in-memory tables can be converted to disk tables (or vice versa) at any time. SAP HANA includes a data lifecycle management tool for moving data between memory tables and disk based on specified rules and policies.

Database Feature	Description
Data modeling and stored procedures	SAP HANA offers a native language called SQLScript that lets you build stored procedures and use advanced capabilities to build complex logic that runs inside the database. It includes a business function library with built-in parameter-driven financial functions. In addition, it includes a framework that lets you build custom algorithms and run them securely inside the database. Core data services, graphical calculation views, and decision tables further simplify and accelerate the creation of database logic.
Administration	SAP HANA provides comprehensive administration tools to support various levels of administrative capabilities from any device and location. You can use these administration tools to start, stop, restart, backup, and recover and to perform offline diagnostics. The SAP DB Control Center systems console is a modern, user-friendly Web administration tool based on the SAP Fiori® user experience that supports multiple databases in your landscape. SAP HANA includes tools to analyze Structured Query Language (SQL) execution plans and CPU and memory utilization over time to pinpoint problems. For applications based on the SAP NetWeaver® technology platform, SAP HANA can be managed from the DBA cockpit and SAP Solution Manager.
Security	SAP HANA safeguards your information through such strategies as authorization and single sign-on using the Kerberos protocol from MIT and the security assertion markup language (SAML). SAP HANA keeps communications, data storage, and application services secure and uses the latest encryption and auditing techniques. A cockpit includes a security dashboard to monitor all key performance indicators related to security.
High availability and disaster recovery	SAP HANA supports high availability and disaster recovery to meet a broad range of service levels through an array of techniques such as backup, storage mirroring, synchronous and asynchronous system replication, hot standby, auto restart, and auto failover. It supports standbys at campus, metropolitan, and remote locations for maximum availability. Several third-party backup and recovery tools are certified to work with SAP HANA as well, so you have your choice of approaches.

Database Feature	Description
Scaling up and out	SAP HANA supports multiple terabytes of data in a single server and scales further by implementing a shared-nothing architecture across multiple servers in a cluster. You can distribute large tables across these servers automatically, based on round-robin, hash, or range-partitioning rules.
Spatial processing	SAP HANA provides native support for spatial data and spatial functions. Spatial processing is supported by SQL through Open Geospatial Consortium standards, International Standards Organization rules for multimedia and application-specific packages (ISO SQL/MM), and geospatial JavaScript Open Notation (GeoJSON) standards to store, query, and access location-enabled content. The use of open standards lets you exchange spatial information with third-party spatial solutions to develop enterprise-wide location intelligence. SAP HANA includes base maps with political boundaries and points of interest to accelerate development of modern location-aware business applications. Third-party spatial solutions can also use SAP HANA as a high-performance, in-memory data store for managing and processing spatial data.
Graph	SAP HANA lets you store and process highly connected data using a dynamic data model called a property graph. Storing and querying graph data is supported through SQL. A graph provides full transactional consistency and guaranteed ACID compliance without replicating live transaction data. Native graph algorithms are provided to uncover relationships in your data in real time. You can also combine graph data processing with additional advanced data processing functionality in SAP HANA, such as text analytics, predictive, and spatial.



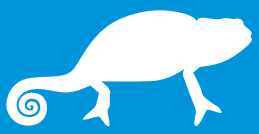
Run Simple in this ever-changing digital economy, where new technologies and solutions emerge at Internet speed.

SAP HANA can help you simplify your infrastructure.

Database Feature	Description
Predictive analytics and R integration	Predictive analysis with SAP HANA includes native high-performance predictive algorithms for both expert and automated modes. Additionally, you can run open-source R scripts on SAP HANA through integration with R Server. Some of the predictive algorithms run on streaming, spatial, and series data and are self-improving. The ability to perform predictive analytics on an entire body of transactional data lets you develop modern applications that forecast outcomes and help your business adapt processes in real time.
Search	You can use SQL to locate text quickly across multiple columns and binary files, such as Adobe PDF files, HTML, RTF, MSG, Microsoft Office documents, and flat text files. SAP HANA lets you run both full-text and advanced fuzzy searches for 32 languages.
Text analytics	Text analytics in SAP HANA include advanced natural-language processing and entity extraction capabilities, such as segmentation, stemming, tagging, and sentiment analysis. SAP HANA also extracts so-called triples – sequences of subject, verb, and object. These functionalities help extract meaning from unstructured data and transform it into structured data for analysis. SAP HANA also supports text-mining algorithms to mine relevant keywords in a body of documents.
Streaming analytics	You can capture and process streams of events from many sources in real time using the highly scalable smart data streaming engine inside SAP HANA. SAP HANA supports an SQL-like processing language to combine streams with contextual data and analyze the result on the fly. To improve scalability, SAP HANA comes with a streaming-light component you can deploy on the streaming data source to analyze and filter streams before they reach SAP HANA.
Series data	Internet-of-Things data and data from sensors arrive in a time-series format. SAP HANA processes time-series data and other kinds of series data efficiently to discover trends over a period. Whether you are monitoring price fluctuations, seasonal shifts, machine efficiency, energy consumption, or network flow, monitoring data over time helps you discover patterns you can exploit to your competitive advantage.

Database Feature	Description
Extended application services (XS)	The XS application server is a built-in Web server that helps you set up Web-based applications to process large amounts of data efficiently. The XS engine is independently scalable from the database server to meet requirements for Internet applications. It supports multiple programming languages, including Java, JavaScript, Node.JS, JSON, Open Data Protocol (OData), and C++ runtime, making it ideal for building applications based on a microservices architecture. With SAP HANA, you can choose among various open-source development tools, such as Git, GitHub, and Apache Maven.
Responsive Web applications	SAP HANA includes an HTML5 and JavaScript framework based on SAP Fiori that lets you develop responsive Web applications. These applications run on any device and adapt to screen size automatically, delivering a consistent look and feel across all touch points.
Application lifecycle management	Integrated application lifecycle management helps you build and package applications, transport them from development to test to production, and deploy and upgrade them.
Application development tools	To develop applications with SAP HANA, you can use the SAP HANA studio or lightweight Web-based development tools. The SAP HANA studio is an Eclipse-based environment for data modeling, application development, database administration, and security management. SAP Web IDE is a browser-based development environment for building applications and managing application lifecycles. And, if you prefer the ABAP® programming language, the development environment in ABAP now includes optimized features that help you build SAP application extensions on SAP HANA with a minimal learning curve. You can also use SAP PowerDesigner® software with SAP HANA to model data for building enterprise architecture.

Eliminate data redundancy, disk latency, and data movement among database, applications, and analytical tools.



Develop modern applications that forecast outcomes and help your business adapt processes in real time.

Database Feature	Description
Data virtualization and federation	Data federation using smart data access lets you access information transparently from many remote data sources and from Apache Hadoop without moving data from remote sources to SAP HANA. SAP HANA provides built-in adapters to help you access data from a wide array of sources.
Data integration, replication, and quality	SAP HANA supports comprehensive features to handle all data-integration scenarios. These include real-time data replication as well as bulk-load processing, data transformation, cleansing services, and data enrichment services. Adapters are available for loading data from several databases, cloud sources, and Apache Hadoop, along with a custom software development kit for building your own adapters. SAP HANA includes functionality to enrich geospatial data and algorithms to cleanse personal names, titles, phone numbers, firm names, and e-mail and street address information.
Apache Hadoop and Apache Spark integration	SAP HANA provides multiple options to analyze Apache Hadoop data, including the SAP HANA Vora™ engine, an Apache Spark adapter, and Apache Hive. You can access data in the Hadoop distributed file system and access MapReduce functions as data sources in SQL using user-defined virtual functions.
Remote data sync	With remote data synchronization, you can bidirectionally synchronize data between SAP HANA and databases in the SAP SQL Anywhere® suite that are embedded in devices or located at the edge of your network. Now you can make enterprise data available to remote workplaces or locations beyond the reach of high-bandwidth connections. In addition, your enterprise can collect and analyze remote data to monitor devices at distant locations – empowering your stakeholders to be more responsive across the entire extended enterprise.

Choose from Multiple Deployment Options

You can deploy SAP HANA in the cloud or on premise. For on-premise installations, SAP HANA supports performance-optimized deployment on hardware appliances from SAP partners, with an option to build custom hardware based on a tailored data-center model. A tailored data-center model lets you use existing hardware and infrastructure components, such as storage and network devices and processors, for your SAP HANA deployment. You can find more about certified and supported SAP HANA hardware here.

For companies that embarked on a software-defined data center strategy, SAP HANA supports virtualization software and hardware logical partitioning.

In the cloud, SAP HANA is available as a comprehensive infrastructure combined with managed services, consumable through SAP HANA Cloud Platform and the SAP HANA Enterprise Cloud service or other third-party cloud services, such as Amazon Web Services, IBM SoftLayer, and Microsoft Azure. In any deployment you choose, SAP stands behind the privacy, security, and availability of your system.

TRY SAP HANA®

Test-drive the SAP HANA® platform at http://hana.sap.com/try.html.

SAP HANA safeguards your information through such strategies as authorization encryption and single sign-on.

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