Selecting the best infrastructure for SAP HANA®

Selecting the best infrastructure for SAP HANA®

SAP® has integrated HANA® at the very heart of its strategy: a platform that delivers exceptional real-time performance to enable new business opportunities. Now, the latest SAP solutions make use of the entire SAP HANA platform capabilities.

Outside a SAP environment, implementing HANA brings all the benefits of a fast, modern, in-memory database.

But if it is to be really successful, the introduction of SAP HANA needs a suitable infrastructure.

This whitepaper examines how implementing SAP HANA affects the infrastructure and provides a guideline for your best possible SAP HANA infrastructure.

Bringing performance and innovation to the heart of your enterprise

Although generally seen as an in-memory database, HANA is actually much more than that. It is based on real-time, analytical and data consumption capabilities that offer the groundbreaking prospect of combining data warehousing and analytics services, integral middleware, an application server and development platform: enabling the construction of a modular platform, featuring optimum integration.

With SAP ending its support for legacy software in 2027, organizations running old SAP systems should plan their migrations to SAP HANA right now.

Making the move to HANA can deliver robust application performance and tremendous opportunities for innovation and acceleration of the organization's digital transformation.

SAP HANA is the SAP's strategic real-time platform for their new generation of applications and solutions. Thanks to the new possibilities brought by high performance servers (multi-core, memory capacity) that allow in-memory technology to provide real-time, multidimensional and multi-level analysis – HANA delivers considerable benefits to every organization and line of business.

On the one hand, HANA is at the heart of the SAP strategy. The company has announced that every future product runs on HANA with simplified applications to enable business innovation and that many existing SAP landscapes will be migrated towards SAP HANA. On the other hand, HANA can also be used just as an ultra-high-performance database or as a solution for big data, where it uses its extreme analytical capabilities in a seamlessly integrated Hadoop landscape.

Boosting SAP application performance (SAP BW)

Applications and software packages are often based on databases that are subject to ever-increasing workloads, as the number of requests grows, and they become more and more complex. To overcome performance issues, architectures have become more complex, with the creation of duplicate databases or datasets in order to host aggregates/ cubes/ data marts, dedicated for OLAP. HANA enables

the simplification of architectures (making duplicate data objects and ETLs obsolete) and improves performance (a RVAUFERR report would run 1,290 times faster, according to SAP), as well as delivering a 37% reduction in TCO (according to a study by Forrester).

An essential step towards S/4HANA®

S/4HANA is the latest generation of the SAP Business Suite, combining big data analytics and transactions on a single platform, together with a highly reduced and optimized data structure. The new generation of SAP applications is, and will be, designed to use all of SAP HANA's unique characteristics that make it so powerful (simplified database structures, removed aggregates, optimized objects and code). This allows "HANA Live" reports to function in real-time. Basically, S/4HANA is the fully re-engineered business application suite that takes the full advantage of the HANA platform. The first available functional component is, Simple Finance (now called S/4 Finance) to be followed by Simple Logistics (S/4 Logistics).

When users want to update their SAP tools, there is an intermediate step known as SoH (Suite on HANA) in the migration of existing databases such as Oracle to HANA. But this step will deliver the intrinsic benefits of HANA ahead optimized business application code (S/4HANA).

Delivering all the power of an in-memory database

HANA can be incorporated into the information system as an in-memory database for high speed transactions and analytics. Effectively, thanks to its SQL capabilities and libraries, HANA can provide a repository or support for third-party software or middleware, to deliver real-time analytics. The ability to store both analytical and transactional data in the same location (without the time and cost of data duplication or transferring it via ETL) makes it a powerful, practical enabler for innovation.

Opening up the doors to big data

Its wealth of interfaces for application development, modeling (R, predictive algorithms and natural language search functions) and data integration (integrated with HANA/Spark/ Hadoop landscape, JSON) helps ensure that it is a central component for accessing data, including unstructured data. As a result, HANA adds its high-speed processing capabilities to these massive amounts of data for cases like Predictive Analytics, Predictive Maintenance or Fraud Analytics. Besides the data modeling and manipulation functions in SAP HANA platform, there are also various statistical and predictive libraries available, providing an interesting workbench for data scientists. This makes HANA the component of choice for big data environments: bringing performance and innovation to information systems!

SAP HANA infrastructure: 3 key points to check

The infrastructure dilemma

Introducing HANA brings more than significant benefits, provided you have an infrastructure that does not limit how it can be used. Transferring the data used from disks to server memory requires a fundamental rethink of the infrastructure, especially when it comes to the server itself.

The three issues that must be addressed are scalability, resilience and flexibility.

It goes without saying that a successful SAP HANA implementation depends on having an SAP certified infrastructure: but that alone is not enough. Of course, certification indicates that performance will be guaranteed, but you also need to consider other technological and financial factors. Failing to take these up-front measures could have a disastrous structural and financial impact.

Scalability

Scalability is an essential prerequisite for straightforward growth and protecting your investment, while optimizing TCO. Indeed, the roadmap towards HANA often starts with a limited implementation, which rapidly evolves. It is often the case that short to medium-term capacity turns out to be many times greater than the initial capacity envisioned. Add to this the natural growth in structured data which, according to analysts, currently stands at around 20% a year.

That means being able to absorb all this data growth on the same platform. In terms of the server, this means being able to easily access more processors (cores) and larger memory capacities. If the chosen platform has no built-in scalability, this can lead either to fragmented developments and increasingly complex IT set-ups (with a proliferation of single databases) or to wasted investment because technology must be changed in a 'rip and replace' scenario. So, it is vital to plan for the future, while optimizing TCO.

Resilience

This is a crucial feature when it comes to ensuring data integrity and the availability of the platform. Effectively, in-memory offers unprecedented performance compared with disk-based database technologies. But while DRAM is the fastest memory available, it is also volatile: and does not retain its contents in case of downtime. So, it is vital to ensure data resilience, and even more so for critical applications. Memory protection becomes essential. What's more, in-memory applications can be relatively slow to restart, so the service quality offered by the infrastructure must allow for in-service support – with no shutdowns if possible – for routine maintenance and even upgrades. This service quality makes a huge difference in HANA environments.

Flexibility

Flexibility is needed to build the most appropriate infrastructure and further optimize TCO. There are two main forms of SAP HANA platform: Appliances and TDI (Tailored Datacenter Integration). In appliances, hardware and software are pre-integrated, in a fully managed and dedicated environment, with predictable performance, but also often limited scalability. TDI is an SAP program that enables existing data center components such as storage and networks to be reused, most notably to optimize the TCO of HANA implementations and ensure continuing return on investment.

As well as these kinds of implementations, there are virtualized infrastructures, which allow for sharing of resources and do not require dedicated locked-in hardware. This approach is particularly well suited to test environments or for disaster recovery.

Finally, the ability to deploy SAP HANA workloads in the cloud and on-premises is a must have option as has the cloud has redefined the way companies run their businesses.

Ideally, the HANA technology platform should be able to support all these types of implementations.

BullSequana S: The benchmark server

As an in-memory database, HANA requires a server with large memory capacity to perform well. As a result, processor power and memory are pivotal criteria.

Various BullSequana S-based configurations are certified by SAP, to ensure successful SAP HANA implementations even in the most critical environments.

From 2 CPUs/ 64 GB of DRAM to 32 CPUs/24TB of DRAM, BullSequana S is the only x86 server that can respond reliably, flexibly and cost-effectively to the specific needs of in-memory computing applications such as SAP HANA.

When capacity needs to be increased, there is no need to invest in a new blade chassis (with high entry cost) or completely 'rip and replace' the existing hardware as the result of an essential change in server families.

BullSequana S offers up to 32 processors i.e. 896 cores in a single server, for outstanding performance. In terms of memory – a key parameter for in-memory computing – BullSequana S breaks glueless architecture limits and goes up to 48TB of DRAM and 96TB of new Intel® Optane™ DC Persistent Memory (DCPMM), an affordable alternative to expensive DRAM that has been designed with and optimized for the 2nd Generation Intel® Xeon® Scalable processors. This new persistent memory can coexist with conventional DRAM on the same server, allowing a huge memory capacity for better workload consolidation, maximizing the use of processors previously underutilized due to memory constraints.

Off the scale scalability

Based on a very flexible architecture, the BullSequana S allows the assembly of one to sixteen 2-socket modules thanks to two types of interconnect:

- A "glueless" interconnect for 1, 2 or 4 modules, allowing a glueless topology of up to 8 sockets
- A new eXternal Node Controller (XNC) to assume the scalability from 8 to 32 sockets.

Glueless configurations can scale-up with a 2-CPU granularity by adding UBoxes to form an SMP system with up to 32 processors in a CC-NUMA architecture. Combined with the Connecting Box, a column that allows you to connect modules easily and without visible cabling, adding more computing power becomes a mere formality.

The same goes for memory and I/O elements that can be quickly and easily hot added. This means you always have a suitable configuration while managing costs since you invest gradually as your business needs grow.

Mainframe-class reliability

In critical environments, where server reliability without compromise is mandatory, BullSequana S offers unique level of reliability and availability, along with several thousand control points per rack and early warning features that anticipate potential breakdowns and simplify preventive maintenance.

On top of basic RAS features, such as critical component redundancy, hot-pluggable critical components, …, and existing Intel RAS features, including the Run Sure® technology, a set of methods to improve RAM and platform reliability, Atos has embedded in BullSequana S a whole series of innovations, including memory protection features. For instance, the Machine Check Architecture (MCA) 2.0 Recovery (as per eMCA gen2 architecture) prevents a server crash in case of a fatal memory error, limiting the impact just to the virtual machine using the faulty block. As another example, the Memory Rank-Sparing enables to automatically copy the data from the failing rank to the spare rank with no performance penalty.

Moreover, the utilization of persistent memory (DPCMM) by BullSequana S is a big step in terms of availability and business continuity, especially for in-memory workloads like SAP HANA. Indeed, in case of restart, data are no longer reloaded from storage, greatly lowering initial data load times and enabling a quick return to operations.

Maximum flexibility

Organizations can take advantage of a dedicated SAP HANA appliance, follow an SAP TDI approach for maximum reuse of existing components in the data center or set up a more limited HANA environment featuring virtualization and can be deployed on-premise, in private or in public cloud. These different approaches ensure that the architecture is optimized depending on the required SLA levels and financial constraints.

Appliance

The appliance consists of pre-configured hardware and software, fully integrated and certified. This ensures successful implementation (in terms of timescales and interoperability between components) on the one hand and, on the other, contractually agreed performance commitments.
BullSequana S for SAP HANA is based on the BullSequana S server and a Unity all-flash unified storage from NetApp, fully racked, with SAP HANA pre-installed and running under a Linux OS (Red Hat® or SUSE®).
By delivering and implementing a pre-integrated and consistent package, Atos guarantees the best possible service quality, performance and reliability, by cutting implementation timescales. This also facilitates unified support and maintenance.

TDI mode

TDI (Tailored Datacenter Integration) is an SAP program that allows HANA customers to utilize existing components as long as they are certified for HANA environments. For example, a SAN bay can be reused in a client data center, with some disks dedicated for HANA implementation. It is also possible – for consistency of hardware and skills – to opt for a particular storage technology provider while also building an SAP certified HANA infrastructure and taking full advantage of BullSequana S.

Like Appliances, TDI also enables a scale-out solution, with several BullSequana S servers working together to provide higher levels of processing in distributed mode. Up to 16 BullSequana S 'nodes' can operate using a shared SAN.

Virtualized VMware® mode

It is also possible to avoid dedicated infrastructure for SAP HANA. Indeed, a BullSequana S-based SAP HANA VMware solution can make sense for running tests, managing a pre-production set-up or even running via a remote data center, by reassigning a BullSequana S resource that is used for lower priority operations. This solution also allows you to capitalize on a widely implemented, market-leading virtualization layer.

In this mode, SAP HANA production will be restricted to the RAM capacities available with VMware (6TB mix of DRAM and Optane PMem in version 6.7 EP10 and later) and to a single, virtual production machine: with no limits, however, when it comes to pre-production, testing.
So, the BullSequana S for SAP HANA VMware solution delivers exceptional flexibility (moving VMs) and infrastructure sharing, reducing the need for dedicated investment.

On-premises, private cloud and/or public cloud

The adoption of cloud computing is now a reality in many industries, even for critical businesses, with a blend of on-premise, bare-metal, virtual and cloud-based deployments.

Atos collaborates with Microsoft to jointly address the fast-growing SAP HANA market, aiming at the most demanding customers, many of whom are running mission-critical SAP workloads. Atos and Microsoft will be targeting the deployment of SAP HANA Very Large Instances (VLI) in Microsoft Azure bare-metal or virtualized environments.

BullSequana S for SAP HANA solutions	Infrastructure benefits	Custome target environment
BullSequana S for SAP HANA appliance	• Very high performance • Very high security • Customer dedicated infrastructure • Private network connectivity • Limited scability and flexibility	Critical production Production New & dedicated Infrastructure
BullSequana S for SAP HANA TDI	• Very high performance • High security • Customer dedicated physical server • Shared storage network • Scalable and flexible	Production Pre-production Development Shared Infrastructure
BullSequana S for SAP HANA VMware	• High performance • High security • Shared server (virtualization) • Shared storage network • High scability and flexibility	Production Pre-production Development Disaster recovery Shared Infrastructure

The BullSequana S for SAP HANA platform offers the choice of deployment models, for maximum flexibility.

Towards a successful SAP HANA project

Beyond the BullSequana S for SAP HANA offering and the intrinsic qualities of the infrastructure – a major component of success - Atos is strongly committed to delivering advice and integration/migration expertise to ensure successful HANA implementations. Often an SAP HANA project has a significant strategic and operational scope. Choosing the right partner, who can offer a wide range of services, from start to finish, is a key success factor.

Consultancy advice: to streamline HANA strategy

SAP HANA implementation is essential in the deployment of a new application such as S/4HANA, a database upgrade or the enhancement of existing SAP environments. It could embrace a range of SAP and non-SAP applications, with the opportunity to significantly consolidate the entire landscape.

Consequently, one of the first steps should be to define a comprehensive SAP HANA strategy.

It's essential to assess existing environments, evaluate possible scenarios and define how best to deploy HANA, to minimize upgrade, migration and functional optimization work while maximizing ROI. Atos has defined a dedicated methodology to help organizations find the right path.

Carrying out bullet-proof migration

Most existing SAP applications require a database migration to HANA. This transition in SoH mode – where the software will use HANA as a data container – requires total control over migration. Atos can carry out bullet-proof migrations thanks to :

- A set of SAP tools to automatically transfer some data
- The expertise and methodology of many SAP certified experts
- Best practices resulting from accumulated experience in deploying and managing numerous SAP environments
- State of the art tools enabling demonstration, proof of concept or even blank migration in Atos SAP Competency Centers

What's more, to prepare for the change, it is often helpful to see a solution that is more or less identical to the target set-up in action. A proof of concept (POC) or performance benchmarking exercise in a target environment are major advantages in ensuring a successful HANA project.

Strengthening availability

Security and availability have always been a pressing issue for critical business operations, as well as for the critical data used by BI and ERP systems. In the HANA environment, which combines both transactional and analytic systems, the need for high-availability (HA) architectures is even greater. As well as all the hardware features that optimize availability (hot-add or hot-swap components, RAS features), setting-up a HA architecture ensures security, integrity and business continuity.

Ensuring 24x7, industrialized operations

SAP HANA environments often experience rapid growth. The BullSequana S for SAP HANA platform offers an exceptional level of scalability. Consequently, robust data center operational capabilities are required to deliver SAP HANA platform services with high availability and disaster recovery.

Based on experience gained during several of the largest HANA deployments worldwide, Atos has developed advanced methodologies designed to reduce application, management and hosting costs, while strongly enhancing service quality and offering flexibility and resilience in equal measure.

With its unique end-to-end capabilities - from global consulting to integration, development, management services and even hosting facilities – Atos is the partner of choice for SAP projects.

Atos SAP expertise in numbers:

13,500 SAP experts in 73 countries

Over 3,400,000 end-users supported in over 90 countries

6,200+ implementations

Atos is recognized as an SAP Platinum Partner

About Atos

Atos is a global leader in digital transformation with 109,000 employees and annual revenue of c. € 11 billion.

European number one in cybersecurity, cloud and high performance computing, the Group provides tailored end-to-end solutions for all industries in 71 countries. A pioneer in decarbonization services and products, Atos is committed to a secure and decarbonized digital for its clients. Atos is a SE (Societas Europaea), listed on Euronext Paris and included in the CAC 40 ESG and Next 20 Paris Stock indexes.

The purpose of Atos is to help design the future of the information space. Its expertise and services support the development of knowledge, education and research in a multicultural approach and contribute to the development of scientific and technological excellence. Across the world, the Group enables its customers and employees, and members of societies at large to live, work and develop sustainably, in a safe and secure information space.

Find out more about us
atos.net
atos.net/career

Let's start a discussion together