

# Reduce Total Cost of Ownership by Properly Sizing Your SAP HANA® Database

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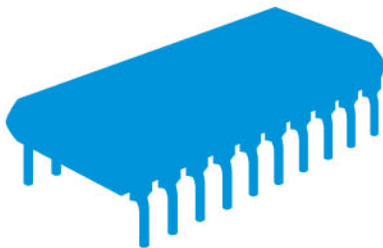
The powerful in-memory processing of the SAP HANA® database helps analysts and users realize live insights about your enterprise. To gain maximum benefit from SAP HANA, however, you must correctly size the hardware on which the database runs. Whether you plan to deploy a new implementation of SAP HANA or migrate from existing SAP® software, we offer tools and methods that can help you [simplify, accelerate, and increase the accuracy of the sizing process](#).

Translating your business needs into hardware requirements is what's known as "sizing." To create an optimum IT landscape, you must size your SAP HANA database.

By provisioning your SAP HANA database so that it matches your anticipated workload, you can realize maximum results from your investment and minimize total cost of ownership (TCO).

The alternatives can be costly: Overprovisioning may lead to excess capacity and a bloated hardware investment. Underprovisioning can cause delays that increase the costs of operational and business performance.

Read on to learn how you can properly size SAP HANA and optimize your long-term total cost of ownership (TCO).



Memory is the leading driver in most SAP HANA sizing decisions.



# Reviewing Sizing Fundamentals

Most experienced IT professionals are familiar with the realities of the sizing process. They know that 20% of the transactions and scenarios create 80% of the load. However, the sizing process for in-memory computing is different from the one used with traditional databases. When sizing for SAP HANA, you must consider the following key performance indicators.

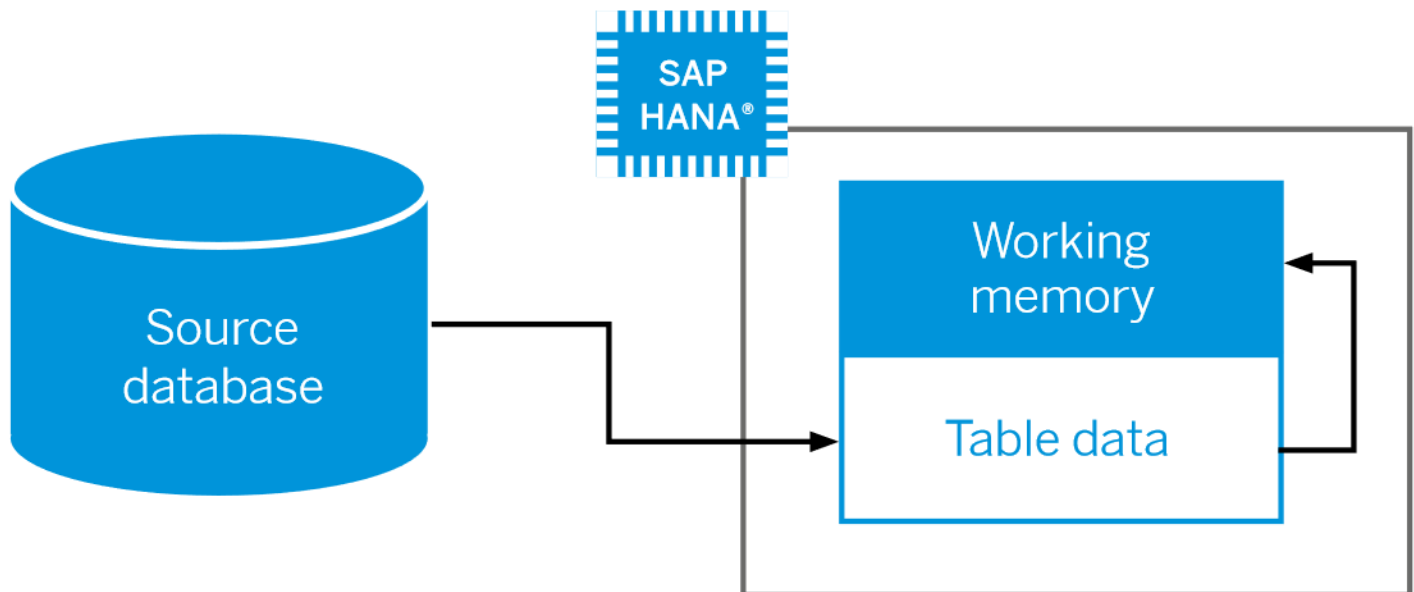
## MEMORY

Memory is the leading driver in most SAP HANA sizing decisions. Essentially, all data – including both master and transactional data – resides in main memory. Memory in SAP HANA includes table data and working memory (see Figure 1).

Most tables are located in the highly compressed column store of SAP HANA, which requires almost as much working memory as it does memory for table data. Memory sizing is based on an analysis of the source database. Using either a sizing script or the sizing report, you can calculate the memory requirement for the table data in SAP HANA. The database also requires memory for code, stack, data caches, the operating system, and other files, although these areas consume smaller amounts of memory in SAP HANA than in traditional databases.

Note: SAP HANA sizing results always consider the total RAM required unless otherwise specified.

Figure 1: Memory Required for Sizing SAP HANA







### **CPU**

Sizing for SAP HANA must address unique CPU requirements. To execute complex queries at high speed, the database processes many queries internally, in parallel, and it stores data in a column-based format. The in-memory processing used by the SAP HANA database requires more CPU capacity than is needed in traditional databases. To enable optimal response times for analytical applications, planners must include sufficient headroom for the CPU to fully support the parallel processing capabilities of SAP HANA.

### **DISK SIZE**

SAP HANA requires disk storage space to preserve database information in case of a system shutdown. The database periodically copies any data changes to disk to create a full image of business data. Disk storage also preserves the current state of the database and all of the data entered in the persistence layer. It also supports the logging of changes.

### **DISK I/O**

The solution requires adequate I/O performance to support processes such as transactional loading, savepoint writing, delta data merges, and database startup times. Storage systems running with SAP HANA must provide sufficient I/O performance to enable processes to run with acceptable data throughput and storage system latency.

### **NETWORK BANDWIDTH**

Network bandwidth is a resource shared by many users. Concurrent requests from multiple users can interfere with each other, resulting in varying network response times. When determining network sizing requirements, planners should ensure there is sufficient available bandwidth to avoid potential performance bottlenecks and enable rapid response times.

When you deploy SAP HANA as an appliance, we provide the network for the internal and storage zones. It is your responsibility to define network requirements for the client zone and admin zone. To deploy SAP HANA using the SAP HANA tailored data center integration approach, we recommend a minimum of 10 gigabits per second for the internal zone and the storage zone.



We recommend that you collaborate with both SAP and your hardware vendor on the sizing process to get the most accurate results.

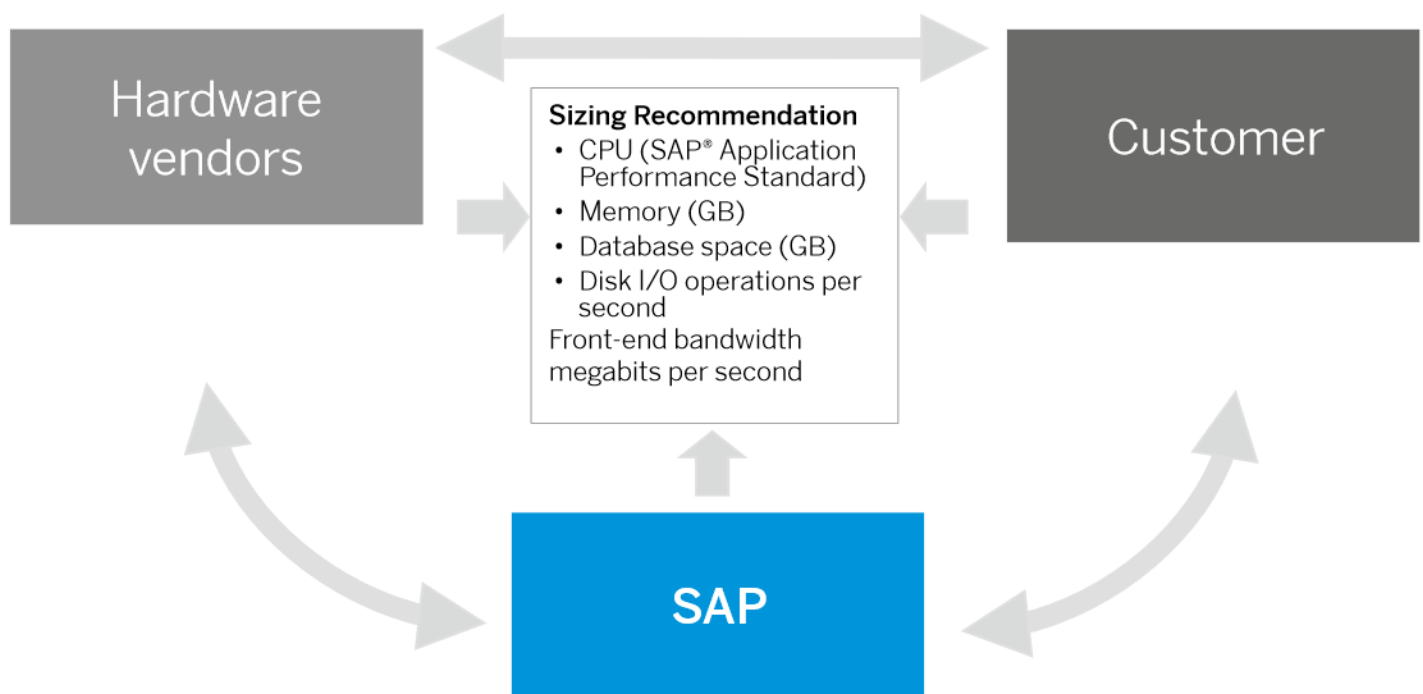


# Collaborating to Precisely Size Your SAP HANA Database

Sizing of your SAP HANA database is best done as an iterative process. For the sizing of new installations, you must make assumptions about user behavior and future transactional volumes to be handled by your database. You also must create initial estimates, test those assumptions,

and make revisions to accommodate real conditions and business needs. We recommend that you collaborate with both SAP and your hardware vendor on the sizing process to get the most accurate results (see Figure 2).

Figure 2: Three-Party Collaboration Model





During this collaboration, each party plays a role in the sizing process.

**Vendors** contribute:

- Certified benchmarks to select scalable hardware
- Selection of hardware configurations
- Performance studies
- Custom load tests in collaboration with you
- Service-level agreements

**SAP** handles:

- Standard sizing guidelines as part of quality assurance
- Sizing verification processes
- Regression testing for new releases
- Development and provision of benchmark toolkits

**Customers** should be prepared to provide:

- Response time requirements
- Throughput requirements
- Business data input

Once you have used this information and our tools to estimate the size of your SAP HANA database, you must determine which hardware would best meet your needs. You may deploy the database in a single hardware host or node or in a scale-out solution. You also can choose whether to deploy the database on an appliance or into your existing enterprise storage. Appliances are prepackaged with network and storage resources. To use your existing enterprise storage and network, you must calculate the required disk space. For more information, refer to the document [\*\*SAP HANA Storage Requirements\*\*](#).



SAP offers a variety of sizing methods and tools that can help you determine the appropriate size of the SAP HANA database for your needs.





# Choosing the Right Sizing Tool

SAP offers a variety of sizing methods and tools that can help you determine the appropriate size of the SAP HANA database for your needs. All sizing guidelines, tools, and training opportunities are available at [www.sap.com/sizing](http://www.sap.com/sizing).

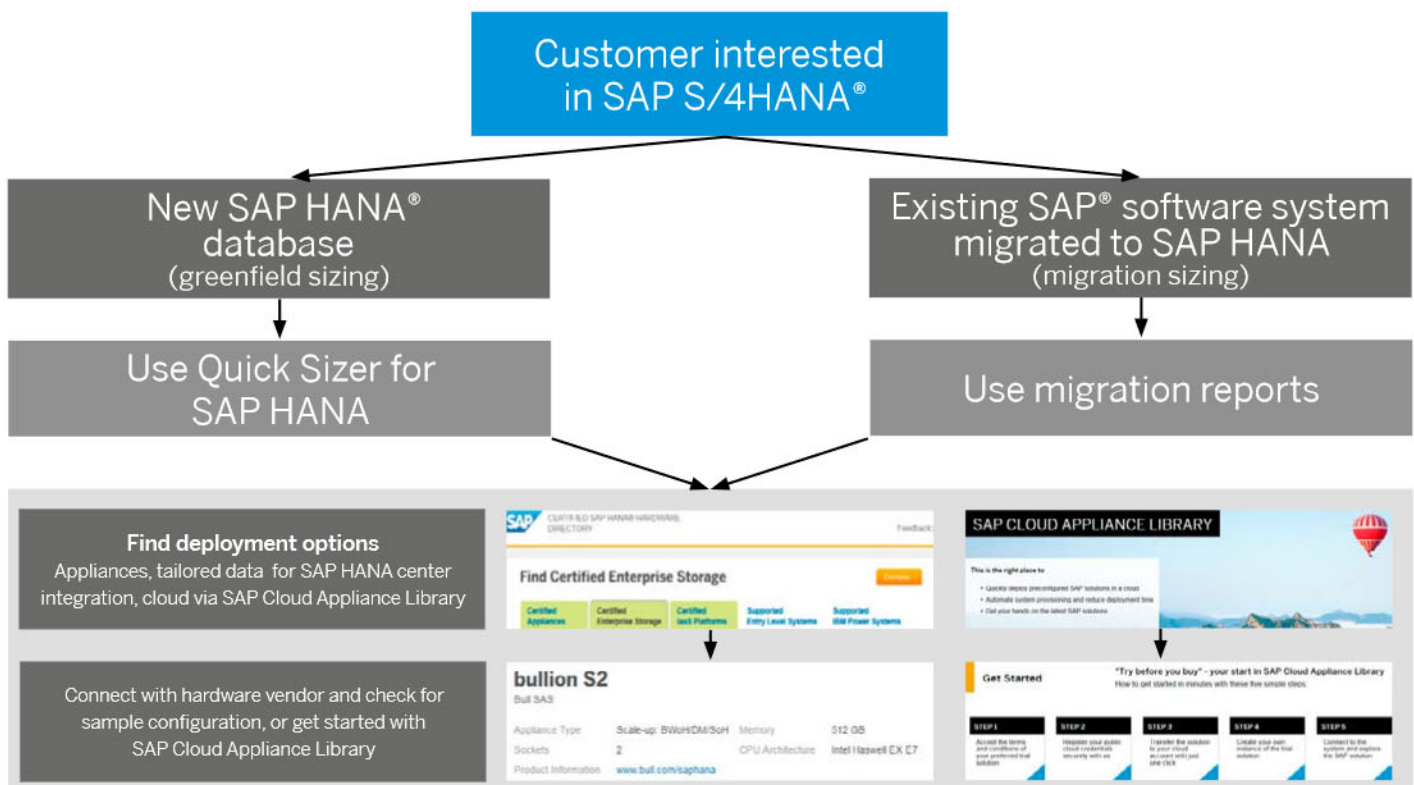
Sizing methodologies differ based on whether you have deployed any SAP solutions (see Figure 3). For new installations, the Quick Sizer tool (a free, Web-based tool that helps simplify and speed the sizing of SAP HANA) is the best option. This self-service tool helps you translate business requirements into technical requirements for SAP HANA. If you are migrating to SAP HANA from an existing SAP solution, we offer migration reports that will help you simplify the sizing process.

## SIZING A NEW SAP HANA DATABASE IMPLEMENTATION

Using a questionnaire to collect information, Quick Sizer addresses peak and average loads considering business processes, user numbers, and data retention times. The results help you pinpoint the disk space, main memory, and CPU resources required for your implementation.

Quick Sizer also includes a hardware vendor contact list to help you begin the collaborative sizing process. This tool is used by our customers, our partners, and SAP consulting, sales, and support organizations in approximately 35,000 projects each year.

Figure 3: Choosing a Sizing Tool for SAP HANA





Here are the basic steps for using Quick Sizer:

1. To perform initial sizing of an implementation of SAP S/4HANA® software, choose the SAP HANA version of the **Quick Sizer** tool (login required).
2. Create a new project. Choose from user-based sizing, which bases requirements on the number of users, or throughput-based sizing, which calculates the transactions being processed. We recommend the throughput-based approach because it allows you to define more variables, such as business objects used, traffic peaks, and averages.
3. Complete the questionnaire by entering data about your implementation and usage. The specifications you enter drive the sizing calculations.
4. Click on the *Calculate Result* button. Quick Sizer provides sizing results based on the data entered.
5. Check for sample hardware configurations at the “**Certified and Supported SAP HANA Hardware Directory**” page. You can also work

with a trusted hardware vendor to evaluate your sizing calculations and determine the appropriate hardware configuration for your implementation.

### MIGRATING AN EXISTING SAP DATABASE TO SAP HANA

Companies already running any productive SAP Business Suite software and the SAP Business Warehouse application can use one of our migration sizing reports to determine the optimum configuration for SAP HANA. The sizing report calculates your memory and disk requirements for the database tables of your SAP applications. This report can be used to migrate any application that runs on the SAP NetWeaver® technology platform to SAP S/4HANA.

To migrate SAP Business Suite onto SAP S/4HANA, please refer to **SAP Note 1872170** (login required – see Figure 4). To migrate SAP Business Warehouse onto SAP HANA, please refer to the sizing report in **SAP Note 1736976** (login required).

**Figure 4: Choosing a Sizing Report for Migrating SAP S/4HANA**

**Sizing for SAP Business Suite on SAP HANA**

Scope:  
List of tables (Leave empty for full sizing) [ ] to [ ]

Choice of the Sizing scenario:  
 Perform SAP Business Suite on SAP HANA Sizing  
 Perform Sizing of SAP S/4HANA Finance  
 Perform Sizing of SAP S/4HANA

Technical options:  
Number of parallel dialog processes: 1  
Server group (Leave empty to use all servers): [ ]  
Number of tables displayed in output: 30

Maximum size of samples:  
 1,000,000  
 100,000  
 10,000

Changes to stores distribution: (Leave empty to use default distribution)  
List of tables to add to standard row store: [ ]  
List of tables to add to standard column store: [ ]





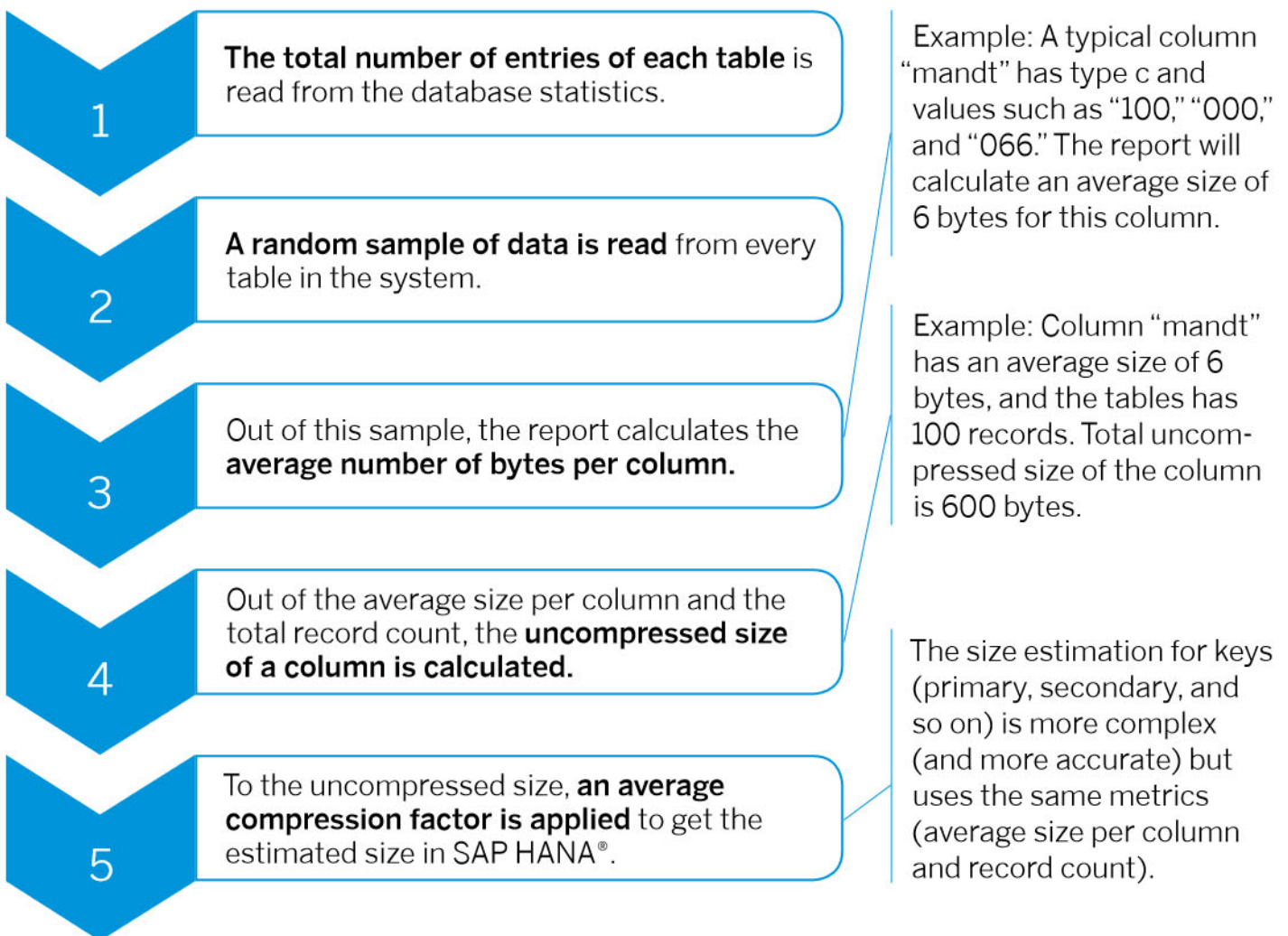


The sizing report estimates the maximum memory consumption of the database needed to migrate your SAP software to SAP HANA. It analyzes the size and data volume of all tables in the source database and estimates memory space requirements by considering:

- Distribution of tables to the row and column store
- Differences for secondary indexes
- Compression of legacy databases

Figure 5 illustrates the processes executed by the sizing report algorithm.

**Figure 5: Sizing Report Algorithm**





Follow these steps to use the migration report:

1. Run the sizing report. **SAP Note 1872170** (logon required) includes detailed instructions for running this ABAP® programming language–based report. Be sure to read the FAQ document attached to the note. Figure 6 shows a sample of a migration report.

In this example, the maximum total memory requirements would be about 1,688 GB. The total includes a 50 GB fixed total for code, stack, and other services.

2. Interpret the results of the sizing report. The report includes sizing projections, which are based on actual table sizes in the legacy system.

3. Review both sets of results. The report issues one set of results for the initial installation and another for memory requirements after data cleanup. If you choose to invest in data house-keeping, you can take advantage of significant savings.
4. Remember to anticipate year-over-year growth in your calculations. For more information, review the FAQ document attached to **SAP Note 1872170** (logon required).

#### LEARN MORE

To learn more about sizing options for SAP HANA, visit [www.sap.com/sizing](http://www.sap.com/sizing). You can also visit the **SAP Support Portal** service for the SAP Notes on migration.

Figure 6: Sample Sizing Report

SIZING RESULTS IN GB	
Based on the selected table(s), the anticipated maximum requirement are	
for SAP S/4HANA:	
- Memory requirement for the initial installation	1.688,2
- Net data size on disk for the initial installation	889,0
- Estimated memory requirement after data cleanup	1.190,3
- Estimated net data size on disk after data cleanup	724,2
Other possible additional memory requirement:	
- during the transition to SAP S/4HANA (See FAQ)	34,2
- for an upgrade shadow instance	184,7



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