



PUBLIC

SAP HANA Platform 2.0 SPS 08

Document Version: 1.0 – 2024-11-20

SAP HANA Master Guide

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1 SAP HANA Master Guide

This guide is the entry point for planning the installation of your SAP HANA system landscape.

This guide is organized as follows:

- **What Is SAP HANA?**
A high-level definition of SAP HANA.
- **SAP HANA Use Cases**
A variety of use cases and scenarios that SAP HANA can be used in from an application point of view.
- **SAP HANA Architecture**
Various aspects of the SAP HANA architecture from a technical point of view.
- **SAP HANA Deployment Options**
An overview of the different deployment options for SAP HANA on-premise or in the cloud.
- **SAP HANA Implementation and Operation**
An overview of the implementation and operation activities during the lifecycle of SAP HANA. The individual steps depend on the chosen use case and the technical deployment.
- **Additional Information**
A collection of additional information. This section includes information about important SAP Notes, the SAP HANA license key, the software download, and hardware and software requirements for SAP HANA.

2 What Is SAP HANA?

SAP HANA is a modern, in-memory database and platform that is deployable on premise or in the cloud.

The **SAP HANA platform** is a flexible data source-agnostic in-memory data platform that allows you to analyze large volumes of data in real time. Using the database services of the SAP HANA platform, you can store and access data in-memory and column-based. SAP HANA allows online transaction processing (OLTP) and online analytical processing (OLAP) on one system, without the need for redundant data storage or aggregates. Using the application services of the SAP HANA platform, you can develop applications, run your custom applications built on SAP HANA, and manage their lifecycles.

For information about the capabilities available for your license and installation scenario, refer to the [Feature Scope Description for SAP HANA](#).

3 SAP HANA Use Cases

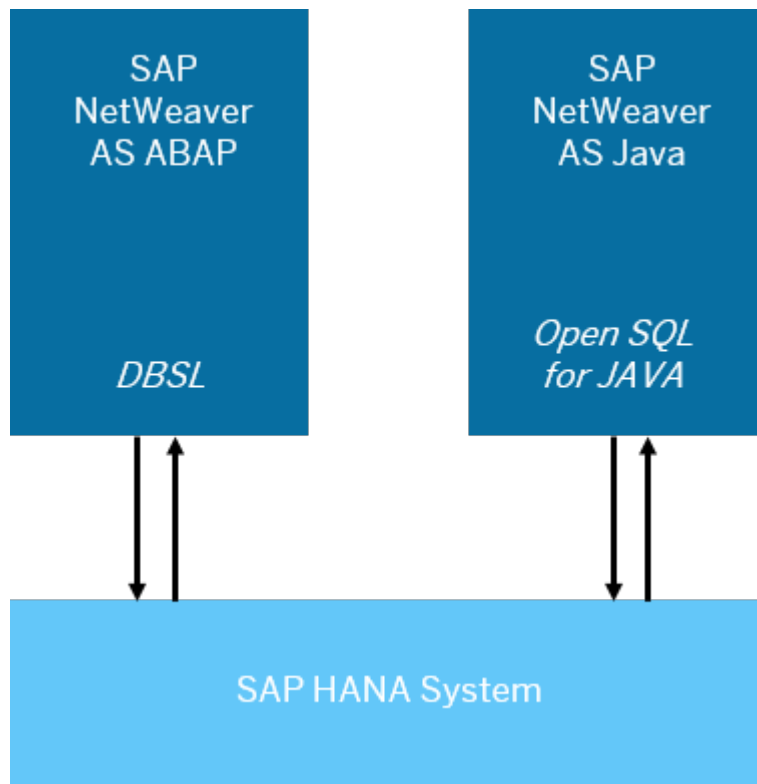
SAP HANA can be used in a variety of use cases and scenarios.

3.1 SAP HANA as Primary Persistence for SAP NetWeaver-Based Applications

SAP Business Suite applications (ERP, CRM, SCM, and so on), SAP Business Warehouse (BW), and other SAP enterprise solutions are built on SAP's pervasive platform, SAP NetWeaver.

SAP NetWeaver has two distinct aspects: ABAP and Java. Many applications built on SAP NetWeaver's ABAP or Java application servers are able to run "on" SAP HANA, where SAP HANA serves as the sole database in the architecture.

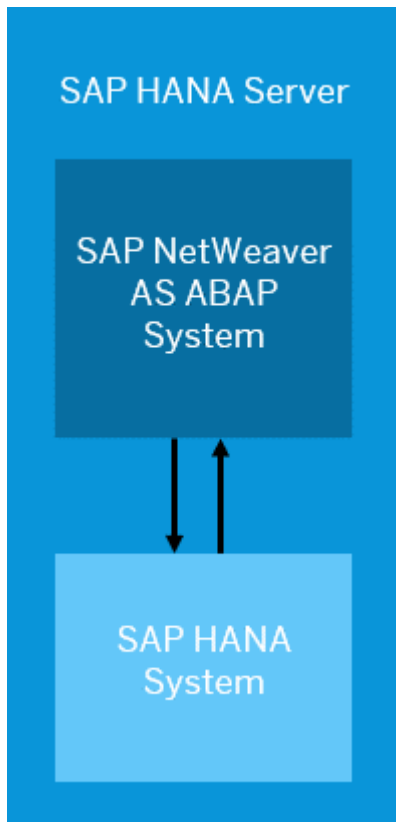
While the technical interfaces are available for applications built on SAP NetWeaver AS ABAP and AS Java to run on SAP HANA, specific development enablement is normally required for each application to ensure it runs optimally on SAP HANA. SAP Business Suite applications (ERP, CRM, SCM, and so on), SAP Business Warehouse (BW), and other SAP NetWeaver-based applications have been renovated to run on SAP HANA in a manner that exploits its many advantages. Additionally, various components and complimentary applications that are built on SAP NetWeaver can also run on SAP HANA through the use of the provided SAP NetWeaver DB interfaces.



SAP HANA and SAP NetWeaver AS ABAP/Java on One Server

Deploying SAP HANA and SAP NetWeaver AS ABAP or SAP NetWeaver AS Java on one server is a multicomponent, resource-optimized, and cost-optimized deployment approach.

For more information, see *SAP Note 1953429 - SAP HANA and SAP NetWeaver AS ABAP on one Server* and *SAP Note 2043509 - SAP HANA and SAP NetWeaver Java on a Single Host*.



Related Information

[SAP Note 1953429](#)

[SAP Note 2043509](#)

[End-to-End Implementation Roadmap for SAP NetWeaver AS ABAP on SAP HANA](#)

[End-to-End Implementation Roadmap for SAP NetWeaver AS Java on SAP HANA](#)

[End-to-End Implementation Roadmap for SAP BW powered by SAP HANA](#)

3.2 SAP HANA as Geographic Information System for ESRI

Before using SAP HANA database with ESRI software create all the necessary spatial reference systems (SRSs).

SAP HANA contains most of the SRSs defined by EPSG and ESRI as predefined SRSs. With the following statement you create all predefined SRSs:

```
CREATE PREDEFINED SPATIAL REFERENCE SYSTEMS;
```

In case you only want to create the SRSs you need in your ESRI software, you can use the following statement:

```
CREATE PREDEFINED SPATIAL REFERENCE SYSTEM IDENTIFIED BY <srs-id>;
```

Note

An SRS cannot be changed or deleted as long as it is used by a table column.

Predefined SRSs can change on an SAP HANA upgrade, but all SRSs created from the previous predefined SRSs remain unchanged.

Related Information

[CREATE PREDEFINED SPATIAL REFERENCE SYSTEMS Statement](#)

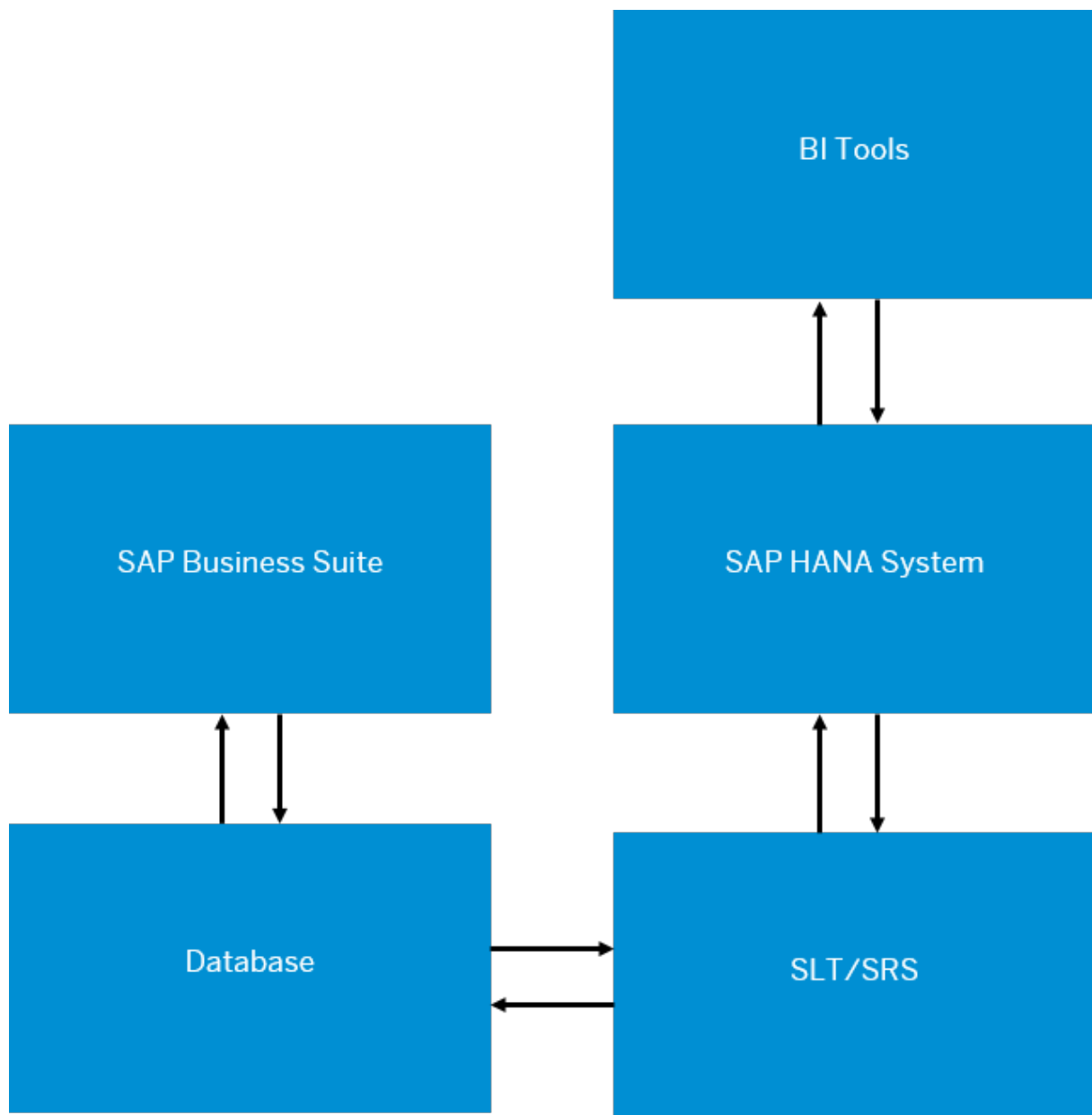
[CREATE PREDEFINED SPATIAL REFERENCE SYSTEM IDENTIFIED BY <srs-id> Statement](#)

3.3 SAP HANA as Data Mart

A data mart is an industry term for a repository of data gathered from operational data originating in transactional systems (and/or other sources), designed to serve a particular community of information workers by forming a basis for analytics, reporting, or a specific use in another type of application. The emphasis of a data mart is on meeting the specific needs of a particular group of users in terms of analysis, content, presentation, and ease-of-use.

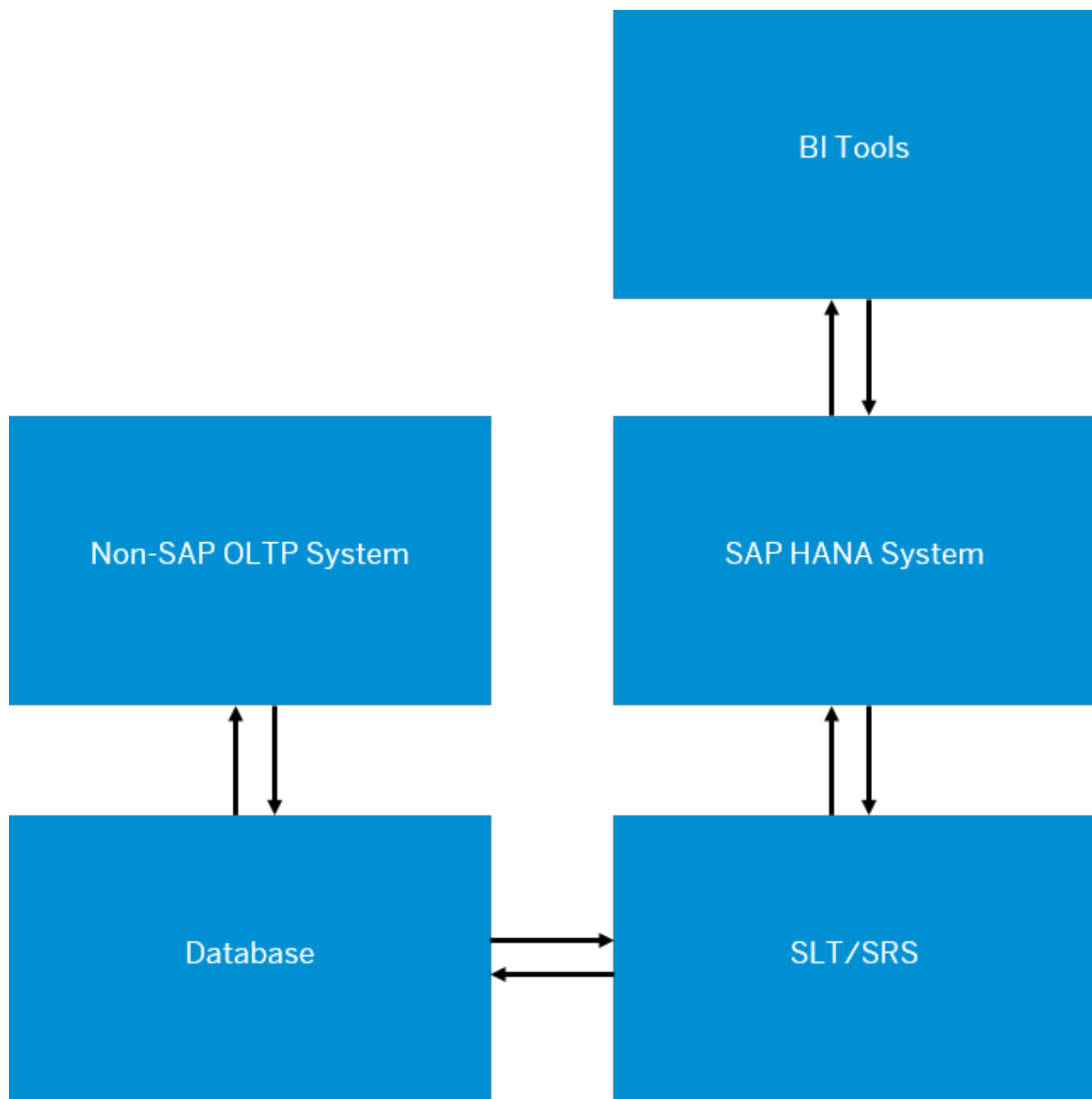
With SAP HANA, operational data marts offer real-time analytics and reporting on data replicated from a transactional system's database. The raw tables themselves are copied (structure and data) from the transactional system's database into SAP HANA. As new data is added into the relevant tables in the transactional system's database, copies of those records are automatically transferred immediately into SAP HANA using replication technology. These replicated tables become the basis for specialized views that are created for analytics purposes. In some cases, the data modeling effort involved in developing these views may be significant, to convert raw transactional table data into a form that is best suited for analytics. Business Intelligence tools, such as the BI Tool Suite available from SAP BusinessObjects, are used for analysis and reporting.

Real-time Operational Data Marts with an SAP Business Suite System



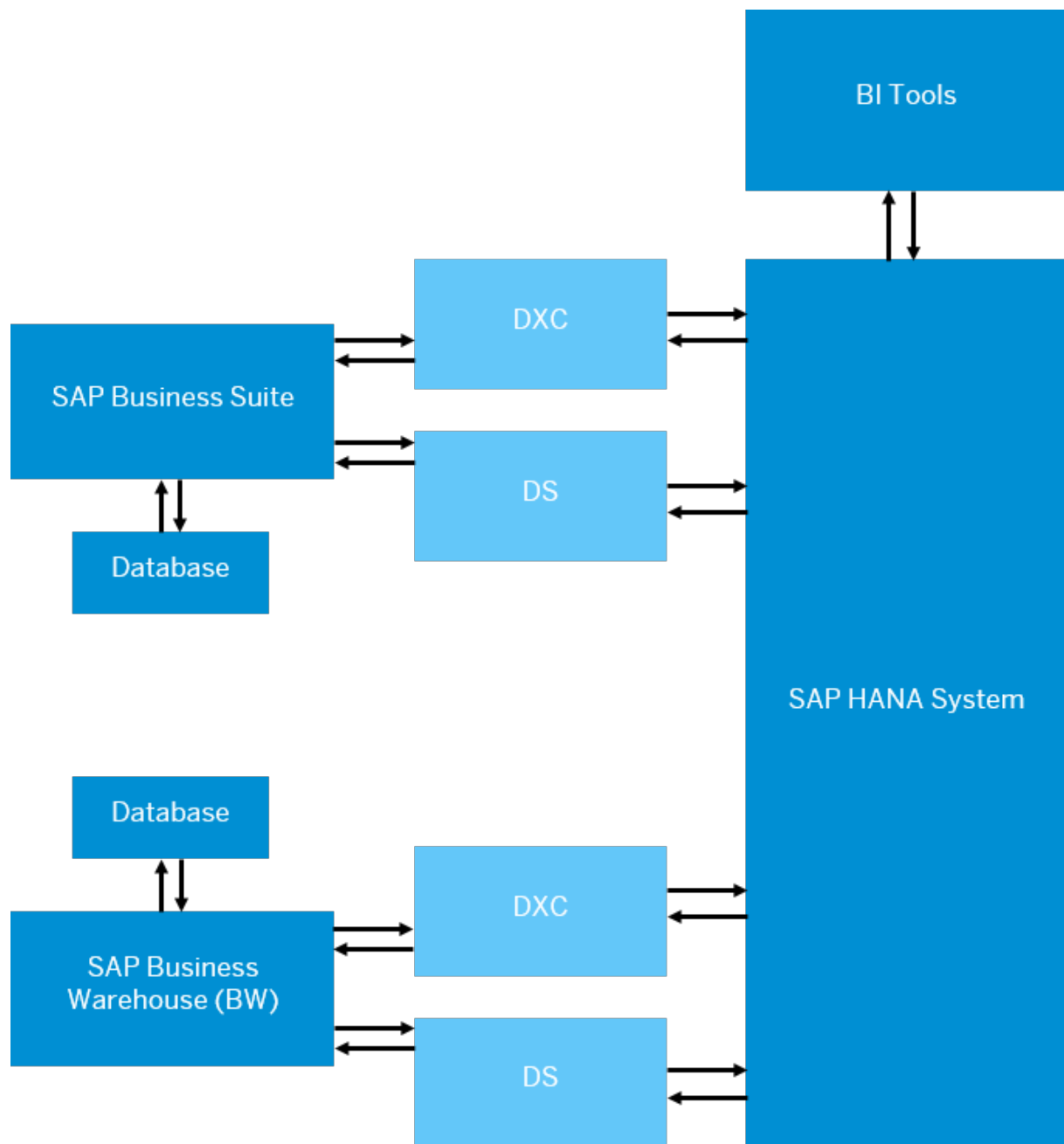
SAP Business Suite is a source system for operational data marts in SAP HANA. The SAP Landscape Transformation Replication Server (SLT) is an SAP NetWeaver ABAP-based tool that provides real-time data replication. In addition, a log-based SAP Replication Server (SRS) can also be used to provide real-time data replication for an SAP Business Suite system.

Real-time Operational Data Marts with a non-SAP OLTP System



A non-SAP transactional source system is used as a basis for real-time operational data marts in SAP HANA. SAP Replication Server (SRS) refers to the SAP Replication Server application, which is a tool which provides real-time data replication.

Agile Data Marts

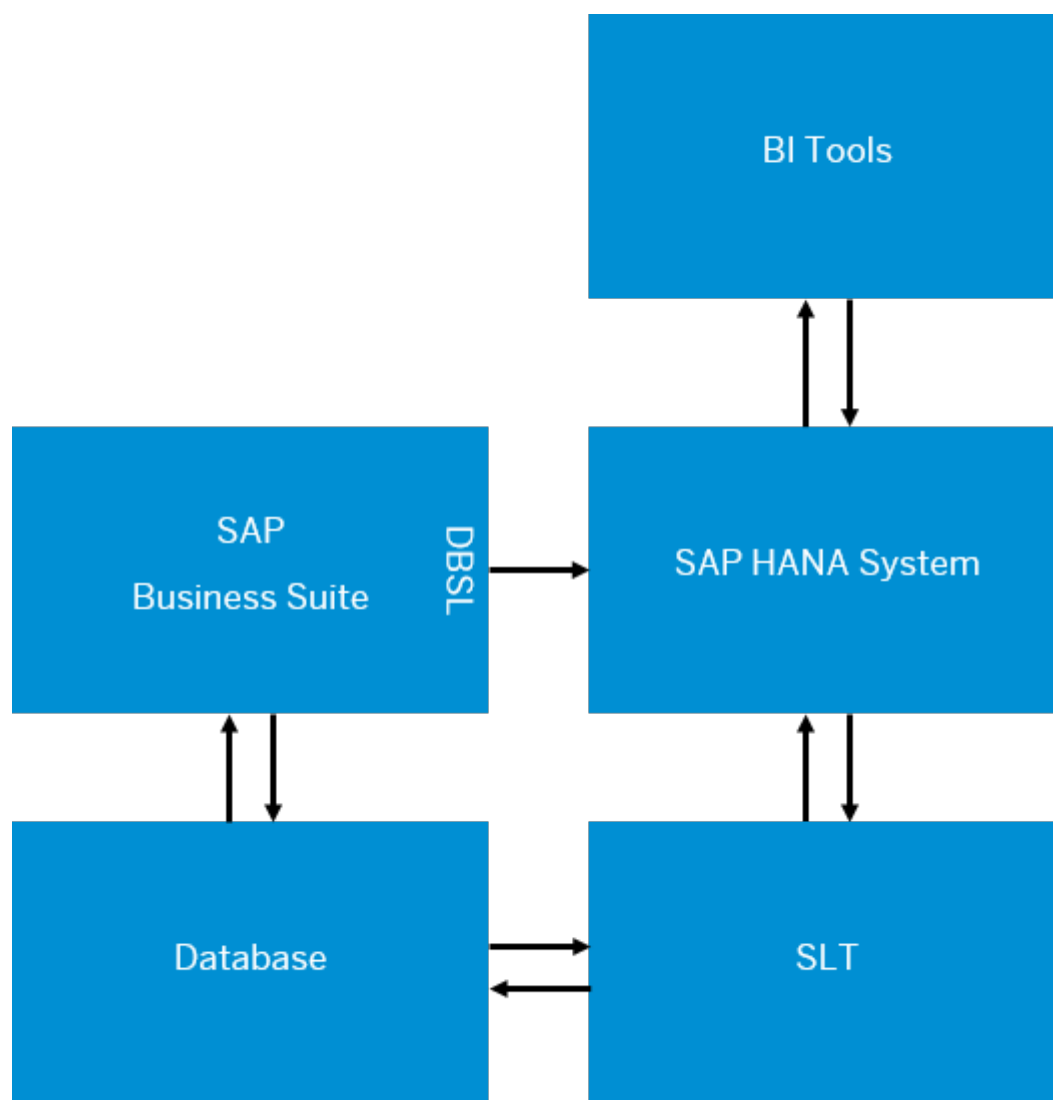


Agile data marts are a type of data mart that offer analytics and reporting on data acquired from a transactional system. When deployed in SAP HANA, they may offer advantages of flexibility when compared to taking a more comprehensive approach to organizational information management, such as deploying data marts within the context of an Enterprise Data Warehouse.

3.4 SAP HANA-Based Accelerators

SAP HANA-based accelerators are types of applications or scenarios that extend the capabilities of business processes in SAP Business Suite systems by leveraging the performance and scalability advantages that SAP HANA provides. This is implemented by performing operations for certain parts of computing operations of designated business processes or reports.

The typical approach for accelerators involves replicating data for data-intensive operations that are often bottlenecks for the given operation in an SAP HANA table. A type of “switch” is then set in the SAP Business Suite application to indicate that whenever these specified tables are read, the read operation will take place in SAP HANA using a secondary database connection.



3.5 SAP HANA as Application and Development Platform

SAP HANA functions as a comprehensive platform for the development and execution of native data-intensive applications that run efficiently in SAP HANA, taking advantage of its in-memory architecture and parallel execution capabilities.

This section provides an overview of the applications and services for application development and execution that are available with SAP HANA. For more information about these technologies, refer to the documentation indicated.

Application or Service	Description	More Information
SAP HANA extended application services, advanced model	SAP HANA extended application services, advanced model, (XS advanced) provide a comprehensive platform for the development and execution of native data-intensive applications. XS advanced is a polyglot application platform that supports several programming languages and execution environments, for example, Java, and Node.js XS advanced includes amongst other things: an integration with the SAP HANA database, OData support, compatibility with XS classic model, and some additional features designed to improve application security. XS advanced also provides support for business applications that are composed of multiple micro-services, which are implemented as separate Cloud Foundry applications, which combined are also known as Multi-Target Applications (MTA).	See the SAP HANA Developer Guide on SAP Help Portal at https://help.sap.com/viewer/4505d0bdaf4948449b7f7379d24d0f0d/2.0.latest/en-US/087356c3bd5241518ab30becaa6bfc28.html.

Application or Service	Description	More Information
SAP Web IDE for SAP HANA	SAP Web IDE for SAP HANA is a browser-based integrated development environment (IDE) for the development of SAP HANA-based applications comprised of web-based or mobile UIs, business logic, and extensive SAP HANA data models. It supports developers who use SAP HANA extended application services, advanced model (XS advanced), by providing a variety of tools, such as syntax-aware editors for code and SAP HANA artifacts, graphical editors for CDS data models and calculation views, as well as inspection, testing and debugging tools. SAP Web IDE works in conjunction with the SAP HANA database explorer, the SAP HANA deployment infrastructure (HDI), the Application Lifecycle Management tools (ALM) and the XS advanced runtime platform.	See the documentation for SAP Web IDE on SAP Help Portal at https://help.sap.com/docs/SAPWEBIDE?version=SAPWEBIDE4HANA.
SAP Enterprise Architecture Designer, Edition for SAP HANA	SAP Enterprise Architecture Designer, Edition for SAP HANA (SAP EA Designer) lets you capture, analyze, and present your organization's landscapes, strategies, requirements, processes, data, and other artifacts in a shared environment. Using industry-standard notations and techniques, organizations can leverage rich metadata and use models and diagrams to drive understanding and promote shared outcomes in creating innovative systems, information sets, and processes to support goals and capabilities.	See the documentation for SAP Enterprise Architecture Designer, Edition for SAP HANA on SAP Help Portal at https://help.sap.com/viewer/p/EAD_HANA.

3.5.1 SAP HANA Extended Application Services, Advanced Model

SAP HANA extended application services, advanced model, (XS advanced) provide a comprehensive platform for the development and execution of native data-intensive applications.

SAP HANA functions as a comprehensive platform for the development and execution of native data-intensive applications that run efficiently in SAP HANA, taking advantage of its in-memory architecture and parallel execution capabilities. Structured accordingly, applications can profit from the increased performance provided by SAP HANA due to the integration with the data source.

XS advanced is a polyglot application platform that supports several programming languages and execution environments, for example, Java and Node.js. The classic XS JavaScript (XSJS) is supported by a framework running in the Node.js run time.

In simple terms, XS advanced is basically the Cloud Foundry open-source Platform-as-a-Service (PaaS) with a number of tweaks and extensions provided by SAP. These SAP enhancements include amongst other things: an integration with the SAP HANA database, OData support, compatibility with XS classic model, and some additional features designed to improve application security. XS advanced also provides support for business applications that are composed of multiple micro-services, which are implemented as separate Cloud Foundry applications, which combined are also known as Multi-Target Applications (MTA). A multi-target application includes multiple so-called “modules” which are the equivalent of Cloud Foundry applications.

Related Information

[SAP HANA Extended Application Services, Advanced Model](#)

3.5.2 SAP Web IDE for SAP HANA

SAP Web IDE for SAP HANA is a browser-based integrated development environment (IDE) for the development of SAP HANA-based applications comprised of web-based or mobile UIs, business logic, and extensive SAP HANA data models.

SAP Web IDE supports developers who use SAP HANA extended application services, advanced model (XS advanced), by providing a variety of tools, such as syntax-aware editors for code and SAP HANA artifacts, graphical editors for CDS data models and calculation views, as well as inspection, testing and debugging tools.

SAP Web IDE works in conjunction with the SAP HANA database explorer, the SAP HANA deployment infrastructure (HDI), the Application Lifecycle Management tools (ALM) and the XS advanced runtime platform.

Related Information

[SAP Web IDE for SAP HANA Reference](#)

3.6 SAP liveCache on SAP HANA

You can run SAP liveCache on SAP HANA, lowering total cost of ownership and taking advantage of SAP HANA features.

SAP liveCache is an in-memory object store technology that is used to speed up material planning scenarios in SAP Supply Chain Management (SCM). It is available as an add-on for SAP HANA.

As of S/4 HANA 1709 and S/4 HANA Cloud 1805, it can also be used for production planning scenarios in S/4 HANA Production Planning & Detailed Scheduling (PP/DS).

There are a number of advantages to running SAP liveCache as part of SAP HANA:

- Only one database needs to be administered, which reduces setup and maintenance
- Backup and recovery is simplified:
 - There is no longer a need for separate backups
 - Inconsistencies that could arise from separate backups can be avoided.
- SAP liveCache can take advantage of existing SAP HANA capabilities like performance and high availability.

Supported Scenarios

For SAP SCM, the SAP HANA database must run on a single host including SAP liveCache.

Note

There is no standalone SAP liveCache based on SAP HANA technology. This means that you cannot replace your standalone SAP liveCache based on MaxDB technology with a standalone SAP liveCache based on SAP HANA technology.

Monitoring SAP liveCache in SAP HANA Studio

You can use both the DBACockpit for SAP HANA and the SAP HANA studio to monitor SAP liveCache. The following system views allow you to monitor run time information in the SAP HANA studio:

- M_LIVECACHE_CONTAINER_STATISTICS
- M_LIVECACHE_CONTAINER_STATISTICS_RESET
- M_LIVECACHE_LOCKS
- M_LIVECACHE_LOCK_STATISTICS
- M_LIVECACHE_LOCK_STATISTICS_RESET
- M_LIVECACHE_OMS_VERSIONS
- M_LIVECACHE_PROCEDURE_STATISTICS
- M_LIVECACHE_PROCEDURE_STATISTICS_RESET
- M_LIVECACHE_SCHEMA_STATISTICS

- M_LIVECACHE_SCHEMA_STATISTICS_RESET

System Copy

For detailed information on the procedure for copying an SAP Supply Chain Management system with SAP liveCache on SAP HANA see the Administrator's Guide for SAP SCM 7.0, Version for SAP HANA.

Related Information

[SAP HANA SQL and System Views Reference](#)

[DBACockpit for SAP HANA](#)

[Administrator's Guide for SAP SCM 7.0, Version for SAP HANA](#)

4 SAP HANA Architecture

Various aspects are relevant to the SAP HANA architecture.

4.1 SAP HANA Platform Software Components

SAP HANA platform is composed of several components.

For information about the capabilities available for your license and installation scenario, refer to the [Feature Scope Description for SAP HANA](#).

The **SAP HANA platform edition** is the technical foundation of the SAP HANA platform and various SAP HANA editions. The *SAP HANA platform edition* comprises among others:

- SAP HANA Database
- SAP HANA Client
- SAP HANA Studio
- SAP HANA XS advanced runtime
- SAP HANA XS Engine
- SAP HANA Advanced Data Processing
- SAP HANA Spatial
- SAP HANA Graph
- SAP HANA Local Secure Store

Note

For information about the feature capability of the SAP HANA server on Intel-based hardware platforms or on IBM Power servers, see *SAP HANA Hardware and Software Requirements* in the *SAP HANA Master Guide*.

Related Information

[SAP HANA Hardware and Software Requirements \[page 73\]](#)

4.2 SAP HANA Technical Deployment Options

The technical deployment options determine how SAP HANA systems, hosts used for SAP HANA systems, and applications running on SAP HANA are deployed.

4.2.1 SAP HANA Tenant Databases

As of SAP HANA 2.0 Support Package Stack (SPS) 01, the SAP HANA system can only be installed or configured to be a tenant database system. A tenant database system contains one system database and can contain multiple tenant databases. A single-container system will be automatically converted to a tenant database system during the upgrade to SPS 01.

An SAP HANA system is capable of containing more than one tenant database.

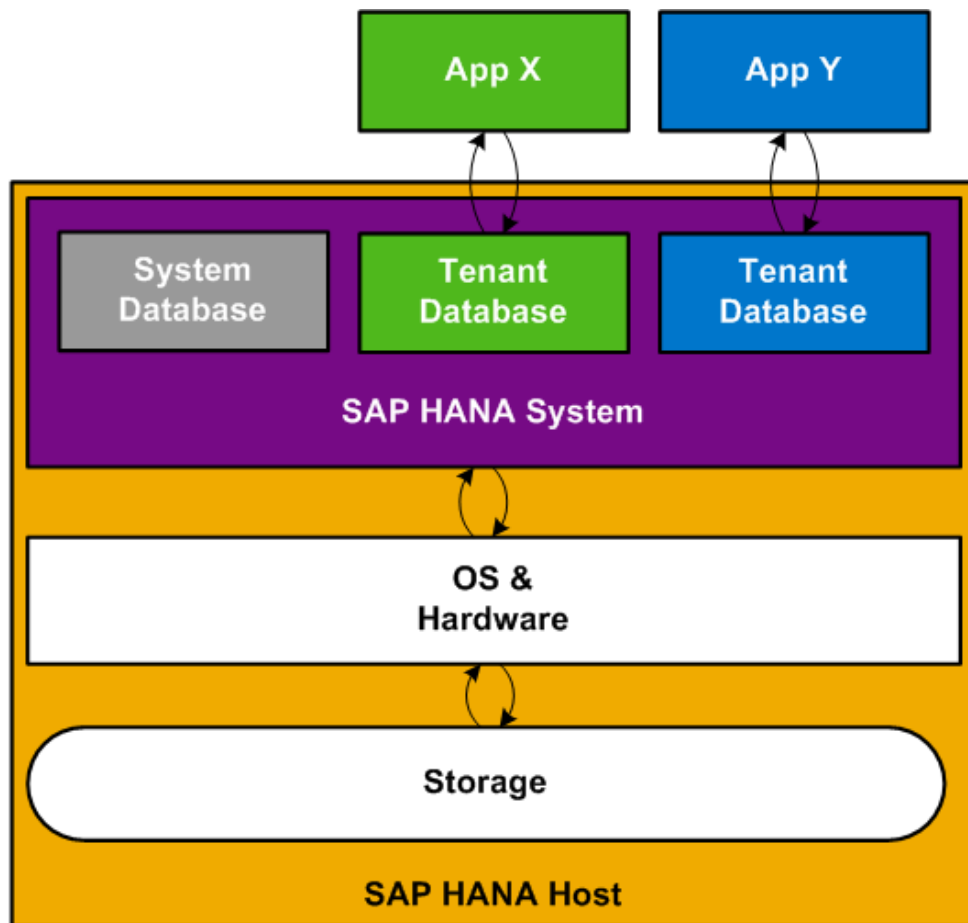
A system always has exactly one system database, used for central system administration, and any number of tenant databases (including zero). An SAP HANA system is identified by a single system ID (SID). Databases are identified by a SID and a database name. From the administration perspective, there is a distinction between tasks performed at system level and those performed at database level. Database clients, such as the SAP HANA cockpit, connect to specific databases.

All the databases share the same installation of database system software, the same computing resources, and the same system administration. However, each database is self-contained and fully isolated with its own:

- Set of database users
- Database catalog
- Repository
- Persistence
- Backups
- Traces and logs

Although database objects such as schemas, tables, views, procedures, and so on are local to the database, cross-database SELECT queries are possible. This supports cross-application reporting, for example.

You have one system database and any number of tenant databases. Multiple applications run in different tenant databases. This deployment option can be used to replace existing MCOS on-premise scenarios.



📘 Note

For more information, see *Creating and Configuring Tenant Databases* in the *SAP HANA Administration Guide* and the *SAP HANA Tenant Databases Operations Guide*.

Related Information

[SAP Note 2096000](#) 📄

[SAP Note 2101244](#) 📄

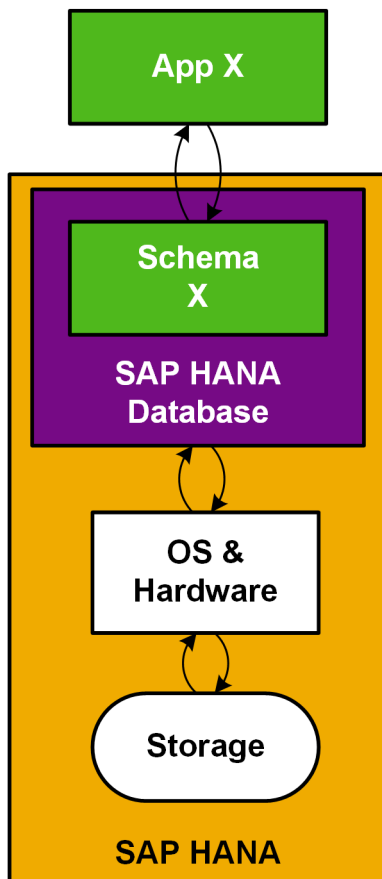
[SAP Note 2423367](#) 📄

[Creating and Configuring Tenant Databases](#)

4.2.2 Single Application on One SAP HANA System (SCOS)

A single application on one SAP HANA system is also known as Single Component on One System (SCOS).

To more readily describe the various other options for technical deployment, it is useful to first illustrate the simple, straightforward approach to deploying an application on an SAP HANA system. This will be useful for comparison purposes.

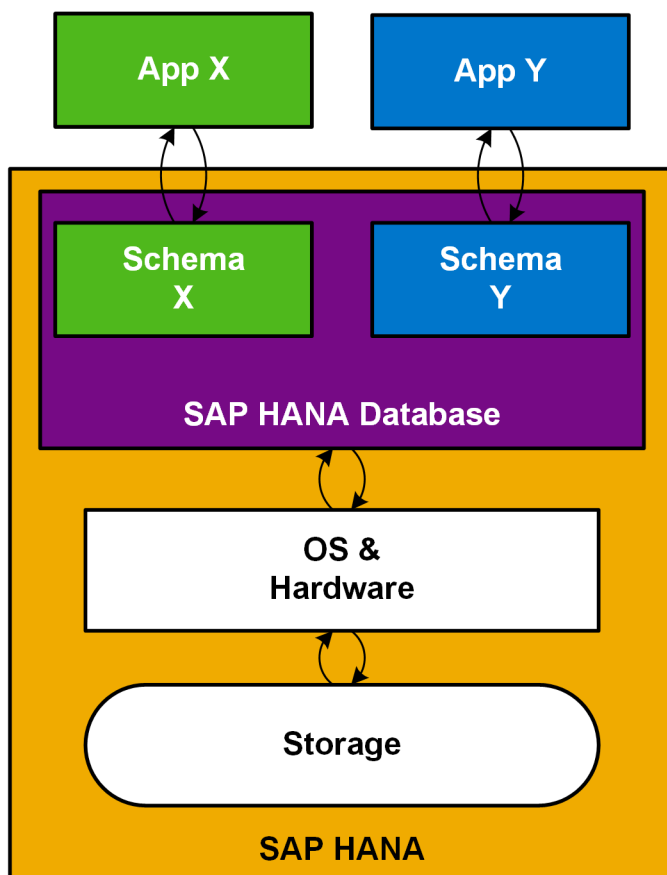


In this configuration, a single application runs in a single schema, in a single SAP HANA database as part of an SAP HANA system. This is a simple, straightforward scenario that is supported for all scenarios without restriction.

4.2.3 Multiple Applications on One SAP HANA System (MCOD)

Multiple applications on one SAP HANA system is also known as Multiple Components on One Database (MCOD).

The technical deployment type MCOD refers to the scenario where more than one application, scenario, or component runs on one SAP HANA system. This deployment type is available, with restrictions, for production SAP HANA systems.



Related Information

[SAP Note 1661202](#)

[SAP Note 1826100](#)

[SAP HANA Tenant Databases \[page 19\]](#)

4.2.4 Multiple SAP HANA Systems on One Host (MCOS)

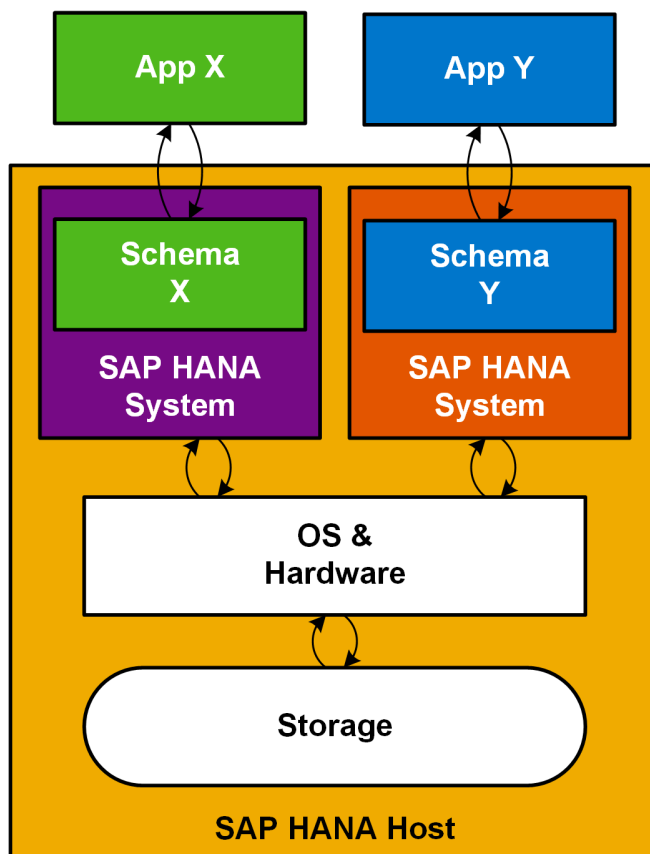
Multiple SAP HANA systems on one host are also known as Multiple Components on One System (MCOS).

SAP does support running multiple SAP HANA systems (SIDs) on a single production SAP HANA host. This is restricted to single-host / scale-up scenarios only. Keep in mind that multi-SID requires significant attention to various detailed tasks related to system administration and performance management.

Production support is restricted to SAP HANA 1.0 SPS 09 (and higher) or SAP HANA 2.0 due to the availability of some resource management parameters (for example affinity). Be aware that running multi-SID on one SAP HANA host may impact performance of various types of operations, as contention for computing resources may occur (memory, cpu, i/o, ...).

SAP strongly recommends performing requisite testing in any project before going live; in general, stress/ volume testing is recommended in order to provide good indicators of expected performance. When operating

a system that features a multi-SID deployment, SAP recommends to actively make use of the resource management features of SAP HANA (e.g. parameters controlling memory limits, and influencing utilization of CPU cores, etc.) in order to optimize performance.



Related Information

[SAP Note 1681092](#)

[SAP Note 1666670](#)

4.2.5 SAP HANA System Types

The number of hosts in a SAP HANA system landscape determines the SAP HANA system type.

The host is the operating environment in which the SAP HANA database runs. The host provides all the resources and services (CPU, memory, network, and operating system) that the SAP HANA database requires. The host provides links to the installation directory, data directory, and log directory or to the storage itself. The storage needed for an installation does not have to be on the host. In particular, shared data storage is required for distributed systems.

An SAP HANA system can be configured as one of the following types:

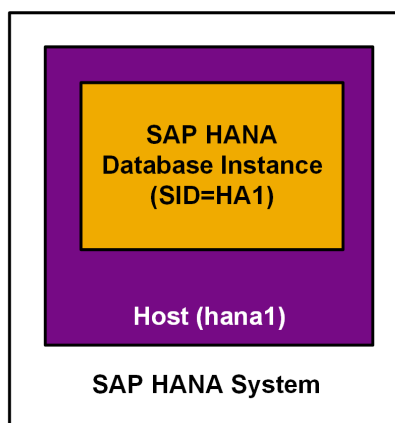
- Single-host system - One SAP HANA instance on one host.
- Distributed system (multiple-host system) - Multiple SAP HANA instances distributed over multiple hosts, with one instance per host.

For more information about SAP HANA system types, see the *SAP HANA Server Installation and Update Guide*.

4.2.5.1 Single-Host System

If the system consists of only one host, it is called a single-host system.

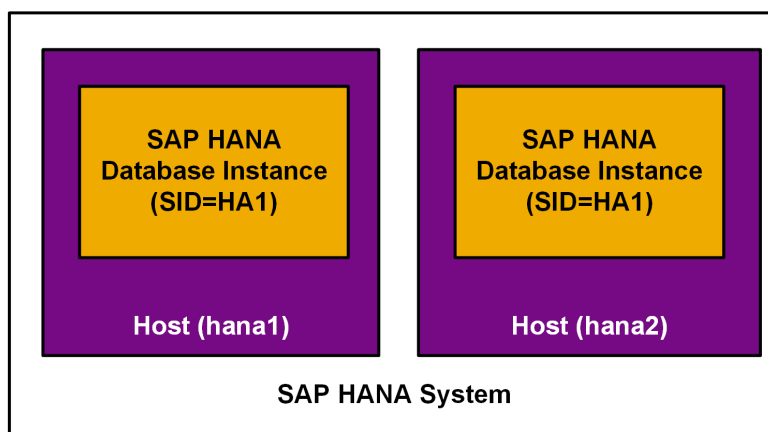
The following graphic shows the file system for a single-host installation:



4.2.5.2 Distributed System (Multiple-Host System)

If the system consists of multiple connected hosts, it is called a distributed system.

The following graphic shows the file system for a distributed installation:



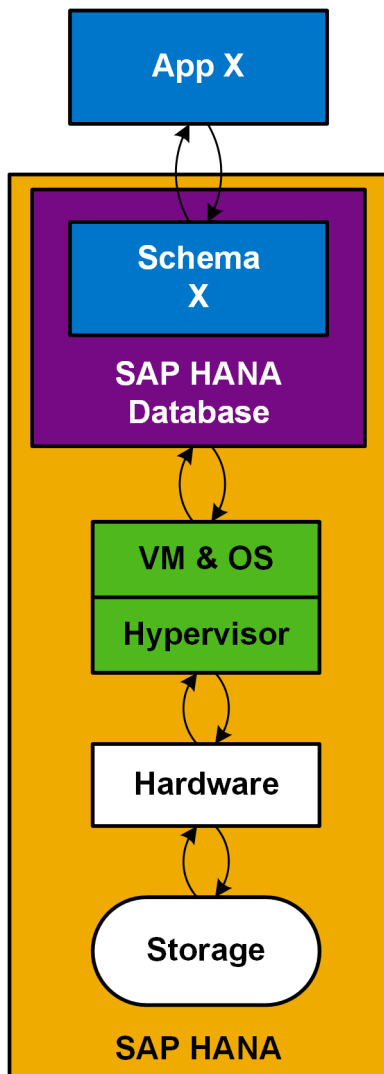
A distributed system might be necessary in the following cases:

- You can scale SAP HANA either by increasing RAM for a single server, or by adding hosts to the system to deal with larger workloads. This allows you to go beyond the limits of a single physical server.
- Distributed systems can be used for failover scenarios and to implement high availability. Individual hosts in a distributed system have different roles (master, worker, slave, and standby) depending on the task.

For more information about scaling, failover scenarios, and high availability, see the *SAP HANA Administration Guide*.

4.2.6 SAP HANA with Virtualization

The technical deployment type SAP HANA with Virtualization refers to the scenario where one or more SAP HANA database SIDs are deployed on one or more virtual machines running on SAP HANA server hardware.



For information about SAP HANA with virtualization, see:

- SAP Note 1788665 - SAP HANA Support for virtualized / partitioned (multi-tenant) environments
- Intel-Based Hardware Platforms - VMware

- SAP Note 2652670 - SAP HANA VM on VMware vSphere
- SAP Note 2024433 - Multiple SAP HANA VMs on VMware vSphere in production
- SAP Note 2157587 - SAP Business Warehouse, powered by SAP HANA on VMware vSphere in scale-out and production
- IBM Power Systems - IBM PowerVM
SAP Note 2055470 - SAP HANA on POWER Planning and Installation Specifics - Central Note

For more information, see *SAP HANA and Virtualization* in *SAP HANA Server Installation and Update Guide*.

Related Information

[SAP HANA and Virtualization](#)

[SAP on VMware](#) 

[SAP Note 1788665](#) 

[SAP Note 2652670](#) 

[SAP Note 2055470](#) 

[SAP Note 2024433](#) 

[SAP Note 2157587](#) 

4.3 The SAP HANA Network

An SAP HANA data center deployment can range from a database running on a single host to a complex distributed system with multiple hosts located at a primary and one or more secondary sites, and supporting a distributed multi-terabyte database with full high availability and disaster recovery.

In terms of network connectivity, SAP HANA supports traditional database client connections and, with SAP HANA Extended Application Services (SAP HANA XS), Web-based clients. SAP HANA can be integrated with transaction-oriented databases using replication services, as well as with high-speed event sources. SAP HANA-based applications can be integrated with external services such as e-mail, Web, and R-code execution.

The setup of an SAP HANA system, and the corresponding data center and network configurations, depends on your company's environment and implementation considerations. Some of these considerations are:

- Support for traditional database clients, Web-based clients, and administrative connections
- The number of hosts used for the SAP HANA system, ranging from a single-host system to a complex distributed system with multiple hosts
- Support for high availability through the use of standby hosts, and support for disaster recovery through the use of multiple data centers
- Security and performance

SAP HANA has different types of network communication channels to support the different SAP HANA scenarios and setups:

- Channels used for external access to SAP HANA functionality by end-user clients, administration clients, application servers, and for data provisioning via SQL or HTTP

- Channels used for SAP HANA internal communication within the database or, in a distributed scenario, for communication between hosts

Before you start configuring the network for SAP HANA, it's important that you understand the different types of connections to, from, and within SAP HANA and which ports to configure for them. In addition, you should be familiar with the mechanisms used for assigning and resolving host names in SAP HANA. For more detailed information about the communication channels used in an SAP HANA landscape, as well as information about host name resolution, see the *SAP HANA Administration Guide*.

For information about troubleshooting the SAP HANA network, see the *SAP HANA Troubleshooting and Performance Analysis Guide*.

Security

SAP HANA supports the isolation of internal communication from outside access. To separate external and internal communication, SAP HANA hosts use a separate network adapter with a separate IP address for each of the different networks. For IBM Power systems, this might be different. In addition, SAP HANA supports encrypted communication for network communication channels. For more information, see the *SAP HANA Security Guide*.

Related Information

[Network Zones \[page 27\]](#)

[Ports and Connections](#)

[Default Host Names and Virtual Host Names](#)

[SAP HANA Network and Communication Security](#)

[Network Performance and Connectivity Problems](#)

4.3.1 Network Zones

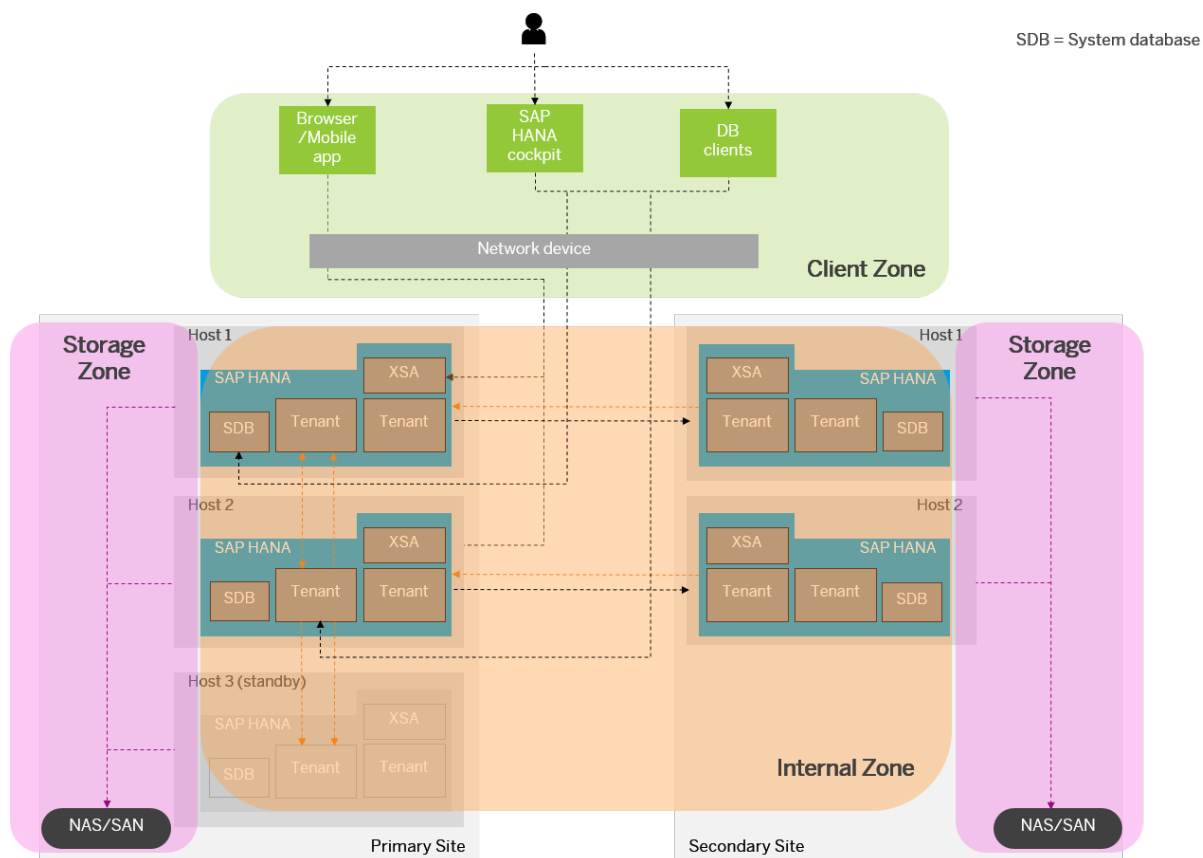
Separate network zones, each with its own configuration, allow you to control and limit network access to SAP HANA to only those channels required for your scenarios, while ensuring the required communication between all components in the SAP HANA network.

These network zones can be basically described as follows:

- Client zone
The network in this zone is used by SAP application servers, by clients such as the SAP HANA studio or Web applications running against the SAP HANA XS server, and by other data sources such as SAP Business Warehouse.
- Internal zone
This zone covers the interhost network between hosts in a distributed system as well as the SAP HANA system replication network.
- Storage zone

This zone refers to the network connections for backup storage and enterprise storage.

In most cases, the preferred storage solution involves separate, externally attached storage subsystem devices that are capable of providing dynamic mount-points for the different hosts, according to the overall landscape. A storage area network (SAN) can also be used for storage connectivity – for example, when running SAP HANA on IBM Power.



Related Information

[Connections from Database Clients and Web Clients to SAP HANA](#)

[Host Name Resolution for SQL Client Communication](#)

[Connections for Distributed SAP HANA Systems](#)

[Internal Host Name Resolution](#)

[Host Name Resolution for System Replication](#)

[SAP HANA Tailored Data Center Integration – Overview](#)

[SAP Note 1900823](#)

5 SAP HANA Deployment Options

SAP HANA is a modern, in-memory database and platform that is deployable on-premise or in the cloud.

5.1 On-Premise Deployment

In an **on-premise** deployment, SAP HANA runs on dedicated hardware.

On-premise SAP HANA is deployed through the following offerings:

- As an **appliance**, SAP HANA combines software components with proven SAP-optimized hardware provided by SAP's hardware partners. This approach is valid for Intel-based hardware platforms only.
- Compared with the appliance delivery approach, **SAP HANA tailored data center integration (TDI)** is a more open and flexible approach, designed to serve your needs regarding the integration of SAP HANA in the data center. The requirements for this deployment option are as follows:
 - The **server** is certified and belongs to the allowed hardware.
 - The **storage solution** has successfully passed SAP HANA hardware certification.
 - The components of SAP HANA can only be **installed** by certified hardware partners, or any person holding **certification** on certified hardware running an approved operating system. See the SAP Education resources for information about the SAP HANA certification exams.

Note

The supported hardware for SAP HANA depends on the deployment method used (appliance or TDI). For more information, see the *Related Information* in this section and under *SAP HANA Hardware and Software Requirements* in the *SAP HANA Master Guide*.

Related Information

Certified Appliance Hardware (also applicable for compute servers in TDI environments)

[SAP HANA Hardware - Certified Appliances](#)

SAP HANA Tailored Datacenter Integration (TDI)

[SAP HANA Tailored Data Center Integration \(TDI\) Overview](#)

[SAP HANA Tailored Data Center Integration - Frequently Asked Questions](#)

[SAP HANA Hardware - Certified Enterprise Storage](#)

[Certified and Supported SAP HANA Hardware - Supported Intel Systems](#)

[SAP Note 2493172](#)

[SAP Note 1900823](#)

[SAP HANA Network Requirements](#)

SAP HANA on IBM Power Systems

[SAP Note 2055470](#) 

[SAP Note 2218464](#) 

General Links

[SAP Training and Certification Shop](#) 

5.2 Cloud Deployment

Learn about the availability of SAP HANA in the cloud.

The in-memory data processing capabilities of SAP HANA can be leveraged in the cloud through one of the following offerings:

SAP HANA Cloud Offerings

Cloud Offering	Description	More Information
SAP HANA Enterprise Cloud	Private cloud service, managed by SAP. Includes an SAP HANA software license, underlying cloud infrastructure, and SAP-managed services.	See the information for SAP HANA Enterprise Cloud at https://support.sap.com/en/alm/solution-manager/expert-portal/hana-enterprise-cloud-operations.html 
SAP HANA Infrastructure Services	Public cloud, infrastructure as a service (IaaS). Bring your own SAP HANA license to run on third-party public cloud providers.	To find third-party public cloud providers offering the service, see <i>Certified and Supported SAP HANA Hardware Directory - Certified IaaS Platforms</i> at https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/ 
SAP HANA Cloud	SAP HANA Cloud provides a single place to access, store, and process all enterprise data in real time. It is a cloud-native platform that offers the power and performance of SAP HANA with full capabilities to manage data storage, virtualization, and run powerful applications.	See the documentation for SAP HANA Cloud on SAP Help Portal at https://help.sap.com/viewer/product/HANA_CLOUD

6 SAP HANA Implementation and Operation

The implementation and operation of SAP HANA depends on the chosen use case and the technical deployment.

6.1 Sizing SAP HANA

The SAP HANA database can be deployed as an SAP In-Memory Appliance (SAP HANA) or deployed following the SAP HANA Tailored Datacenter Integration (TDI) approach, on premise or on Cloud IaaS.

Memory Sizing

Every SAP HANA customer should perform a memory sizing to size an SAP HANA deployment:

- For new (greenfield) SAP HANA implementations, it is necessary to size the memory for an SAP HANA system using the SAP HANA Quick Sizer.
- For systems that are migrating to SAP HANA, we recommend the following:
 - Using a sizing report on the source database if the migration is from an SAP NetWeaver-based system
 - Applying a sizing SAP Note, if the migration is from a non-SAP NetWeaver data source

Any system that is large or complex requires sizing from an SAP sizing expert.

For more information about memory sizing, we recommend the following information:

Starting Point	Sizing for BW on SAP HANA, BW/4HANA	Sizing for Suite on SAP HANA, S/4HANA	Sizing non-NetWeaver
Greenfield / new implementation	SAP HANA Quick Sizer 	• SAP HANA Quick Sizer  • Sizing guide as available http://www.sap.com/sizing  → Sizing Guidelines	Sizing guide as available http://www.sap.com/sizing  → Sizing Guidelines

Starting Point	Sizing for BW on SAP HANA, BW/4HANA	Sizing for Suite on SAP HANA, S/4HANA	Sizing non-NetWeaver
Migration	SAP Note 2296290 - Sizing Report for BW4/HANA	SAP Note 1872170 - Sizing Report for SAP S/4HANA	- SAP Note 2399995 - Hardware requirements for SAP HANA 2.0 - SAP Note 2493172 - SAP HANA Hardware and Cloud Measurement Tools

CPU Sizing

Any system that is very large or complex requires sizing from an SAP sizing expert.

For more information about CPU sizing, we recommend the following related information:

Starting Point	Sizing for BW on SAP HANA, BW/4HANA	Sizing for Suite on SAP HANA, S/4HANA	Sizing non-NetWeaver
Greenfield / new implementation	SAP HANA Quick Sizer	SAP HANA Quick Sizer - Sizing guide as available http://www.sap.com/sizing → Sizing Guidelines	Sizing guide as available http://www.sap.com/sizing → Sizing Guidelines
Migration	SAP Note 2296290 - Sizing Report for BW4/HANA	- SAP Note 1872170 - Sizing Report for SAP S/4HANA - SAP Note 1793345 - Sizing for SAP Suite on HANA	- SAP Note 2399995 - Hardware requirements for SAP HANA 2.0 - SAP Note 2493172 - SAP HANA Hardware and Cloud Measurement Tools

For more information about the SAP sizing approach, see www.sap.com/sizing.

SAP HANA Tailored Datacenter Integration (TDI) Approach

TDI follows the approach of SAP sizing and mapping to certified servers, network, and storage components. Depending on the chosen vendor, various configurations can be deployed to ensure valid mapping. Contact your vendor for information about the options available. If you decide to build the SAP HANA system based on the SAP HANA TDI approach, you must become TDI certified.

For more information, see the *SAP HANA Storage Requirements Whitepaper* in SAP Note [1900823](#) - SAP HANA Storage Requirements and SAP HANA Storage Connector API.

With TDI phase 5, which was introduced in 2017, the SAPS requirements for the specific customer workload are used to determine the type and number of the processors required. The SAP sizing tools (Quick Sizer and SAP HANA sizing reports) have been enhanced to provide separate CPU results in SAPS and RAM sizing results. Customers share the sizing results with their preferred hardware partner to jointly determine the processor type and optimal number of cores needed to run their specific application workload on SAP HANA.

For more information on TDI, see [TDI Overview](#).

Sizing Recommendations for SAP HANA Deployment Infrastructure (HDI)

The table below lists the requirements for main memory and disk space and provides an indication of the execution time for the following HDI operations:

- Create an empty container (including configuring libraries and granting rights)
- Write data into an empty container
- Make container data, that is, deploy artifacts in the SAP HANA database
- Drop a container, which contains data

The values in the table below have been measured using the well-known SHINE scenario, which is a demo scenario with the content of a real EPM business scenario (data models, tables, views, dashboards, and so on). Consequently, all values in the table are valid for the SHINE scenario or similar scenarios but may vary for other business scenarios.

Note

The artifact data for the SHINE scenario has a size of 970 KB in 73 files and 9 folders.

Operation	Execution Time	Main Memory	Disk Space
Create empty container	550 ms/Container	4.300 KB/Container	1.900 KB/Container (#DI schema)
Write data into empty container (SHINE scenario)	230 ms/Container	7.600 KB/Container	2.900 KB/Container (#DI schema)
Make container data (SHINE scenario)	1.800 ms/Container	40.500 KB/Container	5.400 KB/Container plus 4.500 KB/Container for #DI schema
Drop container, which contains data	2.200 ms/Container	Not applicable	Not applicable

Peak memory usage during Make: 122.5 MB/Container

This additional main memory is used during a Make for temporary data structures, which are removed at the end of the Make.

Related Information

[SAP Quick Sizer](#) 

[Quick Sizer for Beginners Guide](#) 

[SAP Note 2296290](#) 

[SAP Note 1872170](#) 

[SAP Note 1793345](#) 

[SAP Note 1514966](#) 

[SAP Note 2055470](#) 

[SAP Note 1900823 - SAP HANA Storage Requirements and SAP HANA Storage Connector API](#) 

[SAP HANA Tailored Data Center Integration – Overview](#) 

[SAP Certified Enterprise Storage Hardware for SAP HANA](#) 

6.2 Installing SAP HANA

The installation of SAP HANA comprises several steps. The central part is the installation of the SAP HANA Platform Edition. You need to check specific installation information, depending on the data provisioning technology you use and the other components you want to add to your SAP HANA landscape.

SAP HANA Platform Edition

For information about installing SAP HANA, see the SAP HANA documentation on SAP Help Portal:

- *SAP HANA Server Installation and Update Guide*
This guide describes how to install and update an SAP HANA system with the SAP HANA lifecycle management tools.

Note

SAP HANA installations are performed using the SAP HANA database lifecycle manager (HDBLCM). SAP HANA installations cannot be performed using the Software Provisioning Manager (SWPM).

- *SAP HANA Client Installation and Update Guide*
- *SAP HANA Studio Installation and Update Guide*

Data Provisioning Technologies

You can find the documentation for the data provisioning technologies on various publication channels:

- *SAP HANA smart data access*

SAP HANA smart data access is part of SAP HANA. However, it is not installed during the installation of the SAP HANA Platform Edition. For more information about installing SAP HANA smart data access, see *SAP HANA Smart Data Access* in the *SAP HANA Administration Guide*.

For IBM Power Systems, only the following data sources are supported: SAP HANA, SAP IQ, SAP Adaptive Service Enterprise, and Oracle Database 12C. For more information, see *SAP HANA Smart Data Access* in the *SAP HANA Administration Guide*.

- ETL-based replication (SAP Data Services)
 - Log-based replication (SAP Replication Server)
 - SAP HANA smart data integration
- See the *SAP HANA Smart Data Integration* page on SAP Help Portal.

Related Information

[SAP HANA Server Installation and Update Guide](#)

[SAP HANA Studio Installation and Update Guide](#)

[SAP HANA Client Installation and Update Guide](#)

[SAP HANA Smart Data Access](#)

[SAP Data Services](#)

[SAP Replication Server](#)

[SAP HANA Smart Data Integration and SAP HANA Smart Data Quality](#)

[SAP HANA Real-Time Replication](#)

[SAP HANA Platform](#)

6.3 Administrating SAP HANA

The SAP HANA Administration Guide provides information about administering SAP HANA system landscape.

Related Information

[SAP HANA Administration Guide](#)

6.4 Data Access

SAP HANA supports the integration of data from many data sources to enrich your applications and deliver in-depth analysis. These include federated queries, data replication, and processes to improve data quality.

This section provides an overview of the tools and technologies that are available with SAP HANA or supported by SAP HANA for data access and data virtualization. For more information about the administration of these technologies, as well as other operations topics, refer to the documentation indicated.

Native Capabilities for Data Access, Integration, and Quality in SAP HANA

Capability	Description	More Information
Data Federation with SAP HANA Smart Data Access (SDA)	SAP HANA SDA enables you to create virtual tables in SAP HANA that point to virtual tables on remote sources, such as SAP ASE, SAP IQ, and Teradata.	See <i>SAP HANA Smart Data Access</i> in the <i>SAP HANA Administration Guide</i> . SAP HANA Smart Data Access
Data Replication and Transformation	SAP HANA smart data integration provides the architecture that supports all types of data delivery in SAP HANA: real-time, batch, and federation (SDA). It includes both data replication and data transformation services.	See the documentation for SAP HANA smart data integration and SAP HANA smart data quality option on SAP Help Portal at https://help.sap.com/viewer/p/HANA_SMART_DATA_INTEGRATION .

Data Replication Technologies in the Extended SAP HANA Landscape

Capability	Description	More Information
Trigger-Based Replication	The trigger-based replication method uses the SAP Landscape Transformation (LT) Replication Server component to pass data from the source system to the SAP HANA database target system.	See the documentation for SAP HANA real-time replication on SAP Help Portal at https://help.sap.com/viewer/p/SAP_LANDSCAPE_TRANSFORMATION_REPLICATION_SERVER .
Extraction Transformation Load-Based Replication	Extraction Transformation Load (ETL)-based data replication uses SAP Data Services (also called Data Services) to load relevant business data from SAP ERP to the SAP HANA database. This lets you read the business data on the application layer level.	See the documentation for SAP Data Services on SAP Help Portal at http://help.sap.com/viewer/p/SAP_DATA_SERVICES

Capability	Description	More Information
Log-Based Replication	SAP Replication Server (SRS) moves and synchronizes transactional data including DML and DDL across the enterprise, providing low impact, guaranteed data delivery, real-time business intelligence, and zero operational downtime.	See the documentation for SAP Replication Server on SAP Help Portal at http://help.sap.com/viewer/p/SAP_REPLICATION_SERVER

Related Information

[Important Disclaimer for Features in SAP HANA \[page 76\]](#)

6.5 SAP HANA Native Storage Extension

SAP HANA native storage extension is a general-purpose, built-in warm data store in SAP HANA that lets you manage less-frequently accessed data without fully loading it into memory. It integrates disk-based or flash-drive based database technology with the SAP HANA in-memory database for an improved cost-to-performance ratio.

The SAP HANA native storage extension is integrated with other SAP HANA functional layers, such as query optimizer, query execution engine, column store, and persistence layers. The key highlights of the SAP HANA native storage extension include the following:

- A substantial increase in SAP HANA data capacity, with good performance for high-data volumes.
- The ability to co-exist with the SAP HANA in-memory column store, preserving SAP HANA memory performance.
- An enhancement of existing in-market paging capabilities by supporting compression, dictionary support, and partitioning.
- An intelligent buffer cache that manages memory pages in SAP HANA native storage extension column store tables.
- Integration with SAP HANA Cockpit for load units configuration for columns, partitions, and tables.
- A simple system landscape with high scalability that covers a large spectrum of data sizes.
- Support for all types of columnar compression techniques, including dictionary and advanced compression.
- An advisor that collects object access statistics and provides load unit recommendations. The advisor provides a flexible interface to act on individual recommended objects to convert from column loadable to page loadable, or vice versa. For more information, see [SAP HANA Native Storage Extension](#) in the SAP HANA Administration Guide.

6.6 Operating SAP HANA

You can operate SAP HANA on premise using the appliance delivery model or using the tailored data center integration model. You can also operate SAP HANA in the cloud.

On-Premise Deployment

You can decide to implement SAP HANA using the appliance delivery model, meaning preconfigured software and hardware bundled by an SAP hardware partner, or you can opt for the SAP HANA tailored data center integration approach, which allows you more flexibility when integrating your SAP HANA system with your existing infrastructure, for example, network or storage solutions.

With the appliance model SAP coordinates all support requests for all components of the system including hardware with the responsible partners.

Tailored data center integration gives you the flexibility to install SAP HANA yourself on the same validated hardware as used for appliances, but you are responsible for all aspects of the system, including managing support with all the involved partners.

SAP HANA Appliance Compared with SAP HANA Tailored Datacenter Integration

SAP HANA appliance	SAP HANA tailored data center integration
Fast implementation	More flexibility
Support fully provided by SAP	Customer aligns with the hardware partner on individual support model
Solution validation done by SAP and partners	Installation is done by the customer (or hardware partner)
Preconfigured hardware setup	Reuse existing infrastructure and thereby reduce costs
Preinstalled software	SAP HANA installation certification required for customer (or hardware partner) to perform SAP HANA software installation

For a list of hardware platforms and supported operating system releases, see *SAP Note 2235581 - SAP HANA: Supported Operating Systems*. For configuration information for the supported operating system releases, see *SAP Note 1944799 - SAP HANA Guidelines for SLES Operating System Installation* and *SAP Note 2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL) Operating System*.

Cloud Deployment

In the cloud, SAP HANA can be deployed and operated in a number of ways:

- As SAP HANA Enterprise Cloud – a private cloud service managed by SAP.
- As SAP HANA service for SAP BTP – a database as a service offering, managed by SAP. For more information, see *SAP HANA service for SAP BTP* in the *Related Information* section.

- In a public cloud run by other infrastructure providers such as Amazon Web Services or Google Cloud Platform. For specific information about operating SAP HANA on these infrastructures, please see the documentation provided by your cloud provider.

Related Information

[SAP HANA Appliance \[page 39\]](#)

[SAP HANA Tailored Data Center Integration \[page 46\]](#)

[SAP HANA service for SAP BTP](#)

[SAP Note 2235581](#) 

[SAP Note 1944799](#) 

[SAP Note 2009879](#) 

6.6.1 SAP HANA Appliance

SAP HANA comes as an appliance combining software components from SAP optimized on proven hardware provided by SAP's hardware partners.

This approach offers you well-defined hardware designed for the performance needs of an in-memory solution out of the box. The appliance delivery is the first choice if you are looking for a preconfigured hardware set-up and a preinstalled software package for a fast implementation done by your chosen hardware partner and fully supported by both, the partner and SAP.

You can decide to implement SAP HANA using the appliance delivery model, meaning preconfigured software and hardware bundled by an SAP hardware partner, or you can opt for the SAP HANA tailored data center integration approach, which allows you more flexibility when integrating your SAP HANA system with your existing storage solution. For more information see *SAP HANA Tailored Data Center Integration*.

Related Information

[SAP HANA Tailored Data Center Integration \[page 46\]](#)

6.6.1.1 Roles and Responsibilities

Using the appliance delivery model it is necessary to define which tasks, concepts, and procedures are necessary for the ongoing operation of the SAP HANA appliance software and who is responsible in each case.

- [Tasks and Responsibilities](#)

The following table gives an overview of tasks and who is responsible for the task. It includes information on:

- What SAP is responsible for and what SAP supports
- What the SAP hardware partners do
- What the customer is asked to do.

Phase	Task	Responsible
Provisioning/Setup		
	Installation of Hardware	Hardware Partner
	Installation of Operating System	Hardware Partner
	Installation of SAP HANA Platform	Hardware Partner
	Adding additional SAP HANA database instances (MCOS)	Customer
	Data Source Connectivity	Customer
	Installation of SMD Agent	Customer
Maintenance		
	Patching of Firmware	Customer (*)
	Patching of Operating System	Customer (*)
	Patching of SAP HANA platform components	Customer
	Patching of peripheral components	Customer
	Upgrade of Operating System	Customer (*)
	Update of SAP HANA platform components	Customer
Operations		
	General administration of SAP HANA database	Customer
	Backup and Recovery	Customer
	Bare Metal Recovery	Customer
	SAP HANA System Monitoring	Customer
	SAP HANA Database Monitoring	Customer
	Installation of third party software components	Customer
Support		
	Issue Handling Process	SAP, Customer (*), (**)

(*) The customer is generally responsible for maintenance of the SAP HANA system. If the customer has a special support agreement with the hardware partner, maintenance may be the responsibility of the hardware partner.

(**) SAP is the main point of contact and distributes all issues within the support organization by default, as is the case for other SAP applications. If the customer has defined special support agreements with the hardware partner, the customer should contact the hardware partner directly in the case of obvious hardware or operating system issues. If no agreements have been made neither SAP nor the hardware

partner are responsible for the installation, maintenance and possible adjustment of external software installed on the SAP HANA system.

- [Schedule](#) - When and how often should each task be performed? What tasks are to be performed during ongoing operation, such as regular checks and periodic tasks? What tasks must be performed on demand and in special situations?
- [Procedures](#) - How can each task be performed? Several tools and transactions can be used for administering and monitoring SAP HANA.

A SAP HANA appliance can only be obtained from a certified SAP hardware partner, for more information see:

- SAP Certified and Supported SAP HANA Hardware
- Product Availability Matrix (PAM)

For more information on supported software and hardware platforms refer to the SAP Product Availability Matrix (search for "HANA"), and the *SAP HANA Master Guide* on the SAP Help Portal.

Related Information

[SAP Certified and Supported SAP HANA Hardware](#) 

[Product Availability Matrix \(PAM\)](#) 

6.6.1.2 Service and Support

If errors occur in any software component of SAP HANA, SAP is the main point of contact. SAP distributes all issues within the support organization by default, as is the case for other SAP applications.

If the customer has defined special support agreements with the hardware partner (such as a special Service Level Agreement (ESA)), the customer should contact the hardware partner directly in the case of obvious hardware or operating system issues.

To investigate SAP HANA-related problems, SAP support requires a support connection to all servers in the SAP HANA landscape. For more information about establishing a service connection for SAP HANA, see *SAP Note 1635304: Central note for HANA support connections*.

Note

You need a valid user to access SAP Support Portal and related SAP Notes.

Related Information

[SAP Note 1635304](#) 

6.6.1.3 Installation of the SAP HANA Appliance Software

The installation of the SAP HANA appliance software is performed by the SAP hardware partner.

The SAP hardware partners deliver the SAP HANA software together with corresponding, validated hardware as a prepackaged solution with the most recent support package stack (at the time of shipment of the SAP HANA appliance) to the customer site. The SAP hardware partner may add specific best practices and SAP HANA software configuration. The installation is finalized by an onsite setup of the SAP HANA components. This includes deploying the SAP HANA system in the customer data center, connectivity to the network, SAP system rename, and SAP Solution Manager connectivity, if applicable.

Once the network connection to the SAP HANA system has been established successfully and the SAP HANA system with the most recent support packages is reachable under its desired host name, IP address and SAP system ID from within the customer network, the establishment of data replication/connectivity to data source systems (including the deployment of additional replication components) and the installation of potential BI clients (such as SAP BusinessObjects Explorer on top of BOE) is again the responsibility of the customer or the consulting organization carrying out the SAP HANA project onsite for the customer.

Note

With the appliance model the installation of the SAP HANA server components, in particular the installation of the SAP HANA database shall only be performed by certified hardware partners, on validated hardware, running a specific operating system, as published in the *SAP HANA Product Availability Matrix (PAM)*. Any other system or content developed with such systems is not supported by SAP for use in production. SAP HANA studio and clients need to be installed outside of the SAP HANA appliance and can therefore be downloaded and installed by SAP customers directly.

Further note, there is a product "SAP HANA (platform|enterprise edition)", where the "SAP HANA database" is one component of the product. The product is also comprised of other components. In consequence, do not use the individual installation tools of the various components to set up an SAP HANA system. Otherwise Lifecycle Management processes like the Software Update Manager (SUM) for SAP HANA, a tool for updating and patching of the SAP HANA product might fail if the product was not installed completely as a whole.

Installation of additional software

To ensure the smooth operation of an SAP HANA system and to fulfill and be compliant with IT policies, you need to use external software in the SAP HANA appliance. External software is software that was not delivered by SAP or by your SAP HANA appliance hardware partner.

SAP permits the installation and operation of external software that is required to fulfill the IT compliance and IT policy that are determined in operation, provided the prerequisites in the following SAP Notes are met.

SAP Note Number	Title
SAP Note 1730929	Using external tools in an SAP HANA appliance
SAP Note 1730932	Using backup tools with Backint

SAP Note Number	Title
SAP Note 1730930	Using antivirus software in an SAP HANA appliance
SAP Note 784391	SAP support terms and 3rd-party Linux kernel drivers

Each of these SAP Notes refers to additional documentation about software and software versions that, in the experience of SAP Support, have caused problems in the customer environment or in the laboratories of SAP or the hardware suppliers and are therefore not recommended for use in the SAP HANA appliance.

Neither SAP nor the hardware supplier of your SAP HANA appliance are responsible for the installation, maintenance and possible adjustment of the external software if no agreements have been made for this purpose.

Related Information

[Product Availability Matrix \(PAM\)](#) 

[SAP Note 1730929](#) 

[SAP Note 1730932](#) 

[SAP Note 1730930](#) 

[SAP Note 784391](#) 

6.6.1.4 Change Management

Change management describes the permitted changes allowed to the standard configuration of an SAP HANA appliance.

The following sections provide information on permitted configuration changes to the SAP HANA software, operating system, and so on. You will also find information about the changes that are not supported by SAP or SAP hardware partners.

SAP allows changes in configuration parameters in the SAP HANA database, when this is recommended in SAP documentation, SAP Notes or by an SAP employee (for example, Consulting, Development, or Support).

To guarantee optimal performance and the highest stability, SAP HANA hardware and technology partners can deliver systems with settings that differ from the SAP standard system.

Customer-specific changes to operating system parameters and ports are permitted in agreement with the relevant SAP HANA hardware or technology partners.

SAP Note 1731000 describes configuration changes that resulted in problems in customer environments and in SAP or hardware partner lab environments.

To guarantee supportability from SAP, all changes that differ from the SAP standard system should be documented. This facilitates later root cause analysis if errors occur.

Related Information

[SAP Note 1731000](#) 

6.6.1.4.1 Updating and Patching the Operating System

The customer is generally responsible for implementing operating system patches. If the customer has a special agreement with the hardware partner, support for operating system patching may be the responsibility of the hardware partner.

For a list of hardware platforms and supported operating system releases, see *SAP Note 2235581 - SAP HANA: Supported Operating Systems*. For configuration information for the supported operating system releases, see *SAP Note 1944799 - SAP HANA Guidelines for SLES Operating System Installation* and *SAP Note 2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL) Operating System*.

SAP supports additional changes to the configuration of the operating system, provided these changes do not contradict the currently applicable SAP HANA documentation, or their incompatibility with SAP HANA is already known. These incompatible configuration changes, which are known in customer environments and/or are known to have caused problems to the laboratories of SAP or to SAP HANA hardware or to technology partners, are described in *SAP Note 1731000*.

OS security patches may be installed immediately after they are available; however, the original packages of the distributors must be used, that a customer is entitled to within the framework of a valid support contract with the distributor or an authorized OEM.

Customer-specific changes to operating system parameters and ports are permitted in agreement with the relevant SAP HANA hardware or technology partners. To guarantee supportability on the SAP side, all changes that deviate from the SAP standard system should be documented. This facilitates later root cause analysis if errors occur.

Any updates related to kernel or runtime libraries (glibc) need to be validated and approved by SAP beforehand. Support Package Stacks (SPSs) can be downloaded and applied to the SAP HANA system only according to agreements with the respective hardware partner.

On rare occasions, SAP HANA might require a certain operating system patch. In this case, you must ensure that the configuration settings of the operating system persist. Do not change configuration settings when you patch the operating system unless explicitly stated in the corresponding SAP release note. SAP will state any dependencies in the relevant SAP Note published when a revision is released which requires such modifications.

Note

In some cases, customers may have outsourced the administration of their landscapes. In such a case, the outsourced service provider should only change any settings after consultation with the hardware support provider. The customer is responsible for any complete upgrade of the operating system and the use of tools for distributing operating system patches in a distributed system landscape.

SUSE offers enhanced support for SUSE Linux in collaboration with SAP Linux Lab ('SUSE Priority Support for SAP'). This support offer facilitates communication and ensures high quality.

Related Information

[SAP Note 2235581](#)

[SAP Note 1944799](#)

[SAP Note 2009879](#)

[SAP Note 1731000](#)

6.6.1.4.2 Updating and Patching SAP HANA Appliance Software

The SAP HANA appliance is shipped with the latest available support package stack and the customer is usually responsible for implementing any subsequent updates and patches.

The SAP hardware partners ships the SAP HANA appliance pre-configured with the most recent support package stack that is available. The customer is responsible for the subsequent implementation of SAP HANA patches, revisions, or support packages and support package stacks.

In general the following points apply:

- Any system connected to the SAP HANA system, as a source or as a client, may require a minimum SAP HANA support package stack to be implemented. Unless explicitly stated, we recommend applying the latest SAP HANA support package stack after applying an update to the connected system.
- The SAP HANA support packages are cumulative. You can update directly from any older SAP HANA support package to any newer SAP HANA support package.
- New SAP HANA support packages mainly cover software improvements. SAP recommends that you download and install these new SAP HANA support packages if SAP support has to resolve issues with SAP HANA versions previously installed in your landscape. However, customers do not necessarily need to update their SAP HANA landscape with the newest SAP HANA support packages if their SAP HANA landscape works correctly.
- New SAP HANA support packages and patches will be produced and shipped at SAP's sole discretion. There is no periodic cycle for releasing and patching the SAP HANA software. The new SAP HANA support package stacks will be communicated to customers and hardware partners by means of SAP Notes.

An automated update of your SAP HANA system is performed using SAP HANA database lifecycle manager (HDBLCM).

Note

It is strongly recommended after the initial setup and before every system update, that you perform a full data and file system backup (including a configuration backup).

Note

Special support agreements may exist with the hardware partner which include services such as patching.

Related Information

[Updating an SAP HANA System Landscape \[page 48\]](#)

6.6.1.4.3 Updating and Patching File System Components

The customer is responsible for implementing patches for the shared file system.

If the customer has a special agreement with the hardware partner, the hardware partner is responsible for providing support for file system patching.

6.6.1.4.4 Updating and Patching Storage Components

The customer is responsible for implementing patches for the storage components.

If the customer has a special agreement with the hardware partner, the hardware partner is responsible for providing support for the storage components.

6.6.1.4.5 Updating and Patching Firmware of Underlying Hardware Components

The customer is responsible for implementing patches for the firmware of underlying hardware components.

If the customer has a special agreement with the hardware partner, the hardware partner is responsible for providing support for the firmware of underlying hardware components.

6.6.2 SAP HANA Tailored Data Center Integration

SAP HANA tailored data center integration offers you more openness and freedom of choice to configure the layer for SAP HANA depending on your existing data center layout.

In addition to SAP HANA as a standardized and highly optimized appliance, you can use the tailored data center integration approach, which is more open and flexible, to run SAP HANA in datacenters. This option enables a reduction in hardware and operational costs through the reuse of existing hardware components and operational processes.

Roles and Responsibilities

With the appliance model SAP distributes all support requests regarding any component of SAP HANA to the correct part of the support organization. With tailored data center integration the customer is responsible for defining support agreements with the various partners and organizing all aspects of support.

Service and Support

Customers should work with their hardware partners to ensure hardware support requirements are fulfilled.

A supportability tool called the SAP HANA hardware and cloud measurement tools is provided by SAP, which allows you to check if the hardware is optimally configured to meet the requirements of SAP HANA. For more information, see the *SAP HANA Administration Guide*.

Installation

A number of requirements have to be fulfilled before you can proceed with the installation of SAP HANA tailored data center integration.

- The server must be certified and is listed in the hardware directory.
- All storage devices must have successfully passed the hardware certification for SAP HANA.
- Only software installed by certified hardware partners, or any person holding certification, is recommended for use on the SAP HANA system. Do not install any other software on the SAP HANA system. The components of SAP HANA can only be installed by certified hardware partners, or any person holding certification. Furthermore, it must be installed on validated hardware running an approved operating system.

For more information, see the blogs *SAP Certified Associate - Database Administrator - SAP HANA* and *The Future Has Been Written – the Rise of the Database Administrator* in the *Related Information* section.

Change Management

- Updating and patching the operating system
With tailored data center integration the customer is responsible for updating and patching the operating system.
- Updating and patching the SAP HANA software
With tailored data center integration the customer is responsible for installing, updating, and patching the SAP HANA software.

Related Information

[SAP Certified and Supported SAP HANA Hardware](#) 

[SAP Partner](#) 

[Product Availability Matrix \(PAM\)](#) 

[SAP Training and Certification Shop](#) 

[SAP HANA TDI - Overview](#) 

[SAP Note 2055470](#) 

[SAP Note 2218464](#) 

[SAP Certified Associate - Database Administrator - SAP HANA](#) 

[The Future Has Been Written – the Rise of the Database Administrator](#) 

6.7 Updating an SAP HANA System Landscape

This section gives you an overview of the activities you have to perform when you update SAP HANA Platform 1.0 (all supported SPS) to SAP HANA Platform 2.0 SPS 00 and when you update SAP HANA Platform 2.0 to a higher release.

⚠ Caution

A direct update of SAP HANA Platform 1.0 to SAP HANA 2.0 SPS 00 for IBM Power Systems is not possible.

The goal of the update activities is that an SAP HANA landscape that has been updated to SAP HANA 2.0 has a comparable state to a newly installed SAP HANA 2.0 landscape.

The update activities are split into the following areas:

- Update an SAP HANA system
You perform an update on your SAP HANA system with the SAP HANA database lifecycle manager (HDBLCM).
- Update dependent components

ℹ Note

Plan to have a business downtime during the update process.

ℹ Note

For information about updating the capabilities available for your license and installation scenario, see the documentation for the capabilities you are using.

ℹ Note

With an SAP HANA SPS you also perform updates for SAP HANA revisions and SAP HANA maintenance revisions. For more information, see *SAP Note 2378962 - SAP HANA 2.0 Revision and Maintenance Strategy*.

Related Information

[SAP HANA 2.0 Revision Strategy](#)

[SAP Note 2378962](#)

[Update Dependent Components \[page 57\]](#)

6.7.1 Prerequisites

Before starting the update for the components in your SAP HANA landscape several prerequisites have to be fulfilled.

Make sure you fulfill the following prerequisites:

- If you are performing an offline update, you have all the necessary installation files for the individual components.
- You have a valid, permanent SAP license for the SAP HANA database.
- You have user names and passwords for the following users:
 - <sid>adm user
 - sapadm user
 - S-user for the SAP Support Portal
- You have carefully read the update instructions for the individual components.
- You have made the necessary preparations to perform backups for the SAP HANA database and the other components.

6.7.2 Update Process

Before updating the SAP HANA components, make sure that no read or write processes are running on the SAP HANA database. Perform the update process in offline mode during a business downtime. After the update, you have to restart SAP HANA and its components.

⚠ Caution

Updating from SAP HANA Platform 1.0 (all supported SPS) to SAP HANA Platform 2.0 SPS 00 also involves upgrading the operating system and possibly changing the hardware.

Updating an SAP HANA Platform 2.0 system might also involve upgrading the operating system and possibly changing the hardware.

This is the general sequence of the steps you have to perform:

1. Stop all processes.
2. We strongly recommend a system backup.
3. Perform an update.

When updating to SAP HANA Platform 2.0 SPS 00 or higher, it may be necessary to upgrade the operating system. For more information, see *SAP Note 2235581 - SAP HANA: Supported Operating Systems*.

4. Update the dependent components.
5. Perform the post-update steps.
6. Restart all processes.

Related Information

[SAP Note 2235581](#)

[SAP Note 2372809](#)

[Update an SAP HANA 1.0 System with the SAP HANA Database Lifecycle Manager \[page 51\]](#)

[Update an SAP HANA 2.0 System with the SAP HANA Database Lifecycle Manager \[page 56\]](#)

[Upgrade the Operating System \[page 50\]](#)

6.7.2.1 Upgrade the Operating System

The different versions of the SAP HANA Platform are only supported on specific operating system versions. For information about supported operating system versions for SAP HANA, see "SAP Note 2235581 - SAP HANA: Supported Operating Systems".

When updating to SAP HANA Platform 2.0 SPS 00, you may need to upgrade the operating system. For information about the upgrade, refer to the documentation of the operating system vendor. For the operating system, we recommend that you choose a new installation as the upgrade procedure. We recommend the following procedures:

- RHEL
For RHEL 7.2 we recommend a new installation.
- SLES
For SLES 12 SP1 we recommend a new installation.

Related Information

[SAP Note 2235581](#)

[SAP Note 2372809](#)

6.7.2.2 Update an SAP HANA 1.0 System with the SAP HANA Database Lifecycle Manager

An update of your SAP HANA system from the local host is performed using the SAP HANA database lifecycle manager.

⚠ Caution

The following update scenarios are valid for Intel-based hardware platforms only.

For information about updating IBM Power Systems, see *SAP Note 2380257 SAP HANA Platform 2.0 SPS 00 Release Note*.

⚠ Caution

For a general description of the upgrade recommendations, see *SAP Note 2407244 - Ensuring OS/HANA compatibility during upgrade of HANA/OS*.

We recommend that you update to SAP HANA Platform 1.0 SPS 12 first and then update to SAP HANA Platform 2.0 SPS 00. An update to SAP HANA Platform 1.0 SPS 10/11 should only be performed if a specific operating system version is needed.

A multiple-container system can only be updated to SAP HANA Platform 2.0 SPS 00 from SAP HANA Platform 1.0 SPS 12 (Revision 122.04).

When updating to SAP HANA Platform 2.0 SPS 00, it might be necessary to upgrade the operating system. Check which update option for the SAP HANA system is compatible with the method that you choose for upgrading the operating system.

For information about the SAP HANA database lifecycle manager, see *Updating the SAP HANA System* and *Installing or Updating SAP HANA Components* in the *SAP HANA Server Installation and Update Guide*.

ℹ Note

Update all SAP HANA studio installations. Use the same revision as the SAP HANA database.

Related Information

[SAP HANA Server Installation and Update Guide](#)

[Updating the SAP HANA System](#)

[Installing or Updating SAP HANA Components](#)

[SAP Note 1948334](#)

[SAP Note 2380257](#)

[SAP Note 2407244](#)

[SAP Note 2503043](#)

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.1 Update an Existing SAP HANA System

The recommended approach for updating SAP HANA Platform 1.0 (all supported SPS) to SAP HANA Platform 2.0 SPS 00 is to update on an existing SAP HANA system.

6.7.2.2.1.1 Update an SAP HANA System from 1.0 SPS 10 - 1.0 SPS 12 to SAP HANA Platform 2.0 SPS 00

Update an SAP HANA system from SAP HANA Platform 1.0 SPS 10 - SAP HANA Platform 1.0 SPS 12 to SAP HANA Platform 2.0 SPS 00:

1. **Note**

With SAP HANA Platform 2.0, the metadata persistency layout has been changed. Furthermore an older column store persistence format has been deprecated and is not supported anymore. Therefore you need to pay special attention before updating your existing SAP HANA 1.0 system to SAP HANA Platform 2.0.

Run the procedure HANA2_PERSISTENCE_MIGRATION_HELPER as described in SAP Note 2372809.

2. Stop the SAP HANA system and all applications that use the SAP HANA system.
3. Perform a system backup.
4. To prevent the SAP HANA system from starting during the operating system upgrade, set the `autostart` parameter in the profile to 0 (=off).
The profile can be found here: `/hana/shared/<SID>/profile/<SID>_HDB<instance_number>_<hostname>`
5. Upgrade the operating system to RHEL 7.2 or SLES 12 SP1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
6. Update the SAP HANA system to SAP HANA 2.0 SPS 00.

Related Information

[SAP Note 2372809](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.1.2 Update an SAP HANA System from 1.0 SPS 07 - 1.0 SPS 09 to SAP HANA Platform 2.0 SPS 00

Update an SAP HANA system from SAP HANA Platform 1.0 SPS 07 - SAP HANA Platform 1.0 SPS 09 to SAP HANA Platform 2.0 SPS 00:

1. Stop the SAP HANA system and all applications that use the SAP HANA system.

2. Perform a system backup.
3. To prevent the SAP HANA system from starting during the operating system upgrade, set the `autostart` parameter in the profile to 0 (=off).
The profile can be found here: `/hana/shared/<SID>/profile/<SID>_HDB<instance_number>_<hostname>`
4. Update the SAP HANA system to SPS 10, SPS 11, or SPS 12.

5. **Note**

With SAP HANA Platform 2.0, the metadata persistency layout has been changed. Furthermore an older column store persistence format has been deprecated and is not supported anymore. Therefore you need to pay special attention before updating your existing SAP HANA 1.0 system into SAP HANA Platform 2.0.

Run the procedure `HANA2_PERSISTENCE_MIGRATION_HELPER` as described in SAP Note 2372809.

6. Upgrade the operating system to RHEL 7.2 or SLES 12 SP1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
7. Update the SAP HANA system to SAP HANA 2.0 SPS 00.

Related Information

[SAP Note 2372809](#)

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.1.3 Update an SAP HANA Platform 1.0 SPS 06 System or Lower to SAP HANA Platform 2.0 SPS 00

Update an SAP HANA Platform 1.0 SPS 06 system or lower to SAP HANA Platform 2.0 SPS 00:

1. Stop the SAP HANA system and all applications that use the SAP HANA system.
2. Perform a system backup.
3. To prevent the SAP HANA system from starting during the operating system upgrade, set the `autostart` parameter in the profile to 0 (=off).
The profile can be found here: `/hana/shared/<SID>/profile/<SID>_HDB<instance_number>_<hostname>`
4. Update the SAP HANA system to SAP HANA Platform 1.0 SPS 06 (version 69.07) according to SAP Note 2175754. This is the minimum version of SAP HANA that is required, in order to update to SAP HANA Platform 1.0 SPS 10.
5. Update the SAP HANA system to SPS 10, SPS 11, or SPS 12.

6. **Note**

With SAP HANA Platform 2.0, the metadata persistency layout has been changed. Furthermore an older column store persistence format has been deprecated and is not supported anymore. Therefore you need to pay special attention before updating your existing SAP HANA 1.0 system to SAP HANA Platform 2.0.

Run the procedure HANA2_PERSISTENCE_MIGRATION_HELPER as described in SAP Note 2372809.

7. Upgrade the operating system to RHEL 7.2 or SLES 12 SP1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
8. Update the SAP HANA system to SAP HANA 2.0 SPS 00.

Related Information

[SAP Note 2372809](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.2 Update an SAP HANA System Using System Replication

Update an SAP HANA system using system replication:

1. Perform a backup of the primary site.
2. On the secondary site, update the SAP HANA system to SAP HANA Platform 1.0 SPS 10, SPS 11, or SPS 12 if the SAP HANA system is lower than SAP HANA Platform 1.0 SPS 10.
3. On the secondary site, upgrade the operating system to RHEL 7.2 or SLES 12 SP1.
4. On the secondary site, update to SAP HANA 2.0 SPS 00.
5. On the secondary site perform a takeover.
6. On the old primary site, update the SAP HANA system to SAP HANA Platform 1.0 SPS 10, SPS 11, or SPS 12 if the SAP HANA system is lower than SAP HANA Platform 1.0 SPS 10.

7. Note

With SAP HANA Platform 2.0, the metadata persistency layout has been changed. Furthermore an older column store persistence format has been deprecated and is not supported anymore. Therefore you need to pay special attention before updating your existing SAP HANA 1.0 system to SAP HANA Platform 2.0.

Run the procedure HANA2_PERSISTENCE_MIGRATION_HELPER as described in SAP Note 2372809.

8. On the old primary site, upgrade the operating system or RHEL 7.2 or SLES 12.1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
9. On the old primary site, update to SAP HANA 2.0 SPS 00.
10. Register the old primary site to the old secondary site so that system replication is ready.

Related Information

[SAP Note 2372809](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.3 Update an Existing SAP HANA System with Unregister and Register

Update an SAP HANA system using unregister and register:

1. Note

In SAP HANA Platform 2.0, the metadata persistency layout has been changed. Also, an older column store persistence format has been deprecated and is no longer supported. You therefore need to pay special attention to what you need to do before updating your existing SAP HANA 1.0 system to SAP HANA Platform 2.0.

Run the procedure HANA2_PERSISTENCE_MIGRATION_HELPER as described in SAP Note 2372809.

2. Stop the SAP HANA system and all applications that use the SAP HANA system.
3. Perform a system backup.
4. To prevent the SAP HANA system from starting during the operating system upgrade, set the `autostart` parameter in the profile to 0 (=off).
The profile can be found here: `/hana/shared/<SID>/profile/<SID>_HDB<instance_number>_<hostname>`
5. Update the SAP HANA system to SAP HANA Platform 1.0 SPS 12.
6. Unregister the SAP HANA system with the resident `hdbclm`.
This removes all operating system integration, such as symlinks and OS users.
For more information, see *Copying and Moving a System Using Platform LCM Tools* in the *SAP HANA Administration Guide*.
7. If the SAP Host Agent is installed in `/usr/sap/hostctrl`, uninstall it as the `root` user with:
`/usr/sap/hostctrl/exe/saphostexec -uninstall`
Alternatively, you can remove the `/usr/sap/hostctrl` directory.
The SAP Host Agent administrator user `sapadm` will be removed when the operating system is reinstalled, and the SAP Host Agent becomes unusable without this user. The SAP Host Agent will be installed again, and the `sapadm` user created, when the SAP HANA system is registered in a later step.
8. Unmount the `/hana/shared`, `data`, and `log` file systems:
 - If it is not possible to unmount a file system, use the `fuser` command to find out which processes still access files on the file system:
`fuser -m /hana/shared`
Use the `ps` command to find out what those processes are, and terminate them.
 - If a file system cannot be unmounted even though the `fuser` command shows no processes accessing it, it can be accessed from a remote computer. See your operating system documentation for more details.
9. Upgrade the operating system to RHEL 7.2 or SLES 12 SP1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
10. Mount the `/hana/shared`, `data`, and `log` file systems.
11. Register the SAP HANA system with the resident `hdbclm`.
This creates the operating system integration, such as symlinks and OS users.
12. Update the SAP HANA system to SAP HANA 2.0 SPS 00.

Related Information

[SAP Note 2372809](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.2.4 Update with Backup and Restore on a New SAP HANA System

You can perform an update with backup and restore from SAP HANA 1.0 (all supported SPS) to SAP HANA 2.0 SPS 00 on a new SAP HANA system:

1. **Note**

With SAP HANA Platform 2.0, the metadata persistency layout has been changed. Furthermore an older column store persistence format has been deprecated and is not supported anymore. Therefore you need to pay special attention before updating your existing SAP HANA 1.0 system into SAP HANA Platform 2.0.

Run the procedure `HANA2_PERSISTENCE_MIGRATION_HELPER` as described in SAP Note 2372809.

2. Stop the old SAP HANA system and all applications that use the SAP HANA system.
3. On the old SAP HANA system, perform a system backup.
4. On the new host, install operating system RHEL 7.2 or SLES 12 SP1.
For more information, see *Upgrade the Operating System* in the *SAP HANA Master Guide*.
5. Move the backup files from the old SAP HANA system to the new host.
6. On the new host, install SAP HANA Platform 1.0 SPS 10 or SPS 11 or SPS 12.
7. On the new SAP HANA system, perform a recovery using the backup files from the old SAP HANA system.
8. Update the new SAP HANA system to SAP HANA 2.0 SPS 00.

Related Information

[SAP Note 2372809](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.3 Update an SAP HANA 2.0 System with the SAP HANA Database Lifecycle Manager

An update of your SAP HANA system from the local host is performed using the SAP HANA database lifecycle manager.

Caution

The following update scenarios are valid for Intel-based hardware platforms only.

For information about updating IBM Power Systems, see *SAP Note 2656575 - SAP HANA Platform 2.0 SPS 04 Release Note*.

⚠ Caution

For a general description of the upgrade recommendations, see *SAP Note 2407244 - Ensuring OS/HANA compatibility during upgrade of HANA/OS*.

For information about the SAP HANA database lifecycle manager, see *Updating the SAP HANA System* and *Installing or Updating SAP HANA Components* in the *SAP HANA Server Installation and Update Guide*.

📌 Note

Update all SAP HANA studio installations. Use the same revision as the SAP HANA database.

Related Information

[SAP HANA Server Installation and Update Guide](#)

[Updating the SAP HANA System](#)

[Installing or Updating SAP HANA Components](#)

[SAP Note 1948334](#) 

[SAP Note 2656575](#) 

[SAP Note 2551355](#) 

[SAP Note 2460914](#) 

[SAP Note 2404375](#) 

[SAP Note 2380257](#) 

[SAP Note 2407244](#) 

[SAP Note 2503043](#) 

[Upgrade the Operating System \[page 50\]](#)

6.7.2.4 Update Dependent Components

Dependent components need to be updated.

- SAP HANA Client
Update all SAP HANA clients that are not located on an SAP HANA system. Use the same revision as the SAP HANA database.
- SAP HANA Studio
Update all SAP HANA studio installations that are not located on an SAP HANA system. Use the same revision as the SAP HANA database:
 - If you are using a complete SPS installation media, use the SAP HANA studio version on this media.
 - If you are downloading an individual SAP HANA studio installation media, make sure you use an SAP HANA studio version that matches with your SAP HANA database version. Check the version number in the file name of the SAP HANA studio installation media.

- **SAP HANA Data Provisioning Technologies Components**
Update the SAP HANA data provisioning technologies components depending on your scenario and the replication technologies in use. For detailed update and installation information, see the guide for your data provisioning technology.
- **Update Business Intelligence (BI) Clients Using SAP HANA**
Update the Business Intelligence (BI) clients you are using for SAP HANA.

Related Information

[SAP HANA Client Installation and Update Guide](#)

[SAP HANA Studio Installation and Update Guide](#)

[SAP HANA Platform on SAP Help Portal](#)

[SAP Note 1906576](#) 

6.7.2.5 Post-Update Steps

Perform the necessary post-update steps.

Note

After an upgrade to a new SAP HANA SPS it is recommended to redeploy the calculation views. For more information, see *SAP Note 1962472 - Redeployment of calculation views recommended when upgrading to a new SPS*.

Related Information

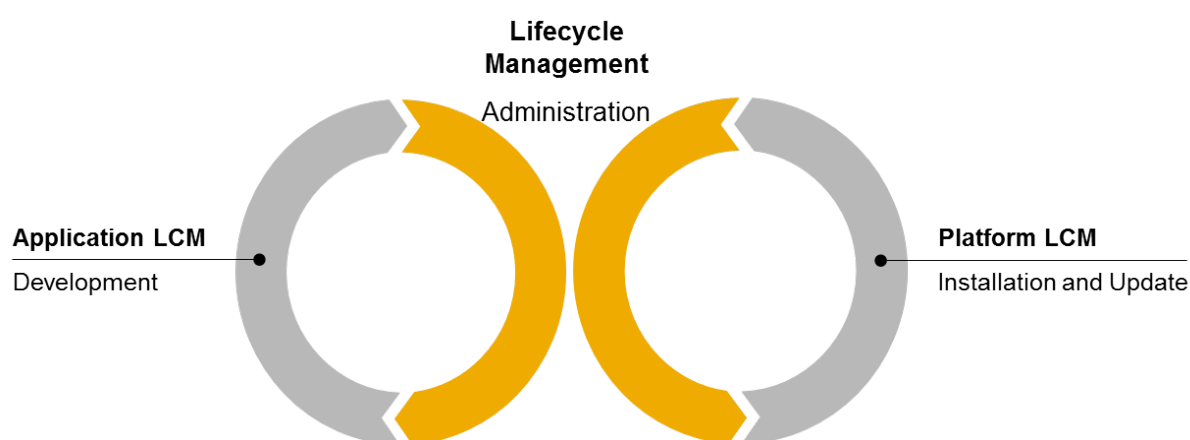
[SAP Note 1962472](#) 

6.7.3 Update to Higher Revisions of the SAP HANA Database

After the release of an SPS of the SAP HANA software, new revisions of the SAP HANA database are released. Use the SAP HANA database lifecycle manager to perform an update from the local host.

6.8 SAP HANA Lifecycle Management

SAP HANA lifecycle management covers two aspects: platform lifecycle management for customizing and updating your SAP HANA platform and application lifecycle management for managing SAP HANA content products and transports.



Platform Lifecycle Management Aspects

You can customize platform lifecycle management aspects of your SAP HANA system by accessing the SAP HANA database lifecycle manager from three user interfaces: the graphical user interface, the command-line interface, or the Web user interface in a stand-alone Web browser, in the SAP HANA studio, or via the SAP HANA cockpit.

SAP HANA platform lifecycle management encompasses the installation and update of an SAP HANA server, mandatory components, and additional components, as well as the post-installation configuration. The concepts and procedures for SAP HANA platform installation and update are described in the *SAP HANA Server Installation and Update Guide* on SAP Help Portal.

A number of system configuration features are integrated into the SAP HANA database lifecycle manager, such as:

- The initial configuration of your SAP HANA platform to integrate it into your landscape. For example, by registering it in a system landscape directory, or configuring the inter-service communication.
- Adapting the topology of your SAP HANA platform by adding or removing additional SAP HANA hosts.
- Reconfiguring the system.

System configuration as it pertains to SAP HANA lifecycle management is described in the *SAP HANA Platform Lifecycle Management* section of this *SAP HANA Administration Guide*.

Application Lifecycle Management Aspects

SAP HANA application lifecycle management aspects can be accessed in different user interfaces: an interface that runs as an SAP HANA XS application in a web browser, a command-line tool hdbalm, integrated in SAP HANA studio, or via the SAP HANA cockpit.

SAP HANA application lifecycle management supports you in all phases of the lifecycle of an SAP HANA application or add-on product, from modelling your product structure, through application development, transport, assembly, to installing and updating products that you have downloaded from SAP Support Portal or which you have assembled yourself.

All application lifecycle management tasks are documented in the guide *SAP HANA Application Lifecycle Management* on SAP Help Portal.

System administrators use SAP HANA application lifecycle management mainly to install and update SAP HANA applications or add-on products. Therefore, these tasks are documented in this *SAP HANA Administration Guide*. Tasks related to SAP HANA development are documented in the *SAP HANA Developer Guide - For SAP HANA Studio* (on SAP Help Portal) under *SAP HANA Application Lifecycle Management*.

Related Information

[SAP HANA Platform Lifecycle Management](#)
[SAP HANA Application Lifecycle Management](#)

7 Additional Information

This section provides additional information.

7.1 Related Information

Links are provided to documentation on planning your deployment that is useful to know but not necessarily directly connected to SAP HANA.

Content	Location
Latest documentation for SAP HANA	SAP HANA Platform on SAP Help Portal
Previous documentation sets for SAP HANA	https://help.sap.com/viewer/product/SAP_HANA_PLATFORM/1.0/en-US
Sizing, calculation of hardware requirements, such as CPU, disk, and memory resources	https://www.sap.com/about/benchmark/sizing.html
Sizing, calculation of hardware requirements - such as CPU, disk and memory resources - with the QuickSizer tool	https://apps.support.sap.com/sap/bc/bsp/sap/qs_oberflaeche/hana.do?sap-language=en&bsp-language=en
Released platforms and technology-related topics such as maintenance strategies and language support – Platform Availability Matrix (PAM)	https://support.sap.com/pam
Security	https://sap.com/security
SAP HANA Security	https://sap.com/hanasecurity

To get full access to the SAP Support Portal and access this information, you need an authorized user ID. Follow the instructions on the corresponding page to register for a login.

The following table lists further useful links:

Content	Location on SAP Support Portal
SAP incident wizard	https://support.sap.com/incident
SAP Notes search	https://support.sap.com/notes
SAP Software Downloads	https://launchpad.support.sap.com/#/softwarecenter

7.2 Important SAP Notes

SAP Notes contain important information that can help you to successfully install, update, administer, and work with an SAP HANA system.

SAP Note Number	Title
1514967 	SAP HANA: Central Note
2380229 	SAP HANA Platform 2.0 - Central Note
3411133 	SAP HANA Platform 2.0 SPS 08 Release Note
3531605 	SAP HANA 2 SPS08 Database Revision 080 00
2372809 	Guideline for Upgrading a SAP HANA 1.0 to SAP HANA 2.0 System
1948334 	SAP HANA Database Update Paths for Maintenance Revisions
2503043 	Global temporary ROW table could not be dropped
2378962 	SAP HANA 2.0 Revision and Maintenance Strategy
2272550 	Remove Host from SAP HANA System
2380291 	SAP HANA 2.0 Cockpit Central Release Note
2373065 	SAP HANA Runtime Tools 2.0 Release Notes
3514077 	SAP Web IDE for SAP HANA 2.0 SPS 08 - Central Release Note
3475293 	SAP HANA Cockpit 2.0 SP 17
3385805 	SAP HANA Runtime Tools 2.0 SP 16
2000003 	FAQ: SAP HANA
2235581 	SAP HANA: Supported Operating Systems
1944799 	SAP HANA Guidelines for SLES Operating System
2009879 	SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL)
2055470 	HANA on POWER Planning and Installation Specifics - Central Note
2218464 	Supported products when running SAP HANA on IBM Power Systems

SAP Note Number	Title
52505 	Support after end of mainstream/extended maintenance
3537501 	Sunset of components XMLA for XSC/XSA
1681092 	Support for multiple SAP HANA databases on a single SAP HANA appliance
1976729 	Application Component Hierarchy for SAP HANA
1661202 	Support for multiple applications on SAP HANA
1927949 	Standard Behavior for SAP Logon Tickets
1906576 	HANA client and server cross-version compatibility
1637145 	SAP BW on HANA: Sizing SAP HANA Database
1793345 	Sizing for Suite on HANA
2428875 	Full-text index creation runs endlessly in Preprocessor service.
2435642 	Deprecation of legacy text mining implementation.
2560918 	Broken transport of changes in HALM after source system SID renaming
2078425 	Troubleshooting note for SAP HANA platform lifecycle management tool hdblcmm

Check the current SAP Notes for the various parts of SAP HANA by searching for any of the following application areas:

SAP HANA Native Applications

- [HAN-APP](#) - SAP HANA Native Applications
- [HAN-APP-DCI](#) - Please use HAN-APP-IOA
- [HAN-APP-DWS](#) - SAP HANA Data Warehouse Services
- [HAN-APP-DWS-DDO](#) - SAP HANA Data Distribution Optimizer
- [HAN-APP-DWS-DLM](#) - SAP HANA Data Lifecycle Manager
- [HAN-APP-DWS-DSO](#) - DataStore Object
- [HAN-APP-DWS-DWS](#) - Data Warehousing Scheduler

SAP HANA Application Services

- [HAN-AS](#) - SAP HANA Application Services
- [HAN-AS-INA](#) - SAP HANA InA Tools and Infrastructure
- [HAN-AS-INA-FL](#) - SAP HANA InA File Loader
- [HAN-AS-INA-UI](#) - SAP HANA InA Toolkit, Fiori Search UI

- [HAN-AS-RPO](#) - SAP HANA Repository
- [HAN-AS-RST](#) - SAP HANA Development Environment REST API
- [HAN-AS-RUL](#) - SAP HANA Rules Framework
- [HAN-AS-XSA](#) - SAP HANA XS Basis Applications
- [HAN-AS-XSA-LIB](#) - Please use HAN-AS-XS
- [HAN-AS-XSA-SHN](#) - SAP HANA Interactive Education (SHINE Model)
- [HAN-AS-XSA-WF](#) - HWF (Deprecated)
- [HAN-AS-XSA-TM](#) - SAP HANA Task management
- [HAN-AS-XS](#) - SAP HANA Extended Application Services
- [HAN-AS-XS-ADM](#) - SAP HANA XS Administration
- [HAN-AS-XS-JOB](#) - SAP HANA XS Scheduled Jobs

SAP HANA Tools - SAP Business Application Studio

- [HAN-BAS](#) - SAP HANA Tools - SAP Business Application Studio
- [HAN-BAS-DBX](#) - HANA Database Explorer in Business Application Studio
- [HAN-BAS-EDT](#) - HANA Editors in Business Application Studio
- [HAN-BAS-EDT-MOD](#) - Calculation View Editor in Business Application Studio
- [HAN-BAS-EIM](#) - Flowgrath, RepTasks and other SDA Tools
- [HAN-BAS-EXL](#) - HANA Explorer
- [HAN-BAS-SA](#) - SQL Analyzer
- [HAN-BAS-SPT](#) - HANA Supportability Tools
- [HAN-BAS-TPL](#) - HANA Templates in Business Application Studio

HANA Cloud Services

- [HAN-CLS](#) - HANA Cloud Services
- [HAN-CLS-CPT](#) - HANA Cloud Services Management Tool
- [HAN-CLS-DB](#) - HANA Database as a Service
- [HAN-CLS-DB-ALI](#) - HANA Service for Alicloud
- [HAN-CLS-DB-PSA](#) - PSA instances based on CF
- [HAN-CLS-HC](#) - HANA Cloud Services HANA Cloud
- [HAN-CLS-HC-ALI](#) - SAP HANA Cloud on AliCloud (operated by CDC)
- [HAN-CLS-HC-FILES](#) - SAP HANA Cloud, Data Lake Files service
- [HAN-CLS-HC-HDL](#) - HANA Cloud HANA Data Lake
- [HAN-CLS-HC-HSA](#) - HANA Cloud - HANA Streaming Analytics
- [HAN-CLS-HC-SPARK](#) - SAP HANA Cloud, Apache Spark service
- [HAN-CLS-MIG](#) - SAP HANA Cloud Migration
- [HAN-CLS-OLP](#) - The HANA Cloud Operator Launchpad
- [HAN-CLS-SRC](#) - Enterprise Search as a Service

SAP HANA Cockpit

- [HAN-CPT](#) - SAP HANA Cockpit
- [HAN-CPT-CPT1](#) - SAP HANA Cockpit version 1 - based on XSC
- [HAN-CPT-CPT1-ADM](#) - SAP HANA Cockpit 1 Administration Core

- [HAN-CPT-CPT1-ASE](#) - SAP HANA Cockpit 1 Accelerator for SAP ASE Administration
- [HAN-CPT-CPT1-BAC](#) - SAP HANA Cockpit 1 Backup and Recovery
- [HAN-CPT-CPT1-SDS](#) - SAP HANA Cockpit 1 Smart Data Streaming Administration
- [HAN-CPT-CPT1-SEC](#) - SAP HANA Cockpit 1 Security
- [HAN-CPT-CPT1-WA](#) - SAP HANA Cockpit 1 Workload Analyser
- [HAN-CPT-CPT2 SAP](#) - HANA Cockpit version 2 - based on XSA
- [HAN-CPT-CPT2-ADM](#) - SAP HANA Cockpit 2 (Administration Core)
- [HAN-CPT-CPT2-ASE](#) - SAP HANA Cockpit 2 (Accelerator for SAP ASE Administration)
- [HAN-CPT-CPT2-BAC](#) - SAP HANA Cockpit 2 Backup and Recovery
- [HAN-CPT-CPT2-CNR](#) - SAP HANA Cockpit 2 (Capture and Replay)
- [HAN-CPT-CPT2-DBX](#) - SAP HANA Cockpit 2 Database Explorer
- [HAN-CPT-CPT2-DYT](#) - SAP HANA Cockpit 2 (Dynamic Tiering Administration)
- [HAN-CPT-CPT2-EWA](#) - SAP HANA Cockpit Early Watch Alert Support
- [HAN-CPT-CPT2-LA](#) - SAP HANA Cockpit Landscape Administration
- [HAN-CPT-CPT2-MDC](#) - SAP HANA Cockpit 2 (MDC Tenant Handling)
- [HAN-CPT-CPT2-MGC](#) - SAP HANA Cockpit Manager
- [HAN-CPT-CPT2-PM](#) - SAP HANA Cockpit 2 (Performance Monitoring)
- [HAN-CPT-CPT2-REC](#) - SAP HANA Cockpit 2 (Recommendation Application)
- [HAN-CPT-CPT2-SA](#) - SAP HANA Cockpit 2 SQL Analyzer
- [HAN-CPT-CPT2-SDA](#) - SAP HANA Cockpit 2 (Smart Data Access)
- [HAN-CPT-CPT2-SDI](#) - SAP HANA Cockpit 2 (Smart Data Integration)
- [HAN-CPT-CPT2-SDS](#) - SAP HANA Cockpit 2 (Smart Data Streaming Administration)
- [HAN-CPT-CPT2-SEC](#) - SAP HANA Cockpit 2 (Security)
- [HAN-CPT-CPT2-SR](#) - SAP HANA Cockpit 2 (System Replication)
- [HAN-CPT-CPT2-TEL](#) - HANA Express Telemetry
- [HAN-CPT-CPT2-WA](#) - SAP HANA Cockpit 2 (Workload Analyzer)
- [HAN-CPT-DP](#) - Please use HAN-DP-SDI

HAN-DB - SAP HANA Database

- [HAN-DB](#) - SAP HANA Database
- [HAN-DB-AFL](#) - Appl. Function Library - SAP Note 2198403 for subcomponents
- [HAN-DB-AFL-APL](#) - Automated Predictive Library in HANA Cloud
- [HAN-DB-AFL-DQ](#) - SAP HANA Data Quality Library
- [HAN-DB-AFL-EML](#) - SAP HANA External Machine Learning Library
- [HAN-DB-AFL-GEN](#) - SAP HANA AFL Shipment and general AFL topics
- [HAN-DB-AFL-HIE](#) - SAP HANA AFL Hierarchies
- [HAN-DB-AFL-PAL](#) - SAP HANA Predictive Analysis Library
- [HAN-DB-AFL-POS](#) - SAP HANA On-Shelf Availability
- [HAN-DB-AFL-SAL](#) - SAP HANA Self Service Analytics Library
- [HAN-DB-AFL-SCA](#) - SAP HANA Supply Chain Algorithm Library
- [HAN-DB-AFL-SOP](#) - SAP HANA Sales and Operations Planning
- [HAN-DB-AFL-TEC](#) - SAP HANA AFL Technology and SDK

- [HAN-DB-AFL-UDF](#) - SAP HANA Unified Demand Forecast
- [HAN-DB-AFL-VCH](#) - Variant Configuration Library (VCH AFL)
- [HAN-DB-ANO](#) - SAP HANA Data Anonymization
- [HAN-DB-BAC](#) - SAP HANA Backup and Recovery
- [HAN-DB-CDS](#) - SAP HANA Activation of HDBDD-files (CDS Definitions)
- [HAN-DB-CLI](#) - SAP HANA Clients (JDBC, ODBC)
- [HAN-DB-CLI](#) - MLAPI HANA machine learning API
- [HAN-DB-DI](#) - SAP HANA DI (HDI): diserver, HDI plugins and client libs
- [HAN-DB-ENG](#) - SAP HANA DB Engines
- [HAN-DB-ENG-BW](#) - SAP HANA BW Engine
- [HAN-DB-ENG-ESH](#) - SAP HANA Enterprise Search Engine
- [HAN-DB-ENG-GPH](#) - SAP HANA Graph Engine
- [HAN-DB-ENG-IM](#) - Please use HAN-DB-SDQ
- [HAN-DB-ENG-JSON](#) - SAP HANA JSON Document Store
- [HAN-DB-ENG-MDS](#) - SAP HANA Multidimensional Services MDS / InA
- [HAN-DB-ENG-PLE](#) - SAP HANA Planning Engine
- [HAN-DB-ENG-SPA](#) - SAP HANA Spatial Engine
- [HAN-DB-ENG-SPA-E](#) - SAP HANA Spatial - Esri Geodatabase
- [HAN-DB-ENG-TRX](#) - TREX API for SAP HANA Database
- [HAN-DB-ENG-TXT](#) - SAP HANA Text Engine
- [HAN-DB-EPM](#) - SAP HANA Planning and Simulation Platform
- [HAN-DB-EPM-PLT](#) - SAP HANA EPM Platform
- [HAN-DB-EPM-XSL](#) - SAP HANA EPM XSJS library
- [HAN-DB-HA](#) - SAP HANA High Availability (System Replication, DR, etc.)
- [HAN-DB-MDX](#) - SAP HANA MDX Engine
- [HAN-DB-MON](#) - SAP HANA Monitoring
- [HAN-DB-NSE](#) - SAP HANA Native Storage Extension
- [HAN-DB-PER](#) - SAP HANA Database Persistence
- [HAN-DB-PERF](#) - SAP HANA Database Performance
- [HAN-DB-R](#) - SAP HANA Integration with R
- [HAN-DB-SCR](#) - SAP HANA SQL Script
- [HAN-DB-SDA](#) - SAP HANA Smart Data Access
- [HAN-DB-SDQ](#) - Information Mgmt Platform - smart data quality
- [HAN-DB-SEC](#) - SAP HANA Security and User Management

HAN-DP - Data Provisioning - please select one of the subcomponents

- [HAN-DP-BC](#) - SAP HANA Blockchain Adapter
- [HAN-DP-DXC](#) - SAP HANA Direct Extractor Connector
- [HAN-DP-ESS](#) - SAP HANA Enterprise Semantic Services (ESS)
- [HAN-DP-LTR](#) - Use CA-LT-SLT instead
- [HAN-DP-SDI](#) - SAP HANA smart data integration (SDI)
- [HAN-DP-SDI-DS](#) - SAP Datasphere specific SDI issues

HAN-DYT - SAP HANA Dynamic Tiering

- [HAN-DYT](#) - SAP HANA Dynamic Tiering

HAN-HCO - HANA Hardware and Cloud Optimization Tool

- [HAN-HCO](#) - HANA Hardware and Cloud Optimization Tool

HAN-LM - SAP HANA Lifecycle Management

- [HAN-LM](#) - SAP HANA Lifecycle Management
- [HAN-LM-APP](#) - SAP HANA Application Lifecycle Management
- [HAN-LM-INS](#) - SAP HANA Installation
- [HAN-LM-INS-DB](#) - Installation of HANA Database
- [HAN-LM-INS-SAP](#) - Installation of SAP Systems on HANA
- [HAN-LM-PLT](#) - SAP HANA Platform Lifecycle Management
- [HAN-LM-UPG](#) - SAP HANA Upgrade
- [HAN-LM-UPG-DB](#) - Upgrade of HANA Database
- [HAN-LM-UPG-SAP](#) - Upgrade of SAP Systems on HANA

HAN-SDS - SAP HANA Smart Data Streaming

- [HAN-SDS](#) - SAP HANA Smart Data Streaming

HAN-STD - SAP HANA Studio (Eclipse)

- [HAN-STD](#) - SAP HANA Studio (Eclipse)
- [HAN-STD-ADM](#) - SAP HANA Studio (Eclipse) Tooling
- [HAN-STD-ADM-BAC](#) - SAP HANA Studio Backup and Recovery
- [HAN-STD-ADM-DBA](#) - SAP HANA Studio (Eclipse) Admin Tooling
- [HAN-STD-ADM-PVZ](#) - SAP HANA Plan Visualizer
- [HAN-STD-ADM-SEC](#) - SAP HANA Security and User Management (Studio)
- [HAN-STD-DEV](#) - SAP HANA Development Tools
- [HAN-STD-DEV-DP](#) - SAP HANA Data Provisioning Modeler
- [HAN-STD-DEV-EPM](#) - SAP HANA EPM Modeler
- [HAN-STD-DEV-MOD](#) - SAP HANA Analytical Modeling
- [HAN-STD-DEV-MOD-CLT](#) - SAP HANA Analytical Modeling Client
- [HAN-STD-DEV-MOD-SRV](#) - SAP HANA Analytical Modeling - Server Component
- [HAN-STD-DEV-REF](#) - SAP HANA Tools for Where-used, Refactoring and Mass Copy
- [HAN-STD-DEV-RUL](#) - SAP HANA Rules Editor
- [HAN-STD-DEV-SCR](#) - SAP HANA SQL Script Editor/Debugger
- [HAN-STD-DEV-TP](#) - SAP HANA Team Provider
- [HAN-STD-DEV-TP-CM](#) - SAP HANA Development Change Management
- [HAN-STD-DEV-UIS](#) - SAP HANA UI Integration Services
- [HAN-STD-DEV-UIS-FLP](#) - SAP HANA UI Integration Services
- [HAN-STD-DEV-XS](#) - SAP HANA XS Editors and Wizards

HAN-WDE - SAP Web IDE for Hana

- [HAN-WDE](#) - SAP Web IDE for Hana
- [HAN-WDE](#) - SAP Web IDE for Hana
- [HAN-WDE-BLD](#) - SAP Web IDE for Hana building applications
- [HAN-WDE-BLD-HDB](#) - SAP Web IDE for Hana HDB Build
- [HAN-WDE-DBX](#) - Database Explorer in Web IDE for SAP HANA
- [HAN-WDE-DOC](#) - SAP Web IDE for Hana documentation
- [HAN-WDE-EDT](#) - SAP Web IDE for Hana text editors
- [HAN-WDE-EDT-CDS](#) - SAP Web IDE for Hana editor for Core Data Services
- [HAN-WDE-EDT-GCDS](#) - Graphical Editor for HANA CDS
- [HAN-WDE-EDT-JAVA](#) - Java Support
- [HAN-WDE-EDT-MOD](#) - SAP Web IDE editor for HANA Analytical Modeling
- [HAN-WDE-EDT-NJS](#) - Node.js Tools
- [HAN-WDE-EIM](#) - Flowgraph, RepTasks and other SDA Tools
- [HAN-WDE-FPM](#) - SAP Web IDE for Hana feature management
- [HAN-WDE-GIT](#) - SAP Web IDE for Hana GIT
- [HAN-WDE-INS](#) - SAP Web IDE for Hana Installation
- [HAN-WDE-MTA](#) - SAP Web IDE for HANA Multi Targeted Application
- [HAN-WDE-PLF](#) - SAP Web IDE for Hana platform
- [HAN-WDE-RTT](#) - SAP Web IDE for Hana Runtime and SQL Tools
- [HAN-WDE-RUN](#) - SAP Web IDE for Hana running applications
- [HAN-WDE-RUN-UI](#) - SAP Web IDE for Hana - Run web and SAP Fiori applications
- [HAN-WDE-SA](#) - SAP HANA SQL Analyzer
- [HAN-WDE-SDS](#) - Smart Data Streaming Tools
- [HAN-WDE-TPL](#) - SAP Web IDE for Hana Project creation, template and wizards
- [HAN-WDE-TXT](#) - Text Analysis Web IDE extensions
- [HAN-WDE-XSC](#) - Old SAP HANA Web IDE
- [HAN-WDE-XSC-EIM](#) - Flowgraph, RepTasks and other SDA Tools
- [HAN-WDE-XSC-MOD](#) - Modeling
- [HAN-WDE-XSC-PVZ](#) - Performance Visualization Plugin

SAP HANA XS Advanced

- [BC](#) - Basis Components
- [BC-XS](#) - SAP HANA XS Advanced
- [BC-XS-BLDP](#) - Buildpacks (Java, Node.js, Python)
Replaces the deprecated components [BC-XS-JAV](#) (Java), [BC-XS-JS](#) (Node.js), and [BC-XS-PY](#) (Python) in the XS advanced environment.

Note

In the Cloud Foundry environment, the deprecated components [BC-XS-JS](#), [BC-XS-PY](#), and [BC-XS-JAV](#) are replaced by [BC-CP-CF-BLDP](#).

- [BC-XS-JS](#) - Javascript runtime

Note

Deprecated; replaced by **BC-XS-BLDP** in the XS advanced environment and by **BC-CP-CF-BLDP** in the Cloud Foundry environment.

- [BC-XS-PY](#) - Python Runtime

Note

Deprecated; replaced by **BC-XS-BLDP** in the XS advanced environment and by **BC-CP-CF-BLDP** in the Cloud Foundry environment.

- [BC-XS-JAV](#) - Java Runtime

Note

Deprecated; replaced by **BC-XS-BLDP** in the XS advanced environment and by **BC-CP-CF-BLDP** in the Cloud Foundry environment.

- [BC-XS-ADM](#) - SAP HANA XS Advanced Administration Tools
- [BC-XS-APR](#) - XS Advanced Application Router
- [BC-XS-ASYNCJS](#) - Successor for XSJS with node.js 16 or higher is async-xsjs
- [BC-XS-CDX](#) - SAP Cloud application programming model (CAP)
- [BC-XS-CDX-COR](#) - SAP CAP– Compiler and CDS language
- [BC-XS-CDX-JAV](#) - SAP CAP – Java runtime
- [BC-XS-CDX-JAV-V1](#) - Java Runtime Version 1
- [BC-XS-CDX-JAV-V2](#) - Java Runtime Version 2
- [BC-XS-CDX-NJS](#) - SAP CAP – Node.js runtime
- [BC-XS-CDX-TLS](#) - SAP CAP – Tools, IDEs, build, deployment
- [BC-XS-RT](#) - OP Runtime / XS Advanced Controller
- [BC-XS-SEC](#) - UAA and Security for the SAP HANA XS Advanced Engine
- [BC-XS-SL](#) - Software Logistics
- [BC-XS-SL-DS](#) - SAP HANA XS Advanced MTA Deployment Service
- [BC-XS-SL-PI](#) - SAP HANA XS Advanced Product Installer
- [BC-XS-SRV](#) - Services
- [BC-XS-SRV-ADT](#) - Audit Log Service for XS advanced
- [BC-XS-SRV-HSB](#) - SAP HANA Service Broker
- [BC-XS-SRV-JBS](#) - Job Scheduler
- [BC-XS-SRV-MESS](#) - Component for XS advanced Messaging Service
- [BC-XS-SRV-ODT](#) - OData Service
- [BC-XS-SRV-ODT-JS](#) - OData Node.js (for XSOData XS Classic, use HAN-AS-XS)
- [BC-XS-SRV-PTL](#) - SAP HANA XS Advanced Portal Services (for Fiori Launchpad)
- [BC-XS-TLS](#) - Tools
- [BC-XS-TLS-MIG](#) - XS Classic to XS Advanced Migration Assistant tooling

SAP HANA Database (CCMS, Porting and DB Interface)

- [BC-DB-HDB](#) Use HAN-DB*. Here CCMS, Porting, DB Interface issues only

- [BC-DB-HDB-AFL](#) Please use HAN-DB-AFL and its subcomponents
- [BC-DB-HDB-BAC](#) Please use HAN-DB-BAC - SAP HANA Backup and Recovery
- [BC-DB-HDB-CCM](#) CCMS / Database Monitors for SAP HANA
- [BC-DB-HDB-CLI](#) Please use HAN-DB-CLI - SAP HANA Clients (JDBC, ODBC)
- [BC-DB-HDB-DBA](#) Please use HAN-STD-ADM-DBA
- [BC-DB-HDB-DXC](#) Please use HAN-DP-DXC
- [BC-DB-HDB-ENG](#) Please use HAN-DB-ENG
- [BC-DB-HDB-PFW](#) SAP HANA Parallelization Framework
- [BC-DB-HDB-POR](#) Dictionary and Consistency checks for SAP HANA
- [BC-DB-HDB-SYS](#) Database Interface/DBMS for SAP HANA

End User Clients

- [BI-BIP](#) - Business intelligence platform (formerly known as BOE)
- [BI-BIP-CMC](#) - Central Management Console (CMC)
- [BI-BIP-CRS](#) - SAP Crystal Reports Server
- [BI-BIP-IDT](#) - Information design tool
- [BI-RA-AO-XLA](#) - MS Excel Add-In
- [BI-RA-CR](#) - SAP Crystal Reports
- [BI-RA-EXP](#) - SAP BusinessObjects Explorer
- [BI-RA-WBI](#) - Web Intelligence
- [BI-RA-XL](#) - Dashboard Designer

The search also supports using the wildcard asterisk (*), so you can, for example, also search for BC-DB-HDB* or similar and you will get results for all subcomponents.

Reporting Incidents

If you encounter any problems with the software, report an incident at <http://support.sap.com/incident> .

In addition, the Customer Interaction Center (CIC) is available 24 x 7 in every region to help you resolve any issues you may run into (<https://support.sap.com/contactus> .

The CIC requires a valid S-user number.

When reporting an incident, you can choose from the above list of components for the relevant software part.

7.3 SAP License Key

You must install a **permanent** SAP license for the SAP HANA database.

When you install your SAP system, a **temporary** license (90 days) is automatically installed. Before the temporary license expires, you must apply for a permanent license key from SAP.

We recommend that you apply for a permanent license key as soon as possible after installing your system.

Note

For more information, see section *Managing SAP HANA Licenses* in the *SAP HANA Administration Guide*.

Related Information

[Managing SAP HANA Licenses](#)

7.4 Software Download

In the SAP Software Downloads, you have access to the installation media and components for SAP HANA.

In the SAP Software Download Center, you find media required to install a new SAP HANA system or to upgrade an existing one. Please note that all SAP HANA media on SAP Software Download Center are self-contained full installation media. This applies to the media available in the section **Installations & Upgrades** as well as to the media available in section **Support Packages & Patches**. The section **Installations & Upgrades** only contains media for the very first revision of a Support Package Stack (SPS). The section **Support Packages & Patches** only contains the latest revision of an SPS.

We strongly recommend using the most recent revision of an SPS to avoid running into issues, which are already known and fixed. Therefore, by default, download media for all components of SAP HANA for an installation or upgrade from the section **Support Packages & Patches**.

Caution

It is essential to keep a copy of all installation media which may be required, for example, for disaster recovery purposes. Installation media, which has been superseded is routinely removed from the Software Center and there is no guarantee that all database revisions will be permanently available.

Installation Media and Components for SAP HANA

Installation Media for an SAP HANA SPS

1. Open the [SAP Software Downloads](#).
2. Go to [INSTALLATIONS & UPGRADES](#), if not already chosen.
3. Open > [By Alphabetical Index \(A-Z\)](#).
4. Choose [H](#).
5. Choose [SAP HANA PLATFORM EDITION](#).
6. Go to [DOWNLOADS](#), if not already opened.
7. Choose [SAP HANA PLATFORM EDITION 2.0](#).
8. Open [DOWNLOADS](#), if not already opened.
9. Choose [INSTALLATION](#).

10. Download the items you need.

Note

The items you have downloaded must be available on the host where the SAP HANA system will be installed or already is installed.

Support Packages and Patches for SAP HANA

1. Open the [SAP Software Downloads](#).
2. Choose [SUPPORT PACKAGES & PATCHES](#), if not already chosen.
3. Open > [By Alphabetical Index \(A-Z\)](#).
4. Choose [H](#).
5. Choose [SAP HANA PLATFORM EDITION](#).
6. Choose [DOWNLOADS](#), if not already chosen.
7. Choose [SAP HANA PLATFORM EDITION 2.0](#).
8. Choose [DOWNLOADS](#), if not already chosen.
9. Open the required component and download the items you need.

Note

The items you have downloaded must be available on the host where the SAP HANA system will be installed or is already installed.

Responsibilities

The responsibility for acquiring and installing SAP HANA depends on the chosen deployment model:

- If a customer chooses the **SAP HANA Tailored Datacenter Integration**, then the components of SAP HANA must be installed on validated hardware by a certified administrator or official SAP HANA hardware partner.
- If a customer chooses an **SAP HANA appliance**, then the components of SAP HANA can only be installed by certified hardware partners on validated hardware running a specific operating system. Any other system or content developed with systems of this type is not supported by SAP. For more information, see the information page for the product version. Support Package Stacks (SPS) can be downloaded and applied to appliances in accordance with agreements with the respective hardware partner.

Related Information

[SAP Software Downloads](#) 

[SAP Support Portal](#) 

7.5 SAP HANA Revision Strategy

SAP HANA software is released in two categories of software bundles – support package stacks (SPSs) and revisions.

For detailed information, see *SAP HANA 2.0 Revision Strategy*.

Related Information

[SAP HANA 2.0 Revision Strategy](#)

[SAP Note 2378962](#) 

7.6 SAP HANA Hardware and Software Requirements

A number of hardware and software requirements apply to SAP HANA.

Note

You can find a complete list of all SAP HANA components and the corresponding SAP HANA hardware and software requirements in the Product Availability Matrix (PAM), in the SAP HANA Hardware Directory, and in the SAP Community Network.

Software Requirements

Note

Only software installed by certified hardware partners, or any person holding certification, is recommended for use on the SAP HANA system. Do not install any other software on the SAP HANA system. The components of SAP HANA can only be installed by certified hardware partners, or any person holding certification. Furthermore, it must be installed on validated hardware running an approved operating system.

For more information, see *C_DBADM - SAP Certified Associate - Database Administrator - SAP HANA* and *The Future Has Been Written – the Rise of the Database Administrator* in the *Related Information* section.

End of Maintenance

The software component version SAPUI5 TOOLS IDE PLUGIN 3.00 is out of maintenance. SAPUI5 TOOLS IDE PLUGIN 3.00 is assigned to the activated instance HANA Studio SAPUI5 Plug-in of SAP HANA PLATFORM EDITION 2.0 SPS05.

For alternatives for SAPUI5 TOOLS IDE PLUGIN 3.00, see [SAPUI5 Tools for Eclipse – Now is the Time to Look for Alternatives](#) .

Supported Hardware Platforms

SAP HANA is available for:

- Intel-based hardware platforms
- IBM Power Systems

Note

You can perform a system copy of an SAP system with SAP HANA database as the source database and also SAP HANA database as the target database. This is relevant if you want to change the hardware platform on the SAP HANA system.

For more information, see the *SAP NetWeaver Documentation* on **System Copy** for your SAP NetWeaver release.

The following features are **supported on Intel-based hardware platforms only**:

- SAP HANA Accelerator for SAP ASE

For detailed information about the supported hardware, see *Related Information* in *On-Premise* in the *SAP HANA Master Guide*.

Supported Operating Systems for SAP HANA

For information about supported operating systems for SAP HANA, see *SAP Note 2235581 - SAP HANA: Supported Operating Systems*.

Hardware Requirements

The supported hardware for SAP HANA depends on the deployment method (appliance or TDI). For more information, see the *Related Information* in this section and in *On-Premise* in the *SAP HANA Master Guide*.

Network Time Protocol (NTP)

We strongly recommend setting up an NTP server for the SAP HANA system landscape.

Note

If an NTP server is not available, this means, for example, that trace files from distributed hosts cannot be displayed in the correct chronological order.

Hardware Requirements for SAP HANA Network Connection

For information about hardware requirements for SAP HANA network connections, see *SAP HANA Network Requirements*.

For installations on IBM Power Servers, Ethernet virtualization using dual VIOS is normally deployed. Natively attached Ethernet cards can also be used however.

Related Information

SUSE Linux Enterprise Server (SLES)

[SAP Note 1944799](#) 

[SAP Note 2205917](#) 

[SAP Note 1984787](#) 

Red Hat Enterprise Linux (RHEL)

[SAP Note 2009879](#) 

[SAP Note 2292690](#) 

Supported Hardware Platforms

[SAP HANA Hardware - Certified Appliances](#) 

[On-Premise Deployment \[page 29\]](#)

[SAP Note 2493172](#) 

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