

PUBLIC

SAP HANA Platform SPS 12
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SAP HANA Server Installation and Update Guide

The SAP logo is located in the bottom left corner of the page. It consists of the letters 'SAP' in a bold, white, sans-serif font, set against a dark blue rectangular background. The background of the entire page is a long-exposure photograph of a complex highway interchange at night, with light trails from cars and streetlights creating a vibrant blue and white pattern.

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1 SAP HANA Installation and Update Overview

This SAP HANA Installation and Update Guide describes how to install or update an SAP HANA system and its components with the SAP HANA database lifecycle manager (HDBLCM).

The SAP HANA database lifecycle manager is used to install either individual or multiple SAP HANA components in combination with the server. Compared to previous SAP HANA installers, the SAP HANA database lifecycle manager provides an efficient and optimized installation path, allowing you to customize your SAP HANA installation by selecting which components should be installed and updated. It is also now possible to perform installation in interactive graphical or interactive command-line interfaces, as well as configure the SAP HANA installation to be automated, using command line, the configuration file, and batch mode.

It is worth noting, that the SAP HANA component installation concept has changed significantly with the fast-paced development of SAP HANA itself. In the early SAP HANA Support Package Stack (SPS) releases, the SAP HANA components had to be installed individually, which proved to be a time-consuming task. Then, the SAP HANA unified installer was developed to streamline the installation process by installing all required components from one call to the installer. As of SPS 08, the unified installer is no longer shipped with SAP HANA.

With SAP HANA SPS 07, the SAP HANA database lifecycle manager was introduced to offer the efficiency of installing all components at one time, while providing further flexibility to customize and automate the installation. The components can now be installed, upgraded, or uninstalled from one tool, in both command-line or graphical user interface.

As of SAP HANA SPS 08, it is possible to also perform post-installation configurations tasks, such as renaming the system, adding or removing hosts, and reconfiguring the system, using the SAP HANA database lifecycle manager. For more information, see the *SAP HANA Administration Guide*.

With the SAP HANA SPS 09 release, the SAP HANA database lifecycle manager offers a third user interface - the Web user interface - in addition to graphical user and command-line interfaces. The Web user interface can be accessed in a standalone Web browser or in the Platform Lifecycle Management view in the SAP HANA studio. Therefore, as of SPS 09, the SAP HANA database lifecycle manager is capable of performing all actions offered in the SAP HANA platform lifecycle management portfolio and is the only recommended tool for these actions. As of SPS 09, SAP HANA supports IBM Power systems.

Before starting the installation of SAP HANA, make sure that you have reviewed the SAP HANA Master Guide.

1.1 SAP HANA Platform Software Components

SAP HANA platform is composed of several components.

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 features, SAP HANA capabilities, SAP HANA options provide additional functions. To use the *SAP HANA options* and *SAP HANA capabilities* you need a dedicated license for the options or capabilities you want to use (see disclaimer below). *SAP HANA options* and *SAP HANA capabilities* are among others:

- SAP HANA Accelerator for SAP ASE
- SAP HANA Dynamic Tiering
- SAP HANA Remote Data Sync
- SAP Landscape Transformation Replication Server
- SAP HANA Smart Data Streaming

Note

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

Caution

SAP HANA server software and tools can be used for several SAP HANA platform and options scenarios as well as the respective capabilities used in these scenarios. The availability of these is based on the available SAP HANA licenses and the SAP HANA landscape, including the type and version of the back-end systems the SAP HANA administration and development tools are connected to. There are several types of licenses available for SAP HANA. Depending on your SAP HANA installation license type, some of the features and tools described in the SAP HANA platform documentation may only be available in the SAP HANA options and capabilities, which may be released independently of an SAP HANA Platform Support Package Stack (SPS). Although various features included in SAP HANA options and capabilities are cited in the SAP HANA platform documentation, each SAP HANA edition governs the options and capabilities available. Based on this, customers do not necessarily have the right to use features included in SAP HANA options and capabilities. For customers to whom these license restrictions apply, the use of features included in SAP HANA options and capabilities in a production system requires purchasing the corresponding software license(s) from SAP. The documentation for the SAP HANA options is available in SAP Help Portal. If you have additional questions about what your particular license provides, or wish to discuss licensing features available in SAP HANA options, please contact your SAP account team representative.

Related Information

[SAP HANA Hardware and Software Requirements \[page 12\]](#)

1.2 Software Download

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

Installation Media and Components for SAP HANA

Installation Media for an SAP HANA SPS

1. Open the *SAP Support Portal Home*.
2. Choose *Download Software*.
3. Go to *INSTALLATIONS & UPGRADES*, if not already chosen.
4. Open > *By Alphabetical Index (A-Z)*.
5. Choose *H*.
6. Choose *SAP HANA PLATFORM EDITION*.
7. Go to *DOWNLOADS*, if not already opened.
8. Choose *SAP HANA PLATFORM EDITION 2.0*.
9. Open *DOWNLOADS*, if not already opened.
10. Choose *INSTALLATION*.
11. Download the items you need.

i 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 Support Portal Home*.
2. Choose *Download Software*.
3. Choose *SUPPORT PACKAGES & PATCHES*, if not already chosen.
4. Open > *By Alphabetical Index (A-Z)*.
5. Choose *H*.
6. Choose *SAP HANA PLATFORM EDITION*.
7. Choose *DOWNLOADS*, if not already chosen.
8. Choose *SAP HANA PLATFORM EDITION 2.0*.
9. Choose *DOWNLOADS*, if not already chosen.
10. Open the required component and download the items you need.

i 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**, 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 of 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 Support Portal Home → Download Software](#) 

2 Concepts and Requirements for an SAP HANA System

Before installing or updating an SAP HANA system, it is important to understand the basic system concepts and SAP HANA database lifecycle manager (HDBLCM) features in order to optimize the installation or update process and avoid unnecessary reconfiguration.

An SAP HANA system is made up of the SAP HANA server and its components. The system can be installed on one or multiple system hosts, which are configured to operate as worker or standby hosts. As of SAP HANA Support Package Stack (SPS) 09, the SAP HANA system can be installed or configured to be a multitenant database container enabled system. Where a single tenant database container system contains exactly one database, a multitenant database container enabled system contains one system database and can contain multiple tenant databases.

The SAP HANA database lifecycle manager offers three user interfaces: graphical, command-line, and Web. System installation can be performed using the graphical user or command-line interface. System update, or component installation or update can be performed using any of the three user interfaces.

The SAP HANA database lifecycle manager can be run interactively, requiring step-by-step input, or it can be run in batch mode, requiring no subsequent input. Defining installation and update parameters can be entered interactively, in a configuration file, or in combination with the call to the program on the command line.

i Note

The components of SAP HANA can only be installed by certified hardware partners, or any person holding E_HANAINS certification, on validated hardware running an approved operating system.

2.1 SAP HANA Hardware and Software Requirements

For SAP HANA, a number of hardware and software requirements apply.

i 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) on the SAP Service Marketplace, in the SAP HANA Hardware Directory and in the SAP Community Network.

Software Requirements

i 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 the blog *Recent changes in the SAP HANA Technology certification program 2016* in the *Related Information* section.

Supported Hardware Platforms

SAP HANA is available for:

- Intel-Based Hardware Platforms
- IBM Power Systems

i 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* for your SAP NetWeaver release under

[▶ Installation](#) [▶ System Copy](#) ▶.

The following **SAP HANA features**, **SAP HANA capabilities**, and **SAP HANA options** are **supported on Intel-based hardware platforms only**:

- SAP HANA Accelerator for SAP ASE
- SAP HANA Hadoop Controller
- SAP HANA Remote Data Sync
- SAP HANA Smart Data Streaming
- SAP HANA Data Provisioning Agent
- Hive ODBC Driver

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.

i Note

If an NTP sever 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 HANA Guidelines for SLES Operating System](#)

[SAP Note 2205917 - SAP HANA DB: Recommended OS settings for SLES 12 / SLES for SAP Applications 12](#)

[SAP Note 1984787 - SUSE LINUX Enterprise Server 12: Installation notes](#)

Red Hat Enterprise Linux (RHEL)

[SAP Note 2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux \(RHEL\) Operating System](#)

[SAP Note 2292690 - SAP HANA DB: Recommended OS settings for RHEL 7.2](#)

Supported Hardware Platforms

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

[SAP Note 1943937 - Hardware Configuration Check Tool - Central Note](#)

[SAP Note 2055470 - HANA on POWER Planning and Installation Specifics - Central Note](#)

[SAP Note 2218464 - Supported products when running SAP HANA on IBM Power Systems](#)

[SAP Note 2188482 - SAP HANA on IBM Power Systems: Allowed Hardware](#)

General Links

[SAP HANA Tailored Data Center Integration 2017 - Overview](#)

[Recent changes in the SAP HANA Technology certification program 2016](#)

[SAP Note 52505 - Support after end of mainstream/extended maintenance](#)

[SAP Note 2235581 - SAP HANA: Supported Operating Systems](#)

[Product Availability Matrix](#)

[SAP HANA Network Requirements](#)

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

2.2 Recommended File System Layout

The SAP HANA database lifecycle manager (HDBLCM) requires certain file systems in order to successfully install an SAP HANA system.

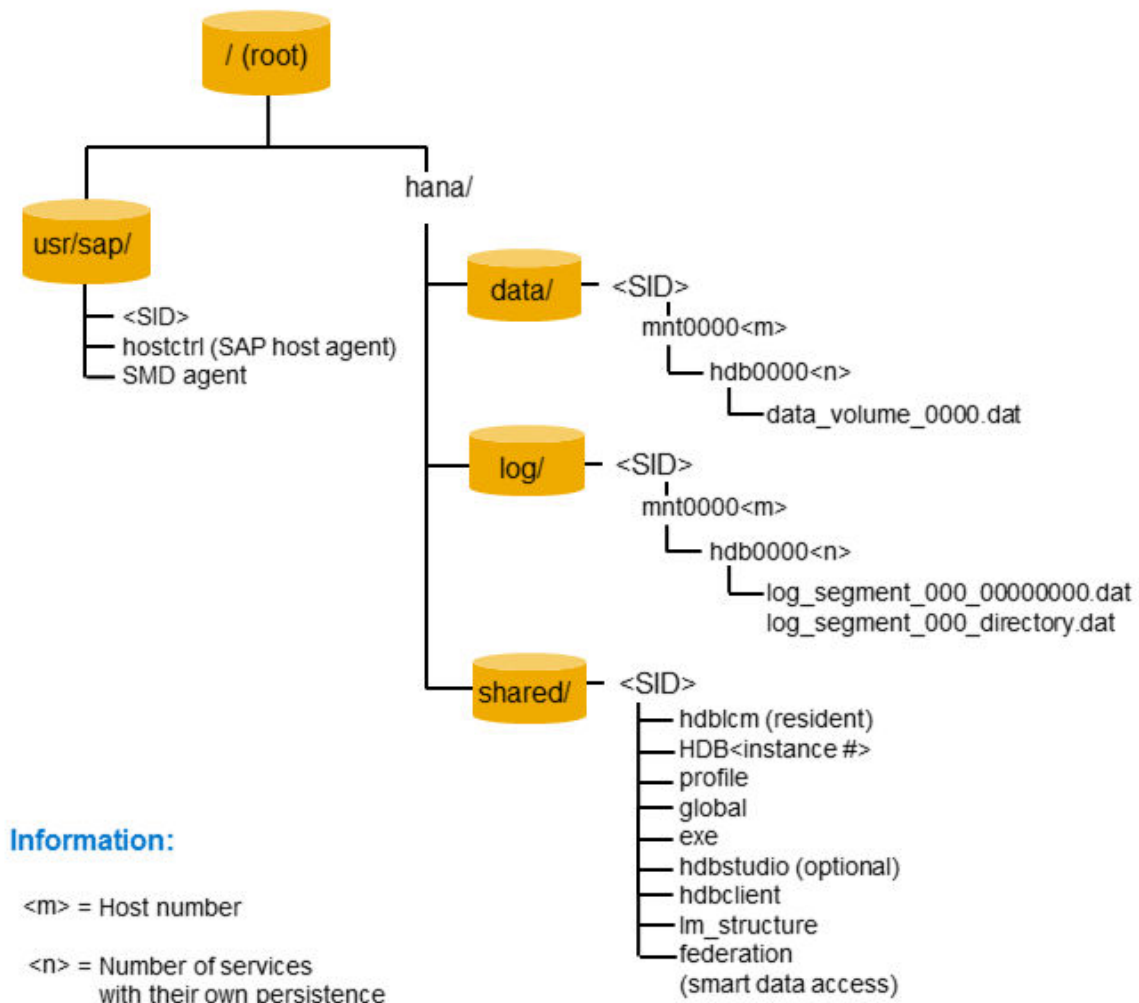
The file systems must be created and mounted manually before installation. The SAP HANA database lifecycle manager (HDBLCM) will create all required subdirectories during installation. It is important that the file systems listed below are available and have the recommended disk space before starting the SAP HANA database lifecycle manager.

Default File Systems

File System	Default Path	Recommendations
Root	/	
Installation path (sapmnt)	/hana/shared	<p>The mount directory is used for shared files between all hosts in an SAP HANA system. This directory needs to be accessible to each of the servers in the SAP HANA cluster.</p> <p>Subdirectories:</p> <ul style="list-style-type: none">• /hana/shared/<SID> - Contains executable programs (exe), globally shared data (global), instance profiles (profile), and SAP HANA configuration files.• /hana/shared/<SID>/hdbclient - The SAP HANA client installation path. <p>The following paths apply when the SAP HANA studio is installed:</p> <ul style="list-style-type: none">• /hana/shared/<SID>/hdbstudio_update - The studio repository installation path. The studio repository is used to update the local SAP HANA studio installation.• /hana/shared/<SID>/hdbstudio - The SAP HANA studio installation path.

File System	Default Path	Recommendations
System instance	/usr/sap	<p>This is the path to the local SAP system instance directories.</p> <p>Subdirectories:</p> <ul style="list-style-type: none"> • /usr/sap/hostctrl - The SAP host agent directory. • /usr/sap/<SID> - Contains symbolic links to system executables (SYS) and the home directory (home) of the <sid>adm user. <p>i Note</p> <p>/usr/sap/<SID> must not be a mount point.</p>
Data volume	/hana/data	The default path to the data directory is /hana/data/<SID>.
Log volume	/hana/log	The default path to the log directory is /hana/log/<SID>.

It is strongly recommended to use the SAP HANA file system layout shown in the figure below:



i Note

An SAP HANA system in a production environment must not share any infrastructure with another SAP HANA system.

Hosts running more than one SAP HANA system (sometimes referred to as multiple-SID installations) can only be used for non-production purposes such as development, quality assurance, or testing.

The installation path, data path, and log path must not point to the same directory.

As of SAP HANA Support Package Stack (SPS) 11, an SAP HANA system cannot be installed under `/usr/sap/<SID>`. The directory `/usr/sap` must not be shared across other hosts.

For production systems with high availability, it is possible to share some temporarily unused resources from the standby hosts. As soon as the standby resources are needed, they must become exclusively available for the production system and no longer shared. For more details, refer to the high availability information in the *SAP HANA Administration Guide*.

The file systems `/hana/data/<SID>` and `/hana/log/<SID>` may use shared file systems like NFS, or block storage using the SAP HANA storage connector API with non-shared file systems. For more details, see [Related Information](#).

The installation path (`/hana/shared`) is visible on all hosts. By default, the installation path is also used for backup. However, backup directories should be manually configured, and must belong to a shared file system. For more details, refer to the backup information in the *SAP HANA Administration Guide*.

Related Information

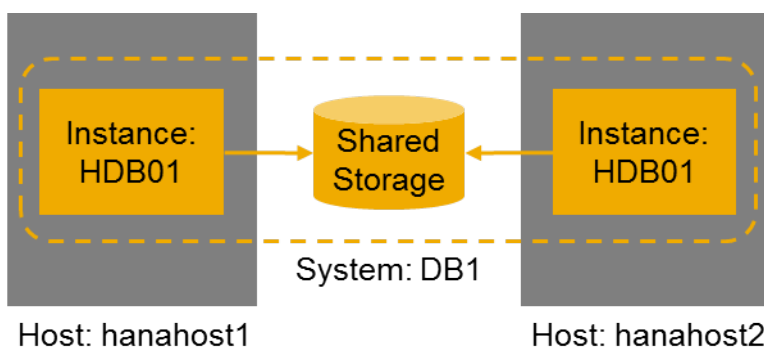
[Multiple-Host System Concepts \[page 63\]](#)

[SAP Note 405827 - Linux: Recommended file systems](#)

[SAP Note 1681092 - Multiple SAP HANA systems \(SIDs\) on the same underlying server\(s\)](#)

2.3 SAP HANA System Concepts

An SAP HANA system is composed of three main components: the host, the system, and the instance.



Host

A 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 storage for an installation does not have to be on the host. For multiple-host systems, a shared storage or a storage that is accessible on-demand from all hosts is required.

For more information about the restrictions that apply to host names in SAP systems, see SAP Note 611361 in Related Information.

Instance (HDB)

An SAP HANA instance (HDB) is the smallest operational unit on a host. It is the set of SAP HANA system components that are installed on one host. A single-host system contains one instance on the one host. A multiple-host system contains several instances distributed across the multiple hosts (one per host). Every system has an instance number, which is a two-digit identifier. Each instance in a multiple-host system must have the same instance number.

System

A system is one or more instances with the same number. If a system has more than one instance, they must be dispersed over several hosts as a multiple-host system. Every system has a unique SAP system ID (SID).

Related Information

[SAP Note 611361 - Hostnames of SAP Servers](#) 

2.4 SAP HANA System Types

An SAP HANA system can be configured as a single-host or multiple-host system using the SAP HANA database lifecycle manager.

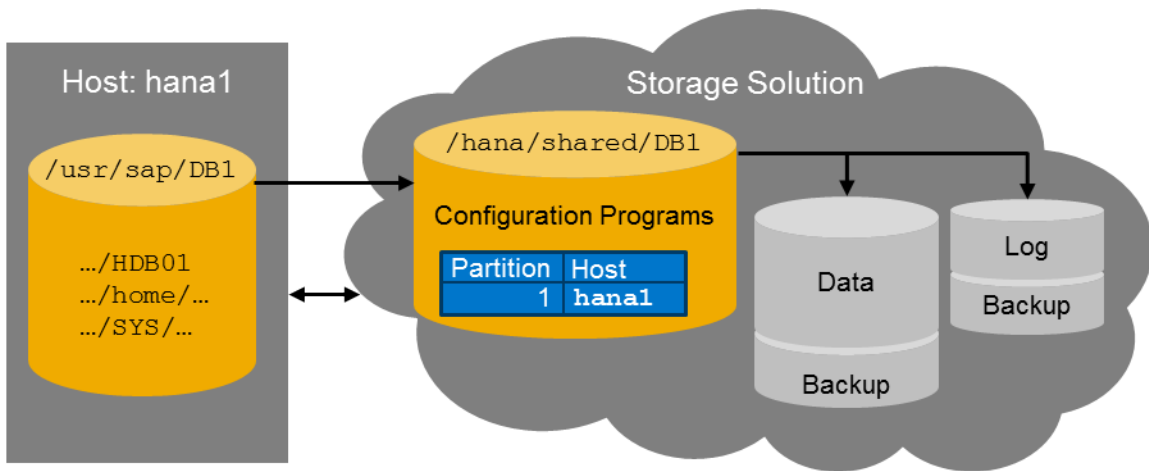
The SAP HANA system type definitions are as follows:

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

A single-host system is the simplest system installation type. It is possible to run an SAP HANA system entirely on one host and then scale the system up as needed. The SAP HANA database lifecycle manager can be used to install an SAP HANA single-host system in one of the program interfaces, and with a combination of parameter specification methods.

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

SAP HANA Single-Host System



System Configuration

Instance Number: 01

SAP System ID (SID): DB1

Host Name: hana1

Database Directories

Installation Path: /hana/shared

Data Path: /hana/data/DB1

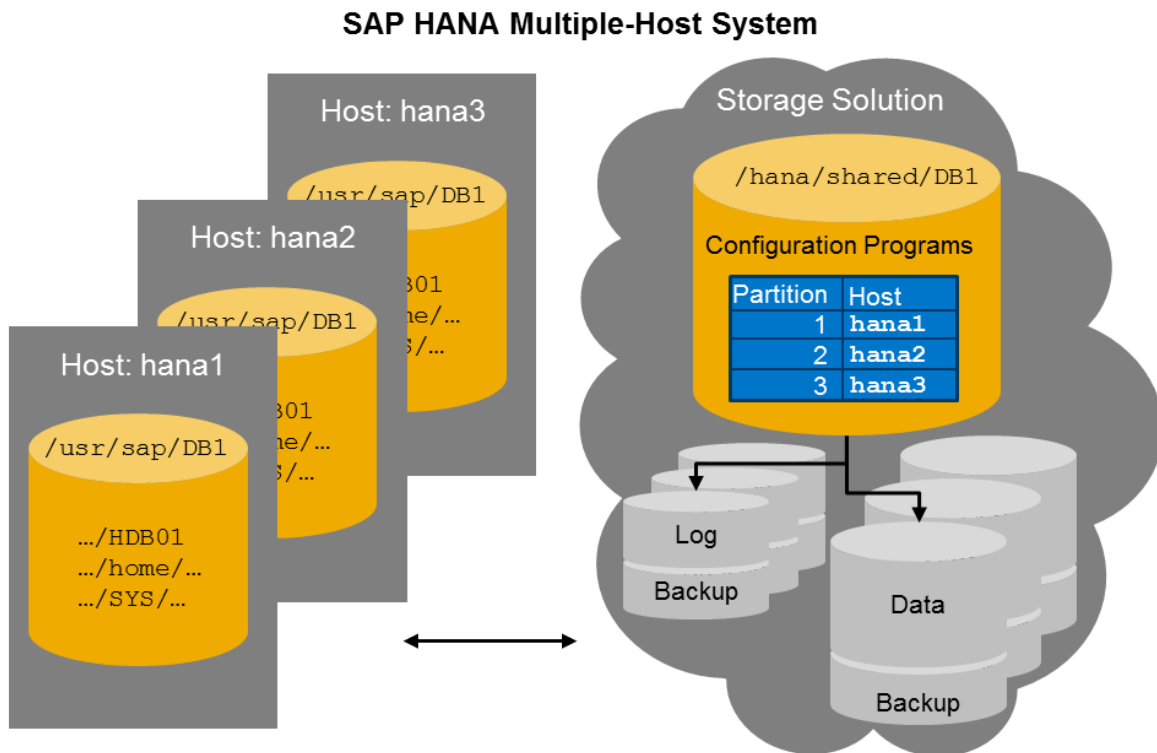
Log Path: /hana/log/DB1

Local Directory

hana1: /usr/sap/DB1

A multiple-host system is a system with more than one host, which can be configured as active worker hosts or idle standby hosts. The SAP HANA database lifecycle manager can be used to install an SAP HANA multiple-host system in one of the program interfaces, and with a combination of parameter specification methods. To add hosts to an existing system, use the SAP HANA resident HDBLCM. For more information about installing a multiple-host system, see the Related Information.

The following graphic shows the file system for a multiple-host system installed on a shared file system with three hosts:



System Configuration

Instance Number: 01
 SAP System ID (SID): DB1
 Host Names: hana1, hana2, hana3

Database Directories

Installation Path: /hana/shared
 Data Path: /hana/data/DB1
 Log Path: /hana/log/DB1

Local Directories

hana1: /usr/sap/DB1
 hana2: /usr/sap/DB1
 hana3: /usr/sap/DB1

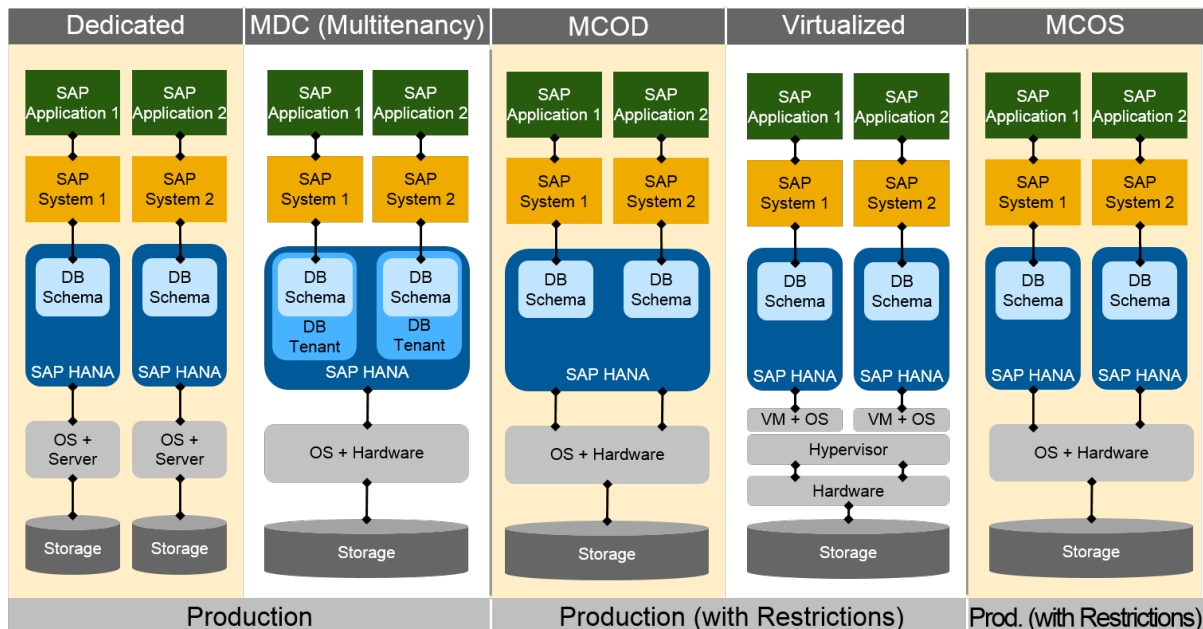
The server software is based on a flexible architecture that enables a distributed installation. This means that load can be balanced between different hosts. The server software has to be installed in a shared file system. This file system has to be mounted by all hosts that are part of the system.

Related Information

[Installing a Multiple-Host System \[page 62\]](#)

2.5 SAP HANA Deployment Types

SAP HANA can be deployed in a number of configurations that are approved in varying degrees for production environments (or not approved for production at all).



The server installation documentation is mainly written for SAP HANA deployment types which are completely approved for production environments, that is to say, an SAP HANA system running on dedicated hardware, or multitenant database container systems (also known as MDC systems).

Multitenant Database Containers (MDC)

The multitenant database container deployment type was introduced with SAP HANA Support Package Stack (SPS) 09, and makes it possible to run several SAP HANA instances on the same hardware in a production environment. It provides an alternative to a virtualized deployment, which is only production approved in some scenarios, and the MCOS (Multiple Components One System) deployment, which is approved for production environments.

It is possible to install an SAP HANA as a multitenant database container system using the SAP HANA database lifecycle manager (HDBLCM). As of SPS 10, you can specify a database isolation type during installation of a multitenant database container system. High isolation can be configured to protect against unauthorized access at the operating-system level by separating system administrator users and providing authenticated communication within databases. For more information, see *Database Isolation* in the *SAP HANA Administration Guide* or the *SAP HANA Security Guide* and *db_isolation* in Related Information.

If you have an SAP HANA system which you would like to update to support multitenancy, you must first update the SAP HANA system to revision 90 or later, and then convert the SAP HANA system to support multitenant database containers. For more information, see *Convert an SAP HANA System to Support Multitenant Database Containers* in the *SAP HANA Administration Guide*.

Multiple Components on One Database (MCOD)

MCOD deployments are characterised by multiple applications on one SAP HANA system. SAP supports deploying and running multiple applications on a single SAP HANA production database **only** for packaged

applications and scenarios listed on the "White List" included in SAP Note 1661202. If a particular packaged application or scenario is not on the "White List", then it is not supported to run together on the same SAP HANA database with any other packaged application or scenario. For more information, see SAP Note 1661202 in Related Information.

Virtualized

SAP HANA systems can be run on virtual machines with restrictions to the hypervisor (including logical partitions). For more information about running SAP HANA virtualized, see SAP Note 1788665, 2230704 and 2024433 in Related Information.

Multiple Components on One System (MCOS)

MCOS deployments are characterized by multiple SAP HANA systems on one host. This configuration is approved for production environments as of SAP HANA Support Package Stack (SPS) 09. This is restricted to single host / scale-up scenarios only. Please keep in mind that multi-SID requires significant attention to various detailed tasks related to system administration and performance management. For more information about running SAP HANA virtualized, see SAP Note 1681092 in Related Information.

It is approved for production environments for SAP HANA systems to share hardware between the SAP HANA server and SAP HANA options. As of SPS 10, you have the option to install SAP HANA systems with multiple host roles - including database server roles and SAP HANA option host roles - on one host, or give an existing SAP HANA host additional roles during system update. For more information about configuring additional host roles, see `add_local_roles` and `add_roles` in Related Information.

Caution

SAP HANA server software and tools can be used for several SAP HANA platform and options scenarios as well as the respective capabilities used in these scenarios. The availability of these is based on the available SAP HANA licenses and the SAP HANA landscape, including the type and version of the back-end systems the SAP HANA administration and development tools are connected to. There are several types of licenses available for SAP HANA. Depending on your SAP HANA installation license type, some of the features and tools described in the SAP HANA platform documentation may only be available in the SAP HANA options and capabilities, which may be released independently of an SAP HANA Platform Support Package Stack (SPS). Although various features included in SAP HANA options and capabilities are cited in the SAP HANA platform documentation, each SAP HANA edition governs the options and capabilities available. Based on this, customers do not necessarily have the right to use features included in SAP HANA options and capabilities. For customers to whom these license restrictions apply, the use of features included in SAP HANA options and capabilities in a production system requires purchasing the corresponding software license(s) from SAP. The documentation for the SAP HANA options is available in SAP Help Portal. If you have additional questions about what your particular license provides, or wish to discuss licensing features available in SAP HANA options, please contact your SAP account team representative.

Related Information

[Install a Multitenant Database Container System Using the Graphical User Interface \[page 73\]](#)

[Install a Multitenant Database Container System Using the Command-Line Interface \[page 76\]](#)

[SAP Note 1661202 - Support for multiple applications on SAP HANA](#)

[SAP Note 1681092 - Multiple SAP HANA DBMSs \(SIDs\) on one SAP HANA system](#)

[SAP Note 1788665 - SAP HANA Support for virtualized / partitioned \(multi-tenant\) environments](#)

[SAP Note 2230704 - SAP HANA on IBM Power Systems with multiple - LPARs per physical host](#)

[SAP Note 2024433 - Multiple SAP HANA VMs on VMware vSphere in production](#)

[add_local_roles \[page 176\]](#)

[add_roles \[page 177\]](#)

[db_isolation \[page 188\]](#)

2.6 SAP HANA and Virtualization

SAP HANA is supported on bare-metal and virtualized platforms.

i Note

Some of the virtualization platforms that are available for SAP HANA are only supported in non-production environments. For more information on supported versions, see *1788665 - SAP HANA Support for virtualized / partitioned (multi-tenant) environments* in Related Information.

VMware vSphere

SAP HANA is supported on VMware vSphere for scale-up, multi-VM and scale-out production environments, including SAP HANA Tailored Datacenter Integration deployments. For more information, see *Best Practices and Recommendations for Scale-up Deployments of SAP HANA on VMware vSphere* and *Best Practices and Recommendations for Scale-Out Deployments of SAP HANA on VMware vSphere* in Related Information.

Hitachi LPAR

Hitachi Unified Compute Platform for the SAP HANA Platform with logical partitioning (LPAR) in a scale-up or multi-VM configuration is a pre-configured virtual appliance ready to plug into a network to provide real-time access to operational data for use in analytic models. SAP HANA on Hitachi solutions with logical partitioning are based on a number of bare metal appliance configurations with modifications that are required for running logical partitions (LPARs) in dedicated mode. For more information, see *Hitachi Unified Compute Platform for the SAP HANA Platform with Logical Partitioning in a Scale-up Configuration using Hitachi Compute Blade 500 and Hitachi Unified Storage VM* in Related Information.

Huawei FusionSphere

SAP HANA is supported for production and non-production use in a virtualized environment using Huawei FusionSphere. For more information, see *Best Practices for Deploying SAP HANA on Huawei FusionSphere*

Virtualization Platform and Guide for Deploying SAP HANA on Huawei FusionSphere Virtualization in Related Information.

Red Hat Enterprise Linux KVM Hypervisor

SAP HANA is supported on the KVM (Kernel-based Virtual Machine) hypervisor in a non-production environment. For more information, see *SAP HANA on KVM: Best Practices Resource Guide* in Related Information.


SUSE Linux Enterprise Hypervisor

SAP HANA can be run in virtualized environments using XEN and KVM for virtual single VM deployments for test and development scenarios. Both the XEN and KVM hypervisor are built into SUSE Linux Enterprise Server for SAP Applications. For more information, see *SAP Note 2284516 - SAP HANA virtualized on SUSE Linux Enterprise hypervisors* in Related Information.

IBM PowerVM

SAP HANA can be deployed on IBM PowerVM for IBM Power Systems. PowerVM is a combination of hardware, PowerVM Hypervisor, and software, which includes other virtualization features, such as the Virtual I/O Server. For more information, see *IBM PowerVM Best Practices* in Related Information.

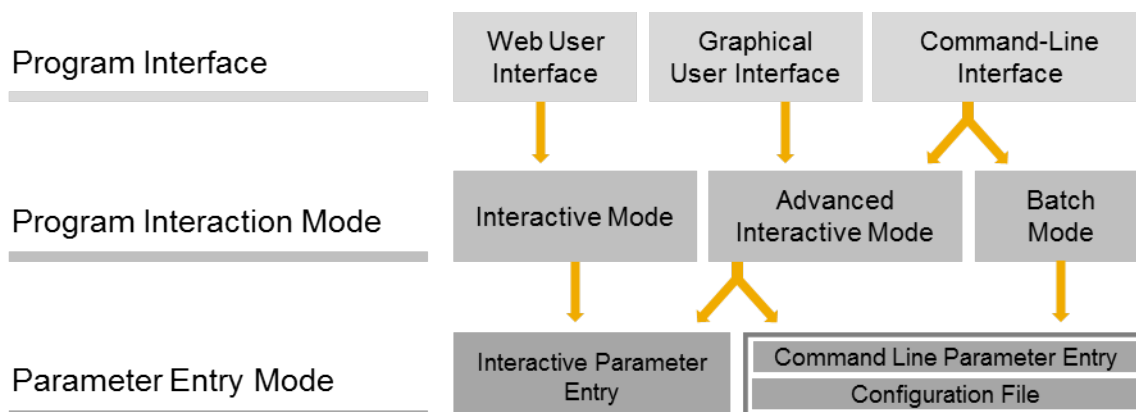
Related Information

[SAP Note 1788665 - SAP HANA Support for virtualized / partitioned \(multi-tenant\) environments](#) 
[Best Practices and Recommendations for Scale-up Deployments of SAP HANA on VMware vSphere](#) 
[Best Practices and Recommendations for Scale-Out Deployments of SAP HANA on VMware vSphere](#) 
[Hitachi Unified Compute Platform for the SAP HANA Platform with Logical Partitioning in a Scale-up Configuration using Hitachi Compute Blade 500 and Hitachi Unified Storage VM](#) 
[Best Practices for Deploying SAP HANA on Huawei FusionSphere Virtualization Platform](#) 
[Guide for Deploying SAP HANA on Huawei FusionSphere Virtualization](#) 
[SAP HANA on KVM: Best Practices Resource Guide](#) 
[SAP Note 2284516 - SAP HANA virtualized on SUSE Linux Enterprise hypervisors](#) 
[IBM PowerVM Best Practices](#) 

3 Using the SAP HANA Platform LCM Tools

The SAP HANA database lifecycle manager (HDBLCM) is used to perform SAP HANA platform lifecycle management (LCM) tasks, including installing, updating, and configuring an SAP HANA system. The SAP HANA database lifecycle manager is designed to accommodate hardware partners and administrators, and so it offers a variety of usage techniques.

The SAP HANA database lifecycle manager is used by means of program interface type, program interaction mode, and parameter entry mode. Before using the SAP HANA database lifecycle manager, you should choose which user interface you prefer to use and how you want to modify the platform LCM task to achieve your desired result. You modify the actions of the platform LCM tools using parameters. Parameters can be modified in a number of ways, for example, in the entry field of a graphical interface, as a call option with the program call, or in a configuration file. These options can be mixed and matched depending on the parameters you need to use and the program interaction mode you choose.



- [Performing LCM Tasks by Program Interface \[page 26\]](#)
- [Use the Web User Interface to Perform Platform LCM Tasks \[page 31\]](#)
- [Use the Graphical User Interface to Perform Platform LCM Tasks \[page 27\]](#)
- [Use the Command-Line Interface to Perform Platform LCM Tasks \[page 28\]](#)
- [Performing LCM Tasks by Program Interaction Mode \[page 34\]](#)
- [Use Interactive Mode to Perform Platform LCM Tasks \[page 34\]](#)
- [Use Advanced Interactive Mode to Perform Platform LCM Tasks \[page 35\]](#)
- [Use Batch Mode to Perform Platform LCM Tasks \[page 37\]](#)
- [Performing LCM Tasks by Parameter Entry Method \[page 39\]](#)
- [Entering Platform LCM Parameters Interactively \[page 40\]](#)
- [Entering Platform LCM Parameters as Call Options from the Command Line \[page 42\]](#)
- [Use LCM Configuration Files to Enter Parameters \[page 40\]](#)

The first choice to make is which SAP HANA database lifecycle manager (HDBLCM) interface type you prefer to use. The SAP HANA HDBLCM program can be run as a graphical user interface, a command-line interface, or as Web user interface in a Web browser or from the SAP HANA studio (the Web user interface is not available for all platform LCM tasks).

Once you've chosen the graphical user, command-line, or Web user interface, you can decide if you prefer to interactively enter parameter values, or give all required parameters with the call to the platform LCM tool, and let it run unattended to completion. Interactive mode is available for all user interfaces, and is the default mode for program interaction. To use interactive mode, you simply call the SAP HANA HDBLCM user interface, and enter parameter values as they are requested by the program. Advanced interactive mode involves entering some parameter values interactively and providing some parameter values as call options or in a configuration file. This is the recommended interaction mode if you'd like to modify parameter default values which are not requested in interactive mode. Batch mode is an advanced platform LCM interaction method because all required parameters must be provided with the call to the LCM program on the command line. Batch mode is designed for large-scale platform LCM tasks, which would be time consuming to perform interactively.

Platform LCM parameters can be entered interactively (only available for interactive mode or advanced interactive mode), as a call option on the command line, or via a configuration file. If you are performing platform LCM tasks in advanced interactive mode, you can choose any of the three parameter entry methods (or use more than one). If you are using batch mode, you must enter parameter values either as call options to the SAP HANA database lifecycle manager or from a configuration file. The syntax for the parameters as call options can be found in the *Parameter Reference*. The configuration file is generated as a blank template, then edited, and called as a call option.

3.1 Choosing the Correct SAP HANA HDBLCM for Your Task

It is important to distinguish between the version of the SAP HANA database lifecycle manager (HDBLCM) that is available on the installation medium and the version that is unpacked during installation, and subsequently used to perform administration and configuration tasks after the SAP HANA system has been installed.

The SAP HANA database lifecycle manager is available in two varieties - an installation medium version to perform installation and update, and a resident version for update and configuration that is unpacked on the SAP HANA host during installation or update. The SAP HANA resident HDBLCM has been designed to be version-compatible. That means, every time you install or update an SAP HANA system, you can be sure that any subsequent configuration tasks performed with the SAP HANA database lifecycle manager will work as expected because the installation or update tool and the configuration tool are of the same version and have been tested together. The SAP HANA resident HDBLCM is located at `<sapmnt>/<SID>/hdb1cm`.

3.2 Performing LCM Tasks by Program Interface

SAP HANA platform lifecycle management tasks can be performed from a graphical, command-line and Web user interface.

Related Information

[Use the Graphical User Interface to Perform Platform LCM Tasks \[page 27\]](#)

[Use the Command-Line Interface to Perform Platform LCM Tasks \[page 28\]](#)

3.2.1 Use the Graphical User Interface to Perform Platform LCM Tasks

SAP HANA platform lifecycle management tasks can be performed from a graphical interface.

Procedure

1. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
Installation Medium (IBM Power Systems)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>
SAP HANA resident HDBLCM	<pre>cd <sapmnt>/<SID>/hdbldcm</pre>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

2. Start the SAP HANA platform lifecycle management tool:

```
./hdbldcmgui
```

3. Enter parameter values in the requested fields. In addition, you can specify parameter key-value pairs as call options or in the configuration file template.

i Note

If parameter key-value pairs are specified as command-line options, they override the corresponding parameters in the configuration file. Parameters in the configuration file override default settings.

Order of parameter precedence:

Command Line > Configuration File > Default

For more information about program interaction modes and parameter values entry methods, see Related Information.

Related Information

[Choosing the Correct SAP HANA HDBLCM for Your Task \[page 26\]](#)

[Entering Platform LCM Parameters as Call Options from the Command Line \[page 42\]](#)

3.2.2 Use the Command-Line Interface to Perform Platform LCM Tasks

SAP HANA platform lifecycle management tasks can be performed from the command line.

Procedure

1. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
Installation Medium (IBM Power Systems)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>
SAP HANA resident HDBLCM	<pre>cd <sapmnt>/<SID>/hdblc</pre>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

2. Start the SAP HANA platform lifecycle management tool:

```
./hdblc
```

3. Enter parameter values in one of the following ways.
 - **Interactive parameter entry** - If you call the SAP HANA platform LCM tool only, the program runs in interactive mode. Parameter default values are suggested in brackets, and can be accepted with *Enter*. Otherwise, enter a non-default value, then select *Enter*.
 - **Command-line parameter entry as call options** - If you enter parameter key-value pairs as call options with the call to the SAP HANA platform LCM tool, the program runs in interactive mode and requests values for any parameter values which you didn't specify in the original input. If you entered the batch mode call option, the program runs to completion without any further requests, unless a mandatory parameter was left out of the original input, in which case, the program fails to perform the platform LCM task.
 - **Configuration file parameter entry** - If you enter parameter key-value pairs in the configuration file template, and enter the configuration file path as a call option with the call to the SAP HANA platform

LCM tool, the program runs in interactive mode and requests values for any parameter values which you didn't specify in the original input. If you entered the batch mode call option, the program runs to completion without any further requests, unless a mandatory parameter was left out of the original input, in which case, the program fails to perform the platform LCM task.

i Note

If parameter key-value pairs are specified as command-line options, they override the corresponding parameters in the configuration file. Parameters in the configuration file override default settings.

Order of parameter precedence:

Command Line > Configuration File > Default

For more information about program interaction modes and parameter values entry methods, see Related Information.

Related Information

[Choosing the Correct SAP HANA HDBLCM for Your Task \[page 26\]](#)

[Performing LCM Tasks by Parameter Entry Method \[page 39\]](#)

[Performing LCM Tasks by Program Interaction Mode \[page 34\]](#)

[Entering Platform LCM Parameters as Call Options from the Command Line \[page 42\]](#)

3.2.3 Using the Web User Interface

SAP HANA platform lifecycle management tasks can be performed using the SAP HANA database lifecycle manager (HDBLCM) Web user interface.

Related Information

[About the Web User Interface \[page 29\]](#)

[Use the Web User Interface to Perform Platform LCM Tasks \[page 31\]](#)

[Log Off From an SAP HANA System \[page 33\]](#)

[Troubleshooting the Web User Interface \[page 34\]](#)

3.2.3.1 About the Web User Interface

The SAP HANA database lifecycle manager (HDBLCM) Web user interface is hosted by the SAP Host Agent, which is installed on the SAP HANA host. When installing or updating the SAP HANA system, as part of the SAP

HANA resident HDBLCM configuration, the SAP HANA system deploys its artifacts on the SAP Host Agent, thus enabling the Web user interface.

All Web user interface actions are always performed in the context of an already installed and registered SAP HANA system. In order to access the SAP HANA database lifecycle manager Web user interface you need to log on as the system administrator user `<sid>adm`.

The communication between the Web browser and the SAP Host Agent is always done over HTTPS, which requires that the SAP Host Agent has a secure sockets layer (SSL) certificate (PSE) in its security directory. For more information about SSL certificate handling, see Related Information.

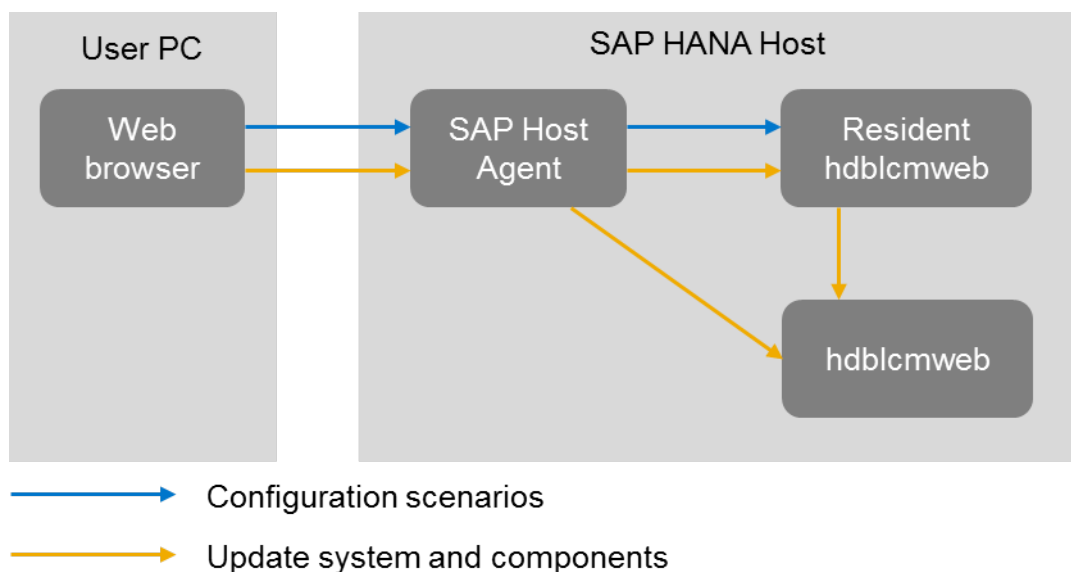
The backend is provided by the special executable `hdblcmmweb`, which is started automatically by the SAP Host Agent as soon as an action is triggered from the Web user interface and terminates after the action completes.

i Note

You should never start `hdblcmmweb` manually. For security reasons, `hdblcmmweb` is always started with system administrator user `<sid>adm` privileges. If you require logging with individual users (to ensure personalized logging), use the SAP HANA database lifecycle manager graphical user or command-line interface.

i Note

Make sure that the system administrator user `<sid>adm` has permissions to read the paths, passed as parameters in the Web user interface (for example, the SAP HANA database installation kit or locations with SAP HANA components).



One platform LCM task, which is worth special attention is the update of the SAP HANA system and components. The SAP HANA system updates are always performed by the installation kit SAP HANA database lifecycle manager in the graphical user and command-line interfaces, (and not the SAP HANA resident HDBLCM). This is because the SAP HANA database lifecycle manager, in the graphical user and command-line interfaces, is not forward compatible. Meaning that only the new version of the tool knows how to update an older system.

On the other hand, all scenarios in the Web user interface are handled by the SAP HANA resident HDBLCM, which is part of the system. For this reason, as a first step before even starting the update process, you are

required to enter a location of an SAP HANA database installation kit. After detecting the kit, the update Web user interface is loaded from the installation kit and the installation kit SAP HANA database lifecycle manager starts serving as backend until the update process finishes. It is as if you start the SAP HANA database lifecycle manager directly from the installation kit in graphical user or command-line interface.

Related Information

[Secure Sockets Layer \(SSL\) Certificate Handling \[page 45\]](#)

3.2.3.2 Use the Web User Interface to Perform Platform LCM Tasks

The SAP HANA database lifecycle manager (HDBLCM) can be accessed as a Web user interface in either a standalone browser or in the Platform Lifecycle Management view within the SAP HANA studio.

Prerequisites

You should verify that the following prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from a Web browser.

- The communication port 1129 is open.
Port 1129 is required for the SSL communication with the SAP Host Agent in a standalone browser via HTTPS.
- The following Web browser requirements are fulfilled:
 - Microsoft Windows
 - Internet Explorer - Version 9 or higher
If you are running Internet Explorer version 9, make sure that your browser is not running in compatibility mode with your SAP HANA host. You can check this in your browser by choosing **Tools > Compatibility View Settings**.
 - Mozilla Firefox - Latest version and Extended Support Release
 - Google Chrome - Latest version
 - SUSE Linux - Mozilla Firefox with XULRunner 10.0.4 ESR
 - Mac OS - Safari 5.1 or higher

i Note

For more information about supported Web browsers for the SAP HANA database lifecycle manager Web interface, see the browser support for `sap.m` library in the *SAPUI5 Developer Guide* in Related Information.

- You are logged on as the system administrator user `<sid>adm`.

You should verify that the following additional prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from the SAP HANA studio.

- The SAP HANA studio revision is 120 or higher.
- For Linux:
 - The system property `org.eclipse.swt.browser.XULRunnerPath` should be set in `hdbstudio.ini` to point to the path of XULRunner, for example:
`-Dorg.eclipse.swt.browser.XULRunnerPath=<path to xulrunner>`.
 This `hdbstudio.ini` file is located in the same folder as the executable that is used to start the SAP HANA studio. For Linux, the default location is `hana/shared/<SID>/hdbstudio..`

Context

The Web user interface supports only the following SAP HANA platform lifecycle management tasks:

- View system information
- Update system and components
- Install or update additional components
- Configure System Landscape Directory (SLD) registration
- Configure inter-service communication

When performing installation and update tasks, various parameters can be set in the [Advanced Parameters Configuration](#) dialog. To access the [Advanced Parameters Configuration](#) dialog, click on the gear icon in the footer bar of the SAP HANA HDBLCM Web user interface.

Procedure

Access the SAP HANA HDBLCM Web user interface.

Option	Description
Web Browser	Enter the SAP HANA database lifecycle manager (HDBLCM) URL in an HTML5-enabled browser: <code>https://<hostname>:1129/lmsl/HDBLCM/<SID>/index.html</code> <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>i Note</p> <p>The URL is case sensitive. Make sure you enter upper and lower case letters correctly.</p> </div>
SAP HANA Studio	<ol style="list-style-type: none"> 1. Start the SAP HANA studio. 2. In the SAP HANA studio, add the SAP HANA system. 3. Open the context menu (right-mouse click) in the Systems view, and select Add System. For more information about adding a system, see Add an SAP HANA System in the SAP HANA Administration Guide in Related Information. 4. In the SAP HANA studio, log on to the system. 5. From the context menu of the selected system, select Lifecycle Management > Platform Lifecycle Management > SAP HANA Platform Lifecycle Management.

Option	Description
SAP HANA Cockpit	<ol style="list-style-type: none"> Enter the SAP HANA cockpit URL in your browser. The URL depends on whether you are connecting to a single-container system or to a database in a multiple-container system. A single-container system is accessed through the URL: <code>http://<host_FQDN>:80<instance>/sap/hana/admin/cockpit</code> For more information about the URLs in multiple-container systems, see <i>Configure HTTP Access to Multitenant Database Containers</i> in the <i>SAP HANA Administration Guide</i> in Related Information. <div style="background-color: #fff9c4; padding: 5px; margin: 10px 0;"> <p>i Note</p> <p>FQDN = fully qualified domain name</p> </div> The <i>SAP HANA Platform Lifecycle Management</i> tiles are visible on the homepage of the SAP HANA cockpit. If they are not, you can add them from the <i>SAP HANA Platform Lifecycle Management</i> tile catalog. For more information, see <i>Customizing the Homepage of SAP HANA Cockpit</i>.

Results

The SAP HANA database lifecycle manager is displayed as a Web user interface in either a standalone browser or in the SAP HANA studio.

Related Information

[SAPUI5 Developer Guide](#)

3.2.3.3 Log Off From an SAP HANA System

In the SAP HANA database lifecycle manager (HDBLCM) Web user interface, you can log off from an SAP HANA system and close all connections to the system. To be able to connect to system again, you must log on.

Procedure

- To log off from a system click the *Log out* button.
All open connections to the system are closed.

i Note

Currently, this feature is not available for browsers on mobile devices.

3.2.3.4 Troubleshooting the Web User Interface

If you have problems with the Web user interface, see SAP Note 2078425 for steps you can take to troubleshoot and resolve them.

i Note

The Web browser used to render the platform lifecycle management Web user interface in the SAP HANA studio **cannot** be changed via **Windows > Preferences > General > Web Browser**.

Related Information

[SAP Note 2078425 - Troubleshooting note for SAP HANA Platform Management tool hdblcm](#)

3.3 Performing LCM Tasks by Program Interaction Mode

SAP HANA platform lifecycle management tasks can be performed in interactive mode, advanced interactive mode and batch mode.

Related Information

[Use Interactive Mode to Perform Platform LCM Tasks \[page 34\]](#)

[Use Advanced Interactive Mode to Perform Platform LCM Tasks \[page 35\]](#)

[Use Batch Mode to Perform Platform LCM Tasks \[page 37\]](#)

3.3.1 Use Interactive Mode to Perform Platform LCM Tasks

Interactive mode is a method for running SAP HANA platform lifecycle management (LCM) tools which starts the program and requires you to enter parameter values successively before the program is run. Interactive mode is the default mode for the SAP HANA platform LCM tools.

Context

To access the SAP HANA database lifecycle manager Web user interface, see Related Information.

Procedure

1. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
Installation Medium (IBM Power Systems)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>
SAP HANA resident HDBLCM	<pre>cd <sapmnt>/<SID>/hdblcmm</pre>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

2. Start the SAP HANA platform lifecycle management tool:

Option	Description
Graphical Interface	<pre>./hdblcmmgui</pre>
Command-line Interface	<pre>./hdblcmm</pre>

To start the SAP HANA platform LCM tools in interactive mode, simply **do not** enter the parameter for batch mode (`--batch` or `-b`) as a call option. You can enter any other required parameters as call options or load a configuration file. The program runs in interactive mode and requests any missing parameter values, which must be verified or changed. You are provided with a summary of parameter values, which you can accept to run the program to completion, or reject to exit the program.

Related Information

[Choosing the Correct SAP HANA HDBLCM for Your Task \[page 26\]](#)

[Use the Web User Interface to Perform Platform LCM Tasks \[page 31\]](#)

3.3.2 Use Advanced Interactive Mode to Perform Platform LCM Tasks

Interactive mode is a method for running SAP HANA platform lifecycle management (LCM) tools which starts the program and requires you to enter parameter values successively before the program is run. If you would like to perform platform LCM tasks in interactive mode, but would like to enter call options not available in

interactive mode, or make use of the configuration file, you can use a combination of interactive mode and advanced parameter entry methods.

Context

The SAP HANA platform LCM tools offer a wide variety of parameters which can modify the platform LCM task you are performing. Some parameters can be modified in interactive mode when the graphical user, command-line, or Web user interface requests a value for a given parameter. However, some parameters are not available in interactive mode, and must be specified either as a call option with the call to the platform LCM tool, or from within a configuration file.

Procedure

1. Review which parameters are offered in interactive mode.

If the parameter you want to configure is not available in interactive mode, you have two options. You can either enter the parameter key-value pair as a call option with the call to the platform LCM tool.

Alternatively, you can generate a configuration file template, and edit the parameters value in the configuration file. Then call the configuration file as a call option with the call to the platform LCM tool.

Using the configuration file for interactive mode is recommended if you plan to perform the exact same platform LCM task multiple times.

2. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
Installation Medium (IBM Power Systems)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>
SAP HANA resident HDBLCM	<pre>cd <sapmnt>/<SID>/hdblcmm</pre>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

3. If you plan to use a configuration file, prepare it with the following steps:
 - a. Generate the configuration file template using the SAP HANA platform lifecycle management tool:

Run the SAP HANA platform LCM tool using the parameter `dump_configfile_template` as a call option. Specify an action and a file path for the template. A configuration file template and a password file template are created.

```
./hdblcmm --action=<LCM action> --dump_configfile_template=<file path>
```

- b. Edit the configuration file parameters. Save the file.
 - c. Edit the password file. Save the file.
4. Start the SAP HANA platform lifecycle management tool:

Start the SAP HANA database lifecycle manager in either the graphical user interface or in the command-line interface, with a call option:

```
./hdblcmgui --<parameter key>=<parameter value>
```

or

```
./hdblcm --<parameter key>=<parameter value>
```

If you are using a configuration file, you must use the call option `--configfile=<file path>`.

Related Information

[Choosing the Correct SAP HANA HDBLCM for Your Task \[page 26\]](#)

3.3.3 Use Batch Mode to Perform Platform LCM Tasks

Batch mode is a method for running SAP HANA platform lifecycle management (LCM) tools which starts the program and runs it to completion without requiring you to interact with it any further. Batch mode must be run with the SAP HANA platform LCM command-line tools. All required parameter values must be passed as call options or from a configuration file.

Prerequisites

- When using batch mode, passwords must either be defined in the configuration file, or passed to the installer using an XML password file and streamed in via standard input. In both cases, it is necessary to prepare the passwords. For more information, see *Specifying Passwords*.

Context

If you are new to performing the desired SAP HANA platform LCM task in batch mode, it is recommended to run some tests before using batch mode in a production environment.

Procedure

1. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<code>cd <installation medium>/DATA_UNITS/HDB_LCM_LINUX_X86_64</code>
Installation Medium (IBM Power Systems)	<code>cd <installation medium>/DATA_UNITS/HDB_LCM_LINUX_PPC64</code>
SAP HANA resident HDBLCM	<code>cd <sapmnt>/<SID>/hdblcm</code>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

2. Start the SAP HANA platform lifecycle management tool:

```
./hdblcm --batch <additional parameters>
```

or

```
./hdblcm -b <additional parameters>
```

It is mandatory to provide an SAP HANA system ID (SID) and user passwords during installation. In batch mode, you are restricted to providing these parameter values as call options on the command line (for passwords, by means of an XML file) or in a configuration file. If you don't provide parameter values for the other required parameters, you implicitly accept the default values.

Example

The following example installs the SAP HANA server and client as a single-host system. The SAP system ID and instance number are also specified from the command line. The system passwords are read from a standard input stream by the installer. All other parameter defaults are automatically accepted and no other input is requested in order to complete the installation.

```
cat ~/hdb_passwords.xml | ./hdblcm --batch --action=install --components=client,server --sid=DB1 --number=42 --read_password_from_stdin=xml
```

If a configuration file is used in combination with batch mode, an identical system can be installed with a simplified call from the command line. In the following example, passwords are defined in the configuration file, in addition to the action, components, SAP system ID, and instance number.

```
./hdblcm --batch --configfile=/var/tmp/H01_configfile
```

Related Information

[Specifying Passwords \[page 56\]](#)

[read_password_from_stdin \[page 204\]](#)

[sid \[page 207\]](#)

[Use LCM Configuration Files to Enter Parameters \[page 40\]](#)

[Entering Platform LCM Parameters as Call Options from the Command Line \[page 42\]](#)

3.4 Performing LCM Tasks by Parameter Entry Method

SAP HANA platform lifecycle management (LCM) parameter values can be entered in a variety of methods: interactively by iteratively providing values in either the graphical interface of command prompt, as command-line options with the call to the platform LCM tool, or in a configuration file.

SAP HANA platform lifecycle management parameter values allow you to customize your SAP HANA installation, update, or configuration. Parameter values can be entered by **one or more** of the following methods:

Interactively (Default)	Using either command line interface or graphical interface, most parameters are requested interactively. Default parameter values are proposed in brackets and can be changed or confirmed. Parameters that are not requested (or specified via another method) accept the default value.
Command Line Options	Parameters are given in their accepted syntax as a space delimited list after the program call (for example, <code>hdblcm</code> or <code>hdblcmgui</code>). The specified parameters replace the defaults. If any mandatory parameters are excluded, they are requested interactively (unless batch mode is specified). All parameters can be entered from the command line. For more details about the accepted parameter syntax, see the inline help output (<code>--help</code>) for the individual SAP HANA lifecycle management tool.
Configuration File	The configuration file is a plain text file, for which a template of parameter key-value pairs can be generated, edited, and saved to be called in combination with the program call. If any mandatory parameters are not specified, they are requested interactively (unless batch mode is used). All parameters can be entered in the configuration file. For more information about the configuration file, see Related Information.

i Note

If parameters are specified in the command line, they override the corresponding parameters in the configuration file. Parameters in the configuration file override default settings.

Order of parameter precedence:

Command Line > Configuration File > Default

Related Information

[Entering Platform LCM Parameters Interactively \[page 40\]](#)

[Use LCM Configuration Files to Enter Parameters \[page 40\]](#)

[Entering Platform LCM Parameters as Call Options from the Command Line \[page 42\]](#)

3.4.1 Entering Platform LCM Parameters Interactively

SAP HANA platform LCM interactive mode is default interaction mode for all platform LCM programs and interfaces.

You can run the graphical, command-line, or Web user interface in interactive mode by simply starting the program, and entering parameter values as they are requested by the program. In interactive mode, parameter default values are suggested in brackets and can be accepted with `Enter`.

Not all parameters are requested in interactive mode. If you would like to configure a parameter not offered in interactive mode, you must enter it as a call option with the call to the platform LCM program, or use corresponding configuration file for the platform LCM task.

3.4.2 Use LCM Configuration Files to Enter Parameters

By defining a prepared configuration file during installation, specified parameter values are used by the SAP HANA platform lifecycle management (LCM) tools to build a customized SAP HANA system.

Context

The configuration file is a plain text file of specified parameters, written in the same syntax as in the command line (except without the leading two dashes --). A configuration file template can be generated, edited, and saved to be called with the call to the SAP HANA database lifecycle manager (HDBLCM).

The configuration file template provides a brief, commented-out summary of each parameter. Each parameter is set to its default value.

Procedure

1. Change to the directory where the SAP HANA database lifecycle manager is located:

Option	Description
Installation Medium (Intel-Based Hardware Platforms)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
Installation Medium (IBM Power Systems)	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>
SAP HANA resident HDBLCM	<pre>cd <sapmnt>/<SID>/hdblcml</pre>

In general, installation and update is carried out from the installation medium. Configuration tasks are performed using the SAP HANA resident HDBLCM. For more information about the two SAP HANA database lifecycle manager types, see Related Information.

2. Generate the configuration file template using the SAP HANA platform lifecycle management tool:

Run the SAP HANA platform LCM tool using the parameter `dump_configfile_template` as a call option. Specify an action and a file path for the template. A configuration file template and a password file template are created.

```
./hdblcml --action=<LCM action> --dump_configfile_template=<file path>
```

3. Edit the configuration file parameters. Save the file.

It is recommended that at least the SAP system ID (`sid`) and the instance number (`number`) are uniquely defined. There are several required parameters, that are provided default values in case they are not customized. For more information, refer to the default values.

Some file path parameters have automatic substitution values as part of the default file path, using the `sid` (SAP HANA system ID) and `sapmnt` (installation path) parameters, so that the substituted values create file paths that are unique and system-specific. For example, the default for the data file path is:

`datapath=/hana/data/${sid}`, where `sid` is automatically replaced by the unique SAP HANA system ID.

4. Start the SAP HANA platform lifecycle management tool:

Run the SAP HANA platform LCM tool using the parameter `configfile` as a call option. Specify the file path of the edited template.

```
./hdblcml --configfile=<file path>
```

You can specify the path to a directory in which custom configuration files are saved using the parameter `custom_cfg` as a call option.

Related Information

[configfile \[page 185\]](#)

[custom_cfg \[page 187\]](#)

[Choosing the Correct SAP HANA HDBLCM for Your Task \[page 26\]](#)

3.4.3 Entering Platform LCM Parameters as Call Options from the Command Line

Call options are available for every SAP HANA platform LCM program.

You can use call options for a number of reasons:

- The parameter is not available in interactive mode, but can be entered as a call option.
- You are using batch mode.
- You are using a configuration file, but would like to override a parameter in the configuration file with a new value.
- You are installing an SAP HANA multiple-host system from the command line.

A call option is entered with the following notation:

```
./<program call> --<parameter1 key>=<parameter1 value> --<parameter2 key>=<parameter2 value>
```

Call options start with a double dash (--) if they are written in long-form syntax. Some parameters also have short-form syntax, in which they are preceded with a single dash (-). For more information about call option syntax, see the *Parameter Reference* topics.

Related Information

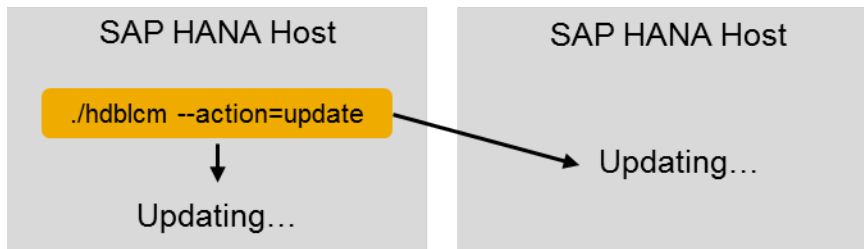
[Parameter Reference \[page 174\]](#)

3.5 Executing Platform LCM Tasks

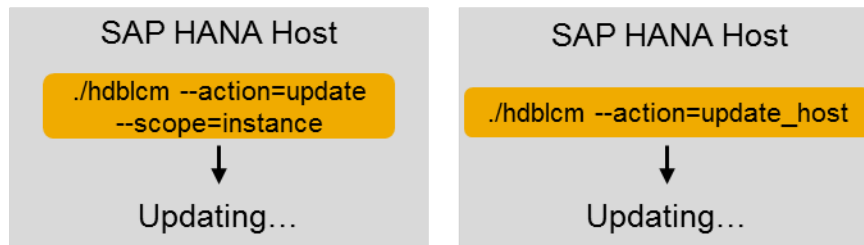
SAP HANA platform lifecycle management tasks can be performed on multiple-host systems centrally, by running the SAP HANA database lifecycle manager (HDBLCM) from any worker host and using remote execution to replicate the call on all remaining system hosts. Otherwise, the platform LCM tasks can be executed first on a worker host, and then re-executed manually on each remaining host. This method is considered decentralized execution.

The following is an example of an SAP HANA system update performed centrally and decentrally.

Centralized Execution



Decentralized Execution



Related Information

[Centralized Execution of Platform LCM Tasks \[page 43\]](#)

[Decentralized Execution of Platform LCM Tasks \[page 48\]](#)

3.5.1 Centralized Execution of Platform LCM Tasks

SAP HANA platform lifecycle management (LCM) tasks can be performed centrally on multiple-host SAP HANA systems in a number of ways depending on the available certificate keys and the remote execution configuration.

3.5.1.1 Using Secure Shell (SSH) to Execute Platform LCM Tasks

An SAP HANA system must be installed with root user credentials. During installation a secure shell (SSH) key is configured so that future platform LCM tasks can be performed remotely on multiple-host SAP HANA systems without requiring the root user password.

By default, the SAP HANA database lifecycle manager (HDBLCM) uses SSH during SAP HANA system installation or update install the SAP Host Agent on all system hosts. In order to use SSH, the SFTP subsystem

must be active. Once the SAP Host Agent is installed, it is used to perform any platform LCM tasks executed from the Web user interface or as the system administrator user `<sid>adm`.

i Note

Platform LCM tasks cannot be executed remotely via SSH as the system administrator user `<sid>adm`.

Related Information

[1944799 - SAP HANA Guidelines for SLES Operating System Installation](#)

[2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux \(RHEL\) Operating System](#)

3.5.1.2 Using SAP Host Agent to Execute Platform LCM Tasks

In previous SAP HANA releases, it was only possible to perform multiple-host system tasks by providing root credentials and executing platform on remote hosts via secure shell (SSH). Since SAP HANA Support Package Stack (SPS) 09, it has been possible to perform platform LCM tasks without root credentials by using the SAP Host Agent.

Even though the SAP Host Agent is not required to be installed on the SAP HANA system, the SAP HANA database lifecycle manager (HDBLCM) heavily relies on it for the following functionality to work:

- Execution as the system administrator user `<sid>adm`
- Connectivity to remote hosts via HTTPS (when no SSH or root user credentials are available)
- Execution from the SAP HANA database lifecycle manager Web user interface

i Note

The SAP HANA cockpit for offline administration also uses the SAP Host Agent to execute tasks as the system administrator user `<sid>adm`, for example, stopping and starting the system, or troubleshooting a system experiencing performance problems. For more information, see *SAP HANA Cockpit for Offline Administration*.

The SAP Host Agent is installed and updated by default during SAP HANA system installation and update, unless the call option `--install_hostagent=off` is used. We recommend installing and updating the SAP Host Agent with the SAP HANA server to ensure version compatibility, however in some cases you may need to install or update only the SAP Host Agent. For information about installing or updating the SAP Host Agent individually, see *Installing SAP Host Agent Manually* and *Upgrading SAP Host Agent Manually* in Related Information.

If execution on the remote hosts is done via SSH (default, `--remote_execution=ssh`), the SAP HANA database lifecycle manager is able to connect to a remote host via SSH and install and configure the SAP Host Agent. In contrast, the remote execution via SAP Host Agent (`--remote_execution=saphostagent`) requires that the SAP Host Agent is installed and configured on all involved hosts in advance, which includes:

- Install SAP Host Agent
- Configure a Secure Sockets Layer (SSL) certificate for the SAP Host Agent, so that the HTTPS port 1129 is accessible. For more information about SSL configuration for the SAP Host Agent, see [Related Information](#). If you don't want to configure HTTPS, it is also possible to use the call option `--use_http`. It tells the SAP HANA database lifecycle manager to communicate with the SAP Host Agent via HTTP. During addition of new host to an SAP HANA system (also during installation of a multiple-host system), the HTTPS of the SAP Host Agent is automatically configured by the SAP HANA database lifecycle manager.

Caution

Use the call option `--use_http` with caution, because passwords are also transferred in plain text via HTTP.

Related Information

[Installing SAP Host Agent Manually](#)

[Updating SAP Host Agent Manually](#)

[SSL Configuration for the SAP Host Agent](#)

3.5.1.2.1 Secure Sockets Layer (SSL) Certificate Handling

To enable secure communication with the SAP Host Agent over HTTPS, the SAP Host Agent needs a secure sockets layer (SSL) certificate in its security directory. This certificate is also used by the SAP HANA database lifecycle manager (HDBLCM) Web-based user interface and the SAP HANA cockpit for offline administration because the Web pages are served by the SAP Host Agent.

The SAP HANA database lifecycle manager handles certificate management during system installation, update, or rename, as well as during the addition of new hosts as follows:

- If there is no certificate in the SAP Host Agent security directory, the SAP HANA database lifecycle manager generates one. The SAP HANA host name is used as the default certificate owner. The certificate owner can be changed by using the call option `--certificates_hostmap`.
- If there is an existing certificate, the following applies:
 - If the certificate host name is not passed to the SAP HANA database lifecycle manager, or if the certificate host name is the same as the owner of the current certificate, the current certificate is preserved.
 - If the certificate host name is passed via the call option `--certificates_hostmap` and it differs from the owner of the current certificate, a new certificate is generated.
 - During update of an SAP HANA system, if the certificates on all hosts are in place, the call option `--certificates_hostmap` is ignored and the current certificates are preserved.

If you want to use your own SSL certificates, see the SAP Host Agent documentation in [Related Information](#).

Related Information

[certificates_hostmap \[page 181\]](#)

[SSL Configuration for the SAP Host Agent](#)

3.5.1.2.2 Starting Platform LCM Tasks as the System Administrator User <sid>adm

When starting platform LCM tasks as the system administrator user <sid>adm, the SAP HANA database lifecycle manager (HDBLCM) requires the usage of SAP Host Agent for execution of remote and local operations.

The following tasks in the SAP HANA database lifecycle manager can be performed as the system administrator user <sid>adm:

- System update from the installation medium
- Installation or update of additional components from the SAP HANA resident HDBLCM
- Host addition and host removal
- System Landscape Directory (SLD) registration configuration
- Inter-service communication configuration

i Note

The SAP HANA cockpit for offline administration also uses the SAP Host Agent to execute tasks as the system administrator user <sid>adm, for example, stopping and starting the system, or troubleshooting a system experiencing performance problems. For more information, see *SAP HANA Cockpit for Offline Administration*.

Make sure that SAP Host Agent is installed and configured (HTTPS-enabled) on all hosts of the SAP HANA system.

i Note

Platform LCM tasks cannot be executed remotely via SSH as the system administrator user <sid>adm.

i Note

Make sure that the system administrator user <sid>adm has permissions to read the paths passed as parameters (for example, the locations of the SAP HANA components).

3.5.1.2.3 Add Hosts Using SAP Host Agent

You can add hosts to an SAP HANA system using the SAP HANA database lifecycle manager (HDBLCM) resident program in combination with the SAP Host Agent in the command-line interface.

Prerequisites

- The SAP HANA system has been installed with its server software on a shared file system (export options `rw, no_root_squash`).
- The host which is to be added has access to the installation directories `<sapmnt>` and `<sapmnt>/<SID>`.
- The SAP Host Agent is installed on the host which is to be added. The SAP Host Agent will create the `<sapsys>` group, if it does not exist prior to installation. Make sure that the group ID of the `<sapsys>` group is the same on all hosts. For information about installing or updating the SAP Host Agent individually, see *Installing SAP Host Agent Manually* and *Upgrading SAP Host Agent Manually* in Related Information.
- A Secure Sockets Layer (SSL) certificate is configured for the SAP Host Agent, so that the HTTPS port 1129 is accessible and the Personal Security Environment (PSE) for the server is prepared. For more information about SSL configuration for the SAP Host Agent, see *Configuring SSL for SAP Host Agent on UNIX* in Related Information.
- The SAP HANA system has been installed with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running.
- You are logged on as root user or as the system administrator user `<sid>adm`.
- The difference between the system time set on the installation host and the additional host is not greater than 180 seconds.
- The operating system administrator (`<SID>adm`) user may exist on the additional host. Make sure that you have the password of the existing `<SID>adm` user, and that the user attributes and group assignments are correct. The SAP HANA database lifecycle manager (HDBLCM) resident program will not modify the properties of any existing user or group.

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdbclm
```

By default, `<sapmnt>` is `/hana/shared`.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdbclm --remote_execution=saphostagent
```

3. Select the index for the `add_hosts` action.
4. Enter the names of the hosts to be added.
5. Enter the SAP Host Agent administrator (`sapadm`) password.
6. Define additional system properties.

7. Review the summary, and select *y* to finalize the configuration.

Results

You have added one or more new hosts to an SAP HANA system. The SAP HANA system you have configured is a multiple-host system.

The new hosts have been added to the SAP HANA landscape information. If your system is SAP HANA multitenant database container (multiple-container) enabled system, the new hosts have been added to the landscape information of the system database.

This configuration task can also be performed in batch mode and using a configuration file. For more information about the available configuration methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

Related Information

[remote_execution](#) [page 204]

[Using the SAP HANA Platform LCM Tools](#) [page 25]

[Using SAP Host Agent to Execute Platform LCM Tasks](#) [page 44]

[Installing SAP Host Agent Manually](#)

[Updating SAP Host Agent Manually](#)

[Configuring SSL for SAP Host Agent on UNIX](#)

3.5.2 Decentralized Execution of Platform LCM Tasks

In some circumstances platform LCM actions must be executed on each individual host of the multiple-host system. This is referred to as **decentralized execution**.

Typically, SAP HANA platform lifecycle management actions, such as update, rename, and inter-service communication configuration, can be performed on a multiple-host system from one host. This is referred to as **centralized execution** and requires SSH or root credentials. For more information, see Centralized Execution of Platform LCM Tasks in Related Information.

In some circumstances, a secure shell (SSH) key may not be installed or root credentials are not available. In this case, the platform LCM actions must be executed on each individual host of the multiple-host system, which is also known as **decentralized execution**. For more information about decentralized execution, see SAP Note 2048681 in Related Information.

Related Information

[SAP Note 2048681 - Performing SAP HANA platform lifecycle management administration tasks on multiple-host systems without SSH or root credentials](#)

[Executing Platform LCM Tasks \[page 42\]](#)

[Centralized Execution of Platform LCM Tasks \[page 43\]](#)

3.6 Additional Information About Using the SAP HANA Platform LCM Tools

If you have already familiarized yourself with the way the SAP HANA database lifecycle manager (HDBLCM) works, you may be interested in additional information like where log files and traces are stores, Linux kernel parameter settings, or using the underlying LCM tools for troubleshooting purposes.

Related Information

[Logging \[page 49\]](#)

[Linux Kernel Parameters \[page 50\]](#)

[General Troubleshooting for the SAP HANA Platform LCM Tools \[page 51\]](#)

3.6.1 Logging

SAP HANA platform lifecycle management processes are logged by the system. The log files are stored in the following path:

```
/var/tmp/hdb_<SID>_<action>_<time stamp>
```

where <action> ::= install | update | addhost | uninstall | and so on.

The following log files are written while performing the action:

- <hdbcommand>.log: can be read using a text editor
- <hdbcommand>.msg: XML format for display in the installation tool with the GUI
- <hostname>_tracediff.tgz: provides a delta analysis of the original trace files, makes a detailed analysis more easy

You can also view the last three log files in the SAP HANA studio using the administration function *Diagnosis Files*. For more information, see the *SAP HANA Administration Guide*.

Instant Logging

If an LCM action crashes or hangs before the execution is finished, even if no LCM action trace is enabled, HDBLCM writes a trace, which has the function of a preliminary (unformatted) log file. Upon program completion, this preliminary logfile is removed and replaced by the real, formatted log file.

The environment variable `HDB_INSTALLER_TRACE_FILE=<file>` enables the trace.

The environment variable `HDBLCM_LOGDIR_COPY=<target directory>` creates a copy of the log directory.

Log Collection

If you perform platform LCM actions on multiple-host SAP HANA systems, all log files are collected to a local folder to make error analysis more convenient.

To collect log files for multiple-host SAP HANA systems, an HDBLCM action ID is passed to each sub-program (underlying LCM tool) working on a remote host. Each sub-program writes a copy of the log file in to the following directory: `<installation path>/<SID>/HDB<instance number>/<host name>/trace`

3.6.2 Linux Kernel Parameters

The following table describes the parameters and limits that are set by the SAP HANA database lifecycle manager (HDBLCM) during the installation or update of an SAP HANA database. The actual values may differ, depending on your system configuration.

Parameter	Description	Value	Location
<code>nofile</code>	Open file descriptors per user	1048576	<code>/etc/security/limits.conf</code>
<code>fs.file-max</code>	Open file descriptors per host	20000000	<code>/etc/sysctl.conf</code>
<code>fs.aio-max-nr</code>	Maximum number of asynchronous I/O requests	18446744073709551615 (= $2^{64}-1$ = <code>ULONG_MAX</code>)	<code>/etc/sysctl.conf</code>
<code>vm.memory_failure_early_kill</code>	Method for killing processes when an uncorrected memory error occurs	1	<code>/etc/sysctl.conf</code>
<code>kernel.shmmax</code>	Maximum shared memory segment size (the default minimum value is <code>ispdating 1 GB</code>)	1073741824	<code>/etc/sysctl.conf</code>
<code>kernel.shmmni</code>	Maximum number of shared memory segments	<ul style="list-style-type: none"> • RAM \geq 256 GB: 524288 • RAM \geq 64 GB: 65536 • RAM < 64 GB: 4096 	<code>/etc/sysctl.conf</code>

Parameter	Description	Value	Location
kernel.shmall	System-wide limit of total shared memory, in 4k pages	<ul style="list-style-type: none"> RAM >= 35.5 TB: (shmmax * shmmni) / 65536 RAM < 35.5 TB: (0.9 * <RAM in bytes>) / 4096 	/etc/sysctl.conf
net.ipv4.ip_local_port_range	Lower limit of ephemeral port range	40000	/etc/sysctl.conf
vm.max_map_count	Maximum number of Virtual Memory Areas (VMAs) that a process can own	<ul style="list-style-type: none"> Intel-Based Hardware Platforms: 1000000 + <RAM in GB> * 32768 IBM Power Systems: 1000000 + <RAM in GB> * 16384 <p>Maximum value: 2147483647</p>	/etc/sysctl.conf

3.6.3 General Troubleshooting for the SAP HANA Platform LCM Tools

The SAP HANA database lifecycle manager (HDBLCM) is a wrapper tool that calls the underlying HDB tools to perform the platform LCM action. If something unexpected happens when using HDBLCM, and the LCM action cannot be completed, you can check the logs and separately run the affected underlying tools.

Caution

We only recommend the following underlying tools to be used for troubleshooting purposes.

Program Name	Description	Location
hdbinst	Command-line tool for installing the software	Installation media
hdbsetup	Installation tool with a graphical interface for installing or updating the software	Installation media

Program Name	Description	Location
hdbuninst	Command-line tool for uninstalling the software and removing a host	Installation media and <installation path>/<SID>/ global/hdb/install/bin
hdbaddhost	Command-line tool for adding a host to a system	<installation path>/<SID>/ global/hdb/install/bin
hdbupd	Command-line tool for updating the software	Installation media
hdbrename	Command-line tool for renaming a system	<installation path>/<SID>/ global/hdb/install/bin and /usr/sap/<SID>/SYS/ global/hdb/install/bin
hdbreg	Command-line tool for registering an SAP HANA system	<installation path>/<SID>/ global/hdb/install/bin and /usr/sap/<SID>/SYS/ global/hdb/install/bin
hdbremovehost	Command-line tool for removing a host	<installation path>/<SID>/ global/hdb/install/bin and /usr/sap/<SID>/SYS/ global/hdb/install/bin
hdbmodify	This command line tool removes and adds remote hosts. Furthermore, the listen interface can be changed ('local', 'global', 'internal').	<installation path>/<SID>/ global/hdb/install/bin and /usr/sap/<SID>/SYS/ global/hdb/install/bin
hdbupprep	Command-line tool for upgrading a repository by loading delivery units into the database	<installation path>/<SID>/ global/hdb/install/bin and /usr/sap/<SID>/SYS/ global/hdb/install/bin

4 Installing an SAP HANA System

The SAP HANA database lifecycle manager (HDBLCM) is the program used to install an SAP HANA system, including server, client, studio, and additional components, in a graphical user interface or the command-line interface. The SAP HANA system can be uninstalled or configured using the resident version of the SAP HANA database lifecycle manager (HDBLCM).

4.1 Getting Started with SAP HANA System Installation

Installation parameters are a fundamental aspect of the SAP HANA database lifecycle manager (HDBLCM), and provide the opportunity to optimize and customize the system during installation.

Installation parameters are used for all methods of parameter specification - interactively, as command line options, or with the configuration file. The following information is relevant for either installation mode (interactive mode or batch mode).

4.1.1 Mandatory Installation Values

The only mandatory parameter without a default value is the SAP system ID (SID, `sid`), which must be specified. However, it is also recommended to define an instance number (`number`), since these two parameters are meaningful to the identity of the system.

If the installation is run in batch mode from the installation medium, the minimum required parameters are the SID and the passwords (specified in XML syntax and streamed in, or specified in the configuration file). In the case that only the SID and passwords are entered as parameters, the other parameters automatically take their default value.

In batch mode, if one of the mandatory parameters, without a default, is not specified, the installation fails with an error. If an installation is not run in batch mode, but in interactive mode (default) instead, the missing mandatory parameters are requested in the console.

When building a multiple-host system, the `action` and `addhosts` parameters are mandatory command-line specifications for the SAP HANA database lifecycle manager.

4.1.2 Changeable Default Values for Installation

The SAP HANA database lifecycle manager (HDBLCM) uses the following default values during installation unless you change them.

Some default values are based on the predefined values on the current host. In a multiple-host system, it is recommended to manually check the mandatory values on each hosts **before** installation.

Changeable Parameter Defaults

Parameter	System Default Value	Interactive Mode Availability
autoadd_xs_roles	1 (on)	<input checked="" type="checkbox"/>
autostart	0 (off)	<input checked="" type="checkbox"/>
certificates_hostmap	<current host>	<input checked="" type="checkbox"/>
client_path	<sapmnt>/<SID>/hdbclient	<input type="checkbox"/>
components	client, server, studio (dependent on the installer finding installation sources for the components)	<input checked="" type="checkbox"/>
copy_repository	/hana/shared/<SID>/hdbstudio_update	<input type="checkbox"/>
datapath	/hana/data/<SID>	<input checked="" type="checkbox"/>
db_isolation	low	<input checked="" type="checkbox"/>
db_mode	single_container	<input checked="" type="checkbox"/>
groupid	79	<input type="checkbox"/>
home	/usr/sap/<SID>/home	<input checked="" type="checkbox"/>
hostname	<current host>	<input checked="" type="checkbox"/>
import_xs_content	1 (on)	<input type="checkbox"/>
install_hostagent	y (on)	<input type="checkbox"/>
install_ssh_key	y (on)	<input type="checkbox"/>
logpath	/hana/log/<SID>	<input checked="" type="checkbox"/>
max_mem	0	<input checked="" type="checkbox"/>
number	<next successive un-used instance number on the host>	<input checked="" type="checkbox"/>
org_manager_user	XSA_ADMIN	<input checked="" type="checkbox"/>
org_name	orgname	<input checked="" type="checkbox"/>

Parameter	System Default Value	Interactive Mode Availability
prod_space_name	PROD	<input checked="" type="checkbox"/>
remote_execution	ssh	<input type="checkbox"/>
restrict_max_mem	(off)	<input checked="" type="checkbox"/>
root_user	root	<input type="checkbox"/>
sapmnt	/hana/shared	<input checked="" type="checkbox"/>
shell	/bin/sh	<input checked="" type="checkbox"/>
studio_path	<sapmnt>/<SID>/hdbstudio	<input type="checkbox"/>
studio_repository	1 (on)	<input type="checkbox"/>
system_usage	custom	<input checked="" type="checkbox"/>
userid	<next successive un-used user ID on the host>	<input checked="" type="checkbox"/>
xs_components	<all>	<input checked="" type="checkbox"/>
xs_customer_space_isolation	1 (on)	<input checked="" type="checkbox"/>
xs_routing_mode	<ports>	<input checked="" type="checkbox"/>
xs_sap_space_isolation	1 (on)	<input type="checkbox"/>

i Note

To substitute parameters in configuration files and batch mode, they must be written in the form \$ {<parameter>}. Substitution also occurs in interactive mode in order to create a suggested path. The advantage of substitution is that the SAP system ID (SID) and the installation path (sapmnt, which is /hana/shared, by default) only need to be specified once, and are then substituted in to the other parameter values. This ensures that the system has unique file system paths if multiple systems are installed on the same host. However, if it is preferred to deviate from the default paths, it is necessary to pay attention to the settings, especially in the configuration file, and when installing in batch mode.

Related Information

[Parameter Reference \[page 174\]](#)

4.1.3 Users Created During Installation

The following users are automatically created during the installation: <sid>adm, sapadm, and SYSTEM.

User	Description
<sid>adm	<p>The operating system administrator.</p> <ul style="list-style-type: none">• The user <sid>adm is the operating system user required for administrative tasks such as starting and stopping the system.• The user ID of the <sid>adm user is defined during the system installation. The user ID and group ID of this operating system user must be unique and identical on each host of a multiple-host system.• The password of the <sid>adm user is set during installation with the <code>password</code> parameter.
sapadm	<p>The SAP Host Agent administrator.</p> <ul style="list-style-type: none">• If there is no SAP Host Agent available on the installation host, it is created during the installation along with the user <code>sapadm</code>.• If the SAP Host Agent is already available on the installation host, it is not modified by the installer. The <code>sapadm</code> user and password are also not modified.• The password of the <code>sapadm</code> user is set during installation with the <code>sapadm_password</code> parameter.
SYSTEM	<p>The database superuser.</p> <ul style="list-style-type: none">• Initially, the <code>SYSTEM</code> user has all system permissions. Additional permissions can be granted and revoked again, however the initial permissions can never be revoked.• The password of the <code>SYSTEM</code> user is set during installation with the <code>system_user_password</code> parameter.

4.1.4 Specifying Passwords

Passwords are a mandatory parameter for installing an SAP HANA system. There are three methods for configuring passwords.

Interactive Mode

Interactive installation is available for the SAP HANA database lifecycle manager in both graphical user and command-line interface. Passwords are entered manually one-by-one as they are requested by the installer. This method is preferred for quick, individual system installations.

Command Line

Configuring passwords in the command line is a two-step process. First, a simple text file with passwords in XML syntax should be created and saved in the home directory of the root user. A password file template can be created with the SAP HANA platform LCM tool using the parameter `dump_configfile_template` as a call option. Then the file can be called using standard input and the `read_password_from_stdin` parameter in the command line with batch mode. Parameters specified in the command line override parameters specified in the configuration file. Since this method is the most powerful and flexible method, it is often the preferred method for installing multiple SAP HANA systems at one time.

Example

The following is an example of the password file in XML syntax:

```
hdb_passwords.xml
<?xml version="1.0" encoding="UTF-8"?>
<Passwords>
<password><![CDATA[Adm1234]]></password>
<sapadm_password><![CDATA[Agent1234]]></sapadm_password>
<system_user_password><![CDATA[Sys1234]]></system_user_password>
<root_password><![CDATA[Root1234]]></root_password>
</Passwords>
```

Now, the password file (stored in the root user's home directory) is called from the command line using standard input, the `read_password_from_stdin=xml` parameter, and batch mode:

```
cat ~/hdb_passwords.xml | ./hdblcm --sid=DB1 --number=42 --
read_password_from_stdin=xml -b
```

Configuration File

It is possible to specify passwords in the configuration file. A configuration file template is created with all the parameters set to their default values. The configuration file is edited to the preferred parameter values, then it is saved, and the values are read by the installer during installation. This method is preferred for a one-step installation that can be re-created several times. If passwords are specified in the configuration file, its permission settings should limit access to the root user, for security reasons.

Example

The following is an example of the configuration file, with configured password parameters:

```
configfile1.cfg
# Root User Password
root_password=Root1234
...
# SAP Host Agent (sapadm) Password
sapadm_password=Agent1234
...
# System Administrator Password
password=Adm1234
...
# Database User (SYSTEM) Password
system_user_password=Sys1234
```

Now, the configuration file (stored in the root user's home directory) is called from the command line using the `configfile` parameter:

```
./hdblcm --sid=DB1 --configfile=~/.configfile1.cfg
```

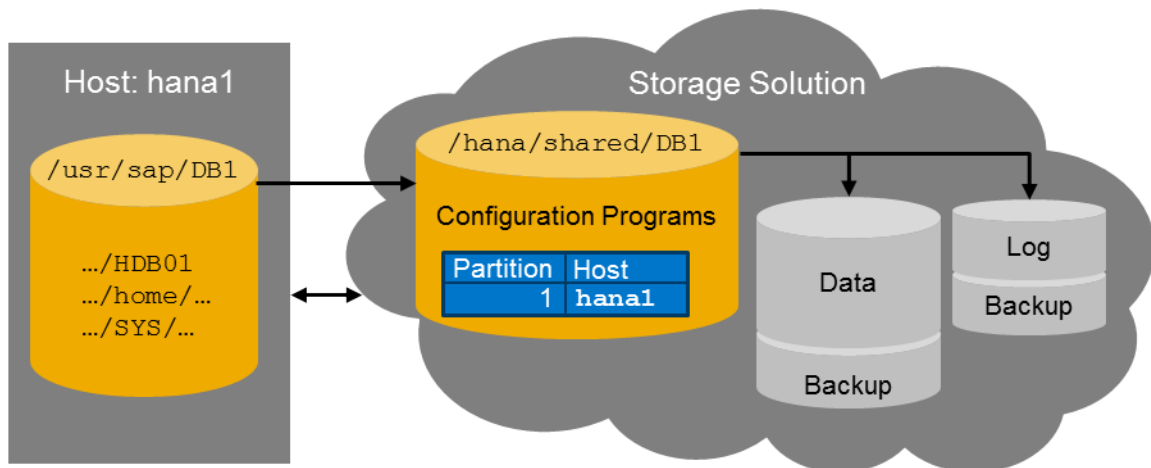
4.2 Installing a Single-Host System

The SAP HANA database lifecycle manager can be used to install an SAP HANA single-host system in one of the program interfaces, and with a combination of parameter specification methods.

A single-host system is the simplest system installation type. It is possible to run an SAP HANA system entirely on one host and then scale the system up as needed.

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

SAP HANA Single-Host System



System Configuration

Instance Number: 01
SAP System ID (SID): DB1
Host Name: hana1

Database Directories

Installation Path: `/hana/shared`
Data Path: `/hana/data/DB1`
Log Path: `/hana/log/DB1`

Local Directory

hana1: `/usr/sap/DB1`

4.2.1 Install a Single-Host SAP HANA System Using the Graphical User Interface

A single-host SAP HANA system can be installed using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode by entering parameters interactively. This procedure may also be performed in advanced interactive mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

- Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select a detected software component or add a software component location by selecting [Add Component Location](#). Then select [Next](#).
4. Select [Install New System](#), then select [Next](#).
5. Select the components you would like to install, then select [Next](#).
6. Select [Single-Host System](#) as the [System Type](#), then select [Next](#).
7. Specify the SAP HANA system properties.
For a list of all system properties, see [System Properties](#) in Related Information.
8. After specifying all system properties, review the summary, and select [Install](#).

Results

A single-host SAP HANA system is installed. A log file is available.

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see [Managing the SAP HANA System After Installation](#) or the platform lifecycle management section of the [SAP HANA Administration Guide](#).

Related Information

[System Properties \[page 89\]](#)

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Installation \[page 53\]](#)

[Managing the SAP HANA System After Installation \[page 143\]](#)

4.2.2 Install a Single-Host SAP HANA System Using the Command-Line Interface

A single-host SAP HANA system can be installed using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode or batch mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblcm
```

3. Select the index for *Install New System*, then select .
4. Select the components you would like to install as a comma-separated list, then select .
5. Specify the SAP HANA system properties.
For a list of all system properties, see *System Properties* in Related Information.
6. After specifying all system properties, review the summary, and select *y*.

Results

A single-host SAP HANA system is installed. A log file is available.

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see *Managing the SAP HANA System After Installation* or the platform lifecycle management section of the *SAP HANA Administration Guide*.

Related Information

[System Properties \[page 89\]](#)

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Installation \[page 53\]](#)

[Managing the SAP HANA System After Installation \[page 143\]](#)

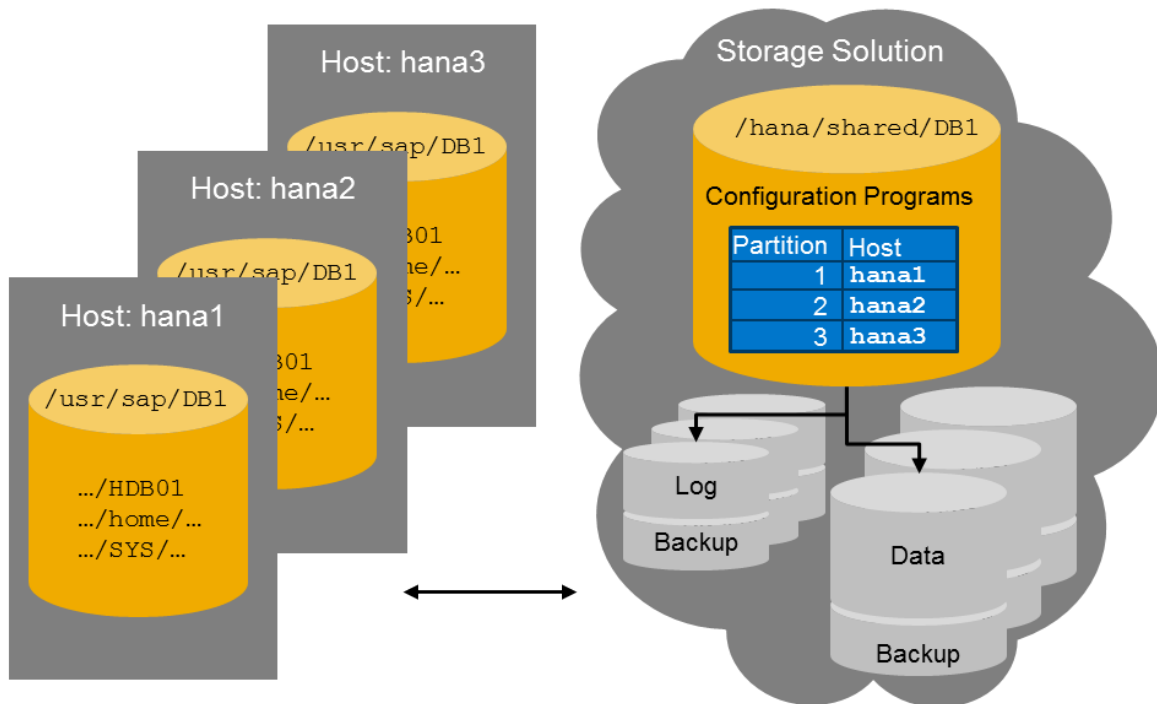
4.3 Installing a Multiple-Host System

The SAP HANA database lifecycle manager can be used to install an SAP HANA multiple-host system in one of the program interfaces, and with a combination of parameter specification methods.

A multiple-host system is a system with more than one host, which can be configured as active worker hosts or idle standby hosts. The server software is based on a flexible architecture that enables a distributed installation. This means that load can be balanced between different hosts. The server software has to be installed in a shared file system. This file system has to be mounted by all hosts that are part of the system.

The following graphic shows the file system for a multiple-host installation using a shared file system:

SAP HANA Multiple-Host System



System Configuration

Instance Number: 01
 SAP System ID (SID): DB1
 Host Names: hana1, hana2, hana3

Database Directories

Installation Path: /hana/shared
 Data Path: /hana/data/DB1
 Log Path: /hana/log/DB1

Local Directories

hana1: /usr/sap/DB1
 hana2: /usr/sap/DB1
 hana3: /usr/sap/DB1

To create a multiple-host system after installing a single-host system, hosts must be added to the SAP HANA system. To add hosts to an existing system, use the SAP HANA resident HDBLCM. For more information about host addition, see Related Information or the *SAP HANA Administration Guide*.

The following information only covers building a multiple-host system **during** installation.

4.3.1 Multiple-Host System Concepts

It is important to review multiple-host system concepts like host grouping and storage options before installing a multiple-host system.

Host Types

When configuring a multiple-host system, the additional hosts must be defined as **worker** hosts or **standby** hosts (worker is default). Worker machines process data; standby machines do not handle any processing and instead just wait to take over processes in the case of worker machine failure.

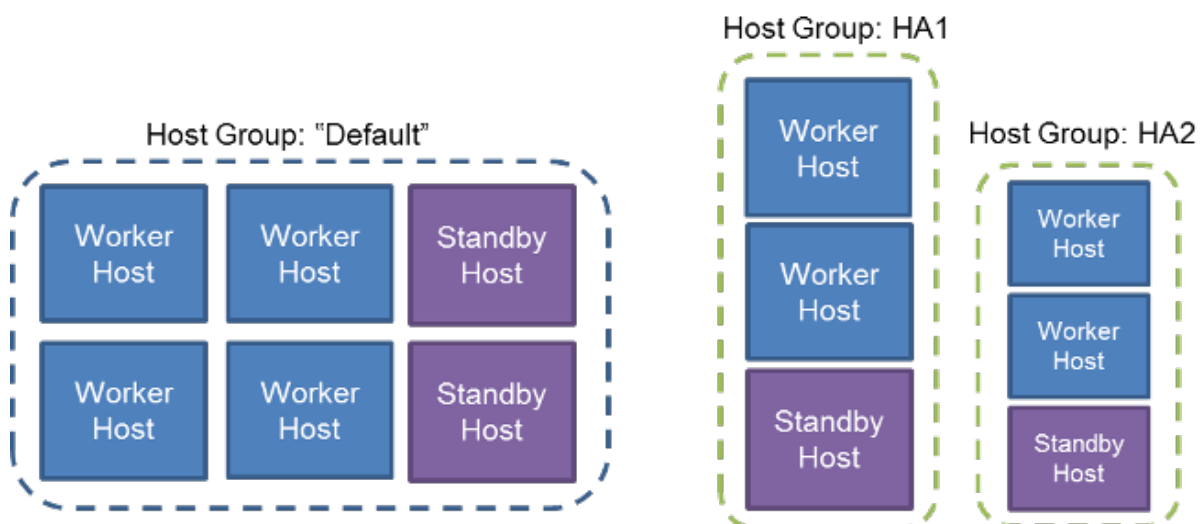
Auto-Failover for High Availability

As an in-memory database, SAP HANA is not only concerned with maintaining the reliability of its data in the event of failures, but also with resuming operations with most of that data loaded back in memory as quickly as possible. Host auto-failover is a local fault recovery solution that can be used as a supplemental or alternative measure to system replication. One (or more) standby hosts are added to a SAP HANA system, and configured to work in standby mode.

Before installing a multiple-host system, it is important to consider whether high availability is necessary and how hosts should be grouped to ensure preferred host auto-failover. For host auto-failover to be successful, if the active (worker) host fails, the standby host takes over its role by starting its database instance using the persisted data and log files of the failed host. The name server of one of the SAP HANA instances acts as the cluster manager that pings all hosts regularly. If a failing host is detected, the cluster manager ensures that the standby host takes over the role and the failing host is no longer allowed write access to the files (called fencing) so that they do not become corrupted. The crash of a single service does not trigger failover since services are normally restarted by `hdbdaemon`. For more information, see *Setting Up Host Auto-Failover* in the *SAP HANA Administration Guide*.

Host Grouping

Host grouping does not affect the load distribution among worker hosts - the load is distributed among all workers in an SAP HANA system. If there are multiple standby hosts in a system, host grouping should be considered, because host grouping decides the allocation of standby resources if a worker machine fails. If no host group is specified, all hosts belong to one host group called "default". The more standby hosts in one host group, the more failover security.



If the standby hosts are each in a different host group, the standby host in the same group as the failing worker host is preferred. Only if no standby host is available in the same host group, the system will try to fail over to a standby host, which is part of another host group. The advantage of this configuration is that in an SAP HANA system with mixed machine resources, similar sized machines can be grouped together. If a small worker host fails, and a small standby in the same group takes over, the processes are moved to a machine with similar resources, which allows processing to continue as usual with optimal resource allocation.

Storage and File System Options

In single-host SAP HANA systems, it is possible to use local file systems residing on direct-attached internal or external storage devices, such as SCSI hard drives, SSDs, SAN storage, or NAS. However, in order to build a multiple-host system with failover capabilities this is not sufficient. Either the chosen file system type or the SAN Infrastructure along with a SAP HANA functionality capable of disc fencing must ensure the following:

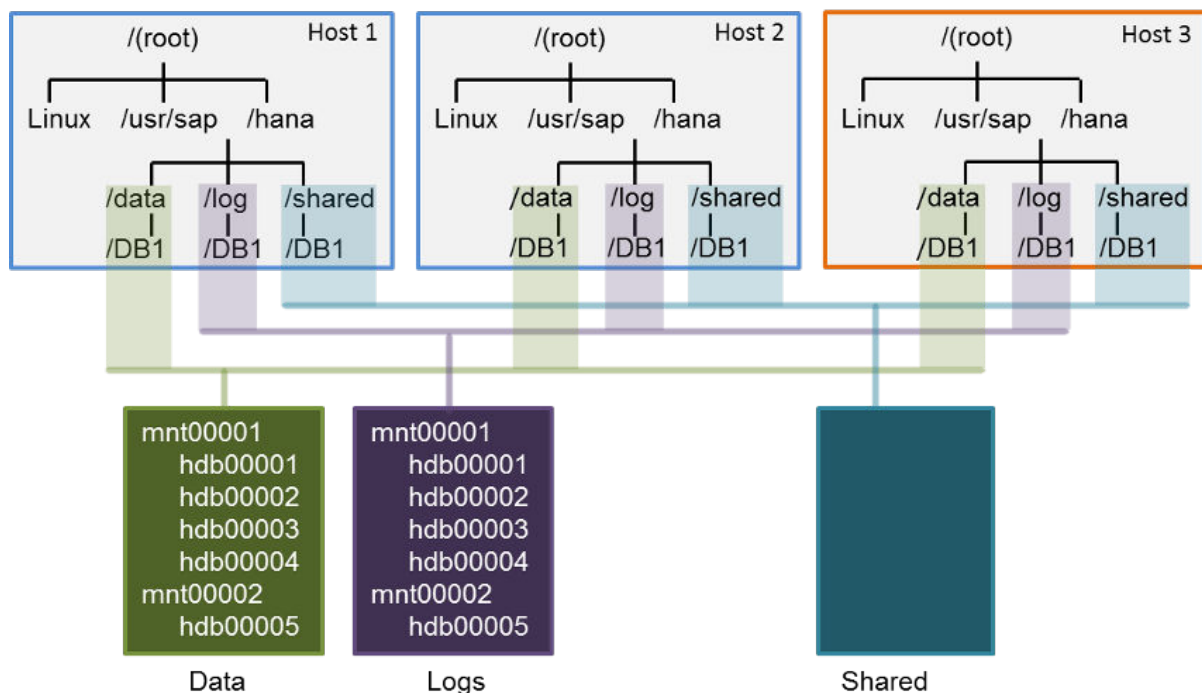
- The standby host has file access to data and log volumes of the failed host.
- The failed worker host no longer has access to write to files - called fencing.

There are two fundamentally different storage configurations which meet the two conditions above: **shared storage devices** or **separate storage devices with failover reassignment**. Do not confuse "shared storage" with the installation directory `/hana/shared` that must be shared across all hosts.

Shared File Systems

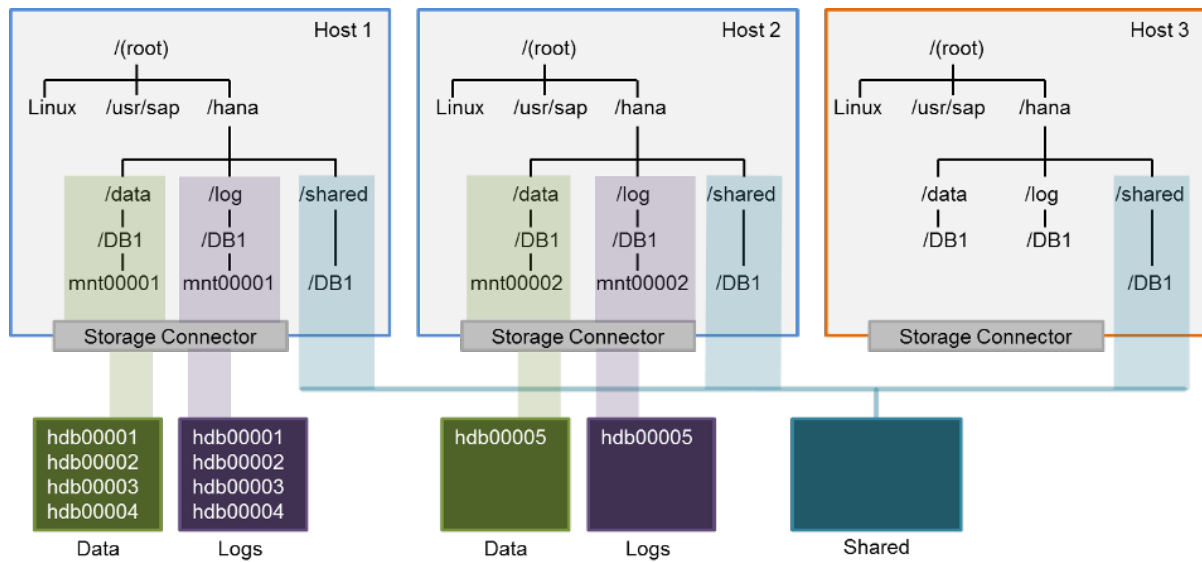
A shared storage subsystem, which is accessed using file systems such as NFS or IBM's GPFS, makes it easy to ensure that the standby host has access to all active host files in the system. In a shared storage solution, the externally attached storage subsystem devices are capable of providing dynamic mount points for hosts. Since shared storage subsystems vary in their handling of fencing, it is the responsibility of the hardware partner and their storage partners to develop a corruption-safe failover solution which is specific for the file system used to access that storage subsystem. An NFSv3 storage solution must be used in combination with the storage connector supplied by the hardware partner. NFSv4 and GPFS storage solutions can optionally be used with a storage connector.

A shared storage system could be configured as in the diagram below, however mounts may differ among hardware partners and their configurations.



Non-shared Storage

It is also possible to assign every SAP HANA host a separate storage, which has nothing mounted except the shared area. A SAN storage must be used in combination with the SAP Fiber Channel Storage Connector, which SAP HANA offers storage technology vendors. During failover, SAP HANA uses the storage connector API to tell the storage device driver to re-mount the required data and logs volumes to the standby host and fence off the same volumes from the failed host.



In a non-shared environment, separate storage is used in combination with the storage connector API. For more information about the storage connector API, see the *SAP Fiber Channel Storage Connector Admin Guide* available in SAP Note 1900823 in Related Information.

Related Information

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

[405827 - Linux: Recommended file systems](#)

4.3.2 Install a Multiple-Host SAP HANA System Using the Graphical User Interface

A multiple-host SAP HANA system can be installed using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.
- The SAP HANA system must be installed with its server software on a shared file system:
 - Create an installation directory, e.g. `/hana/shared/`
 - Set the export options `rw,no_root_squash` for the installation directory.
 - Mount the installation directory on all hosts.
- Depending on the desired storage solution, **shared storage devices** or **separate storage devices with failover reassignment**, different configurations apply:
 - In a shared file system, the data files and log files are configured so that they are present and mounted on all hosts, including the primary host.
 - In a system that uses separate storage devices, each host only has access to its own data files and log files.

The suggested locations for the file systems are as follows:

- `/hana/data/<SID>`
- `/hana/log/<SID>`
- (Optional) Additional storage is configured.
- Root user name must be the same for all hosts in a multiple-host system.
- If the root user name is **not** `root`, it must be specified as a parameter during installation using the parameter `root_user`.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode by entering parameters interactively. This procedure may also be performed in advanced interactive mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select a detected software component or add a software component location by selecting [Add Component Location](#). Then select [Next](#).
4. Select [Install New System](#), then select [Next](#).
5. Select the components you would like to install, then select [Next](#).
6. Select [Multiple-Host System](#) as the [System Type](#), and select [Add Host](#) to specify host parameters for the additional hosts.

Field Name	Description
Installation Path	Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.
Non-standard Shared File System	Specifies a non-standard shared file system, which can be accessed by all hosts during installation. This parameter is typically used when the SID is included in the mountpoint.
Host Name	Specifies the host name of the machine.

Field Name	Description
<i>Role</i>	<p>Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles.</p> <ul style="list-style-type: none"> ○ Database Worker (worker) - A worker host (default) is used for database processing. ○ Database Standby (standby) - A standby host is idle and available for fail-over in a high-availability environment. ○ Dynamic Tiering Worker (extended_storage_worker) - Worker host for SAP HANA dynamic tiering ○ Dynamic Tiering Standby (extended_storage_standby) - Standby host for SAP HANA dynamic tiering ○ Accelerator for SAP ASE Worker (ets_worker) - Worker host for SAP HANA accelerator for SAP ASE ○ Accelerator for SAP ASE Standby (ets_standby) - Standby host for SAP HANA accelerator for SAP ASE ○ Remote Data Sync (rdsync) - Host for SAP HANA remote data sync ○ Smart Data Streaming (streaming) - Host for SAP HANA smart data streaming ○ XS advanced runtime worker - Host for SAP HANA XS advanced runtime ○ XS advanced runtime standby - Standby host for SAP HANA XS advanced runtime
<i>High-Availability Group</i>	<p>Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".</p>
<i>Storage Partition</i>	<p>Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.</p>

7. Specify the SAP HANA system properties.
For a list of all system properties, see *System Properties* in Related Information.
8. After specifying all system properties, review the summary, and select *Install*.

Results

A multiple-host SAP HANA system is installed. A log file is stored in the following path:

```
/var/tmp/hdb_<SID>_<action>_<time stamp>
```

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see *Managing the SAP HANA System After Installation* or the platform lifecycle management section of the *SAP HANA Administration Guide*.

Related Information

[System Properties \[page 89\]](#)

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Installation \[page 53\]](#)

[Managing the SAP HANA System After Installation \[page 143\]](#)

4.3.3 Install a Multiple-Host SAP HANA System Using the Command-Line Interface

A multiple-host SAP HANA system can be installed using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.
- The SAP HANA system must be installed with its server software on a shared file system:
 - Create an installation directory, e.g. `/hana/shared/`
 - Set the export options `rw,no_root_squash` for the installation directory.
 - Mount the installation directory on all hosts.
- Depending on the desired storage solution, **shared storage devices** or **separate storage devices with failover reassignment**, different configurations apply:
 - In a shared file system, the data files and log files are configured so that they are present and mounted on all hosts, including the primary host.
 - In a system that uses separate storage devices, each host only has access to its own data files and log files.

The suggested locations for the file systems are as follows:

- `/hana/data/<SID>`
- `/hana/log/<SID>`
- (Optional) Additional storage is configured.
- Root user name must be the same for all hosts in a multiple-host system.
- If the root user name is **not** root, it must be specified as a parameter during installation using the parameter `root_user`.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode or batch mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblcm
```

i Note

A *Non-standard Shared File System* which can be accessed by all hosts during installation can be set during installation with the `checkmnt` parameter. This parameter is typically used when the SID is included in the mountpoint.

3. Select the index for *Install New System*, then select .
4. Select the components you would like to install as a comma-separated list, then select .
5. Specify the installation path, and the local host name:

SAP HANA System Properties

Field Name	Description
<i>Installation Path</i>	Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.
<i>Local Host Name</i>	Specifies the host name of the machine.

6. Select *y* to the question *Do you want to add hosts to the system?*, and enter the following details for the additional host:

Field Name	Description
<i>Host Name</i>	Specifies the host name of the machine.
<i>Role</i>	<p>Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles.</p> <ul style="list-style-type: none"> ○ Database Worker (worker) - A worker host (default) is used for database processing. ○ Database Standby (standby) - A standby host is idle and available for fail-over in a high-availability environment. ○ Dynamic Tiering Worker (extended_storage_worker) - Worker host for SAP HANA dynamic tiering ○ Dynamic Tiering Standby (extended_storage_standby) - Standby host for SAP HANA dynamic tiering ○ Accelerator for SAP ASE Worker (ets_worker) - Worker host for SAP HANA accelerator for SAP ASE ○ Accelerator for SAP ASE Standby (ets_standby) - Standby host for SAP HANA accelerator for SAP ASE ○ Remote Data Sync (rdsync) - Host for SAP HANA remote data sync ○ Smart Data Streaming (streaming) - Host for SAP HANA smart data streaming ○ XS advanced runtime worker - Host for SAP HANA XS advanced runtime ○ XS advanced runtime standby - Standby host for SAP HANA XS advanced runtime
<i>Host Failover Group</i>	Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".
<i>Storage Partition</i>	Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.

7. Specify the SAP HANA system properties.
For a list of all system properties, see *System Properties* in Related Information.
8. After specifying all system properties, review the summary, and select *y*.

Results

A multiple-host SAP HANA system is installed. A log file is stored in the following path:

```
/var/tmp/hdb_<SID>_<action>_<time stamp>
```

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see *Managing the SAP HANA System After Installation* or the platform lifecycle management section of the *SAP HANA Administration Guide*.

Related Information

[System Properties \[page 89\]](#)

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)
[Changeable Default Values for Installation \[page 53\]](#)
[checkmnt \[page 183\]](#)
[Managing the SAP HANA System After Installation \[page 143\]](#)

4.4 Installing a Multitenant Database Container SAP HANA System

A multitenant database container SAP HANA system is a system that contains one system database and multiple tenant databases.

For more information about creating and configuring multitenant database containers, see the *SAP HANA Administration Guide*.

4.4.1 Install a Multitenant Database Container System Using the Graphical User Interface

An SAP HANA system can be installed as an SAP HANA multitenant database container system using the SAP HANA database lifecycle manager graphical user interface.

Prerequisites

- You are logged in as root user.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode by entering parameters interactively. This procedure may also be performed in advanced interactive mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

⚠ Caution

Configuring an SAP HANA system to be an SAP HANA multitenant database container system is permanent and cannot be reversed.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select a detected software component or add a software component location by selecting [Add Component Location](#). Then select [Next](#).
4. Select [Install New System](#), then select [Next](#).
5. Select the components you would like to install, then select [Next](#).
6. Select [Single-Host System](#) or [Multiple-Host System](#) as the *System Type*, and select [Add Host](#) to specify host parameters for the additional hosts.

Field Name	Description
Installation Path	Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.
Non-standard Shared File System	Specifies a non-standard shared file system, which can be accessed by all hosts during installation. This parameter is typically used when the SID is included in the mountpoint.
Host Name	Specifies the host name of the machine.

Field Name	Description
<i>Role</i>	<p>Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles.</p> <ul style="list-style-type: none"> ○ Database Worker (worker) - A worker host (default) is used for database processing. ○ Database Standby (standby) - A standby host is idle and available for fail-over in a high-availability environment. ○ Dynamic Tiering Worker (extended_storage_worker) - Worker host for SAP HANA dynamic tiering ○ Dynamic Tiering Standby (extended_storage_standby) - Standby host for SAP HANA dynamic tiering ○ Accelerator for SAP ASE Worker (ets_worker) - Worker host for SAP HANA accelerator for SAP ASE ○ Accelerator for SAP ASE Standby (ets_standby) - Standby host for SAP HANA accelerator for SAP ASE ○ Remote Data Sync (rdsync) - Host for SAP HANA remote data sync ○ Smart Data Streaming (streaming) - Host for SAP HANA smart data streaming ○ XS advanced runtime worker - Host for SAP HANA XS advanced runtime ○ XS advanced runtime standby - Standby host for SAP HANA XS advanced runtime
<i>High-Availability Group</i>	<p>Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".</p>
<i>Storage Partition</i>	<p>Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.</p>

7. Specify the SAP HANA system properties. Select the *multiple_containers* value for the *Database Mode* property to configure the system to support multitenant database containers.
For a list of all system properties, see *System Properties* in Related Information.
8. After specifying all system properties, review the summary, and select *Install*.

Results

The SAP HANA system is now installed as an SAP HANA multitenant database container system. For more information about configuring the multitenant database container system in the SAP HANA studio, see Related Information or the *SAP HANA Administration Guide*.

Related Information

- [System Properties \[page 89\]](#)
- [Using the SAP HANA Platform LCM Tools \[page 25\]](#)
- [Changeable Default Values for Installation \[page 53\]](#)
- [Managing the SAP HANA System After Installation \[page 143\]](#)

4.4.2 Install a Multitenant Database Container System Using the Command-Line Interface

An SAP HANA system can be installed as an SAP HANA multitenant database container system using the SAP HANA database lifecycle manager command-line interface.

Prerequisites

- You are logged in as root user.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode or batch mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Caution

Configuring an SAP HANA system to be an SAP HANA multitenant database container system is permanent and cannot be reversed.

Procedure

- Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblcm
```

3. Select the index for *Install New System*, then select .
4. Select the components you would like to install as a comma-separated list, then select .
5. Specify the SAP HANA system properties. Select the *multiple_containers* value for the *Database Mode* property to configure the system to support multitenant database containers.
For a list of all system properties, see *System Properties* in Related Information.
6. After specifying all system properties, review the summary, and select *y*.

Results

The SAP HANA system is now installed as an SAP HANA multitenant database container system. For more information about configuring the multitenant database container system in the SAP HANA studio, see Related Information or the *SAP HANA Administration Guide*.

Related Information

[System Properties \[page 89\]](#)

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Installation \[page 53\]](#)

[Managing the SAP HANA System After Installation \[page 143\]](#)

4.5 Installing XS Advanced Runtime

The SAP HANA database lifecycle manager can be used to install the XS Advanced Runtime.

i Note

From SPS 11, SAP HANA includes an additional run-time environment for application development: SAP HANA extended application services (XS), advanced model. SAP HANA XS advanced model represents an evolution of the application server architecture within SAP HANA by building upon the strengths (and expanding the scope) of SAP HANA extended application services (XS), classic model. SAP recommends that customers and partners who want to develop new applications use SAP HANA XS advanced model. If you want to migrate existing XS classic applications to run in the new XS advanced run-time environment,

SAP recommends that you first check the features available with the installed version of XS advanced; if the XS advanced features match the requirements of the XS classic application you want to migrate, then you can start the migration process.

SAP HANA extended application services, advanced model provides a comprehensive platform for the development and execution of native data-intensive applications. It requires the installation of the XS advanced runtime.

In support of this data-integrated application paradigm, SAP HANA Extended Application Services provide a comprehensive set of embedded services that provide end-to-end support for Web-based applications. This includes a lightweight web server, configurable OData support, JavaScript execution and, of course, full access to SQL and SQLScript.

These SAP HANA Extended Application Services are provided by the SAP HANA XS server, which provides lightweight application services that are fully integrated into SAP HANA. It allows clients to access the SAP HANA system via HTTP. Controller applications can run completely natively on SAP HANA, without the need for an additional external application server.

The application services can be used to expose the database data model, with its tables, views and database procedures, to clients. This can be done in a declarative way using OData services or by writing native application-specific code that runs in the SAP HANA context . Also, you can use SAP HANA XS to build dynamic HTML5 UI applications.

For more information about SAP HANA XS advanced, see the *SAP HANA Developer Guide (For SAP HANA XS Advanced Model)*.

Related Information

[2244998 - Known issues of SAP HANA extended application services, advanced model](#)

4.5.1 System Concepts for XS Advanced Runtime Installations

It is important to review single-host and multiple-host system concepts before installing a SAP HANA system that includes the XS advanced runtime.

Host Types

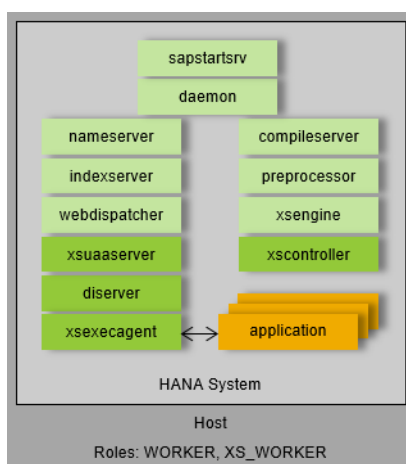
When configuring a multiple-host system with XS advanced runtime, the additional hosts must be defined as **xs_worker** hosts or **xs_standby** hosts. Worker machines run XS applications; standby machines do not handle any processing and instead just wait to take over processes in the case of worker machine failure.

Automatic Role Assignment

XS advanced runtime host roles can be assigned automatically during installation. The installer will assign the role `xs_worker` to every worker host and `xs_standby` to every standby host.

Single-Host Setup

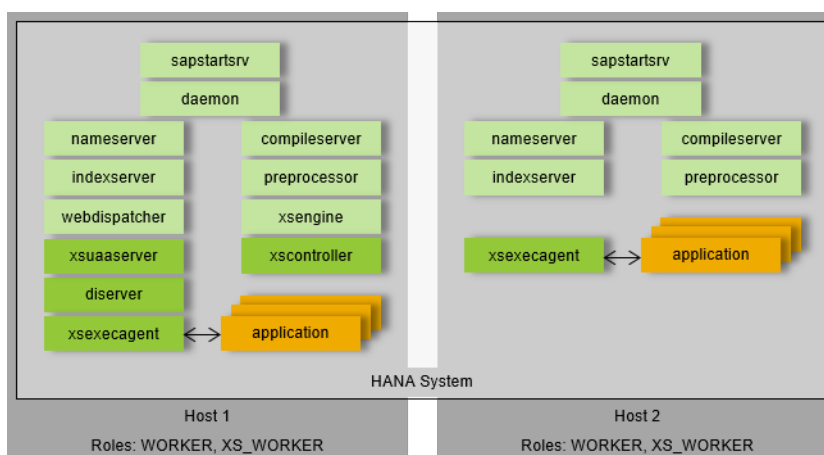
A single-host system is the simplest system installation type. It is possible to run an SAP HANA system entirely on one host and then scale the system up as needed. The host must have the database worker and `xs_worker` host roles assigned.



Multi-Host Setup

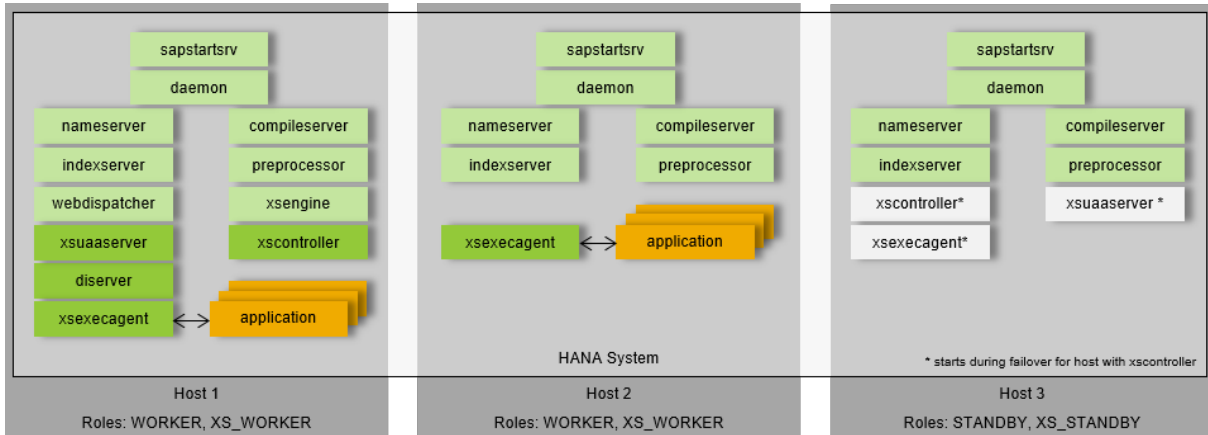
A multiple-host system is a system with more than one host, which can be configured as active worker hosts or idle standby hosts. The server software is based on a flexible architecture that enables a distributed installation. This means that load can be balanced between different hosts. The server software has to be installed in a shared file system. This file system has to be mounted by all hosts that are part of the system.

In a basic multi-host system all worker hosts also act as XS worker hosts.



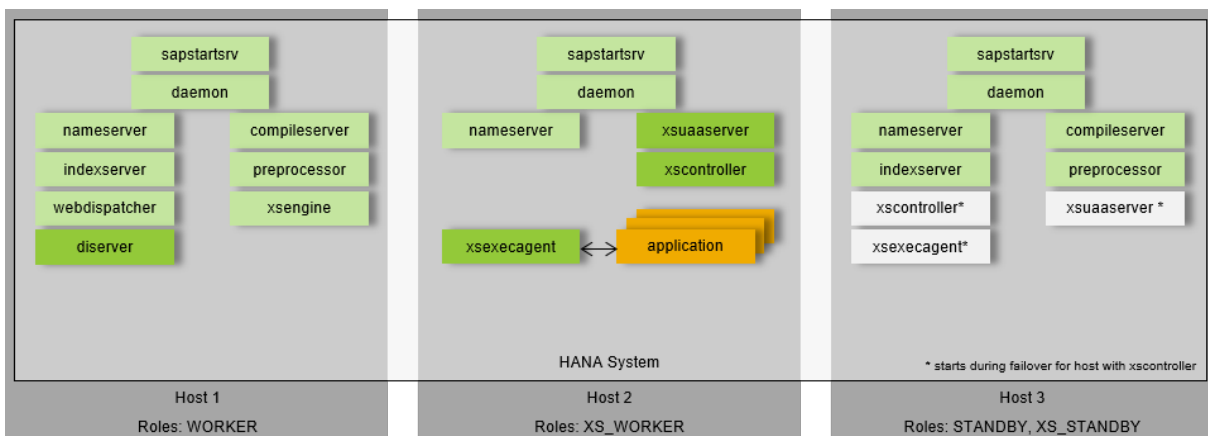
Multi-Host System with Standby Host

A dedicated standby host can be added to the basic multi-host setup. It will act as a failover host in the case of worker machine failure for both worker and XS worker hosts.



Dedicated XS advanced runtime Host

SAP HANA extended application services, advanced model provides a comprehensive platform for the development and execution of native data-intensive applications. Worker and XS worker host roles can therefore be assigned to different hosts. To create a multiple-host system with a dedicated XS worker host, hosts must be assigned manually during installation.



Domains and Routing Configuration

URL routing for XS Advanced applications can be based on ports or hostnames. Using hostname routing mode is recommended for productive use. Application URLs in this mode are user-friendly since they contain the name of the application. You can configure the routing mode and the default domain during installation.

Alternatively you can change this setting within the SAP HANA configuration file for the **xscontroller** service. For more information on domains and routing configuration, see *SAP Note 2245631 - Domains and routing configuration for SAP HANA extended application services, advanced model* in Related Information.

Related Information

[Installing a Single-Host System \[page 58\]](#)

[Installing a Multiple-Host System \[page 62\]](#)

[Install the XS Advanced Runtime Using the Graphical Interface \[page 81\]](#)

[Install the XS Advanced Runtime Using the Command-Line Interface \[page 85\]](#)

[SAP Note 2245631 - Enabling hostname routing in SAP HANA extended application services, advanced model](#)



4.5.2 Install the XS Advanced Runtime Using the Graphical Interface

The SAP HANA XS advanced runtime can be installed in a single-host or multi-host environment using the SAP HANA database lifecycle manager (HDBLCM).

Prerequisites

- The most recent version of the SAP HANA and SAP HANA XS advanced runtime installation packages are downloaded, and all packages are of an equivalent support or revision level.
- You are logged in as root user.
- The SAP HANA system must be installed with its server software on a shared file system:
 - Create an installation directory, e.g. `/hana/shared/`
 - Set the export options `rw,no_root_squash` for the installation directory.
 - Mount the installation directory on all hosts.
- Depending on the desired storage solution, **shared storage devices** or **separate storage devices with failover reassignment**, different configurations apply:
 - In a shared file system, the data files and log files are configured so that they are present and mounted on all hosts, including the primary host.
 - In a system that uses separate storage devices, each host only has access to its own data files and log files.

The suggested locations for the file systems are as follows:

- `/hana/data/<SID>`
- `/hana/log/<SID>`
- (Optional) Additional storage is configured.
- Root user name must be the same for all hosts in a multiple-host system.

- If the root user name is **not** root, it must be specified as a parameter during installation using the parameter `root_user`.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode by entering parameters interactively. This procedure may also be performed in advanced interactive mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</code>
IBM Power Systems	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</code>

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. On the Select Software Component Locations page, if the SAP HANA XS advanced runtime component appears on the list, click [Next](#); otherwise:
 - a. Click [Add Component Location](#).
 - b. Type the path to the missing installation package and click [OK](#).
4. Select [Install New System](#), then select [Next](#).
5. Select SAP HANA XS advanced runtime, then select [Next](#).
6. Select [Single-Host System](#) or [Multiple-Host System](#) as the *System Type*, and select [Add Host](#) to specify host parameters for each additional host.

Field Name	Description
<i>Installation Path</i>	Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.
<i>Non-standard Shared File System</i>	Specifies a non-standard shared file system, which can be accessed by all hosts during installation. This parameter is typically used when the SID is included in the mountpoint.
<i>Host Name</i>	Specifies the host name of the machine. <div style="background-color: #fff9c4; padding: 5px;"> <p>i Note</p> <p>For XS advanced runtime installations, the fully-qualified host name must be specified.</p> </div>
<i>Role</i>	Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles. <ul style="list-style-type: none"> ○ Database Worker (worker) - A worker host (default) is used for database processing. ○ Database Standby (standby) - A standby host is idle and available for fail-over in a high-availability environment. ○ Dynamic Tiering Worker (extended_storage_worker) - Worker host for SAP HANA dynamic tiering ○ Dynamic Tiering Standby (extended_storage_standby) - Standby host for SAP HANA dynamic tiering ○ Accelerator for SAP ASE Worker (ets_worker) - Worker host for SAP HANA accelerator for SAP ASE ○ Accelerator for SAP ASE Standby (ets_standby) - Standby host for SAP HANA accelerator for SAP ASE ○ Remote Data Sync (rdsync) - Host for SAP HANA remote data sync ○ Smart Data Streaming (streaming) - Host for SAP HANA smart data streaming ○ XS advanced runtime worker - Host for SAP HANA XS advanced runtime ○ XS advanced runtime standby - Standby host for SAP HANA XS advanced runtime
<i>High-Availability Group</i>	Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".
<i>Storage Partition</i>	Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.

XS advanced runtime host roles can be assigned automatically during installation. The installer will assign the role `xs_worker` to every worker host and `xs_standby` to every standby host. To create a multiple-host system with a dedicated XS worker host, hosts must be assigned manually during installation.

7. Specify the SAP HANA system properties.

For a list of all system properties, see *System Properties* in Related Information.

8. Select the XS Advanced components you would like to install, then select .

Component	Description
<i>SAP Web IDE Web Client</i>	SAP Web IDE for SAP HANA is a comprehensive browser-based IDE for the development of complex applications comprised of Web-based or mobile UIs, business logic, and extensive SAP HANA data models.
<i>SAP Web IDE Development Infrastructure</i>	SAP Web IDE for SAP HANA development infrastructure core component
<i>XS Monitoring</i>	SAP HANA XS Advanced Model includes a Web-based tool that enables you to maintain important parts of the application-development environment, for example, security and authentication methods.
<i>XS Services</i>	In SAP HANA XS Advanced, application developers can make use of a catalog of services managed by a service broker, for example, for job schedules or user accounts and OAuth clients.
<i>SAP HANA Runtime Tools</i>	SAP HANA provides a selection of tools to help in the various phases of the design-time development and run-time administration of Multi-Target Applications (MTA) on XS advanced.
<i>SAP Hana Demo Model for XS Advanced</i>	SAP HANA Interactive Education (SHINE) for XS Advanced Model

9. After specifying all system properties, review the summary, and select *Install*.

Results

A SAP HANA system with XS advanced runtime is installed. A log file is available.

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see *Managing the SAP HANA System After Installation* or the platform lifecycle management section of the *SAP HANA Administration Guide*.

Related Information

- [System Properties \[page 89\]](#)
- [Using the SAP HANA Platform LCM Tools \[page 25\]](#)
- [Changeable Default Values for Installation \[page 53\]](#)
- [Managing the SAP HANA System After Installation \[page 143\]](#)
- [Installing or Updating SAP HANA Components \[page 117\]](#)
- [xs_components \[page 214\]](#)
- [xs_components_cfg \[page 215\]](#)
- [xs_customer_space_isolation \[page 215\]](#)
- [xs_customer_space_user_id \[page 215\]](#)
- [xs_domain_name \[page 216\]](#)
- [xs_routing_mode \[page 216\]](#)
- [xs_sap_space_isolation \[page 217\]](#)
- [xs_sap_space_user_id \[page 217\]](#)

4.5.3 Install the XS Advanced Runtime Using the Command-Line Interface

The SAP HANA XS advanced runtime can be installed in a single-host or multi-host environment using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- The most recent version of the SAP HANA and SAP HANA XS advanced runtime installation packages are downloaded, and all packages are of an equivalent support or revision level.
- You are logged in as root user.
- The SAP HANA system must be installed with its server software on a shared file system:
 - Create an installation directory, e.g. `/hana/shared/`
 - Set the export options `rw,no_root_squash` for the installation directory.
 - Mount the installation directory on all hosts.
- Depending on the desired storage solution, **shared storage devices** or **separate storage devices with failover reassignment**, different configurations apply:
 - In a shared file system, the data files and log files are configured so that they are present and mounted on all hosts, including the primary host.
 - In a system that uses separate storage devices, each host only has access to its own data files and log files.

The suggested locations for the file systems are as follows:

- `/hana/data/<SID>`
- `/hana/log/<SID>`
- (Optional) Additional storage is configured.
- Root user name must be the same for all hosts in a multiple-host system.
- If the root user name is **not** root, it must be specified as a parameter during installation using the parameter `root_user`.

Context

The following procedure describes the installation of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode or batch mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</code>
IBM Power Systems	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</code>

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblcm
```

3. Select the index for *Install New System*, then select .
4. Select *server, xs* and any other components you would like to install as a comma-separated list, then select .
5. Specify the installation path, and the local host name:

SAP HANA System Properties

Field Name	Description
<i>Installation Path</i>	Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.
<i>Local Host Name</i>	Specifies the host name of the machine.

6. If you want to install a single-host system, select *n* to the question *Do you want to add hosts to the system?*. If you want to install a multi-host system, select *y* and enter the following details for each additional host:

Field Name	Description
<i>Host Name</i>	Specifies the host name of the machine.
	<p>i Note</p> <p>For XS advanced runtime installations, the fully-qualified host name must be specified.</p>

Field Name	Description
<i>Role</i>	<p>Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles.</p> <ul style="list-style-type: none"> ○ Database Worker (worker) - A worker host (default) is used for database processing. ○ Database Standby (standby) - A standby host is idle and available for fail-over in a high-availability environment. ○ Dynamic Tiering Worker (extended_storage_worker) - Worker host for SAP HANA dynamic tiering ○ Dynamic Tiering Standby (extended_storage_standby) - Standby host for SAP HANA dynamic tiering ○ Accelerator for SAP ASE Worker (ets_worker) - Worker host for SAP HANA accelerator for SAP ASE ○ Accelerator for SAP ASE Standby (ets_standby) - Standby host for SAP HANA accelerator for SAP ASE ○ Remote Data Sync (rdsync) - Host for SAP HANA remote data sync ○ Smart Data Streaming (streaming) - Host for SAP HANA smart data streaming ○ XS advanced runtime worker - Host for SAP HANA XS advanced runtime ○ XS advanced runtime standby - Standby host for SAP HANA XS advanced runtime
<i>Host Failover Group</i>	<p>Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".</p>
<i>Storage Partition</i>	<p>Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.</p>

XS advanced runtime host roles can be assigned automatically during installation. The installer will assign the role `xs_worker` to every worker host and `xs_standby` to every standby host. To create a multiple-host system with a dedicated XS worker host, hosts must be assigned manually during installation.

7. Specify the SAP HANA system properties.

For a list of all system properties, see *System Properties* in Related Information.

8. Select the XS Advanced components you would like to install as a comma-separated list, then select

.

Component	Description
<i>xsac_sap_web_ide</i>	SAP Web IDE for SAP HANA is a comprehensive browser-based IDE for the development of complex applications comprised of Web-based or mobile UIs, business logic, and extensive SAP HANA data models.
<i>xsac_di_core</i>	SAP Web IDE for SAP HANA development infrastructure core component
<i>xsac_monitoring</i>	SAP HANA XS Advanced Model includes a Web-based tool that enables you to maintain important parts of the application-development environment, for example, security and authentication methods.
<i>xsac_services</i>	In SAP HANA XS Advanced, application developers can make use of a catalog of services managed by a service broker, for example, for job schedules or user accounts and OAuth clients.

Component	Description
<i>xsac_hrtt</i>	SAP HANA provides a selection of tools to help in the various phases of the design-time development and run-time administration of Multi-Target Applications (MTA) on XS advanced.
<i>xsac_shine</i>	SAP HANA Interactive Education (SHINE) for XS Advanced Model

- After specifying all system properties, review the summary, and select **y**.

Results

A SAP HANA system with XS advanced runtime is installed. A log file is available.

After installing the SAP HANA system, you may want to perform configuration tasks. For more information, see *Managing the SAP HANA System After Installation* or the platform lifecycle management section of the *SAP HANA Administration Guide*.

Related Information

- [System Properties \[page 89\]](#)
- [Using the SAP HANA Platform LCM Tools \[page 25\]](#)
- [Changeable Default Values for Installation \[page 53\]](#)
- [Managing the SAP HANA System After Installation \[page 143\]](#)
- [xs_components \[page 214\]](#)
- [xs_components_cfg \[page 215\]](#)
- [xs_customer_space_isolation \[page 215\]](#)
- [xs_customer_space_user_id \[page 215\]](#)
- [xs_domain_name \[page 216\]](#)
- [xs_routing_mode \[page 216\]](#)
- [xs_sap_space_isolation \[page 217\]](#)
- [xs_sap_space_user_id \[page 217\]](#)

4.6 System Properties

SAP HANA system properties and XS advanced runtime properties.

System Properties

SAP HANA System Properties

Property	Description
<i>Local Host Name</i>	Specifies the host name of the machine.
<i>SAP HANA System ID</i>	Specifies a system ID. The SAP system ID (SID) is the identifier for the SAP HANA system.
<i>Instance Number</i>	Specifies the instance number of the SAP HANA system.
<i>Database Mode</i>	Specifies whether the system is installed in single-container mode (default) or multiple-container mode. A single-container system contains one database but the system and the database are perceived as a single unit. A multiple-container system contains one system database and any number of tenant databases. The system database is created during the installation process. A system administrator must create the required tenant databases after installation. For general information about multiple-container systems, see Related Information.
<i>System Usage</i>	Specifies the usage type of the system to be installed. This setting is stored in the <code>global.ini</code> file, and can be used to identify the intended usage of the system.
<i>Restrict maximum memory allocation?</i>	Specifies whether maximum memory allocation is restricted for a new system. Specifies the maximum memory allocation for a new system in MB.
<i>Restart system after machine reboot?</i>	Restarts system after machine reboot.
<i>Location of Data Volumes</i>	Specifies the path to the data directory of the SAP HANA system.
<i>Location of Log Volumes</i>	Specifies the path to the log directory of the SAP HANA system.
<i>Edit Certificate Host...</i>	Specifies the hostname used for generation of self-signed SSL certificates for the SAP Host Agent.
<i>System Administrator User ID</i>	Specifies the user ID of the system administrator. This parameter is relevant only if the operating system administrator (<code><sid>adm</code>) does not exist prior to installation.
<i>ID of User Group (sapsys)</i>	Specifies the SAP system (sapsys) group ID. This parameter is relevant only if a sapsys group does not already exist on the host. If a sapsys group already exists, passing the <code>groupid</code> parameter does not alter the existing group.
<i>System Administrator Login Shell</i>	Specifies a system administrator login shell. This parameter is relevant only if the operating system administrator (<code><sid>adm</code>) does not exist prior to installation.

Property	Description
<i>System Administrator Home Directory</i>	Specifies the home directory of the system administrator. This parameter is relevant only if the operating system administrator (<sid>adm) does not exist prior to installation.

XS Advanced Runtime Properties

XS Advanced Runtime Properties

Property	Description
<i>Automatically assign XS Advanced Runtime roles to the hosts with database roles</i>	Assigns XS_WORKER and XS_STANDBY host roles. By default, the host role XS_WORKER will be assigned to all worker hosts, the host role XS_STANDBY will be assigned to all standby hosts.
<i>XS Advanced Admin User</i>	Creates a SAP HANA XS advanced runtime admin user. An admin user can add and manage users, view users, edit organization roles, view the organization quota, and perform other administrative tasks.
<i>Customer Organization Name</i>	Sets the name of the customer organization. Organizations enable developers to collaborate by sharing resources, services, and applications. Access to the shared resources, services, and applications is controlled by the organization manager.
<i>Customer Space Name</i>	Sets the name of the customer space for the SAP HANA XS advanced runtime. In an organization, spaces enable users to access shared resources that can be used to develop, deploy, and maintain applications.
<i>Run Applications in Customer Space with Separate OS User</i>	Run applications in customer space with a separate OS user
<i>Routing Mode</i>	Specifies the routing mode to be used for XS advanced runtime installations.
<i>XS Advanced Domain Name</i>	Specifies the domain name of an xs_worker host. The domain name has to resolve to the SAP HANA host which is running the xscontroller and xsuaaserver service.
<i>XS Advanced SAP Space OS User ID</i>	OS user ID used for running XS advanced runtime applications in SAP space
<i>XS Advanced Customer Space OS User ID</i>	OS user ID used for running XS Advanced applications in customer space

Related Information

[hostname \[page 193\]](#)

[sid \[page 207\]](#)

[number \[page 200\]](#)

[db_mode \[page 189\]](#)

[system_usage \[page 212\]](#)

[autoadd_xs_roles \[page 180\]](#)

[restrict_max_mem \[page 205\]](#)

[autostart \[page 180\]](#)
[datapath \[page 188\]](#)
[logpath \[page 199\]](#)
[certificates_hostmap \[page 181\]](#)
[userid \[page 213\]](#)
[groupid \[page 191\]](#)
[shell \[page 207\]](#)
[home \[page 192\]](#)
[org_manager_user \[page 201\]](#)
[org_name \[page 201\]](#)
[prod_space_name \[page 202\]](#)
[xs_customer_space_isolation \[page 215\]](#)
[xs_routing_mode \[page 216\]](#)
[xs_domain_name \[page 216\]](#)
[xs_sap_space_user_id \[page 217\]](#)
[xs_customer_space_user_id \[page 215\]](#)

5 Updating the SAP HANA System

SAP HANA system components like the SAP HANA client, SAP HANA studio, and additional system components like Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin), XS advanced runtime applications, or SAP HANA smart data access (SDA) can be updated using the SAP HANA database lifecycle manager (HDBLCM).

To update an SAP HANA system, you need to first download the individual components from Service Marketplace (SMP). This can be done manually, from the SAP HANA studio, or using the SAP HANA database lifecycle manager (HDBLCM) Web user interface. Once the component packages have been prepared, the system update can be triggered from any of the three SAP HANA database lifecycle manager user interfaces.

We recommend to perform an SAP HANA system update from a local host, a host that is part of the SAP HANA system, which you are logged on to. Performing an update from a local host minimizes the risk of a failed update due to network glitches.

For security reasons, the SYSTEM user might not be available during a system update. It is, therefore, required to create a lesser-privileged database user for updating a system. For more information, see *Create a Lesser-Privileged Database User for Update* in Related Information.

An existing SAP HANA system that supports multitenant database containers can be updated using any of the supported server update methods. If you would like to update a pre-SPS 09 SAP HANA system to support multitenant database containers, you must first perform a regular system update to SPS 09 or later. Then convert the SAP HANA system to support multitenant database containers. For more information about converting the system, see *Convert an SAP HANA System to Support Multitenant Database Containers* in the *SAP HANA Administration Guide*.

i Note

If you have SAP HANA options installed, review the section about multitenant database containers in the administration guide of the corresponding option for additional information before proceeding. Be aware that you need additional licenses for SAP HANA options and capabilities. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities*.

Related Information

[Preparing for Update \[page 94\]](#)

[Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

[Update an SAP HANA System Using the Command-Line Interface \[page 109\]](#)

[Update an SAP HANA System Using the Web User Interface \[page 111\]](#)










[Create a Lesser-Privileged Database User for Update \[page 145\]](#)

5.1 Changeable Default Values for Update

The SAP HANA database lifecycle manager (HDBLCM) uses the following default values during update unless you change them.

Some default values are based on the predefined values on the current host.

Changeable Parameter Defaults

Parameter	System Default Value	Interactive Mode Availability
client_path	<code>\${sapmnt}/\${SID}/hdbclient</code>	
install_hostagent	y (on)	
install_ssh_key	y (on)	
remote_execution	ssh	
root_user	root	
scope	system	
studio_path	<code>\${sapmnt}/\${SID}/hdbstudio</code>	
studio_repository	1 (on)	
system_user	SYSTEM	

Note

The default paths written in the form `${<parameter>}` indicate that substitution of the parameter occurs in the configuration file and in batch mode. Substitution also occurs in interactive mode in order to create a suggested path. The advantage of substitution is that the SAP system ID (`sid`) and the installation path (`sapmnt`, which is `/hana/shared`, by default) only need to be specified once, and are then substituted in to the other parameter values. This ensures that the system has unique file system paths if multiple systems are installed on the same host. However, if it is preferred to deviate from the default paths, it is necessary to pay attention to the settings, especially in the configuration file, and when installing in batch mode.

Related Information

[client_path \[page 183\]](#)

[install_hostagent \[page 195\]](#)

[install_ssh_key \[page 196\]](#)
[remote_execution \[page 204\]](#)
[root_user \[page 206\]](#)
[scope \[page 207\]](#)
[studio_path \[page 211\]](#)
[studio_repository \[page 211\]](#)
[system_user \[page 212\]](#)

5.2 Preparing for Update

An SAP HANA system can be updated from a local host using the SAP HANA database lifecycle manager.

There are three methods for downloading an SAP HANA installation medium:

- Download from Service Marketplace (SMP)
 - Download the installation medium - This method is only applicable when updating to a new SPS
 - Download individual components
- Use the *Check for Updates* functionality in the SAP HANA studio
See Related Information, for more information about using the SAP HANA studio to check for available software component updates and download them from SAP Service Marketplace.
- Use the Maintenance Optimizer (MOPZ) in the SAP Solution Manager
If you have SAP Solution Manager, you can use it to update your SAP HANA system like other SAP systems in your landscape. In this case, you have to register your SAP HANA system using the System Landscape Directory (SLD). Once this configuration is performed, the SAP HANA database server regularly updates the SLD with data about your SAP HANA system. Afterward, SAP Solution Manager can access this data to calculate updates for this system. You can then use the Maintenance Optimizer (MOPZ) in SAP Solution Manager to generate an SPS and download the necessary archives to a specified location. For more information about updating with the Maintenance Optimizer, see Related Information. You can then provide the SPS location to the SAP HANA database lifecycle manager during system update.

Caution

The installation medium cannot be patched manually with newer versions of SAP HANA components and used for installation or update. The result is an error-prone installation.

Related Information

[Preparing for Update \[page 95\]](#)

[Using the Maintenance Optimizer in the SAP Solution Manager to Upgrade](#)

5.2.1 Preparing for Update

It is possible to check for available updates of the SAP HANA system and components using the SAP HANA database lifecycle manager Web user interface or from the SAP HANA studio. If updates are available, the software must be downloaded, and the archive prepared before the update software can be installed.

Related Information

[Configure the Connection to SAP Service Marketplace \[page 95\]](#)

[Download Components from SAP Support Portal Using the Web User Interface \[page 98\]](#)

[Download Components from SAP Service Marketplace Using the SAP HANA Studio \[page 96\]](#)

5.2.1.1 Configure the Connection to SAP Service Marketplace

Before downloading software components using the SAP HANA studio, configure the connection to SAP Service Marketplace (SMP). As of SPS 12, configuring the connection is only required if you want to connect to and update an SAP HANA system version SPS 11 or lower.

Procedure

1. Start the SAP HANA studio.
2. Select **Window** > **Preferences** > **SAP HANA** > **Lifecycle Management** > **Service Marketplace**.
3. Select **Use SMP configuration**.

The *Host Name* is set to *service.sap.com*. This is the URL of SMP, where the files that are used for the update are located. Enter your SMP S-User credentials in *User Name/Password*.

i Note

You can obtain an S-User on SMP at <https://service.sap.com> under *Registration*.

4. Select **Apply**, then **OK** to complete the configuration.

i Note

To reset your entries, choose *Restore Defaults*.

Next Steps

After configuring the connection from the SAP HANA studio to SAP Service Marketplace, download the software components from the SAP Service Marketplace. For more information about downloading software components using the SAP HANA studio, see Related Information.

Related Information

[Download Components from SAP Service Marketplace Using the SAP HANA Studio \[page 96\]](#)

5.2.1.2 Download Components from SAP Service Marketplace Using the SAP HANA Studio

You can use your SAP HANA studio to check for available software component updates and download them from SAP Service Marketplace.

Prerequisites

- In the SAP HANA studio preferences, you have configured connection properties to the SAP Service Marketplace.
- Your SAP HANA system must be Support Package Stack (SPS) 08 or newer and must have been installed with the SAP HANA database lifecycle manager, so that the versions of the currently installed components are correctly detected. Otherwise this information won't be available, but you can still proceed with the download.
- You need to provide system administrator user (<sid>adm) credentials.

Context

In order to update an SAP HANA system, you first need to download the corresponding update sources (components) from SAP Service Marketplace. The SAP HANA studio provides functionality, which helps you to easily check for available updates of the installed SAP HANA core components and download them locally on the machine where the SAP HANA studio is started or on a shared file system. In addition to the downloaded content you are provided with a shell script (`hdblcm_prepare.sh`), which must be run to extract the archives in a directory structure, so that subsequent installation or update with the SAP HANA database lifecycle manager works as expected.

i Note

As of SPS 12, you can use your SAP HANA database lifecycle manager (HDBLCM) Web user interface to check for available software component updates and download them from SAP Support Portal. The following procedure only applies if you connect to an SAP HANA system version SPS 11 or lower.

Procedure

1. Right click on an SAP HANA system and choose **► Lifecycle Management ► Platform Lifecycle Management ► Check for available software component updates ►**.
2. Choose which versions of the available components you want to download or choose *Skip* to skip the download of a particular component. The current version column shown the version of the components, which is currently installed on the SAP HANA system.

Note that you can also select and download SAP HANA core components which are not currently, but can be installed on the system.
3. Review the selected components and choose a download directory.
4. To start the download process, choose *Finish*.
5. You can run the download process in background by pressing the *Run In Background* button. To get the current progress of the download, open the *Progress View* (**► Window ► Show View ► Other... ► Progress ►**).

Next Steps

After downloading components from the SAP Service Marketplace using the SAP HANA studio, prepare the software archive so that it is detected by the SAP HANA database lifecycle manager during update. For more information about preparing the software archive, see Related Information.

Related Information

[Download Components from SAP Support Portal Using the Web User Interface \[page 98\]](#)

[Prepare the Software Archive for the Update \[page 100\]](#)

5.2.1.3 Download Components from SAP Support Portal Using the Web User Interface

You can use your SAP HANA database lifecycle manager (HDBLCM) Web user interface to check for available software component updates and download them from SAP Support Portal.

Prerequisites

- The SAP HANA system has been installed or updated with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running.
- The SAP HANA system has access to the Internet.

i Note

Alternatively, you can download the components to a shared location to which the SAP HANA system has access or copy the downloaded components to the SAP HANA system manually.

You should verify that the following prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from a Web browser.

- The communication port 1129 is open.
Port 1129 is required for the SSL communication with the SAP Host Agent in a standalone browser via HTTPS.
- The following Web browser requirements are fulfilled:
 - Microsoft Windows
 - Internet Explorer - Version 9 or higher
If you are running Internet Explorer version 9, make sure that your browser is not running in compatibility mode with your SAP HANA host. You can check this in your browser by choosing [Tools > Compatibility View Settings](#).
 - Mozilla Firefox - Latest version and Extended Support Release
 - Google Chrome - Latest version
 - SUSE Linux - Mozilla Firefox with XULRunner 10.0.4 ESR
 - Mac OS - Safari 5.1 or higher

i Note

For more information about supported Web browsers for the SAP HANA database lifecycle manager Web interface, see the browser support for `sap.m` library in the *SAPUI5 Developer Guide* in Related Information.

- You are logged on as the system administrator user `<sid>adm`.

You should verify that the following additional prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from the SAP HANA studio.

- The SAP HANA studio revision is 120 or higher.

- For Linux:
 - The system property `org.eclipse.swt.browser.XULRunnerPath` should be set in `hdbstudio.ini` to point to the path of XULRunner, for example:


```
-Dorg.eclipse.swt.browser.XULRunnerPath=<path to xulrunner>.
```

 This `hdbstudio.ini` file is located in the same folder as the executable that is used to start the SAP HANA studio. For Linux, the default location is `hana/shared/<SID>/hdbstudio..`

Procedure

1. Access the SAP HANA HDBLCM Web user interface.

Option	Description
Web Browser	Enter the SAP HANA database lifecycle manager (HDBLCM) URL in an HTML5-enabled browser: <code>https://<hostname>:1129/lmsl/HDBLCM/<SID>/index.html</code> <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>i Note</p> <p>The URL is case sensitive. Make sure you enter upper and lower case letters correctly.</p> </div>
SAP HANA Studio	<ol style="list-style-type: none"> 1. Start the SAP HANA studio. 2. In the SAP HANA studio, add the SAP HANA system. 3. Open the context menu (right-mouse click) in the <i>Systems</i> view, and select <i>Add System</i>. For more information about adding a system, see <i>Add an SAP HANA System</i> in the <i>SAP HANA Administration Guide</i> in Related Information. 4. In the SAP HANA studio, log on to the system. 5. From the context menu of the selected system, select Lifecycle Management > Platform Lifecycle Management > SAP HANA Platform Lifecycle Management.
SAP HANA Cockpit	<ol style="list-style-type: none"> 1. Enter the SAP HANA cockpit URL in your browser. <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>i Note</p> <p>FQDN = fully qualified domain name</p> </div> 2. The <i>SAP HANA Platform Lifecycle Management</i> tiles are visible on the homepage of the SAP HANA cockpit. If they are not, you can add them from the <i>SAP HANA Platform Lifecycle Management</i> tile catalog. For more information, see <i>Customizing the Homepage of SAP HANA Cockpit</i>.

2. Select the *Download Components* tile.
3. Provide the SAP Support Portal credentials, then select *Next*.
4. Select the components for download. Then select *Next*.

Note that you can also select and download SAP HANA core components which are not currently, but can be installed on the system. To display all components available for download, select *Show Components (Only Updates)* and then select *All*.
5. Select *Download* or *Download All* to download the components.
6. Once the downloads have finished, select *Close* to return to the main screen.

Next Steps

After downloading components from the SAP Support Portal using the SAP HANA database lifecycle manager (HDBLCM) Web user interface, prepare the software archive so that it is detected by the SAP HANA database lifecycle manager during update. For more information about preparing the software archive, see [Related Information](#).

Related Information

[Download Components from SAP Support Portal Using the Web User Interface \[page 98\]](#)

[Prepare the Software Archive for the Update \[page 100\]](#)

5.2.1.4 Prepare the Software Archive for the Update

After downloading the software components from SAP Support Portal, the software archive must be prepared for the update.

Prerequisites

- You are logged in as root user.
- You have downloaded the software components from SAP Support Portal (SAP Service Marketplace) using the SAP HANA studio or the SAP HANA database lifecycle manager (HDBLCM) Web user interface.
- You have copied the download directory to the SAP HANA host or in case it is a shared file system, make sure it is accessible from the SAP HANA host.

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdbclm
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdbclm --action=extract_components
```

3. Enter the location of the SAP HANA component archives which you want to prepare for the update.
4. Enter the target directory to extract the software component archives to.
5. Review the summary, and select **y** to finalize the configuration.

Next Steps

You can now update the SAP HANA system with the SAP HANA database lifecycle manager.

If the SAP HANA database lifecycle manager doesn't detect the installation kit, you should run it with the parameter `component_root` specifying the root directory displayed at the end of the `hdblcm_prepare.sh` script:

```
./hdblcmgui --component_root=<component root directory>
```

or

```
./hdblcm --component_root=<component root directory>
```

Related Information

[Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

[Update an SAP HANA System Using the Command-Line Interface \[page 109\]](#)

[Update an SAP HANA System Using the Web User Interface \[page 111\]](#)

[extract_components \[page 191\]](#)

5.2.2 Prepare for Update Manually

As an alternative to preparing for update in the SAP HANA studio, the update can be prepared manually by making local package directories, that are recognized by the update tool.

Context

i Note

If you extract more than one component SAR into a single directory, you need to move the `SIGNATURE.SMF` file to the subfolder (`SAP_HANA_DATABASE`, `SAP_HANA_CLIENT`, etc.), before extracting the next SAR in order to avoid overwriting the `SIGNATURE.SMF` file. For more information, see also SAP Note 2178665 in Related Information.

Procedure

1. Create a local directory for the downloaded packages.

Example: `/hana/local/downloads`

2. Download SAP HANA packages (*.SAR) from the SAP Service Marketplace to the local directory.

The Debug Symbol Packages (*.TAR) that are also available for download are only needed for troubleshooting purposes and not required for a system update. For more information, see SAP Note 2145573 in Related Information.

3. Create a directory, in to which the package contents can be unpacked.

Example: `/hana/local/downloads/install`

4. Unpack the SAP HANA database archive in to the local directory.

Example: `/usr/sap/hostctrl/exe/SAPCAR -manifest SIGNATURE.SMF -xvf
IMDB_SERVER<version number>.SAR`

5. Unpack the component archives to a local directory:

Run the SAP HANA platform LCM tool using the parameter `extract_components` as a call option.

Next Steps

You can now update the SAP HANA system with the SAP HANA database lifecycle manager.

Related Information

[SAP Note 2178665 - Signature validation of archives with SAPCAR](#)

[SAP Note 2145573 - SAP HANA DB: Installing the Debug Symbol Package for SAP HANA](#)

[extract_components \[page 191\]](#)

[Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

[Update an SAP HANA System Using the Command-Line Interface \[page 109\]](#)

[Update an SAP HANA System Using the Web User Interface \[page 111\]](#)

5.3 Prepare an Update for Reduced SAP HANA System Downtime

As of SPS 10, you can run an SAP HANA system update in two phases - an update preparation phase and a resume update phase - in order to reduced system downtime. You can perform the prepare update phase using either the SAP HANA database lifecycle manager graphical user interface, command-line interface or Web user interface. The update resume phase can be performed from any of the three SAP HANA database lifecycle manager user interfaces.

Prerequisites

- You are updating to a new SPS from an installation medium or you have prepared for update, either in the SAP HANA studio or manually.
- With system replication active, you have updated the secondary system before the primary system. The version of the secondary system must be equal to or higher than the version of the primary system.
- You have performed a system backup. Also note that during the update there is a business downtime for your SAP HANA system.
- You know the <sid>adm, and database administrator passwords.
- You have applied a valid license key for the SAP HANA system.

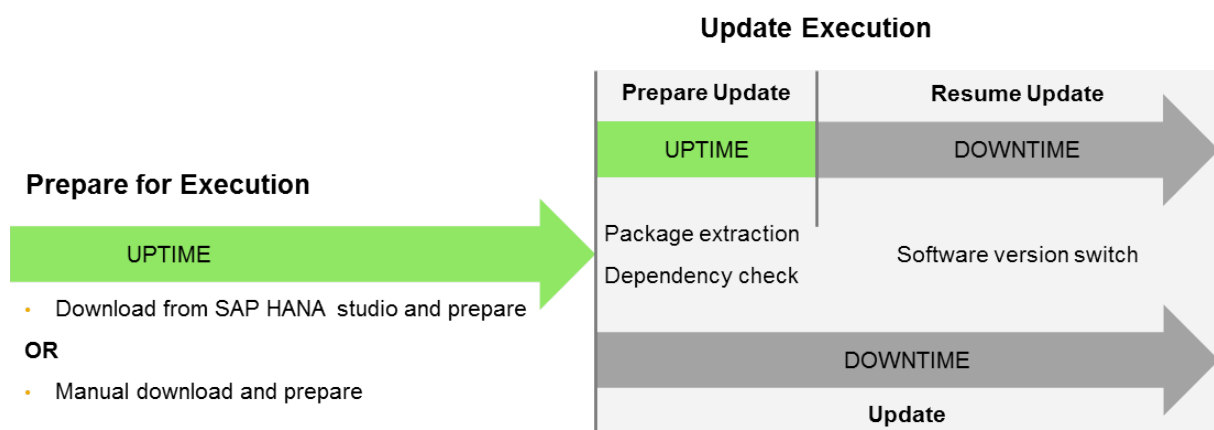
Context

After downloading the SAP HANA software, and preparing the downloaded archives for update execution, you have the choice to update your SAP HANA system in one step, or to update it in a phased approach to minimize system downtime.

When you start the SAP HANA database lifecycle manager with the `prepare_update` flag set, the SAP HANA database lifecycle manager extracts the packages (like the SAP Host Agent, and delivery units) from the new source, but does not actually perform the update. During the preparation phase the system is not modified by the installer or restarted. The software switch occurs when the SAP HANA database lifecycle manager is run a second time, resuming the system update.

The phased update aims to:

- Lower the system downtime
- Reduce the chances of a failed system update due to preliminary steps like archive preparation or dependency conflicts



- [Preparing for Update \[page 94\]](#)
- [Prepare an Update for Reduced SAP HANA System Downtime \[page 102\]](#)
- [Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)
- [Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

i Note

It is also possible to use system replication to achieve near zero downtime upgrades. For more information, see *Use System Replication for Near Zero Downtime Upgrades* in the *SAP HANA Administration Guide* in Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Perform the update preparation phase step with the SAP HANA database lifecycle manager using one of the following commands.

Option	Description
Graphical user interface	<pre>./hdblcgui --action=update --prepare_update</pre>
Command-line interface	<pre>./hdblc --action=update --prepare_update</pre>

Provide the required system update information and credentials. See Related Information for more details about SAP HANA system update.

Before triggering the update preparation phase, confirm that the following line is listed in the action summary under *Update Parameters*:

```
Stop update before software version switch, resumable: Yes
```

If you are using the SAP HANA HDBLCM Web user interface, open the *Advanced Parameters Configuration* dialog from the footer bar and select *Prepare Update Only* under *General Parameters*.

3. Resume the update.

During the planned maintenance window, you can resume the prepared update using any of the standard update procedures. For standard SAP HANA system update procedures, see Related Information.

Related Information

[Preparing for Update \[page 94\]](#)

[Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

[Update an SAP HANA System Using the Command-Line Interface \[page 109\]](#)

[Update an SAP HANA System Using the Web User Interface \[page 111\]](#)

[prepare_update \[page 202\]](#)

[Perform an Optimized Update \[page 105\]](#)

5.4 Perform an Optimized Update

As of SPS 11, you can run an optimized update of an SAP HANA system to reduce the number of restarts and system downtime. You can perform the update using either the SAP HANA database lifecycle manager graphical user interface, command-line interface or Web user interface.

Prerequisites

- You are updating to a new SPS from an installation medium or you have prepared for update, either in the SAP HANA studio or manually.
- With system replication active, you have updated the secondary system before the primary system. The version of the secondary system must be equal to or higher than the version of the primary system.
- You have performed a system backup. Also note that during the update there is a business downtime for your SAP HANA system.
- You know the <sid>adm, and database administrator passwords.
- You have applied a valid license key for the SAP HANA system.

Context

After downloading the SAP HANA software, and preparing the downloaded archives for update execution, you have the choice to update your SAP HANA system in standard mode, or to update it using optimized mode to minimize the number of restarts. The optimized update execution mode is enabled by default, if more than one component that supports the phased update process is selected to be installed or updated. Usually there is no need to specify this option explicitly.

The following components support the optimized update:

- SAP HANA server
- SAP HANA Accelerator for SAP ASE
- SAP HANA Dynamic Tiering
- SAP HANA Remote Data Sync

- SAP HANA Smart Data Streaming

The optimized execution mode is enabled when you install or update more than one of these components. Components which do not support optimized update will be installed or updated in the most appropriate moment.

When you start the SAP HANA database lifecycle manager with `update_execution_mode` set to `optimized`, the SAP HANA database lifecycle manager:

1. Prepares the components for installation. In combination with the parameter `prepare_update` this step can be executed before the actual update to reduce the system downtime during the maintenance window and make sure that all checks pass.
2. Stops the system or individual instances.
3. Updates the software.
4. Starts the system or individual instances.
5. Resumes the update of the components.

The optimized update aims to:

- Reduce the number of system restarts
- Lower the system downtime
- Reduce the chances of a failed system update due to dependency conflicts or errors in preliminary steps, such as archive preparation
- Ensure consistency of component binaries during system start

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Perform the optimized update with the SAP HANA database lifecycle manager using one of the following commands.

Option	Description
Graphical user interface	<code>./hdblcmgui --action=update --update_execution_mode=optimized</code>
Command-line interface	<code>./hdblcm --action=update --update_execution_mode=optimized</code>

The command can be used together with the parameter `--prepare_update` to stop the update process before the resume update phase.

Provide the required system update information and credentials. See Related Information for more details about SAP HANA system update.

If you are using the SAP HANA HDBLCM Web user interface, open the *Advanced Parameters Configuration* dialog from the footer bar and select the optimized update *Update Execution Mode* under *General Parameters*.

Related Information

[Preparing for Update \[page 94\]](#)

[Update an SAP HANA System Using the Graphical User Interface \[page 107\]](#)

[Update an SAP HANA System Using the Command-Line Interface \[page 109\]](#)

[Update an SAP HANA System Using the Web User Interface \[page 111\]](#)

[update_execution_mode \[page 213\]](#)

[Prepare an Update for Reduced SAP HANA System Downtime \[page 102\]](#)

5.5 Update an SAP HANA System Using the Graphical User Interface

All SAP HANA platform components can be updated using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are updating to a new SPS from an installation medium or you have prepared for update, either in the SAP HANA studio or manually.
- You have stopped the data replication.
- You have performed a system backup. Also note that during the update there is a business downtime for your SAP HANA system.
- You know the `<sid>adm`, and database administrator passwords.

- You have applied a valid license key for the SAP HANA system.

Context

The following procedure describes the update of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values, that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file using the graphical user or command-line interface and advanced interactive mode. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</code>
IBM Power Systems	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</code>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Run the SAP HANA database lifecycle manager:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select a detected software component or add a software component location by selecting [Add Component Location](#). Then select [Next](#).
4. Select [Update Existing System](#), and choose the SID from the drop-down menu. Then select [Next](#).
5. Select the components you would like to update, then select [Next](#).
6. Specify the SAP HANA authorization information.

When asked for database user, you have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see [Related Information](#).

7. Define additional properties, depending on which components are selected.
8. After specifying all system properties, review the summary, and select [Update](#).

Next Steps

If your system is a multitenant database container system, SAP HANA content is installed on tenant databases after their creation. After a system update, SAP HANA content on tenant databases must be updated from the system database. Restarting the tenant databases is necessary to trigger the deployment of the updated content on the tenant databases. You can restart the tenant databases once the delivery unit (DU) deployment on the system database has finished. You can monitor the progress of DU deployment by executing the following statement in the SQL console of the SAP HANA studio:

```
SELECT * FROM "PUBLIC"."M_SERVICE_THREADS" WHERE THREAD_TYPE = 'ImportOrUpdateContent';
```

If your system is configured for system replication, you must perform the update on each host individually, starting with the secondary host. The version of the secondary system must be the same or higher as the one running on the primary system

Related Information

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Update \[page 93\]](#)

[Use Advanced Interactive Mode to Perform Platform LCM Tasks \[page 35\]](#)

[Create a Lesser-Privileged Database User for Update \[page 145\]](#)

5.6 Update an SAP HANA System Using the Command-Line Interface

All SAP HANA platform components can be updated using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are updating to a new SPS from an installation medium or you have prepared for update, either in the SAP HANA studio or manually.

- You have stopped the data replication.
- You have performed a system backup. Also note that during the update there is a business downtime for your SAP HANA system.
- You know the `<sid>adm`, and database administrator passwords.
- You have applied a valid license key for the SAP HANA system.

Context

The following procedure describes the update of an SAP HANA system in interactive mode and entering parameters interactively. This procedure may also be performed in advanced interactive mode or batch mode, with parameters entered as call options or from a configuration file. For more information about interaction modes and parameter entry methods, see *Using the SAP HANA Platform LCM Tools* in Related Information.

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</code>
IBM Power Systems	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</code>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Locate the `SAP_HANA_DATABASE` directory, and run the SAP HANA database lifecycle manager:

```
./hdb1cm
```

i Note

If your SAP HANA system has XS advanced runtime installed, you can specify XS advanced runtime components to be updated using the `xs_components` parameter. MTA extension descriptors (`*.mtaext`) can be specified using the `xs_components_cfg` parameter.

3. Select the index for the system to be updated, then select .
4. Select the components you would like to update as a comma-separated list, then select .
5. Specify the SAP HANA authorization information.

When asked for database user, you have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see [Related Information](#).

6. Define additional properties, depending on which components are selected.
7. After specifying all system properties, review the summary, and select **y**.

Next Steps

If your system is a multitenant database container system, SAP HANA content is installed on tenant databases after their creation. After a system update, SAP HANA content on tenant databases must be updated from the system database. Restarting the tenant databases is necessary to trigger the deployment of the updated content on the tenant databases. You can restart the tenant databases once the delivery unit (DU) deployment on the system database has finished. You can monitor the progress of DU deployment by executing the following statement in the SQL console of the SAP HANA studio:

```
SELECT * FROM "PUBLIC"."M_SERVICE_THREADS" WHERE THREAD_TYPE = 'ImportOrUpdateContent';
```

If your system is configured for system replication, you must perform the update on each host individually, starting with the secondary host. The version of the secondary system must be the same or higher as the one running on the primary system

Related Information

[Using the SAP HANA Platform LCM Tools \[page 25\]](#)

[Changeable Default Values for Update \[page 93\]](#)

[Create a Lesser-Privileged Database User for Update \[page 145\]](#)

[xs_components \[page 214\]](#)

[xs_components_cfg \[page 215\]](#)

5.7 Update an SAP HANA System Using the Web User Interface

All SAP HANA platform components can be updated using the SAP HANA database lifecycle manager (HDBLCM) Web user interface. This method is available only for update of SAP HANA Support Package Stack (SPS) 09 systems to higher revision. SAP HANA SPS 08 systems cannot be updated to SPS 09 using the SAP HANA database lifecycle manager Web user interface.

Prerequisites

You should verify that the following prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from a Web browser.

- The communication port 1129 is open.
Port 1129 is required for the SSL communication with the SAP Host Agent in a standalone browser via HTTPS.
- The following Web browser requirements are fulfilled:
 - Microsoft Windows
 - Internet Explorer - Version 9 or higher
If you are running Internet Explorer version 9, make sure that your browser is not running in compatibility mode with your SAP HANA host. You can check this in your browser by choosing **Tools > Compatibility View Settings**.
 - Mozilla Firefox - Latest version and Extended Support Release
 - Google Chrome - Latest version
 - SUSE Linux - Mozilla Firefox with XULRunner 10.0.4 ESR
 - Mac OS - Safari 5.1 or higher

i Note

For more information about supported Web browsers for the SAP HANA database lifecycle manager Web interface, see the browser support for `sap.m` library in the *SAPUI5 Developer Guide* in Related Information.

- You are logged on as the system administrator user `<sid>adm`.

You should verify that the following additional prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from the SAP HANA studio.

- The SAP HANA studio revision is 120 or higher.
- For Linux:
 - The system property `org.eclipse.swt.browser.XULRunnerPath` should be set in `hdbstudio.ini` to point to the path of XULRunner, for example:
`-Dorg.eclipse.swt.browser.XULRunnerPath=<path to xulrunner>`.
This `hdbstudio.ini` file is located in the same folder as the executable that is used to start the SAP HANA studio. For Linux, the default location is `hana/shared/<SID>/hdbstudio..`
- The installation medium must be owned by the root user and should not have write permissions for the group (except for when the group ID is 0) and others.
- You are updating to a new Support Package Stack (SPS) from an installation medium or you have prepared for update, either in the SAP HANA studio or manually. For more information, see *Preparing for Update* in Related Information.
- You have stopped the data replication.
- You have performed a system backup. Also note that during the update there is a business downtime for your SAP HANA system.
- You have applied a valid license key for the SAP HANA system.

Context

If your system is a multitenant database container system, SAP HANA content is installed on tenant databases after their creation. After a system update, SAP HANA content on tenant databases must be updated from the system database. Restarting the tenant databases is necessary to trigger the deployment of the updated content on the tenant databases. You can restart the tenant databases once the delivery unit (DU) deployment on the system database has finished. You can monitor the progress of DU deployment by executing the following statement in the SQL console of the SAP HANA studio:

```
SELECT * FROM "PUBLIC"."M_SERVICE_THREADS" WHERE THREAD_TYPE = 'ImportOrUpdateContent';
```

i Note

Not all parameters are requested interactively. Some parameters have default values that do not require confirmation in interactive mode. Those parameters must be specified as call options or from a configuration file. For more information about changeable default values, see Related Information.

Procedure

1. Access the SAP HANA HDBLCM Web user interface.

Option	Description
Web Browser	<p>Enter the SAP HANA database lifecycle manager (HDBLCM) URL in an HTML5-enabled browser:</p> <pre>https://<hostname>:1129/lmsl/HDBLCM/<SID>/index.html</pre> <p>i Note</p> <p>The URL is case sensitive. Make sure you enter upper and lower case letters correctly.</p>
SAP HANA Studio	<ol style="list-style-type: none">1. Start the SAP HANA studio.2. In the SAP HANA studio, add the SAP HANA system.3. Open the context menu (right-mouse click) in the <i>Systems</i> view, and select <i>Add System</i>. For more information about adding a system, see <i>Add an SAP HANA System</i> in the <i>SAP HANA Administration Guide</i> in Related Information.4. In the SAP HANA studio, log on to the system.5. From the context menu of the selected system, select Lifecycle Management Platform Lifecycle Management SAP HANA Platform Lifecycle Management.
SAP HANA Cockpit	<ol style="list-style-type: none">1. Enter the SAP HANA cockpit URL in your browser. The URL depends on whether you are connecting to a single-container system or to a database in a multiple-container system. A single-container system is accessed through the URL: <code>http://<host_FQDN>:80<instance>/sap/hana/admin/cockpit</code> For more information about the URLs in multiple-container systems, see <i>Configure HTTP Access to Multitenant Database Containers</i> in the <i>SAP HANA Administration Guide</i> in Related Information.

Option	Description
	<p>i Note</p> <p>FQDN = fully qualified domain name</p> <p>2. The <i>SAP HANA Platform Lifecycle Management</i> tiles are visible on the homepage of the SAP HANA cockpit. If they are not, you can add them from the <i>SAP HANA Platform Lifecycle Management</i> tile catalog. For more information, see <i>Customizing the Homepage of SAP HANA Cockpit</i>.</p>

2. Select the *Update System and Components* tile.
3. Enter the file path of the installation medium in the location field:

Option	Description
Intel-Based Hardware Platforms	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</code>
IBM Power Systems	<code>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</code>

If you downloaded the components to a different directory, enter the file path to the directory where you unpacked the server archive.

4. Select *Proceed with Update*.
The SAP HANA database lifecycle manager (HDBLCM) detects all available components for the given file path.
If you would like to add more than one software location, select *Add Software Location*.
5. Select the components you would like to update, or install if they are not already available on your system.
6. Specify the SAP HANA authorization information.
When asked for database user, you have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see Related Information.
7. Define additional properties, depending on which components are selected.
8. After specifying all system properties, review the summary, and select *Update*.

Next Steps

If your system is a multitenant database container system, SAP HANA content is installed on tenant databases after their creation. After a system update, SAP HANA content on tenant databases must be updated from the system database. Restarting the tenant databases is necessary to trigger the deployment of the updated content on the tenant databases. You can restart the tenant databases once the delivery unit (DU) deployment on the system database has finished. You can monitor the progress of DU deployment by executing the following statement in the SQL console of the SAP HANA studio:

```
SELECT * FROM "PUBLIC"."M_SERVICE_THREADS" WHERE THREAD_TYPE = 'ImportOrUpdate Content';
```

If your system is configured for system replication, you must perform the update on each host individually, starting with the secondary host. The version of the secondary system must be the same or higher as the one running on the primary system

Related Information

[SAPUI5 Developer Guide](#)

[Preparing for Update \[page 94\]](#)

[Changeable Default Values for Update \[page 93\]](#)

[Create a Lesser-Privileged Database User for Update \[page 145\]](#)

6 Managing SAP HANA System Components

SAP HANA system components can be installed, updated, or uninstalled using the SAP HANA database lifecycle manager (HDBLCM).

The SAP HANA system is made up of the following components:

- SAP HANA mandatory components
 - SAP HANA server
 - SAP HANA client
- SAP HANA additional components
 - SAP HANA studio
 - Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, TRD, UDF)
 - SAP liveCache applications (SAP LCA or LCAPPS-Plugin)
 - SAP HANA smart data access (SDA)
 - SAP HANA XS Advanced Runtime (For more information about installing XS advanced runtime, see [Installing XS Advanced Runtime in Related Information.](#))

i Note

As of SAP HANA Support Package Stack (SPS) 09, the SAP HANA studio repository is divided into core and additional repositories.

i Note

As of SAP HANA SPS 08, the Solution Manager Diagnostics Agent can no longer be installed or uninstalled using the SAP HANA platform lifecycle management tools. To install or uninstall the Solution Manager Diagnostics Agent, use Software Provisioning Manager (SWPM). For more information about the setting up the Solution Manager Diagnostics Agent using SWPM, see [SAP Note 1858920 in Related Information.](#)

i Note

As of SAP HANA SPS 09, SAP HANA platform lifecycle management no longer provides SAP LT (Landscape Transformation) replication configuration. SAP LT replication configuration is a part of SL Toolset 1.0. For more information about configuring SAP LT replication, see [SAP Note 1891393 in Related Information.](#)

- SAP HANA options
 - SAP HANA dynamic tiering
 - SAP HANA remote data sync
 - SAP HANA smart data streaming
 - SAP HANA accelerator for SAP ASE

Note

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

For more information about installing, updating, and uninstalling the SAP HANA mandatory components and SAP HANA additional components, see Related Information. For more information about installing, updating, and uninstalling the SAP HANA options, see SAP HANA option documentation in Related Information.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[SAP Note 1858920 - Diagnostics Agent installation with SWPM](#)

[SAP Note 1891393 - Automated Configuration scripts for HANA Landscape](#)

[Installing or Updating SAP HANA Components \[page 117\]](#)

[SAP HANA Options in SAP Help Portal](#)

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

[Installing XS Advanced Runtime \[page 77\]](#)

6.1 Installing or Updating SAP HANA Components

SAP HANA components can be installed or updated the following ways:

- From the installation medium, using
 - the graphical user interface,
 - the command-line interface.
- From the resident program, using
 - the graphical user interface,
 - the command-line interface.
- Using the Web user interface.

Related Information

[Install or Update SAP HANA Components Using the Graphical User Interface \[page 118\]](#)

[Install or Update SAP HANA Components Using the Command-Line Interface \[page 120\]](#)

[Install or Update SAP HANA Components Using the Resident Program \[page 121\]](#)

[Install or Update SAP HANA Components Using the Web User Interface \[page 124\]](#)

[SAP Note 1858920 - Diagnostics Agent installation with SWPM](#)

[SAP Note 2293092 - SAP HANA Database upgrade fails due to missing plugin](#)

[SAP Note 2014334 - Migration from SAP HANA AFL \(SPS 07 or earlier\) to Product-Specific AFLs \(SPS 08\)](#)

6.1.1 Install or Update SAP HANA Components Using the Graphical User Interface

You can install additional SAP HANA system components like the SAP HANA client, SAP HANA studio, and additional system components like Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin), XS advanced runtime applications, or SAP HANA smart data access (SDA) using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

The system component should have the same version as the SAP HANA database. Do one of the following:

- Patch the SAP HANA system component to a higher patch number within the same SP (revision).
- Update both the SAP HANA system component and the SAP HANA database to a higher SP (revision).

You cannot update the AFLs and TRDs to a higher revision number unless you also update your SAP HANA database to the same revision number. The installation and update of XS advanced runtime components requires the installation/update of the XS advanced runtime.

Context

In order to install or update SAP HANA system components or additional components, you must start the SAP HANA database lifecycle manager (HDBLCM) and run an update. The update component menu offers the opportunity to update the components (if a more recent version is found) and to install additional components, which were not installed during the initial server installation. If you select the action *Install new system* instead of *Update existing system*, the SAP HANA database lifecycle manager (HDBLCM) also installs the SAP HANA server, by default. Therefore, if you would like to add only one additional system component to an existing system, it is necessary to select the action *Update existing system*, and select only that system component from the available component list.

i Note

The product-specific AFLs are released individually and are no longer released as part of SAP HANA AFL. Therefore, before updating AFL version SPS 07 to a current version, it is necessary to perform a migration.

For more information, see SAP Note 2014334 in Related Information. You can update AFL version SPS 08 to a current version as described.

i Note

Adding SAP liveCache applications (SAP LCA or LCAPPS-Plugin) is only supported for the integrated SAP liveCache, single-host scenario. The SAP LCA archive should be owned by the root user.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select *Update existing system* from the activity options. Then select *Next*.
4. Select the components you would like to install or update as a comma-separated list, then select .
5. Specify the SAP HANA system properties.
You have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see Related Information.
6. Review the summary, and select *Run* to finalize the configuration.

Related Information

[SAP Note 2327295 - Confirm Successful Installation of Smart Data Access](#)

6.1.2 Install or Update SAP HANA Components Using the Command-Line Interface

You can install additional SAP HANA system components like the SAP HANA client, SAP HANA studio, and additional system components like Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin), XS advanced runtime applications, or SAP HANA smart data access (SDA) using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

The system component should have the same version as the SAP HANA database. Do one of the following:

- Patch the SAP HANA system component to a higher patch number within the same SP (revision).
- Update both the SAP HANA system component and the SAP HANA database to a higher SP (revision).

You cannot update the AFLs and TRDs to a higher revision number unless you also update your SAP HANA database to the same revision number. The installation and update of XS advanced runtime components requires the installation/update of the XS advanced runtime.

Context

In order to install or update SAP HANA system components or additional components, you must start the SAP HANA database lifecycle manager (HDBLCM) and run an update. The update component menu offers the opportunity to update the components (if a more recent version is found) and to install additional components, which were not installed during the initial server installation. If you select the action *Install new system* instead of *Update existing system*, the SAP HANA database lifecycle manager (HDBLCM) also installs the SAP HANA server, by default. Therefore, if you would like to add only one additional system component to an existing system, it is necessary to select the action *Update existing system*, and select only that system component from the available component list.

i Note

The product-specific AFLs are released individually and are no longer released as part of SAP HANA AFL. Therefore, before updating AFL version SPS 07 to a current version, it is necessary to perform a migration. For more information, see SAP Note 2014334 in Related Information. You can update AFL version SPS 08 to a current version as described.

i Note

Adding SAP liveCache applications (SAP LCA or LCAPPS-Plugin) is only supported for the integrated SAP liveCache, single-host scenario. The SAP LCA archive should be owned by the root user.

Procedure

1. Change to the following directory on the installation medium:

Option	Description
Intel-Based Hardware Platforms	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_X86_64</pre>
IBM Power Systems	<pre>cd <installation medium>/DATA_UNITS/ HDB_LCM_LINUX_PPC64</pre>

i Note

If you downloaded the components to a different directory, change to the directory where you unpacked the archive.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblcm
```

3. Select the index for the system to be updated, then select .
4. Select the components you would like to install or update as a comma-separated list, then select .
5. Specify the SAP HANA system properties.
You have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see Related Information.
6. After specifying all system properties, review the summary, and select *y*.

Related Information

[SAP Note 2327295 - Confirm Successful Installation of Smart Data Access](#)

6.1.3 Install or Update SAP HANA Components Using the Resident Program

SAP HANA system components like the SAP HANA client, SAP HANA studio, HLM, Application Function Libraries (AFL), SAP liveCache applications (SAP LCA), XS advanced runtime, or SAP HANA smart data access

(SDA) can be added to an SAP HANA system after installation from a local host using the SAP HANA lifecycle management tool `hdbclm(gui)`.

Prerequisites

The system component should have the same version as the SAP HANA database. Do one of the following:

- Patch the SAP HANA system component to a higher patch number within the same SP (revision).
- Update both the SAP HANA system component and the SAP HANA database to a higher SP (revision).

You cannot update the AFLs and TRDs to a higher revision number unless you also update your SAP HANA database to the same revision number. The installation and update of XS advanced runtime components requires the installation/update of the XS advanced runtime.

Context

In order to add SAP HANA system components, you must start the `hdbclm(gui)` installer and select update. The update component menu offers to update the server (if a more recent version is found) and also offers to install additional components, which were not installed during the initial server installation. If you select the action *Install new system* instead of *Update existing system*, `hdbclm(gui)` also installs the SAP HANA server, by default. Therefore, if you would like to add only one additional system component, it is necessary to select the action *Update existing system*, and select only that system component from the available component list.

To install and update software components in SAP HANA XS Advanced, the `xs install` command is available in the XS Advanced command-line interface (CLI). For more information, see *Installing and Updating Software Components in SAP HANA XS Advanced Model* in the SAP HANA Administration Guide.

i Note

The product-specific AFLs are released individually and are no longer released as part of SAP HANA AFL. Therefore, before updating AFL version SPS 07 to a current version, it is necessary to perform a migration. For more information, see SAP Note 2014334 in Related Information. You can update AFL version SPS 08 to a current version as described.

Procedure

1. Prepare the component location.

The SAP HANA database lifecycle manager detects software components in nearby standard directories, but not in unique or distant directories. Therefore, you should make note of where the software components for installation or update are located, so that you can add the component location in the graphical user interface field, or specify the component location as a call option in the command-line interface using one of the following parameters:

- `component_dirs`

- component_medium
- component_root

For more information about these parameters, see [Related Information](#).

2. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblc
```

By default, `<sapmnt>` is `/hana/shared`.

3. Start the SAP HANA database lifecycle manager using the graphical user interface or the command-line interface.

Option	Description
Graphical User Interface	<ol style="list-style-type: none"> 1. Start the SAP HANA HDBLCM graphical user interface: <pre>./hdblcgui</pre> 2. Select the <i>Install or Update Additional Components</i> from the activity list. Then select <i>Next</i>. 3. Select a detected software component or add a software component location by selecting <i>Add Component Location...</i> Then select <i>Next</i>. 4. Select the components you would like to install or update, then select <i>Next</i>. 5. Specify the SAP HANA system properties. You have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see Related Information. 6. If you are installing or updating XS advanced runtime components, you can select which of the detected components are installed. 7. Review the summary and select <i>Upgrade</i>.
Command-Line Interface	<ol style="list-style-type: none"> 1. Start the SAP HANA HDBLCM command-line interface: <pre>./hdblc</pre> <p>If the component location is not detected by the SAP HANA HDBLCM, rerun the program with one of the following call options specified <code>--component[_dirs _medium _root]=<component location></code></p> 2. Select the index for the <code>update_components</code>, then select <input type="text" value="Enter"/>. 3. Select the components you would like to install or update as a comma-separated list of indexes, then select <input type="text" value="Enter"/>. 4. Specify the SAP HANA system properties. You have the opportunity to specify a lesser-privileged database user if you have previously created one. For more information about creating a database user for update, see Related Information. 5. If you are installing or updating XS advanced runtime components, you can select which of the detected components are installed. 6. Review the summary and select <i>y</i>.

Results

A system component has been added to the SAP HANA system. The component list has been updated. A log has been produced.

Related Information

[component_dirs \[page 183\]](#)

[component_medium \[page 184\]](#)

[component_root \[page 184\]](#)

[Create a Lesser-Privileged Database User for Update \[page 145\]](#)

[SAP Note 2327295 - Confirm Successful Installation of Smart Data Access](#)

6.1.4 Install or Update SAP HANA Components Using the Web User Interface

You can install additional SAP HANA system components like the SAP HANA client, SAP HANA studio, and additional system components like Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin), XS advanced runtime applications, or SAP HANA smart data access (SDA) using the SAP HANA database lifecycle manager (HDBLCM) Web user interface.

Prerequisites

You should verify that the following prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from a Web browser.

- The communication port 1129 is open.
Port 1129 is required for the SSL communication with the SAP Host Agent in a standalone browser via HTTPS.
- The following Web browser requirements are fulfilled:
 - Microsoft Windows
 - Internet Explorer - Version 9 or higher
If you are running Internet Explorer version 9, make sure that your browser is not running in compatibility mode with your SAP HANA host. You can check this in your browser by choosing **Tools > Compatibility View Settings**.
 - Mozilla Firefox - Latest version and Extended Support Release
 - Google Chrome - Latest version
 - SUSE Linux - Mozilla Firefox with XULRunner 10.0.4 ESR
 - Mac OS - Safari 5.1 or higher

i Note

For more information about supported Web browsers for the SAP HANA database lifecycle manager Web interface, see the browser support for `sap.m` library in the *SAPUI5 Developer Guide* in Related Information.

- You are logged on as the system administrator user `<sid>adm`.

You should verify that the following additional prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from the SAP HANA studio.

- The SAP HANA studio revision is 120 or higher.
- For Linux:
 - The system property `org.eclipse.swt.browser.XULRunnerPath` should be set in `hdbstudio.ini` to point to the path of XULRunner, for example:


```
-Dorg.eclipse.swt.browser.XULRunnerPath=<path to xulrunner>.
```

 This `hdbstudio.ini` file is located in the same folder as the executable that is used to start the SAP HANA studio. For Linux, the default location is `hana/shared/<SID>/hdbstudio..`

The system component should have the same version as the SAP HANA database. Do one of the following:

- Patch the SAP HANA system component to a higher patch number within the same SP (revision).
- Update both the SAP HANA system component and the SAP HANA database to a higher SP (revision).

You cannot update the AFLs and TRDs to a higher revision number unless you also update your SAP HANA database to the same revision number. The installation and update of XS advanced runtime components requires the installation/update of the XS advanced runtime.

Context

i Note

The product-specific AFLs are released individually and are no longer released as part of SAP HANA AFL. Therefore, before updating AFL version SPS 07 to a current version, it is necessary to perform a migration. For more information, see SAP Note 2014334 in Related Information. You can update AFL version SPS 08 to a current version as described.

Procedure

1. Access the SAP HANA HDBLCM Web user interface.

Option	Description
Web Browser	Enter the SAP HANA database lifecycle manager (HDBLCM) URL in an HTML5-enabled browser: <code>https://<hostname>:1129/lmsl/HDBLCM/<SID>/index.html</code>
	<i>i</i> Note The URL is case sensitive. Make sure you enter upper and lower case letters correctly.
SAP HANA Studio	<ol style="list-style-type: none"> 1. Start the SAP HANA studio. 2. In the SAP HANA studio, add the SAP HANA system. 3. Open the context menu (right-mouse click) in the <i>Systems</i> view, and select <i>Add System</i>.

Option	Description
	<p>For more information about adding a system, see <i>Add an SAP HANA System</i> in the <i>SAP HANA Administration Guide</i> in Related Information.</p> <ol style="list-style-type: none"> In the SAP HANA studio, log on to the system. From the context menu of the selected system, select Lifecycle Management > Platform Lifecycle Management > SAP HANA Platform Lifecycle Management.
SAP HANA Cockpit	<ol style="list-style-type: none"> Enter the SAP HANA cockpit URL in your browser. The URL depends on whether you are connecting to a single-container system or to a database in a multiple-container system. A single-container system is accessed through the URL: <code>http://<host_FQDN>:80<instance>/sap/hana/admin/cockpit</code> For more information about the URLs in multiple-container systems, see <i>Configure HTTP Access to Multitenant Database Containers</i> in the <i>SAP HANA Administration Guide</i> in Related Information. <div data-bbox="427 779 1402 891" style="background-color: #fff9c4; padding: 5px;"> <p>i Note</p> <p>FQDN = fully qualified domain name</p> </div> The <i>SAP HANA Platform Lifecycle Management</i> tiles are visible on the homepage of the SAP HANA cockpit. If they are not, you can add them from the <i>SAP HANA Platform Lifecycle Management</i> tile catalog. For more information, see <i>Customizing the Homepage of SAP HANA Cockpit</i>.

- Select the *Install or Update Additional Components* tile.
- Select *Add Software Locations...* to add SAP HANA components for installation or update. Then select *Next*.
- Select the components for installation or update. Then select *Next*.

Various parameters can be set in the *Advanced Parameters Configuration* dialog. To access the *Advanced Parameters Configuration* dialog, click on the gear icon in the footer bar of the SAP HANA HDBLCM Web user interface.

- Specify additional hosts or roles to be added. Then select *Next*.
- Specify the SAP HANA authorization information.

Depending on the component selection, if asked for database user, you have the opportunity to specify a lesser-privileged database user if you have previously created one.

- After specifying all system properties, review the summary, and select *Update*.

Related Information

[SAP Note 2327295 - Confirm Successful Installation of Smart Data Access](#)

6.2 Uninstalling SAP HANA Components

SAP HANA components - including system components and additional components - can be uninstalled the following ways:

- From the resident program, using
 - the graphical user interface,
 - the command-line interface.
- Using the Web user interface.

Related Information

[Uninstall SAP HANA Components Using the Graphical User Interface \[page 127\]](#)

[Uninstall SAP HANA Components Using the Command-Line Interface \[page 129\]](#)

[Uninstall an SAP HANA Component on a System Missing the SAP HANA Resident Program \[page 130\]](#)

[Uninstall SAP HANA Components Using the Web User Interface \[page 131\]](#)

[SAP Note 1858920](#)

6.2.1 Uninstall SAP HANA Components Using the Graphical User Interface

SAP HANA system components and additional system components can be removed from an SAP HANA system after installation using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.
- The SAP HANA system has been installed with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running. Otherwise, inconsistencies in the configuration occur.

i Note

It is possible to remove the SAP HANA server, SAP HANA client, SAP HANA studio system components, or the Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin) additional system components, but it is not possible to remove SDA, SAP Host Agent, or the SMD agent. If you need to uninstall the SMD agent, see SAP Note 1858920 in Related Information.

i Note

If you want to uninstall a component that requires specific host roles, you must first remove all related host roles or hosts which have these host roles assigned. For more information, see the removing hosts and removing host roles sections in the *SAP HANA Administration Guide* in Related Information.

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdbclm
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdbclmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select *Uninstall SAP HANA Components* from the activity options. Then select *Next*.
4. Select *Uninstall separate components*, and then choose the components to be uninstalled. Then select *Next*.
5. Review the summary, and select *Run* to finalize the configuration.

Results

The selected components are uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

6.2.2 Uninstall SAP HANA Components Using the Command-Line Interface

SAP HANA system components and additional system components can be removed from an SAP HANA system after installation using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.
- The SAP HANA system has been installed with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running. Otherwise, inconsistencies in the configuration occur.

i Note

It is possible to remove the SAP HANA server, SAP HANA client, SAP HANA studio system components, or the Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin) additional system components, but it is not possible to remove SDA, SAP Host Agent, or the SMD agent. If you need to uninstall the SMD agent, see SAP Note 1858920 in Related Information.

i Note

If you want to uninstall a component that requires specific host roles, you must first remove all related host roles or hosts which have these host roles assigned. For more information, see the removing hosts and removing host roles sections in the *SAP HANA Administration Guide* in Related Information.

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblc
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblc
```

3. Select the index for *uninstall*, then select .
4. Select the components to be uninstalled as a comma-separated list of indexes. Then select *Enter*.
5. Review the summary, and select *y* to finalize the configuration.

Results

The selected components are uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

6.2.3 Uninstall an SAP HANA Component on a System Missing the SAP HANA Resident Program

If you would like to uninstall SAP HANA components from a system, which has been installed with the SAP HANA platform lifecycle management tool `hdbinst`, and has been updated with `hdbupd`, you cannot use the typical uninstallation procedures with the SAP HANA database lifecycle manager (HDBLCM). The reason for this is that the SAP HANA resident HDBLCM is missing from the system.

Prerequisites

- You are logged on to the host where the server software is installed.
- You are logged on as the root user.

Context

To uninstall an SAP HANA component on a system missing the SAP HANA resident HDBLCM, you have two choices:

- Uninstall the SAP HANA component using the uninstaller `hdbuninst`.
To uninstall using this method, follow the procedure below.
- Install the SAP HANA resident HDBLCM, then perform component uninstallation as usual using the newly available SAP HANA resident HDBLCM.
Start the SAP HANA database lifecycle manager from an SAP HANA server installation kit, which has the same version as the installed SAP HANA database, with the following command:

```
./hdblcmm --action=update --components=hdblcmm
```

Then uninstall using one of the typical uninstallation procedures in *Uninstalling SAP HANA Components*.

Procedure

1. Change to the hdbuninst directory:
`<installation_path>/<SID>/global/hdb/install/bin`

2. Start hdbuninst interactively in the command-line interface:

```
./hdbuninst
```

3. Review the summary, and select **y** to finalize the configuration.

6.2.4 Uninstall SAP HANA Components Using the Web User Interface

SAP HANA system components and additional system components can be removed from an SAP HANA system after installation using the SAP HANA database lifecycle manager (HDBLCM) Web user interface.

Prerequisites

You should verify that the following prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from a Web browser.

- The communication port 1129 is open.
Port 1129 is required for the SSL communication with the SAP Host Agent in a standalone browser via HTTPS.
- The following Web browser requirements are fulfilled:
 - Microsoft Windows
 - Internet Explorer - Version 9 or higher
If you are running Internet Explorer version 9, make sure that your browser is not running in compatibility mode with your SAP HANA host. You can check this in your browser by choosing **Tools > Compatibility View Settings**.
 - Mozilla Firefox - Latest version and Extended Support Release
 - Google Chrome - Latest version
 - SUSE Linux - Mozilla Firefox with XULRunner 10.0.4 ESR
 - Mac OS - Safari 5.1 or higher

i Note

For more information about supported Web browsers for the SAP HANA database lifecycle manager Web interface, see the browser support for `sap.m` library in the *SAPUI5 Developer Guide* in Related Information.

- You are logged on as the system administrator user `<sid>adm`.

You should verify that the following additional prerequisites are fulfilled before trying to access the SAP HANA database lifecycle manager from the SAP HANA studio.

- The SAP HANA studio revision is 120 or higher.
- For Linux:
 - The system property `org.eclipse.swt.browser.XULRunnerPath` should be set in `hdbstudio.ini` to point to the path of XULRunner, for example:
`-Dorg.eclipse.swt.browser.XULRunnerPath=<path to xulrunner>`.
 This `hdbstudio.ini` file is located in the same folder as the executable that is used to start the SAP HANA studio. For Linux, the default location is `hana/shared/<SID>/hdbstudio..`

The system component should have the same version as the SAP HANA database. Do one of the following:

- Patch the SAP HANA system component to a higher patch number within the same SP (revision).
- Update both the SAP HANA system component and the SAP HANA database to a higher SP (revision).

You cannot update the AFLs and TRDs to a higher revision number unless you also update your SAP HANA database to the same revision number. The installation and update of XS advanced runtime components requires the installation/update of the XS advanced runtime.

i Note

If you want to uninstall a component that requires specific host roles, you must first remove all related host roles or hosts which have these host roles assigned. For more information, see the removing hosts and removing host roles sections in the *SAP HANA Administration Guide* in Related Information.

Context

i Note

The product-specific AFLs are released individually and are no longer released as part of SAP HANA AFL. Therefore, before updating AFL version SPS 07 to a current version, it is necessary to perform a migration. For more information, see SAP Note 2014334 in Related Information. You can update AFL version SPS 08 to a current version as described.

Procedure

1. Access the SAP HANA HDBLCM Web user interface.

Option	Description
Web Browser	Enter the SAP HANA database lifecycle manager (HDBLCM) URL in an HTML5-enabled browser: <code>https://<hostname>:1129/lmsl/HDBLCM/<SID>/index.html</code>
	i Note The URL is case sensitive. Make sure you enter upper and lower case letters correctly.

Option	Description
SAP HANA Studio	<ol style="list-style-type: none"> 1. Start the SAP HANA studio. 2. In the SAP HANA studio, add the SAP HANA system. 3. Open the context menu (right-mouse click) in the <i>Systems</i> view, and select <i>Add System</i>. For more information about adding a system, see <i>Add an SAP HANA System</i> in the <i>SAP HANA Administration Guide</i> in Related Information. 4. In the SAP HANA studio, log on to the system. 5. From the context menu of the selected system, select ► <i>Lifecycle Management</i> ► <i>Platform Lifecycle Management</i> ► <i>SAP HANA Platform Lifecycle Management</i> ►.
SAP HANA Cockpit	<ol style="list-style-type: none"> 1. Enter the SAP HANA cockpit URL in your browser. The URL depends on whether you are connecting to a single-container system or to a database in a multiple-container system. A single-container system is accessed through the URL: <code>http://<host_FQDN>:80<instance>/sap/hana/admin/cockpit</code> For more information about the URLs in multiple-container systems, see <i>Configure HTTP Access to Multitenant Database Containers</i> in the <i>SAP HANA Administration Guide</i> in Related Information. <div style="background-color: #fff9c4; padding: 5px;"> <p>i Note</p> <p>FQDN = fully qualified domain name</p> </div> 2. The <i>SAP HANA Platform Lifecycle Management</i> tiles are visible on the homepage of the SAP HANA cockpit. If they are not, you can add them from the <i>SAP HANA Platform Lifecycle Management</i> tile catalog. For more information, see <i>Customizing the Homepage of SAP HANA Cockpit</i>.

2. Select the *Uninstall Components* tile.
3. Select the components for uninstallation. Then select *Next*.
4. Specify the SAP HANA authorization information.
5. Select *Uninstall*.

7 Uninstalling the SAP HANA System

If required, you can uninstall the previously installed SAP HANA components by running either the SAP HANA database lifecycle manager (HDBLCM) from the SAP HANA resident HDBLCM directory.

7.1 Uninstall the SAP HANA System Using the Graphical User Interface

You can uninstall an SAP HANA system using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.

Note

Using the SAP HANA database lifecycle manager, it is possible to remove the SAP HANA server, SAP HANA client, SAP HANA studio, HLM, Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (LCAPPS), or SAP HANA smart data access (SDA), but it is not possible to remove the SAP host agent or the Solution Manager Diagnostics (SMD) agent. If you need to uninstall the SMD agent, see SAP Note 1858920 in Related Information.

Context

Caution

Uninstalling the SAP HANA system removes all data volumes and log volumes. It is a permanent action that cannot be undone!

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblc
```

By default, `<sapmnt>` is `/hana/shared`.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select *Uninstall SAP HANA Components* from the activity options. Then select *Next*.
4. Select *Uninstall SAP HANA Database version <version number> and all other components*. Then select *Next*.
5. Review the summary, and select *Uninstall* to finalize the configuration.

Results

The selected components are uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#)

7.2 Uninstall the SAP HANA System Using the Command-Line Interface

You can uninstall an SAP HANA system using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.

i Note

Using the SAP HANA database lifecycle manager, it is possible to remove the SAP HANA server, SAP HANA client, SAP HANA studio, HLM, Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (LCAPPS), or SAP HANA smart data access (SDA), but it is not possible to remove the SAP host agent or the Solution Manager Diagnostics (SMD) agent. If you need to uninstall the SMD agent, see SAP Note 1858920 in Related Information.

Context

Caution

Uninstalling the SAP HANA system removes all data volumes and log volumes. It is a permanent action that cannot be undone!

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdbclm
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdbclm
```

3. Select the index for *uninstall*, then select .
4. Select the components to be uninstalled as a comma-separated list of indexes. Then select .
5. Review the summary, and select *y* to finalize the configuration.

Results

The selected components are uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

8 Uninstalling the SAP HANA System with XS Advanced

If required, you can uninstall the previously installed SAP HANA components by running either the SAP HANA database lifecycle manager (HDBLCM) from the SAP HANA resident HDBLCM directory.

8.1 Uninstall the SAP HANA System with XS Advanced Using the Graphical User Interface

You can uninstall an SAP HANA system with XS Advanced using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.

Context

Caution

Uninstalling the SAP HANA system removes all data volumes and log volumes. It is a permanent action that cannot be undone!

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblcml
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmlgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select *Uninstall SAP HANA Components* from the activity options. Then select *Next*.
4. Select *Uninstall SAP HANA Database version <version number> and all other components*. Then select *Next*.
5. Review the summary, and select *Uninstall* to finalize the configuration.

Results

The SAP HANA system is uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

8.2 Uninstall the SAP HANA System with XS Advanced Using the Command-Line Interface

You can uninstall an SAP HANA system with XS Advanced using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.

Context

Caution

Uninstalling the SAP HANA system removes all data volumes and log volumes. It is a permanent action that cannot be undone!

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblc
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblc
```

3. Select the index for *uninstall*, then select .
4. Select the components to be uninstalled as a comma-separated list of indexes. Then select .
5. Review the summary, and select *y* to finalize the configuration.

Results

The SAP HANA system is uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

8.3 Uninstall XS Advanced Using the Graphical User Interface

You can uninstall XS Advanced using the SAP HANA database lifecycle manager (HDBLCM) graphical user interface.

Prerequisites

- You are logged in as root user.
- You have removed all XS Advanced **xs_worker** and **xs_standby** hosts. For more information, see the removing hosts and removing hosts sections in the *SAP HANA Administration Guide* in Related Information.
- The SAP HANA system has been installed with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running. Otherwise, inconsistencies in the configuration occur.

Context

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblcml
```

By default, <sapmnt> is /hana/shared.

2. Start the SAP HANA database lifecycle manager interactively in the graphical user interface:

```
./hdblcmlgui
```

The SAP HANA database lifecycle manager graphical user interface appears.

3. Select *Uninstall SAP HANA Components* from the activity options. Then select *Next*.
4. Select *Uninstall SAP HANA XS Advanced Runtime* from the components list. Then select *Next*.
5. Review the summary, and select *Uninstall* to finalize the configuration.

Results

XS Advanced is uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

8.4 Uninstall XS Advanced Using the Command-Line Interface

You can uninstall XS Advanced using the SAP HANA database lifecycle manager (HDBLCM) command-line interface.

Prerequisites

- You are logged in as root user.
- You have removed all XS Advanced **xs_worker** and **xs_standby** hosts. For more information, see the removing hosts and removing hosts sections in the *SAP HANA Administration Guide* in Related Information.
- The SAP HANA system has been installed with the SAP HANA database lifecycle manager (HDBLCM).
- The SAP HANA database server is up and running. Otherwise, inconsistencies in the configuration occur.

Context

Procedure

1. Change to the SAP HANA resident HDBLCM directory:

```
cd <sapmnt>/<SID>/hdblc
```

By default, `<sapmnt>` is `/hana/shared`.

2. Start the SAP HANA database lifecycle manager interactively in the command line:

```
./hdblc
```

3. Select the index for *uninstall*, then select .
4. Select the index for *xs*, then select .
5. Review the summary, and select *y* to finalize the configuration.

Results

XS Advanced is uninstalled. A log file is available.

Related Information

[SAP Note 1858920](#) 

9 Managing the SAP HANA System After Installation

After the installation has finished, it is recommended to perform the following tasks:

- Perform a system backup.
We strongly recommend that you perform an initial backup of your system once you have finished the installation. For more details, see the system backup information in the *SAP HANA Administration Guide*.
- Change the passwords.
If you are receiving a newly installed SAP HANA platform from a hardware provider, it is recommended to update the passwords so they comply with your security guidelines. For more information, see the *SAP HANA Security Guide*.
- Change the master keys.
SAP HANA secures content in two secure stores in the file system (SSFS): the instance SSFS and the system PKI SSFS. The initial default master key is changed during installation or update. If you received your system preinstalled from a hardware or hosting partner, we recommend that you change it immediately after handover to ensure that it is not known outside of your organization. For more information, see *Change the SSFS Master Keys* in the *SAP HANA Administration Guide*.
- Finalize your customization.
Use the SAP HANA lifecycle management tools to adapt the existing configuration, if necessary. For more information, see the *SAP HANA Administration Guide*.

The following sections in this chapter are optional tasks that can be performed as part of installation management.

9.1 Start and Stop the SAP HANA System

After the installation has finished successfully, the SAP HANA system is up and running. So you do not need to start the SAP HANA system.

Context

However, if required, you can start and stop the SAP HANA system from the command line in one of the following ways:

Procedure

- By using the `sapcontrol` program:

- a. Log on to the SAP HANA system host as a user with root authorization.
- b. Execute one of the following commands:

- Start the SAP HANA system by entering the following command:

```
/usr/sap/hostctrl/exe/sapcontrol -nr <instance number> -function Start
```

- Stop the SAP HANA system by entering the following command:

```
/usr/sap/hostctrl/exe/sapcontrol -nr <instance number> -function Stop
```

- By using the HDB program:

- a. Log on to the SAP HANA system host as user <sid>adm.

- b. Execute one of the following commands:

- Start the SAP HANA system by entering the following command:

```
/usr/sap/<SID>/HDB<instance number>/HDB start
```

Example:

```
/usr/sap/KB1/HDB26/HDB start
```

- Stop the SAP HANA system by entering the following command:

```
/usr/sap/<SID>/HDB<instance number>/HDB stop
```

Example:

```
/usr/sap/KB1/HDB26/HDB stop
```

i Note

The SAP HANA database does not start automatically by default when the SAP HANA system is started. But you can enable an automated start of this kind. For more information, see Related Information.

9.2 Display the Process List

It is possible to display the SAP HANA system processes from the command line.

Prerequisites

You are logged on with the required root user or system administrator user <sid>adm credentials.

Procedure

Display the SAP HANA system processes by running the following from the command line:

```
/usr/sap/hostctrl/exe/sapcontrol -nr <instance number> -function GetProcessList
```

You can also display the SAP HANA system processes using the SAP Microsoft Management Console (SAP MMC) from a Microsoft Windows PC.

Results

Example

Displaying the Process List

```
/usr/sap/hostctrl/exe/sapcontrol -nr 00 -function GetProcessList
```

```
09.07.2015 14:09:20
GetProcessList
OK
name, description, dispstatus, textstatus, starttime, elapsedtime, pid
hdbdaemon, HDB Daemon, GREEN, Running, 2015 07 06 13:38:00, 72:31:20, 1195
hdbnameserver, HDB Nameserver, GREEN, Running, 2015 07 06 13:38:03, 72:31:17,
1213
hdbpreprocessor, HDB Preprocessor, GREEN, Running, 2015 07 06 13:38:18,
72:31:02, 1279
hdbindexserver, HDB Indexserver, GREEN, Running, 2015 07 06 13:38:26,
72:30:54, 1317
hdbxsengine, HDB XSEngine, GREEN, Running, 2015 07 06 13:38:26, 72:30:54, 1320
hdbcompileserver, HDB Compileserver, GREEN, Running, 2015 07 06 13:38:18,
72:31:02, 1282
hdbwebdispatcher, HDB Web Dispatcher, GREEN, Running, 2015 07 06 13:39:10,
72:30:10, 1540
```

9.3 Create a Lesser-Privileged Database User for Update

As the most powerful database user, SYSTEM is not intended for use in production systems. Create a lesser-privileged database user for updating a system.

Context

For security reasons, the SYSTEM user might not be available during a system update. It is, therefore, required to import the delivery units as another user.

A database user should be created with the following granted roles and object privileges:

- Granted Roles: CONTENT_ADMIN
- Object Privileges: _SYS_REPO (SELECT)

By calling one of the update LCM tools with the `system_user` option specified, the previously defined database user is used in place of SYSTEM to authenticate the configuration task.

Procedure

1. Add the SAP HANA system in the SAP HANA studio.

For more information, see *Add an SAP HANA System* in the *SAP HANA Administration Guide*.

2. Create the user in the SAP HANA studio and grant the new user the CONTENT_ADMIN role and the object privilege SELECT on the catalog object _SYS_REPO.

For more information, see *Create and Authorize a User* in the *SAP HANA Administration Guide*.

3. Re-add the SAP HANA system in the SAP HANA studio as the new user, and create a new password when prompted.

For more information, see *Add an SAP HANA System with a Different User* in the *SAP HANA Administration Guide*.

4. Perform the SAP HANA system update as usual, specifying the new lesser-privileged user in place of the SYSTEM user when prompted.

Related Information

[system_user \[page 212\]](#)

9.4 Enable Data Volume Encryption

To ensure that the SAP HANA database can always be restored to its most recent committed state, all data is periodically copied to disk. Privacy of data on disk can be ensured by enabling data volume encryption.

About Data Volume Encryption

Data in the SAP HANA database is stored in persistent disk volumes that are organized in pages. If data volume encryption is enabled, all pages that reside in the data area on the disk are encrypted using the AES-256-CBC algorithm. Pages are transparently decrypted as part of the load process. When pages reside in memory they are therefore not encrypted and there is no performance overhead for in-memory page accesses. When changes to data are persisted to disk, the relevant pages are automatically encrypted as part of the write operation.

Enabling data volume encryption does not increase data size.

Data volume encryption requires the availability of a cryptographic service provider on the SAP HANA server. The SAP Cryptographic Library (CommonCryptoLib) is available and used by default. For more information, see the *SAP HANA Security Guide*.

For more information about data volume encryption, see *Data Volume Encryption* in the *SAP HANA Security Guide*.

How to Enable Encryption

There are two ways to enable data volume encryption in an existing SAP HANA system. The recommended way involves reinstalling your system. If this is not possible (for example, because it would result in too much downtime), you can enable encryption immediately.

i Note

Do not enable data volume encryption if you plan to use the SAP HANA dynamic tiering option. It is not possible to create extended storage in encrypted SAP HANA databases. Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

[Enable Data Volume Encryption with System Reinstallation \[page 148\]](#)

The recommended way to enable data volume encryption in an existing SAP HANA system is after reinstalling the system.

[Enable Data Volume Encryption Without System Reinstallation \[page 150\]](#)

If it is not possible to reinstall your SAP HANA system to enable data volume encryption, for example, because it would result in too much downtime, you can enable encryption immediately. However, this is not recommended because your data will only be fully protected after some delay.

Related Information

[SAP Note 1848999 - Central Note for CommonCryptoLib 8 \(replacing SAPCRYPTOLIB\)](#)

[SAP Note 2093286 - Migration from OpenSSL to CommonCryptoLib \(SAPCrypto\)](#)

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

9.4.1 Enable Data Volume Encryption with System Reinstallation

The recommended way to enable data volume encryption in an existing SAP HANA system is after reinstalling the system.

Prerequisites

- You have the privileges required to perform an installation, as well as a backup and recovery.
- You have the system privilege RESOURCE ADMIN.
- If you are using the SAP HANA cockpit:
 - You have the privileges granted by the role `sap.hana.security.cockpit.roles::MaintainDataVolumeEncryption`.
 - The *Data Storage Security* tile is visible on the homepage of the SAP HANA cockpit. If it's not, you can add it from the *SAP HANA Security Overview* tile catalog. For more information, see *Customize the Homepage of SAP HANA Cockpit*.
- If the system is a secondary site in a system replication setup, verify how parameter replication is configured **before** attempting to enable data volume encryption. For more information about how parameter replication affects data volume encryption, see the SAP HANA Security Guide.

Context

Enabling data volume encryption after re-installing your system ensures that a new root encryption key is generated. In addition, it provides complete protection. If you enable encryption without a re-installation, due to the shadow memory nature of SAP HANA persistence, outdated versions of pages may still remain unencrypted on disk.

For more information about this recommendation, see SAP Note 2159014.

Procedure

1. Perform a data backup.
2. Uninstall your system.

If possible, overwrite the former data area with random values.


3. Reinstall your system.

➔ Remember

If the system is a secondary site in a system replication setup, you must configure system replication now, before enabling data volume encryption.

4. Enable data volume encryption:

You can do this using either the SAP HANA cockpit or SAP HANA studio.


Option	Description
SAP HANA cockpit	<ol style="list-style-type: none">1. Open the <i>Data Volume Encryption</i> app by clicking the <i>Data Storage Security</i> tile on the home-page of the SAP HANA cockpit..2. Click the <i>Encrypt Data Volumes</i> button in the footer bar.
SAP HANA studio	<ol style="list-style-type: none">1. In the Security editor of the system or database to be encrypted, choose the <i>Data Volume Encryption</i> tab.2. Select <i>Activate encryption of data volumes</i> and choose  (<i>Deploy</i>).

5. Recover your system.

Results

All data persisted to data volumes is encrypted. The status of data volume encryption is *Encrypted*.

Note

In the SAP HANA studio, you must refresh () the editor to see status changes.

For more information, see *SAP HANA SQL and System Views Reference* on SAP Help Portal.

Task overview: [Enable Data Volume Encryption \[page 146\]](#)

Related Information

[Enable Data Volume Encryption Without System Reinstallation \[page 150\]](#)

[SAP Note 2159014 - FAQ: SQP HANA Security !\[\]\(4a63b5f1647b15fca98ac06ee5f507fe_img.jpg\)](#)

[Installing an SAP HANA System \[page 53\]](#)

9.4.2 Enable Data Volume Encryption Without System Reinstallation

If it is not possible to reinstall your SAP HANA system to enable data volume encryption, for example, because it would result in too much downtime, you can enable encryption immediately. However, this is not recommended because your data will only be fully protected after some delay.

Prerequisites

- You have changed the root encryption key if necessary. SAP HANA generates unique root keys on installation. However, if you received SAP HANA pre-installed from a hardware or hosting partner, you might want to change the root key used for data volume encryption to ensure it is not known outside your organization. For more information, see *Change the Root Encryption Key for Data Volume Encryption*.

i Note

In a system-replication configuration, change the root key used for data volume encryption in the primary system only. The new key will be propagated to all secondary systems.

- If you are using the SAP HANA cockpit:
 - You have the privileges granted by the role `sap.hana.security.cockpit.roles::MaintainDataVolumeEncryption`.
 - The *Data Storage Security* tile is visible on the homepage of the SAP HANA cockpit. If it's not, you can add it from the *SAP HANA Security Overview* tile catalog. For more information, see *Customize the Homepage of SAP HANA Cockpit*.
- If you are using the SAP HANA studio, you have the system privilege `RESOURCE ADMIN`.
- If the system is a secondary site in a system replication setup, verify how parameter replication is configured **before** attempting to enable data volume encryption. For more information about how parameter replication affects data volume encryption, see the SAP HANA Security Guide.

Context


For maximum protection, we recommend that you reinstall your SAP HANA system before enabling data volume encryption. If you enable encryption once the database has been operational, only the pages in use within the data volumes will be encrypted. Pages in the data volumes that are not in use may still contain old content and will only be overwritten and encrypted over time. This means that your data will only be fully protected after some delay.

For more information about this recommendation, see SAP Note 2159014.

Procedure

Enable data volume encryption:


You can do this using either the SAP HANA cockpit or SAP HANA studio.

Option	Description
SAP HANA cockpit	<ol style="list-style-type: none">1. Open the <i>Data Volume Encryption</i> app by clicking the <i>Data Storage Security</i> tile on the homepage of the SAP HANA cockpit..2. Click the <i>Encrypt Data Volumes</i> button in the footer bar.
SAP HANA studio	<ol style="list-style-type: none">1. In the Security editor of the system or database to be encrypted, choose the <i>Data Volume Encryption</i> tab.2. Select <i>Activate encryption of data volumes</i> and choose  (<i>Deploy</i>).

Results

Encryption is now active for new data saved to disk as of the next savepoint operation. Existing data starts being encrypted in the background. Only after this process has completed is all your data encrypted. You can monitor the progress of encryption by service. Once encryption of a data volume has completed, the status changes to *Encrypted*.

Note

In the SAP HANA studio, you must refresh () the editor to see status changes.

Remember

Due to the shadow memory nature of SAP HANA database persistence, the data area may still contain outdated, unencrypted versions of pages. This approach is therefore not recommended.

Task overview: [Enable Data Volume Encryption \[page 146\]](#)

Related Information

[Enable Data Volume Encryption with System Reinstallation \[page 148\]](#)

[SAP Note 2159014 - FAQ: SQP HANA Security](#)

[Change the Root Encryption Key for Data Volume Encryption \[page 152\]](#)

9.5 Change the Root Encryption Key for Data Volume Encryption

SAP HANA generates unique root keys on installation. However, if you received SAP HANA pre-installed from a hardware or hosting partner, you might want to change the root key used for data volume encryption to ensure it is not known outside your organization. You can change the root key using the [Data Volume Encryption](#) app of the SAP HANA cockpit.

Prerequisites

- You have the privileges granted by the role `sap.hana.security.cockpit.roles::MaintainDataVolumeEncryption`.
- The [Data Storage Security](#) tile is visible on the homepage of the SAP HANA cockpit. If it's not, you can add it from the [SAP HANA Security Overview](#) tile catalog. For more information, see [Customize the Homepage of SAP HANA Cockpit](#).

Procedure

i Note

If the system is configured for system replication, change the root key in the primary system only. The new key will be propagated to all secondary systems.

1. In the SAP HANA cockpit, open the [Data Volume Encryption](#) app.
2. Choose [Change Root Encryption Key](#) in the footer bar.

A root key change request is sent to the server and the value in the [Root Key Change Pending](#) column changes to [Yes](#).

Results

A new unique root encryption key is generated after the next savepoint operation and all page encryption keys are re-encrypted with the new key. When this process has completed, the value in the [Root Key Change Pending](#) column changes to [No](#) and the value in the [Current Key Version](#) increments by one.

9.6 Change the Root Key of the Internal Data Encryption Service

SAP HANA generates unique root keys on installation. However, if you received SAP HANA pre-installed from a hardware or hosting partner, you might want to change the root key of the internal data encryption service to ensure it is not known outside your organization. We recommend that you do this immediately after system installation or handover from your hardware or hosting partner.

Prerequisites

- You have the credentials of the operating system user (<sid>adm user) that was created when the system was installed.
- You have the credentials of the database user SYSTEM.
- You have the system privilege RESOURCE ADMIN.

Context

The internal data encryption service can be used by SAP HANA XS-based applications and SAP HANA internal components to securely store data in the database. Consumers of this service include the secure internal credential store for the logon of applications to remote systems (outbound connections), as well as all secure stores defined using the SAP HANA XS `$.security.Store` API. Every consumer of the service has its own system-internal application encryption key. Application encryption keys are encrypted with the root key of the data encryption service.

You should only change this root key if you need to ensure that it is not known outside your organization. Ideally, you change the root immediately after installation or receipt of your system from the hardware partner. At the latest, you must change it before any data is encrypted using the service. This means before you create any of the following things:

- A remote data source
- A HTTP destination
- An XS secure store
- A certificate collection with private key

Caution

It is important that you plan this root key change carefully as you will have to shut down the database. Not only that, but changing the root key after data has been encrypted will result in key information in the SSFS and the database becoming inconsistent and encrypted data becoming inaccessible. Rectifying the problem could result in data loss. We recommend that you contact SAP Support if errors related to inconsistent SSFS or encryption failure occur.

Additionally, if the system supports multitenant database containers, you must change the root key before any tenant databases have been created.

Procedure

1. Verify that no data has already been encrypted using the internal data encryption service by querying the following system views:

- CREDENTIALS (PUBLIC)
- P_DPAPI_KEY_ (SYS)

Note

This view can only be accessed by user SYSTEM.

If the credential store is empty, then CREDENTIALS (PUBLIC) will also be empty. If there are no XS secure stores, then P_DPAPI_KEY_ (SYS) will have no records with the caller XsEngine. If there are no certificate collections with private keys, then there will be no records with the caller PSEStore.

Caution

Do not proceed with the root key change if there is encrypted data.

2. Log on to the SAP HANA system host as the operating system user, <sid>adm.
3. Shut the system down using the sapcontrol program:

```
/usr/sap/hostctrl/exe/sapcontrol -nr <instance_no> -function Stop
```

4. Generate a new root encryption key using the hdbnsutil program.

```
cd /usr/sap/<sid>/HDB<instance_no>/exe  
./hdbnsutil - generateRootKeys --type=DPAPI
```

5. Start the system using the sapcontrol program:

```
/usr/sap/hostctrl/exe/sapcontrol -nr <instance_no> -function Start
```

6. Reset the consistency information in the SSFS using the hdbcons program:

```
cd /usr/sap/<sid>/HDB<instance_no>/exe  
./hdbcons "crypto ssfs resetConsistency"
```

The first time you execute the command, it does not reset the consistency information in the SSFS but outputs only a warning. To actually reset the consistency information in the SSFS, you must execute the command again within 20 seconds.

7. Change all application keys so that they are encrypted with the new root key.

You do this by executing the following SQL statement, for example using the SAP HANA studio or SAP HANA HDBSQL:

```
ALTER SYSTEM APPLICATION ENCRYPTION CREATE NEW KEY
```

Note

You need RESOURCE ADMIN to execute this command.

After the next savepoint operation, new random internal application keys are created. New data is encrypted with the new application keys and the new keys are encrypted with the root encryption key. No

re-encryption takes place. Any data encrypted with existing keys continues to be encrypted with these keys.

i Note

Depending on the workload of the database, the next savepoint operation may not happen for some time. You can force a savepoint with the statement: `ALTER SYSTEM SAVEPOINT`. In particular, you should force a savepoint with this statement if you plan to shut down your database right after generating the new application keys because a shutdown does not automatically write a savepoint and your change would be lost.

Related Information

[SAP HANA XS JavaScript API Reference](#)

10 Tutorials

The following tutorials are a sampling of general use cases, which illustrate the functionality and versatility of the SAP HANA database lifecycle manager.

10.1 Tutorial: Automating Installation

Installation automation is designed for those who are familiar with SAP HANA, and are installing it regularly, in various production environments. In particular, installation automation refers to installing SAP HANA systems using batch mode and a combination of a configuration file and call options passed on the command line.

Introduction to Installation Automation

With the SAP HANA database lifecycle manager (HDBLCM), it is now possible to automate installation by using a combination of the configuration file, command line options, and batch mode, so that an SAP HANA system installation can be executed once without any follow-up selection.

To illustrate the purpose of installation automation, let us assume there is a hardware partner who offers SAP HANA platforms (SAP HANA system installed on SAP verified hardware) in three sizes: Small, Large, and Extra Large.



Extra Large Platform

- Multi-host
 - 4 workers
 - 2 standby
- 2 host groups
- Host auto-failover



Large Platform

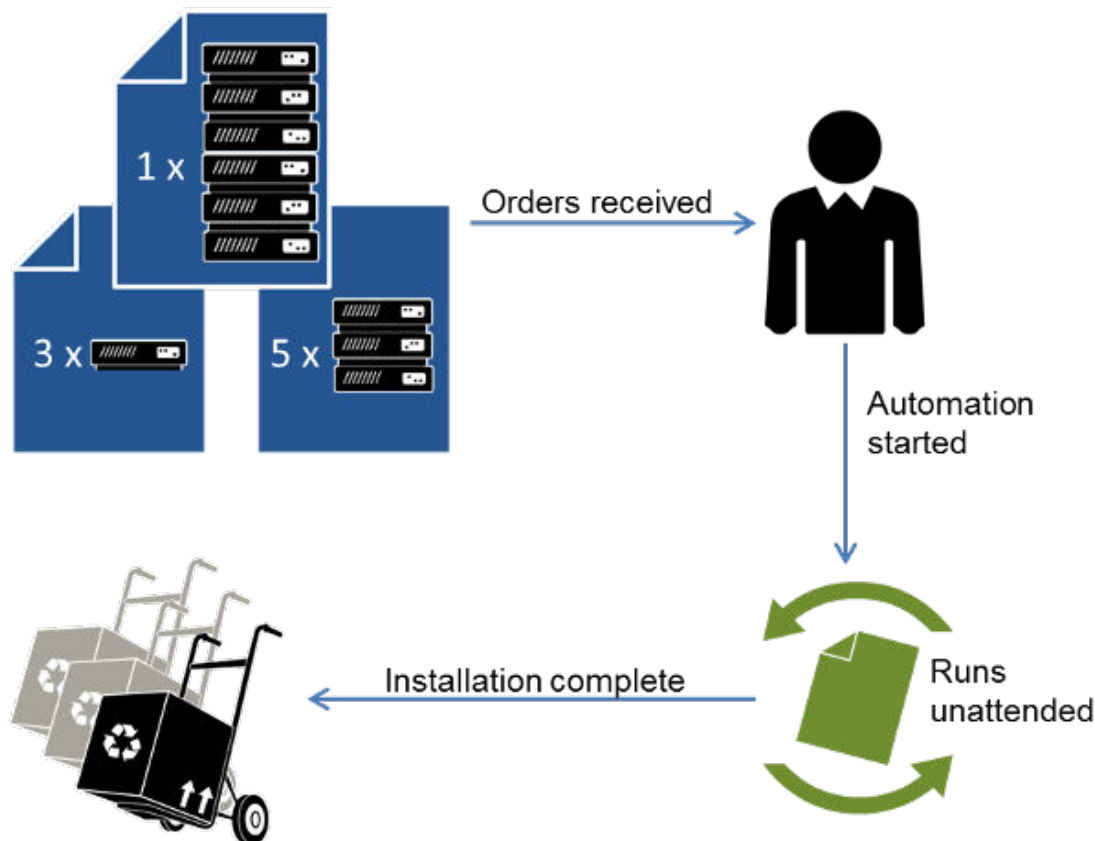
- Multi-host
 - 2 workers
 - 1 standby
- Host auto-failover



Small Platform

- Single-host
- No auto-failover

Since the hardware partner prepares the SAP HANA platform on-demand, he needs to be able to react quickly to orders as they are placed. During slow sales periods, manual installation is feasible, however during busy sales periods, manual installation could create too much overhead. In this case, installation automation would allow the hardware partner to start as many installation copies as required, without any further interaction with the installer. It would even be possible for the partner to start the installation near the end of the business day, leave the installation, and ship out the order the next morning.



The hardware partner automates the installation of nine SAP HANA systems (1 Extra Large, 5 Large, and 3 Small). Previously, he has created configuration files for each of the three system types. So, when several orders come in at the same time, he fine tunes his installation script to include the number of systems and calls the SAP HANA database lifecycle manager using the command-line interface with the configuration file parameter in batch mode. When the installation script is run, SAP HANA is installed on both the single-host and multiple-host systems, without any additional input. By reusing the same configuration files, the installations are reliable, flexible, and efficient.

Step 1: Prepare for automation with the automation checklist.

Automation is ideal for installations that run unattended. Before you start an automated installation, it is recommended to consider the following.

For All System Types

Do the operating system and additional software components meet the requirements?	Refer to the <i>SAP HANA Hardware and Software Requirements</i> .
Do you know where the data volumes and the log volumes will be located?	For security reasons, the data device and log device should not be the same. Refer to the <i>SAP HANA System Types</i> .
Where will the required file systems be located and is the storage sufficient?	Refer to the <i>Recommended File System Layout</i> .
Have you performed a hardware check?	The installer performs a hardware check before installation, for automated installation it is recommended to perform a manual hardware check first. Refer to the <i>Hardware and Software Requirements</i> .
Where will you specify passwords?	SYSTEM, <sid>adm, and root passwords must be specified in the configuration file or in an XML file. Refer to the <i>Specifying Passwords</i> information.
For the Multiple-Host System Type Only	
How many worker hosts and standby hosts will there be? How will they be grouped?	System processes and data are distributed among worker hosts, including the original host. Standby hosts do not perform tasks. Refer to the <i>Multiple-Host System Concepts</i> .
How will storage devices be configured?	External storage can be configured so that hosts have shared or non-shared access. Refer to the <i>Multiple-Host System Concepts</i> .
The root user name must be the same for all hosts in a multiple-host system. Will the root user name for all hosts be "root"?	If not, the <code>root_user</code> parameter must be specified during installation. Refer to the <code>root_user</code> parameter information.

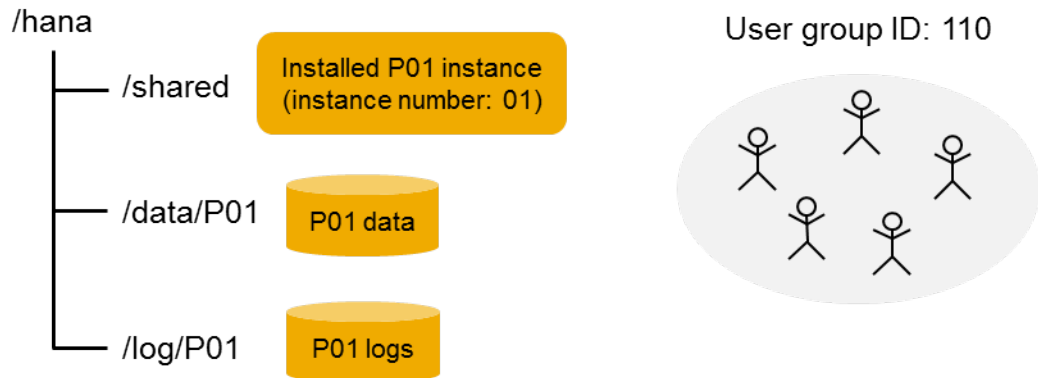
Step 2: Review the installation scenario.

In order to provide flexibility, it is possible to install the same SAP HANA system in several ways. The differences between installation methods are best depicted through a one-to-one comparison of the same system installed with each available method.

In the following example, there is a hardware partner who plans to install several SAP HANA single-host systems. His desired system has the following specifications:

- System name: P01
- Instance number: 01
- Installation path: `/hana/shared`
- Data path: `/hana/data/P01`
- Log path: `/hana/log/P01`
- User group ID: 110

Single-host system name: P01



He has several customers who have pre-ordered the single-host SAP HANA P01 system and he is expecting more P01 orders. His goal is to iteratively improve his installation method to the point that he can automate his ideally configured system installation on several hosts at the same time, come back later, and the installed SAP HANA platforms will be finished and ready to ship. To reach his goal, he installs the same system (P01) three times, using:

- Command line options
- Configuration file
- Configuration file in batch mode

Step 3: Create a test installation by installing the system using command line options.

Since the hardware partner is still new to installing SAP HANA, he tries out the installation first from the command line. He reviews the installation parameters and finds the corresponding parameter key-value pairs for his desired P01 single-host system.

System Detail	Specification	Command Line Parameter
System name	P01	--sid=P01
Instance number	01	--number=01
Installation path	/hana/shared	--sapmnt=/hana/shared
Data path	/hana/data/P01	--datapath=/hana/data/P01
Log path	/hana/log/P01	--logpath=/hana/log/P01
User group ID	110	--groupid=110

The hardware partner takes the parameter key-value pairs, and builds the command line input as follows:

```
./hdblcm --sid=P01 --number=01 --groupid=110 --sapmnt=/hana/shared --datapath=/hana/data/P01 --logpath=/hana/log/P01
```

Upon review of the parameter syntax, he realizes he did not need to specify `sapmnt`, `datapath`, or `logpath` parameters because he chose the default values. The rest of the parameters could also have been given the short-form syntax. Therefore, the same P01 system installation could be simplified to the following syntax:

```
./hdblcm -s P01 -n 01 -G 110
```

System Detail	Specification	Simplified Command Line Parameter
System name	P01	-s P01
Instance number	01	-n 01
Installation path	/hana/shared	<default>
Data path	/hana/data/P01	<default>
Log path	/hana/log/P01	<default>
User group ID	110	-G 110

Step 4: Create a test installation by installing the system using the configuration file.

Now that the hardware partner successfully installed from the command line, he wants to make use of the configuration file, since his end goal is to automate the installation.

He generates a template of the configuration file:

```
./hdblcm --action=install --dump_configfile_template=/home/root/HANA_install.cfg
```

He opens the blank configuration file template and fills it in as follows:

```
HANA_install.cfg# SAP HANA System ID
sid=P01

# Instance Number (Default: 00)
number=01
...
# ID of User Group 'sapsys'
Groupid=110
```

Since it was already discovered that only the SID, instance number, and group ID differ from the default values, only they are specified in the configuration file. The hardware partner also realizes that there is automatic substitution of the SID (`sid`) and installation path (`sapmnt`) throughout the configuration file according to default values (for example, `datapath` default: `/hana/data/${<sid>}`), so he does not need to append the SID (in this case, P01) to the paths.

Now, he can start the installer from the command line with the following simple command:

```
./hdblcm --configfile=/home/root/HANA_install.cfg
```

Step 5: Automate the system installation using the configuration file in batch mode

Now the hardware partner can take the last step of automation with the SAP HANA lifecycle management tool `hdblcm` and use batch mode. It is important to note, up this point the hardware partner has been interactively entering passwords and confirming other default parameters as part of interactive mode. Batch mode runs the installer without asking for any confirmation or parameter entry, thereby allowing installation to run to completion from one push of a button.

There are two choices for password entry in batch mode. Either the passwords can be stored in an XML file and passed to the installer as a stream by standard input, or they can be specified in the configuration file. Since the hardware partner is already making use of the configuration file, he decides to enter the passwords there. The only mandatory parameters in batch mode are the SID and passwords, so he checks the other defaults of the mandatory installation values before continuing the installation. In batch mode, the installer accepts default values for any unspecified parameters.

With the addition of passwords to the configuration file, it now looks like this:

```
HANA_install.cfg# Root User Password
root_password=Root1234
...
# SAP HANA System ID
sid=P01

# Instance Number (Default: 00)
number=01
...
# ID of User Group 'sapsys'
Groupid=110
...
# SAP Host Agent (sapadm) Password
sapadm_password=Agent1234
...
# System Administrator Password
password=Adm1234
...
# Database User (SYSTEM) Password
system_user_password=Sys1234
```

Now, the partner starts the installer, this time with the addition of the batch mode parameter, `-b` (or `--batch`):

```
./hdblcm --configfile=/home/root/HANA_install.cfg -b
```

Related Information

[Getting Started with SAP HANA System Installation \[page 53\]](#)

[SAP HANA Hardware and Software Requirements \[page 12\]](#)

[SAP HANA System Types \[page 18\]](#)

[Recommended File System Layout \[page 15\]](#)

[Specifying Passwords \[page 56\]](#)

[root_user \[page 206\]](#)

[Multiple-Host System Concepts \[page 63\]](#)

10.2 Tutorial: Using Custom Configuration Files

During system installation, customized SAP HANA configuration (*.ini) files can be placed inside a dedicated directory that is specified using the `custom_cfg` parameter.

Context

Custom configuration files can be placed inside a custom configuration folder. These files are used during installation to override default settings. This reduces the number of restarts during installation and facilitates configuration of the SAP HANA system.

Procedure

1. Create an empty directory that will contain your custom configuration files. The configuration files will be copied to the following directory before system start and will override the default settings: `<sapmnt>/<SID>/global/hdb/custom/config`
2. Create your own configuration files (*.ini) inside the custom configuration files directory. Alternatively, you can copy existing files from another system to re-use a tested configuration. For more information on configuration files, see *Configuring SAP HANA System Properties (INI Files)* in the *SAP HANA Administration Guide*.
3. Now the installer can be called from the command line.

```
./hdblcm --action=install --custom_cfg=<path to directory containing custom configuration files>
```

Related Information

[custom_cfg \[page 187\]](#)

[SAP Note 2267798 - Configuration of the SAP HANA Database during Installation Using hdbparam](#)

10.3 Tutorial: Installing a Multiple-Host System Using a Configuration File in Batch Mode

The following use case installs a multiple-host system, with two hosts (both worker). The installer reads the parameters from a configuration file. The installation is run in batch mode, so that once the installation is started, both host installations are configured without any further input required.

Procedure

1. The following are the relevant parameters for the SAP HANA server. They are specified in a combination of command line options and configuration file:

Parameter	Input	Location Specified
Passwords	<pre># Root User Password root_password=Root1234 ... # SAP Host Agent (sapadm) Password sapadm_password=Agent1234 ... # System Administrator Password password=Adm1234 # Database User (SYSTEM) Password system_user_password=Sys1234</pre>	Configuration file
action	<code>--action=install</code>	Call option
sid	<code>sid=ABC</code>	Configuration file
number	<code>number=01</code>	Configuration file
root_user	<code>root_user=sysroot</code>	Configuration file
addhosts	<code>addhosts=hananode1</code>	Configuration file
configfile	<code>--configfile=/home/sysroot/hdblcm.cfg</code>	Call option
batch	<code>-b</code>	Call option
userid	<code>userid=55</code>	Configuration file

Parameter	Input	Location Specified
groupid	groupid=110	Configuration file
storage_cfg	storage_cfg=/home/sysroot/storage	Configuration file

- The reusable installation parameter values are saved in the following configuration file:

```
[Server]
# Additional Hosts
addhosts=hananode1
# Root User Name (Default: root)
root_user=sysroot
# Root User Password
root_password=Root1234
# SAP HANA System ID
sid=ABC
# Instance Number (Default: <next available number>)
number=01
# SAP Host Agent (sapadm) Password
sapadm_password=Agent1234
# System Administrator Password
password=Adm1234
# System Administrator User ID (Default: <next available number>)
userid=55
# ID of User Group 'sapsys' (Default: 79)
groupid=110
# Directory containing a storage configuration
storage_cfg=/home/sysroot/storage
# Database User (SYSTEM) Password
system_user_password=Sys1234
```

- Now the installer can be called from the command line, with the remaining parameters read from the configuration file. The installation is run in batch mode, so no follow-up confirmation is required.

```
./hdblcm --action=install --configfile=/home/sysroot/hdblcm.cfg -b
```

10.4 Tutorial: Overwriting Configuration File Parameters with Command Line Parameters

The following use case uses the same configuration file as above. However, this time, the desired system deviates slightly from the one defined the configuration file. By specifying parameters in the command line which are already specified in the configuration file, the configuration file settings are effectively overwritten. The command line parameters take precedence over the configuration file parameters.

Procedure

- The following are the desired parameters for the SAP HANA server. They are specified in a combination of command line and configuration file:

Parameter	Input	Location Specified	Used for Installation
Passwords	# Root User Password root_password=Root1234 ... # SAP Host Agent (sapadm) Password sapadm_password=Agent1234 ... # System Administrator Password password=Adm1234 # Database User (SYSTEM) Password system_user_password=Sys1234	Configuration file	yes
action	--action=install	CLI	yes
sid	sid=ABC	Configuration file	no
sid	--sid=DB1	CLI	yes
number	number=01	Configuration file	no
number	-n 01	CLI	yes
root_user	root_user=sysroot	Configuration file	yes
addhosts	addhosts=hananode1	Configuration file	no
addhosts	-- addhosts=hananode1,hananode2 :role=standby	CLI	yes
configfile	--configfile=/home/sysroot/ hdblcm_SPS7.cfg	CLI	yes
batch	-b	CLI	yes
userid	userid=55	Configuration file	yes
groupid	groupid=110	Configuration file	yes
storage_cfg	storage_cfg=/home/sysroot/ storage	Configuration file	no

Parameter	Input	Location Specified	Used for Installation
storage_cfg	<code>--storage_cfg=/home/sysroot/ storage_new</code>	CLI	yes

- The reusable installation parameter values are saved in the following configuration file:

```
[Server]
# Additional Hosts
addhosts=hananode1
# Root User Name (Default: root)
root_user=sysroot
# Root User Password
root_password=Root1234
# SAP HANA System ID
sid=ABC
# Instance Number (Default: <next available number>)
number=01
# SAP Host Agent (sapadm) Password
sapadm_password=Agent1234
# System Administrator Password
password=Adm1234
# System Administrator User ID (Default: <next available number>)
userid=55
# ID of User Group 'sapsys' (Default: 79)
groupid=110
# Directory containing a storage configuration
storage_cfg=/home/sysroot/storage
# Database User (SYSTEM) Password
system_user_password=Sys1234
```

- Now the installer can be called from the command line, with the remaining parameters read from the configuration file. The installation is run in batch mode, so no follow-up confirmation is required.

```
./hdblcm --action=install -n 01 --sid=DB1 --
addhosts=hananode1,hananode2:role=standby --storage_cfg=/home/sysroot/
storage_new --configfile=/home/sysroot/hdblcm_SPS7.cfg -b
```

10.5 Tutorial: Installing a Single-Host System with Passwords Read from XML Standard Input Stream

The following use case installs a single-host system. The installer reads the parameters from the command line, and the passwords from a standard input stream. The installation is run in batch mode, so that once the installation is started, the host is configured without any further input required.

Procedure

- The following are the desired parameters for the SAP HANA server, to be entered in command line in combination with the call to the installer.

Parameter	Input	Location Specified
Passwords	<code>--read_password_from_stdin=xml</code>	Call Option
sid	<code>--sid=P02</code>	Call Option
number	<code>--number=01</code>	Call Option
root_user	<code>--root_user=sysroot</code>	Call Option
batch	<code>--batch</code>	Call Option

- The following password file is prepared with the accepted XML syntax:

```
hdb_passwords.xml
<?xml version="1.0" encoding="UTF-8"?>
<Passwords>
<password><![CDATA[Adm1234]]></password>
<sapadm_password><![CDATA[Agent1234]]></sapadm_password>
<system_user_password><![CDATA[Sys1234]]></system_user_password>
<root_password><![CDATA[Root1234]]></root_password>
</Passwords>
```

- Now the installer can be called from the command line, with the passwords read from a standard input stream. The installation is run in batch mode, so no follow-up confirmation is required.

```
cat ~/hdb_passwords.xml | ./hdblcm --sid=P02 --number 01 --root_user=sysroot
--read_password_from_stdin=xml --batch
```

11 Troubleshooting

Troubleshooting should be referred to if the installation fails for an unknown reason, or for workarounds in special circumstances.

11.1 Accessing the Underlying Installer Components (pass_through_help)

Since `hdblcm` and `hdblcmgui` are wrapper tools, in some troubleshooting cases, it may be useful to pass component options on to the underlying component tools (`hdbinst` or `hdbupd`) in combination with the call to the `hdblcm` or `hdblcmgui` SAP HANA lifecycle management tools.

To view the available underlying component parameters as extended help output, use the `pass_through_help` parameter. The `action` parameter and `--help` or `-h` must be specified in combination with `pass_through_help`.

Syntax




To view the help output for the installation or the update `pass_through_help` parameters, use the following syntax:























```
--action=[install|update] --pass_through_help --help
```



















or

```
--action=[install|update] --pass_through_help -h
```

Available Parameters for `pass_through_help`

Parameter	Install	Update
<code>--hdbinst_client_ignore=<check1>[]...</code> Ignores failing prerequisite checks (<code>check_version</code>)		
<code>--hdbinst_client_sapmnt=<installation_path></code> Mount point for shared client installations [default: <code>--hdbinst_client_sapmnt=/hana/shared</code>]		
<code>--hdbinst_plugin_ignore=<check1>[]...</code> Ignores failing prerequisite checks (<code>check_busy_files</code> , <code>check_version</code>)		
<code>--hdbinst_plugin_nostart</code> Does not start the instance after installation		

Parameter	Install	Update
<pre>--hdbinst_plugin_system_user</pre> <p>Specifies the system user of the database [default: --hdbinst_plugin_system_user=SYSTEM]</p>		
<pre>--hdbinst_server_prepare_update</pre> <p>Stops the update before software version switch</p>		
<pre>--hdbinst_server_remote_execution</pre> <p>Specifies the connectivity method for multiple host operations [default: ssh]</p>		
<pre>--hdbinst_server_ignore=<check1>[]...</pre> <p>Ignores failing prerequisite checks (check_busy_files, check_diskspace, check_hosts, check_license, check_min_mem, check_pending_upgrade, check_plugin_dependencies, check_secondary_system, check_version)</p>		
<pre>--hdbinst_server_import_content[=off]</pre> <p>Imports delivery units [default: --hdbinst_server_import_content]</p>		
<pre>--hdbinst_server_xs_engine[=off]</pre> <p>Enables the XS engine [default: --hdbinst_server_xs_engine]</p>		
<pre>--hdbinst_server_xs_engine_http_port=<port></pre> <p>Specifies the HTTP port of the XS engine</p>		
<pre>--hdbinst_server_xs_engine_https_port=<port></pre> <p>Specifies the HTTPS port of the XS engine</p>		
<pre>--hdbinst_studio_features=all <feat1>[,<feat2>]...</pre> <p>Specifies the features to be installed [default: --hdbinst_studio_features=all]</p>		
<pre>--hdbinst_studio_path=<hdbinst_studio_path></pre> <p>Installation path [default: --hdbinst_studio_path=/usr/sap/hdbstudio]</p>		
<pre>--hdbupd_server_change_initial_ssfs_key[=off]</pre> <p>Changes the initial SSFS key [default: off]</p>		

Parameter	Install	Update
<pre>--hdbupd_server_ignore=<check1>[]...</pre> <p>Ignores failing prerequisite checks (<code>check_busy_files</code>, <code>check_diskspace</code>, <code>check_hosts</code>, <code>check_license</code>, <code>check_min_mem</code>, <code>check_pending_upgrade</code>, <code>check_plugin_dependencies</code>, <code>check_secondary_system</code>, <code>check_version</code>)</p>		
<pre>--hdbupd_server_import_content[=off]</pre> <p>Imports delivery units [default: <code>--hdbupd_server_import_content</code>]</p>		
<pre>--hdbupd_server_nostart</pre> <p>Does not start the instance after upgrade</p>		
<pre>--hdbupd_server_prepare_update</pre> <p>Stops the update before software version switch</p>		
<pre>--hdbupd_server_remote_execution</pre> <p>Specifies the connectivity method for multiple host operations [default: <code>ssh</code>]</p>		
<pre>--hdbupd_server_xs_engine[=off]</pre> <p>Enables the XS engine [default: <code>--hdbupd_server_xs_engine</code>]</p>		
<pre>--hdbupd_server_xs_engine_http_port=<port></pre> <p>Specifies the HTTP port of the XS engine</p>		
<pre>--hdbupd_server_xs_engine_https_port=<port></pre> <p>Specifies the HTTPS port of the XS engine</p>		
<p>XML password tag: <code><hdbinst_plugin_password></code></p> <p>System administrator password</p>		

11.2 Locating all SAP HANA File System Components

In addition to the main components installed in the default file systems described in [Recommended File System Layout \[page 15\]](#), it may also be necessary to locate the temporary files from the SAP HANA system. They can be found in the following directories:

- SAP HANA DB files:
 - `/var/lib/hdb` - IPC data (volatile)
 - `/var/tmp` - Installer log files, `HDB_alive_*`
 - `/tmp` - `.hdb*_lock` (volatile)

- `sapstartsrv` files:
 - `/etc/init.d/sapinit*` - Boot script
 - `/tmp/.sap*` - Sockets, lock files (volatile)

11.3 Enabling the Installer Trace

If the installer crashes or loops it may make sense to trace the installer until the problem occurs, open a CSS ticket, and attach the trace file for further analysis. You can switch on the installer trace by setting the environment variable `HDB_INSTALLER_TRACE_FILE` to `<tracefilename>`. The directory containing the trace file must already exist.

11.4 Checking the Log Files

The SAP HANA lifecycle management tools `hdb lcm` and `hdb lcmgui` write log files during installation. The most recent log file is always available under `/var/tmp/hdb lcm.log` or `/var/tmp/hdb lcmgui.log`. Additionally, a copy of the log files is archived in the directory `hdb_<SID>_hdb lcm_<action>_<date>..`

Since the SAP HANA lifecycle management tools `hdb lcm` and `hdb lcmgui` are wrappers for underlying component installers, it is also possible to check the component logs. It is recommended to review and analyze the SAP HANA lifecycle management tools `hdb lcm` and `hdb lcmgui` logs first. Once the source of the problem is narrowed down to a specific component, then the component logs can be further analyzed.

The component log files are stored in the following path:

```
/var/tmp/hdb_<SID>_<action>_<time_stamp>
```

where `<action>` ::= `install` | `update` | `addhost` | `uninstall` | and so on

The following log files are written during performing the action:

- `<hdbcommand>.log`: can be read using a text editor
- `<hdbcommand>.msg`: XML format for the display in the installation tool with the GUI
- `<hostname>_tracediff.tgz`: provides a delta analysis of the original trace files, makes a detailed analysis more easy

You can also view the last three log files in the SAP HANA studio using the administration function [Diagnosis Files](#).

11.5 Adding hdblcm to an Existing SAP HANA Installation

The SAP HANA lifecycle management tool `hdblcm` can be added to an existing installation that was performed using `hdbinst` by executing the following command:

```
./hdblcm --action=update --sid=<SID> --components=hdblcm
```

i Note

The version of `hdblcm` must be identical with the version of the installed SAP HANA system.

11.6 Disabling the Optimized Update

As of SPS 11, an optimized update of an SAP HANA system is performed to reduce the number of restarts and system downtime. The optimized update execution mode is enabled by default, if more than one component that supports the phased update process is selected to be installed. For troubleshooting purposes, the update mode can be switched to standard. Perform a standard update with the SAP HANA database lifecycle manager using one of the following commands.

Graphical user interface	<pre>./hdblcmgui --action=update -- update_execution_mode=standard</pre>
Command-line interface	<pre>./hdblcm --action=update -- update_execution_mode=standard</pre>

If you are using the SAP HANA HDBLCM Web user interface, open the *Advanced Parameters Configuration* dialog from the footer bar and select the standard update *Update Execution Mode* under *General Parameters*.

11.7 Dealing with a Failed Update

If the update stops without fully installing, uninstall the SAP HANA system using the SAP HANA database lifecycle manager (HDBLCM) and recover the system from the last backup. Then reinstall the SAP HANA system and run the update.

Related Information

[Updating the SAP HANA System \[page 92\]](#)

11.8 Removing a Partially Installed System

If the installation stops without fully installing, and you would like to remove the components and start over, run the component uninstaller (`hdbuninst`) for each component individually. Then start the installation over again using `hdblcm`.

11.9 Adjusting the System Time

A host cannot be added using the SAP HANA lifecycle management tool `hdblcm` if the time difference between the system time set on the installation host and the additional host is greater than 180 seconds. For information about setting the system time, see the documentation of your Linux distribution.

11.10 Skipping the Import of Initial XS Advanced Runtime Content

The XS advanced runtime requires initial content to be imported during installation. However, this import can be skipped by executing the SAP HANA installation with the following parameter:

```
--import_xs_content=off
```

If the import of the initial content was skipped during installation, the content can be imported at a later time by executing the resident SAP HANA lifecycle management tool `hdblcm` with the following parameter:

```
--load_initial_xs_content
```

11.11 Proxy Server Settings for SAP HANA Installations with XS Advanced Runtime

An SAP HANA system with XS advanced runtime installed that is using a proxy server requires the values of the `http_proxy`, `https_proxy` and `no_proxy` environment variables to be set. To do so, execute the following commands:

```
export http_proxy=http://<proxy_host>:<proxy_port>
export https_proxy=https://<proxy_host>:<proxy_port>
export no_proxy="<full qualified name of the XS Advanced server>"
```

12 Parameter Reference

Reference information is provided for each installation parameter.

Each parameter section includes some or all of the following information, depending on the complexity of the parameter:

- **Description** - The function of the parameter.
- **Syntax** - The command line option format and configuration file format for the parameter. Interactive mode (for both the GUI and CLI) do not require the use of parameter syntax.
- **Options** - The sub-specifications for the highly configurable parameters.
- **Remarks** - Important information about the parameters, including default values and whether the parameter is offered in interactive mode. If it is not available in interactive mode, and the default value is not wanted, the parameter must be specified as a command line option or in the configuration file in combination with the call to the installation tool in interactive mode.
- **Examples** - The syntax in its common usage with acceptable parameter specifications.
- **Related Information** - Links to relevant sections in the current document or to other documents which contain more detailed information.

12.1 `action`

Specifies the action of `hdblcm` to be either installation, update, or extract components.

Syntax

In the command line, the following syntax is used:

```
--action[=extract_components|install|update]
```

Remarks

The default for this parameter is `--action=exit`.

This parameter is available in interactive mode.

12.2 `addhosts`

Specifies additional hosts for the SAP HANA system as a comma-separated list. Individual host options are specified by a colon-separated list. This parameter is used when configuring a multiple-host system during installation.

Requirements

If the root user has a user name other than "root", the `root_user` parameter must also be specified in combination with `addhosts`.

When used with command-line batch mode, the `action` parameter must be specified in combination with `addhosts`.

Syntax

In the command line, the following syntax is used:

```
--addhosts=<host>[,<host2>]
```

where the `<host>` syntax is as follows:

```
<host_name>[:role=worker|standby|extended_storage_worker|  
extended_storage_standby|ets_worker|ets_standby|streaming|rdsync|  
xs_worker|xs_standby][:group=<name>][:storage_partition=<number>]
```

Options

The following options can be used to configure the parameter:

- `role` - Specifies the purpose of the SAP HANA host. SAP HANA hosts in production environments must only have one host role. However, if XS advanced runtime is installed, hosts can share multiple roles.
 - `worker` - A worker host (default) is used for database processing.
 - `standby` - A standby host is idle and available for failover in a high-availability environment.
 - `extended_storage_worker` - Worker host for SAP HANA dynamic tiering
 - `extended_storage_standby` - Standby host for SAP HANA dynamic tiering
 - `ets_worker` - Worker host for SAP HANA accelerator for SAP ASE
 - `ets_standby` - Standby host for SAP HANA accelerator for SAP ASE
 - `streaming` - Host for SAP HANA smart data streaming
 - `rdsync` - Host for SAP HANA remote data sync
 - `xs_worker` - Host for SAP HANA XS advanced runtime
 - `xs_standby` - Standby host for SAP HANA XS advanced runtime
- `group` - Specifies the host group ID for failover scenarios. If undefined, the host group is named "default".
(The host group ID is NOT the same as the sapsys group ID, which is specified by the parameter `groupid`).
- `storage_partition` - Specifies the storage partition number, which is a logical role number assigned to non-shared storage devices in a storage connector API. Standby hosts do not have a storage partition.

Remarks

This parameter is available in interactive mode.

The following SAP HANA options are supported on Intel-based hardware platforms only:

- SAP HANA Accelerator for SAP ASE
- SAP HANA Remote Data Sync
- SAP HANA Smart Data Streaming

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Multiple-Host System Concepts \[page 63\]](#)

[Install a Multiple-Host SAP HANA System Using the Graphical User Interface \[page 67\]](#)

[root_user \[page 206\]](#)

[action \[page 174\]](#)

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.3 `add_local_roles`

Specifies additional roles of the local host during SAP HANA system installation. Multiple host roles are **not** supported in production environments. However, if XS advanced runtime is installed, hosts can share multiple roles.

Syntax

In the command line, the following syntax is used:

```
--add_local_roles=<role1>[,<role2>]
```

where the following roles can be specified:

- `worker` - A worker host (default) is used for database processing.
- `standby` - A standby host is idle and available for failover in a high-availability environment.
- `extended_storage_worker` - Worker host for SAP HANA dynamic tiering
- `extended_storage_standby` - Standby host for SAP HANA dynamic tiering
- `ets_worker` - Worker host for SAP HANA accelerator for SAP ASE
- `ets_standby` - Standby host for SAP HANA accelerator for SAP ASE
- `streaming` - Host for SAP HANA smart data streaming
- `rdsync` - Host for SAP HANA remote data sync
- `xs_worker` - Host for SAP HANA XS advanced runtime
- `xs_standby` - Standby host for SAP HANA XS advanced runtime

Remarks

The following SAP HANA options are supported on Intel-based hardware platforms only:

- SAP HANA Accelerator for SAP ASE

- SAP HANA Remote Data Sync
- SAP HANA Smart Data Streaming

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.4 `add_roles`

Specifies additional roles for existing SAP HANA hosts during SAP HANA option installation. Multiple host roles are **not** supported in production environments. However, if XS advanced runtime is installed, hosts can share multiple roles.

Syntax

In the command line, the following syntax is used:

```
--add_roles=<host name>=<role> -R <host name>=<role>
```

where the following roles can be specified:

- `extended_storage_worker` - Worker host for SAP HANA dynamic tiering
- `extended_storage_standby` - Standby host for SAP HANA dynamic tiering
- `ets_worker` - Worker host for SAP HANA accelerator for SAP ASE
- `ets_standby` - Standby host for SAP HANA accelerator for SAP ASE
- `rdsync` - Host for SAP HANA remote data sync
- `streaming` - Host for SAP HANA streaming analytics
- `xs_worker` - Host for SAP HANA XS advanced runtime
- `xs_standby` - Standby host for SAP HANA XS advanced runtime

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.5 ase_datapath

Specifies the path to the directory of the SAP HANA accelerator for SAP ASE data. Required for installation of SAP HANA accelerator for SAP ASE.

Syntax

In the command line, the following syntax is used:

```
--ase_datapath=<path to SAP HANA accelerator for SAP ASE data directory>
```

Remarks

The default for this parameter is `--ase_datapath=/hana/data_ase/<SID>`.

This parameter is available in interactive mode.

This parameter is not supported by SAP HANA on IBM Power Systems.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.6 ase_logpath

Specifies the path to the directory of the SAP HANA accelerator for SAP ASE logs. Required for installation or update of SAP HANA accelerator for SAP ASE.

Syntax

In the command line, the following syntax is used:

```
--ase_logpath=<path to SAP HANA accelerator for SAP ASE log directory>
```

Remarks

The default for this parameter is `--ase_logpath=/hana/log_ase/<SID>`.

This parameter is available in interactive mode.

This parameter is not supported by SAP HANA on IBM Power Systems.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.7 `ase_user`

Specifies the administrator user of SAP HANA accelerator for SAP ASE.

Syntax

In the command line, the following syntax is used:

```
--ase_user=<administrator user name>
```

Remarks

The default for this parameter is `--ase_user=sa`.

This parameter is available in interactive mode.

This parameter is not supported by SAP HANA on IBM Power Systems.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.8 autoadd_xs_roles

Assigns XS_WORKER and XS_STANDBY host roles. By default, the host role XS_WORKER will be assigned to all worker hosts, the host role XS_STANDBY will be assigned to all standby hosts.

Syntax

In the command line, the following syntax is used:

```
--autoadd_xs_roles[=off]
```

Remarks

The default for this parameter is `--autoadd_xs_roles (on)`.

This parameter is available in interactive mode.

12.9 autostart

Restarts system after machine reboot.

Syntax

In the command line, the following syntax is used:

```
--autostart=[0|1]
```

where 0 = off, and 1 = on

Remarks

The default for this parameter is `--autostart=0 (off)`.

12.10 basepath_streaming

Specifies the location of streaming logstores and runtime information.

Syntax

In the command line, the following syntax is used:

```
--basepath_streaming=<location of streaming logstores and  
runtime information>
```

Remarks

The default for this parameter is `--basepath_streaming=/hana/
data_streaming/<SID>`.

This parameter is available in interactive mode.

12.11 `batch`

Runs the SAP HANA lifecycle management tool from the command line in batch mode using default values for unspecified parameters. If mandatory values are omitted or if invalid values are specified, the program issues an error message.

Syntax

In the command line, the following syntax is used:

```
--batch
```

or, in short form:

```
-b
```

Related Information

[Specifying Passwords \[page 56\]](#)

12.12 `certificates_hostmap`

Specifies the hostname used for generation of self-signed SSL certificates for the SAP Host Agent.

Requirements

The key-value pair `action=install` must be specified in combination with `certificates_hostmap`.

Syntax

In the command line, the following syntax is used:

```
--action=install --certificates_hostmap=<host name>=<certificate  
host name>
```

or

```
--action=install -C <host name>=<certificate host name>
```

Remarks

The default for this parameter is the current host.

This parameter is available in interactive mode.

Example

The following example generates certificates for two hosts in the long-form syntax:

```
./hdblcm --action=install --  
certificates_hostmap=hananode01=server1.company.com --  
certificates_hostmap=hananode02=server2.company.com
```

The following example generates certificates for two hosts in the short-form syntax:

```
./hdblcm --action=install -C hananode01=server1.company.com -C  
hananode02=server2.company.com
```

In this example, not all required installation parameters are specified in the command line. If this is the case, the remaining mandatory parameters are requested interactively.

Related Information

[action \[page 174\]](#)

[components \[page 184\]](#)

12.13 `change_system_user_password`

Changes the password of the database user (SYSTEM).

Syntax

In the command line, the following syntax is used:

```
--change_system_user_password
```

Remarks

This parameter is available in interactive mode.

12.14 `check_installation`

Checks the SAP HANA installation

Syntax

In the command line, the following syntax is used:

```
--action=check_installation
```

12.15 `checkmnt`

Specifies a non-standard shared file system, which can be accessed by all hosts during installation. This parameter is typically used when the SID is included in the mountpoint.

Syntax

In the command line, the following syntax is used:

```
--checkmnt=<path>
```

12.16 `check_only`

Executes checks, but does not change the SAP HANA system.

Syntax

In the command line, the following syntax is used:

```
--check_only
```

12.17 `client_path`

Specifies the installation path for the client.

Syntax

In the command line, the following syntax is used:

```
--client_path=<path for client installation>
```

Remarks

The default for this parameter is `--client_path=<sapmnt>/<SID>/hdbclient`.

12.18 `component_dirs`

Specifies the installer component directories as a comma-separated list.

Syntax

In the command line, the following syntax is used:

```
--component_dirs=<component directory>
```

Remarks

This parameter supports relative paths.

12.19 `component_medium`

Specifies the location of the SAP HANA installation medium.

Syntax

In the command line, the following syntax is used:

```
--component_medium=<directory of the installation medium>
```

12.20 `component_root`

Specifies the directory root to search for components.

Syntax

In the command line, the following syntax is used:

```
--component_root=<component root directory>
```

Remarks

This parameter supports relative paths.

12.21 `components`

Specifies the components to be installed in combination with the SAP HANA server: SAP HANA client, SAP HANA studio, aAdditional system components like Application Function Libraries (AFL and the product-specific AFLs POS, SAL, SCA, SOP, UDF), SAP liveCache applications (SAP LCA or LCAPPS-Plugin), or SAP HANA smart data access (SDA), or SAP HANA options. It is also possible to specify all components, or to specify a combination of components as a comma-separated list. The server is always installed, even if it is not explicitly specified.

Requirements

The parameter `action` must be specified in combination with `components`.

Syntax

In the command line, the following syntax is used:

```
--action=[install|update|uninstall] --components [=all|client|
```

```
es|ets|lcapps|server|smartda|streaming|studio|afl|pos|sal|sca|
sop|trd|udf]
```

Remarks

The default for this parameter is `--components=client,server` and is dependent on the installer finding installation sources for the components.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

This parameter is available in interactive mode.

Example

The following example installs the SAP HANA client, the SAP HANA studio, and the SAP HANA database (always installed, despite the specification):

```
./hdblcm --action=install --components=client,studio
```

In this example, not all required installation parameters are specified in the command line. If this is the case, the remaining mandatory parameters are requested interactively.

Related Information

[action \[page 174\]](#)

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.22 `configfile`

Loads a configuration file of call option key-value pairs to be passed to the SAP HANA lifecycle management program.

Syntax

In the command line, the following syntax is used:

```
--configfile=<file path>
```

Remarks

The configuration file makes installation and configuration tasks more efficient and reliable. For more information, see Related Information.

This complement to this call option is the call option `dump_configfile_template`.

Related Information

[dump_configfile_template \[page 189\]](#)

12.23 `continue_update`

Continues the pending update with the persisted parameters. For more details about update planning and updating in a two-phase approach, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--continue_update [=off]
```

Remarks

The default for this parameter is `--continue_update (on)`.

This parameter is available in interactive mode.

Related Information

[Prepare an Update for Reduced SAP HANA System Downtime \[page 102\]](#)

12.24 `copy_repository`

Specifies the target path to which the SAP HANA studio repository should be copied.

Syntax

In the command line, the following syntax is used:

```
--copy_repository=<target path>
```

Remarks

The default for this parameter is `--copy_repository=/<sapmnt>/<SID>/hdbstudio_update`

12.25 `custom_cfg`

Specifies the path to the directory which contains custom configuration (*.ini) files.

Syntax

In the command line, the following syntax is used:

```
--custom_cfg=<path to directory containing custom configuration files>
```

Remarks

Customized versions of SAP HANA configuration files for configuring the system as a whole and individual tenant databases, hosts, and services can be placed inside the directory. These configuration files will be copied to the following directory before system start and will override the default settings:

```
<sapmnt>/<SID>/global/hdb/custom/config
```

Related Information

[SAP Note 2267798 - Configuration of the SAP HANA Database during Installation Using hdbparam](#) 
[Tutorial: Using Custom Configuration Files \[page 162\]](#)

12.26 `databackuppath`

Specifies the location of the data backups.

Syntax

In the command line, the following syntax is used:

```
--databackuppath=<path>
```

Remarks

This parameter is available in interactive mode.

The path must be specified if the new directory is located on a different physical storage. The contents of the directory must be moved manually to the new location.

12.27 `datapath`

Specifies the path to the data directory of the SAP HANA system.

Syntax

In the command line, the following syntax is used:

```
--datapath=<path to data directory>
```

Remarks

The default for this parameter is `--datapath=/hana/data/<SID>`.

This parameter is available in interactive mode.

The path must be specified if the new directory is located on a different physical storage. The contents of the directory must be moved manually to the new location.

12.28 `db_isolation`

Specifies the isolation of the tenant databases on operating system level for multitenant database container SAP HANA systems. By default, all database processes in a multiple-container system run under the default OS user `<sid>adm`. If it's important to mitigate against cross-database attacks through OS mechanisms, you can configure the system for high isolation. In this way, the processes of individual tenant databases must run under dedicated OS users belonging to dedicated OS groups. Database-specific data on the file system is subsequently protected using standard OS file and directory permissions.

Requirements

This parameter must be used in combination with `db_mode=multiple_containers`. For more information, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--db_isolation=high|low
```

Remarks

The default for this parameter is `--db_isolation=low`.

This parameter is available in interactive mode.

For more information about database isolation, see *Database Isolation* in the *SAP HANA Administration Guide* or the *SAP HANA Security Guide*.

Related Information

[db_mode](#) [page 189]

12.29 `db_mode`

Specifies whether the system is installed in single-container mode (default) or multiple-container mode. A single-container system contains one database but the system and the database are perceived as a single unit. A multiple-container system contains one system database and any number of tenant databases. The system database is created during the installation process. A system administrator must create the required tenant databases after installation. For general information about multiple-container systems, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--db_mode=multiple_containers|single_container
```

Remarks

The default for this parameter is `--db_mode=single_container`.

This parameter is available in interactive mode.

12.30 `dump_configfile_template`

Specifies a file path to which a template configuration file is exported. The call options in the template configuration file are set to their default values, and can be edited.

Syntax

In the command line, the following syntax is used:

```
--dump_configfile_template=<file path>
```

Remarks

The configuration file makes installation and configuration tasks more efficient and reliable. For more information, see Related Information.

This complement to this call option is the call option `configfile`.

12.31 `es_datapath`

Specifies the path to the directory of the SAP HANA dynamic tiering data. Required for installation of SAP HANA dynamic tiering.

Syntax

In the command line, the following syntax is used:

```
--es_datapath=<path to SAP HANA dynamic tiering data directory>
```

Remarks

The default for this parameter is `--es_datapath=/hana/data_es/<SID>`.

This parameter is available in interactive mode.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.32 `es_logpath`

Specifies the path to the directory of the SAP HANA data tiering logs. Required for installation or update of SAP HANA dynamic tiering.

Syntax

In the command line, the following syntax is used:

```
--es_logpath=<path to SAP HANA dynamic tiering log directory>
```

Remarks

The default for this parameter is `--es_logpath=/hana/log_es/<SID>`.

This parameter is available in interactive mode.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.33 `extract_components`

Extracts content that was downloaded from the SAP Service Marketplace for installation or update. For more details about preparing software archives for update, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--extract_components
```

Options

The following options are available:

- `component_archives_dir` - Location of the SAP HANA component archives.
- `extract_temp_dir` - The target directory to extract the software component archives to.
- `sapcar_location` - Location to the SAPCAR executable.
- `tar_executable_location` - Location of the tar executable.

Remarks

The default for this parameter is `--extract_components --component_archives_dir --extract_temp_dir=<component_archives_dir>/extracted --sapcar_location=<install_path>/<SID>/global/hdb/saphostagent_setup/SAPCAR --tar_executable_location=</bin/tar>`.

This parameter is available in interactive mode.

Related Information

[Prepare the Software Archive for the Update \[page 100\]](#)

12.34 `groupid`

Specifies the SAP system (`sapsys`) group ID. This parameter is relevant only if a `sapsys` group does not already exist on the host. If a `sapsys` group already exists, passing the `groupid` parameter does not alter the existing group.

Syntax

In the command line, the following syntax is used:

```
--groupid=<sapsys group ID>
```

or, in short form:

```
-G <sapsys group ID>
```

Remarks

The default for this parameter is `--groupid=79`.

This parameter is available in interactive mode.

12.35 `help`

Displays the inline help information.

Syntax

In the command line, the following syntax is used:

```
--help
```

or, in short form:

```
-h
```

Remarks

A general help output is available for all SAP HANA lifecycle management programs. Task-specific help output is available for some programs. Refer to the task documentation for more details.

12.36 `home`

Specifies the home directory of the system administrator. This parameter is relevant only if the operating system administrator (`<sid>adm`) does not exist prior to installation.

Syntax

In the command line, the following syntax is used:

```
--home=<home directory>
```

Remarks

The default for this parameter is `--home=/usr/sap/<SID>/home`.

This parameter is available in interactive mode.

12.37 `hostmap`

Specifies the host mapping to rename one host. The parameter has to be specified for each renamed host.

Syntax

In the command line, the following syntax is used:

```
--hostmap=<old host name>=<new host name>
```

or, in short form:

```
-H <old host name>=<new host name>
```

Remarks

This parameter is available in interactive mode.

Example

The following command renames two hosts, host1 and host2, to host3 and host4:

```
./hdblcm --action=rename_system -H host1=host3 -H host2=host4
```

12.38 `hostname`

Specifies the virtual host name of the system host.

Syntax

In the command line, the following syntax is used:

```
--hostname=<name of the host machine>
```

or, in short form:

```
-H <name of the host machine>
```

Remarks

Restrictions apply to host names in SAP HANA systems. Alphanumerical string of lowercase alpha characters [a-z] and digits [0-9] and the hyphen (or minus) character "-" are permitted. Although the newer RFCs permit hostnames beginning with digits we recommend hostnames to begin with an alpha character. The period character "." is only allowed to delimit components of domain names like (sapc11.sap.com).

The default for this parameter is the host name of the current machine.

This parameter is available in interactive mode.

12.39 `https`

Specifies whether or not to use HTTPS.

Syntax

In the command line, the following syntax is used:

```
--https
```

Remarks

This parameter is available in interactive mode.

12.40 `ignore`

Specifies failing prerequisite checks that the SAP HANA platform lifecycle management tools should ignore.

Syntax

In the command line, the following syntax is used:

```
--ignore=<check1>[, <check2>]...
```

12.41 `import_content`

Imports delivery units.

Syntax

In the command line, the following syntax is used:

```
--import_content[=off]
```

Remarks

The default for this parameter is `--import_content`.

12.42 `import_xs_content`

Imports SAP HANA XS advanced runtime content.

Syntax

In the command line, the following syntax is used:

```
--import_xs_content [=off]
```

Remarks

The default for this parameter is `--import_xs_content`.

12.43 `init_user`

Uses the properties of an existing system administrator (`<sid>adm`) if the user ID does not match the user ID that was used to set up the SAP HANA system.

Syntax

In the command line, the following syntax is used:

```
--init_user
```

12.44 `init_user_home_dir`

Creates a home directory for the system administrator on each host. This parameter is relevant only if the home directory of the operating system administrator (`<sid>adm`) does not exist.

Syntax

In the command line, the following syntax is used:

```
--init_user_home_dir
```

12.45 `install_hostagent`

Enables the installation or update of the SAP host agent.

Syntax

In the command line, the following syntax is used:

```
--install_hostagent [=off]
```

Remarks

The default for this parameter is `--install_hostagent (on)`.

12.46 `install_ssh_key`

Installs SSH key to access remote hosts.

Syntax

In the command line, the following syntax is used:

```
--install_ssh_key[=off]
```

Remarks

The default for this parameter is `--install_ssh_key(on)`.

12.47 `internal_network`

Specifies the internal subnet address in CIDR notation.

Syntax

In the command line, the following syntax is used:

```
--internal_network=<address>|none
```

Example

The following example specifies the internal network address in CIDR notation.

```
--internal_network=192.168.1.0/24
```

12.48 `isc_mode`

Specifies the inter-service communication mode.

Syntax

In the command line, the following syntax is used:

```
--isc_mode=standard|ssl
```

Remarks

If SAP HANA XS Advanced Runtime is installed, SSL is used for inter-service communication by default. SSL can be disabled during the installation of the SAP HANA XS Advanced Runtime by passing the parameter `--isc_mode=standard` to the SAP HANA database lifecycle manager.

12.49 `keep_user`

Keeps the system administrator user (<sid>adm) from the source system to be used in the target system.

Syntax

In the command line, the following syntax is used:

```
--keep_user [=on]
```

or, in short form:

```
-k [=on]
```

Remarks

The default for this parameter is `--keep_user (off)`.

This parameter is available in interactive mode.

12.50 `keep_user_home_dir`

Prevents the home directory of the source system administrator user (<sid>adm) from being removed.

Syntax

In the command line, the following syntax is used:

```
--keep_user_home_dir [=on]
```

Remarks

The default for this parameter is `--keep_user_home_dir (off)`.

This parameter is available in interactive mode.

12.51 `listen_interface`

Specifies the listen interface for the internal network communication.

Syntax

In the command line, the following syntax is used:

```
--listen_interface=[local|global|internal]
```

Options

The following options are available:

`global` - Binds the processes to all interfaces. This option does not require an internal network address entry.

`internal` - Binds the processes to this address only and to all local host interfaces. This option requires an internal network address entry.

`local` - Opens the communication ports for internal usage on the local interfaces. This configuration is only an option for single installations as the server is not reachable from outside. This option does not require an internal network address entry.

Remarks

If you define a value other than `local`, the local interfaces will always be open.

When using `listen_interface` in batch mode, the `global` option must be specified in combination with `--internal_network=none` to disable internal network binding.

This parameter is available in interactive mode.

12.52 `list_systems`

Displays a list of the installed SAP HANA systems on the current host, including the SAP system ID (SID), instance number, version number, and hosts.

Syntax

In the command line, the following syntax is used:

```
--list_systems
```

or, in short form:

```
-L
```

12.53 `load_initial_xs_content`

Imports SAP HANA XS advanced runtime content if `--import_xs_content=off` was selected during installation of the system.

Syntax

In the command line, the following syntax is used:

```
--load_initial_xs_content[=off]
```

Remarks

The default for this parameter is `--load_initial_xs_content`.

12.54 `logbackuppath`

Specifies the location of the log backups.

Syntax

In the command line, the following syntax is used:

```
--logbackuppath=<path>
```

Remarks

This parameter is available in interactive mode.

The path must be specified if the new directory is located on a different physical storage. The contents of the directory must be moved manually to the new location.

12.55 `logpath`

Specifies the path to the log directory of the SAP HANA system.

Syntax

In the command line, the following syntax is used:

```
--logpath=<path to log directory>
```

Remarks

The default for this parameter is `--logpath=/hana/log/<SID>`.

This parameter is available in interactive mode.

The path must be specified if the new directory is located on a different physical storage. The contents of the directory must be moved manually to the new location.

12.56 `max_mem`

Specifies the maximum memory allocation for a new system in MB.

Requirements

This parameter must be used in combination with `restrict_max_mem`. For more information, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--max_mem=<MB>
```

Remarks

The default for this parameter is `--max_mem=0`.

This parameter is available in interactive mode.

Related Information

[restrict_max_mem \[page 205\]](#)

12.57 `nostart`

Prevents the SAP HANA system from being started.

Syntax

In the command line, the following syntax is used:

```
--nostart
```

12.58 `nostart_tenant_db`

Prevents the SAP HANA tenant databases from being started.

Syntax

In the command line, the following syntax is used:

```
--nostart_tenant_db
```

12.59 `number`

Specifies the instance number of the SAP HANA system.

Requirements

The instance number must be a two-digit number between 00 and 97.

Syntax

In the command line, the following syntax is used:

```
--number=<instance number>
```

or, in short form:

```
-n <instance number>
```

Remarks

The default value for this parameter is the next successive un-used instance number.

This parameter is available in interactive mode.

12.60 `org_manager_user`

Creates a SAP HANA XS advanced runtime admin user. An admin user can add and manage users, view users, edit organization roles, view the organization quota, and perform other administrative tasks.

Syntax

In the command line, the following syntax is used:

```
--org_manager_user=<admin user>
```

Remarks

The default for this parameter is `--org_manager_user=XSA_ADMIN`.

This parameter is available in interactive mode.

12.61 `org_name`

Sets the name of the customer organization. Organizations enable developers to collaborate by sharing resources, services, and applications. Access to the shared resources, services, and applications is controlled by the organization manager.

Syntax

In the command line, the following syntax is used:

```
--org_name=<org_name>
```

Remarks

The default for this parameter is `--org_name=orgname`.

This parameter is available in interactive mode.

12.62 `prepare_update`

Stops the SAP HANA update before software version switch. The update is resumable. For more details about update planning and updating in a two-phase approach, see [Related Information](#).

Syntax

In the command line, the following syntax is used:

```
--prepare_update
```

Related Information

[Prepare an Update for Reduced SAP HANA System Downtime \[page 102\]](#)

12.63 `prod_space_name`

Sets the name of the customer space for the SAP HANA XS advanced runtime. In an organization, spaces enable users to access shared resources that can be used to develop, deploy, and maintain applications.

Syntax

In the command line, the following syntax is used:

```
--prod_space_name=<prod_space_name>
```

Remarks

The default for this parameter is `--prod_space_name=PROD`.

This parameter is available in interactive mode.

12.64 `rdsync_downloadpath`

Specifies the location of SAP HANA remote data sync file download directory.

Syntax

In the command line, the following syntax is used:

```
--rdsync_downloadpath=<path>
```

Remarks

The default for this parameter is `--rdsync_downloadpath=/hana/download_rdsync/<SID>`.

This parameter is available in interactive mode.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.65 `rdsync_uploadpath`

Specifies the location of SAP HANA remote data sync file upload directory.

Syntax

In the command line, the following syntax is used:

```
--rdsync_uploadpath=<path>
```

Remarks

The default for this parameter is `--rdsync_uploadpath=/hana/upload_rdsync/<SID>`.

This parameter is available in interactive mode.

Caution

Be aware that you need additional licenses for SAP HANA options. For more information, see *Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities* in Related Information.

Related Information

[Important Disclaimer for Features in SAP HANA Platform, Options and Capabilities \[page 225\]](#)

12.66 `read_password_from_stdin`

Reads passwords in XML syntax via input stream in batch mode.

Requirements

When using `read_password_from_stdin` in batch mode, the program looks for the necessary passwords from an input stream. Therefore, the following two requirements apply:

- A text file with XML tagging is created before calling the `read_password_from_stdin` parameter during installation.
- Batch mode is specified from the command line.

Syntax

In the command line, the following syntax is used:

```
--read_password_from_stdin=xml
```

Remarks

Passwords can be specified in several ways depending on your installation method of choice. For more details, refer to the information about passwords specification.

Example

The following example shows the file containing the passwords:

```
hdb_passwords.xml
<?xml version="1.0" encoding="UTF-8"?>
<Passwords>
<password><![CDATA[Adm1234]]></password>
<sapadm_password><![CDATA[Agent1234]]></sapadm_password>
<system_user_password><![CDATA[Sys1234]]></system_user_password>
<root_password><![CDATA[Root1234]]></root_password>
</Passwords>
```

Related Information

[Specifying Passwords \[page 56\]](#)

12.67 `remote_execution`

Specifies the connectivity method for SAP HANA multiple-host system operations.

Syntax

In the command line, the following syntax is used:

```
--remote_execution=saphostagent|ssh
```

Remarks

The default for this parameter is `--remote_execution=ssh`.

12.68 `removehosts`

Specifies remote hosts to be removed from the SAP HANA system.

Syntax

In the command line, the following syntax is used:

```
removehosts=<hostname1>[,<hostname2>]...
```

Remarks

This parameter is available in interactive mode.

12.69 `repository`

Defines the source path from which the SAP HANA studio repository should be copied.

Syntax

In the command line, the following syntax is used:

```
--repository=<source path>
```

or, in short form:

```
-r <source path>
```

Remarks

If you do not specify this option, the repository contained in the installation kit is copied.

12.70 `restrict_max_mem`

Specifies whether maximum memory allocation is restricted for a new system.

Requirements

This parameter must be used in combination with `max_mem`. For more information, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--restrict_max_mem
```

Remarks

This parameter is available in interactive mode.

Related Information

[max_mem \[page 199\]](#)

12.71 `root_user`

Specifies the root user name.

Syntax

In the command line, the following syntax is used:

```
--root_user=<user name>
```

Remarks

The default for this parameter is `--root_user=root`.

This parameter is available in interactive mode.

12.72 `sapmnt`

Specifies the path to the SAP mount directory, which can be used as a shared directory between multiple hosts.

Syntax

In the command line, the following syntax is used:

```
--sapmnt=<installation path>
```

Remarks

The default for this parameter is `--sapmnt=/hana/shared`.

This parameter is available in interactive mode.

This parameter can be specified once and automatically substituted throughout all parameter defaults, which use `sapmnt` as part of their default value.

12.73 `scope`

Performs task on the SAP HANA System (all hosts) or only on the local instance. This parameter is available for update only.

Syntax

In the command line, the following syntax is used:

```
--scope=instance|system
```

Remarks

The default for this parameter is `--scope=system`.

12.74 `shell`

Specifies a system administrator login shell. This parameter is relevant only if the operating system administrator (`<sid>adm`) does not exist prior to installation.

Syntax

In the command line, the following syntax is used:

```
--shell=<admin login shell>
```

Remarks

The default for this parameter is `--shell=/bin/sh`.

This parameter is available in interactive mode.

12.75 `sid`

Specifies a system ID. The SAP system ID (SID) is the identifier for the SAP HANA system.

Requirements

- The ID must be unique throughout your organization and consistent throughout your SAP system installation landscape.
- If you want to install an additional application server instance, make sure that no gateway instance with the same SAP SID exists in your SAP system landscape.

- The ID must consist of exactly three alphanumeric characters. Only uppercase letters are allowed. The first character must be a letter (not a digit).
- The following IDs are reserved and cannot be used: ADD ALL AMD AND ANY ARE ASC AUX AVG BIT CDC COM CON DBA END EPS FOR GET GID IBM INT KEY LOG LPT MAP MAX MIN MON NIX NOT NUL OFF OLD OMS OUT PAD PRN RAW REF ROW SAP SET SGA SHG SID SQL SUM SYS TMP TOP UID USE USR VAR.

Syntax

In the command line, the following syntax is used:

```
--sid=<SID>
```

or, in short form:

```
-s <SID>
```

Remarks

This parameter is available in interactive mode.

This parameter can be specified once and automatically substituted throughout all parameter defaults, which use `sid` as part of their default value.

12.76 `skip_modify_sudoers`

Prevents the file `/etc/sudoers` from being modified.

Syntax

In the command line, the following syntax is used:

```
--skip_modify_sudoers
```

or, in short form:

```
-M
```

12.77 `sld_hostname`

Specifies the name of the host where the SLD system is installed.

Syntax

In the command line, the following syntax is used:

```
--sld_hostname=<host name>
```

Remarks

This parameter is available in interactive mode.

12.78 `sld_password`

Specifies the password for the SLD system.

Syntax

In the command line, the following syntax is used:

```
--sld_password=<password>
```

Remarks

This parameter is available in interactive mode.

12.79 `sld_port`

Specifies the standard HTTP access port of the SLD.

Syntax

In the command line, the following syntax is used:

```
--sld_port=<port number>
```

Remarks

This parameter is available in interactive mode.

12.80 `sld_username`

Specifies the user of the SLD system. It must be a user that already exists on the host where the SLD system is running.

Syntax

In the command line, the following syntax is used:

```
--sld_username=<user name>
```

Remarks

This parameter is available in interactive mode.

12.81 `source_sid`

Specifies the source system ID if the `<sapmnt>/<SID>` is mounted under the new `<SID>`.

Syntax

In the command line, the following syntax is used:

```
--source_sid=<SID>
```

or, in short form:

```
-s <SID>
```

Remarks

This parameter is available in interactive mode.

12.82 `sso_cert`

Single sign-on (SSO) certificate file to authenticate `sapcontrol` and SAP Host Agent admin user.

Syntax

In the command line, the following syntax is used:

```
--sso_cert=<ssocertificate>
```

12.83 `storage_cfg`

Specifies a location where a `global.ini` is defined. It is possible to set up a storage connector, allowing SAP HANA to use hardware vendor-specific scripts for automated resource allocation and input/output fencing during failover.

Requirements

Resource allocation scripts are dependent on the hardware used. Therefore, only the hardware partners can provide correct scripts.

Syntax

In the command line, the following syntax is used:

```
--storage_cfg=<directory of the storage configuration>
```

Related Information

[Multiple-Host System Concepts \[page 63\]](#)

12.84 `studio_path`

Specifies the installation path for the SAP HANA studio.

Syntax

In the command line, the following syntax is used:

```
--studio_path=<installation path>
```

Remarks

The default for this parameter is `--studio_path=<sapmnt>/<SID>/hdbstudio`.

12.85 `studio_repository`

Enables the copying of the SAP HANA studio repository. When enabled (default), the SAP HANA studio repository is copied to the location defined by `copy_repository` from the location defined by `repository`.

Syntax

In the command line, the following syntax is used:

```
--studio_repository[=off]
```

Remarks

The default for this parameter is `--studio_repository (on)`.

Related Information

[copy_repository \[page 186\]](#)

[repository \[page 205\]](#)

12.86 `system_usage`

Specifies the usage type of the system to be installed. This setting is stored in the `global.ini` file, and can be used to identify the intended usage of the system.

Syntax

In the command line, the following syntax is used:

```
--system_usage=[production|test|development|custom]
```

Remarks

The default for this parameter is `--system_usage=custom`.

This parameter is available in interactive mode.

For information about implementing the next steps of the system usage type, see the *SAP HANA Administration Guide*.

12.87 `system_user`

Specifies the system user of the database.

Syntax

In the command line, the following syntax is used:

```
--system_user=<name>
```

Remarks

The default for this parameter is `--system_user=SYSTEM`.

12.88 `target_sid`

Specifies the SID for the target system.

Syntax

In the command line, the following syntax is used:

```
--target_sid=<new sid>
```

or, in short form:

```
-S <new sid>
```

Remarks

This parameter is available in interactive mode.

12.89 `timeouts`

Sets customized timeouts (`start_instance`, `start_service`, `stop_instance`, `stop_service`).

Syntax

In the command line, the following syntax is used:

```
--timeouts=<name1>:<sec>[,<name2>:<sec>]...
```

12.90 `update_execution_mode`

Specifies the update mode of `hdblcm` to be either standard or optimized. If the optimized update mode is selected, the update process will be carried out in a phased approach to minimize system downtime. For more details about the optimized update, see Related Information.

Syntax

In the command line, the following syntax is used:

```
--update_execution_mode=[standard|optimized]
```

Remarks

The default for this parameter is `--update_execution_mode=standard`.

Related Information

[Perform an Optimized Update \[page 105\]](#)

12.91 `userid`

Specifies the user ID of the system administrator. This parameter is relevant only if the operating system administrator (`<sid>adm`) does not exist prior to installation.

Syntax

In the command line, the following syntax is used:

```
--userid=<ID number>
```

or, in short form:

```
-U <ID number>
```

Remarks

The default value for this parameter is the next successive un-used user ID number.

This parameter is available in interactive mode.

12.92 `version`

Displays the version of the SAP HANA lifecycle management program.

Syntax

In the command line, the following syntax is used:

```
--version
```

or, in short form:

```
-v
```

12.93 `vm`

Specifies the path of the Java runtime file. This parameter is only relevant if the SAP HANA studio is selected for installation or update.

Syntax

In the command line, the following syntax is used:

```
--vm=<Java path>
```

Remarks

The default value for this parameter is the Java runtime that is found in the environment variable `PATH`, or the Java runtime specified with the environment variable `JAVA_HOME`.

12.94 `xs_components`

Specifies the XS advanced runtime components to be installed or updated.

Syntax

In the command line, the following syntax is used:

```
--xs_components=all|comp1[,comp2]...
```

Remarks

The default for this parameter is `--xs_components=xsac_monitoring,xsac_services`.

This parameter is available in interactive mode.

12.95 `xs_components_cfg`

Specifies the path to the directory containing MTA extension descriptors (*.mtaext)

Syntax

In the command line, the following syntax is used:

```
--xs_components_cfg=path
```

12.96 `xs_customer_space_isolation`

Run applications in customer space with a separate OS user

Syntax

In the command line, the following syntax is used:

```
--xs_customer_space_isolation[=off]
```

Remarks

The default for this parameter is `--xs_customer_space_isolation(on)`.

This parameter is available in interactive mode.

12.97 `xs_customer_space_user_id`

OS user ID used for running XS Advanced applications in customer space

Syntax

In the command line, the following syntax is used:

```
--xs_customer_space_user_id=uid
```

Remarks

This parameter is available in interactive mode.

12.98 `xs_domain_name`

Specifies the domain name of an `xs_worker` host. The domain name has to resolve to the SAP HANA host which is running the **xscontroller** and **xsuaaserver** service.

Syntax

In the command line, the following syntax is used:

```
--xs_domain_name=domain_name
```

Remarks

This parameter is available in interactive mode.

Alternatively, the domain name can resolve to a host which is not part of the SAP HANA system. On this host a SAP Web Dispatcher must be installed and configured to act as a reverse proxy, forwarding the requests to the `xs_worker` hosts.

Related Information

[SAP Note 2245631 - Enabling hostname routing in SAP HANA extended application services, advanced model](#)



[xs_routing_mode \[page 216\]](#)

12.99 `xs_routing_mode`

Specifies the routing mode to be used for XS advanced runtime installations.

Syntax

In the command line, the following syntax is used:

```
--xs_routing_mode=ports|hostnames
```

Remarks

The default for this parameter is `--xs_routing_mode=ports`.

This parameter is available in interactive mode.

Related Information

[SAP Note 2245631 - Enabling hostname routing in SAP HANA extended application services, advanced model](#)



[xs_domain_name \[page 216\]](#)

12.100 `xs_sap_space_isolation`

Run applications in SAP space with a separate OS user

Syntax

In the command line, the following syntax is used:

```
--xs_sap_space_isolation[=off]
```

Remarks

The default for this parameter is `--xs_sap_space_isolation (on)`.

12.101 `xs_sap_space_user_id`

OS user ID used for running XS advanced runtime applications in SAP space

Syntax

In the command line, the following syntax is used:

```
--xs_sap_space_user_id=uid
```


















Remarks














This parameter is available in interactive mode.

13 Important SAP Notes

Read the following SAP Notes before you start the installation. These SAP Notes contain the latest information about the installation, as well as corrections to the installation documentation.

Make sure that you have the most up-to-date version of each SAP Note, which you can find on SAP Service Marketplace at <https://service.sap.com/notes>.

SAP Note Number	Title
1514967 	SAP HANA: Central Note
2298750 	SAP HANA Platform SPS 12 Release Note
1523337 	SAP HANA Database: Central Note
2000003 	FAQ: SAP HANA
1944799 	SAP HANA Guidelines for SLES Operating System
1824819 	SAP HANA DB: Recommended OS settings for SLES 11 / SLES for SAP Applications 11 SP2
1954788 	SAP HANA DB: Recommended OS settings for SLES 11 / SLES for SAP Applications 11 SP3
2240716 	SAP HANA DB: Recommended OS settings for SLES 11 / SLES for SAP Applications 11 SP4
2205917 	SAP HANA DB: Recommended OS settings for SLES 12 / SLES for SAP Applications 12
2009879 	SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL)
2013638 	SAP HANA DB: Recommended OS settings for RHEL 6.5
2136965 	SAP HANA DB: Recommended OS settings for RHEL 6.6
2247020 	SAP HANA DB: Recommended OS settings for RHEL 6.7
2292690 	SAP HANA DB: Recommended OS settings for RHEL 7.2
2055470 	HANA on POWER Planning and Installation Specifics - Central Note
2218464 	Supported products when running SAP HANA on IBM Power Systems
2235581 	SAP HANA: Supported Operating Systems

SAP Note Number	Title
52505 	Support after end of mainstream/extended maintenance
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
1828400 	SAPUI5 tools disappeared after updating HANA Studio
1917938 	Migrating the Statistic Server During Update to SPS 07
1927949 	Standard Behavior for SAP Logon Tickets
1577128 	Supported clients for SAP HANA
1514966 	SAP HANA: Sizing SAP HANA Database
1637145 	SAP BW on HANA: Sizing SAP HANA Database
1793345 	Sizing for Suite on HANA
1824819 	Optimal settings for SLES 11 SP2 and SLES 11 for SAP SP2
1597355 	Swap space recommendation for Linux For the SAP HANA system there are no special requirements regarding swap space.

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](#) SAP HANA Data Center Intelligence
- [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-IOA](#) SAP IT Operations Analytics

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-FLY](#) SAP HANA InA Firefly
- [HAN-AS-INA-SVC](#) SAP HANA InA Service
- [HAN-AS-INA-UI](#) SAP HANA InA Toolkit, Fiori Search UI
- [HAN-AS-MDS](#) SAP HANA Multidimensional Service

- [HAN-AS-RPO](#) SAP HANA Repository
- [HAN-AS-RST](#) SAP HANA Development Environment REST API
- [HAN-AS-RUL](#) SAP HANA Rules Framework
- [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
- [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-TM](#) SAP HANA Task management
- [HAN-AS-XSA-WF](#) SAP HANA Workflow

SAP HANA Accelerator for SAP ASE

- [HAN-ASE](#) SAP HANA Accelerator for SAP ASE

SAP HANA Cockpit

- [HAN-CPT](#) SAP HANA Cockpit
- [HAN-CPT-ADM](#) SAP HANA Administration Core
- [HAN-CPT-ASE](#) SAP HANA Accelerator for SAP ASE Administration
- [HAN-CPT-BAC](#) SAP HANA Backup and Recovery
- [HAN-CPT-CNR](#) SAP HANA Workload Capture and Replay
- [HAN-CPT-DCC](#) SAP DB Control Center
- [HAN-CPT-DP](#) Please use HAN-DP-SDI
- [HAN-CPT-DYT](#) SAP HANA Dynamic Tiering Administration
- [HAN-CPT-SDS](#) SAP HANA Smart Data Streaming Administration
- [HAN-CPT-SYN](#) SAP HANA Remote Data Sync Cockpit
- [HAN-CPT-UM](#) SAP HANA User Management
- [HAN-CPT-XS](#) Please use HAN-AS-XS-ADM

SAP HANA Database

- [HAN-DB](#) SAP HANA Database
- [HAN-DB-AFL](#) Please use subcomponents, see SAP Note 2198403
- [HAN-DB-AFL-DQ](#) SAP HANA Data Quality 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-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-DI](#) HANA Deployment Infrastructure (HDI)
- [HAN-DB-ENG](#) SAP HANA DB Engines
- [HAN-DB-ENG-BW](#) SAP HANA BW Engine
- [HAN-DB-ENG-GPH](#) SAP HANA Graph Engine
- [HAN-DB-ENG-GPH-API](#) SAP HANA Graph Engine API
- [HAN-DB-ENG-GPH-GEM](#) Graph Exploration and Manipulation (GEM) Language
- [HAN-DB-ENG-IM](#) Please use HAN-DB-SDQ
- [HAN-DB-ENG-PLE](#) SAP HANA Planning Engine
- [HAN-DB-ENG-SPA](#) SAP HANA Spatial Engine
- [HAN-DB-ENG-TXT](#) SAP HANA Text Engine
- [HAN-DB-EPM](#) SAP HANA Enterprise Performance Management 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
- [HAN-DB-LVC](#) SAP HANA integrated liveCache
- [HAN-DB-MDX](#) SAP HANA MDX Engine/Excel Client
- [HAN-DB-MON](#) SAP HANA Monitoring
- [HAN-DB-PER](#) SAP HANA Database Persistence
- [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

SAP HANA Data Provisioning Services

- [HAN-DP](#) SAP HANA Data Provisioning Services
- [HAN-DP-DS](#) SAP Data Services
- [HAN-DP-DXC](#) SAP HANA Direct Extractor Connector
- [HAN-DP-ESS](#) SAP HANA Enterprise Semantic Services (ESS)
- [HAN-DP-LTR](#) SAP Landscape Transformation Replication Server
- [HAN-DP-REP](#) SAP Sybase Replication Server
- [HAN-DP-SDI](#) SAP HANA smart data integration

SAP HANA Dynamic Tiering

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

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

SAP HANA Remote Data Sync

- [HAN-SYN](#) SAP HANA Remote Data Sync

SAP HANA Smart Data Streaming

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

SAP HANA Studio (Eclipse)

- [HAN-STD](#) SAP HANA Studio (Eclipse)
- [HAN-STD-ADM](#) SAP HANA Administration
- [HAN-STD-ADM-BAC](#) SAP HANA Backup and Recovery (Studio)
- [HAN-STD-ADM-DBA](#) SAP HANA Database Administration and Monitoring
- [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-CDS](#) SAP HANA Core Data Services Tools
- [HAN-STD-DEV-CDS-GR](#) Please use HAN-STD-DEV-CDS
- [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 Component
- [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 Tools Platform / 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 Fiori Launchpad
- [HAN-STD-DEV-XS](#) SAP HANA XS Editors and Wizards

SAP HANA remote data sync

- [HAN-SYN](#) SAP HANA remote data sync

SAP HANA Vora

- [HAN-VO](#) SAP HANA Vora
- [HAN-VO-EN](#) SAP HANA Vora Engine
- [HAN-VO-SE](#) SAP HANA Vora Spark Extension Library

SAP HANA Web IDE

- [HAN-WDE](#) SAP HANA Web IDE
- [HAN-WDE-BLD](#) SAP Web IDE for Hana building applications
- [HAN-WDE-CHE](#) SAP Web IDE for Hana CHE
- [HAN-WDE-DBG](#) SAP Web IDE for Hana debugging applications

- [HAN-WDE-DOC](#) SAP Web IDE for Hana documentation
- [HAN-WDE-EDT](#) SAP Web IDE for Hana editor
- [HAN-WDE-EDT-CDS](#) SAP Web IDE for Hana editor for Core Data Services
- [HAN-WDE-EDT-MOD](#) SAP Web IDE editor for HANA Analytical Modeling
- [HAN-WDE-EDT-NJS](#) SAP Web IDE for Hana Node.js Tools
- [HAN-WDE-EDT-UI5](#) SAP Web IDE for Hana editor for UI5 applications
- [HAN-WDE-EIM](#) Flowgraph, RepTasks and other SDA Tools
- [HAN-WDE-GIT](#) SAP Web IDE for Hana GIT
- [HAN-WDE-INS](#) Installation SAP Web IDE for HANA
- [HAN-WDE-MTA](#) Multi Targeted Application in Web IDE
- [HAN-WDE-PREF](#) SAP Web IDE for Hana user and project settings
- [HAN-WDE-RTT](#) SAP Web IDE for Hana Runtime and SQL Tools
- [HAN-WDE-RUN](#) SAP Web IDE for Hana running applications
- [HAN-WDE-SDS](#) Smart Data Streaming Tools
- [HAN-WDE-SRC](#) Search
- [HAN-WDE-TPL](#) Project creation, template and wizards
- [HAN-WDE-XSC](#) Old SAP HANA Web IDE

SAP HANA XS Advanced

- [BC-XS](#) XS Engine (XS Advanced)
- [BC-XS-JAS](#) Java Runtime
- [BC-XS-JS](#) Javascript runtime
- [BC-XS-SEC](#) UAA and Security for XS engine
- [BC-XS-SRV](#) XS Engine Services and Administration

SAP HANA Database (CCMS, Porting and DB Interface)

- [BC-DB-HDB-CCM](#) CCMS for SAP HANA
- [BC-DB-HDB-POR](#) DB Porting for SAP HANA
- [BC-DB-HDB-SYS](#) SAP HANA database interface/DBMS

End User Clients

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

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 sub-components.

Reporting Incidents

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

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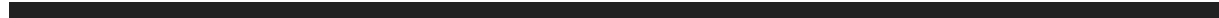
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[go.sap.com/registration/
contact.html](https://go.sap.com/registration/contact.html)

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