



# SAP HANA ADMINISTRATION

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## About the Tutorial

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SAP HANA is an in-memory data platform that is deployable as an on-premise appliance, or in the cloud. It is a revolutionary platform, which is best suited for performing real-time analytics, and developing and deploying real-time applications. At the core of this real-time data platform is the SAP HANA database, which is fundamentally different from any other database engine in the market today.

This tutorial will teach you SAP HANA Administration tasks in a single and distributed environment. This tutorial is specifically focused on admin activities in HANA system - System Management, Table Properties, License Keys, Smart data access, integration with different non-SAP systems, security management, and audit policies in HANA system.

## Audience

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This tutorial has been prepared for those who have good knowledge on SAP Basis and HANA system concepts. After completing this tutorial, you will find yourself at a moderate level of expertise in administration and management of SAP HANA in multitenant environment.

## Prerequisites

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Before you proceed with this tutorial, we assume that you are well-versed with basic SAP Basis and HANA concepts. You should have a good exposure to SAP HANA in-memory concepts, HANA Studio, and different options in HANA studio. If you are not aware of these concepts, then we recommend that you first go through our short tutorials on SAP HANA and Basis.

## Disclaimer & Copyright

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# 1. SAP HANA Admin – Overview

SAP HANA is an in-memory database for performing real-time data analysis, and development of applications on the top of real-time data. HANA administration deals with managing SAP HANA system in a single and distributed system environment. Each HANA system can contain multi node architecture with each node containing multiple processors for fast speed data analysis and real-time data provisioning. You can use Smart data access to get the data from non-SAP systems without importing the data to HANA database, and virtual tables can be used to perform read/write data operations.

SAP HANA Administration includes the following activities:

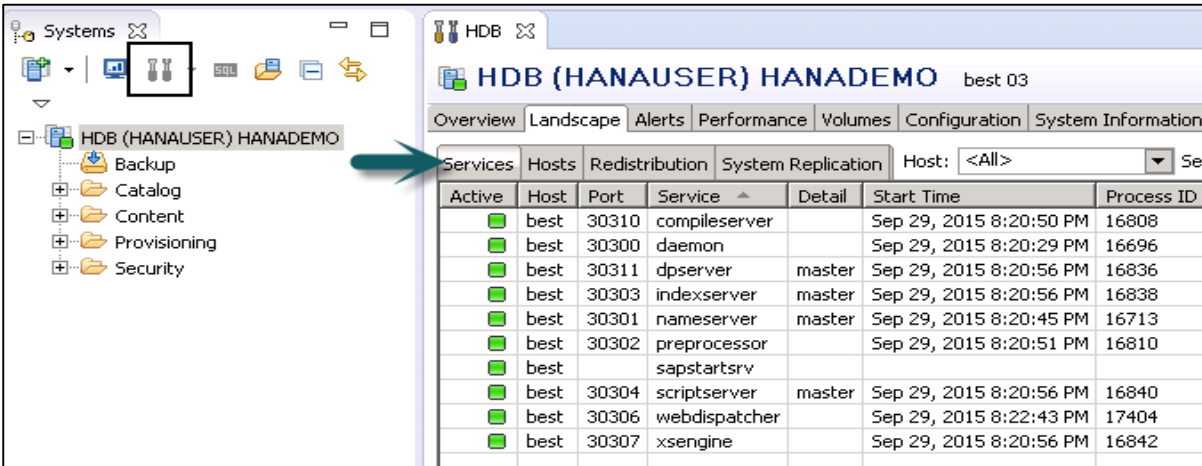
- SAP HANA multiple host system management
- SAP HANA Administration Tools
- SAP HANA System Management and Availability
- SAP HANA Lifecycle Management
- SAP HANA Security and User Management
- SAP HANA Backup and Recovery Management
- SAP HANA Data Provisioning and Integration with non-SAP systems

Each SAP system contains multiple servers and it can be checked in HANA Studio under Administration tab. SAP HANA Studio contains Administration Perspective (default) to manage all admin tasks in HANA systems.

To check the landscape of HANA system, navigate to Landscape tab in HANA studio. Services shows all the services running on HANA system.

The following screenshot shows SAP HANA system and all the key services running under system Landscape for the same system.

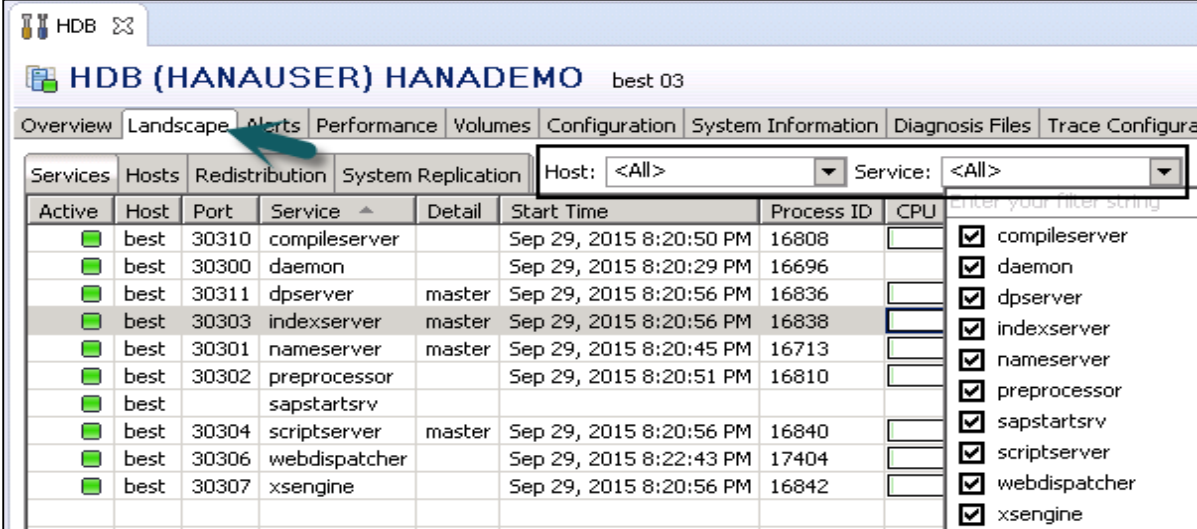
You can see the service name corresponding to each server in HANA system landscape.



Active	Host	Port	Service	Detail	Start Time	Process ID
■	best	30310	compileserver		Sep 29, 2015 8:20:50 PM	16808
■	best	30300	daemon		Sep 29, 2015 8:20:29 PM	16696
■	best	30311	dpserver	master	Sep 29, 2015 8:20:56 PM	16836
■	best	30303	indexserver	master	Sep 29, 2015 8:20:56 PM	16838
■	best	30301	nameserver	master	Sep 29, 2015 8:20:45 PM	16713
■	best	30302	preprocessor		Sep 29, 2015 8:20:51 PM	16810
■	best		sapstartsrv			
■	best	30304	scriptserver	master	Sep 29, 2015 8:20:56 PM	16840
■	best	30306	webdispatcher		Sep 29, 2015 8:22:43 PM	17404
■	best	30307	xsengine		Sep 29, 2015 8:20:56 PM	16842

From the dropdown list, you can select all the host names and services that you want to see and the status of each system.

Various details available for each service includes: Start time, CPU and Memory details, Used Memory, Peak Used Memory, Effective Allocation Unit, Physical Memory on host, and SQL Port.



The screenshot shows the SAP HANA Admin interface for 'HDB (HANAUSER) HANADEMO best 03'. The 'Services' tab is selected, showing a table of services and a list of services on the right.

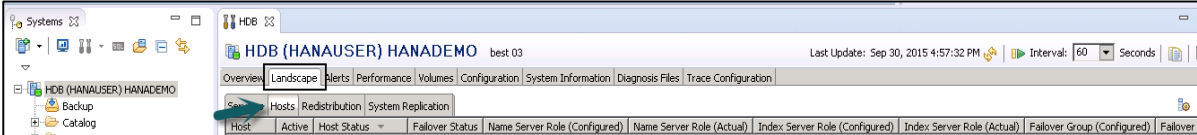
Active	Host	Port	Service	Detail	Start Time	Process ID	CPU
<input checked="" type="checkbox"/>	best	30310	compileserver		Sep 29, 2015 8:20:50 PM	16808	
<input checked="" type="checkbox"/>	best	30300	daemon		Sep 29, 2015 8:20:29 PM	16696	
<input checked="" type="checkbox"/>	best	30311	dpserver	master	Sep 29, 2015 8:20:56 PM	16836	
<input checked="" type="checkbox"/>	best	30303	indexserver	master	Sep 29, 2015 8:20:56 PM	16838	
<input checked="" type="checkbox"/>	best	30301	nameserver	master	Sep 29, 2015 8:20:45 PM	16713	
<input checked="" type="checkbox"/>	best	30302	preprocessor		Sep 29, 2015 8:20:51 PM	16810	
<input checked="" type="checkbox"/>	best		sapstartsrv				
<input checked="" type="checkbox"/>	best	30304	scriptserver	master	Sep 29, 2015 8:20:56 PM	16840	
<input checked="" type="checkbox"/>	best	30306	webdispatcher		Sep 29, 2015 8:22:43 PM	17404	
<input checked="" type="checkbox"/>	best	30307	xengine		Sep 29, 2015 8:20:56 PM	16842	

On the right side, there is a list of services with checkboxes:

- compileserver
- daemon
- dpserver
- indexserver
- nameserver
- preprocessor
- sapstartsrv
- scriptserver
- webdispatcher
- xengine

When you click the Hosts tab, you can see the host names in the System Landscape and the role of HANA system defined under Name server.

You can also check the status of the systems, failover status, Index server role, and Failover group.



The screenshot shows the SAP HANA Admin interface for 'HDB (HANAUSER) HANADEMO best 03'. The 'Hosts' tab is selected, showing a table of hosts.

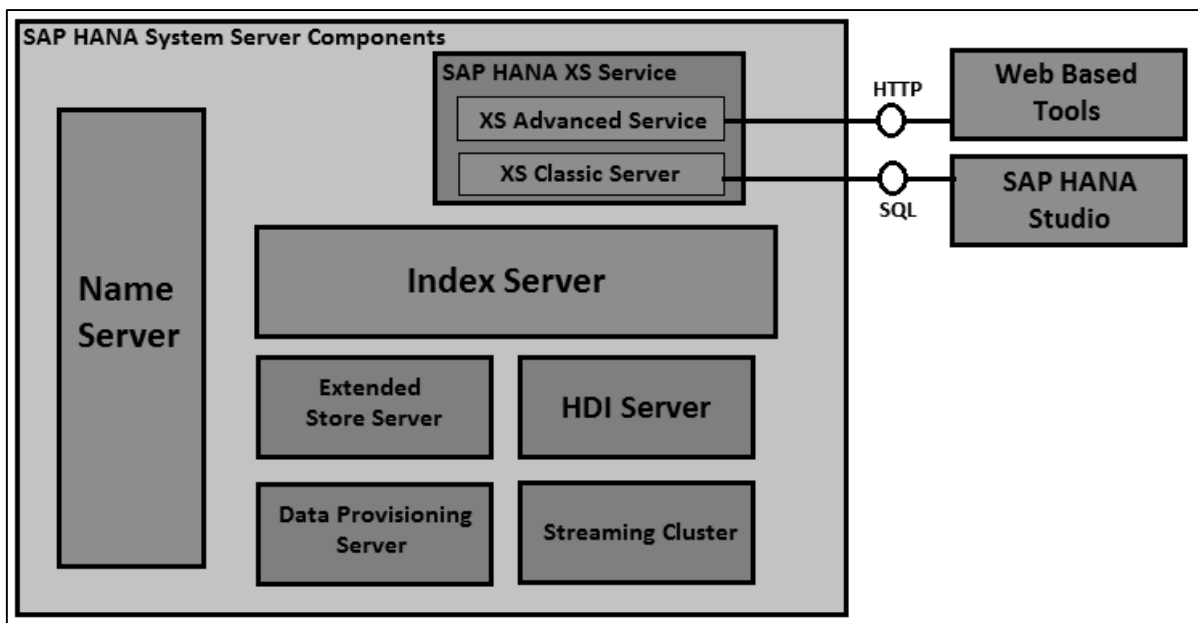
Host	Active	Host Status	Fallover Status	Name Server Role (Configured)	Name Server Role (Actual)	Index Server Role (Configured)	Index Server Role (Actual)	Fallover Group (Configured)	Fallover Group (Actual)
best	<input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> OK		MASTER 1	MASTER	WORKER	MASTER	default	default

## 2. SAP HANA Admin – Architecture Overview

In SAP HANA system architecture, it contains all the server components that gets installed at the time of installation. Each server has defined set of tasks and different services are run for each server in a SAP HANA distributed environment.

The most important server system and the heart of HANA system is the Index server. This server is responsible for processing SQL/MDX statement using engines in the Index server. It also contains Session and Transaction Manager to keep track of completed and running transactions.

Persistence Layer in the Index server is used for backing up data and transaction of log files.



Following table lists all the key server components in HANA, the corresponding services, and OS process details.

Server Component Name	Service Name in HANA system	OS Process Name	Component Details
Index Server	Indexserver	hdbindexserver	Responsible for processing SQL statements using SQL/MDX Processors
Name Server	nameserver	hdbnameserver	To maintain topology of SAP HANA system. This is used to manage all the running components and data stored on each component.



XS Classic Server	xsengine	hdbxsengine	It can be used to develop and host applications on the top of SAP HANA system.
Data Provisioning Server	dpserver	hdbdpserver	To provide SAP HANA smart data access function.
Preprocessor	preprocessor	hdbpreprocessor	To analyze the text data and perform search capabilities.
Compile Server	compileserver	hdbcompileserver	This is used to perform compilation of SQL Procedures and doesn't contain any data.
Web Dispatcher	Webdispatcher	Hdbwebdispatcher	It is used to process HTTP/HTTPS request to HANA XS Engine.

## 3. SAP HANA Admin – Multitenant Database

It is possible to set up multiple databases into a single HANA system. When you install SAP HANA system in multiple container mode, you can setup multiple isolated databases in single SAP HANA system. This is called **Multitenant database containers**.

You can also convert a single container HANA system to multiple container databases HANA system. In multiple container HANA system, each database runs on the same infrastructure and uses the same computing resources. However, each database contains following components:

- Database Users
- Repository
- Catalog
- Backups
- Traces and Logs
- Persistence

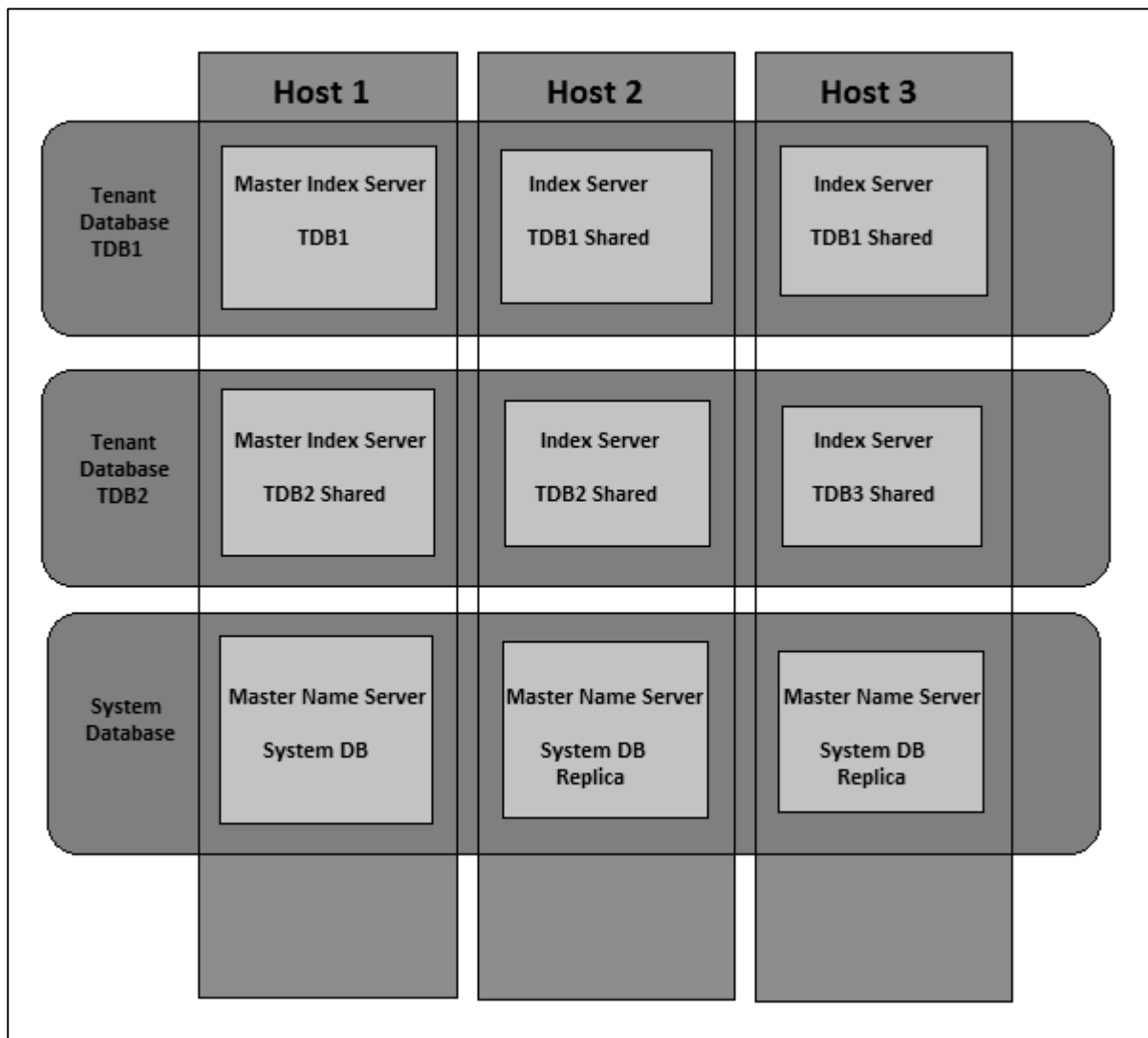
All the database objects - tables, schemas, database views, SQL procedures - are separate for each database. You can also perform cross-database functions in multitenant database.

In SAP HANA system, it contains multiple server - Name Server, Index Server, Preprocessor, and XS Server. With multiple container databases, different combinations of the above servers are used.

Name server maintains the landscape details of the system and the system databases run the Name server. The Name server of multitenant databases doesn't contain topology information and this information is stored in tenant database catalog.

Preprocessor and Compile server runs on system databases as they don't contain persist data. Each tenant database contain its own index server and SAP HANA Classic Server runs on the Index server of tenant database by default.

You can see the architecture of SAP HANA multiple container system in the following screenshot. Each instance of system database runs on multiple hosts to provide scalability and system availability. In multiple worker configuration, when a system fails, standby instance will fail over all active databases.



In the above screenshot, you can see 2 databases distributed across three hosts in multiple container database system.

In multiple container architecture, the system database is set up at the time of installation of a multiple-container system or when you convert a single container system to multiple container system. This is used to manage information about the system as a whole, and also for tenant databases. It is used for Central System Administration in multitenant environment.

System database contains data and user data for system administration and SAP HANA Administration tools such as SAP HANA Studio to connect to the system database. All the administration tasks that are performed in the system database applies to the whole system and you can also target the configuration for a specific tenant database. System database contains complete landscape information about Tenant components, however it doesn't contain topology related information.

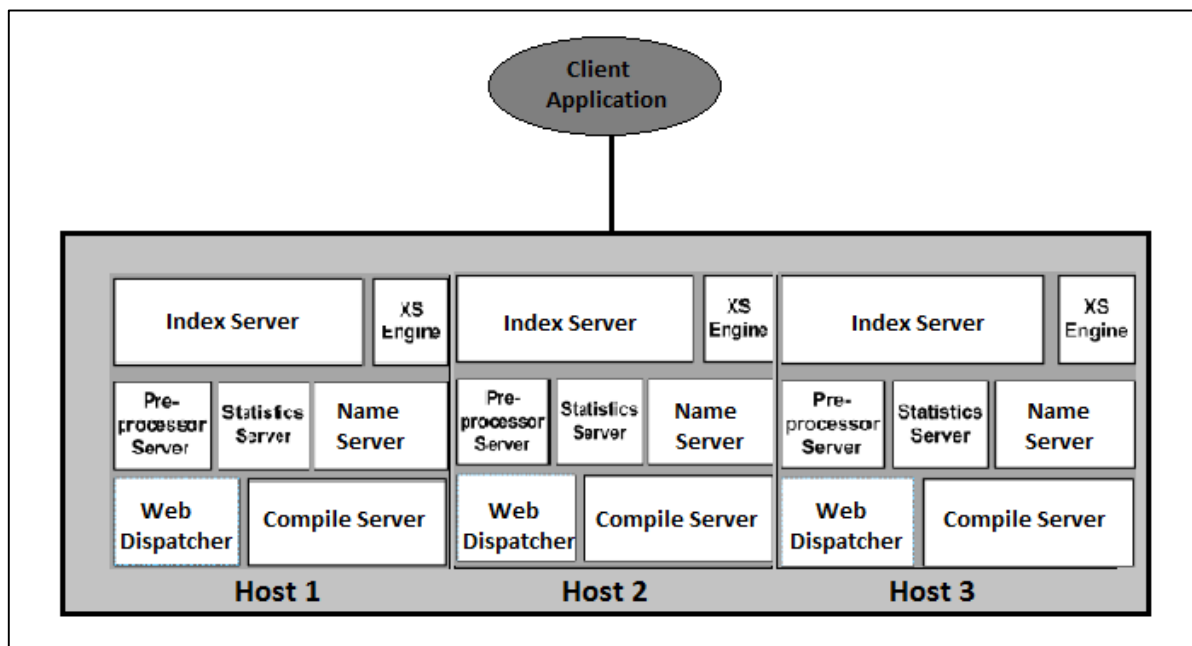
## 4. SAP HANA Admin – Multiple Host Systems

When your SAP HANA system is installed on a single system, it is known as **Single Host System**; however, when you distribute the system installation on multiple systems, it is called **Multiple Host Systems**. Using multiple host systems, you can use features such as Load Balancing and Scale Out feature of SAP HANA system. You can overcome the hardware limitations by distributing the load of your system on multiple servers.

You can also assign different tables to different hosts using database partition to split a single table between hosts (partitioning of tables), and to replicate tables to multiple hosts.

When SAP HANA system is installed on multiple hosts, SAP HANA Administrator can perform start and stop, backup, or run update as a single system by taking single System ID known as SID.

Each SAP HANA system contains its own server components for each host and the request from the client application can be distributed to different hosts in multiple host systems.



In the above screenshot, you can see SAP HANA multiple host system architecture, where HANA system has 3 separate instances, and each instance has its own server components.

The request from the client application can be distributed to any of the instance in this environment.

## 5. SAP HANA Admin – Tools

There are various tools that can be used to perform administration tasks in single container or multiple container system. All the tools are used to perform database level administration and the system level administration can be performed using SAP HANA Cockpit.

Following are common HANA Administration Tools:

### **SAP HANA Cockpit**

This is an administration tool to manage your SAP HANA system and is based on SAP Fiori Launchpad based navigation to access long range of HANA applications. SAP HANA cockpit can be accessed via a web browser.

### **SAP HANA Studio**

Using SAP HANA Studio, you can perform system administration and monitoring activities in a distributed environment. You can create users with different access privilege, backup and recovery, and data provisioning using HANA Studio.

HANA Studio is an Eclipse-based tool and is available for Window, Mac, and Unix OS.

### **SAP HANA Lifecycle Manager**

This is an administration tool to manage SAP HANA components after installation. You can add/remove hosts or rename using the Lifecycle Manager.

### **SAP Solution Manager**

This tool is used to integrate your SAP HANA platform with other business solutions.

### **SAP HANA HW Configuration Check**

You can use this tool to check the interoperability of SAP HANA system with enterprise storage.

### **SAP HANA XS Administration Tools**

This tool is used to manage and administration applications developed on the top of HANA database using XS Classic model and XS Advanced model. You can perform security and define user authentication for applications developed and hosted in SAP HANA environment.

### **SAP HANA Application Lifecycle Management**

This tool is used to perform the transport of delivery units, upload or download transports and to perform transport management tasks.

## 6. SAP HANA Admin – Cockpit

This is an administration tool to manage your SAP HANA system and is based on SAP Fiori Launchpad based navigation to access long range of HANA applications. SAP HANA cockpit can be accessed via a web browser.

You can also use SAP HANA Cockpit in an offline mode to perform administration tasks - starting HANA system to fix performance-related issues.

SAP HANA Cockpit with Fiori-based Launchpad shows the content in the form of tiles arranged in groups. Using these tiles, you can access individual applications and can also access app-specific data for immediate review.

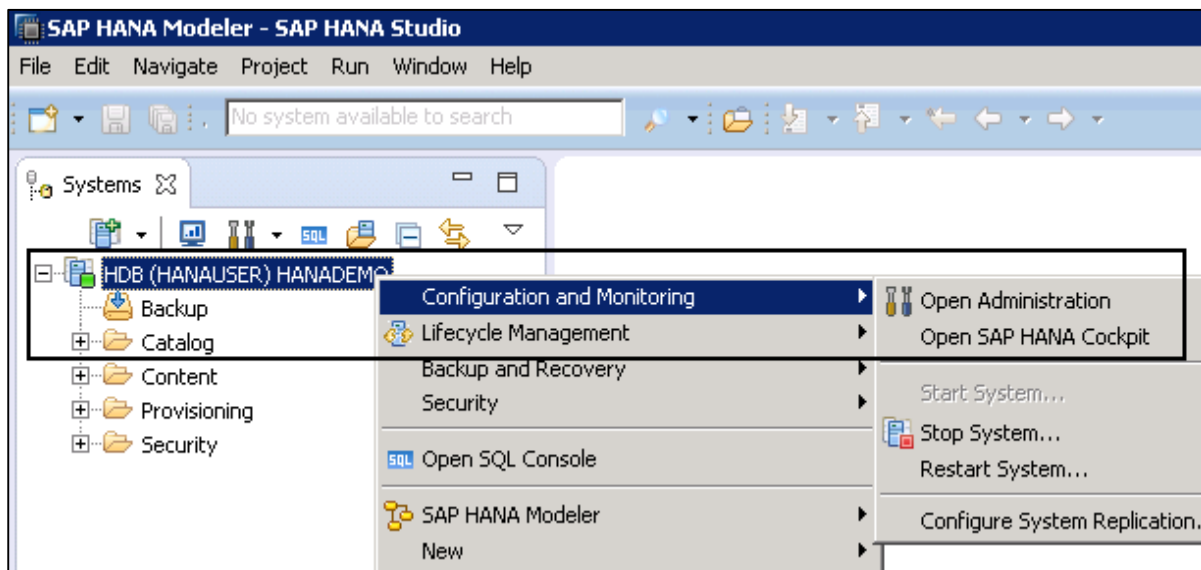
You can also perform a drill on these tiles to see the detailed information about specific applications.

Following roles are required to open and access tile-based SAP HANA Cockpit:

**sap.hana.admin.roles:: Monitoring or sap.hana.admin.roles::Administrator**

To open SAP HANA Cockpit via a web browser, you need to have browser support SAPUI5 library sap.m.

You can also open SAP HANA Cockpit via HANA Studio. Navigate on HANA system -> Configuration and Monitoring -> Open SAP HANA Cockpit.

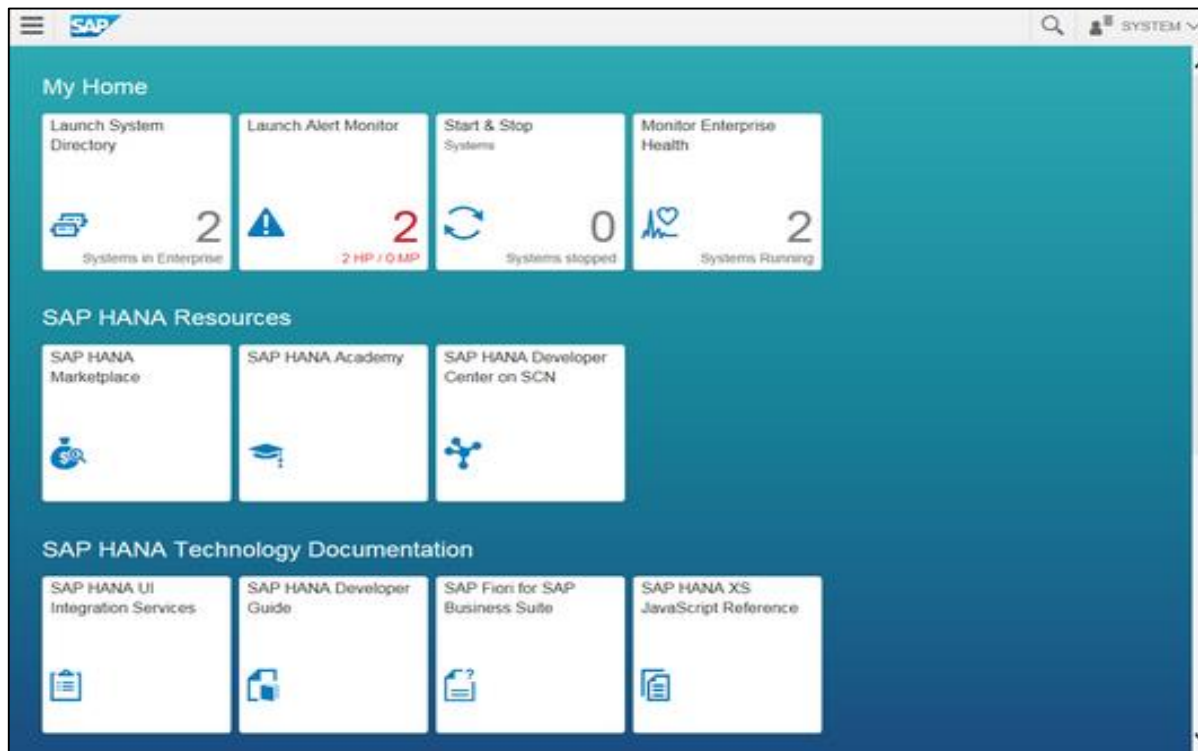


A single-container system is accessed through the following URLs:

[https://<host\\_FQDN>:43<instance>/sap/hana/admin/cockpit](https://<host_FQDN>:43<instance>/sap/hana/admin/cockpit)

[http://<host\\_FQDN>:80<instance>/sap/hana/admin/cockpit](http://<host_FQDN>:80<instance>/sap/hana/admin/cockpit)

Host name is SAP HANA system name and Instance number is SAP HANA system Instance number.



## SAP HANA Cockpit for Offline Administration

You can also open HANA Cockpit in an offline mode using a web browser or via standard SAP HANA Cockpit tool. This is used to perform administration tasks - starting SAP HANA system, other offline administration activities.

To login to SAP HANA Cockpit for offline administration, following prerequisites should be met:

- You need to have credentials for Operating System user <sid> admuser created at the time of installation.
- Port 1129 should be open for communication.
- You need to have browser support SAPUI5 library sap.m.

There are two ways to open SAP HANA Cockpit in an offline mode:

### Using the Web Browser

Enter the following URL in the web browser.

<https://<host>:1129/lmsl/hdbcockpit/<sid>/index.html>

You can directly enter the above URL in the web browser and it opens SAP HANA Cockpit for offline administration. You have to authenticate via Operating system user <sid> admuser.

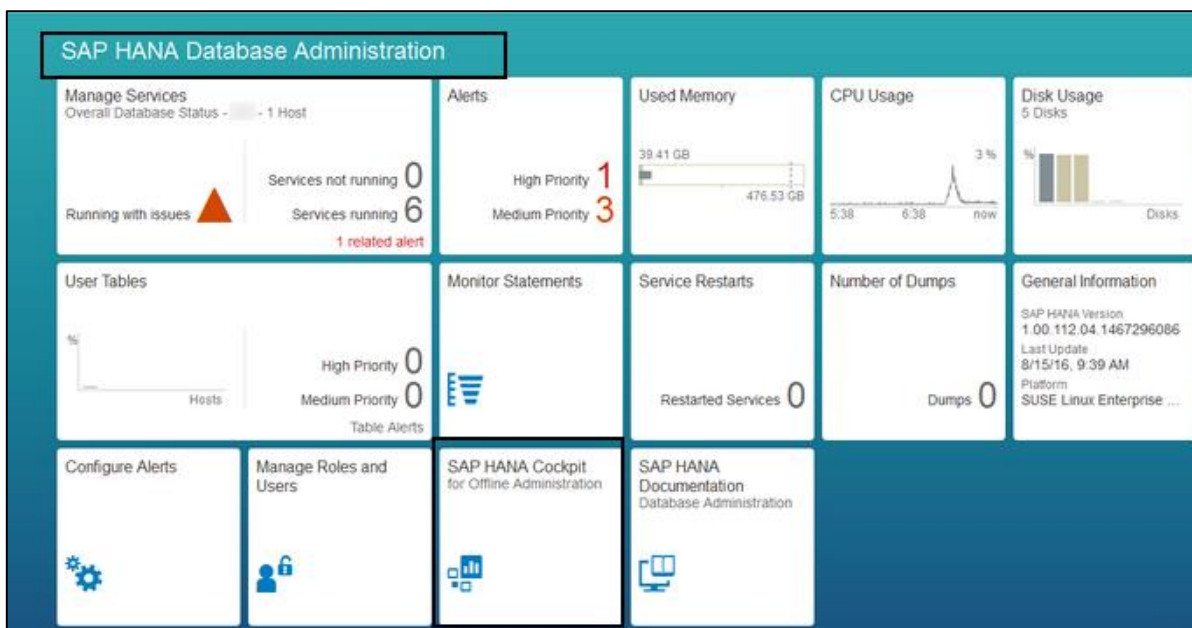
This method is not recommended as it transfers the password in plain text via HTTP.

### Using the Standard SAP HANA Cockpit

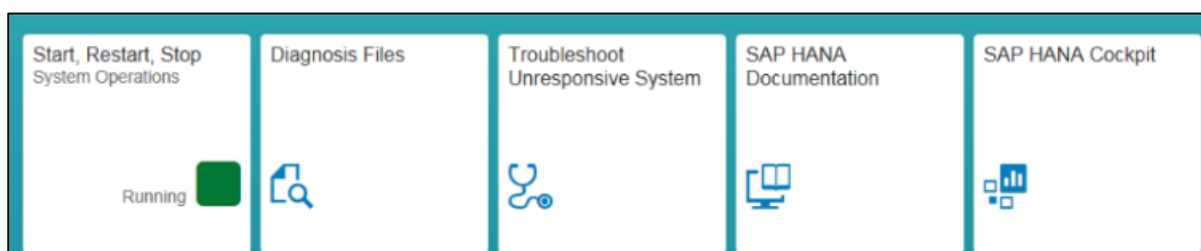
You can open SAP HANA cockpit by entering the following URL.

<https://<host FQDN>:43<instance>/sap/hana/admin/cockpit>

Navigate to SAP HANA Database Administration group -> Select SAP HANA Cockpit for offline administration as shown in the 2<sup>nd</sup> last box of the following screenshot.



There are various options under SAP HANA Cockpit for offline mode, when you click on the options as shown in the following screenshot -





## Start, Restart and Stop

This tile shows the status of your SAP HANA system. Following are the most common status messages you can see -

- Running
- Stopping
- Stopped
- Initializing

When you click on this tile, it allows you to start, stop, and restart a server.

## Diagnosis Files

This is used to open the log files, trace results and other diagnosis files. You can use this tile to get the diagnosis files in zip format and it can be attached to support messages.

It is also possible to search diagnosis files to find specific words and phrases.

## Troubleshoot Unresponsive System

This tile is used to access the information required for troubleshooting performance issues.

## SAP HANA Documentation Tile

Using this tile, you can see the documentation of all the administrative tasks that you can perform in SAP HANA Cockpit for offline administration.

## SAP HANA Cockpit

This tile is used to access the main window where you can access all applications for performing SAP HANA administration online. In case of system replication, this option is only available with primary system.

**Note:** In multitenant database containers, when you use Start option under SAP HANA Cockpit offline administration -> Start, Restart, Stop tile -> Footer bar, Start System - this options restarts all the tenant database systems.

When you stop a system, the status of the system under Start, Restart, and Stop tile is changed to Stopped (red) as seen in the following screenshot.



# 7. SAP HANA Admin – HANA Studio

SAP HANA Studio is an Eclipse-based tool. SAP HANA Studio is both, the central development environment and the main administration tool for HANA system. Additional features are –

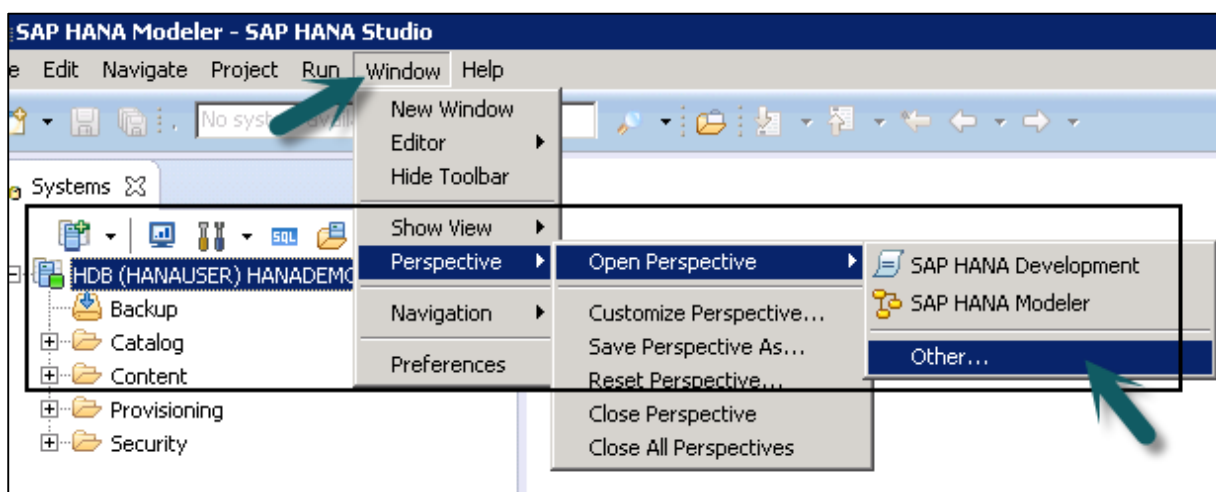
- It is a client tool, which can be used to access local or remote HANA system.
- It provides an environment for HANA Administration, HANA Information Modeling, and Data Provisioning in HANA database.

There are various administration tasks that can be performed using SAP HANA Studio:

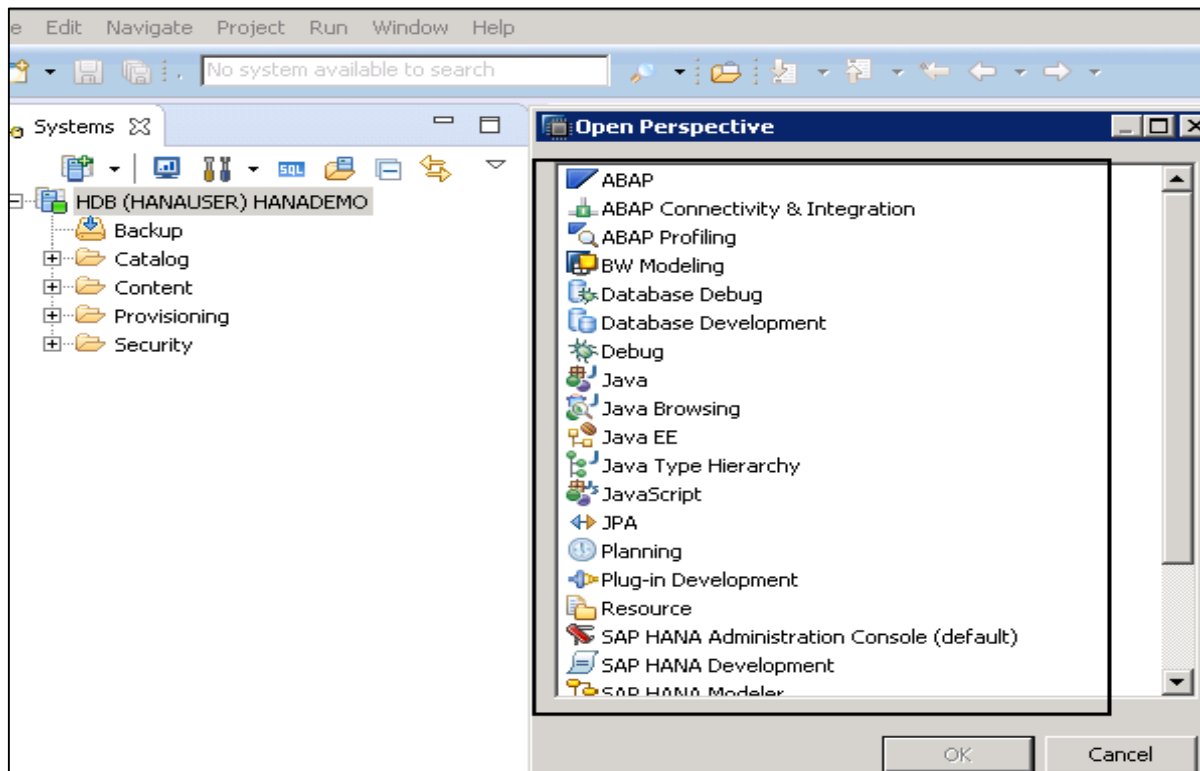
- To start and stop service
- To perform monitoring of SAP HANA system
- To perform user management and authorization
- To perform backup and recovery
- To perform Audit policy and Security configuration
- To perform license management
- To perform other configurations in HANA system
- To perform SQL development tasks - HANA Information Models, SQL Stored Procedures

In SAP HANA Studio, you will find a long list of perspectives, which can be considered as separate tools in HANA Studio. All these perspectives can be used for performing various administrative tasks, system monitoring, and data provisioning.

To see list of all Perspectives in HANA Studio, navigate to Window tab -> Perspective -> Open Perspective -> Other -> Other.



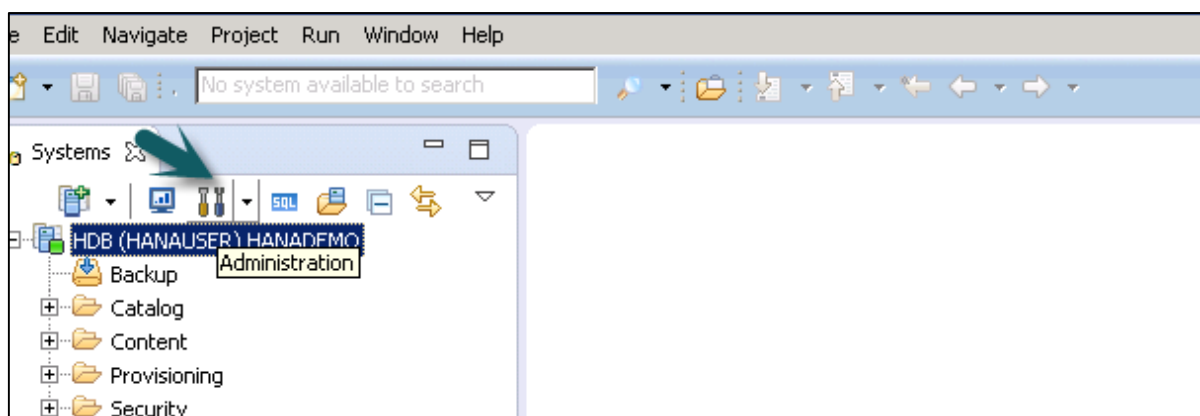
When you click on "Other...", it will open the list of all the perspectives that can be used to manage and perform system administration.



## SAP HANA Administration Console in HANA Studio

Using this feature, you can open HANA database administration and monitoring features in HANA Studio. By default, it opens in System View.

To open SAP HANA Administration, you can select SAP HANA Administration Console Perspective default option. You can also access it via Administration button at the top.



When you click the Administration button as shown in the following screenshot, it opens SAP HANA Administration Console. The console contains all database administration and monitoring features of the SAP HANA studio.

Following tabs are available under SAP HANA Administration Console:

- Overview
- Landscape
- Alerts
- Performance
- Volumes
- Configuration
- System Information
- Diagnosis Files
- Trace Configuration

These tabs are used to perform monitoring and administration tasks in your SAP HANA system.

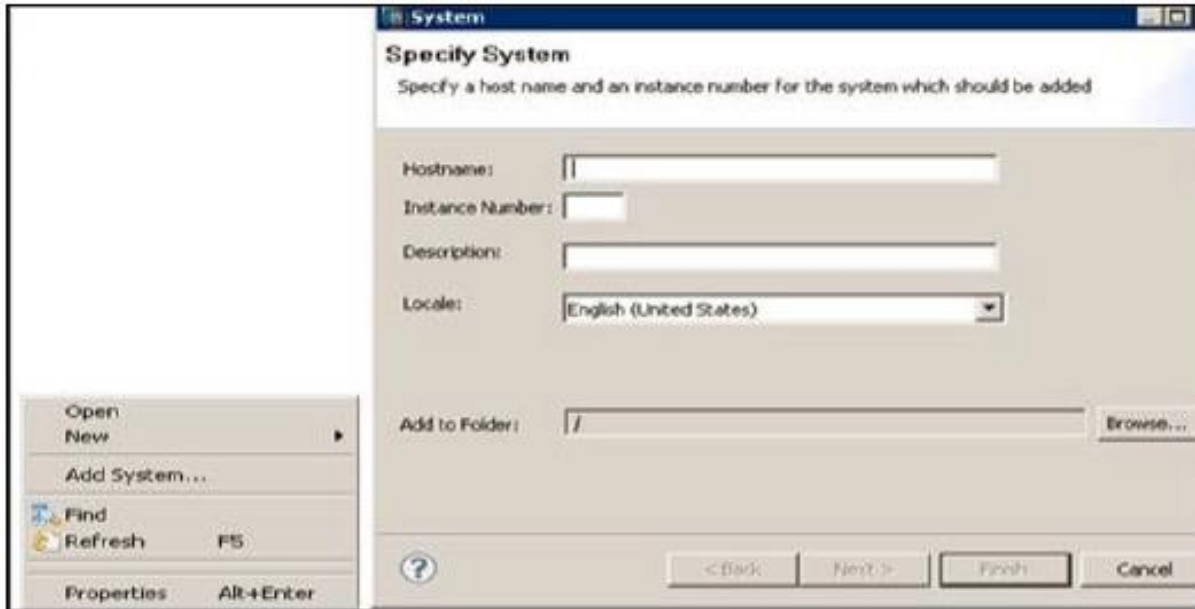
## Adding a System in HANA Studio

Single or multiple systems can be added to HANA Studio for administration and information modeling purposes. To add new HANA system, host name, instance number and database user name and password is required.

- Port 3615 should be open to connect to Database
- Port 31015 Instance No 10
- Port 30015 Instance No 00
- SSh port should also be open

Following are the steps to add a system to HANA Studio.

**Step 1:** Right-click the Navigator space and click Add System. Enter HANA system details, i.e. Host name & Instance number and click Next.



**Step 2:** Enter Database user name and password to connect to SAP HANA database. Click Next and then Finish.



End of ebook preview  
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