

Browse the Book

In this chapter, you'll prepare for exam topics pertaining to the SAP HANA cockpit. You'll review key concepts like system architecture, installation, and configuration for the cockpit, before testing your knowledge with practice questions and detailed answer explanations.

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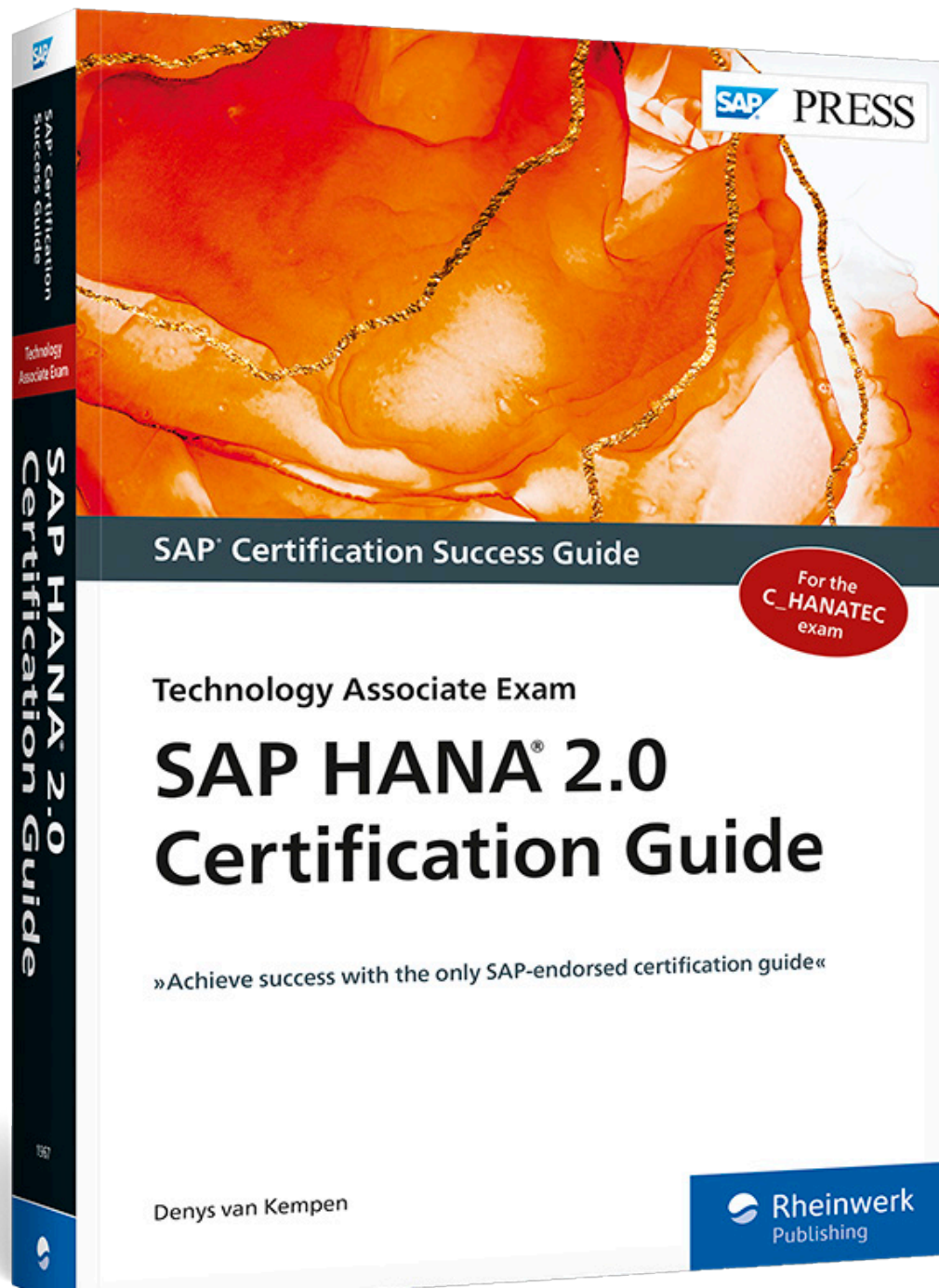
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Chapter 6

SAP HANA Cockpit

6

Techniques You'll Master

- Understanding the SAP HANA cockpit architecture, deployment options, and components
- Understanding the revision and maintenance strategy for SAP HANA cockpit
- Installing and updating SAP HANA cockpit
- Provisioning and configuring SAP HANA cockpit

This chapter is all about SAP HANA cockpit. For the exam, you're expected to be familiar with this tool not only as the pilot but also as the flight engineer. The pilot knows what all the gauges mean and which knobs to turn to make SAP HANA systems fly. It's the responsibility of the flight engineer, however, to know how the cockpit works and support the pilot in doing his job. The pilot role is covered in many chapters of this exam guide: user administration, backup and recovery, monitoring, and other system administration tasks. In this chapter, we're going to focus on the flight engineer role and get under the hood of the SAP HANA cockpit tool itself.

Real-World Scenario

Your company has joined the SAP S/4HANA movement and started a project to migrate its SAP ERP system to SAP S/4HANA. The SAP ERP environment runs on any database (AnyDB), and the DBA Cockpit is used for database administration. Although some Basis administrators prefer to continue using the DBA Cockpit for SAP HANA administration, you've been asked to investigate the accompanying tool for SAP HANA administration: SAP HANA cockpit. How do the two cockpits compare? What are the differences? What effort is required to install and update the software? What is the ease of use? For the next meeting, you need to present your findings followed by a brief email with the main points. Your manager wishes you success and good luck with the challenge.

Topic and Objectives

In this chapter, we'll discuss how to install and configure SAP HANA cockpit. We'll also cover provisioning, which usually refers making systems available for use and could include creating users, enabling firewall access, and so on.

For the exam, you're expected to have a good understanding of the following topics:

- SAP HANA cockpit architecture, including the different components roles they play
- System requirements and the installation process
- Where to find the software and how to run the installation program
- How to update SAP HANA cockpit and understand the maintenance strategy
- How to configure SAP HANA cockpit, and how to define database groups, database users, and cockpit users
- What the technical user is used for and how to create it
- Different cockpit roles and how to assign them

Note

This topic area has a weight of < 8% of the total certification exam score. With 80 questions in total, you can expect about 4 questions on the material of this chapter. It's a minor topic in that sense, however, as almost all other topics areas build on the knowledge acquired in this chapter, we recommend spending sufficient time on this part of the exam.

Learn More

How and when to use SAP HANA cockpit is documented in the SAP HANA Administration Guide. Here you can find, for example, how to make a backup using SAP HANA cockpit and how to make a backup using SAP HANA studio. This is for what we described as the "pilot" role.

For the flight engineer, there is a separate documentation set, including a What's New Guide and the Release Notes, an Installation and Update Guide specific to SAP HANA cockpit, and an extract of the SAP HANA Administration Guide, this time only including the relevant sections (see "SAP HANA Cockpit" on the SAP Help Portal at <http://s-prs.co/v507838>). KBA 2800006 – FAQ: SAP HANA Cockpit is a good place to start, although most of this material is beyond the scope of this exam.

SAP HANA 2.0 SPS 05: What's New?

As explained in Chapter 4, SAP HANA cockpit comes with its own release cycle with more frequent updates. New functionality corresponding with the SAP HANA 2.0 SPS 05 releases was added with SAP HANA cockpit 2.0 SP 11 and SP 12. Listing all new functionality for these releases would take several pages and is, for the most part, beyond the scope of the exam. For more detailed information, see the What's New section in the SAP HANA cockpit 2.0 documentation.

Key Concepts Refresher

In this section, we'll highlight the most important concepts that fall under the SAP HANA cockpit topic, from deployment options and the architecture to installation and provisioning.

Deployment Options

With SAP HANA cockpit 2.0, you can administer not only single SAP HANA 2.0 tenant databases but also entire SAP HANA system landscapes for every supported SAP HANA release. At the time of publication (summer 2020), this covers SAP HANA 2.0 SPS 03 and later but also the previous SAP HANA 1.0 SPS 12 release, in both single database mode and with tenant databases.

One of the major differences between SAP HANA cockpit 2.0 and its predecessor is that the cockpit is no longer an integral part of the SAP HANA database but comes with a dedicated system. There are two reasons for this:

■ **SAP HANA landscape management**

The first release of SAP HANA cockpit was included as an SAP HANA XS application with each database, which brought up the question of which one to use to monitor system landscapes. You wouldn't want to add additional load to a production system, but you also wouldn't want to use a developer system that might be shut down unexpectedly. Using a dedicated SAP HANA system would solve both issues but requires an additional license.

■ **Offline administration**

As an application "powered by SAP HANA," with the power off, there is also no SAP HANA cockpit for system administration tasks such as restoring database, troubleshooting unresponsive systems, accessing trace files, and so on.

Initially, SAP HANA cockpit 2.0 came with SAP HANA, express edition, embedded. However, for simple proof of concept (POC) or test/training systems, having two systems to back up may provide too much overhead. Running SAP HANA cockpit inside the SAP HANA system would work just fine for these use cases. To address this, as of SPS 02, you can also install SAP HANA cockpit in a regular SAP HANA tenant database.

Figure 6.1 illustrates the following deployment options:

- Dedicated hardware using embedded SAP HANA, express edition, which was the original plan
- Shared hardware using embedded SAP HANA, express edition
- Shared database using SAP HANA tenant as of SPS 02

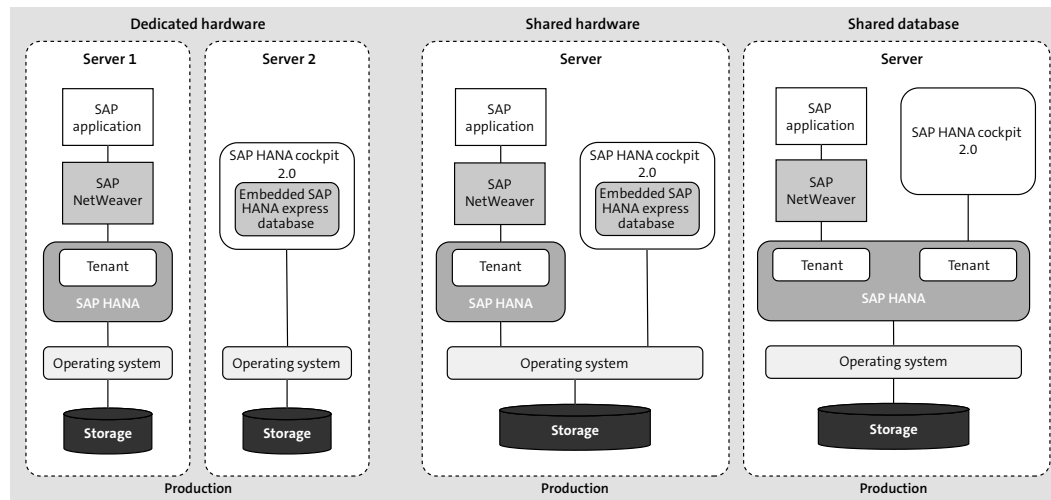


Figure 6.1 SAP HANA Cockpit Deployment Options

The shared hardware and shared database deployment options leverage existing infrastructure and will reduce costs at the expense of agility and (potentially) some resource contention. When sharing, the systems need to be properly sized

and global allocation limits adjusted. You may have noticed that option two (shared hardware) corresponds to a multi-SID/MCOS deployment, as discussed in Chapter 3. It's also possible to virtualize the deployment, in which case, a dedicated virtual machine (VM) is preferred.

Learn More

Although out of scope for the exam, we highly recommend you read the following paper that explains how to configure high availability (HA) for SAP HANA cockpit: "How To: High Availability for SAP HANA Cockpit Using SAP HANA System Replication" (<http://s-prs.co/v507839>).

System Architecture

The different components of SAP HANA cockpit are illustrated in Figure 6.2. In SAP HANA cockpit, you encounter cockpit persistence, which refers to the database part—either embedded express or as a regular tenant. Next, the SAP HANA XSA runtime is shown together with two applications: the SAP HANA cockpit manager and the SAP HANA cockpit services. The first is for metadata management, and the second is for landscape and database administration.

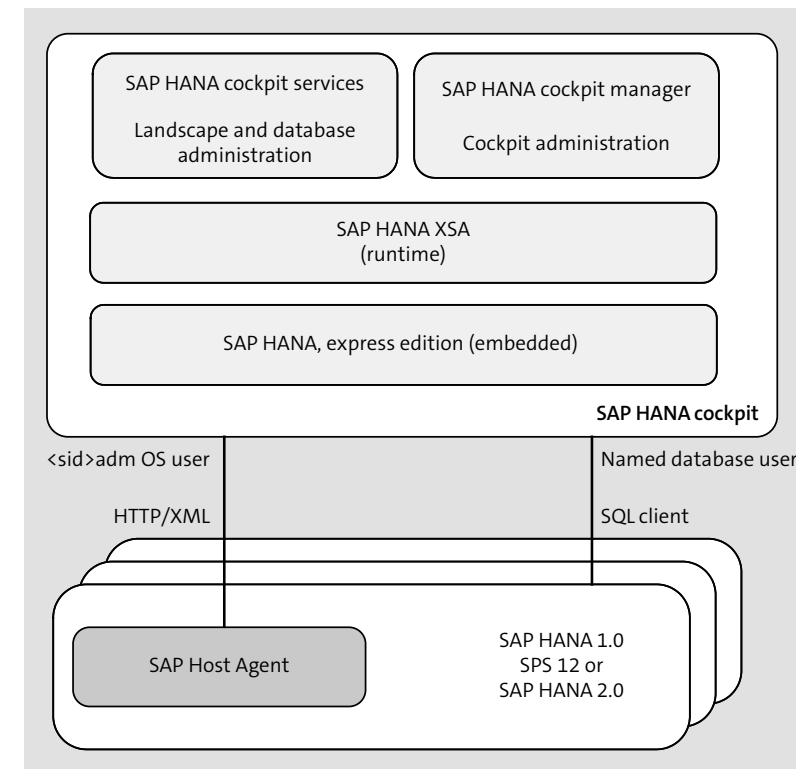


Figure 6.2 SAP HANA Cockpit Architecture

The lower portion shows that SAP HANA cockpit makes an HTTP/XML connection to SAP Host Agent using the <sid>adm operating system account and a SQL client connection using a named database user. This is similar to how both SAP HANA studio and the previous cockpit tools made their connections.

We'll take a closer look at the SAP HANA cockpit manager first, before examining the layout of both SAP HANA cockpit and SAP HANA XS Advanced cockpit.

SAP HANA Cockpit Manager

Figure 6.3 shows the interface of the SAP HANA cockpit manager. With this tool, you manage the metadata of an SAP HANA cockpit landscape. This works with databases, database groups, and cockpit users. With groups, you can control database access. By default, only the user who has registered a database can access this database with SAP HANA cockpit. By creating additional users and adding them to groups, this privilege can be extended. How exactly this works will be covered next.

SAP HANA Cockpit		COCKPIT_ADMIN
Categories	Cockpit Manager	
Registered Databases	4	<p>Welcome to the Cockpit Manager.</p> <p>Register a Database / Import Databases Register or import databases for the cockpit to monitor.</p> <p>Create Database Group Create groups of registered databases for group-level monitoring.</p> <p>Add a Cockpit User Add users who can access groups of databases.</p>
Database Groups	1	
Cockpit Users	1	
Cockpit Settings	6	
Active Sessions	2	
XSA Logs		
Go to SAP HANA Cockpit		

Figure 6.3 SAP HANA Cockpit Manager

SAP HANA 2.0 SPS 05: What's New?

As of SP 12, the more generic term “resource” has been replaced with “database” as in **Register a Database**, **Database Directory**, **Database Overview**, and so on.

SAP HANA Cockpit

The home page of SAP HANA cockpit is also called the **Landscape Overview** page because it provides an overview of the landscape, as shown in Figure 6.4. Seasoned SAP users will recognize the SAP Fiori look with its tiles.

There are three rows: **Monitor Landscape**, **Manage Landscape**, and **SAP ONE Support**. This page is configurable, and you can hide tiles or convert them to links, rename the headers, change the theme, and modify other common SAP Fiori configuration settings.

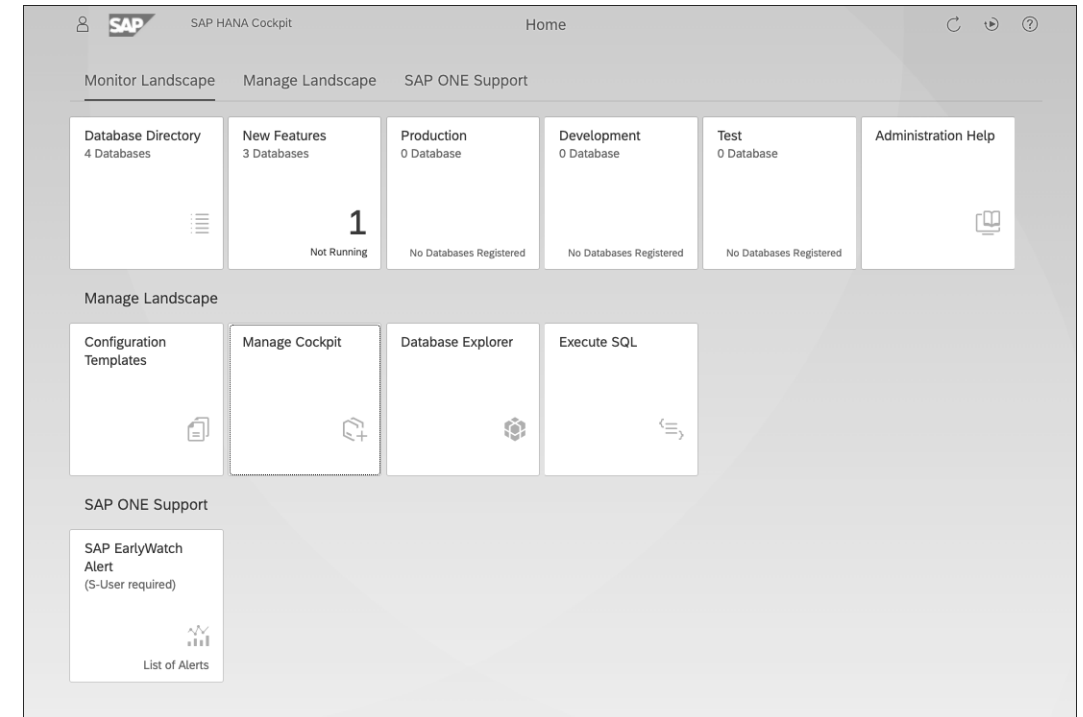


Figure 6.4 SAP HANA Cockpit: Home

With the **Configuration Templates** tile, you can create a collection of system parameter settings, for example, to implement consistent security settings across all registered databases.

Manage Cockpit launches the SAP HANA cockpit manager, and **Database Explorer** or **Execute SQL** opens SAP HANA database explorer in a new tab or window. We cover this tool in Chapter 5.

The **SAP ONE Support** row only displays a single tile: **SAP EarlyWatch Alert**. When configured, this displays the alerts of the SAP EarlyWatch Alert program. The connection is configured in the cockpit manager and can be hidden if not used.

The most important row of **Home** is the **Monitor Landscape** row. Apart from a link to the documentation, here you find the **Database Directory** and a tile for each of the database groups. Three groups have been created for you by default and reflect the three usage types of SAP HANA systems: **Production**, **Development**, and **Test**. Systems configured with any of these usage types are automatically assigned to these groups. For the fourth usage type, *custom*, you can create your own database

groups in the SAP HANA cockpit manager. Each of the automatically created database groups can be hidden, and databases can be assigned to multiple database groups.

The **Database Directory** shows another important aspect of database groups: you can only access databases that are in the same group as your user account. Figure 6.5 shows the two databases assigned to the custom group **New Features**: a system database and a tenant database. Most landscapes will list many more databases, and you can use the search bar and filters to find and organize them. Before you can connect to a database, you need to enter your credentials, which are stored encrypted in the cockpit database. Single sign-on (SSO) is also supported.

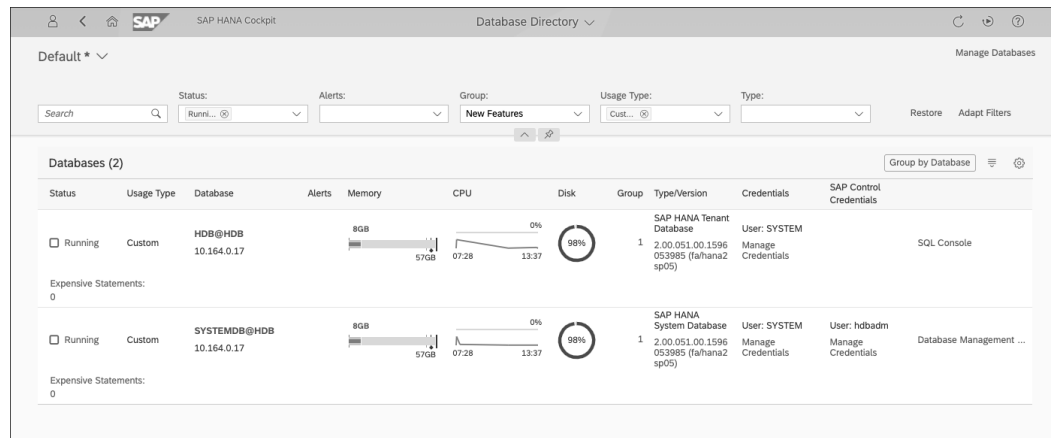


Figure 6.5 Database Directory

The gear icon in the table header of the **Database Directory** screen enables you to list additional information such as the operating system (kernel) version, the SAP HANA XSA version, and any alerts with the key performance area (KPA). From tenant databases, you can directly access the SQL console of SAP HANA database explorer. From the system database, you can access the Database Management app to work with tenant databases and configure restricted features, global allocation limits, audit policies, backup schedules, and other common settings. From here, you can also create new tenants and perform other tenant database management activities, which we'll return to in Chapters 7 and 8.

From the **Database Directory** or from the tiles on the **Home** page, you navigate to **Database Overview** illustrated in Figure 6.6. Some of the tiles display live information, for example, **Services**, **Memory Usage**, and **SQL Statements**. Others contain links to apps such as **Monitor performance**, which opens the Performance Monitor app. **Open SQL Console** in the menu bar opens the SAP HANA database explorer again, the same as when accessed from the **Landscape Overview** page. There are often different ways to access the tools, apps, and views.

When connected to the system database, you can also navigate from **Database Overview** to external applications such as the SAP HANA Platform Lifecycle Management tool or, when installed, add-on web interfaces for products such as SAP HANA dynamic tiering and SAP HANA smart data integration (SDI).

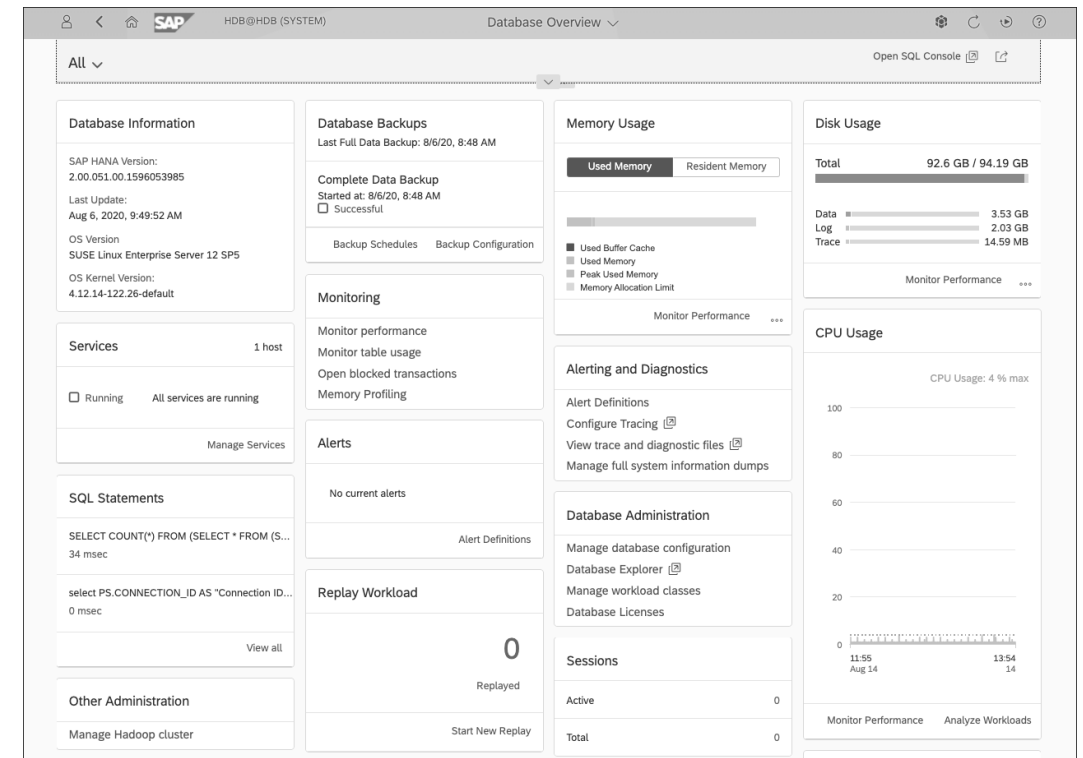


Figure 6.6 Database Overview

SAP HANA XS Advanced Cockpit

SAP HANA cockpit also includes SAP HANA XS Advanced cockpit. This is the same web application you find on the SAP HANA platform system when the SAP HANA XSA runtime is installed. For SAP HANA cockpit systems, the *HANACockpit* organization is created with all applications installed in the SAP space. Spaces and organizations refer to Cloud Foundry/SAP HANA XSA concepts, as discussed in Chapter 2. However, to manage and configure SAP HANA cockpit and the SAP HANA cockpit manager, you'll need to access the underlying SAP HANA XSA environment from time to time using either the `xs` command-line tool or the SAP HANA XS Advanced cockpit application (and probably both).

Figure 6.7 shows the applications of an SAP HANA XS Advanced cockpit system. The list is filtered on “cockpit” and shows the microservices architecture with multiple web applications (**app**) and services (**svc**).

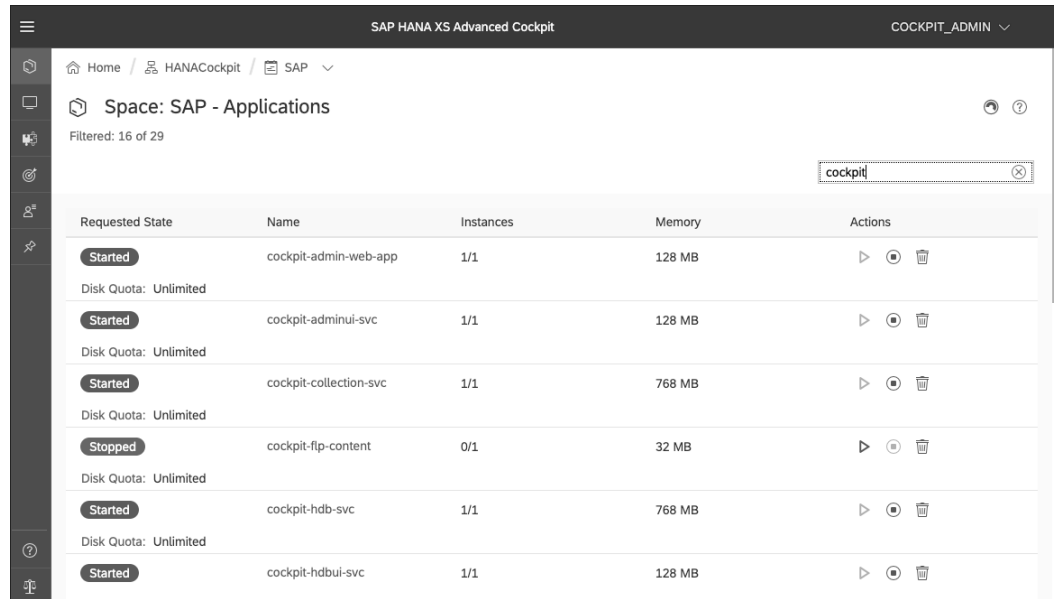


Figure 6.7 SAP HANA XS Advanced Cockpit: Applications

When an application is selected, the application route is listed, which provides the URL to connect to the SAP HANA cockpit manager, as illustrated in Figure 6.8.

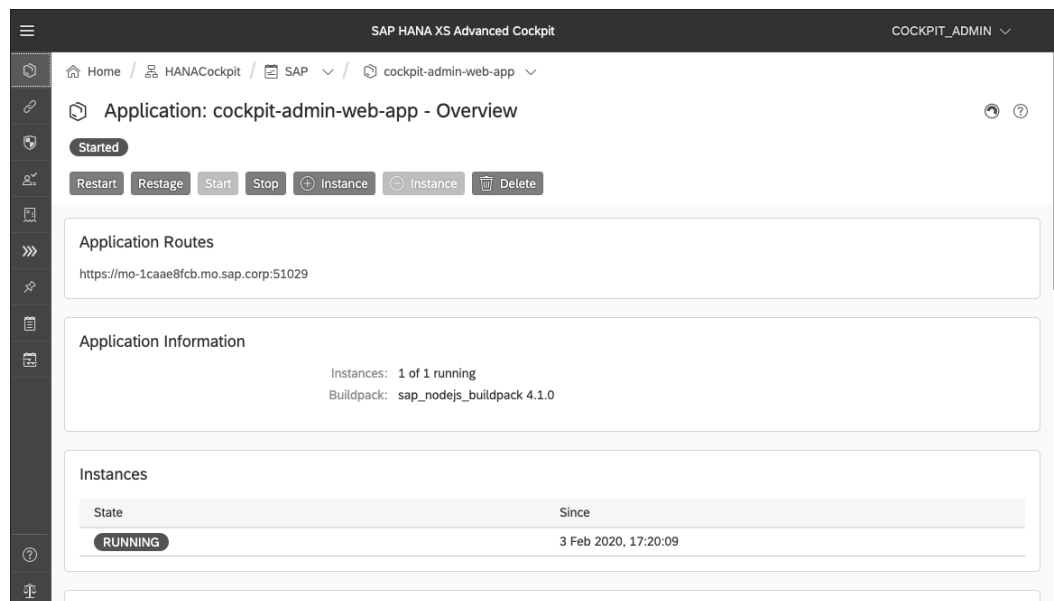


Figure 6.8 SAP HANA XS Advanced Cockpit: SAP HANA Cockpit Manager

Release and Maintenance Strategy

In Chapter 4, we described the revision and maintenance strategy of SAP HANA with its support package stacks (SPSs) and release dates, and we mentioned that SAP HANA cockpit has its own release cycle with updates made available as support packs (SPs). Unlike SAP HANA SPSs, SAP HANA cockpit SPs include both new functionality and corrections and security updates. SP releases are synchronized with the release of an SPS of the SAP HANA platform.

SAP HANA cockpit also provides patches for the latest SP release that contain fixes and security updates. Updates are cumulative, and only the latest patch release of all the available SPs is listed (as illustrated in Figure 6.9).

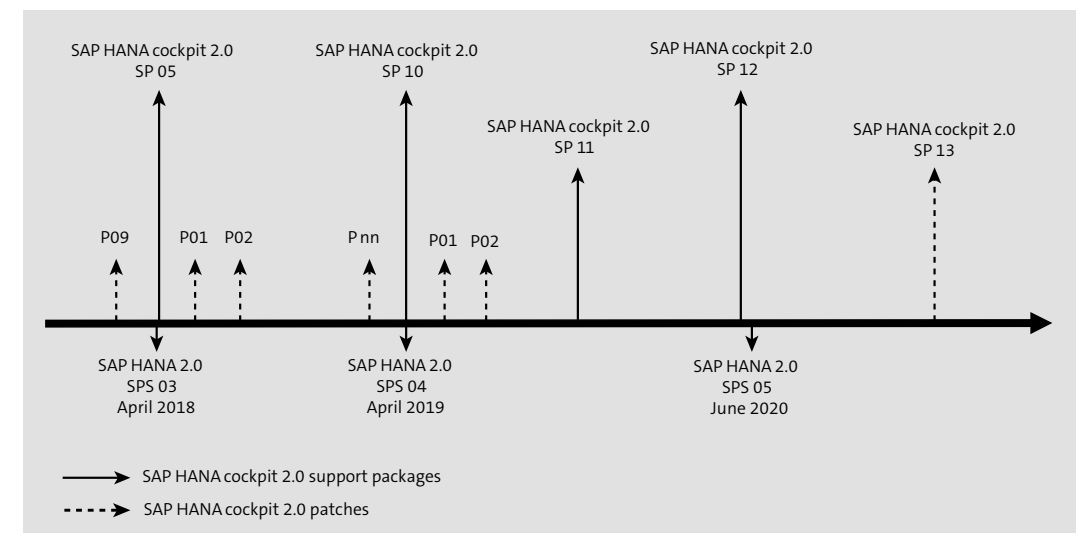


Figure 6.9 SAP HANA Cockpit 2.0: Revision and Maintenance Strategy

Note

For a more extensive coverage of this topic, beyond the scope of this exam, see the following SAP Notes:

- SAP Note 2433181 – SAP HANA 2.0 Cockpit Revision and Maintenance Strategy
- SAP Note 2380291 – SAP HANA 2.0 Cockpit Central Release Note

Installation

In this section, we'll walk through the installation process for SAP HANA cockpit. Before getting into the steps, we'll cover the requirements and software downloads necessary to begin.

Sizing and System Requirements

SAP HANA cockpit is available, like the SAP HANA platform, on Intel and IBM Power Systems processor architectures and supports both the SUSE Linux Enterprise Server (SLES) and Red Hat Enterprise Linux (RHEL) operating systems (RHEL on IBM Power Systems isn't supported).

We mentioned that SAP HANA cockpit comes with SAP HANA, express edition, embedded. On dedicated hardware, only 16 GB of RAM is required. For disk space, an equally low 16 GB is quoted with the mention that additional disk space is required as data is generated. For the shared database deployment model, a 22 GB RAM allocation is recommended.

Software Download

Like the SAP HANA platform, you download SAP HANA cockpit from the **Software Downloads** area on the SAP ONE Support Launchpad (see Chapter 4). For this, navigate to **Support Packages and Patches**, as illustrated in Figure 6.10, using “SAP HANA Cockpit 2.0” as the search term. As there are no compatibility requirements, SAP recommends updating SAP HANA cockpit to the latest supported release.

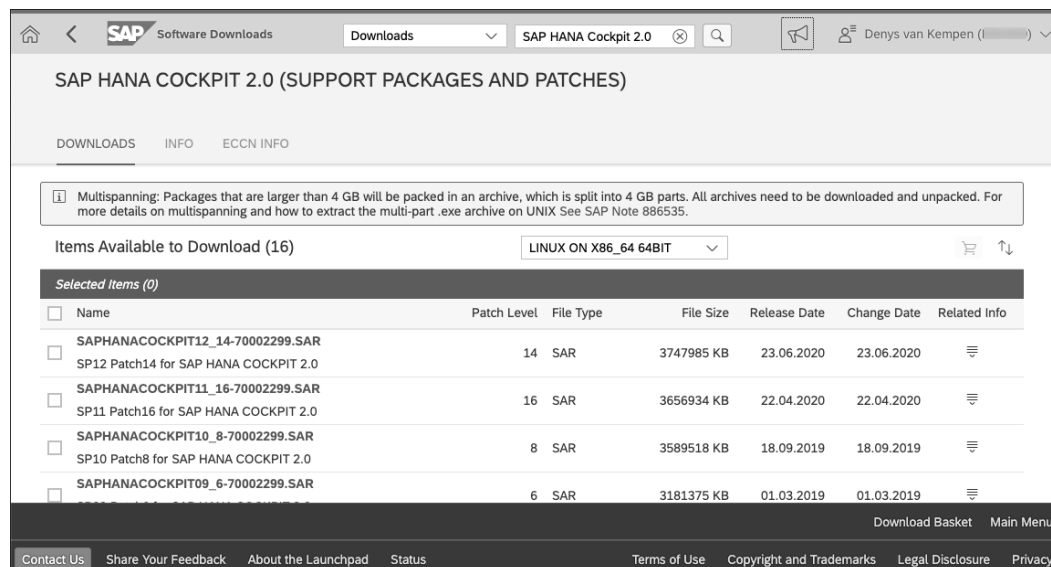


Figure 6.10 Software Downloads

The download is in the SAR file format and requires the SAPCAR utility for extraction, also available from **Software Downloads**. To extract the file, use the following command:

```
SAPCAR -manifest SIGNATURE.SMF -xvf SAPHANACOCKPIT<nn>.SAR
```

The extracted file is illustrated in Figure 6.11.

```
hana-vm1:/install/cockpit # ls
SAPCAR SAPHANACOCKPIT12_14-70002299.SAR
hana-vm1:/install/cockpit # ./SAPCAR -manifest SIGNATURE.SMF -xvf SAPHANACOCKPIT12_14-70002299.SAR
SAPCAR: processing archive SAPHANACOCKPIT12_14-70002299.SAR (version 2.01)
x COCKPIT2_APP
x COCKPIT2_APP/sap-xsac-cockpit-2.12.14.zip
x hdblc.sh
x hdblcgui.sh
x HDB_SERVER_LINUX_X86_64
x HDB_SERVER_LINUX_X86_64/adapters.d
x HDB_SERVER_LINUX_X86_64/adapters.d/HDBLCM.adapter
x HDB_SERVER_LINUX_X86_64/adapters.d/HDBLCM_ext1.adapter
x HDB_SERVER_LINUX_X86_64/configurations
x HDB_SERVER_LINUX_X86_64/configurations/auto_install.cfg
x HDB_SERVER_LINUX_X86_64/configurations/custom
x HDB_SERVER_LINUX_X86_64/configurations/custom/compileserver.ini
x HDB_SERVER_LINUX_X86_64/configurations/custom/daemon.ini
x HDB_SERVER_LINUX_X86_64/configurations/custom/global.ini
x HDB_SERVER_LINUX_X86_64/configurations/custom/indexserver.ini
x HDB_SERVER_LINUX_X86_64/configurations/custom/nameserver.ini
x HDB_SERVER_LINUX_X86_64/configurations/custom/xscontroller.ini
```

Figure 6.11 Extracting Files with SAPCAR

Installation Steps

The installation of SAP HANA cockpit is similar to the installation of the SAP HANA server, but not identical. The same SAP HANA database lifecycle manager (HDBLCM) tool is used, and you can choose between using the command line or the graphical (X Window System) user interface. However, there is a small but important difference. To install (or update) SAP HANA cockpit, you need to start HDBLCM with scripts: `hdblc.sh` and `hdblcgui.sh`. You see both scripts listed in Figure 6.12.

```
x XSA_RT_20_LINUX_X86_64/packages/manifest
x XSA_RT_20_LINUX_X86_64/packages/NODE_10.TGZ
x XSA_RT_20_LINUX_X86_64/packages/ROUTER.TGZ
x XSA_RT_20_LINUX_X86_64/packages/SAPJVM_8.TGZ
x XSA_RT_20_LINUX_X86_64/packages/XS2_INDEP.TGZ
x SIGNATURE.SMF
SAPCAR: 714 file(s) extracted
hana-vm1:/install/cockpit # ls
COCKPIT2_APP SAPCAR SIGNATURE.SMF XSA_RT_20_LINUX_X86_64 manifest
HDB_SERVER_LINUX_X86_64 SAPHANACOCKPIT12_14-70002299.SAR XSAC_HRTT_20 hdblc.sh
HDB_LCM_LINUX_X86_64 SAP_PORTAL_SERVICES XSA_COCKPIT hdblcgui.sh
hana-vm1:/install/cockpit # cat hdblc.sh
#!/bin/bash

current_dir=$(dirname "$0")
current_dir=$(readlink -f "$current_dir")
hdblc_dir=$(find "$current_dir" -name "HDB_LCM_*" 2>/dev/null |
if [ ! -f "$hdblc_dir/hdblc" ]; then
echo "$hdblc_dir/hdblc not found" >&2
exit 1
elif [ ! -x "$hdblc_dir/hdblc" ]; then
echo "Cannot execute $hdblc_dir/hdblc" >&2
exit 1
fi
"$hdblc_dir/hdblc" --component_root="$current_dir" $*
hana-vm1:/install/cockpit #
```

Figure 6.12 Installation Script hdblc.sh

The script files make sure that you use the prepared configuration file for SAP HANA cockpit with default settings depending on whether you select the stand-alone or shared database installation (`auto_install.cfg` and `auto_install_hdb.cfg`, respectively). These settings can be adjusted, although for some configurations, different steps are required, for example, if you want to assign a different port range for the SAP HANA cockpit applications (default 51000–51500).

The first screen prompts you to either install a new system or update the current one when detected, as shown in Figure 6.13.

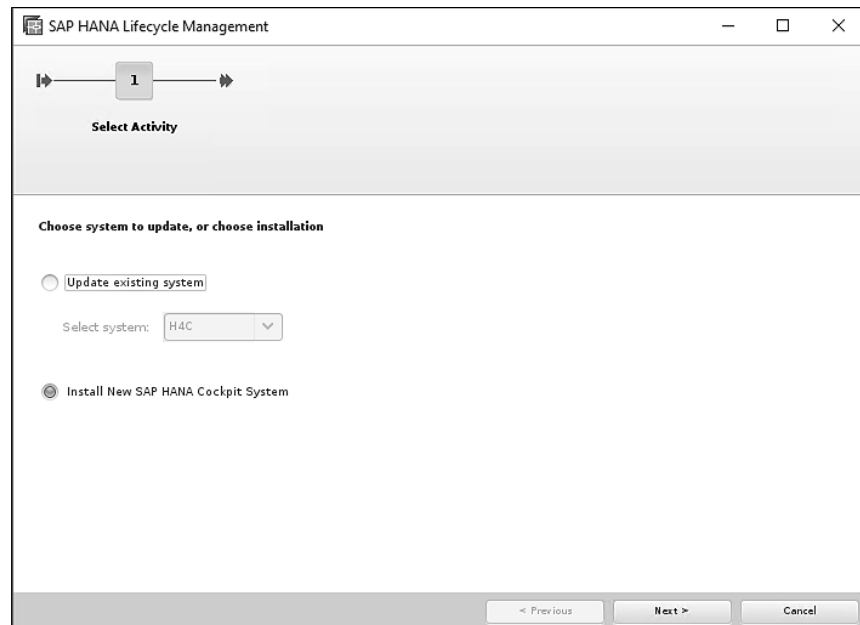


Figure 6.13 SAP HANA Lifecycle Management: Install New System

Even when opting for a new installation, all default values for the system properties are provided, including the SID, unlike with SAP HANA server installations. These values come from the template. You see this illustrated in Figure 6.14. The default value for **SAP HANA System ID** is **H4C** (HANA for Cockpit), and the default for the **Instance Number** is 96 or next available ($n+1$).

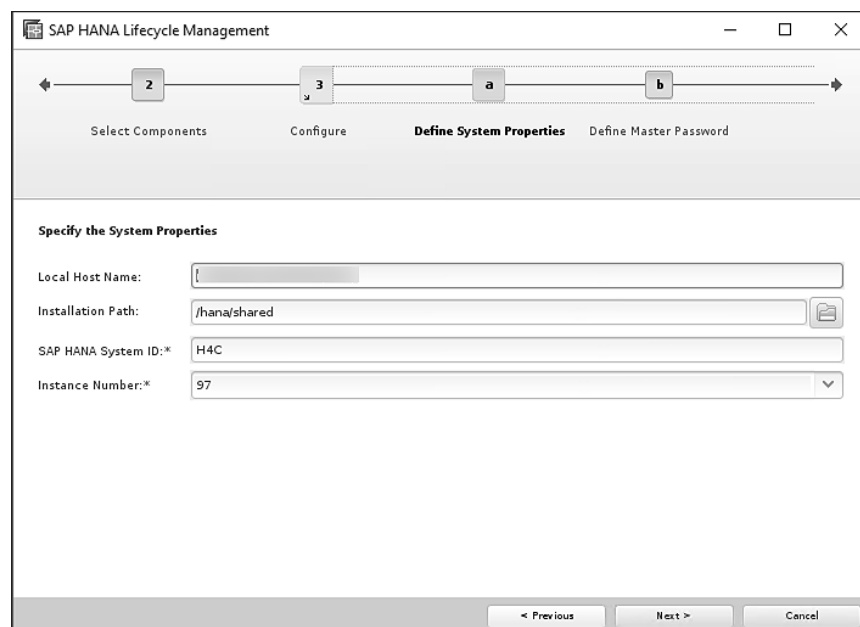


Figure 6.14 SAP HANA Lifecycle Management: Specify System Properties

After clicking **Next**, you're prompted to define the master password, which will be used for the `COCKPIT_ADMIN` user account for the SAP HANA cockpit and SAP HANA cockpit manager applications. In the last screen, you only need to review your selections and click **Install** to install.

As with the SAP HANA server, you can also run the installation in batch mode with optional command-line parameters to override those defined in the configuration file. For example, to install SAP HANA cockpit in batch mode and override the default name of the SAP HANA XSA runtime admin user, you can enter the following command:

```
hdblcm.sh --action=install -b --org_manager_user=JDOE
```

For SAP HANA cockpit, the default value for this parameter is `COCKPIT_ADMIN`. For the SAP HANA platform, the equivalent account is `XSA_ADMIN`, which corresponds to the SAP HANA XSA administration account. Although this account maps to a database user, it's an application account with the SAP HANA XS user account and authentication (UAA) service managing access control.

Figure 6.15 illustrates the installation in command-line mode and is identical.

```
hana-vm1:/install/cockpit # whoami
root
hana-vm1:/install/cockpit # ls
COCKPIT2_APP          SAPCAR                SIGNATURE.SMF        XSA_RT_20_LINUX_X86_64  manifest
HDB_SERVER_LINUX_X86_64  SAPHANACOCKPIT12_14-70002299.SAR  XSAC_HRTT_20        hdblcm.sh
HDB_LCM_LINUX_X86_64    SAP_PORTAL_SERVICES    XSA_COCKPIT         hdblcmgui.sh
hana-vm1:/install/cockpit # ./hdblcm.sh

SAP HANA Lifecycle Management - SAP HANA Cockpit 2.0.12.14.0
*****

Choose an action

-----
Index | Action          | Description
-----
1     | HDB (install)   | Install SAP HANA Cockpit on SAP HANA Database version 2.00.051.00.1596053985
2     | install         | Install new SAP HANA Cockpit system
3     | Exit (do nothing) |
-----

Enter selected action index [3]: 2

Enter Installation Path [/hana/shared]:
Enter Local Host Name [hana-vm1]:
Enter SAP HANA System ID [H4C]:
Enter Instance Number [96]:
Enter Master Password:
Confirm Master Password:

Summary before execution:
=====
SAP HANA Cockpit System Installation
Installation Parameters
Remote Execution: ssh
Use single master password for all users, created during installation: Yes
Database Isolation: low
Create initial tenant database: No
Install Execution Mode: optimized
Installation Path: /hana/shared
```

Figure 6.15 SAP HANA Cockpit: Install

At the end of the installation, connection information for SAP HANA cockpit and SAP HANA cockpit manager is displayed, but this might be easy to miss (see Figure 6.16). Note the different SAP HANA XSA applications being created and the log file written to `/var/temp` with SID (H4C), action name (install), and timestamp.

```

root@mo-1caae8fcb.mo.sap.corp:/install
Creating application "cockpit-xsa-svc" from MTA module "cockpit-xsa-svc"...
Uploading application "cockpit-xsa-svc"...
Starting application "cockpit-xsa-svc"...
Creating application "cockpit-web-app" from MTA module "cockpit-web-app"...
Uploading application "cockpit-web-app"...
Starting application "cockpit-web-app"...
Creating application "cockpit-adminui-svc" from MTA module "cockpit-adminui-svc"...
Uploading application "cockpit-adminui-svc"...
Starting application "cockpit-adminui-svc"...
Creating application "cockpit-admin-web-app" from MTA module "cockpit-admin-web-app"...
Uploading application "cockpit-admin-web-app"...
Starting application "cockpit-admin-web-app"...
Creating application "cockpit-js-svc" from MTA module "cockpit-js-svc"...
Uploading application "cockpit-js-svc"...
Starting application "cockpit-js-svc"...
Creating configuration change subscription from MTA module "cockpit-health-svc" to MTA resource "cockpit-health-svc-endpoints"...
Registering service URL "https://mo-1caae8fcb.mo.sap.corp:51027" named "hana-cockpit"...
Registering service URL "https://mo-1caae8fcb.mo.sap.corp:51029" named "hana-cockpit-admin"...
Updating application "hrtt-service" from MTA "com.sap.xsa.hrtt" for subscription "cockpit-persistence-svc"
Updating application "hrtt-service" from MTA "com.sap.xsa.hrtt" for subscription "cockpit-landscape-svc"
Updating application "hrtt-service" from MTA "com.sap.xsa.hrtt" for subscription "cockpit-hdb-svc"
Updating application "sqlanzl-svc" from MTA "com.sap.xsa.hrtt" for subscription "cockpit-hdbui-svc"
Updating application "cockpit-health-svc" from MTA "com.sap.hana.cockpit" for subscription "cockpit-health-svc-endpoints"
Stopping application "hrtt-service"...
Starting application "hrtt-service"...
Stopping application "sqlanzl-svc"...
Starting application "sqlanzl-svc"...
Stopping application "cockpit-health-svc"...
Starting application "cockpit-health-svc"...
Installation of archive file '['/install/COCKPIT2_APP/sap-xsac-cockpit-2.11.11.zip']' finished successfully.
SAP HANA Cockpit System installed

Launch SAP HANA cockpit by opening https://mo-1caae8fcb.mo.sap.corp:51027
Launch SAP HANA cockpit manager by opening https://mo-1caae8fcb.mo.sap.corp:51029

Log file written to '/var/tmp/hdb_H4C_hdb1cm_install_2020-02-03_15.40.04/hdb1cm.log' on host 'mo-1caae8fcb.mo.sap.corp'
mo-1caae8fcb:/install #

```

Figure 6.16 SAP HANA Cockpit: Installation Finished

If you miss the URL for the cockpit web applications, you can look it up in the **Applications** view of the SAP HANA XS Advanced cockpit (refer to Figure 6.7) or use the equivalent `xs apps` command to query this information, as illustrated in Figure 6.17.

```

root@mo-1caae8fcb.mo.sap.corp:/install
h4cadm@mo-1caae8fcb.mo:/usr/sap/H4C/HDB96> xs login
API URL: https://mo-1caae8fcb.mo.sap.corp:39630
USERNAME: COCKPIT_ADMIN
PASSWORD>
Authenticating...
ORG: HANACockpit
SPACE: SAP
API endpoint: https://mo-1caae8fcb.mo.sap.corp:39630 (API version: 1)
User: COCKPIT_ADMIN
Org: HANACockpit
Space: SAP

h4cadm@mo-1caae8fcb.mo:/usr/sap/H4C/HDB96> xs apps | grep web-app
cockpit-admin-web-app      STARTED      1/1          128 MB    <unlimited>    https://mo-1caae8fcb.mo.sap.corp:51029
cockpit-web-app            STARTED      1/1          512 MB    <unlimited>    https://mo-1caae8fcb.mo.sap.corp:51027
h4cadm@mo-1caae8fcb.mo:/usr/sap/H4C/HDB96>

```

Figure 6.17 SAP HANA XS Command-Line Tool

Note

For those less familiar with Linux system administration, the output of the `xs apps` command (a long list) is sent to the `grep` tool, which applies a filter on the `web-app` word:

```
xs apps | grep web-app
```

Update

The procedure to update an SAP HANA cockpit system is very similar to the installation except that you select the update action in the SAP HANA Lifecycle Management tool and choose the SID from the list. In the graphical version, you're prompted to select which components you want to update; however, except for support cases, you would normally leave all components selected (database, runtime, applications). Figure 6.18 shows the **Review & Confirm** screen.

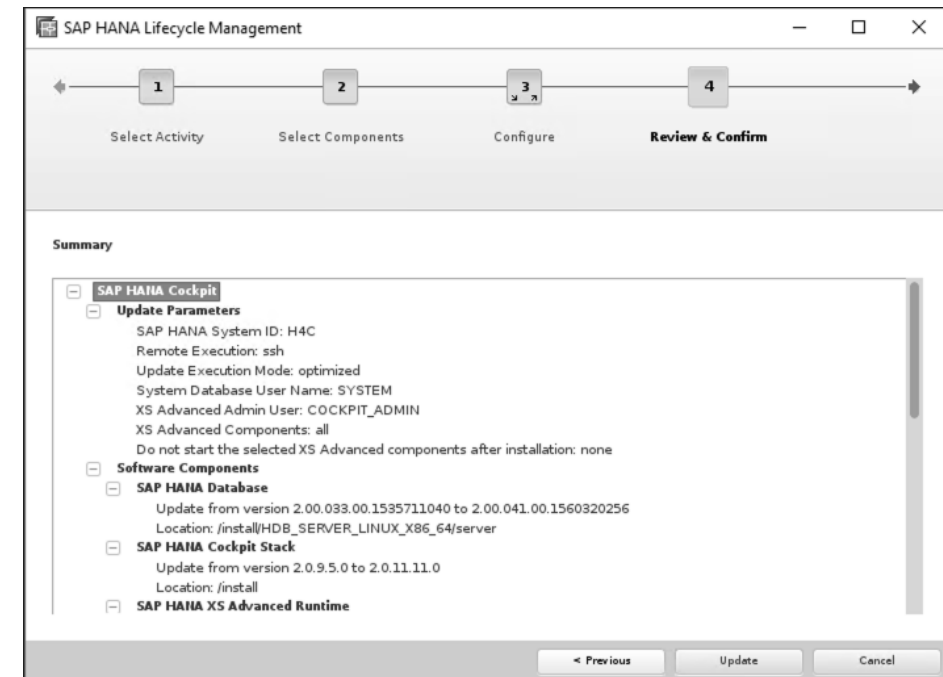


Figure 6.18 Update SAP HANA Cockpit: Graphical Version

Figure 6.19 shows the command-line prompts with default values except for the passwords. As always, it's a common best practice to perform a database backup prior to updating the system. Depending on system resources, a SAP HANA cockpit update takes about 45 minutes.

```

SAP HANA Lifecycle Management - SAP HANA Cockpit 2.0.11.11.0
*****

Choose an action

  Index | Action          | Description
  -----|-----|-----
  1      | H4C (update)    | Update SAP HANA Cockpit version 2.0.9.5.0
  2      | install         | Install new SAP HANA Cockpit system
  3      | Exit (do nothing) |

Enter selected action index [3]: 1

Enter System Database User Name [SYSTEM]:
Enter System Database User (SYSTEM) Password:
Enter XS Advanced Admin User (COCKPIT_ADMIN) Password:

Summary before execution:
=====

SAP HANA Cockpit
  Update Parameters
    SAP HANA System ID: H4C
    Remote Execution: ssh
    Update Execution Mode: optimized
    System Database User Name: SYSTEM
    XS Advanced Admin User: COCKPIT_ADMIN
    XS Advanced Components: all
    Do not start the selected XS Advanced components after installation: none
  Software Components
    SAP HANA Database
      Update from version 2.00.033.00.1535711040 to 2.00.041.00.1560320256
      Location: /install/HDB_SERVER_LINUX_X86_64/server
    SAP HANA Cockpit Stack
      Update from version 2.0.9.5.0 to 2.0.11.11.0
      Location: /install
    SAP HANA XS Advanced Runtime
      Update from version 1.0.99.13607 to 1.0.119.14405
      Location: /install/XSA_RT_20_LINUX_X86_64/packages
  XS Advanced Components
    SAP HANA Cockpit
      Update from version 2.9.5 to 2.0011.11
      Location: /install/COCKPIT2_APP/sap-xsac-cockpit-2.11.11.zip
    SAP HANA tools for accessing catalog content, data preview, SQL console, etc.
      Update from version 2.8.33 to 2.011.64
      Location: /install/XSAC_HRTT_20/sap-xsac-hrtt-2.11.64.zip
    Develop and run portal services for customer apps on XSA
      Update from version 1.2.1 to 1.003.2
      Location: /install/SAP_PORTAL_SERVICES/sap-portal-services-assembly-1.14.3.zip
    SAPUI5 FESV5 XSA 1 - SAPUI5 1.60
      Install version 1.060.18
      Location: /install/SAP_UI5_1/sapui5-dist-xsa-1.60.18.zip
    XSA Cockpit 1
      Update from version 1.1.7 to 1.001.15
      Location: /install/XSA_COCKPIT/cockpit-web-xsa-assembly-1.1.15.zip
  Log File Locations
    Log directory: /var/tmp/hdb_H4C_hdb1cm_update_2020-02-03_15.31.20
    Trace location: /var/tmp/hdb1cm_2020-02-03_15.31.20_25792.trc

```

Figure 6.19 Update SAP HANA Cockpit: Command Line

Uninstall

The procedure to remove SAP HANA cockpit is identical to that for the SAP HANA platform. Note that this time you don't use a script file. Instead, launch the resident HDBLCM, and select the **uninstall** action, as shown in Figure 6.20. You have the option to remove only the runtime or only the SAP HANA cockpit applications, but again, this addresses special cases and would usually only be selected when instructed by SAP Support. Select **All** and confirm your selection.

```

mo-1caae8fcb:/hana/shared/H4C/hdb1cm # ls
SIGNATURE.SMF  configurations  filelist.resident  hdb1cmgui  instruntime  resources
adapters.d    descriptors.d  hdb1cm             hdb1cmweb  operations.d
mo-1caae8fcb:/hana/shared/H4C/hdb1cm # ./hdb1cm

SAP HANA Lifecycle Management - SAP HANA Cockpit 2.0.9.5.0
*****

Choose an action

  Index | Action          | Description
  -----|-----|-----
  1      | check_installation | Check SAP HANA Cockpit Installation
  2      | configure_sld      | Configure System Landscape Directory Registration
  3      | extract_components | Extract Components
  4      | rename_system      | Rename the SAP HANA Cockpit System
  5      | uninstall          | Uninstall SAP HANA Cockpit Components
  6      | unregister_system   | Unregister the SAP HANA Cockpit System
  7      | update_component_list | Update Component List
  8      | update_components  | Install or Update Additional Components
  9      | update_host        | Update the SAP HANA Cockpit Instance Host integration
  10     | update            | Update the SAP HANA Cockpit System
  11     | exit              | Exit (do nothing)

Enter selected action index [11]: 5

Choose components to be uninstalled for system 'H4C':
  Index | Components | Description
  -----|-----|-----
  1      | all        | SAP HANA Database version 2.00.033.00.1535711040 and all other components
  2      | xs         | Uninstall SAP HANA XS Advanced Runtime version 1.0.99.13607
  3      | cockpit    | Uninstall SAP HANA Cockpit Stack version 2.0.9.5.0

Enter comma-separated list of the selected indices [1]:

Summary before execution:
=====

SAP HANA Cockpit System Uninstallation
  Software Components
    SAP HANA XS Advanced Runtime
      Uninstall version 1.0.99.13607
    SAP HANA Cockpit Stack
      Uninstall version 2.0.9.5.0
    SAP HANA Database
      Uninstall version 2.00.033.00.1535711040

Note: All data volumes and all log volumes of SAP HANA Database 'H4C' will be removed!

Do you want to continue? (y/n):

```

Figure 6.20 Uninstall SAP HANA Cockpit

Provisioning and Configuration

Before we can use SAP HANA cockpit in an SAP HANA system landscape, we need to provision and configure the tool. The exact steps required will depend on the situation but usually include the following:

■ Firewall configuration

SAP HANA cockpit needs to be able to connect to the different SAP HANA systems using both the SQL port and the TCP port of the SAP start service. In addition, a web connection from the computer of the SAP HANA cockpit administrators and the SAP HANA cockpit system itself needs to be enabled.

This activity is typically performed by the network administrator and is out of scope for the exam, but you do need to know the relevant HTTP/S ports.

■ Configure single sign-on (SSO) and Transport Layer Security/Secure Sockets Layer (TLS/SSL)

Configuring SSO and TLS/SSL isn't required but is certainly recommended. You can enable SSO to connect to SAP HANA cockpit and SAP HANA cockpit manager, so you don't have to enter your user name and password each time. You can also enable SSO from SAP HANA cockpit to a database for the same reason. In addition, it's highly recommended to configure encrypted connections using HTTPS and TLS. Both SSO and TLS can be enforced.

■ Register databases and create database groups and SAP HANA cockpit users

By default, only the user who has registered a database can access this database with SAP HANA cockpit. By creating additional users and adding them to groups, this privilege can be extended.

Learn More

For more extensive coverage of how to provision SAP HANA cockpit, which is beyond the scope of this exam, see the "SAP HANA Administration with SAP HANA Cockpit" documentation at <http://s-prs.co/v507840>.

In the following sections, we'll take a closer look into the specific items that must be configured.

Connecting to the SAP HANA Cockpit Manager

Before you can start using SAP HANA cockpit, you first need to register at least a single database. In most cases, you also want to create cockpit users and add database groups so you can map databases to users and control access. Although there is a logic in the sequence of steps, the exact order isn't fixed, and you can always return to the SAP HANA cockpit manager to add or delete users, database groups, and register or deregister databases.

The SAP HANA XSA runtime comes with a self-signed certificate for HTTPS, which most modern browsers no longer accept. Unless you've already performed the steps to update the TLS certificates, you might need to import the certificates on your local computer and set it to trusted. The error page and certificate are displayed in Figure 6.21. We cover this topic in more detail in Chapter 10.

When you proceed and make your first connection to the SAP HANA cockpit manager with the `COCKPIT_ADMIN` user, you'll receive a **Not Authorized** message, as illustrated in Figure 6.22, which you need to acknowledge.

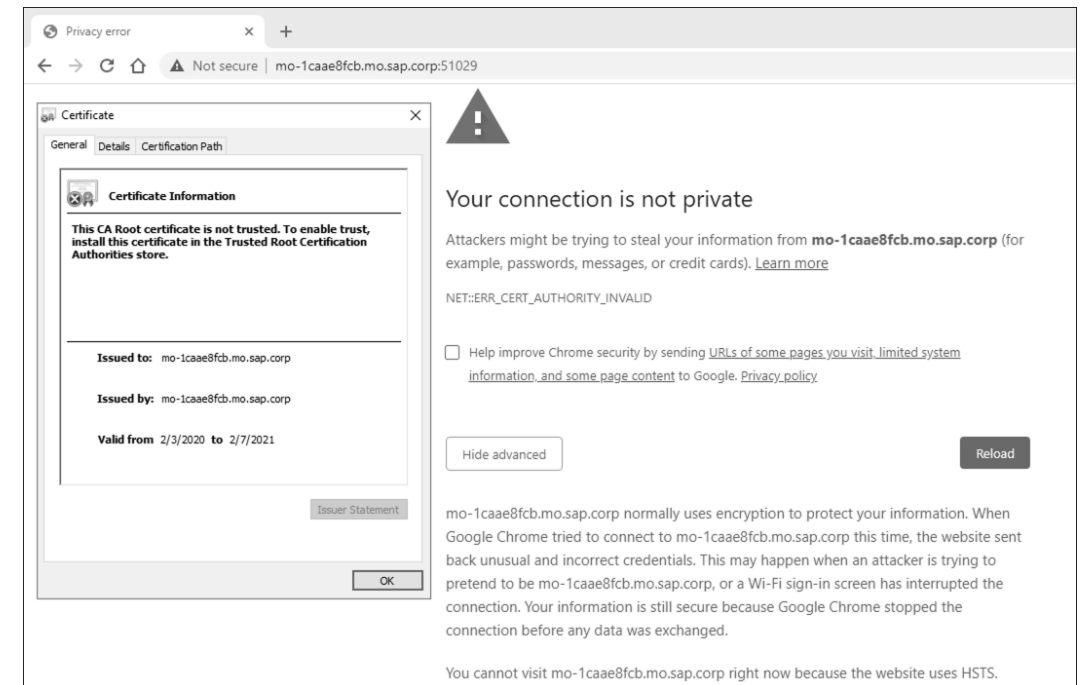


Figure 6.21 Your Connection Is Not Private Error

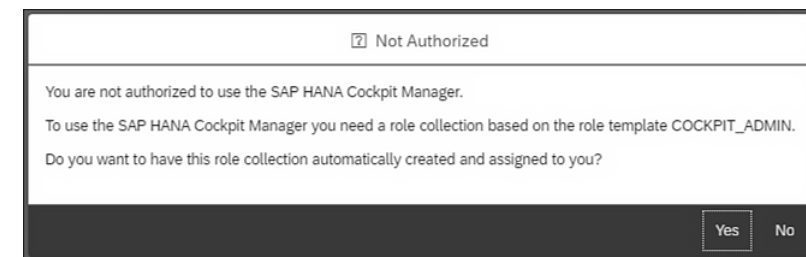


Figure 6.22 Not Authorized

The SAP HANA cockpit manager will appear initially with only a single SAP HANA cockpit user, no registered databases, and no database groups, as shown in Figure 6.23. An alert informs you that you need to register or import databases for SAP HANA cockpit to monitor.

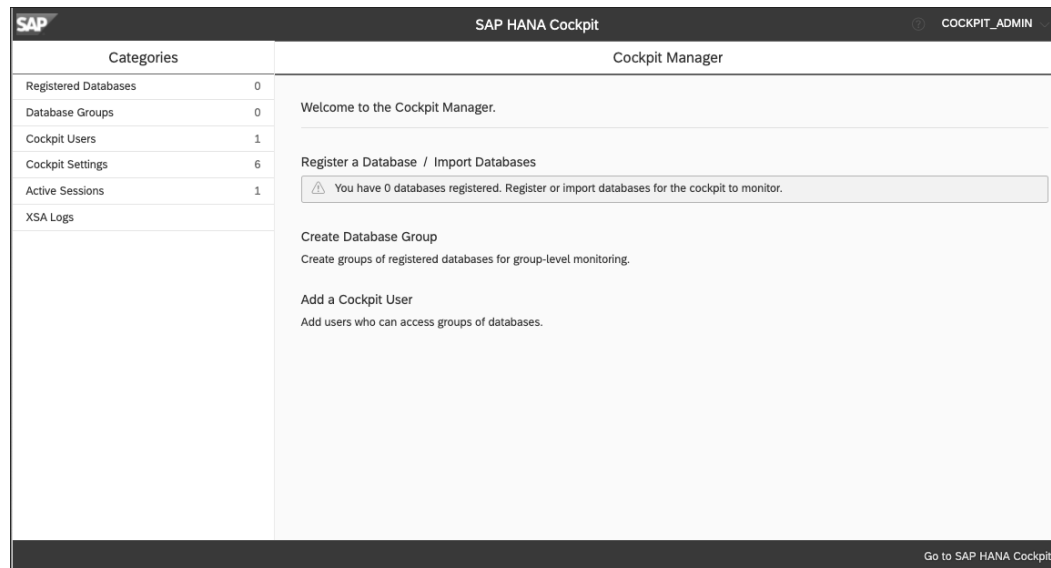


Figure 6.23 SAP HANA Cockpit Manager

SAP HANA Cockpit Users

Selecting **Cockpit Users** enables you to create new users, as shown in Figure 6.24. From the bottom toolbar, you can create new users or edit/delete existing ones. The default `COCKPIT_ADMIN` user has the five principal roles assigned but no database. A security best practice would be to keep it this way and use the cockpit administrator only for administration. Ideally, for separation of duties, you would even want to create different administrators for the different activities.

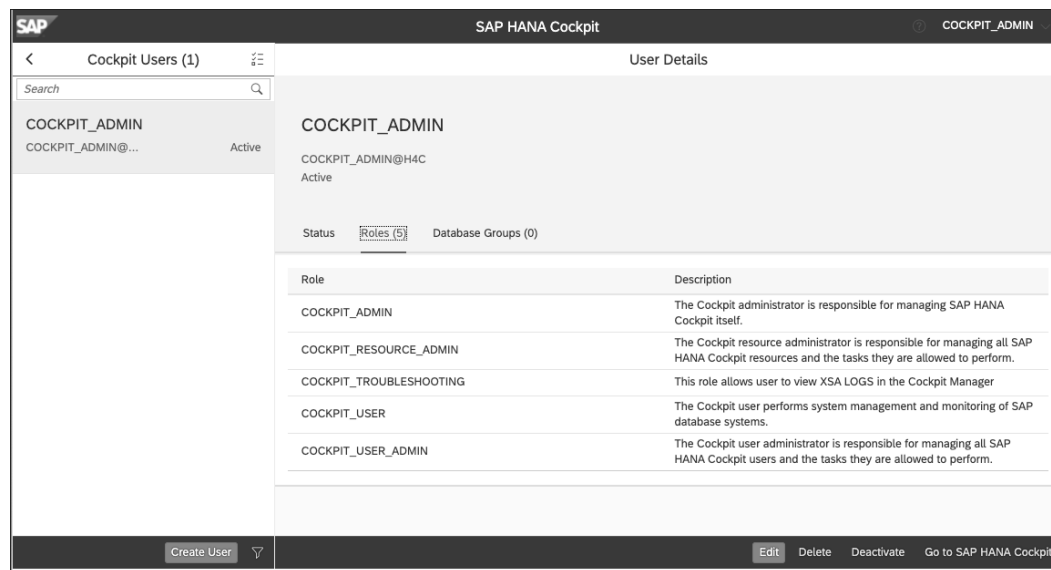


Figure 6.24 SAP HANA Cockpit Manager: User Details

Register Database

Selecting **Register a Database**, as shown earlier in Figure 6.23, and then clicking the **Register** button on the bottom toolbar launches the **Register Database** wizard with five steps:

1. Database

In this step, you need to provide host, identifier, and container information and indicate how you want the database to be listed in SAP HANA cockpit by either using our own format (user-defined) or the system-generated format `database@system` (see Figure 6.25). As an identifier, you can enter either the instance number or the SQL port. This corresponds to how you would connect to the database using HDBSQL (or SAP HANA studio). Single container systems are still supported for SAP HANA 1.0 SPS 12. Otherwise and for SAP HANA 2.0, indicate whether to register the system database or provide the name of the tenant database.

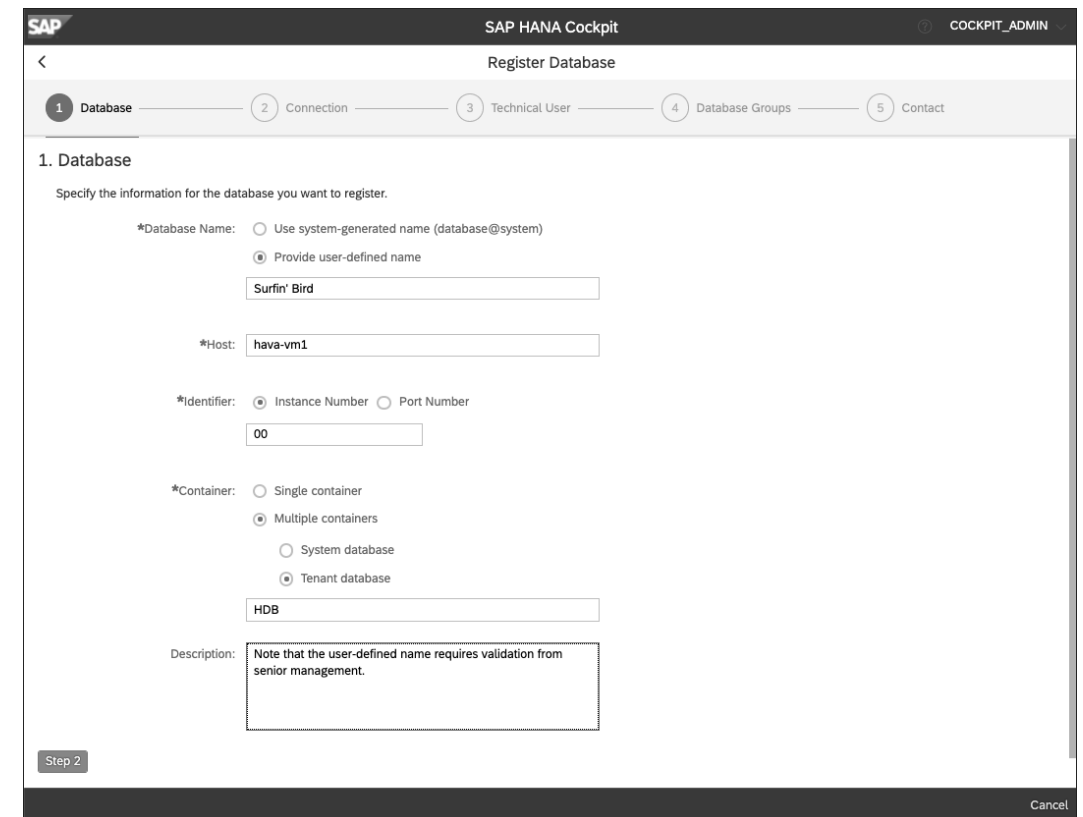


Figure 6.25 Register Database

2. Connection

In this step, you can specify the encryption to use for the database and the sap-control connection. The latter enables you to stop and start the system using the operating system account <sid>adm. Using encryption for this connection is strongly recommended as you're exchanging passwords. Here you can also indicate whether you want to validate the certificate. When selected, you need to import the certificate for the validation to succeed.

3. Technical User

In this step, you need to provide the credentials of a technical database user. This user requires CATALOG READ system privilege and SELECT object privilege on _SYS_STATISTICS schema, and should not be used for regular connections. The account password should also not expire, and you could consider using a user group and dedicated password policies. We cover this topic in more detail in Chapter 10. In early versions of SAP HANA cockpit, this user first had to be created on the source system, which was cumbersome as this required either SAP HANA studio or the hdbsql command-line utility. Now, a dialog enables you to create this user, as illustrated in Figure 6.26. If applicable, grant the SAP Early-Watch Alert privileges (requires additional privileges).

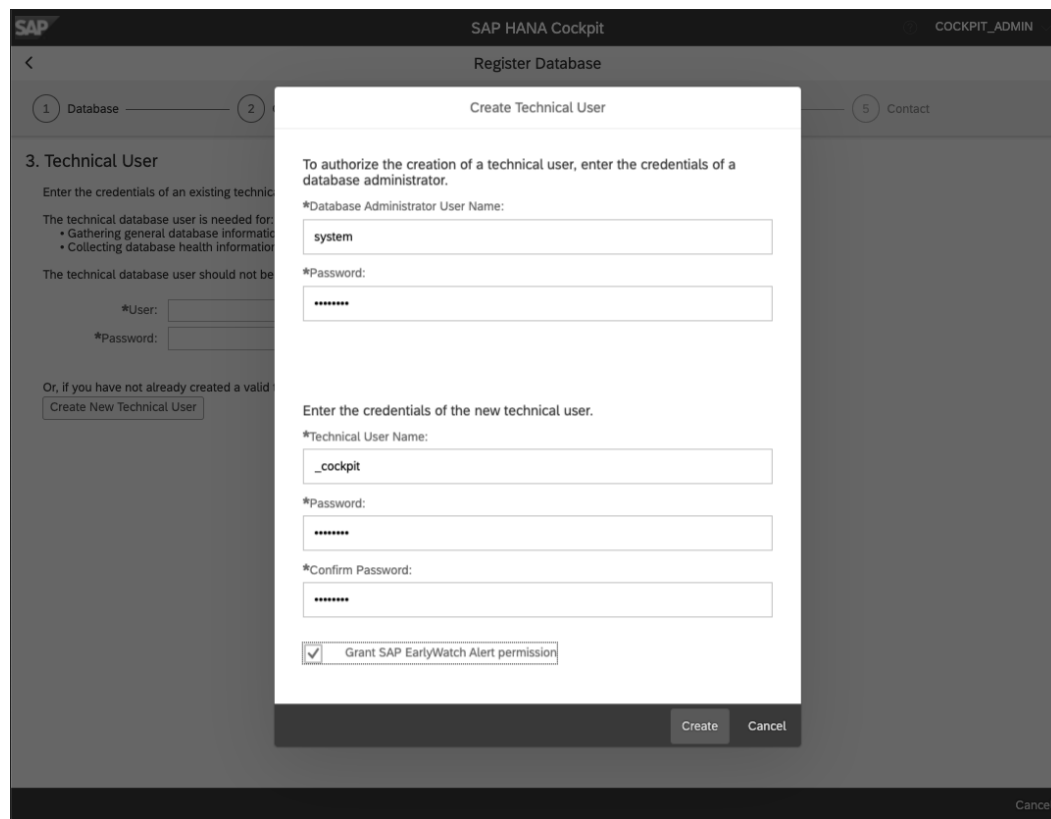


Figure 6.26 Create Technical User

4. Database Groups

In this step, you can assign the database to a database group. This step is optional, but as long as the database isn't assigned to a database group, you can't map any users to the database because users are also assigned to database groups but not to the database directly.

5. Contact

In this step, you can provide optional contact information and confirm the information in a final review screen.

The result is shown in Figure 6.27. When you edit the registration, you can enable and even enforce SSO. This requires the TRUST ADMIN system privilege on the target database (as indicated).

From the bottom toolbar, you can register additional databases, export the registration details for selected databases, and import database registrations.

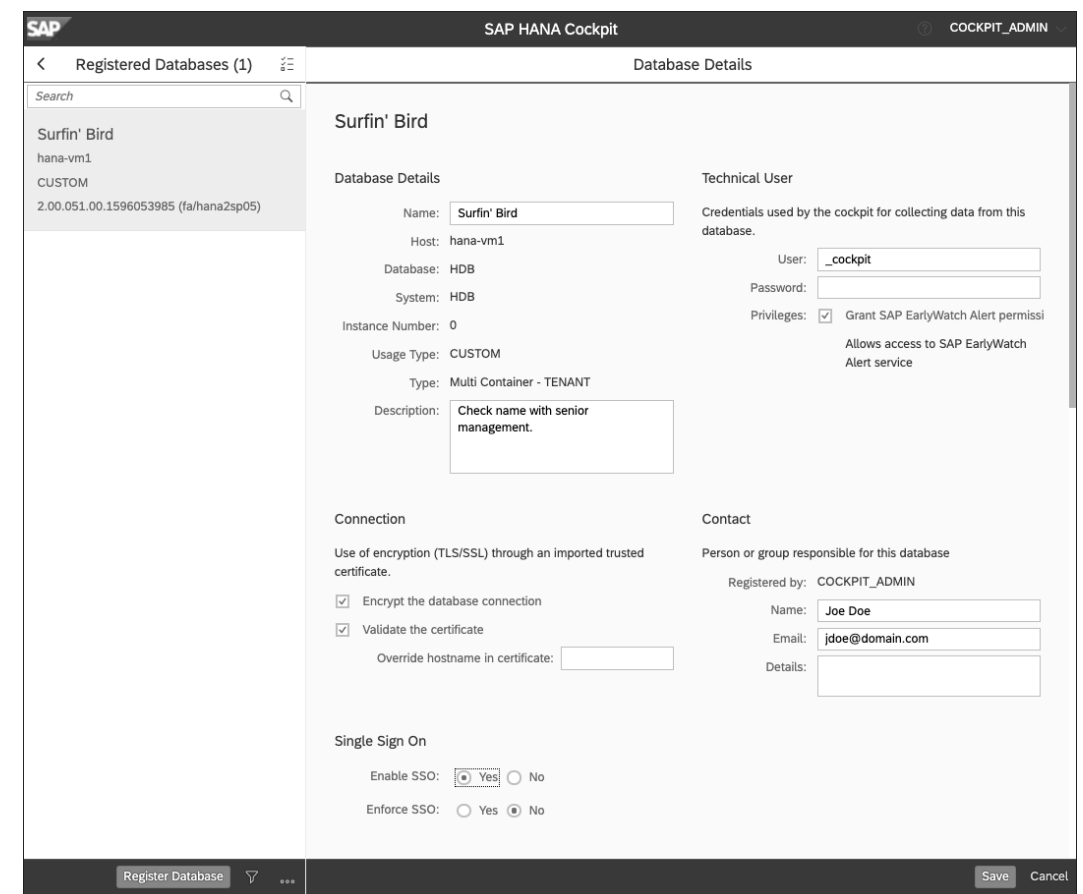


Figure 6.27 Database Details

SAP HANA Cockpit Manager Roles

Clicking the **Cockpit Users** menu option (refer to Figure 6.23) allows you to create users and roles. Creating users is a three-step process:

1. Provide user information.
2. Assign SAP HANA cockpit roles.
3. Assign users to database groups.

A **Create User** wizard helps you complete the procedure:

1. User Information

In this step, you enter user name, password, and email. There is an option to allow existing database users to access the SAP HANA cockpit.

2. Cockpit Roles

In this step, you select the roles for this user, as shown in Figure 6.28. By default, the **Cockpit User Role** is selected.

3. Database Groups

In this step, you can assign any available groups to this user.

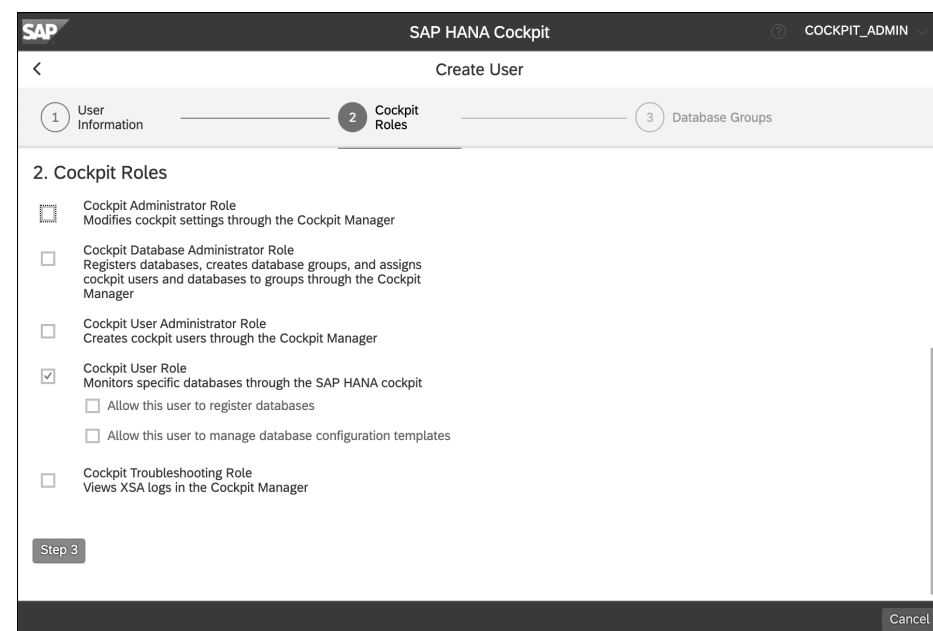


Figure 6.28 Create User

The following roles are available:

- **Cockpit Administrator Role**
Modifies SAP HANA cockpit manager settings.
- **Cockpit Database Administrator Role**
Registers databases, creates database groups, and assigns users and databases to groups.

- **Cockpit User Administrator Role**
Creates SAP HANA cockpit users.
- **Cockpit User Role**
Monitors specific databases, including the following two options:
 - **Allow this user to register databases:** Select to make a cockpit power user, who can monitor and register databases.
 - **Allow this user to manager database configuration templates:** Select to make a configuration template administrator.
- **Cockpit Troubleshooting Role**
Views the web application XSA logs.

Users with the cockpit user role can connect only to SAP HANA cockpit and access the databases that are included in the SAP HANA cockpit user database groups, as shown in Figure 6.29.

Note

Note that there is no master role containing all privileges. The cockpit power user and configuration template administrator are listed in the documentation as roles but aren't displayed as such in the UI.

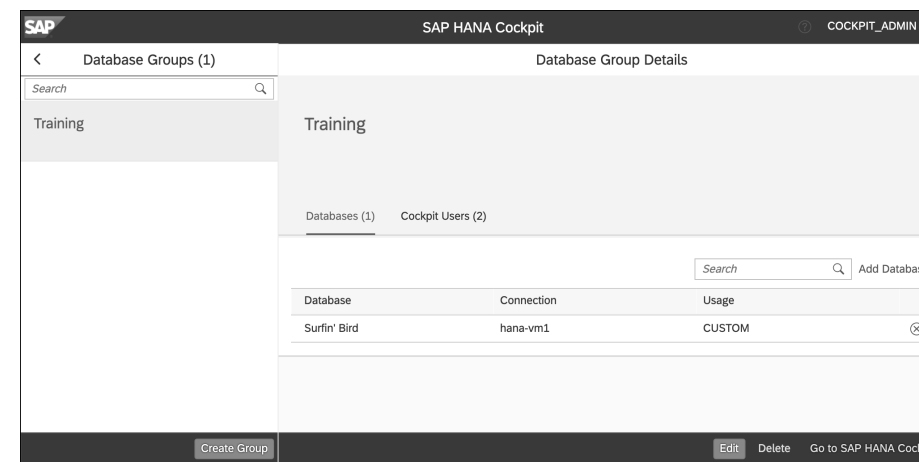


Figure 6.29 Create Database Group

A similar wizard is available to create database groups in three steps:

1. Enter group name with optional description.
2. Select database to be included in the group.
3. Select SAP HANA cockpit users to be included in the group.

SAP HANA Cockpit Manager Settings

Users with the cockpit administrator role can connect to the SAP HANA cockpit manager **Settings**, as shown in Figure 6.30, to control the following:

- **Data Collection**
Includes the following collection options:
 - Number of threads for the collection services (5)
 - System status and alert counts (**ON**, every minute)
 - Database and feature data (**ON**, every minute)
- **Proxy**
Includes option to assign a proxy.
- **Connections**
Includes the following connection options:
 - Database connection timeout (30 seconds)
 - sapcontrol connection timeout (15 seconds)
- **SSO with Kerberos**
Includes option to enable SSO.
- **Display**
Includes system-defined groups.
- **SAP Early Watch Alert**
Includes user, transmission schedule, location, and optional SAP routers.

Note that without additional privileges (roles), a user with only the cockpit manager role can only change SAP HANA cockpit settings, which may be a bit of a disappointment given the title. The system-defined database groups reference the usage types system and installation parameter. Refer to Figure 6.4 for how these database groups are displayed by default on the SAP HANA cockpit home page.

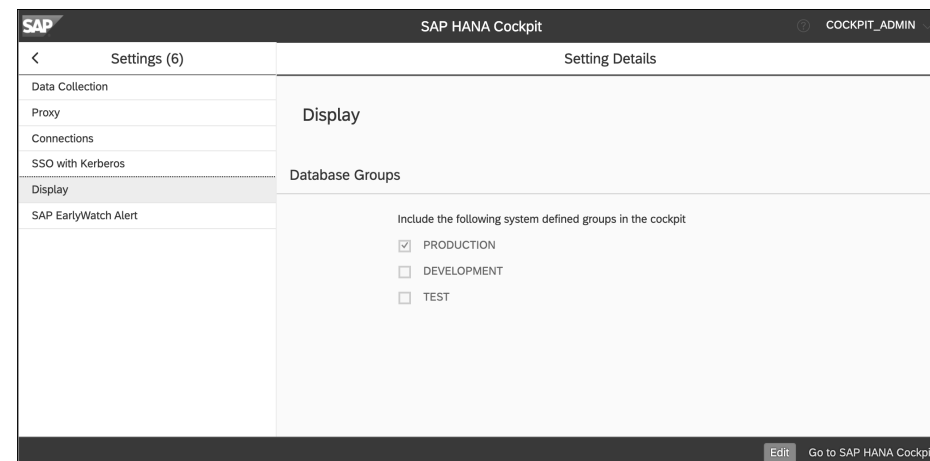


Figure 6.30 Settings

XSA Logs

The cockpit troubleshooting role grants access to the **XSA Logs** section of the SAP HANA cockpit manager but requires an additional privilege, which doesn't yet exist. On the first time access, the following message is displayed: **You need the Space Auditor role in order to view the XSA logs. Ask the cockpit User Administrator to assign this role to you.** If you're the user administrator, you need to know that you have to execute the `xs set-space-role` command, as illustrated in Figure 6.31.

```
h4cadm@hxehost:/usr/sap/H4C/HDB96> xs 1
API URL: https://hanacockpit.c.sap-hana-academy-174915.internal:39630
USERNAME> cockpit_admin
PASSWORD>
Authenticating...
ORG: HANACockpit
SPACE: SAP
API endpoint: https://hanacockpit.c.sap-hana-academy-174915.internal:39630 (API version: 1)
User: cockpit_admin
Org: HANACockpit
Space: SAP

h4cadm@hxehost:/usr/sap/H4C/HDB96> xs set-space-role COCKPIT_ADMIN HANACockpit SAP SpaceAuditor
Adding role 'SpaceAuditor' to user COCKPIT_ADMIN in space "SAP" of org "HANACockpit" ...
OK
h4cadm@hxehost:/usr/sap/H4C/HDB96> █
```

Figure 6.31 Set Space Auditor Role

With this and the cockpit troubleshooting role, you can then access the different SAP HANA XSA log files, one for each web application and service, as shown in Figure 6.32.

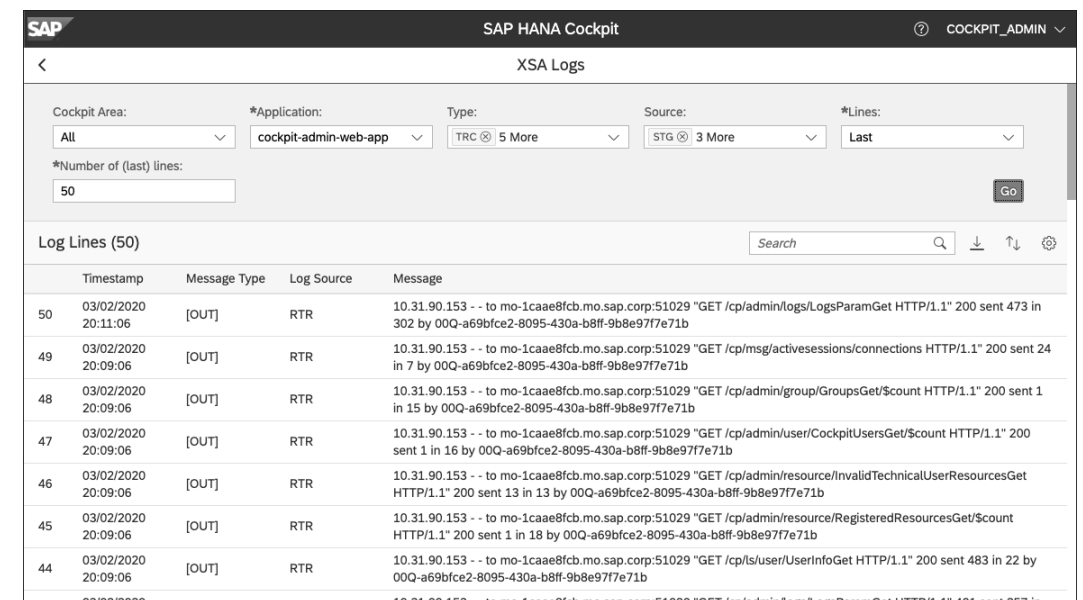


Figure 6.32 SAP HANA Cockpit Manager: XSA Logs

SAP HANA XSA User Administration

Although out of scope of the exam, it's good to realize that the security concept of SAP HANA cockpit maps to the SAP HANA XSA security settings. As illustrated in Figure 6.33, to assign the **Space Auditor** role to your user, you could have also used SAP HANA XS Advanced cockpit.

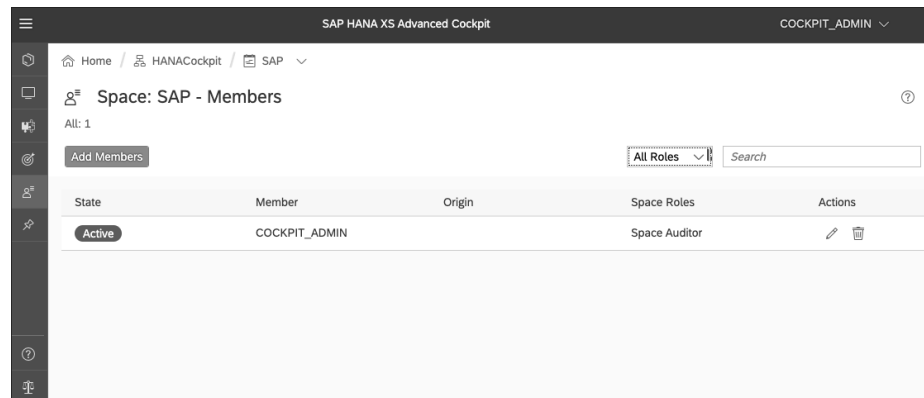


Figure 6.33 SAP HANA XS Advanced Cockpit: Space Members

Although this web application is also called a cockpit, it has nothing to do with your SAP HANA database administration tool. SAP HANA XS Advanced cockpit is the administration tool for the SAP HANA XSA infrastructure and comes with the runtime. SAP HANA cockpit manager provides the UI to abstract any SAP HANA XSA complexities, but it's still an SAP HANA XSA application leveraging the XS UAA service. The user will be created in the system database of the SAP HANA cockpit system or, in case of a shared database installation, in the SAP HANA cockpit database tenant, as shown in Figure 6.34.

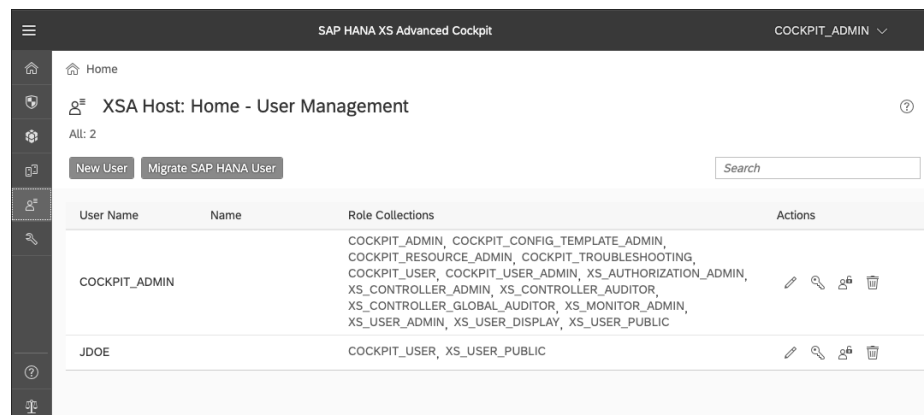


Figure 6.34 SAP HANA XS Advanced Cockpit: User Management

Active Sessions

The **Active Sessions** view in the SAP HANA cockpit manager (refer to Figure 6.23) shows you currently connected cockpit users, with latency and last location. From here you can send a message that displays as five-second popup or, if needed, interrupt with a message that requires acknowledgement, as illustrated in Figure 6.35.

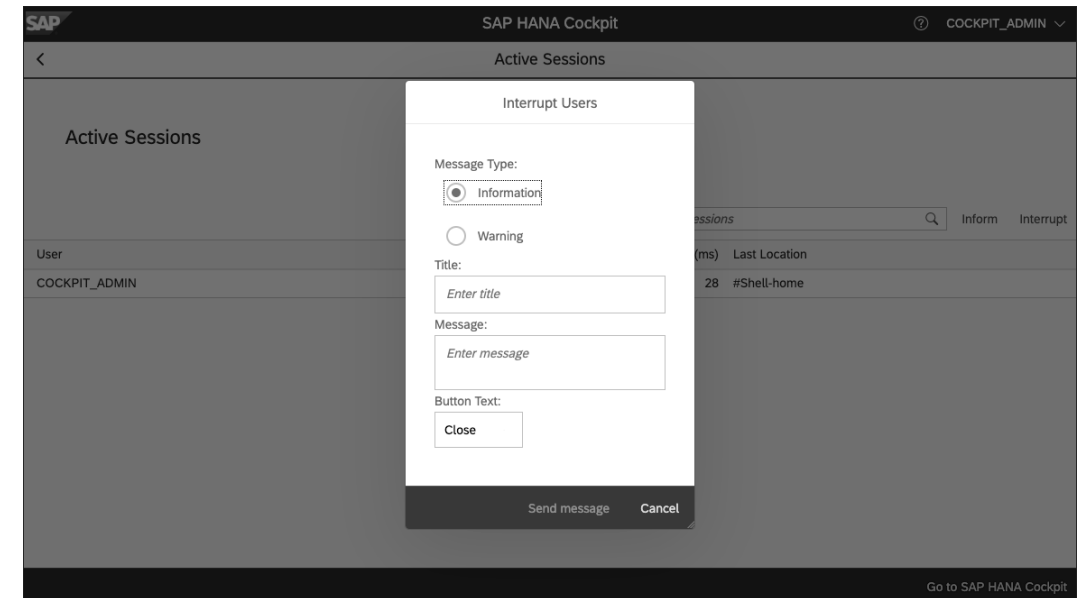


Figure 6.35 SAP HANA Cockpit: Active Sessions

Database Directory

When everything is configured the way you want, you can share the credentials with the SAP HANA cockpit administrators. They can then connect to SAP HANA cockpit, which opens on the **Home** view listing the tiles to monitor and manage the landscape, as illustrated previously in Figure 6.4.

From **Home**, you can either open the **Database Directory** screen or have a filter applied by opening only a specific database group. The **Database Directory** screen lists the databases the currently connected SAP HANA cockpit user has been granted access to (i.e., the database and the SAP HANA cockpit user belong to the same database group). For the **Database Directory** screen, see Figure 6.5.

The default **Database Directory** view shows the following:

- **Status**
Status of the database (e.g., **Running**, **Starting**, **Stopped**, **Issues**).
- **Usage type**
Can be production, development, test, or custom.

- **Database**
Database name as configured at registration time (system generated, or user defined; refer to Figure 6.25)
- **Alerts**
Number of alerts, if any.
- **Memory, CPU, and Disk**
Graphical indicators.
- **Expensive Statements**
Number of SQL statements, which consume significant resources.
- **Group**
Number of groups the database belongs to (click for a list).
- **Availability/Performance/Capacity**
Aggregated health view for the three key performance areas (KPIs).
- **Type/Version**
Type and version of the database; system database or tenant with version release number in format 2.00.051.00.<patch number>.
- **Credentials**
Credentials of the database connection.
- **SAP Control Credentials**
Credentials of the sapcontrol connection.

What is on display is configurable. With enough screen real estate available, you could also select the SID, SAP HANA XSA version, and so on.

The sapcontrol credentials can be only be provided for system databases. With sapcontrol, you stop and start the entire system, and you don't want to delegate this authority to mere tenant database administrators.

Note that even though your SAP HANA cockpit database administrator has made the database available to your user account, you still can't connect because you need to provide your own credentials in the **Database Directory** screen first. If you have no password or have forgotten it, you still can't connect.

If a system database is a registered database, you can also select the **Database Management** link to directly open the app. Alternatively, you can access this app from the header of the **Database Overview** page. We return to this topic when we describe database administration activities in Chapter 7.

Similarly, the **Manage Database** link in the header opens the SAP HANA cockpit manager again, which you could also have accessed from the SAP HANA cockpit **Home** page. There are often multiple ways to access an app.

Important Terminology

For this exam objective, you're expected to understand the following terms:

- **COCKPIT_ADMIN**
COCKPIT_ADMIN is the initial application administration account that you can use to prepare SAP HANA cockpit for first use. Typically, you would use this account to create other SAP HANA cockpit users and SAP HANA cockpit administrators, after which you can disable the account. The name is configurable, and the password is set during installation.
- **Database Directory**
The **Database Directory** is a view in SAP HANA cockpit that lists the databases accessible to the SAP HANA cockpit user. The same view also provides an aggregate health view and shows the database status, alerts, and a green checkmark or warning sign for the KPIs of availability, performance, and capacity.
- **Database overview**
The **Database Overview** page is the default page that SAP HANA cockpit displays when connected to a database. This page is configurable and shows tiles displaying **CPU Usage**, **Memory Usage**, **Disk Usage**, and other performance counters and links.
- **Database (resource)**
A database is either a system or tenant database and a single container or tenant database system (also known as multitenant database container [MDC] system). You need to register a database with the SAP HANA cockpit manager before you can connect to this database using SAP HANA cockpit. A database is assigned to a group. Prior to SAP HANA Cockpit 2.0 SP 12, the term "resource" was used.
- **Database (resource) group**
Registered databases are bundled in database groups. Both SAP HANA cockpit users and databases are assigned to a database group.
- **Landscape overview**
The **Landscape Overview** page is the default page that SAP HANA cockpit displays when you connect. This page is configurable and shows tiles displaying the **Database Directory** screen and database groups assigned to your SAP HANA cockpit user.
- **sapcontrol credentials**
The sapcontrol credentials are used to connect to the sapcontrol command with the operating system credentials of the SAP HANA system, typically with the <sid>adm user, the SAP HANA operating system administration account. These credentials are needed to start and stop an SAP HANA system.

- **SAP HANA cockpit manager**

SAP HANA cockpit contains a number of web applications and services, one of which is the SAP HANA cockpit manager. You use the SAP HANA cockpit manager for the metadata management of your SAP HANA cockpit environment, including users, databases, and database groups.

- **SAP HANA cockpit user**

SAP HANA cockpit users connect to the SAP HANA cockpit application to administer and monitor databases. Without any of the SAP HANA cockpit manager roles, they can't connect to the SAP HANA cockpit manager, and without the role or privilege to register databases, they can only connect to the databases that are included in the database group the SAP HANA cockpit user belongs to. To connect to a database, the SAP HANA cockpit user will need to enter the database credentials in the **Database Directory** view.

- **SAP HANA, express edition**

The standard deployment option of SAP HANA cockpit includes the SAP HANA, express edition, database for persistence. The express edition requires no license for configurations up to 32 GB and has been optimized to run on relatively resource-constrained environments such as virtual machines (VMs), run locally on a laptop, or be hosted in the cloud. Although production usage is supported, it's typically used for development and training. For SAP HANA cockpit, the minimum system requirement is 16 GB of RAM.

- **SAP HANA extended application services, advanced model (SAP HANA XSA)**

SAP HANA cockpit is a collection of SAP HANA XSA web applications and services. An SAP HANA cockpit installation includes the SAP HANA XSA runtime.

- **SAP HANA Lifecycle Management**

We install SAP HANA cockpit with the SAP HANA database lifecycle manager tool (HDBLCM) with a preconfigured template in limited interactive mode. Instead of the `hdblcm` command, you run the `hdblcm.sh` script.

- **Shared database**

A shared database is an alternative SAP HANA cockpit deployment option. In this case, you install SAP HANA cockpit in a separate tenant of an existing SAP HANA system.

- **System identifier (SID)**

The default SID of SAP HANA cockpit is H4C with instance number 96. This is configurable if, for example, you want to install two SAP HANA cockpit systems on a single computer (shared system deployment option).

- **Technical user**

Registered databases are configured with a technical user, which corresponds to a dedicated database account on that database. This account is used to collect general database information during registration and database health information after registration. The technical user account should not be used to connect to the database for system administration.

- **Usage type**

There are four predefined usage types for SAP HANA systems: production, test, development, and custom. The usage type of an SAP HANA system is set during installation but is configurable as system parameters. When a database has any of the first three usage types, a database group with a corresponding name is automatically created. These automatically created database groups can be hidden.

Practice Questions

These practice questions will help you evaluate your understanding of the topics covered in this chapter. The questions shown are similar in nature to those found on the certification examination. Although none of these questions will be found on the exam itself, they will allow you to review your knowledge of the subject. Select the correct answers, and then check the completeness of your answers in the “Practice Question Answers and Explanations” section. Remember that on the exam, you must select all correct answers, and only correct answers, to receive credit for the question.

1. Which SAP HANA releases are supported for SAP HANA cockpit? (There are three correct answers.)
 - A. SAP HANA 1.0 SPS 12 single database mode
 - B. SAP HANA 1.0 SPS 12 multitenant database container (MDC) mode
 - C. SAP HANA 2.0 SPS 05
 - D. SAP HANA 2.0 SPS 00
 - E. SAP HANA 2.0 SPS 02

2. Which platform is NOT supported for SAP HANA cockpit?
 - A. SUSE Linux Enterprise Server on Intel x64
 - B. SUSE Linux Enterprise Server on IBM Power Systems
 - C. Red Hat Enterprise Linux on IBM Power Systems
 - D. Red Hat Enterprise Linux on Intel x64

3. How do you install SAP HANA cockpit?
 - A. Use `hdbinst`.
 - B. Use HDBLCM and select the SAP HANA cockpit 2.0 component.
 - C. Use the `hdblcm.sh` installation script with the configuration file.
 - D. SAP HANA cockpit is a web application and doesn't require installation.

4. How do you know the HTTP/S port to access SAP HANA cockpit?
- A. Although configurable, SAP HANA cockpit uses the default HTTP port 80 and HTTP/S port 443. Only the host name in the URL is required to access the application.
 - B. SAP HANA cockpit uses the HTTP/S ports of SAP Host Agent (1128, 1129).
 - C. The installation summary screen displays the URLs for how to connect to SAP HANA cockpit. If not recorded, you need to do a TCP port scan.
 - D. SAP HANA cockpit is an SAP HANA XSA application. Application URLs are listed in SAP HANA XS Advanced cockpit. On the command line, use `xs apps`.
5. Which actions can you perform using the SAP HANA cockpit manager? (There are three correct answers.)
- A. Import users.
 - B. Register a database.
 - C. Access XSA logs.
 - D. Add a SAP HANA cockpit user.
 - E. Assign users to databases.
6. Which SAP HANA cockpit roles can you assign to users? (There are three correct answers.)
- A. Cockpit power user
 - B. Cockpit troubleshooting
 - C. Cockpit configuration template administrator
 - D. Cockpit pilot
 - E. Cockpit flight engineer
7. Which usage types are automatically assigned to a database group?
- A. System database
 - B. Cockpit database
 - C. QA (quality assurance)
 - D. Test
8. What aggregated health alerts are displayed in the **Database Directory**? (There are three correct answers.)
- A. Threads
 - B. Performance
 - C. Availability

- D. Sessions
 - E. Capacity
9. Which is the correct order to register databases in SAP HANA cockpit?
- A. Register database, create user, and create group.
 - B. Create user, create group, and register database.
 - C. Create group, create user, and register database.
 - D. There is no set order.
10. Which steps are required to grant a SAP HANA cockpit user access to a database? (There are two correct answers.)
- A. Register database, create user, create group, assign database to group, and assign user to group.
 - B. Register database, create user, and assign to database.
 - C. Create user, register database, and assign to database.
 - D. Create group, create user and assign to group, and register database and assign to group.
11. Which statements regarding the technical user are true? (There are two correct answers.)
- A. The technical user account needs to be created before you can register a database with SAP HANA cockpit.
 - B. The technical user requires the `CATALOG READ` system privilege and the `SELECT` on the `_SYS.STATISTICS` schema.
 - C. The `SYSTEM` user can't be used as technical user.
 - D. The technical user account should only be used by SAP HANA cockpit and not by another person.
12. Which SSO methods are supported to access SAP HANA cockpit 2.0?
- A. SAML
 - B. Kerberos
 - C. JWT LDAP
 - D. All three
13. Which SAP HANA cockpit role is required to assign SAP HANA cockpit users to database groups?
- A. Cockpit administrator
 - B. Cockpit user administrator

- C. Cockpit database (resource) administrator
 - D. Cockpit power user
14. Which user(s) is(are) required to access the Database Management app of SAP HANA cockpit? (There are two correct answers.)
- A. SAP HANA cockpit user with access to the registered system database
 - B. SAP HANA cockpit technical user
 - C. A database user with DATABASE ADMIN system privileges on the system database
 - D. The database administration operating system account <sid>adm
15. Which components are included in SAP HANA cockpit? (There are three correct answers.)
- A. SAP Web IDE for SAP HANA
 - B. SAP HANA database explorer
 - C. SAP HANA XSA runtime.
 - D. SAP HANA, express edition

Practice Question Answers and Explanations

1. Correct answers: **A, B, C**
SAP HANA cockpit supports both SAP HANA 1.0 SPS 12 in single database mode and with tenant databases as in all supported SAP HANA 2.0 releases.
Answers D and E are incorrect because the SAP HANA 2.0 SPS 00 and SPS 02 releases are no longer supported.
2. Correct answer: **C**
SAP HANA cockpit 2.0 doesn't support Red Hat Enterprise Linux (RHEL) on IBM Power Systems. This is a valid statement for the C_HANATEC_16 SAP HANA 2.0 SPS 04 exam. Future hardware requirements may change, so always check the latest SAP Notes. For this reason, questions like these are (or should be) rare on exams.
3. Correct answer: **C**
The installation of SAP HANA cockpit is performed using a script file and installation configuration template. You'll be prompted only to provide the host name, installation path, SID, and instance number, for which default values will be given (hostname, /hana/shared, H4C, 96, respectively).
Answer A is incorrect because you can use the single component installer hdbinst (command line) to install SAP HANA client and SAP HANA studio on client computers but not to install SAP HANA cockpit. Answer B is incorrect

because manual installation with the SAP HANA database lifecycle management tool (HDBLCM) isn't supported. Answer D is incorrect because although SAP HANA cockpit is web-based, you do need to install the product somewhere! Typically, this will be a server hosted from the data center most often close to where the SAP HANA system resides, although this isn't a requirement.

4. Correct answer: **D**
We can use both the `xs apps` command on the command line and SAP HANA XS Advanced cockpit to query the URLs of the SAP HANA cockpit applications (including ports).
Answer A is incorrect because SAP HANA cockpit ports are configurable and could use the default HTTP/S port, but this isn't the default configuration. In addition, you would have to choose which application gets the default port: SAP HANA cockpit or SAP HANA cockpit manager? Answer B is incorrect because SAP Host Agent is used by the resident HDBLCM for its web interface and previously also by SAP HANA cockpit 1.0 in offline mode but not by SAP HANA cockpit 2.0. Answer C is incorrect because the installation summary screen displays the URLs for how to connect to SAP HANA cockpit. However, if this hasn't been recorded, you can use the `xs apps` command on the command line or the SAP HANA XS Advanced cockpit to query the URL. A port scan reveals open TCP ports but doesn't inform you what ports are being used by SAP HANA cockpit.
5. Correct answers: **B, C, D**
With SAP HANA cockpit, you can register databases, create database groups, and add SAP HANA cockpit users. The SAP HANA cockpit manager also provides access to the XSA logs.
Answer A is incorrect because you can import and export databases but not users. Answer E is incorrect because users and databases are added to database groups, but you can't assign a user to a database group directly.
6. Correct answers: **A, B, C**
The documentation mentions the following roles:
- Cockpit administrator
 - Cockpit database administrator
 - Cockpit user administrator
 - Cockpit user
 - Cockpit power user
 - Cockpit configuration template administrator
 - Cockpit troubleshooting
- Although **Cockpit Roles** doesn't list the cockpit power user role, enabling a SAP HANA cockpit user to register databases makes this user a power user.
Answers D and E are incorrect because these roles aren't listed above and don't exist.

7. Correct answer: **D**

For the usage types production, development, and test, database groups are automatically generated, as illustrated earlier in Figure 6.30.

Answer A is incorrect because system database isn't a usage type, and system databases aren't automatically assigned to a database group. Answer B is incorrect because the database used by SAP HANA cockpit isn't a usage type, and they aren't automatically assigned to a database group. Answer C is incorrect because there is no QA usage type.

8. Correct answers: **B, D, E**

Aggregated health alerts are displayed for availability, performance, and capacity. Status and alerts are also considered aggregated health alerts.

Answers A and D are incorrect because used sessions and threads are only displayed on the **Database Overview**.

9. Correct answer: **D**

The tasks of registering databases, creating groups, and creating SAP HANA cockpit users don't have a set order. This makes answers A, B, and C incorrect.

10. Correct answers: **A, D**

We can't only assign users and databases to a group. You also can't directly assign a user to a database. This makes answers B and C incorrect.

11. Correct answers: **B, D**

Technical user accounts need to be created before you can register a database, and also technical user accounts should only be used by SAP HANA cockpit.

Answer A is incorrect because the technical user can be created while you register the database. In older SAP HANA cockpit releases, this user needed to be created manually. Answer C is incorrect because using `SYSTEM` as the technical user isn't recommended but can be used.

12. Correct answer: **B**

We can enable SSO to access SAP HANA cockpit using **SSO with Kerberos** settings in SAP HANA cockpit manager.

13. Correct answer: **C**

The database administrator role is required to assign SAP HANA cockpit users to database groups (refer to Figure 6.28).

Answer A is incorrect because the cockpit administrator role only provides access to the **Settings** menu. Answer B is incorrect because the SAP HANA cockpit user administrator role only allows creating and managing SAP HANA cockpit users. Answer D is incorrect because a SAP HANA cockpit power user has access to the **Registered Database** menu of the SAP HANA cockpit manager and can add (register) databases.

14. Correct answers: **A, C**

We need, at a minimum, two accounts to access a registered database: a SAP HANA cockpit user and a database (administration) account.

Answer B is incorrect because a separate SAP HANA cockpit technical user is recommended, but existing database accounts can be used. Answer D is incorrect because the database administration operating system account `<sid>adm` is required to start and stop the system and some other actions (e.g., restoring a database) but not to access an app in SAP HANA cockpit.

15. Correct answers: **B, C, D**

The components include SAP HANA database explorer, SAP HANA XSA runtime, and SAP HANA, express edition.

Answer B is incorrect because the SAP HANA cockpit installation doesn't include the SAP Web IDE for SAP HANA application, although SAP HANA database explorer with SQL console and Catalog Browse with trace file access is included.

Takeaway

You should now have a good overview of SAP HANA cockpit from the point of view of the flight engineer. You know the hardware requirements, deployment options, where to download the software, how to extract, and how to perform installation and updates.

You know how to access SAP HANA cockpit and the SAP HANA cockpit manager: URL and user name/password. You also know which application to use for tasks such as creating database groups or monitoring individual tenant databases.

You're familiar with databases groups and SAP HANA cockpit users and how these are related. You know where to look if your administrator calls you because he can't access a system.

Although beyond the scope of the exam, we also provided a brief description of some of the predecessors of SAP HANA cockpit. The present is often better understood when you know a bit about the past.

Finally, we also listed where you can find more information about particular topics. Again, this will be beyond the scope of the exam.

Summary

In this chapter, we introduced SAP HANA cockpit and described its architecture and deployment options. We looked at how you can install and update SAP HANA cockpit. The revision and maintenance strategy was discussed as this is different from the SAP HANA platform. You learned how to provision SAP HANA cockpit by

registering databases, creating technical users, creating database groups, and adding users. We also looked at how you navigate from SAP HANA cockpit manager to SAP HANA cockpit and back, as well as the **Database Directory** and **Database Overview** pages.

In the next chapter, we discuss database administration tasks.

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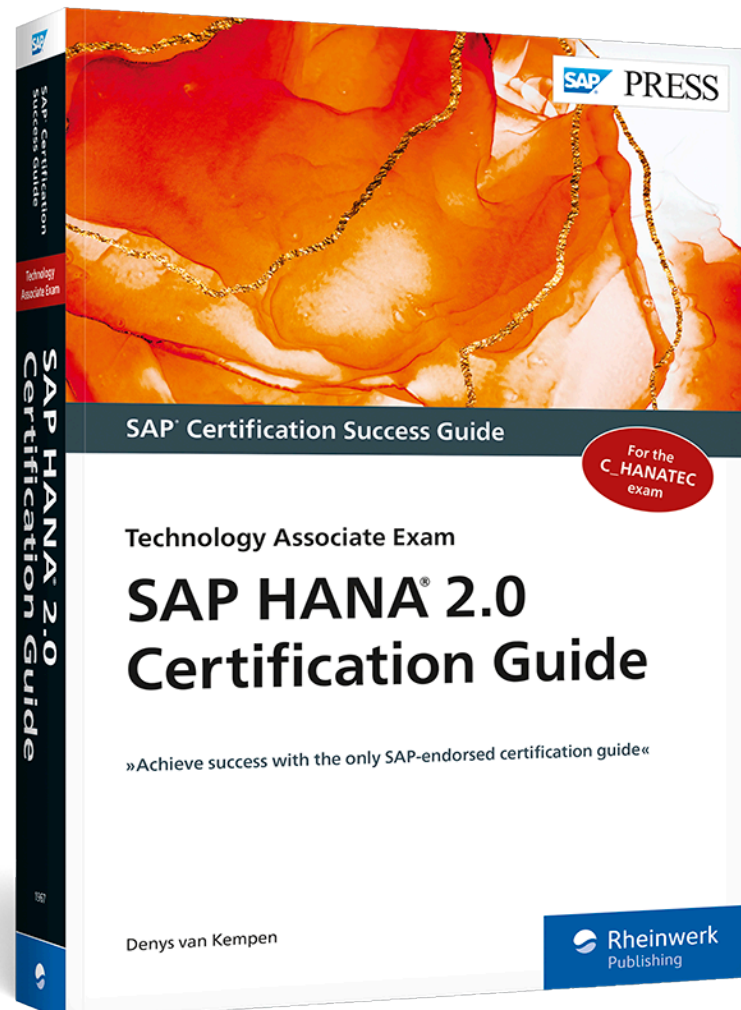
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