



Getting Started with SAP NetWeaver AS ABAP incl. SAP Business Warehouse 7.4 SP5 on SAP HANA 1.0 SP7 [Developer Edition]

Provided as Virtual Appliance by the SAP Cloud Appliance Library

Version 1.2

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Typographic Conventions

Type Style	Description
<i>Example Text</i>	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Cross-references to other documentation
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
Example text	File and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example text	User entry texts. These are words or characters that you enter in the system exactly as they appear in the documentation.
<Example text>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
EXAMPLE TEXT	Keys on the keyboard, for example, F2 or ENTER.

Icons

Icon	Description
	Caution
	Important
	Note
	Recommendation or Tip
	Example

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1. Overview

This guide provides information on first steps for using instances created from the “SAP NetWeaver Application Server ABAP 7.4 SP05 incl. Business Warehouse on SAP HANA SP07 [Developer Edition]” solution.

2. Solution Information

This solution comprises a backend image and a frontend image which can be instantiated using the *Create Instance* command:

You can find the installation media on which this solution is based on SAP Service Marketplace in the Software Download Center: <https://service.sap.com/swdc>

Backend [SUSE Linux Enterprise Server 11, patch level 2]

[Main Component]: SAP High Performance Analytic Appliance 1.0

[Stack-no. of Main Component]: 1.00.70

[Main Component]: SAP NetWeaver Application Server ABAP 7.4

[Stack-no. of Main Component]: 7.40 SP05

Frontend [Microsoft Windows Server 2008 R2, AWS AMI]

[Main Component]: SAP JVM 7

[Stack-no. of Main Component]: 7.1.013

[Main Component]: SAP GUI for Windows 7.30

[Stack-no. of Main Component]: 7.30 patch level 07

[including Component]: BI 7.0 Add-on for SAP GUI 7.30

[Main Component]: SAP HANA Studio 1.0

[Stack-no. of Main Component]: 1.00.70

[including Component]: ABAP Development Tools 2.19.2

[including Component]: BW Modeling Tools 1.0.4

[including Component]: SAPUI5 Tools 1.16.6

[Main Component]: SAP HANA Client 1.0

[Stack-no. of Main Component]: 1.00.70

3. Using the SAP Cloud Appliance Library

Prerequisite for using the SAP Cloud Appliance Library is a valid Amazon Web Services (AWS) account providing the cloud computing services to run your virtual appliances. If you already have an active AWS account you can directly proceed with the next section. Otherwise, navigate the AWS home page and sign up: <https://aws.amazon.com/>

3.1 Retrieving Your AWS Credentials

You will need an AWS user with appropriate permissions for configuring your cloud service provider account in the SAP Cloud Appliance Library. The credentials of this AWS user will be used by the SAP Cloud Appliance Library to establish the communication to your cloud service provider:

1. Log on to your AWS account and navigate to the IAM section:
<https://console.aws.amazon.com/iam/home>
2. Click on *Users* and hit the *Create New User* button.
3. Enter a user name, ensure that the *Generate Access Key* option is activated, and hit the *Create* button.
4. **Important:** Download and store the credentials (access key, secret key) in a safe place.
5. Click on *Groups* and hit the *Create New Group* button.
6. Enter a group name and hit the *Next Step* button.
7. In the *Select Policy Template* step select the *Administrator Access* policy and hit the *Next Step* button.
8. Finally, hit the *Create Group* button.
9. Click on your new group and hit the *Add Users to Group* button.
10. Select your new SAP CAL user and hit the *Add Users* button.

Now you are done with the initial configuration of your AWS account and can continue with setting up your SAP Cloud Appliance Library account.

3.2 Using SAP Cloud Appliance Library

Enter your CAL account using the link to the test drive center of the SAP Cloud Appliance Library:

https://caltdc.netweaver.ondemand.com/console/tenant_<tenant_name>

The next steps show how to configure your solution in SAP Cloud Appliance Library:

1. Create an account in SAP Cloud Appliance Library using your AWS user credentials described above.
2. As the user who has created the account, you become an account owner and can assign other users to your account (optional).
3. Browse for your solution (“SAP NetWeaver Application Server for ABAP 7.4 SP05 on SAP HANA SP 07 [Developer Edition]”) in the *Solutions* tab page and activate it.
4. Select the activated solution and hit the *Create instance* button to start the wizard.
5. In the wizard you can choose between two important deployment options:
 - a) **Public:** If you choose this option, we strongly recommend to **uncheck** (not check) the *Open all TCP ports* option in one of the following steps. This creates a default security group for your solution instance acting like a firewall. Thus, only port 22 (SSH) and port 3389 (RDP) are accessible from outside.
 - b) **Corporate Network:** This is the right option for creating your instances in the subnet of a [virtual private cloud](#) (VPC). In a secure VPC environment you could also open additional ports by adding additional *Access Points* to the default entries.

Internally, meaning for the communication between frontend and backend instances, all ports are open (valid for both options).

 Please be aware that creating your instances in the public zone of your cloud computing platform is convenient but less secure. Thus, please ensure to open only port 22 (SSH) and port 3389 (RDP) of the default security group. In addition, we also recommend to limit the access to your instances by defining a specific IP range in the *Access Points* settings using [CIDR notation](#). The more complex but secure alternative is to set up a virtual private cloud (VPC) with VPN access, which is described in [this tutorial on SCN](#).

The list below describes the open ports of the default security group, if you don't check the *Open all TCP ports* option (recommended setting):

Protocol	Port	Description
SSH	22	Used for SSH connection to the backend server
RDP	3389	Used for RDP connection to the frontend server

 For more information about these three steps, see the official documentation of SAP Cloud Appliance Library (choose *Related Links & Help* → *Documentation* and choose  (expand all) button to see all documents in the structure). You can also use the context help in SAP Cloud Appliance Library by choosing the *Help* panel from the right side.

The creation of the solution instance including starting the database and the ABAP system takes initially about 40 minutes. **Please be patient and don't interrupt the initial deployment phase.**

3.3 Working with Solution Instances

You can find the solution instances you created on the *Instances* tab page of the SAP Cloud Appliance Library. For more information, see the *Working with Solution Instances* document from the official documentation of SAP Cloud Appliance Library (choose *Related Links & Help* → *Documentation* and choose  (expand all) button to see all documents in the structure). You can also use the context help in SAP Cloud Appliance Library by choosing the *Help* panel from the right side.

 If you decided to go with the option “Activate or suspend manually” during instance creation please make sure to suspend the instance manually when you don't work with the instance to avoid unnecessary costs. We also strongly recommend to [set up a billing alert for your AWS charges](#).

4. Connecting to Your Frontend Instance

4.1 Remote Desktop Client

For connecting to your frontend instance you need an RDP client for your local operating system:
Microsoft Windows: Start the *Remote Desktop Connection* using the Start Menu (All Programs > Accessories) or executing `mstsc.exe`.

Apple Mac OS X: Use the free [Microsoft Remote Desktop](#) app available in the Mac App Store to connect to your frontend.

Linux: You can use open source RDP clients like [rdesktop](#) or [FreeRDP](#).

4.2 Connecting with RDP

You can find the `<IP Address>` of your frontend instance by clicking on the instance name in your SAP Cloud Appliance Library account. Take the IP of the frontend instance and use the OS user “Administrator” with your master password to log in with your remote desktop client.

4.3 Using SAP GUI for Windows

SAP GUI for Windows is already installed on your frontend instance with a pre-configured system connection for SAP Logon. If you want to create an additional entry, proceed with the following steps:

1. Start the SAP Logon.
2. Choose new entry → User defined.
3. In the *System* wizard, specify the following parameters:

Parameter ID	Parameter Value	Note
Application Server	<code>abapci</code>	The IP address of the instance from SAP Cloud Appliance Library
Instance Number	00	ABAP instance number used by the

		appliance.
System-ID	A4H	ABAP system id used by the appliance.
User Name	Client 000: SAP*, DDIC Client 001: SAP*, DDIC, DEVELOPER, BWDEVELOPER	Default users
Password	<Master Password>  It is recommended that you change the password for all three users directly after creation of the instance!	The password of <i>SAP</i> , <i>DDIC</i> and <i>DEVELOPER</i> users are the same.

 For out-of-the-box ABAP development and the pre-configured demo applications we recommend to use the user DEVELOPER in client 001. For the pre-configured BW demo scenarios and BW development we recommend to use the user BWDEVELOPER in client 001.

4.4 Using SAP HANA Studio

The pre-installed SAP HANA Studio on your frontend instance also contains the ABAP Development Tools, the SAPUI5 Tools, and the BW Modeling Tools. In the *Systems* view of the *HANA Development* perspective you find a pre-configured connection to your HANA system, using the following parameters:

Parameter ID	Parameter Value	Note
Hostname	<i>hanadb</i>	The IP address of the instance from the SAP Cloud Appliance Library
Instance Number	02	HANA instance number used for the appliance.
User Name	SYSTEM	For the connection to the DB use <i>SYSTEM</i> user.
Password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.

The system ID of the database is HDB. It is recognized automatically via the host name.

Moreover, in the *ABAP* and the *BW Modeling* perspective you find pre-configured ABAP development and BW modeling projects with the following parameters:

A4H_001_developer_en: SID A4H, client 001, user: developer/ master password

A4H_001_bwdeveloper_en: SID A4H, client 001, user: bwdeveloper/master password

For detailed information about these SAP development tools for Eclipse, we recommend to use the documentation available within Eclipse by opening the *Help* menu > *Help Contents* or consult the standard documentation available at <http://help.sap.com/>.

5. Connecting to Your Backend Instance

5.1 Connecting to Your Backend on OS Level

In case you want to access your backend instance on OS level (not recommended unless you know what you are doing), you need an SSH client for your local environment, e.g. [PuTTY for Windows](#).

The following steps describe how to connect to your backend instance using PuTTY, but are similar for alternative SSH clients:

1. Click on the instance name in your CAL account, to retrieve the IP of your backend instance and download the instance key pair (maybe you already downloaded the key pair during instance creation).
2. Extract the private key of the key pair by using a tool like puttygen.exe.
3. Open PuTTY and enter the IP of your backend instance.
4. Navigate to the SSH > Auth node and enter your private key file.
5. Navigate to the Connection > Data node and enter *root* as auto-login username.
6. Save these session settings and hit the *Open* button.

Now you can log in to your backend instance on OS level (SLES) for monitoring, troubleshooting, or accessing files on the server.

The following tables list all important users on OS level:

Parameter ID	Parameter Value	Note
OS User Name	root	The default OS Administrator user for Linux SUSE.
OS Password	<none>	Use the private key (downloaded during the activation of the instance in SAP Cloud Appliance Library) for login with the root user.

The administration users for HANA and ABAP on operating system level are defined as follows:

Parameter ID	Parameter Value	Note
HANA administrator name	hdbadm	Additional user for HANA lifecycle management – start/stop, administration, functions, recovery
HANA administrator password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.
ABAP administrator name	a4hadm	Additional user for ABAP lifecycle management – start/stop, administration, functions, recovery
ABAP administrator password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.

Additional users on operating system level are:

Parameter ID	Parameter Value	Note
SAP System Administrator	sapadm	
SAP System Administrator password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.
SAP System Administrator	daaadm	
SAP System Administrator password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.

5.2 Manually starting and stopping the system

The system (ABAP server and database) is automatically started when you activate an instance in CAL. The system (ABAP server and database) is automatically stopped, when you suspend the instance in CAL. There might be nevertheless situations where you want to start or stop the ABAP server or the database manually. The next sections describe how to do this.

5.2.1 ABAP System

To check the status of the ABAP system logon as root on operating system level and execute:

```
su - a4hadm
sapcontrol -nr 00 -function GetProcessList
```

For stopping the ABAP system logon as root on operating system level and execute:

```
su - a4hadm
stopsap r3
exit
```

For starting the ABAP system logon as root on operating system level and execute (database must run):

```
su - a4hadm
startsap r3
exit
```

5.2.2 SAP HANA Database

To check the status of the database logon as root on operating system level and execute:

```
su - hdbadm
sapcontrol -nr 02 -function GetProcessList
```

For stopping the database logon as root on operating system level and execute (make sure the ABAP system has been stopped before):

```
su - hdbadm
HDB stop
exit
```

For starting the database logon as root on operating system level and execute:

```
su - hdbadm
HDB start
exit
```

5.3 Transport of Copies

The system has been set up in a way that allows you to import and export ABAP objects as transport of copies. This section describes an export/import scenario.

5.3.1 Export

To export objects with a transport of copies you have to execute the following procedure:

1. In transaction SE01 choose *Create* (F6).
2. Mark *Transport of Copies* and choose *Enter*.
3. Enter a description.
4. As transport target enter **DMY** and choose *Save*.
5. Add the objects you need into the request. You may enter them either directly or via the menu *Request/Task* → *Object List* → *Include Objects...*
6. Release the request.

7. You will find your transport files in the directories:
 - a. /usr/sap/trans/data
 - b. /usr/sap/trans/cofiles
 - c. For the file transfer you can use sFTP/SCP clients like WinSCP with user *root* and the private key file of your backend instance (see [Connecting to Your Backend on OS Level](#)) or you can directly import the existing PuTTY connection profile.

5.3.2 Import

To import transports into the system you have to execute the following procedure:

1. Copy your transport files to:
 - a. /usr/sap/trans/data
 - b. /usr/sap/trans/cofiles
 - c. For the file transfer you can use ftp or FTP client tools like WinSCP (see above).
2. Ensure that user *a4hadm* has sufficient rights for accessing your transport files (e.g. use the *chown a4hadm:sapsys <file>* command), otherwise the import will fail.
3. In transaction *STMS* open the *Import Overview* (F5) and double click on *A4H*.
4. In the menu select *Extras* → *Other Requests* → *Add*.
5. Use the F4 help to select your transport request.
6. Choose *Enter* and answer the question if you want to attach the request to the A4H import queue with yes.
7. Mark the request in the import queue and select *Ctrl+F11* (Import Request).
8. In the popup select for Execution “Synchronous” (for smaller request) and mark all import options.
9. Choose *Enter* and *Yes* to import your request.

6. Technical Licenses

6.1 Installation of the SAP NetWeaver License

The SAP NetWeaver Application Server ABAP comes with a temporary license that allows you to logon to the system.

As a first step before using the system you need to install a 90 days Minisap license as follows:

1. Logon to AS ABAP via SAP GUI with user *SAP** in tenant 000.
2. Start transaction *SLICENSE*
3. Get a “Minisap” license at <http://www.sap.com/minisap> .
As system ID choose *A4H - SAP NetWeaver 7.4 AS ABAP (Linux / SAP HANA)*.
As hardware key use the hardware key shown in transaction *SLICENSE*.
4. Choose *Install new License* and select the downloaded license from step 3.
5. After license installation call transaction *SECSTORE* and run a check for all entries using F8.
This is needed to enable RFC after the change of the installation number from *INITIAL* to *DEMOSYSTEM*.

Installing the Minisap license will change the installation number from *INITIAL* to *DEMOSYSTEM*. The developer access key for user *DEVELOPER* and installation number *DEMOSYSTEM* is already in the system and you can start developing in the customer name range (*Z**, *Y**).

6.2 Installation of the SAP HANA License

The SAP HANA database comes with a temporary license. Please install a 90 days Minisap license as follows:

1. Start the installed SAP HANA Studio and open the HANA Development perspective.
2. From the *Systems* view right-click on your HDB (*SYSTEM*) connection.
3. Select *Properties*.

4. From the *Properties* dialog box, select the *License* tab.
5. Get a “Minisap” license at <http://www.sap.com/minisap> .
As system ID choose *HDB - SAP HANA Platform Edition (64GB)*.
As hardware key use the hardware key shown on the *License* tab.
6. Once you received the license key file, choose first *Delete License Key* and then *Install License Key*.



These technical licenses can be renewed as long as you adhere to the terms and conditions of the [developer license agreement](#) of the SAP Developer Center and the solution-specific terms and conditions.

7. Tutorials and Demo Scenario

To explore the different development options and sample applications available for this developer edition of Application Server ABAP 7.4 on SAP HANA you can consult or try out the following guides and tutorials with pre-configured scenarios:

- [ABAP for SAP HANA Reference Scenario](#)
- Business Warehouse Scenarios
 - [SAP BW Feature Content](#)
(more details can be found directly in the system in transaction RSFC)
 - [SAP Demo Scenario ITeLO Company](#)
- [SAP HANA Developer Guide](#)
- [SAP HANA Interactive Education \(SHINE\)](#)

More tutorials and guides are available on the [SAP Community Network](#) (SCN).

8. Security

8.1 System Parameter Summary

This section gives an overview of all relevant system parameters.

Parameter Description	Parameter Value	Note
Master Password	<i><Master Password></i>	You specify the master password during instance creation in the SAP Cloud Appliance Library.
Server domain	dummy.nodomain	If no specific domain has been maintained yet.
Private key	<i><Private Key File></i>	The private key file is provided during instance creation in the SAP Cloud Appliance Library. It is used for SSH access to the host.
Server IP Address	<i><IP Address></i>	The IP address of your instance from the SAP Cloud Appliance Library
Host names	abapci, hanadb	Predefined name of the host on which HANA and ABAP are

		running.
Root user / password	root / <i><Private Key File></i>	Default OS Administrator user for Linux SUSE.
HDB System ID	HDB	-
HDB Instance Number	02	-
DB User / Password	SYSTEM / <i><Master Password></i> SAPHANAABAP / <i><Master Password></i> DBACOCKPIT / <i><Master Password></i>	-
HDB Administrator OS level / Password	hdbadm / <i><Master Password></i>	-
ABAP System ID	A4H	-
ABAP Instance number	00	-
ABAP Client/ User / Password	000 / SAP* / <i><Master Password></i> 000 / DDIC / <i><Master Password></i> 001 / SAP* / <i><Master Password></i> 001 / DDIC / <i><Master Password></i> 001 / DEVELOPER / <i><Master Password></i> 001 / BWDEVELOPER / <i><Master Password></i>	-
ABAP Administrator OS level / Password	a4hadm / <i><Master Password></i>	-
SAP System Administrator	sapadm / <i><Master Password></i>	-
Diagnostic Agent User	daaadm / <i><Master Password></i>	-

8.2 Security Recommendations

This section provides an overview of the security-relevant information.

To mitigate the potential security risks (for example, OS users can obtain the password of the solution while the initial provisioning is in process) we recommend changing the password of the following users:

- **SYSTEM** – this is a DB user.
The procedure can be executed from SAP HANA Studio:
 1. Start the installed SAP HANA Studio.
 2. From the *Systems* view right click with the mouse on HANA instance SID (user SYSTEM).
 3. Select *SQL editor*.
 4. In the editor, enter the following string:
 - ALTER USER system PASSWORD *<new_password>*.
 5. Choose *Execute*.
 6. Switch on OS to a4hadm user and execute the following command:


```
"/usr/sap/A4H/hdbclient/hdbuserstore set default hanadb:30215
SYSTEM <new_password>"
```

7. Change password also in properties of the HDB system in the HANA Studio. From the *Systems* view right click with the mouse on HANA instance SID. Select Properties → Database User Logon and change the password.

- **SAPHANAABAP** – this is a DB user.

As the user is used for the ABAP server connection to the database you should stop the ABAP system during the password change procedure:

1. As the user is used for the ABAP server connection to the database you should stop the ABAP system during the password change procedure. On operating system level execute:

```
su - a4hadm
stopsap r3
exit
```

2. Start the installed SAP HANA Studio.
3. Open the *Systems* view and right click with the mouse in this view and then choose *Add System...*
4. In the *System* wizard, specify the following parameters:

Parameter ID	Parameter Value	Note
Hostname	<IP Address>	The IP address of the instance from the SAP Cloud Appliance Library
Instance Number	02	HANA instance number used for the appliance.
User Name	SAPHANAABAP	User used for ABAP DB connections
Password	<Master Password>	The password is the same as the master password provided during instance creation in the SAP Cloud Appliance Library.

5. From the *Navigator* view right click with the mouse on HANA instance SID (User SAPHANAABAP).
6. Select *SQL editor*.
7. In the editor, enter the following string:
 - ALTER USER SAPHANAABAP PASSWORD <new_password>.
8. Choose *Execute*.
9. Switch on OS to a4hadm user and execute the following command:


```
"/usr/sap/A4H/hdbclient/hdbuserstore set default hanadb:30215 SAPHANAABAP <new_password>"
```
10. Change password also in Properties of the HDB system in the HANA Studio. From the *Navigator* view right click with the mouse on HANA instance SID. Select Properties → Database User Logon and change the password.
11. Restart the ABAP system: On operating system level execute:


```
su - a4hadm
startsap r3
exit
```

- **hdbadm** – this is an OS user.

To change the password you have to logon with the root user to the Linux OS and change the password of the *hdbadm* user. For more information, see [Connecting to Your Backend on OS Level](#).

In the Linux console you have to execute the following command: `passwd hdbadm` and then enter the new password.

- **a4hadm** – this is an OS user.

To change the password you have to logon with the root user to the Linux OS and change the password of the *a4hadm* user. For more information, see [Connecting to Your Backend on OS Level](#).

In the Linux console you have to execute the following command: `passwd a4hadm` and then enter the new password.

- **SAP***, **DDIC**, **DEVELOPER**, **BWDEVELOPER** – these are ABAP users.

The default password for all three users is the *<Master Password>* provided during the instance creation via CAL. To change the password insert user and password in the SAP GUI login screen and press the button *new password*.

9. Additional Information

9.1 Frontend Settings

9.1.1 Windows Proxy Settings

If you want to access the internet from your frontend instance, which is not required for working with this solution but allows you to update your frontend tools, please proceed as follows:

- a) If you created your instance in the **public** AWS cloud environment, no additional proxy settings should be required to access the internet.
- b) If you created your instance in a **private/corporate subnet** of a virtual private cloud (VPC), you have to enter the address of your proxy server or the internet gateway in the Windows internet settings: Open Internet Explorer > Internet options and add a proxy exception for *hanadb*, *abapci*, **.dummy.nodomain* (default dummy domain) or the fully qualified host names. SAP HANA Studio will automatically update its proxy settings according to the Windows internet settings if you don't change the default proxy settings in Eclipse (*Active Provider: Native*).

9.1.2 Enhanced Security Configuration

On the Windows Server image the enhanced security configuration (ESC) of Internet Explorer is activated by default (recommended by Microsoft). This makes working with Web UIs and external sites like SCN inconvenient and forces you to deal with several security pop-ups and notifications. Thus, you can deactivate IE ESC with the following procedure (at your own risk):

1. In the Start menu navigate to All Programs > Administrative Tools > Server Manager.
2. In the *Server Manager* root node click on *Configure IE ESC* in the Security Information section.
3. Deactivate the *IE ESC* for administrators.

9.2 Using Local Client Software

If you want to access SAP HANA or the ABAP application server of your backend instance from your local client (not via the associated frontend instance), we recommend the following procedure for a local Windows environment (other operating systems require different SAP clients):

9.2.1 Downloading the SAP client software

1. Before connecting to the frontend instance using the *Remote Desktop Connection*, open the *Options* dialog and navigate to the *Local Resources* tab.
2. Hit the more button in the *Local devices and resources* section and activate one of your local drives.
3. After logging into your frontend instance you can use *Windows Explorer* to exchange files between your local machine and your frontend instance.
4. The SAP software is located on the D: drive of your Windows instance:
 - Copy the *hdbstudio70* folder to your local environment and adapt the JVM location in the *hdbstudio.ini* file to the location of your local JVM.

- Copy the SAPGUI-BI-Core.exe file to your local environment and start the installation of SAP GUI for Windows (take a look at the SAP GUI documentation for prerequisites).

9.2.2 Accessing your Backend Instance locally

Before you can use your local SAP client software you have to ensure, that your backend instance is accessible locally and all required TCP ports are open.

 We strongly recommend not to use a public instance for this setup, but instances running in a virtual private cloud (VPC) with a VPN connection to your local network. For more information, how to create instances in a VPC please revisit the [Using SAP Cloud Appliance Library](#) section.

If your instances are running in a VPC with VPN connection to your local network, you could open all ports by checking the *Open all TCP ports* option in the *Access Points* setting (Virtual Machine tab of your CAL instance). If you only want to expose the required ports (recommended approach), the list below shows all required TCP ports:

Protocol	Port	Description
SSH	22	Used for SSH connection to the server
Custom TCP	3200	SAP Dispatcher, used by SAP GUI
Custom TCP	3300	SAP Gateway. Used for CPIC and RFC communication.
Custom TCP	3601	Message Server
HTTP	8002	HTTP (HANA XS)
Custom TCP	30215	External SQL Interface. Used by SAP HANA Studio.
HTTP	50000	HTTP (AS ABAP)
HTTPS	50001	HTTPS (AS ABAP)
Custom TCP	50213	Instance agent. SAP Start administrative channel for low-level access to the SAP HANA instance to allow features such as starting or stopping of the SAP HANA database.
Custom TCP	50214	Instance agent (SSL).

After following the steps above you should be able to access your cloud instances from your local environment and use the locally installed client software.

 Please keep in mind that in case of latency or bandwidth issues a remote desktop connection to your frontend instance might be the better choice.

9.3 Additional Information for Business Warehouse

Due to technical reasons we had to switch of the manual master data maintenance for info objects larger than 60 characters. This limitation will go away in a later delivery.

In addition to the BW scenarios mentioned above we also have implemented scenarios for tutorials using the BI Server (former BOE).

We have now included several BI tools on our frontend instance (see section [Solution Information](#)). Due to license restrictions of Microsoft Office the use of BEX Analyzer is not possible.

10. Troubleshooting

- **Symptom: You cannot connect to your frontend instance via Remote Desktop Connection.**
Please ensure that your local network permits outbound RDP connections on port 3389 (TCP/UDP), i.e. your firewall/router doesn't block these connections.
- **Symptom: You cannot connect to your backend instance via SSH.**
Please ensure that your local network permits outbound SSH connections on port 22, i.e. your firewall/router doesn't block these connections.
- **Symptom: You cannot select the *Corporate Network* option when creating a new solution instance.**
The AWS subnet you want to use might be located in the wrong region. Please ensure to create a subnet in the Amazon region US-East (Virginia).
- **Symptom: You can't connect to your backend instance using your local SAP GUI.**
 - Check, if the ABAP server is running:
Logon as `root` to the server on which the database is running (see [Connecting to Your Backend on OS Level](#)). Then execute the following statements to check the status of the ABAP server:

```
su - a4hadm
sapcontrol -nr 00 -function GetProcessList
```
 - Check if all required TCP ports are open and accessible from your local network:
Please refer to section [Accessing your Backend Instance locally](#) for more information.

For more information about how to use the SAP Cloud Appliance Library, you can read the official documentation of the product by choosing the following navigation from SAP Cloud Appliance Library: *Related Links & Help* → *Documentation*. If you cannot find the needed information in the documentation, you can open a normal support ticket within the SAP Cloud Appliance Library (BC-VCM-CAL) component and your ticket will be processed by the SAP Cloud Appliance Library Operators. If you have AWS related problems, you can report them directly to AWS support or alternatively on the BC-OP-LNX-AWS component in SAP Service Marketplace.