Applicable Releases:

SAP BW/4HANA 1.0 SP08
SAP BW/4HANA 2.0 SP00
and higher

The Document is not intended to be exhaustive, as additional functionality might be added on purpose.

SAP BW/4HANA is a new SAP product that replaces SAP Business Warehouse in a logical way. BW/4HANA runs only on HANA platform, and will be the foundation for a new lineage of data warehousing solutions from SAP.

Furthermore, it optimizes and simplifies a customer’s BW environment and experience (like S/4HANA). BW/4 HANA (DW4CORE) is a new code-line on which all future BW enhancements will take place. Classic BW goes into maintenance mode.

This SAP First Guidance Document put’ s is emphasize to the complete functional scope (CFS) to ensure the full functionality right from the start of the Implementation of SAP BW/4HANA 1.0 SP08 and 2.0 SP00 and higher also in the Microsoft Azure Cloud.

For more information, contact roland.kramer@sap.com
SAP First Guidance – SAP BW/4HANA in Microsoft Azure Cloud

Version 1.21
April 2019
## Document History

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## Typographic Conventions

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## Icons

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1. Introduction

SAP BW/4HANA is a data warehouse solution which is highly optimized for the SAP HANA platform. It offers a managed approach to data warehousing. This means that prefabricated templates (building blocks) are offered for building a data warehouse in a standardized way. The use case illustrates how you can use your SAP BW/4HANA implementation. The main use case of SAP BW/4HANA is Data Warehousing.

SAP BW/4HANA provides you with a simplified Data Warehouse, with agile and flexible data modeling, SAP HANA-optimized processes and state of the art user interfaces. The core functionality of SAP BW is preserved. In SAP BW/4HANA, objects for data modeling, as well as processes and user interfaces, are especially primed for use with a SAP HANA database. Data modeling is restricted to the small number of objects that are well suited for modeling the layer architecture of a data warehouse on SAP HANA (LSA++). In SAP BW/4HANA, data warehouse models can be flexibly combined with SAP HANA views. An intuitive Eclipse-based modeling environment supports object modeling here.

To get a functional overview you can also refer to the latest Feature Presentation of SAP BW/4HANA SP04 - Features BW/4HANA SP04 – Features BW/4 SP08 (FP01) – Roadmap BW/4 2.0 new

Furthermore, as the Implementation of BW/4HANA not differs from the On-Premise Implementation, the existing SAP First Guidance Document will be used here as well.

And the BW/4HANA overview - technical presentation about SAP BW/4HANA

Feature Scope Description - SAP BW/4HANA
https://help.sap.com/viewer/0cd8f518d3144ff4a4aeced3a7e5c097a/1.0.12/en-US/ce9d46c518884eecaacb68f50d55cabf.html

https://help.sap.com/viewer/0cd8f518d3144ff4a4aeced3a7e5c097a/2.0.1/en-US/ce9d46c518884eecaacb68f50d55cabf.html

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2. The Microsoft Azure Cloud

The Azure Cloud provided by Microsoft can be used as well to implement SAP BW on HANA and SAP BW/4HANA Systems along with other SAP Products like S/4HANA.

Log on with a Web Browser (Google Chrome suggested) to – http://www.azure.com

Make yourself familiar with the possible options, e.g. Virtual Machines, etc.
Visit the Azure roadmap to see what’s new and what’s coming next.
Switch to the Azure Marketplace to discover more options to host SAP Applications
2.1 Create/Log on to the Azure Account
Either log on with the “Start free” option or “buy now” option to create your Azure Account

Create your free Azure account today

- Get $200 free credit
  Start free with $200 in credit, and keep going with free options.
- Try any Azure services
  Explore our cloud by trying out any combination of Azure services for 30 days.
- Pay nothing at the end
  We use your credit card information for identity verification, but you'll never be charged unless you choose to subscribe.

Start free

Or buy now >
Frequently asked questions >
Call sales 1-800-867-1389

How to buy Azure
Our most popular and flexible payment plan, the Pay-As-You-Go subscription offers:

- Pay only for what you use
  Scale up or down on the fly, with no minimums.
- Bill to credit card or invoice
  Enjoy competitive pricing and easy monthly billing.
- Cancel your account anytime
  You’re under no obligations and can cancel anytime.

Buy now

Or start a free account >
Once you created your Account, you can logon to the Azure Portal which will be the main entrance for all activities.

https://azure.microsoft.com/en-us/account/

Reference Architecture - Deploy SAP NetWeaver and SAP HANA on Azure
3. Create the Virtual Machine for SAP BW/4HANA

For all activities on the Azure Cloud with the Portal access there are detailed description to go forward. Even the whole usage is intuitive, it makes sense to consult the Help Pages if necessary. It also makes sense to create a “Jumpserver” first, which can be used to download all necessary Software from the SAP Marketplace first and to access the SAP BW/4HANA System in the Azure Cloud environment via SAP GUI and the SAP BW modelling tools (BW-MT).

A short overview of the BW/4HANA concepts can be found in the SAP First Guidance – complete functional scope (CFS) for SAP BW/4HANA.

3.1 Create the Jumpserver (Win64 based)

Use the Azure Portal and create a Windows 201x Datacenter Instance. If necessary, this VM can be used later also for other services, e.g. an own DNS service.

Microsoft Azure Step-by-Step Tutorial
https://docs.microsoft.com/en-us/azure/virtual-machines/windows/

The VM creation wizard guides you through the complete Process. If the entries are not matching or not following the Azure standard, a pop-up will apply like below:
Create virtual machine

1. Basics
   Configure basic settings
   - Name: BW4onAzure

2. Size
   Choose virtual machine size
   - VM disk type: SSD

3. Settings
   Configure optional features
   - Username: bw4onazure
   - Password: ************
   - Confirm password: ************

4. Summary
   Windows Server 2012 R2 Datacenter
   - Subscription: 
   - Resource group:
     - Create new
     - Use existing: BW4onAzure
   - Location: West Europe

Save money
Save up to 40% with a license you already own.

- Already have a Windows Server license?: Yes  No
A suitable size would be “DS5_V2 Standard”. The Disk(s) will be added in a later step.

You can proceed here with the default settings. These settings will be explained here –

Create a Windows virtual machine with the Azure portal
Allow the Azure Infrastructure to create the VM. You can see the progress in the Azure Portal.

Once your Windows VM is deployed you can check and modify the necessary details to access the machine from your local Network.
As there are many, many features to activate for the proper usage there are some essential settings which should be applied.
This is for example:
- Active the DNS name, Check/assign a Public IP Address
- Open/Modify access ports
- Add a disk (or several)
- Enable Backup
- etc.

To access the settings, you can use the “All resources” Tile in the left upper corner of the Portal.
3.1.1 DNS label/Public IP address

The Entry “Public IP address” allows you to define a public DNS name. The external Domain is pre-defined .westeurope.cloudapp.azure.com

Microsoft Azure Help
User-defined routes and IP forwarding
Public IP addresses
Create your first virtual network
Name resolution for VMs and cloud services
3.1.2 Network security group

The Entry "Network security group" allows you to define inbound/outbound port definitions for the access of the SAP Systems. By default, there is for example for Windows VM’s only the RDP port for the mstsc.exe defined.

Manage NSGs using the Azure portal

Depending on the needed services this list can be enhanced to your needs.

### 3.1.3 Attach a data disk

To store data on the Windows VM, at least one data disk must be attached. The default disks only carry the OS and a further disk allows only to store temporary data and will be erased and recreated as soon the VM will be restarted.
Microsoft Azure Help
Create and manage VM disks

Once the data disk is active, you must use the OS tools to activate the disk in the OS. Creating the data disk will not automatically attach the storage to the OS.

Click the start menu inside the VM and type `diskmgmt.msc` and hit Enter. This will start the Disk Management snap-in.

How to attach a managed data disk to a Windows VM in the Azure portal
3.1.4 Enable the Backup of the VM

Microsoft Azure Help

Backup virtual machines

3.1.5 Additional resources

How to connect and log on to an Azure virtual machine running Windows

Using SAP on Azure Virtual Machines (VMs)
3.2 Create the SAP BW/4HANA server (Linux64 based)

SAP NetWeaver on Azure Virtual Machines (VMs) – Planning and Implementation Guide  
Quickstart: Manual installation of single-instance SAP HANA on Azure VMs  
Deploy SAP S/4HANA or BW/4HANA on Azure  
Running SAP NetWeaver on Microsoft Azure SUSE Linux VMs  
SAP HANA (large instances) overview and architecture on Azure

These very detailed Blog explain the setup and implementation of BW/4HANA on Azure end-to-end. However, it is mandatory to consult the SAP First Guidance Document - SAP First Guidance – complete functional scope (CFS) for SAP BW/4HANA  
As the Implementation not differs for BW on or for HANA all concepts mentioned here can be considered https://blogs.sap.com/2012/05/22/sap-bw-installationconfiguration-also-on-hana/

3.2.1 How to attach a data disk to a Linux VM

How to Attach a Data Disk to a Linux Virtual Machine

Proceed as follows (details are mentioned on the Blog above):

```
Create a new (data) disk according to your VM OS from the Azure Portal.

1. Use the lsscsi command to find out the device id.
   saps4hsrv:~ # lsscsi (or fdisk -l)
```

5/14/2019
2. The last entry shows the recent added data disk

```
[5:0:0:0] disk Msft Virtual Disk 1.0 /dev/sdc
[5:0:0:1] disk Msft Virtual Disk 1.0 /dev/sdd
```

3. Format the data disk now

```
saps4hsrv:~ # fdisk /dev/sdd
```

Welcome to fdisk (util-linux 2.28).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.
Command (m for help): n

Example for 1TB disk

```
Example for 1TB disk
p 1 2048 2145386495 w q
```

4. Create the file system on the new partition (use ext3 for SLES 11, and ext4 for SLES 12)

```
saps4hsrv:~ # mkfs -t ext4 /dev/sdd1
```

5. Make a directory to mount the new file system, as follows

```
saps4hsrv:~ # mkdir /sapmnt
```

6. Finally, you can mount the drive, as follows:

```
saps4hsrv:~ # mount /dev/sdd1 /sapmnt
```

7. Add the new drive to /etc/fstab, therefore locate the UUID for the new drive. Use the `blkid` command to find out the device id.

```
saps4hsrv:~ # blkid
/dev/sdc1: UUID="a8c139da-cd7a-46f4-b94f-cd1abd2ac9de" TYPE="ext3"
PARTUUID="21c7d1c5-01"
/dev/sdd1: UUID="bd801813-e8a2-494b-892a-d788f4a6b1c3" TYPE="ext4"
PARTUUID="f0a2a5b4-01"
```

```
saps4hsrv:~ # vi /etc/fstab
/dev/disk/by-uuid/a8c139da-cd7a-46f4-b94f-cd1abd2ac9de /s4hdata ext4 defaults,nofail 1 2
/dev/disk/by-uuid/bd801813-e8a2-494b-892a-d788f4a6b1c3 /sapmnt ext4 defaults,nofail 1 2
```

```
saps4hsrv:~ # df -h
/dev/sdc1 1007G 875G  82G 92% /s4hdata
/dev/sdd1 1007G  88G 869G 10% /sapmnt
```

8. The new data disk is now attached to the existing VM
The online tool yast2 allows you to do the mentioned procedure in a graphical way all at once.

However, you must check manually the correct entries in the file `/etc/fstab`.
4. using the CAL Version of BW/4HANA

In the meantime, the initial Version of the BW/4HANA CAL (cloud application library) was updated to a more recent software stack.

Log on to the site https://cal.sap.com and select “SAP BW/4HANA SP03 ...”

Read and accept the Terms and Conditions ...

⚠️ The trial period for this solution will begin on the date you accept this Agreement.

Follow the procedure on the screen. Please note that there will a little fee purchased while using the Trial Version of BW/4HANA.
You can combine an existing Azure Account with the Trial Version of SAP BW/HANA
Supported VM Sizes

Please be aware that the selected solution "SAP BW/4HANA SP03 including BW/4HANA Content SP01 XT" is only fully supported on certified platforms which is not the case for the VM size D13_v2 of the Microsoft Azure cloud provider.

Although the selected solution has been tested on this platform, support remains limited to community support even if an SAP Cloud Appliance Library subscription package is in place.

⚠️ Warning

Wait until the solution instance is prepared to be used for the first time. This will take approximately 45 minutes. Please do not connect to the instance while it is being prepared.

Free Trial Restrictions

Note that according to the terms and conditions free trials must not be used for:

- Development, prototyping, proof of concepts, or sandbox environments
- Hosting a training course or a workshop with employees, partners, or customers
- Applying commercial license keys or uploading data for production use to the trial systems
- Demonstrations of software to prospective customers
- Benchmarking against competing third-party products

Once the Image is available, you can specify more details of the created Instance as follows.
4.1 Access the CAL BW/4 1.0 Image

Getting Started Guide_BW4HANASP03_Trial_Vanilla
4.1.1 Access the Azure Portal
Log on to the Azure Portal as described in Chapter of this Document

4.1.2 Access the OS level
In case you want to access your backend instance on OS level, e.g. start/stop the SAP HANA and the SAP BW/4 system manually, you need an SSH client for your local environment, e.g. PuTTY for Windows. For the graphical access, together with PuTTY, the MobaXterm package is suitable.

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

- 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).
- Extract the private key of the key pair by using a tool like puttygen.exe.
- Open PuTTY and enter the IP of your backend instance.
- Navigate to the SSH > Auth node and enter your private key file.
- Navigate to the Connection > Data node and enter root as auto-login username.
- 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 start/stop procedures are described in Chapter 5.2 of the Getting Started Guide
4.1.3 Access the SAP BW/4 system

Create the SAP Logon Details according the [Getting Started Guide](#) and the given Information of your Instance.

Additional Details for the access of the CAP Image in several ways is explained in the [Chapter 3.4](#)

<table>
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<th>Value</th>
<th>Description</th>
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<tr>
<td>SID</td>
<td>ABA</td>
<td>System ID of the SAP system</td>
</tr>
<tr>
<td>Cl Instance Number</td>
<td>00</td>
<td>The instance number of the central instance (Cl)</td>
</tr>
<tr>
<td>CS Instance Number</td>
<td>01</td>
<td>The instance number of the central services (CS) instance</td>
</tr>
<tr>
<td>Password</td>
<td>&lt;master password&gt;</td>
<td>The password set during instance creation.</td>
</tr>
<tr>
<td>Username</td>
<td>DDIC</td>
<td>These are the standard users which you can use to access the ABAP server.</td>
</tr>
<tr>
<td>Clients</td>
<td>000</td>
<td>000: Administration</td>
</tr>
</tbody>
</table>

After an Installation or a CAL based SAP system you will find two entries in the Instance Profile, which will prevent the procedure successfully to start the system. These settings are obsolete since SAP Kernel 7.40 and must be removed to continue the activation of the SAP Installation.

```
ipc/shm_psize_10 = 124000000
ipc/shm_psize_40 = 1668000000
```

You can use Putty (0.6x) with the MobaXterm Solution as well. For details, how to use it, visit the URL [http://mobaxterm.mobatek.net/features.html](http://mobaxterm.mobatek.net/features.html)

MobaXterm also includes a SFTP access which allows you to modify the Instance profiles if necessary. Due to the new SAP Kernel 7.40 changes, only the following Parameters are necessary:

```
PHYS_MEMSIZE = 30%
abap/buffersize = 400000
```
4.1.4 Further post activities on the CAL Image

If you want to improve the stability and the functionality scope of the CAL BW/4 Image, please consult the SAP First Guidance Document - SAP First Guidance – complete functional scope (CFS) for SAP BW/4HANA

The CAL Image need the same post activities like for a new installation not based on the CAL image to ensure a proper usage.

As the Implementation not differs for BW on or for HANA all concepts mentioned here can be considered [https://blogs.sap.com/2012/05/22/sap-bw-installationconfiguration-also-on-hana/](https://blogs.sap.com/2012/05/22/sap-bw-installationconfiguration-also-on-hana/)

4.1.5 Troubleshooting

The “classical” problem is the access to the SAP Instance via SAP GUI

10060: WSAETIMEDOUT: Connection timed out

You should consider the SAP CAL Wiki


In addition, you can test with the program “niping” the connection between the CAL image and your local frontend. Start the test as follows:

On the CAL Image OS ➔ niping -s -I 0
On the frontend PC ➔ niping -c -H <ip-address> -S 3200 -B 1024 -L 10 -D 3

If you get a timeout and your local firewall is blocking the SAP Ports like the dispatcher Port 32<nr>
In addition, you can also check the availability of the SAP System with the following OS command (logged on as `<sid>adm` on the OS):

```
sid-aba-hdb:abaadm 55> sapcontrol -nr 00 -function GetProcessList
```

Finally, please make sure that at least one network security rule (NSG) is defined on the CAL image.

The inbound rule for the sap dispatcher port is optional, depending on your scenario.
4.2 Access the BW/4 2.0 Image

Basically, you can follow the description from Chapter 4.1 and follows

4.2.1 Details of the CAL Image

https://cal.sap.com/console/tenant_NXDVO35VQX95#/solutions/8845c0f3-6e9c-4030-87bb-e4f8891567c5

Getting Started Guide


Blog


4.2.2 Apply the latest SW stack

Go the Maintenance Planner and update to the latest Components (also the latest 7.73 Kernel):

- BW/4 2.0 SP01
- SAP Application Server 7.53 SP02
- SAP UI 7.53 SP03
- BW/4 Content T/B initial delivery
- BPC 11.1 initial delivery
5. Access the SAP BW/4HANA server

To access the BW/4HANA server either via the Jump server which was created in Chapter 1.2.1 or if you modified the Network security groups directly from your Desktop. Depending on your Network and Firewall settings there is nothing else to do.

5.1 Access via SAP GUI 7.x

Simply add system with the public DNS and further settings for Instance Number and System ID in the SAP Logon Pad.
5.2 Access via the SAP HANA Studio

Connections for Tenant Databases
Communication Channels

The default port number range for tenant databases is \(3 \langle \text{instance} \rangle 40 - 3 \langle \text{instance} \rangle 99\). This means that the maximum number of tenant databases that can be created per instance is 20. However, you can increase this by reserving the port numbers of further instances. In the cockpit, a dialog will prompt you to do this, or you can configure the property \([\text{multidb}] \ reserved\_instance\_numbers\) in the \(\text{global.ini}\) file. The default value of this property is 0. If you change the value to 1, the port numbers of one further instance are available (for example, 30040 - 30199 if the first instance is 00). If you change it to 2, the port numbers of two further instances are available (for example, 30040 - 30299 if the first instance is 00). And so on.

Note 2101244 - FAQ: SAP HANA Multitenant Database Containers (MDC)
5.3 Access via the SAP BW-MT

Implement the BW-MT according the SAP First Guidance – Implementing BW-MT as the new SAP BW Modeling Experience if not already done.
New BW Project

System Connection

Associate the new project with an SAP system connection

Define a new system connection from scratch or select an existing SAP Logon entry from the list:

<table>
<thead>
<tr>
<th>Name</th>
<th>Group/Server</th>
<th>SID</th>
<th>Instance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4H - BW/4 in the Azure Cloud</td>
<td>westeurope.cloudapp.azure.com</td>
<td>B4H</td>
<td>03</td>
<td></td>
</tr>
<tr>
<td>B4H - BW/4HANA System</td>
<td>i.corp</td>
<td>B4H</td>
<td>03</td>
<td></td>
</tr>
</tbody>
</table>

New BW Project

Connection Settings

Secure Network Communication (SNC) is disabled. For security reasons, you should enable SNC.

Connection Parameters

System ID: * B4H
Connection Type: Custom Application Server
Message Server
Groups
Message Server Port
Application Server: * westeurope.cloudapp.azure.com
Instance Number: * 03
SAProuter String:

New BW Project

Logon to System

System IDs: B4H
Client: * 001
User: * KRAME1
Password: * ********
Language: * EN

New BW Project

SAP HANA System

Select SAP HANA system

Attach SAP HANA system
Configured SAP HANA Systems:
- [ ] H48 (SAPB4H)
- [ ] H48 (SYSTEM)
5.3.1 Access via OS level

To access the BW/4HANA server, you can use Putty (0.71) with the MobaXterm for Linux/UNIX based Installations. For details, how to use it, visit the URL http://mobaxterm.mobatek.net/features.html

MobaXterm allows the graphical access to the Linux VM and works together with Putty. Once the connection is created in Putty, you can import the settings into MobaXterm.

```
root@westerneurope:~$ sudo -su
SUSE Linux Enterprise Server 12 SP2 (x86_64) - Kernel \r \n\nWelcome to SUSE Linux Enterprise Server for SAP Applications 12 SP2 (x86_64) - Kernel \r \n\nroot@westerneurope:~$ sudo -su
Last failed login: Wed Jul 5 14:31:35 CEST 2017 from user@sh:~
There was 1 failed login attempt since the last successful login.
Last login: Wed Jul 5 14:31:35 2017 from 2
SUSE Linux Enterprise Server 12 SP2 for SAP Applications x86_64 (64-bit)

Please register this image using your existing SUSE entitlement.
As "root" (sudo or su -) use either one of the following commands:
- SUSEConnect --url=\https://soc.suse.com -e company@example.com -x YOUR_CODE
  - yast soc
to register the instance with SOC
Without registration this instance does not have access to updates and security fixes.
Have a lot of fun...
Even that MobaXterm includes also a FTP tool, WinSCP is more convenient for the usage. However, feel free to use the tools of your choice.
5.4 Access the XSa Infrastructure

Depending the way, you implemented the XSa Infrastructure you haven to open some additional Ports to allow the access of several applications like WebIDE, DWF, XSa Monitoring/Cockpit, etc.

**Note 2245631** - Routing Mode and Default Domain configuration for SAP HANA extended application services, advanced model

**Note 2711421** - Installing SAP HANA Extended Application Services, advanced model using the Xs Advanced installation media

<table>
<thead>
<tr>
<th>Port</th>
<th>Service</th>
<th>Start</th>
<th>End</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280</td>
<td>WebIDE.App.in</td>
<td>53075</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>1290</td>
<td>XSa.DWF.in</td>
<td>30130</td>
<td>30132</td>
<td>Any</td>
</tr>
<tr>
<td>1300</td>
<td>XSa.DWF.in</td>
<td>51077</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>1310</td>
<td>XSa.Dev.in</td>
<td>51022</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>1320</td>
<td>XSa.Execution.in</td>
<td>49951</td>
<td>Any</td>
<td></td>
</tr>
</tbody>
</table>

```
xs-admin-login
xs version ➔ shows additional application ports
h4badm@h4badsrv:/usr/sap/H4B/HDB01/trace> tail -f xscontroller.out
```
6. Further Settings and Connectivity

Now that you rudimental find your way around the Microsoft Azure Infrastructure there are additional settings and connectivity options which enables for example the access of the existing IT infrastructure inside your network or other IT topics.

6.1 Activate the Azure PowerShell

Even that you can configure almost everything in the Azure Portal for your Cloud based Infrastructure, some enhancement are available with the Azure PowerShell only.

The Azure PowerShell is an extension to the Windows PowerShell and provides a set of cmdlets that use the Azure Resource Manager model for managing your Azure resources.

Review the [Install] article to get Azure PowerShell up and running on your system. Then read the [Get Started] article to begin using it. For information about the latest release, see the [release notes].

The following samples can help you learn how to perform common scenarios with Azure PowerShell:

- [Linux Virtual Machines]
- [Windows Virtual Machines]

Log in with Azure PowerShell

![Administrator: Windows PowerShell ISE](image-url)
6.1.1 Useful Power Shell snippets

6.1.1.1 Logon via PowerShell

Login

Select-AzureRmSubscription -SubscriptionId <your-SID> -SubscriptionName <your-SIN>

6.1.1.2 Change internal IP address

With this snippet, you can change the internal IP address without deallocate the IP first. This is useful in case you used a wrong IP Range on Azure which would interfere with the on-premise IP Range in case of a VPN Tunnel usage.

$vnet = Get-AzureRmVirtualNetwork -Name <your-vnet> -ResourceGroupName <your-group>
subnet = Get-AzureRmVirtualNetworkSubnetConfig -Name FrontEnd -VirtualNetwork $vnet
$nic = Get-AzureRmNetworkInterface -Name <your-network-If> -ResourceGroupName <your-vnet>
$nic | Set-AzureRmNetworkInterfaceIpConfig -Name ipconfig1 -PrivateIpAddress 10.xxx.xxx.xxx -Subnet $subnet -Primary
$nic | Set-AzureRmNetworkInterface

6.1.1.3 Add the CustomScriptExtension

With this Extension it is possible to run Administration Scripts against a Windows Domain controller, as there are limitation in the usage of certain commands, e.g. Changing or extending the Lifetime of the Domain Controller Password, etc.

Go to the Details of your Virtual machine and select Extensions on the left side and use the +Add Button to add the CustomScriptExtension
Create a script with the ending *.ps1 and paste the necessary command into it.

- Get-AzureADUser / Set-AzureADUser

Select the script from your local frontend and press the OK Button. The script will now run against the VM.

Azure Help - How to reset the Remote Desktop service or its login password in a Windows VM
6.2 Additional connectivity for the Cloud

6.2.1 Activate a customer DNS service

The first step to make your on-premise server and applications are visible for the Azure Cloud environment beside the Network security groups, is to activate an own DNS service. For this service the existing Jumpserver based on Win64 can be used. Of course, you can also choose another VM for that service.

Microsoft Azure Help
Name Resolution for VMs and Role Instances
Name resolution using your own DNS server
Logon to the Jumpserver and use the Server Manager Application to add the DNS server role.

After the DNS service is activated, you can configure the DNS application accordantly.
- Create Forward Lookup Zones
- Within the Zones create Hosts (A or AAAA)
6.2.2 Configure a Site-to-Site connection

The Site-to-Site connection is necessary to allow the communication between the on-premise systems and the Cloud hosted servers.

Microsoft Azure Help
Create a Site-to-Site connection in the Azure portal

As this is a complex process there are several components to touch and some of them are already configured during the process of the creation of the VM’s.
Check with your Network Security Team first to plan the VPN Gateway properly.

Microsoft Azure Help
- Before you begin
- Planning and design for VPN Gateway
- About VPN devices and IPsec/IKE parameters for Site-to-Site VPN Gateway connections

6.2.2.1 Create a virtual network

Microsoft Azure Help
- Extend your datacenter
- Build distributed applications
- Remotely debug your applications
6.2.2.2 Specify a DNS server
6.2.2.3 Create the gateway subnet

6.2.2.4 Create the VPN gateway
Microsoft Azure Help

Create your first virtual network

6.2.2.5 Create the local network gateway
A local network gateway represents the hardware or software VPN device in your local network. Use this with a connection to set up a site-to-site VPN connection between an Azure virtual network and your local network.

There are no additional charges for creating local network gateways in Microsoft Azure.
6.2.2.6 Configure your VPN device
Microsoft Azure Help
Validated VPN devices and device configuration guides

6.2.2.7 Create the VPN connection
Microsoft Azure Help
Create a VNet with a Site-to-Site VPN connection using PowerShell
6.2.2.8 Verify the VPN connection

In the Azure portal, you can view the connection status of a Resource Manager VPN Gateway by navigating to the connection. The following steps show one way to navigate to your connection and verify.

1. In the Azure portal, click All resources and navigate to your virtual network gateway.
2. On the blade for your virtual network gateway, click Connections. You can see the status of each connection.
3. Click the name of the connection that you want to verify to open Essentials. In Essentials, you can view more information about your connection. The Status is 'Succeeded' and 'Connected' when you have made a successful connection.

To connect to a virtual machine

You can connect to a VM that is deployed to your VNet by creating a Remote Desktop Connection to your VM. The best way to initially verify that you can connect to your VM is to connect by using its private IP address, rather than computer name. That way, you are testing to see if you can connect, not whether name resolution is configured properly.

Microsoft Azure Help
How to configure BGP on Azure VPN Gateways using PowerShell
6.2.3 Connect the SAP system to sapservX

To enable the automatic download of SAP Notes via tx. SNOTE, the SAP system located in the Azure Cloud needs access to the sapservX service.

![SAP system connection diagram]

There is no need to maintain a SAP Router service on the Azure Cloud, a designated Firewall rule with your local Network is necessary.

- Note 33135 - Guide for OSS1
- Note 797001 - SAP Notes - Unable to download an SAP Note with SNOTE
- Note 1178624 - No service connection: "Partner not reached" (sapserv#)
- Note 195715 - Service connection types "BW RFC" and "BW GUI"
6.2.4 Connect Azure based System to local SLD/LMDB

Another important connection to realize, is the update of the existing system landscape directory with your SAP Systems available in the Azure Cloud. Assuming the SLD service and the corresponding LMDB hosted on the Solution Manager is available in the on-premise Network only.

To maintain software lifecycle task, the system data needs to be updated to the SLD service via tx. RZ70. Details of the activation can be found here - SAP First Guidance – SEM/BW Modelling in SolMan 7.1 with MOPZ/MP

![Registration in System Landscape Directory](image)

- **Note 2188401** - Enabling HTTP(S) in RZ70

Use the Program RSLDHTTPCONF to configure the HTTP(S) support in Transaction RZ70

![SLD DS HTTP(s) Configuration](image)

- **SAP First Guidance – complete functional scope (CFS) for SAP BW 7.50**

- **Note 2046334** - Distribution of TMS configuration ends with an error

- **Note 2691074** - SPAM / SAINT hangs at IMPORT_PROPER problem connecting to Message Server

niping -v
6.3 smart data integration (SDI) with SAP HANA

Blog: Smart Data Integration available for the SAP Cloud Platform

The SAP HANA smart data integration and SAP HANA smart data quality options provide tools to access source data, and provision, replicate, and transform that data in SAP HANA on-premise or in the cloud. The smart data integration and smart data quality options let you enhance, cleanse, and transform data to make it more accurate and useful. These options let you efficiently connect to any source to provision and cleanse data for loading into SAP HANA on-premise or in the cloud, and for supported systems, write back to the original source.

SAP Help: SAP HANA Smart Data Integration and SAP HANA Smart Data Quality

6.3.1 SAP HANA deployed on premise

Outbound Connections

When SAP HANA is deployed on premise, the Data Provisioning Server within SAP HANA connects to the agent using the TCP/IP protocol (HTTP Port 5050 by default). To manage the listening port used by the agent, edit the adapter framework preferences with the Data Provisioning Agent Configuration tool.

The connections to external data sources depend on the type of adapter used to access the source. C++ adapters running in the Data Provisioning Server connect to the source using a source-defined protocol. Java adapters deployed on the Data Provisioning Agent connect to the source using a source-defined protocol.
6.3.2 SAP HANA deployed in the cloud or behind a firewall

Inbound Connections

When SAP HANA is deployed in the cloud or behind a firewall, the Data Provisioning Agent connects to the SAP HANA XS engine using the HTTP/S protocol. (HTTP Ports 80xx and 43xx by default)

When the agent connects to SAP HANA in the cloud over HTTP/S, data is automatically gzip compressed to minimize the required network bandwidth.

For information about configuring the port used by the SAP HANA XS engine, see the SAP HANA Administration Guide.

6.3.3 Components

SAP HANA smart data integration and SAP HANA smart data quality include several components that you need to install, deploy, and configure.


6.4 nearline storage (NLS) with SAP HANA

Overview

6.5 BW/4 HANA and the SAP Data Hub

Overview

6.6 SAP Analytics Cloud (SAC)
For more information, see System Requirements and Technical Prerequisites.

SAP Help: SAP Analytics Cloud
SAP Help: Live Data Connections to SAP BW
SAP Help: What’s new in SAC (bi-weekly update)

Note 2551072 - How to download the SAP Analytics Cloud Agent for SAP Analytics Cloud (BOC)
Note 2518900 - How do I connect SAP Analytics Cloud (BOC) to SAP S/4HANA Cloud Identity Provider
Note 2541557 - Support further SAP Analytics Cloud BW features
(this Note contains a XML file with SAP Notes which can be applied with Z_SAP_BW_NOTE_ANALYZER)

Blog: SAP Analytics Cloud: Live Data Connection to SAP BW/4HANA
Blog: Enable BW Direct Live connections in SAC

For the option “Data Connectivity - Import” you will need
- 4.6.1 Configuration SAP Cloud Connector
- 4.6.2 Configuration SAP Analytics Cloud Agent

For the option “Data Connectivity - Live” you will need
- 4.6.4 Configuration of Cross-Origin Resource Sharing (CORS)
6.6.1 Configuration SAPCP Cloud Connector
SAP Help: Installing the SAPCP Cloud Connector

Download the necessary Software from - https://tools.hana.ondemand.com/#cloud

Install the Cloud Connector Components

```
sapbpc110srv:/sapmnt/software/Cloud_Connector # rpm -i sapjvm-8.1.033-linux-x64.rpm
```
```
sapbpc110srv:/sapmnt/software/Cloud_Connector # rpm -qa | grep jvm
sapjvm_8-1.033-1.x86_64
```
```
sapbpc110srv:/sapmnt/software/Cloud_Connector # rpm -i com.sap.scc-ui-2.10.1-2.x86_64.rpm
```

Installing Cloud Connector
search for java installations ...

Found SAP JVM 8 installation. Will use it for cloud connector.

scc_Daemon installed.

Cloud Connector server can be managed using service scc_daemon
start|stop|restart.
```
sapbpc110srv:/sapmnt/software/Cloud_Connector # service scc_daemon start
```
Call the Cloud Connector UI
https://server.domain.ext:8443 (Administrator/manage)

SAP Help: Initial Configuration

Define your Connection to the SAP Analytics Cloud
Details of the Connection

6.6.2 Configuration Analytics Cloud Agent

SAP Help: Installing SAP Analytics Cloud Agent

Download the necessary Software from – https://launchpad.support.sap.com/#/softwarecenter

Install the Web Server: Make yourself familiar with the Tomcat Distribution - http://tomcat.apache.org/whichversion.html and Download the latest Tomcat 8.5 Version (currently 8.5.24)

SAP Help: Installing the SAP Java Connector (JCO)
6.6.2.1 Tomcat 8.5 Installation
Log on as a user with root authorization.
Change to the directory to which you downloaded the file `apache-tomcat-8.5.24.tar.gz`
Extract `apache-tomcat-8.5.24.tar.gz` to `/opt`

6.6.2.2 Enable SSL/TLS support on Tomcat 8.5
Create a keystore file to store the server’s private key and self-signed certificate by executing the following command and specify a password value of “changeit”:

```
$JAVA_HOME/bin/keytool -genkey -alias tomcat -keyalg RSA
```

6.6.2.3 Adapt the configuration file on Tomcat 8.5
Change to the directory `/opt/apache-tomcat-8.5.24/conf` and edit the file `server.xml`
There are several settings to change:
- Server port
- Connector port for HTTP and HTTPS
- Connector Port for APJ/1.3

The following Example starts the Tomcat 8.5 server on port 8042 with can be accessed at port 1080 (HTTP) and redirected to port 1443 (HTTPS)
<Server port="8042" shutdown="SHUTDOWN">
  <Listener className="org.apache.catalina.startup.VersionLoggerListener" />
  <Listener className="org.apache.catalina.core.AprLifecycleListener" SSLEngine="on" />
  <Listener className="org.apache.catalina.mbeans.GlobalResourcesLifecycleListener" />
  <Listener className="org.apache.catalina.core.JreMemoryLeakPreventionListener" />
  <Listener className="org.apache.catalina.core.ThreadLocalLeakPreventionListener" />

  <GlobalNamingResources>
    <!-- Editable user database that can also be used by UserDatabaseRealm to authenticate users -->
    <Resource name="UserDatabase" auth="Container"
      type="org.apache.catalina.UserDatabase"
      description="User database that can be updated and saved"
      factory="org.apache.catalina.users.MemoryUserDatabaseFactory"
      pathname="conf/tomcat-users.xml" />
  </GlobalNamingResources>

  <Service name="Catalina">
    <Executor name="tomcatThreadPool" namePrefix="catalina-exec"
      maxThreads="200" minSpareThreads="4" />

    <!-- A "Connector" represents an endpoint by which requests are received and responses are returned. Documentation at : Java HTTP Connector: /docs/config/http.html (blocking & non-blocking) Java AJP Connector: /docs/config/ajp.html APR (HTTP/AJP) Connector: /docs/apr.html Define a non-SSL/TLS HTTP/1.1 Connector on port 1080 -->

    <Connector port="1080" protocol="HTTP/1.1"
      connectionTimeout="20000"
      redirectPort="1443" address="0.0.0.0" />

    <!-- Define a non-SSL/TLS HTTP/1.1 Connector on port 1080 -->
    <Connector executor="tomcatThreadPool"
      port="1080" protocol="HTTP/1.1"
      connectionTimeout="20000"
      redirectPort="1443" />

    <!-- Define a non-SSL/TLS HTTP/1.1 Connector on port 1080 -->
      maxThreads="200" SSLEnabled="true" scheme="https" secure="true"
      keystoreFile="${user.home}/.keystore"
      keystorePass="changeit"
      clientAuth="false" sslProtocol="TLS" />

    <Connector port="8009" protocol="AJP/1.3" redirectPort="1443" />
  </Service>
</Server>
The start/stop commands for Tomcat 8.5 can be found in the directory

```
/opt/apache-tomcat-8.5.24/bin
```

Start the Tomcat Web Application Manager

https://server.domain.ext:1443/

6.6.2.4 Deploy the Cloud Agent (WAR file)

Log on as a user with root authorization.

Change to the directory to which you downloaded the cloud agent file

Extracted the C4AAGENT<SP-version>.zip archive.

Copy the C4A_AGENT.war file to `/opt/apache-tomcat-8.5.24/webapps` directory

The war file is automatically deployed once Tomcat is restarted.

6.6.2.5 Configure the Cloud Agent Service User

Change to the directory `/opt/apache-tomcat-8.5.24/conf` and edit the file `tomcat-users.xml`

There are several settings to change:

- Several roles for the Tomcat Administration
- At least one Administration User
- Role/User assignment for the Cloud Agent Service
Log on to the Tomcat Web Application Manager with your User/password combination and check the Version of the SAP Cloud Agent - https://server.domain.ext:1443/C4A_AGENT/deploymentInfo

6.6.2.6 Deploy the SAP JCo file
Log on as a user with root authorization.
Change to the directory to which you downloaded the JCO file
Extracted the sapjco30P_<SP-version>.zip archive.
Copy the files `libsapjco3.so` and `sapjco3.jar` to `/opt/apache-tomcat-8.5.24/lib`
6.6.2.7 Configure the Access Control in the SAP HCC

Logon to the SAP HANA Cloud Connector (HCC) with your User/password combination and add a System mapping-

Add: "Other SAP System" as HTTPS and specify your configured Tomcat server configured in Chapter 4.6.2.3 and set the URL PATH: /C4A/AGENT/
6.6.3 Configuration of Reverse Proxy

SAP Help: Connectivity via Reverse Proxy

Azure Help: Application Gateway redirect overview
https://azure.microsoft.com/en-us/services/application-gateway/

As the cross-origin resource sharing (CORS) can replace the “classical Reverse Proxy” Implementation, you will save an additional configuration of the HTTPD functionality on the Linux VM.

In case you need a reverse proxy configuration anyway, you can check the following Document for this Setup with the SAP Web Dispatcher functionality.

SAP First Guidance – complete functional scope (CFS) for SAP BW/4HANA

6.6.4 Configuration of Cross-Origin Resource Sharing (CORS)

Blog: How to enable CORS on SAP NetWeaver Platform
Enable BW Direct Live connections in SAC

Note 2659735 - Troubleshooting CORS issues with SAP Analytics Cloud (SAC)
Note 1757252 - How to analyze problems related to session loss, logoff or blank screens caused by timeout issues (not only CRM related)

Cross-Origin Resource Sharing (CORS) is a W3C specification that allows cross-domain communication from the browser. By building on top of the AJAX/XMLHttpRequest object, CORS allows developers to work in the same coding paradigm as with same-domain requests. CORS has started to play a more and more important role in today’s web and cloud-based applications, while our web applications are trending towards system/data integration across domains. Web application servers that support CORS make it possible for a clean architecture, without using reverse proxies or other forms of middle tier.

The final CORS functionality is available from NetWeaver 7.51 and onwards. This is either available:

- with the Installation of the BPC 11.0 Add-On which requires SAP_UI 7.51
- with the import of Feature Pack 01 (based on SP08) which requires SAP_UI 7.52

icf/cors_enabled = 1 (from 7.51 onwards)
Ensure that the InA package (/sap/bw/ina/) or a higher-level package on your SAP NetWeaver system is configured for basic authentication.

Check with tx. SICF

Test the URL
https://server.domain.ext:<HTTPS Port>/sap/bw/ina/getserverinfo?sap-client=001

Check the HTTPS availability with tx. SMICM
Note 2694092 - HTTP error 500 from myssocntl service
login/create_sso2_ticket = 3
login/accept_sso2_ticket = 1

Note 2715935 - SSO fails due to logon ticket created for a specific hostname

Note 2578923 - Collective corrections for ICF service /sap/public/myssocntl

Make sure that the Browser Settings from the Blog are active

SAP Analytics Cloud: Live Data Connection to SAP BW/4HANA Using CORS and SSO

tax: UCONCOCKPIT or UCON_CHW

Note 2573569 - UCON HTTP Whitelist Downport

During the Logging Mode” you can switch between activation of the Context Types 01 - 04
Switch to **1 – Trusted Network Zone** and execute **Execute Selection (Whitelist Maintenance)**

Switch to Edit Mode and Press **Refresh Coverage**

Add the mandatory internal calls to the whitelist and save the entries

Switch to **4 – Cross-origin Resource sharing** and execute **Execute Selection (Whitelist Maintenance)**

Switch to Edit Mode and Press **Refresh Coverage**
Depending on your scenario, you will see different HTTP Service URL's on the left-hand side and corresponding Origin Hosts. Add the necessary URL to the whitelist.

Select the HTTP Service Path `/sap/bw/ina` and add to the Whitelist.
Modify the entry 📝 and follows and save 📝 the settings.

- Allowed Methods: **GET, HEAD, POST, OPTIONS**
- Exposed Headers: **X-CSRF-TOKEN, SAP-REWRITEURL, SAP-URL-SESSION-ID, SAP-PERF-FESREC, SAP-SYSTEM**
- Allow Credentials: ✗
- Max Age: 600

💡

This is corresponding with the Solution prior to 7.51 based on the rewrite file which was specified as

```plaintext
icm/HTTP/mod_0 = PREFIX=/,FILE={path_to_cors_rewrite_file}
```

**Note 2596285** - How to enable CORS for Live Data Connection to BW in SAP Analytics Cloud (SAC) on SAP NetWeaver releases where native CORS is not supported

**Note 2482807** - Secure HTTPS Browser configuration using Live Data Connections (CORS) in SAP Analytics Cloud

**Additional Corrections to implement (Component BC-MID-ICF)**

**Note 2547381** - CORS integration in UCON HTTP Whitelist and Internet Communication Framework and Clickjacking integration in HTTP Whitelist

**Note 2714225** - UCON HTTP Whitelist - Fix counting in Whitelist UI

**Note 2753471** - UCON HTTP Whitelist CORS: Overwrite of several whitelist entries in UCONCOCKPIT transaction possible

**Additional Corrections to implement (Component BC-SEC-LGN)**

**Note 2748063** - Improper Session Management in ABAP Server of SAP NetWeaver and ABAP Platform

**Note 2751466** - Improve Supportability of HTTP Security Sessions

**Note 2757811** - User gets recurring login screen with forced re-authentication

**Note 2760552** - Improve resilience of HTTP Security Sessions

**Note 2784752** - HTTP400 Session not found after (concurrent) reauthentication
test your SAC Application now and log on to the SAP Analytics Cloud with your provided URL

Add a new connection by pressing the Plus Symbol

Add the System Details and Credentials to the screen as suggested.
By pressing <F12> the Browser (e.g. Chrome) open a Web Console to investigate any problems during the input or response of your SAP Analytics Cloud Connection.

Important Information can be found at the Network TabStrip.

Troubleshooting:

Note 2544696 - Failed to connect to system in SAP Analytics Cloud *** Master KBA ***

Note 2589761 - Connecting to Live Data in SAP Analytics Cloud *** Master KBA ***
6.7 SAP Cloud Platform Integration

Overview: [https://cloudplatform.sap.com/index.html](https://cloudplatform.sap.com/index.html)

SAP Cloud Platform is the agile platform-as-a-service (PaaS) for digital transformation, with comprehensive application development services and capabilities that allows businesses to collect, manage, analyze, and leverage information of all types, to extend and connect to business systems, and to innovate new edge scenarios to allow the business to continuously adapt and advance. It enables customers to achieve business agility, create a truly integrated and optimized enterprise, and accelerate digital transformation across the business—all without the requirement of maintaining or investing in on-premises infrastructure.

CPI can be the central platform for the integration for all existing Cloud Solutions provided by SAP.
6.8 ODP based data extraction

6.8.1 ODP-Based Data Extraction via OData
Using ODP-based data extraction via OData (based on the OData communication protocol) you can perform consistent, scalable delta extraction of ODP data into external non-ABAP recipients (such as Cloud and mobile applications).
SAP Help: ODP-Based Data Extraction via OData

6.8.2 ODP-Based Data Extraction via CDS views
SAP Help: Transferring Data from SAP Systems via ODP (ABAP CDS Views)

Related Information
SAP How-to Guide - How to use ABAP CDS for Data Provisioning in BW
6.9 Integration with other Cloud Solutions

6.9.1 General cloud classification and responsibilities

![Diagram showing cloud classification and responsibilities](image)

- **Business process management**
  - Business context

- **Application management**
  - Applications
  - Middleware / platform

- **System management**
  - System
  - Database
  - Operating system
  - Virtualization

- **IT infrastructure management**
  - Servers
  - Storage
  - Networking

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**Customers’ integration domains**

- **User2Cloud**
- **Cloud2Cloud**
- **Thing2Cloud**
- **User2OP**
- **OP2OP**
- **Thing2OP**

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- **Public cloud**
- **IaaS**
- **PaaS**
- **SaaS**

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- On-premise
- Private cloud

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- Completely managed by customer
- Managed by service provider, but SLAs and KPIs are defined
- Completely managed by service provider

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- IaaS: Infrastructure as a Service
- PaaS: Platform as a Service
- SaaS: Software as a Service
6.9.2 SAP Integration Technologies

Cloud Infrastructure Services -
SAP API Business Hub – SAP Fieldglass – SAP Cloud Platform (SCP) -

- Roadmap & Integration Guides -Customer
- SAP Road Map for Cloud Integration - Edition 2017 Q3

Integration is the cornerstone for end-to-end digital transformation
6.9.3 SuccessFactors
Integration via Integration Center (output via CSV files hosted on dedicated sFTP servers)

SAP Success Factors Integration Center - Q3 2017 – 2017-09-08

SAP Help: Integration Center

SAP Help:
Integrating SAP Cloud for Customer and SuccessFactors Employee Central Service Center - Employee Replication

Integrating SAP Hybris Cloud for Customer and SuccessFactors Employee Central Service Center - Employee Replication

Note 2171588 - SuccessFactors: OData API Metadata Refresh and Export

Note 2212494 - Enable Event Center/Intelligent Services

Note 2215682 - SuccessFactors API URLs for different Data Centers

Note 2278751 - How to find the Admin Guides for SuccessFactors Integrations

Note 2355830 - How to refresh metadata of restricted OData MDF entities

Note 2395508 - IP addresses to be whitelisted when customer’s own sftp is used with Int. Center
6.9.4 Concur

- CONCUR – Development Center
- SAP-Concur Integration – SAP Setup Guide

Note 2432767 - SAP Best Practices for SAP S/4 HANA Cloud integration with Concur solutions
Note 2388587 - FAQ: Concur Integration

Overall Scenario
6.9.5 Hybris

YaaS (SAP Hybris as a Service) is a microservices ecosystem helping businesses to rapidly augment and build new, highly flexible solutions. YaaS provides the platform that allows you to mashup, compose and measure all single components of your projects.

- SAP Hybris Dev Portal
  Note 2246019 - CPQ Hybris - Frequently Asked Questions

SAP Hybris Service Engagement Center Integration
https://help.sap.com/viewer/DRAFT/8541e089d13a4a27903b112b00ff2ced/6.6.0.0/en-US/c6c60f07e6504c989ecb6424cb786bc0.html

Blog: SAP Cloud for Customer Integration with SAP On-Premise: ERP, CRM, BW
Blog: SAP Cloud for Customer integration with SAP Business Warehouse – Know your options
The following options are available for C4C and SAP BW integration:

**Outbound Integration (C4C to SAP BW)**
- Transfer data from C4C to BW using the ODP connector
- Pull C4C report data via ODATA

**Inbound Integration (SAP BW to C4C)**
- Transfer data from BW to a C4C Cloud Data Source
- Use BW reports as mashups
6.9.6 Ariba

- SAP Ariba cloud solutions integration white paper
- SAP Ariba Open APIs

Note 2336401 - SAP Best Practices for SAP S/4HANA Integration with SAP Ariba solutions V3

Blog: HANA Cloud Integration (HCI), a new option to Integrate SAP to Ariba Network