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SAP HANA Direct Extractor Connection Implementation Guide

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

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1 SAP HANA Direct Extractor Connection Implementation Guide

This guide is the starting point for the technical implementation of the SAP HANA Direct Extractor Connection in the SAP HANA platform.

2 Overview of the SAP HANA Direct Extractor Connection

The SAP HANA Direct Extractor Connection (DXC) is a means for providing out-of-the-box foundational data models to SAP HANA, which are based on SAP Business Suite entities. DXC is also a data acquisition method for SAP HANA. The rationale for DXC is simple, low TCO data acquisition for SAP HANA leveraging existing delivered data models.

Customer projects can face significant complexity in modeling entities in SAP Business Suite systems. In many cases, data from various areas in SAP Business Suite systems requires application logic to represent the state of business documents appropriately. SAP Business Content DataSource Extractors have been available for many years as a basis for data modeling and data acquisition for SAP Business Warehouse. Now, with DXC, these SAP Business Content DataSource Extractors are available to deliver data directly to SAP HANA.

DXC is a batch-driven data acquisition technique; it is considered a form of extraction, transformation, and load, although its transformation capabilities are limited to using the user exit for extraction purposes. For more information, see http://help.sap.com/saphelp_nw04/helpdata/en/49/ae67401d4988448036b180dc9ec1e6/frameset.htm and http://help.sap.com/saphelp_nw70/helpdata/en/6e/fe6e420f00d242e10000000a1550b0/content.htm.

A key point about DXC is that in many use cases, batch-driven data acquisition at certain intervals is sufficient, for example, every 15 minutes.

Overview of the DXC Rationale

The following key points sum up the rationale for the SAP HANA Direct Extractor Connection:

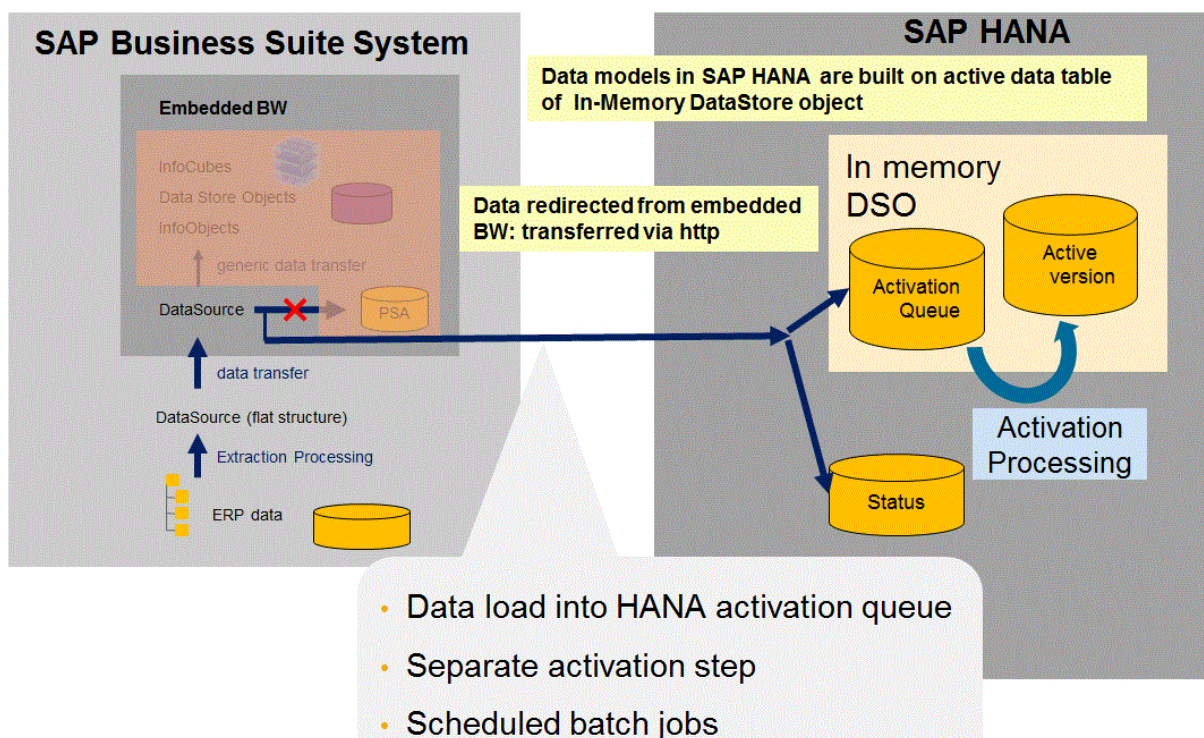
- Use the preexisting foundation data models of SAP Business Suite entities as a basis for use in SAP HANA data-mart scenarios:
 - Reduces complexity of data modeling tasks in SAP HANA significantly
 - Speeds up time lines for SAP HANA implementation projects
- Provide semantically rich data from SAP Business Suite to SAP HANA
 - Ensures that data appropriately represents the state of business documents from ERP
 - Includes application logic that is built into many extractors
- Simplicity/Low TCO
 - Reuses existing proprietary extraction, transformation, and load mechanism built into SAP Business Suite systems over a simple HTTP(S) connection to SAP HANA
 - Requires no additional server or application in the system landscape
- Change data capture (delta handling):
 - Acquires data efficiently – brings only new or changed data into SAP HANA
 - Handles data from all delta processing types properly

DXC Configuration for SAP Business Suite

There are two configurations available for DXC, based on the SAP Business Suite system:

- The default configuration for SAP Business Suite systems based on SAP NetWeaver 7.0 or higher – such as ECC 6.0 is covered by this document.
- The alternative configuration for SAP Business Suite systems based on releases lower than SAP NetWeaver 7.0 – such as SAP ERP 4.6 is covered in the appendix of this document. For more information, see the [Appendix – DXC System Landscape Variants: The “Sidecar” Approach](#) section.

An SAP Business Suite system is based on SAP NetWeaver. As of SAP NetWeaver version 7.0, SAP Business Warehouse (BW) is part of SAP NetWeaver, for example, ERP (ECC 6.0 or higher). This BW system is referred to as an “embedded BW system”. Typically, this embedded BW system is not used because most customers who run BW have it installed on a separate server, and they rely on that one. The default DXC configuration uses the scheduling and monitoring features of the embedded BW system but not its other aspects, such as storing data, data warehousing, or reporting (Business Intelligence (BI)). DXC extraction processing bypasses the normal dataflow and sends data to SAP HANA instead. The following illustration depicts the default configuration of DXC.



In SAP HANA, an In-Memory DataStore Object (IMDSO) is generated, which directly corresponds to the structure of the DataSource you are working with. This IMDSO consists of several tables and an activation mechanism. The active data table of the IMDSO can be used as a basis for building data models in SAP HANA (attribute views, analytical views, and calculation views).

Data is transferred from the SAP Business Suite source system using an HTTP connection. In general terms, the extraction and load process is the same as those used for extracting and loading SAP Business Warehouse – you rely on InfoPackage scheduling, the data load monitor, process chains, and so on.

i Note

DXC redirects data into SAP HANA and therefore does not require BW on SAP HANA.

3 Getting Started

The SAP HANA Direct Extractor Connection (DXC) Implementation Guide provides information about setup and technical configuration of the SAP HANA DXC. This guide also includes information about the basic operation of the SAP HANA DXC, in particular the scheduling and monitoring of extraction and load.

3.1 About this Document

This implementation guide is the starting point for the technical implementation of the SAP HANA Direct Extractor Connection (DXC) in an SAP HANA appliance. You can find scenario-specific information in this guide.

i Note

The starting point for the technical upgrade of your SAP application/solution is the Upgrade Master Guide, which you can find on SAP Service Marketplace at <http://service.sap.com/instguides>.

Use this guide for an overview of the SAP HANA DXC, its delivery units, and its scenarios from a technical perspective. This guide refers you to the required detailed information about:

- Import of delivery units
- SAP Notes
- Configuration documentation

This implementation guide consists of the following main sections:

- **Overview of the SAP HANA Direct Extractor Connection**
This section provides an overview of SAP HANA DXC and some information about its installation.
- **Getting Started**
This section provides an overview of this document. It also contains references to the most important SAP Notes that apply to the installation and configuration of the SAP HANA DXC.
- **Setup in SAP HANA and the SAP Business Suite**
This section provides the various setup steps in SAP HANA and the SAP Business Suite.
- **Configuration Steps Specific to SAP Business Warehouse**
This section provides an overview of the configuration of SAP Business Warehouse (BW) and how to transfer data from DataSources to SAP HANA using DXC.
- **Appendix – DXC System Landscape Variants: The “Sidecar” Approach**
This section provides an overview of the “sidecar” approach that covers the following use cases:
 - You want to implement DXC with an older version of SAP Business Suite system that is not based on SAP NetWeaver 7.0 or higher (for example, 4.6C).
 - You already use the embedded BW system and do not want to use it for the purpose of transferring data from BW to SAP HANA using DXC.
- **References**
This section provides an overview of related documents containing further information about the SAP HANA Direct Extractor Connection.

➔ Tip

You can find the most current information about the technical implementation of the SAP HANA Direct Extractor Connection and the latest installation and configuration guides on SAP Service Marketplace at <http://service.sap.com/instguides>.

SAP strongly recommends that you use the documents available here. The guides are updated regularly.

3.2 Related Information

The following sections provide an overview of documents covering planning topics and some useful links.

3.2.1 Planning Information

For more information about planning topics not covered in this guide, see the following content on SAP Service Marketplace:

Content	Location on SAP Service Marketplace
Latest versions of installation and upgrade guides	http://service.sap.com/instguides
General information about the SAP HANA Direct Extractor Connection	http://service.sap.com/ <quick link>
SAP HANA Administration Guide	http://help.sap.com/hana > SAP HANA Appliance > Administration Guide >
Sizing, calculation of hardware requirements - such as CPU, disk, and memory resource - with the Quick Sizer tool	http://service.sap.com/quicksizer
Released platforms and technology-related topics such as maintenance strategies and language support	http://service.sap.com/platforms To access the Platform Availability Matrix directly, enter http://service.sap.com/pam .
Network Security	http://service.sap.com/securityguide
High Availability	http://www.sdn.sap.com/irj/sdn/ha
Performance	http://service.sap.com/performance

Content	Location on SAP Service Marketplace
Information about Support Package Stacks, latest software versions, and patch level requirements	http://service.sap.com/sp-stacks

3.2.2 Useful Links

The following table contains further useful links that are available on SAP Service Marketplace:

Content	Location on SAP Service Marketplace
Information about creating error messages	http://service.sap.com/message
SAP Notes search	http://service.sap.com/notes

3.3 Relevant SAP Notes

You must read the following SAP Notes before you start the installation. These SAP Notes contain the most recent information about the installation, as well as corrections to the installation documentation.

Make sure that you have the up-to-date version of each SAP Note, which you can find on SAP Service Marketplace at <http://service.sap.com/notes>.

SAP Note Number	Title	Description
1583403	Direct extractor connection to SAP HANA	Main note for setup steps required in the source SAP Business Suite system.
1670518	SAP HANA Direct Extractor Connection: Monitoring	Provides information on how to monitor SAP HANA Direct Extractor Connection (DXC), in particular the activation processing for In-Memory DataStore Objects (IMDSOs).
1688750	DataSource: Reading a property in the source system	Apply this note to the source SAP Business Suite system only if you have the "sidecar" scenario described in section Appendix – DXC System Landscape Variants: The "Sidecar" Approach .

SAP Note Number	Title	Description
1701750	DataSource: Secondary Index on the PSA	If your DataSource is missing a key, apply this note to any BW systems connected to the SAP Business Suite system you are using with DXC.
1677278	DataSource: Changing the Key Definition (A version)	Provides a report where you can define a semantic key for any DataSources that are missing keys. DataSources without keys cause an error when you try to generate the In-Memory DataStore Object in SAP HANA. Before applying this note to your SAP Business Suite system, first apply SAP note 1701750 to any BW systems connected to the SAP Business Suite system you are using with DXC.
1710236	SAP HANA DXC: DataSource Restrictions	Lists specific DataSources not supported by DXC.
1714852	Troubleshooting SAP HANA DXC issues	Guidance for troubleshooting DXC issues and the appropriate action to take.
1665553	Handling issues with IMDSO activation - SAP HANA DXC	Discusses how to report issues with In-Memory DataStore Object activation to SAP.
1714933	DXC: Partitioning In-Memory DSO tables	Provides information about partitioning active data tables of IMDSOs where large data volume is expected.
1781102	SAP HANA DXC with BW 730 SP8 or higher	Provides additional information if you want to use SAP HANA Direct Extractor Connection (DXC) with an SAP BW 730 SP8 or higher system as part of the DXC system landscape architecture.

4 Setup in SAP HANA and SAP Business Suite

The process for setting up SAP HANA Direct Extractor Connection (DXC) in the SAP HANA system follows:

1. [Enable SAP HANA XS and SAP Web Dispatcher Services](#)
2. [Setup of SAP HANA Direct Extractor Connection](#)
3. [Create an HTTP Connection to the SAP HANA System](#)
4. [Configure DXC HTTP Interface Destination](#)
5. [Choose the System-Wide Setting for DataSources](#)
6. [Create and Populate a Table to Specify the DataSources for Use with DXC](#)
7. [Indicate the Table Used to Specify the DataSources for Use with DXC](#)
8. [Designate the Schema in SAP HANA to Store IMDSOs](#)

When you finish these tasks, continue with setting up the SAP Business Suite system(s).

4.1 Enabling SAP HANA XS and SAP Web Dispatcher Services

Context

Ensure that the SAP HANA XS service (Process name: *hdbxsengine*; Service name: *xsengine*) and the SAP Web Dispatcher service (Process name: *sapwebdisp_hdb*) are running.

Procedure

1. Open the SAP HANA studio.
2. Select your SAP HANA instance, click the alternate mouse button and choose [Administration](#).
The [Administration Console](#) perspective of your SAP HANA instance opens.
3. Choose the [Configuration](#) tab, locate and expand *daemon.ini* and then locate and expand *sapwebdisp*.
4. If a green light and the number 1 appear in the [Host](#) section for *instances*, continue with step 5.

If a green light and the number 1 do not appear, start the service.

- a) Double-click *instances*.
- b) In the [Change Configuration Value](#) dialog box in the [Hosts](#) section, replace the 0 with 1.

If the [Hosts](#) section of the dialog box appears to be empty, it means that you have multiple systems. Click on the dropdown list icon to reveal the host system and change the [Configuration Value](#) for the host system there.

i Note

If you do not know which is the host system, you can find the master *indexserver* service's host on the *Landscape* tab.

- c) Choose *Save*.
5. On the *Configuration* tab in the expanded *daemon.ini*, locate and expand *xsengine*.
6. If a green light and the number 1 appear in the *Hosts* section for the *instances* parameter, continue with step 7.

If a green light and the number 1 do not appear, start the service.

- a) Double-click the *instances* parameter.
- b) In the *Change Configuration Value* dialog box in the *Hosts* section, replace the 0 with 1.
If the *Hosts* section of the dialog box appears to be empty, it means that you have multiple systems. Click on the dropdown list icon to reveal the host system and change the *Configuration Value* for the host system there.

i Note

If you do not know which is the host system, you can find the master *indexserver* service's host on the *Landscape* tab.

- c) Choose *Save*.
7. Ensure that SAP HANA XS and SAP Web Dispatcher services are running using the **http://<hostname>:80<instance number>** URL.
The **<hostname>** placeholder requires the name of the host on which the SAP HANA system's master *indexserver* resides and **<instance number>** placeholder requires the instance number of the specified SAP HANA system.

i Note

The port name (80<instance number>) in this URL can differ on your system, depending on the instance number of your installation.

The SAP XSEngine is up and running message appears.

4.2 Set Up SAP HANA Direct Extractor Connection

Set up the SAP HANA Direct Extractor Connection (DXC) application as follows:

1. *Import the Delivery Unit for DXC*
2. *Configure the XS Application Server to Use DXC*
3. *Verify that DXC Is Operational*
4. *Create a DXC User in SAP HANA*
5. *Create a DXC Schema in SAP HANA*

4.2.1 Importing the Delivery Unit

Context

The delivery unit is included as non-automated content. You must import it to use SAP HANA Direct Extractor Connection (DXC).

i Note

Ensure that you have access to the `/usr/sap/HDB/SYS/global/hdb/content` server directory path. If you do not, then have someone with access copy the delivery unit archive onto your local client.

Procedure

1. Open the SAP HANA studio and change to the *Modeler* perspective.
2. On the *Quick launch* tab in the *Content* section, choose *Import*.
3. In the *Import* wizard, expand the *SAP HANA Content* node, select *Delivery Unit*, and then choose *Next*.
4. Select *Server* and in the *File* field, enter the `/usr/sap/HDB/SYS/global/hdb/content` directory path.
If you cannot access the server location, choose *Client* and then choose *Browse* and navigate to the location on your computer in which you have stored the delivery unit archive.
5. Select the delivery unit archive and then choose *Finish*.
A green light appears in the *Object import simulation* status.
6. Ensure *Activate objects* is selected and keep all default values, then choose *Finish*.

Results

In the lower right-hand corner of the screen, a *Job Log* tab appears with a progress indicator under *Current*. When the delivery unit import is finished, the `Completed Successfully` message appears.

4.2.2 Checking the Application Server Configuration

Context

The configuration settings for the SAP HANA Direct Extractor Connection (DXC) application ought to have been defined for the *xsengine* service on the master index server's host. Use the following steps to ensure that the settings are correct.

Procedure

1. Open the SAP HANA studio and select the SAP HANA instance.
2. Open the *Administration Console* perspective and select the *Configuration* tab.
3. Expand the *xsengine.ini* section, and then expand the *application_container* section.
4. Select *application_list*, click the alternate mouse button, and then select *Change* from the context menu.
5. In the *System* screen area in the *New Value* field, ensure that the `libxsdx` value appears.
If the value does not appear, enter `libxsdx` in the field, and choose *Save*.

If another value exists, type a comma and space after the existing value and enter `libxsdx`, for example, `searchservice, libxsdx`, and choose *Save*.

4.2.3 Testing the Setup of the DXC Application

Context

To check if the setup of the SAP HANA Direct Extractor Connection (DXC) application works as expected, enter the following URL into your browser, `http://<hostname>/:80<instance number>/sap/hana/dxc/dxc.xscfunc`.

The `<hostname>` placeholder requires the full name of the host on which the SAP HANA system's master *indexserver* resides and the `<instance number>` placeholder requires the instance of the specified SAP HANA system.

Results

If the check is successful, a success message appears.

4.2.4 Creating a DXC User in SAP HANA

Context

Create a user with the privileges to execute the SAP HANA Direct Extractor Connection (DXC) extraction and load.

Procedure

1. Open the SAP HANA studio and select your SAP HANA system.
2. In the navigation tree, select **Catalog > Authorization > Users**.
3. Select *Users*, click the alternate mouse button, and choose *New User*.
4. In the *User Name* field, enter an appropriate name, for example, **DXCUSER**.
5. Select internal authentication, enter a password and confirm it.
6. On the *Granted Roles* tab, add the roles *PUBLIC* and *MONITORING*.
7. Choose *Deploy*.

4.2.5 Creating a DXC Schema in SAP HANA

Context

Create a schema for the SAP HANA Direct Extractor Connection (DXC) that is owned by the DXC user.

i Note

You need to create a unique schema for each specific SAP Business Suite system that you connect to this SAP HANA system with DXC.

Procedure

1. In the SAP HANA studio, execute the following SQL statement:

```
create schema <SCHEMANAME> owned by <DXCUSERNAME>
```

Example:

```
create schema R3TSCHEMA owned by DXCUSER
```

2. Choose *Deploy*.
3. Repeat steps 1 and 2 for each SAP Business Suite system.

4.3 Troubleshooting: Restarting the SAP HANA XS Server

Context

If you encounter problems when setting up the SAP HANA Direct Extractor Connection (DXC) component, try restarting the SAP HANA XS server (*xsengine* service).

Caution


Follow these steps carefully. You must ensure that all applications using the SAP HANA XS service have been stopped before stopping and restarting it. SAP HANA XS provides its own persistency, therefore it is relevant for backups. A database backup fails if the SAP HANA XS volumes exist in the topology but the service is not running.

Procedure

1. Stop all applications that use the database.
2. In the *Administration Console* perspective of the SAP HANA studio, choose the *Landscape* tab.
3. Select the *xsengine* service, click the alternate mouse button and choose *Stop*.
The status light changes to yellow and then to red.
4. Select the *xsengine* service again, click the alternate mouse button and choose *Start*.
The status light changes to green.
5. Create a new data backup.
6. Start the applications that use the database.

4.4 Setup in SAP Business Suite

The process for setting up SAP HANA Direct Extractor Connection (DXC) in the SAP Business Suite system follows:

1. Apply [SAP Note 1583403](#)  to the SAP Business Suite system.
Note that there are several manual steps that must be performed. Ensure that you perform all steps described in the note, including those in the *Manual Pre-implementation* section.
2. [Create an HTTP Connection to the SAP HANA System](#)
3. [Configure DXC HTTP Interface Destination](#)
4. [Choose the System-Wide Setting for DataSources](#)
 - a. If you chose the DATASOURCE setting: [Create and Populate a Table to Specify the DataSources Used by DXC](#)
 - b. If you chose the DATASOURCE setting: [Indicate the Table Used to Specify the DataSources for Use with DXC](#)

5. [Designate the Schema in SAP HANA to Store In-Memory DataStore Objects](#)

4.4.1 Creating an HTTP Connection to the SAP HANA System

Context

You need to identify the target SAP HANA system for the SAP HANA Direct Extractor Connection (DXC) in the SAP Business Suite system.

Procedure

1. Log in to the SAP Business Suite system and start transaction **SM59**.
2. Select the *HTTP Connections to External Server* node and choose *Create*.
3. Enter a name for the HTTP destination, for example, **DXC_HANA_CONNECTION_<SID>**.
4. On the *Technical Settings* tab in the *Target Host* field, enter the name of the target host.
5. In the *Service No.* field, enter the port number for your remote SAP HANA system.

→ Tip

The port number is **80<instance number>** of your SAP HANA database.

6. In the *Path Prefix* field, enter **/sap/hana/dxc/dxc.xscfunc**.
7. On the *Logon & Security* tab, choose *Basic Authentication* and enter the user name and password for your DXC user.
8. Choose *Save*.

4.4.2 Configuring the DXC HTTP Interface Destination

Context

You need to add an entry in the RSADMIN table to identify the HTTP destination in the SAP HANA system.

Procedure

1. In the SAP Business Suite system, start transaction **SA38**.
The SAP_RSADMIN_MAINTAIN program starts.

2. In the *OBJECT* field, enter **PSA_TO_HDB_DESTINATION**.
3. In the *VALUE* field, enter the name of the HTTP destination you created in the previous task, for example, **DXC_HANA_CONNECTION_<SID>**.

i Note

The HTTP destination name is case sensitive. Ensure that you use upper-case and lower-case letters correctly.

4. Choose *Insert*, and then choose *Execute* to create the table entry.

4.4.3 Choosing the System-Wide Setting for DataSources

Context

You must determine which SAP Business Warehouse (BW) system you want to use for SAP HANA Direct Extractor Connection (DXC) and specify the extent of use of DXC in the source SAP Business Suite system.

There are two issues you need to consider before you start performing these tasks. First, you need to determine which BW system you want to use for the DXC connection.

- Embedded BW
If you are using the embedded BW for your daily BW work or any portion of it, then depending on the choice value you make in this section, the embedded BW could be disabled completely.
- Remote BW
If you have a remote BW connected to this SAP Business Suite system that you use for your normal BW work, it is not affected (no matter what choice value you make in this section) by using the DXC with the embedded system.

Next, you need to understand the implications of the choices of values offered to make the best choice for your business circumstances.

Table 1: Values and Implications

Value	Implication	When to use this value
GLOBAL	<p>All DataSources are available for use with DXC. When you choose this value, it is no longer possible to execute any BW processes or reports in the source system. If you have a separate SAP BW system connected to this SAP Business Suite system and you use that for your daily BW tasks, this setting has no effect.</p> <p>i Note This is not the case if you are using the sidecar scenario, described in the Appendix – DXC System Landscape Variants: The Sidecar Approach section.</p>	<p>⚠ Caution This option disables the embedded BW for any other purpose.</p> <p>Choose this option if you want to use the embedded BW exclusively for the DXC.</p>
SYSTEM	<p>Only the specified clients are used with DXC. The remaining clients are available for DataSources to be extracted, transformed, and loaded into the Persistent Staging Area (PSA) of the SAP BW system (typically this is the embedded BW).</p>	<p>Choose this option if you are using an embedded BW for daily tasks with specified clients. The client you choose to use with DXC is no longer available for any other purpose.</p> <p>You can choose this option if you are not using the embedded BW for daily tasks, but might consider using it in the future.</p>
DATASOURCE	<p>Only the specified DataSources are used with DXC. Any DataSources not specified can be extracted, transformed, and loaded into the PSA of the SAP BW system.</p>	<p>Choose this option if this SAP BW system (embedded BW or sidecar BW) is used for other purposes besides DXC.</p> <p>i Note Keep in mind that any DataSources you choose to be used by DXC cannot be used in this (embedded or sidecar) SAP BW system in your daily business tasks.</p>

Subsequent use of SAP BW in this guide refers to the embedded BW system, which is located in the SAP Business Suite system. If you are using the “sidecar” approach, discussed in [Appendix – DXC System Landscape Variants: The “Sidecar” Approach](#), this reference also applies to that BW system.

⚠ Caution

The choice you make for this next configuration setting determines whether or not the normal BW functionality is available in the system you are using with DXC. If you are using the embedded BW for some purpose other than DXC (or you might do so at some point in the future), the choice you make in this section is very important.

Take time to discuss the implications of the choice you make here, and make the choice only after proper consideration.

Procedure

1. Start transaction **SA38**.
The SAP_RSADMIN_MAINTAIN program opens.
2. Create an additional entry object **PSA_TO_HDB**. In the **VALUE** field, enter either **GLOBAL**, **SYSTEM**, or **DATASOURCE**, depending on the option that is best in your scenario.
3. Once you have decided on the appropriate configuration setting, enter the text for that choice (for example DATASOURCE), and choose *Insert*.
4. Choose *Execute*.

4.4.4 Create and Populate a Table to Specify the DataSources Used by DXC

i Note

If you chose DATASOURCE as the value of *PSA_TO_HDB* in the previous task, then you must perform the following tasks.

If you did not choose DATASOURCE, continue with [Designating the Schema in SAP HANA to Store IMDSOs](#).

Perform the following tasks.

1. [Create a Customer-Specific Database Table](#)
2. [Create Table Entries for Specific DataSources](#)
3. [Indicate the Table Used to Specify the DataSources for Use with DXC](#)

4.4.4.1 Creating a Customer-Specific Database Table

Context

To be able to use specific DataSources with SAP HANA Direct Extractor Connection (DXC), you must create a customer-specific database table to list the DataSources to use with it.

Procedure

1. In the SAP Business Suite system, start transaction **SE11**.
 - a) In the *Database Table* field, enter a unique table name, for example, **ZDXCDATASOURCES**.
 - b) In the *Short Description* field, enter a description for the table, for example, **DataSources for DXC**.
2. Choose *Create*.
3. Choose the *Delivery and Maintenance* tab, and in the *Delivery Class* field, select **c**.
4. In the *Data Browser/Table View Maint.* list, select *Display/Maintenance Allowed*.
5. Choose the *Fields* tab.
6. Fill out the first row as follows:
 - a) In the *Field* column, enter **DATASOURCE**.
 - b) Select the checkboxes in the *Key* and *Initial Values* columns.
 - c) In the *Data element* column, enter **ROOSOURCER**.
7. Press .
8. Fill out the next row as follows:
 - a) In the *Field* column, enter the value **LOGSYS**.
 - b) Select the checkbox in the *Key* column.
 - c) Leave the *Initial Values* column empty.
 - d) In the *Data element* column, enter the value **RSSLOGSYS**.
9. Press .
10. Choose *Save*.

A dialog box appears in which you can enter an appropriate customer package (starting with "Z") for the object directory entry.

→ Tip

If you are not sure which package to use, consult with the person responsible for transporting objects in your system landscape.

11. In the next dialog box, assign this to a change request for transport.
12. Choose *Technical Settings*.
13. On the following screen in the *Data Class* field, enter **APPL2**.
14. In the *Size category* field, select **0**.
15. Choose *Save* and then choose *Back*.
16. Choose *Activate*.

i Note

In this situation you can ignore the activation warnings.

4.4.4.2 Creating Table Entries for Specific DataSources

Context

Create table entries for the specific DataSources that you want to use with SAP HANA Direct Extractor Connection (DXC). You can add entries to this table later if you decide to work with additional DataSources.

Procedure

1. In the SAP Business Suite system, start transaction **SE16**.
2. In the *Table Name* field, enter the table name you created in the previous task, for example, **ZDXCDATASOURCES**, and choose *Create*.
3. Enter the specific DataSource name and logical system name for the relevant client.

→ Tip

There is no help or dropdown list available for this task, so you need to know the exact technical name for the DataSource and logical system name. Ensure that you use the correct spelling.

4. Repeat step 3 for all DataSources (and all associated relevant clients) that you want to use with DXC.

4.4.4.3 Indicating the Table Used to Specify the DataSources for Use with DXC

Context

You must identify the table you created in the previous tasks to the SAP HANA Direct Extractor Connection (DXC).

Procedure

1. In the SAP Business Suite system, start transaction **SA38**.
The SAP_RSADMIN_MAINTAIN program starts.
2. In the *OBJECT* field, enter **PSA_TO_HDB_DATASOURCETABLE**.
3. In the *VALUE* field, enter the name of the name of the table you created in the previous task to hold the specific DataSources you want to enable for DXC, for example, **ZDXCDATASOURCES**.
4. Choose *Insert*, and then choose *Execute*.

4.4.5 Designating the Schema in SAP HANA to Store IMDSOs

Context

In the SAP HANA database, an In-Memory DataStore Object (IMDSO) is generated for each DataSource. An IMDSO is a set of tables with an activation mechanism. In order to ensure that the IMDSOs are generated in the appropriate schema into the SAP HANA database, assign the DXC schema to be used. Use the schema that you created in SAP HANA.

Procedure

1. In the SAP Business Suite system, start transaction **SA38**.
The SAP_RSADMIN_MAINTAIN program starts.
2. Create the **PSA_TO_HDB_SCHEMA** entry object.
3. In the **VALUE** field, enter the name of the SAP HANA database schema you created, for example, **R3TSHEMA**.

Results

For more information about creating SAP HANA Direct Extractor Connection (DXC) schema, see the [Creating a DXC Schema in SAP HANA](#) section.

5 Configuration Steps that Use BW Functions to Enable DXC

The default system landscape architecture for SAP HANA Direct Extractor Connection (DXC) involves the use of the embedded SAP Business Warehouse (BW) in the SAP Business Suite system (for solutions based on SAP NetWeaver 7.0 or higher). If you are working with this default system landscape architecture, follow the steps outlined in this section, which involves using some parts of the embedded BW to enable DXC directly to SAP HANA. If you are working with the “sidecar” variation, refer to the appendix listed in the related links.

i Note

The next tasks require BW knowledge, in particular working with DataSources, InfoPackages, and Extraction/Load in a BW context. If you do not have BW knowledge, SAP recommends that you work with someone who is familiar with DataSources as well as with data load scheduling and monitoring in BW. Although data is not sent into BW when working with DXC, BW functionality is used to provide foundational data models to SAP HANA and to transfer data to SAP HANA. For further information about working with the various BW concepts and tasks described in this guide, refer to the SAP BW documentation and online help at http://help.sap.com/nw_platform >▶ <Your SAP NetWeaver Platform version> >▶ [Application Help](#) >▶ [SAP Library](#) >▶ <Your language> >▶ [SAP NetWeaver Business Warehouse](#) >▶.

In addition, if you are unsure which SAP Business Content DataSources you need work with, SAP recommends that you work with someone who has knowledge of the specific domain area.

Related Information

[Appendix – DXC System Landscape Variants: The Sidecar Approach](#) [page 36]

5.1 Installing Business Content DataSources

Context

To install Business Content DataSources proceed as follows.

Procedure

1. In the SAP Business Suite system, start transaction **RSA5**.
The *Installation of DataSource from Business Content* program starts.
2. Select the specific DataSource that you want to install and choose *Activate DataSources*.

5.2 Replicate DataSources

Perform the next tasks in the SAP Business Warehouse (BW) Data Warehousing workbench.

Caution

Consider which client to use as the BW client carefully. Be aware that once you decide which client in your system is the BW client, other BW-related functions cannot be used in any other client. It is difficult to change to another client later, as many configuration steps are performed automatically upon accessing the workbench.

Perform the following tasks:

1. [Create Source Systems for Clients](#)
2. [Verify the Creation of the In-Memory DataStore Objects](#)

5.2.1 Creating Source Systems for Clients

Context

To transfer data from the SAP Business Suite system to SAP HANA, you must create source systems for the client(s) in the SAP Business Suite system that extract data and load it into the SAP HANA database. For more information, refer to the SAP BW documentation and online help at http://help.sap.com/nw_platform >

▶ [<your SAP NetWeaver Platform version>](#) ▶ [Application Help](#) ▶ [SAP Library](#) ▶ [<your language>](#) ▶ [SAP NetWeaver Business Warehouse](#) ▶

Procedure

1. In the SAP Business Suite system, start transaction **RSA1**.
2. Select the system you are working with, click the alternate mouse button and choose [Replicate DataSources](#).

If prompted about the type of DataSource, choose [DataSource](#) for all entries.

Caution

Do not use [3.x type DataSource](#).

All DataSources that have been installed using transaction RSA5 are transferred to the Data Warehousing workbench.

3. Select the DataSource(s) you want to work with, click the alternate mouse button and select [Change](#).
4. In the [Change DataSources](#) dialog box, choose [Activate](#).

Results

This creates an In-Memory DataStore Object (IMDSO) in the SAP HANA database that corresponds to the DataSource structure.

5.2.2 Verifying the Creation of the In-Memory DataStore Objects

Context

You can see the *In-Memory DataStore Object* (IMDSO) in the *Modeler* perspective of the SAP HANA studio:

Procedure

1. Log on to the SAP HANA studio with the SAP HANA Direct Extractor Connection (DXC) user.
2. In the *Modeler* perspective, locate and expand the schema that you created for this source system, for example, R3TSCHEMA.
3. Expand the *Tables* folder.
4. Ensure that the tables that make up the IMDSO appear.

The tables include the DataSources with the following naming convention:

- `/BIC/A<DATASOURCENAME>00`
This is the active data table that stores all data that is loaded into this IMDSO from DXC. This table is the one to use in SAP HANA data modeling – it is a base DB (columnar) table that can be used in attribute views, analytic views, calculation views, and so on.
- `/BIC/A<DATASOURCENAME>40`
This is the activation queue table. When a DXC extraction/load job runs, it loads the entire series of data packages for this job into this activation queue, and then, in a separate step, they are activated in the active data table. This activation mechanism preserves a proper sequence of records and ensures that all delta processing types (change data capture) are handled appropriately.
- `/BIC/A<DATASOURCENAME>70`, `/BIC/A<DATASOURCENAME>80`, `/BIC/A<DATASOURCENAME>AO`, and so on.
These are technical tables used to control the activation process.

Results

i Note

If you expect a significant data volume to accumulate in a particular IMDSO, then partition the active data table of that IMDSO for better performance. For information on partitioning the IMDSO active data table, refer to [SAP Note 1714933](#).

5.3 Creating InfoPackages

Context

In order to load the DataSources into the SAP HANA database, you must create InfoPackages. In some cases you can create an InfoPackage containing delta processing (change data capture) data. In this scenario you create an InfoPackage for the delta initialization (full load) and another InfoPackage for the regular delta data loads.

If delta processing is not available, you can either create an InfoPackage for a full load or create several InfoPackages for a full load using selection criteria.

After you have created the InfoPackage, you can schedule it to load data into your IMDSO in the SAP HANA database.

Procedure

1. In the Data Warehousing workbench, select your DataSource, click the alternate mouse button and choose *Create InfoPackage*.
2. In the *Create InfoPackage* dialog box, select the appropriate options and choose *Save*.
3. On the *Schedule* tab, select the appropriate time for the job to run, and choose *Start* to schedule the extraction job.

5.4 Monitoring Data Load in the Source SAP Business Suite System

Context

After the data load starts, you can monitor the status of the InfoPackages.

Procedure

1. In the Data Warehousing Workbench, select the InfoPackage and choose *Monitor*. The *Monitor - Administrator Workbench* dialog box appears.
2. Choose the *Status* tab to display detailed information about the data load.

i Note

A status message appears stating that the request was successfully loaded to PSA, although the data is loaded into the activation queue table for the corresponding In-Memory DataStore Object (IMDSO) in the SAP HANA database.

3. Choose the *Details* tab to view detailed information about the records that have been transferred. You can navigate through the structure of the processed data packets as follows:
 - a) Look for *Processing (Data Packets)*, and select one.
 - b) Expand the *Update PSA* node.

The Data package 1 saved to remote SAP HANA DB message (or something similar) appears.

You can also expand the *Subsequent Processing* node; errors in the activation process appear here.

Results

After the data for a given extraction job is successfully loaded into the activation queue of the IMDSO, the data is immediately activated and available in the active data table of the IMDSO.

i Note

The order in which data is loaded is important for data consistency. Therefore, all subsequent data activation for an IMDSO is blocked if a (failed) request still exists in the activation queue table of the IMDSO.

If this occurs, refer to [SAP Note 1665553](#).

5.5 Verifying Data Transfer in the SAP HANA Database

Context

You can verify which data has been loaded into the SAP HANA database.

Procedure

1. Log on to the SAP HANA studio with the SAP HANA Direct Extractor Connection (DXC) user.
2. Expand the *Catalog* node, and expand the node for the schema for the specific SAP Business Suite system from which you scheduled an extraction / load job.
3. Locate the activation queue table of the IMDSO you are working with.
The naming convention of the active table for the IMDSO is `/BIC/A<Name of the DataSource>00`, for example, `/BIC/A0VER_SCARR_ATR00`.
4. Select this table, click the alternate mouse button and choose *Open Content*.

Records of the data packages temporarily stored in the activation queue table appear. If the table is empty (and there are success indicators in the data load monitor, see [Monitor Data Load in the Source SAP Business Suite System](#)), then the records have been activated and moved into the active data table.

When the data load activation is completed, all records from all data packages reside in the active data table of the IMDSO. This table also stores the historical records. The naming convention of the active table for the IMDSO is `/BIC/A<Name of the DataSource>00`, for example, `/BIC/A0VER_SCARR_ATR00`.

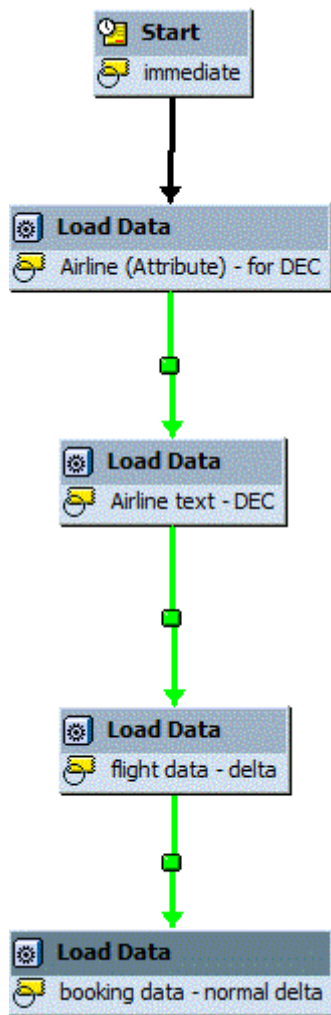
5. Select this table, click the alternate mouse button and choose *Open Content*.
All data extracted from this DataSource appear.

Results

While it may be interesting to see the main tables of the IMDSO that store data, these steps (checking table contents) are not typically performed in normal operations. For this purpose a monitoring view and alerting features in the SAP HANA statistics server are provided (see sections [Monitoring the Activation Process of In-Memory DataStore Objects in SAP HANA](#) and [Setup Email Alerting for the Activation Process of In-Memory DataStore Objects in SAP HANA](#)).

5.6 Create a Process Chain for Regular Data Transfer

After you perform any initial data loads, including delta initializations, you can create a process chain for extractions and loads at a regular interval, using the appropriate InfoPackages. This document does not provide explicit detail for the practice of creating process chains, refer to the SAP Business Warehouse (BW) documentation and online help at http://help.sap.com/nw_platform > [> <your SAP NetWeaver Platform version>](#) > [Application Help](#) > [SAP Library](#) > [<your language>](#) > [SAP NetWeaver Business Warehouse](#) or consult colleagues who have knowledge of BW process chains for information on how to work with them. The following graphic is an example of a process chain.



i Note

If you have master data loads in your process chain, it automatically adds a change run process to follow. This is not necessary for SAP HANA Direct Extractor Connection (DXC) loads into the SAP HANA database; you can delete the ones automatically added to your process chain, and ignore any warnings about the change run.

5.7 Monitoring the Activation Process of In-Memory DataStore Objects in SAP HANA

Prerequisites

Most of the monitoring tasks are performed using the SAP Business Warehouse (BW) monitoring features in the embedded BW of the SAP Business Suite system (or in the attached BW in the “sidecar” scenario

mentioned in section [Appendix – DXC System Landscape Variants: The “Sidecar” Approach](#)). InfoPackage monitoring and Process Chain monitoring cover nearly all of the processing steps involved in extracting data from the source system and loading it into the activation queue of the SAP HANA In-Memory DataStore Object (IMDSO). The only step that is not handled with this type of monitoring is the activation processing of the IMDSO. Since this action occurs solely in SAP HANA, its monitoring is decoupled from the other processes that are driven from the BW S-API.

Context

SAP HANA provides a monitoring view that contains the status of IMDSO activation. This view resides in the `SYS` schema; its technical name is `M_EXTRACTORS`. You can view status information in this table.

Procedure

1. Log on to the SAP HANA studio with the SAP HANA Direct Extractor Connection (DXC) user.
2. Expand the `Catalog` node and then expand the `SYS` node.
3. Locate the `M_EXTRACTORS` view.

Note

The view appears with its description first. To locate the view, search for the following description:

```
Direct extractor connection (DXC) status information (M_EXTRACTORS)
```

You can widen the pane and look for the technical name `M_EXTRACTORS`.

4. Select the `M_EXTRACTORS` view, click the alternate mouse button and choose *Open Content*.
5. Look for the DataSource name that you want to monitor.
The activation status table of the IMDSO appears in the *Table Name* column with the naming convention `/BIC/A<Name of the DataSource>AO`, for example, `/BIC/AOVER_SCARR_ATRAO`.
6. In the *Status* column, check the value.
Successful activations have the value `OK`.

5.8 Setting up E-mail Alerts for Failed Activation of In-Memory DataStore Objects

Prerequisites

The SAP HANA statistics server offers alerts for various aspects of operating the system. It includes an automatic e-mail alerting mechanism to inform designated administrators of issues. The statistics server

includes a feature that evaluates the *M_EXTRACTORS* view records at regular intervals (every 15 minutes) to check for failed activations.

Context

To set up e-mail alerting, proceed as follows:

Procedure

1. In the SAP HANA studio, open the *Administration Console* perspective, and choose the *Alerts* tab.
2. Choose *Configure Check Settings*.
3. In the *Configure Check Settings* dialog box, enter the appropriate information in the following fields:
 - a) *Sender Email Address*

Note

Typically an e-mail address is created in the company e-mail system to be used for sending alerts for this purpose.

- b) *SMTP Server*
- c) *SMTP Port*

These are general settings for all types of statistics server alerts in SAP HANA.

Tip

If you do not want to receive e-mail alerts for any type of error condition, skip the *Recipients Email Address for All Checks* section.

4. Choose *Configure Recipients for Specific Checks*.
5. Select the *Check In-Memory DataStore Object Activation* checkbox.
6. Choose *Add Recipients*.
7. In the dialog box, enter the e-mail address of every administrator or specialist who need to receive an e-mail if an In-Memory DataStore Object (IMDSO) activation fails.
8. Choose *OK*, and then in the *Configure Check Settings* dialog box, choose *OK*.

5.9 DXC and SAP HANA Data Modeling

For each DataSource represented in the example process chain, there is a corresponding In-Memory DataStore Object (IMDSO) that is loaded. In the SAP HANA database, you need to perform several data-modeling tasks:

- Creating attribute views
- Creating analytic views
- Creating calculation views

The basis for data modeling is the active data tables. Remember that the naming convention of the active table for the IMDSO is `/BIC/A<Name of the DataSource>00`, for example, `/BIC/A0VER_SCARR_ATR00`. When creating SAP HANA data models, use the active data tables of the relevant IMDSOs as base tables.

For more information, see the *SAP HANA Developer Guide*.

5.10 Further Information

The following sections contain information and a few comments about further considerations for how to use the SAP HANA Direct Extractor Connection (DXC).

Type of Data


SAP recommends that you consider the type of data the DataSource provides in the context of your use case. The SAP HANA DXC is available for all SAP Business Content DataSources. There are a small number of DataSources related to inventory data however, that pose challenges in working with an SAP HANA appliance, because the appliance does not have a concept like Business Warehouse (BW) does of “non-cumulative key figures”. There are special features in BW designed for working with inventory data that are not available in SAP HANA natively. For example, a `2LIS_03_BF` DataSource (Material Movements data) is not well suited for use with DXC because it provides data that requires the special features for inventory that BW provides. In these use cases (inventory data), SAP recommends working with BW itself, rather than the SAP HANA appliance. Of course BW on SAP HANA offers its own set of benefits. For a list of DataSources not supported with DXC, refer to [SAP Note 1710236](#).

In addition, some SAP Business Content DataSources do not provide delta handling (change data capture). This is not particularly problematic for DXC, but you need to be aware that the In-Memory DataStore Object (IMDSO) that is generated by DXC does not include a change log, and therefore the IMDSO itself cannot generate delta datasets for use by another data mart in the SAP HANA appliance. (Unlike in BW, no layering concept exists in the SAP HANA appliance.) Although DXC works with DataSources that do not have a delta mechanism, in some cases this can mean long-running extraction jobs transferring large datasets to the SAP HANA appliance. Any identical records are not duplicated and any new records are added. Remember that if you delete transactional records in the Business Suite system (in cases for which the DataSource does not offer delta handling), the deletion is not sent to the IMDSO in the SAP HANA appliance.

DataSources Without Keys

One requirement for DXC is that DataSources or extract structures must have a unique semantic key defined. This is important for DXC’s features in SAP HANA, because with the IMDSO, database tables require a primary

key. If you try to activate a DataSource for DXC that does not have a key, you receive an error message. If you encounter this issue, refer to [SAP Note 1677278](#) and [SAP Note 1701750](#).

 **Caution**

You must apply [SAP Note 1701750](#) to any BW system that is connected to the source SAP Business Suite system before you apply [SAP Note 1677278](#).

Recommendation

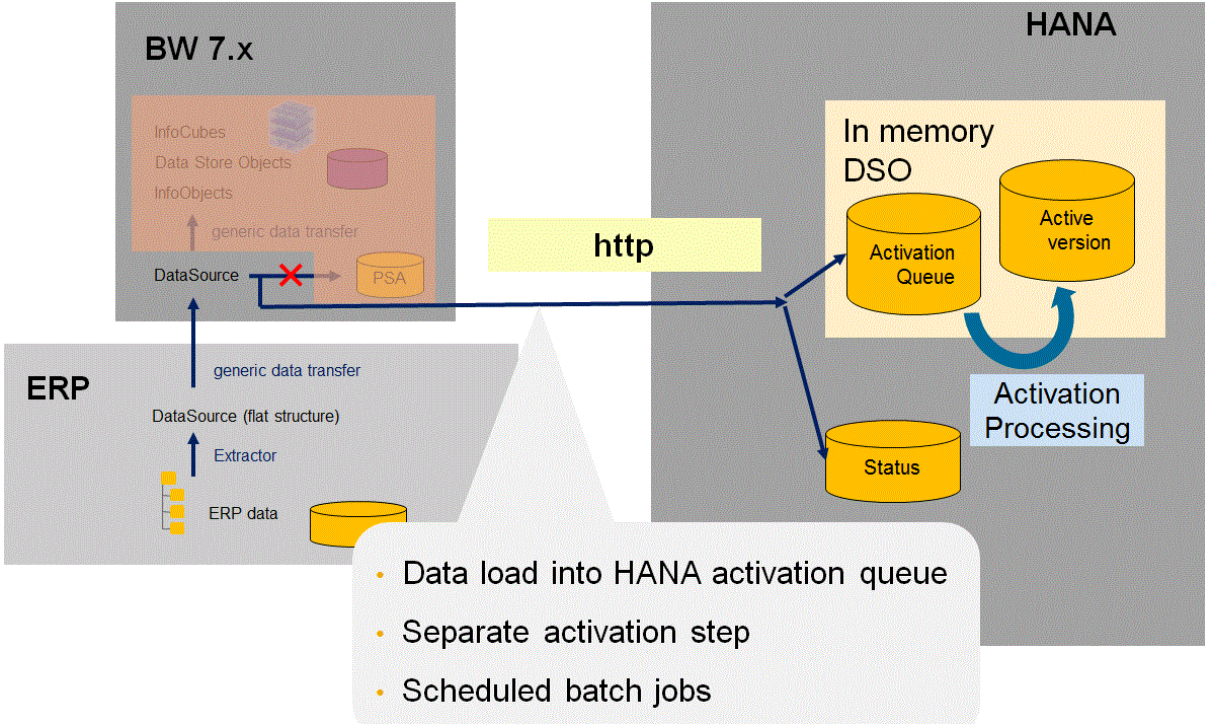
SAP recommends that you explore DXC's value for a number of use cases. Its simplicity, as well its provision of foundation models from SAP Business Suite systems, which offer semantically rich data in a straightforward manner, offer unique advantages for your SAP HANA project.

6 Appendix – DXC System Landscape Variants: The “Sidecar” Approach

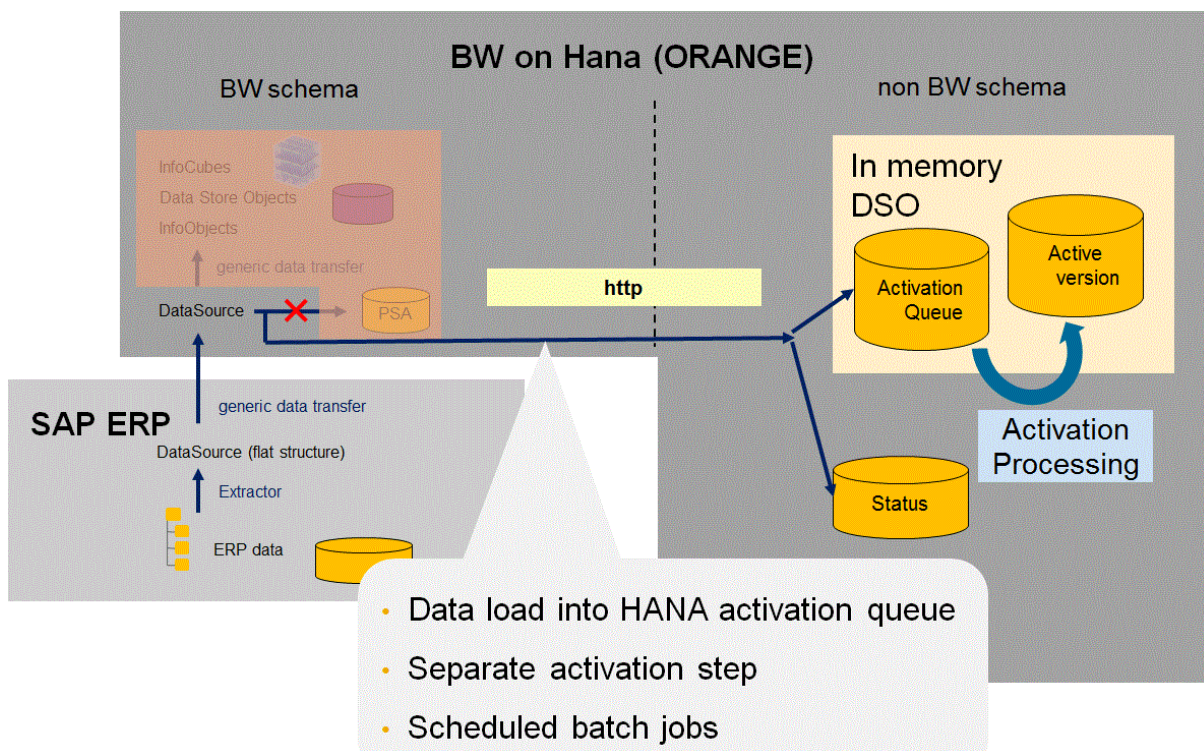
In some cases you might be interested in implementing Direct Extractor Connection (DXC) with an older SAP Business Suite system, therefore not based on SAP NetWeaver 7.0 or higher (for example, 4.6C). In other cases the “embedded BW” is already in use, causing reluctance in using it for this purpose. You might choose to avoid the use of the embedded BW system on an SAP Business Suite system, even though it is primarily used for scheduling and monitoring of extraction jobs in the DXC scenario.

To enable DXC when these conditions exist, you can implement the DXC with the “sidecar” approach. With the “sidecar” approach, instead of using the “embedded BW” inside the SAP Business Suite system, you use a separate connected BW system as an intermediary system for scheduling and managing the extraction job in the connected SAP Business Suite system, which sends the extracted data directly to SAP HANA. Extracted data is not loaded into the connected SAP BW system; instead the data flow is redirected to the SAP HANA system.

The following graphic depicts the basic “sidecar” approach.



A similar variation is available to customers running “SAP NetWeaver BW Powered by SAP HANA” (also called BW on SAP HANA). The following graphic depicts this variation of the “sidecar” approach.



In both variations illustrated here, you need to perform the steps in the “sidecar” BW system rather than in the SAP Business Suite system. Apply [SAP Note 1583403](#) to the BW system. Note that there are several manual steps that must be performed. Ensure that you perform all steps described in the note, including those in the *Manual Pre-implement* section. In addition, you must apply [SAP Note 1688750](#) to the SAP Business Suite source system. This “sidecar” BW is used in the same way that the “embedded BW” is used in the default configuration, even though it performs the same function from a remote BW system.

If you proceed with this “sidecar” variation, the configuration steps described in the *4.1 Install Business Content Datasources* section of this document are performed in the SAP Business Suite system. The remaining configuration steps (from *4.2 Replicate Datasources* onwards) are performed in the BW “sidecar” system.

⚠ Caution

If you decide to use the “sidecar” approach, the choices outlined in section [Choose the System-Wide Setting for Datasources](#) are particularly important.

If this BW is used for any other purpose than DXC, then with the “sidecar” approach, you need to use the setting DATASOURCE, and specify the particular Datasources that can be used with DXC.


⚠ Caution

When you choose to use a particular DataSource with DXC, you cannot use that DataSource for normal BW operations in the “sidecar” BW system. In other words, the use of a particular DataSource with DXC in the “sidecar” approach is a “binary” decision: either a DataSource can be used with DXC or it can be used in the normal manner to load data into the “sidecar” BW system – it cannot be used for both purposes.

7 References

For important information see: [Relevant SAP Notes](#) [page 10].

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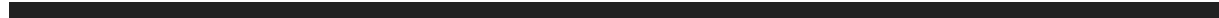
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