How to set up SAP HANA Datasource (SDI) to load data into SAP BW powered by SAP HANA

Applicable Releases:
SAP BW 7.5 SP2 powered by SAP HANA on SAP HANA SP 11

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### Document History

<table>
<thead>
<tr>
<th>Document Version</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1.10</td>
<td>&lt;&lt; Enter your summary of changes in this version &gt;&gt;</td>
</tr>
<tr>
<td>1.00</td>
<td>First official release of this guide</td>
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## Typographic Conventions

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

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>🔴</td>
<td>Caution</td>
</tr>
<tr>
<td>⛔️</td>
<td>Note or Important</td>
</tr>
<tr>
<td>🌱</td>
<td>Example</td>
</tr>
<tr>
<td>🚦</td>
<td>Recommendation or Tip</td>
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1. Introduction

SAP BW 7.5 powered by SAP HANA provides a variety of innovations in various areas. One of the focus areas are extended and simplified ways to integrate external – typically non-SAP – data structures into SAP BW. To enable such scenarios, SAP BW provides a new way to integrate and persist this data into BW. Enterprise Information Management and Smart Data Integration are the keywords for this new technology. Within this technology SAP provides a new way to real-time access or to persist the data coming from various sources into BW.

To leverage the full advantages of SAP HANA and to simplify and unify existing source systems a new type of DataSource will be introduced – the new SAP HANA Source System.

The SAP HANA Source System is the new simplified and unified source system connection to SDI, SDA and local SAP HANA sources with the SAP HANA Source system in BW.

This paper describes the SAP HANA Smart Data Integration capabilities and see how they can be leveraged within SAP BW based on the new SAP HANA Source system available with BW 7.5, Open ODS Views, CompositeProviders and Advanced DataStore Objects.

2. Background Information

2.1 Twitter Example

In this example a Twitter account will be connected to SAP BW and upload the delta data into a DataStore object (advanced). It is also possible to consume the data of this DataSource in real-time via an Open ODS View and a CompositeProvider on top of it.

This paper will explain the necessary steps to set up the SAP HANA DataSource from the Twitter Account, preview the data in real-time and persist the data in a BW InfoProvider.
This paper is based on an example on the Twitter Adapter which is only one adapter of many other possible adapters.

See the SAP HANA EIM Configuration Guide for information about those adapters.
<table>
<thead>
<tr>
<th>Adapter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2LogReaderAdapter</td>
<td>This adapter retrieves data from DB2. It can also receive changes that occur to tables in real time. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>OracleLogReaderAdapter</td>
<td>This adapter retrieves data from Oracle. It can also receive changes that occur to tables in real time. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>MsqLogReaderAdapter</td>
<td>This adapter retrieves data from SQL Server. It can also receive changes that occur to tables in real time. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>DB2ECCAdapter</td>
<td>This adapter retrieves data from an SAP ERP system running on DB2. It can also receive changes that occur to tables in real time. The only difference between this adapter and the DB2LogReaderAdapter is that this adapter uses the data dictionary in the SAP ERP system when browsing metadata.</td>
</tr>
<tr>
<td>OracleECCAdapter</td>
<td>This adapter retrieves data from an SAP ERP system running on Oracle. It can also receive changes that occur to tables in real time. The only difference between this adapter and the OracleLogReaderAdapter is that this adapter uses the data dictionary in the SAP ERP system when browsing metadata.</td>
</tr>
<tr>
<td>MsqECCAdapter</td>
<td>This adapter retrieves data from an SAP ERP system running on SQL Server. It can also receive changes that occur to tables in real time. The only difference between this adapter and the MsqLogReaderAdapter is that this adapter uses the data dictionary in the SAP ERP system when browsing metadata.</td>
</tr>
<tr>
<td>AseECCAdapter</td>
<td>This adapter retrieves data from an SAP ERP system running on SAP ASE.</td>
</tr>
<tr>
<td>Camel/FacebookAdapter</td>
<td>The Camel Facebook adapter is a pre-delivered component that is based upon Camel adapter. Use the Camel Facebook component to connect to and retrieve data from Facebook. In addition to Facebook, many other components are available from the Apache Software Foundation website.</td>
</tr>
<tr>
<td>DB2MainframeAdapter</td>
<td>This adapter retrieves data from a DB2 for z/OS system. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>ExcelAdapter</td>
<td>This adapter retrieves data from MS Excel.</td>
</tr>
<tr>
<td>FileAdapter</td>
<td>This adapter retrieves data from formatted text files. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>HanaAdapter</td>
<td>This adapter provides real-time change data capture capability in order to replicate data from a remote SAP HANA database to a target SAP HANA database. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>HiveAdapter</td>
<td>This adapter retrieves data from HADOOP.</td>
</tr>
<tr>
<td>ODataAdapter</td>
<td>This adapter retrieves data from an OData service.</td>
</tr>
<tr>
<td>ASEAdapter</td>
<td>This adapter retrieves data from SAP ASE. It can also receive changes that occur to tables in real time. You can also write back to a virtual table.</td>
</tr>
<tr>
<td>ABAPAdapter</td>
<td>This adapter retrieves data from virtual tables through RFC for ABAP tables and ODP extractors. It also provides real-time change data capture for ODP extractors.</td>
</tr>
<tr>
<td>SoapAdapter</td>
<td>This adapter is a SOAP web services client that can talk to a web service using the HTTP protocol to download the data. The SOAP adapter uses virtual functions instead of virtual tables to expose server-side operations as it closely relates to how the operation is involved.</td>
</tr>
<tr>
<td>TwitterAdapter</td>
<td>This adapter retrieves data from Twitter. It can also receive new data from Twitter in real time.</td>
</tr>
<tr>
<td>TeradataAdapter</td>
<td>This adapter retrieves data from Teradata. It can also receive changes that occur to tables in real time. You can also write back to a virtual table.</td>
</tr>
</tbody>
</table>
2.2 Data Provisioning Agent

The Data Provisioning Agent provides secure connectivity between the SAP HANA database and your on-premise, adapter-based sources. See Documentation for more information. Regarding the EIM overall architecture see EIM Documentation for more detail.

2.3 Limitations of the Pilot Version

As part of SAP BW 7.5 SP0 a new source system type is being introduced for access to local SAP HANA objects or external databases. As a pilot customer it is possible to test the new functionality of the SAP HANA Source System with a limited scope.

Limitation of pilot version (see SAP Note 2254661) - planned to be removed with BW 7.50 SP04:

- Only single data package in the Initial Load (data volume limited by available memory) is supported
- Temp. SAP GUI Editor for SAP HANA DataSources will be replaced with BW Modeling Tools (BWMT)
- Temp. SAP GUI program for initializing real-time replication into SAP HANA DataSources will be revised
- No automated conversion of DB connect Source System into SAP HANA Source System
- No support to connect other database tenants
- No real-time replication of type Insert (only Upsert possible) is supported
3. System requirements and prerequisites

The following prerequisites need to be fulfilled on the SAP HANA side to leverage the capabilities of the SAP HANA Source System:

- Enterprise Information Management (EIM) option deployed on SAP HANA
- Data Provisioning Agent installed and Data Provisioning Adapter deployed
- Remote Source created e.g. in the SAP HANA Studio or Web IDE

The deployment of the EIM, the Installation of the Data Provisioning Agent and the Deployment of the Data Provisioning Adapter is a basis task and needs to be scheduled.

The minimum System requirement is BW 7.50 SP0 and SAP HANA SP10. SAP HANA SP11 is not necessary needed but within SAP HANA SP11 SAP offers a larger number of adapters compared to SAP HANA SP10. For more information check the PAM.

In SAP HANA SP09 the option for EIM is available but not sufficient for the usage in SAP BW.
4. **Set up the Remote Source**

In the first step the SAP HANA SDI Twitter Adapter needs to be configured. Therefore open the System View in the SAP HANA Administration console perspective. Use the context menu to create a new remote source Provisioning -> Remote Sources -> New Remote Source.

Create the new remote source by maintaining the following fields:

1. **Source Name:** Give a proper Name
2. **Adapter Name:** Choose the right adapter for SDI – in this case TwitterAdapter
3. **SourceLocation:** Enter the right data provisioning agent
4. **Fill in the right Credentials to use the Twitter App.**

Now the remote source is connected to the SAP HANA DB.

In the next step the virtual table will be established. Therefore search for the required table in the remote source and add this table as virtual table in the desired schema with a spoken name.
Execute a quick smoke test and get a preview of Twitter data by running the following SQL statement in the console:

```sql
select top 500 *
FROM "<YOURSHEMA>"."GW_Twitter_Status";
```

Repeat the steps for all the Virtual Tables based on the individual Requirements. In this example we’d like to use 2 tables from the Source (Twitter) as Virtual tables.
Now the Source Tables are connected via EIM, the Data Provisioning Agent is installed and the Data Provisioning Adapter is deployed. Furthermore the Remote Source and the related Virtual Tables are created.

5. Leveraging the SAP HANA SDI Twitter Adapter in SAP BW

5.1 Create Source System

In this step a new source system of type SAP HANA Smart Data Access (SDA) will be established. The source system maintenance is currently only possible in the SAP GUI Editor. The creation of a new source system is a system specific action and needs to be done once.

To establish a new source system jump into the SAP GUI Editor in the SAP. Therefore Go to RSA1 -> Source Systems -> SAP HANA -> Create Choose the desired Names. The Source System Type and the Release will be filled automatically and could be empty in this case. It is important for the SAP BW Content Installation.
Enter the right connection details as well.

Note:
The SAP BW Hana Data Source Editor will be replaced with BW Modeling Tools (Eclipse). This is planned with SAP BW 7.50 SP04.

Double Click on the Source System (GW_TWITTER) to open the Application Components Tree. Choose or create the right Application Component and choose “Create DataSource” from the Context Menu. Enter the desired DataSource ID and choose Transaction Data for Data Source Type. All the other well-known DataSource Data Types can be used as well in this example we choose Transaction Data.
Enter a description for the DataSource on the “General Information” tab.

Move to the next tab -> Extraction tab.

Execute the followings steps on the “Extraction” tab in this sequence:
1. Choose a (remote) table or view
2. Optionally choose real-time replication (proceed with step 5) or
3. Maintain the required fields and the generic delta
4. Choose the Delta Process (depending on the source)
5. click the check box “Remote Subscription Type UPSERT”
The next screenshot represents steps 1-4:

For a remote subscription of type UPSERT, the delta process is automatically switched to AIMD and the “SDA change time” and the “SDA change type” are added to the fields.
Move to the next tab -> Proposal tab and adjust the field names and mappings:

1. Adjust the proposed field names (max. 30 characters, uppercase)
2. Adjust the proposed mapping of SAP HANA data types to ABAP data types.
The market fields in the screenshot are an example for fields which have been changed.

Move to the next tab -> the “Fields” tab and:

- Hide fields if not needed
- Adjust the field descriptions
- Add ABAP conversion exists
- Associate currency and unit fields
- Define other general field properties
The definition of the DataSource is now completed. Save and activate the DataSource (before jumping to the Preview tab).

After successful activating the DataSource move to the next tab -> “Preview” tab. Preview the data through the generated view on the (generated virtual) table.

The SAP HANA DataSource is now activated sucessfully.

To check and display the generated SAP HANA artefacts for this DataSource go back to the “Extraction” Tab and press the SAP HANA Artefactes.

It is of course also possible to find the generated SAP HANA Artefacts on SAP HANA native side:
The owner/schema is SAP<SID> as if created by the data dictionary (DDIC)

- The generated views already include the SAP HANA-to-ABAP name mapping, the basic data type conversions, and some ABAP conversion exits like ALPHA.

Go back to the Extraction tab and click on Manage button to manage real-time replications.

Note:
This is an intermediate solution for pilot customers where a program with selection screen is provided for the delta initialization.
The following actions flags (actions) needs to be set and the execution should be scheduled in the background.

After executing this steps successfully the datasource is initial loaded and the queued delta is ready to run.

It is also possible to stop the delta capturing and truncate the target table. This actions needs to be perform manually in this transaction on demand.

To monitor the real-time replications jump to the SAP HANA side. Here it is possible to use the SAP HANA cockpit to monitor remote subscriptions.
6. Create a flexible data model in BW

6.1 Build an Open ODS View

Open ODS views enable you to define BW data models for external objects like database tables, database or SAP HANA views, virtual tables or BW DataSources (for direct access). These data models allow flexible integration without the need to create InfoObjects.

The Open ODS view does not have separate storage for transaction data or master data. This means persistency and analytic modeling are decoupled for the Open ODS view.

Further and detailed Information can be found in the Documentation.

Note:
In the piloting phase of the SAP HANA DataSource it is mandatory to put an Open ODS View on top of a SAP HANA DataSource. It is not possible to generate the DataSource out of the Open ODS View.

In this step an Open ODS View on the Twitter DataSource to do a quick analysis of the incoming Twitter feed will be created.

After that, we will complete the scenario by creating a CompositeProvider on top of the Open ODS View to enable real-time data access.

Therefore an Open ODS View based on the SAP HANA DataSource in the BW Modeling Tools will be created.

More information regarding the BW Modeling Tools can be found in the documentation.

Go to the InfoArea in the Project Explorer and select “New”→“Open ODS View” from the context menu.

Enter a meaningful name, a description and:
- choose Semantics = ‘Facts’
- Source Type = DataSource (BW)
How to integrate external data into SAP BW powered by SAP HANA

- **DataSource** = `YOURDATASOURCENAME`
- **Source System** = `YOURSOURCESYSTEM`

The new generated Open ODS View with an initial proposal will open automatically. Switch to the facts and check the initial proposal for field names and types (characteristics vs. key figures, aggregation behavior, etc.) and define the structure of the Open ODS View.
After the successful definition the structure of the Open ODS view save and activate the Open ODS view. If the Open ODS view is activated it is possible to preview the data replicated in real-time via e.g. BeX Web Analyzer.

Now it is possible to directly use this Open ODS View in a BW query or in a CompositeProvider. Another option is to transfer the data into BW InfoProviders to apply more complex transformations. This paper will introduce the capability to persist the data in an Advanced DSO.
6.2 Build an Advanced DSO out of the Open ODS view

To persist the data in an Advanced DSO one option is the usage of the “Generate Dataflow” wizard. Another alternative is the manual generation of the dataflow. Therefore the following objects needs to be created:

- A target InfoProvider, e.g. a DataStore object (advanced)
- A transformation
- A data transfer process

This paper will describe the usage of the “Generate Dataflow” wizard more in detail.

Go to the Open ODS view and open the General tab. Press Generate Dataflow and enter the desired Target Type. In this case we will use the DataStore object (advanced). Enter a valid name and define the Data Type Usage.

If the dataflow is generated it is possible to maintain the persistency object.
In the next step we will refine the BW persistency and adjust the target InfoProvider properties like:

- decide whether a change log is written or not
- Adjust the fields and assign BW objects
- Aggregation behavior of the Keyfigures

It is also possible and sometimes strongly required to refine and adjust the Transformation in the BW Modeling Workbench. The automatic proposal is a 1:1 mapping from the source fields to the target fields. It is of course possible to change the transformation based on the individual requirements.
And last but not least the DTP has to maintain as well. In this example (load Twitter data) the DTP will extract the data in Delta mode. The Delta extraction from the target table of the remote subscription is automatically enabled by using the SDA change type as a numeric delta pointer. No pointer or timestamp is needed in the source structure because the Delta Field is automatically added during the Data Source Maintenance.

Note:
In the piloting phase only the DTP type “Standard” is supported.
The dataflow is now valid and the DTP can be executed manually or via process chain to upload the delta data into the DataStore object (advanced).

Remark:
Add a formula to calculate the value of ORECORDMODE or an identical InfoObject or field from the “SDA change type” to track the changes.
Formula: IF( SDI_CHANGE_TYPE = 'D', 'D', '' )
7. Summary

As part of SAP BW 7.5, a new source system type is being introduced for access to local SAP HANA objects or external databases – the SAP HANA Source System. In particular, the real-time replication of data from an external database into a local target table in the BW on SAP HANA system is supported as well as the possibility to persist the data into BW InfoProvider.

The SAP HANA Source System is the new simplified and unified source system connection to SDI, SDA and local SAP HANA sources with the SAP HANA Source system in BW.