

PUBLIC

Data Integration and Data Flow Modeling with SAP Data Warehouse Cloud ANA365

Exercises
Jascha Kanngiesser / SAP SE

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Thank you for participating in this hands-on session about Data Integration and Data Flow Modeling with SAP Data Warehouse Cloud! The session is divided into three main parts:

1. Space creation and connection setup
2. Data loading and modeling
3. Data visualization

SYSTEMS

For working your way through the hands-on materials you need access to a SAP Data Warehouse Cloud tenant. Depending on whether you join the live session or watch the session on demand or replay the materials at a later point in time, different systems and credentials can be used.

Participating live

In case you are reading this manual while participating in the live session during the SAP TechEd 2020 program, you can use any of the following three tenants for participating in this hands-on session:

- EMEA region: <https://dwc-teched2020.eu10.hcs.cloud.sap/>
- APJ region: <https://dwc-teched2020.ap10.hcs.cloud.sap/>
- NA region: <https://dwc-teched2020.us10.hcs.cloud.sap/>

To receive login credentials please send an e-mail to jascha.kanngiesser@sap.com mentioning the session ID and the tenant you would like to log in to.

On Demand

In case you are working on this hands-on material after the live session you cannot use any of the three tenants listed above. Instead, you need to get yourself a SAP Data Warehouse Cloud trial tenant here:
<https://saphanajourney.com/data-warehouse-cloud/trial/>

You need to set up all the required connectivity yourself, including the Data Provisioning Agent, uploading certificates, creating the data sets in the remote sources (or uploading the data sets to SAP Data Warehouse Cloud).

Please note that the exercise below is written for attending the live session. Therefore, for example the user credentials and tenant information might not match in case you are following the materials later on demand. In this case please substitute any live session-specific information with the individual information available to you in your trial tenant.

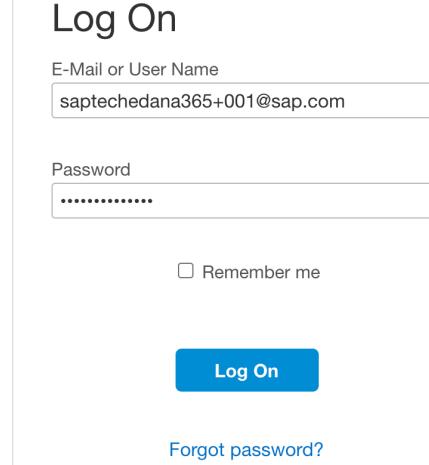
During the session we are using different source systems in the cloud and on-premise. However, you can reply the whole session by uploading the required data sets using the File Upload option to your SAP Data Warehouse Cloud tenant, too.

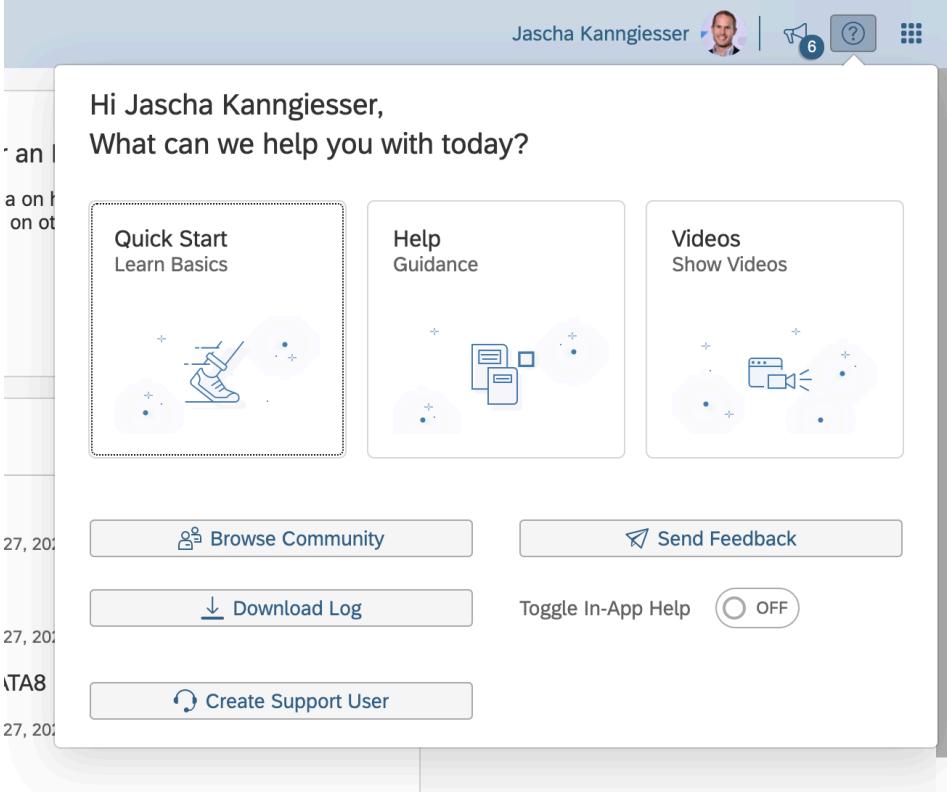
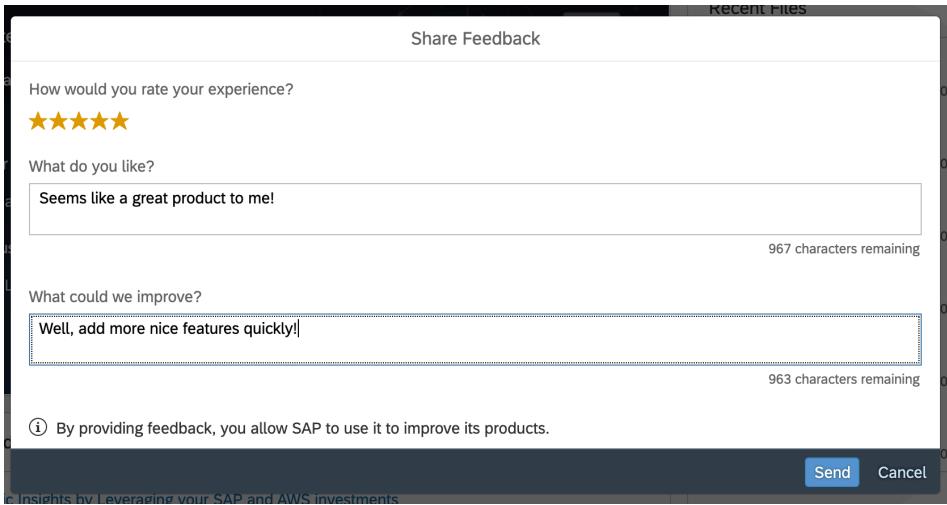
THINGS YOU WILL LEARN IN THIS SESSION

- How to create federated and replicated connections to SAP & non-SAP, cloud and on-premises data sources.
- How to load data into SAP Data Warehouse Cloud using external SQL clients.
- How to upload CSV files.
- How to model ETL processes to extract data from external sources into SAP Data Warehouse Cloud.
- How to consume & visualize data models using the SAP Analytics Cloud story builder and external SQL clients.

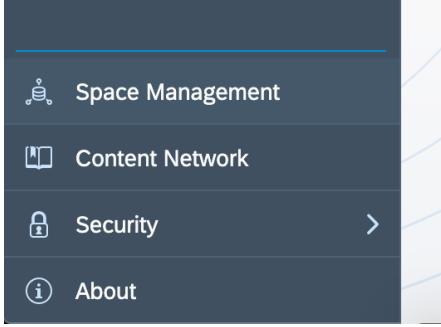
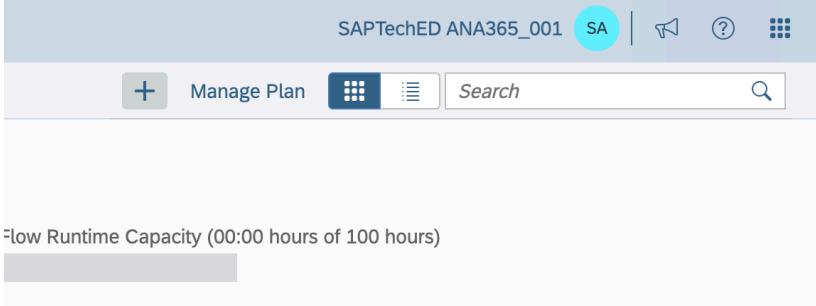
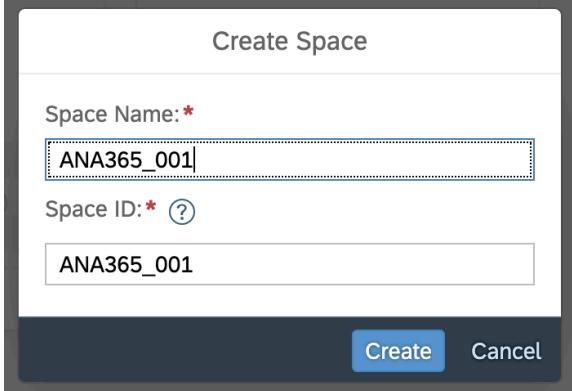
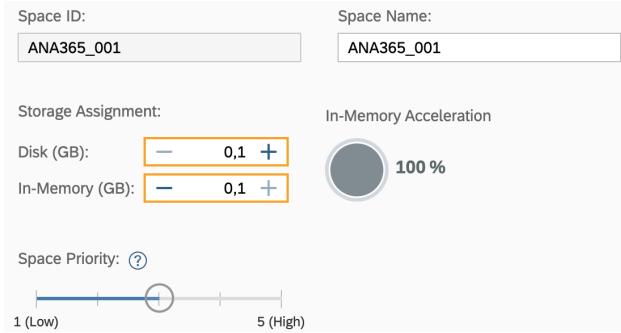
Last but not least, check out this site for all information on TechEd and upcoming sessions:

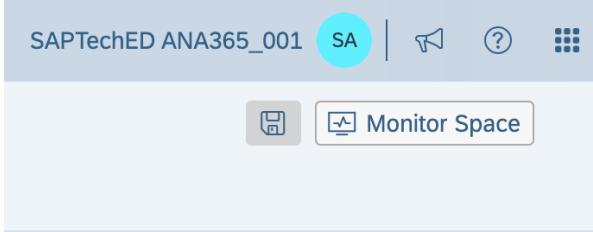
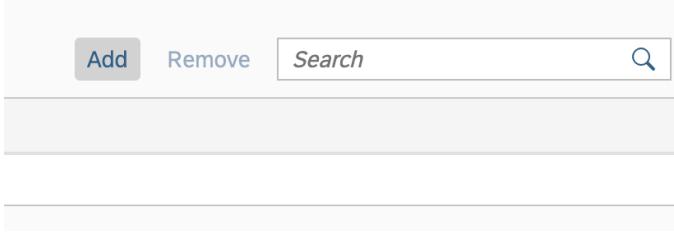
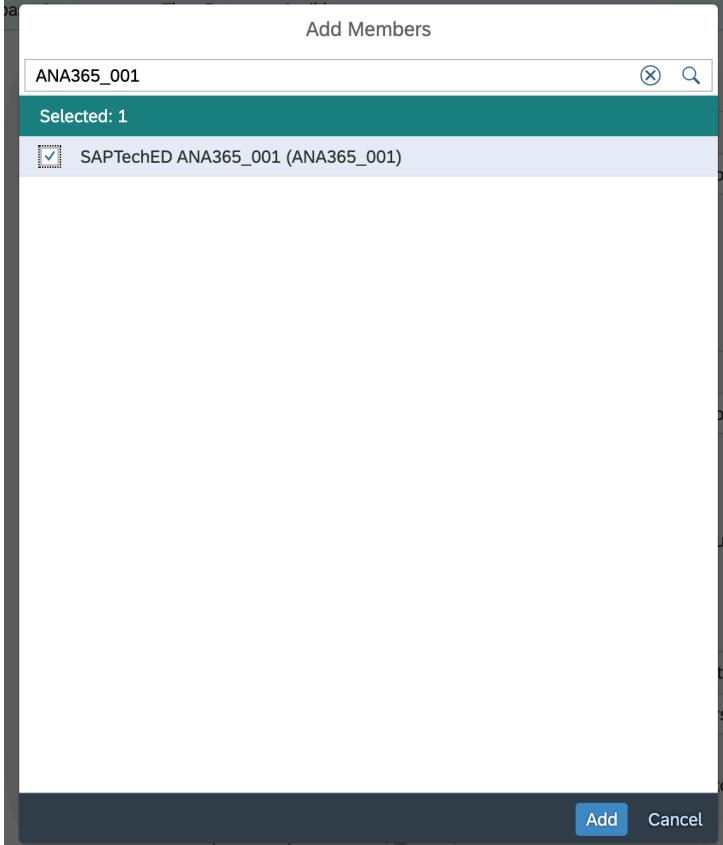
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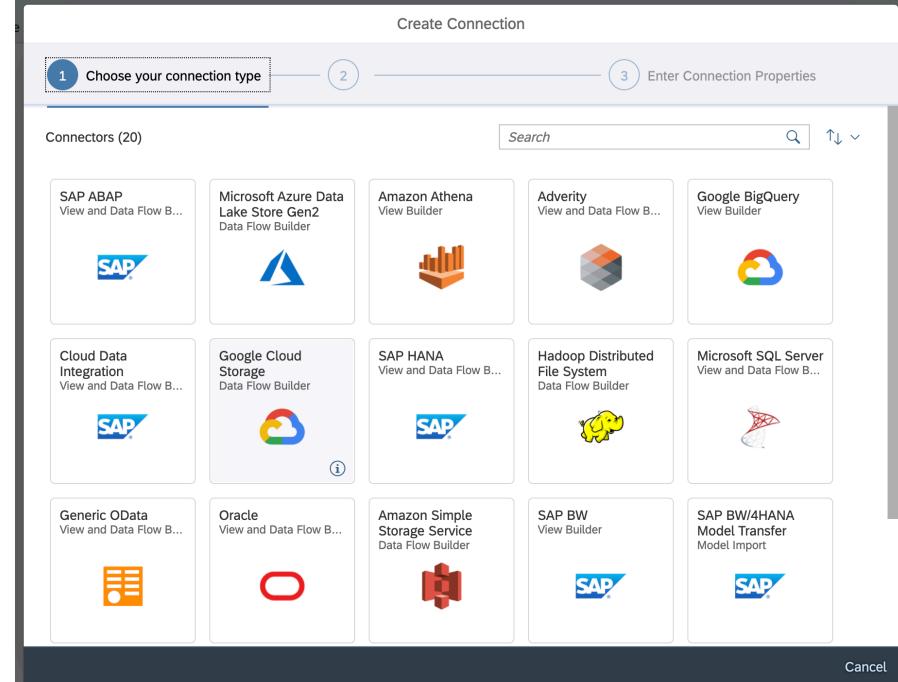
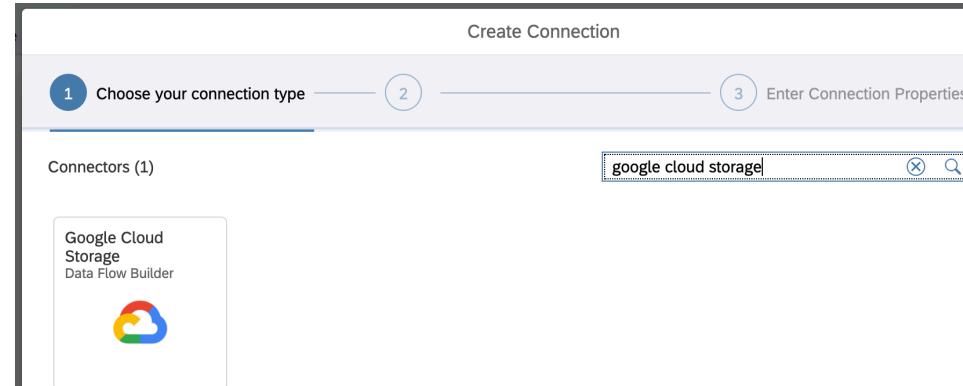
Explanation	Screenshot
<p>1. Make sure you have the login credentials available to you. You should have received a username like saptechedana365+xyz@sap.com and a password. Replace the value xyz with the number assigned to you.</p>	 <p>The screenshot shows the SAP HANA Cloud Services log-on page. It features a header "Log On" and two input fields: "E-Mail or User Name" containing "saptechedana365+001@sap.com" and "Password" containing a series of dots. Below the fields are "Remember me" and "Log On" buttons, and a "Forgot password?" link.</p>
<p>2. Let's get going – first part!</p>	<p>As mentioned above, this session consists of three main areas: Creating your space and required connections, load the data and build your data models and visualizing the results. Let's get started with creating your space and setting up the required connectivity.</p>
<p>3. First things first – providing feedback.</p>	<p>While working your way through this hands-on you probably want to provide some feedback on things that go well and things that don't go that well. No matter what, please don't hesitate to use the feedback functionality in the tool to provide any kind of feedback that comes to your mind! Let us briefly check out how you can provide feedback. You don't need to do that now of course, but just that you know the process in case you want to provide feedback later.</p>

Explanation	Screenshot
<p>4. To provide feedback, click on the question mark icon in the top right corner.</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud interface with a floating feedback menu. The menu header says "Hi Jascha Kanngiesser, What can we help you with today?". It contains three cards: "Quick Start Learn Basics" (with a shoe icon), "Help Guidance" (with a document icon), and "Videos Show Videos" (with a video camera icon). Below the cards are buttons for "Browse Community", "Send Feedback", "Download Log", and "Create Support User". A toggle switch for "Toggle In-App Help" is set to "OFF". The top right corner of the screen has a question mark icon with a blue border and the number "6" indicating unread notifications.</p>
<p>5. Hit the Send Feedback button in the bottom right corner.</p>	 <p>The screenshot shows the "Share Feedback" dialog box. At the top is a "Send Feedback" button. Below it is a "Toggle In-App Help" switch set to "OFF". The main area of the dialog contains fields for rating experience (5 stars), writing likes ("Seems like a great product to me!"), and suggesting improvements ("Well, add more nice features quickly!").</p>
<p>6. Provide your feedback and hit the Send button.</p>	 <p>The screenshot shows the "Share Feedback" dialog box with the "Send" button highlighted at the bottom. A note below the "Send" button states: "By providing feedback, you allow SAP to use it to improve its products." There are also "Send" and "Cancel" buttons at the bottom.</p>

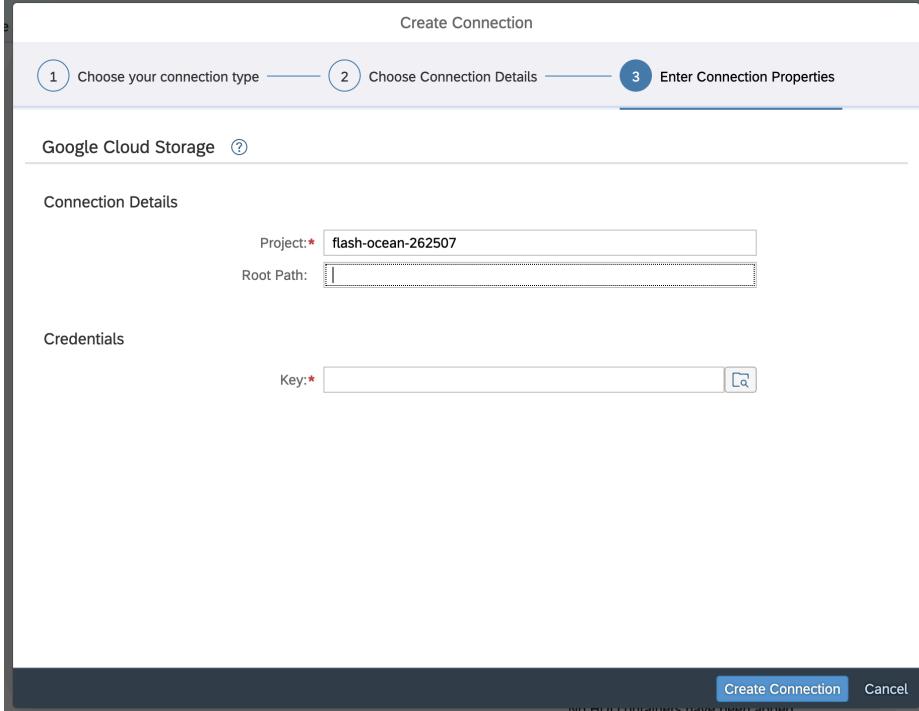
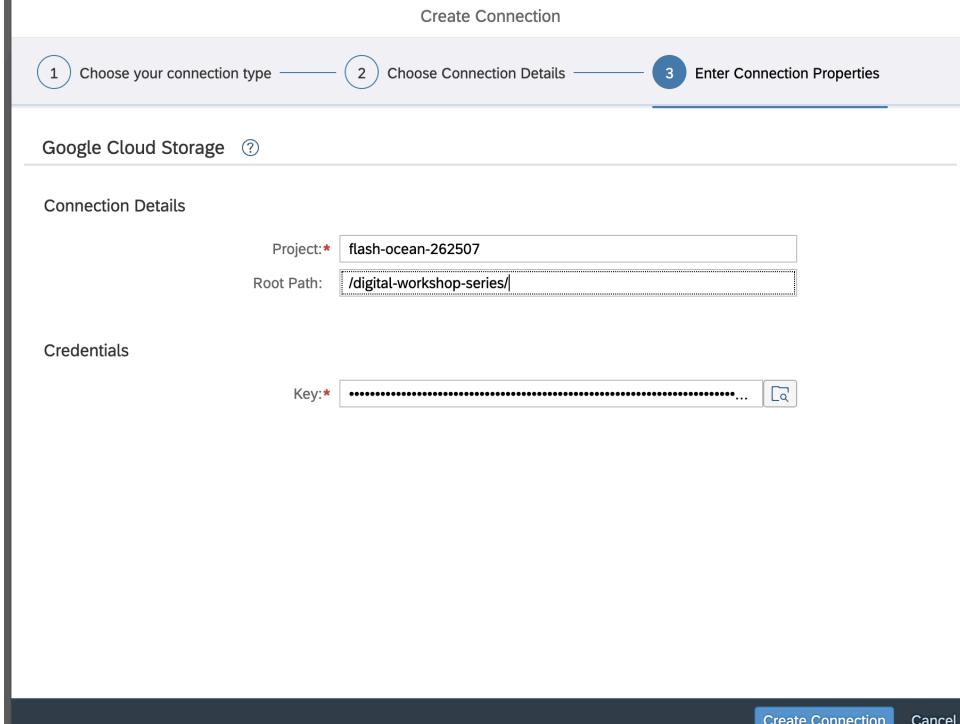
Explanation	Screenshot
7. When this toast message is shown, we received your feedback!	A screenshot of a toast message box. The message reads "Your feedback has been sent." in white text on a dark blue background. The background of the slide shows a blurred SAP Home interface with various icons.
8. Alright now you know how to provide feedback. Let's get started with the real stuff!
9. Click on the menu bar to expand the navigation menu.	A screenshot of the SAP Home interface. The top navigation bar is visible with the SAP logo and "Home" text. A vertical navigation menu is open on the left side, displaying several icons: home, search, user, dashboard, data, process, and settings. The background features a light gray grid pattern.

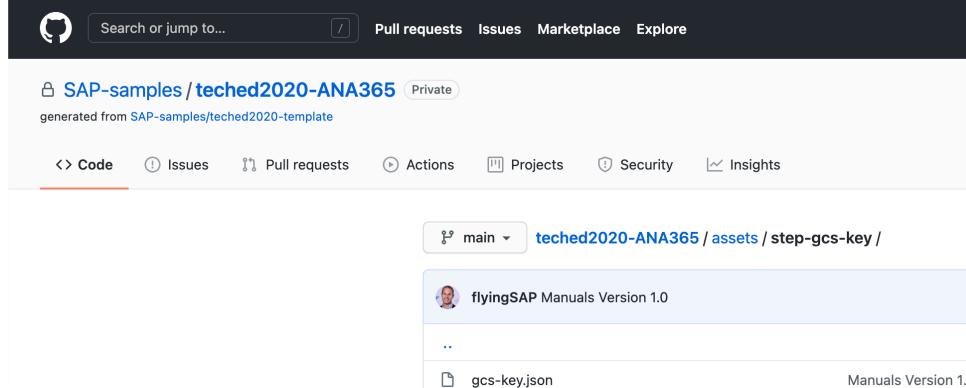
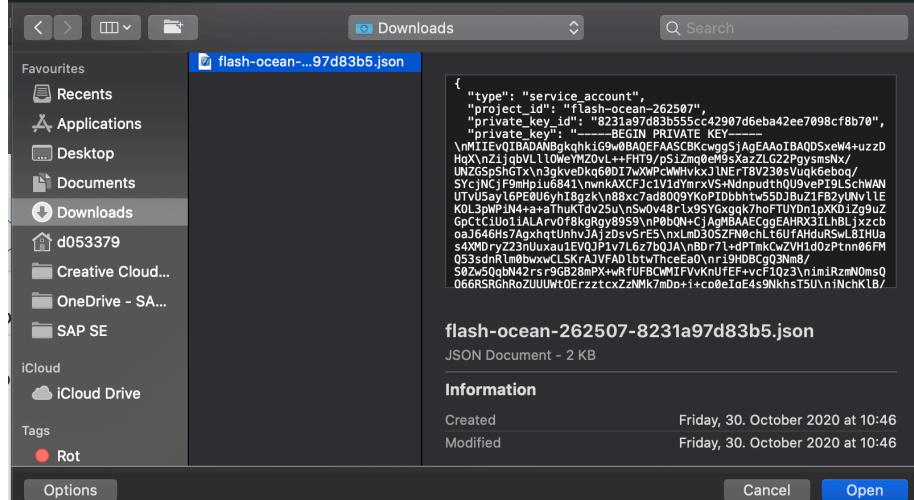
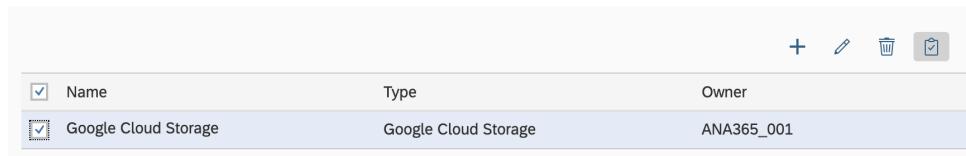
Explanation	Screenshot
10. Select Space Management in the bottom left corner.	
11. Hit the Create Space + button in the top right corner to create a new space.	
12. Enter a Space Name and Space ID. Make sure that at least the Space ID follows the syntax ANA365_<your three-digit number>. Then hit Create to create your space.	
13. Reduce the space size in the Overview section at the top. Make sure to specify both the Disk (GB) and In-Memory (GB) storage assignment as 0,1 (GB).	

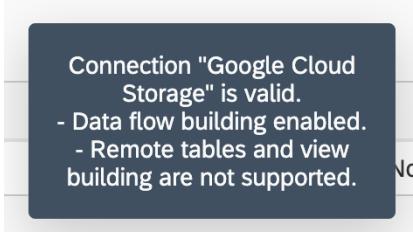
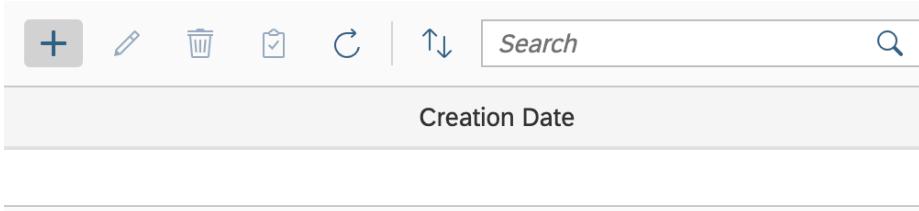
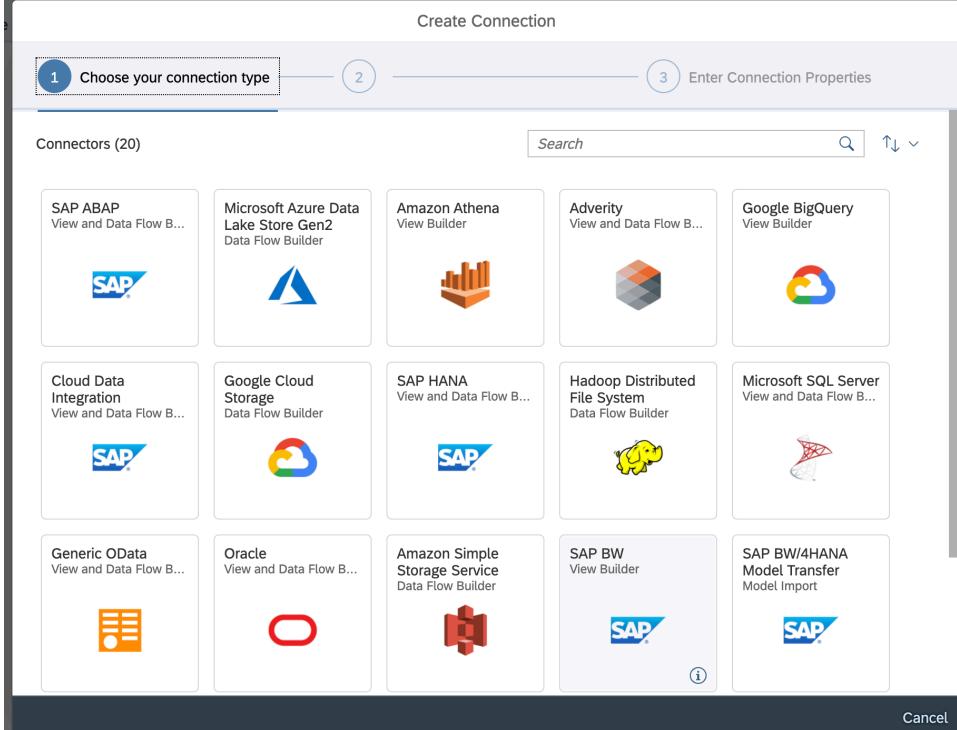
Explanation	Screenshot
14. Hit Save in the top right corner to save your changes.	
15. Head on to the Members section and hit the Add button on the right to add yourself to your space.	
16. Search for your user ANA365_<your three digit number> in the dialog, select your user and hit Add to close the dialog. Make sure that it is really your ANA365 user!	

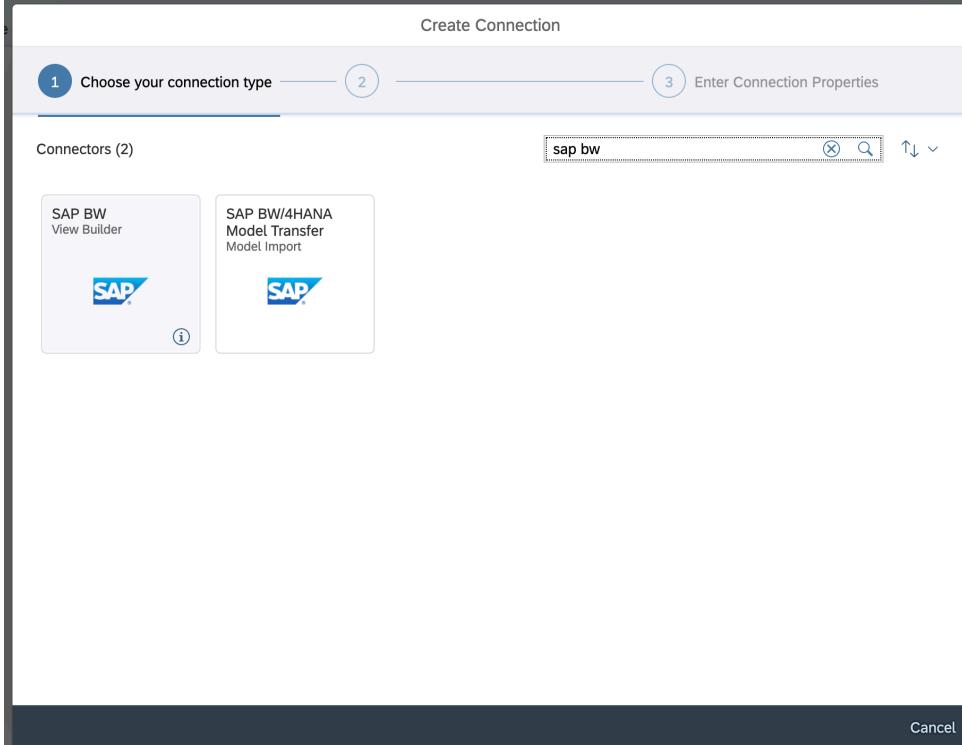
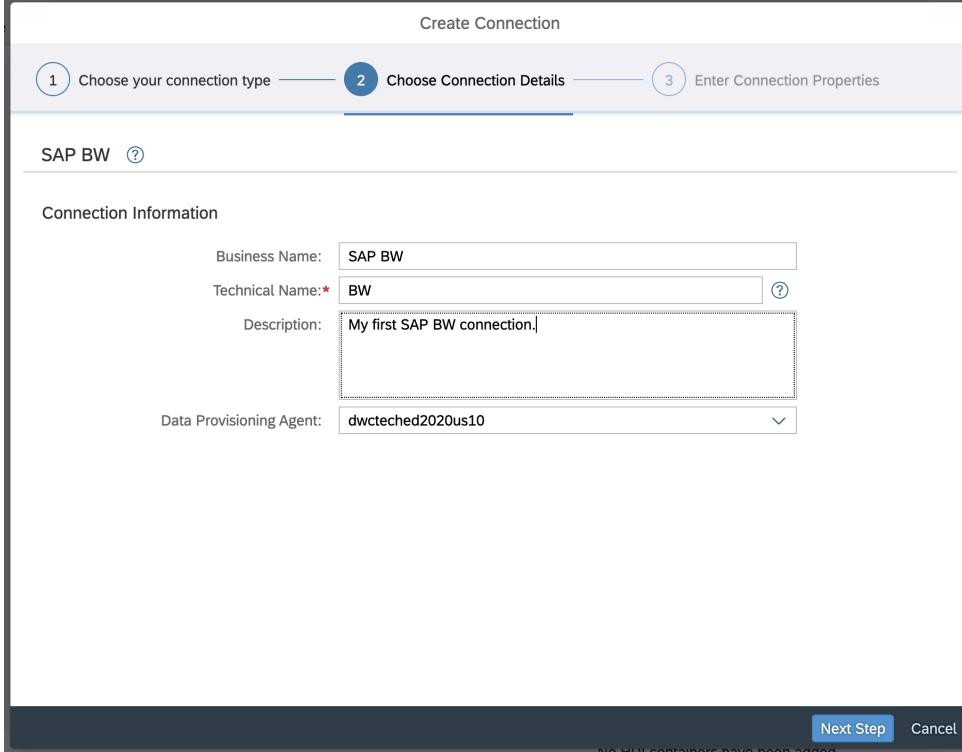
Explanation	Screenshot
17. Head on to the Connections (Local Connections) section and hit the + - button to create a new connection.	
18. Select the Google Cloud Storage tile.	
19. Or use the filter and search for Google Cloud storage in case you cannot find it in the list of connections.	

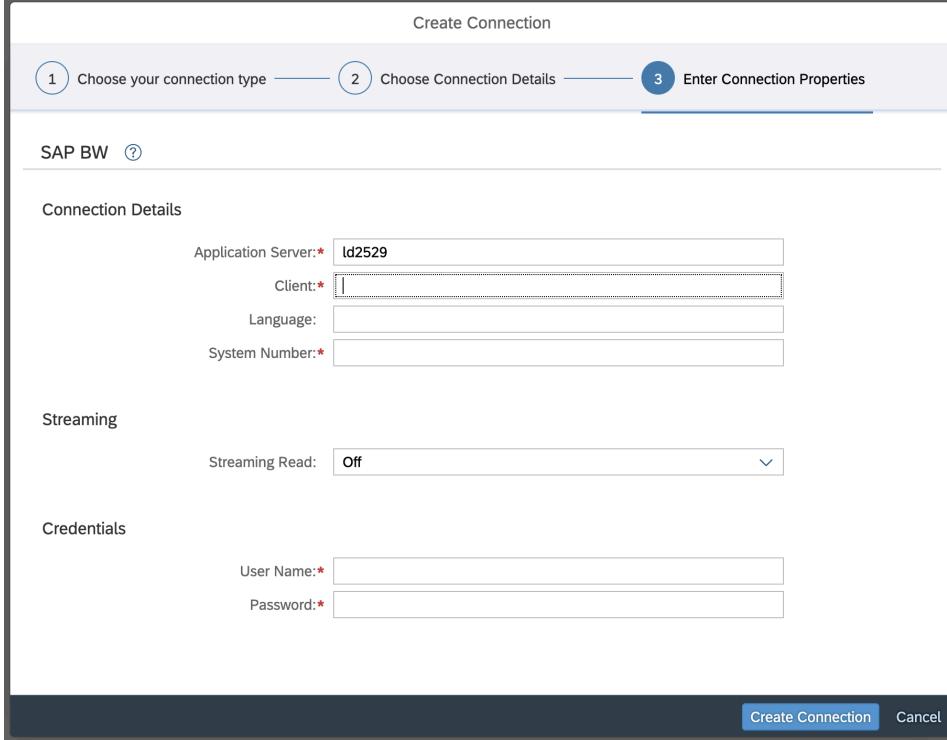
Explanation	Screenshot
<p>20. Enter a meaningful business name and technical name as well as a useful description.</p>	<p>The screenshot shows the 'Create Connection' interface. Step 2, 'Choose Connection Details', is active. A 'Google Cloud Storage' connection is selected. The 'Connection Information' section contains the following data:</p> <ul style="list-style-type: none"> Business Name: Google Cloud Storage Technical Name: GCS Description: My first Google Cloud Storage connection. <p>At the bottom right are 'Next Step' and 'Cancel' buttons.</p>
<p>21. Hit Next Step to navigate to the next screen.</p>	<p>The screenshot shows the 'Create Connection' interface. Step 3, 'Enter Connection Properties', is active. The 'Connection Details' section contains the following data:</p> <ul style="list-style-type: none"> Project: (empty input field) Root Path: (empty input field) <p>The 'Credentials' section contains a 'Key:' field with an empty input field and a magnifying glass icon.</p> <p>At the bottom right are 'Create Connection' and 'Cancel' buttons.</p>

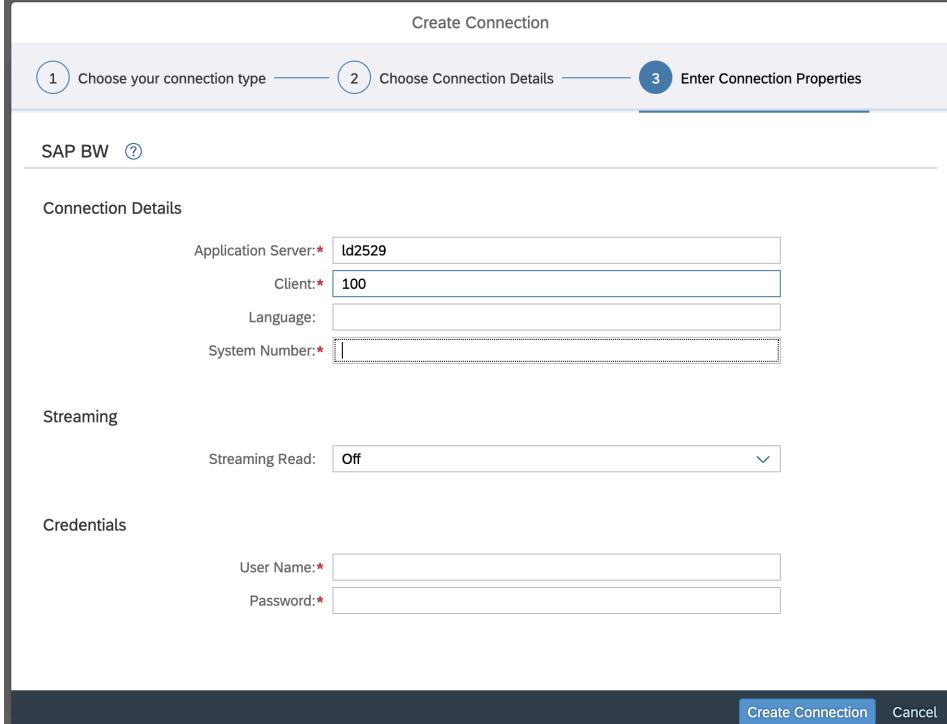
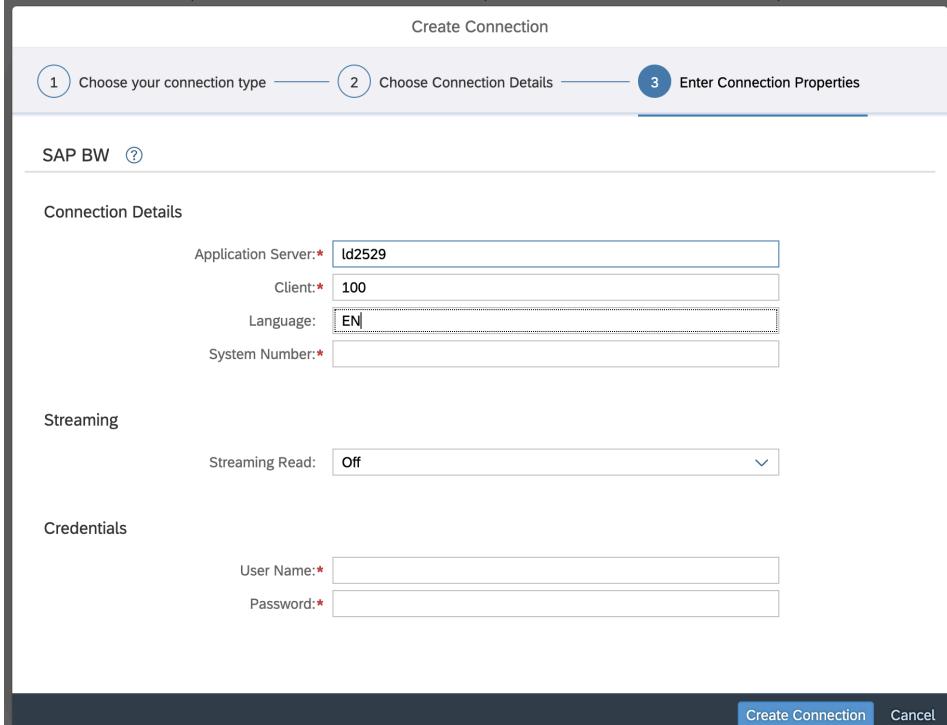
Explanation	Screenshot
<p>22. Enter the Project as flash-ocean-262507</p>	 <p>The screenshot shows the 'Create Connection' dialog for Google Cloud Storage. It is divided into three steps: 1. Choose your connection type (done), 2. Choose Connection Details (done), and 3. Enter Connection Properties (selected). The 'Connection Details' section shows a 'Project:' field containing 'flash-ocean-262507' and a 'Root Path:' field containing '/'. The 'Credentials' section has a 'Key:' field with a placeholder value. At the bottom, there are 'Create Connection' and 'Cancel' buttons.</p>
<p>23. Enter the root path as /digital-workshop-series/</p>	 <p>The screenshot shows the 'Create Connection' dialog for Google Cloud Storage, identical to the previous one but with a different root path. The 'Root Path:' field now contains '/digital-workshop-series/'. The rest of the interface, including the 'Create Connection' and 'Cancel' buttons at the bottom, remains the same.</p>

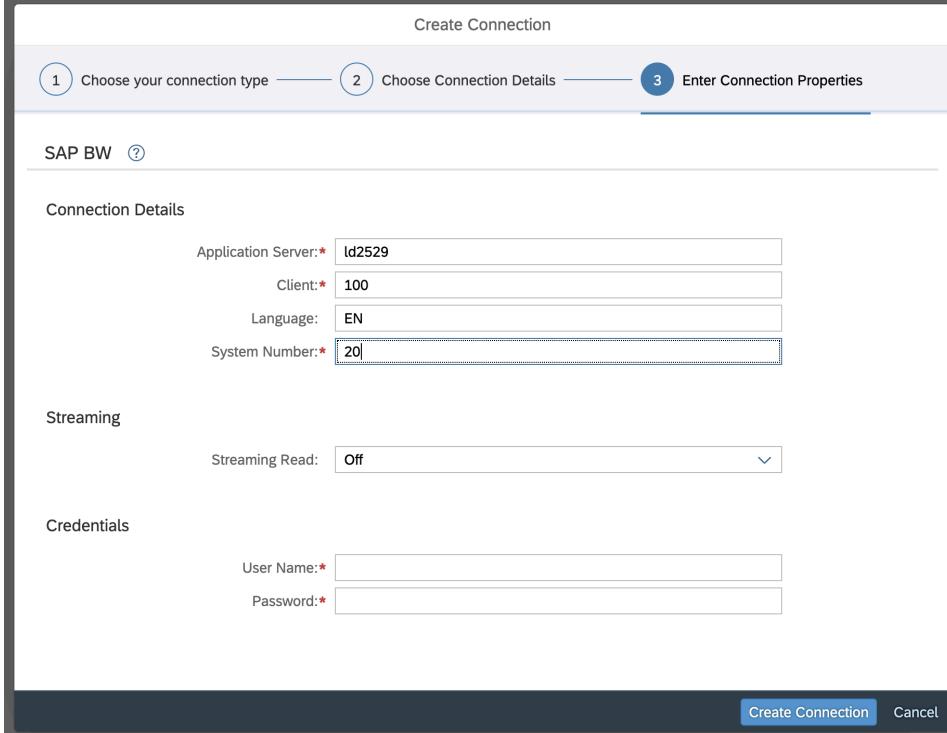
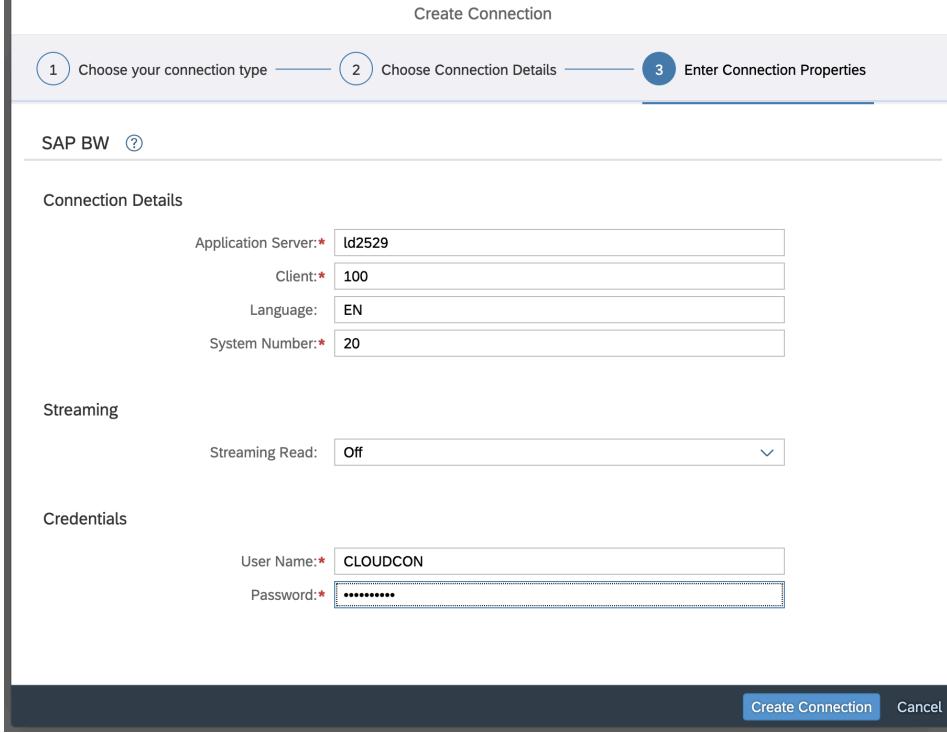
Explanation	Screenshot
<p>24. Download the key <code>gcs-key.json</code> from the assets folder in the Github repository here: https://github.com/SAP-samples/teched2020-ANA365/tree/main/assets/step-gcs-key</p>	
<p>25. Hit the Browse button next to the Key entry field and select the downloaded file.</p>	
<p>26. Hit Create Connection to finish the dialog.</p>	
<p>27. Select the created connection from the list of connections and hit the Validate Connection button on the right.</p>	

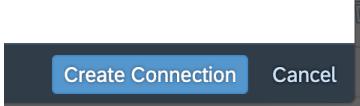
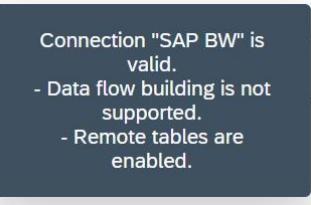
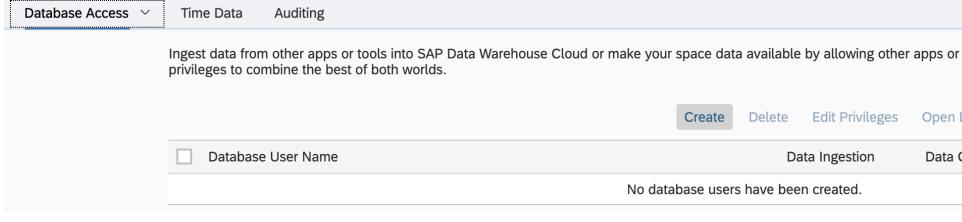
Explanation	Screenshot
28. Make sure that the connection is valid for data flow building in the toast message show non the bottom of the screen.	 <p>Connection "Google Cloud Storage" is valid. - Data flow building enabled. - Remote tables and view building are not supported.</p>
29. Hit the + button again to create another connection.	 <p>+ Search</p> <p>Creation Date</p>
30. This time select the SAP BW connection.	 <p>Create Connection</p> <p>1 Choose your connection type 2 3 Enter Connection Properties</p> <p>Connectors (20)</p> <ul style="list-style-type: none"> SAP ABAP View and Data Flow B...  Microsoft Azure Data Lake Store Gen2 Data Flow Builder  Amazon Athena View Builder  Adverity View and Data Flow B...  Google BigQuery View Builder  Cloud Data Integration View and Data Flow B...  Google Cloud Storage Data Flow Builder  SAP HANA View and Data Flow B...  Hadoop Distributed File System Data Flow Builder  Microsoft SQL Server View and Data Flow B...  Generic OData View and Data Flow B...  Oracle View and Data Flow B...  Amazon Simple Storage Service Data Flow Builder  SAP BW View Builder  SAP BW/4HANA Model Transfer Model Import  <p>No HUI containers have been added.</p> <p>Cancel</p>

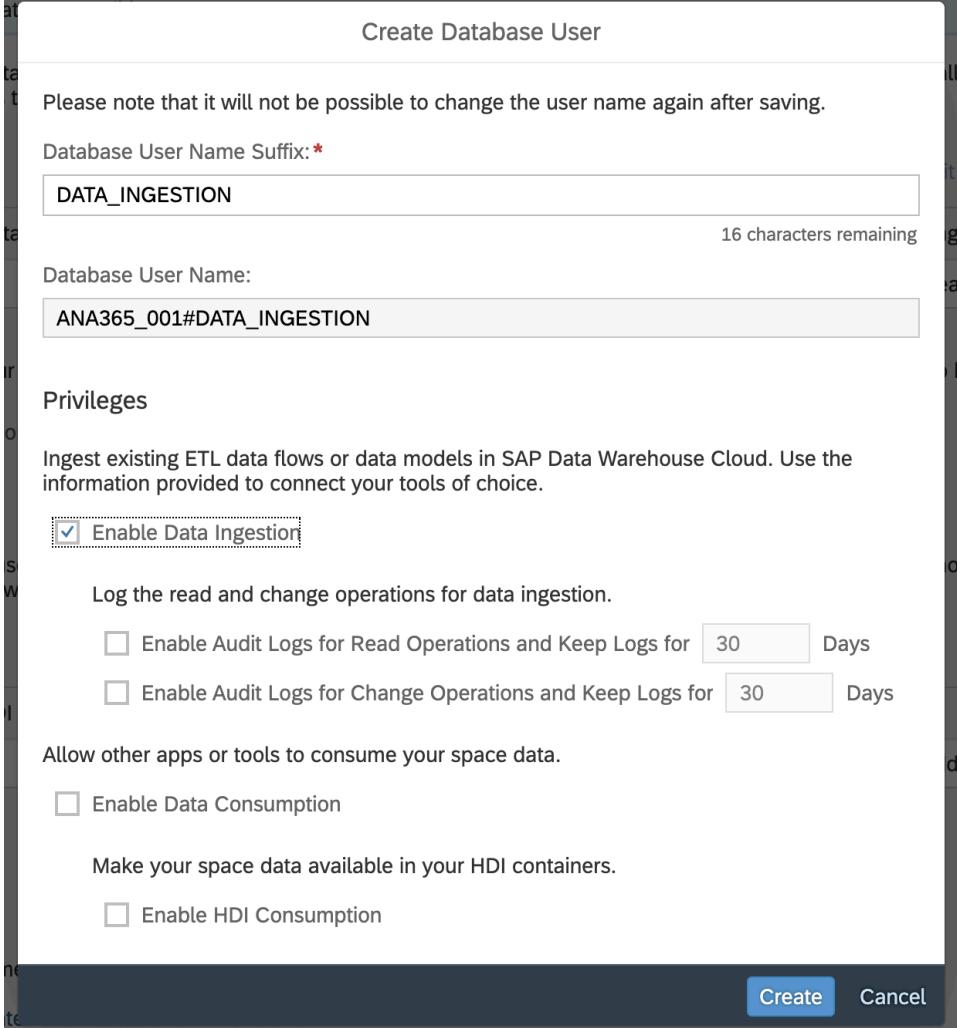
Explanation	Screenshot
<p>31. In case you cannot find it, search for SAP BW in the filter bar.</p>	
<p>32. Enter a meaningful business name and technical name as well as a descriptive description.</p>	

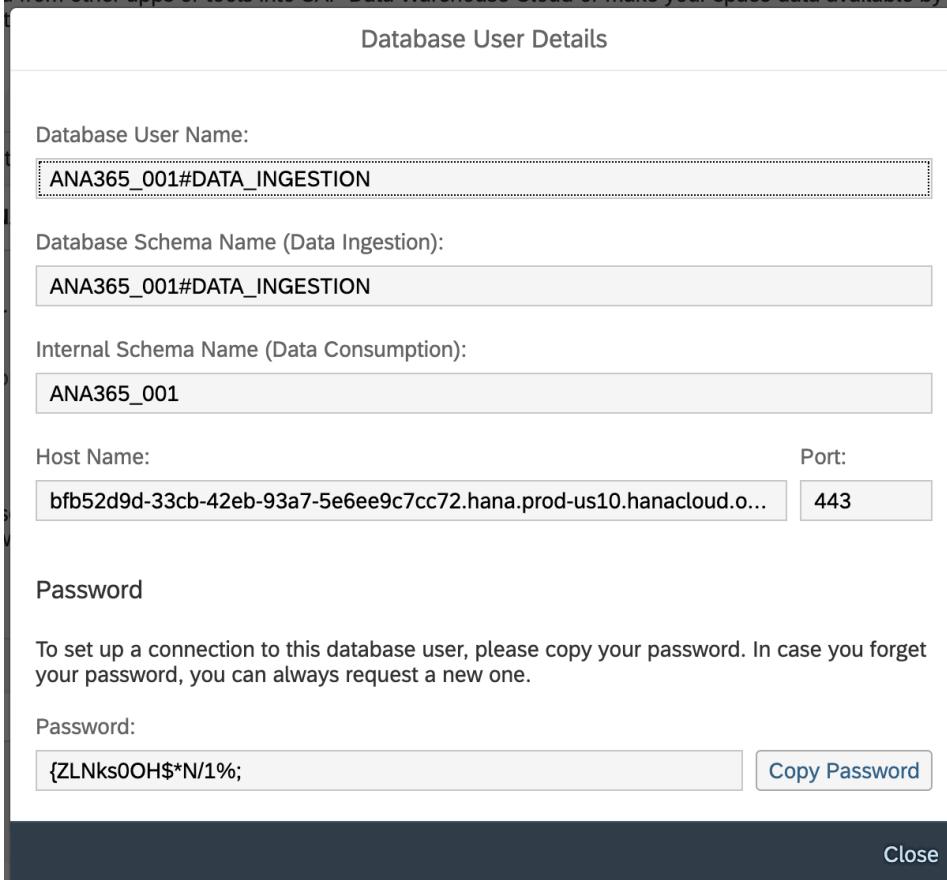
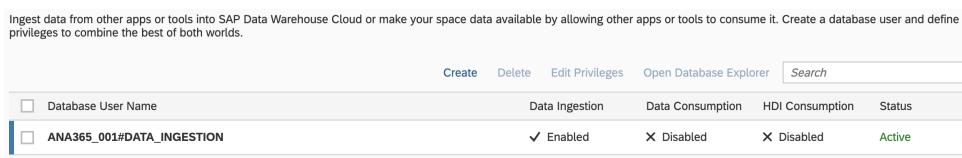
Explanation	Screenshot
<p>33. Make sure that the right Data Provisioning Agent is selected. The ending (in this case us10) should match the tenant you are logged in to.</p>	<p>Data Provisioning Agent:</p> 
<p>34. Hit Next Step.</p>	
<p>35. Fill out the Connection Details. Use Id2529 as the Application Server.</p>	

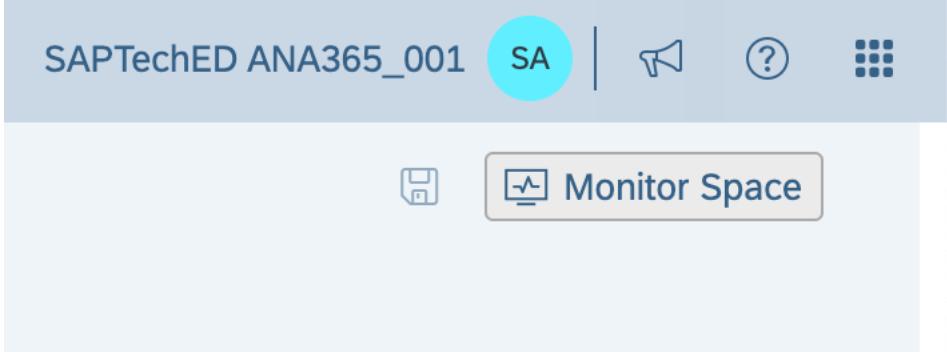
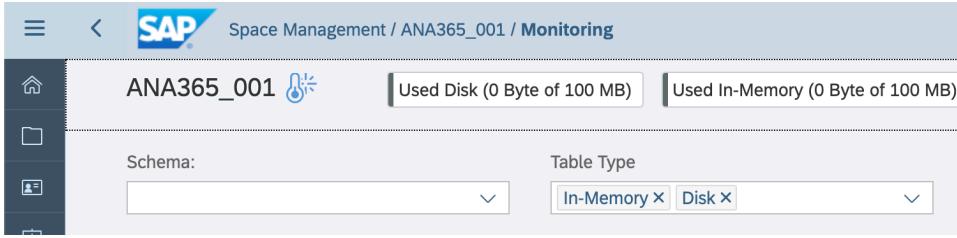
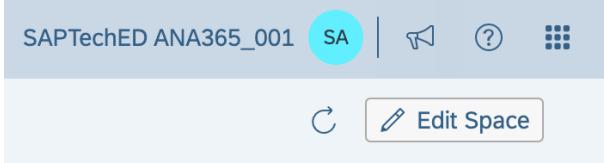
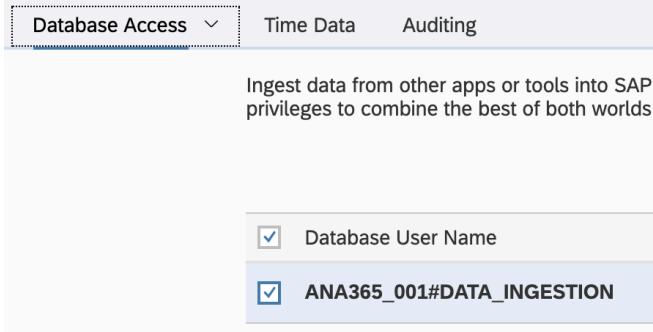
Explanation	Screenshot
36. Enter Client 100.	 <p>SAP BW ?</p> <p>Connection Details</p> <p>Application Server: * <input type="text" value="id2529"/> Client: * <input type="text" value="100"/> Language: <input type="text"/> System Number: * <input type="text"/></p> <p>Streaming</p> <p>Streaming Read: <input type="text" value="Off"/></p> <p>Credentials</p> <p>User Name: * <input type="text"/> Password: * <input type="text"/></p> <p>Create Connection Cancel</p>
37. Optionally enter the language as EN (is the default anyway).	 <p>SAP BW ?</p> <p>Connection Details</p> <p>Application Server: * <input type="text" value="id2529"/> Client: * <input type="text" value="100"/> Language: <input type="text" value="EN"/> System Number: * <input type="text"/></p> <p>Streaming</p> <p>Streaming Read: <input type="text" value="Off"/></p> <p>Credentials</p> <p>User Name: * <input type="text"/> Password: * <input type="text"/></p> <p>Create Connection Cancel</p>

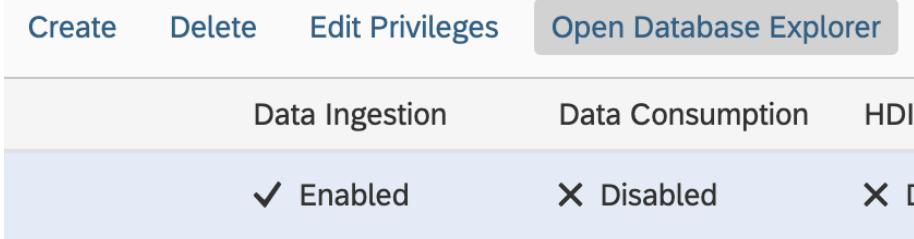
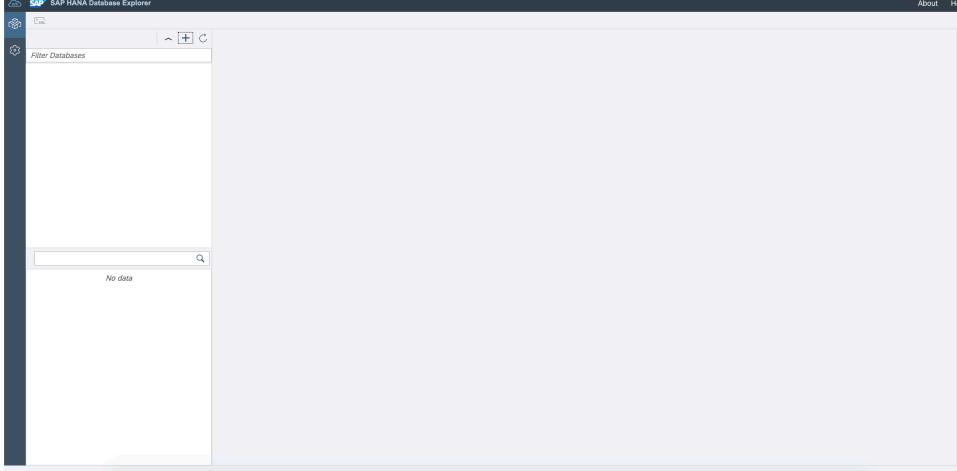
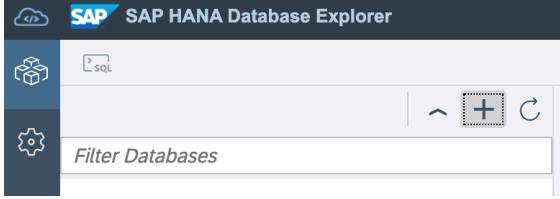
Explanation	Screenshot
<p>38. Enter System Number 20.</p>	 <p>Create Connection</p> <p>1 Choose your connection type 2 Choose Connection Details 3 Enter Connection Properties</p> <p>SAP BW ?</p> <p>Connection Details</p> <p>Application Server: * <input type="text" value="ld2529"/> Client: * <input type="text" value="100"/> Language: <input type="text" value="EN"/> System Number: * <input type="text" value="20"/></p> <p>Streaming</p> <p>Streaming Read: <input type="text" value="Off"/></p> <p>Credentials</p> <p>User Name: * <input type="text"/> Password: * <input type="password"/></p> <p>Create Connection Cancel</p>
<p>39. Leave the Streamind Read option as Off. Enter user CLOUDCON with password Teched2020</p>	 <p>Create Connection</p> <p>1 Choose your connection type 2 Choose Connection Details 3 Enter Connection Properties</p> <p>SAP BW ?</p> <p>Connection Details</p> <p>Application Server: * <input type="text" value="ld2529"/> Client: * <input type="text" value="100"/> Language: <input type="text" value="EN"/> System Number: * <input type="text" value="20"/></p> <p>Streaming</p> <p>Streaming Read: <input type="text" value="Off"/></p> <p>Credentials</p> <p>User Name: * <input type="text" value="CLOUDCON"/> Password: * <input type="password" value="Teched2020"/></p> <p>Create Connection Cancel</p>

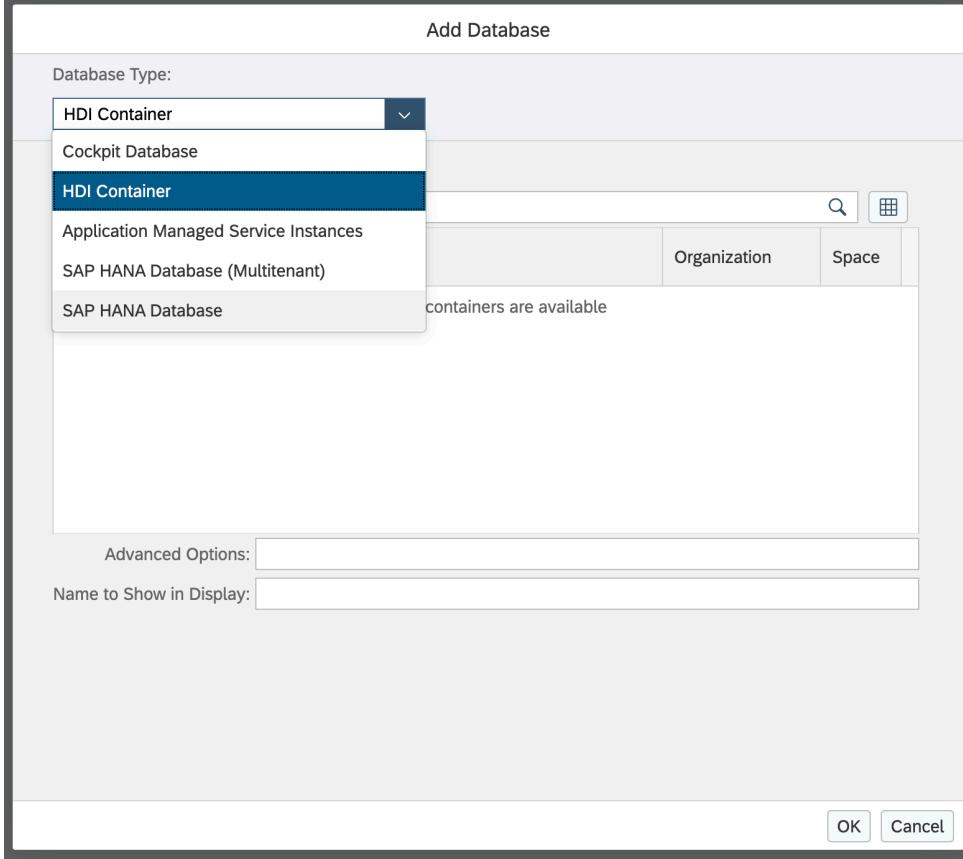
Explanation	Screenshot
40. Hit Create Connection to finish the dialog.	
41. Select the newly created SAP BW connection and again hit the Validate Connection button on the right.	
42. Make sure that the toast message on the bottom of the screen mentions that the connection can be used in the view builder.	
43. Head on to the Database Access (Database Users) section. Hit the Create button to create a new database user.	

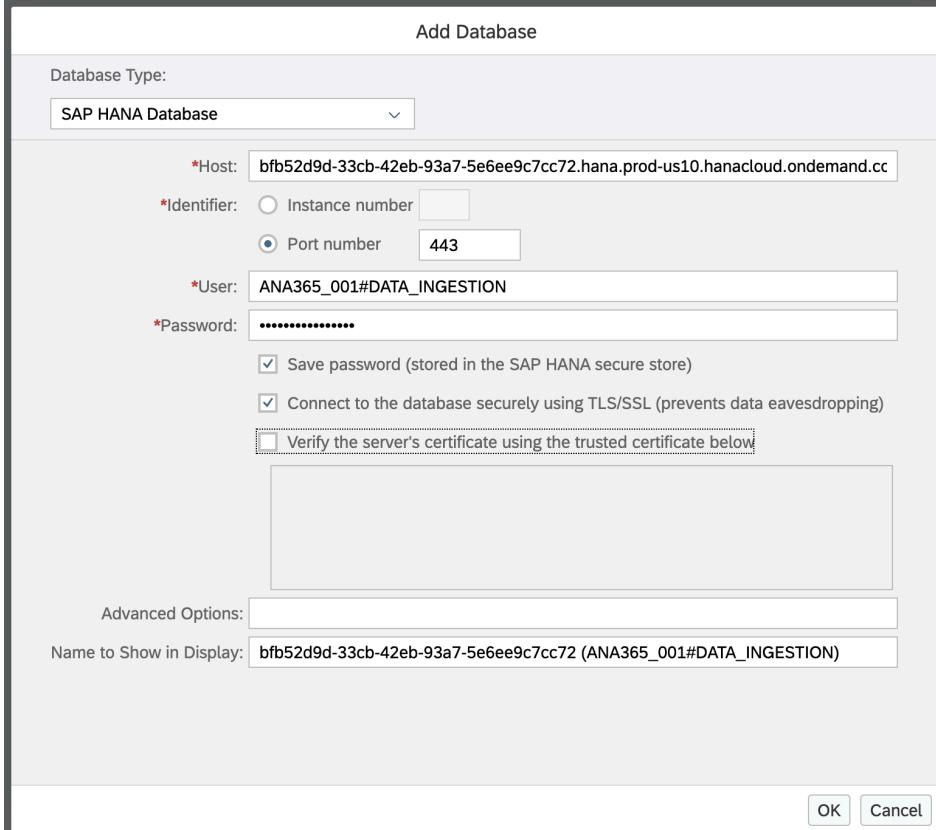
Explanation	Screenshot
<p>44. Enter a meaningful Database User Name suffix and make sure to select the Enable Data Ingestion checkbox in the Privileges section. Then hit Create to close the dialog.</p>	 <p>Create Database User</p> <p>Please note that it will not be possible to change the user name again after saving.</p> <p>Database User Name Suffix: *</p> <input type="text" value="DATA_INGESTION"/> <p>16 characters remaining</p> <p>Database User Name:</p> <input type="text" value="ANA365_001#DATA_INGESTION"/> <p>Privileges</p> <p>Ingest existing ETL data flows or data models in SAP Data Warehouse Cloud. Use the information provided to connect your tools of choice.</p> <p><input checked="" type="checkbox"/> Enable Data Ingestion</p> <p>Log the read and change operations for data ingestion.</p> <p><input type="checkbox"/> Enable Audit Logs for Read Operations and Keep Logs for <input type="text" value="30"/> Days</p> <p><input type="checkbox"/> Enable Audit Logs for Change Operations and Keep Logs for <input type="text" value="30"/> Days</p> <p>Allow other apps or tools to consume your space data.</p> <p><input type="checkbox"/> Enable Data Consumption</p> <p>Make your space data available in your HDI containers.</p> <p><input type="checkbox"/> Enable HDI Consumption</p> <p>Create Cancel</p>

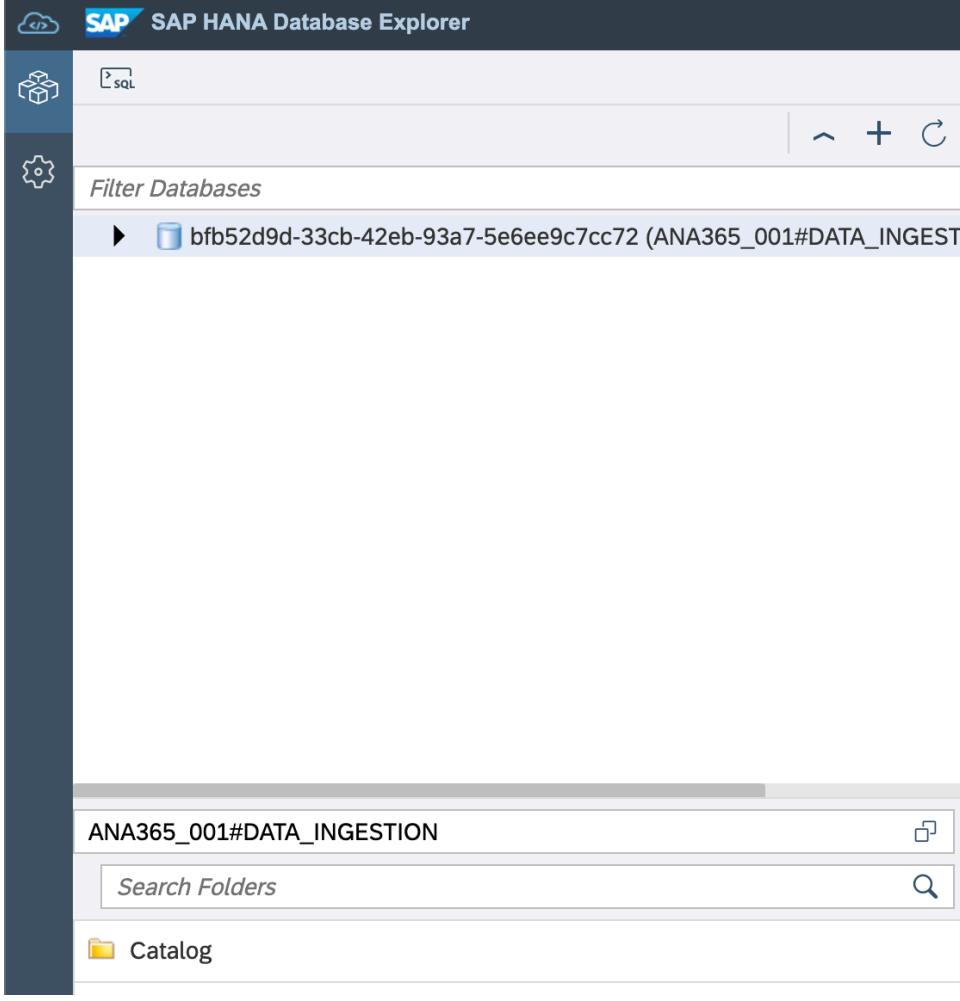
Explanation	Screenshot										
45. Make sure to copy the Host Name, Port, Database User Name and Password to a safe place, for example your local notes on Mac or Notepad on Windows. Then hit Close to finish the user creation.	 <p>Database User Details</p> <p>Database User Name: ANA365_001#DATA_INGESTION</p> <p>Database Schema Name (Data Ingestion): ANA365_001#DATA_INGESTION</p> <p>Internal Schema Name (Data Consumption): ANA365_001</p> <p>Host Name: bf... Port: 443</p> <p>Password {ZLNks0OH\$*N/1%;} <input type="button" value="Copy Password"/></p> <p><input type="button" value="Close"/></p>										
46. The created database user should be shown with status Active .	 <p>Ingest data from other apps or tools into SAP Data Warehouse Cloud or make your space data available by allowing other apps or tools to consume it. Create a database user and define privileges to combine the best of both worlds.</p> <table border="1"> <thead> <tr> <th data-bbox="518 1332 551 1353"><input type="checkbox"/> Database User Name</th> <th data-bbox="1041 1332 1122 1353">Data Ingestion</th> <th data-bbox="1139 1332 1220 1353">Data Consumption</th> <th data-bbox="1237 1332 1318 1353">HDI Consumption</th> <th data-bbox="1334 1332 1383 1353">Status</th> </tr> </thead> <tbody> <tr> <td data-bbox="518 1374 551 1396"><input checked="" type="checkbox"/> ANA365_001#DATA_INGESTION</td> <td data-bbox="1041 1374 1090 1396">✓ Enabled</td> <td data-bbox="1139 1374 1188 1396">✗ Disabled</td> <td data-bbox="1237 1374 1286 1396">✗ Disabled</td> <td data-bbox="1334 1374 1383 1396">Active</td> </tr> </tbody> </table>	<input type="checkbox"/> Database User Name	Data Ingestion	Data Consumption	HDI Consumption	Status	<input checked="" type="checkbox"/> ANA365_001#DATA_INGESTION	✓ Enabled	✗ Disabled	✗ Disabled	Active
<input type="checkbox"/> Database User Name	Data Ingestion	Data Consumption	HDI Consumption	Status							
<input checked="" type="checkbox"/> ANA365_001#DATA_INGESTION	✓ Enabled	✗ Disabled	✗ Disabled	Active							
47. Congratulations!	You successfully created your space and created connections to a non-SAP source, Google Big Query! Also you integrated a SAP BW system and enabled your space to get connected to external SQL clients! Before we continue with the second parts, let's quickly make sure that the space is still empty.										

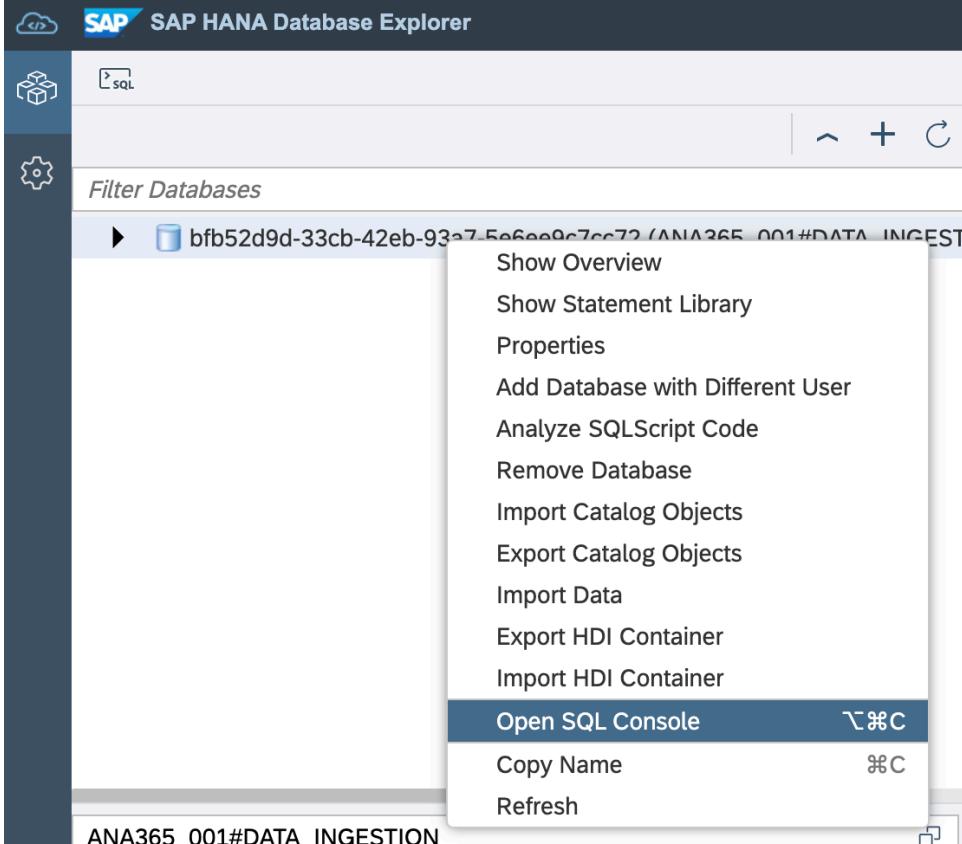
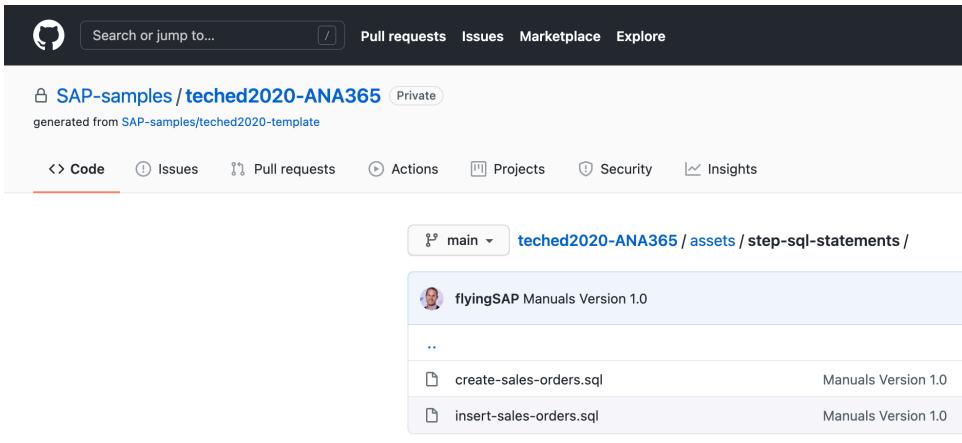
Explanation	Screenshot
48. Before we start loading data into our space, hit the Monitor Space button in the top right corner.	
49. Make sure that the space does not yet contain any data.	
50. Hit Edit Space in the top right corner to navigate back to the Management of your Space.	
51. Now it's time to prep your space with some data!	<p>As part of the second section of this hands-on we will equip your space with all the required data and setup the data models. We will ingest some data via an external SQL client (SAP HANA Database Explorer, but can be any client actually), replicate data from some of the data sets available in the SAP BW source, upload a flat file, use the Data Flow to ETL-like move data from Google Cloud Storage into your space and combine the locally available data from these different steps with some data we access virtually from the SAP BW system.</p>
52. Navigate back to the Database Access section and select the Database User you created.	

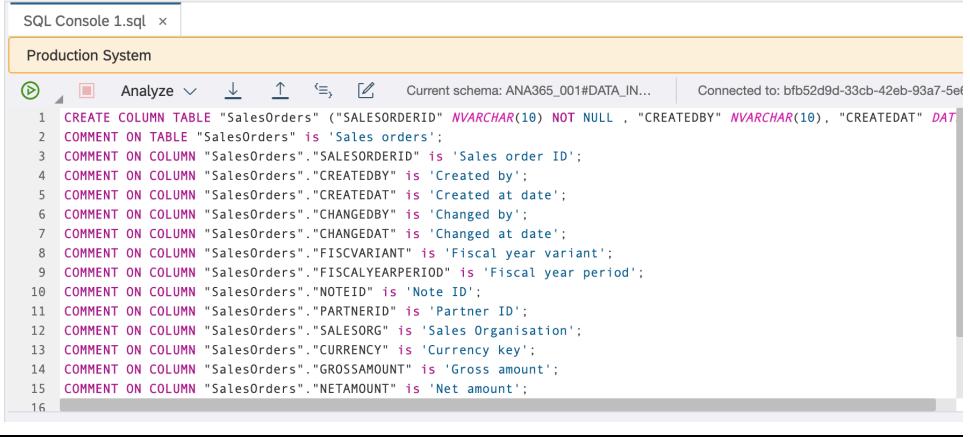
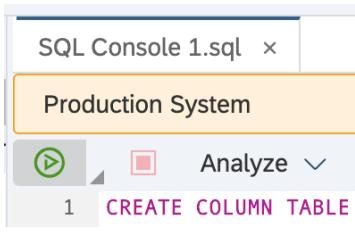
Explanation	Screenshot
53. Hit the Open Database Explorer button on the right. This takes you to the SAP HANA Database Explorer website.	 <p>The screenshot shows a menu bar with 'Create', 'Delete', 'Edit Privileges', and 'Open Database Explorer'. Below the menu is a horizontal bar with three items: 'Data Ingestion' (Enabled), 'Data Consumption' (Disabled), and 'HDI' (Disabled). The 'Open Database Explorer' button is highlighted with a blue background.</p>
54. If you have enabled two-factor authentication on SAP Cloud Platform you need to enter your passcode first. If not enabled you will be directly forwarded to the screen shown in the next step.	<h2 data-bbox="528 677 1099 728">Two-Factor Authentication</h2> <p>To proceed, please enter the time-based passcode generated by your mobile device.</p> <div data-bbox="638 804 1432 1015"> <p>E-Mail, ID, or Login Name <input type="text" value="jascha.kanngiesser@sap.com"/> *</p> <p>Passcode * <input type="text"/></p> <p style="text-align: right;">*Required</p> </div> <p style="text-align: right;">Continue</p>
55. Within the SAP HANA Database Explorer you can execute DML and DDL statements to create tables or views or insert table into tables.	 <p>The screenshot shows the SAP HANA Database Explorer interface with a sidebar containing icons for cloud, cube, and gear. The main area displays a table with the message 'No data'.</p>
56. Hit the + button in the top left corner.	 <p>The screenshot shows the SAP HANA Database Explorer interface with the '+' button highlighted in the top left corner of the toolbar.</p>

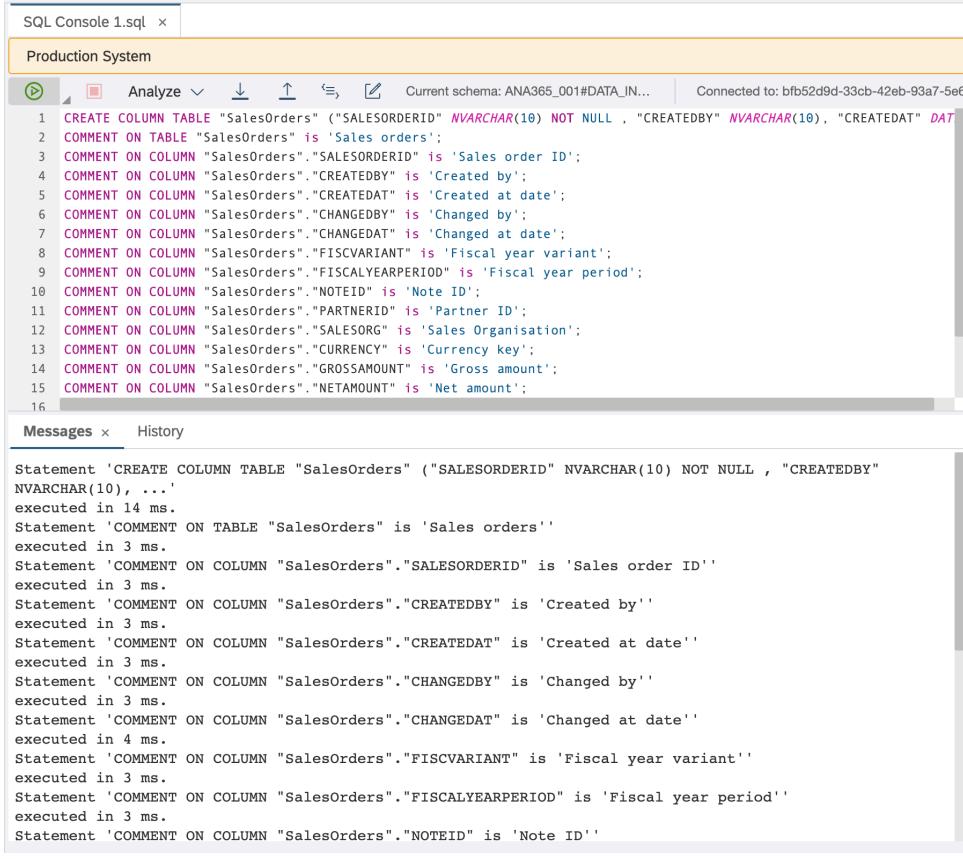
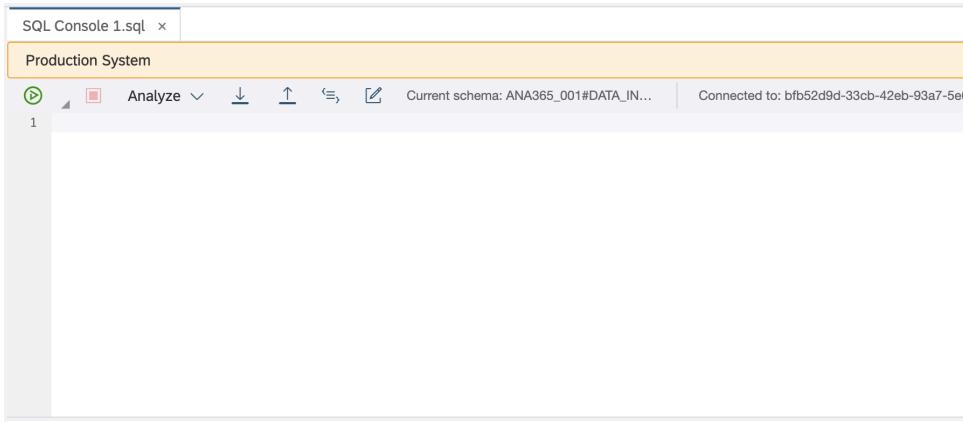
Explanation	Screenshot
<p>57. From the Database Type select SAP HANA Database.</p>	 <p>The screenshot shows the 'Add Database' dialog box. In the top right corner, there is a search icon and a grid icon. Below the title 'Add Database', there is a section labeled 'Database Type:' with a dropdown menu. The dropdown menu has the following options: 'HDI Container' (selected), 'Cockpit Database', 'HDI Container' (highlighted in blue), 'Application Managed Service Instances', 'SAP HANA Database (Multitenant)', and 'SAP HANA Database'. To the right of the dropdown, there is a table with two columns: 'Organization' and 'Space'. Below the table, it says 'containers are available'. At the bottom of the dialog box, there are 'Advanced Options:' and 'Name to Show in Display:' input fields, and 'OK' and 'Cancel' buttons.</p>

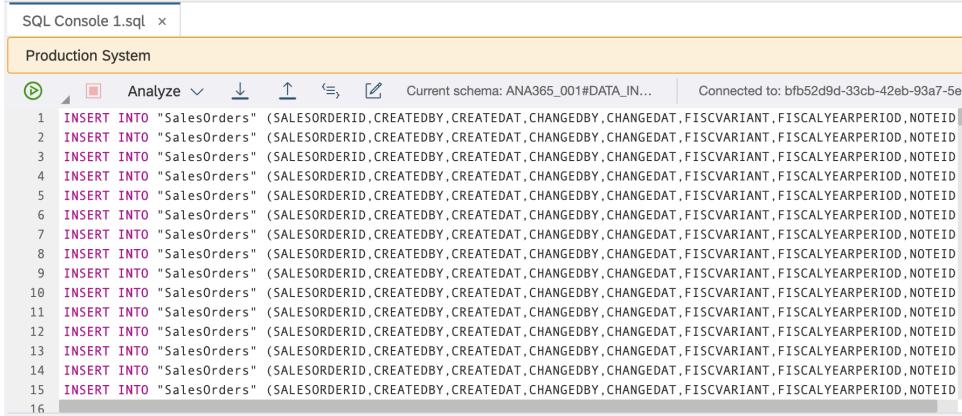
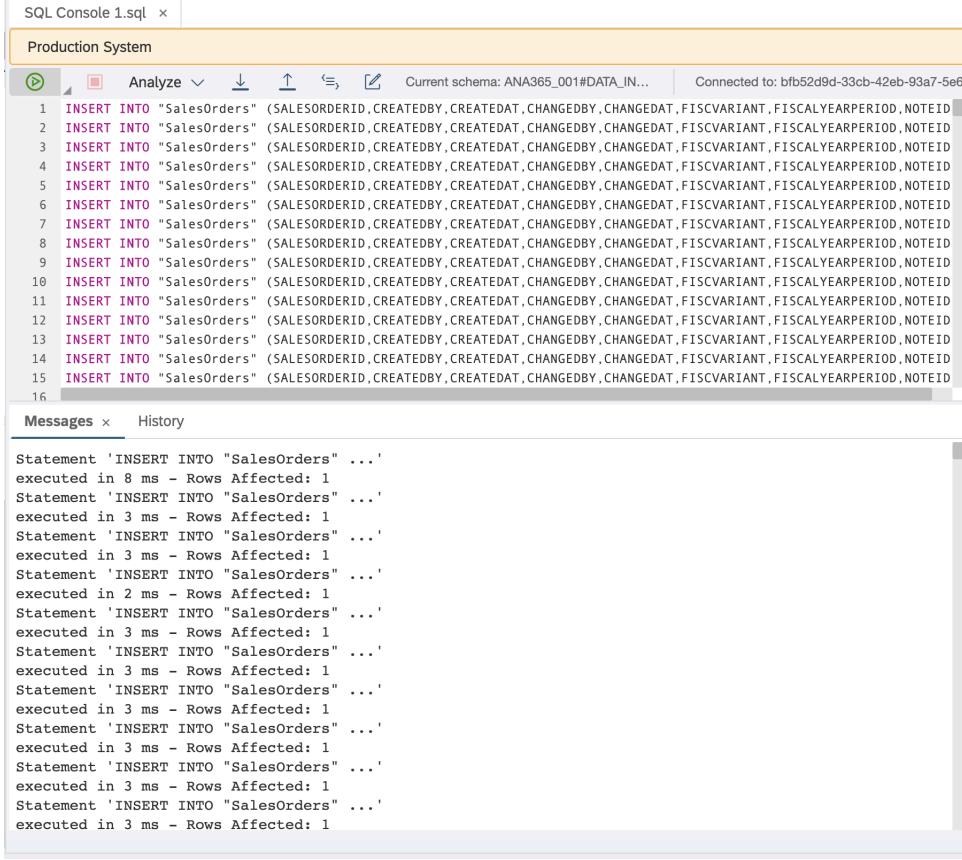
Explanation	Screenshot
<p>58. Enter the information copied earlier to a safe place when creating the database user like the Host Name, Port, Database User and Password.</p>	 <p>The screenshot shows the 'Add Database' dialog for a SAP HANA Database. The 'Host' field contains the URL 'bfb52d9d-33cb-42eb-93a7-5e6ee9c7cc72.hana.prod-us10.hanacloud.ondemand.cc'. The 'Port number' is set to 443. The 'User' field is 'ANA365_001#DATA_INGESTION' and the 'Password' field is masked. Under 'Advanced Options', there is a checkbox for 'Save password (stored in the SAP HANA secure store)' which is checked. Below it are two more checkboxes: 'Connect to the database securely using TLS/SSL (prevents data eavesdropping)' which is also checked, and 'Verify the server's certificate using the trusted certificate below' which is unchecked. At the bottom right are 'OK' and 'Cancel' buttons.</p>
<p>59. Make sure to check the Save password (stored in the SAP HANA secure store) and Connect to the database securely using TLS/SSL (prevents data eavesdropping) options. Uncheck the Verify the server's certificate using the trusted certificate below option.</p>	<p><input checked="" type="checkbox"/> Save password (stored in the SAP HANA secure store)</p> <p><input checked="" type="checkbox"/> Connect to the database securely using TLS/SSL (prevents data eavesdropping)</p> <p><input type="checkbox"/> Verify the server's certificate using the trusted certificate below</p>

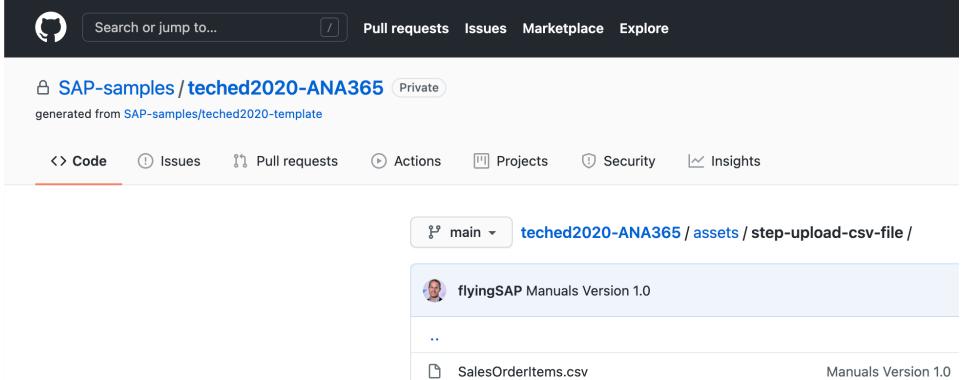
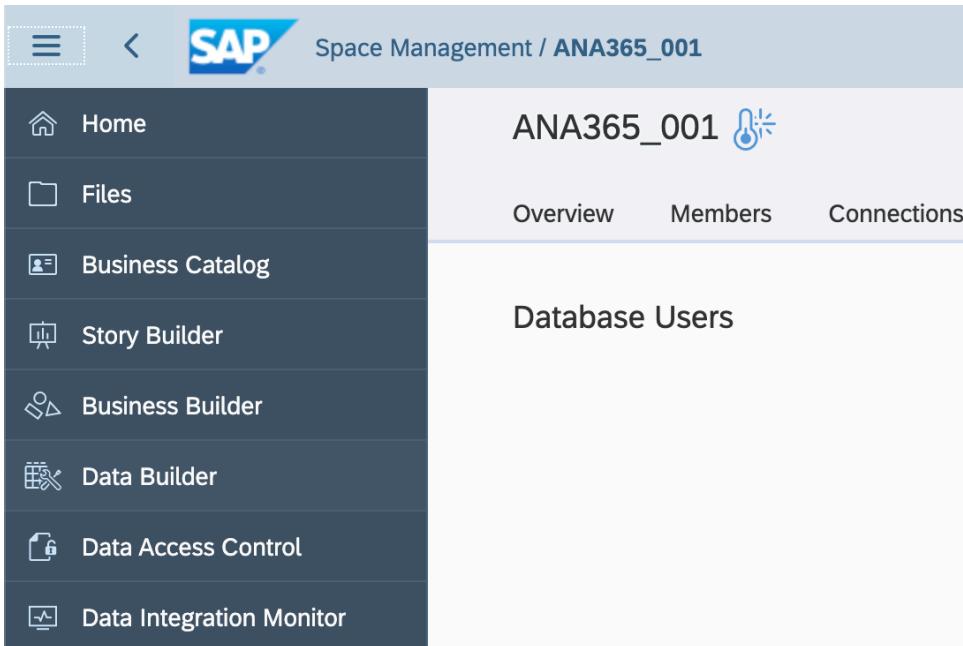
Explanation	Screenshot
<p>60. Hit the OK button to add the database to your list of databases.</p>	 <p>The screenshot shows the SAP HANA Database Explorer interface. The title bar reads "SAP HANA Database Explorer". On the left, there is a sidebar with icons for clouds, databases, and settings. The main area displays a list of databases under the heading "Filter Databases". One database entry is highlighted: "bfb52d9d-33cb-42eb-93a7-5e6ee9c7cc72 (ANA365_001#DATA_INGEST)". Below this, there is a folder structure with "ANA365_001#DATA_INGESTION" expanded, showing "Search Folders" and "Catalog".</p>

Explanation	Screenshot
<p>61. Right-click the newly created database and select Open SQL Console.</p>	 <p>The screenshot shows the SAP HANA Database Explorer interface. A context menu is open over a database entry named "ANALOG_001#DATA_INGEST". The menu items include: Show Overview, Show Statement Library, Properties, Add Database with Different User, Analyze SQLScript Code, Remove Database, Import Catalog Objects, Export Catalog Objects, Import Data, Export HDI Container, Import HDI Container, Open SQL Console (which is highlighted in blue), Copy Name, and Refresh.</p>
<p>62. Get the SQL statements from the folder in the Github repository to create and fill the table that holds the Sales Orders: https://github.com/SAP-samples/teched2020-ANA365/tree/main/assets/step-sql-statements</p>	 <p>The screenshot shows a GitHub repository page for "SAP-samples/teched2020-ANA365". The "step-sql-statements" folder is selected. The repository is private and was generated from "SAP-samples/teched2020-template". The main branch is "main". The folder contains two files: "create-sales-orders.sql" and "insert-sales-orders.sql", both of which are labeled "Manuals Version 1.0".</p>

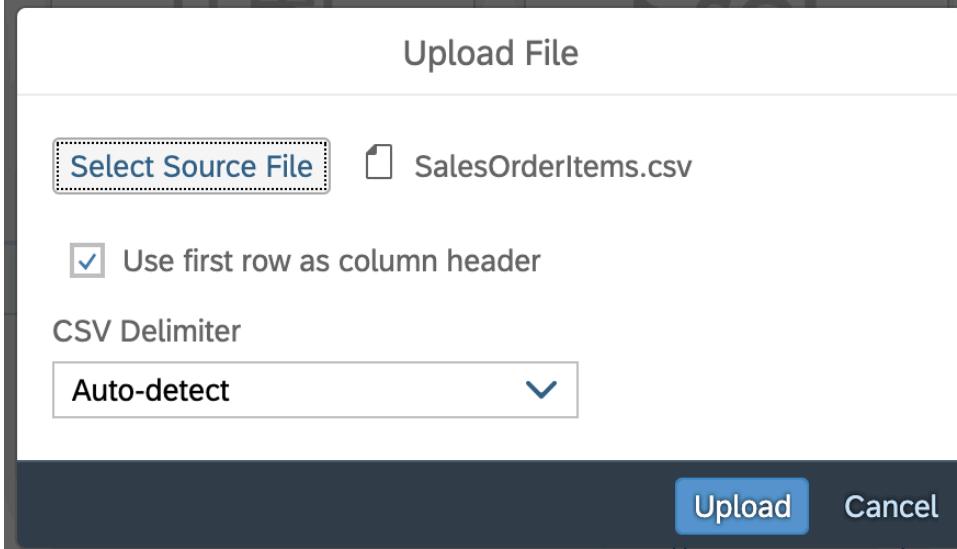
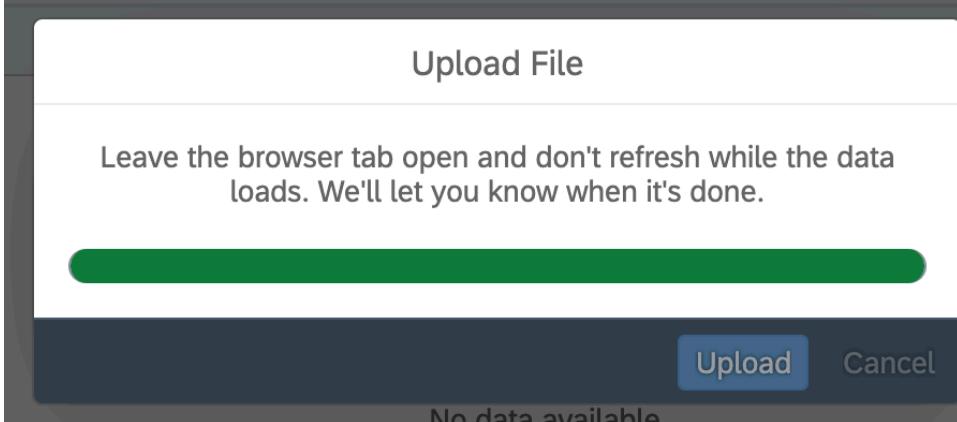
Explanation	Screenshot
63. Open the create-sales-orders.sql file and copy over the content in the SQL console opened in the SAP HANA Database Explorer.	 <p>The screenshot shows the SAP HANA Database Explorer interface with an open SQL console titled "SQL Console 1.sql". The console displays the following SQL script:</p> <pre> CREATE COLUMN TABLE "SalesOrders" ("SALESORDERID" NVARCHAR(10) NOT NULL , "CREATEDBY" NVARCHAR(10), "CREATEDAT" DATETIME, "CHANGEDBY" NVARCHAR(10), "CHANGEDAT" DATETIME, "FISCALVARIANT" NVARCHAR(10), "FISCALYEARPERIOD" NVARCHAR(10), "NOTEID" NVARCHAR(10), "PARTNERID" NVARCHAR(10), "SALESORG" NVARCHAR(10), "CURRENCY" NVARCHAR(10), "GROSSAMOUNT" DECIMAL(18,2), "NETAMOUNT" DECIMAL(18,2)); COMMENT ON TABLE "SalesOrders" IS 'Sales orders'; COMMENT ON COLUMN "SalesOrders"."SALESORDERID" IS 'Sales order ID'; COMMENT ON COLUMN "SalesOrders"."CREATEDBY" IS 'Created by'; COMMENT ON COLUMN "SalesOrders"."CREATEDAT" IS 'Created at date'; COMMENT ON COLUMN "SalesOrders"."CHANGEDBY" IS 'Changed by'; COMMENT ON COLUMN "SalesOrders"."CHANGEDAT" IS 'Changed at date'; COMMENT ON COLUMN "SalesOrders"."FISCALVARIANT" IS 'Fiscal year variant'; COMMENT ON COLUMN "SalesOrders"."FISCALYEARPERIOD" IS 'Fiscal year period'; COMMENT ON COLUMN "SalesOrders"."NOTEID" IS 'Note ID'; COMMENT ON COLUMN "SalesOrders"."PARTNERID" IS 'Partner ID'; COMMENT ON COLUMN "SalesOrders"."SALESORG" IS 'Sales Organisation'; COMMENT ON COLUMN "SalesOrders"."CURRENCY" IS 'Currency key'; COMMENT ON COLUMN "SalesOrders"."GROSSAMOUNT" IS 'Gross amount'; COMMENT ON COLUMN "SalesOrders"."NETAMOUNT" IS 'Net amount'; </pre>
64. Hit the green Execute button to create the Sales Order table.	 <p>The screenshot shows the SAP HANA Database Explorer interface with an open SQL console titled "SQL Console 1.sql". The console displays the following message:</p> <p>1 CREATE COLUMN TABLE</p> <p>The "Execute" button, which is green, has been clicked to execute the script.</p>

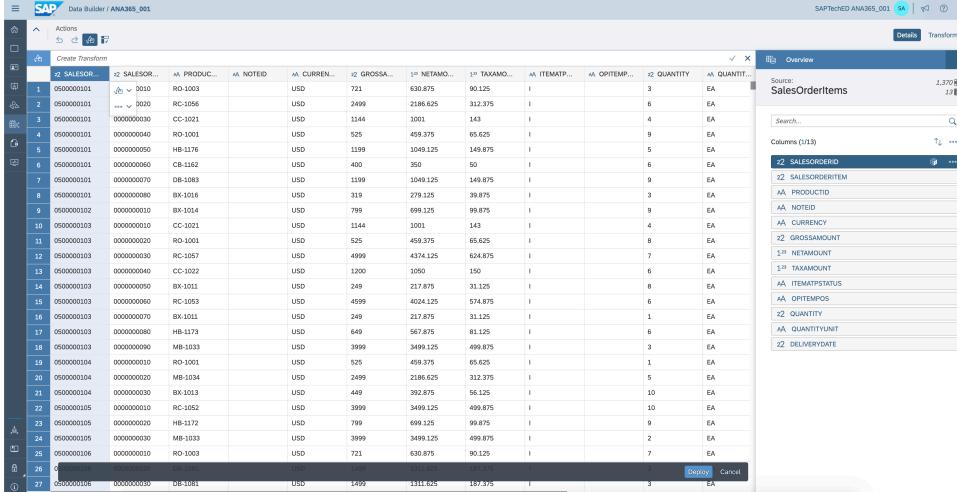
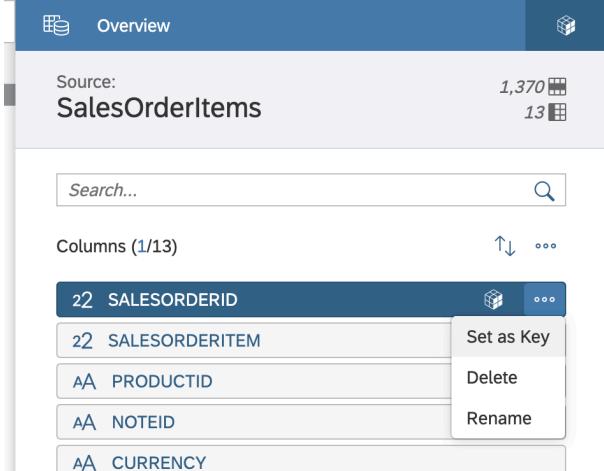
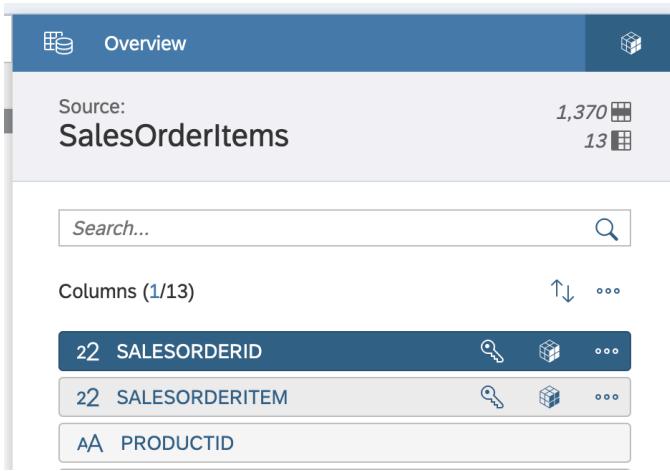
Explanation	Screenshot
<p>65. Make sure that the table was created correctly by checking the log. It should similar to what you see below, stating that the statement was executed (no errors mentioned).</p>	 <p>The screenshot shows the SAP SQL Console interface. The title bar says "SQL Console 1.sql x". The toolbar includes "Analyze", "Current schema: ANA365_001#DATA_IN...", and "Connected to: bfb52d9d-33cb-42eb-93a7-5e". The main area displays the following SQL code:</p> <pre> 1 CREATE COLUMN TABLE "SalesOrders" ("SALESORDERID" NVARCHAR(10) NOT NULL , "CREATEDBY" NVARCHAR(10) , "CREATEDAT" DAT 2 COMMENT ON TABLE "SalesOrders" IS 'Sales orders'; 3 COMMENT ON COLUMN "SalesOrders"."SALESORDERID" IS 'Sales order ID'; 4 COMMENT ON COLUMN "SalesOrders"."CREATEDBY" IS 'Created by'; 5 COMMENT ON COLUMN "SalesOrders"."CREATEDAT" IS 'Created at date'; 6 COMMENT ON COLUMN "SalesOrders"."CHANGEDBY" IS 'Changed by'; 7 COMMENT ON COLUMN "SalesOrders"."CHANGEDAT" IS 'Changed at date'; 8 COMMENT ON COLUMN "SalesOrders"."FISCVARIANT" IS 'Fiscal year variant'; 9 COMMENT ON COLUMN "SalesOrders"."FISCALYEARPERIOD" IS 'Fiscal year period'; 10 COMMENT ON COLUMN "SalesOrders"."NOTEID" IS 'Note ID'; 11 COMMENT ON COLUMN "SalesOrders"."PARTNERID" IS 'Partner ID'; 12 COMMENT ON COLUMN "SalesOrders"."SALESORG" IS 'Sales Organisation'; 13 COMMENT ON COLUMN "SalesOrders"."CURRENCY" IS 'Currency key'; 14 COMMENT ON COLUMN "SalesOrders"."GROSSAMOUNT" IS 'Gross amount'; 15 COMMENT ON COLUMN "SalesOrders"."NETAMOUNT" IS 'Net amount'; 16 </pre> <p>Below the code, the "Messages" tab is selected, showing the execution results:</p> <pre> Statement 'CREATE COLUMN TABLE "SalesOrders" ("SALESORDERID" NVARCHAR(10) NOT NULL , "CREATEDBY" NVARCHAR(10) , "CREATEDAT" DAT NVARCHAR(10), ...' executed in 14 ms. Statement 'COMMENT ON TABLE "SalesOrders" IS 'Sales orders'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."SALESORDERID" IS 'Sales order ID'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."CREATEDBY" IS 'Created by'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."CREATEDAT" IS 'Created at date'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."CHANGEDBY" IS 'Changed by'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."CHANGEDAT" IS 'Changed at date'' executed in 4 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."FISCVARIANT" IS 'Fiscal year variant'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."FISCALYEARPERIOD" IS 'Fiscal year period'' executed in 3 ms. Statement 'COMMENT ON COLUMN "SalesOrders"."NOTEID" IS 'Note ID'' </pre>
<p>66. Empty the SQL console by removing the executed statements.</p>	 <p>The screenshot shows the SAP SQL Console interface. The title bar says "SQL Console 1.sql x". The toolbar includes "Analyze", "Current schema: ANA365_001#DATA_IN...", and "Connected to: bfb52d9d-33cb-42eb-93a7-5e". The main area displays the number "1" in a list, indicating one statement has been run.</p>

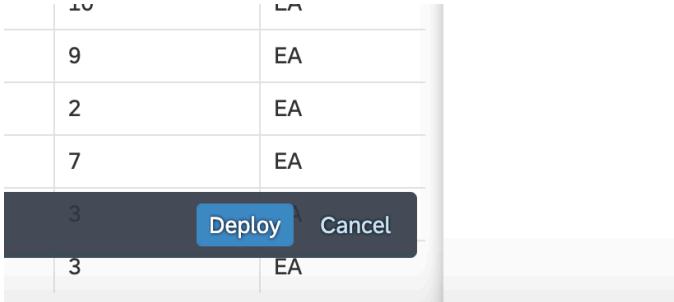
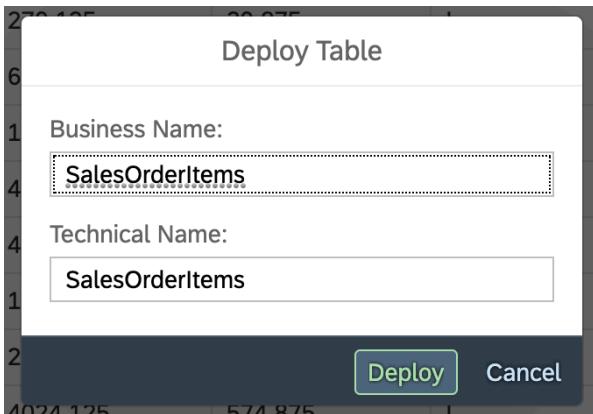
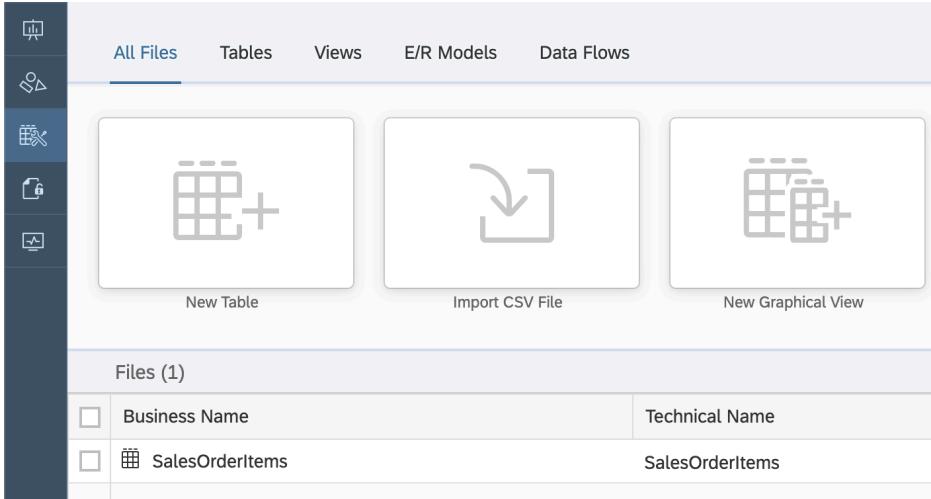
Explanation	Screenshot
67. Open the insert-sales-orders.sql file and copy over the SQL to fill the table you just created.	 <pre> SQL Console 1.sql x Production System Connected to: bfb52d9d-33cb-42eb-93a7-5e1 1 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 2 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 3 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 4 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 5 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 6 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 7 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 8 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 9 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 10 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 11 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 12 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 13 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 14 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 15 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 16 </pre>
68. Again hit the green Execute button and check the log for the successful execution.	 <pre> SQL Console 1.sql x Production System Connected to: bfb52d9d-33cb-42eb-93a7-5e1 1 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 2 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 3 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 4 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 5 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 6 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 7 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 8 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 9 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 10 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 11 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 12 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 13 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 14 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 15 INSERT INTO "SalesOrders" (SALESORDERID,CREATEDBY,CREATEDAT,CHANGEDBY,CHANGEDAT,FISCVARIANT,FISCALYEARPERIOD,NOTEID 16 Messages x History Statement 'INSERT INTO "SalesOrders" ...' executed in 8 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 2 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 Statement 'INSERT INTO "SalesOrders" ...' executed in 3 ms - Rows Affected: 1 </pre>
69. Congratulations!	You just used an external tool to connect to your SAP Data Warehouse Cloud space via SQL, created a table and inserted data! This is one example how you can use actually any external 3rd party tool, for example also open source applications like DBeaver, to connect to your SAP Data Warehouse Cloud space from the outside and ingest data using SQL. This way you can for example integrate your SAP Data Warehouse Cloud tenant in your already existing ETL processes.

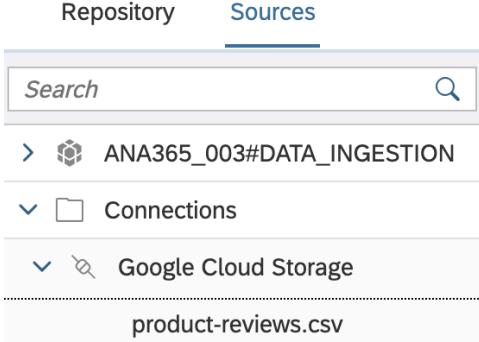
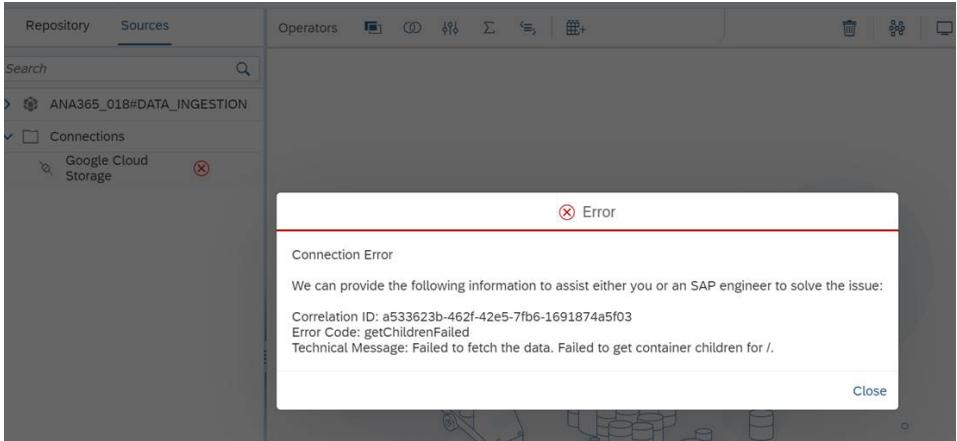
Explanation	Screenshot
<p>70. Get the required CSV file SalesOrderItems.csv from the Github repository: https://github.com/SAP-samples/teched2020-ANA365/tree/main/assets/step-upload-csv-file</p>	
<p>71. Head back to your SAP Data Warehouse Cloud tenant and navigate to the Data Builder.</p>	

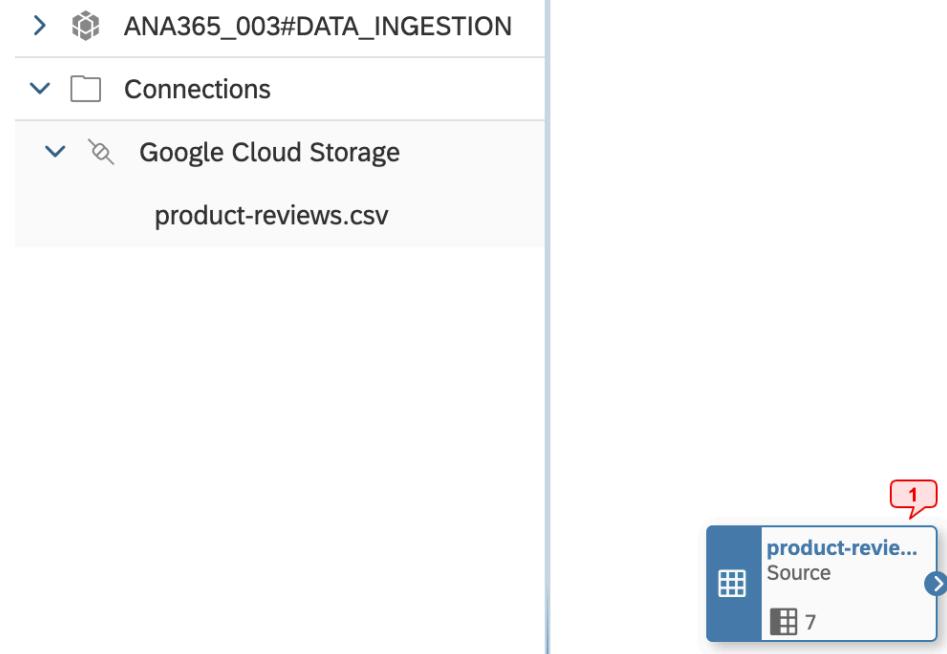
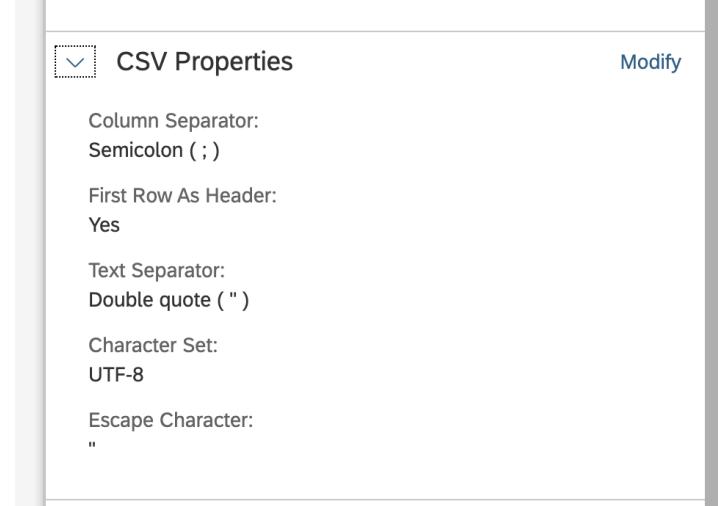
Explanation	Screenshot																																																												
<p>72. If you find yourself again on this page, select your space. Otherwise you will be directly forwarded to the screen shown in the next step.</p>																																																													
<p>73. On the right click the Import icon and select the Import CSV File option.</p>	<table border="1"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> <th>Type</th> <th>Created By</th> <th>Created On</th> <th>Actions</th> </tr> </thead> <tbody> <tr> <td>Sales Data 003</td> <td>Sales_Data_003</td> <td>Analytical Dataset (View)</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 17:05:36</td> <td><input type="button" value="Import CSV File"/></td> </tr> <tr> <td>Sales Orders</td> <td>Sales_Orders</td> <td>Local Table</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 16:11:57</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Products</td> <td>Products</td> <td>Dimension (View)</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 16:06:58</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Product Texts 003</td> <td>Product_Texts_003</td> <td>Relational Dataset (Remote T...</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 15:59:34</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Product Attributes 003</td> <td>Product_Attributes_003</td> <td>Relational Dataset (Remote T...</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 15:57:20</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Product Category MDT 003</td> <td>Product_Category_MDT_003</td> <td>Relational Dataset (Remote T...</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 15:49:06</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Load Product Reviews 003</td> <td>Load_Product_Reviews_003</td> <td>Data Flow</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 12:26:27</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>Product Review</td> <td>Product_Reviews</td> <td>Relational Dataset (Local Tab...</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 12:25:14</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> <tr> <td>SalesOrderItems 003</td> <td>SalesOrderItems_003</td> <td>Relational Dataset (Local Tab...</td> <td>SAPTechED ANA365_003</td> <td>Nov 24, 2020 11:53:35</td> <td><input type="button" value="SAPTechED ANA365_0X"/></td> </tr> </tbody> </table>	Business Name	Technical Name	Type	Created By	Created On	Actions	Sales Data 003	Sales_Data_003	Analytical Dataset (View)	SAPTechED ANA365_003	Nov 24, 2020 17:05:36	<input type="button" value="Import CSV File"/>	Sales Orders	Sales_Orders	Local Table	SAPTechED ANA365_003	Nov 24, 2020 16:11:57	<input type="button" value="SAPTechED ANA365_0X"/>	Products	Products	Dimension (View)	SAPTechED ANA365_003	Nov 24, 2020 16:06:58	<input type="button" value="SAPTechED ANA365_0X"/>	Product Texts 003	Product_Texts_003	Relational Dataset (Remote T...	SAPTechED ANA365_003	Nov 24, 2020 15:59:34	<input type="button" value="SAPTechED ANA365_0X"/>	Product Attributes 003	Product_Attributes_003	Relational Dataset (Remote T...	SAPTechED ANA365_003	Nov 24, 2020 15:57:20	<input type="button" value="SAPTechED ANA365_0X"/>	Product Category MDT 003	Product_Category_MDT_003	Relational Dataset (Remote T...	SAPTechED ANA365_003	Nov 24, 2020 15:49:06	<input type="button" value="SAPTechED ANA365_0X"/>	Load Product Reviews 003	Load_Product_Reviews_003	Data Flow	SAPTechED ANA365_003	Nov 24, 2020 12:26:27	<input type="button" value="SAPTechED ANA365_0X"/>	Product Review	Product_Reviews	Relational Dataset (Local Tab...	SAPTechED ANA365_003	Nov 24, 2020 12:25:14	<input type="button" value="SAPTechED ANA365_0X"/>	SalesOrderItems 003	SalesOrderItems_003	Relational Dataset (Local Tab...	SAPTechED ANA365_003	Nov 24, 2020 11:53:35	<input type="button" value="SAPTechED ANA365_0X"/>
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<p>74. Hit the Select Source File button and select the SalesOrderItems.csv file you just downloaded.</p>																																																													

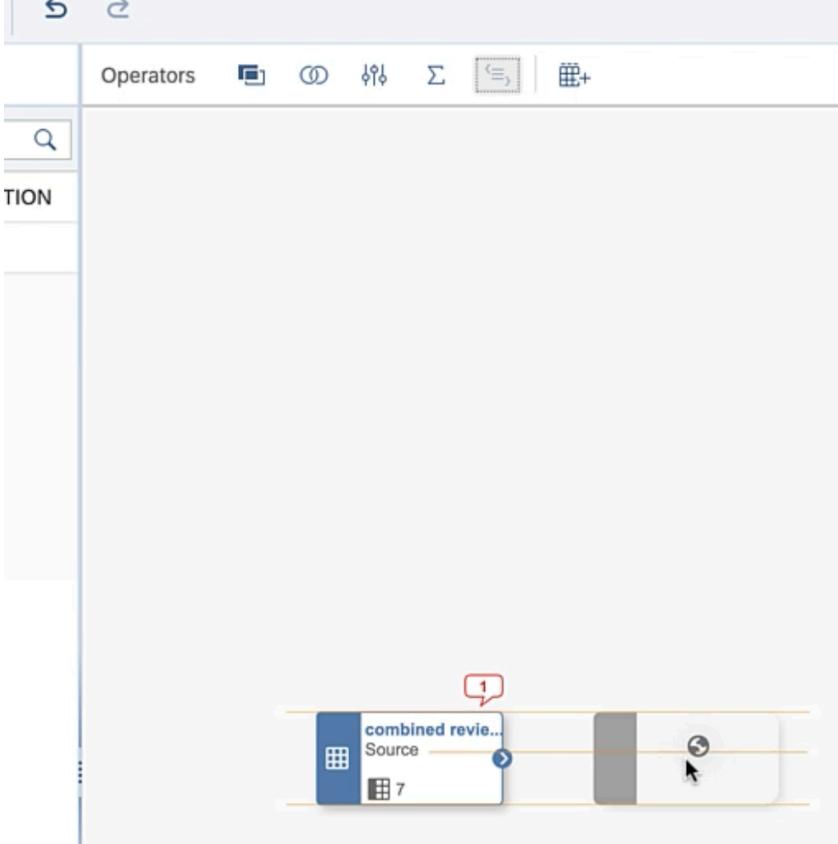
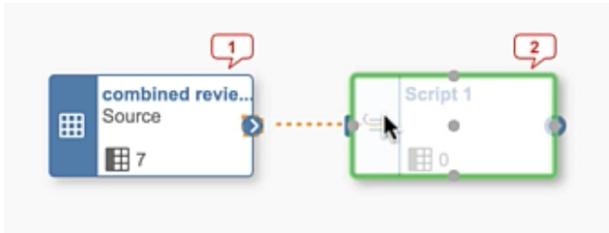
Explanation	Screenshot
75. Leave all options as is and hit the Upload button.	 <p>The screenshot shows the 'Upload File' dialog box. It has a 'Select Source File' button with a dashed border, a file preview for 'SalesOrderItems.csv', a checked checkbox for 'Use first row as column header', a dropdown for 'CSV Delimiter' set to 'Auto-detect', and 'Upload' and 'Cancel' buttons at the bottom.</p>
76. Wait until the file was uploaded to the tenant.	 <p>The screenshot shows the 'Upload File' dialog box with a message: 'Leave the browser tab open and don't refresh while the data loads. We'll let you know when it's done.' A green progress bar is visible. At the bottom, there are 'Upload' and 'Cancel' buttons, and the text 'No data available.'</p>

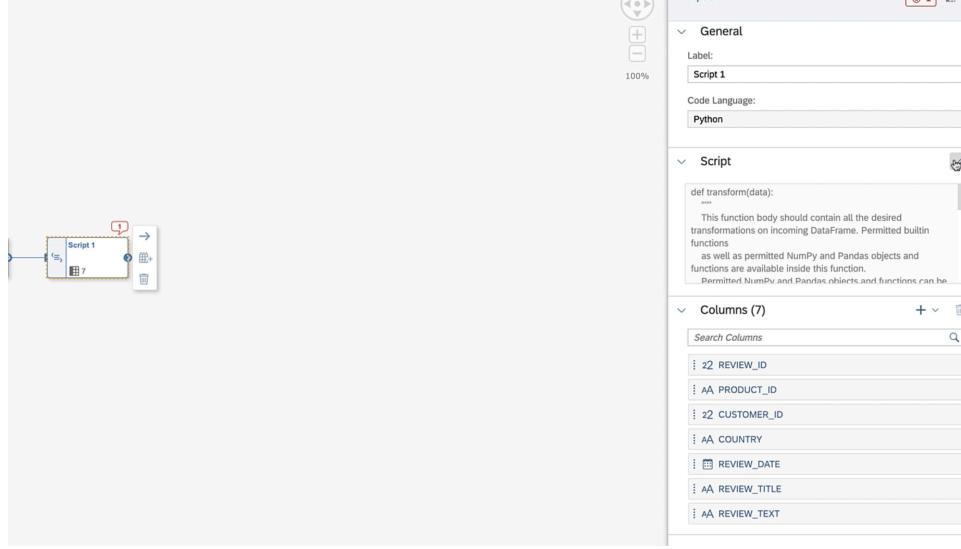
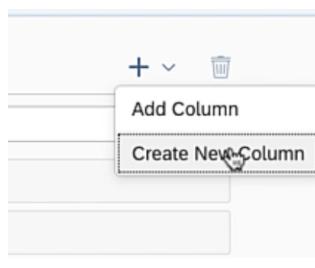
Explanation	Screenshot
<p>77. Make sure that the data is shown and the headers are identified correctly.</p>	
<p>78. Select the columns SALESORDERID and SALESORDERITEM M as key fields.</p>	
<p>79. Make sure that both columns are enabled as key fields.</p>	

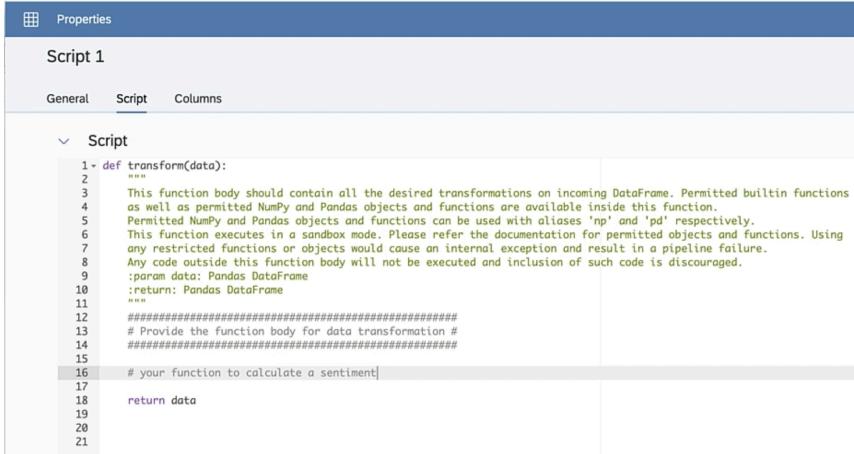
Explanation	Screenshot
80. Hit Deploy to open the dialog for deploying the table into your space.	 <p>A screenshot of a table list interface. At the bottom of the list, there is a modal dialog box with the title 'Deploy'. Inside the dialog, there are two buttons: 'Deploy' (highlighted in blue) and 'Cancel'. The table list above shows four rows with columns for index (1, 2, 3, 4), value (9, 2, 7, 3), and name (EA, EA, EA, EA).</p>
81. Enter a Business Name and Technical Name and deploy the table into your space.	 <p>A screenshot of the 'Deploy Table' dialog box. It contains two input fields: 'Business Name' with the value 'SalesOrderItems' and 'Technical Name' with the value 'SalesOrderItems'. At the bottom are 'Deploy' and 'Cancel' buttons.</p>
82. Make sure that the table was correctly created in your space and is visible in the Data Builder overview.	 <p>A screenshot of the Data Builder overview page. The top navigation bar includes 'All Files', 'Tables' (which is selected and highlighted in blue), 'Views', 'E/R Models', and 'Data Flows'. Below the navigation are three large buttons: 'New Table', 'Import CSV File', and 'New Graphical View'. A sidebar on the left contains icons for file operations like upload, download, and search. The main area shows a table titled 'Files (1)' with one item: 'Business Name' (checkbox) and 'Technical Name' (checkbox) both set to 'SalesOrderItems'.</p>
83. Congratulations!	<p>You have successfully uploaded data into your SAP Data Warehouse Cloud space using the CSV file upload! As a next step we will continue loading data into your space using the data flow feature.</p>

Explanation	Screenshot
<p>84. Select the New Data Flow tile.</p>	
<p>85. Switch to the Sources tab and navigate to the product reviews folder: Connections > Google Cloud Storage. If you face an error while drilling down into the connection, check the next step.</p>	
<p>86. If you face this error while drilling down into the connection, head back to Space Management and make sure the connection was created correctly and is valid (use the Validity Check button above the list of connections).</p>	

Explanation	Screenshot
<p>87. Select the product-reviews.csv file and drag it from the tree on the left onto the canvas.</p>	
<p>88. Make sure that the CSV properties are set correctly by selecting the added node and expanding the CSV properties section on the right.</p>	
<p>89. In the Operators button bar above the canvas you can use several different operators for working with the data sets in your data flow.</p>	

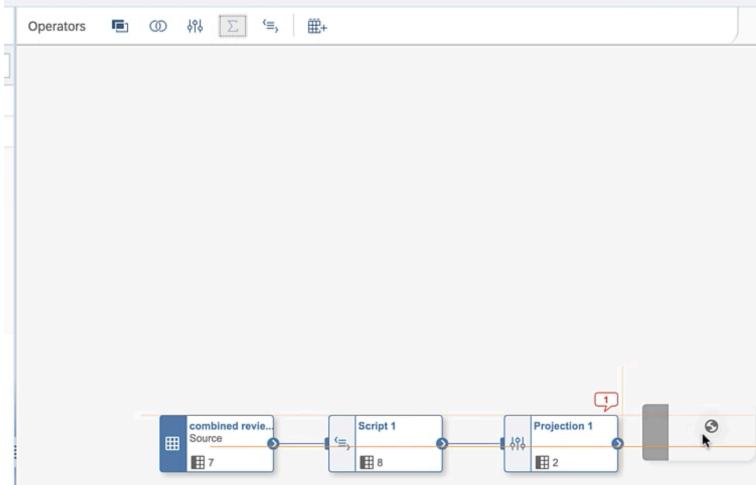
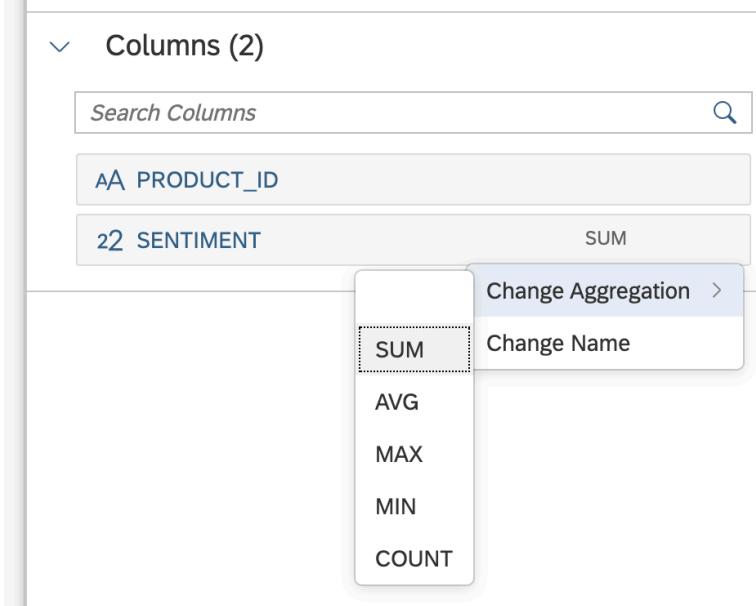
Explanation	Screenshot
<p>90. First, we want to calculate a sentiment from the available product reviews. Add the Script operator as a target node after the combined reviews source node. Please note that the left node should be named product-reviews in your case (this applies to the following screenshots, too).</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud Data Flow interface. On the left, there is a sidebar with a search icon and the word 'TION'. The main area has a toolbar at the top with icons for back, forward, search, and various operators like filter, group, and summarize. Below the toolbar, there is a legend for data types. A blue source node labeled 'combined review...' is connected by a yellow line to a grey target node. A red callout bubble labeled '1' points to the connection line between the two nodes. A red callout bubble labeled '2' points to the target node.</p>
<p>91. Connect the two nodes by dragging a line from the left to the right node.</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud Data Flow interface. A blue source node labeled 'combined review...' is connected by a dashed orange line to a green target node labeled 'Script 1'. A red callout bubble labeled '1' points to the connection line between the source and target nodes. A red callout bubble labeled '2' points to the target node.</p>

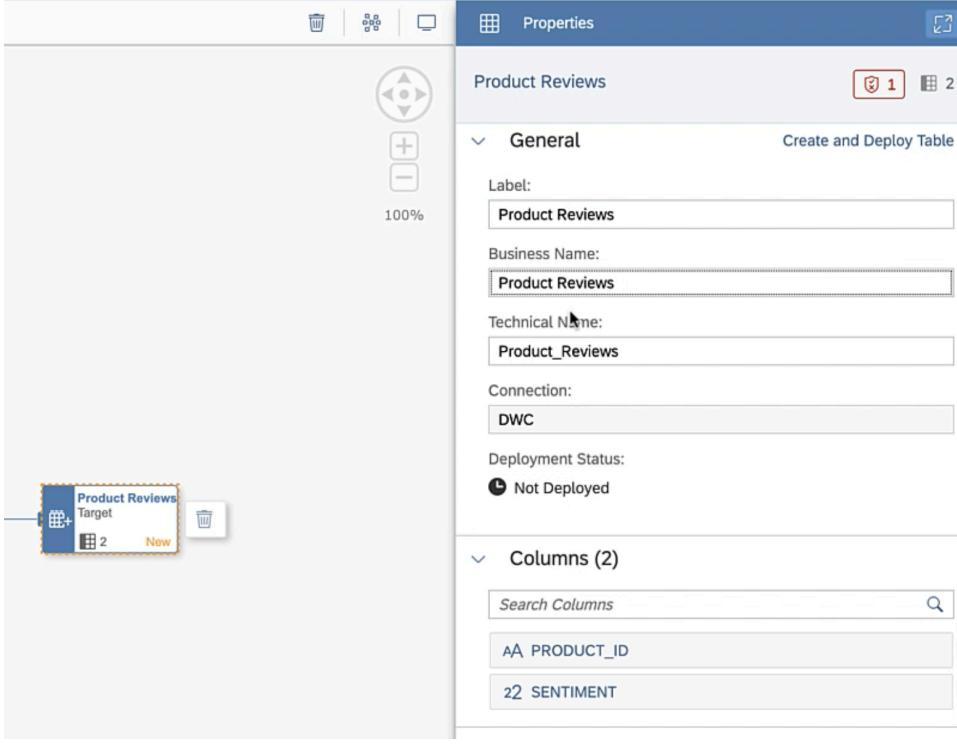
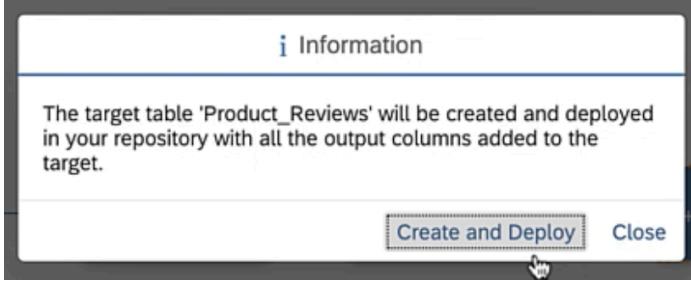
Explanation	Screenshot
92. Select the Script node and navigate to the Script details by selecting the Edit button on the right.	 <p>The screenshot shows a data flow diagram with a single orange Script node labeled "Script 1". To the right, the "Script 1" properties panel is open. It includes sections for General (Label: "Script 1", Code Language: "Python"), Script (containing a code editor with a placeholder "def transform(data):"), and Columns (listing seven columns: z2 REVIEW_ID, AA PRODUCT_ID, z2 CUSTOMER_ID, AA COUNTRY, REVIEW_DATE, AA REVIEW_TITLE, and AA REVIEW_TEXT).</p>
93. Select the Columns section.	 <p>The screenshot shows the "Properties" dialog for "Script 1". The "Columns" tab is selected. Below it, the "Columns (7)" list displays the same seven columns as the previous screenshot.</p>
94. Select Create New Column to create a new column named SENTIMENT with data type INT32.	 <p>The screenshot shows a modal dialog titled "Add Column" with a "Create New Column" button highlighted. This dialog is part of a larger interface where multiple columns are listed, though they are mostly obscured by a gray overlay.</p>

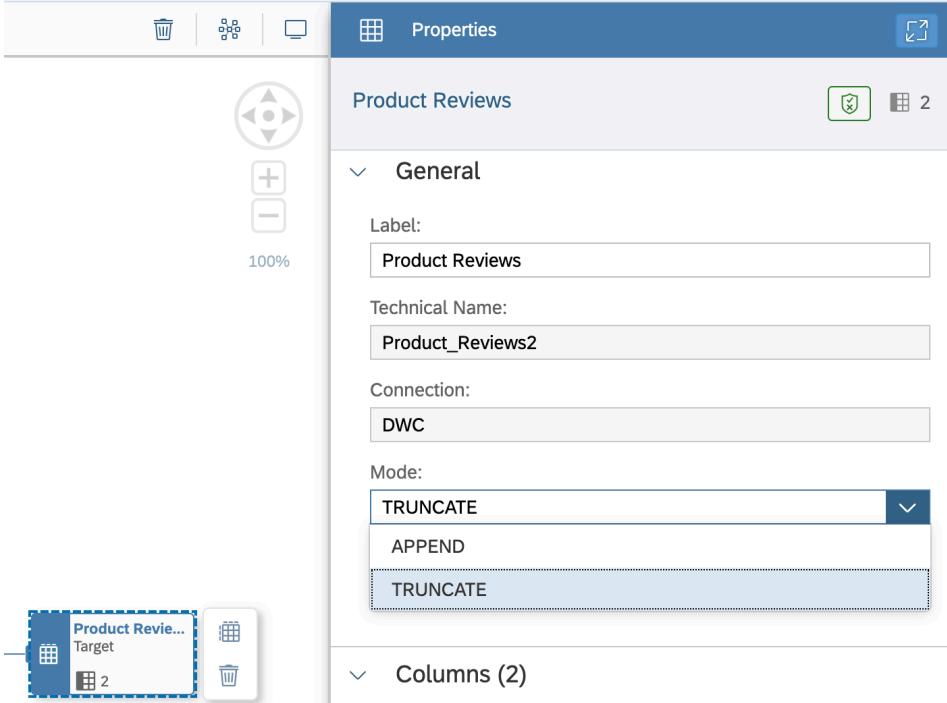
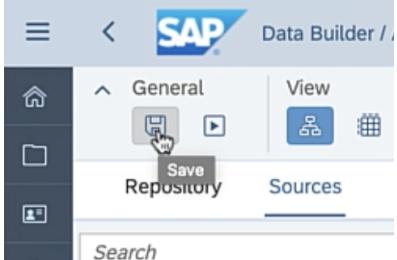
Explanation	Screenshot
95. Confirm the details by clicking Save.	
96. Switch to the Script section and start entering your python script for a sentiment analysis.	 <pre> 1- def transform(data): 2 """ 3 This function body should contain all the desired transformations on incoming DataFrame. Permitted builtin functions 4 as well as permitted NumPy and Pandas objects and functions are available inside this function. 5 Permitted NumPy and Pandas objects and functions can be used with aliases 'np' and 'pd' respectively. 6 This function executes in a sandbox mode. Please refer the documentation for permitted objects and functions. Using 7 any restricted functions or objects would cause an internal exception and result in a pipeline failure. 8 Any code outside this function body will not be executed and inclusion of such code is discouraged. 9 :param data: Pandas DataFrame 10 """ 11 12 ###### 13 # Provide the function body for data transformation # 14 ##### 15 16 # your function to calculate a sentiment] 17 18 return data 19 20 21 </pre>
97. It's up to you!	<p>Here's the thing: Are you a Python expert? We've got a challenge for you!</p> <p>You can either try to figure out the right script yourself using the pandas library. Pro-tip: Check out the pandas data frame apply method documentation here: https://pandas.pydata.org/pandas-docs/stable/reference/api/pandas.DataFrame.apply.html</p> <p>To make your life easier, we have already provided you with a list of predefined key words and assigned sentiments in the file assets/step-data-flow-script/sentiment-key-words.py</p> <p>Using the list of words and assigned sentiment values (1: positive; -1: negative; word not mentioned: neutral / 0) you want to do two things:</p> <ol style="list-style-type: none"> 1) Define a function that takes a row from the input data and checks whether the column REVIEW_TITLE contains any of the words from the words sentiment array. If a match is found, you want to return the sentiment associated with this word, otherwise (no match) you want to return zero using the string.lower() and string.find() methods.

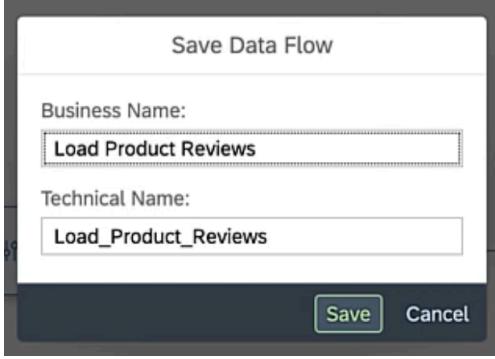
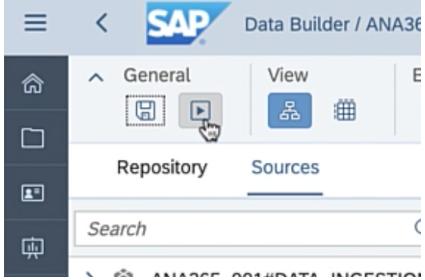
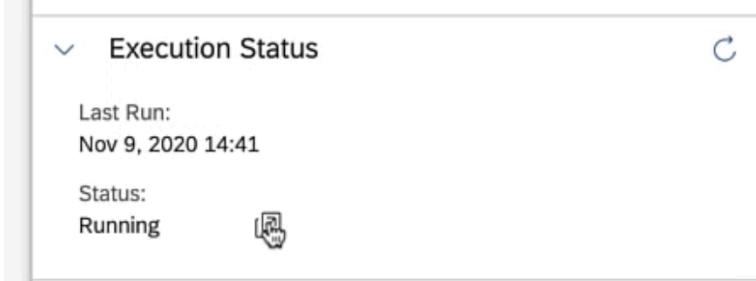
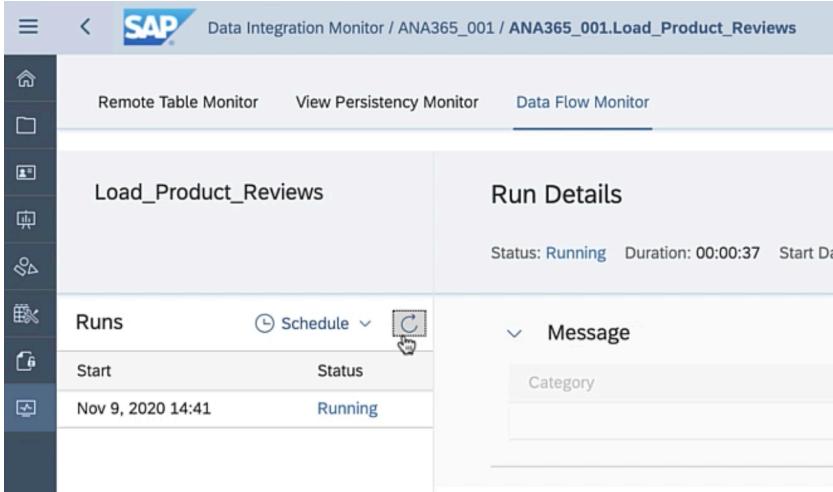
Explanation	Screenshot
	<p>2) You want to use the pandas dataframe apply() function to loop over the data and call the function defined in 1) for each row. Make sure to specify the axis as 1 and the result_type=reduce!</p>
<p>98. Want to take the quick route?</p>	<p>Ok, fair enough – here's the deal. You can use the pre-build solution from the assets/step-data-flow-script/sentiment-analysis-script.py file. If you do so, don't put the blame on us that the solution is not the nicest or you finished the hands-on well before the scheduled 2hrs! ;-)</p>
<p>99. Add a Projection node to filter out unwanted columns or to apply a filter on the data to be extracted. Make sure to connect it to the previous Script 1 node.</p>	

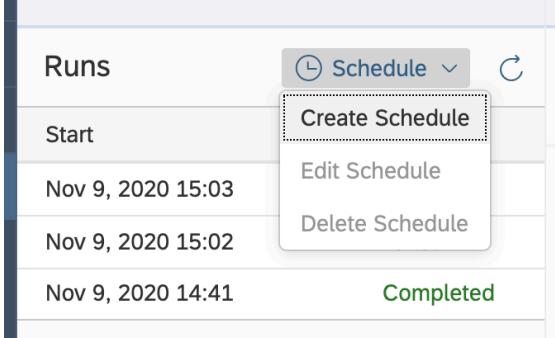
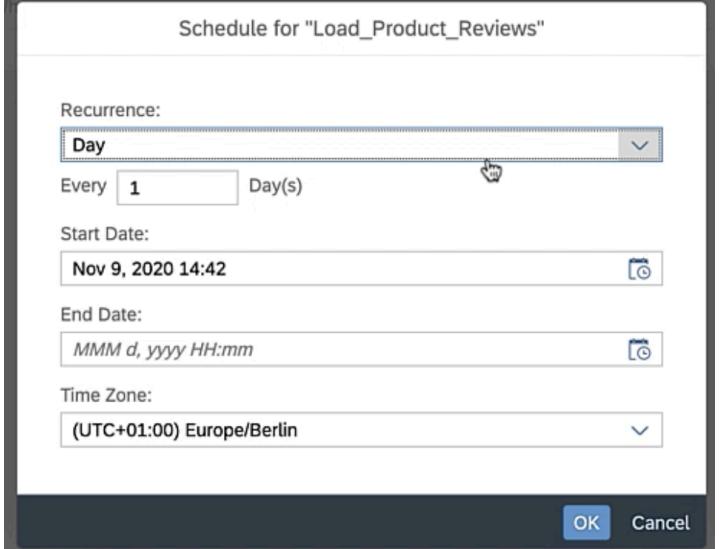
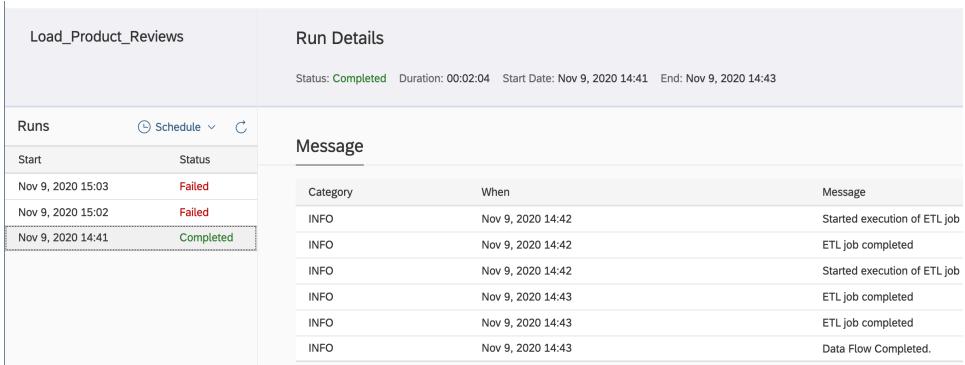
Explanation	Screenshot
<p>100. Select the added Projection node and select Remove Column to hide the following columns from the Details screen on the right:</p> <ul style="list-style-type: none"> - REVIEW_ID - CUSTOMER_ID - COUNTRY - REVIEW_DATE - REVIEW_TITLE - REVIEW_TEXT 	<p>Columns (8)</p> <p>Search Columns</p> <ul style="list-style-type: none"> z2 REVIEW_ID AA PRODUCT_ID z2 CUSTOMER_ID AA COUNTRY AA REVIEW_DATE AA REVIEW_TITLE AA REVIEW_TEXT z2 SENTIMENT
<p>101. After removing all columns, only the following two columns should be available.</p>	<p>Columns (2)</p> <p>Search Columns</p> <ul style="list-style-type: none"> AA PRODUCT_ID z2 SENTIMENT <p>Filter</p>

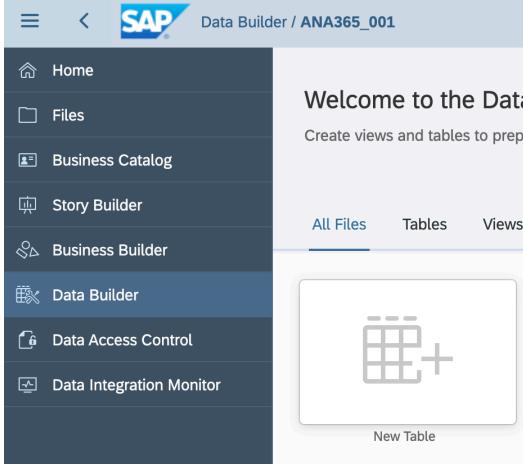
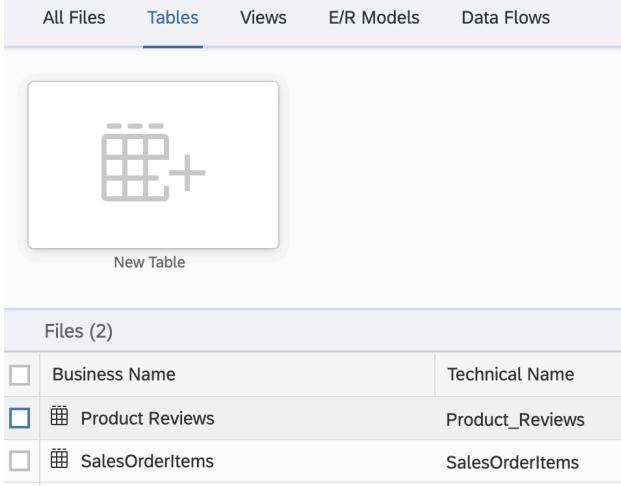
Explanation	Screenshot
102. Next, add an Aggregation node and connect it to the previous Projection 1 node.	
103. Select the node and from the Details pane on the right set the aggregation for the column SENTIMENT.	
104. Select the Add Table operator or use the context menu from the added aggregation node to add the target table in which we will persist the data.	

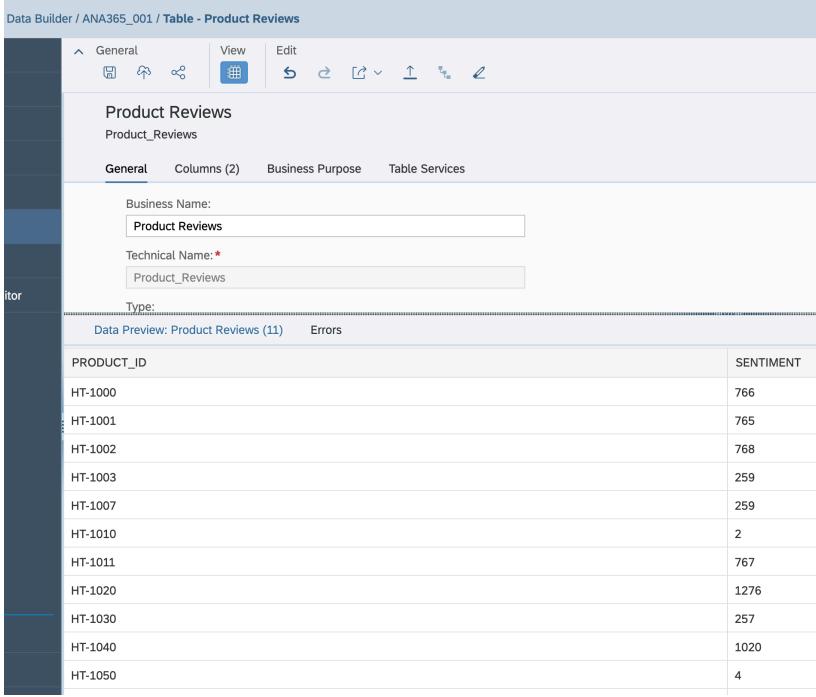
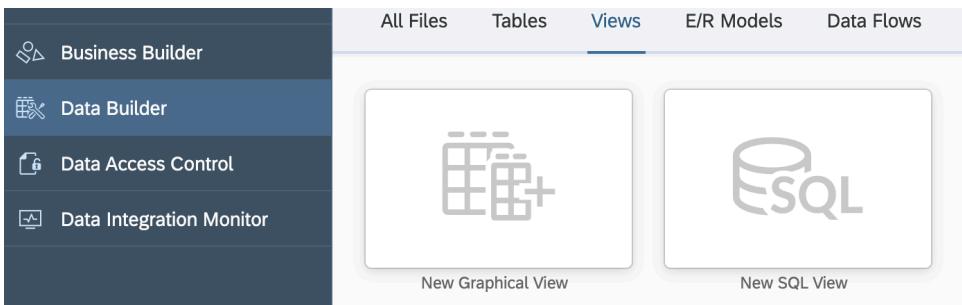
Explanation	Screenshot
105. Select the newly added node and define a label, business name and technical name for the target table.	
106. Select the Create and Deploy Table button to create the table in the repository.	
107. Confirm the dialog to create the table.	

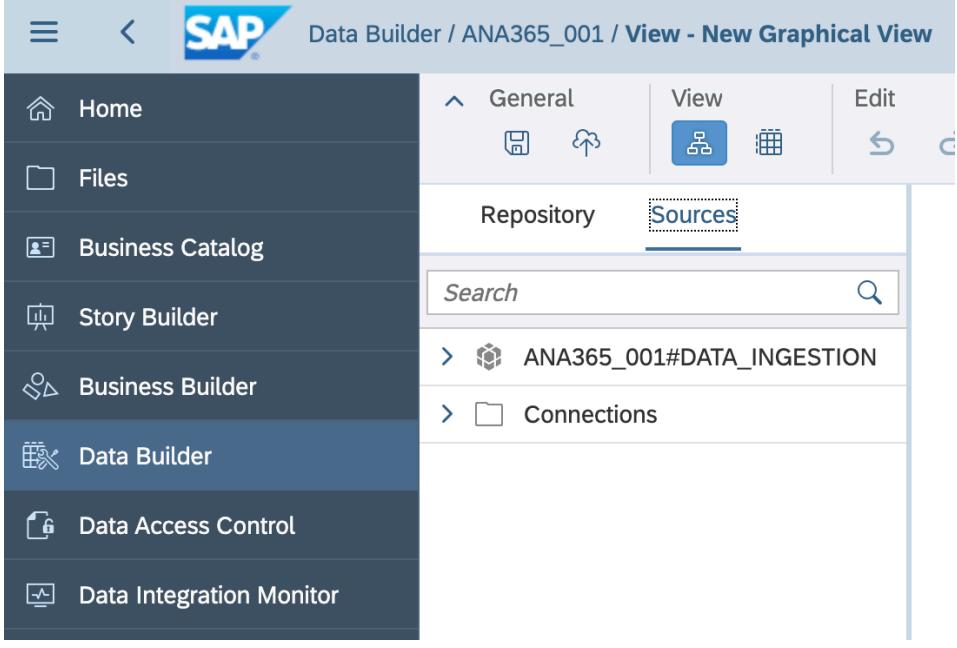
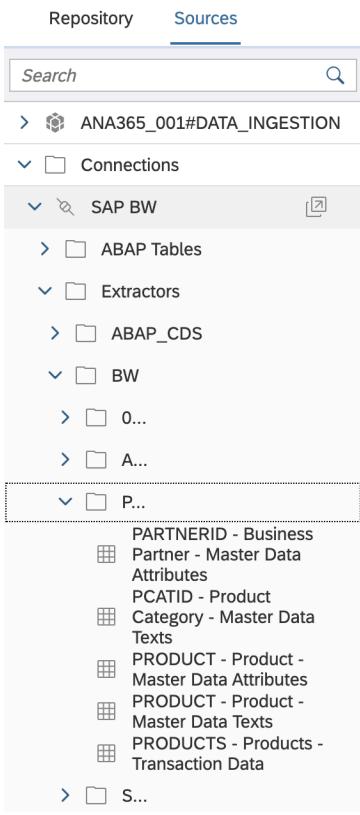
Explanation	Screenshot
<p>108. Change the mode from APPEND to TRUNCATE to make sure that in case of repetitive loads only the most recent data is available in the target table.</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud Data Builder interface. A target table named "Product Reviews" is selected. In the "Properties" panel, under the "General" section, the "Mode" dropdown is set to "TRUNCATE". Other options like "APPEND" and "TRUNCATE" are also visible in the dropdown menu.</p>
<p>109. This is how your data flow should look like by now.</p>	 <p>The screenshot shows a completed data flow diagram in the SAP Data Warehouse Cloud Data Builder. The flow consists of the following steps: a Source node ("product-reviews") connected to a Script 1 node, which is then connected to a Projection 1 node. This is followed by an Aggregation 1 node and finally a Target node ("Product Reviews"). Each node has its own configuration box attached to it.</p>
<p>110. Save the data flow.</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud Data Builder interface with the "General" tab selected in the properties panel. The "Save Repository" button is highlighted with a mouse cursor, indicating the action to save the data flow.</p>

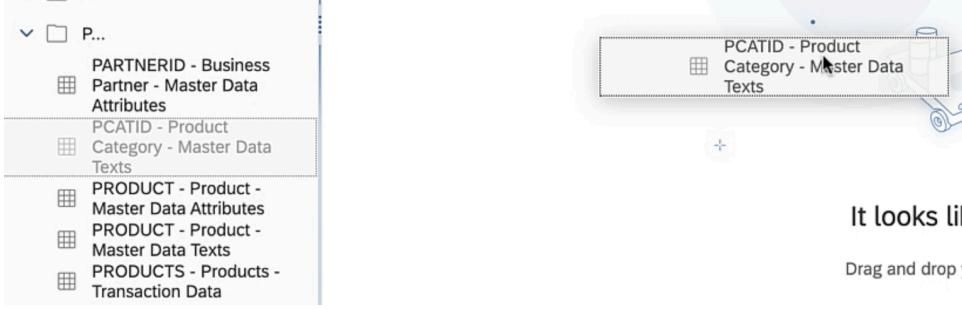
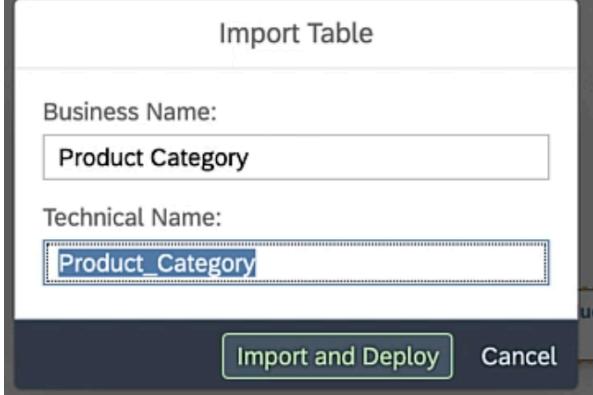
Explanation	Screenshot
111. Provide a name for the data flow and hit Save.	
112. After saving the data flow execute it.	
113. Navigate to the data flow monitor by selecting the navigation icon from the left to navigate to the run details.	
114. Hit the Refresh button until the data flow run completes. If the message Authorize us to run... is visible you can simply ignore it. ☺	

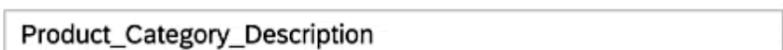
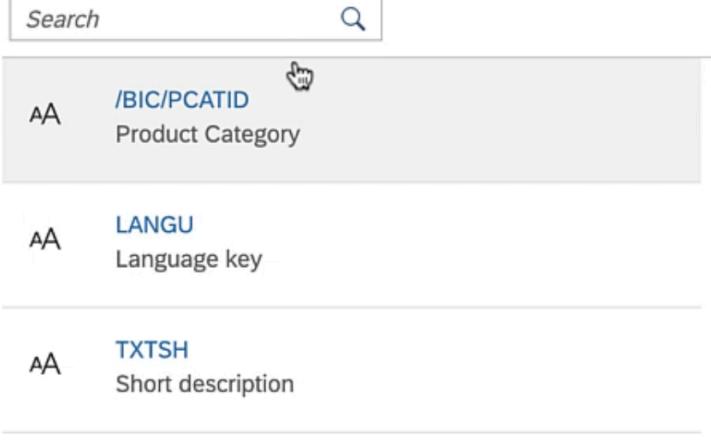
Explanation	Screenshot
115. If you wanted to, you could also define a schedule to run the data flow repeatedly. This is however not needed for this session. ☺ You can define schedules by selecting the Schedule item from the left next to the Refresh icon.	 <p>The screenshot shows a table titled 'Runs' with three rows of data. The first row has a 'Start' timestamp of 'Nov 9, 2020 15:03' and a 'Status' of 'Completed'. The second row has a 'Start' timestamp of 'Nov 9, 2020 15:02' and a 'Status' of 'Completed'. The third row has a 'Start' timestamp of 'Nov 9, 2020 14:41' and a 'Status' of 'Completed'. A context menu is open over the first row, with the 'Create Schedule' option highlighted.</p>
116. You can specify different options like recurrence, start and end date.	 <p>The screenshot shows a dialog box titled 'Schedule for "Load_Product_Reviews"'. It contains the following fields: - Recurrence: Day - Every 1 Day(s) - Start Date: Nov 9, 2020 14:42 - End Date: MMM d, yyyy HH:mm - Time Zone: (UTC+01:00) Europe/Berlin At the bottom are 'OK' and 'Cancel' buttons.</p>
117. Make sure that your executed data flow executed completely.	 <p>The screenshot shows the 'Run Details' page for the 'Load_Product_Reviews' job. It includes the following sections: - Run Details: Status: Completed, Duration: 00:02:04, Start Date: Nov 9, 2020 14:41, End: Nov 9, 2020 14:43. - Runs: A table showing three runs. The first two are 'Failed' and the last one is 'Completed'. - Message: A table showing log messages with categories like INFO and timestamps like Nov 9, 2020 14:42, along with corresponding messages like 'Started execution of ETL job'.</p>

Explanation	Screenshot						
<p>118. Navigate to the Data Builder to check whether the table created during the data flow execution is filled correctly.</p>	 <p>The screenshot shows the SAP Data Builder interface. The left sidebar has a dark blue background with white icons and text. The 'Data Builder' option is highlighted with a blue background. The main area has a light gray background with the title 'Welcome to the Data' and a sub-instruction 'Create views and tables to prepare data for analysis'. Below this are three tabs: 'All Files', 'Tables' (which is underlined in blue), and 'Views'. In the center, there is a large button labeled 'New Table' with a grid icon and a plus sign.</p>						
<p>119. Select the Tables tab and select the Products Reviews table.</p>	 <p>The screenshot shows the SAP Data Builder interface with the 'Tables' tab selected in the top navigation bar. Below it, there is a 'New Table' button. Underneath, there is a section titled 'Files (2)' containing two entries:</p> <table border="1" data-bbox="518 1220 1139 1347"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> Product Reviews</td> <td>Product_Reviews</td> </tr> <tr> <td><input type="checkbox"/> SalesOrderItems</td> <td>SalesOrderItems</td> </tr> </tbody> </table>	Business Name	Technical Name	<input checked="" type="checkbox"/> Product Reviews	Product_Reviews	<input type="checkbox"/> SalesOrderItems	SalesOrderItems
Business Name	Technical Name						
<input checked="" type="checkbox"/> Product Reviews	Product_Reviews						
<input type="checkbox"/> SalesOrderItems	SalesOrderItems						

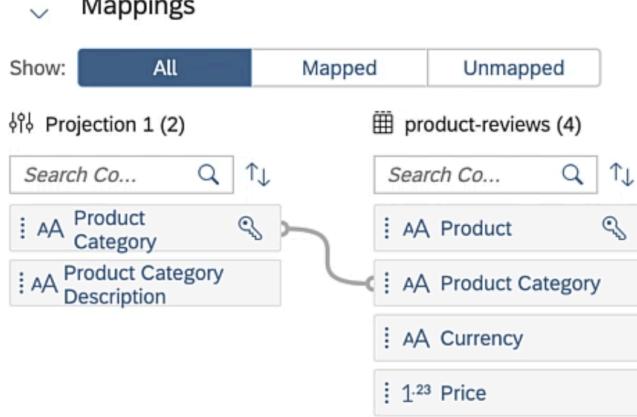
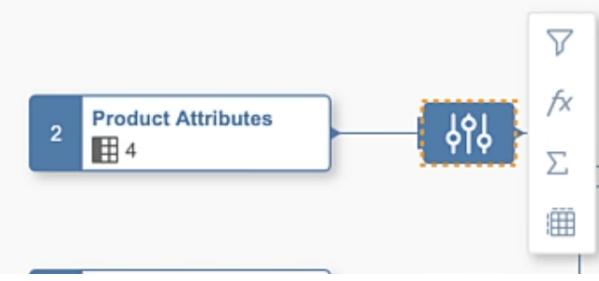
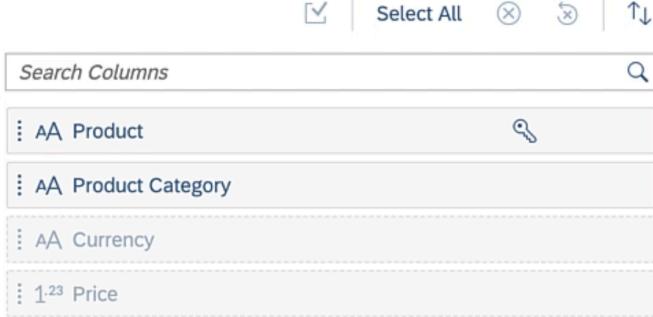
Explanation	Screenshot																								
<p>120. Open the Data Preview by clicking on the Data Preview button in the View section at the top. Make sure the different products are listed and the sentiment is shown. The aggregated sentiment or product IDs might look a little different in your case from what is visible in this screenshot.</p>	 <table border="1"> <thead> <tr> <th>PRODUCT_ID</th> <th>SENTIMENT</th> </tr> </thead> <tbody> <tr><td>HT-1000</td><td>766</td></tr> <tr><td>HT-1001</td><td>765</td></tr> <tr><td>HT-1002</td><td>768</td></tr> <tr><td>HT-1003</td><td>259</td></tr> <tr><td>HT-1007</td><td>259</td></tr> <tr><td>HT-1010</td><td>2</td></tr> <tr><td>HT-1011</td><td>767</td></tr> <tr><td>HT-1020</td><td>1276</td></tr> <tr><td>HT-1030</td><td>257</td></tr> <tr><td>HT-1040</td><td>1020</td></tr> <tr><td>HT-1050</td><td>4</td></tr> </tbody> </table>	PRODUCT_ID	SENTIMENT	HT-1000	766	HT-1001	765	HT-1002	768	HT-1003	259	HT-1007	259	HT-1010	2	HT-1011	767	HT-1020	1276	HT-1030	257	HT-1040	1020	HT-1050	4
PRODUCT_ID	SENTIMENT																								
HT-1000	766																								
HT-1001	765																								
HT-1002	768																								
HT-1003	259																								
HT-1007	259																								
HT-1010	2																								
HT-1011	767																								
HT-1020	1276																								
HT-1030	257																								
HT-1040	1020																								
HT-1050	4																								
<p>121. Congratulations!</p>	<p>You have successfully created and executed your first Data Flow instance in SAP Data Warehouse Cloud! You now know how to create ETL processes, schedule data loads using data flows and how to transform the incoming data.</p> <p>As a next step, let's take a look at how you can integrate data virtually from the connected SAP BW system to add the required product master data to our data model. We will now build a virtual master data dimension.</p>																								
<p>122. Navigate to the Views area in the Data Builder.</p>	 <p>All Files Tables Views E/R Models Data Flows</p> <p>New Graphical View New SQL View</p>																								

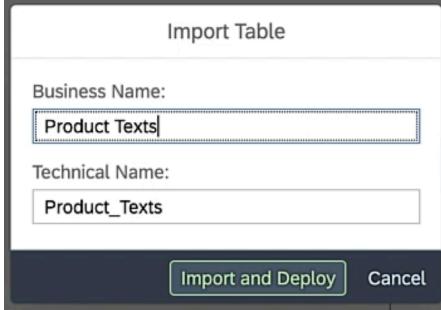
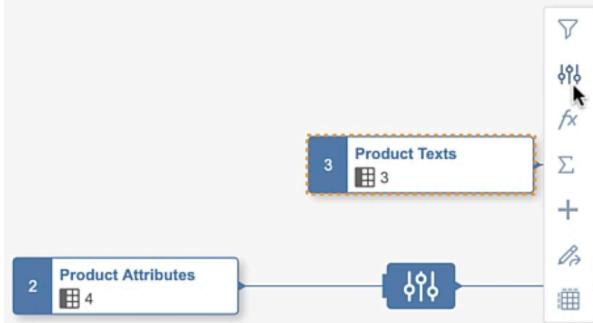
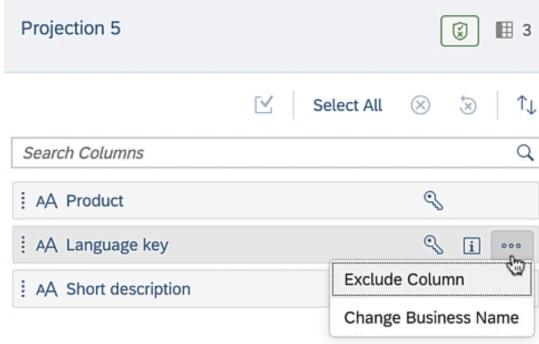
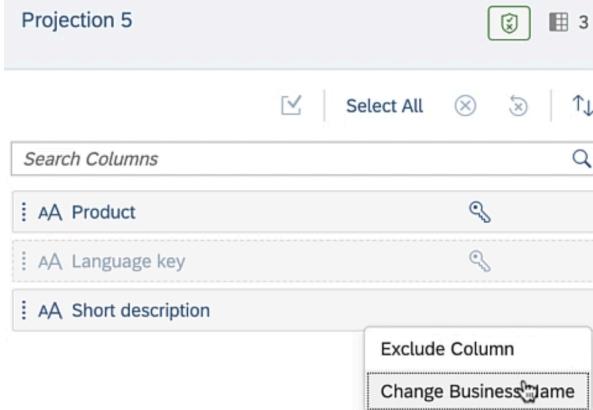
Explanation	Screenshot
123. Select the New Graphical View tile and select the Sources tab.	
124. Drill down into the SAP BW connection and navigate to SAP BW > Extractors > BW > P...	

Explanation	Screenshot
125. Start off by dragging over the PCATID – Product Category – Master Data Texts.	 <p>It looks like you have selected a master data category</p> <p>Drag and drop</p>
126. Provide a meaningful Business Name and Technical Name.	
127. Add a calculation node.	
128. Add a new calculated column.	

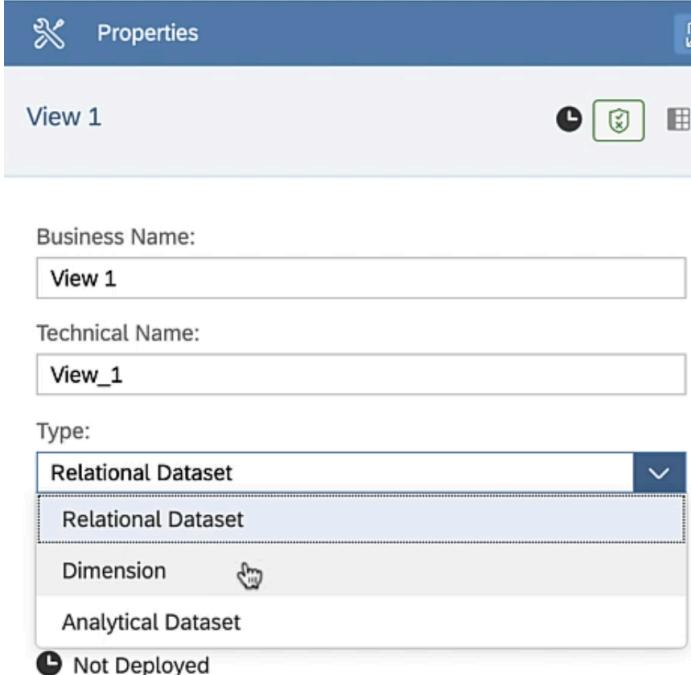
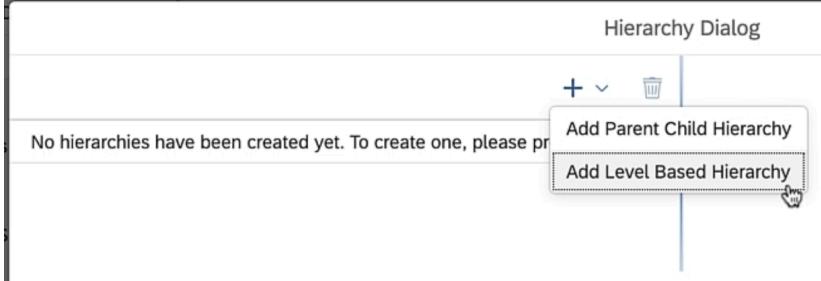
Explanation	Screenshot
129. Provide a meaningful Business Name and Technical Name and define the Data Type as String.	Business Name:  Technical Name:  Data Type:  Length: 
130. Select the column TXTSH from the list of columns as the Expression.	Expression Validate  The expression of calculated column 'Product_Category_Description' is invalid. Functions (140) Columns (4) Other  <ul style="list-style-type: none"> <li data-bbox="556 1284 833 1368">AA /BIC/PCATID Product Category <li data-bbox="556 1417 801 1480">AA LANGU Language key <li data-bbox="556 1550 833 1613">AA TXTSH Short description
131. Hit the Validate button to make sure the expression is valid.	Expression Validate 

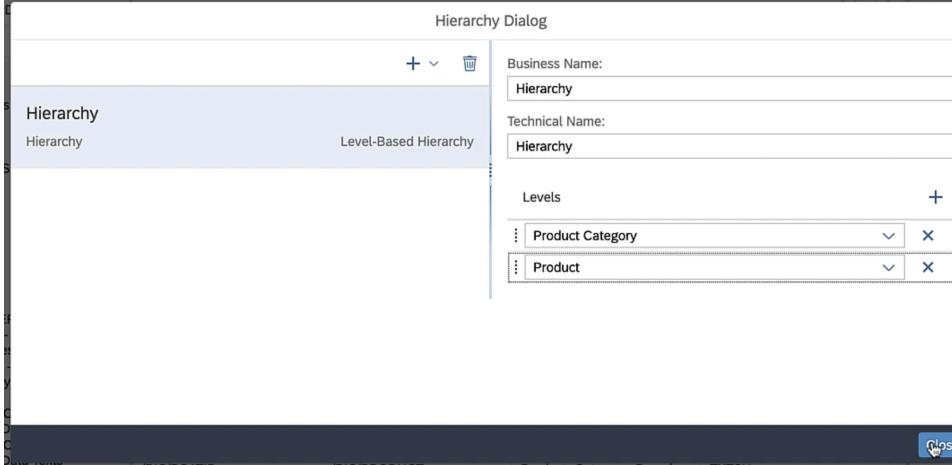
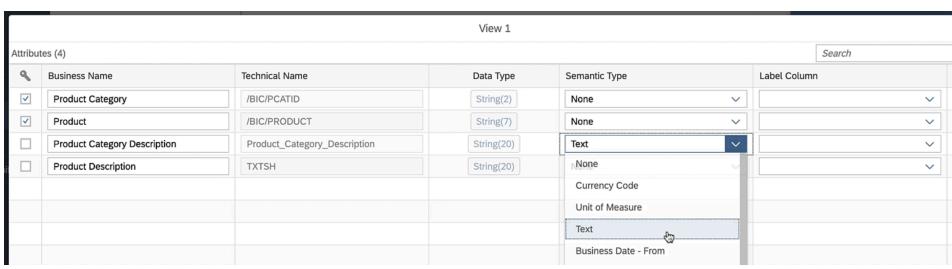
Explanation	Screenshot
132.Add a projection node after the calculation node.	
133.Make sure to exclude the column Short Description and Language key.	
134.Next, drag over the PRODUCT – Product – Master Data Attributes from the Sources tree and put it onto the projection node. Make sure that the option Join is selected when dropping the table!	
135.Again, provide a meaningful Business Name and Technical Name. Then, click on Import and Deploy.	

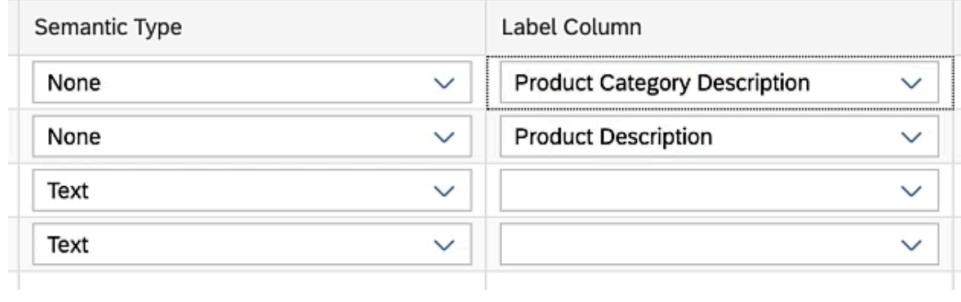
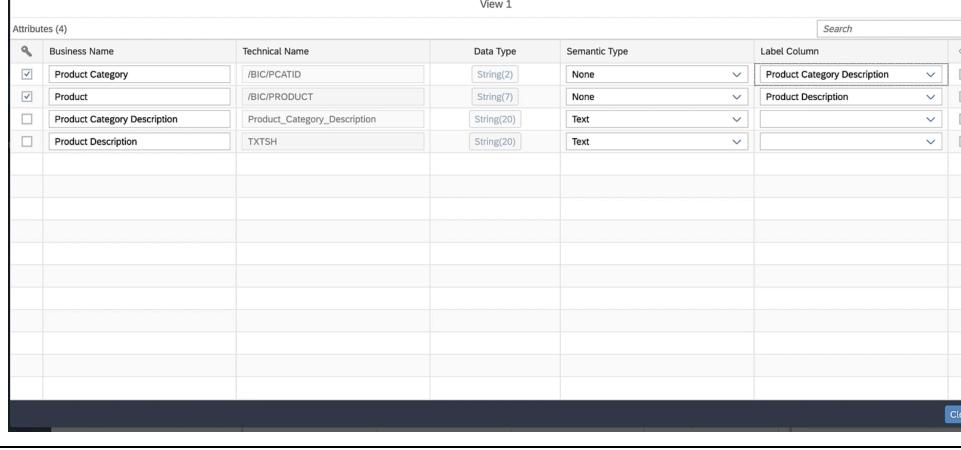
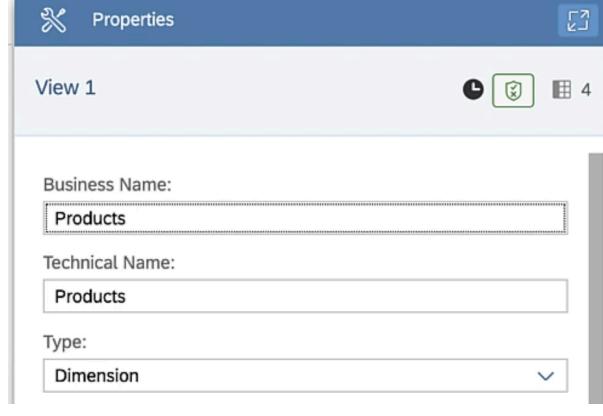
Explanation	Screenshot
136. Make sure that the Join mapping is defined correctly.	
137. Add a projection node after the Product Attributes.	
138. Exclude the columns Currency and Price. We don't need these columns because the Sales Order data sets already contain this information.	
139. Next, drag over the PRODUCT – Product – Master Data Texts and drop it on the projection node you created after the Product Attributes table.	

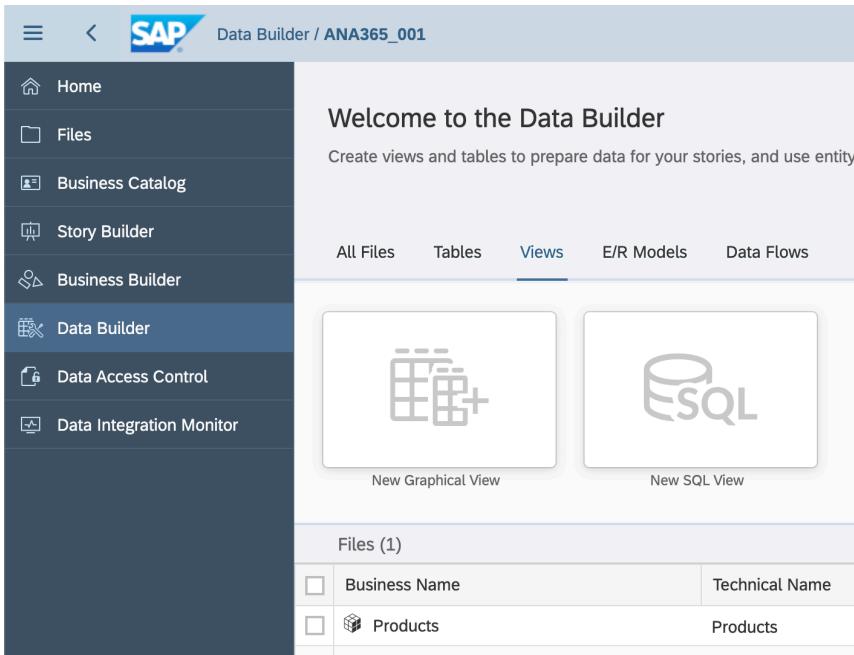
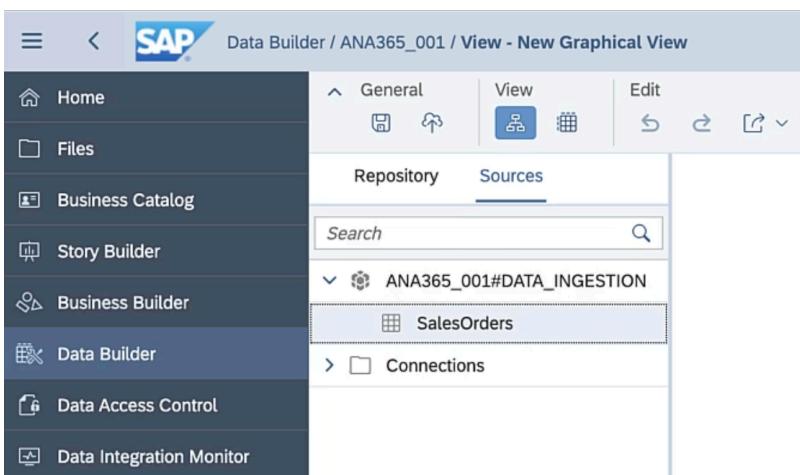
Explanation	Screenshot
140. Provide a meaningful Business Name and Technical Name.	 <p>The dialog box shows the 'Import Table' interface. It has two input fields: 'Business Name:' containing 'Product Texts' and 'Technical Name:' containing 'Product_Texts'. At the bottom are 'Import and Deploy' and 'Cancel' buttons.</p>
141. Add a projection node after the Product Texts node.	 <p>The diagram shows a data flow starting with a 'Product Attributes' node (2 rows, 4 columns) connected to a projection node. The projection node then connects to a 'Product Texts' node (3 rows, 3 columns). A context menu is open over the projection node, with the 'Add' icon highlighted.</p>
142. Exclude the Language key column.	 <p>The 'Projection 5' configuration screen shows three columns: 'AA Product', 'AA Language key', and 'AA Short description'. The 'AA Language key' row has a context menu open with 'Exclude Column' selected.</p>
143. Change the Business Name of the Short description column.	 <p>The 'Projection 5' configuration screen shows three columns: 'AA Product', 'AA Language key', and 'AA Short description'. The 'AA Short description' row has a context menu open with 'Change Business Name' selected.</p>

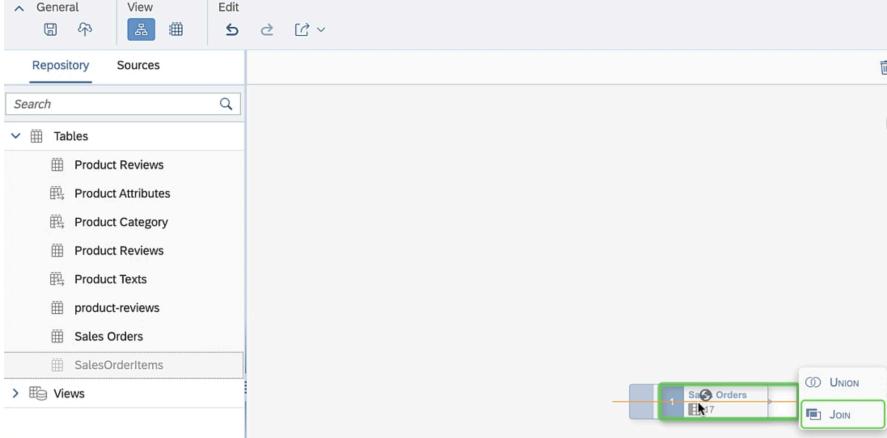
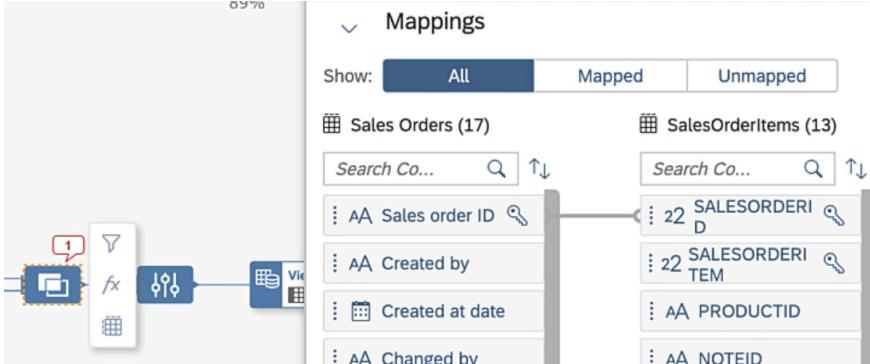
Explanation	Screenshot																							
144. Provide a meaningful name like Product Description.	<p>Search Columns</p> <ul style="list-style-type: none"> AA Product AA Language key AA Product Description <p>The business name for columns must be unique.</p>																							
145. This is how your model should look like by now.	<pre> graph LR A[Product Texts 003 3] -- fx --> B[Product Attributes 003 4] B -- fx --> C[Product Category MD... 3] C -- fx --> D[View 1 4] </pre>																							
146. Select the View 1 output node and open the data preview. Make sure that the data is displayed.	<table border="1"> <thead> <tr> <th data-bbox="551 1262 763 1284">Data Preview: View_1 (44)</th> <th data-bbox="780 1262 845 1284">Errors</th> <th data-bbox="1351 1262 1475 1284">Preview SQL</th> </tr> </thead> <tbody> <tr> <td data-bbox="551 1305 763 1326">/BIC/PCATID</td> <td data-bbox="780 1305 894 1326">/BIC/PRODUCT</td> <td data-bbox="1008 1305 1220 1326">Product_Category_Descri...</td> <td data-bbox="1269 1305 1318 1326">TXTSH</td> </tr> <tr> <td data-bbox="551 1358 763 1379">BX</td> <td data-bbox="780 1358 845 1379">BX-1011</td> <td data-bbox="1008 1358 1057 1379">BMX</td> <td data-bbox="1269 1358 1383 1379">BMX Vintage 1011</td> </tr> <tr> <td data-bbox="551 1400 763 1421">BX</td> <td data-bbox="780 1400 845 1421">BX-1012</td> <td data-bbox="1008 1400 1057 1421">BMX</td> <td data-bbox="1269 1400 1367 1421">BMX Jump 1012</td> </tr> <tr> <td data-bbox="551 1442 763 1463">BX</td> <td data-bbox="780 1442 845 1463">BX-1013</td> <td data-bbox="1008 1442 1057 1463">BMX</td> <td data-bbox="1269 1442 1367 1463">BMX Jump Lux I</td> </tr> <tr> <td data-bbox="551 1484 763 1505">BX</td> <td data-bbox="780 1484 845 1505">BX-1014</td> <td data-bbox="1008 1484 1057 1505">BMX</td> <td data-bbox="1269 1484 1367 1505">BMX Jump Lux II</td> </tr> </tbody> </table>	Data Preview: View_1 (44)	Errors	Preview SQL	/BIC/PCATID	/BIC/PRODUCT	Product_Category_Descri...	TXTSH	BX	BX-1011	BMX	BMX Vintage 1011	BX	BX-1012	BMX	BMX Jump 1012	BX	BX-1013	BMX	BMX Jump Lux I	BX	BX-1014	BMX	BMX Jump Lux II
Data Preview: View_1 (44)	Errors	Preview SQL																						
/BIC/PCATID	/BIC/PRODUCT	Product_Category_Descri...	TXTSH																					
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BX	BX-1012	BMX	BMX Jump 1012																					
BX	BX-1013	BMX	BMX Jump Lux I																					
BX	BX-1014	BMX	BMX Jump Lux II																					

Explanation	Screenshot
<p>147.In the Properties pane change the Type from Relational Dataset to Dimension.</p>	 <p>Business Name: View 1</p> <p>Technical Name: View_1</p> <p>Type:</p> <ul style="list-style-type: none"> Relational Dataset Dimension Analytical Dataset <p>Not Deployed</p>
<p>148.In the Attributes section select the hierarchy icon.</p>	 <p>Attributes (4)</p> <ul style="list-style-type: none"> AA Product Category AA Product
<p>149.In the dialog add a new level-based hierarchy.</p>	 <p>Hierarchy Dialog</p> <p>No hierarchies have been created yet. To create one, please press</p> <ul style="list-style-type: none"> Add Parent Child Hierarchy Add Level Based Hierarchy

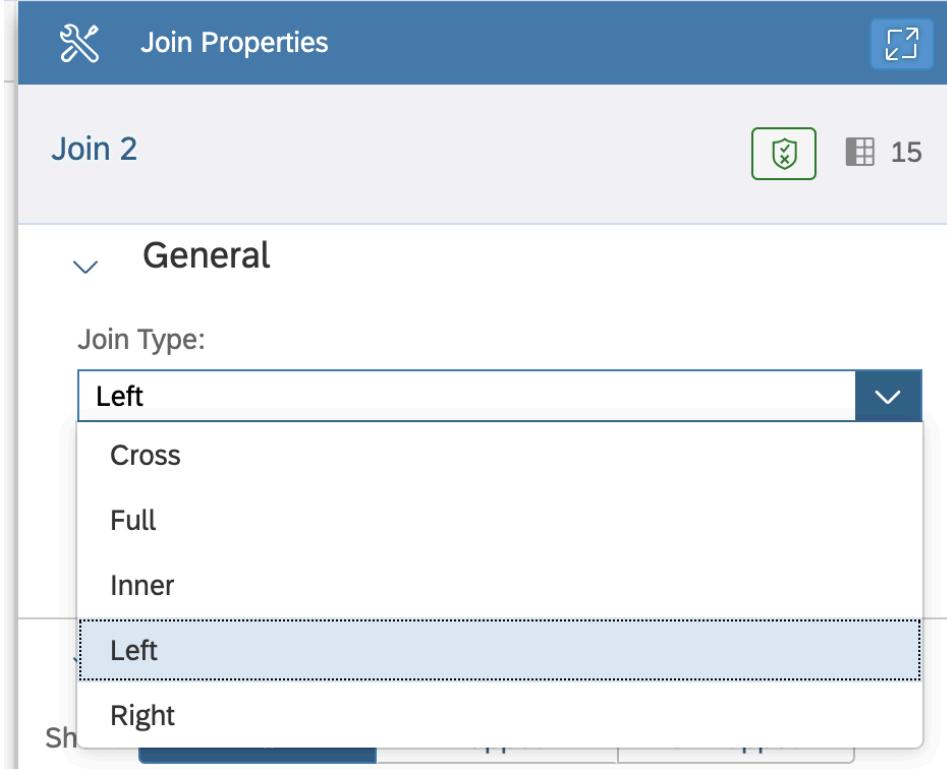
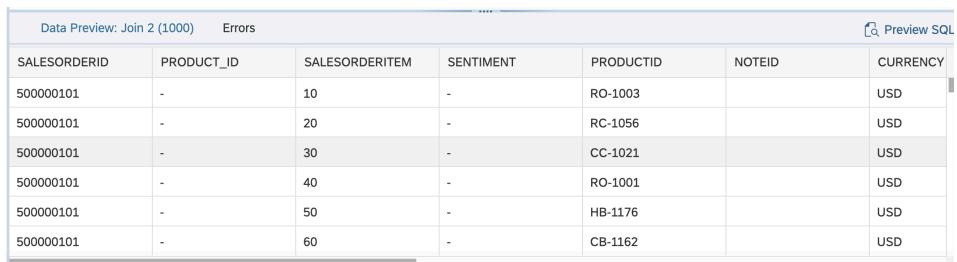
Explanation	Screenshot																									
150. Add two levels and specify the first level as Product Category and the second level as Product.	 <p>The screenshot shows the 'Levels' dialog. It contains a list of levels with a '+' button at the top right. Two levels are listed: 'Product Category' (selected) and 'Product'. Below the list are four buttons: 'Product', 'Product Category Description', 'Product Description', and another 'Product' button.</p>																									
151. Confirm the dialog to create the hierarchy.	 <p>The screenshot shows the 'Hierarchy Dialog' with the 'Hierarchy' tab selected. It displays a 'Level-Based Hierarchy' section containing 'Product Category' and 'Product'. On the right side, there are fields for 'Business Name' (Hierarchy) and 'Technical Name' (Hierarchy), both set to 'Hierarchy'. A 'Levels' section below them also lists 'Product Category' and 'Product'. At the bottom right is a 'Close' button.</p>																									
152. Select the edit icon in the Attributes section.	 <p>The screenshot shows the 'Attributes' section with four entries: 'Product Category', 'Product', 'Product Category Description', and 'Product Description'. Each entry has a key icon and an edit icon (highlighted in the screenshot).</p>																									
153. In the dialog change the Semantic Type for the columns Product Category Description and Product Description to Text.	 <p>The screenshot shows the 'Attributes' dialog with a table titled 'View 1'. The table has columns for Business Name, Technical Name, Data Type, Semantic Type, and Label Column. The rows are:</p> <table border="1"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> <th>Data Type</th> <th>Semantic Type</th> <th>Label Column</th> </tr> </thead> <tbody> <tr> <td>Product Category</td> <td>/BIC/PCATID</td> <td>String(2)</td> <td>None</td> <td></td> </tr> <tr> <td>Product</td> <td>/BIC/PRODUCT</td> <td>String(7)</td> <td>None</td> <td></td> </tr> <tr> <td>Product Category Description</td> <td>Product_Category_Description</td> <td>String(20)</td> <td>Text</td> <td></td> </tr> <tr> <td>Product Description</td> <td>TXTSH</td> <td>String(20)</td> <td>None</td> <td></td> </tr> </tbody> </table> <p>Below the table are sections for Currency Code, Unit of Measure, and Business Date - From.</p>	Business Name	Technical Name	Data Type	Semantic Type	Label Column	Product Category	/BIC/PCATID	String(2)	None		Product	/BIC/PRODUCT	String(7)	None		Product Category Description	Product_Category_Description	String(20)	Text		Product Description	TXTSH	String(20)	None	
Business Name	Technical Name	Data Type	Semantic Type	Label Column																						
Product Category	/BIC/PCATID	String(2)	None																							
Product	/BIC/PRODUCT	String(7)	None																							
Product Category Description	Product_Category_Description	String(20)	Text																							
Product Description	TXTSH	String(20)	None																							

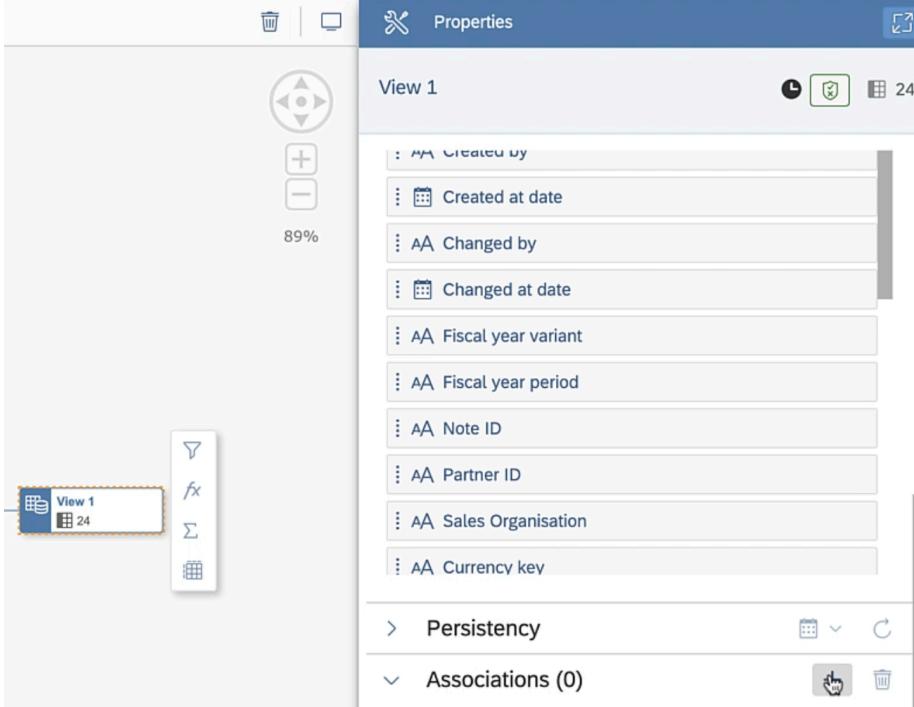
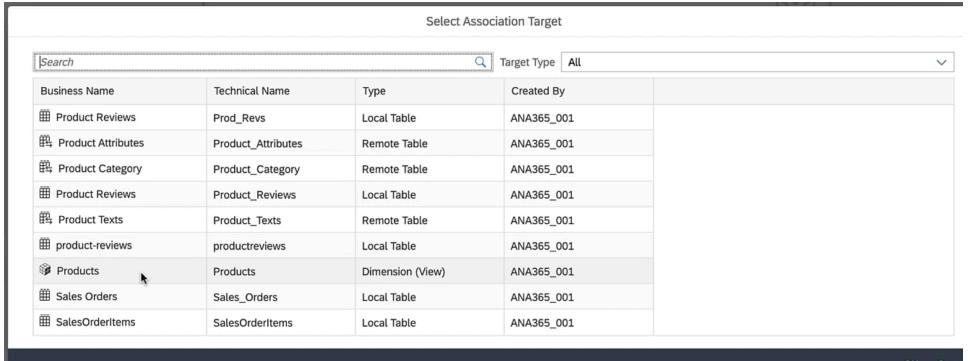
Explanation	Screenshot
154. Change the Label Column values for the first row to Product Category Description and for the second row to Product Description.	
155. Confirm the dialog.	
156. Change the Business Name and Technical Name of the view to Products.	
157. Save and deploy the view.	

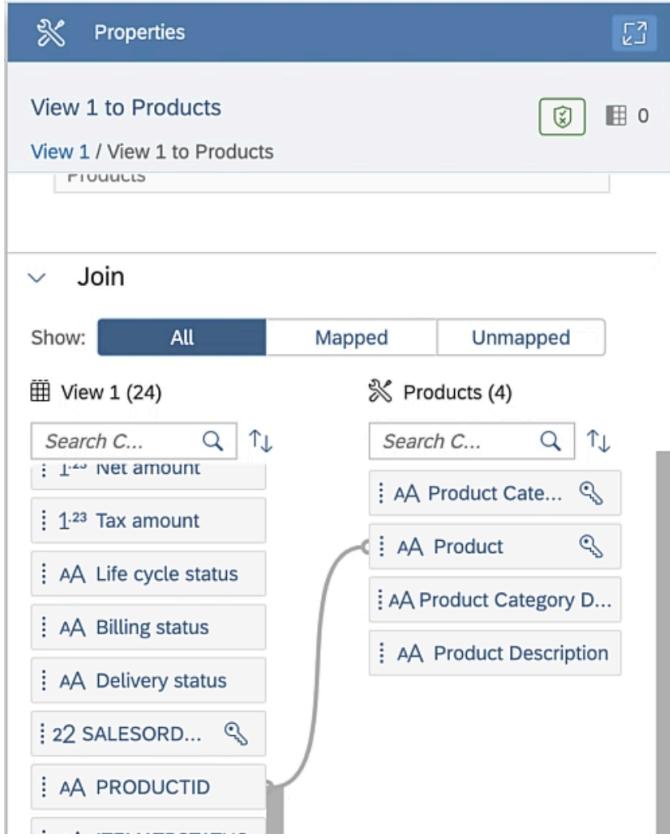
Explanation	Screenshot
158.Congratulations!	<p>You created your first master data dimension in SAP Data Warehouse Cloud! By now the dimension is all virtual. The data we put together in the dimension is fetched live from the connected SAP BW system whenever we query the data model, be it the data preview or when used later in a SAP Analytics Cloud story.</p> <p>Next, we create our final data model combining all the different data assets in a single model.</p>
159.Navigate to the Data Builder and create a new Graphical View.	
160.We start with the Sales Order and Sales Order Items we created in the Open SQL Schema using the Database User. Switch to the Sources tab and drill down into the Open SQL Schema connection. Select the SalesOrders table and drag it onto the canvas.	

Explanation	Screenshot
161. Provide a meaningful Business Name and Technical Name.	
162. Select the Repository tab and select the SalesOrderItems table. Drag it onto the Sales Orders table and make sure the Join option is selected.	
163. Select the Join node and make sure the field mapping is correctly defined (Sales order ID -> SALESORDERID).	

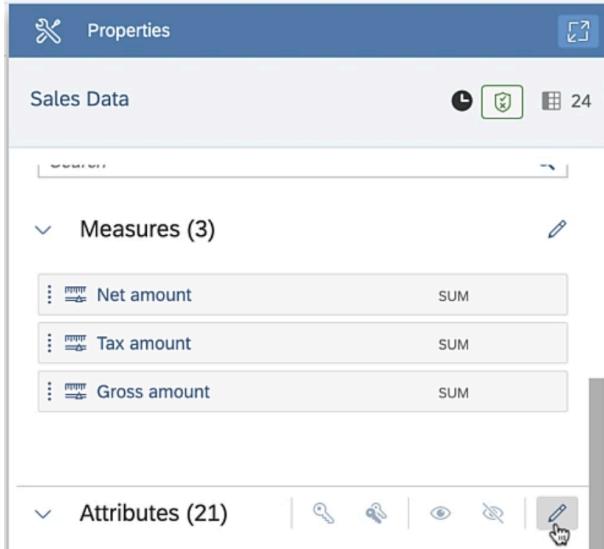
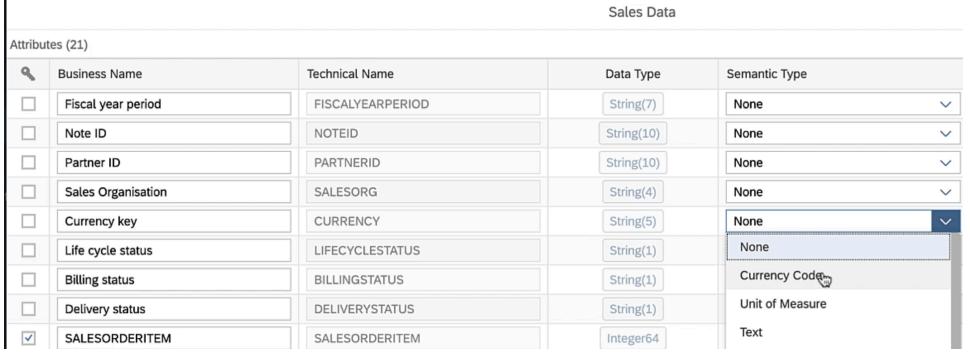
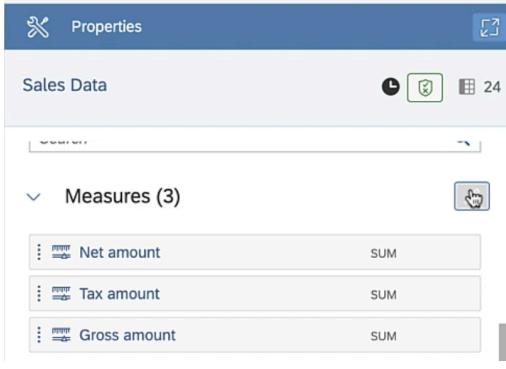
Explanation	Screenshot																					
<p>164. Switch to the Repository tab and in the Tables list select the Product Reviews table. Drag it onto the canvas and drop it onto the Sales Order Items node.</p>																						
<p>165. Select the join node and make sure that the join field mapping is correct (PRODUCTID -> PRODUCT_ID) Don't worry in case your output node on the right is still named View 1, we will get to that.</p>	<table border="1"> <thead> <tr> <th>Mappings</th> </tr> </thead> <tbody> <tr> <td>SalesOrderItems (13)</td> <td>Product Reviews (2)</td> </tr> <tr> <td>22 SALESORDERI_D</td> <td>AA PRODUCT_ID</td> </tr> <tr> <td>22 SALESORDERI_TEM</td> <td>22 Sentiment</td> </tr> <tr> <td>AA PRODUCTID</td> <td></td> </tr> <tr> <td>AA NOTEID</td> <td></td> </tr> <tr> <td>AA CURRENCY</td> <td></td> </tr> <tr> <td>22 GROSSAMOUNT</td> <td></td> </tr> <tr> <td>123 NETAMOUNT</td> <td></td> </tr> <tr> <td>123 TAXAMOUNT</td> <td></td> </tr> <tr> <td>AA ITEMATPSTATUS</td> <td></td> </tr> </tbody> </table>	Mappings	SalesOrderItems (13)	Product Reviews (2)	22 SALESORDERI_D	AA PRODUCT_ID	22 SALESORDERI_TEM	22 Sentiment	AA PRODUCTID		AA NOTEID		AA CURRENCY		22 GROSSAMOUNT		123 NETAMOUNT		123 TAXAMOUNT		AA ITEMATPSTATUS	
Mappings																						
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123 TAXAMOUNT																						
AA ITEMATPSTATUS																						

Explanation	Screenshot																																																	
<p>166. In the General section make sure to set the Join Type as Left so that products for which no reviews exist are still available in the final result set.</p>	 <p>The screenshot shows the 'Join Properties' dialog for 'Join 2'. At the top, there's a wrench icon and the title 'Join Properties'. Below that, the identifier 'Join 2' is shown along with a shield icon and the number '15'. Under the 'General' section, the 'Join Type:' dropdown is open, displaying 'Left' (which is selected), 'Cross', 'Full', and 'Inner'. A scroll bar is visible at the bottom of the dropdown menu.</p>																																																	
<p>167. Do data preview on join node to validate that data is available. Again, the output might look a little different – don't worry. ☺</p>	 <p>The screenshot shows the 'Data Preview' interface for 'Join 2 (1000)'. The table has the following data:</p> <table border="1"> <thead> <tr> <th>SALESORDERID</th> <th>PRODUCT_ID</th> <th>SALESORDERITEM</th> <th>SENTIMENT</th> <th>PRODUCTID</th> <th>NOTEID</th> <th>CURRENCY</th> </tr> </thead> <tbody> <tr><td>500000101</td><td>-</td><td>10</td><td>-</td><td>RO-1003</td><td></td><td>USD</td></tr> <tr><td>500000101</td><td>-</td><td>20</td><td>-</td><td>RC-1056</td><td></td><td>USD</td></tr> <tr><td>500000101</td><td>-</td><td>30</td><td>-</td><td>CC-1021</td><td></td><td>USD</td></tr> <tr><td>500000101</td><td>-</td><td>40</td><td>-</td><td>RO-1001</td><td></td><td>USD</td></tr> <tr><td>500000101</td><td>-</td><td>50</td><td>-</td><td>HB-1176</td><td></td><td>USD</td></tr> <tr><td>500000101</td><td>-</td><td>60</td><td>-</td><td>CB-1162</td><td></td><td>USD</td></tr> </tbody> </table>	SALESORDERID	PRODUCT_ID	SALESORDERITEM	SENTIMENT	PRODUCTID	NOTEID	CURRENCY	500000101	-	10	-	RO-1003		USD	500000101	-	20	-	RC-1056		USD	500000101	-	30	-	CC-1021		USD	500000101	-	40	-	RO-1001		USD	500000101	-	50	-	HB-1176		USD	500000101	-	60	-	CB-1162		USD
SALESORDERID	PRODUCT_ID	SALESORDERITEM	SENTIMENT	PRODUCTID	NOTEID	CURRENCY																																												
500000101	-	10	-	RO-1003		USD																																												
500000101	-	20	-	RC-1056		USD																																												
500000101	-	30	-	CC-1021		USD																																												
500000101	-	40	-	RO-1001		USD																																												
500000101	-	50	-	HB-1176		USD																																												
500000101	-	60	-	CB-1162		USD																																												

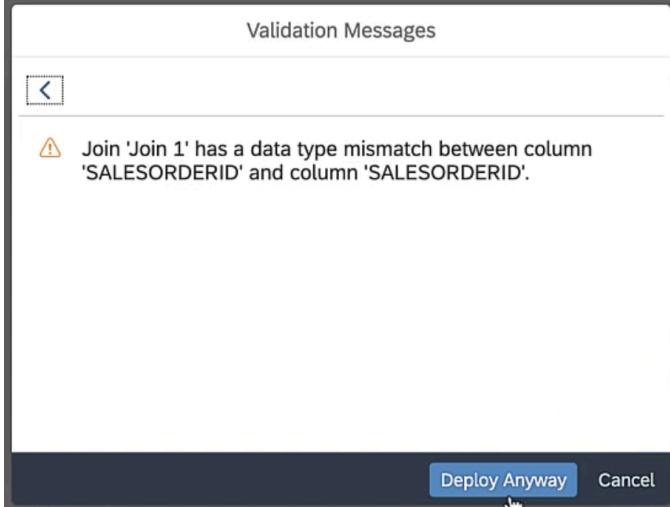
Explanation	Screenshot																																								
<p>168. Select the View 1 output node and scroll down to the Associations section. Hit the Add button to add a new association. The number of columns might be different from what you see in your tenant, but don't worry.</p>																																									
<p>169. From the list of dimensions select the Products view and hit OK.</p>	 <table border="1"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> <th>Type</th> <th>Created By</th> </tr> </thead> <tbody> <tr> <td>Product Reviews</td> <td>Prod_Revs</td> <td>Local Table</td> <td>ANA365_001</td> </tr> <tr> <td>Product Attributes</td> <td>Product_Attributes</td> <td>Remote Table</td> <td>ANA365_001</td> </tr> <tr> <td>Product Category</td> <td>Product_Category</td> <td>Remote Table</td> <td>ANA365_001</td> </tr> <tr> <td>Product Reviews</td> <td>Product_Reviews</td> <td>Local Table</td> <td>ANA365_001</td> </tr> <tr> <td>Product Texts</td> <td>Product_Texts</td> <td>Remote Table</td> <td>ANA365_001</td> </tr> <tr> <td>product-reviews</td> <td>productreviews</td> <td>Local Table</td> <td>ANA365_001</td> </tr> <tr> <td>Products</td> <td>Products</td> <td>Dimension (View)</td> <td>ANA365_001</td> </tr> <tr> <td>Sales Orders</td> <td>Sales_Orders</td> <td>Local Table</td> <td>ANA365_001</td> </tr> <tr> <td>SalesOrderItems</td> <td>SalesOrderItems</td> <td>Local Table</td> <td>ANA365_001</td> </tr> </tbody> </table>	Business Name	Technical Name	Type	Created By	Product Reviews	Prod_Revs	Local Table	ANA365_001	Product Attributes	Product_Attributes	Remote Table	ANA365_001	Product Category	Product_Category	Remote Table	ANA365_001	Product Reviews	Product_Reviews	Local Table	ANA365_001	Product Texts	Product_Texts	Remote Table	ANA365_001	product-reviews	productreviews	Local Table	ANA365_001	Products	Products	Dimension (View)	ANA365_001	Sales Orders	Sales_Orders	Local Table	ANA365_001	SalesOrderItems	SalesOrderItems	Local Table	ANA365_001
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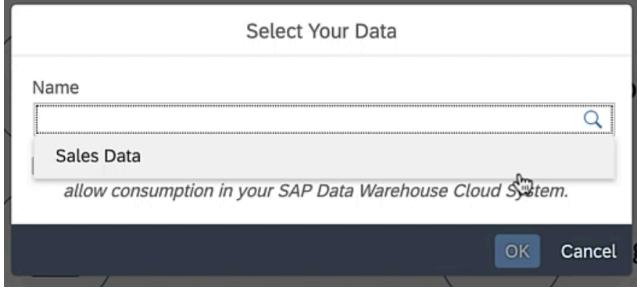
Explanation	Screenshot
<p>170. In the details on the added association make sure that the join fields are defined correctly (PRODUCTID -> Product).</p>	 <p>The screenshot shows the SAP DWHC Properties screen for a View 1 output node. The node is named "View 1 to Products". Under the "Join" section, there are two lists: "View 1 (24)" on the left and "Products (4)" on the right. A curved arrow points from the "AA PRODUCTID" field in the "View 1 (24)" list to the "AA Product" field in the "Products (4)" list, indicating a mapping or association between them.</p>
<p>171. Navigate back to the main Properties screen of the View 1 output node by clicking on the View 1 bread crumb navigation at the top.</p>	 <p>The screenshot shows the SAP DWHC Properties screen for a View 1 output node. The node is named "View 1 to Products". The "General" tab is selected under the "View 1 / View 1 to Products" section. The breadcrumb navigation at the top shows "View 1" as the active item.</p>

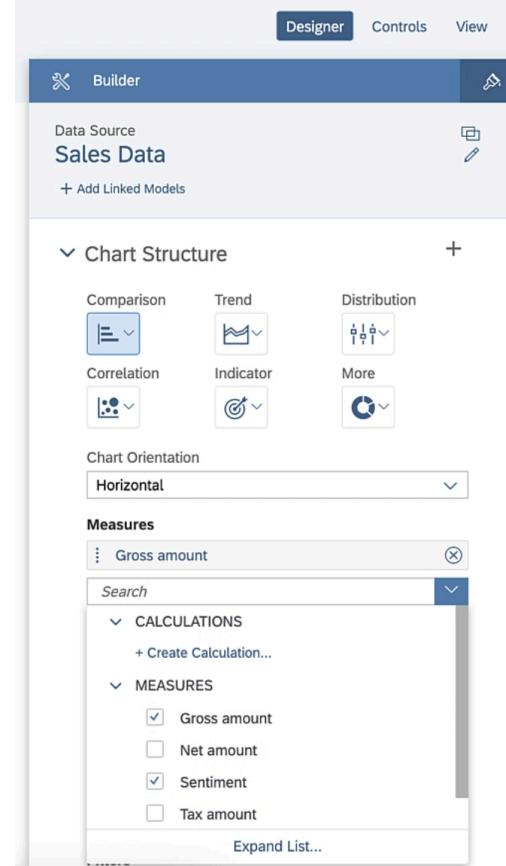
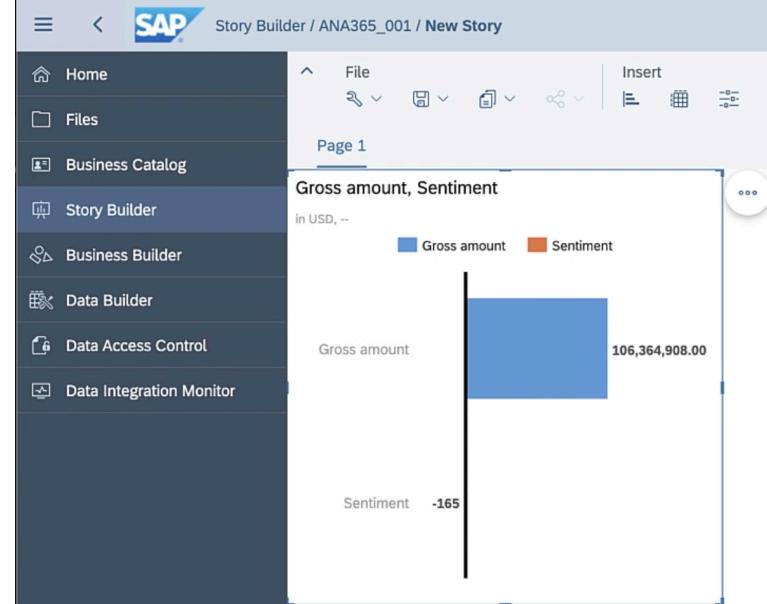
Explanation	Screenshot
<p>172. Provide a meaningful Business Name and Technical Name and set the type to Analytical Dataset. Make sure to switch on the Exposing option.</p>	
<p>173. Now that you have set the type as Analytical Dataset you can define measures. Scroll down and move the columns Sentiment, Gross amount, Net amount and Tax amount from the list of Attributes to the list of Measures.</p>	

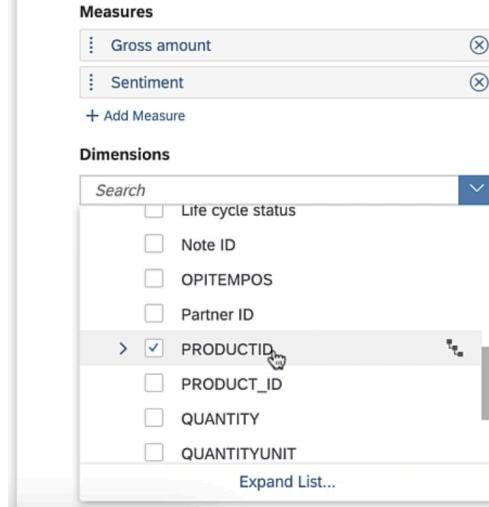
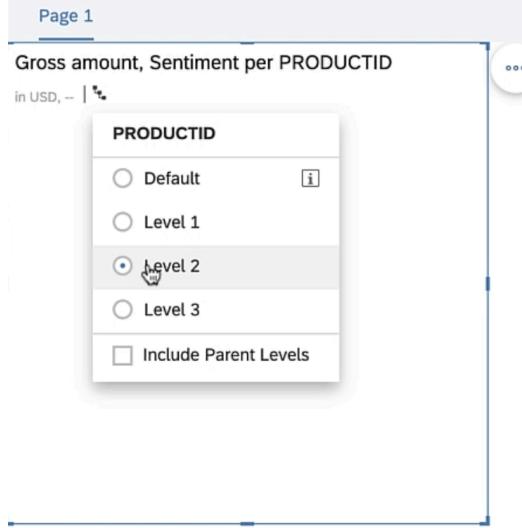
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174. Select the edit button for the Attributes. Don't worry if your view contains more than 21 attributes.																																																																			
175. Change the Semantic Type for the column Currency key to Currency Code.	 <table border="1" data-bbox="518 973 1488 1305"> <thead> <tr> <th colspan="5">Attributes (21)</th> <th>Sales Data</th> </tr> <tr> <th></th> <th>Business Name</th> <th>Technical Name</th> <th>Data Type</th> <th>Semantic Type</th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>Fiscal year period</td> <td>FISCALYEARPERIOD</td> <td>String(7)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Note ID</td> <td>NOTEID</td> <td>String(10)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Partner ID</td> <td>PARTNERID</td> <td>String(10)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Sales Organisation</td> <td>SALESORG</td> <td>String(4)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Currency key</td> <td>CURRENCY</td> <td>String(5)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Life cycle status</td> <td>LIFECYCLESTATUS</td> <td>String(1)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Billing status</td> <td>BILLINGSTATUS</td> <td>String(1)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>Delivery status</td> <td>DELIVERYSTATUS</td> <td>String(1)</td> <td>None</td> <td><input type="button" value="Edit"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>SALESORDERITEM</td> <td>SALESORDERITEM</td> <td>Integer64</td> <td>Text</td> <td><input type="button" value="Edit"/></td> </tr> </tbody> </table>	Attributes (21)					Sales Data		Business Name	Technical Name	Data Type	Semantic Type		<input type="checkbox"/>	Fiscal year period	FISCALYEARPERIOD	String(7)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Note ID	NOTEID	String(10)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Partner ID	PARTNERID	String(10)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Sales Organisation	SALESORG	String(4)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Currency key	CURRENCY	String(5)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Life cycle status	LIFECYCLESTATUS	String(1)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Billing status	BILLINGSTATUS	String(1)	None	<input type="button" value="Edit"/>	<input type="checkbox"/>	Delivery status	DELIVERYSTATUS	String(1)	None	<input type="button" value="Edit"/>	<input checked="" type="checkbox"/>	SALESORDERITEM	SALESORDERITEM	Integer64	Text	<input type="button" value="Edit"/>
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177.Specify a readable business name for each of the measures.	<table border="1"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> <th>Data Type</th> <th>Aggregation</th> </tr> </thead> <tbody> <tr> <td>Sentiment</td> <td>SENTIMENT</td> <td>Integer</td> <td>SUM</td> </tr> <tr> <td>Tax amount</td> <td>TAXAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> </tr> <tr> <td>Net amount</td> <td>NETAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> </tr> <tr> <td>Gross amount</td> <td>GROSSAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> </tr> </tbody> </table>	Business Name	Technical Name	Data Type	Aggregation	Sentiment	SENTIMENT	Integer	SUM	Tax amount	TAXAMOUNT	Decimal(15, 2)	SUM	Net amount	NETAMOUNT	Decimal(15, 2)	SUM	Gross amount	GROSSAMOUNT	Decimal(15, 2)	SUM				
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178.Change the Semantic Type for the three measures Gross amount, Net amount and Tax amount to Amount with Currency. Specify no semantic type for Sentiment.																									
179.For the Unit Column select Currency key for the three measures expect Sentiment.																									
180.Close the dialog.	<table border="1"> <thead> <tr> <th>Business Name</th> <th>Technical Name</th> <th>Data Type</th> <th>Aggregation</th> <th>Semantic Type</th> <th>Unit Column</th> </tr> </thead> <tbody> <tr> <td>Net amount</td> <td>NETAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> <td>Amount with Currency</td> <td>Currency key</td> </tr> <tr> <td>Tax amount</td> <td>TAXAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> <td>Amount with Currency</td> <td>Currency key</td> </tr> <tr> <td>Gross amount</td> <td>GROSSAMOUNT</td> <td>Decimal(15, 2)</td> <td>SUM</td> <td>Amount with Currency</td> <td>Currency key</td> </tr> </tbody> </table>	Business Name	Technical Name	Data Type	Aggregation	Semantic Type	Unit Column	Net amount	NETAMOUNT	Decimal(15, 2)	SUM	Amount with Currency	Currency key	Tax amount	TAXAMOUNT	Decimal(15, 2)	SUM	Amount with Currency	Currency key	Gross amount	GROSSAMOUNT	Decimal(15, 2)	SUM	Amount with Currency	Currency key
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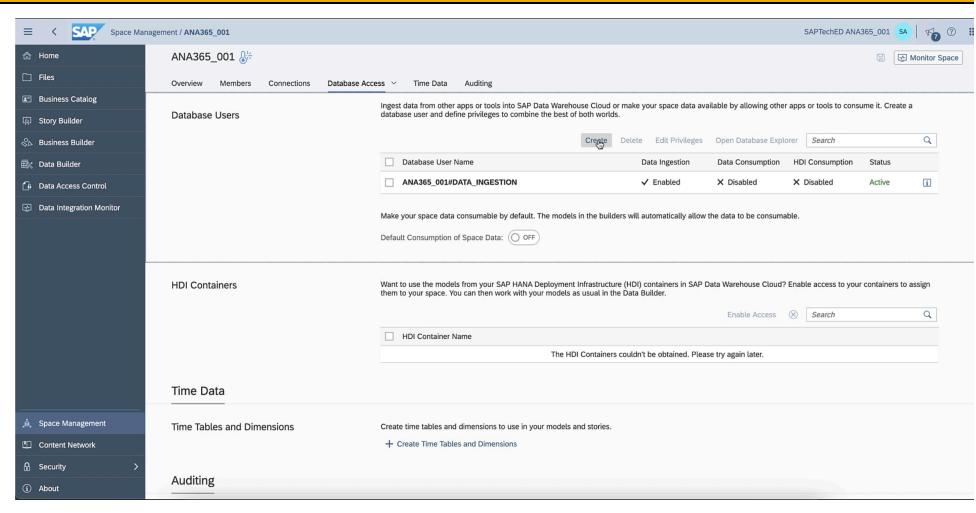
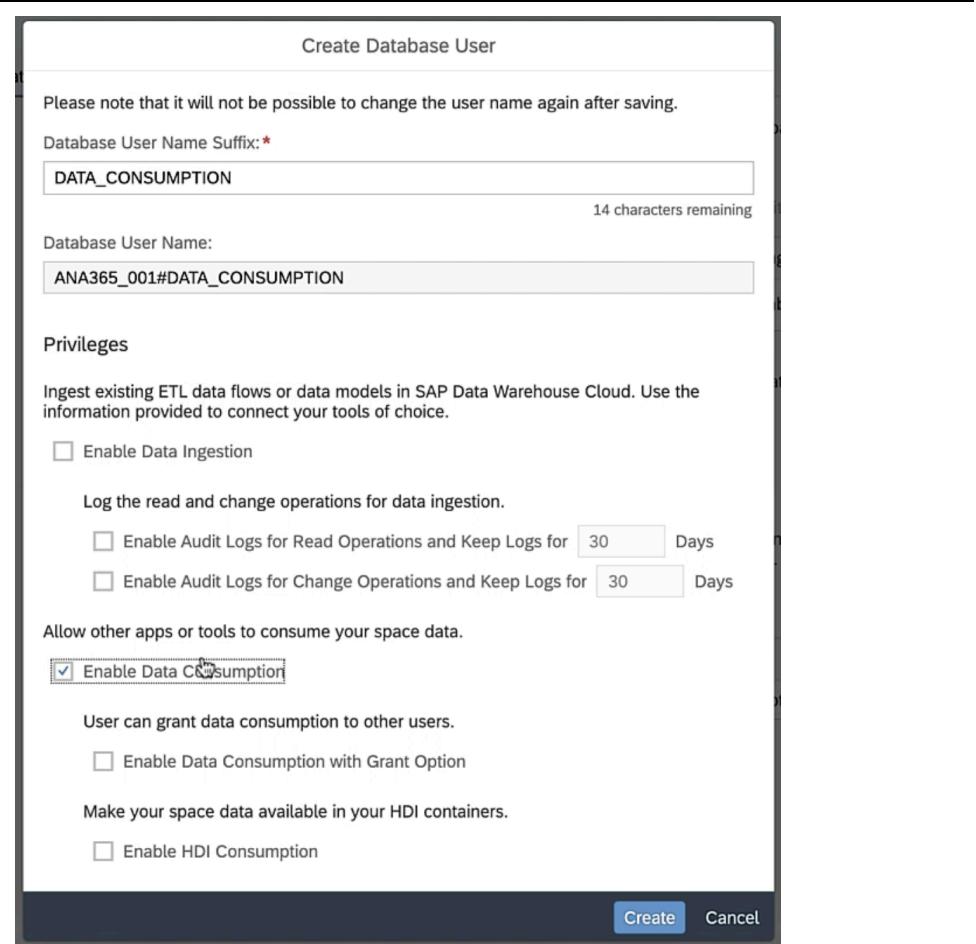
Explanation	Screenshot
181. Save and deploy the view and confirm the validation message in case it is shown.	
182. Congratulations!	<p>You created your data model and combined the different data assets. We are now ready to consume the data model in an application like SAP Analytics Cloud or a 3rd party external SQL application.</p> <p>In the next section we will experience both possible ways, before we finally take a look at how the models can be tweaked further to improve the performance and make sure that the source systems are not overloaded with data requests.</p> <p>We will start with creating a SAP Analytics Cloud story as an example, then take a look at how you can consume the exposed data models in a 3rd party SQL tool.</p>
183. Select the Story Builder from the navigation bar and create a new story.	

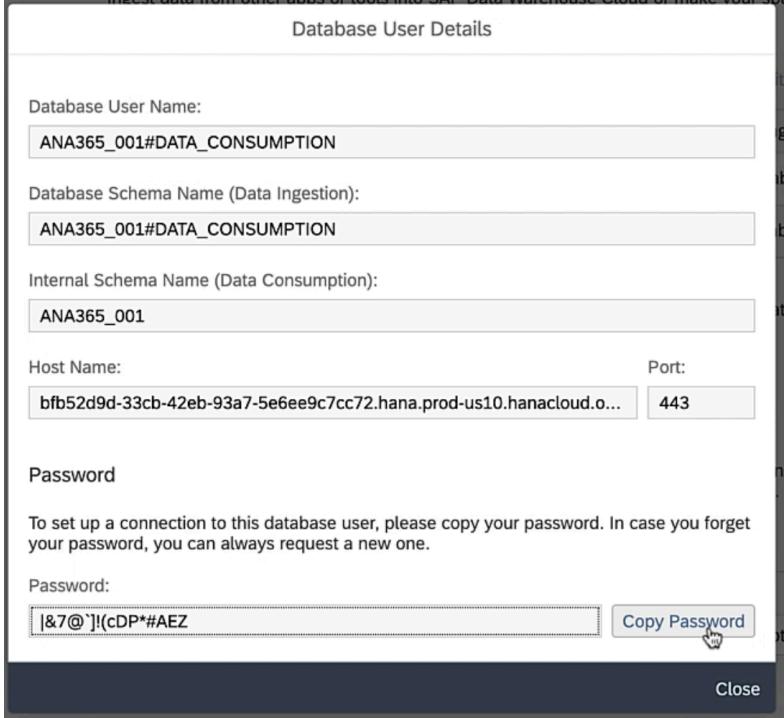
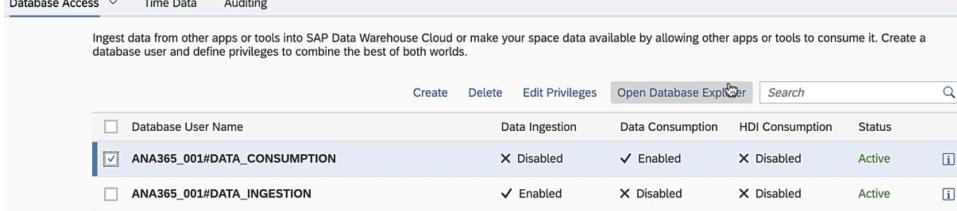
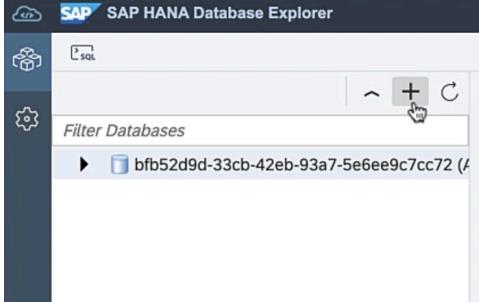
Explanation	Screenshot
<p>184. Select the Sales Data set you created earlier. If no entry is visible navigate back to the graphical Sales Data view and make sure the Exposing option is switched on!</p>	
<p>185. Select the Chart option.</p>	<p>Add an object to the story canvas.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>You've added the field Sales Data to your story.</p> <p>Now that you've uploaded data, select the first object you would like to add to your story canvas.</p> </div> <div style="display: grid; grid-template-columns: 1fr 1fr;"> <div style="text-align: center;">  <p>Chart</p> </div> <div style="text-align: center;">  <p>Geo Map</p> </div> <div style="text-align: center;">  <p>Table</p> </div> <div style="text-align: center;">  <p>Image</p> </div> <div style="text-align: center;">  <p>Shape</p> </div> <div style="text-align: center;">  <p>Text</p> </div> </div> </div>

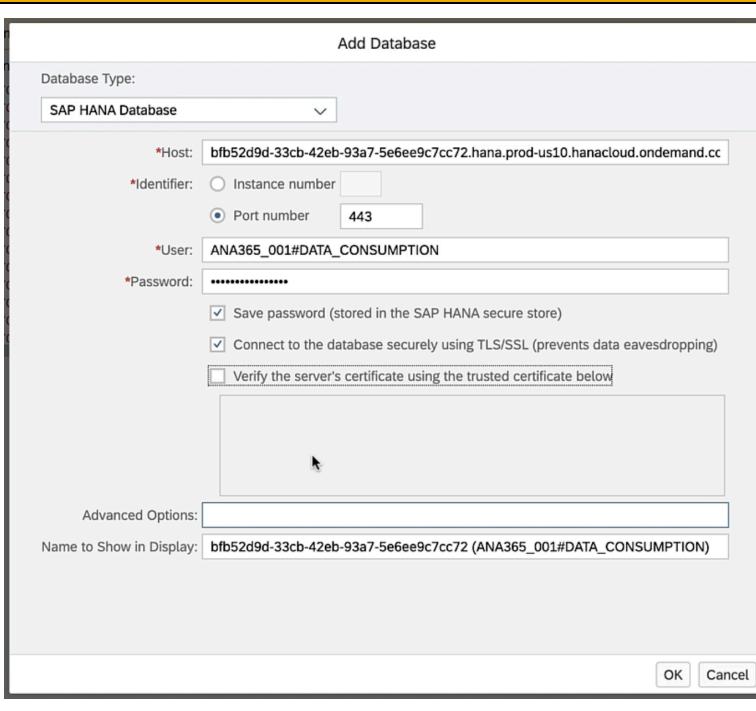
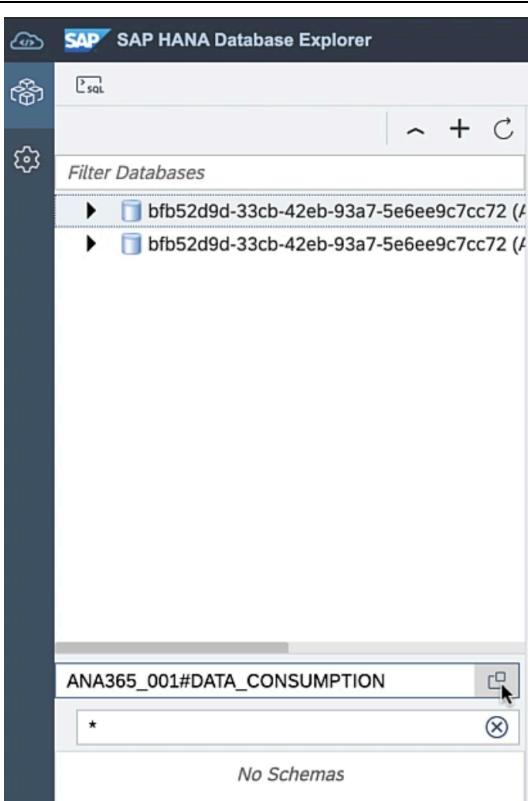
Explanation	Screenshot
<p>186. On the right add the two measures Gross amount and Sentiment.</p>	 <p>The screenshot shows the SAP Data Warehouse Cloud Builder interface. In the 'Chart Structure' section, under 'Measures', 'Gross amount' is selected under 'CALCULATIONS'. Under 'MEASURES', 'Gross amount' and 'Sentiment' are selected. Both checkboxes are checked.</p>
<p>187. The aggregated sum and sentiment is shown on the left.</p>	 <p>The screenshot shows the SAP Story Builder interface. A bar chart titled 'Gross amount, Sentiment' is displayed. The chart has two bars: 'Gross amount' (blue) with a value of 106,364,908.00 and 'Sentiment' (orange) with a value of -165. The legend at the bottom identifies the colors for each category.</p>

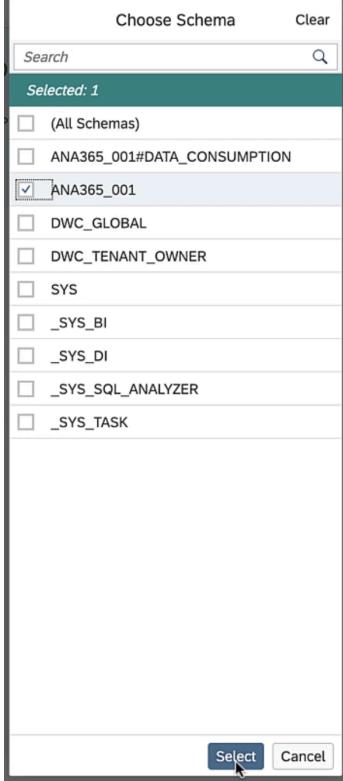
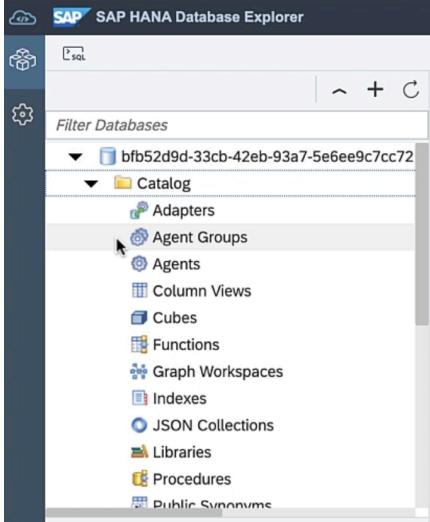
Explanation	Screenshot
188. Add the PRODUCTID dimension to the list of Dimensions.	
189. Change the PRODUCTID hierarchy display to Level 2.	

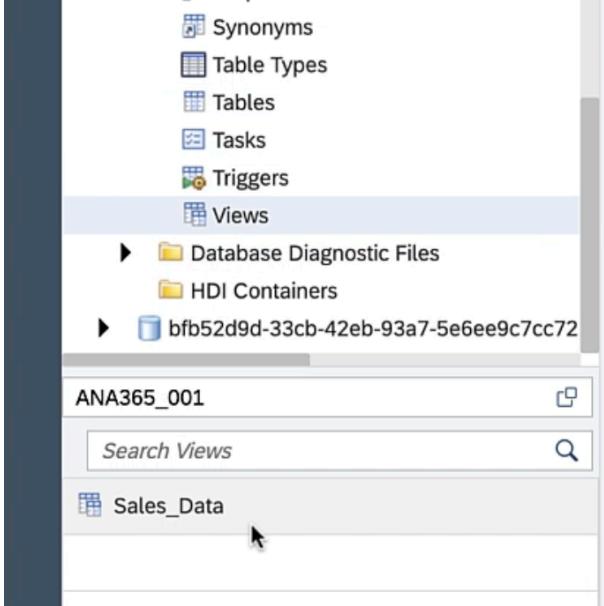
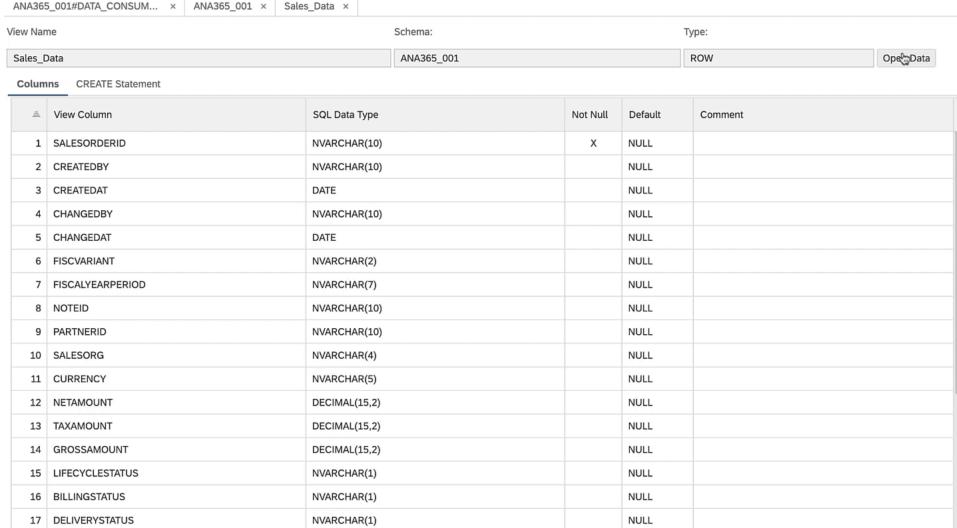
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<p>190. Drag the canvas a little wider to get a good overview on the aggregated sentiment per product category.</p>	<table border="1"> <thead> <tr> <th>Category</th> <th>Gross amount</th> <th>Sentiment</th> </tr> </thead> <tbody> <tr> <td>BMX</td> <td>16,332,817.00</td> <td>-49</td> </tr> <tr> <td>Cruiser</td> <td>7,214,774.00</td> <td>-49</td> </tr> <tr> <td>Cyclo-cross Bike</td> <td>7,954,082.00</td> <td>-48</td> </tr> <tr> <td>Downhill Bike</td> <td>7,159,982.00</td> <td>-42</td> </tr> <tr> <td>eBike</td> <td>20,440,518.00</td> <td>-50</td> </tr> <tr> <td>Hybrid Bike</td> <td>12,000,412.00</td> <td>-73</td> </tr> <tr> <td>Mountain Bike</td> <td>10,791,173.00</td> <td>-70</td> </tr> <tr> <td>Racing Bike</td> <td>19,107,879.00</td> <td>210</td> </tr> <tr> <td>Road Bike</td> <td>5,363,271.00</td> <td>-49</td> </tr> </tbody> </table>	Category	Gross amount	Sentiment	BMX	16,332,817.00	-49	Cruiser	7,214,774.00	-49	Cyclo-cross Bike	7,954,082.00	-48	Downhill Bike	7,159,982.00	-42	eBike	20,440,518.00	-50	Hybrid Bike	12,000,412.00	-73	Mountain Bike	10,791,173.00	-70	Racing Bike	19,107,879.00	210	Road Bike	5,363,271.00	-49
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<p>191. To save the story, click on the Save button and select Save.</p>																															
<p>192. Congratulations!</p>	<p>You have successfully consumed the data set in the SAP Analytics Cloud story builder. You can go ahead and tweak and fine-tune the story as you like, however we will not drill down deeper into the possibilities of the SAP Analytics Cloud story builder for the sake of this data integration session.</p> <p>As a next step, let's check out how you can consume the very same data model using a 3rd party SQL external application.</p>																														

Explanation	Screenshot
<p>193. Navigate back to the Space Management into your space to the Database Access section. Hit Create to create another Database User.</p>	
<p>194. Provide a Database User Name Suffix like DATA_CONSUMPTION and make sure to select the Enable Data Consumption checkbox.</p>	

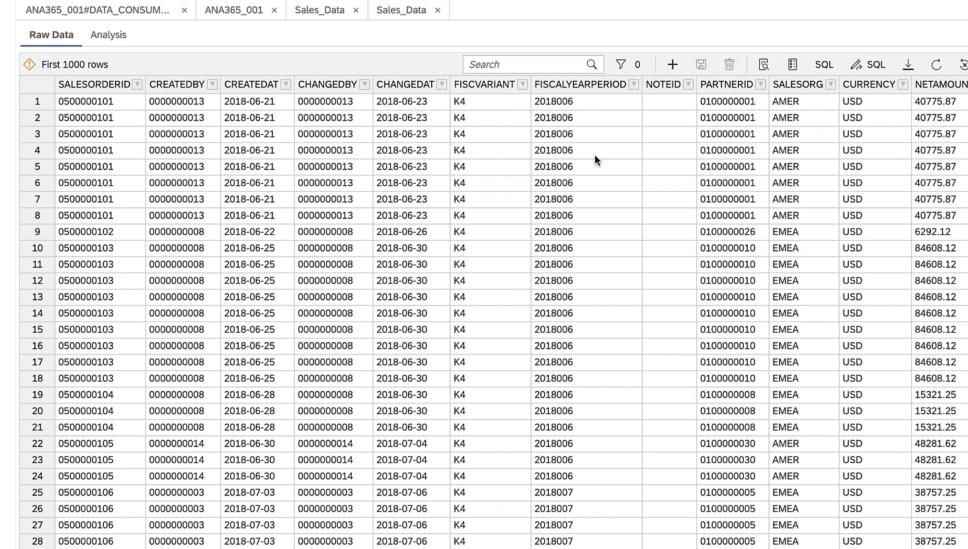
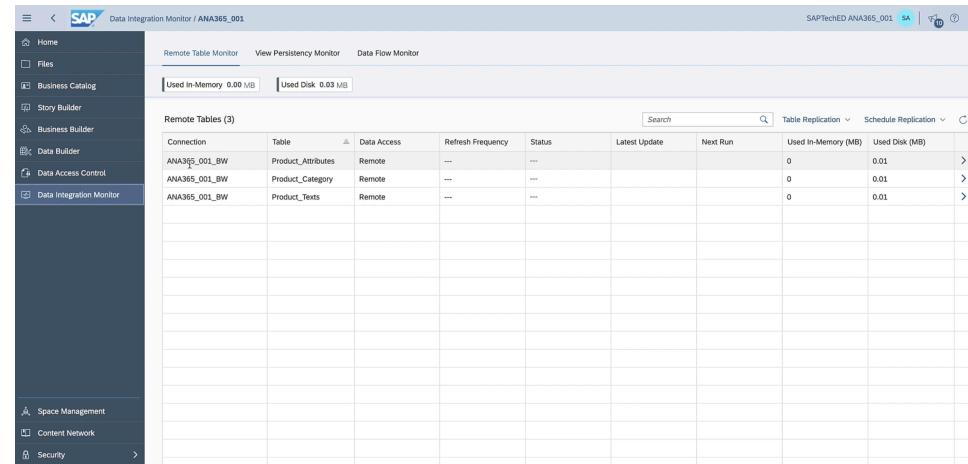
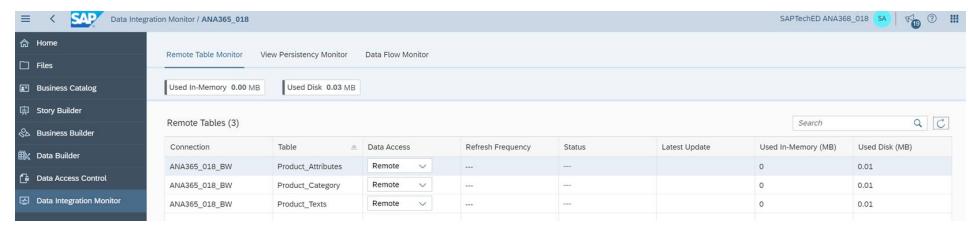
Explanation	Screenshot
195. Copy over the Database User Name, Host Name, Port and Password to for example notepad. In case you lost the password later you can always return to this dialog and request a new password.	 <p>The screenshot shows the 'Database User Details' dialog box. It contains fields for Database User Name (ANA365_001#DATA_CONSUMPTION), Database Schema Name (Data Ingestion) (ANA365_001#DATA_CONSUMPTION), Internal Schema Name (Data Consumption) (ANA365_001), Host Name (bf52d9d-33cb-42eb-93a7-5e6ee9c7cc72.hana.prod-us10.hanacloud.o...), Port (443), and a Password field containing a complex string. A 'Copy Password' button is visible next to the password input field.</p>
196. Select the newly created database user and hit the Open Database Explorer button on the right.	 <p>The screenshot shows the 'Database Access' interface. It lists two users: ANA365_001#DATA_CONSUMPTION (selected) and ANA365_001#DATA_INGESTION. The selected user has 'Enabled' checked under 'Data Ingestion' and 'Data Consumption'. The 'Open Database Explorer' button is highlighted.</p>
197. In the SAP HANA Database Explorer (you can also use any other 3rd party SQL tool instead) hit the Add Database button.	 <p>The screenshot shows the SAP HANA Database Explorer interface. On the left is a sidebar with icons for Cloud, SAP HANA Database Explorer, and Settings. The main area shows a list of databases, with a '+' icon in the top right corner indicating where to click to add a new database.</p>

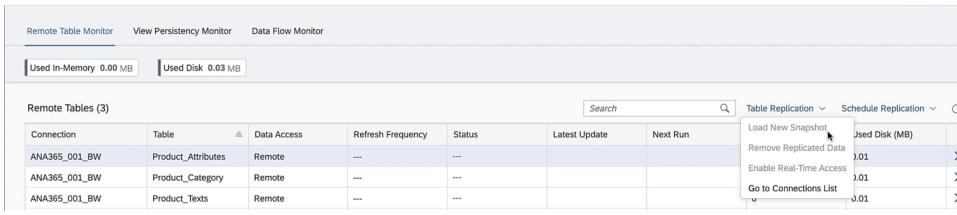
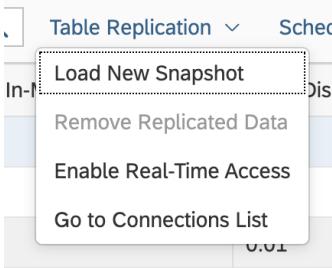
Explanation	Screenshot
198. Select the Database Type SAP HANA Database and enter the host, Port number, User and Password which you copied over from the other dialog in SAP Data Warehouse Cloud. Make sure to check the checkboxes Save password and Connect to the database... Make sure to un-check the Verify the server's certificate... checkbox.	
199. Select the value help button.	

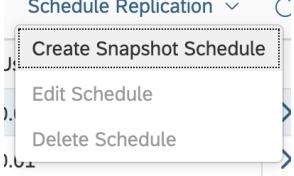
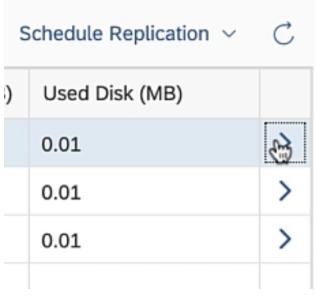
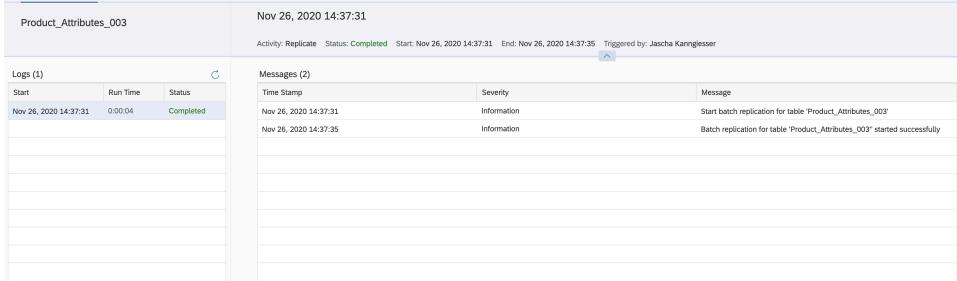
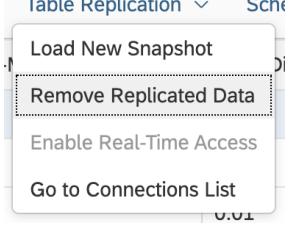
Explanation	Screenshot
<p>200. Choose the schema matching your space name, for example ANA365_001.</p>	
<p>201. Expand the database you just added and scroll down to Views.</p>	

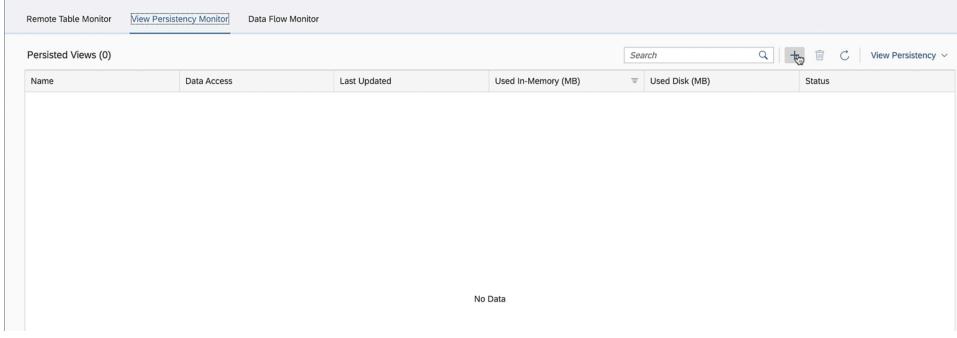
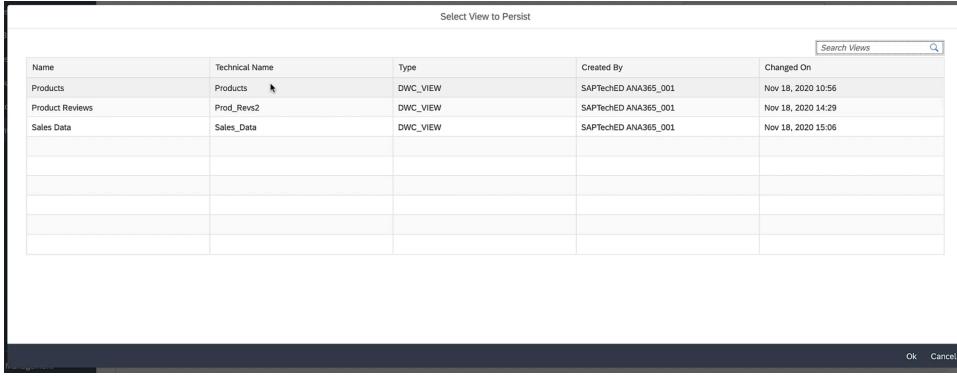
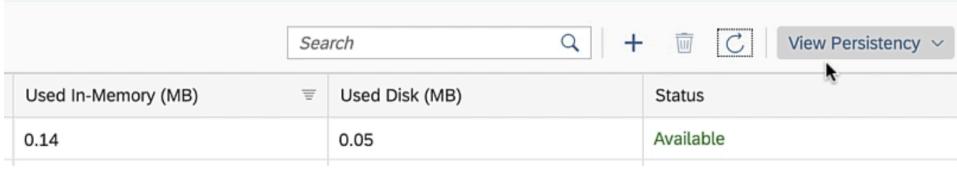
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<p>202. Select Views and select your view Sales_Data from the list of available views below.</p>																																																																																											
<p>203. A new tab opens displaying the columns of this view like you created it in SAP Data Warehouse Cloud. Hit the Open Data button in the top right corner to preview the available data.</p>	 <table border="1"> <thead> <tr> <th>View Column</th> <th>SQL Data Type</th> <th>Not Null</th> <th>Default</th> <th>Comment</th> </tr> </thead> <tbody> <tr><td>1 SALESORDERID</td><td>NVARCHAR(10)</td><td>X</td><td>NULL</td><td></td></tr> <tr><td>2 CREATEDBY</td><td>NVARCHAR(10)</td><td></td><td>NULL</td><td></td></tr> <tr><td>3 CREATEDAT</td><td>DATE</td><td></td><td>NULL</td><td></td></tr> <tr><td>4 CHANGEDBY</td><td>NVARCHAR(10)</td><td></td><td>NULL</td><td></td></tr> <tr><td>5 CHANGEDAT</td><td>DATE</td><td></td><td>NULL</td><td></td></tr> <tr><td>6 FISCVARIANT</td><td>NVARCHAR(2)</td><td></td><td>NULL</td><td></td></tr> <tr><td>7 FISCALYEARPERIOD</td><td>NVARCHAR(7)</td><td></td><td>NULL</td><td></td></tr> <tr><td>8 NOTEID</td><td>NVARCHAR(10)</td><td></td><td>NULL</td><td></td></tr> <tr><td>9 PARTNERID</td><td>NVARCHAR(10)</td><td></td><td>NULL</td><td></td></tr> <tr><td>10 SALESORG</td><td>NVARCHAR(4)</td><td></td><td>NULL</td><td></td></tr> <tr><td>11 CURRENCY</td><td>NVARCHAR(5)</td><td></td><td>NULL</td><td></td></tr> <tr><td>12 NETAMOUNT</td><td>DECIMAL(15,2)</td><td></td><td>NULL</td><td></td></tr> <tr><td>13 TAXAMOUNT</td><td>DECIMAL(15,2)</td><td></td><td>NULL</td><td></td></tr> <tr><td>14 GROSSAMOUNT</td><td>DECIMAL(15,2)</td><td></td><td>NULL</td><td></td></tr> <tr><td>15 LIFECYCLESTATUS</td><td>NVARCHAR(1)</td><td></td><td>NULL</td><td></td></tr> <tr><td>16 BILLINGSTATUS</td><td>NVARCHAR(1)</td><td></td><td>NULL</td><td></td></tr> <tr><td>17 DELIVERYSTATUS</td><td>NVARCHAR(1)</td><td></td><td>NULL</td><td></td></tr> </tbody> </table>	View Column	SQL Data Type	Not Null	Default	Comment	1 SALESORDERID	NVARCHAR(10)	X	NULL		2 CREATEDBY	NVARCHAR(10)		NULL		3 CREATEDAT	DATE		NULL		4 CHANGEDBY	NVARCHAR(10)		NULL		5 CHANGEDAT	DATE		NULL		6 FISCVARIANT	NVARCHAR(2)		NULL		7 FISCALYEARPERIOD	NVARCHAR(7)		NULL		8 NOTEID	NVARCHAR(10)		NULL		9 PARTNERID	NVARCHAR(10)		NULL		10 SALESORG	NVARCHAR(4)		NULL		11 CURRENCY	NVARCHAR(5)		NULL		12 NETAMOUNT	DECIMAL(15,2)		NULL		13 TAXAMOUNT	DECIMAL(15,2)		NULL		14 GROSSAMOUNT	DECIMAL(15,2)		NULL		15 LIFECYCLESTATUS	NVARCHAR(1)		NULL		16 BILLINGSTATUS	NVARCHAR(1)		NULL		17 DELIVERYSTATUS	NVARCHAR(1)		NULL	
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ANA365 - Data Integration and Data Flow Modeling with SAP Data Warehouse Cloud

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<p>205. Congratulations!</p>	<p>You now know how to consume data models within SAP Data Warehouse Cloud using the Story Builder or externally via the Open SQL Schema using Database Users enabled for consumption and any external 3rd party SQL client.</p> <p>Let's continue with the last section of this hands-on! We will now check out how we can replicate data to SAP Data Warehouse Cloud using the Remote Table replication and View Persistence.</p>																																																																																																																																																																																																																																																																																																																																
<p>206. In SAP Data Warehouse Cloud navigate to the Data Integration Monitor.</p>	 <table border="1"> <thead> <tr> <th>Connection</th> <th>Table</th> <th>Data Access</th> <th>Refresh Frequency</th> <th>Status</th> <th>Latest Update</th> <th>Next Run</th> <th>Used In-Memory (MB)</th> <th>Used Disk (MB)</th> </tr> </thead> <tbody> <tr><td>ANA365_001_BW</td><td>Product_Attributes</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> <tr><td>ANA365_001_BW</td><td>Product_Category</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> <tr><td>ANA365_001_BW</td><td>Product_Texts</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> </tbody> </table>	Connection	Table	Data Access	Refresh Frequency	Status	Latest Update	Next Run	Used In-Memory (MB)	Used Disk (MB)	ANA365_001_BW	Product_Attributes	Remote	---	---			0	0.01	ANA365_001_BW	Product_Category	Remote	---	---			0	0.01	ANA365_001_BW	Product_Texts	Remote	---	---			0	0.01																																																																																																																																																																																																																																																																																												
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<p>207. Please note: As of writing this manual on Dec 7th 2020 the scheduling functionality mentioned in the following steps is</p>	 <table border="1"> <thead> <tr> <th>Connection</th> <th>Table</th> <th>Data Access</th> <th>Refresh Frequency</th> <th>Status</th> <th>Latest Update</th> <th>Next Run</th> <th>Used In-Memory (MB)</th> <th>Used Disk (MB)</th> </tr> </thead> <tbody> <tr><td>ANA365_018_BW</td><td>Product_Attributes</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> <tr><td>ANA365_018_BW</td><td>Product_Category</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> <tr><td>ANA365_018_BW</td><td>Product_Texts</td><td>Remote</td><td>---</td><td>---</td><td></td><td></td><td>0</td><td>0.01</td></tr> </tbody> </table>	Connection	Table	Data Access	Refresh Frequency	Status	Latest Update	Next Run	Used In-Memory (MB)	Used Disk (MB)	ANA365_018_BW	Product_Attributes	Remote	---	---			0	0.01	ANA365_018_BW	Product_Category	Remote	---	---			0	0.01	ANA365_018_BW	Product_Texts	Remote	---	---			0	0.01																																																																																																																																																																																																																																																																																												
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Explanation	Screenshot								
<p>currently not available. Therefore, the following screens might look a little different in your tenant than shown in the screenshots.</p>									
<p>208. For any remote table you create in your space in SAP Data Warehouse Cloud you can control whether the data access is remote (no data is stored permanently in your space, but always accessed live during query runtime) or replicated (real-time or snapshot). Using the Table Replication menu in the top right corner you can enable snapshot or realtime replication if available.</p>									
<p>209. Select the line for the Product_Attributes table and then select Load New Snapshot to replicate the remote table Product_Attributes to your space for the sake of demonstrating the Snapshot Schedule option. For specific data sets you can also enable Real-Time Access if required.</p>									
<p>210. Refresh the page and wait until the Status changes to Available.</p>	<table border="1" data-bbox="518 1780 1475 1892"> <thead> <tr> <th data-bbox="518 1780 763 1812">Data Access</th><th data-bbox="763 1780 1008 1812">Refresh Frequency</th><th data-bbox="1008 1780 1253 1812">Status</th><th data-bbox="1253 1780 1475 1812">Latest Update</th></tr> </thead> <tbody> <tr> <td data-bbox="518 1812 763 1843">Replicated</td><td data-bbox="763 1812 1008 1843">None</td><td data-bbox="1008 1812 1253 1843">Available</td><td data-bbox="1253 1812 1475 1843">Nov 26, 2020 14:37:35</td></tr> </tbody> </table>	Data Access	Refresh Frequency	Status	Latest Update	Replicated	None	Available	Nov 26, 2020 14:37:35
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Explanation	Screenshot
211. For snapshot replications you can also create a schedule. Creating a schedule allows you to automatically create new snapshots based on the provided frequency. Go ahead and create a Snapshot Schedule for this table.	
212. Clicking on the little arrow icon on the right takes you to the replication monitor logs for the data replication tasks for the selected table.	
213. The Logs screen gives you an overview of all past and currently running replications.	
214. Replicating a remote table always replicates all the data from this table 1:1. This might not be needed if you apply filters in views that use this table and therefore only a require a subset of the actual data of this remote table. Go back to the Remote Table Monitor and	

Explanation	Screenshot
change the Data Access back to Remote.	
215. To only persist the result of a modeled view, select the View Persistence Monitor. Hit the Add button on the right create a new view persistence.	 <p>The screenshot shows the SAP Data Warehouse Cloud interface for managing view persistency. The top navigation bar includes 'Remote Table Monitor', 'View Persistence Monitor' (which is selected), and 'Data Flow Monitor'. Below the navigation is a search bar and a toolbar with icons for search, add, delete, and refresh. A table titled 'Persisted Views (0)' displays columns for Name, Data Access, Last Updated, Used In-Memory (MB), Used Disk (MB), and Status. The status column shows 'No Data'.</p>
216. From the dialog select the Products view.	 <p>The screenshot shows a modal dialog titled 'Select View to Persist'. It lists three views: 'Products', 'Product Reviews', and 'Sales Data'. Each entry includes its name, technical name, type (DWC_VIEW), created by (SAPTechED ANA365_001), and changed on date (Nov 18, 2020). The 'Products' row is currently selected. At the bottom of the dialog are 'Ok' and 'Cancel' buttons.</p>
217. After confirming the dialog, you can see that a new view persistence was created and the status is Loading.	 <p>The screenshot shows the 'Persisted Views (1)' list. It contains one entry for 'Products' with a 'Virtual' data access type. The 'Used In-Memory (MB)' and 'Used Disk (MB)' fields are both 0. The 'Status' field is set to 'Loading'.</p>
218. Hit Refresh until the status changes to Available.	 <p>The screenshot shows the same 'Persisted Views (1)' list as before, but the 'Status' column for the 'Products' entry now shows 'Available'.</p>
219. Congratulations!	<p>You made it! You finished the exercise and experienced all the different aspects of data integration in SAP Data Warehouse Cloud. As a review, during the session you learned about, how to create federated and replicated connections to SAP & non-SAP, cloud and on-premises data sources, how to load data into SAP Data Warehouse Cloud using external SQL clients, how to upload CSV files, how to model ETL processes to extract data from external sources into SAP Data Warehouse Cloud, how to consume & visualize data models using the SAP Analytics Cloud story builder and external SQL clients, ... hope you enjoyed it!</p>

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