

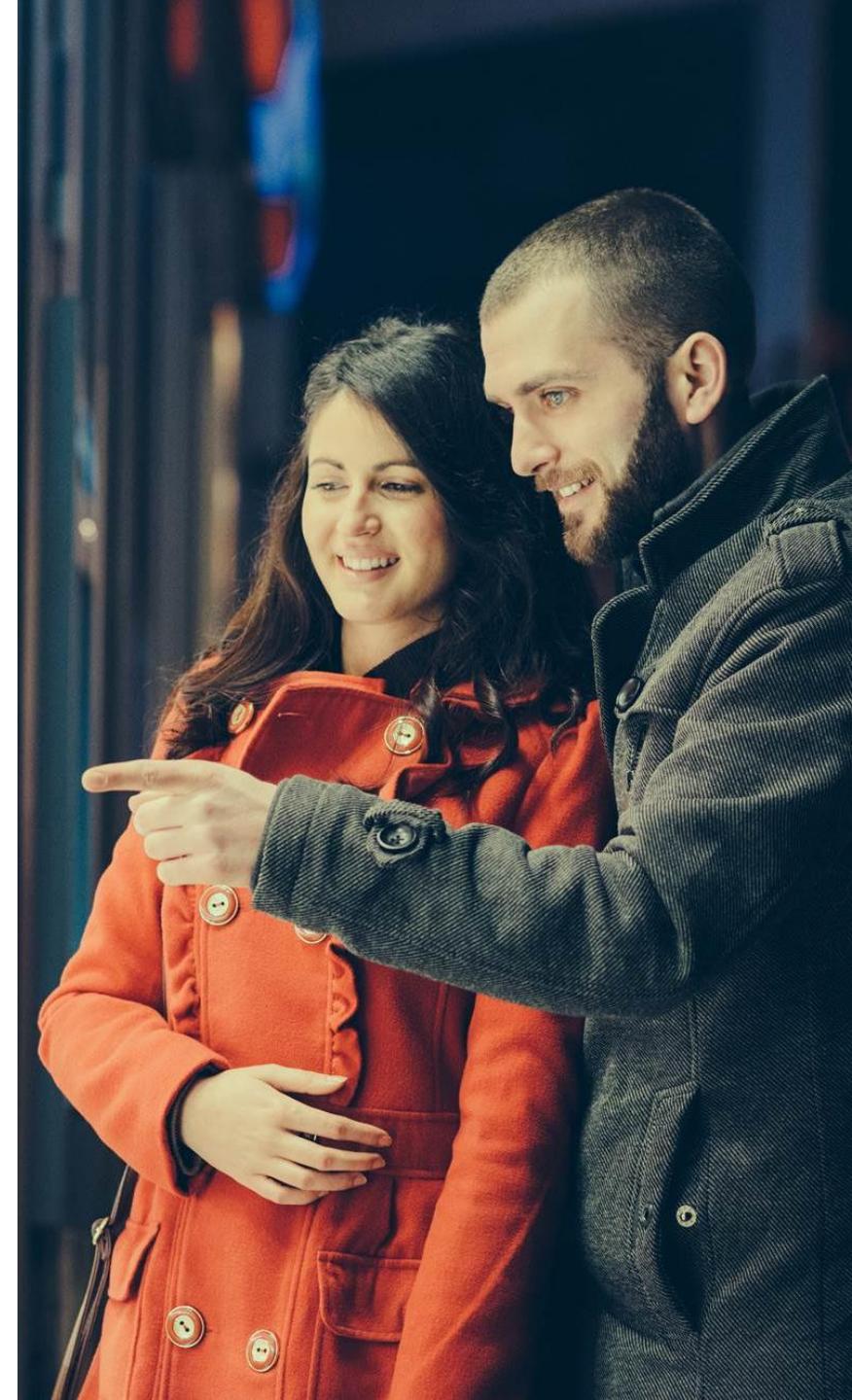


Week 1: Introduction and Data Modeling  
**Unit 1: Course Introduction**

## What is this course about and what can you expect?

### Introduction to SAP Datasphere

- A practical example with hands-on exercises will guide you through the weeks and units
- Learn how to leverage features and functions
- You will get a very good understanding of how to use the solution for real world use cases
- The focus is on data modeling and extending your model as new tasks arise



## Week and unit overview

### Week 1

- Focus on modeling and enhancing existing models
- Integrating remote sources, data flows, data integration monitor
- How to share data and apply row-level security

### Week 2

- Advanced modeling using the analytic model & business builder
- Data marketplace & intelligent lookup
- Repository, impact and lineage, catalog
- Command line interface

### Week 3

- Additional useful components of SAP Datasphere
  - Administration, user management, transport, business content
  - Analytics and planning integration, BW bridge, and more



## The scenario

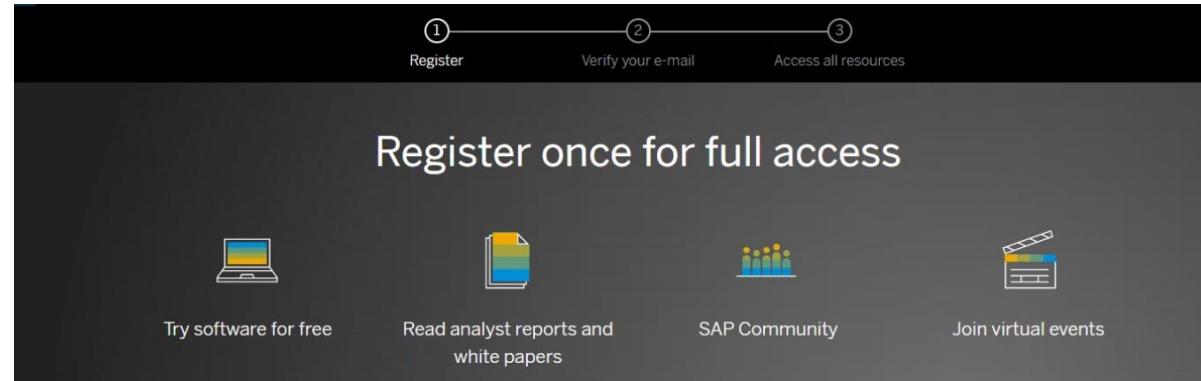
Your task is to start building the analytics for the “Best run bikes” company

- The company provides you tenants for SAP Datasphere and SAP Analytics Cloud
- The units will have different tasks and we guide you on how to solve them
- You learn about the system setup and your own dedicated space to work with your data



## How to get access to a tenant?

- Navigate to [sap.com/datasphere](https://sap.com/datasphere)
- Click on the Experience SAP Datasphere button or alternatively use the following link  
<https://www.sap.com/registration/trial.4d48ec23-eadf-4399-8595-ac3f9c66c64f.html>
- Enter the mandatory details in the registration form and proceed using the Submit button.
- You then get an email to activate your account by clicking the button [Click to activate your account](#)
- After successful registration your login details (user ID and password) will be emailed to you



The screenshot shows the SAP Datasphere registration process. At the top, there is a navigation bar with three steps: ① Register, ② Verify your e-mail, and ③ Access all resources. Below this, a large heading says "Register once for full access". There are four main sections with icons: "Try software for free" (laptop icon), "Read analyst reports and white papers" (document icon), "SAP Community" (people icon), and "Join virtual events" (calendar icon). Further down, there is a "Tell us about yourself" section with various input fields: Business e-mail address (klaus-peter), First Name (Klaus-Peter), Last Name (Sauer), Company (SAP SE), Country/Region (United States), Phone (+1), Department (Product Management), and Relationship to SAP (SAP Employee). To the right, there is a "Already registered?" section with a "Log in" button. At the bottom, there is a note about converting to SAP Universal ID and links to privacy policy and terms of service.

① Register    ② Verify your e-mail    ③ Access all resources

Register once for full access

Try software for free    Read analyst reports and white papers    SAP Community    Join virtual events

Tell us about yourself

Business e-mail address: klaus-peter

Last Name: Sauer

Country/Region: United States

Department: Product Management

First Name: Klaus-Peter

Company: SAP SE

Phone: +1

Relationship to SAP: SAP Employee

Already registered?

Log in

Convert your account to SAP Universal ID by the end of Q3 2022 for access to all SAP applications from one login.

Create your SAP Universal ID >

SAP will use the data provided hereunder in accordance with the [Privacy Statement](#).

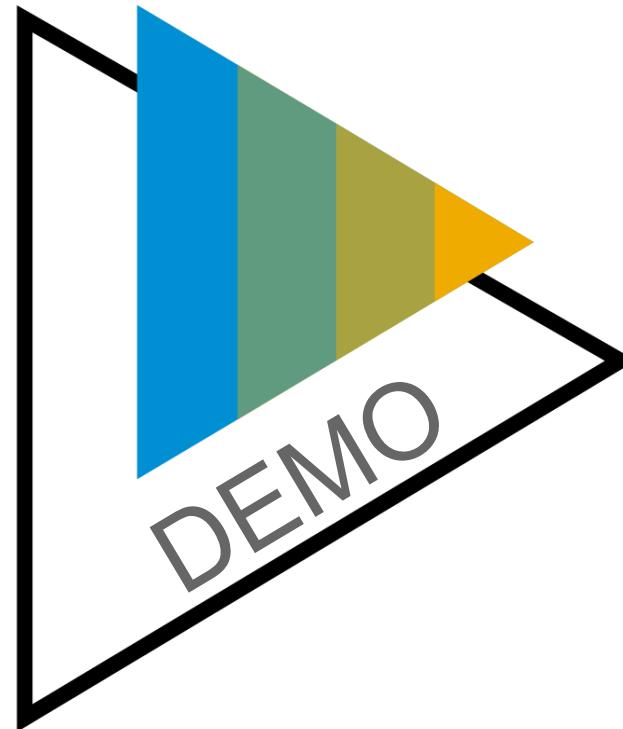
I have read and understood the Terms and Conditions of SAP.com \*

This site is protected by reCAPTCHA and the Google [Privacy Policy](#) and [Terms of Service](#) apply.

Submit

Course introduction

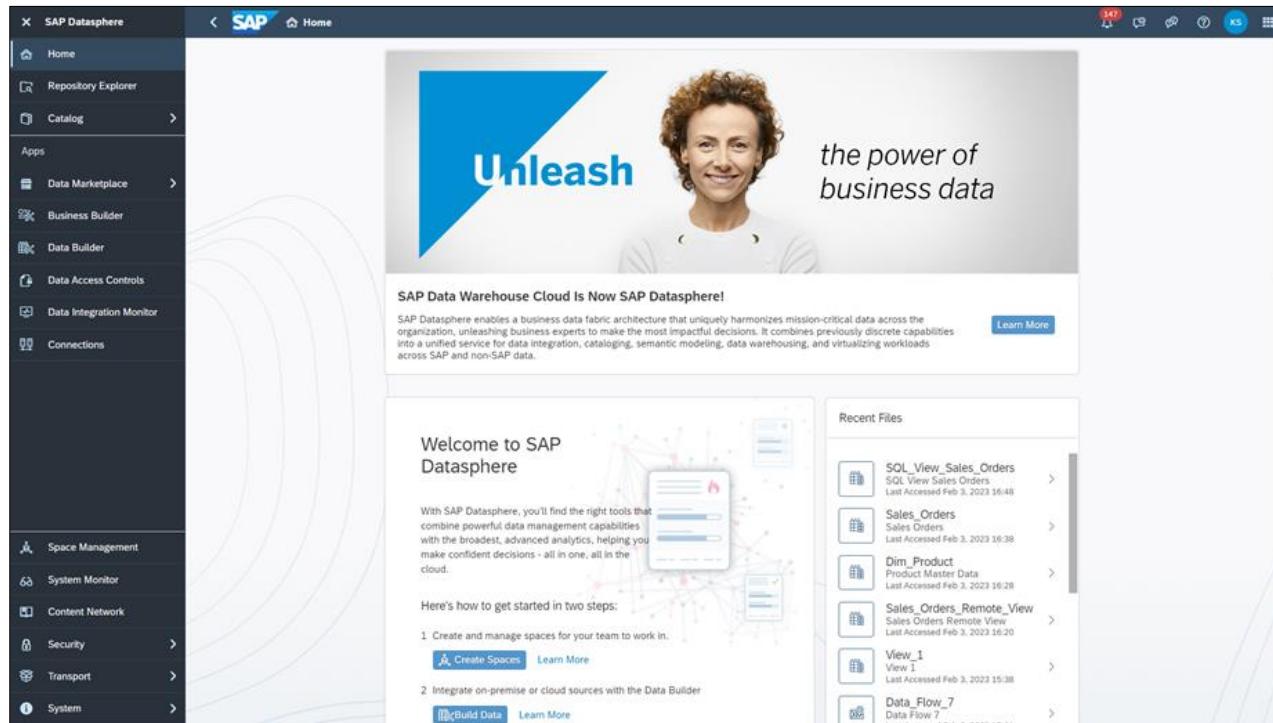
## How to get access to a tenant?



# Course introduction

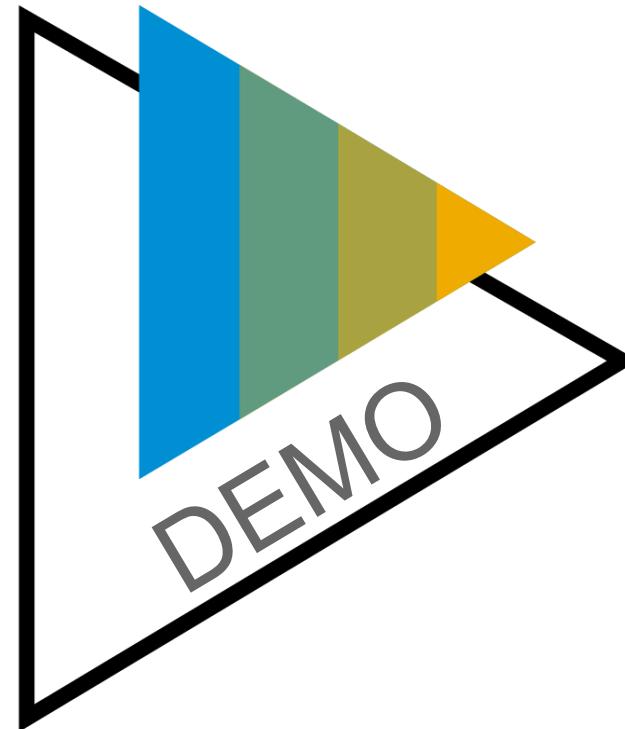
## The home screen

- Navigation pane provides direct access to all essential functions
- Menu entries and functions are visible based on user authorizations
- Middle section contains recent news, links to documentation, and most important functions
- Help icon in top right corner gives easy access to in-app help and SAP Help Portal
- Application switch lets you navigate to SAP Analytics Cloud



Course introduction

## Get to know the home screen and the main menu



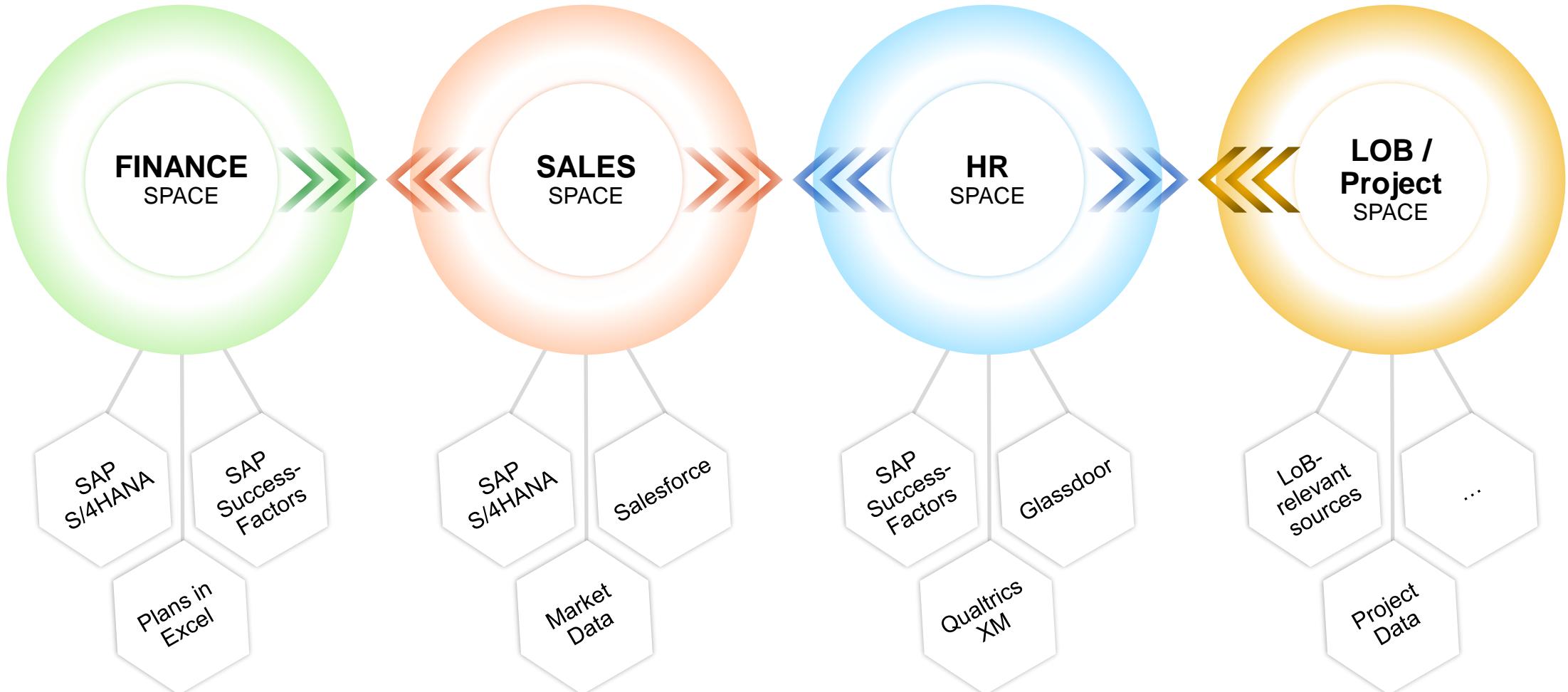
# Course introduction

## What are spaces?

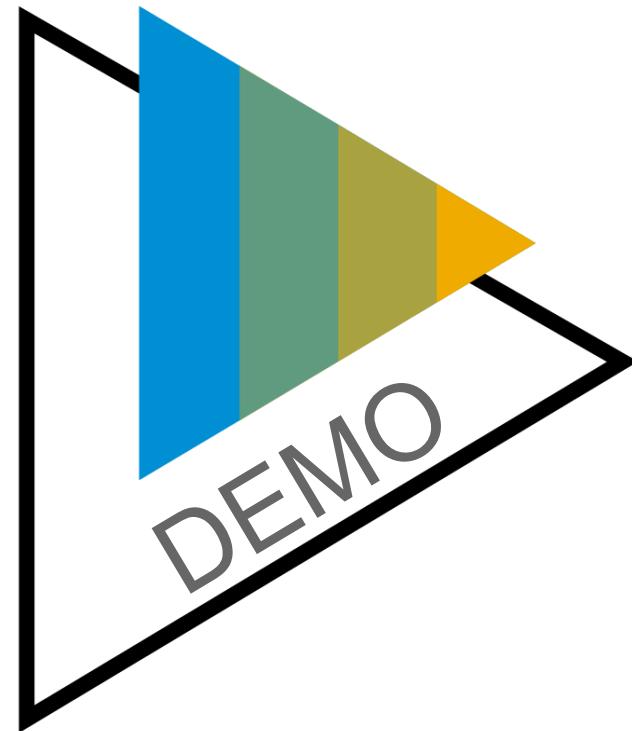
- Spaces are secured virtual work environments which
  - provide isolation for metadata objects and space resources
  - define storage quota, control resource usage, and workload class settings per space
  - maintain space-specific source system connections and a common time dimension
  - manage user access for space members
  - enable sharing of data and currency conversion settings with other spaces

Space	Deployment Date	Storage	Memory	Status
LEGAL	Feb 23, 2023 10:19	368.64 KB of 1 GB	828.7 KB of 1 GB	Cold
MASTER_DATA	Feb 23, 2023 10:23	323.58 KB of 2 GB	828.73 KB of 1 GB	Cold
SUPPLY_CHAIN	Feb 23, 2023 10:14	368.64 KB of 1 GB	828.7 KB of 1 GB	Cold
HUMAN_RESOURCES	Feb 23, 2023 10:16	368.64 KB of 500 MB	828.7 KB of 500 MB	Cold
CENTRAL_IT_SPACE	Feb 23, 2023 10:21	405.5 KB of 1 GB	685.45 KB of 1 GB	Cold
MONITORING_SPACE	Feb 23, 2023 10:21	614.4 KB of 1 GB	727.76 KB of 1 GB	Cold
MARKETING_CAMPAIGNS	Feb 23, 2023 10:18	368.6 KB	828.7 KB	Healthy
SALES_AND_OPERATIONS	Feb 23, 2023 10:17	368.64 KB of 1 GB	828.7 KB of 500 MB	Cold

## Spaces provide your business process with the right data



# Spaces



# Course introduction

## Useful information

Useful resources during and after the course

- [SAP community pages](#)
  - [Get started](#)
  - [Best practices](#)
  - [Business content](#)
  - [SAP BW Bridge](#)
- [SAP online documentation](#)
- [SAP tutorials for developers](#)
- [SAP learning journey](#)



## What you have learned in this unit

- Overview of the course and its structure
- The scenario used to guide you through the units over the different weeks
- How to register for an account on a guided experience trial system and get access to your own space
- The focus areas of the course
- The home screen and main menu structure of the solution
- What spaces are and how you can use and configure them for the task ahead
- Where to find useful information outside of this course



# Thank you.

**Contact information:**

**open@sap.com**

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Week 1: Introduction and Data Modeling

## **Unit 2: Your First Model and Report**

Your first model and report

## Your task

- In unit 1 you got access to the system
- While IT is setting up the system connectivity in the backend, you can already start
- Upload the provided sales orders sample file
- The report should show the revenue by sales organization
- Get an overview of how to achieve that



Your first model and report

## Data Builder overview – Editors

The **Data Builder** offers a collection of editors to create artifacts in the data layer like

- Table Editor
- Graphical View Editor
- SQL View Editor
- Entity Relationship Editor
- Analytic Model Editor
- Data Flow Editor
- Intelligent Lookup Editor
- Replication Flow Editor
- Task Chain Editor

The screenshot shows the SAP Data Builder interface for the 'Energy Data' project. The top navigation bar includes links for All Files, Tables, Views, E/R Models, Analytic Models, Flows, Intelligent Lookups, and Task Chains. Below the navigation is a toolbar with icons for New Table, New Graphical View, New SQL View, New Entity - Relationship Model, New Analytic Model, New Data Flow, New Replication Flow, and New Intelligent Lookup. A search bar is also present. The main area displays a table titled 'Files (13)' listing various data artifacts:

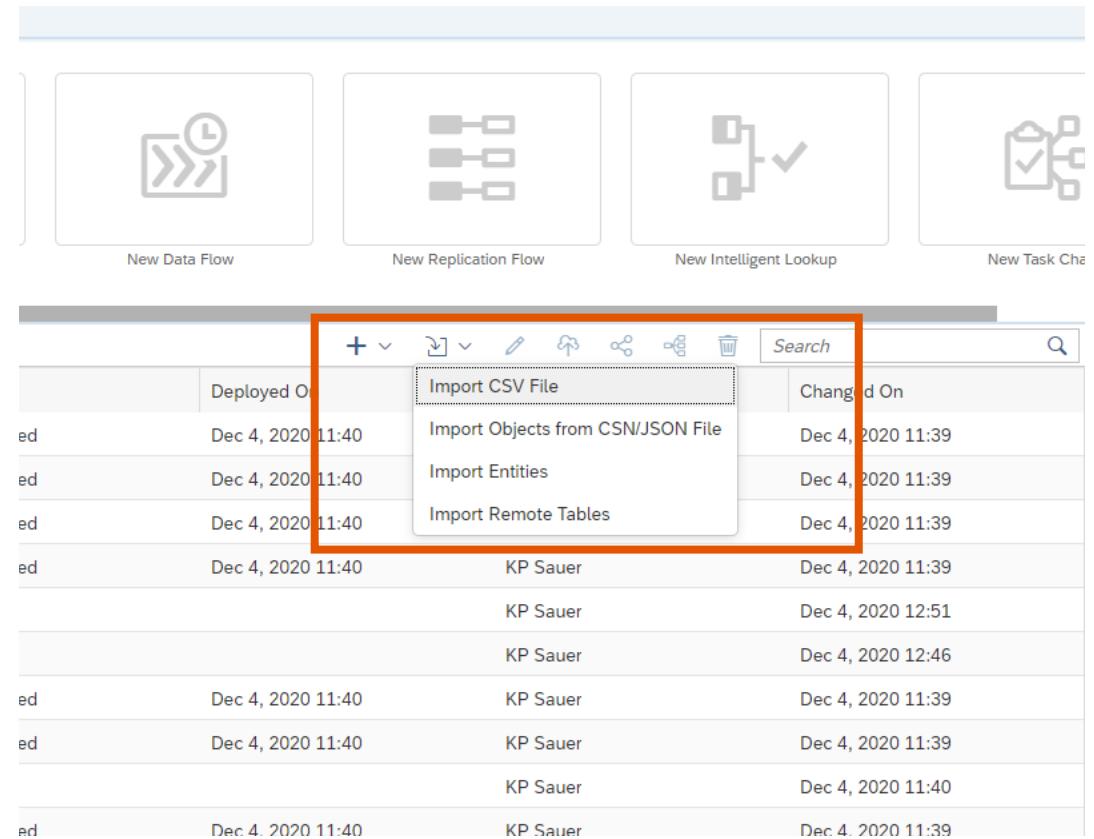
Business Name	Technical Name	Type	Status	Deployed On	Changed By	Changed On
1 Energy Actuals	Energy_Actuals	View (Analytical Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
2 Energy Production Plan & Consumption Predictions	Energy_Production_Plan_Consum	View (Analytical Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
3 Energy Actuals, Plan & Predictions	Energy_Actuals_Plan_Prediction	View (Analytical Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
Consumption vs Plan	Consumption_vs_Plan	View (Analytical Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
Data Flow Energy Consumption	Data_Flow_Energy_Consumption	Data Flow			KP Sauer	Dec 4, 2020 12:51
Data Flow Energy Production	Data_Flow_Energy_Production	Data Flow			KP Sauer	Dec 4, 2020 12:46
Energy Consumption Actuals	EN_CONS_AF_2	Local Table (Relational Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
Energy Consumption Predictions	ENERGY_CONSUMPTION_PREDICTED_V	Local Table (Relational Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
Energy Model	Energy_Model	E/R Model			KP Sauer	Dec 4, 2020 11:40
Energy Production Actuals	EN_PROD_AF_2	Local Table (Relational Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
Energy Production Planned	Energy_Production_Planned	Remote Table (Relational Data...)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
WeekDay Description	WeekDay_Description	Local Table (Relational Dataset)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39
WeekDay View	WeekDay_View	View (Dimension)	Deployed	Dec 4, 2020 11:40	KP Sauer	Dec 4, 2020 11:39

Your first model and report

## Data Builder overview – More features

The Data Builder offers more features in addition to the editors like

- Enabling currency conversion
- Import data and artifacts
  - CSV files
  - Objects from CSN/JSON files
  - Entities
  - Remote tables
- Mass deployment and deletion of artifacts
- Share artifacts
- Show impact and lineage analysis for artifacts



Your first model and report

## Import Sales Order CSV file

Welcome to the Data Builder

Create views and tables to prepare data for your stories, and use entity-relationship models to visualize and make associations between artifacts.

All Files   Tables   Views   E/R Models   Analytic Models   Data Flows   Intelligent Lookups   Task Chains

New Table   New Graphical View   New SQL View   New Entity - Relationship Model   New Analytic Model   New Data Flow   New Intelligent Lookup

Files (0)

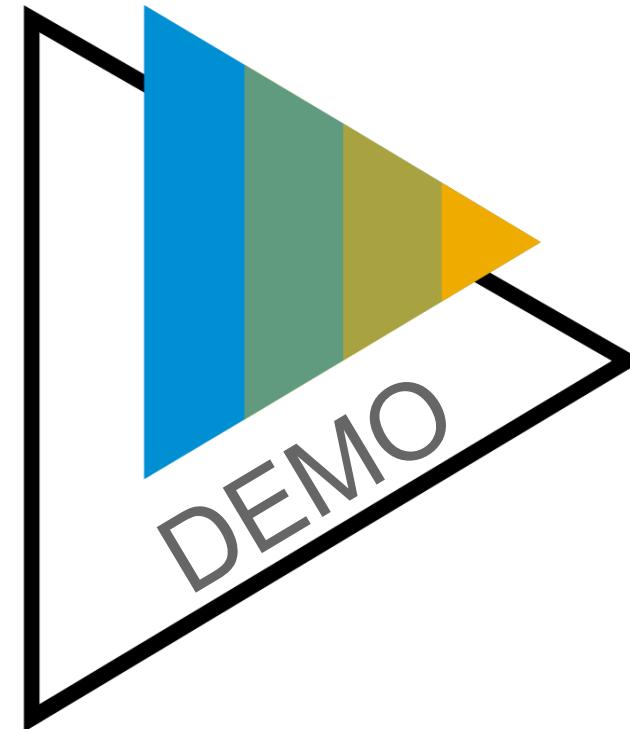
No data available.

Import CSV File  
Import Objects from CSN/JSON File  
Import Entities  
Import Remote Tables

The screenshot shows the SAP Data Builder interface. On the left is a vertical toolbar with icons for Home, Search, and other functions. The main area has a header with tabs: All Files (selected), Tables, Views, E/R Models, Analytic Models, Data Flows, Intelligent Lookups, and Task Chains. Below the tabs are seven buttons: New Table, New Graphical View, New SQL View, New Entity - Relationship Model, New Analytic Model, New Data Flow, and New Intelligent Lookup. A 'Files (0)' section at the bottom has a '+' icon and a context menu with options: Import CSV File, Import Objects from CSN/JSON File, Import Entities, and Import Remote Tables. The message 'No data available.' is displayed below the files section. The bottom right corner shows the number '5'.

Your first model and report

## Import Sales Order CSV file



# Your first model and report

## Table Editor

- Assign semantic usage type:  
fact, dimension, text, hierarchy, relational dataset, analytical dataset (deprecated)\*
- Define primary keys, compound keys, default values, column visibility, associations, field names, data types, descriptions, time-dependency, and semantics
- Delete current and upload new data from files
- Preview data and share tables with other spaces
- Allow to refresh the metadata for the definition of remote tables and open SQL schema tables

The screenshot shows the SAP Data Builder interface with the following details:

- Title Bar:** SAP Data Builder, open SAP Course, Local Table - SalesOrders CSV.
- Toolbar:** General, View, Edit, Tools.
- Table Overview:** SalesOrders CSV, SalesOrders\_CSVC.
- General Tab:** Business Name: SalesOrders CSV, Technical Name: SalesOrders\_CSVC, Semantic Usage: Relational Dataset, Status: Deployed, Deployed On: Feb 10, 2023 11:52.
- Columns Tab:** Shows 17 columns with their properties:

Business Name	Technical Name	Data Type	Default Value	Not Null
SALESORDERID	SALESORDERID	Integer64	Enter a number	<input type="checkbox"/>
CREATEDBY	CREATEDBY	Integer64	Enter a number	<input type="checkbox"/>
CREATEDAT	CREATEDAT	Date	MMM d, y	<input type="checkbox"/>
CHANGEDBY	CHANGEDBY	Integer64	Enter a number	<input type="checkbox"/>
CHANGEDAT	CHANGEDAT	Date	MMM d, y	<input type="checkbox"/>
FISCVARIANT	FISCVARIANT	String(5000)	Enter a string	<input type="checkbox"/>
FISCALYEARPERIOD	FISCALYEARPERIOD	Integer64	Enter a number	<input type="checkbox"/>
NOTEID	NOTEID	String(5000)	Enter a string	<input type="checkbox"/>
PARTNERID	PARTNERID	Integer64	Enter a number	<input type="checkbox"/>
SALESORG	SALESORG	String(5000)	Enter a string	<input type="checkbox"/>

\* The Analytical Dataset is still available and can be used. Find more details in [this blog](#).

Your first model and report

## Create your first graphical view

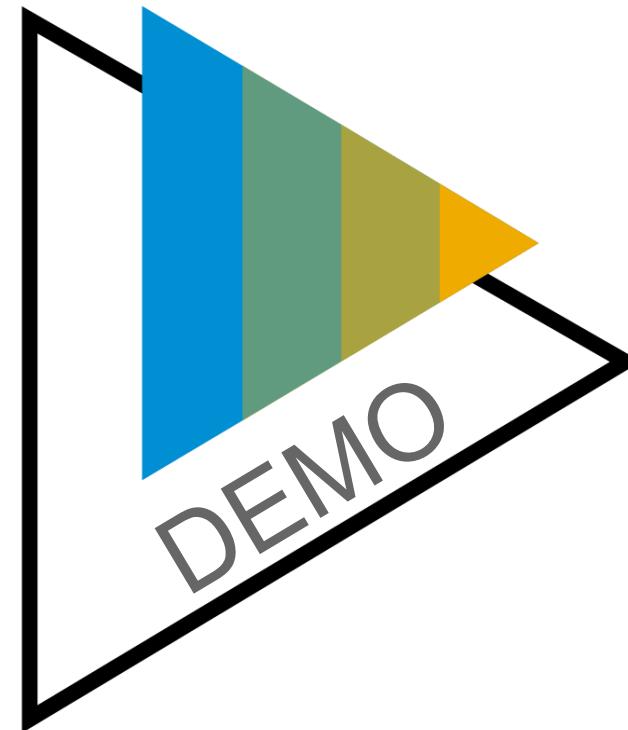
The screenshot shows the SAP Data Builder interface with the title "View - New Graphical View\*". The left sidebar lists "Tables" (SalesOrders CSV), "Views", "Intelligent Lookups", and "Shared Objects". The main area displays a graphical model with two nodes: "SalesOrders CSV" (17 rows) and "View 1" (17 rows). A connection line links them. To the right, the "Local Table Properties" panel is open for "SalesOrders CSV", showing:

- General**: Business Name: SalesOrders CSV, Technical Name: SalesOrders\_CS1, Alias: (empty), Distinct Values: OFF, Status: Deployed.
- Columns**: SALESORDERID (selected).

Other columns listed in the "Columns" section include SALESORDERDATE, SALESORDERNUMBER, SALESORDERSOURCE, SALESORDERSTATUS, and SALESORDERTYPE.

Your first model and report

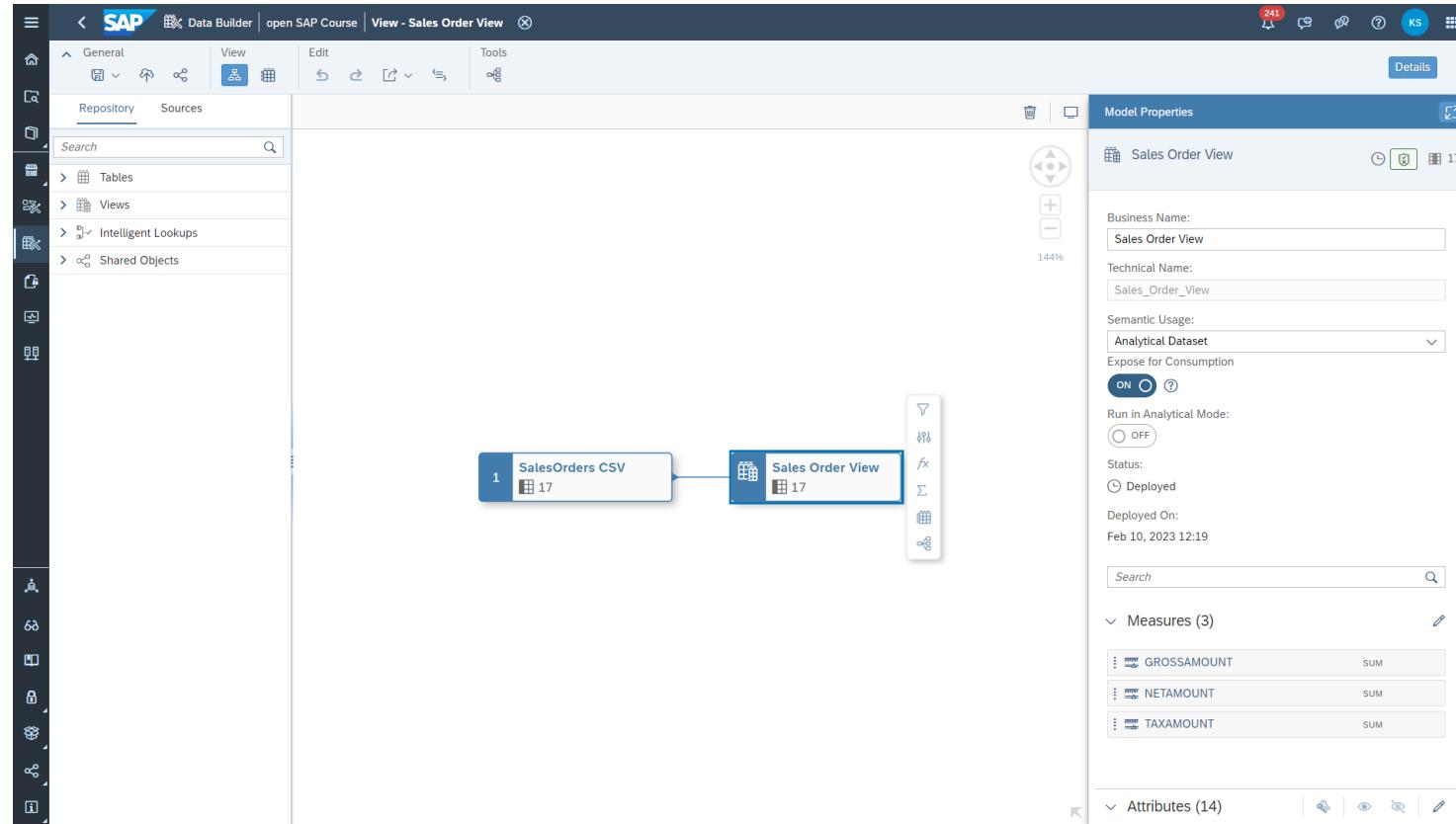
## Create your first graphical view



# Your first model and report

## Graphical View Editor

- Views on top of remote, replicated, or local tables
  - Define measures and attributes in analytical datasets
  - Create parent-child or level-based hierarchies in dimension views
  - Support multi-language text fields
  - Define unions, joins, aggregations, rename and remove columns, add calculations, currency conversion, and filters
- Define exposure for consumption and sharing with other spaces
- Apply data access controls, input parameters, view persistency
- View the data at each node



Your first model and report

# Create your first story in SAP Analytics Cloud

SAP Data Builder | open SAP Course 241

Welcome to the Data Builder

Create views and tables to prepare data for your stories, and use entity-relationship models to visualize and make associations between artifacts.

All Files Tables Views E/R Models Analytic Models Data Flows Intelligent Lookups Task Chains

Analytics Datasphere

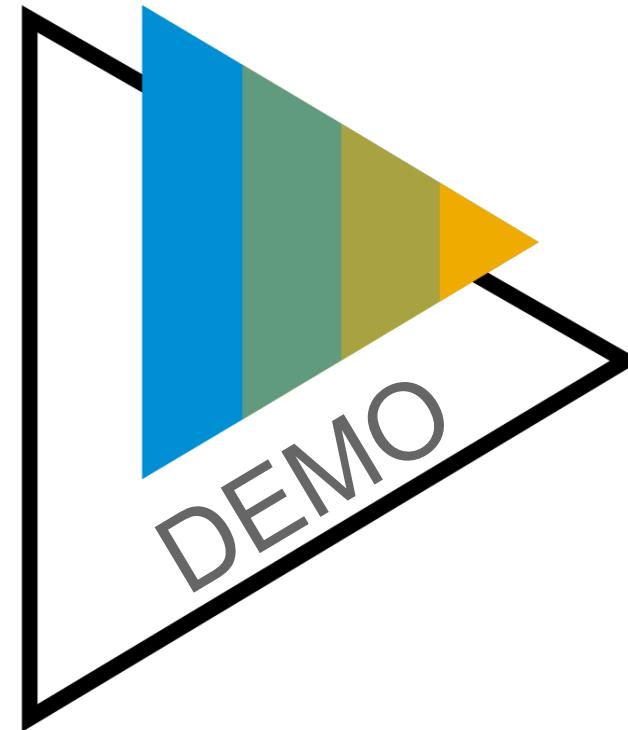
New Table New Graphical View New SQL View New Entity - Relationship Model New Analytic Model New Data Flow New Intelligent Lookup New Task Chain

Files (2)

Business Name	Technical Name	Type	Status	Deployed On	Changed By	Changed On
Sales Order View	Sales_Order_View	View (Analytical Dataset)	Deployed	Feb 10, 2023 12:19	KP Sauer	Feb 10, 2023 12:19
SalesOrders CSV	SalesOrders_CSV	Local Table (Relational Dat...	Deployed	Feb 10, 2023 12:19	KP Sauer	Feb 10, 2023 12:13

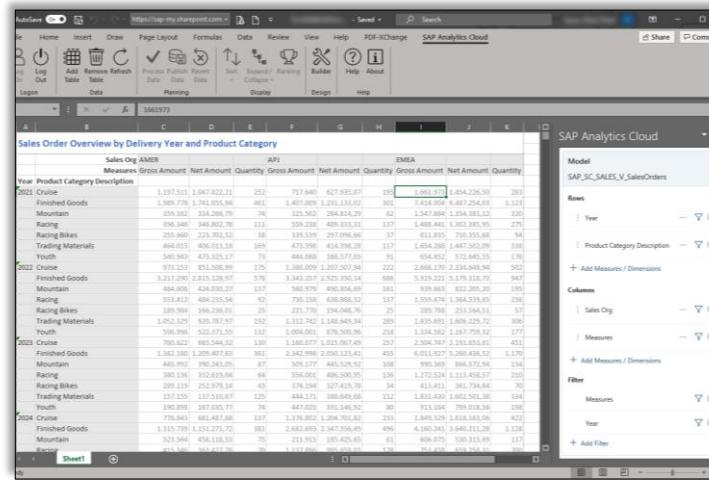
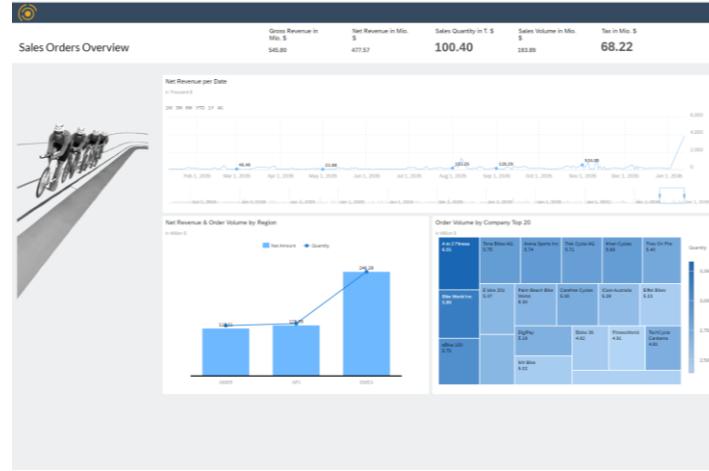
Your first model and report

## Create your first story in SAP Analytics Cloud



# Your first model and report

## Options for analytic consumption and openness with external tooling



### SAP Analytics Cloud

- Direct consumption of models in SAP Analytics Cloud (live connection)
- Any number of SAP Datasphere systems can be connected to any number of SAP Analytics Cloud systems

### MS Office Integration

- SAP Analytics Cloud, add-in for Microsoft Office 365 (live connection) online or desktop version
- SAP Datasphere with SAP Analysis for Microsoft Office 2.8 SP14+

### APIs for external consumption

- Freedom of choice to use a consumption interface (SQL/OData) to connect frontend tooling to exposed views
- Make your data models accessible for consumption tools and other applications

Your first model and report

## What you have learned in this unit

- Overview of the Data Builder
- How to upload a flat file
- The Table Editor and its features
- The Graphical View Editor and its basic features
- The Application Switcher
- How to create a simple story in SAP Analytics Cloud



# Thank you.

**Contact information:**

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Week 1: Introduction and Data Modeling

## **Unit 3: Connect to a Remote Source and Add a Time Dimension**

Connect to a remote source and add a time dimension

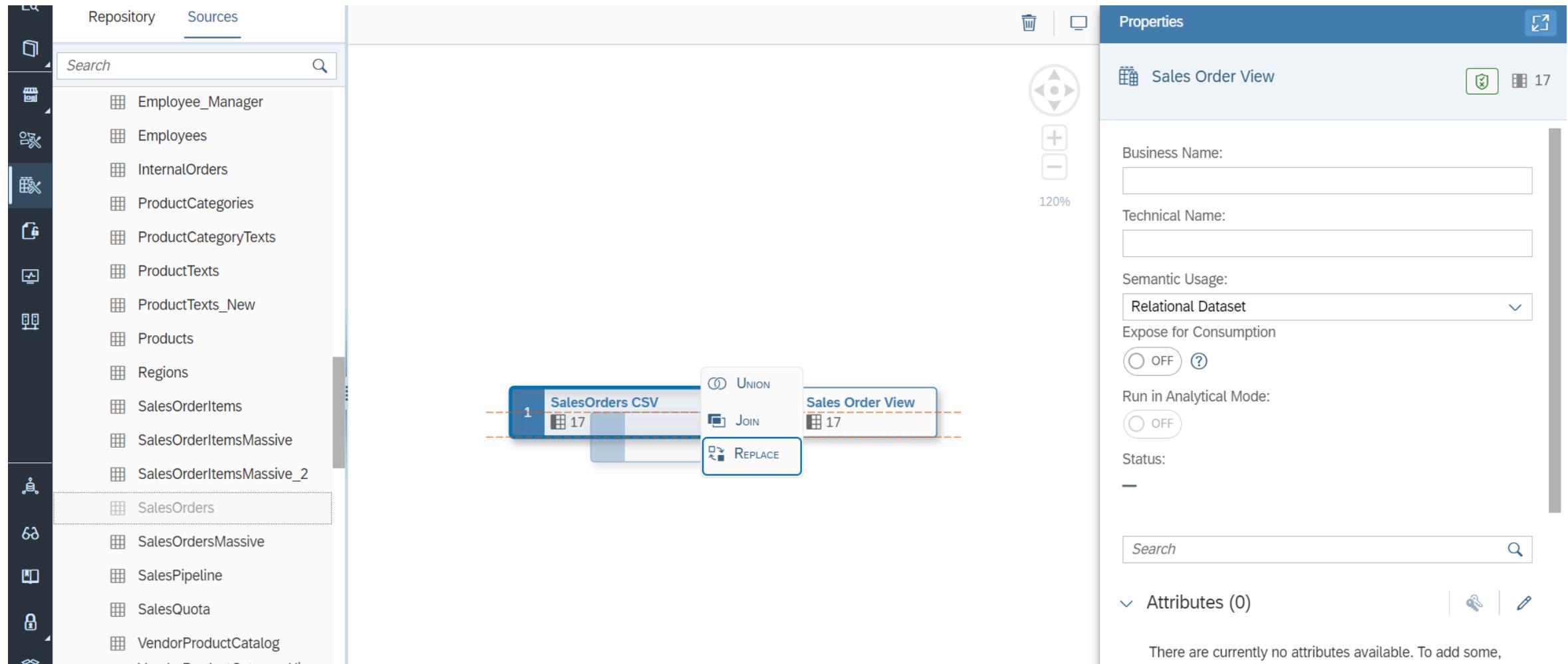
## Your task

- In unit 2 you created your first model and story
- IT has set up the system connectivity in the backend
- You do not need to start from scratch; simply replace your local table with a remote table
- Add a time dimension to your model and story



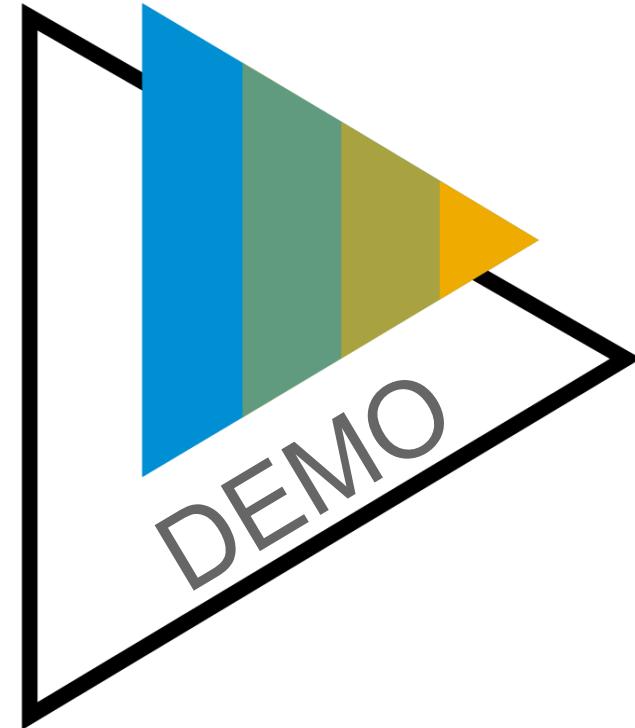
# Connect to a remote source and add a time dimension

## Replace your local table with a remote table



Connect to a remote source and add a time dimension

**Replace your local table with a remote table**

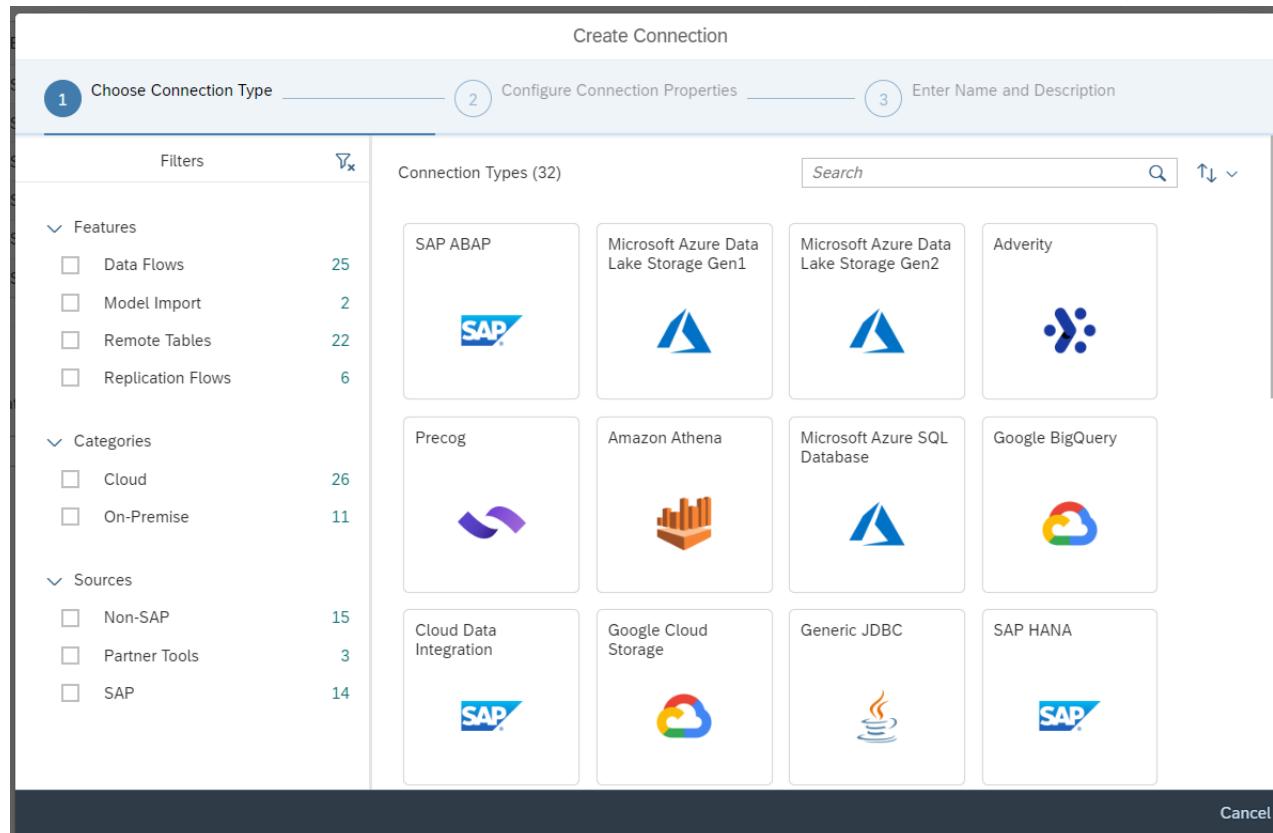


Connect to a remote source and add a time dimension

## Connection overview (1)

**Connections** provide access to data from a wide range of sources: cloud and on-premise sources, SAP and non-SAP sources, and partner tools.

- You only see spaces you are a member of in the Space overview
- Create, edit, delete, and validate local connections
- Pause and restart connections with real-time replications
- Integrate Open Connectors and connect to supported third-party data sources



Connect to a remote source and add a time dimension

## Connection overview (2)



### SAP Applications

SAP S/4HANA SAP S/4HANA Cloud

SAP ERP ABAP

SAP BW/4HANA Model Transfer

SAP BW SAP HANA Data Lake

SAP HANA, Data Lake Files

SAP SuccessFactors SAP Fieldglass

SAP Marketing Cloud



### Databases & Generic Connections

SAP HANA On-Prem & Cloud

Oracle Microsoft SQL Server

Generic JDBC Generic OData

Generic SFTP Local CSV File

Generic Cloud Data Integration



### Hyperscaler & Cloud Apps

Google Cloud Storage Google BigQuery

Azure SQL Database Azure Blob Storage

Azure Data Lake Store Gen1

Azure Data Lake Store Gen2

Amazon S3 Amazon Athena

Amazon Redshift HDFS

Open Connectors



### External Tool Support

SAP Data Intelligence\* SAP Data Services\*

SAP HANA Smart Data Integration\*

SAP Landscape Transformation\*

Adverity APOS\* Datazeit\*

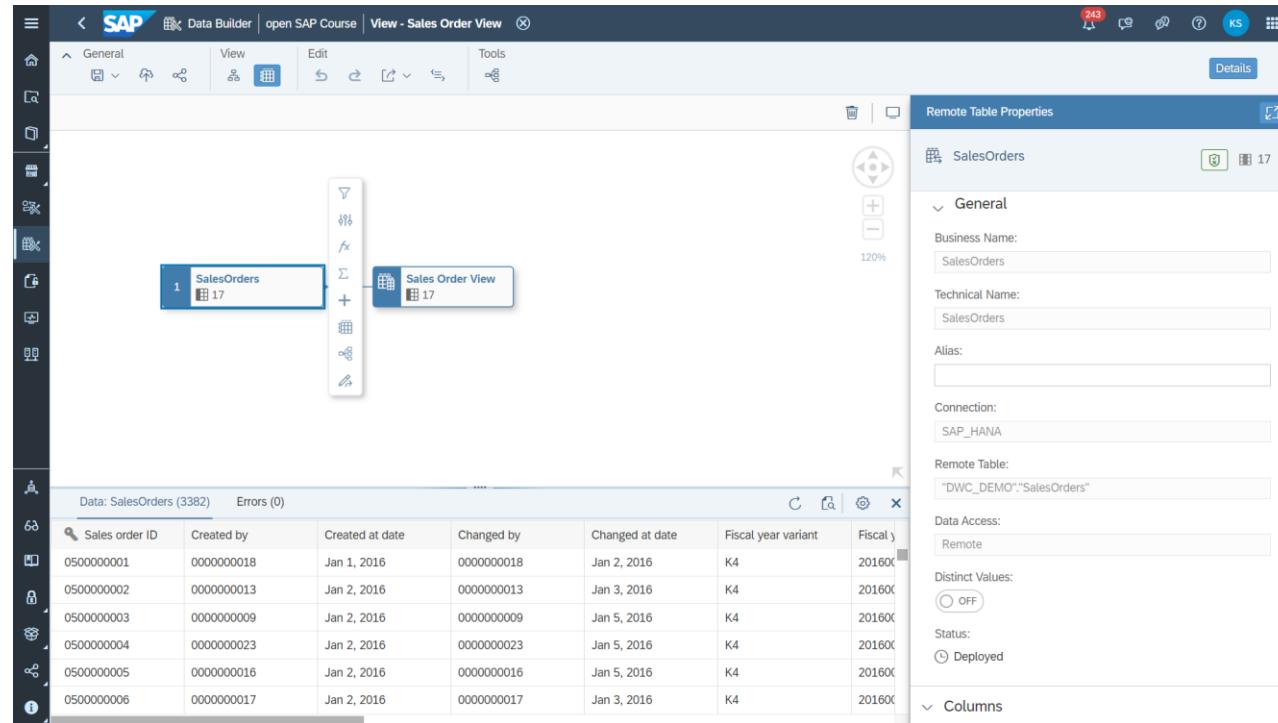
Informatica\* Precog Snaplogic\*

SAP Help: [Connection Overview](#)

# Connect to a remote source and add a time dimension

## Virtual data access

- Virtual access using remote tables, which points to a table in an external system
- Access remote data as if it were stored in local tables
- Remote tables access data without copying the data
- Data is transferred through the network each time a query is executed
- Restrict data transfer using central filters and selected columns only\*
- Seamless switching between remote access and data replication (or snapshots) without the need to change the data models



\* Filtering depends on source connection and column data types.  
See more information in the [online documentation](#).

# Connect to a remote source and add a time dimension

## Real-time replication and snapshots via remote tables

- Switch from remote access to snapshots or real-time replication for change-data-capture (CDC) enabled tables
- Schedule snapshot loading for remote tables
- Create partitions for snapshot and real-time replication to split larger data transfers and execute these single transactions in parallel
- Ability to start and stop, pause and resume, and cancel real-time replication

The image displays two screenshots of the SAP Data Integration Monitor interface.

**Screenshot 1: Remote Tables (8)**

This screenshot shows a list of remote tables managed by the Book Space connection. The columns include Connection, Table, Data Access, Refresh Frequency, Status, Latest Update, Next Run, Used In-Memory, and Used Disk (MB). The tables listed are:

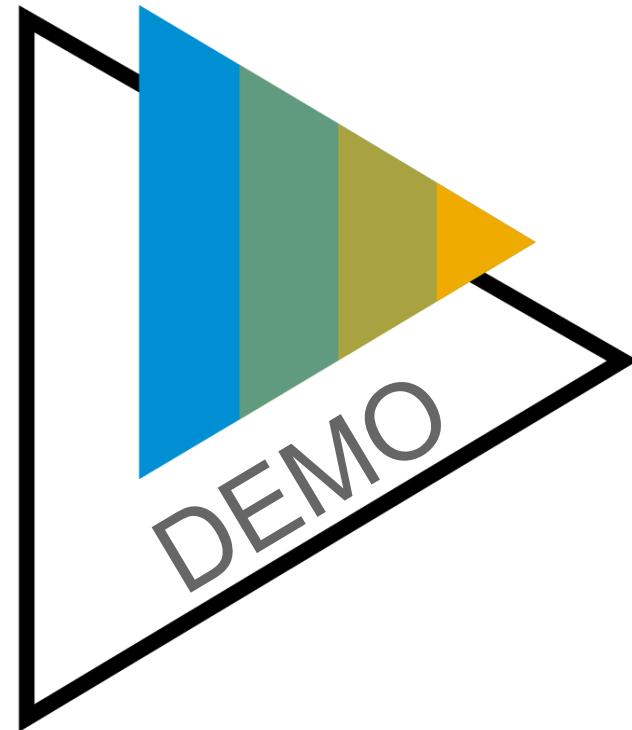
Connection	Table	Data Access	Refresh Frequency	Status	Latest Update	Next Run	Used In-Memory	Used Disk (MB)
BOOKSPACE_SAP_HANA	BusinessPartners_2	Remote	---	---			0	0.02
BOOKSPACE_SAP_HANA	Countries	Replicated (Snapshot)	None	Available	Dec 1, 2020 17:24		0	0.14
BOOKSPACE_SAP_HANA	Delivery	Remote	---	---			0	0.02
BOOKSPACE_SAP_HANA	Products_Snapshot	Replicated (Snapshot)	None	Available	Feb 20, 2021 17:16		0	0.36
BOOKSPACE_SAP_HANA	Sales_Order_Items_...	Replicated (Real-Time)	Real-Time	Active	Jun 14, 2020 16:48		0	0.31
BOOKSPACE_SAP_HANA	Sales_Orders_Remote	Remote	---	---			0	0.32
BOOKSPACE_SAP_HANA	SalesPipeline	Remote	---	---			0	0.02
BOOKSPACE_SAP_HANA	SalesQuota	Remote	---	---			0	0.01

**Screenshot 2: Products\_Snapshot**

This screenshot shows the configuration and history for the 'Products\_Snapshot' table. It includes sections for Data Access (Replicated (Snapshot), Available), Schedule (Refresh Frequency: None, Latest Update: Feb 20, 2021 17:16, Next Run: ), and Activity. The activity details show a completed replication task from Feb 20, 2021, at 17:16, triggered by Direct, with a duration of 0:00:02 and 42 records replicated.

Connect to a remote source and add a time dimension

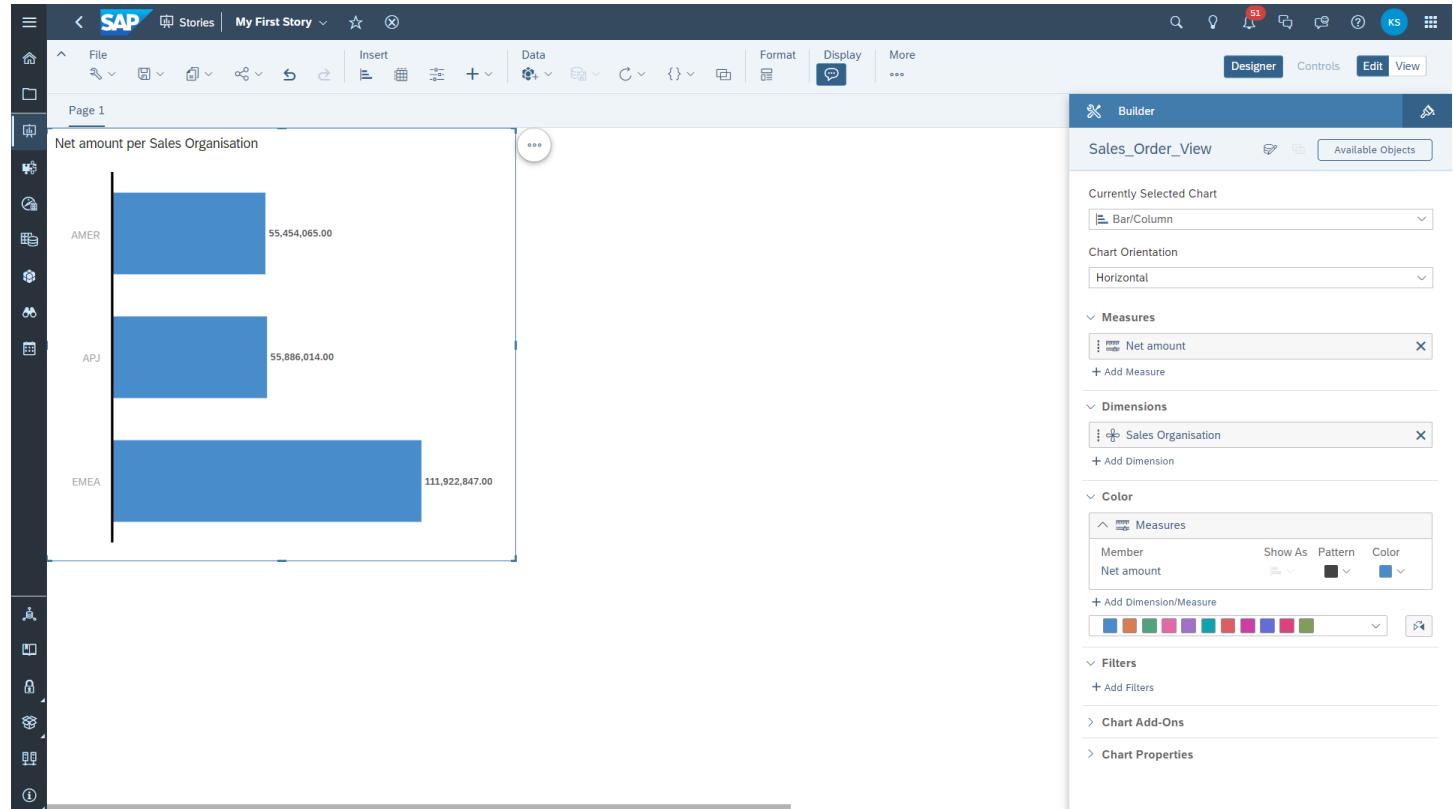
## How to create a new connection



Connect to a remote source and add a time dimension

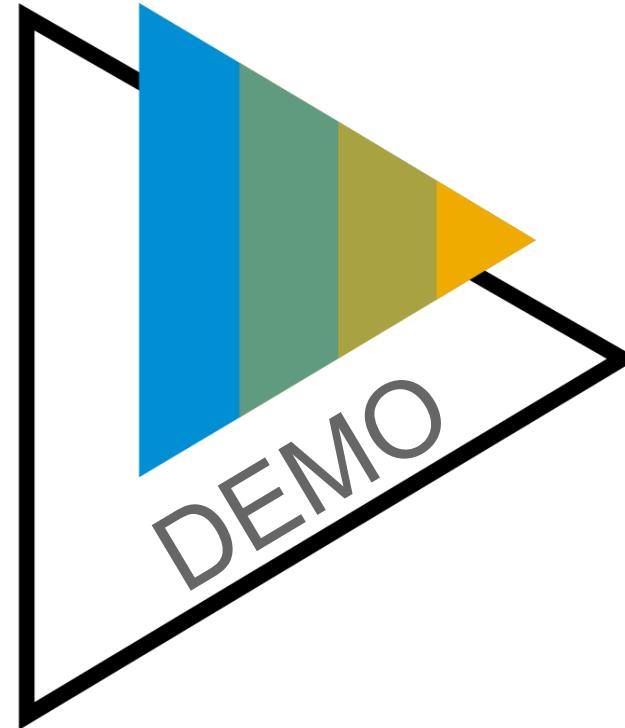
## Your story with remote data

- Just refresh your story
- There is no need to change anything else after the local table has been replaced by the remote table
- Your story now shows all data for all years
- You want to show a time split for years, quarters, months, and so on
- This is where the time dimension comes in



Connect to a remote source and add a time dimension

## **How to create a time dimension and use it in your story**



Connect to a remote source and add a time dimension

## The time dimension

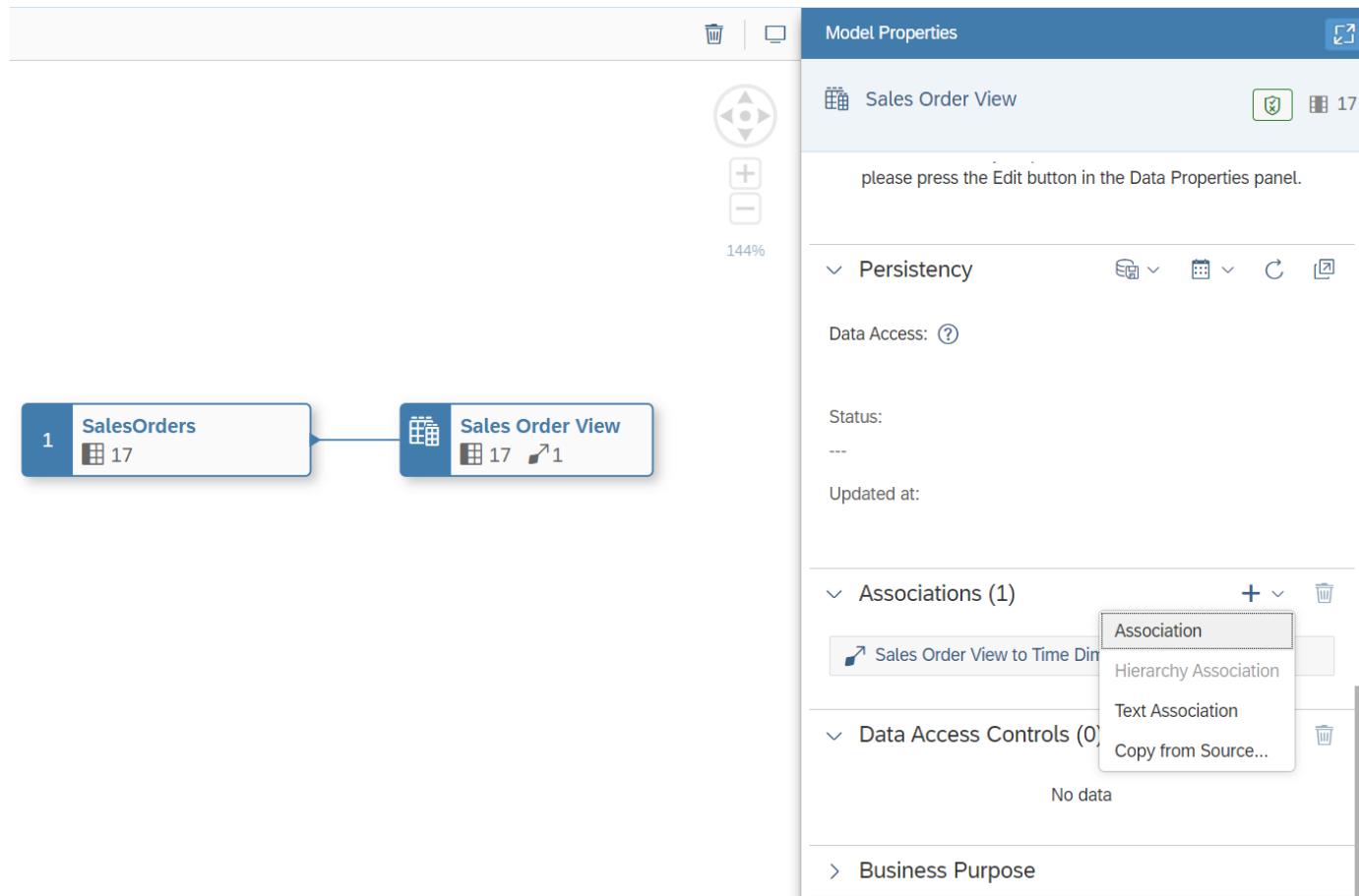
- Enrich your models and stories with a time dimension
- Create the time dimension in Space Management
- Enrich your models with years, quarters, months, and days
- By creating hierarchies based on a specific granularity, time dimensions also allow you to drill down on stories
- A time table is created only once per space

The screenshot shows the SAP Space Management interface with the title 'open SAP Course' and a green checkmark icon. The top navigation bar includes links for Overview, Workload Management, Members, Database Access, Connections, and Time Data. The 'Time Data' tab is selected. On the left, there's a sidebar with icons for Home, Search, and other management functions. The main content area is titled 'Time Data' and 'Time Tables and Dimensions'. It features a section for 'Create Time Tables and Dimensions' with fields for Business Name (Time Table) and Technical Name (SAP.TIME.M\_TIME\_DIMENSION). Below this are sections for 'Time Table Settings' (From Year: 1900, To Year: 2050, Calendar Type: Gregorian, Granularity: Day) and 'Time Dimensions' (Year Dimension, Quarter Dimension, Month Dimension, Day Dimension, each with Business Name and Technical Name fields). At the bottom right are 'Create' and 'Cancel' buttons.

Connect to a remote source and add a time dimension

## Associations

- Associations can be created in the Entity Relationship Model, Table, and View Editors
- Create an association from any table or view to any other table or view at any level of the data layer
- This creates a join, which is only executed at runtime when the associated data is queried
- Analytical datasets can associate to
  - Dimensions or
  - Text entities
- Dimensions can associate to
  - Dimensions or
  - Text entities or
  - Hierarchies



Connect to a remote source and add a time dimension

## What you have learned in this unit

- Overview of available connections and the connectivity options for remote tables
- How to replace a source table with a remote table while the models and reports on top stay stable
- The time-dimension feature and how to create the time tables and time dimension in a space
- Associations and how to use them with your time dimension



# Thank you.

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Week 1: Introduction and Data Modeling

## **Unit 4: Enhance Your Model with Joins and Dimensions**

## Enhance your model with joins and dimensions

### Your task

- You are interested in enhancing your simple story with the top five sales partners per region and year.
- As the sales partners show only the partner ID in the story, you want to add the partners' company names instead of IDs.
- Next to this you also are asked to add information about the best selling products.
- To achieve that, you will have to learn
  - how to create dimension tables,
  - how to join a table, and
  - how to leverage some other important features.



# Enhance your model with joins and dimensions

## Add your business partner dimension

Import Remote Tables

1 Connections    2 Tables    3 Review

Ready for Import (1)    Already in the Repository (0)

Business Name	Technical Name	Type	Location	Import Status
BusinessPartners	BusinessPartners	Table	SAP_HANA/<NULL> DWC_D...	Will be imported

Search

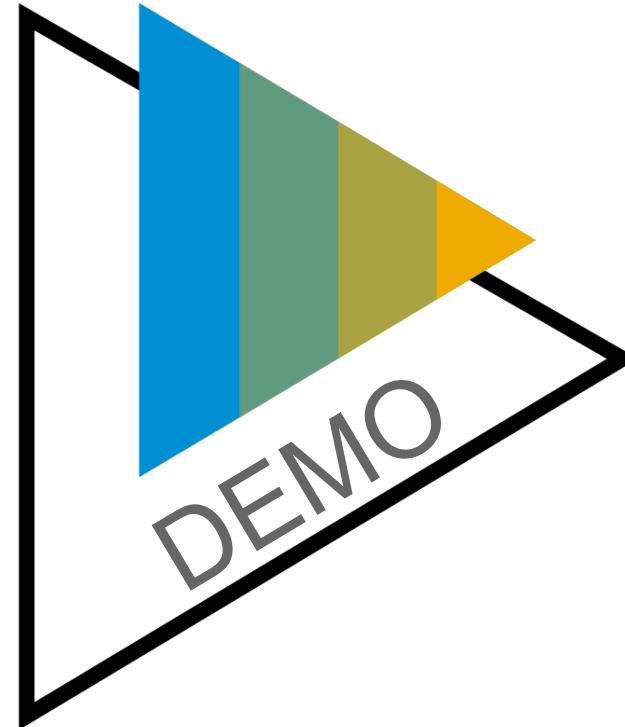
New Intelligent Lookup

Go Back    Import and Deploy    Close

The screenshot shows the SAP Studio interface for importing remote tables. The main area displays the 'Import Remote Tables' screen with three tabs: 'Connections' (step 1), 'Tables' (step 2), and 'Review' (step 3). The 'Tables' tab is active, showing one table ready for import: 'BusinessPartners'. The table details are: Business Name 'BusinessPartners', Technical Name 'BusinessPartners', Type 'Table', Location 'SAP\_HANA/<NULL> DWC\_D...', and Import Status 'Will be imported'. Below the table, there are sections for 'Ready for Import (1)' and 'Already in the Repository (0)'. A search bar is available at the top right. On the left, a sidebar lists 'All Files' and 'Files (11)' with various entries like 'Business N', 'SalesO', 'Sales C', etc. On the right, a sidebar titled 'New Intelligent Lookup' lists recent actions with dates: 15. 2023 10:46, 15. 2023 15:45, 10. 2023 12:13, 15. 2023 14:59, 15. 2023 14:59, 15. 2023 14:59, 15. 2023 14:59, and 15. 2023 14:59.

Enhance your model with joins and dimensions

**Enhance your story with the top five sales partners per region and year**



# Enhance your model with joins and dimensions

## Remote tables

### Virtual Access

Connection	Table	Data Access	Refresh Frequency	Status	Latest Update	Next Run	Used In-Memory (MB)	Used Disk (MB)
SAP HANA	BusinessPartners	Replicated (Real Time)	Real-Time	Active	Feb 6, 2022 23:00		0	0.55
SAP HANA	Cost Center 2222	Remote	—	—			0	0.01
SAP HANA	Countries	Replicated (Snapshot)	None	Available	Dec 1, 2020 17:24		0	0.14
SAP HANA	Delivery	Replicated (Snapshot)	None	Available	Feb 6, 2022 22:28		0	1.89
SAP BW/HANA	Master Data Attributes	Remote	—	—			0	0.07
SAP HANA	Product Snapshot	Replicated (Snapshot)	None	Loading	Feb 20, 2021 17:16		0	0.35
SAP HANA	Sales Order Items R...	Remote	—	—			0	0.02
SAP HANA	Sales Orders Remote	Remote	—	—			0	0.29
SAP HANA TWO	SaleOrderItems	Remote	—	—			0	0.01
SAP HANA TWO	SaleOrders	Remote	—	—			0	0.02
SAP HANA	SalePositive	Replicated (Snapshot)	None	Available	Jun 12, 2021 15:37		0	0.22
SAP HANA	SaleQuota	Remote	—	—			0	0.01

### Real-time virtual data access

- Leave data in the source system and access remotely when needed
- No upfront data movement
- Federation is supported across various sources and hyperscalers

### Persisted

```
graph LR; Products[Products] --> ProductDetails[ProductDetails]; ProductDetails --> ProductCategoryPath[ProductCategoryPath]; ProductCategoryPath --> ProductCategories[ProductCategories];
```

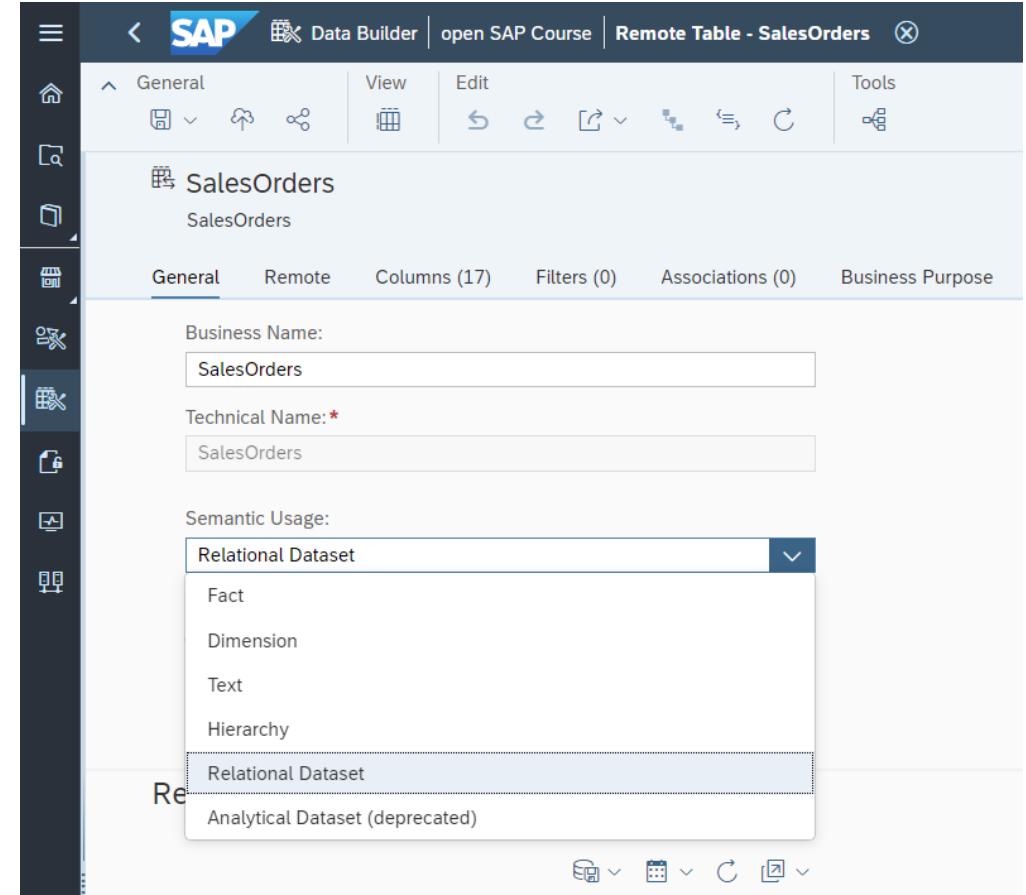
### Single table replication

- Real-time table replication for up-to-date data
- Materialize views and update snapshots using automated, scheduled data loads
- Schedule in task chains

Enhance your model with joins and dimensions

## Semantic usage and semantic types

- When creating a table or view there are several options for the semantic usage to choose from:
  - **Fact** to indicate that your entity contains one or more measures that can be analyzed
  - **Relational dataset** contains columns with basically no specific analytical purpose
  - **Dimensions** indicate that your entity contains attributes that are used to analyze and categorize measures defined in other entities, like product master data
  - **Hierarchy** to indicate that your entity contains parent-child relationships for members in a dimension
  - **Text** to indicate that your entity contains strings with language identifiers to translate text attributes
  - **Analytical dataset (deprecated)\***

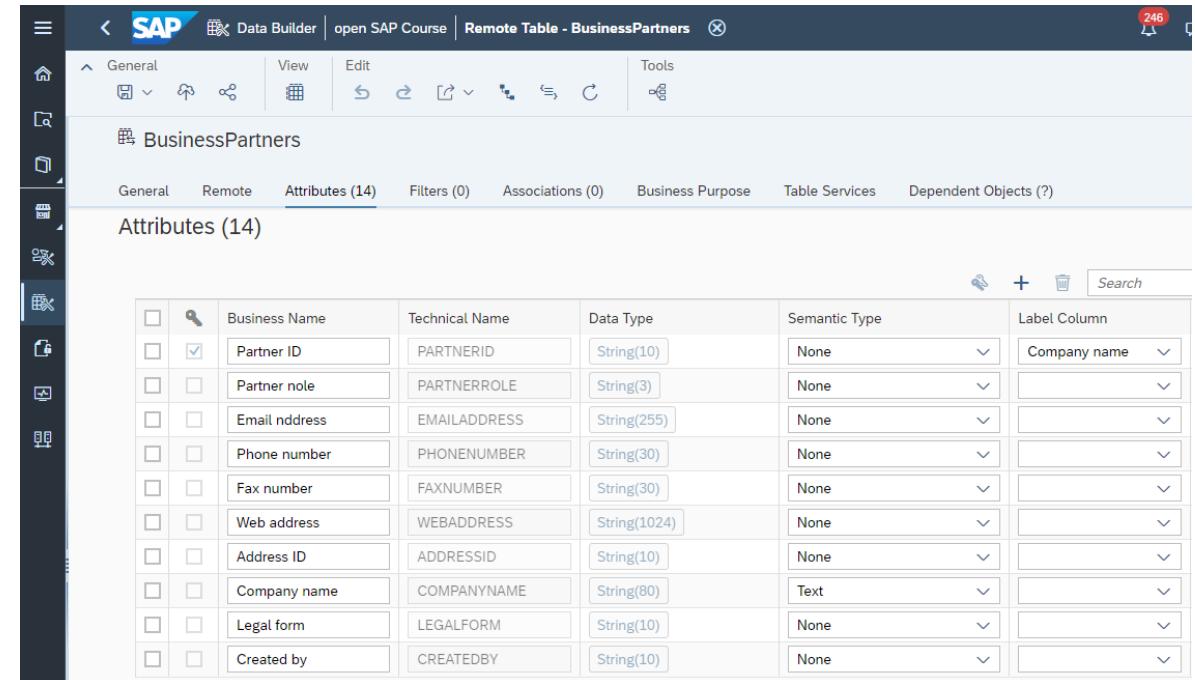


\* The Analytical Dataset is still available and can be used. Find more details in [this blog](#).

Enhance your model with joins and dimensions

## Dimensions

- Dimensions indicate that your entity contains attributes that can be used to analyze and categorize measure defined in other entities
- Typical types of dimensions include:
  - Geography – region, country, state, city
  - Product – range, category, product
  - Business Partner – customer, supplier, partner
  - Organization – company, department, organizational unit
  - Time – year, quarter, day



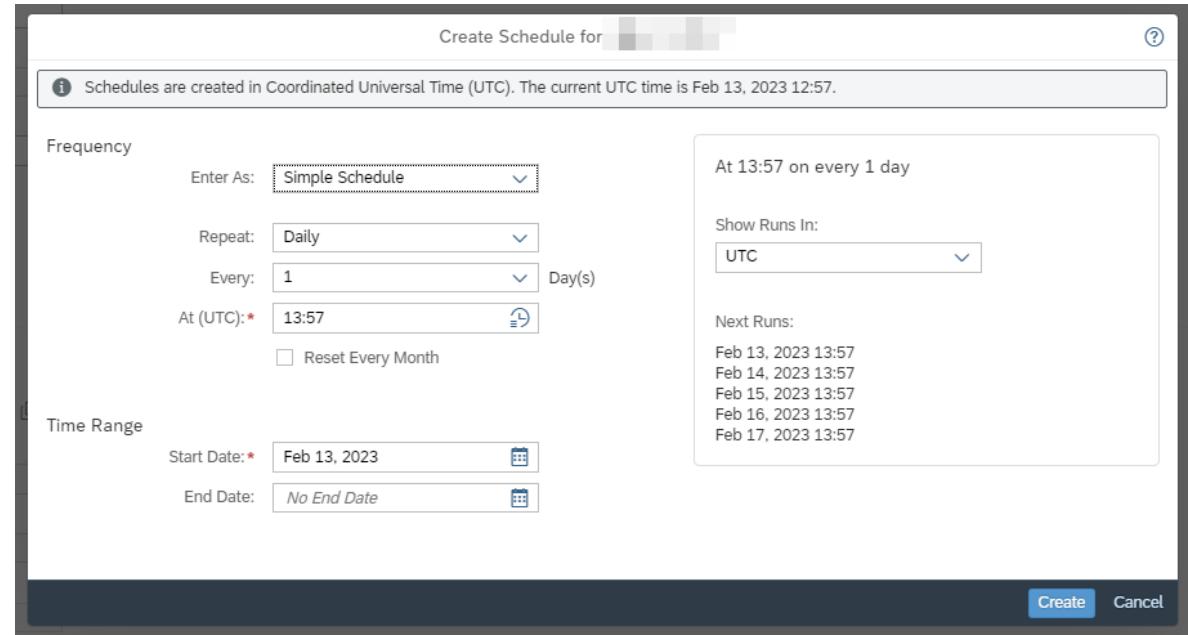
The screenshot shows the SAP Data Builder interface with the title 'BusinessPartners' selected. The 'Attributes (14)' tab is active, displaying a list of attributes with their technical names, data types, semantic types, and label columns. The attributes listed are:

Business Name	Technical Name	Data Type	Semantic Type	Label Column
Partner ID	PARTNERID	String(10)	None	Company name
Partner role	PARTNERROLE	String(3)	None	
Email address	EMAILADDRESS	String(255)	None	
Phone number	PHONENUMBER	String(30)	None	
Fax number	FAXNUMBER	String(30)	None	
Web address	WEBADDRESS	String(1024)	None	
Address ID	ADDRESSID	String(10)	None	
Company name	COMPANYNAME	String(80)	Text	
Legal form	LEGALFORM	String(10)	None	
Created by	CREATEDBY	String(10)	None	

Enhance your model with joins and dimensions

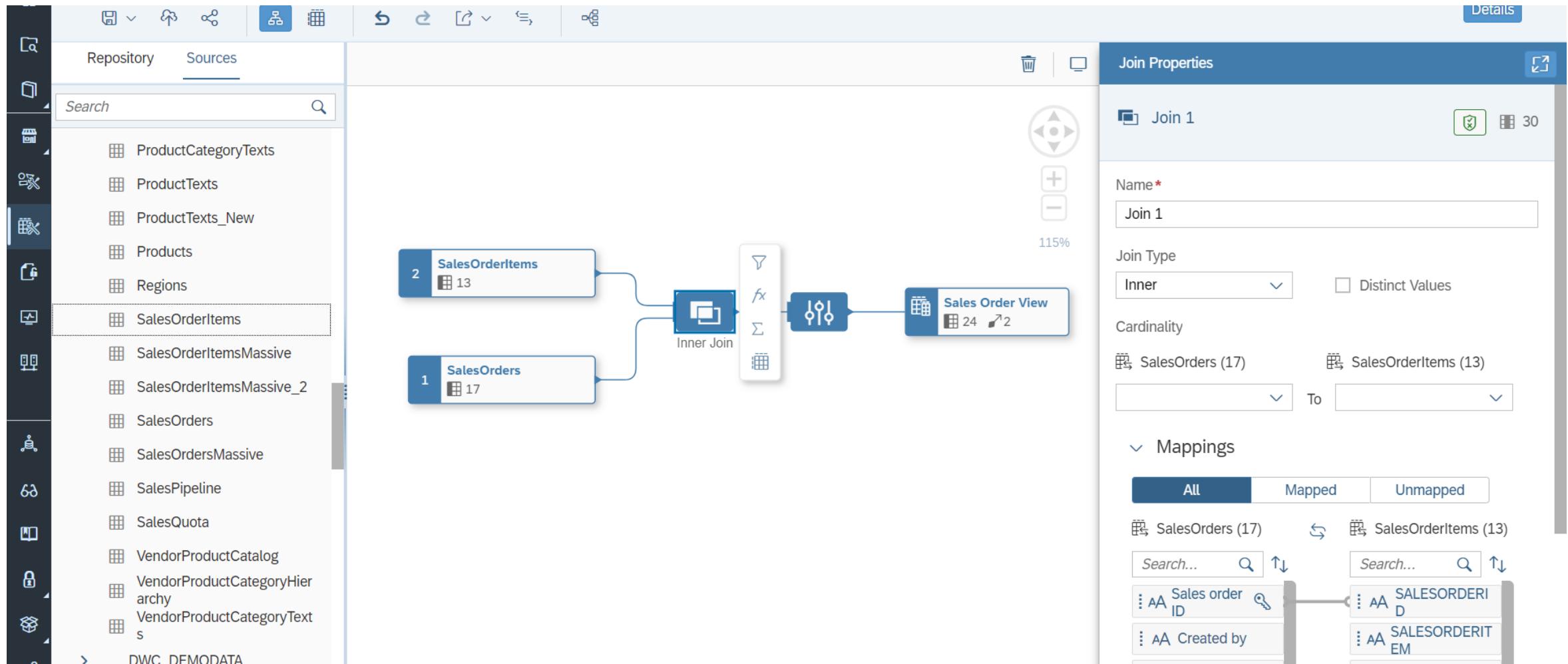
## Load schedule and snapshots

- Use snapshot replication to copy the full set of data from your source object
- For a successful load, you will see the status “Available” and the date and time of the latest update
- Schedule snapshot loading for remote tables, orchestrated via task chains



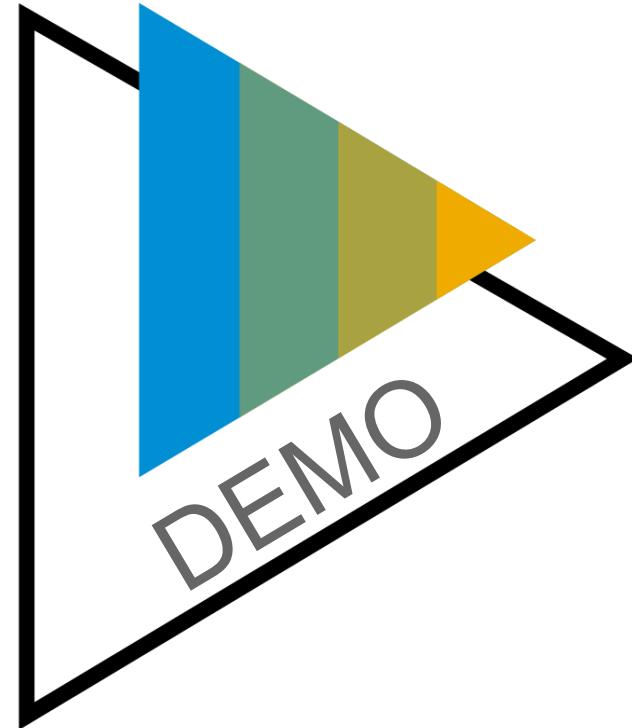
Enhance your model with joins and dimensions

## What are the best selling products?



Enhance your model with joins and dimensions

## What are the best selling products?



# Enhance your model with joins and dimensions

## Joins and unions

- Use join or union operators to combine data from multiple sources
- Several types of SQL joins available:
  - Cross
  - Full
  - Inner (default)
  - Left
  - Right
- Union properties available:
  - Union All
  - Union
- Set properties and mapping specifics to fit your needs

The screenshot displays two dialog boxes from the SAP Data Services interface:

- Join Properties**: Shows "Join 7" selected. The "Join Type" dropdown is set to "Inner". A tooltip indicates that "Inner" joins to Zero or one row in the target table. The "To" dropdown is set to "One (0..1)". The "Mappings" section shows mappings between "Product Sub Category" and "Product Category".
- Union Properties**: Shows "Union 1" selected. The "Union All" button is selected. The "Mappings" section shows mappings between "customer data ..." and "Union 1 (8)".

Enhance your model with joins and dimensions

## What you have learned in this unit

- How to import remote tables from Data Builder overview and from within the View Editor
- The semantic usage of tables and the available semantic types
- Dimensions and when to use them
- Creation and scheduling of snapshots for remote tables
- How to join and union datasets



# Thank you.

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Week 1: Introduction and Data Modeling

## **Unit 5: Data Flows, Task Chains, and SQL Views**

### Your task

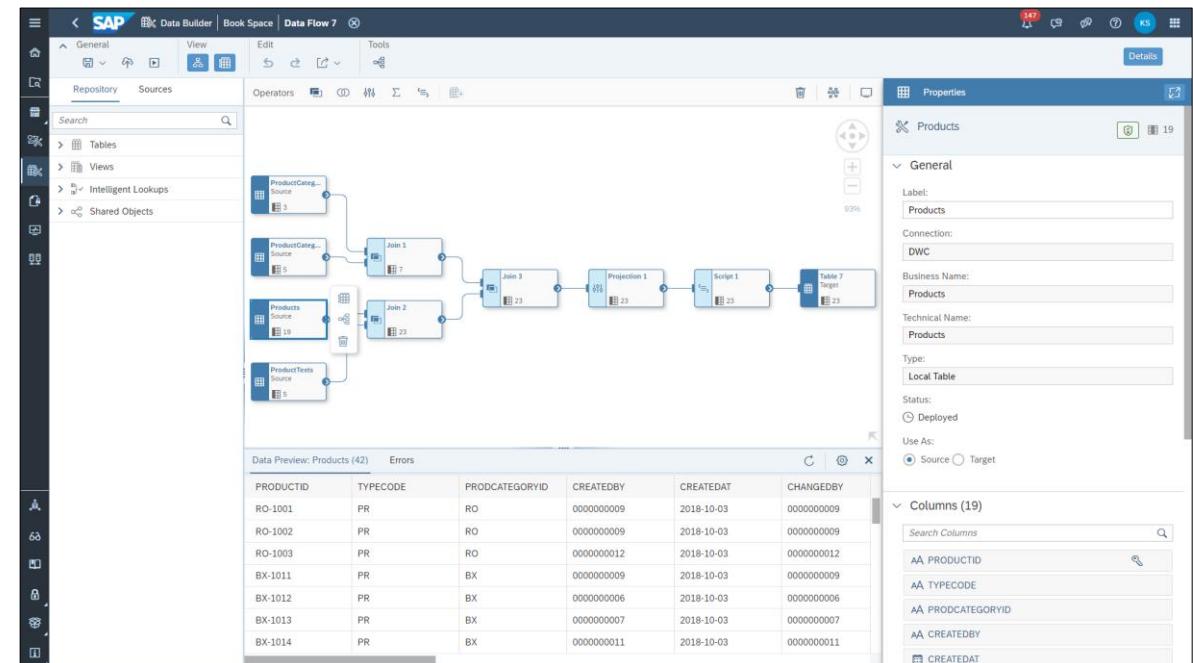
- The story needs to be enhanced such that it also shows the Top Sales Person per region
- This data is available in two remote tables that must be brought into SAP Datasphere using data flows so that all the data can be joined and stored in one local table in the space
- To ensure that data loading is a systematic process, you must start creating a sequence of loading tasks in a task chain



# Data flows, task chains, and SQL views

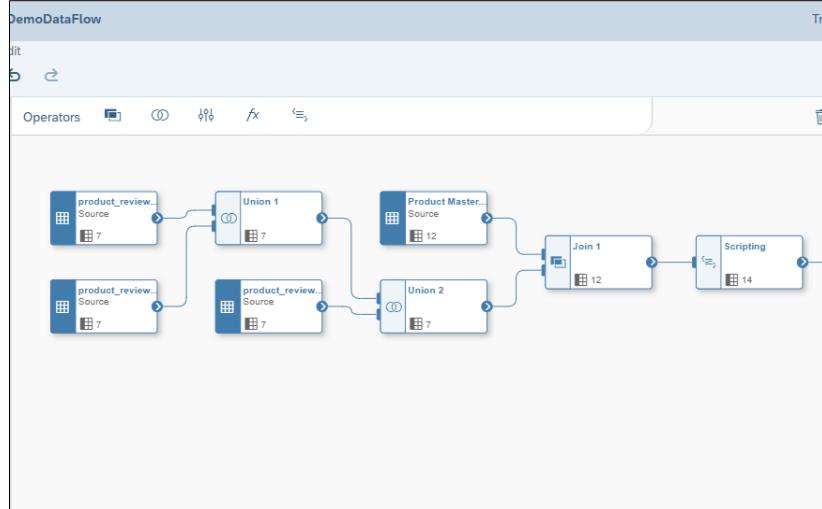
## Data flows

- Data integration from variety of data sources
- Easy-to-use data flow modeling experience for ETL requirements
- Load and combine data from different data sources, both SAP and non-SAP
- Use standard transformation capabilities and scripting for advanced requirements
- Apply a generic filter-based delta or select only specific columns to reduce the amount of data that needs to be transferred
- Dynamic memory allocation and auto restart option



# Data flows, task chains, and SQL views

## Script operator in data flows



Script

Properties

General Script Output Columns

General

Label: Scripting

Code Language: Python

Script

```
1 from textblob import TextBlob
2 def on_input(data):
3     try:
4         REVIEW_TEXT_INDEX = 17
5         if len(data.body) > 0:
6             for row in data.body:
7                 if row[REVIEW_TEXT_INDEX] is None:
8                     row[REVIEW_TEXT_INDEX] = ...
9                     tb = TextBlob(row[REVIEW_TEXT_INDEX])
10                    row.append(tb.sentiment.polarity)
11                    row.append(tb.sentiment.subjectivity)
12                    api.send("output", data)
13    except Exception as e:
14        # just forward
15        raise e
16
17 api.set_port_callback("input1", on_input)
```

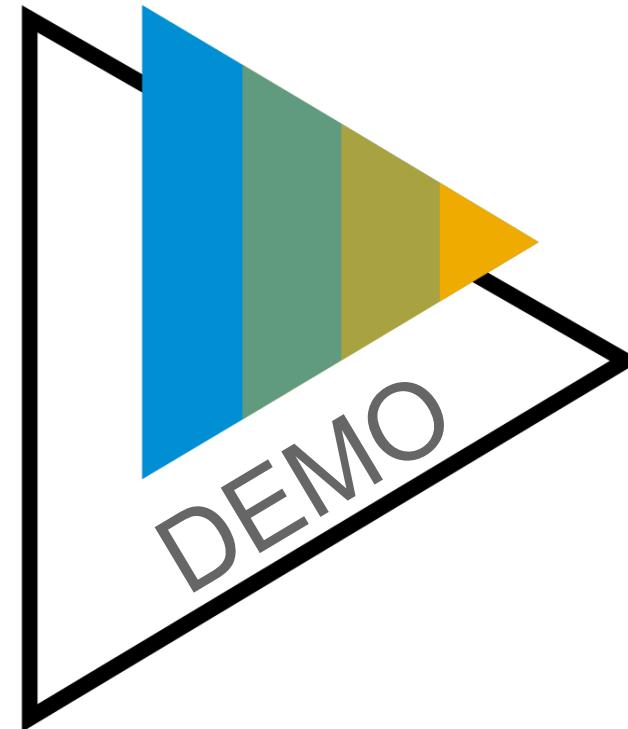
### Standard Transformations

- Combine data sets with no-code operators for Projection, Aggregation, Join, Filter, Union, Add Table
- Data source can be tables, ABAP CDS views, OData, remote files (JSON/JSONL, CSV, ORC, EXCEL, or PARQUET)
- Target mode: Append/Upsert, Truncate, Delete

### Scripting

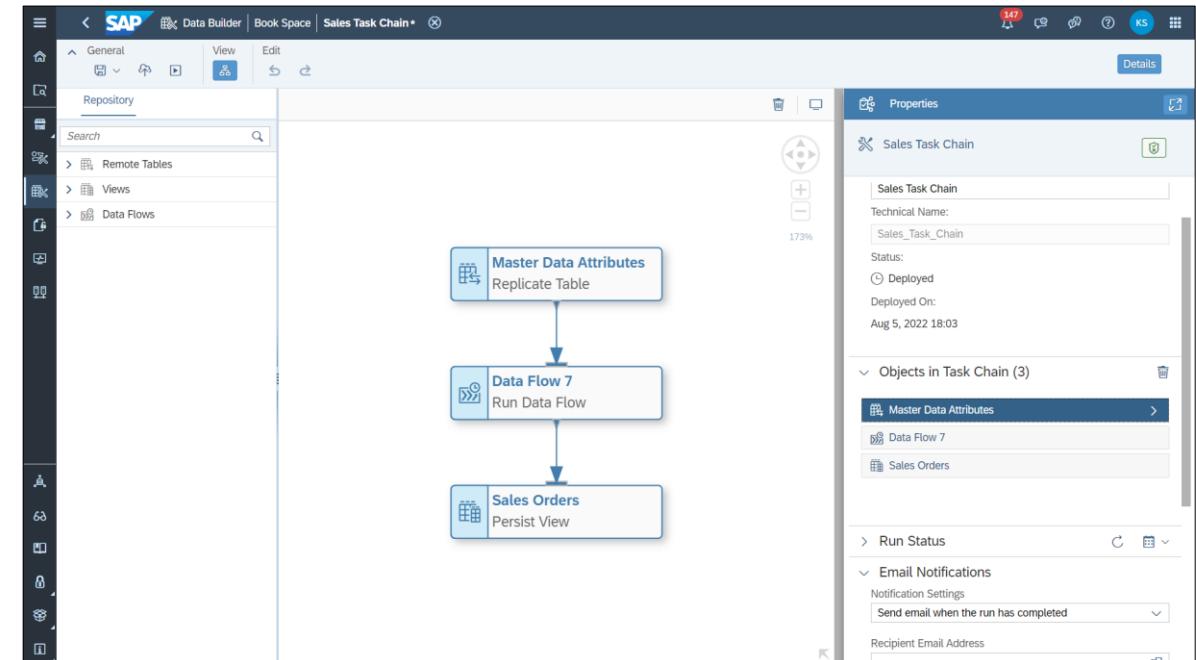
- Advanced transformation requirements like extraction of text
- Embedded scripting editor in data flow modeler
- Support of standard Python 3 scripting language

## Data flows



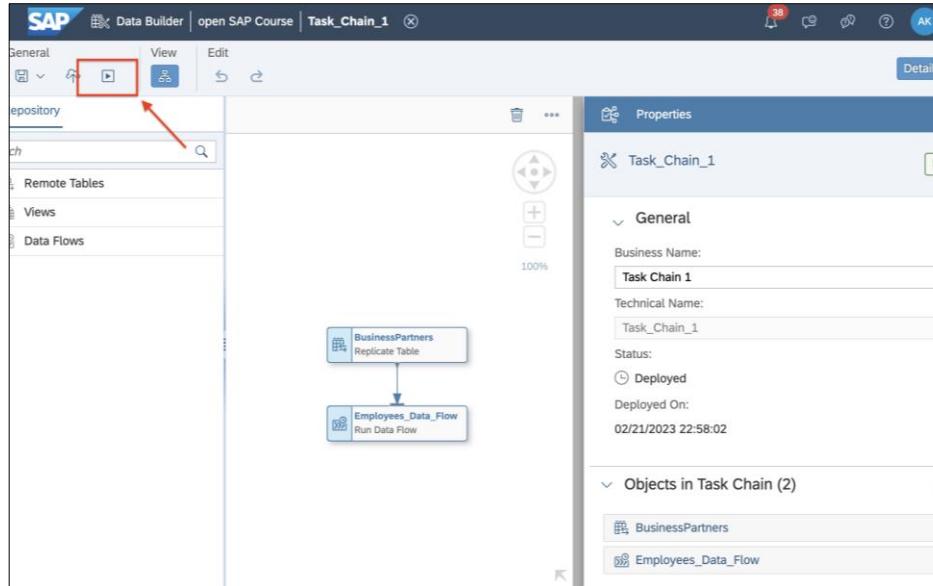
## Task chains

- Group multiple tasks into a task chain and run them once manually, or periodically through a schedule
- Tasks chain scheduling may include execution of
  - Remote table replication
  - View persistency, and
  - Data flow runs
- Serial processing
- Customizable email notification of success and/or failure of entire task chains

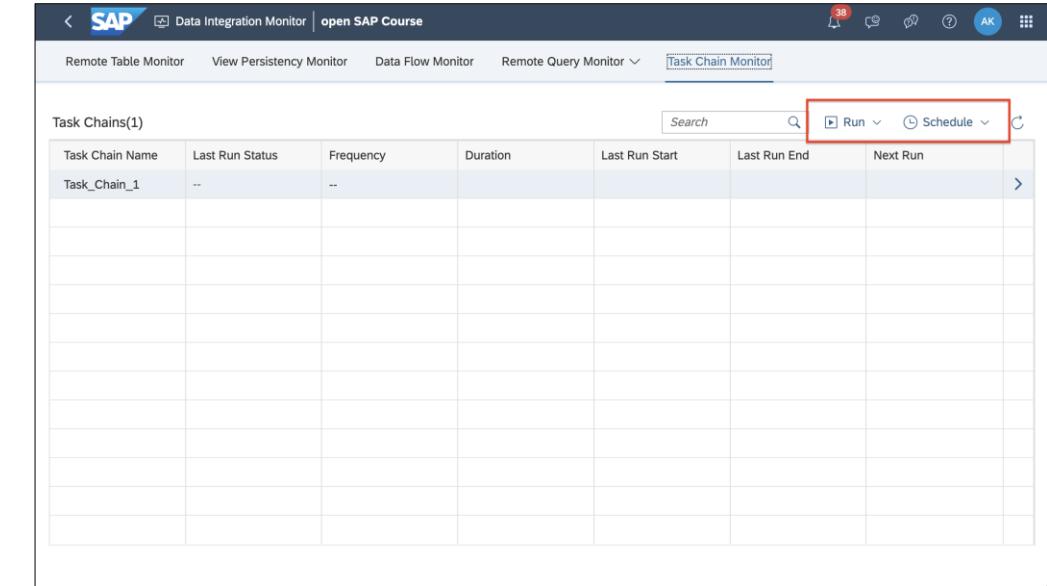


# Data flows, task chains, and SQL views

## Task chains execution

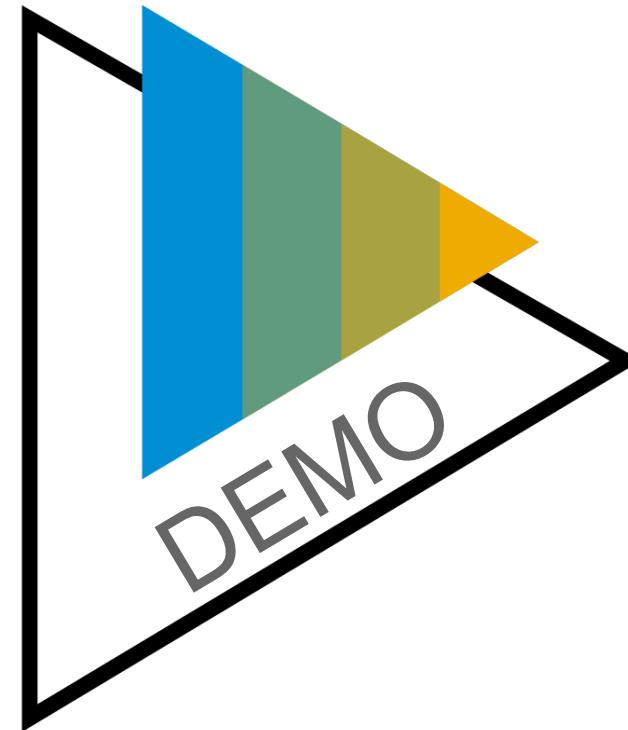


Execute task chains directly from the task chain modeling screen



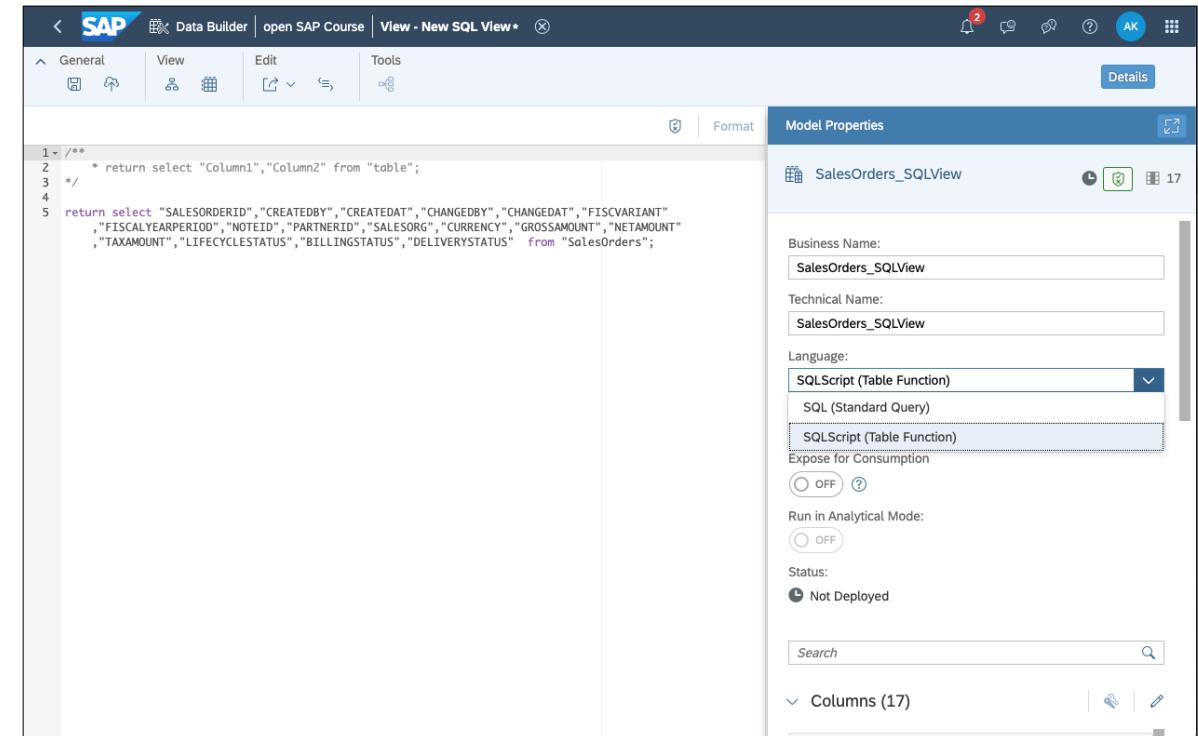
Run and/or schedule task chain execution from the Data Integration Monitor like other replication tasks

## Task chains



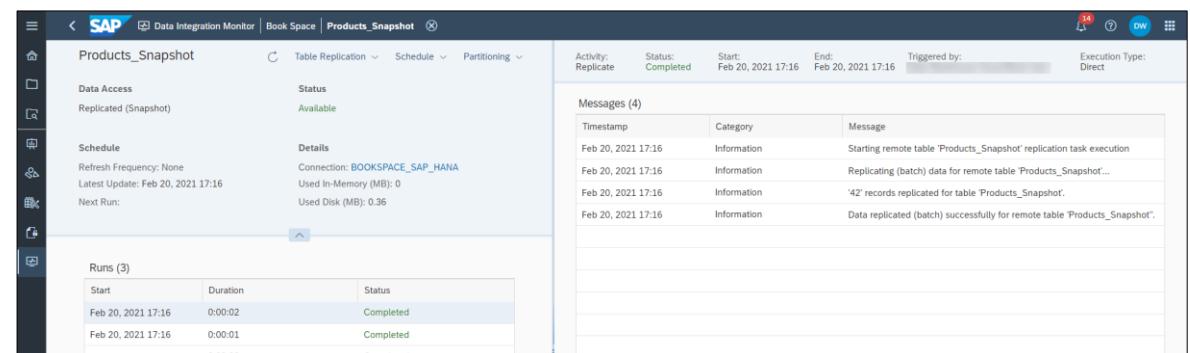
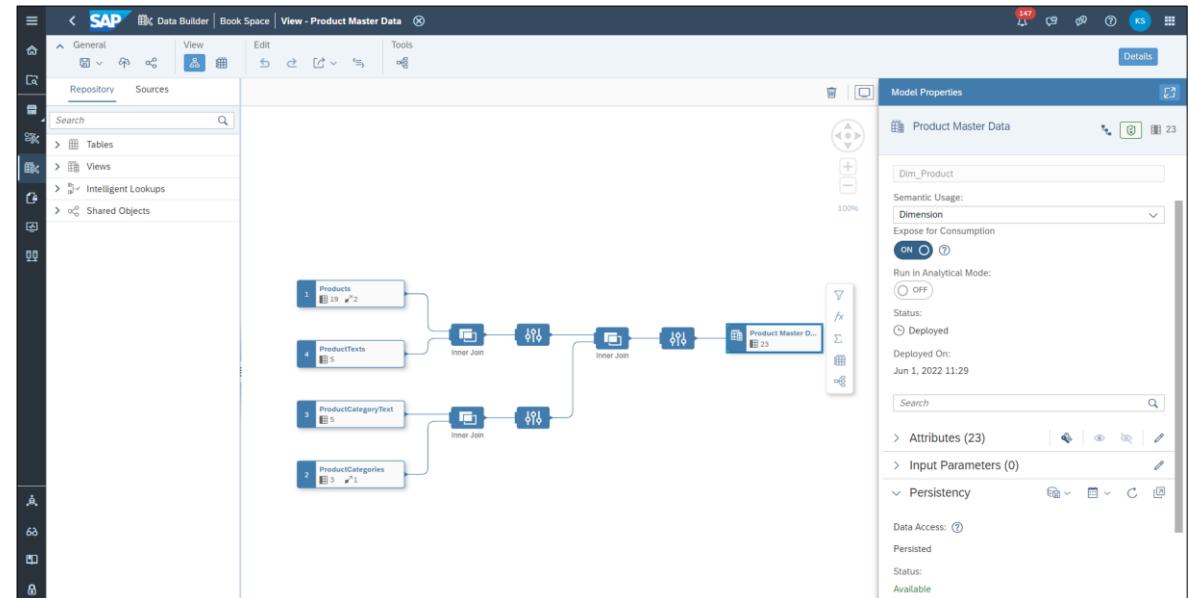
## SQL View Builder

- Create SQL views to query sources in powerful SQL editor along with drag-and-drop support
- Two ways to compose the SQL view
  - SQL: writing a standard SQL query using Select statements and operators such as Join and Union
  - SQLScript: to produce a table function
- Subset of SQL syntax supported by SAP HANA Cloud

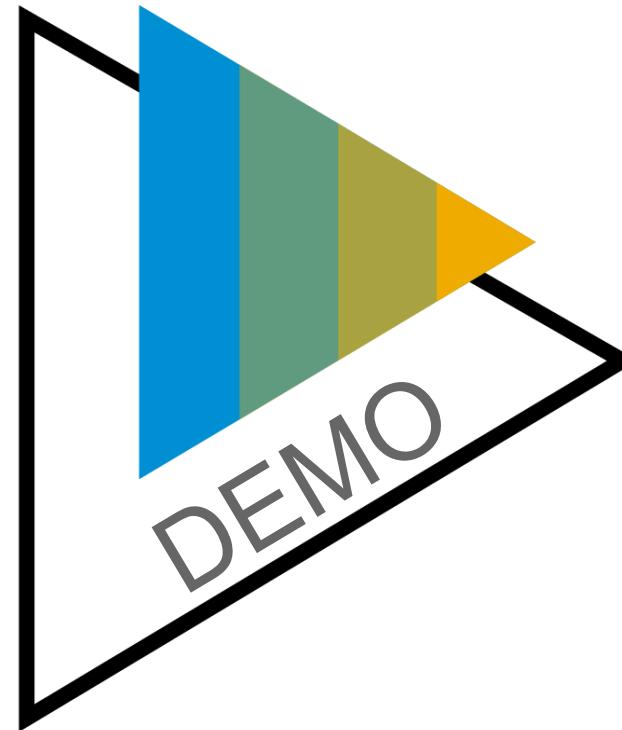


## View persistence

- Graphical and SQL views can be configured as persisted views to materialize the output result
- Improve performance for views with heavy transformations or slow remote sources
- Result set is persisted similar to remote table snapshots or data flow target tables
- Store only required data instead of full 1:1 remote table replication
- Monitoring, scheduling, and view analyzer access via the Data Integration Monitor
- Supports partitioning and partition-wise refresh
- Can be used in task chains (optional)

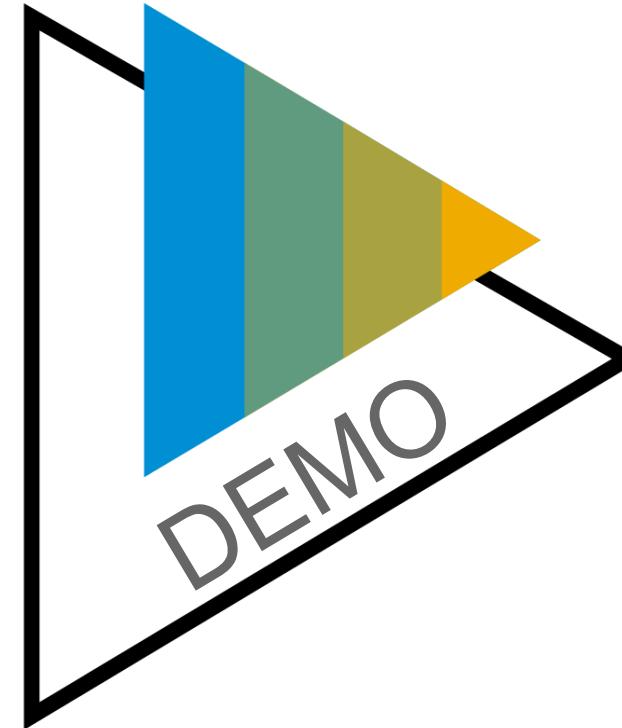


## View persistence



Data flows, task chains, and SQL views

## Associate Employees dimension to dataset



## What you have learned in this unit

- How to use the Data Flow Editor
- How to use the script operator for data flows
- How to use task chains
- How to persist a view



# Thank you.

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Week 1: Introduction and Data Modeling

## **Unit 6: Sharing Data, Access Controls, and ER Models**

### Your task

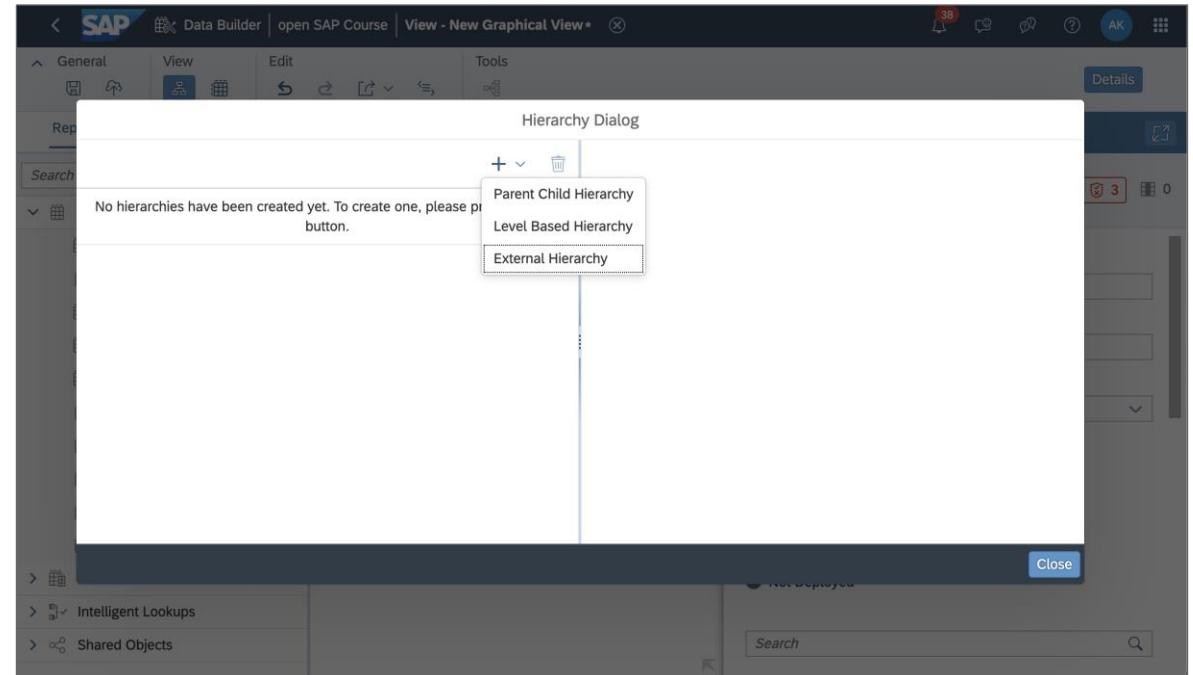
- You have created a story that shows a good view over sales, business partners, products and employees
- Need to enhance the product information into the Sales Order view and then share it with the sales organization for their reporting
- Use the Products view from the master data space and share the resulting Sales Order view to the Sales Org space for consumption
- But before releasing this report, we need to ensure that users see data based on their authorizations which is region-specific – use data access control for the same



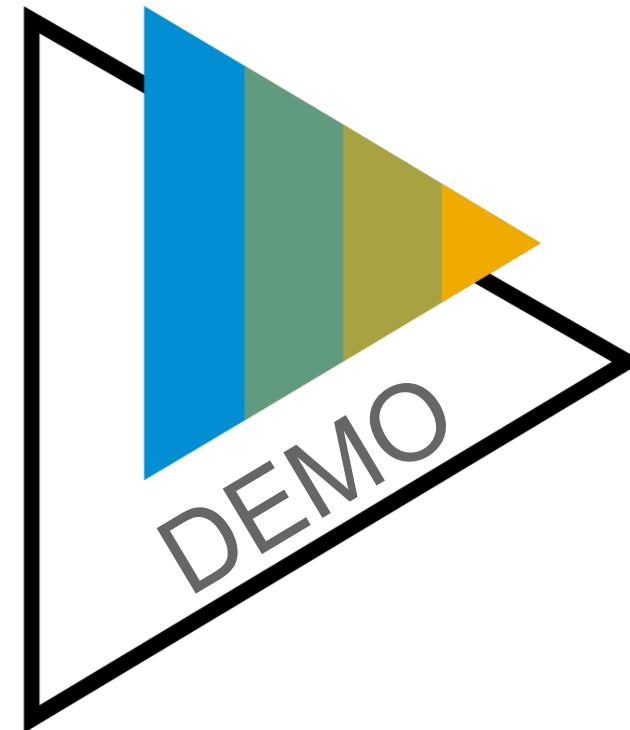
# Sharing data, access controls, and ER models

## Hierarchies

- Add a hierarchy to a dimension to support drill-down and drill-up in BI clients
- Supported hierarchy types
  - Parent-Child
  - Level-Based
  - External Hierarchy

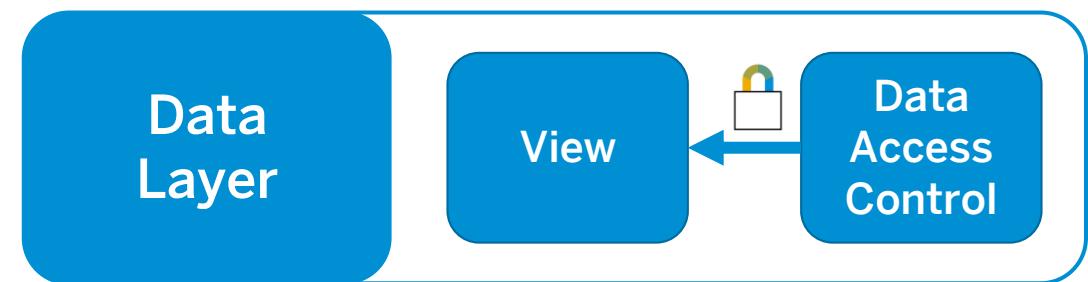


## Hierarchies

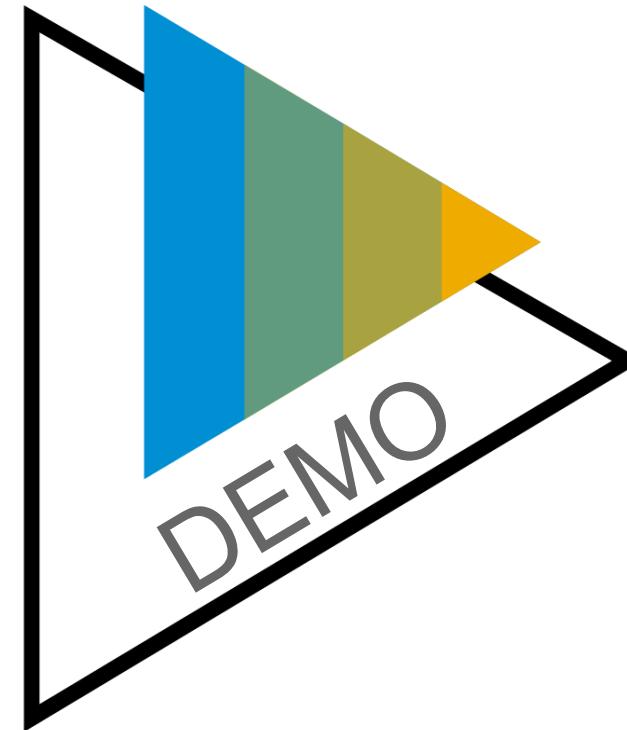


## Data access controls

- Allow more granular access to data on row level
- Any user viewing data will see only the rows for which they are authorized, based on the specified criteria
- Applied on artifacts in the data layer
- Cannot be overruled
- Data access controls are defined once and can be applied to multiple artifacts in the data layer

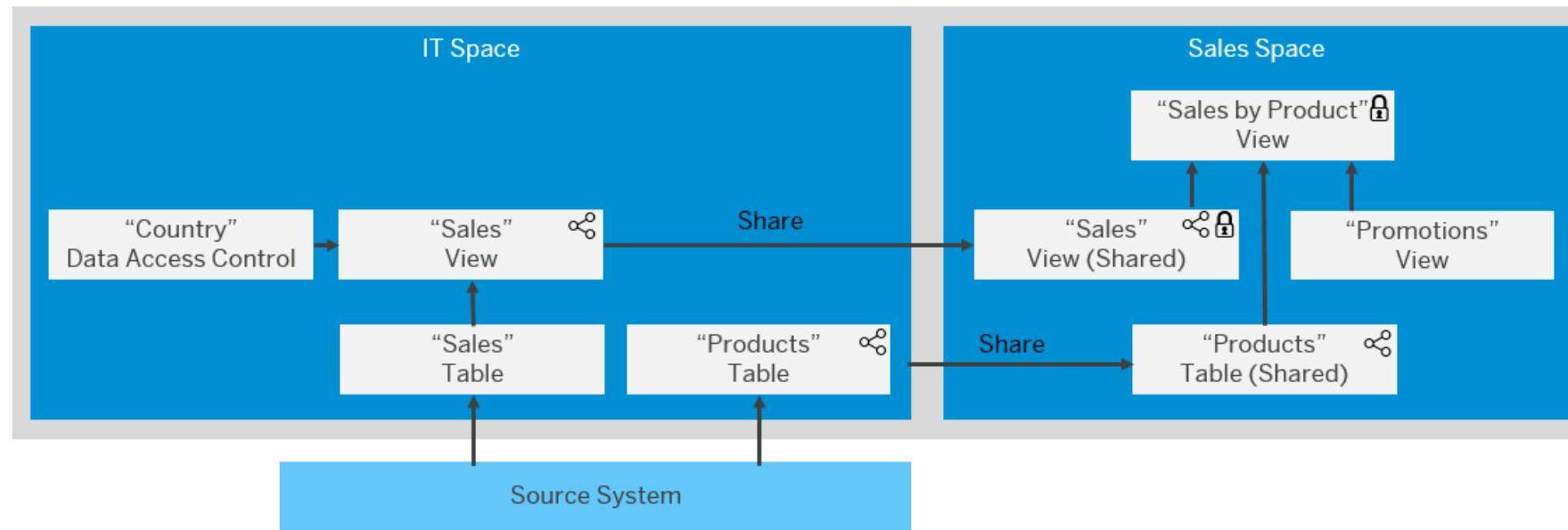


## Data access controls

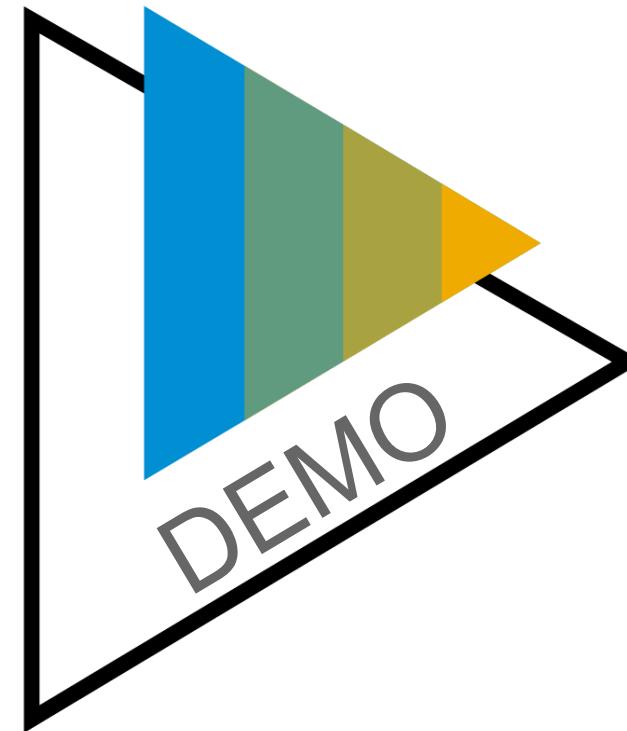


## Cross-space sharing

- Share a Data Builder table or view to another space to allow that space's members to use it as a source for their objects
- Your space is a secure area, and its entities and other objects cannot be seen in other spaces unless you choose to share them
- When you share an entity to another space, users in that space can use it as a source for their views and other objects



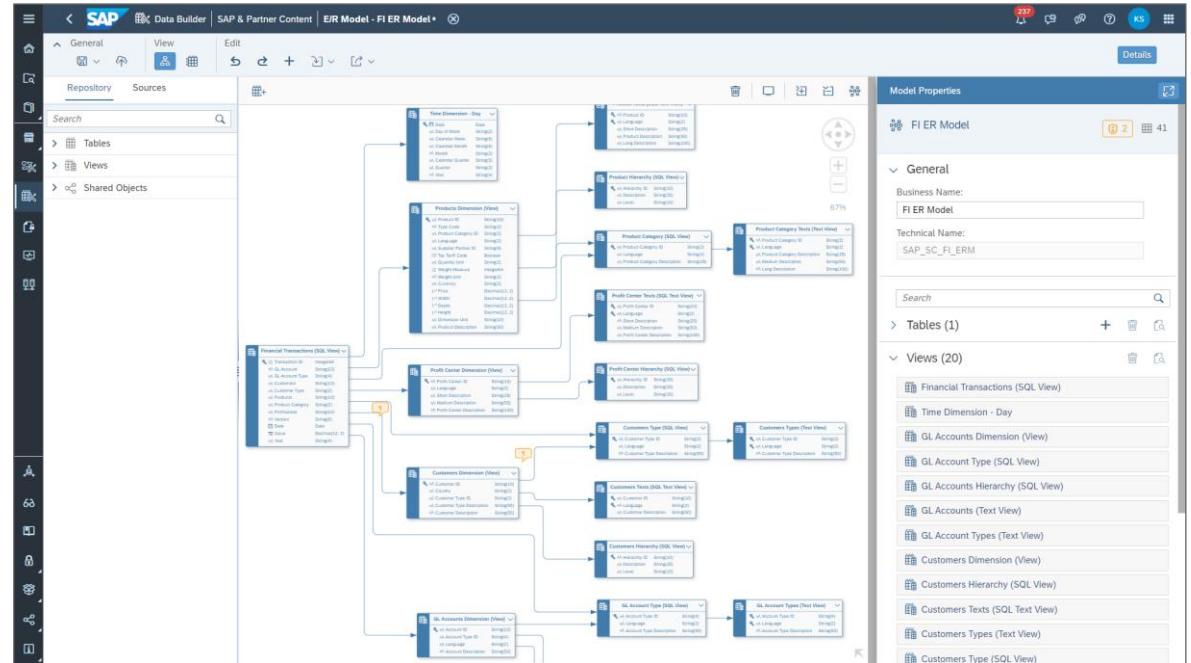
## Cross-space sharing



# Sharing data, access controls, and ER models

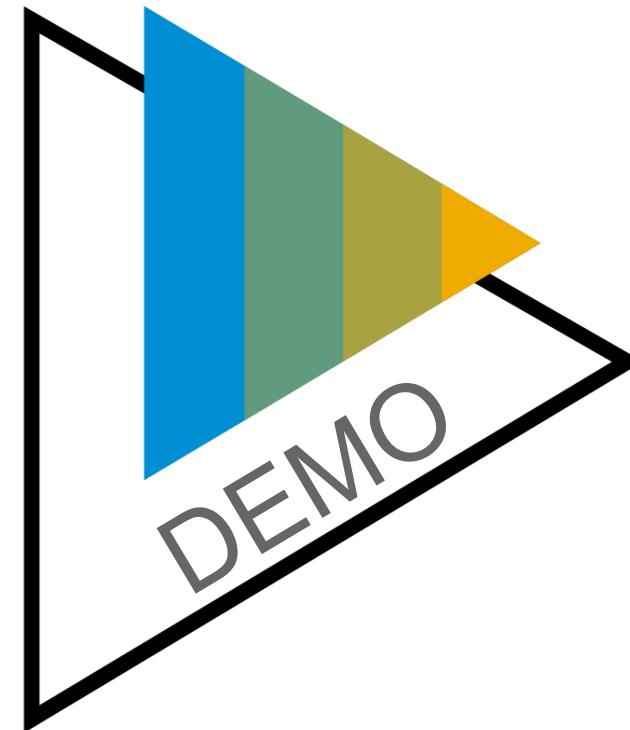
## Entity relationship models

- Definition of entity relationship models
- Design physical or remote database models
- Reverse model engineering
- Re-use existing entities (table, view) from Data Builder
- Add new entities on-the-fly
- In-editor real-time data preview
- Integrated impact and lineage analysis
- Model import / export



Sharing data, access controls, and ER models

## Entity relationship models



## Summary

What you have learned in unit 6

- How to create hierarchies
- How to use data access controls
- How to use cross-space sharing
- The entity relationship modeler



# Thank you.

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Week 1: Introduction and Data Modeling

## **Unit 7: Data Integration Monitor**

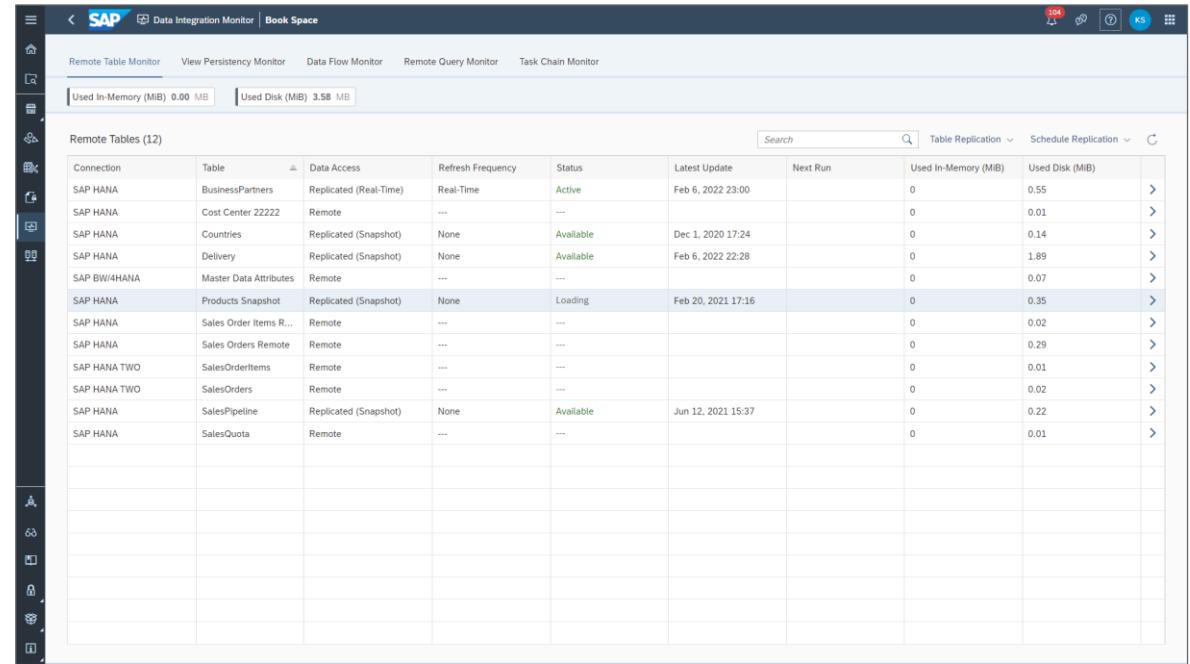
## Your task

- You want to learn how to monitor different data integration tasks that you execute or schedule in SAP Datasphere
- You need to understand how to monitor your SAP Datasphere tenant to analyze its health and troubleshoot issues in the tenant



# Data Integration Monitor Overview

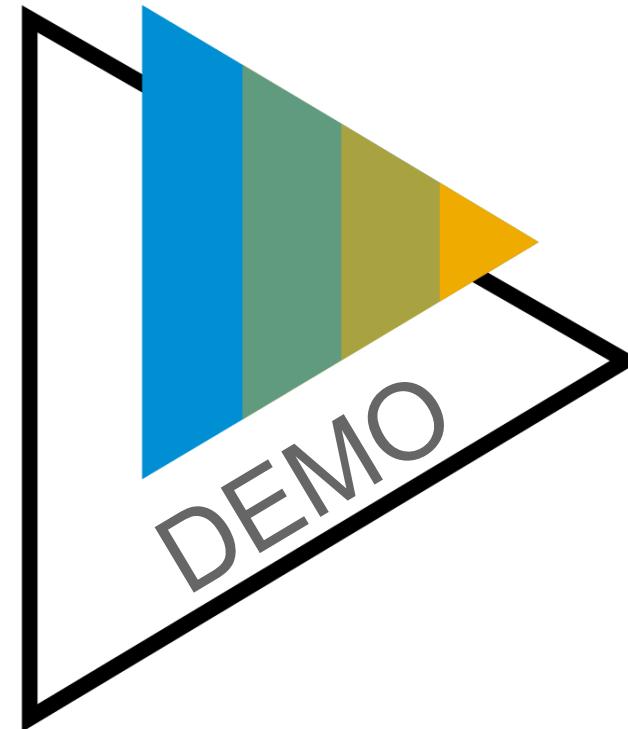
- Central monitoring for remote tables, data flows, persistent views, remote queries, and task chains
- Ability to start, stop, pause, resume, and cancel real-time replication for change-data-capture (CDC) enabled tables
- Switch seamlessly between remote access, real-time replication, and snapshots
- Add and manage persistent views
- Create and manage schedules for data flows, task chains, snapshots on remote tables, and persistent views
- Remote query monitoring and display active SQL statement
- Enable statistics on virtual tables



The screenshot shows the SAP Data Integration Monitor interface. The top navigation bar includes tabs for 'Remote Table Monitor' (which is selected), 'View Persistence Monitor', 'Data Flow Monitor', 'Remote Query Monitor', and 'Task Chain Monitor'. Below the tabs, there are two status boxes: 'Used In-Memory (MB) 0.00 MB' and 'Used Disk (MB) 3.58 MB'. The main content area is titled 'Remote Tables (12)' and displays a table with the following data:

Connection	Table	Data Access	Refresh Frequency	Status	Latest Update	Next Run	Used In-Memory (MB)	Used Disk (MB)
SAP HANA	BusinessPartners	Replicated (Real-Time)	Real-Time	Active	Feb 6, 2022 23:00		0	0.55
SAP HANA	Cost Center 22222	Remote	---	---			0	0.01
SAP HANA	Countries	Replicated (Snapshot)	None	Available	Dec 1, 2020 17:24		0	0.14
SAP HANA	Delivery	Replicated (Snapshot)	None	Available	Feb 6, 2022 22:28		0	1.89
SAP BW/4HANA	Master Data Attributes	Remote	---	---			0	0.07
SAP HANA	Products Snapshot	Replicated (Snapshot)	None	Loading	Feb 20, 2021 17:16		0	0.35
SAP HANA	Sales Order Items R...	Remote	---	---			0	0.02
SAP HANA	Sales Orders Remote	Remote	---	---			0	0.29
SAP HANA TWO	SalesOrderItems	Remote	---	---			0	0.01
SAP HANA TWO	SalesOrders	Remote	---	---			0	0.02
SAP HANA	SalesPipeline	Replicated (Snapshot)	None	Available	Jun 12, 2021 15:37		0	0.22
SAP HANA	SalesQuota	Remote	---	---			0	0.01

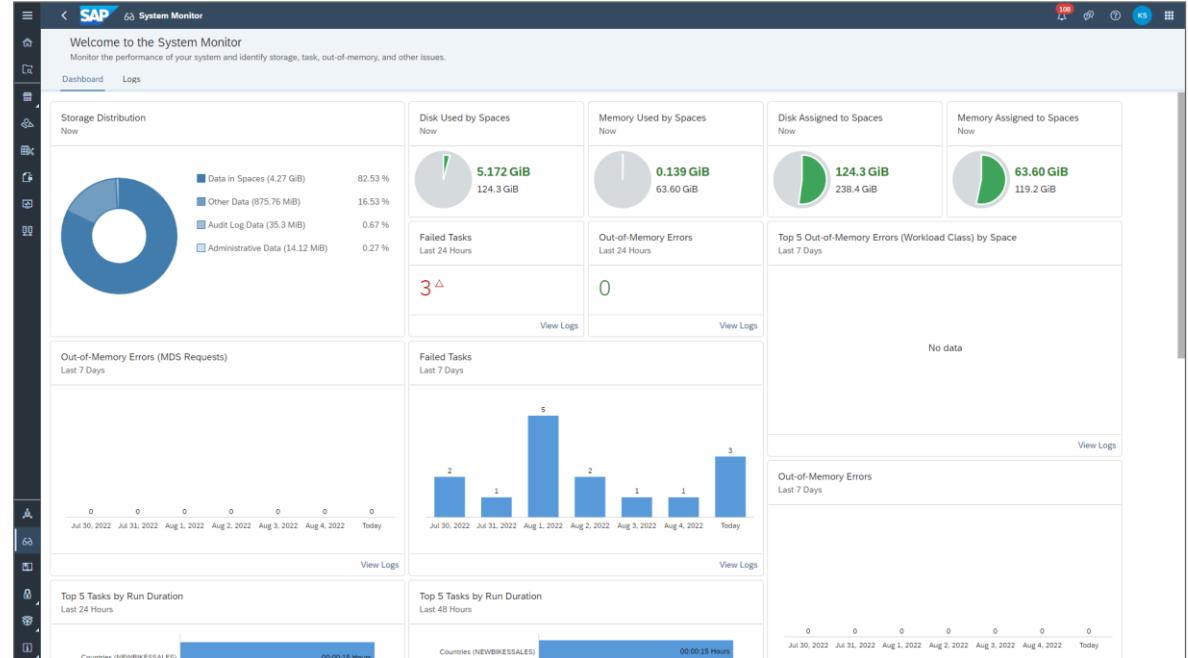
## **Data Integration Monitor – Demo**



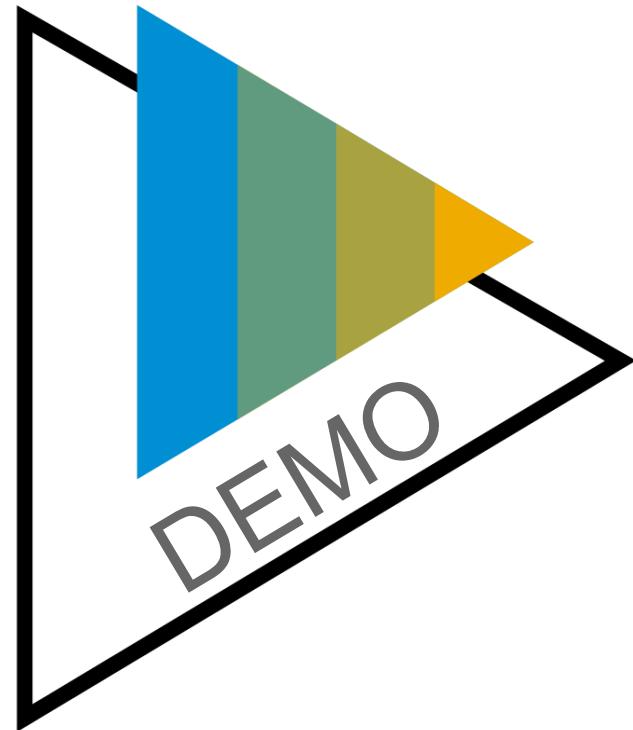
# Data Integration Monitor

## System monitor

- The system monitor tool allows administrators to monitor the performance of their system and identify storage, task, out-of-memory, and other issues across all spaces
  - Disk and memory assignment and consumption
  - Out-of-memory events
  - Failed tasks (24h/48h)
  - An overview of all tasks across spaces, and more
  - The top five statements with the highest peak memory consumption and run duration
  - Drill down to task log and statements



Data Integration Monitor  
**System monitor – Demo**



# Data Integration Monitor

## Monitoring configuration

### Expensive Statements Tracing

- Analyze SQL queries that exceed one of the following thresholds –
  - CPU time, memory, run duration

### Monitoring View Enablement

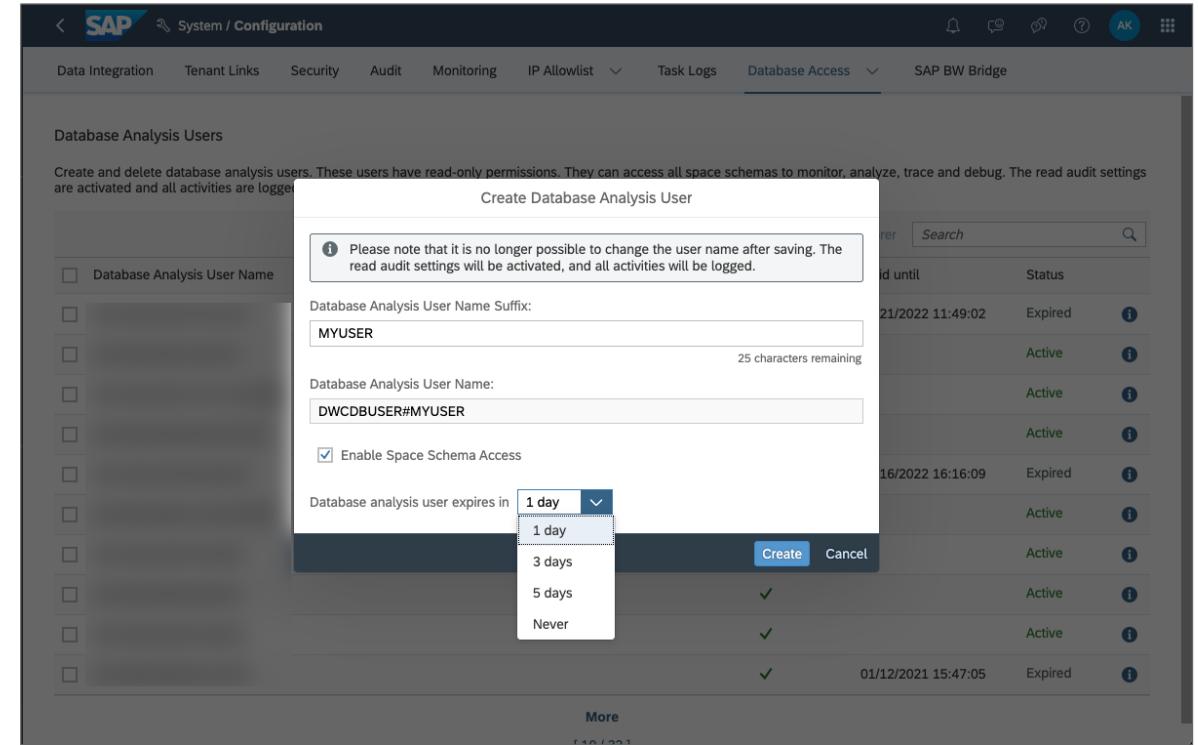
- Select up to 2 spaces that get access to the monitoring views in the Data Builder
  - Administrator privilege required to enable access

The screenshot shows the SAP System / Configuration interface with the 'Monitoring' tab selected. Under 'Monitoring View Enablement', it says 'Select a space that can access monitoring data. The monitoring data is saved in a dedicated view. You can use the Builders to view or work with the monitoring view.' A dropdown menu shows 'System Monitoring (8 Members)' and a 'Confirm Selected Space' button. Below this, a note says 'Use the SAP Monitoring Content Space (SAP\_ADMIN) to import SAP delivered content to monitor your SAP Data Warehouse Cloud tenant.' A 'Enable access to SAP Monitoring Content Space' toggle switch is turned on. Under 'Expensive Statement Tracing', there is a section to 'Save information about expensive statements in a dedicated view to enable further analysis.' A checked checkbox 'Enable Expensive Statement Tracing' has a warning message: '⚠ Be aware that changing these values may impact system resources.' It includes fields for 'In-Memory Tracing Records:' (30000), 'Threshold CPU Time:' (0, Microseconds), 'Threshold Memory:' (10000000, Bytes), 'Threshold Duration:' (100000, Microseconds), and 'Trace Parameter Values'. A 'Save Expensive Statement Tracing' button is at the bottom.

# Data Integration Monitor

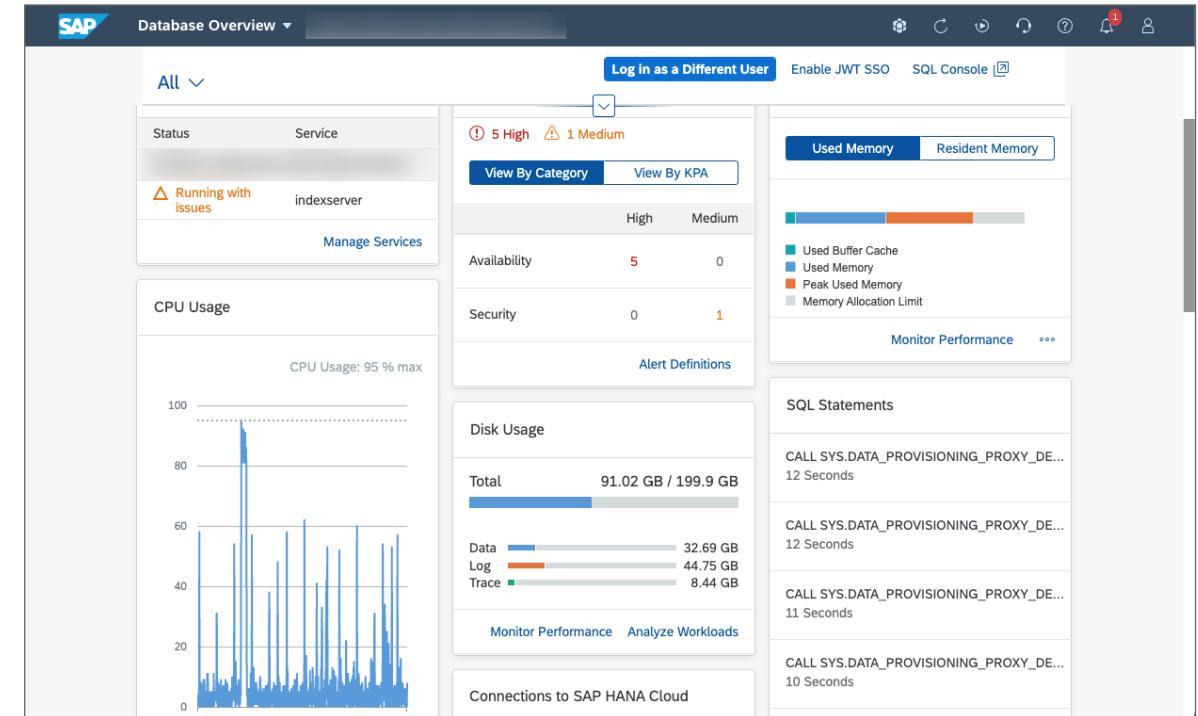
## DB analysis user

- Supports monitoring, analyzing, tracing, and debugging of runtime database
- DB analysis user has read privilege over the underlying runtime database (with optional access to space schema)
- Create user with pre-configured expiration date
- Use the DB analysis user for
  - Accessing SAP HANA Cloud cockpit
  - Consuming SAP HANA Cloud monitoring views

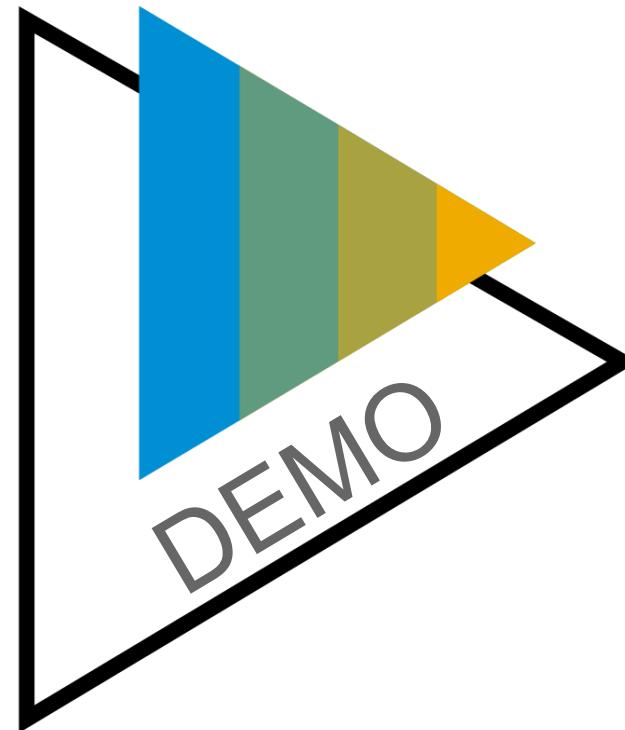


# Data Integration Monitor **SAP HANA Cloud cockpit**

- Administration tool for administering and monitoring runtime database
- Use DB analysis user to access the cockpit to get read-only view
- What can you do with the cockpit –
  - Monitoring
  - Error analysis & trace files
  - Performance monitor
  - Workload analyzer
  - User & role analysis



Data Integration Monitor  
**SAP HANA Cloud cockpit**



## What you have learned in this unit

- How to use the Data Integration Monitor and its capabilities
- How to use the system monitor to understand tenant health and status
- How to configure the system for monitoring
- How to use the DB analysis user for monitoring
- The SAP HANA Cloud cockpit



# Thank you.

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