Getting Started with SAP Datasphere
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1 Getting Started with SAP Datasphere

SAP Datasphere enables a business data fabric architecture that uniquely harmonizes mission-critical data across the organization, unleashing business experts to make the most impactful decisions. It combines previously discrete capabilities into a unified service for data integration, cataloging, semantic modeling, data warehousing, and virtualizing workloads across SAP and non-SAP data.
This diagram shows how you acquire data from sources, prepare and model it in SAP Datasphere, and expose it for consumption in SAP Analytics Cloud, Microsoft Excel, and other clients, tools, and apps. Click an element to learn more.

**Consume Data**

All users of SAP Datasphere with any of the standard roles can consume data exposed by spaces of which they are a member. If a user does not need to access SAP Datasphere itself, and only wants to consume data exposed by it, they should be granted the **DW Consumer** role.

See [Consuming Data Exposed by SAP Datasphere](page 32).

**Model Data in the Business Builder**

Users with the **DW Modeler** role can use the **Business Builder** editors to combine, refine, and enrich **Data Builder** objects and expose lightweight, tightly-focused perspectives for consumption by SAP Analytics Cloud and other BI clients.

See [Modeling Data in the Business Builder](page 28).

**Acquire and Prepare Data**

Users with the **DW Modeler** role can import data directly into the **Data Builder** from connections and other sources, use replication flows to replicate multiple objects, and data flows to extract, transform and load data.

See [Acquiring Data in the Data Builder](page 19).

**Integrate Data**

Users with the **DW Space Administrator** or **DW Integrator** role can create connections to source systems and databases and can schedule and monitor data replication and other data integration tasks. Space administrators use other methods to integrate data into their space and are responsible for maintaining the list of space members and monitoring and managing the space. They can create data access controls to secure data, and can transport content between tenants.

See [Preparing Your Space and Integrating Data](page 17).

**Model Data in the Data Builder**

Users with the **DW Modeler** role can add semantic information to their entities and expose them directly to clients, tools, and apps, or combine, refine, and enrich them in tightly-focused analytic models for consumption in SAP Analytics Cloud.

See [Modeling Data in the Data Builder](page 24).
Import Data Models from SAP BW

You can leverage your existing investment in SAP BW by provisioning an SAP BW bridge tenant and by importing queries from SAP BW/4HANA.

See Importing Data Models from SAP BW [page 30].

Browse Data and Analytic Assets in the Catalog

Users with the Catalog Administrator role publish high-quality trusted data and analytic assets, glossary terms, and key performance indicators to the Catalog to promote their discovery and reuse.

Users with the Catalog User role browse the Catalog to discover and use these artifacts.

See Curating and Publishing Data Assets in the Catalog [page 31].

SAP Datasphere allows you to converge data coming from SAP and third-party on-premise and cloud environments into a single, fully-managed cloud environment to allow your organization to radically simplify your data warehousing landscape. It provides:

- A secure environment supporting diverse data application needs including real-time analytics, governed data access, a data catalog, and data science (machine learning).
- Spaces, which are created and provisioned centrally to provide secure modeling environments for different departments or use cases.
- A wide range of connections to SAP and non-SAP cloud and on-premise sources, including data lakes.
- Graphical low-code/no-code tools to support self-service modeling needs for business users.
- Powerful built-in SQL and data flow editors for sophisticated modeling and data transformation needs, along with support for 3rd party tools and other SAP IDEs.
- An embedded data marketplace to consume external data products and to create internal data products.
- A business user-friendly data matching environment to enrich existing datasets with external data, coming from Data Marketplace, csv uploads, and other 3rd party sources.
- A catalog to support self-service discovery of data and analytic assets, glossaries and terms, and key performance indicators.
- Multi-dimensional modeling with powerful analytical capabilities and built-in data preview.
- A graphical impact and lineage analysis to visualize data movements, transformations, and other dependencies.
- Cross-space collaboration and sharing of centrally governed sources for joining with local files and external sources with support for row-level security.
- Re-use and migration of trusted and governed meta and data models residing in on-premise SAP Business Warehouse and SAP SQL Data Warehouse implementations.
- Provision of SAP and partner business content to support end-to-end business scenarios for various industries and lines of business.
- Seamless integration with SAP Analytics Cloud, Microsoft Excel, and public OData APIs to support consumption by other clients, tools, and apps.
2  Logging Into SAP Datasphere

When you are added as a user to SAP Datasphere, you receive a welcome email. Click the Activate Account button to connect to the server and set your password.

The main panel of the SAP Datasphere Home screen gives access to shortcuts to help you get started.

- Create Spaces (see Create a Space)
- Build Data (see Acquiring Data in the Data Builder [page 19])

To the right of this panel are buttons to send feedback to SAP and to view the SAP Datasphere blog, along with a list of your recent objects.

2.1  Changing Your Profile Settings

A user profile resembles a business card and consists of standard user data, such as your name and email address. The profile also includes user preferences as well as data privacy and task scheduling consent options.

Overview

To view and edit your user profile settings, click your user icon in the shell bar and select Settings.

The Settings dialog opens to display the profile setting options available.

User Account

You can view your user data: name and email address.

Appearance

You can view the SAP standard theme used for the visual appearance of SAP Datasphere.
Language & Region

In this section, you can find the following settings, which are partially editable and saveable:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Choose a language to view SAP Datasphere in.</td>
</tr>
<tr>
<td>Data Access Language</td>
<td>Controls the default language for displaying SAP Analytics Cloud stories created from live data connections and needs to be set in SAP Analytics Cloud.</td>
</tr>
</tbody>
</table>

To choose the data access language, click (Product Switch) and open your Profile Settings and edit your user preferences.

For more information, see Edit Your Profile in the SAP Analytics Cloud documentation.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Formatting</td>
<td>Choose a date format from the list.</td>
</tr>
<tr>
<td>Time Formatting</td>
<td>Choose a time format from the list. You can choose either 12 h or 24 h.</td>
</tr>
</tbody>
</table>

- Example
  - 8:48:53 AM or 8:48:53
  - 11:03:31 PM or 23:03:31

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Formatting</td>
<td>Choose a number format from the list.</td>
</tr>
<tr>
<td>Scale Formatting</td>
<td>Choose how to format the number scale. You can choose the system default, short (k, m, bn) or long (Thousand, Million, Billion).</td>
</tr>
<tr>
<td>Currency Position</td>
<td>View information about scale formatting and where the currency symbol (or ISO code) is displayed.</td>
</tr>
</tbody>
</table>

Profile Picture

If you would like to set a profile picture for your user, there is no UI functionality to support this in SAP Datasphere. However, you can set a profile picture by using a POST request with path /sap/fpa/services/rest/epm/security/photo and upload a file of type jpg.

### Sample Code

```plaintext
POST /sap/fpa/services/rest/epm/security/photo?filename=example_logo.jpg&uid=97DE06904D3AF731700CE0A318925D7&tenant=1 HTTP/1.1
```

In case there is an SAP Analytics Cloud tenant connected, you can switch to this tenant and upload the profile picture there with UI support. For more information, see Edit Your Profile.

UI Settings

You can choose the way names are shown in SAP Datasphere: business or technical name.
By default, you see your object’s business name. To switch to its technical name, choose Show Technical Name. You will then see the technical name in the Data Builder UIs for graphical views, SQL views, and ER models and in the Data Integration Monitor UIs. You can switch back to show the business name at any time. Other UIs, such as the table editor, show both names.

Privacy
By default, SAP Datasphere keeps track of objects you’ve accessed, so you can quickly locate those objects or files again. The names of those objects appear in a Recent Files list displayed on the SAP Datasphere Home page, and in the Repository Explorer, where you can search for recently accessed objects. For each listing of recently accessed objects, SAP Datasphere provides a dropdown list of up to ten objects you last accessed that you can select. For example, in the Repository Explorer, you can select the Recent option from the left-side navigation pane to display the last ten objects you accessed, created, or edited. In addition, if you click in the search entry field in the Repository Explorer, the last ten successful search queries are shown in the autosuggest selection box.

When you first log into SAP Datasphere, a popup dialog box prompts whether you want to disable tracking of objects you access, create, or edit. (By default, object tracking is enabled.) Clicking the Manage Settings button opens the Settings dialog for your account where you can disable future tracking and optionally clear previously tracked data. In addition, you can always click your user icon in the shell bar, select Settings, and then select the Privacy setting option to change profile settings.

- To disable tracking of objects you access, clear the Remember My Searches and Opened Objects checkbox and click Save.
- To clear any existing data for previous searches and recent objects you’ve accessed, click the Clear My Data button.

After disabling the tracking of accessed objects, or confirming the selection to clear tracked data, the changes will take effect immediately. If you want to reenable object and search tracking, just reopen the Privacy settings dialog, select the Remember My Searches and Opened Objects checkbox again, and click Save.

Authorized Consent Settings
You can give or revoke your consent to let SAP Datasphere run scheduled tasks you own. Consent is also required to run task chains, whether they are scheduled or you choose to run a task chain directly, without a schedule. Scheduled tasks or task chains run asynchronously in the background according to the settings defined in their schedules. Note that if you do not have the required consent, task chains or tasks you have scheduled to run won’t be executed.

Your consent is valid for 12 months. After the consent has expired, a log informs you that future tasks you have scheduled to run will no longer be executed. Renew your consent to resume task execution according to their original schedules.

For more information, see Schedule a Data Integration Task.
2.2 How to Find Help

SAP Datasphere has integrated in-app help.

The following video shows you where to find what’s new information and help in SAP Datasphere.

Help

To open the in-app help, click the question mark on the upper right hand corner.

A short description gives you a general idea what can be done on this screen. When you click on this short description, you get a longer text with conceptual information, a step by step procedure or even a video tutorial.

i Note

The in-app help is context sensitive. The help topics change depending on where you are in SAP Datasphere.

What’s New Information

When the in-app help panel is open, click the megaphone icon to view the what’s new topics.

A short description gives you general information of the new or changed features sorted by SAP Datasphere version. When you click on this short description, you get a longer and more detailed text about these new or changed features.

For more information, see What’s New in SAP Datasphere.
3 Navigating in SAP Datasphere

Use the left navigation area to access all the apps available in SAP Datasphere.

**i Note**
Each app requires specific privileges, and some may not be visible to you (see Roles and Privileges by App and Feature).

The apps contained in SAP Datasphere are available in the side navigation area.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ (Expand)</td>
<td>Expand the side navigation area.</td>
</tr>
<tr>
<td>☐ (Home)</td>
<td>View shortcuts, recent objects, and article feed.</td>
</tr>
<tr>
<td>☐ (Repository Explorer)</td>
<td>Browse and create objects (see Repository Explorer).</td>
</tr>
<tr>
<td>☐ (Catalog)</td>
<td>Discover, enrich, classify, and publish high-quality, trusted data and analytic assets from across your enterprise (see Governing and Publishing Catalog Assets).</td>
</tr>
<tr>
<td>☐ (Data Marketplace)</td>
<td>Purchase data products from providers and download them directly into your space (see Purchasing Data from Data Marketplace).</td>
</tr>
<tr>
<td>☐ (Business Builder)</td>
<td>Create business entities, fact models, and consumption models to present your data to analytics clients (see Modeling Data in the Business Builder [page 28]).</td>
</tr>
<tr>
<td>☐ (Data Builder)</td>
<td>Create or import tables and views, and create data flows and entity-relationship diagrams (see Acquiring Data in the Data Builder [page 19] and Modeling Data in the Data Builder).</td>
</tr>
<tr>
<td>☐ (Data Access Controls)</td>
<td>Create criteria-based privileges to filter the data accessible in views and business layer objects (see Securing Data with Data Access Controls).</td>
</tr>
<tr>
<td>☐ (Data Integration Monitor)</td>
<td>Monitor remote tables, persisted views, and data flows (see Managing and Monitoring Data Integration).</td>
</tr>
<tr>
<td>☐ (Connections)</td>
<td>Create connections to source systems to allow accessing and importing data into SAP Datasphere (see Integrating Data via Connections).</td>
</tr>
</tbody>
</table>

**i Note**
To open an app in a new browser tab, right-click it and select Open App in New Tab.

Administration tools are available from the lower part of the side navigation area.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🛍️ (Space Management)</td>
<td>Set up, configure, and monitor your spaces, including assigning users to them (see Preparing Your Space and Integrating Data [page 17]).</td>
</tr>
<tr>
<td>🛡️ (System Monitor)</td>
<td>Monitor the performance of your system and identify storage, task, out-of-memory, and other issues (see Monitoring SAP Datasphere).</td>
</tr>
<tr>
<td>🌐 (Content Network)</td>
<td>Import business content into your space (see Importing SAP and Partner Business Content from the Content Network).</td>
</tr>
<tr>
<td>⚜️ (Security)</td>
<td>Contains the following tools:</td>
</tr>
<tr>
<td></td>
<td>• 🏛️ (Users) - See Managing SAP Datasphere Users.</td>
</tr>
<tr>
<td></td>
<td>• 📜 (Roles) - See Managing Roles and Privileges.</td>
</tr>
<tr>
<td></td>
<td>• ⌚️ (Activities) - See Monitor Object Changes with Activities.</td>
</tr>
<tr>
<td>🚢 (Transport)</td>
<td>Contains the following tools:</td>
</tr>
<tr>
<td></td>
<td>• 🛢️ (Export) - Export objects from your space for transfer to another space or tenant (see Exporting Content for Sharing with Other Tenants).</td>
</tr>
<tr>
<td></td>
<td>• 🔄 (Import) - Import objects from another space or tenant into your space (see Importing Content from Another Tenant).</td>
</tr>
<tr>
<td>🎨 (Data Sharing Cockpit)</td>
<td>Become a data provider and make your data products available in Data Marketplace (see Data Marketplace - Data Provider’s Guide).</td>
</tr>
<tr>
<td>🖥️ (System)</td>
<td>Contains the following tools:</td>
</tr>
<tr>
<td></td>
<td>• 📦 (Configuration) - See Administering SAP Datasphere.</td>
</tr>
<tr>
<td></td>
<td>• 🤖 (Administration) - See Administering SAP Datasphere.</td>
</tr>
<tr>
<td></td>
<td>• ⏳ (About) - Obtain technical information about your version of SAP Datasphere.</td>
</tr>
</tbody>
</table>

General tools are available in the shell bar.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>📣 (Notifications)</td>
<td>Open the Notifications panel.</td>
</tr>
<tr>
<td>📭 (Feedback)</td>
<td>Open the Feedback survey on a separate browser tab and share your experience when working with SAP Datasphere.</td>
</tr>
<tr>
<td>🕵️‍♂️ (Support)</td>
<td>Open the Support dialog (see Request Help from SAP Support).</td>
</tr>
<tr>
<td>⏩ (Help)</td>
<td>Open the Help panel (see How to Find Help [page 10]).</td>
</tr>
<tr>
<td>⚙️ (Profile)</td>
<td>Open the Settings dialog (see Changing Your Profile Settings [page 7]) or log out.</td>
</tr>
<tr>
<td>Tool</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>![Product Switch]</td>
<td>Click here and select <strong>Analytics</strong> to navigate to your organization's SAP Analytics Cloud tenant.</td>
</tr>
</tbody>
</table>

**i Note**

The *Product Switch* is available if an administrator has enabled it (see *Enable the Product Switch to Access an SAP Analytics Cloud Tenant*) and you are assigned one or more BI roles.

For detailed information about working with SAP Analytics Cloud, see the *[SAP Analytics Cloud](#)* documentation.
4  Creating Users and Spaces and Preparing Connectivity

Users with the *DW Administrator* role can configure, manage, and monitor the SAP Datasphere tenant to support the work of acquiring, preparing, and modeling data for analytics. They manage users, create spaces, and allocate storage to them. They prepare and monitor connectivity for data integration and perform ongoing monitoring and maintenance of the tenant.

This topic contains the following sections:

- Configure Your SAP Datasphere Tenant [page 14]
- Create Users and Assign Roles [page 14]
- Create Spaces and Allocate Storage to Them [page 15]
- Prepare Connectivity [page 15]
- Monitor and Maintain SAP Datasphere [page 16]

**Configure Your SAP Datasphere Tenant**

Either SAP will provision your tenant or you can create an instance in SAP BTP (see Creating and Configuring Your SAP Datasphere Tenant).  

- We recommend that you link your tenant to an SAP Analytics Cloud tenant (see Enable the Product Switch to Access an SAP Analytics Cloud Tenant).  
- You can enable SAP SQL data warehousing on your tenant to exchange data between your HDI containers and your SAP Datasphere spaces without the need for data movement (see Enable SAP SQL Data Warehousing on Your SAP Datasphere Tenant).  
- You can enable the SAP HANA Cloud script server to access the SAP HANA Automated Predictive Library (APL) and SAP HANA Predictive Analysis Library (PAL) machine learning libraries (see Enable the SAP HANA Cloud Script Server on Your SAP Datasphere Tenant).

**Create Users and Assign Roles**

An administrator creates SAP Datasphere users manually, from a *.csv* file, or via an identity provider (see Managing SAP Datasphere Users).  

You must assign one or more roles to each of your users (see Managing Roles and Privileges). The following standard roles are available:

- Roles providing privileges to administer the SAP Datasphere tenant:  
  - **System Owner** - Includes all user privileges to allow unrestricted access to all areas of the application. Exactly one user must be assigned to this role.  
  - **DW Administrator** - Can create users and spaces and has full privileges across the whole of the SAP Datasphere tenant.
• Roles providing privileges to work in SAP Datasphere spaces:
  • **DW Space Administrator** - Can manage all aspects of a space (except the *Storage Assignment* and *Workload Management* properties) and can create data access controls and use the *Content Network*.
  • **DW Integrator** - Can integrate data via connections and can manage and monitor data integration in spaces of which they are a member.
  • **DW Modeler** - Can create and edit objects in the *Data Builder* and *Business Builder* and view data in all objects in spaces of which they are a member.
  • **DW Viewer** - Can view objects in spaces of which they are a member and view data output by views that are exposed for consumption in these spaces.
• Roles providing privileges to consume the data exposed by SAP Datasphere spaces:
  • **DW Consumer** - Can consume data exposed by SAP Datasphere spaces of which they are members using SAP Analytics Cloud, and other clients, tools, and apps, but cannot log into SAP Datasphere. This role is intended for business analysts and other users who use SAP Datasphere data to drive their visualizations, but who have no need to access the modeling environment.
• Roles providing privileges to work in the SAP Datasphere catalog:
  • **Catalog Administrator** - Can set up and implement data governance using the catalog. This includes connecting the catalog to source systems for extracting metadata, building business glossaries, creating tags for classification, and publishing enriched catalog assets so all catalog users can find and use them. Must be used in combination with another role such as *DW Viewer* or *DW Modeler* for the user to have access to SAP Datasphere.
  • **Catalog User** - Can search and discover data and analytics content in the catalog for consumption. These users may be modelers who want to build additional content based on official, governed assets in the catalog, or viewers who just want to view these assets. Must be used in combination with another role such as *DW Viewer* or *DW Modeler* for the user to have access to SAP Datasphere.

**Create Spaces and Allocate Storage to Them**

All data acquisition, preparation, and modeling happens inside spaces. A space is a secure area - space data cannot be accessed outside the space unless it is shared to another space or exposed for consumption.

An administrator must create one or more spaces. They allocate disk and in-memory storage to the space, set its priority, and can limit how much memory and how many threads its statements can consume. See *Creating Spaces and Allocating Storage*.

**Prepare Connectivity**

Administrators prepare SAP Datasphere for creating connections to source systems in spaces (see *Preparing Connectivity for Connections*).
Monitor and Maintain SAP Datasphere

Administrators have access to various monitoring logs and views and can, if necessary, create database analysis users to help troubleshoot issues (see Monitoring SAP Datasphere).
5 Preparing Your Space and Integrating Data

Users with the DW Space Administrator or DW Integrator role can create connections to source systems and databases and can schedule and monitor data replication and other data integration tasks. Space administrators use other methods to integrate data into their space and are responsible for maintaining the list of space members and monitoring and managing the space. They can create data access controls to secure data, and can transport content between tenants.

This topic contains the following sections:

- Prepare and Manage Your Space [page 17]
- Create Connections to Source Systems [page 17]
- Integrate Other Data Sources [page 17]
- Prepare Row-Level Security for Data [page 18]
- Manage and Monitor Data Integration Tasks [page 18]

Prepare and Manage Your Space

An administrator will assign you the DW Space Administrator role, create your space, and add you to it as a member. Once this is done, you can prepare your space as follows:

- Add SAP Datasphere users as members of your space (see Assign Members to Your Space).
- Optionally import SAP and partner business content to support end-to-end business scenarios for various industries and lines of business (see Importing SAP and Partner Business Content from the Content Network).
- Transport objects securely to and from your space (see Transporting Content Between Tenants).
- Use various monitoring and logging tools to manage your space (see Managing Your Space).

Create Connections to Source Systems

Space administrators and integrators can create connections to source systems to allow space members to acquire data from those systems (see Integrating Data via Connections).

Integrate Other Data Sources

Space administrators can integrate data from other sources:

- Create database users to allow external tools to connect to the space and write data to Open SQL schemas associated with the space (see Integrating Data via Database Users/Open SQL Schemas).
• If your space has access to the SAP HANA Cloud, data lake, you can access it via an Open SQL schema (see Integrating Data to and From SAP HANA Cloud Data Lake).
• Add SAP HDI containers to your space (see Exchanging Data with SAP SQL Data Warehousing HDI Containers)
• Generate a time table and associated time dimension views for use in the space (see Create Time Data and Dimensions).

**Prepare Row-Level Security for Data**

We recommend that you create data access controls, which can be applied to views to provide row-level filtering of your space data (see Securing Data with Data Access Controls).

**Manage and Monitor Data Integration Tasks**

You can enable, run, schedule, and monitor data replication tasks in the (Data Integration Monitor) (see Managing and Monitoring Data integration).
6  Acquiring Data in the Data Builder

Users with the *DW Modeler* role can import data directly into the *Data Builder* from connections and other sources, use replication flows to replicate multiple objects, and data flows to extract, transform and load data.

This topic contains the following sections:

- Federate and Replicate Data in Remote Tables [page 19]
- Extract, Transform, and Load Data with Data Flows [page 20]
- Load Data from Multiple Objects with Replication Flows [page 20]
- Import Entities from SAP S/4HANA [page 20]
- Import Entities from SAP BW Bridge [page 20]
- Import Data from CSV Files [page 20]
- Purchase Data from Data Marketplace [page 21]
- Create and Import Objects to Receive and Prepare Data [page 21]

Space administrators and integrators prepare connections and other sources to allow modelers to acquire data (see *Integrating Data and Managing Spaces in SAP Datasphere*).

**Federate and Replicate Data in Remote Tables**

Many connections (including most connections to SAP systems) support importing remote tables to federate or replicate data (see *Integrating Data via Connections*).

You can import remote tables to make the data available in your space from the *Data Builder* start page, in an entity-relationship model, or directly as a source in a view.

- To get started: In the side navigation area, click (Data Builder), select a space if necessary, and click Import Remote Tables. See Import Remote Tables.

- By default, remote tables federate data, and each time the data is used a call is made to the remote system to load it. You can improve performance by enabling replication to store the data in SAP Datasphere. Some connections support real-time replication and for others, you can keep your data fresh by scheduling regular updates (see Replicate Remote Table Data).

- To optimize replication performance and reduce your data footprint, you can remove unnecessary columns and set filters (see Restrict Remote Table Data Loads).

- To maximize access performance, you can store the replicated data in-memory (see Accelerate Table Data Access with In-Memory Storage).

- Once a remote table is imported, it is available for use by all members of the space and can be used as a source for views.

- You can automate sequences of data replication and loading tasks with task chains (see Creating a Task Chain).
Extract, Transform, and Load Data with Data Flows

Many connections (including most connections to SAP systems) support loading data to SAP Datasphere via data flows (see Integrating Data via Connections).

Data flows support a wide range of extract, transform, and load (ETL) operations.

- To get started: In the side navigation area, click (Data Builder), select a space if necessary, and click New Data Flow to open the editor. See see Creating a Data Flow.
- To add a source to your data flow, drag it from the Source Browser (see Using the Source Browser).
- In addition to connections, data flows can load and transform data from the following kinds of sources:
  - Open SQL schemas (see Integrating Data via Database Users/Open SQL Schemas)
  - HDI containers (see Exchanging Data with SAP SQL Data Warehousing HDI Containers).
  - Objects that are already in the SAP Datasphere repository (see Add Objects from the Repository).
- Data flows load data into local tables.
- You can automate sequences of data replication and loading tasks with task chains (see Creating a Task Chain).

Load Data from Multiple Objects with Replication Flows

Certain connections support loading data from multiple source objects to SAP Datasphere via a replication flow. You can enable a single initial load or request initial and delta loads and perform simple projection operations (see Creating a Replication Flow).

Import Entities from SAP S/4HANA

The Import Entities wizard allows you to import entities from SAP S/4HANA Cloud and SAP S/4HANA on-premise systems with rich metadata (see Importing Entities with Semantics from SAP S/4HANA).

Import Entities from SAP BW Bridge

SAP BW bridge enables you to use SAP BW functionality in the public cloud and to import bridge entities into SAP Datasphere (see Importing Entities with Semantics from SAP BW Bridge).

Import Data from CSV Files

You can import data from a CSV file to create a new local table (see Creating a Local Table from a CSV File).
**Purchase Data from Data Marketplace**

Purchase data products from providers and download them directly into your space (see Purchasing Data from Data Marketplace).

You can become a data provider and offer your own data products for sale in Data Marketplace via the Data Sharing Cockpit (see Data Marketplace - Data Provider’s Guide).

**Create and Import Objects to Receive and Prepare Data**

You can create and import empty tables and views to receive and prepare data:

- You can create an empty local table ready to receive data from a CSV file or from a data flow (see Creating a Local Table).
- You can import business content prepared by SAP and partners to support end-to-end business scenarios (see Importing SAP and Partner Business Content from the Content Network).
- You can import object definitions from a CSN/JSON file (see Importing Objects from a CSN/JSON File).
7 Preparing Data in the Data Builder

Users with the **DW Modeler** role can use views and intelligent lookups in the **Data Builder** to combine, clean, and otherwise prepare data.

This topic contains the following sections:

- Combine, Filter, and Enrich Data with Views [page 22]
- Combine Data via Match Rules in an Intelligent Lookup [page 22]
- Browse the Catalog for Trusted Data Assets [page 23]
- Visualize and Understand the Dependencies Between Objects [page 23]

For information about identifying the semantic usage of your entities and modeling them for consumption, see **Modeling Data in the Data Builder**.

### Combine, Filter, and Enrich Data with Views

You can combine, filter, enrich and otherwise prepare data in views.

- You can write SQL or SQLScript (table function) code in a powerful SQL editor (see Creating an SQL View).
  - To get started: In the side navigation area, click **Data Builder**, select a space if necessary, and click **New SQL View** to open the editor.
  - SAP Datasphere supports:
    - A subset of the SQL syntax supported by SAP HANA Cloud (see SQL Reference).
    - The SQLScript syntax for table user-defined functions in SAP HANA Cloud (see SQLScript Reference).
  - You can prepare your data in a graphical no code/low code environment (see Creating a Graphical View).
    - To get started: In the side navigation area, click **Data Builder**, select a space if necessary, and click **New Graphical View** to open the editor.
    - You can add and combine your sources by drag and drop (see Add a Source, Create a Join, and Create a Union).
    - You can refine, filter, and enrich your data in the diagram (see Reorder, Rename, and Exclude Columns, Create a Column, Filter Data, and Aggregate Data).
    - By default, views are virtual and must be run each time they are accessed. You can improve performance by persisting the view (see Persist View Data).

### Combine Data via Match Rules in an Intelligent Lookup

You can join two entities even where there is no appropriate foreign key column or where its data is incomplete or unreliable, with an intelligent lookup. You can iteratively join two entities by defining rules to match records and then reviewing and processing the results (see Creating an Intelligent Lookup).
Browse the Catalog for Trusted Data Assets

You can browse the catalog to discover high-quality trusted data assets to use as sources in your views and other objects (see Finding and Accessing Data in the Catalog).

Visualize and Understand the Dependencies Between Objects

SAP Datasphere provides various ways to visualize and understand the dependencies between your entities and other objects:

• You can visualize the objects that your object depends on (its lineage) and those that depend on it (its impacts) by opening its impact and lineage analysis (see Impact and Lineage Analysis).
• You can visualize a set of entities and the associations between them by adding them to an entity-relationship model (see Creating an Entity-Relationship Model).
• You can trace the source of a column in your graphical view and the transformations it has passed through (see Visualize the Lineage of Columns and Input Parameters in a Graphical View).
### Modeling Data in the Data Builder

Users with the *DW Modeler* role can add semantic information to their entities and expose them directly to clients, tools, and apps, or combine, refine, and enrich them in tightly-focused analytic models for consumption in SAP Analytics Cloud.

This topic contains the following sections:

- Model Facts, Dimensions, Texts, and Hierarchies [page 24]
- Identify Measures to Analyze in a Fact [page 25]
- Prepare Master Data for Grouping in a Dimension [page 25]
- Support Translations of Attributes with a Text Entity [page 25]
- Enable Drill-Down with a Hierarchy [page 26]
- Expose View Data for Consumption Outside SAP Datasphere [page 26]
- Combine Entities for Consumption in an Analytic Model [page 26]

### Model Facts, Dimensions, Texts, and Hierarchies

Use the *Semantic Usage* property to indicate the type of data contained in your entity:

- Select a *Semantic Usage of Fact* to indicate that your entity contains numerical measures that can be analyzed.
  - In our example, *Acme Sales View* is a fact containing sales data.

- Select a *Semantic Usage of Dimension* to indicate that your entity contains attributes that can be used to analyze and categorize measures defined in other entities.
In our example, four dimensions surround the fact, allowing us to analyze it by Salespeople, Time, Product, and Geo attributes.

- Select a Semantic Usage of Text to indicate that your entity contains strings with language identifiers to translate text attributes in other entities.
  In our example, there are four translation entities to translate time and product dimension attributes.
- Select a Semantic Usage of Hierarchy to indicate that your entity contains parent-child relationships for members in a dimension.
  In our example, the Acme Salespeople Hierarchy provides a hierarchy for the Salespeople dimension.

**Identify Measures to Analyze in a Fact**

Facts are entities that contain numerical measures that can be analyzed and are the principal type of object that is consumed by BI clients (see Creating a Fact).

- To get started: Select a Semantic Usage of Fact to indicate that your entity contains numerical measures that can be analyzed.
- You must identify at least one measure (see Specify Measures).
- You can create associations to dimensions and text entities (see Create an Association).
- To expose your data for consumption in SAP Analytics Cloud, add it to an analytic model (see Creating an Analytic Model).

**Prepare Master Data for Grouping in a Dimension**

Dimensions are entities that contain master data that categorize and group the numerical data contained in your measures (see Creating a Dimension).

- To get started: Select a Semantic Usage of Dimension to indicate that your entity contains attributes that can be used to analyze and categorize measures defined in other entities.
- You must set at least one key column (see Set Key Columns to Uniquely Identify Records).
- You can create associations to other dimensions, text entities, and hierarchies (see Create an Association).
- You can add parent-child or level-based hierarchies to support drill-down (see Add a Hierarchy to a Dimension).
- You can make your dimension time-dependent, so that its members can change over time (see Enable Time-Dependency for a Dimension or Text Entity).

**Support Translations of Attributes with a Text Entity**

Text entities are entities that contain data to store strings in multiple languages for translating attributes in other entities (see Create a Text Entity for Attribute Translation).

- To get started: Select a Semantic Usage of Text to indicate that your entity contains strings with language identifiers to translate text attributes in other entities.
You must specify attributes and keys to uniquely identify a master data member and a language.
You can make your text entity time-dependent, so that the texts it contains can change over time (see Enable Time-Dependency for a Dimension or Text Entity).

Enable Drill-Down with a Hierarchy

External hierarchies are entities that contain data to define parent-child relationships for a dimension (see Creating an External Hierarchy).

- To get started: Select a Semantic Usage of Hierarchy to indicate that your entity contains parent-child relationships for members in a dimension.
- You must specify the parent and child attributes and set the child attribute as a key.

i Note
Parent-child and level-based hierarchies can also be defined directly in a dimension. See Add a Hierarchy to a Dimension.

Expose View Data for Consumption Outside SAP Datasphere

There are two methods for exposing view data for consumption outside SAP Datasphere:

- SAP Analytics Cloud (and Microsoft Excel via an SAP add-in) do not consume view data directly. Set the Semantic Usage of your view to Fact and then add it to an analytic model to expose it (see Creating an Analytic Model). There is no need to enable the Expose for Consumption switch.
- Other third-party BI clients, tools, and apps can consume data from views with any Semantic Usage via OData or ODBC if the Expose for Consumption switch is enabled.

For more information, see .

Combine Entities for Consumption in an Analytic Model

Once your fact is ready for use, create an analytic model from it to consume its data in SAP Analytics Cloud (see Creating an Analytic Model).

- To get started: In the side navigation area, click (Data Builder), select a space if necessary, and click New Analytic Model to open the editor.
- You must add a fact as a source and can choose to copy all its measures, attributes and associated dimensions to the analytic model (see Add a Source).
- You can deselect measures and attributes to leave only those that are relevant to answer your particular analytic question.
- You can create additional calculated and restricted measures (see Add Measures).
• You can create multiple tightly-focused analytic models from a single fact, each providing only the data needed for a particular BI context, and enriched with appropriate variables, filters, and additional measures as necessary.
Modeling Data in the Business Builder

Users with the DW Modeler role can use the Business Builder editors to combine, refine, and enrich Data Builder objects and expose lightweight, tightly-focused perspectives for consumption by SAP Analytics Cloud and other BI clients.

This topic contains the following sections:

- Consume Data From the Data Builder in Business Entities [page 28]
- Combine Business Entities in Fact Models and Consumption Models [page 28]
- Expose Data in Perspectives [page 29]
- Import SAP BW/4HANA Queries [page 29]

Consume Data From the Data Builder in Business Entities

Each business entity created in the Business Builder consumes data from a Data Builder entity. As you can, at any time, switch the data source of a business entity to a different Data Builder entity, this loose coupling allows you to maintain stable business entities for reporting, even as your physical data sources change.

- You can create a business entity by selecting a Data Builder entity as its source (see Creating a Business Entity).
- You can remove unneeded measures and attributes to simplify your business entity for a particular reporting need.
- You can enrich your business entity with new measures (including derived and calculated measures), attributes, and other properties.
- You can change the data source of your business entity to a new Data Builder entity if necessary.

Combine Business Entities in Fact Models and Consumption Models

Combine your business entities into star-schemas to prepare them for consumption (see Creating a Consumption Model).

You can use a single business entity in multiple consumption models and modify it by adding and removing measures and attributes as appropriate for a particular reporting context.

You can, optionally, combine your business entities into an intermediate fact model and then use this as a source for multiple consumption models (see Creating a Fact Model).
Expose Data in Perspectives

Create perspectives from a consumption model for exposure to SAP Analytics Cloud and other BI clients, MS Excel, and other apps and tools (see Define Perspectives).

Import SAP BW/4HANA Queries

Import an SAP BW4/HANA query, along with its supporting InfoObjects and CompositeProviders to SAP Datasphere (see Importing SAP BW/4HANA Models).
10 Importing Data Models from SAP BW

You can leverage your existing investment in SAP BW by provisioning an SAP BW bridge tenant and by importing queries from SAP BW/4HANA.

This topic contains the following sections:

- Import Entities from SAP BW Bridge [page 30]
- Import SAP BW/4HANA Queries [page 30]

**Import Entities from SAP BW Bridge**

SAP BW bridge enables you to use SAP BW functionality in the public cloud and to import bridge entities into SAP Datasphere (see Importing Entities with Semantics from SAP BW Bridge).

**Import SAP BW/4HANA Queries**

Import an SAP BW4/HANA query, along with its supporting InfoObjects and CompositeProviders to SAP Datasphere (see Importing SAP BW/4HANA Models).
11 Curating and Publishing Data Assets in the Catalog

Users with the Catalog Administrator role publish high-quality trusted data and analytic assets, glossary terms, and key performance indicators to the Catalog to promote their discovery and reuse.

This topic contains the following sections:

• Enrich, Classify, and Publish Catalog Assets [page 31]
• Create Glossary Terms [page 31]
• Create Key Performance Indicators [page 31]
• Administer the Catalog [page 31]

Enrich, Classify, and Publish Catalog Assets

You can select data and analytic assets for enrichment and publication in the catalog (see Editing and Enriching Catalog Assets).

Create Glossary Terms

You can promote a common, consistent understanding of business terms within your organization by creating glossary terms and publishing them in the catalog (see Create and Manage a Glossary).

Create Key Performance Indicators

You can define key performance indicators to track performance and provide an analytical basis for decision-making (see Create and Manage Key Performance Indicators).

Administer the Catalog

You can connect up to three SAP Analytics Cloud tenants to the catalog to allow you to publish stories and other analytic assets. You can monitor the extraction of assets from the hosting SAP Datasphere tenant as well as these tenants (see Connecting and Monitoring Source Systems).
12 Consuming Data Exposed by SAP Datasphere

All users of SAP Datasphere with any of the standard roles can consume data exposed by spaces of which they are a member. If a user does not need to access SAP Datasphere itself, and only wants to consume data exposed by it, they should be granted the *DW Consumer* role.

This topic contains the following sections:

- Exposing Data from SAP Datasphere [page 32]
- Consume Data in SAP Analytics Cloud [page 33]
- Integrate with SAP Analytics Cloud for Planning [page 34]
- Consume Data in Microsoft Excel [page 34]
- Consume Data in Other Clients, Tools, and Apps [page 36]
- Consume Data via an OData Service [page 36]

Exposing Data from SAP Datasphere

Data can be exposed as analytic models, perspectives, and views, which are accessible to clients, tools, and apps as follows:

<table>
<thead>
<tr>
<th>Object</th>
<th>SAP Analytics Cloud</th>
<th>Microsoft Excel</th>
<th>Other Clients, Tools, and Apps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytic models (see Creating an Analytic Model)</td>
<td>Live Connection</td>
<td>Live Connection (via an SAP Add-In)</td>
<td>-</td>
</tr>
<tr>
<td>Exposed: Automatically</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perspectives (see Define Perspectives)</td>
<td>Live Connection</td>
<td>Live Connection (via an SAP Add-In)</td>
<td>-</td>
</tr>
<tr>
<td>Exposed: Automatically</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Views* (see Exposing a View For Consumption)</td>
<td>OData**</td>
<td>-</td>
<td>OData/ODBC</td>
</tr>
<tr>
<td>Exposed: When the <em>Expose for Consumption</em> switch is enabled</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For more information, see:

- Consume Data in SAP Analytics Cloud via a Live Connection
- Integrate with SAP Analytics Cloud for Planning
- Consume Data in Microsoft Excel via an SAP Add-In
- Consume Data in Power BI and Other Clients, Tools, and Apps via an OData Service
- Consume Data in Power BI and Other Clients, Tools, and Apps via ODBC

* The workflow of consuming views with a semantic usage of Analytical Dataset in SAP Analytics Cloud and Microsoft Excel via live connection is now deprecated. We recommend that you migrate your analytical datasets to the new Fact semantic usage and expose your view data via analytic models (see Analytical Datasets (Deprecated)).

** SAP Analytics Cloud primarily uses the consumption of view data via ODATA for planning (see Integrate with SAP Analytics Cloud for Planning).

**Note**

Before exposing data for consumption, you should consider applying row-level security via data access controls (see Securing Data with Data Access Controls).

**Consume Data in SAP Analytics Cloud**

You can create a live connection from SAP Analytics Cloud to SAP Datasphere and consume data exposed as analytic models and perspectives to create stories and analytic applications.
You must:

• Be a SAP Datasphere user with any of the standard roles. If you do not need to connect to SAP Datasphere itself, and only consume data, then an administrator can grant you the **DW Consumer** role (see **Standard Application Roles**).
  
  If data access controls have been applied, then the data you can consume will be filtered based on your user id (see **Securing Data with Data Access Controls**).

• Be a member of the SAP Datasphere space exposing the data (see **Assign Members to Your Space**).

• Have access to an SAP Analytics Cloud tenant and have the role **BI Content Creator** or another role providing equivalent privileges.

• Create or have access to an SAP Analytics Cloud live data connection to your SAP Datasphere tenant (see **Live Data Connections to SAP Datasphere** in the **SAP Analytics Cloud** documentation).

---

**i Note**

The workflow of consuming views with a semantic usage of **Analytical Dataset** in SAP Analytics Cloud and Microsoft Excel via live connection is now deprecated. We recommend that you migrate your analytical datasets to the new **Fact** semantic usage and expose your view data via analytic models (see **Analytical Datasets (Deprecated)**).

For more information, see **Consume Data in SAP Analytics Cloud via a Live Connection**.

---

**Integrate with SAP Analytics Cloud for Planning**

You can use SAP Datasphere as a data source for loading actuals or external data into an SAP Analytics Cloud planning model. You can also load your SAP Analytics Cloud planning data into SAP Datasphere and combine it with live actuals or other data as appropriate.

For more information, see **Integrate with SAP Analytics Cloud for Planning**.

---

**Consume Data in Microsoft Excel**

You can create a live connection from SAP Analytics Cloud to SAP Datasphere and consume data exposed as analytic models and perspectives in Microsoft Excel, via the SAP Analytics Cloud add-in for Microsoft Office.
You must:

• Install the add-in (see Deploying the Add-In in the SAP Analytics Cloud, Add-In for Microsoft Office documentation).

<i>Note</i>

This topic focuses on the SAP Analytics Cloud add-in for Microsoft Office. You can also consume data exposed as perspectives and views in the SAP Analysis for Microsoft Office add-in (see the SAP Analysis for Microsoft Office documentation). Data exposed as analytic models cannot be consumed in the SAP Analysis for Microsoft Office add-in.

• Be a SAP Datasphere user with any of the standard roles. If you do not need to connect to SAP Datasphere itself, and only consume data, then an administrator can grant you the <i>DW Consumer</i> role (see Standard Application Roles).

If data access controls have been applied, then the data you can consume will be filtered based on your user id (see Securing Data with Data Access Controls).

• Be a member of the SAP Datasphere space exposing the data (see Assign Members to Your Space).

• Have access to an SAP Analytics Cloud tenant and have the role <i>BI Content Creator</i> or another role providing equivalent privileges.

• Create or have access to an SAP Analytics Cloud live data connection to your SAP Datasphere tenant (see Live Data Connections to SAP Datasphere in the SAP Analytics Cloud documentation).

<i>Note</i>

The workflow of consuming views with a semantic usage of <i>Analytical Dataset</i> in SAP Analytics Cloud and Microsoft Excel via live connection is now deprecated. We recommend that you migrate your analytical datasets to the new <i>Fact</i> semantic usage and expose your view data via analytic models (see Analytical Datasets (Deprecated)).

For more information, see Consume Data in Microsoft Excel via an SAP Add-In.
Consume Data in Other Clients, Tools, and Apps

You can consume data exposed from SAP Datasphere clients, tools, and apps via an OData service or via a database user/Open SQL schema.

See Consume Data in Power BI and Other Clients, Tools, and Apps via an OData Service and Consume Data in Power BI and Other Clients, Tools, and Apps via ODBC.

Consume Data via an OData Service

You can connect to the OData API and consume data exposed as views in SAP Analytics Cloud and other clients, tools, and apps that are capable of accessing an OData service and authenticating via an OAuth client.

You must:

- Be a SAP Datasphere user with any of the standard roles. If you do not need to connect to SAP Datasphere itself, and only consume data, then an administrator can grant you the DW Consumer role (see Standard Application Roles).
  If data access controls have been applied, then the data you can consume will be filtered based on your user id (see Securing Data with Data Access Controls).
- Be a member of the SAP Datasphere space exposing the data (see Assign Members to Your Space).
- Obtain the following parameters for an OAuth client defined in your SAP Datasphere tenant:
  - Client ID
  - Secret
  - OAuth2SAML Token URL - To be used in the OAuth 2.0 SAML Bearer Assertion workflow.
  - OAuth2SAML Audience - To be used in the OAuth 2.0 SAML Bearer Assertion workflow.

i Note

Consuming exposed data in third-party clients, tools, and apps via an OData service requires a three-legged OAuth2.0 flow with type authorization_code. Users must manually authenticate against the configured IDP in order to generate the authorization code before continuing with the remaining OAuth2.0 steps.
For more information, see *Consume Data via the OData API.*
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