Create virtual tables using virtual connectors (Private Preview)

Contents

> ⓘ **Note**
>
> Effective November 2020:
>
> - Common Data Service has been renamed to Microsoft Dataverse. Learn more
> - Some terminology in Microsoft Dataverse has been updated. For example, *entity* is now a *table* and *field* is now a *column*. Learn more

Introduction

Virtual tables enable integrating data from external data sources by seamlessly representing that data as tables in Microsoft Dataverse, without replication of data. Solutions built on Power Platform can leverage virtual tables, as if they were native Dataverse tables. More information: Get started with virtual tables.

In this private preview release, we are adding support to virtualize connectors so you can easily create virtual tables from external data sources exposed via connectors. You can review the Connectors documentation to learn more and view the full list of connectors.

> ⓘ **Note**
>
> In this release, we are adding support to virtualize the **SQL Server** connector. We will continue to expand on supported connectors in subsequent releases.
>
> See the connector reference for the SQL Server connector for supported actions and limitations.

Conceptual overview

Virtual connector provider extends Connectors allowing you to create virtual tables in Dataverse. When you establish a remote connection to an external source using a connector data source, the virtual connector provider automatically generates an entity catalog with a list of all the available entities by retrieving the metadata from the external data source.

The entity catalog does not persist any information and always represents the external data source's current state. You can select entities from the entity catalog to create virtual tables. If you are working with multiple external data sources, an entity catalog is generated for each external source.

The underlying data source is key to allowing the provider to establish an authenticated remote connection to the external data. It uses a connection reference that stores pertinent details to the external source. This connection reference is subjective to the connector type. The information stored is specific to the data connector.

For example, the SQL connector will need the server information, database details, authentication method, username, password, and (optional) gateway connection details. Each external data source will need a new connection reference setup to create an instance of its entity catalog.
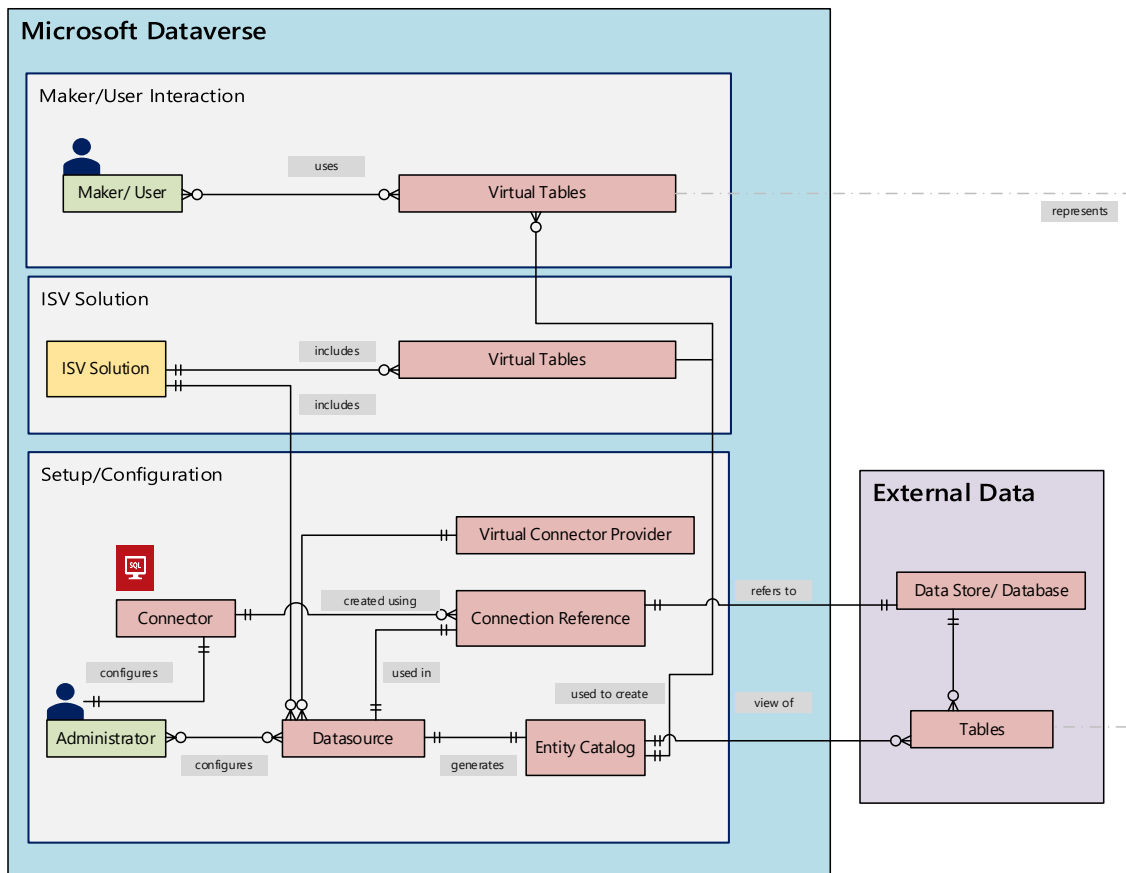
The connector's permissions enforce the ability for organizational users to access and operate on the virtual table. The connection should be shared with one user or can be shared with the entire organization. This allows for users to access and operate on virtual tables using a shared connection without having a user-specific account setup in the external data source.

Additionally, you need to create a service principal (Application ID) that will be used to authenticate with the provider. The service principal needs to be created in the tenant of the organization. The provider supports the use of Client ID and a Client Secret when setting up the data source.

ALM is supported for virtual tables created through virtual connectors. Virtual tables should be part of the managed solution along with the remote connection to distribute the solution. The solution can have other components such as a model-driven app that uses the virtual tables. When importing the solution into a new Dataverse environment, the data source should be updated to use a connection reference setup in the respective environment along with client ID and secret.

For more information about Application lifecycle management (ALM) and Solutions, see the articles:

- Application lifecycle management (ALM) in Microsoft Power Platform
- Solution Overview

Get started with virtual connectors:

Prerequisites:

- Create a service principal (Application ID) that will be used to authenticate with the provider. The service principal needs to be created in the tenant of the organization. More information: Creating service principal from Azure portal.
- Create a secret for the registered application ID. You will need this information when you create a data source for the external data as part of setting up the virtual connector.

Create a virtual table using the virtualized SQL connector:

1. The connector is behind a preview flag and can be directly accessed by selecting the link: Virtual connectors in Dataverse
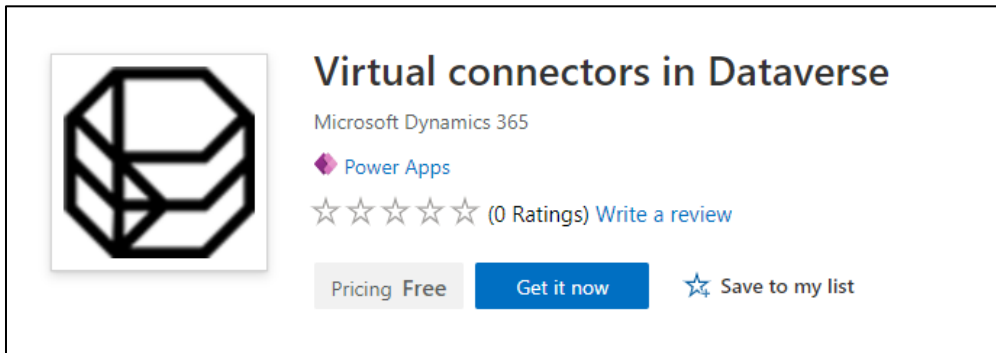
2. Select **Get it now**. In the sign in dialog, enter work or school account email. Agree to the terms and conditions and then select **Continue**. The Power Platform Admin Center will open automatically.
3. Select the environment where you want to install the solution. Once the installation is complete, you will the **Virtual connectors in Dataverse** app installed under **Environments -> [*your environment name*] -> Dynamics 365 apps**.

4. You should also see the **Virtual Connector Provider** solution along with other solutions enabled in the environment.

5. Go to Power Apps, select the environment where you have installed the virtual connector solution. In the left navigation pane, select **Data** and then select **Connections** to create a **data connection** using the SQL connector. Set SQL server specific details and the external database you want to connect to. Make sure this connection is shared with a specific user or all users in your organization by selecting the **Share** action in the connection details view.

6. With the connection to the external data source established you can now start creating **Connection Reference**. As the name suggests, a connection reference is a reference entity that provides a way for the Dataverse platform to access the connection information associated with the external data source.

   To create a connection reference:

   i.   Go to **Solutions**.
   ii.   Select the **Default Solution.**
   iii. Select **New** and then select **Connection Reference (preview).**
   iv.   Provide a name and select SQL data connection that was previously setup.

   Note: You can also create a new data connection from this dialog. You will be presented with a list of connectors to choose. Select the SQL Server connector for setting up a new connection.

7. Create a new **Virtual Entity Data Source** by navigating to **Advanced Setting -> Administration -> Virtual Entity Data Source**. Use the Virtual Connector Data Provider and the connection reference previously created, along with the Tenant ID, Client ID, and the Client Secret in this step.

CONNECTORDATASOURCE : INFORMATION

Adventure Works DB Data Source ≡

▲ General

Name	Adventure Works DB Data Source
Connection Reference	Adventure Works DB
PowerApps Environment	
Tenant	b433bb49-7685-435f-8f3f-2f02e2e43f85
Client ID	7dab45fc-9dda-4db2-84c3-27a49b241806
Client Secret	*******

8. With the connection reference and the connection data source setup, an **Entity Catalog** is automatically generated. The **Entity Catalog** is specific to the data source and will list all the tables that are in the respective data source.

   You can view the **Entity Catalog** by selecting **Advanced Find** and using the **Look for:** field. The catalog will include a prefix "Entity Catalog for" followed by the connection reference (example: *Entity Catalog for Adventure Works DB*).

   ⓘ **Note**

   The creation of the entity catalog is an asynchronous process. Depending on your environment, this may take a few minutes.
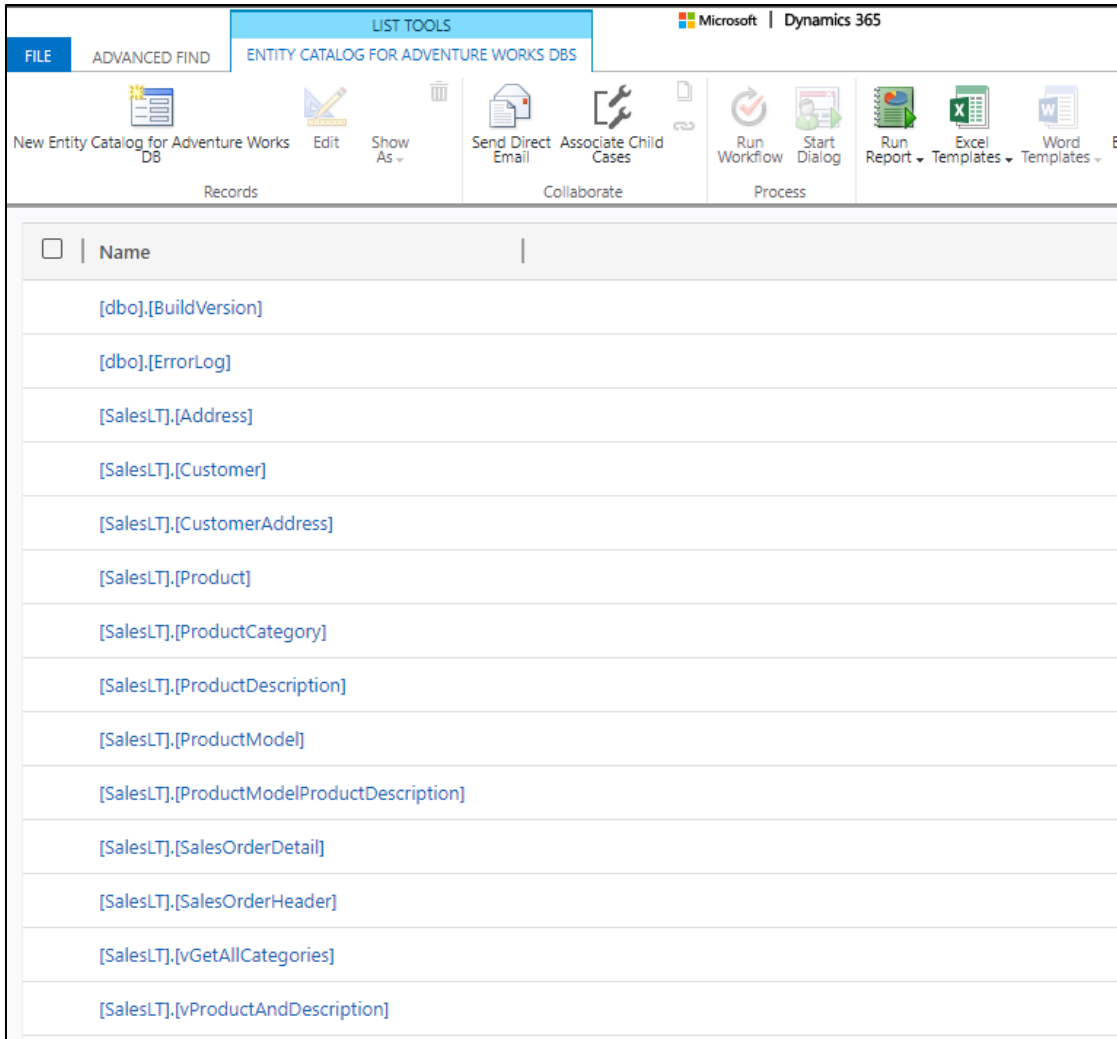
9. Find the **Entity Catalog** for your respective data connection and select the **Results** button to see all the external data source tables.

10. You can now **create a virtual table** by selecting any record from the entity catalog record and setting the Create or Refresh Entity field to "Yes".

    Set the **Primary Field** for the virtual table by select the appropriate column name listed. The drop-down lists all the columns that are of datatype string (nvarchar) that are eligible to be used as the primary field for the virtual table.
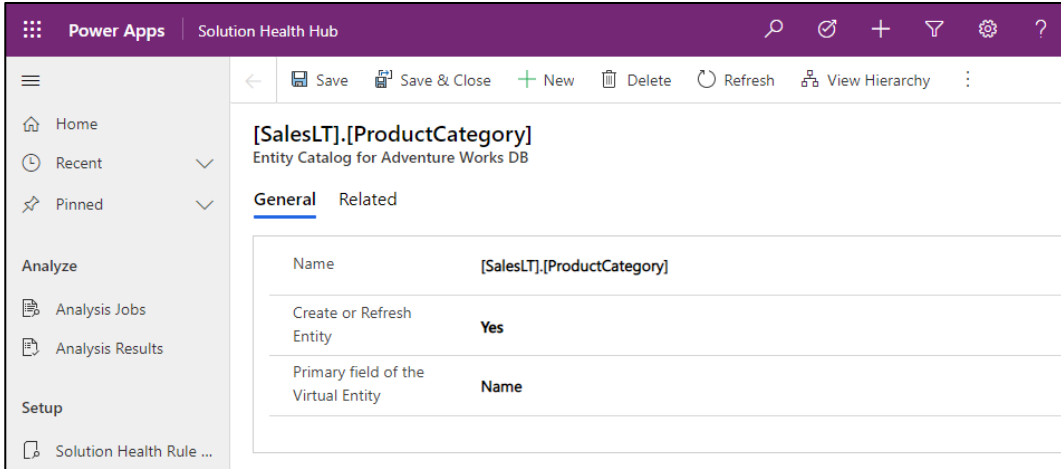
Saving the record creates the virtual table. You can go back to **Advanced Find** and select the virtual table to retrieve all records.

Bulk creation of virtual tables is not supported currently. Even though the Entity Catalog allows you to select multiple entities.
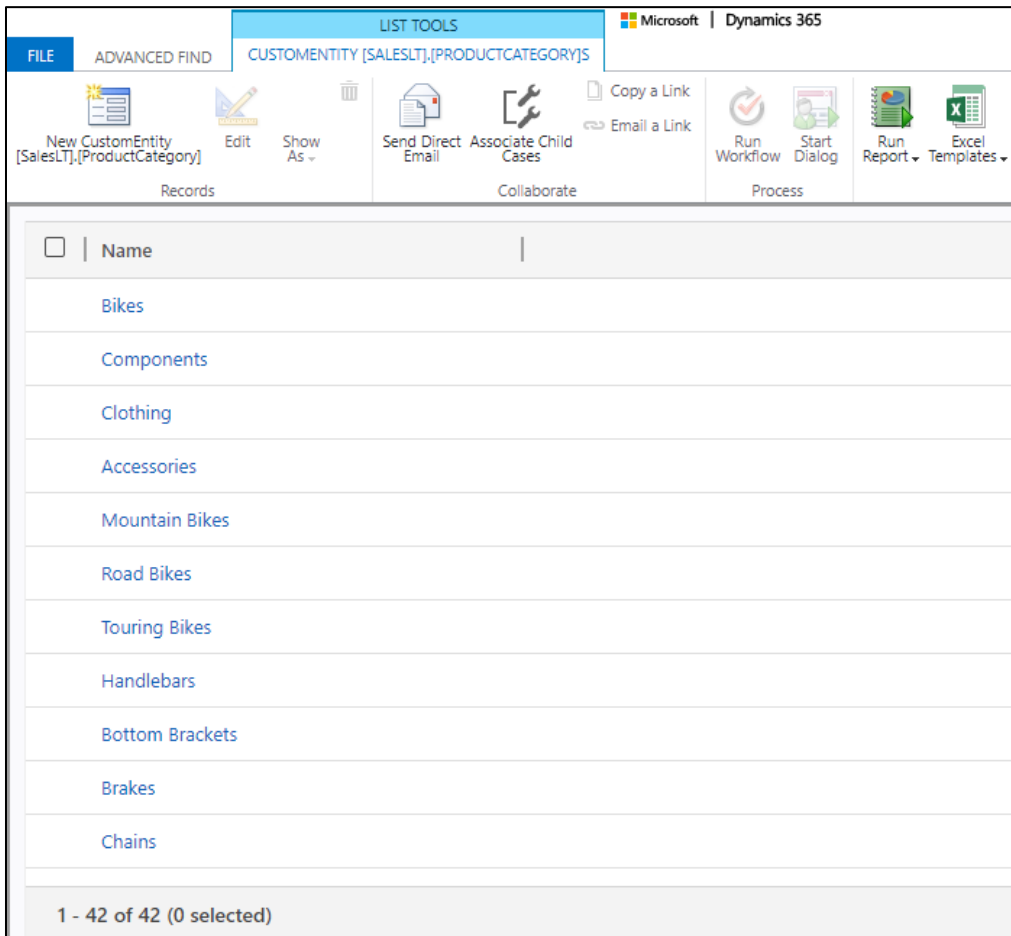
> ⓘ **Important**
>
> Virtual tables are no longer required to have an associated GUID as a primary key with the virtual connector provider. The provider automatically maps the primary key associated with the external data source when creating the virtual table. All CRUD operations can be performed on the generated virtual table.

11. All fields in the external data are automatically mapped to Dataverse types. You can review the virtual table details and make changes by navigating to **Settings -> Customization – Entities** view.

Once you have created a virtual table, you can work with it in much the same way as any other table. You can start defining the relationships with other tables in the environment and use them in your Power Apps, and Power Automate flows.

Known Issues
- Quick Create form is not automatically created for virtual tables. You will have to either create a new form or edit one of the default forms to validate create operation.

Tips
- Primary Key field should be included in a create form if you did not setup to field to automatically increment during the design of the underlying table. You will have to enter a valid value in the primary key field for an insert operation to be successful.
- If entity catalog creation is taking a long time, you can check the associated job completion by going to **Settings -> System - > System Jobs.**

Feedback

We would love to hear your feedback or answer any questions you might have when working with the Virtual Connector Provider. Please email us at CDSConnector@microsoft.com

Preview disclaimer

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