

Microsoft Dataverse documentation

Securely store and manage data that's used by Power Apps business applications.

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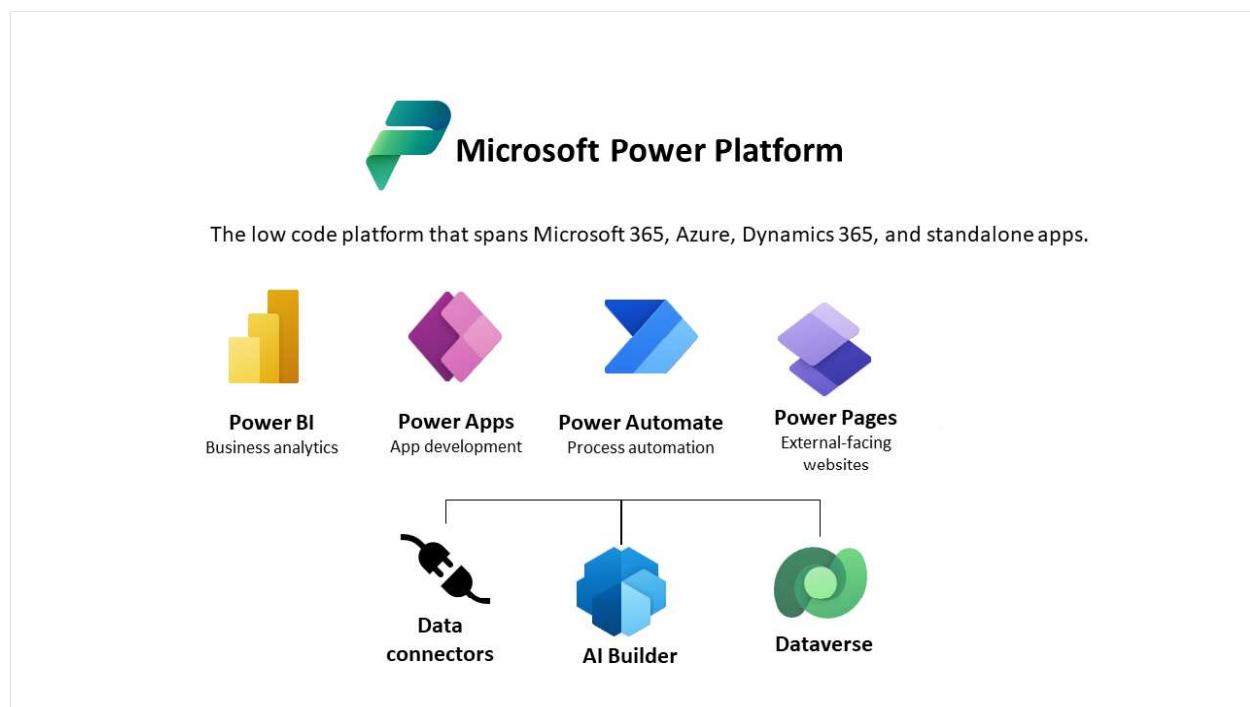
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What is Microsoft Dataverse?

Article • 06/13/2024

Dataverse lets you securely store and manage data that's used by business applications. Data within Dataverse is stored within a set of tables. A *table* is a set of rows (formerly referred to as records) and columns (formerly referred to as fields/attributes). Each column in the table is designed to store a certain type of data, for example, name, age, salary, and so on. Dataverse includes a base set of standard tables that cover typical scenarios, but you can also create custom tables specific to your organization and populate them with data by using Power Query. App makers can then use Power Apps to build rich applications that use this data.



For information about purchasing a plan to use Dataverse, go to [Pricing info](#).

Why use Dataverse?

Standard and custom tables within Dataverse provide a secure and cloud-based storage option for your data. Tables let you create a business-focused definition of your organization's data for use within apps. If you're not sure whether tables are your best option, consider these benefits:

- **Easy to manage** – Both the metadata and data are stored in the cloud. You don't need to worry about the details of how they're stored.
- **Easy to secure** – Data is securely stored so that users can see it only if you grant them access. Role-based security allows you to control access to tables for

Why choose Microsoft Dataverse?

Article • 04/11/2023

Data is at the center of everything a business does today and powers the insights that can drive what it should do tomorrow. To thrive and grow, businesses need to capture, analyze, predict, present, and report data and do it all with a high level of agility.

Building out the data infrastructure to enable business insight can be both time consuming and expensive. The data originates from a variety of devices, applications, systems, services, and software as a service (SaaS). This large and growing number of sources often consists of multiple data technologies that store different types of data, expose different APIs, and use a mixture of security models. The developers needed to create these technologies can be expensive and hard to find. Developers often must have a deep understanding of how to deploy, configure, manage, and integrate these different data technologies.

Dataverse addresses these concerns with an easy to use, easy to manage, compliant, secure, scalable, and globally available SaaS data service. Dataverse empowers organizations to work with any type of data and any type of app, and use the data within it to gain insights and drive business action.

As part of Microsoft Power Platform, Dataverse requires no or little code to be written, so it can easily be used by everyone from knowledge workers to professional developers.

Knowing that it's built on Azure, organizations choosing Dataverse can be confident that it's globally available, compliant, scalable, and secure.

Work with any type of data

Dataverse is designed to work with any type of data and incorporates all the major categories of data technologies that your organization needs—relational, non-relational, file, image, search, and data lake.

Dataverse includes a set of visual designers to create, edit, and interact with data. This makes it easy to quickly define the tables, relationships, business rules, forms, and workflows that represent your business.

With the easy-to-configure integration features built into Dataverse, deep integration with Microsoft's cloud services such as Azure, Dynamics 365, and Microsoft 365—plus access to many connectors in Power Automate and Azure Logic Apps—Dataverse can

Work with any data

Article • 03/02/2023

Microsoft Dataverse provides an abstraction that makes it possible to work with any type of data, including relational, non-relational, image, file, relative search, or data lake. There is no need to understand the type of data as Dataverse exposes a set of data types that allow you to build up your model. The type of storage is optimized for the data type chosen.

Data can be easily imported and exported with dataflows, Power Query, and Azure Data Factory. Dynamics customers can also use the Data Export Service.

Dataverse also has a connector for Power Automate and Azure Logic Apps that can be used with the hundreds of other connectors in those services for on-premises, infrastructure as a service (IaaS), platform as a service (PaaS), or software as a service (SaaS) services. This includes sources in Azure, Microsoft 365, Dynamics 365, SAP ERP, Salesforce, Amazon Redshift, Access, Excel, text/CSV, SharePoint lists, SQL Server databases, Oracle, MySQL, PostgreSQL, Blockchain, and Azure Synapse Analytics.

Common Data Model

If you've ever had to bring data from multiple systems and apps together, you know what an expensive and time-consuming task that can be. Without being able to share and understand the same data easily, each app or data integration project requires a custom implementation.

Common Data Model provides reference architecture that's intended to streamline this process by providing a shared data language for business and analytical apps to use. The Common Data Model metadata system makes it possible for data and its meaning to be shared across apps and business processes such as Power Apps, Power BI, Dynamics 365, and Azure.

Common Data Model includes a set of standardized, extensible data schemas that Microsoft and its partners have published. This collection of predefined schemas includes tables, attributes, semantic metadata, and relationships. The schemas represent commonly used concepts and activities, such as **Account** and **Campaign**, to simplify the creation, aggregation, and analysis of data.

The Common Data Model schemas can be used to inform the creation of tables in Dataverse. The resulting tables will then be compatible with apps and analytics that target this Common Data Model definition.

Importing and exporting data from Dataverse

Article • 08/06/2024

Microsoft Dataverse is a SaaS data platform that helps you easily create and manage your data, events, and logic and generate analytics** and insights to support interconnected apps built on the Dataverse platform. Apps include first-party apps such as Dynamics 365 Sales, Service, Marketing, Customer Insights, Customer Journey Orchestration, as well as custom third-party apps and processes, all of which operate in a secure and compliant manner. Dataverse, being a hyperscale polyglot storage, can store any type of data (relational, file, observational, and so on) for all your transactional and analytical applications. For this reason, it's the data platform for all Power Platform products and Dynamics 365 applications. Dataverse is a critical element of Microsoft Power Platform, supporting all the data, events, analytics, and related processing, in addition to generating insights for citizen app makers and professional developers to build, store, and manage data for their applications.



Data required by apps and processes doesn't often originate from or reside within Dataverse. Mashing up external data with Dataverse is an essential component in building apps, adding data to existing apps, and creating valuable insights. With the proliferation of big data and the ever-multiplying types of data sources, such as AI, ML, IoT, web commerce, web API, services, ERP, and line of business apps require Dataverse customers to be agile with using this variety of data.

Work with any type of app

Article • 06/21/2022

Microsoft Dataverse provides multiple ways to integrate in any type of app (mobile, web, desktop), device, system, or service. For cloud solutions, there are ways to integrate regardless of the model in which your solution is deployed—infrastructure as a service (IaaS), platform as a service (PaaS), or software as a service (SaaS). For IaaS-based solutions, the integration approach also works well if solutions are running inside of containers.

In some cases, integration with an app can be achieved by using business logic contained in Dataverse. In other cases, it will involve integration via events, the Dataverse OData API, or using plug-ins.

Defining business logic

Tables in Dataverse can use rich server-side logic and validation to ensure data quality and reduce repetitive code in each app that creates and uses data in a table.

- **Business rules:** Validate data across multiple columns and tables, and provide warning and error messages, regardless of the app used to create the data. More information: [Create a business rule for a table](#)
- **Business process flows:** Guide users to ensure that they enter data consistently and follow the same steps every time. Business process flows are currently only supported for model-driven apps. More information: [Business processes flows overview](#)
- **Workflows:** Automate business processes without user interaction. More information: [Classic Dataverse workflows](#)
- **Business logic with code:** Supports advanced developer scenarios to extend the app directly through code. More information: [Apply business logic using code](#)

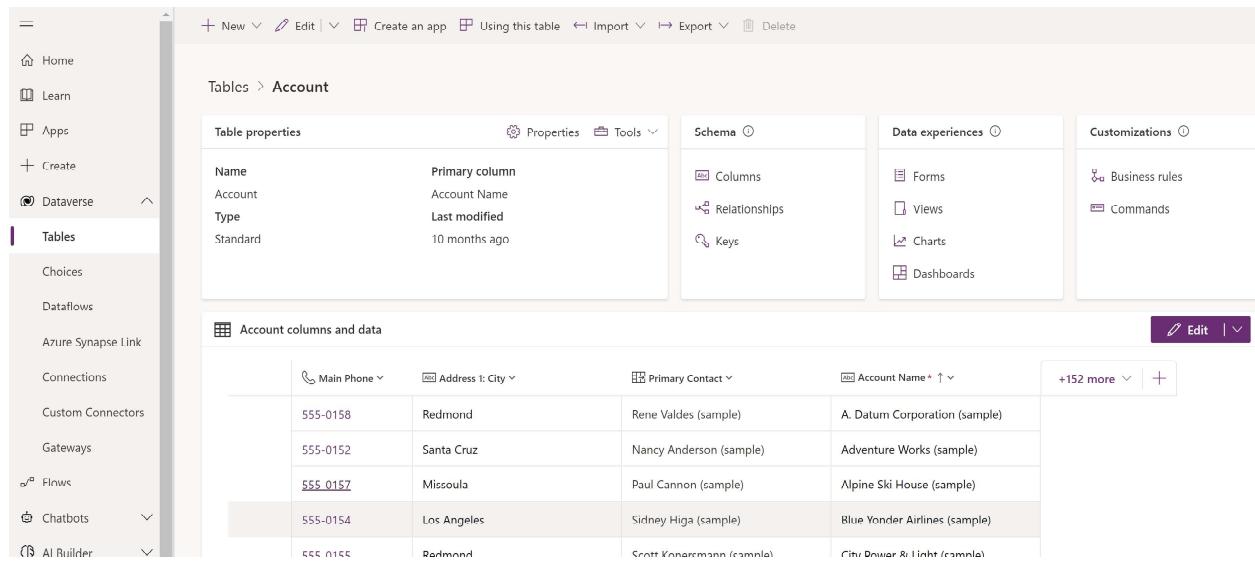
Integrating with apps by using events

A common approach of app integration is through the use of events. For example, an event such as adding a new row occurs in Dataverse, and this should be communicated to an associated system so that an action can be taken. For example, if a new support request was raised, it might trigger an SMS message to be sent to the assigned support staff.

Tables in Dataverse

Article • 06/22/2022

Tables are used to model and manage business data. When you develop an app, you can use standard tables, custom tables, or both. Microsoft Dataverse provides standard tables by default. These are designed, in accordance with best practices, to capture the most common concepts and scenarios within an organization.



The screenshot shows the Microsoft Dataverse interface for managing tables. On the left, there's a navigation sidebar with options like Home, Learn, Apps, Create, and a main category 'Tables' which is currently selected. Under Tables, there are sub-options: Choices, Dataflows, Azure Synapse Link, Connections, Custom Connectors, Gateways, Flows, Chatbots, and AI Builder. The main content area is titled 'Tables > Account'. At the top of this area, there are several action buttons: '+ New', 'Edit', 'Create an app', 'Using this table', 'Import', 'Export', and 'Delete'. Below these buttons, there are four tabs: 'Table properties', 'Schema', 'Data experiences', and 'Customizations'. The 'Table properties' tab is active, showing details about the 'Account' table: Name (Account), Primary column (Account Name), Type (Standard), and Last modified (10 months ago). The 'Schema' tab shows columns (Main Phone, Address 1: City, Primary Contact, Account Name), relationships, and keys. The 'Data experiences' tab includes sections for Forms, Views, Charts, and Dashboards. The 'Customizations' tab includes Business rules and Commands. The bottom section of the interface is a data grid titled 'Account columns and data'. It displays a list of account records with columns for Main Phone, Address 1: City, Primary Contact, and Account Name. The data includes entries like '555-0158' (Redmond, Rene Valdes (sample), A. Datum Corporation (sample)), '555-0152' (Santa Cruz, Nancy Anderson (sample), Adventure Works (sample)), '555-0157' (Missoula, Paul Cannon (sample), Alpine Ski House (sample)), '555-0154' (Los Angeles, Sidney Higa (sample), Blue Yonder Airlines (sample)), and '555-0155' (Redmond, Scott Kanarekman (sample), City Dwellers Right (sample)). There are buttons for 'Edit' and 'More' at the top right of the data grid.

See also

[Types of tables](#)

[Create a custom table](#)

Tables and metadata in Microsoft Dataverse

Article • 10/03/2024

Microsoft Dataverse is designed so that you can quickly and easily create a data model for your application. Normally, you shouldn't have to concern yourself with some of the details about metadata that this article introduces. But if you want to develop a deeper understanding about how apps that use Dataverse work or you're evaluating what is possible, understanding the metadata used by Dataverse can provide you with insight.

Metadata means data about data. Dataverse provides a flexible platform for you because it's relatively easy to edit the definitions of the data that the environment will use. In Dataverse, the metadata is a collection of tables. Tables describe the kinds of data stored in the database. Table metadata is what controls the kinds of records you can create and what kind of actions can be performed on them. When you use the customization tools to create or edit tables, columns, and table relationships, you're editing this metadata.

Different clients people use to interact with the data in your environment depend on the table metadata and adapt as you customize the metadata. But these clients also depend on other data to control what visual elements to display, any custom logic to apply, and how to apply security. This system data is also stored within tables but the tables themselves aren't available for customization.

You can learn about standard tables, attributes, and table relationships included by default in Dataverse by reviewing the [entity reference](#).

💡 Tip

The designers available to edit metadata don't show all the details found in the metadata. You can install a model-driven app called the **Metadata Browser**, which will allow you to view all the tables and metadata properties that are found in the system. More information: [Browse table definitions in your environment](#).

Create new metadata or use existing metadata?

Dataverse comes with standard tables that support core business application capabilities. For example, data about your customers or potential customers is intended to be stored using the account or contact tables.

Types of tables

Article • 06/18/2024

A table defines information that you want to track in the form of rows (records), which typically include column data such as company name, location, products, email, phone, and so on.

Tables appear in Power Apps as one of these different types:

- **Standard:** Several standard tables, also known as out-of-box tables, are included with a Power Platform environment that includes Microsoft Dataverse. Account, business unit, contact, task, and user tables are examples of standard tables in Dataverse. Most of the standard tables included with Dataverse can be customized. Tables that are imported as part of a managed solution and set as customizable also appear as standard tables. Any user with appropriate privileges can customize these tables where the table property has customizable set to true.
- **Activity:** Are a special kind of table and are best for rows that have an activity-based element, which can include a subject, start time, stop time, due date, and duration. Dataverse already comes with several out-of-the-box activity tables, such as appointment, task, email, and phone call. More information: [Activity tables](#)
- **Virtual:** Are when you need the table to be populated with data from an external source outside of Dataverse.
- **Elastic:** Are for when the table will store a very large dataset in excess of tens of millions of rows.

Activity tables

An activity can be thought of as any action for which an entry can be made on a calendar. An activity has time dimensions (start time, stop time, due date, and duration) that help determine when the action occurred or will occur. Activities also contain data that helps determine what action the activity represents, for example, subject and description. An activity can be opened, canceled, or completed. The completed status of an activity will have several sub-status values associated with it to clarify the way that the activity was completed.

Activity tables are a special kind of table that can only be owned by a user or team, but can't be owned by an organization. When you create a table, you can specify it as a standard or activity table.

The following table lists activity tables that are available in a default environment.

Create and edit tables using Power Apps

Article • 01/21/2025

Tables are used to model and manage business data. When you develop an app, you can use standard tables, custom tables, or both. Power Apps provides an easy way to view, create, and edit tables for Microsoft Dataverse.

Prerequisites

To create and edit tables in Dataverse, you need the following:

- A Power Platform environment with Dataverse.
- Appropriate permission with either of the following privileges:
 - The system customizer security role in the environment. Users with the system customizer security role can create tables and have access to view and edit standard and custom tables. Apart from self-created table records, the system customizer role doesn't have the privileges to access table records that aren't shared with them. More information: [Environments with a Dataverse database](#).
 - The environment maker security role with a custom security role that has Create, Read, and Write privileges to the [Entity](#) table. These privileges allow the environment maker to create and edit tables in Dataverse, however a Power Platform admin must grant them data access to these tables.

View tables

Sign into [Power Apps](#), and then select **Tables** on the left navigation pane. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.

Filter the tables that are displayed using the following tabs:

 [Expand table](#)

View	Description
Recommended	Displays only the standard tables. Standard tables are tables included with Power Apps or Dynamics 365 apps.
Custom	Displays only custom tables. Custom tables are created by you and other app makers.
All	Displays all the tables.

Create a custom table that has components in Power Apps

Article • 04/12/2024

With Power Apps, you tailor your app to closely fit your organization's industry, nomenclature, and unique business processes. Power Apps app development includes adding standard "out-of-box" tables or creating custom tables. A table defines the information you want to track in the form of records, which typically include properties such as company name, location, products, email, and phone.

In this article you create a table and then add or customize key components such as columns, relationships, views, and forms. You learn how to:

- Create a custom table.
- Add custom columns to your table.
- Add a table relationship.
- Customize a view.
- Customize a form.

The article will follow the company, Contoso, which is a pet grooming business that grooms dogs and cats. Contoso needs an app for client and pet tracking that can be used by employees across a variety of devices.

Prerequisites

Sign in to [Power Apps](#). If you don't already have a Power Apps account, select the **Get started free** link from [powerapps.com](#).

Create a custom table

1. On the left navigation pane select **Tables**. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. On the command bar select **New table > Set advanced properties**.
3. In the right pane, enter the following values, and then select **Create**.
 - **Display name:** *Pet*
 - **Description:** *Custom table to track pet services*

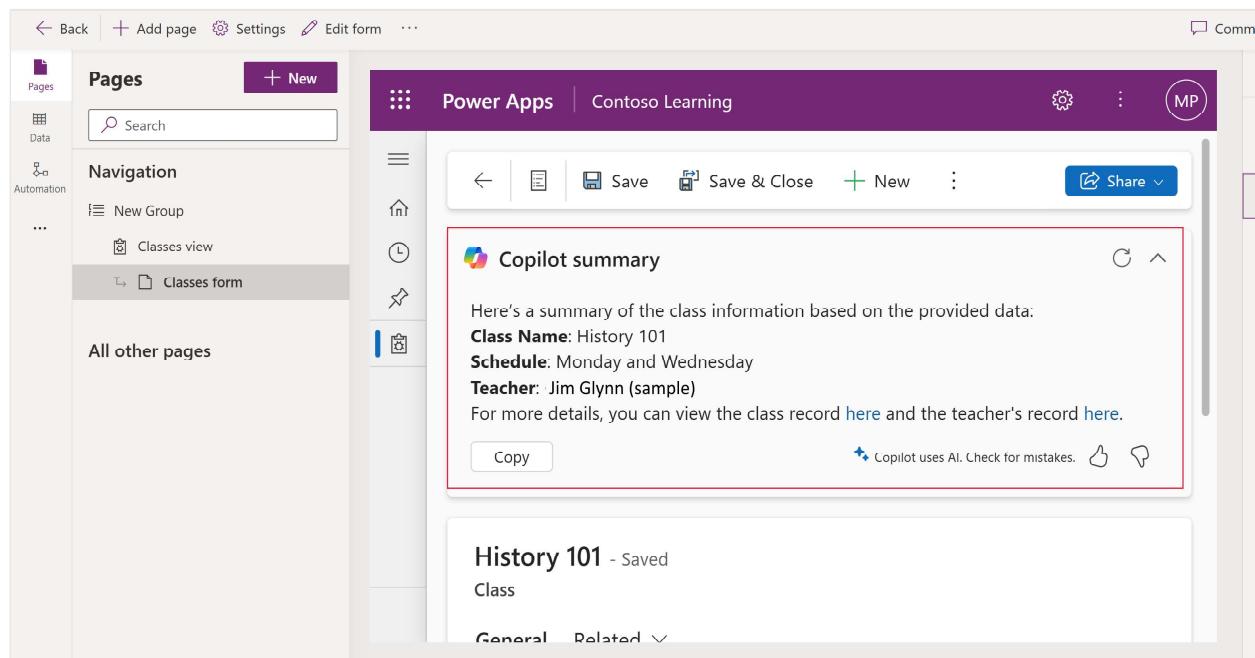
Configure a row summary for a model-driven app main form (preview)

Article • 01/06/2025

[This topic is pre-release documentation and is subject to change.]

Write a custom prompt to specify columns that you want to be included in a summary generated by Copilot that appears above a form in a model-driven app. Forms can contain dozens and dozens of columns scattered throughout a handful of tabs, and sections, all of which make it time consuming for a user to parse the information.

The collapsible summary bar at the top of a model-driven app form can be customized by makers to give users the most important information at-a-glance in table rows (records). When generated, the row summary can also include hyperlinks to related information, making it easy to copy-and-paste summaries to colleagues using tools like Microsoft Teams.



Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Import data from Excel and export data to CSV

Article • 08/07/2024

To get (import) data into Microsoft Dataverse tables, use an Excel worksheet file or a comma-separated values (CSV) file.

When you export Dataverse table data, it's exported as a CSV file.

Import from an Excel or CSV file

There are two ways to import data from Excel.

- [Option 1: Import by creating and modifying a file template](#)
- [Option 2: Import by bringing your own source file](#)

Important

- To import or export data, you must have the **Environment Maker** security role.
- Import from Excel or CSV file using the **Import > Import data from Excel** command isn't available in GCC, GCC High, and DoD environments. To work around this limitation, from the **Tables** area in Power Apps select **Import > Import data**, and then choose a data source, such as **Excel workbook** or **Text/CSV**.

Option 1: Import by creating and modifying a file template

Every table has required columns that must exist in your input file. We recommend that you create a template. To do this, export data from the table. Then, use the same file and modify it with your data. Finally, import the modified file back into the table. Using a template can save you time because you won't have to specify the required columns for each table.

Prepare the file template

1. [Export the table data](#).

Create and use dataflows in Power Apps

Article • 04/21/2025

With advanced data preparation available in Power Apps, you can create a collection of data called a dataflow, which you can then use to connect with business data from various sources, clean the data, transform it, and then load it to Microsoft Dataverse or your organization's Azure Data Lake Gen2 storage account.

A dataflow is a collection of tables that are created and managed in environments in the Power Apps service. You can add and edit tables in your dataflow, as well as manage data refresh schedules, directly from the environment in which your dataflow was created.

Once you create a dataflow in the Power Apps portal, you can get data from it using the Dataverse connector or Power BI Desktop Dataflow connector, depending on which destination you chose when creating the dataflow.

There are three primary steps to using a dataflow:

1. Author the dataflow in the Power Apps portal. You select the destination to load the output data to, the source to get the data from, and the Power Query steps to transform the data using Microsoft tools that are designed to make doing so straightforward.
2. Schedule dataflow runs. This is the frequency in which the Power Platform Dataflow should refresh the data that your dataflow will load and transform.
3. Use the data you loaded to the destination storage. You can build apps, flows, Power BI reports, and dashboards or connect directly to the dataflow's Common Data Model folder in your organization's lake using Azure data services like Azure Data Factory, Azure Databricks or any other service that supports the Common Data Model folder standard.

The following sections look at each of these steps so you can become familiar with the tools provided to complete each step.

Create a dataflow

Dataflows are created in one environment. Therefore, you'll only be able to see and manage them from that environment. In addition, individuals who want to get data from your dataflow must have access to the environment in which you created it.

Note

Creating dataflows is currently not available with Power Apps Developer Plan licenses.

Dataverse long term data retention overview

Article • 04/08/2025

Microsoft Dataverse supports custom retention policies to securely retain unlimited data long term in a cost-efficient way. While Dataverse can support your business growth with no limit on active data, you might want to consider moving inactive data to the Dataverse long term retention store.

Important

The Power Platform environment where the retention policy resides must be a [Managed Environment](#). This also applies to Dynamics 365 customers who will be required to upgrade to a Managed Environment if the environment isn't already a Managed Environment.

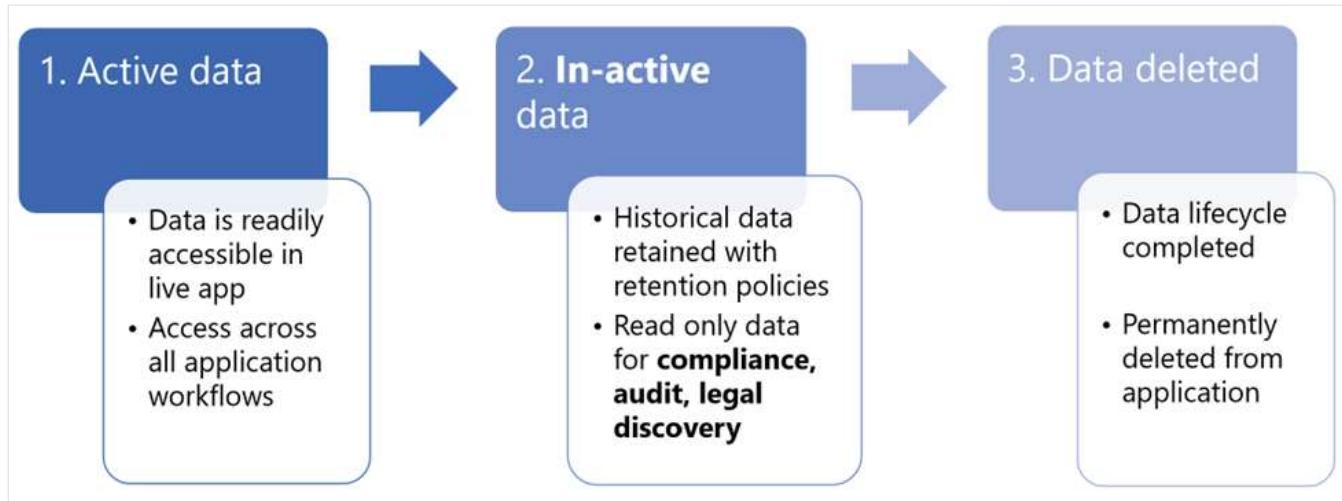
Customers who don't meet this requirement can continue to create data retention policies, but the policies are disabled.

Watch this video to learn about Dataverse long term data retention.

[https://learn-video.azurefd.net/vod/player?id=c34fea68-46b2-4486-b9c1-a3ef9d01b4f9&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fdata-retention-overview ↗](https://learn-video.azurefd.net/vod/player?id=c34fea68-46b2-4486-b9c1-a3ef9d01b4f9&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fdata-retention-overview)

Business application data lifecycle

Consider the business application data lifecycle in three stages. First active data, which over time transitions to inactive data, and finally transitions to deleted data.



Set a data retention policy for a table

Article • 05/10/2024

This article explains how to set up a data retention policy for a Microsoft Dataverse table.

Prerequisites

These prerequisites must be completed before you can set a table for long term data retention:

- [Enable a table for long term retention](#)
- [Determine Dataverse views for policy criteria](#)

Enable a table for long term retention

Before you set up a retention policy, enable the parent (root) table for long term retention.

Note

When a parent (root) table is enabled for long term retention, all the related child tables are automatically enabled. You can't disable retention for a child table when the parent table is already enabled for retention. For example, assume a custom table and notes table are child tables of the case table. These child tables can't be disabled for retention when the parent case table is enabled. A maker can always disable the parent table for long term retention and separately enable the child tables for retention. However, there's an exception to this related child tables behavior when long term retention is enabled through a solution import process. In this case, the related child tables aren't automatically enabled.

1. Sign into [Power Apps](#), go to **Tables**, and then open the table you want. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Select **Properties** on the command bar, expand **Advanced options**, and then select [Enable long term retention](#).

Manage data retention policies

Article • 02/29/2024

Use the retention policies dashboard to view and manage retention policies. From the dashboard, view the policy run history, update policy details, deactivate, and delete a policy.

View and manage retention policies

1. Sign into [Power Apps](#), and then on the left navigation pane select **Retention policies**. If the item isn't in the side panel pane, select ...[More](#) and then select the item you want.
2. Select a retention policy from the list, and then on the command bar select **Policy details**.
3. The following retention policy actions are available:
 - **History.** Displays the retention [policy run status](#), run start, run end and table. For every run, you can view all tables (root and child tables) and the number of rows retained in the run.
 - **Policy details.** Displays the properties for the policy where you can view and edit the policy name, criteria, and frequency.
 - **Deactivate.** Stops the retention policy from running by disabling the policy schedule. To activate a deactivated policy, select **Policy details**, set the policy **Schedule**, and then select **Update**.
 - **Delete.** Removes the policy.

The screenshot shows the Power Apps Retention Policies dashboard. The left sidebar has a 'Retention Policies' section selected. The main area displays 'Run details' for a policy named 'Resolved Cases in EastR1'. The run started on 05/05/2023 at 11:34:07 AM and ended on 05/08/2023 at 1:00:37 PM, with a status of 'Succeeded'. Below this, a table titled 'Tables in the last run' shows the following data:

Table	Type	Retained	Failed
Case	Root	8	0
postregarding	Child	8	0
postrole	Child	24	0
Phone To Case Process	Child	8	0
Post	Child	8	0
Total records archived in last run		56	0

View long term retained data

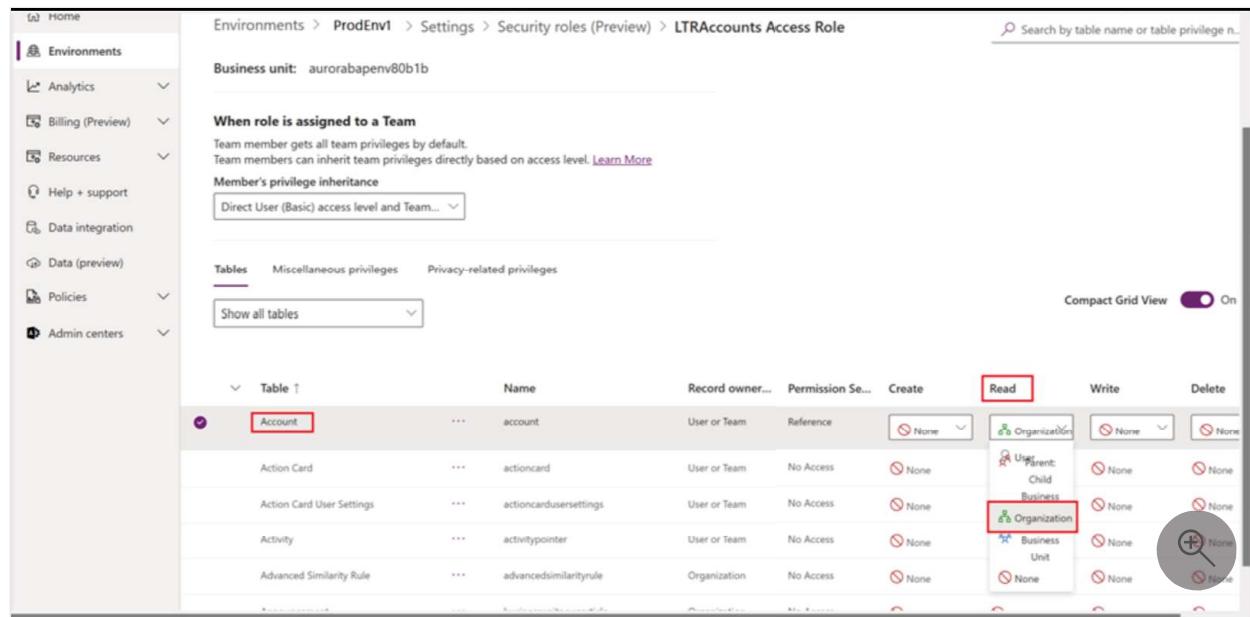
Article • 06/27/2024

You can view retained data from an advanced find query or by creating a Power Automate flow.

To view retained data in an environment requires the system administrator security role or other security role membership that includes organization scope read privileges to the table.

Grant privileges to view retained data

Imagine an auditor requires access to long term data retained for the accounts table. To provide the auditor access, a Power Platform admin creates a new role, for example a role named *LTRAccounts Access Role* and grants organization scope read privilege to the accounts table. Then add the auditor's Power Platform user account to the security role. When the auditor's job is complete, it's a best practice to remove the auditor from the security role.



The screenshot shows the Microsoft Dataverse Security Roles (Preview) interface. On the left, there's a navigation sidebar with options like Home, Environments, Analytics, Billing (Preview), Resources, Help + support, Data integration, Data (preview), Policies, and Admin centers. The main area shows the path: Environments > ProdEnv1 > Settings > Security roles (Preview) > LTRAccounts Access Role. The Business unit is listed as aurorabapenv80b1b. Under 'When role is assigned to a Team', it says 'Team member gets all team privileges by default.' and 'Team members can inherit team privileges directly based on access level.' There's a 'Member's privilege inheritance' dropdown set to 'Direct User (Basic) access level and Team...'. Below this, there are tabs for 'Tables', 'Miscellaneous privileges', and 'Privacy-related privileges', with 'Tables' being the active tab. A search bar at the top right says 'Search by table name or table privilege n...'. The 'Tables' section lists several tables: Account, Action Card, Action Card User Settings, Activity, and Advanced Similarity Rule. For each table, columns show the table name, Record owner..., Permission Set..., Create, Read, Write, and Delete. The 'Read' column for the 'Account' table is highlighted with a red border. The 'Organization' icon in the 'Read' column for the 'Account' table is also highlighted with a red border. The 'Compact Grid View' toggle switch is turned on. At the bottom right of the table list, there's a circular button with a magnifying glass icon.

For more information about creating and editing Dataverse security roles, go to [Create or edit a security role to manage access](#).

View retained data using edit filters from a model-driven app

 Note

Dataverse long term data retention FAQ

FAQ

This article provides information on frequently asked questions about long term data retention with Microsoft Dataverse.

Can a data retention policy be set only on a particular table and not the related tables?

No. Admins can set up a retention policy on a root table, such as the Dynamics 365 apps accounts table. Dataverse automatically sets all related child tables for data retention. So if the account row has related task rows, all task rows are also set for data retention. Admins can always set up a retention policy on a specific table with no related tables.

What about my existing custom Dataverse native delete action logic to ensure business rules are followed when any live data is deleted?

All custom logic with Dataverse native delete actions are always honored during the data retention process.

Why can't I view some data in a table while a particular policy is being executed in the background that was a part of the policy criteria?

Until all records are purged, records are available for viewing. Retention is a multi-step process that includes reconciliation to confirm that all the records within the criteria are retained for long-term before delete from Dataverse. We recommend that you set up long term retention only for nonactive records, or records that aren't actively required for your business operations.

Create and edit virtual tables that contain data from an external data source

Article • 10/21/2022

A virtual table is a custom table in Microsoft Dataverse that has columns containing data from an external data source. Virtual tables appear in your app to users as regular table rows, but contain data that is sourced from an external database, such as an Azure SQL Database. Rows based on virtual tables are available in all clients including custom clients developed using the Dataverse web services.

In the past, to integrate the disparate data sources you would need to create a connector to move data or develop a custom plug-in, either client or server-side. However, with virtual tables you can connect directly with an external data source at runtime so that specific data from the external data source is available in an environment, without the need for data replication.

Virtual tables are made up of three main components, a *data provider*, a *data source row*, and a *virtual table*. The data provider consists of plug-ins and a data source table. The data source is a table row in Dataverse, which includes metadata that represents the schema of the connection parameters. Each virtual table references a data source in the table definition.

Dataverse includes an OData Data Provider that you can use to connect with an OData v4 web service that accesses the external data.

Alternatively, developers can build their own data providers. Data providers are installed in an environment as a solution. More Information: [Developer Documentation: Get started with virtual tables](#)

Virtual table benefits

- Developers can implement plugins to read, update or delete external data using the Dataverse web services and Plug-in Registration tool.
- System customizers use Power Apps solution explorer to configure the data source row and create virtual tables that are used to access external data without writing any code.
- End users work with the rows created by the virtual table to view the data in columns, grids, search results, and Fetch XML-based reports and dashboards.

OData v4 Data Provider configuration, requirements, and best practices

Article • 06/21/2022

This topic describes how to configure the OData v4 Data Provider as well as the requirements and recommended best practices for using the OData v4 data provider to connect with an OData v4 web service.

OData v4 data provider best practices

- Microsoft Dataverse requires that all tables have an ID attribute, this ID is known as a unique identifier and the value must be a guid. You can only map ID columns to external columns with the `Edm.Guid` data type. You can't map an `Edm.Int32` data type to a Unique Identifier data type column in Dataverse.
- OData tables with nullable properties must be set to match the mapped column in the virtual table. For example, an OData table property with `Nullable=False` must have the mapped column in Dataverse **Field Requirement** attribute set to **Business Required**.
- For retrieve multiple queries, such as when you load data in to a grid, control the size of the dataset returned from the external data source by using the select and filter query parameters.
- If not already enabled, system administrators should enable plug-in tracing. Once enabled, all errors from the OData endpoint are captured in the plug-in trace log. More information: [Administrator Guide: System Settings dialog box - Customization tab](#)
- You can't use the OData v4 Data Provider to connect to another environment.

Data type mapping

The following table lists the OData table Data Model (EDM) data type mappings with Dataverse data types.

OData Data Type	Dataverse Data Type
<code>Edm.Boolean</code>	Two Options
<code>Edm.DateTime</code>	Date and Time
<code>Edm.DateTimeOffset</code>	Date and Time

Create virtual tables using the virtual connector provider

Article • 02/10/2025

Virtual tables enable integrating data from external data sources by seamlessly representing that data as tables in Microsoft Dataverse, without data replication. Solutions, apps, flows, and more can use virtual tables as if they were native Dataverse tables. Virtual tables allow for full create, read, update, and delete privileges unless the data source they're connecting to specifically forbids it. More information about virtual tables: [Create and edit virtual tables that contain data from an external data source](#).

This document covers the new experience using Power Apps (make.powerapps.com) to create virtual tables using the following virtual connector providers:

- SQL Server
- Microsoft SharePoint
- Microsoft Fabric. More information: [Build apps and automations drive action with insights from Microsoft Fabric](#)
- Salesforce (preview)
- Oracle (preview)
- Snowflake (preview)
- PostgreSQL

Except for the Excel connector provider, all virtual connector providers use a Power Platform connector. More information: [Connector reference for virtual connector providers used with virtual tables](#)

You can create a virtual table for Excel using the virtual connector provider by following the legacy process. More information: [Create the virtual table for Microsoft Excel](#)

Overview

Virtual tables include the following components:



Setting up a virtual table relationship

Article • 01/04/2023

Virtual tables are enabled for relationships. You can set up 1:N, N:1, and custom multi-table (polymorphic) relationships. Relationships can be established between:

- Local tables in Dataverse and virtual tables.
- Virtual tables and other virtual tables from the same provider, for example SQL->SQL.

For instance, you can't set up a relationship between a virtual table created using the OData virtual table provider and a virtual table created using the virtual connector provider.

Defining relationships in virtual tables

Virtual tables created using the virtual connector provider automatically creates all the columns that are represented in the external source table. This will also include columns on which relationships are defined. However, the relationship definition won't be automatically created. You'll have to define this relationship in Dataverse manually.

The following example creates an N:1 relationship between a virtual table (**Service Request**) and a native table (**Account**). The column used to set up the relationship is **AccountId**. This column is the primary key in the account table and is a foreign key in the service request table.

A representation of the **Service Request** virtual table is shown below. You'll notice that the **AccountId** column, which is the column used for relationship in the external source, is of type **Multiple Line of Text**. You need to have this column represented as a **Lookup** type to create a relationship.

Name	Schema Name	Type	Field Type	State	Field Security	Audit Status	Customizable	
new_accountid	new_AccountId	Accountid	Multiple Line of Text	Simple	Unmanaged	Disabled	Enabled	True
new_dbo_servicerequest	new_dbo_servicerequest	Custom Entity	Primary Key	Simple	Unmanaged	Non Applicable	Non Applicable	True
new_description	new_Description	Description	Single Line of Text	Simple	Unmanaged	Non Applicable	Enabled	True
new_severity	new_Severity	Severity	Whole Number	Simple	Unmanaged	Disabled	Enabled	True

1. Go to **Advanced settings > Settings > Customization** and choose **Customize the System**.

Known limitations and troubleshooting with virtual tables

Article • 11/22/2024

This article describes the known limitations and troubleshooting tips when working with virtual tables in Microsoft Dataverse.

The following is a list of known limitations for virtual tables created using the virtual connector provider.

General limitations

- The table or list used must include at least one string field to be used as the primary field, and one GUID field. Without these string fields, the virtual table can't be created and an error is generated during the table details retrieval stage.
 - SharePoint uses the hidden numeric ID field present in all lists
 - SQL can use a GUID or integer field
 - Excel must have a GUID field
- Dataverse can only create columns that include data types compatible with Dataverse. This includes the following data types:
 - String
 - Multiline text (memo)
 - Whole Number/Integer
 - Decimal
 - Float
 - Date/time
 - Yes/No (boolean)
 - Choices (multi-value select)
 - Hyperlink/Url
- Data types not supported for virtual tables:
 - File and attachments
 - Image
- Maximum length of characters allowed for a text column in a virtual table is 4,000 characters. If the source table has a maximum character limit greater than this value, any create or update operation exceeding the max character limit results in a validation error, and the operation fails.
- Virtual table queries are limited to return 1,000 records. If you have a 1:N or N custom multi-table (polymorphic) relationship with a virtual table, any query

Create and edit elastic tables

Article • 03/31/2025

An elastic table is a table managed by Microsoft Dataverse. Elastic tables come with the same familiar user experience and API that are offered with standard tables. They share many aspects and options with standard tables, but come with their own unique features and capabilities that are powered by Azure Cosmos DB.

Elastic tables are included with your Dataverse log capacity use.

Watch this video that to learn about elastic tables.

[https://learn-video.azurefd.net/vod/player?id=6f859c28-12b1-4042-9502-b8a441020768&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fcreate-edit-elastic-tables ↗](https://learn-video.azurefd.net/vod/player?id=6f859c28-12b1-4042-9502-b8a441020768&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fcreate-edit-elastic-tables)

When to consider Dataverse elastic tables?

Elastic tables are designed to handle large volumes of data in real-time. With elastic tables, you can import, store, and analyze large volumes of data without scalability, latency, or performance issues.

Elastic tables have unique capabilities for flexible schema, horizontal scaling, and automatic removal of data after a time-period.

Elastic tables automatically scale to ingest tens of millions of rows every hour. Background processes can collate the IoT signals, predict maintenance requirements, and proactively schedule technicians.

Consider a scenario where Contoso is a retailer with millions of existing customers. Contoso has a large database of customers and are looking to increase sales while retaining customers. Based on prior customer history, they're looking to have 24-hour flash sale events with different coupons targeting their customers and products. They have estimated that the number of coupons required will be 100 million plus per flash sale campaign. Marketing plans to run multiple 24-hour campaigns targeting different customer segments.

The requirement for Contoso's marketing application is that it must be able to ingest up to 100 million or more coupon details within a few hours, read millions of coupons per hour, and send coupons to customers.

Elastic tables will automatically scale for this high throughput scenario.

Create a business rule for a table

Article • 10/22/2024

You can create business rules and recommendations to apply logic and validations without writing code or creating plug-ins. Business rules provide a simple interface to implement and maintain fast-changing and commonly used rules.

Important

Business rules defined for a table apply to both *canvas apps* and *model-driven apps* if the table is used in the app. Not all business rule actions are available on canvas apps at this time. More information: [Differences between canvas and model-driven apps](#)

In a model-driven app, not all business rule actions are available for [editable grids](#). For [table based view pages](#), recommendations can't be created. Editable [subgrids](#) don't support business rules. Business rules won't work with other types of dataset controls.

To define a business rule that applies to a form in a model-driven app, see [Create business rules to apply logic in a model-driven app form](#).

By combining conditions and actions, you can do any of the following with business rules:

- Set column values
- Clear column values
- Set column requirement levels
- Show or hide columns
- Enable or disable columns
- Validate data and show error messages
- Create business recommendations based on business intelligence.

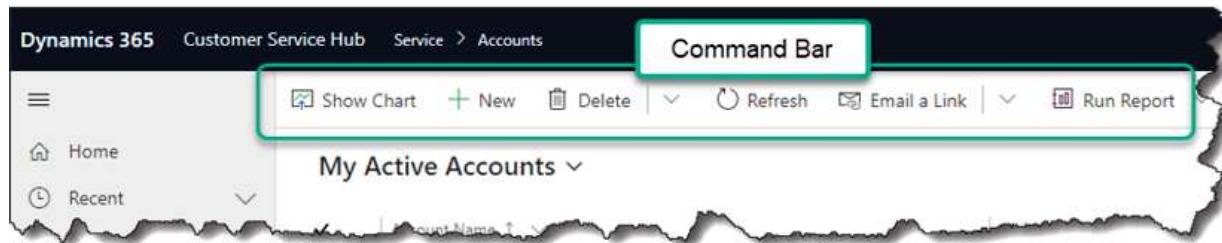
Differences between canvas and model-driven apps

Forms in model-driven apps can use all actions available on business rules, however not all business rule actions are available for canvas apps at this time. The following actions are **not** available on canvas apps:

Modern commanding overview

Article • 01/17/2024

Commands drive core application behavior for model-driven apps. They're the buttons users interact with when playing apps and the resulting actions performed when a button is selected. Each command is positioned in relation to other commands and bound to a command bar location within the app.

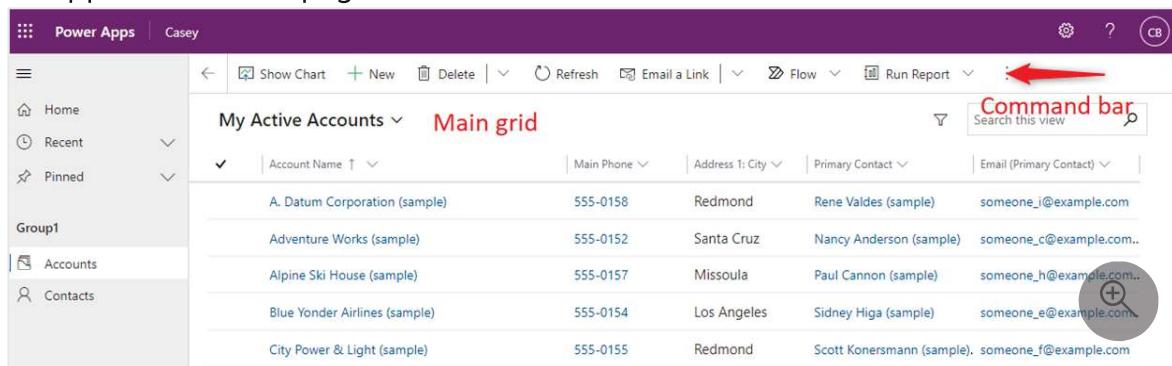


At a high level, command customization fits into the following categories. Various capabilities exist within each category and are covered in more depth throughout modern commanding documentation:

- **Display.** How the button appears and where it's located in an app. For example, the button's label, icon, and accessibility labels as well as the command bar location and position within a command bar.
- **Action.** The logic that is executed when a button is selected. For example, creating and updating data or interacting with various controls and pages inside the app.
- **Visibility.** Logical conditions that specify when a button is visible or hidden to a user. For example, you might want the button visible for some users and hidden for others. Or perhaps the button should only be visible when certain criteria of the data records are satisfied.

Command bar locations

- **Main grid.** This command bar is displayed when using the left-hand navigation of an app to view a full page list of records in this table.



Edit system table messages (preview)

Article • 03/13/2023

[This topic is pre-release documentation and is subject to change.]

The default display name of some system tables, such as account and contact tables, is used in user interface text and error messages in Microsoft Dataverse. If you change the display name for a system table, you should also update any messages that use the default display name. For example, if you change the display name from *Account* to *Company*, you could still see an error message using the old name.

ⓘ Important

This is a preview feature. More information: [Model-driven apps and app management](#)

Add a message to a system table

1. Sign into [Power Apps](#) (make.powerapps.com).
2. Go to **Solutions**, open the solution that has the table you want, and then open the table. If the item isn't in the left navigation pane, select ...**More** and then select the item you want.
3. In the **Customizations** area, select **Messages**.

The screenshot shows the Microsoft Dataverse Table properties page for the 'Account' table in the 'Contoso Sales App'. The 'Customizations' section is expanded, and the 'Messages' option is highlighted with a red box. Other options like 'Business rules' and 'Commands' are also visible.

4. Select the message you want, and then select **Add**.

View and edit tables representing solution objects

Article • 08/08/2023

Some standard tables in Dataverse represent the structure and instances of solution objects. If you aren't familiar with solutions, go to [Solutions overview](#).

For example, the **Custom API** table has columns that represent the properties of an API, such as **Name** and **Binding Type**, with each row of data in the table representing a particular API instance. For more information about Custom API table, go to [Custom API table columns](#)

The screenshot shows the 'Custom API' table details page in the Microsoft Dataverse interface. The top navigation bar includes 'Tables > Custom API'. Below the header, there are four main sections: 'Table properties', 'Properties', 'Tools', 'Schema', 'Data experiences', 'Customizations', and a bottom section for 'Custom API columns and data'.

Name	Primary column	Columns	Forms	Business rules
Custom API	Name	Relationships	Views	Commands
Type	Last modified	Keys	Charts	
Standard	11 months ago		Dashboards	
AddTabToSwarmGroupChat	Normal	4/25/2022 1:47 AM	None	
AIBRealTimePredict	Cloud	4/1/2022 7:15 PM	None	
AssociateConversation	Normal	8/14/2021 8:06 PM	None	
Call Power Automate API	Empty	6/11/2021 11:52 PM	None	
Cascade Async Failure Notification	Normal	1/16/2021 10:29 PM	Async Only	
Cascade Async Failure Notification	Normal	3/27/2021 8:39 PM	Both	

When viewing these tables in Power Apps ([make.powerapps.com](#)), you'll see a warning stating that the data in the table is read only. This ensures the instances of these objects aren't changed.

To update data in such tables, you must navigate to the respective objects in the solution. In our example of custom API, you can open a solution that contains the custom API object or add the custom API object to a new solution and then customize the data as required.

Define alternate keys using Power Apps

Article • 05/30/2023

Power Apps provides an easy way to view and create table alternate keys with the Microsoft Dataverse. For more information about alternate keys, see [Define alternate keys to reference rows](#).

Power Apps enables configuring the most common options, but certain options can only be set using solution explorer. More information: [Define alternate keys using solution explorer](#)

ⓘ Important

If the data within a column that is used in an alternate key will contain one of the following characters /, #,<,>,*,%,&, :, \\\,, ?, + then GET or PATCH actions will not work. If you only need uniqueness then this approach will work, but if you need to use these keys as part of data integration then it is best to create the key on columns that won't have data with those characters.

View alternate keys

1. In Power Apps (make.powerapps.com), select **Tables** from the left navigation pane, and then select the table that you want to view. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
2. Select **Keys** to view a list of any alternate keys that are defined.

Create an alternate key

1. While [viewing alternate keys](#), select **New key**.
2. Use the panel to set a **Display name** and choose the columns to use to create the alternate key.

The **Name** column will be populated based on the display name.

Define alternate keys using solution explorer

Article • 05/30/2023

Solution explorer provides one way to view and create alternate keys for Microsoft Dataverse.

The [Power Apps portal](#) enables configuring the most common options, but certain options can only be set using solution explorer.

More information:

- [Define alternate keys to reference rows](#)
- [Define alternate keys using Power Apps portal](#)

ⓘ Important

If the data within a column that is used in an alternate key will contain one of the following characters /,<,>,*,%,&, :, \\\,?,+ then GET or PATCH actions will not work. If you only need uniqueness then this approach will work, but if you need to use these keys as part of data integration then it is best to create the key on columns that won't have data with those characters.

Open solution explorer

Part of the name of any alternate key you create is the customization prefix. This is set based on the solution publisher for the solution you're working in. If you care about the customization prefix, make sure that you are working in an unmanaged solution where the customization prefix is the one you want for this table. More information: [Change the solution publisher prefix](#)

Open an unmanaged solution

1. From [Power Apps](#) select **Solutions** from the left navigation pane, and then on the toolbar, select **Switch to classic**. If the item isn't in the left navigation pane, select **...More** and then select the item you want.
2. In the **All Solutions** list open the unmanaged solution you want.

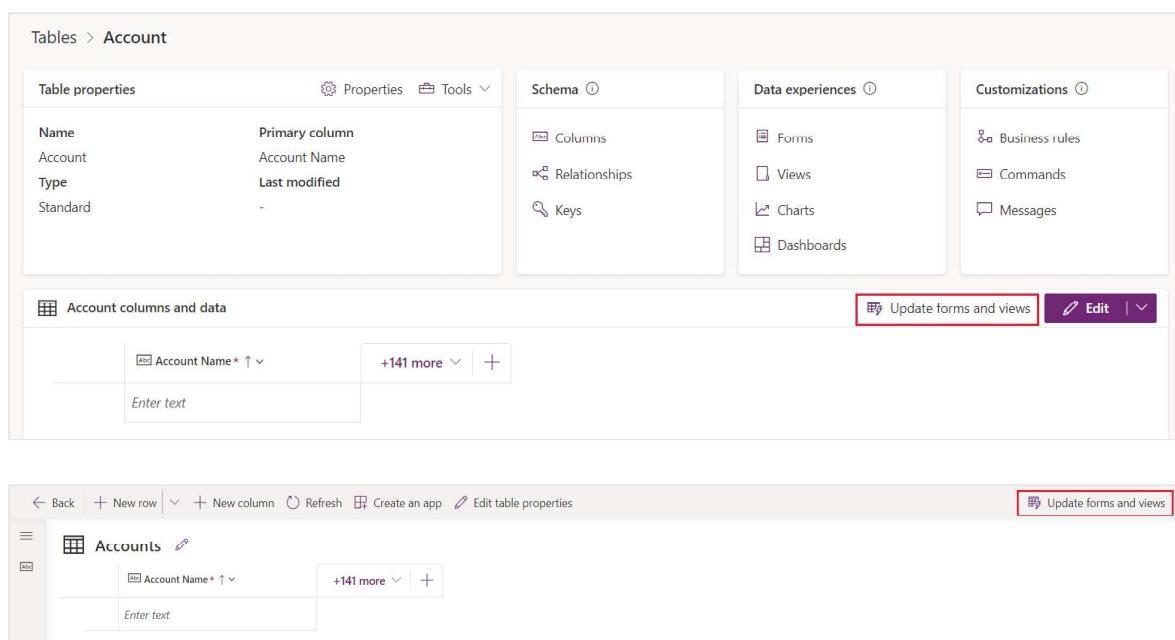
Update forms and views using table designer

Article • 08/25/2023

Create columns directly in the table hub or table designer, which will then be added to your forms and views. In this walkthrough, you'll learn how to simply add the columns you created to forms and views of this table without manually doing so in the form or view designer.

Using table hub and table designer

1. Sign in to [Power Apps](#).
2. In the left navigation pane, select **Tables**, and then select the table that you want to update from the table list. In the table hub and table designer, there's an **Update forms and views** option that allows you to directly add columns to selected forms and views in this table.



The screenshot shows the Power Apps Table Hub interface. At the top, there's a navigation bar with 'Tables > Account'. Below it is a card for 'Table properties' containing fields like Name (Account), Primary column (Account Name), Type (Standard), and Last modified (-). To the right are sections for 'Schema' (Columns, Relationships, Keys), 'Data experiences' (Forms, Views, Charts, Dashboards), and 'Customizations' (Business rules, Commands, Messages). At the bottom, there's a preview of the 'Accounts' list with a column for 'Account Name' and a 'More' button. A prominent red box highlights the 'Update forms and views' button at the bottom right of the preview area. Another red box highlights the same button in a smaller preview window below.

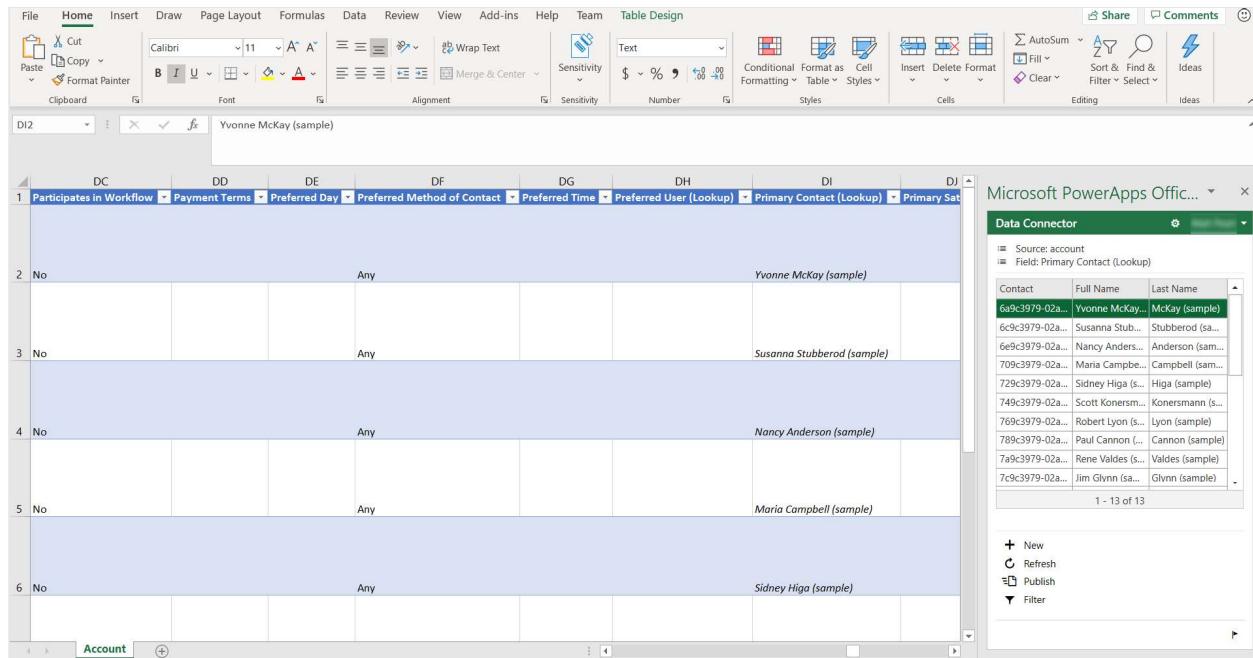
3. Select **Update forms and views** to configure what columns should be added to certain forms and views:

Property	Description	Available option	Default option
Add these columns	Selected columns in this dropdown list will be added to the selected forms and views.	Only columns currently shown in the table preview.	Both new columns that are recently created and existing columns that are

Open table data in Excel

Article • 03/13/2023

By opening table data in Microsoft Excel, you can quickly and easily view and edit data by using the Microsoft Power Apps Excel Add-in.



The screenshot shows a Microsoft Excel spreadsheet with a table containing six rows of data. The columns are labeled DC, DD, DE, DF, DG, DH, DI, and DJ. The first row contains column headers. Rows 2 through 6 each have a 'No' in the first column and 'Any' in the second column. The last column of each row contains the name of a contact: 'Yvonne McKay (sample)', 'Susanna Stubberod (sample)', 'Nancy Anderson (sample)', 'Maria Campbell (sample)', and 'Sidney Higa (sample)' respectively. The 'Account' tab is selected at the bottom left. On the right side of the Excel window, there is a 'Microsoft PowerApps Office Add-in' pane. This pane has a 'Data Connector' section with a table showing 'Source: account' and 'Field: Primary Contact (Lookup)'. Below this is a list of contacts with columns for 'Contact', 'Full Name', and 'Last Name'. The list includes names like Yvonne McKay, Susanna Stubberod, Nancy Anderson, Maria Campbell, Sidney Higa, Scott Konermann, Robert Lyon, Paul Cannon, Rene Valdes, and Jim Glynn. At the bottom of the pane, there are buttons for 'New', 'Refresh', 'Publish', and 'Filter'.

To install the Power Apps Excel add-in, see [Microsoft PowerApps Office Add-in](#). For more information about how to add or remove an Office Excel Add-in, see [Add or remove add-ins in Excel](#).

Open table data in Excel

1. Sign in to [Power Apps](#).
2. In the left navigation pane, select **Tables**. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
3. Select the ellipsis (...) to the right of the table that you're interested in, and then select **Edit data in Excel**.
4. Open the Excel worksheet that is downloaded to your browser's default download folder named similar to *table-name (1591125669213).xlsx*. This workbook has binding information for the table, a pointer to your environment, and a pointer to the Power Apps Excel add-in.
5. In Excel, select **Enable editing** to enable the Power Apps Excel Add-in to run. The Excel add-in runs in a pane on the right side of the Excel window.

Define alternate keys to reference rows

Article • 12/01/2023

Alternate keys provide an efficient and accurate way of integrating data with external systems. It's essential in cases when an external system doesn't store the Globally Unique Identifier (GUID) IDs that uniquely identify rows in Microsoft Dataverse.

A data integration system uses alternate keys to uniquely identify rows using one or more table column values that represent a unique combination. Each alternate key has a unique name.

For example, to identify an account row with an alternate key, you can use the account number or the account number column in combination with some other columns, which have values that shouldn't change.

Note

While you can define alternate keys with Power Apps, they can only be used programmatically in code. To learn more about using alternate keys programmatically, see:

- [Developer Documentation: Use an alternate key to create a row](#)
- [Developer Documentation: Retrieve a row with the Web API using an alternate key](#)

Some of the benefits of the alternate keys feature include:

- Faster lookup of the rows.
- More robust bulk data operations.
- Simplified programming with data imported from external systems without row IDs.

Creating an alternate key

There are two designers you can use to create alternate keys:

Designer	Description
Power Apps portal	Provides an easy streamlined experience, but some options aren't available. More information: Define alternate keys using Power Apps portal

Define status reason transitions for the Case or custom tables

Article • 06/21/2022

You can specify status reason transitions for the Incident (Case) table or a custom table.

ⓘ Note

Although the Incident (Case) table isn't included in a default Microsoft Power Apps environment, it is used by [Dynamics 365 for Customer Service](#) and defined within the [Common Data Model](#)

Status reason transitions are an optional additional level of filtering to define what the status reason value can be changed to for each status reason. Defining a limited list of valid options can make it easier for people to choose the correct next status reason for a row when you have a large number of combinations for valid status reason values.

What is the connection between Status and Status Reason columns?

Tables that can have different status values have two columns that capture this data:

Display Name	Description
Name	
Status	Represents the state of the row. Typically Active or Inactive . You cannot add new status options.
Status Reason	Represents a reason that is linked to a specific status. Each status must have at least one possible status reason. You can add additional status reason options.

The metadata for the column defines what status values are valid for a given state. For example, for the Incident (Case) table, the default status and status reason options are:

Status	Status Reason
Active	<ul style="list-style-type: none">In ProgressOn HoldWaiting for DetailsResearching

Delete a table

Article • 02/24/2023

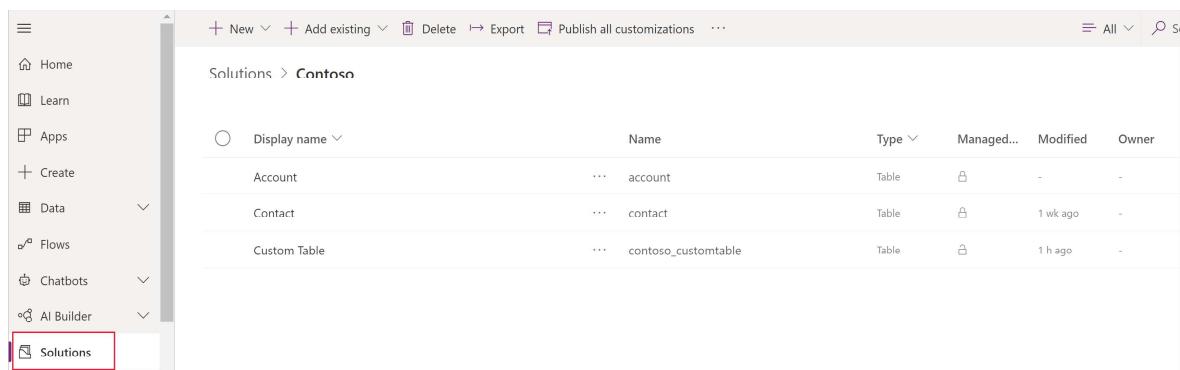
You can delete custom tables, but you can't delete standard tables. Notice that you can't delete a custom table while it has one or more dependent components. More information: [Delete a table that has dependencies](#)

⚠️ Warning

When you delete a table, you delete both the table definition and all data that the table contains. Tables and the data within them can't be recovered if deleted.

Delete a custom table

1. Sign into [Power Apps](#), and then select **Solutions** in the left navigation pane. If the item isn't in the left navigation pane, select **...More** and then select the item you want.
2. Open the solution that contains the custom table you want to delete, and then select it.



The screenshot shows the Power Apps Solutions page. On the left, there's a navigation pane with options like Home, Learn, Apps, Create, Data (with a dropdown), Flows, Chatbots, AI Builder, and Solutions. The Solutions option is highlighted with a red box. The main area shows a list of tables in a solution named 'Contoso'. The columns are Display name, Name, Type, Managed..., Modified, and Owner. The tables listed are Account, Contact, and Custom Table (contoso_customtable).

Display name	Name	Type	Managed...	Modified	Owner
Account	account	Table		-	-
Contact	contact	Table		1 wk ago	-
Custom Table	contoso_customtable	Table		1 h ago	-

3. On the command bar select **Remove**, and then select from the following choices:
 - **Remove from this solution.** Removes the table from the solution. You can still access the table from the Default Solution.
 - **Delete from this environment.** Deletes the table and associated data.
4. In the dialog box that appears, select **Delete** to delete the table. If you receive a message that the *component cannot be deleted because it is referenced by other components*, see the next section in this article.

Display custom icons alongside values in list views

Article • 02/15/2022

Power Apps environment administrators and customizers can add graphics to a view and establish the logic used to select a graphic based on the column value using JavaScript. The capability lets you customize list views that display icons alongside text or numerical values.

This example displays custom icons in a view for the opportunity table, which is available with certain apps, such as Dynamics 365 Sales. You can display custom icons in views with other standard tables, such as the account or contact table, as well as custom tables.

Some interest in our JJJ...	Adventure W...	Won	7/18/2013	\$94,800.82	7/21/2013	\$95,000.00	Warm	
Test		Open					Warm	
They sell many of the ...	Contoso Phar...	Open	8/2/2013		1/7/2014	\$26,000.00	Hot	95
Very interested in our ...	City Power & ...	Won	6/14/2013	\$40,201.49	6/29/2013	\$40,000.00	Hot	90
Very likely will order 1...	Alpine Ski Ho...	Open	8/2/2013		12/4/2013	\$30,000.00	Hot	
Very likely will order 7...	A. Datum Cor...	Won	3/20/2013	\$153,385.37	4/1/2013	\$16,000.00	Cold	50
Will be ordering abou...	Coho Winery ...	Open	8/2/2013		2/5/2014	\$25,000.00	Hot	80

Custom icons in list views can display in Unified Interface, legacy web client, mobile app, and App for Outlook.

ⓘ Note

Custom icons aren't available when the app is in mobile offline mode.

Add custom graphics and JavaScript as web resources

1. Create the new graphic files needed for your customization. We recommend an icon size of 16x16 pixels (larger images will be scaled down).
2. Write one or more JavaScript functions that establish which icons to show for which values (you'll typically need one function for each column you want to customize). Each function must accept a row data object and a language (LCID) code as input and return an array containing an image name and tooltip text. For an example function, see [Sample JavaScript function](#), later in this article.

Edit system table messages (preview)

Article • 03/13/2023

[This topic is pre-release documentation and is subject to change.]

The default display name of some system tables, such as account and contact tables, is used in user interface text and error messages in Microsoft Dataverse. If you change the display name for a system table, you should also update any messages that use the default display name. For example, if you change the display name from *Account* to *Company*, you could still see an error message using the old name.

ⓘ Important

This is a preview feature. More information: [Model-driven apps and app management](#)

Add a message to a system table

1. Sign into [Power Apps](#) (make.powerapps.com).
2. Go to **Solutions**, open the solution that has the table you want, and then open the table. If the item isn't in the left navigation pane, select ...**More** and then select the item you want.
3. In the **Customizations** area, select **Messages**.

The screenshot shows the Microsoft Dataverse Table properties page for the 'Account' table in the 'Contoso Sales App'. The 'Customizations' section is expanded, and the 'Messages' option is highlighted with a red box. Other options like 'Business rules' and 'Commands' are also visible.

4. Select the message you want, and then select **Add**.

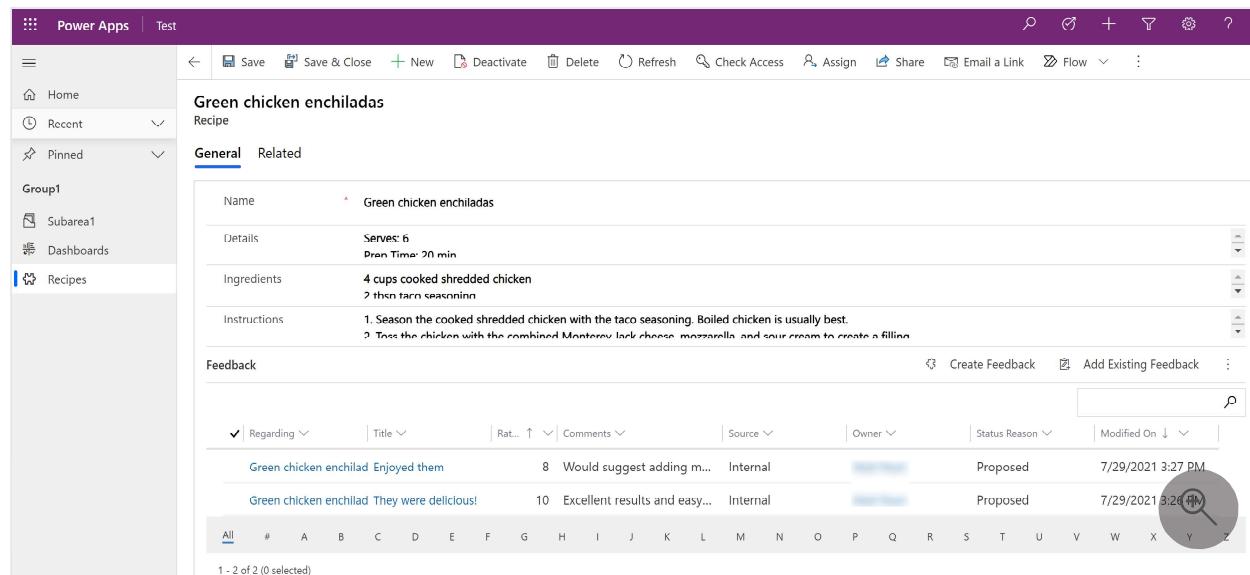
Configure a table for feedback/ratings

Article • 06/22/2022

Let customers or employees submit feedback for any table record, or rate table records within a defined rating range by enabling tables for feedback. Use this capability for the following scenarios:

- For customers to capture data via a portal or survey.
- To collect data about service or product satisfaction from table records.
- For employees to provide comments on collaborative efforts or as a way to improve on products and services.

For example, imagine you have an app that is used to maintain recipes and you want to get feedback from your users about their experience using the recipes in the app.



The screenshot shows a Power Apps canvas interface. On the left, there's a navigation pane with sections like Home, Recent, Pinned, Group1, Subarea1, Dashboards, and Recipes. The main area displays a "Green chicken enchiladas" recipe card. The card includes fields for Name (Green chicken enchiladas), Details (Serves 6, Prep Time: 20 min), Ingredients (4 cups cooked shredded chicken, 2 tbsp taco seasoning), and Instructions (Season the cooked shredded chicken with the taco seasoning. Boiled chicken is usually best. Toss the chicken with the combined Monterey Jack cheese, mozzarella, and sour cream to create a filling.). Below the card, there's a "Feedback" section with a table showing two comments. The first comment is "Green chicken enchilad Enjoyed them" with a rating of 8, marked as "Would suggest adding m... Internal" and "Proposed" on 7/29/2021 3:27 PM. The second comment is "Green chicken enchilad They were delicious!" with a rating of 10, marked as "Excellent results and easy... Internal" and "Proposed" on 7/29/2021 8:26 AM. The table has columns for Regarding, Title, Rating, Comments, Source, Owner, Status Reason, and Modified On. A search bar and a magnifying glass icon are also visible.

Configure feedback for a table

First, you must enable the **Allow feedback** property in the table definition.

1. Sign into [Power Apps](#).
2. Open the table you want or create a new one. More information: [Edit a table](#)
3. On the right table properties pane, select **Allow feedback**.

! Note

Once you enable the **Allow feedback** property for a table, you can't disable it.

Preview feature: Azure Cosmos DB for NoSQL Data Provider requirements

Article • 06/14/2023

This topic describes the requirements for the Azure Cosmos DB for NoSQL data provider as well as how to configure and recommended best practices when you use the Azure Cosmos DB for NoSQL data provider with virtual tables.

Important

- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.
- We expect changes to this feature, so you shouldn't use it in production. Use it only in test and development environments.
- Microsoft doesn't provide support for this preview feature. Microsoft Dynamics 365 Technical Support won't be able to help you with issues or questions. Preview features aren't meant for production use and are subject to a separate [supplemental terms of use](#).

What is Azure Cosmos DB?

Azure Cosmos DB is Microsoft's globally distributed multi-model database service for mission-critical applications. It provides rich and familiar SQL query capabilities with consistent low latencies over schema-less JSON data. More information: [Introduction to Azure Cosmos DB: Azure Cosmos DB for NoSQL](#)

Requirements

- Azure subscription that includes Azure Cosmos DB.
- An Azure Cosmos DB for NoSQL collection.
- The Azure Cosmos DB database type should be SQL.

Data type mapping

Virtual table walkthrough using the OData v4 Data Provider

Article • 02/22/2023

Imagine that you want to access, create, update, and delete some personal information about a contact from an external data source within your model-driven app. In this simple walkthrough, you will model a virtual table named *Person* with columns mapped to the external schema to these operations at runtime from an OData web service.

Data source details

Because the data source used for this walkthrough has an OData v4 web service, we can use the OData v4 Data Provider included with your environment.

Web service url: <https://contosowebservice.azurewebsites.net/odata/>

ⓘ Important

- The web service url used for this walkthrough isn't a functioning web service.
- You can't use the OData v4 Data Provider to connect to another environment.

For this walkthrough, a single virtual table that contains the following columns is needed.

External column name	External data type	Virtual table data type	Purpose
Id	Edm.Guid	Primary key	Primary key for the table
FirstName	Edm.String	Single line of text	First name of the person
LastName	Edm.String	Single line of text	Last name of the person
Age	Edm.Int32	Whole number	Age of the person
LastModifiedOn	Edm.DateTimeOffset	Data and time	Last modified data and time of the person record

The OData metadata of the external data source person table:

Create and edit tables using solution explorer

Article • 02/15/2022

You can easily create a table using Power Apps (make.powerapps.com) for most common situations, but not all capabilities are implemented there. When you need to meet the requirements described in [Create and edit tables in Microsoft Dataverse](#), you can achieve them by creating or editing tables using the Solution Explorer.

Open solution explorer

The customization prefix is part of the name of any table you create. This is set based on the solution publisher for the solution you're working in. If you care about the customization prefix, make sure that you are working in an unmanaged solution where the customization prefix is the one you want for this table. More information: [Change the solution publisher prefix](#)

Open an unmanaged solution

1. From [Power Apps](#) select **Solutions** from the left navigation pane, and then on the toolbar, select **Switch to classic**. If the item isn't in the left navigation pane, select **...More** and then select the item you want.
2. In the **All Solutions** list open the unmanaged solution you want.

View tables

In the solution explorer **Components** node, select the **Entities** node.

Microsoft Dataverse table relationships

Article • 09/19/2024

Table relationships in Microsoft Dataverse define the ways that table rows can be associated with rows from other tables or the same table. There are two types of table relationships:

- One-to-many relationships
- Many-to-many relationships

One-to-many relationships

In a one-to-many table relationship, many referencing (related) table rows can be associated with a single referenced (primary) table row. The referenced table row is sometimes referred to as the “parent” and rows of the referencing table are referred to as “children.” A many-to-one relationship is just the child perspective of a one-to-many relationship.

For example, in a school scenario multiple courses might be delivered in a single classroom, so the class table would have a one-to-many relationship with the course table.

Many-to-many relationships

In a many-to-many table relationship, many table rows can be associated with many other table rows. Rows related using a many-to-many relationship can be considered peers and the relationship is reciprocal.

For example, in the same school scenario mentioned earlier, a single student can enroll in multiple courses, and each course can have multiple students. This type of relationship allows for more complex data associations and is managed using Power Apps in Dataverse.

How relationships work in Dataverse

Table relationships define how table rows can be related to each other in Dataverse. At the simplest level, adding a lookup column to a table creates a new 1:N (one-to-many) relationship between the two tables and lets you put that lookup column on a form. With the lookup column, users can associate multiple *child* rows of that table to a single *parent* table row.

Create one-to-many or many-to-one table relationships in Microsoft Dataverse overview

Article • 09/19/2024

In Microsoft Dataverse a one-to-many (1:N) or many-to-one (N:1) relationship defines how two tables are related to each other.

Before you create a custom table relationship, evaluate whether using an existing table relationship would meet your requirements. More information: [Create new metadata or use existing metadata?](#)

Watch this video for a quick overview about how to create a table, a table relationship, and columns:

<https://learn-video.azurefd.net/vod/player?id=19b21a48-4a49-4163-8506-7fb79f3290ef&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fcreate-edit-1n-relationships>

You create and edit table relationships, including one-to-many and many-to-one relationships, in Power Apps.

You can also create new table relationship in your environment using any of the following experiences:

- In model-driven apps, select **New Column** from the form editor and create a *Lookup* column. More information: [Add, configure, move, or delete columns on a form](#)
- Create a new *Lookup* column for the related table. More information: [Create and edit columns](#)
- Import a solution that contains the definition of the table relationship. More information: [Import, update, and export solutions](#)
- Use Power Query to create new tables and fill them with data. More information: [Add data to a table in Dataverse by using Power Query](#).
- A developer can use [Metadata services](#) to write a program to create and update table relationships. More information: [Table relationship definitions](#)

Information in this article helps you choose which designer you can use.

Create many-to-many table relationships overview

Article • 09/17/2024

One-to-many (1:N) table relationships establish a hierarchy between rows. With many-to-many (N:N) relationships, there's no explicit hierarchy. There are no lookup columns or behaviors to configure. Rows created using many-to-many relationships can be considered peers and the relationship is reciprocal.

One example of a many-to-many relationship is defined between two standard tables included with the Dynamics 365 for Sales app. The opportunity table has an N:N relationship with the competitor table. This relationship allows for multiple competitors to be added to the opportunity and multiple opportunities associated with the same competitor.

With many-to-many relationships, a relationship (or intersect) table stores the data that associates the tables. This table has a one-to-many table relationship with both of the related tables and only stores the necessary values to define the relationship. You can't add custom columns to a relationship table and it's never visible in the user interface.

Creating a many-to-many relationship requires choosing the two tables that you want to participate in the relationship. For model-driven apps you can decide how you want the respective lists to be available within the navigation for each table. These are the same options used for the primary table in 1:N table relationships.

Not all tables can be used with many-to-many relationships. If the table isn't available to be chosen in the designer, you can't create a new many-to-many relationship with this table. More information: [Developer documentation: table relationship eligibility](#)

Note

You can also create new many-to-many (N:N) table relationship in your environment using the following:

- Import a solution that contains the definition of the relationship. More information: [Import, update, and export solutions](#)
- A developer can use [Metadata services](#) to write a program to create and update table relationships. More information: [Developer documentation: Customize table relationship metadata](#)

Create a relationship between tables

Article • 09/19/2024

Data in one table often relates to data in another table. For example, you might have a **Teachers** table and a **Class** table, and the **Class** table might have a lookup relation to the **Teachers** table to show which teacher instructs the class. You can use a lookup column to show data from the **Teachers** table. This is commonly referred to as a lookup column.

Define a relationship

You can create several types of relationships from one table to another (or between a table and itself). Each table can have a relationship with more than one table, and each table can have more than one relationship to another table. Some common relationship types are:

- **Many-to-one** - In this type of relationship, each row in table A can match more than one row in table B, but each row in table B can match only one row in table A. For example, a class has a single classroom. This is the most common type of relationship and is shown in the column list as a **Lookup column**
- **One-to-many** - In this type of relationship, each row in table B can match more than one row in table A, but each row in table A can match only one row in table B. For example, a single teacher, teaches many classes.
- **Many-to-many** - In this type of relationship, each row in table A can match more than one row in table B, and vice versa. For example, students attend many classes, and each class can have multiple students.

Additionally, you can set advanced cascading behaviors on many-to-one and one-to-many relationships whenever an action is taken on the parent table.

Add a lookup column (Many-to-one relationship)

To add a lookup relation to a table, create a relation under the **Relationships** area and specify the table with which you want to create a relationship.

1. On [powerapps.com](#), on the left navigation pane select **Tables**. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Select an existing table, or [Create a new table](#)

Create and edit one-to-many or many-to-one table relationships using Power Apps

Article • 09/19/2024

In Microsoft Dataverse a one-to-many (1:N) or many-to-one (N:1) relationship defines how two tables are related to each other.

Power Apps provides an easy way to create and edit one-to-many (1:N) or many-to-one (N:1) relationships for Microsoft Dataverse. For more information about these kinds of relationships, go to [Create one-to-many or many-to-one table relationships overview](#).

View table relationships

1. Sign in to [Power Apps](#), and open the environment you want.
2. Select **Solutions** on the left navigation pane, and then open the solution you want.
3. Select **Tables** and open the table that has the relationships you want to view. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
4. Select the **Relationships** area to view all relationships configured for the table.

The screenshot shows the Microsoft Power Apps interface. On the left, there's a navigation pane with sections like 'Objects', 'Overview', 'History', 'Pipelines', and 'Tables'. Under 'Tables', 'Custom table' is selected. In the main content area, the title is 'Contoso Sales > Tables > Custom table > Relationships'. A table lists various relationships with columns for 'Display name', 'Name', 'Related table', 'Relationship type', 'Managed', 'Customized', and 'Customizable'. Some rows include 'base record id', 'Created By', 'Deleted Object', 'Duplicate Record ID', 'Entity instance', 'Modified By', 'Modified By (Delegate)', 'Name', 'Object Id', 'Owner', 'Owning Business Unit', 'Owning Team', 'Owning User', 'Record', and 'Referencing'. A search bar at the top right contains the placeholder 'Search'.

Create a relationship

While [viewing table relationships](#), on the command bar, select **New relationship**, and then select either **Many-to-one** or **One-to-many**.

Note

Create many-to-many table relationships using Power Apps

Article • 09/17/2024

Power Apps [↗](#) provides an easy way to create and edit many-to-many relationships for Microsoft Dataverse tables. A many-to-many relationship defines the type of connection between two tables where multiple records in one table can be associated with multiple records in another table. For example, in a school scenario, a single student can enroll in multiple courses, and each course can have multiple students. This type of relationship allows for more complex data associations and is managed using Power Apps in Dataverse. For more information about many-to-many table relationships, go to [Create many-to-many table relationships overview](#).

View many-to-many table relationships

1. From [Power Apps ↗](#), select **Solutions** on the left navigation pane, and open the solution you want.
2. Open the table that has the relationships you want to view.
3. Select the **Relationships** area to view all relationships configured for the table.

Display name ↑	Name	Related table	Relationship type	Managed	Customized	Customizable
Base Record ID	contoso_customtable_DuplicateBaseRecord	Duplicate Record	One-to-many	No	Yes	Yes
Created By	lk_contoso_customtable_createdby	User	Many-to-one	No	Yes	Yes
Created By (Delegate)	lk_contoso_customtable_createdonbehalfby	User	Many-to-one	No	Yes	Yes
Deleted Object	contoso_customtable_DeletedItemReferences	Deleted Record Reference	One-to-many	No	No	Yes
Duplicate Record ID	contoso_customtable_DuplicateMatchingRecord	Duplicate Record	One-to-many	No	Yes	Yes
Entity instance	contoso_customtable_PrincipalObjectAttributeAccess	Field Sharing	One-to-many	No	Yes	Yes
Modified By	lk_contoso_customtable_modifiedby	User	Many-to-one	No	Yes	Yes
Modified By (Delegate)	lk_contoso_customtable_modifiedonbehalfby	User	Many-to-one	No	Yes	Yes
Name	contoso_investmenttable_BulkDeleteFailure	Roll Delete Failure	One-to-many	N/A	Yes	Yes
Object Id	contoso_customtable_UseEntityInstanceData	User Entity Instance Data	One-to-many	No	Yes	Yes
Owner	owner_contoso_customtable	Owner	Many-to-one	No	Yes	Yes
Owning Business Unit	business_unit_contoso_customtable	Business Unit	Many-to-one	No	Yes	Yes
Owning Team	team_contoso_customtable	Team	Many-to-one	No	Yes	Yes
Owning User	user_contoso_customtable	User	Many-to-one	No	Yes	Yes
Record	contoso_customtable_SyncErrors	Sync Error	One-to-many	No	Yes	Yes
RewardPlan	contoso_investmenttable_AwardDefinitions	System Job	One-to-many	N/A	Yes	Yes

Many-to-many relationships have a **Relationship type** of **Many-to-many**.

ⓘ Note

The table you view might have no **Many-to-many** relationships.

Set managed properties for relationships

Article • 09/19/2024

Managed properties apply when you include a column with a managed solution and import it into another organization. These settings allow a solution maker to have some control over the level of customization that they want to allow people who install their managed solution to have when they customize a table relationship.

Set managed properties for a relationship

1. Sign in to [Power Apps](#), and select the environment you want.
2. Select **Solutions**, open the solution you want, and then open the table that has the relationship where you want to view the managed properties.
3. Select the relationship, and then select **Advanced > Managed properties** on the command bar.

With relationships, the only managed property is **Allow customizations**. This single setting controls all changes that can be made to the table relationship.

See also

[Create and edit relationships between tables](#)

[Solutions in Power Apps overview](#)

Feedback

Was this page helpful?

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Configure connection roles

Article • 03/13/2023

With Microsoft Dataverse, you can define **connections** between table rows without creating a table relationship. In model-driven apps people can establish a named link between rows to establish less a formal relationship, which doesn't justify creating an actual table relationship. Some examples include *friend*, *sibling*, *spouse*, *attendee*, and *stakeholder*. Some connections can also be reciprocal, such as *child* and *parent*, *husband* and *wife*, or *doctor* and *patient*.

When people set a connection between two rows, they can also add a description and additional information such as start and end dates for the relationship. More information: [Add a connection role to link rows to each other](#)

Anyone with write access to the **Connection Role** table can establish which connections are available for people to use.

 **Important**

For a table to be available as a row type for a new or existing connection role, the **Can have connections** property must be enabled for the table.

Enable connection roles for a table

1. Sign in to [Power Apps](#).
2. Open the table you want or create a new one. More information: [Edit a table](#)
3. Select **Properties**, and then in the right properties pane, select **Can have connections**.

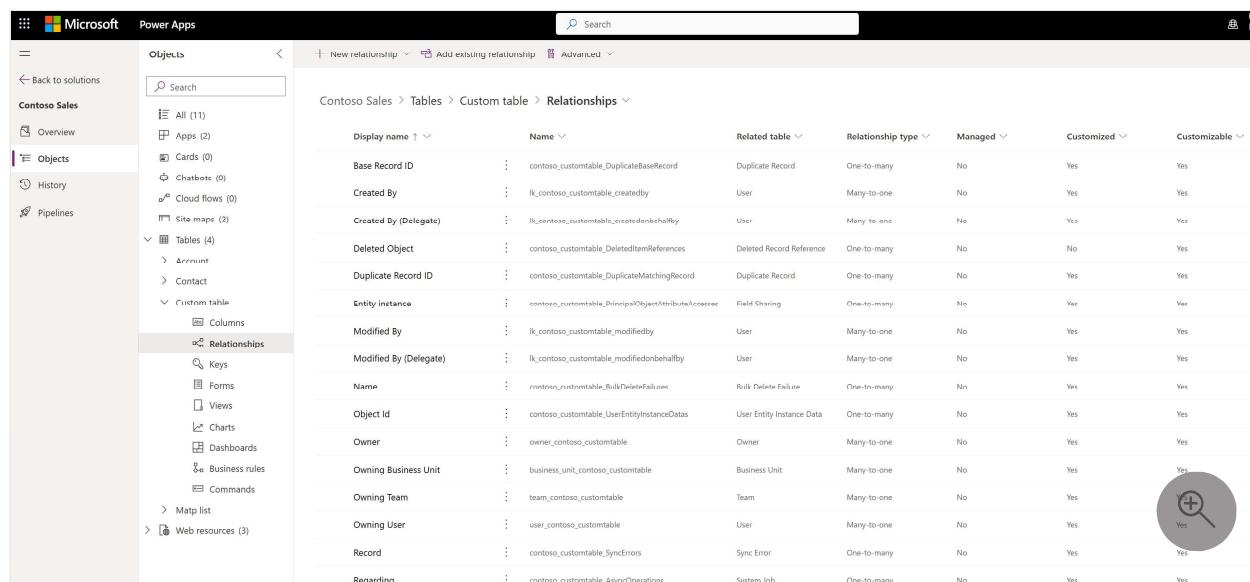
Create many-to-many table relationships using Power Apps

Article • 09/17/2024

Power Apps [↗](#) provides an easy way to create and edit many-to-many relationships for Microsoft Dataverse tables. A many-to-many relationship defines the type of connection between two tables where multiple records in one table can be associated with multiple records in another table. For example, in a school scenario, a single student can enroll in multiple courses, and each course can have multiple students. This type of relationship allows for more complex data associations and is managed using Power Apps in Dataverse. For more information about many-to-many table relationships, go to [Create many-to-many table relationships overview](#).

View many-to-many table relationships

1. From [Power Apps ↗](#), select **Solutions** on the left navigation pane, and open the solution you want.
2. Open the table that has the relationships you want to view.
3. Select the **Relationships** area to view all relationships configured for the table.



The screenshot shows the Microsoft Power Apps interface with the 'Objects' tab selected. In the 'Tables' section, a 'Custom table' is expanded, and its 'Relationships' section is selected. The main area displays a table of relationships with columns: Display name, Name, Related table, Relationship type, Managed, Customized, and Customizable. The 'Relationship type' column for all listed relationships is set to 'Many-to-many'. A large circular icon with a magnifying glass and a plus sign is overlaid on the bottom right corner of the table.

Display name ↑	Name	Related table	Relationship type	Managed	Customized	Customizable
Base Record ID	contoso_customutable_DuplicateBaseRecord	Duplicate Record	One-to-many	No	Yes	Yes
Created By	lk_contoso_customutable_createdby	User	Many-to-one	No	Yes	Yes
Created By (Delegate)	lk_contoso_customutable_createdonbehalfby	User	Many-to-one	No	Yes	Yes
Deleted Object	contoso_customutable_DeletedItemReferences	Deleted Record Reference	One-to-many	No	No	Yes
Duplicate Record ID	contoso_customutable_DuplicateMatchingRecord	Duplicate Record	One-to-many	No	Yes	Yes
Entity instance	contoso_customutable_PrincipalObjectAttributeAccess	Field Sharing	One-to-many	No	Yes	Yes
Modified By	lk_contoso_customutable_modifiedby	User	Many-to-one	No	Yes	Yes
Modified By (Delegate)	lk_contoso_customutable_modifiedonbehalfby	User	Many-to-one	No	Yes	Yes
Name	contoso_investmenttable_BulkDeleteFailure	Roll Delete Failure	One-to-many	N/A	Yes	Yes
Object Id	contoso_customutable_UseEntityInstanceData	User Entity Instance Data	One-to-many	No	Yes	Yes
Owner	owner_contoso_customutable	Owner	Many-to-one	No	Yes	Yes
Owning Business Unit	business_unit_contoso_customutable	Business Unit	Many-to-one	No	Yes	Yes
Owning Team	team_contoso_customutable	Team	Many-to-one	No	Yes	Yes
Owning User	user_contoso_customutable	User	Many-to-one	No	Yes	Yes
Record	contoso_customutable_SyncErrors	Sync Error	One-to-many	No	Yes	Yes
RewardPlan	contoso_investmenttable_AwardOvershoots	System Job	One-to-many	N/A	Yes	Yes

Many-to-many relationships have a **Relationship type** of **Many-to-many**.

ⓘ Note

The table you view might have no **Many-to-many** relationships.

Create and edit 1:N (one-to-many) or N:1 (many-to-one) table relationships using solution explorer

Article • 02/15/2022

Solution explorer provides one way to create and edit 1:N (one-to-many) or N:1 (many-to-one) table relationships for Microsoft Dataverse.

The [Power Apps portal](#)  enables configuring the most common options, but certain options can only be set using solution explorer. More information:

- [Create 1:N \(one-to-many\) or N:1 \(many-to-one\) relationships](#)
- [Create and edit 1:N \(one-to-many\) or N:1 \(many-to-one\) table relationships in Power Apps portal](#)

Open solution explorer

Part of the name of any custom relationship you create is the customization prefix. This is set based on the solution publisher for the solution you're working in. If you care about the customization prefix, make sure that you are working in an unmanaged solution where the customization prefix is the one you want for this table. More information: [Change the solution publisher prefix](#)

Open an unmanaged solution

1. From [Power Apps](#)  select **Solutions** from the left navigation pane, and then on the toolbar, select **Switch to classic**. If the item isn't in the left navigation pane, select **...More** and then select the item you want.
2. In the **All Solutions** list open the unmanaged solution you want.

View table relationships

In solution explorer, expand **Tables** and select a table. Within that table, select either **1:N Relationships** or **N:1 Relationships**

Create N:N (many-to-many) table relationships in Microsoft Dataverse using solution explorer

Article • 02/15/2022

Solution explorer provides one way to create and edit N:N (many-to-many) for Dataverse.

The [Power Apps portal](#)  enables configuring the most common options, but certain options can only be set using solution explorer. More information:

- [Create Many-to-many \(N:N\) table relationships](#)
- [Create Many-to-many table relationships in Dataverse using Power Apps portal](#)

Open solution explorer

Part of the name of any custom relationship you create is the customization prefix. This is set based on the solution publisher for the solution you're working in. If you care about the customization prefix, make sure that you are working in an unmanaged solution where the customization prefix is the one you want for this table. More information: [Change the solution publisher prefix](#)

Open an unmanaged solution

1. From [Power Apps](#)  select **Solutions** from the left navigation pane, and then on the toolbar, select **Switch to classic**. If the item isn't in the left navigation pane, select **...More** and then select the item you want.
2. In the **All Solutions** list open the unmanaged solution you want.

View table relationships

In solution explorer, expand **Tables** and select a table. Within that table, select **N:N Relationships**.

Set managed properties for relationships

Article • 09/19/2024

Managed properties apply when you include a column with a managed solution and import it into another organization. These settings allow a solution maker to have some control over the level of customization that they want to allow people who install their managed solution to have when they customize a table relationship.

Set managed properties for a relationship

1. Sign in to [Power Apps](#), and select the environment you want.
2. Select **Solutions**, open the solution you want, and then open the table that has the relationship where you want to view the managed properties.
3. Select the relationship, and then select **Advanced > Managed properties** on the command bar.

With relationships, the only managed property is **Allow customizations**. This single setting controls all changes that can be made to the table relationship.

See also

[Create and edit relationships between tables](#)

[Solutions in Power Apps overview](#)

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Query and visualize hierarchically related data

Article • 02/24/2023

Get valuable business insights by visualizing hierarchically related data. The hierarchical modelling and visualization capabilities give you a number of benefits:

- View and explore complex hierarchical information.
- View key performance indicators (KPIs) in the contextual view of a hierarchy.
- Visually analyze key information across the web and the tablets.

For some tables, such as account and user, the visualizations are provided out-of-the-box. Other tables, including custom tables, can be enabled for a hierarchy and you can create the visualizations for them. Based on your needs, you can choose between using a tree view, which shows the entire hierarchy, or a tile view, which depicts a smaller portion of the hierarchy. Both views are shown side by side. You can explore a hierarchy by expanding and contracting a hierarchy tree. The same hierarchical settings for visualization are set once, but apply to both web and mobile clients. In tablets, the visuals render in a modified format suitable for the smaller form factor. The customizable components required for hierarchical visualization are solution aware, therefore, they can be transported between organizations like any other customization. You can configure the attributes shown in the visualization by customizing a Quick Form using the form editor. There is no requirement to write code.

Query hierarchical data

With Microsoft Dataverse, hierarchical data structures are supported by self-referential relationships of the related rows. In the past, to view hierarchical data, you had to iteratively query for the related rows. Presently, you can query the related data as a hierarchy, in one step. You'll be able to query rows using the **Under** and **Not Under** logic. The **Under** and **Not Under** hierarchical operators are exposed in Advanced Find and the workflow editor. For more information about how to use these operators, see [Configure workflow steps](#). For more information about Advanced Find, see [Create, edit, or save an Advanced Find search](#)

The following examples illustrate various scenarios for querying hierarchies:

Query account hierarchy

Define and query hierarchically related data

Article • 08/03/2024

ⓘ Important

This feature is deprecated. For more information, go to [Hierarchy control in model-driven apps is deprecated](#).

You can get valuable business insights by defining and querying hierarchically related data. The hierarchical modeling and visualization capabilities give you a number of benefits:

- View and explore complex hierarchical information.
- View key performance indicators (KPIs) in the contextual view of a hierarchy.
- Visually analyze key information across the web and the tablets.

Some standard tables already have hierarchies defined. Other tables, including custom tables, can be enabled for a hierarchy and you can create the visualizations for them.

Define hierarchical data

With Microsoft Dataverse, hierarchical data structures are supported by *self-referential* one-to-many (1:N) relationships of the related rows.

ⓘ Note

Self-referential means that the table is related to itself. For example, the account table has a lookup column to associate it with another account table row.

When a self-referential one-to-many (1:N) relationship exists, in the relationship definition the **Hierarchical** option is available to be set to **Yes**.

Configure connection roles

Article • 03/13/2023

With Microsoft Dataverse, you can define **connections** between table rows without creating a table relationship. In model-driven apps people can establish a named link between rows to establish less a formal relationship, which doesn't justify creating an actual table relationship. Some examples include *friend*, *sibling*, *spouse*, *attendee*, and *stakeholder*. Some connections can also be reciprocal, such as *child* and *parent*, *husband* and *wife*, or *doctor* and *patient*.

When people set a connection between two rows, they can also add a description and additional information such as start and end dates for the relationship. More information: [Add a connection role to link rows to each other](#)

Anyone with write access to the **Connection Role** table can establish which connections are available for people to use.

 **Important**

For a table to be available as a row type for a new or existing connection role, the **Can have connections** property must be enabled for the table.

Enable connection roles for a table

1. Sign in to [Power Apps](#).
2. Open the table you want or create a new one. More information: [Edit a table](#)
3. Select **Properties**, and then in the right properties pane, select **Can have connections**.

Improve copilot responses from Microsoft Dataverse

Article • 11/21/2024

Copilot experiences in Dynamics 365 apps, apps in Power Apps, or Microsoft 365 Copilot allow users to ask natural language questions about data that's stored in Dataverse. Copilots help your users get insights and information from your enterprise data, which improves their productivity and decision-making. However, sometimes they might not get the answers they expect or need from copilots. This article shows you how to improve the accuracy and relevance of copilot answers by using Microsoft Copilot Studio and the record picker.

Prerequisites for using copilots with Dataverse

By default, the Copilot feature for app users in model-driven apps is turned off. Admins must enable this feature for their environments in the Power Platform admin center.

Learn more: [Turn on copilots and generative AI features](#)

Improve results for Dataverse using knowledge sources in Copilot Studio

As a maker, you know how your data is structured and how your users ask questions about it. To improve the quality of the results, you can teach the copilot some domain knowledge, also known as *grounding*, using synonyms and phrases with definitions. This information helps the copilot understand how your users ask questions that don't match the names or values of the tables or columns in your data.

For example, if your users ask "What are my closed leads?" and the results depend on a column that doesn't include "closed" or a status that doesn't have "closed" in the definition, the results might be imprecise. If your company defines a closed lead as a status of not qualified or canceled, you can add a glossary term that defines "closed leads" as "lead status isn't qualified or canceled." This additional information helps the copilot understand your users' questions better.

Teach your copilot domain knowledge by adding a knowledge source in Copilot Studio to make its answers more relevant and informative for your users. You can add enterprise data from Power Platform, Dynamics 365, and external systems as knowledge

Create new data columns in Dataverse

Article • 03/12/2025

Columns in Microsoft Dataverse define the individual data items that can be used to store information in a table. Column data is used in apps to display information on forms, in views, and can be used in searches within an app. By default, the account main form has several columns, such as account name, phone, fax, website, and so on.

The screenshot displays the Microsoft Dataverse account form for "A. Datum Corporation (sample)". The form is divided into sections: "ACCOUNT INFORMATION" and "ADDRESS". The "ACCOUNT INFORMATION" section contains fields for Account Name (A. Datum Corporation), Phone (555-0158), Fax (---), Website (http://www.adatu...), Parent Account (---), and Ticker Symbol (---). The "ADDRESS" section contains fields for Address 1: Street 1 (2137 Birchwood Dr) and Address 1: Street 2 (---). To the right of the form is a "Timeline" pane showing recent activity:

- Modified on: 5/2/2023 12:12 PM
Email from: **Overdue**
Replacement product shipped (sample)
View more
- Modified on: 5/2/2023 12:12 PM
Phone Call from: **Rene Valdes (sample)** **Closed**
Schedule a maintenance appointment (sample)
Scheduled an appointment with the customer. Ca
View more
- Modified on: 5/2/2023 12:12 PM
Phone Call from: **Overdue**

With the exception of choices columns, all columns depend on a table. Columns support many different data types, such as text, number, date and time, lookup (links to another table), currency, autonumber, file, or Power Fx formula.

Create new columns to capture data when existing standard tables don't have columns that meet your requirements. After you create a new column, be sure to include it on the appropriate forms and views for the table so that they are available in your app.

Watch this short video that shows you how to quickly create a column.

[https://learn-video.azurefd.net/vod/player?id=f0015291-5024-4427-a669-dd230cf5c0c8&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Ffields-overview ↗](https://learn-video.azurefd.net/vod/player?id=f0015291-5024-4427-a669-dd230cf5c0c8&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Ffields-overview)

Types of columns

Article • 01/06/2025

The names used for types depend on the designer used. [Power Apps](#) uses a convention that includes the way the data is formatted. The solution explorer type uses a name aligned with the database data type with a format modifier.

Watch this video for a quick overview about data types in Dataverse:

<https://learn-video.azurefd.net/vod/player?id=d64c0198-42de-4dd0-8cec-14e3008442e6&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Ftypes-of-fields>

The following table includes the corresponding `AttributeTypeDisplayName` API type.

[+] [Expand table](#)

Power Apps data type	Solution Explorer type	API type
Big	Time Stamp	BigIntType
Choice	Option Set	PicklistType
Choices	MultiSelect Field	MultiSelectPicklistType
Currency	Currency	MoneyType
Customer	Customer	CustomerType
Date and Time	Date and Time <i>Date and Time Format</i>	DateTimeType
Date Only	Date and Time <i>Date Only Format</i>	DateTimeType
Decimal Number	Decimal Number	DecimalType
Duration	Whole Number <i>Duration Format</i>	IntegerType
Email	Single Line of Text <i>Email Format</i>	StringType
File	File	FileType
Floating Point Number	Floating Point Number	DoubleType
Image	Image	ImageType

Create and edit choice columns overview

Article • 10/10/2022

A choice (picklist) is a type of column that can be included in a table. It defines a set of options. When a choice is displayed in a form it uses a drop-down list control. When displayed in **Advanced Find** it uses a *picklist control*. Sometimes choices are called picklists by developers.

You can define a choice to use a set of options defined within itself (locally) or it can use a set of options defined elsewhere (globally) which can be used by other choice columns.

Global choice columns are useful when you have a standard set of categories that can apply to more than one column. Maintaining two separate choice options with the same values is difficult and if they aren't synchronized you can see errors, especially if you are mapping table columns in a one-to-many table relationship. More information:

[Mapping table columns](#)

ⓘ Note

If you define every choice as a global choice your list of global choice columns will grow and could be difficult to manage. If you know that the set of options will only be used in one place, use a local choice.

Choice columns can be configured as either single select (choice) or multi-select (choices).

ⓘ Note

You can also create global choices in your environment using the following:

- Import a solution that contains the definition of the global choices.
- A developer can write a program to create them.

More information: [Developer documentation: Choices columns](#).

See also

Autonumber columns

Article • 03/13/2023

Autonumber columns are columns that automatically generate alphanumeric strings whenever they are created. Makers can customize the format of these columns to their liking, and then rely on the system to generate matching values that automatically fill them in at runtime.

While autonumber columns are formally just text columns with additional functionality built on top of them, [Power Apps](#) simplifies this concept by simply exposing **Autonumber** as a distinct data type under the **Text** category. It is important to note that the classic solution explorer doesn't support creating or managing autonumber columns.

To create an autonumber column, follow the same steps to [create a column](#) and simply select **Autonumber** from the **Data type** drop-down list box.

You may also activate autonumber functionality on an existing text column by opening the column and selecting **Autonumber** from the **Data type** drop-down list box. Similarly, autonumber functionality can also be disabled at any time by opening the column and selecting a different option in the **Data type** drop-down list box.

ⓘ Note

Autonumber values are preselected by the database when the row is started. If a row is started but cancelled, the number it was assigned is not used. If, during this time, another row is completed with the next sequential number, gaps will be present in the autonumbering of rows.

Autonumber types

In order to make the creation of autonumber columns easier, there are a few pre-defined default autonumber types to capture the most common scenarios.

String prefixed number

The most common autonumber format is a simple string prefixed number. When this type is selected, the autonumber will consist of an automatically incrementing number with an optional string constant prefix. For example, a string prefixed number with the

Work with formula columns

Article • 11/19/2024

Formula columns are columns that display a calculated value in a Microsoft Dataverse table. Formulas use [Power Fx](#), a powerful but human-friendly programming language. Build a formula in a Dataverse formula column the same way you would build a formula in Microsoft Excel. As you type, Intellisense suggests functions and syntax, and even helps you fix errors.

Add a formula column

1. Sign in to Power Apps at <https://make.powerapps.com>.
2. Select **Tables**, and then select the table where you want to add a formula column. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
3. Select the **Columns** area, and then select **New column**.
4. Enter the following information:
 - A **Display name** for the column.
 - Optionally, enter a **Description** of the column.
5. For **Data type** select **fx Formula**.
6. Type the formula or use formula suggestions:

Type a formula

Enter the Power Fx formula in the **Formula** box. More information: [Type a formula](#)

7. Select additional properties:

- Select **Searchable** if you want this column to be available in views, charts, dashboards, and Advanced Find.
- **Advanced options:**
 - If the formula evaluates to a decimal value, expand **Advanced options** to change the number of points of precision, between 0 and 10. The default

Create formula columns with decimal, whole number, float, and choice data types

Article • 01/15/2025

This article provides guidance on creating and using different data types in Microsoft Dataverse formula columns, such as decimal, whole number, floating point, and choice columns. It outlines steps starting with selecting **fx Formula** as the data type and entering a numeric value-returning formula in the formula bar.

Start by creating a column for a table

1. Sign in to Power Apps at <https://make.powerapps.com>.
2. Select **Tables**, and then select the table where you want to add a formula column.
If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
3. Select the **Columns** area, select **New column**, and then select the data type and enter the Power Fx formula. Depending on the formula you enter, you can create any of the following:
 - [Decimal formula column](#)
 - [Whole number formula column](#)
 - [Floating point number formula column](#)
 - [Choice formula column](#)

Create a decimal formula column

Create a formula column that returns a decimal number.

1. Select **Data type** as **fx Formula**.
2. Enter a formula that returns a numeric value in the **Formula** bar. This example creates a formula column called *Total Amount*. The *Price Per Unit* column is of

Set managed properties for columns

Article • 04/10/2025

Managed properties only apply when you export columns in a managed solution and import the solution into another environment. These settings allow a solution maker to have some control over the level of customization that people who install their managed solution can have when they customize this column.

To view and set managed properties for a column, follow these steps:

1. Sign into [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Open the solution, open the table you want, and then open the **Columns** area.
3. Select the column you want.
4. On the command bar select **More Actions**, and then select **Managed properties**.
5. Select the [managed properties options](#) you want, and then select **Set**.

Managed properties options

The **Allow customizations** option controls all the other options. If this option is `False`, none of the other settings apply. When it is `True`, you can specify the other customization options.

If the column is customizable, you set the following options to `True` or `False`.

- **Display name can be modified**
- **Can change requirement level**
- **Can change additional properties**

These options are self-explanatory. If you set all the individual options to `False`, you might as well set **Allow customizations** to `False`.

Next steps

[Create and edit columns](#)

[Solutions overview](#)

Related information

[Set managed properties for columns with Power Apps \(video\)](#)

Email address validation for email columns (preview)

Article • 08/23/2024

[This topic is pre-release documentation and is subject to change.]

Get email address columns validated automatically in model-driven apps with no-code. With smart data validation, makers can build smarter and contextually aware next-gen apps for their workflows with better data quality.

Traditionally, the existing email column type had only basic email validation. With smart email address validation, the email column format comes with better validation that includes reasons for the column being invalid. Any model-driven apps using a text column with email format receives automatic validation, which is helpful in guiding users to enter better email data.

Important

- This is a preview feature.
- During preview, these regions will have email address validation feature available: Asia (East, Southeast), Australia (East, Southeast), Canada (Central, East), Europe (North, West), France (Central, South), India (Central, South), Japan (East, West), South America – Brazil (South), Switzerland (North, West), UAE (North), UK (South, West), US (East, West).
- Smart email validation currently only works for model-driven apps.
- Smart email validation shows validation issues but won't block users from saving their record.

Email address validation detects the following issues:

- Incorrect syntax: For example, an address that doesn't contain both a username and an email domain.
- Disposable domain: An address that contains a known disposable or temporary email domain.
- Test or spam email addresses. An address that contains known indicators of a test or spam address in the email header or metadata, IP address, HTML code of the email, and email content and formatting.
- Expired email addresses: This is an email account that has expired and can no longer receive or send email.

Behavior and format of the date and time column

Article • 05/28/2024

In Microsoft Dataverse, you can specify how date and time values are shown to users and how they're adjusted for time zones.

Two options are available for date and time columns.

- **Behavior:** Whether to adjust values for time zones.
- **Format:** Whether to display the time portion of the value.

Behavior

Dataverse stores all date and time values in UTC time zone. When your app displays values or processing values entered by users, Dataverse and model-driven apps can adjust for the user's time zone with these **Behavior** options.

- **User local:** Adjust values for the user's time zone. This is the default behavior. You can [change this once to another behavior](#).
- **Time zone independent:** No time zone conversion.
- **Date only:** No time zone conversion. Unlike **Time zone independent**, the time portion isn't stored.

The user's time zone is set in [personal options](#), not the system time zone in Windows, Android, iOS, or macOS. However, the [system time zone might affect client scripts that work with JavaScript Dates](#).

Format

All date and time columns have a time portion unless its behavior is **Date Only**. **Format** determines whether to display the time portion of the value.

- **Date and time:** Displays the date and time of the value.
- **Date only:** Displays the date portion of the value only.

Note

Users can still change the time portion if the **Format** is **Date Only**. For example, with Web API calls or by using a control that has the time portion. This is different

How to create and edit columns

Article • 06/04/2022

In Microsoft Dataverse columns define the individual data items that can be used to store data in a table. Columns are sometimes called *attributes* by developers.

Watch this video for a quick overview about columns:

<https://learn-video.azurefd.net/vod/player?id=3379c026-1830-4265-86fc-c7d16a0b6b49&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fcreate-edit-fields>

Before you create a custom column, evaluate whether using an existing column would meet your requirements. More information: [Create new metadata or use existing metadata?](#)

There are two designers you can use to create or edit columns:

[] [Expand table](#)

Designer	Description
Power Apps portal	Provides an easy streamlined experience, but some special settings are not available. More information: Create and edit columns for Dataverse using Power Apps portal
Solution explorer	Not as easy, but provides for more flexibility for less common requirements. More information: Create and edit columns for Dataverse using Power Apps solution explorer

ⓘ Note

You can also create columns in your environment using the following:

- In model-driven apps, select **New Column** from the form editor.
- Import a solution that contains the definition of the columns.
- Use Power Query to create new tables and fill them with data.
More information: [Add data to a table in the Dataverse by using Power Query](#).
- A developer can use **Metadata services** to write a program to create and update columns.

Manage custom columns in a table

Article • 02/24/2023

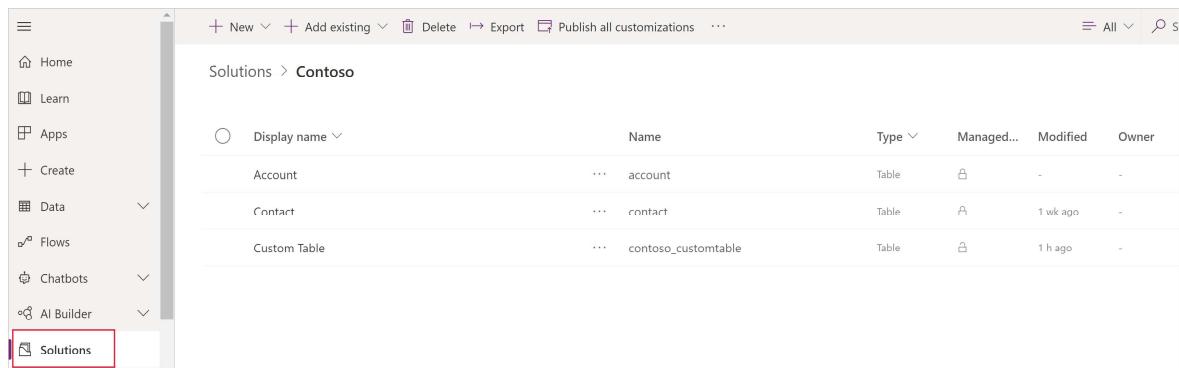
You can create and update one or more custom columns in any table. When you create a custom column, you specify a set of properties, such as the column's name, its display name, and the type of data that it will contain. For more information, see [table attribute metadata](#).

ⓘ Note

Every table has system columns, such as columns that indicate when a row was last updated, and who updated it. In addition, standard tables have standard (default) columns. You can't modify or delete system columns or standard columns. If you create a custom column, it should provide functionality on top of these built-in columns.

Create a column

1. On [powerapps.com](#), select **Tables** in the left navigation pane. If the item isn't in the left navigation pane, select ...[More](#) and then select the item you want.



The screenshot shows the Power Apps portal interface. The left sidebar includes links for Home, Learn, Apps, Create, Data (with a dropdown), Flows, Chatbots, AI Builder, and Solutions. The 'Solutions' link is highlighted with a red box. The main content area shows a list of tables under 'Contoso'. The columns are: Display name, Name, Type, Managed..., Modified, and Owner. The tables listed are Account, Contact, and Custom Table (contoso_customtable).

Display name	Name	Type	Managed...	Modified	Owner
Account	account	Table		-	-
Contact	contact	Table		1 wk ago	-
Custom Table	contoso_customtable	Table		1 h ago	-

2. Select an existing table, or [Create a new table](#)
3. Add a new column to your table by selecting **Add column**.
4. In the New Column panel, enter the **Display name** for your column, **Name** will be automatically populated and is used as the unique name for your column. The **Displayname** is used when presenting this column to your users, the **Name** is used when building your app, in expressions and formulas.

ⓘ Note

Create and edit columns in Dataverse using Power Apps

Article • 04/02/2025

Creating and editing table columns in Microsoft Dataverse using Power Apps is a straightforward process that allows you to customize your data tables to meet your specific needs. This guide walks you through the steps to view, create, and edit columns, as well as provide detailed information on the various data types and properties you can configure. Whether you're adding new columns or modifying existing ones, Power Apps offers a user-friendly interface to manage your Dataverse tables efficiently.

View columns

1. From [Power Apps](#), select **Tables**, and then open the table that has the columns you want to view. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Select the **Columns** area, where all columns for the table are displayed.

Create a column

While viewing columns, on the command bar, select **New column** which displays the **Column properties** panel.

Several column properties are available:

[+] Expand table

Property	Description
Display Name	The text to be displayed for the column in the user interface.
Name	The unique name across your environment. A name is generated for you based on the display name that you've entered, but you can edit it before saving. Once a column is created, the name can't be changed as it might be referenced in your applications or code. The name has the customization prefix for your Dataverse Default Publisher prepended to it.
Data type	Controls how values are stored as well as how they're formatted in some applications. Once a column is saved, you can't change the data type except for converting text columns to autonumber columns.

Create and edit columns for Microsoft Dataverse using Power Apps solution explorer

Article • 04/01/2025

Solution explorer provides one way to create and edit columns for Dataverse.

The [Power Apps portal](#)  enables configuring the most common options, but certain options can only be set using solution explorer.

More information:

- [Create and edit columns for Dataverse](#)
- [Create and edit columns for Dataverse using Power Apps portal](#)

Part of the name of any custom column you create is the customization prefix. This is set based on the solution publisher for the solution you're working in. Make sure that you're working in an unmanaged solution where the customization prefix is the one you want for this table. More information: [Change the solution publisher prefix](#)

View columns

1. From [Power Apps](#) , select **Solutions** on the left navigation pane, and then on the toolbar select ... > **Switch to classic**.
2. Open the unmanaged solution where you want to view a column. The classic solution explorer opens in a new browser window.
3. In the classic solution explorer, under **Components** expand **Entities**, expand the table where you want to view columns, and then select **Fields**.

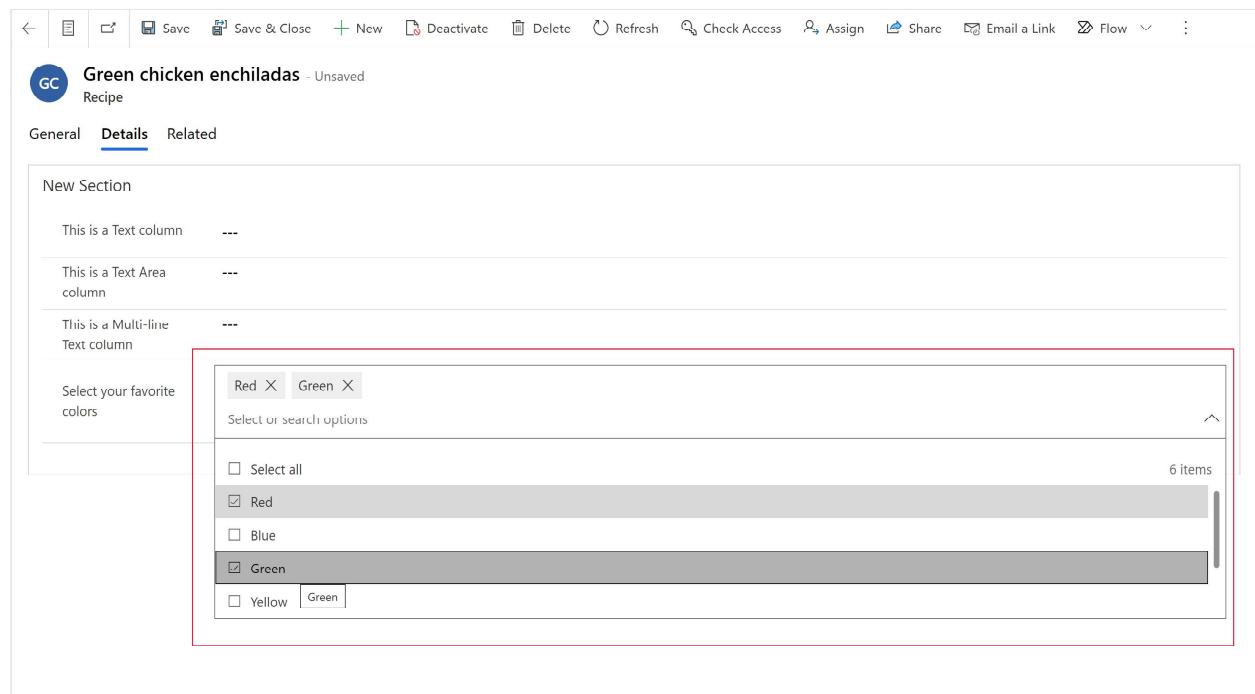
Create a choice

Article • 03/13/2023

Choice columns allow you to include dropdown lists of fixed values to a user within your app to ensure data consistency. Choice columns, were formerly referred to as option sets and are sometimes called picklists. Similar to tables, there are both standard choices or makers have the ability to create custom choice columns to use in apps.

Choices can be created while working from a solution in powerapps.com or on a table form in the form designer.

Choice columns can be single selection only (choice) or can allow multi-selection (choices). The following screenshot shows a multi-select choices column in a model-driven app.



Choices are either global or local. You can define a choice to use a set of options defined elsewhere (globally) which can be made available to other choice columns, or define a set of options only available within the choice column (locally). More information: [Create and edit choice columns overview](#)

Create a global choice within a solution

1. Sign into [powerapps.com](#), select **Solutions**, and then open the solution you want. If the item isn't in the left navigation pane, select ...[More](#) and then select the item you want.

Automate calculations by defining calculated columns

Article • 05/22/2024

Use calculated columns to automate otherwise manual calculations used in your business processes.

For example, a salesperson might want to know the weighted revenue for an opportunity, which is based on the estimated revenue from an opportunity multiplied by the probability. Or, they want to automatically apply a discount, if an order is greater than \$500. A calculated column can contain values resulting from simple math operations, or conditional operations, such as greater than or if-else, and many others.

Capabilities

- Calculated columns use the columns from the current table or related parent tables.
- The expression support is available on the current table and the related parent table columns in the **Condition** sections and the **Action** sections. The built-in functions include:
ADDHOURS, **ADDDAYS**, **ADDWEEKS**, **ADDMONTHS**, **ADDYEARS**,
SUBTRACTHOURS, **SUBTRACTDAYS**, **SUBTRACTWEEKS**, **SUBTRACTMONTHS**,
SUBTRACTYEARS, **DIFFINDAYS**, **DIFFINHOURS**, **DIFFINMINUTES**, **DIFFINMONTHS**,
DIFFINWEEKS, **DIFFINYEARS**, **CONCAT**, **TRIMLEFT**, and **TRIMRIGHT**. Learn more in [Functions syntax](#).
- A rich conditional support provides branching and multiple conditions. The logical operations include **AND** and **OR** operators.
- The visual editing capabilities include modern user interface and intellisense in the **ACTION** section.
- A seamless integration of the calculated columns with the forms, views, charts, and reports are available in real time.
- You can configure calculated columns to use custom controls.

Scenarios

- Weighted Revenue:** Estimated revenue multiplied by probability
- Net Worth:** Assets subtracted by the liabilities for a given account
- Cost of Labor:** Base rate up to 40 hours, plus more overtime
- Contact Number:** Phone number for an opportunity based on account or contact

Define rollup columns that aggregate values

Article • 04/30/2024

Rollup columns help users obtain insights into data by monitoring key business metrics. A rollup column contains an aggregate value computed over the rows related to a specified row. This includes regular tables and activity tables such as emails and appointments.

In more complex scenarios, you can aggregate data over the hierarchy of rows. As an administrator or customizer, you can define rollup columns by using the customization tools in Power Apps, without needing to write code.

Rollup columns benefits and capabilities

The benefits and capabilities of rollup columns include:

- Visual editing is easy. You can create rollup columns by using the Column Editor, just like you do when you create a regular column.
- Wide selection of aggregate functions. You can aggregate data by using the following functions: `SUM`, `COUNT`, `MIN`, `MAX` and `Avg`.
- Full filter support for aggregation. You can set various filters for the source table or related table while setting multiple conditions.
- Seamless integration with the user interface. You can include the rollup columns in forms, views, charts, and reports.
- Rollup columns are solution components. You can easily transport the rollup columns as components between environments and distribute them in solutions.
- Rollup columns and the calculated columns are complementary to each other. You can use a rollup column as a part of the calculated column, and vice versa.
- You can configure rollup columns to use custom controls.

Some examples of rollup columns include:

- Total estimated revenue of open opportunities of an account
- Total estimated revenue of open opportunities across all accounts in a hierarchy
- Total estimated revenue of an opportunity including child opportunities
- Total estimated value of qualified leads generated by a campaign
- Number of high priority open cases across all accounts in a hierarchy
- Earliest created time of all high priority open cases for an account

Map table columns

Article • 09/19/2024

You can map columns, also known as attributes, between tables that have a one-to-many or many-to-one table relationship. Column mapping lets you set default values for a row that is created in the context of another row.

Let's say that people want to add a new contact row for a person who is an employee for a specific account. They can do this in two different ways:

- The hard way is people can just navigate in the app to create a new contact row from scratch. But then they need to set the parent account and enter several items of information, such as address and phone information, which are probably the same as the parent account it can be time consuming and introduce opportunities for error.
- The easier way is to start with the account table and, using the **Contacts** subgrid on the form, and then select + to add a contact. The interface first guides people to look up any existing related contacts so they don't accidentally create a duplicate row. If they don't find an existing row, they can select **New** and create a new contact row. The new contact row form then includes any of the mapped attribute values from the account, such as address and phone information, as the default values. People can edit these values before they save the row.

When you map table columns for a 1:N table relationship, certain items of data from the primary table row will be copied into the new related table form to set default values that people can edit before saving.

ⓘ Note

- These mappings only set default values to a row before it's saved. People can edit the values before saving. The data that is transferred is the data at that point in time. The data isn't synchronized if the source data later changes.
- These mappings aren't applied to related rows created using a workflow or dialog process. They aren't automatically applied to new rows created using code, although developers can use a special message called `InitializeFrom` ([InitializeFrom Function](#) or [InitializeFromRequest Class](#)) to create a new row using available mappings.
- These mappings aren't applied for new related table forms that are opened when an app doesn't have an active network connection to Microsoft

Delete columns

Article • 02/15/2022

As someone with the system administrator security role, you can delete any custom columns that aren't part of a managed solution. When you delete a column, any data stored in the column is lost. The only way to recover data from a column that was deleted is to restore the database from a point before the column was deleted.

Before you can delete a custom table, you must remove any dependencies that may exist in other solution components.

1. In the **Solutions** area of Power Apps, open the solution that includes the column that you want to delete.
2. Open the table, select the **Column** tab, and then select the column you want to delete.
3. Select **Show Dependencies** on the command bar to view the **Dependent components** page.

For example, if the column is used in a form or view, you must first remove the column from those solution components.

If you delete a lookup column, the 1:N table relationship for it will automatically be deleted.

See also

[Delete a custom table](#)

Apply business logic in Microsoft Dataverse

Article • 02/14/2024

There are several choices available for applying business logic in Dataverse.

Business rules

You can create business rules and recommendations to apply logic and validations without writing code or creating plug-ins. Business rules provide a simple interface to implement and maintain fast-changing and commonly used rules.

Define *business rules* for a table that apply to all the table forms and at the server level. Business rules defined for a table apply to both *canvas apps* and *model-driven apps* if the table is used in the app. More information: [Create a business rule for a table](#)

 Note

To define a business rule that applies to a form in a model-driven app, see [Create business rules for a model-driven app form](#)

Dataverse processes

You can also use the following Dataverse processes:

- [Real-time workflows](#)
- [Actions](#)

Power Automate

Power Automate has several different flows you can use to create automated workflows within Dataverse or between Dataverse and another app or service that can be used to synchronize files, get notifications, collect data, and more.

 Expand table

Create a business rule for a table

Article • 10/22/2024

You can create business rules and recommendations to apply logic and validations without writing code or creating plug-ins. Business rules provide a simple interface to implement and maintain fast-changing and commonly used rules.

Important

Business rules defined for a table apply to both *canvas apps* and *model-driven apps* if the table is used in the app. Not all business rule actions are available on canvas apps at this time. More information: [Differences between canvas and model-driven apps](#)

In a model-driven app, not all business rule actions are available for [editable grids](#). For [table based view pages](#), recommendations can't be created. Editable [subgrids](#) don't support business rules. Business rules won't work with other types of dataset controls.

To define a business rule that applies to a form in a model-driven app, see [Create business rules to apply logic in a model-driven app form](#).

By combining conditions and actions, you can do any of the following with business rules:

- Set column values
- Clear column values
- Set column requirement levels
- Show or hide columns
- Enable or disable columns
- Validate data and show error messages
- Create business recommendations based on business intelligence.

Differences between canvas and model-driven apps

Forms in model-driven apps can use all actions available on business rules, however not all business rule actions are available for canvas apps at this time. The following actions are **not** available on canvas apps:

Microsoft Dataverse real-time workflows

Article • 07/12/2024

Workflows automate business processes without a user interface. People usually use workflow processes to initiate automation that doesn't require any user interaction.

There are two types of workflows:

- Background workflows. Background workflows run when the system has resource availability (asynchronously). Go to the [Power Automate](#) documentation for more details about background workflows.
- Real-time workflows. Real-time workflows run immediately (synchronously).

Create or edit real-time workflows

ⓘ Important

There are better ways to create modern automations. Consider using Power Automate flows to automate your processes. More information: [Power Automate](#)

1. Create a solution or open an existing one.
2. Select **New > Automation > Process > Workflow**.
3. Enter a **Display name**, select a **Table**, and then clear the **Run workflow in the background** option.
4. Select **Create**.

The workflow designer is displayed. Select the workflow attributes and steps needed. More information: [Configure real-time workflow stages and steps](#)

View and edit real-time workflows

1. Sign in to [Power Apps](#), select the **Settings** icon on the upper right, and then select **Advanced settings**.
2. Select the down arrow next to **Settings** on the top bar, and then select **Processes**.
3. In the list of processes, select the workflow that you want to edit.

Learn more

Configure real-time workflow stages and steps

Article • 02/01/2023

When you design workflows, you have the option to contain the logic you want to perform in stages and steps.

Stages

Stages make the real-time workflow logic easier to read, and explain the real-time workflow logic. However, stages do not affect the logic or behavior of workflows. If a process has stages, all the steps within the process must be contained with a stage.

Steps

Steps are a unit of business logic within a workflow. Steps can include conditions, actions, other steps, or a combination of these elements.

Actions that real-time workflow processes can perform

Real-time workflow processes can perform the actions listed in the following table.

Action	Description
Create Row	Creates a new row for a table and assigns values that you choose to attributes.
Update Row	You can update the row that the real-time workflow is running on, any of the rows linked to that row in an N:1 relationship, or any rows created by earlier steps.
Assign Row	You can assign the row that the real-time workflow is running on, any of the rows linked to that row in an N:1 relationship, or any rows created by earlier steps.
Send Email	Sends an email. You can choose to create a new email message or use an email template configured for the table of the row that the real-time workflow is running on or any tables that have an N:1 relationship with the table, or the table for any rows created by earlier steps.
Start Child Workflow	Starts a real-time workflow process that has been configured as a child workflow.
Change Status	Changes the status of the row that the process is running on, any of the rows linked to that row in an N:1 relationship, or any rows created by earlier steps.

Monitor and manage real-time workflow processes

Article • 05/15/2024

To monitor and manage processes, you must locate the process, evaluate the status, and perform any actions necessary to address problems.

Monitoring real-time workflows and actions

Real-time workflows and actions don't use System Job rows because are displayed to the user in the application with the heading **Business Process Error**.

There's no log for successful operations. You can enable logging for errors by checking the **Keep Logs for workflow jobs that encountered errors** option in the **Workflow Log Retention** area at the bottom of the **Administration** tab for the process.

To view the log of errors for a specific process, open the real-time workflow or action definition and go to the **Process Session** tab. This log only shows errors logged for this process.

If you want a view of all the errors for any process, go to **Advanced Find** and create a view showing errors on the process session table.

Status of real-time workflow processes

When you view a list of real-time workflow processes, any individual process can have one of the following **State** and **Status Reason** values:

[] Expand table

State	Status Reason
Ready	Waiting for Resources
Suspended	Waiting
Locked	In Progress
	Pausing
	Canceling

Best practices for real-time workflow processes

Article • 02/15/2022

This article contains best practices for creating and managing real-time workflow processes.

Avoid infinite loops

It's possible to create logic in a real-time workflow that initiates an infinite loop, which consumes server resources and affects performance. The typical situation where an infinite loop might occur is when you have a real-time workflow configured to start when a column is updated and then updates that column in the logic of the workflow. The update action triggers the same real-time workflow that updates the record and triggers the real-time workflow again and again.

The workflows you create include logic to detect and stop infinite loops. If a real-time workflow process is run more than a certain number of times on a specific record in a short period of time, the process fails with the following error: **This workflow job was canceled because the workflow that started it included an infinite loop. Correct the workflow logic and try again.** The limit of times is 16.

Use real-time workflow templates

If you have workflows that are similar and you anticipate creating more workflows that follow the same pattern, save your real-time workflow as a workflow template. This way, the next time you need to create a similar workflow, you can create the real-time workflow using the template and avoid entering all the conditions and actions from scratch.

In the **Create Process** dialog, choose **New process from an existing template (select from list)**.

Use child workflows

If you apply the same logic in different workflows or in conditional branches, define that logic as a child real-time workflow so you don't have to replicate that logic manually in each real-time workflow or conditional branch. This helps make your workflows easier to

Functions in Microsoft Dataverse (preview)

Article • 02/15/2025

[This topic is pre-release documentation and is subject to change.]

Microsoft Dataverse offers a powerful solution for achieving more efficient data architecture and reducing client-side workload through functions (formerly known as instant low-code plug-ins). Functions in Dataverse use [Power Fx](#) to create your business logic. Power Fx is a general-purpose, strong-typed, declarative, and functional programming language. Whereas functions in Dataverse are reusable solution objects, which execute a specific set of commands within Dataverse, running server-side.

Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Traditionally, functions were created using plug-ins. These plug-ins were created as custom classes compiled into a .NET Framework assembly, which were then uploaded and registered within Dataverse. However, now with the introduction of functions, users can create them with minimal or no coding required, and without the need for manual registration.

Functions are stored within a Dataverse database and can be seamlessly integrated into Power Apps and Power Automate. The behavior of the workflow is defined using the Power Fx expression language and can directly connect with Dataverse business data and external data sources through Power Platform connectors. With functions, makers can rapidly construct complex logic with minimal coding expertise.

Benefits of creating server-side logic

Defining server-side business logic offers several benefits, including:

- Increased security. Since server-side logic executes on the server, it can help prevent unauthorized access to sensitive data or processes.

Create and use functions in Microsoft Dataverse (preview)

Article • 02/24/2025

[This topic is pre-release documentation and is subject to change.]

Create and use reusable functions in Microsoft Dataverse. Functions use Power Fx to execute a specific set of commands within Dataverse that run server-side.

Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Prerequisites

System customizer security role membership in the Power Platform environment.

Create a function in a solution

1. Go to [Power Apps](#), and then select **Solutions** in the left navigation pane. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Open the solution where you want to create a function.
3. On the command bar, select **New > Automation > Function**.
4. Enter the following information in the **New function** side panel that appears.
 - Provide a **Display name** and **Description** for your function.
 - Select **New input parameter** and/or **New output parameter**, then provide a name and data type for the parameter. Add more input and output parameters as needed.
 - In the **Table references** list you can optionally select tables. You can reference the Dataverse tables you choose using data collection functions, such as **Filter()** and **LookUp()**.
 - Enter the Power Fx expression in the **Formula** box.
5. Select **Save**.

Invoke a function from app, flow, code, or another function (preview)

Article • 02/26/2025

[This topic is pre-release documentation and is subject to change.]

You can invoke functions in Dataverse from a canvas app, a custom page in a model-driven app, a flow, code, or from another function.

Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Invoke a function from a canvas app or custom page

1. From the **Functions** area in Power Apps (make.powerapps.com), select the function you want to invoke from a canvas app or custom page.
2. Select **Copy code snippet** on the command bar.
3. Paste and save the copied formula to a text editor, Notepad, or somewhere you can easily refer to.
4. In Power Apps Studio:
 - a. Create or edit a canvas app or custom page in Power Apps Studio.
 - b. On the left navigation pane, under the **Data Sources** tab, select **Add data**, and search for the **Environment** option from the Dataverse connector, and select it.
 - c. Insert the following components onto the canvas:
 - Add input controls that correspond with each parameter's data type, such as number input.
 - Add a button to call the function.
 - Add an output control that corresponds with your parameter's data type, such as number input.
5. Select the button you created, and in the **OnSelect** property, enter your function, such as *Environment.new_calculatesum*.

Example functions (preview)

Article • 02/15/2025

[This topic is pre-release documentation and is subject to change.]

The article helps you get started with functions in Microsoft Dataverse by integrating them into your apps. You'll understand that the authoring experience includes authoring Dataverse custom APIs backed by Power Fx expressions, which can trigger actions internal or external to Dataverse.

ⓘ Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Test a Power Fx expression

You can test a Power Fx expression to verify it's working. This example uses the `Abs()` function to return the non-negative value of its argument. If a number is negative, `Abs` returns the positive equivalent.

1. Sign into [Power Apps](#) and select **Functions** from the left navigation. If the item isn't in the side panel pane, select **...More** and then select the item you want. Open the unmanaged solution where you want to add a function.
2. Select **New function**.
3. On the **New function** pane, enter a **Display name**, such as *Return non-negative value*, and **Description** for your function.
4. Create a **New output parameter** to validate expected behavior, such as a string. For example, enter the **Name** of your **New Output parameter** `Out`.
5. Optionally, use input parameters to make testing easier, that makes sense with the formula. In this example, no input parameters are used.
6. In the **Formula** box, wrap the **Out** parameter in curly brackets: `{Out: "" }` For example, you can test the `Abs()` function, which uses `-5` to return the absolute value `5`.

Supported functions

Article • 02/15/2025

Functions in Microsoft Dataverse can add business logic to your apps using the Power Fx expression language and you can quickly build rich workflows without any code. Functions support many of the Power Fx operators, variables, and formulas.

The following table lists the Power Fx formulas that work with functions in Dataverse but have limitations or don't work but have an alternative for use with functions.

[+] Expand table

Power Fx formula or operation	Supported in functions?	Limitation or work around
Collect	Yes	Requires the variable to exist and the variable type to match what you're trying to set it to.
Defaults	No	Use <code>Collect</code> instead of <code>Patch</code> . For example, instead of <code>Patch(account, Defaults(account), {"Account Name": "Example Account"})</code> , use <code>Collect(account, {"Account Name": "Example Account"})</code> .
Add tables in the UI	Yes	For example, in order for the expression to <code>Collect(Accounts, {...})</code> , the accounts table needs to be added in the UI. This helps with intellisense.
Accessing fields in formula	Yes	No implicit scope for accessing fields. Instead of saying <code>Field2</code> , say <code>NewRecord.Field2</code> . This applies to <code>Set</code> as well: <code>Set(NewRecord.Field1, OldRecord.Field2*10)</code> .
With()	Yes	Functions don't support contexts, named formulas, or variables. <code>With()</code> can be used to create aliases and factor the expressions.
Access Dataverse tables	Yes	Functions can read and write to Dataverse tables. This includes <code>Collect()</code> , <code>Patch()</code> , <code>Filter()</code> , and <code>LookUp()</code> . Delegation operations are supported, and a warning is issued if an expression can't be delegated. These operations run directly against the function's <code>IOrganizationService</code> (not the current table) and directly operate on the database. Functions run in the transaction context.

Power Fx functions not supported

Use low-code plug-ins in Dataverse (preview)

Article • 11/13/2024

[This topic is pre-release documentation and is subject to change.]

Microsoft Dataverse offers a powerful solution for achieving more efficient data architecture and reducing client-side workload through low-code plug-ins. These plug-ins are reusable, real-time workflows that execute a specific set of commands within Dataverse, running server-side and triggered by personalized event handlers.

Important

- Instant low-code plug-ins are deprioritized and aren't being delivered as a feature. Instant low-code plug-ins are replaced with functions. More information: [Functions in Microsoft Dataverse \(preview\)](#).
- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Traditionally, plug-ins were created as custom classes compiled into a .NET Framework assembly, which were then uploaded and registered within Dataverse. However, with the introduction of low-code plug-ins, users can create these event handlers with minimal or no coding required, and without the need for manual registration.

Low-code plug-ins are stored within a Dataverse database and can be seamlessly integrated into Power Apps and Power Automate. The behavior of the workflow is defined using the Power Fx expression language and can directly connect with Dataverse business data and external data sources through Power Platform connectors. With low-code plug-ins, makers can rapidly construct complex workflows with minimal coding expertise, resulting in a more streamlined and efficient data architecture.

Benefits of server-side logic

Defining server-side business logic offers several benefits, including:

- Increased security. Since server-side logic executes on the server, it can help prevent unauthorized access to sensitive data or processes.

Example Dataverse low-code plug-ins (preview)

Article • 02/15/2025

[This topic is pre-release documentation and is subject to change.]

The goal of these example plug-ins is to help you get started by integrating them into your apps. You'll understand the authoring experience includes authoring Microsoft Dataverse custom APIs backed by Power Fx expressions, which can trigger actions internal or external to Dataverse.

ⓘ Important

- Instant low-code plug-ins are deprioritized and aren't being delivered as a feature. Instant low-code plug-ins are replaced with functions. More information: [Functions in Microsoft Dataverse \(preview\)](#).
- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Prerequisite

To use one of the example plug-ins for the data event the Dataverse accelerator app must be installed in the environment. More information: [Prerequisites for creating a low-code plug-in](#)

ⓘ Note

Email templates are only available for certain tables. More information: [Create templates for email](#)

Return a non-negative value

This example uses the [Abs\(\) function](#) to return the non-negative value of its argument. If a number is negative, `Abs` returns the positive equivalent.

Low-code plug-ins Power Fx (preview)

Article • 02/15/2025

[This topic is pre-release documentation and is subject to change.]

Low-code plug-ins can add business logic to your apps using the Power Fx expression language and directly integrate with Dataverse business data and external data through Power Platform connectors. With low-code plug-ins, you can quickly build rich workflows without any code.

Important

- Instant low-code plug-ins are deprioritized and aren't being delivered as a feature. Instant low-code plug-ins are replaced with functions. More information: [Functions in Microsoft Dataverse \(preview\)](#).
- This is an preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Low-code plug-ins support many of the Power Fx operators, variables, and formulas. For more information about Power Fx, go to these articles:

- [Expression grammar](#)
- [Operators](#)
- [Variables](#)
- [Formula reference](#)

The following table lists the Power Fx formulas that work but have limitations or don't work but have an alternative for use with low-code plug-ins.

 Expand table

Power Fx formula	Supported in plug-ins?	Limitation or work around
Collect	Yes	Requires the variable to exist and the variable type to match what you're trying to set it to.
Defaults	No	Use Collect instead. For example, instead of <code>Patch(account, Defaults(account), {"Account Name": "Example Account"})</code> use

Create low-code plug-ins to use with a copilot (preview)

Article • 05/03/2024

[This topic is pre-release documentation and is subject to change.]

Copilot actions are a way to extend the capabilities of your copilot bots. With Copilot generative AI actions, you create custom actions that are triggered by your copilot bot. These actions are used to perform a wide range of tasks, such as sending emails, creating records in Microsoft Dataverse, or calling external APIs. In this article, you create a basic low-code plug-in that adds two integers together and a more complex plug-in that can be used to send a notification either of which can be used to create an action in Microsoft Copilot Studio.

Important

- Instant low-code plug-ins are deprioritized and aren't being delivered as a feature. Instant low-code plug-ins are replaced with functions. More information: [Functions in Microsoft Dataverse \(preview\)](#).
- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Prerequisites to use the plug-in with Microsoft Copilot

Before you begin, make sure you have the following prerequisites:

- Access to a Dataverse environment that includes the Dataverse Accelerator App for creating low-code plug-ins.
- Access to Copilot Studio in the same environment as your Dataverse environment.

Basic low-code plugin example

In this example you create a low-code instant plug-in that adds two numbers and returns the sum of those numbers. You then create a Copilot action that calls this low-

Microsoft Dataverse low-code plug-ins tips and known issues (preview)

Article • 02/15/2025

[This topic is pre-release documentation and is subject to change.]

This article describes tips and known issues when working with low-code plug-ins in Microsoft Dataverse.

Important

- Instant low-code plug-ins are deprioritized and aren't being delivered as a feature. Instant low-code plug-ins are replaced with functions. More information: [Functions in Microsoft Dataverse \(preview\)](#).
- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Handle general runtime issues

If you face runtime plugin issues, re-edit the low-code plug-in. Then the intellisense issues on your formula expression are displayed in the low-code plug-in editor. Follow the guidelines to correct the issue that are also displayed, and then resave the plug-in.

Use caution when using post-operation patching

Your low-code plug-in execution might encounter this error when using `Patch` in a post-operation: `Execution failed for PowerPlexPlugin: System.ServiceModel.FaultException`1[Microsoft.Xrm.Sdk.OrganizationServiceFault]` `This low-code plugin's execution was cancelled because the plugin logic caused an infinite loop. Correct the plugin logic and try again.`

Using `Patch` in a post-operation scenario must be done with caution to avoid infinite loops. A `Patch` operation initiates a new transaction. For example, if an update trigger

Use custom process actions

Article • 02/15/2022

Custom process actions, also known as *Custom actions*, or just *actions* open a range of possibilities for composing business logic. With custom process actions, you can perform operations, such as Create, Update, Delete, Assign, or Perform Action. Internally, a custom process action creates a custom message. Developers refer to these actions as *messages*. If the goal of a process is to create a row, then update it, and then assign it, there are three separate steps. Each step is defined by the capabilities of the table—not necessarily your business process.

Custom process actions let you define a single verb (or message) that matches an operation you need to perform for your business. These new messages are driven by a process or behavior rather than what can be done with a table. These messages can correspond to verbs like Escalate, Convert, Schedule, Route, or Approve—whatever you need. The addition of these verbs helps provide a richer vocabulary for you to fluently define your business processes. You can apply this richer vocabulary from clients or integrations rather than having to write the action within clients. This also makes it easier because you can manage and log the success or failure of the entire action as a single unit.

Configurable messages

Once an action is defined and activated, a developer can use that message like any of the other messages provided by the platform. However, a significant difference is that now someone who isn't a developer can apply changes to what should be done when that message is used. You can configure the action to modify steps as your business processes change. Any custom code that uses that message doesn't need to be changed as long as the process arguments don't change.

Workflow processes and plug-ins continue to provide similar capabilities for defining automation. Workflow processes still provide the capability for a nondeveloper to apply changes. But the difference is in how the business processes are composed and how a developer can write their code. A custom process action is a message that operates on the same level as any of the messages provided by the platform. Developers can register plug-ins for actions.

Note

Create a custom process action

Article • 02/15/2022

Use custom process actions when you want to automate a series of commands in the system. Custom process actions expand the vocabulary available for developers to express business processes. A custom process action uses core verbs provided by the system, such as Create, Update, Delete, and Assign, to create more expressive verbs like Approve, Escalate, Route, or Schedule. If the definition of a business process changes, someone who isn't a developer can edit the custom process action so the code doesn't need to be changed.

ⓘ Note

If you intend to write a plug-in to implement your logic for a custom process action instead of using the workflow designer, you should use custom API instead. More information: [Compare Custom Process Action and custom API](#)

Create a custom process action

ⓘ Important

If you're creating a custom process action to include as part of a solution that will be distributed, create it in the context of the solution. Go to [Settings](#) > [Solutions](#) and locate the unmanaged solution that this action will be part of. Then, in the menu bar, select **New > Process**. This ensures that the customization prefix associated with the name of the action will be consistent with other components in the solution. After you create the action, you can't change the prefix.

Like workflow processes, custom process actions have the following properties in the [Create Process](#) dialog box:

- **Process name**

After you enter a name for the process, a unique name will be created for it by removing any spaces or special characters from the process name.

- **Category**

This property establishes that this is an action process. You can't change this after you save the process.

Configure custom process actions from a workflow

Article • 02/15/2022

You can enable a custom process action from a real-time workflow without writing code.

More information: [Invoke custom actions from a workflow](#)

You also can create a custom process action so that a developer can use it in code, or you might need to edit an action that was previously defined. Like real-time workflow processes, consider the following:

- What should the action do?
- Under what conditions should the action be performed?

Unlike real-time workflow processes, you don't need to set the following options:

- **Start When:** Custom process actions start when code calls the message generated for them.
- **Scope:** Custom process actions always run in the context of the calling user.
- **Run in the background:** Custom process actions are always real-time workflows.

Custom process actions also have something that real-time workflow processes don't—input and output arguments. More information: [Define process arguments](#)

Create a custom process action

Important

If you're creating an action to include as part of a solution that will be distributed, create it in the context of the solution. Go to [Settings](#) > [Solutions](#) and locate the unmanaged solution that this action will be part of. Then, in the menu bar, select [New > Process](#). This ensures that the customization prefix associated with the name of the action will be consistent with other components in the solution. After you create the action, you can't change the prefix.

Note

Invoke custom process actions from a workflow

Article • 02/15/2022

Workflows have numerous capabilities supporting business scenarios. Calling basic data operation actions for a row, such as create, update, and delete, from within a workflow solves quite a few business scenarios. However, if you couple the capabilities of the workflows with the power of the custom processs actions invoked directly from within a workflow, you add a whole new range of business scenarios to your application without needing to write code.

Let's look at the scenario in which a custom process action is invoked from a workflow. We'll invoke a custom process action to request the manager's approval when a discount for a particular opportunity exceeds 20 percent.

Example: Create a custom process action using the opportunity table

1. In [solution explorer](#), select **Processes**.
2. On the Nav bar, choose **New**. Give the process a name and choose the **Action** category.

To request an approval for the discount, we're using a custom action called **Approval Process**. We added an input parameter, **SpecialNotes**, and a **Send email** step to create a new message and send a request for the manager's approval, as shown here.

Solutions in Power Apps overview

Article • 10/25/2024

Solutions are used to transport apps and components from one environment to another or to apply a set of customizations to existing apps. A solution can contain one or more apps as well as other components such as site maps, tables, processes, web resources, choices, flows, and more.

Solutions are the mechanism for implementing application lifecycle management (ALM) in Power Apps and other Power Platform products, such as Power Automate.

ⓘ Note

To learn more about the solution concepts and how solutions are used for application lifecycle management, go to [Overview of ALM with Microsoft Power Platform](#) in the Power Platform ALM guide.

This section focuses on the **manual** tasks that app makers need to perform while working with solutions in Power Apps.

Get started: solution concepts

Before you work with solutions, it's important that you get acquainted with the following solution concepts:

- Two types of solutions (managed and unmanaged)
- Solution components
- Lifecycle of a solution (create, update, upgrade, and patch a solution)
- Solution publisher
- Solution and solution component dependencies

To learn more, go to [Solution concepts](#) in the Power Platform ALM guide.

Default solutions

Power Apps provides you with the following default [unmanaged](#) solutions:

- **Common Data Service Default Solution.** This solution is available for makers to use by default for their customizations in an environment. The Common Data

Solution view

Article • 11/06/2024

The modern solution view makes it easier for you to work with solution objects and subcomponents in your solutions.

Open solution view

To open the solution view, sign in to Power Apps (make.powerapps.com) on the left navigation pane, select **Solutions**, and then open the solution you want. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.

The solution objects and available actions are displayed.

1. Panes - The left navigation pane consists of the following areas:

- **Overview.** Provides details about the solution, such as display name, name, created on date, version, managed or unmanaged, publisher, description, and whether the solution is a patch. Also, solution health information and solution actions available on the command bar such as export, clone, apply upgrade, and translations.
- **Objects.** Presents a tree view of all objects within the solution. Select an object from the objects list (4) to view or edit it.
- **History.** Presents the solution operations completed on the solution. An operation can be a solution import, export, or uninstall. The solution history displays information such as solution version, solution publisher, type of operation, operation start and end time, and operation result status.
- **Pipelines.** Deploy solutions using pipelines in Power Platform. More information: [Set up pipelines in Power Platform](#)
- **Source control** (not shown in image). Connect to Git to source your Power Platform solution objects in an Azure DevOps Git repo. More information: [Overview of Dataverse Git integration](#)

2. Tree view. From the **Object** pane, the tree view displays a list that you can browse to find an object to open it or one of the object's subcomponents. Search for objects and subcomponents that are in the solution.

3. Command bar. Contextual command bar to perform actions on the solution, objects, or subcomponents.

4. Objects. Displays information and solution components that can be viewed and/or opened for editing of the selected object from the **Objects** pane. Add existing

Create a solution

Article • 10/16/2024

To locate and work with just the components you've customized, create a solution and do all your customization there. Then, always remember to work in the context of the custom solution as you add, edit, and create components. This makes it easy to export your solution so that it can be backed up or imported to another environment.

Note

For information about implementing healthy application lifecycle management (ALM) using solutions, see the [Power Platform ALM guide](#).

To create a solution:

1. Sign in to [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Select **New solution** and then complete the required columns for the solution.

 [Expand table](#)

Field	Description
Display Name	The name shown in the list of solutions. You can change this later.
Name	The unique name of the solution. This is generated using the value you enter in the Display Name column. You can edit this before you save the solution, but after you save the solution, you can't change it.
Publisher	You can select the default publisher or create a new publisher. We recommend that you create a publisher for your organization to use consistently across your environments where you'll use the solution. See Solution publisher later in this article.
Version	Enter a number for the version of your solution. This is only important if you export your solution. The version number is included in the file name when you export the solution.

3. Select **Save**.

After you save the solution, you might wish to add information to columns that aren't required. These steps are optional. Use the **Description** column to describe the solution

Export solutions

Article • 03/13/2023

You can manually export solutions using the steps in this article. We recommend that you create an unmanaged solution to use for exporting your customizations, and then export your customizations periodically so that you have a backup in case anything happens. You can't export [managed](#) solutions or the [Default Solution](#).

ⓘ Note

To implement healthy application lifecycle management (ALM) in your organization, consider using a source control system to store and collaborate on your solutions, and automate the solution export process. More information: [ALM basics](#) in the Power Platform ALM guide.

Export from Power Apps

1. Sign into [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
2. In the list of solutions, select the unmanaged solution you want to export, and then select **Export**. Notice that you can't export managed solutions.
3. The **Before you export** right pane appears. Choose from the following options, and then select **Next**:
 - **Publish all changes.** Notice that, when you export an unmanaged solution, only published components are exported. We recommend that you select **Publish all changes** to make sure all components are included in the exported solution.
4. The **Export this solution** right pane appears. Enter or select from the following options, and then select **Export**:
 - **Version number:** Power Apps automatically increments your solution version while displaying the current version. You can accept the default version or enter your own.
 - **Export as:** Select the package type, either **Managed** or **Unmanaged**. More information: [Managed and unmanaged solutions](#)

Import solutions

Article • 03/29/2024

You can manually import solutions using the steps in this article. You must import only those solutions that you've obtained from a trusted source.

ⓘ Note

- The create privilege is required to import a component. Although, the System Customizer security role has create privilege on most components that are commonly imported, by default it doesn't have create privilege on the **Plug-In Assembly** table. The System Administrator security role has this privilege.
- When you import a managed solution, all component changes will be brought into the environment in a published state. However, when you import an unmanaged solution, the changes are imported in a draft state so you must publish them to make them active.
- To implement healthy application lifecycle management (ALM) in your organization, consider using a source control system to store and collaborate on your solutions, and automate the solution import process. More information: [ALM basics](#) in the Power Platform ALM guide.
- The maximum size of a solution file is 95 MB.

When you import an **unmanaged** solution:

- You add all the components of that solution into your environment and can't delete the components by deleting the solution. Deleting the unmanaged solution deletes only the solution container.
- That contains customized components, the existing customizations to the component will be overwritten after the unmanaged solution import. You can't undo this.

To import a solution:

1. Sign into [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. On the command bar, select **Import**.

 New solution

 Import



Open AppSource



Publish all customizations



Switch to classic

Set the preferred solution

Article • 04/10/2025

By default, unless you're already in the context of an unmanaged solution when you create an object, all solution objects are stored in the solution named Common Data Services Default Solution. For most situations, you don't want to create your solution objects in either of the two Dataverse system solutions, which are the Common Data Services Solution and the Default Solution. This article explains why using the system solutions is discouraged and provides step-by-step instructions to set and manage your preferred solution.

Why not create your objects in the system solutions?

There are a few reasons you *shouldn't* create your solution objects in either the Common Data Services Solution and the Default Solution:

- There's no control over the separation of solution objects between makers. All objects can be viewed from the Default Solution and the Common Data Services Solution is the default solution so other makers can and likely are using it.
- The Default Solution can't be exported for import to other environments.
- You can't change the solution publisher for the Default Solution. Additionally, since the solutions already exist, you can't change the solution publisher prefix for either system solutions. More information: [Solution publisher](#)

Using preferred solutions is a way to determine which solutions contain each maker's edits that occur in Power Apps. Setting the preferred solution enables makers to view and update which solution they're using. After you set your preferred solution, you can create objects in the solution you specify and those objects will automatically be in that solution so that you control the objects within the solution. Then, you can export your preferred solution and import the solution to other Microsoft Dataverse environments.

Note

When your preferred solution isn't set, by default, the **Common Data Services Default Solution** is your preferred solution. If **Common Data Services Default Solution** isn't available, the solution named **Default Solution** is used as your preferred solution. You can change this to your desired solution by following the steps in this article. For more information about the **Common Data Services Default Solution** and **Default Solution**, go to [Default solutions](#).

View solution deployments on the deployment page (preview)

Article • 01/14/2025

ⓘ Important

- This is a production-ready preview feature.
- Production-ready previews are subject to [supplemental terms of use ↗](#).

From the **Solutions** page, makers can navigate to **Deployments** to view all of their solution deployments, across all solutions and pipelines, in one place. If their deployment began from (or was deployed to) the current environment, they are able to view its status and other details.

The screenshot shows the Power Apps Deployments page. On the left, there's a navigation bar with options like Home, Create, Learn, Apps, Tables, Flows, Solutions, More, and Power Platform. The Solutions item is highlighted. The main area has a search bar at the top. Below it, there's a 'Get started' section with a card about deployment basics. The 'Failed deployments' section shows a single entry for 'Woodgrove Events' with a timestamp of Dec 4, 2024 1:16 PM. The 'History' section lists three deployment entries:

Start time	End time	Pipeline	Stage	Source	Target	Status	Solution	Version	Deployed by
Dec 4, 2024 1:26 PM (8 days ago)	Dec 4, 2024 2:08 PM (8 days ago)	Default Pipeline - Deployments Req...	UAT	Woodgrove Bank ...	UAT	Success	Woodgrove Mor...	1.0.0.1	Jim Glyn (sample)
Dec 4, 2024 1:15 PM (8 days ago)	Dec 4, 2024 1:26 PM (8 days ago)	Default Pipeline - Deployments Req...	UAT	Woodgrove Bank ...	UAT	Canceled	Woodgrove Mor...	1.0.0.0	Jim Glyn (sample)
Dec 4, 2024 1:11 PM (8 days ago)	Dec 4, 2024 1:12 PM (8 days ago)	Default Pipeline - Deployments Req...	UAT	Woodgrove Bank ...	UAT	Failed	Woodgrove Events	1.0.0.3	Jim Glyn (sample)

ⓘ Important

This is a preview feature.

Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Get started

Use pipelines in Power Platform to deploy solutions

Article • 02/23/2023

Easily deploy solutions to test and production environments using pipelines in Power Platform. Once pipelines are in place, makers can initiate in-product deployments with a few clicks. Makers do so directly within their development environments. More information: [Overview of pipelines in Power Platform](#)

See also

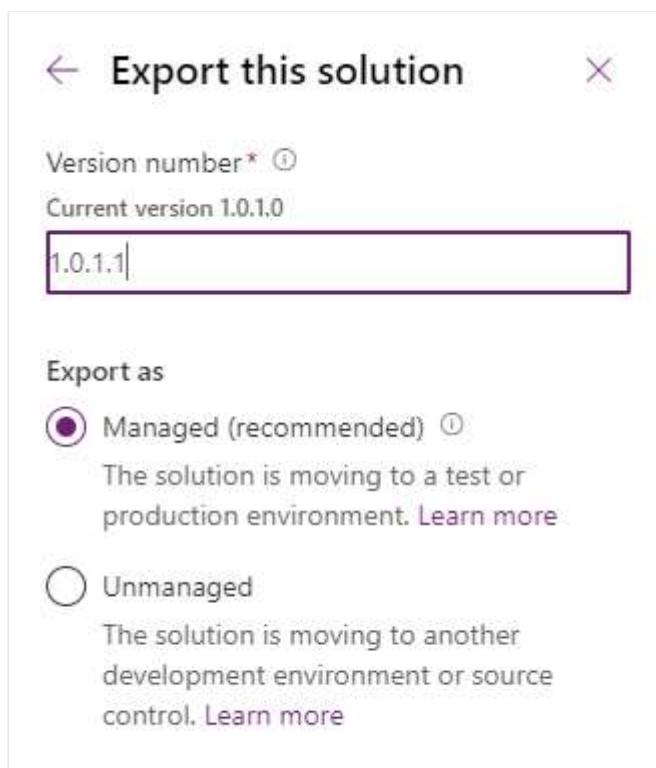
[Solutions overview](#)

Upgrade or update a solution

Article • 08/31/2023

There are times when you need to update an existing managed solution. To update the solution, follow these steps:

1. Open the unmanaged solution in your development environment and create new or add and remove the existing components that you want.
2. Increment the version number when you export the solution as a managed solution. More information: [Understanding version numbers for updates](#)



3. [Apply the upgrade or update in the target environment](#)

Apply the upgrade or update in the target environment

The procedure to import the updated solution is similar to installing a new managed solution, except you'll get some different options. If you're updating a solution you got from someone else, you should get guidance from the solution publisher about which options you should choose.

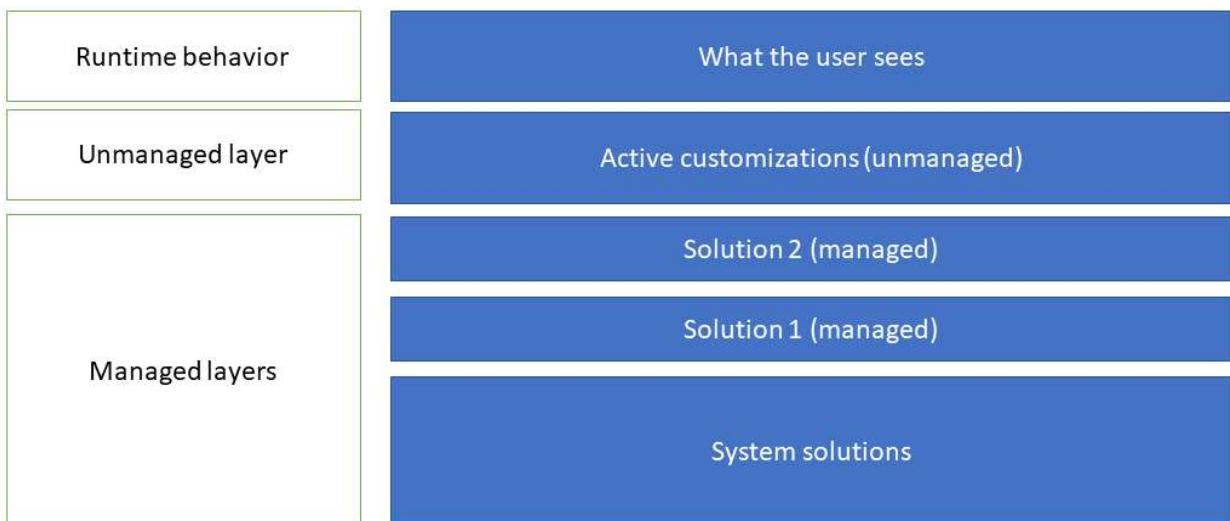
1. Sign into [Power Apps](#), select the target environment you want, and then select **Solutions** from the left navigation. If the item isn't in the side panel pane, select ...

Solution layers

Article • 11/22/2024

Managed and unmanaged solutions exist at different levels within a Microsoft Power Platform environment. In Microsoft Dataverse, there are two distinct layer levels:

- Unmanaged layer. All imported unmanaged solutions and unmanaged customizations exist at this layer. The unmanaged layer is a single layer.
- Managed layers. All imported managed solutions and the system solution exist at this level. When multiple managed solutions are installed, the last one installed is above the managed solution installed previously. This means that the second solution installed can customize the one installed before it. When two managed solutions have conflicting definitions, the runtime behavior is either "Last one wins" or a merge logic is implemented. If you uninstall a managed solution, the managed solution below it takes effect. If you uninstall all managed solutions, the default behavior defined within the system solution is applied. At the base of the managed layers level is the system layer. The system layer contains the tables and components that are required for the platform to function.



Solution merge behavior

When you prepare your managed solution for distribution, remember that an environment might have multiple solutions installed or that other solutions might be installed in the future. Construct a solution that follows best practices so that your solution doesn't interfere with other solutions.

The processes that Dataverse uses to merge customizations emphasize maintaining the functionality of the solution. While every effort is made to preserve the presentation,

View the history of a solution

Article • 07/17/2024

View details about solution operations from the **Solutions** area of Power Apps. An operation can be a solution import, export, or uninstall. The solution history displays information such as solution version, solution publisher, type of operation, operation start and end time, and operation status.

ⓘ Note

The system automatically deletes solution history records that are older than 180 days.

View solution history

1. Sign in to [Power Apps](#).
2. Select **Solutions** on the left navigation pane. If the item isn't in the side panel pane, select ...[More](#) and then select the item you want.
3. select the solution you want, and then on the command bar select **See history**.

The history is displayed.

Solutions > History								
Name	Start time	End time	Version	Publisher	Operation	Suboperati...	Result	Error...
Contoso	3/16/2020, 02:46 PM	3/16/2020, 02:47 PM	1.4.1.0	contosoinc	Import	Upgrade	Success	-
Contoso_Patch_801c1acf	3/16/2020, 10:24 AM	3/16/2020, 10:25 AM	1.4.2.1	contosoinc	Import	New	Success	-
Contoso	3/16/2020, 10:18 AM	3/16/2020, 10:19 AM	1.3.0.0	contosoinc	Uninstall	Upgrade	Success	-
Contoso	3/16/2020, 10:18 AM	3/16/2020, 10:18 AM	1.4.0.1	contosoinc	Import	Upgrade	Success	-

Select a solution operation to display the **Information page**. Each solution history row is read-only and includes the following in the **Details** area:

- **Name.** The solution unique name.
- **Start time.** The time in which the operation started.
- **End time:** The time in which the operation ended.
- **Version.** The version of the solution.
- **Publisher.** The name of the publisher that is associated with the operation.
- **Operation.** The operation, such as import, export, or delete.

View dependencies for a component in Power Apps

Article • 03/22/2024

Solution components in Microsoft Dataverse often depend on other solution components. You can't delete any solution component that has dependencies from another solution component. For example, you can't delete a model-driven app site map component without first deleting the model-driven app component, or removing the dependency, because the site map depends on the model-driven app.

You can view the dependent components from the **Solutions** area of Power Apps.

Show dependencies

The show dependencies page for a component helps identify the dependencies so you can take appropriate action.

This section describes the actions you can take while viewing the dependencies in the **Show dependencies** menu under **Advanced**.

Dependencies page contents

The **Dependencies** page displays details about all the components that have a dependency on the solution component. They're grouped by the solution's name.

The **Dependencies** page has tabs covering reports for **Delete blocked by**, **Used by**, and **Uses**:

- **Delete blocked by:** The report lists all the dependencies that block the delete of the solution component. Unless these dependencies are removed or the component is deleted, the solution component delete remains blocked.
- **Used by:** The report lists all the dependencies of other components that are using this solution component.
- **Uses:** This report lists all the dependencies that the given solution component uses.

Dependencies page actions

The **Dependencies** page has multiple actions you can take for each dependency. The actions can be used to inspect, delete the component, or remove a dependency with the

Environment variables for Power Platform overview

Article • 01/31/2025

Environment variables enable the basic application lifecycle management (ALM) scenario of moving an application between Power Platform environments. In this scenario, the application stays exactly the same except for a few key external application references (such as tables, connections, and keys) that are different between the source environment and the destination environment. The application requires the structure of the tables or connections to be exactly the same between the source and the destination environments, with some differences. Environment variables allow you to specify which of these different external references should be updated as the application is moved across environments.

Environment variables store the parameter keys and values, which then serve as input to various other application objects. Separating the parameters from the consuming objects allows you to change the values within the same environment or when you migrate solutions to other environments. The alternative is leaving hard-coded parameter values within the components that use them. This approach is often problematic; especially when the values need to be changed during ALM operations. Because environment variables are solution components, you can transport the references (keys) and change the values when solutions are migrated to other environments.

Benefits of using environment variables:

- Provide new parameter values while **importing solutions** to other environments.
- Store configuration for the **data sources** used in canvas apps and flows. For example, SharePoint Online site and list parameters can be stored as environment variables. This approach allows you to connect to different sites and lists in different environments without needing to modify the apps and flows.
- Package and transport your customization and configuration together and manage them in a single location.
- Package and transport secrets, such as credentials used by different components, separately from the components that use them.
- One environment variable can be used across many different solution components - whether they're the same type of component or different. For example, a canvas app and a flow can use the same environment variable. When the value of the environment variable needs to change, you only need to change one value.

Use data source environment variables in canvas apps

Article • 01/31/2025

In this article, you'll learn about using data source environment variables in canvas apps. You can either use pre-existing data source environment variables, or create data source environment variables automatically when connecting to data.

Use pre-existing data source environment variables

Environment variables can be reused across other apps and even different types of resources like cloud flows. You might wish to first create them within your solution and later use them while authoring canvas apps and cloud flows.

1. Follow the steps to [manually create an environment variable in a solution](#).
2. Edit or create a canvas app from your solution.
3. Add a **new** data source for SharePoint online.
4. Select the **Advanced** tab. You'll see a filtered list of environment variables that you have access to and that match the parameter being set. For example, when you select the SharePoint site, you'll see a list of all data source environment variables with **Connector as SharePoint** and **Parameter type as Site**. The same is true when selecting SharePoint lists for a given site.
5. Select the desired environment variable(s), and then select **Connect**.

Important

- If an environment variable from a different solution is selected, a dependency will exist on the solution containing the environment variable. Therefore, be sure to either:
 - Add the environment variable to your current solution prior to exporting.
 - Ensure the solution containing the environment variable is imported to the destination environment before your current solution is imported.

Automatically create data source environment variables when connecting to data

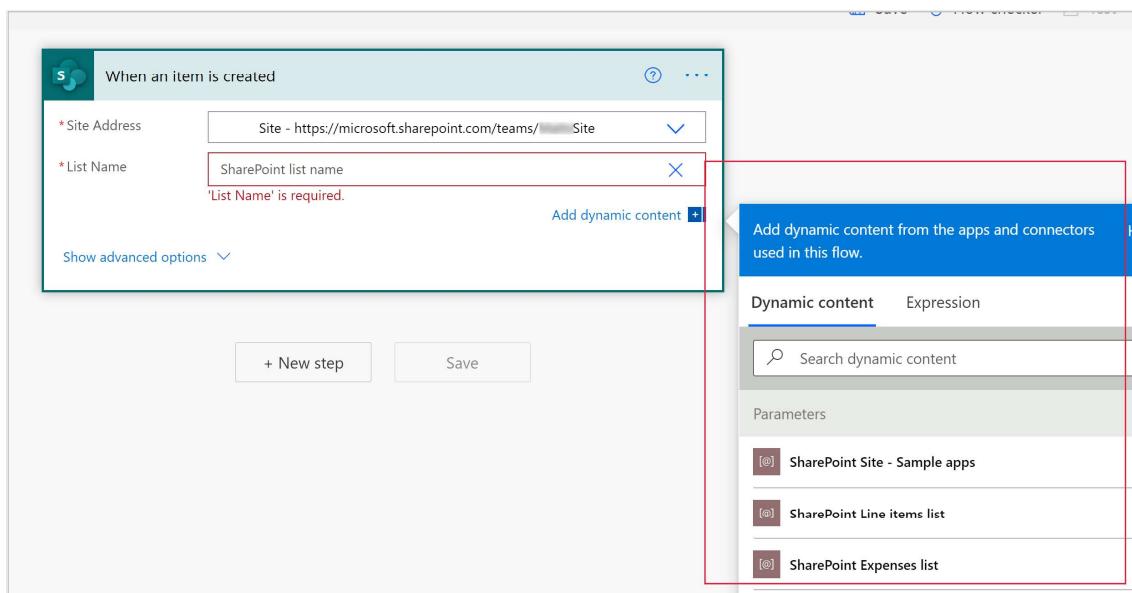
Use environment variables in Power Automate solution cloud flows

Article • 12/12/2023

Environment variables can be used in solution cloud flows since they're available in the dynamic content selector. All types of environment variables can be used in triggers and actions.

To use an environment variable in a solution cloud flow:

1. Edit or create a cloud flow in a solution.
2. In an action or a trigger, determine the parameter that you want to use for the environment variable:
 - a. If the parameter takes a simple value, such as a string or number, enter the parameter.
 - b. If the parameter is a lookup, scroll to the bottom of the lookup, and then select **Enter custom value**. Environment variables that you have access to are listed in the dynamic content selector with other dynamic content.



3. Select the desired environment variable.

Limitations

- When environment variable values are changed directly within an environment instead of through an ALM operation like solution import, flows will continue using

Use environment variables for Azure Key Vault secrets

Article • 04/01/2025

Environment variables allow for referencing secrets stored in Azure Key Vault. These secrets are then made available for use within Power Automate flows and custom connectors. Notice that the secrets aren't available for use in other customizations or generally via the API.

The actual secrets are stored in Azure Key Vault and the environment variable references the key vault secret location. Using Azure Key Vault secrets with environment variables require that you configure Azure Key Vault so that Power Platform can read the specific secrets you want to reference.

Environment variables referencing secrets aren't currently available from the dynamic content selector for use in Power Automate flows.

Configure Azure Key Vault

To use Azure Key Vault secrets with Power Platform, the Azure subscription that has the vault must have the `PowerPlatform` resource provider registered and the user who creates the environment variable must have appropriate permissions to the Azure Key Vault resource.

ⓘ Important

- There are recent changes to the security role used to assert access permissions within Azure Key Vault. Previous instructions included assigning the Key Vault Reader role. If you have set up your key vault previously with the Key Vault Reader role, make sure that you add the Key Vault Secrets User role to ensure that your users and Microsoft Dataverse have sufficient permission to retrieve the secrets.
- We recognize that our service is using the Azure role-based access control APIs to assess security role assignment even if you still have your key vault configured to use the vault access policy permission model. To simplify your configuration, we recommended that you switch your vault permission model

Environment variables frequently asked questions

Article • 10/25/2024

In this article find the frequently asked question (FAQs) for environment variables.

Why can't I see the value for my environment variable?

If the environment variable is in a managed solution, you won't be able to see the value unless you look inside of the **Default solution**. This behavior is by design, since the environment variable value is an unmanaged customization.

How can I view where environment variables are being used?

Either through selecting **Show dependencies** in the solution interface, while authoring components, or in source control and in the solution file by viewing the app or flow metadata.

Are data source environment variables the same as connections?

No. Although they're related. A connection represents a credential or authentication required to interact with the connector. Data source environment variables store parameters that are required by one or more actions in the connector and these parameters often vary depending on the action. For example, a SharePoint Online connection doesn't store any information about sites, lists, or document libraries. Therefore calling the connector requires both a valid connection and some additional parameters.

Can data source environment variables be used with shared connections such as SQL Server with SQL authentication?

Use settings to provide customized app experiences

Article • 03/13/2023

Settings are solution components that enable makers and administrators to quickly configure apps to provide a customized experience. Settings can be used to enable or disable features or configure feature behavior for a single app or all apps within an environment.

Settings are made up of three subcomponents: Setting definition, setting environment value, and setting app value.

Subcomponent	Description
Setting definition	<ul style="list-style-type: none">Application authors, administrators, or partners can create a setting definition that includes properties such as name, description, data type, default value, and more.They can then, via code, use the setting's value to enable or disable or configure the feature they are delivering.They can include the setting definition in the solution that is used to deliver the feature to their customers.Example:<ul style="list-style-type: none">The <i>Async save handler</i> for model-driven apps is a feature from Power Apps that uses settings.The setting is of type Yes/No and the default value of this setting is No.Therefore, by default, the <i>Async save handler</i> feature will be disabled for all model-driven apps.
Setting environment value	<ul style="list-style-type: none">A setting environment value can be used to override the default value, as specified in the setting definition.Example:<ul style="list-style-type: none">Extending the example above, an environment administrator in a customer's organization can add a setting environment value for the <i>Async save handler</i> setting and set it to Yes.This setting environment value will override the default value and will apply to all apps in that environment.This will enable the <i>Async save handler</i> feature for all model-driven apps in that environment.

Use a connection reference in a solution with Microsoft Dataverse

Article • 04/23/2024

A *connector* is a proxy or a wrapper around an API that allows the underlying service to talk to Microsoft Power Automate, Microsoft Power Apps, and Azure Logic Apps. It provides a way for users to connect their accounts and use a set of prebuilt actions and triggers to build their apps and workflows.

A [connection](#) is a stored [authentication credential](#) for a connector, for example OAuth credentials for the SharePoint connector.

A *connection reference* is a solution component that contains a reference to a connection about a specific connector. Both solution-aware canvas apps and operations within a [solution-aware flow](#) bind to a connection reference instead of directly to a connection. During solution import into a target environment, a connection is provided for all the connection references so any referencing flows can be [turned on](#) automatically after the import completes. To change a specific connection associated with a canvas app or flow, you edit the connection reference component within the solution.

Add connection references to a solution

Connection references can be added to a solution in different ways:

- When you're using the solution explorer to create a new connection reference in a solution.
- When you import a solution. To learn more, go to [Import solutions](#).
- Implicitly when you build your [canvas apps](#) and [flows](#) that are defined in a Microsoft Dataverse solution.

Note

- Canvas apps and flows handle connections differently. Flows use connection references for all connectors, whereas canvas apps only use them for implicitly shared (non-OAuth) connections, such as SQL Server Authentication. More information: [Security and types of authentication](#)

Translate label text

Article • 02/15/2022

The standard tables include default text for labels that are available in many different languages. However, when you customize a form, such as adding or changing columns, or create custom tables, you may need the labels for those components to appear in different languages. You can import translated label text for customized tables for your apps so that the label text displays in languages other than the base language.

When you translate label text for a form, you are modifying the base language of the form as part of a form customization. When you do this, you create active unmanaged changes to the labels. Subsequently, if you don't modify the base language translation for a component, such as a column, and then export the translation file, the column's object id won't be exported. This is because the export doesn't see any modifications done to the base language label of that column.

High-level process

1. Export the translations from the solution that contains the tables that you want to translate label text. Then, open the translations XML file and add the translated text. More information: [Translate customized table and column text into other languages](#)
2. Import the translations. More information: [Import translated table and column text back into an app](#)

Common issues with translating form label text

Form label translations don't appear in the layers

Imported translations may not appear when you view the solution layers for a component. Make sure the translations are on the <Label> level when you view the solution layer. Note that "displayname" tags are at the attribute level, so they will not translate labels. The "DisplayName" tags are actually for form labels and will translate form's labels. For more information about viewing solution layers, see [Solution layers](#).

Form label translations don't appear specifically for the base language

Translate customized table, form, and column text into other languages

Article • 03/13/2023

After you create customized table and column text in your unmanaged solution, you may want to translate it into other languages.

Important

When you export translations, the export translations feature exports translations for the table. So, that means even if the solution contains only a single form, labels for all the forms for the table will be exported. Make sure you only modify the form's labels when importing the translations back otherwise another component translation you modify will be added as a dependency to the solution.

1. Sign into [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
2. Select the unmanaged solution you want, on the command bar select ..., select **Translations**, and then select **Export translations**.
3. After the export completes the exported translations compressed (.zip) file is downloaded to your browser's default download folder and contains the exported labels.
4. Extract the XML file from the compressed (.zip) file.
5. Open the CrmTranslations.xml file in Excel.
6. Select the sheet named **Localized Labels**.
7. Notice there is already a column with the base language code id, such as 1033 (English U.S.) Add a column with the language code id for every language you want to translate labels. For example, add a column for 1034 (Spanish traditional).
8. Add the translated text in the new column for the object names and object ids that you want.

Import translated table, form, and column text back into an app

Article • 03/13/2023

If you have customized table or column text, such as column labels or drop-down list values, you can provide the users in your organization who are not working with the base language version of your environment with this customized text in their own languages. To do so, you export the text strings for all your customizations so that they can be translated into the languages you use in your organization.

After the translation, you need to import the translated text strings into your environment before users can take advantage of the changes.

ⓘ Important

- The file that you import must be a compressed file that contains the CrmTranslations.xml and the [Content_Types].xml file at the root.
- You can't import translated text that is over 500 characters long. If any of the items in your translation file are longer than 500 characters, the import process will fail. If the import process fails, review the line in the file that caused the failure, reduce the number of characters, and try to import again. Also note that after you import translated text, you must republish customizations.

1. Sign in to Power Apps at <https://make.powerapps.com>.
2. Select **Solutions**, and select the unmanaged solution from which to import the translated text. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
3. In the solution explorer, on the Actions toolbar, select **Translations**, and then select **Import translations**.
4. In the **Import Translated Text** dialog box, specify the file that contains the translated text, and then select **Import**.
5. When the import is complete, select **Close**.

ⓘ Note

Update localized labels for forms

Article • 12/07/2024

This article describes how to update existing localized labels that were created following the steps in the article [Translate localizable text for model-driven apps](#).

Updating localized labels overview

When you create a new model-driven app form and add columns to the form, the form creates a copy of the localized labels for those columns in the base language. Once a form is created, changing the localized label text for a column in the base language doesn't update the localized label on the form. However, you can change the column, tab, and section labels that can be localized for a form using the form designer. For more information about customized text, go to [Configure column properties on a form](#).

To update localized labels for forms through the export translations Excel file, you need to correctly identify the object ID corresponding to each tab, section, or column. The following sections explain how to do this.

Identify the object ID for form labels

1. Create a solution and add the form as part of this new solution.
2. Export the solution as managed.
3. Unzip the solution file and open the customizations.xml file with an XML or text editor.
4. Find the tab, section, or column of the form that has the localized label you want to update.
5. Once you find the tab, section, or column, check if there's `labelid` property defined. If yes, then the value of `labelid` attribute is the object ID for the localized label. If not, then the value of the ID attribute is the object ID for localized label.

For example, say you want to find the object ID for attribute `websiteurl1`. Search for that attribute in the customizations.xml file in the `formxml` section.

XML

```
<row>
<cell id="{e6441984-4343-813a-aa7e-e2747ad35390}" showlabel="true" labelid="aaaaaaaa-0000-1111-2222-bbbbbbbbbb">
<labels>
<label description="Website" languagecode="1033" />
```

Tools available to diagnose solutions

Article • 02/15/2022

There are two tools available for diagnosing solutions in Power Apps.

- [Object checker](#)
- [Solution checker](#)

Object checker

Object checker and solution checker are similar and share much of the same infrastructure. However, object checker runs *live diagnostics on the database* and can analyze issues based on the metadata and layering of a given solution object - regardless of which solution(s) the object is in. Therefore, object checker is better suited for troubleshooting application lifecycle (ALM) related issues in test and production environments. More information: [Use object checker to diagnose a solution component](#)

Solution checker

Solution checker runs offline analysis on a single solution file. Solution checker requires the solution be exported before you can run a solution diagnostic. Solution checker is best suited for development environments or analyzing a solution prior to committing it to a source control repository. More information: [Use solution checker to validate your model-driven apps in Power Apps](#)

See also

[Debug a model-driven app with Monitor](#)

Use object checker to diagnose a solution component (preview)

Article • 11/13/2024

[This topic is pre-release documentation and is subject to change.]

Object checker runs real-time diagnostics on component objects within your solution. If issues are detected, a recommendation is returned that describes how to fix the issue. This might include documentation, instructions, or a click-able action that can fix the issue for you.

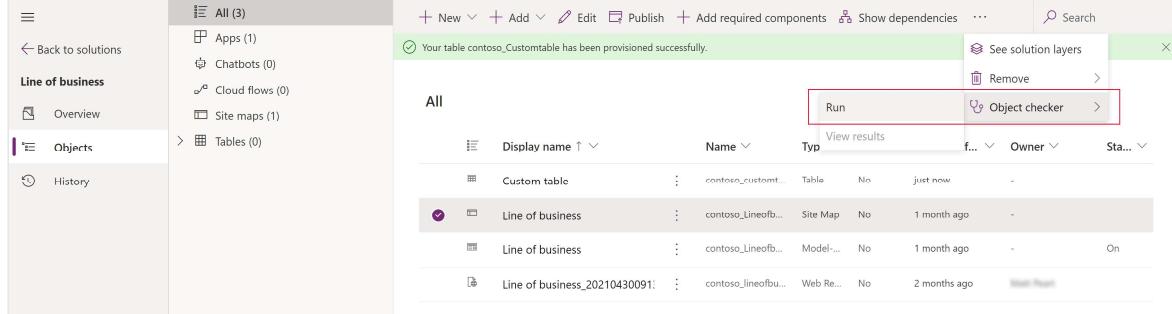
Example issues object checker detects

- Active layer hiding customizations.
- Malformed or corrupted metadata.

Run object checker and view the results

1. Sign into [Power Apps](#), and then select **Solutions** from the left navigation pane. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
2. Open a solution that contains the problematic object. You can run object checker within either managed and unmanaged solutions.
3. Select a single object, such as a model-driven app or a site map.

4. On the command bar, select ... > **Object checker** > **Run**.

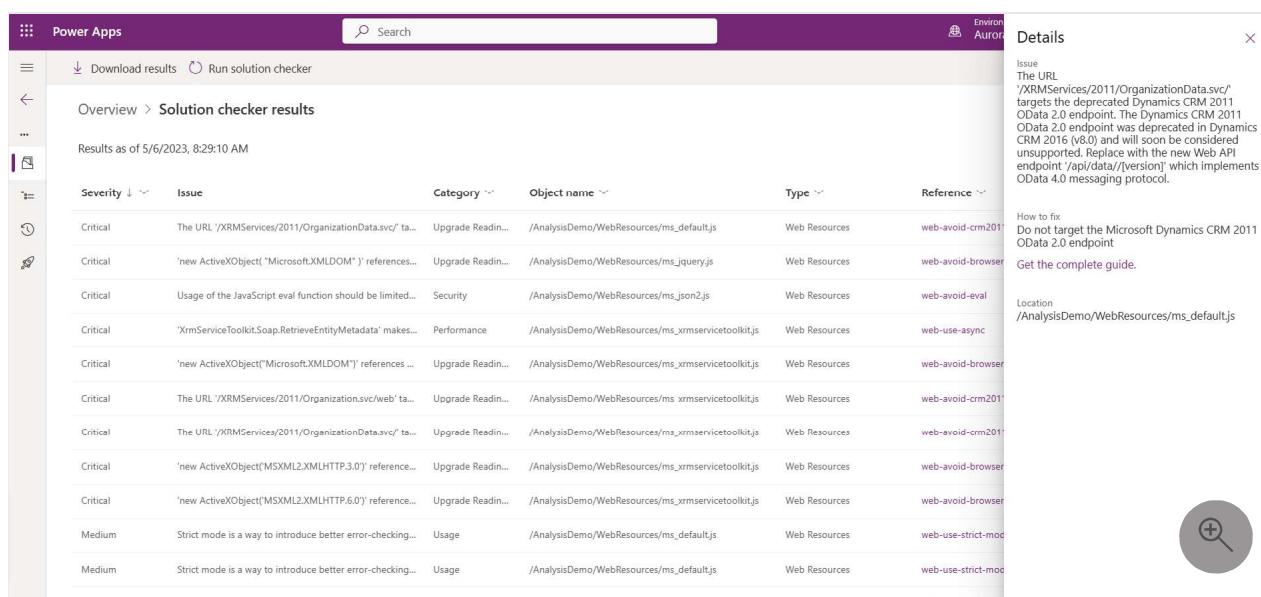


5. When object checker finishes, on the command bar, select ... > **Object checker** > **View results**

Improve solution performance, stability and reliability

Article • 07/30/2024

Solutions are used to distribute Power Platform objects, such as apps, tables, flows, web resources, and plugins. This article introduces the solution checker feature, a powerful tool that performs a comprehensive static analysis of your solution objects against a set of [best practice rules](#). By using solution checker, you can quickly identify problematic patterns in your components and receive detailed reports that highlight issues, affected components, and provide links to documentation on how to resolve each issue. This ensures your solutions are optimized for performance, stability, and reliability.



The screenshot shows the Power Apps interface with the 'Solution checker results' page open. The results are listed in a table with columns: Severity, Issue, Category, Object name, Type, and Reference. One specific row is expanded to show more details:

Severity	Issue	Category	Object name	Type	Reference
Critical	The URL '/XRMServices/2011/OrganizationData.svc/' ta...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_default.js	Web Resources	web-avoid-crm201...
Critical	'new ActiveXObject('Microsoft.XMLDOM')' references...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_jquery.js	Web Resources	web-avoid-browser...
Critical	Usage of the JavaScript eval function should be limited...	Security	/AnalysisDemo/WebResources/ms_json2.js	Web Resources	web-avoid-eval...
Critical	'XrmServiceToolkit.Soap.RetrieveEntityMetadata' makes...	Performance	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-use-async...
Critical	'new ActiveXObject('Microsoft.XMLDOM')' references ...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-avoid-browser...
Critical	The URL '/XRMServices/2011/Organization.svc/web/' ta...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-avoid-crm201...
Critical	The URL '/XRMServices/2011/OrganizationData.svc/' ta...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-avoid-crm201...
Critical	'new ActiveXObject('MSXML2.XMLHTTP.3.0')' reference...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-avoid-browser...
Critical	'new ActiveXObject('MSXML2.XMLHTTP.6.0')' reference...	Upgrade Readin...	/AnalysisDemo/WebResources/ms_xrmservicetoolkit.js	Web Resources	web-avoid-browser...
Medium	Strict mode is a way to introduce better error-checking...	Usage	/AnalysisDemo/WebResources/ms_default.js	Web Resources	web-use-strict-mod...
Medium	Strict mode is a way to introduce better error-checking...	Usage	/AnalysisDemo/WebResources/ms_default.js	Web Resources	web-use-strict-mod...

Details pane on the right side shows the following information for the first critical issue:

- Issue:** The URL '/XRMServices/2011/OrganizationData.svc/' targets the deprecated Dynamics CRM 2011 OData 2.0 endpoint. The Dynamics CRM 2011 OData 2.0 endpoint was deprecated in Dynamics CRM 2016 (v8.0) and will soon be considered unsupported. Replace with the new Web API endpoint '/api/data/{version}' which implements OData 4.0 messaging protocol.
- How to fix:** Do not target the Microsoft Dynamics CRM 2011 OData 2.0 endpoint.
- Get the complete guide:**
- Location:** /AnalysisDemo/WebResources/ms_default.js

Solution checker works with unmanaged solutions that can be exported from an environment.

You can run solution checker either from Power Apps (make.powerapps.com) or by using [PowerShell](#).

How solution checker helps you

To deliver on complex business requirements, makers often can end up with highly advanced solutions that customize and extend the Power Platform. With advanced implementations come an increased risk where performance, stability, and reliability issues become introduced, which can negatively impact the user experience. Identifying and understanding how to resolve these issues can be complicated and time consuming. With the solution checker feature, you can perform a check within seconds on your solution, which uses a set of best practice rules to quickly identify problematic patterns. After the check completes, you receive a detailed report in Power Apps as well as in an email message that lists the issues identified, the components and code affected, and links to documentation that describes how to resolve each issue.

The solution checker analyzes these solution components:

Common issues and resolutions for solution checker

Article • 06/12/2023

This article lists some common issues that you might encounter while using solution checker. Where applicable, workarounds are provided.

You're unable to use solution checker to run analysis or download results

Shortly after submitting a solution checker request to run an analysis or download results the operation doesn't complete and an error message is displayed, such as:

"We weren't able to run the check on [Solution Name] solution. Try running it again."

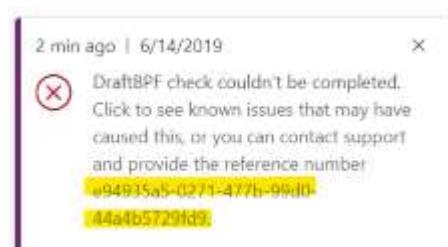
Whenever possible, solution checker attempts to return a specific error message with a link to details about the potential cause and resolution steps. Select 'Learn more' for details.



Failures that occur during background processing of the analysis will fail with 'Couldn't be completed' status and return an error message in the Power Apps portal as well as send email notification to the requestor.

Solutions					
Display name	Created ↓	Version	Managed externally?	Solution check	
Draft BPF	... 6/14/2019	1.0.0.0	✗	Couldn't be completed	

Selecting the portal notification will link to this page of common issues for further troubleshooting. If one of the provided common issues doesn't resolve the problem, a reference number is also returned. Provide this reference number to Microsoft Support for further investigation.



avoid-2011-api

Article • 07/18/2022

Don't use the deprecated Microsoft Dynamics CRM 2011 object model. Instead, follow [Dataverse Web API documentation](#).

avoid-browser-specific-api

Article • 07/18/2022

Don't use Internet Explorer legacy APIs or browser plug-ins.

Recommendation

Examples of APIs you shouldn't use include `XMLHTTP`, `XMDOM`, and `DOMDocument`.

avoid-crm2011-service-odata

Article • 07/18/2022

Don't target the Microsoft Dynamics CRM 2011 OData 2.0 endpoint.

Recommendation

More information: [Odata V2 Deprecation notice](#).

avoid-crm2011-service-soap

Article • 09/09/2023

Don't target the Microsoft Dynamics CRM 2011 SOAP services.

Recommendation

For details on the correct Dataverse services to use, go to [Microsoft Dataverse SDK for .NET](#).

avoid-dom-form

Article • 02/14/2023

Don't use the Document Object Model (DOM) of model-driven apps directly. This isn't a supported approach in Dynamics 365 or Power Apps. Use the supported [Client API object model](#) instead.

Options

- By default, violations are only reported when certain `Xrm` or `Mscrm` calls are made in the same file, so that violations outside of Dataverse are not reported. The `requireXrm` option, which is `true` by default, can be set to `false` to report all violations regardless of `Xrm` or `Mscrm` usage
 - Example: `"@microsoft/power-apps/avoid-dom-form": ["error", { requireXrm: false }]`

avoid-dom-form-event

Article • 02/14/2023

Don't register or unregister handles to the Document Object Model (DOM) events of model-driven apps. This isn't a supported approach in Dynamics 365 or Power Apps. Use the supported [Client-side event handlers](#) instead.

Options

- By default, violations are only reported when certain `xrm` or `Mscrm` calls are made in the same file, so that violations outside of Dataverse are not reported. The `requireXrm` option, which is `true` by default, can be set to `false` to report all violations regardless of `xrm` or `Mscrm` usage
 - Example: `"@microsoft/power-apps/avoid-dom-form-event": ["error", { "requireXrm: false }]`

avoid-isactivitytype

Article • 07/21/2022

Replace `Xrm.Utility.isActivityType` with `Xrm.Utility.getEntityMetadata` and don't use in ribbon rules.

Recommendation

For details on the correct Xrm.Utility functions go to the [Xrm.Utility.getEntityMetadata](#) documentation.

avoid-loadtheme

Article • 02/27/2023

`loadTheme` is a way to provide a theme in global (and only global) scope, which will affect your entire application. We recommend that you replace `loadTheme` with `ThemeProvider`. That way, your application consistently has one way of providing a theme.

Recommendation

For details on the correct `ThemeProvider` usage go to the [ThemeProvider ↗](#) documentation.

avoid-modals

Article • 10/20/2022

Avoid using `showModalDialog()`.

Recommendation

Instead, go to the documentation for the [XRM Navigation API](#).

avoid-ui-refreshribbon

Article • 07/18/2022

Don't use `ui.refreshRibbon` during evaluation of ribbon rules. This API triggers duplicated network calls from ribbon and degrades performance. Use promises and asynchronous patterns.

avoid-unpub-api

Article • 07/18/2022

Avoid using unpublished (private) functionality as it is not guaranteed to continue working and utilizing it may break your code in the future.

Recommendation

Avoid using unsupported namespaces, global objects, global functions, and CSS styles.

avoid-window-top

Article • 07/21/2022

Don't use `window.top` or `window.parent.parent`. Using either of these fields will likely result in cross-origin security errors when hosted outside of the primary web client. Develop an alternate approach. For more information, go to [best practices: avoid-window-top](#).

do-not-make-parent-assumption

Article • 07/21/2022

Don't assume that the usage of `global.parent`, `window.parent`, `window.opener`, or `this.parent` from JavaScript web resources will result in the same context across versions or client types, for example mobile, tablet, and browser. Consider a different approach when attempting to interact with one of these contexts. For more information, go to [best practices: avoid-window-top](#).

use-appsidepane-api

Article • 10/24/2023

Use `Xrm.App.sidePanes.createPane` instead of `Xrm.Panels.loadPanel`.

Recommendation

The `Xrm.Panels.loadPanel` API is being replaced with `Xrm.App.sidePanes.createPane` because the former only supports a single pane while the latter supports multiple panes. For more information, go to [Use with `Xrm.App.panels.loadPanel`](#).

use-async

Article • 07/18/2022

Interact with HTTP and HTTPS resources asynchronously.

Recommendation

For more information, go to [asynchronous HTTP best practices](#).

use-cached-webresource

Article • 07/21/2022

Don't use a relative or absolute URL that retrieves a web resource from the server rather than from the cache. Web resource URLs should always be relative to ensure caching support. Additionally, don't include `/WebResources/` within the URL path as it will refer to the caller's default organization.

use-client-context

Article • 07/18/2022

Don't use `xrm.Page`. Although `Xrm.Page` is deprecated, `parent.Xrm.Page` will continue to work with HTML web resources embedded in forms as this is the only way to access the form context from the HTML web resource. For a more comprehensive list of appropriate replacements for `Xrm.Page` functionality, go to [Client API Deprecations](#).

use-getsecurityroleprivilegesinfo

Article • 07/18/2022

Avoid `userSettings.securityRolePrivileges`. This returns only privilege GUIDs, which are difficult to work with. You might be making extra network requests to get further details about the privilege GUID and that degrades performance. Use [`userSettings.getSecurityRolePrivilegesInfo\(\)`](#) instead, which gives you more details about each security role privilege.

use-global-context

Article • 07/18/2022

Don't use `xrm.Page.context`. For access to the global context use `Xrm.Utility.getGlobalContext`.

Recommendation

For more detail on appropriate replacement APIs, go to [Client API deprecations](#).

use-grid-api

Article • 07/21/2022

Don't use deprecated APIs in the grid object model. Replace these calls with the `data` property of the grid row object.

Recommendation

For more detail on the specific replacement calls, go to [Client API deprecations](#).

use-navigation-api

Article • 07/18/2022

Use navigation API parameters instead of utility parameters.

Recommendation

For more information on deprecations and the associated replacements, go to [Client API deprecations](#).

use-offline

Article • 07/18/2022

Don't use `Xrm.Mobile.offline`. Instead, use `Xrm.WebApi.offline`.

Recommendation

For a more comprehensive list of deprecations and replacements, go to [Client API deprecations](#).

use-org-setting

Article • 07/18/2022

Use organization settings. Specifically:

- Calls to `Xrm.Page.context.getIsAutoSaveEnabled()` should be replaced with
`Xrm.Utility.getGlobalContext().organizationSettings.isAutoSaveEnabled`
- Calls to `Xrm.Page.context.getOrgLcid()` should be replaced with
`Xrm.Utility.getGlobalContext().organizationSettings.languageId`
- Calls to `Xrm.Page.context.getOrgUniqueName()` should be replaced with
`Xrm.Utility.getGlobalContext().organizationSettings.uniqueName`

Recommendation

For more information, go to [Client API deprecations](#).

use-relative-uri

Article • 07/18/2022

Don't use absolute Microsoft Dataverse endpoint URLs.

Recommendation

Don't use an absolute reference to a Microsoft Dataverse endpoint. Microsoft Dataverse endpoint URLs should be constructed using the appropriate client API function along with a relative path to the desired endpoint.

use-utility-dialogs

Article • 02/14/2023

Use Web API dialogs in form and ribbon commands.

Recommendation

Alerts should be replaced with `Xrm.Navigation.openAlertDialog`, while confirms should be replaced with `Xrm.Navigation.openConfirmDialog`. For more information, go to [Xrm.Navigation](#).

Options

- By default, violations are only reported when certain `Xrm` or `Mscrm` calls are made in the same file, so that violations outside of Dataverse are not reported. The `requireXrm` option, which is `true` by default, can be set to `false` to report all violations regardless of `Xrm` or `Mscrm` usage
 - Example: `"@microsoft/power-apps/use-utility-dialogs": ["error", { requireXrm: false }]`

Catalog in Power Platform

Article • 09/10/2024

Building from scratch every time by recreating branding, layouts, links, complex connectors and flows, and more is painful and error-prone. Organizations where developers and makers build and share customized and reusable components and templates get more value from Power Platform. Successful organizations adopt a *fusion teams* model where pro-developers, makers, and admins all work together to deliver the best solutions for their users, and derive the highest value possible from Power Platform.

Important

- The catalog needs to be set up by an admin before you can use it, including permissions. More information [Administer the catalog](#).
- The catalog only works with Microsoft Dataverse environments. Environments without Dataverse aren't supported at this time.
- You need a Managed Environment in order to submit solutions to the catalog. However, you can install catalog items from any environment. More information: [Managed Environments overview](#)

In any organization, there might be many components and templates distributed among many environments. The catalog in Power Platform enables developers and makers to:

- Crowd-source and find templates and components within their organization easily
- Find and install the latest and authoritative version of a component
- Get started with templates and components that provide immediate value

Components include things like:

- AI prompts
- Copilot app templates
- AI plugins
- Power Platform dataflows
- Custom connectors
- Power Apps component framework controls
- Power Automate flows
- Canvas apps
- Model-driven apps

View, submit, and install catalog items

Article • 11/14/2024

In any organization, there might be many components and templates distributed among many environments. The catalog in Power Platform enables developers and makers to:

- Crowd-source and find templates and components within their organization easily
- Find and install the latest and authoritative version of a component
- Get started with templates and components that provide immediate value

ⓘ Important

You need a Managed Environment in order to submit items to the catalog. You can however install catalog items from any environment. More information: [Managed Environments overview](#)

Before reading this article, you should:

- [Learn about the catalog](#)
- [Learn how administrators setup and configure the catalog](#)

ⓘ Note

Developers can also use the Power Platform CLI, Dataverse SDK for .NET, and Dataverse Web API to perform the operations described here. [Catalog in Power Platform for developers](#)

Access controls

The catalog has a separate set of access controls from Power Platform. This means makers in a given environment don't automatically get permissions to publish and acquire items from the catalog. There are four access roles:

[+] [Expand table](#)

Role	Enables user to:
Catalog Submitter	Submit items to the catalog

Self-service data prep with dataflows

Article • 02/15/2022

As the volume of data continues to grow, so does the challenge of shaping that data into well-structured, actionable information. You want data that's ready for apps, AI workloads, or analytics so that you can quickly turn volumes of data into actionable insights. With self-service data prep in the Power Apps portal, you can transform and load data to Microsoft Dataverse or your organization's Azure Data Lake Storage Gen2 account with just a few clicks.

Dataflows were introduced to help organizations unify data from disparate sources and prepare it for consumption. You can easily create dataflows using familiar, self-service tools to ingest, transform, integrate, and enrich big data. When creating a dataflow, you will define data source connections, ETL (extract, transform, load) logic, and destination to load the resulting data to. Once created, you can configure a dataflow's refresh schedule to indicate how frequently it should run. In addition, the new model-driven calculation engine makes the process of data preparation more manageable, more deterministic, and less cumbersome for dataflow customers. With dataflows, tasks that once required a data IT organization to create and oversee (and many hours or days to complete) can now be handled with a few clicks by individuals who aren't even data scientists, such as app creators, business analysts and report creators.

Dataflows store data in tables. A table is a set of rows used to store data, similar to how a table stores data within a database. Customers can define custom table schema or leverage the Common Data Model's standard tables. The Common Data Model is a shared data language for business and analytical applications to use. The Common Data Model metadata system enables consistency of data and its meaning across applications and business processes such as Power Apps, Power BI, some Dynamics 365 apps (model-driven apps), and Azure, which store data in conformance with the Common Data Model. A dataflow's resulting tables can then be stored in either of the following:

- **Dataverse.** Lets you securely store and manage data that's used by business applications built using Power Apps and Power Automate.
- **Azure Data Lake Storage Gen2.** Lets you collaborate with people in your organization using Power BI, Azure Data, and AI services or custom-built line-of-business applications that read data from the lake. Dataflows that load data to an Azure Data Lake Storage Gen2 account store data in [Common Data Model folders](#). **Common Data Model folders** contain schematized data and metadata in a standardized format to facilitate data exchange and to enable full interoperability

Create and use dataflows in Power Apps

Article • 04/21/2025

With advanced data preparation available in Power Apps, you can create a collection of data called a dataflow, which you can then use to connect with business data from various sources, clean the data, transform it, and then load it to Microsoft Dataverse or your organization's Azure Data Lake Gen2 storage account.

A dataflow is a collection of tables that are created and managed in environments in the Power Apps service. You can add and edit tables in your dataflow, as well as manage data refresh schedules, directly from the environment in which your dataflow was created.

Once you create a dataflow in the Power Apps portal, you can get data from it using the Dataverse connector or Power BI Desktop Dataflow connector, depending on which destination you chose when creating the dataflow.

There are three primary steps to using a dataflow:

1. Author the dataflow in the Power Apps portal. You select the destination to load the output data to, the source to get the data from, and the Power Query steps to transform the data using Microsoft tools that are designed to make doing so straightforward.
2. Schedule dataflow runs. This is the frequency in which the Power Platform Dataflow should refresh the data that your dataflow will load and transform.
3. Use the data you loaded to the destination storage. You can build apps, flows, Power BI reports, and dashboards or connect directly to the dataflow's Common Data Model folder in your organization's lake using Azure data services like Azure Data Factory, Azure Databricks or any other service that supports the Common Data Model folder standard.

The following sections look at each of these steps so you can become familiar with the tools provided to complete each step.

Create a dataflow

Dataflows are created in one environment. Therefore, you'll only be able to see and manage them from that environment. In addition, individuals who want to get data from your dataflow must have access to the environment in which you created it.

Note

Creating dataflows is currently not available with Power Apps Developer Plan licenses.

Get insights from your data

Article • 05/31/2024

Microsoft Dataverse is the intelligent data platform that powers Dynamics 365 apps and the Power Platform. All Dynamics 365 data is hosted in Dataverse. The data included data from finance and operations apps and customer engagement apps like Dynamics 365 Sales and Dynamics 365 Customer Service. Dynamics 365 applications can be extended with Power Platform tools like Power Apps, Power Automate, and Power Pages for low-code and pro-code extensions. Data from Power Platform apps is also hosted in Dataverse.

When you understand the data and its intent, Dataverse provides turnkey capabilities in a consistent manner for all your data. Dataverse isn't just a database or storage, it encompasses everything needed to build integrated applications, processes, and in turn provides insights from the data it hosts. Dataverse also provides a comprehensive governance framework for your data including granular role based security and audit and compliance. Because it's a low-code data platform, developers can spend more time focusing on business needs through the configuration of the system and less time building infrastructure.

There are several approaches to getting insights from your data hosted by Dataverse:

- [Quick view](#) is a data exploration feature built into Power Apps. When you build a low-code app, either by extending Dynamics 365 or with your own data, quick view is enabled by default. There's no need to create reports to inquire and explore data. You can save these reports as required and later extend them in Power BI Desktop - the authoring tool for Power BI.
- [Power BI with Dataverse data](#). As a low-code maker or a business analyst, you can use Power BI with Dataverse data to create rich reports and embed these reports within pages and forms in Power Apps.
- [Link to Fabric](#) feature provides a no-copy, no-ETL, fully managed software as a service (SaaS) integration. The link to Microsoft Fabric feature enables data engineers and business analysts to use all the tools of Microsoft Fabric to combine Dataverse data with their own data.
- [Azure Synapse Link](#) enables continuous export of data to your own Azure data lake and enables IT admins and data integration specialists to create data pipelines.

Data export service, bring your own device (BYOD), and Export to Data Lake were features introduced in Dynamics 365 apps to export data for analytics and data

Use Power BI with Microsoft Dataverse data

Article • 05/06/2022

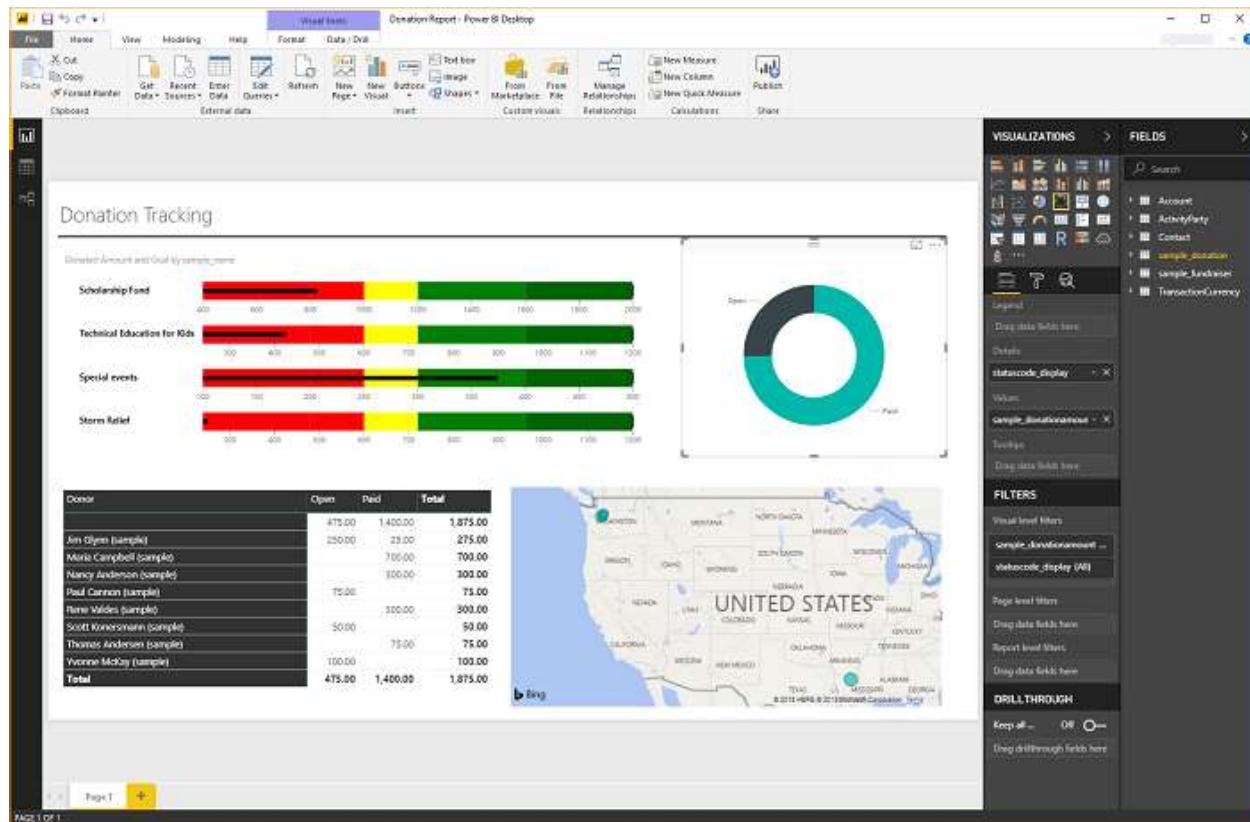
Power BI is a comprehensive collection of services and tools that you use to visualize your business data. The following connector, templates, and features are available that make it easy to visualize and analyze Microsoft Dataverse data or the Dynamics 365 Sales and Dynamics 365 Customer Service apps data with Power BI.

- **Dataverse connector:** Dataverse allows you to connect directly to your data using Power BI Desktop to create reports and publish them to Power BI. From Power BI, reports can be used in dashboards, shared to other users and accessed cross platform on Power BI mobile apps. This connector is the most recent version and uses the tabular data stream (TDS) protocol. More information: [Create a Power BI report](#)
- **Common Data Service (legacy) connector:** This is the earlier version of the connector. Use this connector when the query results will be greater than 80 MB. This version also supports paging of the query results and building reports that use the image data type.
- **Dataflow templates:** Dataflows help organizations unify data from disparate sources and prepare it for consumption. You can easily create dataflows using familiar, self-service tools to ingest, transform, integrate, and enrich big data. Once you create a dataflow in Power Apps, you can get data from it using the Common Data Service connector or Power BI Desktop Dataflow connector. More information: [Create and use dataflows in Power Apps](#)
- **Power BI template apps:** Power BI template apps are integrated packages of pre-built Power BI dashboards and reports. Using Power BI template apps with Dynamics 365 Sales provides a convenient, powerful, and quick way to access and analyze your sales data. For more information, see these articles:
 - [Sales analytics](#)
 - [Service analytics](#)
- **Embed Power BI reports on a form:** You can use Power BI reports in Power Apps model-driven apps to bring rich reporting and analytics to your system forms and empower your users to accomplish more. More information: [Embed a Power BI report in a model-driven system form](#)
- **Embed Power BI reports on a system dashboard:** Use can add Power BI reports to the dashboards and include in the solution with Environment Variables for ALM. More information: [Create or edit a Power BI embedded system dashboard](#)

Create a Power BI report using data from Dataverse

Article • 10/15/2024

Microsoft Dataverse allows you to connect directly to your data using Power BI Desktop to create reports and publish them to Power BI. From Power BI, reports can be used in dashboards, shared to other users, and accessed cross platform on Power BI mobile apps.



Prerequisites

To use Power BI with Dataverse, you need the following items:

- Download and install Power BI Desktop, which is a free application that runs on your local computer. You can download Power BI desktop [here](#).
- A Power Platform environment with the following privileges:
 - To access data in a table, you must have read privileges to the table.
 - To modify a table in Power Apps (make.powerapps.com), you must have a security role that includes maker privileges, such as system customizer or environment maker.
- You must have the appropriate Power BI [license](#) to build and share Power BI reports.

View table data in Power BI Desktop

Article • 08/08/2024

Use Power BI Desktop to view tables in Microsoft Dataverse. The table row data that you can access from your environment is read-only. Data access uses the Dataverse security model that is the same used to access table row data using a Power Apps app.

Prerequisites

- Enable the Tabular Data Stream (TDS) endpoint (on by default). More information: [Manage feature settings](#).
- Power BI Desktop. [Get it now](#)

View table data

1. Sign into [Power Apps](#), and then select the appropriate environment from the top-right corner.
2. On the left navigation pane select **Tables**. If the item isn't in the side panel pane, select [...More](#) and then select the item you want.
3. Select **Analyze > Analyze in Power BI** on the command bar.

The pbids file for your environment is downloaded to your browser's default download folder.

Note

To be able to download the file, you must have read access to the analysis component (msdyn_analysiscomponent) custom table privilege in Dataverse. Users with the environment maker security role have full access to this privilege.

4. Open the .pbids file to access it in Power BI Desktop.
5. The pbids file is loaded in Power BI Desktop. In the dialog box, select **Organizational account**, select **Sign in**, and then in the browser window that appears select or enter your credentials.

Transition from legacy data integration services

Article • 03/31/2025

Data export service, [bring your own database \(BYOD\)](#), and [Export to Data Lake](#) were features introduced in Dynamics 365 apps to export data for analytics and data integration scenarios. These services enabled IT admins and specialists to export data into external databases or data lakes and build data integration pipelines. While we improved these services over the years with updates as part of unification of Dynamics 365 with the power platform, we rearchitected the same capabilities of these disparate services into simpler, unified experiences built into Power Apps (make.powerapps.com). With a transition to Microsoft Fabric link or upgrade to Azure Synapse Link, the rearchitected services provide you with an easy ramp to benefit from AI and Copilot investments in Microsoft Dataverse and Fabric.

If you're a customer using any of the previous generation services, this article provides guidance on upgrading to the new experiences, benefiting from innovations, as well as reducing end-to-end expenses and effort.

Based on preview customer surveys, we also compiled a high level cost and benefits estimate to help you with the transition. Links to more information and videos, links to join forums and weekly office hour sessions to engage with the product team, Microsoft specialists, and fellow users are also provided here. We strive to enhance these services with community participation.

Before transition

If you're a customer using legacy services BYOD, data export service, or Export to Data lake, you might have a data integration architecture similar to the one shown here. The highlighted box indicates the data pipelines your organization might have built to leverage the data exported from Dynamics 365 and Dataverse. You can use a selection of tools from Microsoft, as well as others, to copy and integrate Dynamics data with your own data. You can also transform and aggregate data by copying into multiple stores – shown in the data prep box of the diagram. You can use Power BI or another tool to visualize data and create actionable insights. You might have pipelines built to export data to an on-premises system and other clouds.

Frequently asked questions when transitioning from legacy data integration services

Article • 04/01/2025

This article discusses the frequently asked questions with transition from legacy data integration services to Fabric link or Azure Synapse Link for Dataverse.

Data export service, [bring your own database \(BYOD\)](#), and [export to data lake](#) were features introduced in Dynamics 365 apps to export data for analytics and data integration scenarios. These services enabled IT admins and specialists to export data into external databases or data lakes and build data integration pipelines. While we improved these services over the years with updates, as part of unification of Dynamics 365 with the Power Platform, the same capabilities are rearchitected for these disparate services into simpler, unified experiences built into Power Apps (make.powerapps.com). The unified and improved service is called link to Azure Synapse.

Also available is a service named link to Microsoft Fabric where you can directly integrate Microsoft Dataverse, the data platform behind Dynamics 365 as well as Power Apps with Microsoft Fabric with no-copy, no-ETL required. Whether you link to Microsoft Fabric or upgrade to Azure Synapse Link, the rearchitected services provide you with an easy ramp to benefit from AI and Copilot investments in Dataverse and Fabric.

What is the difference between Link to Azure Synapse and link to Fabric?

Link to Azure Synapse and link to Fabric services are built into Dataverse, the platform powering Power Apps and all Dynamics 365 products.

Azure Synapse Link continuously exports data from Dynamics 365 and Power Apps to your own storage account, allowing IT professionals to build and manage data integration pipelines with Azure Synapse Analytics as well as other tools.

In contrast, link to Fabric offers a no-copy, no-ETL integration directly with Microsoft Fabric, keeping data within the Dataverse governance boundary for enhanced security. Fabric Link uses Dataverse managed storage, removing the need to configure and manage your own storage. When using link to Fabric, you might notice an increase in Dataverse storage consumption.

Link your Dataverse environment to Microsoft Fabric and unlock deep insights

Article • 04/03/2025

Microsoft Dataverse direct link to Microsoft Fabric enables organizations to extend their Power Apps and Dynamics 365 enterprise applications, and business processes into Fabric. The **Link to Microsoft Fabric** feature built into Power Apps makes all your Dynamics 365 and Power Apps data available in Microsoft OneLake, the built-in data lake for Microsoft Fabric.

- No need to export data, build extract, transform, load (ETL) pipelines, or use our partner integration tools.
- With shortcuts from Dataverse directly into OneLake, your data stays in Dataverse while authorized users get to work with data in Fabric.
- Link data from all Dynamics 365 apps, including Dynamics 365 Finance and Operations apps.
- Build Power Apps and automations to drive action from insights in OneLake.

[Microsoft OneLake](#), a data lake built into Fabric, helps eliminate data silos. Combine data from your applications and devices web sites, mobile apps, sensors, and signals from your warehouse and factories with data from your business processes in Dynamics 365, such as sales, cases, inventory, and orders, to predict potential delays or shortages that affect keeping your promises to customers. Dataverse creates shortcuts to OneLake, which enables you to work with data without making multiple copies.

Dataverse also generates an enterprise-ready [Synapse lakehouse and SQL endpoint](#) and a Power BI dataset for your Power Apps and Dynamics 365 data. This makes it easier for data analysts, data engineers, and database admins to combine business data with data already present in OneLake using Spark, Python, or SQL. As data gets updated, changes are reflected in lakehouse automatically.

Low-code makers can build apps and automations to orchestrate business processes and react to insights found in Fabric. By adding those insights back to Dataverse as virtual tables connected to OneLake, makers build low-code apps with Power Apps, Power Pages, or Power Automate using the design tools already available. Using connectors to over 1,000 apps, makers create business processes that span Dynamics 365 as well as many other enterprise applications.

Watch this video to learn about accessing Dataverse data in Fabric:

Link to Microsoft Fabric

Article • 04/03/2025

Microsoft Fabric integration with Microsoft Dataverse allows you to seamlessly link your Power Platform environment to Microsoft Fabric, enabling advanced data analysis and reporting capabilities. This guide provides step-by-step instructions on configuring your environment, linking it to Microsoft Fabric, and managing linked tables.

You can use an existing Dataverse environment or create a new developer environment if you want to try this feature. More information: [Create a developer environment](#)

Prerequisites

- You must have the Systems Administrator security role in the Power Platform environment to enable **Link to Fabric** or **Synapse Link**.
- You must be an administrator of the Power BI workspace.
- If you want the system to create a Power BI workspace, you need to have Power BI Capacity Administrator access to a capacity within the same region as the Dataverse environment.

The system creates a data connection between the Power Apps environment and Fabric workspace using the credentials of the user at the time of link creation. If you use the **Fabric link** option from the Power Apps **Tables** area, the system creates the connection and asks you to save. If you use the **Synapse Link** option, you must create a data connection yourself before enabling the link.

The system uses this connection to enable Fabric users to connect to Dataverse - the data store behind the Power Platform environment. If you want to enable other users to add or remove tables to Fabric link, you need to share this data connection with other users.

Share the data connection with other users

1. Go to [Fabric.Microsoft.com](#) and select the gear icon on top left (next to user icon).
2. On the **Settings** menu, select **Data connections and Gateways**. The available data connections are displayed.
3. Select the **Connections** tab, and then choose the data connection you created with the connection type **Dataverse**. You might see a connection that is named like

Work with Dataverse data and generate Power BI reports

Article • 04/03/2025

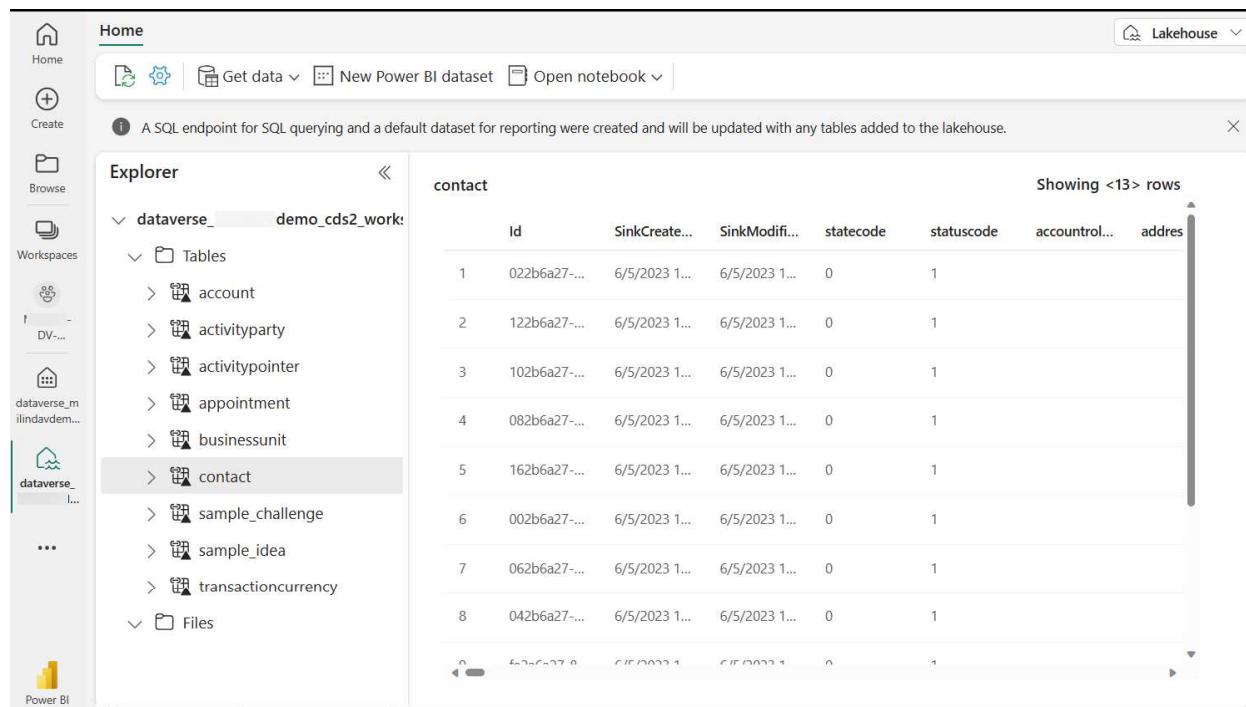
This section describes the different ways you can work with Microsoft Dataverse data in Microsoft Fabric and generate reports in Power BI.

You can view the Azure Synapse Analytics lakehouse, SQL endpoint, and the default dataset generated by Dataverse in the Fabric workspace you chose earlier.

When you select **Link to Microsoft Fabric**, a Dataverse generated Azure Synapse Analytics lakehouse opens. You can go to other Fabric features and work with Fabric and Power BI.

Explore the Dataverse generated Azure Synapse Analytics lakehouse

The tables you selected are added to the Azure Synapse Analytics lakehouse and displayed in Power BI as shown here. These tables are linked to your Power Platform environment using **Dataverse shortcuts**. As data changes in Dataverse, the Dataverse shortcuts in Fabric reflect the latest data.



The screenshot shows the Microsoft Fabric Home interface. The top navigation bar includes 'Home', 'Create', 'Browse', 'Workspaces', and 'Power BI'. The main area has tabs for 'Lakehouse' and 'Dataset'. Below the tabs, there are buttons for 'Get data', 'New Power BI dataset', and 'Open notebook'. A message indicates that a SQL endpoint and a default dataset were created and will be updated with any tables added to the lakehouse. The 'Explorer' sidebar shows a workspace named 'dataverse_demo_cds2_work' containing tables like account, activityparty, appointment, businessunit, contact, sample_challenge, sample_idea, and transactioncurrency. The 'contact' table is currently selected, displaying a preview of 13 rows with columns: Id, SinkCreate..., SinkModifi..., statecode, statuscode, accountrol..., and address. The data in the preview table is as follows:

	Id	SinkCreate...	SinkModifi...	statecode	statuscode	accountrol...	address
1	022b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
2	122b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
3	102b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
4	082b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
5	162b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
6	002b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
7	062b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		
8	042b6a27...	6/5/2023 1...	6/5/2023 1...	0	1		

Note that Dataverse manages these shortcuts. You shouldn't delete or remove these shortcuts in Fabric. If you accidentally delete a link, you can go to the [Azure Synapse](#)

Build apps and automations, drive action with insights from Microsoft Fabric

Article • 03/11/2025

Link to Microsoft Fabric feature in Microsoft Dataverse enables extending your data and insights in Dynamics 365 and Power Apps in Fabric. Bring your own data into Fabric and combine, reshape, and aggregate data with data from Dataverse. Use Fabric tools such as SQL, Spark, and dataflows to work with your data within Fabric. For example:

- Combine financial data from Dynamics 365 with financial data from other systems to derive consolidated insights.
- Merge historical data ingested into OneLake from legacy systems with current business data from Dynamics 365 and Dataverse.
- Combine weblogs and telemetry data from your website with product and order details from Dynamics 365.
- Apply machine learning and detect anomalies and exceptions within your data.

Insights aren't complete unless you can drive action and business processes. Bring insights you found in Fabric to build apps, drive business processes with Power Automate without data copy, no-ETL, or non-Microsoft integration tools.

With Dataverse virtual tables sourced with Fabric, your low-code app builders connect to data in Microsoft OneLake and build Power Apps and drive business actions. Additionally, with Power Pages, low-code makers can build external facing websites and drive action from OneLake insights with partners, suppliers, and customers.

Troubleshooting common issues with link to Fabric

Article • 04/03/2025

If you experience an error message when using link to Fabric with Microsoft Dataverse, here are suggestions and more information about how to resolve the issue.

[+] Expand table

Error message	How to resolve
<p>You must have Power BI premium or Fabric capacity in the same region {Region}. You can also get a Fabric trial.</p> <p>You won't receive this error after April 30, 2024. Instead, you're shown an error if you don't have capacity in the same geography.</p>	<p>You need a Power BI premium or a Fabric capacity in the same region as your Dataverse environment. Power BI premium per user capacity isn't sufficient. You can get a free trial capacity by visiting Fabric (preview) trial. More information: Prerequisites</p>
<p>Creation of Fabric workspace failed. You can try again. If this issue persists contact Microsoft customer support with the corelation ID.</p>	<p>You must be a Power BI Capacity Administrator or have contributor access to a capacity within the same geography as your Dataverse environment.</p> <p>Currently, the system supports these premium capacity SKUs described in the Prerequisites.</p> <p>Verify with your Power BI Tenant admin that you have permissions to create workspaces. You can find this setting in Power BI Admin portal under Tenant settings > workspace settings > Create workspaces.</p> <p>If the issue isn't resolved, contact Microsoft customer support with the provided reference ID</p>
<p>Creation of Fabric lakehouse failed. You can try again. If this issue persists contact Microsoft customer support with the corelation ID.</p>	<p>Verify with your Power BI Tenant admin that you have permissions to create OneLake shortcuts.</p> <p>You can find this setting in Power BI Admin portal under Admin Portal > Tenant Settings > Microsoft Fabric > Users can create Fabric items.</p> <p>More information: Prerequisites</p> <p>If the issue isn't resolved after several retries, you can contact Microsoft customer support with the provided reference ID.</p>

What is Azure Synapse Link for Dataverse?

Article • 06/21/2022

Azure Synapse Link for Dataverse enables you to get near real-time insights over your data in Microsoft Dataverse. With a tight seamless integration between Dataverse and Azure Synapse Analytics, Azure Synapse Link enables you to run analytics, business intelligence and machine learning scenarios on your data.

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Using Azure Synapse Link, continuously export data from Dataverse to:

- Azure Synapse Analytics
- Azure Data Lake Storage Gen2

The Azure Synapse Link for Dataverse is a service designed for enterprise big data analytics by delivering scalable high availability with disaster recovery capabilities. Data is stored in the Common Data Model format, which provides semantic consistency across apps and deployments.



The Azure Synapse Link for Dataverse provides these features:

- Linking or unlinking the environment to Azure Synapse Analytics and/or Azure Data Lake Storage Gen2 in your Azure Subscription.
- Continuous replication of tables to Azure Synapse Analytics and/or Azure Data Lake Storage Gen2 in your Azure Subscription.
- Replication of both standard and custom tables as well as create, update, and delete (CUD) transactions.

Create an Azure Synapse Link for Dataverse with your Azure Synapse Workspace

Article • 10/29/2024

You can use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to perform the following tasks:

1. Connect your Dataverse data to your Azure Synapse Analytics workspace with the Azure Synapse Link service.
2. Manage Dataverse tables included in the Azure Synapse Link.
3. Monitor your Azure Synapse Link.
4. Unlink your Azure Synapse Link.
5. Relink your Azure Synapse Link.
6. View your data in Azure Synapse Analytics.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

- Dataverse: You must have the Dataverse **system administrator** security role. Additionally, tables you want to export via Azure Synapse Link must have the **Track changes** property enabled. More information: [Advanced options](#)
- Azure Data Lake Storage Gen2: You must have an Azure Data Lake Storage Gen2 account and **Owner** and **Storage Blob Data Contributor** role access. Your storage account must enable **Hierarchical namespace** for both initial setup and delta sync. **Allow storage account key access** is required only for the initial setup.
- Synapse workspace: You must have a Synapse workspace and the **Synapse Administrator** role access within the Synapse Studio. The Synapse workspace must be in the same region as your Azure Data Lake Storage Gen2 account. The storage

Create an Azure Synapse Link for Dataverse with Azure Data Lake

Article • 01/15/2025

You can use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Data Lake Storage Gen2 to enable various analytics scenarios. This article shows you how to perform the following tasks:

1. Connect your Dataverse data to your Azure Data Lake Storage Gen2 account with the Azure Synapse Link service.
2. Manage Dataverse tables included in the Azure Synapse Link.
3. Monitor your Azure Synapse Link.
4. Unlink your Azure Synapse Link.
5. Relink your Azure Synapse Link.
6. View your data in Azure Data Lake and understand the file structure.

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

- Azure Data Lake Storage Gen2: You must have an Azure Data Lake Storage Gen2 account and **Owner** and **Storage Blob Data Contributor** role access. Your storage account must enable **Hierarchical namespace** for both initial setup and delta sync. **Allow storage account key access** is required only for the initial setup.

ⓘ Note

- The storage account must be created in the same Microsoft Entra tenant as your Power Apps tenant.
- To set **Enabled from selected virtual networks and IP addresses** for linked storage account to grant access from selected IP addresses, you must create an Azure Synapse Link with managed identities.[Use managed identities for Azure with your Azure data lake storage](#) (without managed identities set up,

Advanced configuration options in Azure Synapse Link

Article • 10/29/2024

Azure Synapse Link offers multiple ways to write and read your data to fit various analytical scenarios. Depending on your analytical scenario, you can choose a specific configuration from the options below.

[+] Expand table

Scenario	Applies to	Available configuration options
Operational reporting	Dataverse tables, finance and operations tables and entities	Synapse Analytics with Delta lake option provides better query response times especially applicable for querying large amounts of data. More information: Synapse Link with Delta lake option
Operational reporting	Dataverse tables only	Synapse Link with "In place update" configuration option provides CSV files in your data lake that are updated near-real time This is a legacy option available for Dataverse tables. This option isn't supported for tables from finance and operations apps
Data integration	Dataverse tables and finance and operations tables and entities	"Append only" option provides CSV files that contain incremental data. You can build pipelines that consume incremental data and populate downstream systems User-specified data partition feature enables choosing a custom data partitioning strategy specifically for Dataverse tables. Finance and operations table data are partitioned by the system based on appropriate partition strategy. This option isn't available for finance and operations apps

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake Storage as well as Azure Synapse Analytics. Starting Sept-2023, Azure Synapse Link also enables you to choose data from Dynamics 365 finance and operations applications. Not all integration patterns are supported with finance and

Use managed identities for Azure with your Azure data lake storage

Article • 09/24/2024

Azure Data Lake Storage provides a layered security model. This model enables you to secure and control the level of access to your storage accounts that your applications and enterprise environments demand, based on the type and subset of networks or resources used. When network rules are configured, only applications requesting data over the specified set of networks or through the specified set of Azure resources can access a storage account. You can limit access to your storage account to requests originating from specified IP addresses, IP ranges, subnets in an Azure Virtual Network (VNet), or resource instances of some Azure services.

Managed identities for Azure, formerly known as Managed Service Identity (MSI), help with the management of secrets. Microsoft Dataverse customers using Azure capabilities create a managed identity (part of enterprise policy creation) that can be used for one or more Dataverse environments. This managed identity that will be provisioned in your tenant is then used by Dataverse to access your Azure data lake.

With managed identities, access to your storage account is restricted to requests originating from the Dataverse environment associated with your tenant. When Dataverse connects to storage on behalf of you, it includes additional context information to prove that the request originates from a secure, trusted environment. This allows storage to grant Dataverse access to your storage account. Managed identities are used to sign the context information in order to establish trust. This adds application-level security in addition to the network and infrastructure security provided by Azure for connections between Azure services.

Before you start

- Azure CLI is required on your local machine. [Download and install](#)
- You need these two PowerShell modules. If you don't have them, open PowerShell and run these commands:
 - Azure Az PowerShell module: `Install-Module -Name Az`
 - Azure Az.Resources PowerShell module: `Install-Module -Name Az.Resources`
 - Power Platform admin PowerShell module: `Install-Module -Name Microsoft.PowerApps.Administration.PowerShell`
 -

Choose finance and operations data in Azure Synapse Link for Dataverse

Article • 03/10/2025

Microsoft Azure Synapse Link for Dataverse lets you choose data from Dynamics 365 finance and operations apps. Use Azure Synapse Link to continuously export data from finance and operations apps into Azure Synapse Analytics and Azure Data Lake Storage Gen2.

Azure Synapse Link for Dataverse is a service that's designed for enterprise big data analytics. It provides scalable high availability together with disaster recovery capabilities. Data is stored in the Common Data Model format, which provides semantic consistency across apps and deployments.

Azure Synapse Link for Dataverse offers the following features that you can use with finance and operations data:

- You can choose both standard and custom finance and operations entities and tables.
- Continuous replication of entity and table data is supported. Create, update, and delete (CUD) transactions are also supported.
- You can link or unlink the environment to Azure Synapse Analytics and/or Data Lake Storage Gen2 in your Azure subscription. You don't have to go to the Azure portal or Microsoft Dynamics Lifecycle Services for system configuration.
- You can choose data and explore by using Azure Synapse. You don't have to run external tools to configure Synapse Analytics workspaces.
- All features of Azure Synapse Link for Dataverse are supported. These features include availability in all regions, saving as Parquet Delta files, and restricted storage accounts.
- The table limits in the Export to Data Lake service aren't applicable in Azure Synapse Link for Dataverse.
- By default, saving in Parquet Delta Lake format is enabled for finance and operations data, so that query response times are faster.

Note

This feature is generally available with finance and operations application versions shown in the following list. If you haven't yet applied these application versions, install the latest cumulative update to use this feature.

Azure Synapse Link for Dataverse troubleshooting guide

Article • 10/15/2024

When you open an Azure Synapse Link profile, you might see an error with a message and link to this article. In addition, users might also see **Error** status next to tables that are already in an Azure Synapse Link profile. Use this troubleshooting guide to diagnose and fix error conditions with Azure Synapse Link for Dataverse.

[+] Expand table

Error message	Cause	Resolution
MSI-801: Azure Synapse Link is unable to access storage account secured via MSI. Data updates are paused.	You have enabled managed services identify (MSI) to the storage account selected for this Azure Synapse Link profile. Azure Synapse Link service doesn't have access to the storage account due to MSI configuration issues and the service has paused. Revisit and verify MSI configuration	Verify that the MSI policy isn't deleted. Validate that MSI is granted with the required access privileges. More information: MSI configuration Once the required access is granted, the service resumes.
ADLS-802: Azure Synapse Link is unable to access storage account. Data updates are paused.	Azure Synapse Link service can't access storage account and the service has paused. Permissions associated with storage account assigned to Azure Synapse Link profile might have changed or the storage account doesn't exist.	Verify that the storage account exists and that the Azure Synapse Link service has owner access to storage account. More information: Prerequisites Once required access is granted, the service resumes.
CT-803: Row version change tracking configuration key disabled in linked environment. Data updates in some tables may be paused.	Azure Synapse Link service requires the configuration key enable row version change tracking enabled in the linked finance and operations apps environment. This configuration key is disabled in the linked environment and the service has paused finance and operations apps tables from the linked environment. It's possible that a database restore operation caused the configuration to be reverted. Enable the configuration key and remove and readd finance and operations apps tables to resume.	Your administrator must reenable the finance and operations apps configuration key. More information: Add configurations in a finance and operations apps environment The service resumes when the configuration key is reenabled.

Receive Azure Synapse Link for Dataverse notifications in Power Apps

Article • 03/22/2024

The state of your Azure Synapse Link for Dataverse is stored in a Microsoft Dataverse table with real-time updates. You can customize a notification using Power Automate flows or Power BI to stay on top of the state of your Azure Synapse Link for Dataverse activity instead of manually checking the Azure Synapse Link for Dataverse profile page in Power Apps (make.powerapps.com).

The Azure Synapse Link for Dataverse profile and its synchronization status are stored in six system-generated read-only tables within Dataverse. These tables are designed to refresh and update in real time, ensuring that the information contained within them remains accurate and up to date at all times.

How notification works with Azure Synapse Link for Dataverse

To customize a notification, monitor the data changes in a Dataverse table related to the synchronization status of Azure Synapse Link. By tracking these changes, you can export the updated data for visualization using Power BI or set up an automated cloud flow that activates whenever there's a change in the Azure Synapse Link for Dataverse state. This is achieved by reading the row change from any of the Azure Synapse Link state tables.

Connector to use for a Power Automate flow

We recommend users have the appropriate Power Platform licensing to use Power Automate to customize the trigger function. Use the Dataverse connector, which triggers a flow when a row is added, modified, or deleted in the selected Dataverse table. More information: [Trigger flows when a row is added, modified, or deleted - Power Automate](#)

Several options are available for using Power Automate to send notifications. Here are some examples.

[+] Expand table

Azure Synapse Link for Dataverse FAQ

FAQ

This article provides information on frequently asked questions about exporting Microsoft Dataverse table data to Azure Synapse Analytics and Azure Data Lake.

Can I manually perform tasks such as creating, updating, deleting, or setting autodelete policies for data files in the connected Azure storage?

Data files shouldn't be modified by a customer and no customer files should be placed in the data folders.

 Note

To drop stale and stagnant data in the data lake without breaking the Azure Synapse Link, consider using the feature [Query and analyze the incremental updates](#)

How can I access my table relationships?

To access many-to-many relationships, the relationship is available as a table to select from the **Add tables** page for a new link and from the **Manage tables** for a pre-existing link.

 Note

All relationships data is in Append-only mode by default when written in CSV format.

How can I get estimated costs before adding Azure Synapse Link?

Azure Synapse Link is a free feature with Dataverse. Utilizing Azure Synapse Link for Dataverse doesn't incur additional charges under Dataverse. However, consider potential costs for the Azure service:

Transport the Azure Synapse Link for Dataverse configuration across environments

Article • 02/22/2023

In Power Apps, solutions are used to transport apps and components from one environment to another, or to apply a set of customizations to existing apps. Making the Azure Synapse Link for Dataverse configurations solution-aware enables basic application lifecycle management (ALM) abilities such as distribution, copy, and backup and restore of the Azure Synapse Link for Dataverse configuration.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to transport the Azure Synapse Link for Dataverse configuration across environments.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Azure Synapse Link for Dataverse Advanced Configuration Options enabled.** This guide assumes that you have already toggled the Show advanced configuration settings under Advanced when creating Azure Synapse Link for Dataverse [Azure Synapse Link Advanced Configuration Settings](#).

Install the Azure Synapse Link for Dataverse solution

ⓘ Note

The Azure Synapse Link for Dataverse solution must be installed in both the source and the destination environments.

Manage your Azure Synapse Link during environment lifecycle events

Article • 02/15/2022

Azure Synapse Link for Dataverse provides a continuous pipeline of data from Dataverse to Azure Synapse Analytics and/or Azure Data Lake. Once the link is created it continuously writes all the initial data as well as any incremental data. When you make changes to your Power Platform environment, this can affect the state of your Azure Synapse Link for Dataverse. This article explains the behavior of the Azure Synapse Link for Dataverse and possible user action during environment lifecycle events.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Environment lifecycle events overview

Environment operation	Synapse link	Data	User action
Backup and restore	Stops syncing	Maintained	Use solutions to transport the link across environments
Copy	Source continues syncing	Source is maintained	Use solutions to transport the link across environments
Delete	Stops syncing	Maintained	None
Edit the properties	Error	Maintained	Unlink and relink
Move	Source stops syncing	Source is maintained	Use solutions to transport the link across environments
Recover	Continue syncing	Maintained	None
Reset	Removed	Maintained	Delete data before recreating the link

Backup and restore an environment

Query Azure Synapse Link for Dataverse data with serverless SQL pool

Article • 02/15/2022

You can use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to query your Dataverse data with built-in serverless SQL pool in your Azure Synapse Analytics workspace.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to query your Dataverse data after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.
- **Synapse administrator.** You must be granted the **Synapse Administrator** role access within Synapse studio.

Query your Dataverse data with serverless SQL pool

ⓘ Note

Azure Synapse Link for Dataverse does not support the use of dedicated SQL pools at this time.

Query and analyze the incremental updates

Article • 03/04/2025

Microsoft Dataverse data (including data from Dynamics 365 apps and finance and operations) can continuously change through create, update, and delete transactions. With the incremental update option, you can build incremental data pipelines that apply these changes to downstream systems and databases. Synapse Link for Dataverse exports incremental data in time stamped folders that contain data changes within user-specified time intervals.

You can leverage incremental update feature for several scenarios:

- **Update a downstream datastore or a data warehouse.** You might need to apply changes from your Power Apps and Dynamics 365 data into a downstream datastore. Incremental update is a standard capability in most data transformation tools, such as Azure Data Factory. However, for the incremental update feature to work, you must identify the records that changed in source tables. The incremental update feature provides changed data as a set of files such that you don't need to detect changes by comparing before and after images of tables.
- **Analyze changes in large datasets.** If you need to analyze changes in large datasets, the incremental update feature provides a continuous stream of data in small batches such that you don't need to store all data. With this option you can drop stale and stagnant data to save data storage costs as well as track data changes relevant for a user-specified time period.

Azure Synapse Link for Dataverse also provides the option to export and maintain a replica of tables in your Azure Data Lake (Gen 2) storage. You can configure Azure Synapse Link to export incremental data in addition to exporting a replica of tables. Each configuration (known as a "Synapse Link profile") can export either tables or incremental data. While you can create multiple profiles, you can't configure both tables and incremental updates within the same profile.

Important

An initial time stamped folder is created when you enable this feature with a copy of your data. Subsequent timestamp and table folders are created only when there is a data update during the user-specified time interval.

Create a view of your Azure Synapse Link for Dataverse data

Article • 10/31/2024

Use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to create a view of your Dataverse data in your Azure Synapse Analytics workspace.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to create a view of your Dataverse data after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.
- **Synapse administrator.** You must be granted **Synapse Administrator** role access within Synapse studio.

Create a view of your Dataverse data

1. In Power Apps, select your Azure Synapse Link from the list, and then select **Go to Azure Synapse workspace**.

Transform Azure Synapse Link for Dataverse data with Apache Spark

Article • 08/25/2022

You can use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to transform your Dataverse data using the Apache Spark engine available in your Synapse workspace.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to transform Dataverse data with Apache Spark after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.
- **Synapse administrator.** You must be granted the **Synapse Administrator** role access within Synapse studio.

Transform your data with an Apache Spark notebook

1. In Power Apps, select your desired Azure Synapse Link from the list, and then select **Go to Azure Synapse workspace**.

Copy Dataverse data into Azure SQL

Article • 02/08/2023

Use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to run Azure Synapse pipelines or Azure Data Factory to copy data from Azure Data Lake Storage Gen2 to an Azure SQL Database with incremental updates feature enabled in Azure Synapse Link.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics. This template is a code sample. We encourage you to use this template as guidance to test out the functionality of retrieving data from Azure Data Lake Storage Gen2 to Azure SQL Database using the pipeline provided.

Prerequisites

1. Azure Synapse Link for Dataverse. This guide assumes that you've already met the prerequisites to create an Azure Synapse Link with Azure Data Lake. More information: [Prerequisites for an Azure Synapse Link for Dataverse with your Azure Data Lake](#)
2. Create an Azure Synapse Workspace or Azure Data Factory under the same Microsoft Entra tenant as your Power Apps tenant.
3. Create an Azure Synapse Link for Dataverse with the **incremental folder update enabled** to set the time interval. More information: [Query and analyze the incremental updates](#)
4. Microsoft.EventGrid provider needs to be registered for trigger. More information: [Azure portal](#). Note: If you are using this feature in Azure Synapse Analytics, ensure that your subscription is also registered with Data Factory resource provider, otherwise you'll get an error stating that the creation of an "Event Subscription" failed.
5. Create an Azure SQL database with the **Allow Azure services and resources to access this server** property enabled. More information: [What should I know when setting up my Azure SQL Database \(PaaS\)?](#)
6. Create and configure an Azure integration runtime. More information: [Create Azure integration runtime - Azure Data Factory & Azure Synapse](#)

Visualize Azure Synapse Link for Dataverse data with Power BI

Article • 02/15/2022

You can use the Azure Synapse Link to connect your Microsoft Dataverse data to Azure Synapse Analytics to explore your data and accelerate time to insight. This article shows you how to generate a Power BI report by connecting to the serverless SQL endpoint from your Azure Synapse Analytics workspace.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to access Dataverse choices with Power BI after using the Azure Synapse Link for Dataverse service.

- **Power BI Desktop.** [Get it now ↗](#)
- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.

Connect to your Azure Synapse Analytics workspace to Power BI

1. Open Power BI Desktop.
2. Select **Get data > More....**
3. Select **Azure > Azure Synapse Analytics (SQL DW) > Connect**.

Copy exported Dataverse data to dedicated SQL pool

Article • 02/15/2022

After creating a continuous pipeline of data from Dataverse to your Synapse workspace with Azure Synapse Link for Dataverse, you can copy the data to dedicated SQL pool with Synapse Pipelines.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to copy your Dataverse data to dedicated SQL pool after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse.** This guide assumes that you've already exported Dataverse data by using [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.
- **Synapse administrator.** You must be granted the **Synapse Administrator** role access within Synapse studio.
- **Dedicated SQL Pool.** This guide assumes that you've already created a dedicated SQL pool. You can create a dedicated SQL pool under the **Manage** tab in your Synapse workspace.

Copy the exported Dataverse data to dedicated SQL pool

1. Navigate to your Azure Synapse Analytics workspace.

Read the incremental updates of Dataverse data

Article • 02/15/2022

After creating a continuous pipeline of data from Microsoft Dataverse to your Synapse workspace with Azure Synapse Link for Dataverse, you can read the incremental updates of a specified time interval. Every Dataverse table exported with Azure Synapse Link for Dataverse contains a *SinkModifiedOn* column which can be used to get the incremental updates.

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to read the incremental updates of your exported Dataverse data.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#) and that all tables are syncing with **Append-only** mode.
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.
- **Synapse administrator.** You must be granted the **Synapse Administrator** role access within Synapse studio.

Read the Incremental Updates of your Dataverse data

1. Navigate to your Azure Synapse Analytics workspace.
2. Select **Develop** from the left side panel, then select + > **SQL script**.

Access Dataverse choices (option sets) with serverless SQL pool

Article • 02/15/2022

For columns that use Microsoft Dataverse [Choices](#), choice values are written as an integer label and not a text label to maintain consistency during edits. The integer-to-text label mapping is stored in the *Microsoft.Athena.TrickleFeedService/table-EntityMetadata.json* file. This article covers how to access the integer-to-text label mapping using serverless SQL pool.

D	E	F	G	H
11	0	1	882880003	TRUE
11	0	1	4 882880004	TRUE
11	0	1	882880001	FALSE
11	0	1	0 882880002	FALSE
11	0	1	0 882880000	FALSE
11	0	1	4 882880000	TRUE
11	0	1	0 882880001	TRUE

Snapshot file

```
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880000",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Red"  
},  
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880001",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Yellow"  
},
```

<table>-EntityMetadata.json file

ⓘ Note

Azure Synapse Link for Microsoft Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to consume Dataverse data with serverless SQL pool after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse:** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#) with and Azure Synapse Analytics workspace.
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.

Consuming Dataverse choices with serverless SQL pool

Export Dataverse data in Delta Lake format

Article • 03/11/2025

Use Azure Synapse Link for Dataverse to export your Microsoft Dataverse data to Azure Synapse Analytics in Delta Lake format. Then explore your data and accelerate time to insight. This article provides the following information and shows you how to perform the following tasks:

- Explains Delta Lake and Parquet and why you should export data in this format.
- Export your Dataverse data to your Azure Synapse Analytics workspace in Delta Lake format with the Azure Synapse Link.
- Monitor your Azure Synapse Link and data conversion.
- View your data from Azure Data Lake Storage Gen2.
- View your data from Synapse Workspace.

Important

- If you're upgrading from CSV to Delta Lake with existing custom views, we recommend updating the script to replace all **partitioned** tables to **non_partitioned**. Do this by looking for instances of `_partitioned` and replace them with an empty string.
- For the Dataverse configuration, append-only is enabled by default to export CSV data in `appendonly` mode. But the Delta Lake table will have an in-place update structure because the Delta Lake conversion comes with a periodic merge process.
- There are no costs incurred with the creation of Spark pools. Charges are only incurred once a Spark job is executed on the target Spark pool and the Spark instance is instantiated on demand. These costs are related to the usage of Azure Synapse workspace Spark and are billed monthly. The cost of conducting Spark computing mainly depends on the time interval for incremental update and the data volumes. More information: [Azure Synapse Analytics pricing ↗](#)
- It's important to take these additional costs into consideration when deciding to use this feature as they aren't optional and must be paid in order to continue using this feature.

Ingest exported Dataverse data with Azure Data Factory

Article • 04/13/2022

After exporting data from Microsoft Dataverse to Azure Data Lake Storage Gen2 with Azure Synapse Link for Dataverse, you can use Azure Data Factory to create dataflows, transform your data, and run analysis.

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

This article shows you how to perform the following tasks:

1. Set the Data Lake Storage Gen2 storage account with the Dataverse data as a *source* in a Data Factory dataflow.
2. Transform the Dataverse data in Data Factory with a dataflow.
3. Set the Data Lake Storage Gen2 storage account with the Dataverse data as a *sink* in a Data Factory dataflow.
4. Run your dataflow by creating a pipeline.

Prerequisites

This section describes the prerequisites necessary to ingest exported Dataverse data with Data Factory.

- **Azure roles.** The user account that's used to sign in to Azure must be a member of the *contributor* or *owner* role, or an *administrator* of the Azure subscription. To view the permissions that you have in the subscription, go to the [Azure portal](#), select your username in the upper-right corner, select ..., and then select **My permissions**. If you have access to multiple subscriptions, select the appropriate one. To create and manage child resources for Data Factory in the Azure portal—including datasets, linked services, pipelines, triggers, and integration runtimes—you must belong to the *Data Factory Contributor* role at the resource group level or above.

Copy Dataverse data from multiple data Lakes to a single data lake

Article • 02/15/2022

After exporting data from Microsoft Dataverse to Azure Data Lake Storage Gen2 with Azure Synapse Link for Dataverse, you can use Azure Data Factory to create a pipeline that copies data from multiple data lakes to a single data lake.

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

This article shows you how to perform the following tasks:

1. Create a pipeline from an official Microsoft template.
2. Configure the template.
3. Run the pipeline.

Prerequisites

This section describes the prerequisites necessary to copy exported Dataverse data from multiple data lakes to a single data lake.

- **Azure roles.** The user account that's used to sign in to Azure must be a member of the *contributor* or *owner* role, or an *administrator* of the Azure subscription. To view the permissions that you have in the subscription, go to the [Azure portal](#), select your username in the upper-right corner, select ..., and then select **My permissions**. If you have access to multiple subscriptions, select the appropriate one. To create and manage child resources for Data Factory in the Azure portal—including datasets, linked services, pipelines, triggers, and integration runtimes—you must belong to the *Data Factory Contributor* role at the resource group level or above.
- **Azure Synapse Link for Dataverse.** This guide assumes that you've already exported Dataverse data to multiple data lakes by using [Azure Synapse Link for Dataverse](#).

Transform Dataverse data from CSV to Parquet with a pipeline template

Article • 02/15/2022

After exporting data from Microsoft Dataverse to Azure Data Lake Storage Gen2 with Azure Synapse Link for Dataverse, you can use Azure Data Factory to create a pipeline that copies data from the data lake to Azure SQL.

Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

This article shows you how to perform the following tasks:

1. Create a pipeline from a Microsoft template.
2. Configure the template.
3. Run the pipeline.

Prerequisites

This section describes the prerequisites necessary to transform Dataverse data to from CSV to Parquet.

- **Azure roles.** The user account that's used to sign in to Azure must be a member of the *contributor* or *owner* role, or an *administrator* of the Azure subscription. To view the permissions that you have in the subscription, go to the [Azure portal](#), select your username in the upper-right corner, select ..., and then select **My permissions**. If you have access to multiple subscriptions, select the appropriate one. To create and manage child resources for Data Factory in the Azure portal—including datasets, linked services, pipelines, triggers, and integration runtimes—you must belong to the *Data Factory Contributor* role at the resource group level or above.
- **Azure Synapse Link for Dataverse.** This guide assumes that you've already exported Dataverse data by using [Azure Synapse Link for Dataverse](#). In this example, the account table data is exported to the data lake.

Analyze Microsoft Dataverse data in Azure Data Lake Storage Gen2 with Power BI

Article • 02/15/2022

After exporting data from Microsoft Dataverse to Azure Data Lake Storage Gen2 with Azure Synapse Link for Dataverse, you can use Power BI to create business reports and analytics. This can be useful for sales managers and sales associates to refine and build additional reports and dashboards in Power BI.

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

This article shows you how to perform the following tasks:

1. Connect the Data Lake Storage Gen2 storage container containing the exported Dataverse data to Power BI.
2. Create a report in Power BI that graphs account owners and their respective total account revenue.

Prerequisites

This section describes the prerequisites necessary to consume Dataverse data with Power BI by using the Azure Synapse Link for Dataverse service.

- **Power BI Desktop.** [Get it now ↗](#)
- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#). In this example, the account table data is exported to the data lake and will generate a report by using the account table columns.
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.

Access Dataverse choices (option sets) with Azure Data Factory

Article • 02/15/2022

For columns that use Microsoft Dataverse [choices](#), choice values are written as an integer label and not a text label to maintain consistency during edits. The integer-to-text label mapping is stored in the *Microsoft.Athena.TrickleFeedService/table-EntityMetadata.json* file. This article covers how to access the integer-to-text label mapping using Azure Data Factory.

D	E	F	G	H
11	0	1	882880003	TRUE
11	0	1	4 882880004	TRUE
11	0	1	882880001	FALSE
11	0	1	0 882880002	FALSE
11	0	1	0 882880000	FALSE
11	0	1	4 882880000	TRUE
11	0	1	0 882880001	TRUE

Snapshot file

```
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880000",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Red"  
},  
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880001",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Yellow"  
},
```

<table>-EntityMetadata.json file

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to access Dataverse choices with Azure Data Factory after using the Azure Synapse Link for Dataverse service.

- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.

Consuming Dataverse choices with Azure Data Factory

Access choice labels directly from Azure Synapse Link for Dataverse

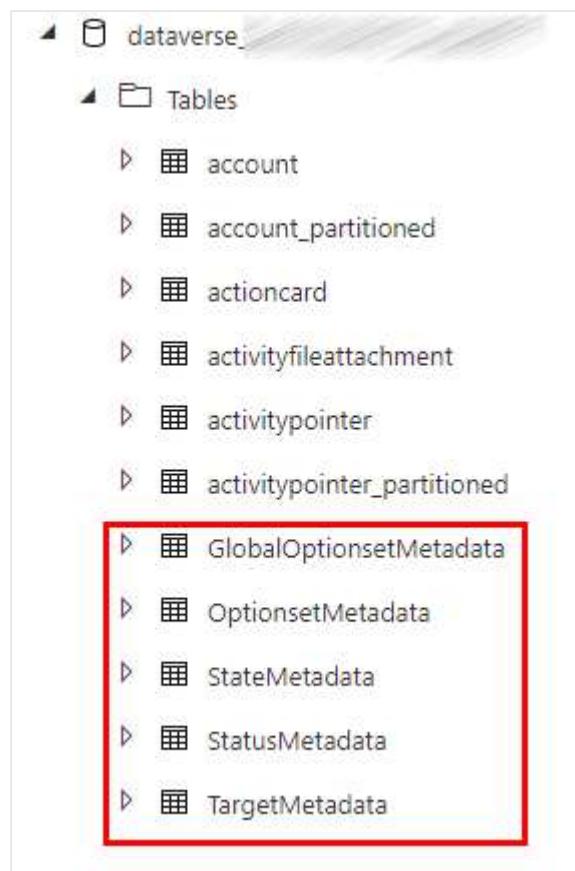
Article • 05/03/2022

Microsoft Dataverse provides rich metadata that can be used directly within Power Apps. A choice (picklist) is one of the most used types of columns that can be included in a table. It defines a set of options. When a choice is displayed in a form, it uses a drop-down list control. You can define a choice to use a set of options defined within itself (locally) or it can use a set of options defined elsewhere (globally), which can be used by other choice columns.

For more information about choice columns, go to [Create and edit global choices overview](#).

After creating an Azure Synapse Link, the following five tables are created in a folder named **OptionsetMetadata** in Azure Data Lake Storage Gen2:

- OptionsetMetadata
- GlobalOptionsetMetadata
- StateMetadata
- StatusMetadata
- TargetMetadata



Access Dataverse choices with Power BI

Article • 02/15/2022

For columns that use Microsoft Dataverse [choices](#), choice values are written as an integer label and not a text label to maintain consistency during edits. The integer-to-text label mapping is stored in the *Microsoft.Athena.TrickleFeedService/table-EntityMetadata.json* file. This article covers how to access the integer-to-text label mapping using Power BI.

D	E	F	G	H
41	0	1	882880003	TRUE
41	0	1	4 882880004	TRUE
41	0	1	882880001	FALSE
41	0	1	0 882880002	FALSE
41	0	1	0 882880000	FALSE
41	0	1	4 882880000	TRUE
41	0	1	0 882880001	TRUE

Snapshot file

```
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880000",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Red"  
},  
,  
{  
    "OptionSetName": "crfa1_color",  
    "Option": "882880001",  
    "IsUserLocalizedLabel": false,  
    "LocalizedLabelLanguageCode": 1033,  
    "LocalizedLabel": "Yellow"  
},
```

<table>-EntityMetadata.json file

ⓘ Note

Azure Synapse Link for Dataverse was formerly known as Export to data lake. The service was renamed effective May 2021 and will continue to export data to Azure Data Lake as well as Azure Synapse Analytics.

Prerequisites

This section describes the prerequisites necessary to access Dataverse choices with Power BI after using the Azure Synapse Link for Dataverse service.

- **Power BI Desktop.** [Get it now ↗](#)
- **Azure Synapse Link for Dataverse.** This guide assumes that you have already exported data from Dataverse by using the [Azure Synapse Link for Dataverse](#).
- **Storage Account Access.** You must be granted one of the following roles for the storage account: Storage Blob Data Reader, Storage Blob Data Contributor, or Storage Blob Data Owner.

Consuming Dataverse choices with Power BI

1. Open Power BI Desktop.

License requirements for tables

Article • 02/08/2023

App makers can use most of the tables available within Microsoft Dataverse (including custom tables and tables that are part of the Common Data Model) to create apps and flows for users who have a Power Apps or Power Automate license.

In some cases, tables contain complex business logic or are tied to customer engagement apps in Dynamics 365 (Dynamics 365 Sales, Customer Service, Field Service, Marketing, or Project Service Automation) that require app users to have a specific license. This topic provides licensing information for tables with complex business logic and tables that are tied to Dynamics 365 apps (termed as restricted tables).

Tables with complex business logic

Tables that include the following complex server-side logic require users of an app or flow that uses these tables to have a [Power Apps](#) or [Power Automate](#) license:

- Code plug-ins (for more information, see [Plug-in development](#))
- Real-time workflows (for more information, see [Workflow processes](#))

Note

Only workflows that are converted to a real-time workflow are considered real-time and synchronous. Workflows that are run in the background can still be used with the appropriate Power Apps plan and do not require additional licenses.

To know whether or not you added complex business logic to your tables, review the list of plug-in assemblies and workflows configured in your environment. For the list of tables which may contain server side logic after installing a Dynamics 365 app (such as Dynamics 365 Sales or Dynamics 365 Customer Service), see [Complex tables requiring Power Apps or Power Automate licenses](#)

Impacting license requirements when adding complex business logic

App makers can add code plug-ins and real-time workflows to tables within Dataverse, but doing so could change the license requirements for users of apps already deployed.

Complex tables and licensing

Article • 02/15/2022

ⓘ Important

This topic is applicable only for older Power Apps Plan 1 and Plan 2 licenses.

Complex tables are applicable *only* for the older Power Apps Plan 1 and Plan 2 licenses, and not for the latest Power Apps per app and Power Apps per user plans.

For the latest information on licensing requirements for tables, see the [Power Apps licensing guide](#).

Tables that include the following complex server-side logic require users of an app or flow that uses these tables to have a Power Apps Plan 2 or Power Automate Plan 2 license:

- Code plug-ins. More information: [Plug-in development](#)
- Real-time workflows. More information: [Workflow processes](#)

ⓘ Note

Only workflows that are converted to a real-time workflow are considered real-time and synchronous. Workflows that are run in the background can still be used with the appropriate Power Apps plan and do not require additional licenses.

To know whether or not you've added complex business logic to your tables, review the list of plug-in assemblies and workflows configured in your environment.

Complex tables installed with Dynamics 365 apps

The following table lists tables that contain complex server-side logic out-of-the-box as part of the installation of customer engagement apps in Dynamics 365 (Dynamics 365 Sales, Customer Service, Field Service, Marketing, and Project Service Automation). This list is intended as a guide. Depending on the Dynamics 365 apps and versions installed in your environment, the list of complex tables may vary.

Restricted tables requiring Dynamics 365 licenses

Article • 05/18/2022

App makers, who are building custom apps, can use all of the Microsoft Dataverse tables available within [Common Data Model](#) to create apps and flows for users who have any version of Power Apps and Power Automate license.

However, a smaller set of tables tied to Dynamics 365 apps (Dynamics 365 Sales, Customer Service, Field Service, Marketing, or Project Service Automation) require canvas and model-driven app users to have a license for the corresponding Dynamics 365 app if they need to create, update, or delete rows within the tables. These are referred to as restricted tables.

Tables may be restricted to a Dynamics 365 app license for the following reasons:

- The table is used to store and maintain product-specific configuration data that should typically be not used outside of the application.
- The table is accompanied by advanced logic that creates and maintains data in a specific way when used within a Dynamics 365 product.

If an app or flow only reads information from a table, a Dynamics 365 app license is not required and an appropriate Power Apps or Power Automate license is all that's needed.

Restricted tables for create, update, and delete operations

The following table lists the restricted tables and the associated Dynamics 365 license requirements for users who create, update, or delete data stored within these tables.

Note

Dynamics 365 Customer Engagement Plan and Dynamics 365 Plan licenses are no longer available for purchase and is referenced here only for the benefit of existing customers who have bought these licenses in the past.

 Expand table

SharePoint, OneNote, and OneDrive integration with Microsoft Dataverse

Article • 02/15/2022

Dataverse provides support for SharePoint, OneDrive, and OneNote integration. Integration with these services requires that you first enable SharePoint integration.

Microsoft 365 service	Description	More information
SharePoint	Lets app users manage common document types, such as Word, Excel, PowerPoint, OneNote, and create folders to save and manage those documents that are seamlessly stored in SharePoint from within Dataverse apps.	Manage your documents using SharePoint Set up SharePoint integration
OneDrive for Business	App users can create and manage private documents that can be accessed from within Dataverse apps.	Enable OneDrive for Business
OneNote	App users can use OneNote to take or review notes from within Dataverse rows.	Set up OneNote integration

Translate customized table, form, and column text into other languages

Article • 03/13/2023

After you create customized table and column text in your unmanaged solution, you may want to translate it into other languages.

Important

When you export translations, the export translations feature exports translations for the table. So, that means even if the solution contains only a single form, labels for all the forms for the table will be exported. Make sure you only modify the form's labels when importing the translations back otherwise another component translation you modify will be added as a dependency to the solution.

1. Sign into [Power Apps](#) and select **Solutions** from the left navigation. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
2. Select the unmanaged solution you want, on the command bar select ..., select **Translations**, and then select **Export translations**.
3. After the export completes the exported translations compressed (.zip) file is downloaded to your browser's default download folder and contains the exported labels.
4. Extract the XML file from the compressed (.zip) file.
5. Open the CrmTranslations.xml file in Excel.
6. Select the sheet named **Localized Labels**.
7. Notice there is already a column with the base language code id, such as 1033 (English U.S.) Add a column with the language code id for every language you want to translate labels. For example, add a column for 1034 (Spanish traditional).
8. Add the translated text in the new column for the object names and object ids that you want.

Import translated table, form, and column text back into an app

Article • 03/13/2023

If you have customized table or column text, such as column labels or drop-down list values, you can provide the users in your organization who are not working with the base language version of your environment with this customized text in their own languages. To do so, you export the text strings for all your customizations so that they can be translated into the languages you use in your organization.

After the translation, you need to import the translated text strings into your environment before users can take advantage of the changes.

ⓘ Important

- The file that you import must be a compressed file that contains the CrmTranslations.xml and the [Content_Types].xml file at the root.
- You can't import translated text that is over 500 characters long. If any of the items in your translation file are longer than 500 characters, the import process will fail. If the import process fails, review the line in the file that caused the failure, reduce the number of characters, and try to import again. Also note that after you import translated text, you must republish customizations.

1. Sign in to Power Apps at <https://make.powerapps.com>.
2. Select **Solutions**, and select the unmanaged solution from which to import the translated text. If the item isn't in the left navigation pane, select [...More](#) and then select the item you want.
3. In the solution explorer, on the Actions toolbar, select **Translations**, and then select **Import translations**.
4. In the **Import Translated Text** dialog box, specify the file that contains the translated text, and then select **Import**.
5. When the import is complete, select **Close**.

ⓘ Note

Privileges required for Dataverse customization

Article • 04/15/2025

App users can personalize the system and even share some of their customizations with others, but only users with the correct privileges can apply changes for everyone.

(!) Note

- This section assumes you know how to work with security roles. For more information about working with security roles, see [Security roles and privileges](#).
- For some feature and data access, a system customizer security role might be required. More information: [A copied system customizer security role might not provide the same access](#).

System administrator and system customizer security roles

Anyone who customizes have at least the system customizer security role associated with their account. This security role gives you the permission you need to customize in Microsoft Dataverse.

[] Expand table

System administrator	System customizer
Has full permission to customize the system	Has full permission to customize the system
Can view all data in the system	Can view all custom tables in the system but only view rows (records) in the account, contact, and activity tables that they create

The difference between the system administrator and system customizer security roles is that a system administrator has read privileges on most records in the system and can see everything. Assign the system customizer role to someone who needs to perform customization tasks and has access to all the custom tables but only has access to the account, contact, and activity rows (records) they create. However, testing is an important part of customizing the system. If system customizers can't see any data, they need to create rows (records) to test their customizations. By default, system customizers have full access to custom tables. If you want to have the same limitations that exist for system tables, you need to adjust the system

Microsoft Dataverse API limits overview

Article • 01/31/2023

Dataverse API limits help ensure service levels, availability, and quality. Dataverse API limits are part of the Power Platform Request limits and allocations. This article will introduce limits specifically for Dataverse applicable for Power Apps, Power Automate, and customer engagement apps (Dynamics 365 Sales, Dynamics 365 Customer Service, Dynamics 365 Field Service, Dynamics 365 Marketing, and Dynamics 365 Project Service Automation) connecting to Dataverse.

For information about limits for all areas within Power Platform, see [Power Platform Request limits and allocations](#).

There are two categories of limits that apply for Dataverse: *Entitlement* and *Service protection* limits as summarized below.

[] Expand table

Service Protection limits	Power Platform Request (API Entitlement) limits
Immediately return 429 Too Many Requests when limits are exceeded.	Enforced for Power Automate flows but will have provisions for occasional overages on Dataverse, when enforced
Evaluated in a 5-minute sliding window.	Evaluated in a 24-hour period.
Applies to all external requests to Dataverse web services.	Applies to all compute operations and analytics originating from internal or external requests.
Developer is responsible for avoiding conditions that can cause errors and managing retry when they occur.	Administrator is responsible to manage assigned capacity. They can purchase capacity add-ons to increase limits.
Enforced today within the product.	<ul style="list-style-type: none">- Will be enforced after preview report, available today for administrators to track and estimate usage, is made generally available.- Preview reports are available now.
More information: https://aka.ms/serviceprotectionlimits	More information: https://aka.ms/PlatformLimits

Entitlement limits

Migrate Microsoft Access data to Microsoft Dataverse

Article • 04/26/2023

Microsoft Access users can now choose to migrate their data into Dataverse or Dataverse for Teams to make use of Azure cloud security and Microsoft Power Platform functionality. Migrating Access data to Dataverse provides many new opportunities for interaction and management of data.

Watch this short video about migrating Access data to Dataverse.

<https://learn-video.azurefd.net/vod/player?id=c151d1a0-3a30-4715-95cb-aab380611592&locale=en-us&embedUrl=%2Fpower-apps%2Fmaker%2Fdata-platform%2Fmigrate-access-to-dataverse>

Migration is handled in Access using the export feature, and the migration tool that streamlines the process.

Note

[Learn how to prepare MS Access for Migration](#)

Once migrated, Access users can continue using their existing desktop client to manage their data. They're also able to use Power Platform to manage their data. Plus, they can:

- Create applications for desktop, laptop, phone, and tablet.
- Create automated processes based on the data and services in Dataverse or Dataverse for Teams.
- Create AI-driven virtual assistants based on the data.
- Perform deep analysis on the stored data using business intelligence.

Before you migrate, there are a few key factors to consider. Currently, Dataverse and Dataverse for Teams don't support every data type that is in Access. Additionally, some data types in Dataverse and Dataverse for Teams may have different data limits. More information: [Data types and sizes for Access data migration to Dataverse](#)

Dataverse and Dataverse for Teams offer differing features that you can use to best meet your needs. Dataverse for Teams is targeted at users who want to have Power Platform functionality within the Microsoft Teams application. Dataverse is included with licenses of Dynamics 365 or Power Apps. Organizations that have a Dataverse for Teams environment can choose later to upgrade to Dataverse.

Data types and sizes for Access data migration to Dataverse

Article • 01/26/2023

When you migrate from Microsoft Access to Microsoft Dataverse or Microsoft Dataverse for Teams, you should be aware of a few differences in the data types. These differences include supported types, data type names, and column capacity.

When you migrate, a validation will be executed to ensure:

- The table only includes supported data types.
- The column values in the rows being migrated don't exceed the size limits of Dataverse.

This validation is done to prevent data loss. If a table has columns that exceed the maximum column value in Dataverse, or the table contains data types not supported by Dataverse, the user will be alerted by the Access migration tool validator and will be provided additional information.

Users can choose to either cancel the migration completely, or to continue to migrate all supported content and keep the unsupported content in an Access table.

 **Note**

[Learn how to prepare MS Access for Migration](#) ↗

Access data types supported by Dataverse

In the following table, the data type mappings supported can assist you in planning your data migration.

Access data type	Dataverse data type	Can migrate?
Short Text	Text	Yes
Long Text	Multiline text	Yes
Autonumber	Autonumber	Yes
Date/Time	Date and Time	Yes
Currency	Currency	Yes
Number: Decimal	Decimal Number	Yes
Float	Number:Single, Number:Double	Yes ¹

System tables and columns in Dataverse and Dataverse for Teams

Article • 05/11/2022

Both Dataverse and Dataverse for Teams have several tables and columns that need to be present for data types and features to work properly. These are part of the default organizations and cannot be removed. When migrating from Access to Dataverse, you'll see columns added to tables after the migration and additional linked tables added in Access to support the columns. This document provides an overview of the tables and columns that will be added.

ⓘ Note

Learn how to prepare MS Access for migration. ↗

Tables

The following tables are included in environments of Dataverse and Dataverse for Teams and may appear as a linked table in Access after migration. These tables can't be deleted.

- **Currency:** Used for currency transactions.
- **Users:** Stores users of the environment that use the apps or data. Used in lookup columns that are created by default.
- **Teams:** Stores teams of users in the environment that use the apps or data. Used in lookup columns that are created by default.
- **Business Unit:** Stores business units users belong to in the environment that use the apps or data. Used in lookup columns that are created by default.

ⓘ Note

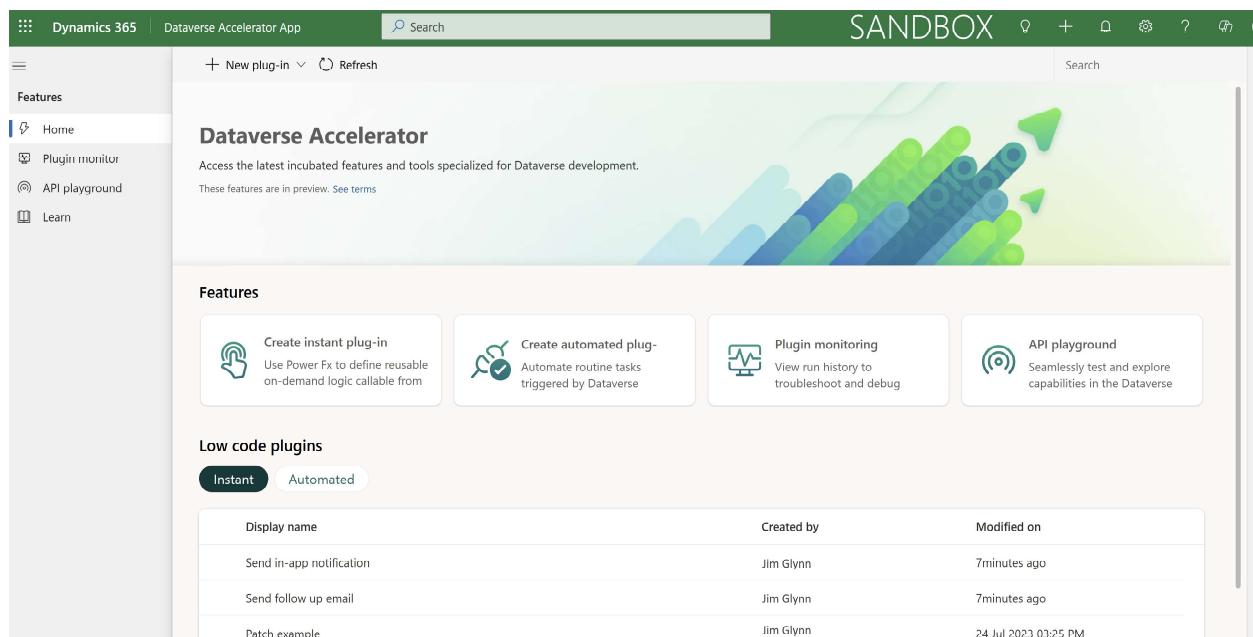
- The tables are present and usable but not displayed by default in Dataverse for Teams.
- The Currency table is linked in Access only when a currency column is added to the table.

Get preview features early with the Dataverse accelerator (preview)

Article • 04/02/2025

[This topic is pre-release documentation and is subject to change.]

The Microsoft Dataverse accelerator is a model-driven application that provides access to select preview features and tooling related to Dataverse development. The featured set of capabilities include early prototype experiences that represent backlog features scheduled to be in the native platform and tools for enriching Dataverse development for makers, delivered in a convenient and accessible web application built with low-code.



While preview features shouldn't be used in production instances, the accelerator offers the opportunity to proactively evaluate, share feedback, and prepare for integration. Using features available with the Dataverse accelerator helps you leverage cutting-edge capabilities to enhance productivity, optimize Dataverse processes, and maintain a competitive edge in Power Platform.

Important

- This is a preview feature.
- Preview features aren't meant for production use and might have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Monitor and troubleshoot Dataverse plug-in runs (preview)

Article • 05/14/2024

[This topic is pre-release documentation and is subject to change.]

Use tracing to troubleshoot low-code and pro code plug-ins. Tracing helps makers by recording run-time information as an aid in diagnosing the cause of failures, or for general validation of certain states during development.

ⓘ Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

The plug-in monitoring module of the [Dataverse accelerator](#) is an enhanced view of the existing [tracing and logging](#) capabilities available in Microsoft Dataverse for plug-ins. The interface helps improve the troubleshooting and debugging processes during development phase by collocating relevant details in a modern treatment.

All events surfaced in the app are read from the [Trace](#) table for 24 hours by the following workflow types:

- Plug-ins
- Custom APIs
- Instant and automated low-code plug-ins

The screenshot shows the 'Power Apps | Dataverse Accelerator' application interface. On the left, there's a sidebar with navigation icons and a main area titled 'Plugin monitoring'. Below it, a sub-section titled 'Analyze plugin executions for troubleshooting, debugging, and performance evaluation of both pro-code and low-code plugins.' is displayed. A table lists five plugin executions with columns for Status, Start time, Duration, Workflow type, Name, Message, and Details. The first four entries are successful, while the last one failed. The 'Details' column for the failed entry shows the error message: 'In execute Start message: new_GetAccounts, stage=MainOperation, etn=, ver=1.0.0 {"Message":"This is a test","Severity":"Information","CustomRecord":[]}'.

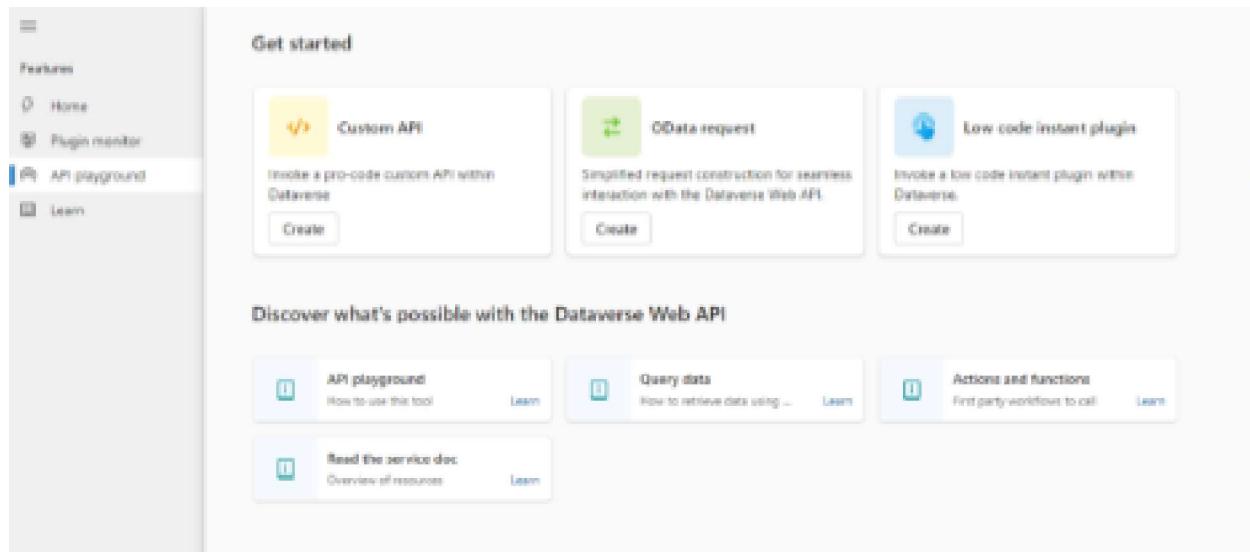
On the right side of the screenshot, a detailed view of a specific trace log for a 'new_TracelogsUitest' entry is shown. The log is categorized under 'Success' and 'Instant low code plugin'. It includes sections for 'Debug' (which is currently selected) and 'Context'. The 'Debug' section shows the start time (04 Sat 2024 02:03: AM), duration (109 ms), primary table (none), and step ID (02eefc8d-f4f3-ee11-a1ff-000d3a0a2504). The 'Context' section contains a 'Message block' with the same error message as the table: 'In execute Start message: new_TracelogsUitest, stage=MainOperation, etn=, ver=1.0.0 {"Message":"This is a test","Severity":"Information","CustomRecord":[]}'.

Explore and test Dataverse in the Web API playground (preview)

Article • 06/07/2024

[This topic is pre-release documentation and is subject to change.]

The API playground is a preauthenticated software testing tool that helps makers quickly and conveniently interact with the [Microsoft Dataverse Web API](#).



This web application allows developers to test and experiment with different API endpoints without the need for extensive setup or authentication processes. It also conveniently presents certain available actions and links to documentation for faster learning.

Use this tool to explore what's possible in the RESTful API, test user-defined workflows, and more.

ⓘ Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Key features

Security concepts in Microsoft Dataverse

Article • 07/23/2024

ⓘ Note

The [new and improved Power Platform admin center](#) is now in public preview! We designed the new admin center to be easier to use, with task-oriented navigation that helps you achieve specific outcomes faster. We'll be publishing new and updated documentation as the new Power Platform admin center moves to [general availability](#).

One of the key features of [Dataverse](#) is its rich security model that can adapt to many business usage scenarios. This security model is only in play when there's a Dataverse database in the environment. As an administrator, you likely won't be building the entire security model yourself, but will often be involved in the process of managing users and making sure they have the proper configuration and troubleshooting security access related issues.

💡 Tip

🎥 Check out the following video: [Microsoft Dataverse – Security Concepts Shown In Demos](#).

Role-based security

Dataverse uses role-based security to group together a collection of privileges. These [security roles](#) can be associated directly to users, or they can be associated with Dataverse teams and business units. Users can then be associated with the team, and therefore all users associated with the team benefit from the role. A key concept of Dataverse security to understand is all privilege grants are accumulative with the greatest amount of access prevailing. If you gave broad organization level read access to all contact records, you can't go back and hide a single record.

Business units

Manage access to public system views (preview)

Article • 04/25/2025

[This topic is pre-release documentation and is subject to change.]

Admins can manage views that users can access in model-driven apps with security roles. When a user plays a model-driven app, the user only has access to the system views that apply to the security roles that they're assigned to.

Important

- This is a preview feature.
- Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.
- From January 15 through January 31, 2025 the public preview for managing system views with security roles will be deployed to environments to make available.

System views are special views that model-driven apps depend on, which exist for system tables or are automatically created when you create custom tables. These views have specific purposes and some additional capabilities. By default, all system views are for **everyone**. When a Power Platform admin manages a view with a security role, only the users who are assigned with the selected security role are able to see the view in the view selector. The other system views aren't filtered from the view selector dropdown list. Users can still access all the views when they navigate to the **Manage and share views** option.

After a Power Platform admin turns on the manage table list views feature, users can set their own default view from the list of views that the admin manages and their own personal views from the Manage and share views option in a model-driven app.

Microsoft Dataverse Developer Guide

Article • 11/30/2022

Power Apps offers users, businesses, independent software vendors (ISVs), and systems integrators (SIs) a powerful platform for building line-of-business apps. Microsoft Dataverse is the underlying data platform for Power Apps that contains the core functionality such as server-side logic (plug-ins and workflows), business process flows, a highly sophisticated security model, and an extensible platform for developers to build apps.

There are many aspects to how developers can contribute to creating apps that use Dataverse. While it is possible to build an application with code using Dataverse as your data source, most projects will use either [model-driven apps](#) or [canvas apps](#) to generate the experience that people will use.

Working with model-driven apps

Model-driven apps are built on Dataverse, and can only connect to a Dataverse environment. All the data that defines a model-driven app is stored within Dataverse.

Model-driven apps share the method of distributing customizations and extensions used by Dataverse using [Solutions](#).

Model driven apps also have a number of points for developers to write code to extend. For information on what developers can do with model-driven apps, see [Model-driven apps Developer Guide](#).

Some examples of model-driven apps available from Microsoft are [Dynamics 365 Customer Service](#), [Dynamics 365 Field Service](#), and [Dynamics 365 Marketing](#).

Understand when to write code

Because Dataverse includes many capabilities for people to configure custom business logic without writing code, the most common scenarios for developers to contribute involve filling spaces in-between where existing features may not provide functionality you need to meet a requirement. Fortunately, Dataverse provides many points for developers to extend the common functionality using code.

For a developer who will contribute to projects it is important that they understand what can be done without writing code. You should familiarize yourself with these capabilities. More information: [What is Dataverse?](#)

Dataverse community tools

Article • 02/15/2022

View Layout Replicator and View Designer are a couple of the many tools available in a Power Platform community developed app named XrmToolBox. XrmToolBox is a Windows application that connects to Microsoft Dataverse.

Note

These tools are provided by XrmToolBox and are not supported by Microsoft. If you have questions pertaining to the tool, please contact the publisher. More information: [XrmToolBox](#).

For more information about XrmToolBox and other Dataverse community tools, go to [Developer tools](#).