

## **Domain 5: Manage and secure Power BI**

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# Manage workspaces in Power BI service

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## 1. Introduction

<https://learn.microsoft.com/en-us/training/modules/manage-workspaces-power-bi-service/1-introduction>

## Introduction

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Completed

Imagine you're part of a growing analytics team in your organization. You spent weeks building a detailed sales performance report in Power BI Desktop, filled with interactive visuals and valuable insights. Now, your leadership team wants to have access to this report, and your colleagues from different departments need to collaborate on the data. However, sharing a static Power BI (.pbix) file through email isn't a scalable solution — it creates version control issues, risks data inconsistency, and makes collaboration difficult.

Additionally, some stakeholders only need to see high-level trends, while others need the ability to drill down into the raw data. The IT team wants to ensure that sensitive financial data remains secure, while executives need a streamlined way to access reports without navigating complex folders or multiple files.

This is where the Power BI service comes in. By publishing your report to the Power BI service, you can create a centralized, web-based environment where users can securely view, interact with, and collaborate on reports. With workspaces, dashboards, and apps, you can control access levels, ensure everyone sees the most up-to-date data, and streamline report distribution across your organization.

By the end of this module, you'll have the skills to effectively publish and share your Power BI reports using the Power BI service. This enables you to collaborate seamlessly with your colleagues, ensuring that everyone has access to the latest insights and data models, regardless of their location or device.

## 2. Understand Power BI service

# Understand Power BI service

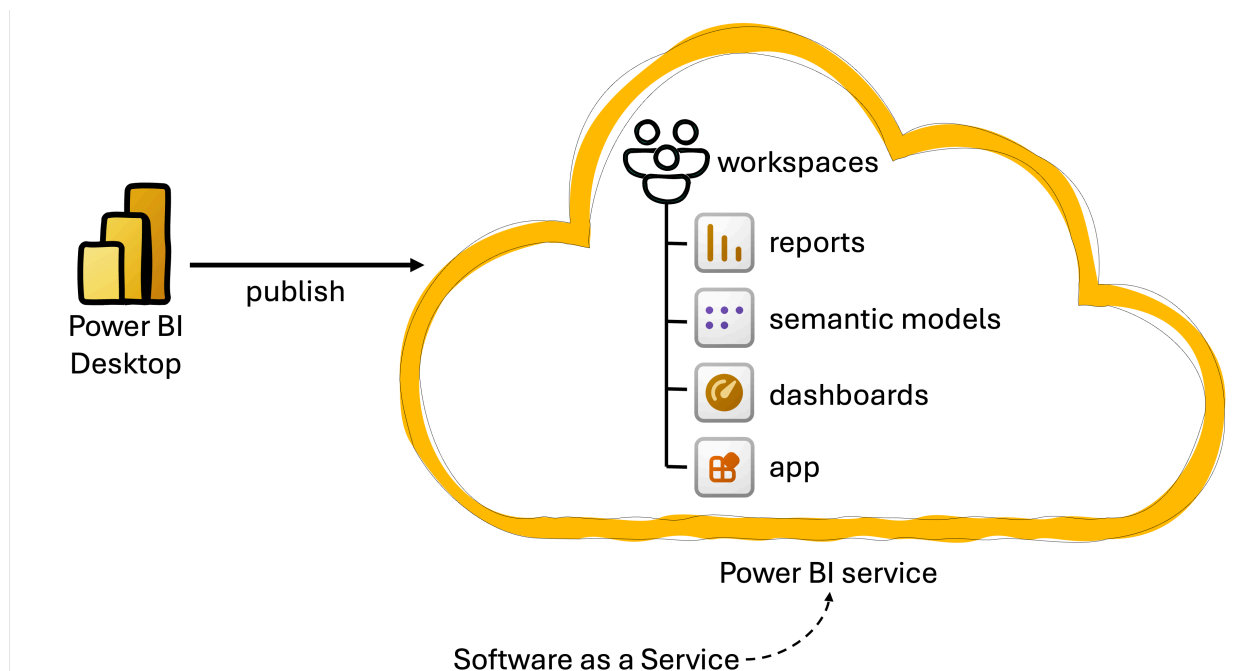
Completed

You've likely had the chance to load and transform data from numerous sources, build visuals, create measures, and even publish a report or two to Microsoft Power BI. The next step on your data analysis journey is to share these reports with a wider audience in your organization. This is where the Power BI service comes into play.

## What is the Power BI service?

In a typical Power BI workflow, you begin by building a report in Power BI Desktop, then publishing it to the Power BI service. It's the Software as a Service (SaaS) part of Power BI and can be accessed through a web browser (<https://app.powerbi.com>). The Power BI service lets you consume and interact with reports, as well as individual visual elements found in those reports, right from your browser.

The Power BI service is composed of many building blocks, including workspaces, reports, semantic models, dashboards, and apps. Each of these components play a unique role in the Power BI ecosystem.



## Workspaces

Workspaces are spaces for your Power BI content. They allow you to organize and manage your reports, semantic models, and dashboards. Workspaces can be created for different teams or projects within your organization, enabling collaboration and sharing of Power BI content.

Depending on the license mode, workspaces offer different levels of sharing, performance, and advanced features such as AI capabilities and higher refresh rates.

## Reports

Once a report designer publishes a report to a Power BI workspace, the report becomes available to other users in that workspace. Users can then view it in their browser and interact with the visuals, and create their own reports based on the same semantic model.

A report has one or more pages, each containing one or more visuals. Presenting data as visuals makes it easier to grasp the meaning of what you're seeing. And, the visuals aren't static. You interact with the visuals and filters as you dig into the data to discover insights and find answers.

## Semantic models

Power BI semantic models represent a source of data that's ready for reporting and visualization. When publishing a report from Power BI Desktop, the semantic model is included in the report. The semantic model is a collection of tables, relationships, and measures that define how data is structured and how it can be used in reports.

If you have access to a Power BI semantic model, you can create new reports based on that model. It's a great way to reuse existing content and save time. Semantic models can be promoted or even certified in order to help users find the right data for their reports. The **Browse** experience in the Power BI service is a great place to find semantic models that are available to you, regardless of where they're located.

## Dashboards

Dashboards and reports in Power BI might look similar, but they have key differences. Dashboards are single-page visual summaries that can pull data from multiple reports and models, while reports can have multiple pages and use only one semantic model. Reports offer more interactive features like filtering, drilling down, and viewing data tables, while dashboards focus on quick insights. Both allow subscriptions, favorites, and natural language queries, but only dashboards support alerts on certain tiles.

Dashboards are exclusive to the Power BI service and aren't available in Power BI Desktop. You can create a dashboard by pinning a visual from a report, which is called a *tile*. A dashboard can contain tiles from multiple reports, and it can be shared with other users in the Power BI service. Due to its single-page limitation, an effective dashboard includes only the key highlights of the story. For more detailed information, readers can refer to the associated reports.

## Apps

Apps are an easy way for designers to share related content, like dashboards, semantic models, and reports, all in one place. It's easier to find content in the Power BI service when it's organized together as an app. After you install an app, you don't have to remember the names of several dashboards or reports because they're all together in one app.

For the app designer, it gives them control over the content included in the app and who can access it. They do not need to share each item individually or depend on the workspace access list. Apps are a great way to share content with a larger audience, such as an entire department or organization. You can even target multiple audiences in the same app.

Additionally, it gives app designers control over when updated content will be released as a new app version.

### 3. Understand workspaces

<https://learn.microsoft.com/en-us/training/modules/manage-workspaces-power-bi-service/3-understand-workspaces>

## Understand workspaces

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Completed

A **Power BI workspace** is a collaborative environment within Power BI service where users can create, manage, and share reports, dashboards, and datasets. It acts as a container for Power BI content, allowing teams to work together on analytics projects.

### Types of Workspaces

There are two types of workspaces: **My Workspace**, which is private to an individual user, and **Shared workspaces**, which can be accessed by multiple users with assigned roles. Workspaces allow you to organize your content, apply role-based access control, and create Power BI apps.

### Create a workspace

When you create a workspace, you have to choose a unique name for it. You can also enter an optional description to help others understand the purpose of the workspace. A workspace image can be uploaded as a .png or .jpg file. The name, description, and icon are important for identifying

the workspace and its content. The Contact list allows you to identify the people who are responsible for the workspace.

## Create a workspace



Name \*

Fabrikam Operations

✓ This name is available

Description

Insights from daily activities, supply chain, logistics, and production.

Domain ⓘ

Assign to a domain (optional)



[Learn more about workspace settings](#)

Workspace image



↑ Upload

↶ Reset

Advanced ^

Contact list \* ⓘ



admin (Owner) ×

Apply

Cancel

## Choose a license mode for your workspace

You also have to choose a license mode for the workspace. The license mode determines how the content in the workspace can be shared and consumed.

A **Power BI Pro** license allows users to create workspaces and share content, but all users who access the workspace must also have a Pro license. It's suitable for small to medium teams needing

collaboration within Power BI service. However, it doesn't support advanced features like larger model sizes or AI capabilities.

A **Premium Per User (PPU)** license provides all Pro features plus advanced capabilities such as more scheduled refreshes per day, AI-powered features, and larger semantic model sizes. Unlike Pro, PPU workspaces can only be accessed by other PPU-licensed users, making it less flexible for broad sharing. It's ideal for individuals or teams needing Premium features without committing to full Fabric Capacity.

A **Fabric Capacity** license provides enterprise-grade performance and scalability by allocating dedicated cloud resources (a capacity). This option supports all advanced features, including real-time streaming, larger semantic models, and enhanced AI capabilities. Users can create dataflows, pipelines, data warehouses, and other Fabric content.

## Create a workspace



### License mode ⓘ

☒ **Pro**

Select Pro to use basic Power BI features and collaborate on reports, dashboards, and scorecards. To access a Pro workspace, users need Pro per-user licenses. [Learn more](#)

☐ **Trial**

Select the free trial per-user license to try all the new features and experiences in Microsoft Fabric for 60 days. A Microsoft Fabric trial license allows users to create Microsoft Fabric items and collaborate with others in a Microsoft Fabric trial capacity. Explore new capabilities in Power BI, Data Factory, Data Engineering, and Real-Time Intelligence, among others. [Learn more](#)

☐ **Premium per-user**

Select Premium per-user to collaborate using Power BI Premium features, including paginated reports, dataflows, and datamarts. To collaborate and share content in a Premium per-user workspace, users need Premium per-user licenses. [Learn more](#)

☐ **Premium capacity**

Select premium capacity if the workspace will be hosted in a premium capacity. When you share, collaborate on, and distribute Power BI and Microsoft Fabric content, users in the viewer role can access this content without needing a Pro or Premium per-user license. [Learn more](#)

☐ **Embedded**

Select embedded if the workspace will be hosted in an Azure embedded capacity. ISVs and developers use Power BI Embedded to embed visuals and analytics in their applications. [Learn more](#)

☐ **Fabric capacity**

Select Fabric capacity if the workspace will be hosted in a Microsoft Fabric capacity. With Fabric capacities, users can create Microsoft Fabric items and collaborate with others using Fabric features and experiences. Explore new capabilities in Power BI, Data Factory, Data Engineering, and Real-Time Intelligence, among others. [Learn more](#)

**Apply**

**Cancel**

Once a workspace has been created, the diamond icon  identifies Fabric workspaces. Premium Per User workspaces are identified by this diamond icon .



## Note

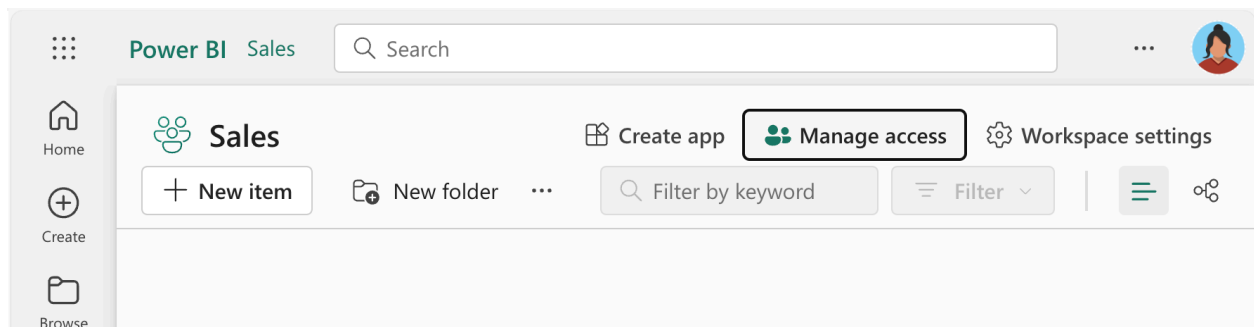
In this learn module, we won't cover Fabric topics. For more information about Fabric, see [Microsoft Fabric concepts and licenses](#).

## Grant access to a workspace

Roles let you manage who can do what in a workspace, so teams can collaborate. Workspaces allow you to assign roles to individuals, and also to user groups such as security groups, Microsoft 365 groups, and distribution lists.

- **Viewers** has read-only access, allowing them to view and interact with reports and dashboards without making changes.
- **Contributors** can create, edit, and delete content but lacks control over app publishing, sharing, and workspace settings.
- **Members** can manage content, publish and update apps, share items, and modify data settings but can't delete the workspace or manage Admin roles.
- **Admins** have full control, including managing workspace settings, updating or deleting the workspace, adding or removing users, and controlling app publishing.

Select the **Manage access** option to add people or groups to the workspace. You can also remove people or groups from the workspace.



## 4. Publish to Power BI service

<https://learn.microsoft.com/en-us/training/modules/manage-workspaces-power-bi-service/4-explore-publishing-process>

## Publish to Power BI service

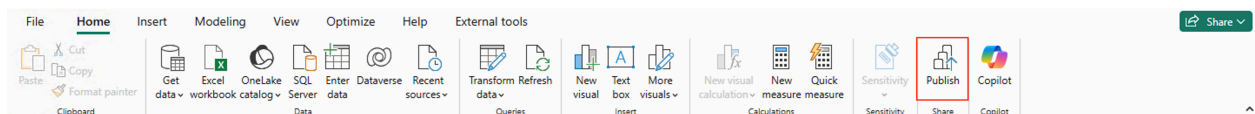
Completed

Imagine you have created a report in the Power BI Desktop and now you want to share it to your colleagues. Sending the .pbix file via email isn't the best option, as the file might be too large, and it can be difficult to keep track of the latest version. Also, your colleagues might not have the same version of Power BI Desktop installed, which could lead to compatibility issues.

Instead, you can publish the report to the Power BI service, where your colleagues can access it online. This process is called publishing.

## Publish from Power BI Desktop

In Power BI Desktop, choose **File > Publish > Publish to Power BI** or select **Publish** on the **Home** ribbon.



If you aren't signed in yet with your Microsoft Entra ID (work or school account), you're prompted to do so. After signing in, you'll see a dialog box that allows you to select the workspace where you want to publish the report.

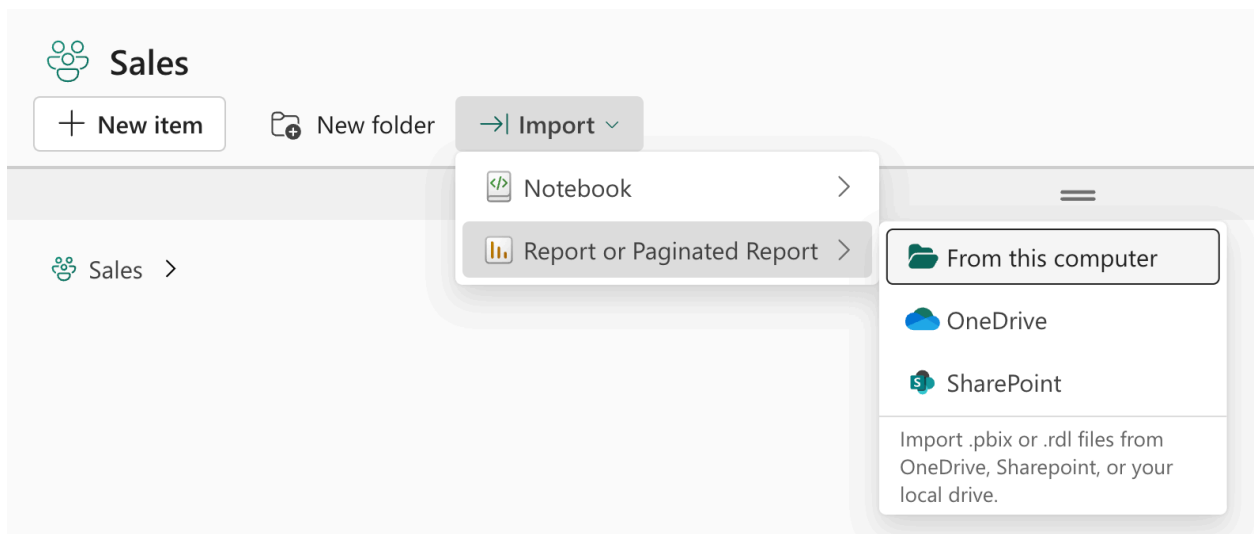
When publishing is complete, you receive a link to your report. You can also find the report in the Power BI service by navigating to the workspace you selected during the publish process.

Notice the semantic model is also published with the report. This means that the data model, including tables, relationships, and measures, is now available in the Power BI service. You can use this semantic model to create new reports or dashboards based on the same data.

When you make a change to a report in Power BI Desktop and then republish it, a message shows you how many workspaces, reports, and dashboards are potentially impacted by the change. Power BI then asks you to confirm that you want to replace the currently published semantic model with the one you modified.

## Upload a Power BI report

There's another way to add a report to a workspace. You can upload a Power BI report (.pbix file) directly to the workspace. This is useful if you have a report that was created in Power BI Desktop and you want to add it to the workspace without publishing it from Power BI Desktop. The following image shows the menu options.

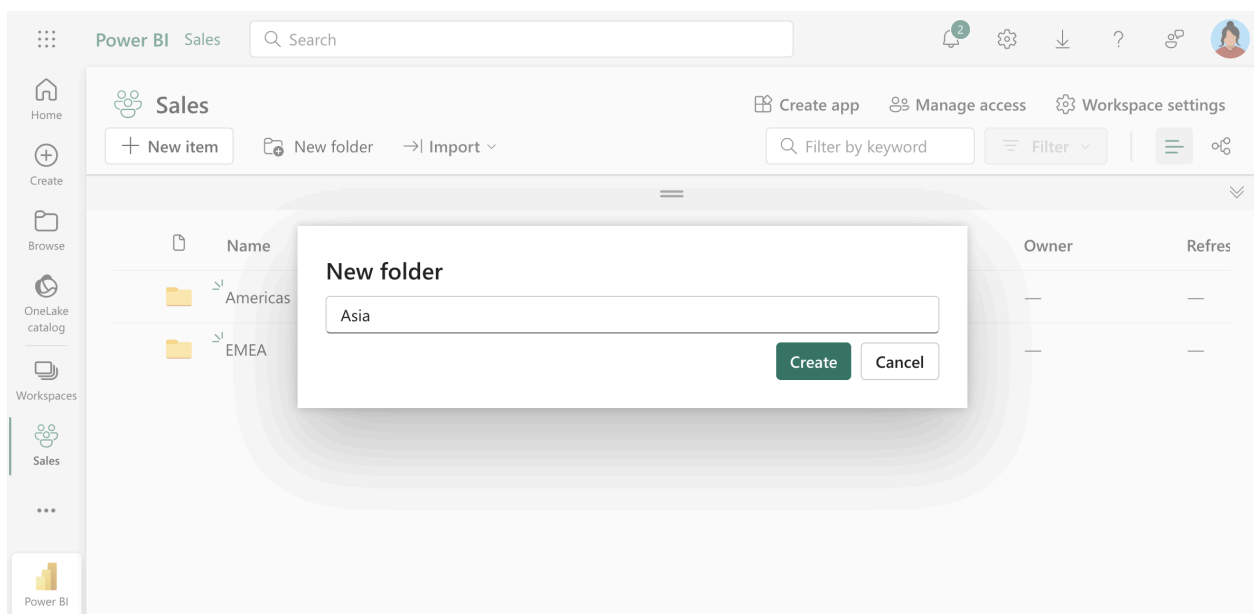


You can use the dropdown menu to connect to files stored in OneDrive for work or school or any SharePoint site to which you have access, or you can upload them from your computer through the Browse menu option.

If you use the OneDrive for work or school or SharePoint option, the Power BI service creates a connection to the file and as you make changes to the file in SharePoint, Power BI can automatically sync those changes approximately each hour.

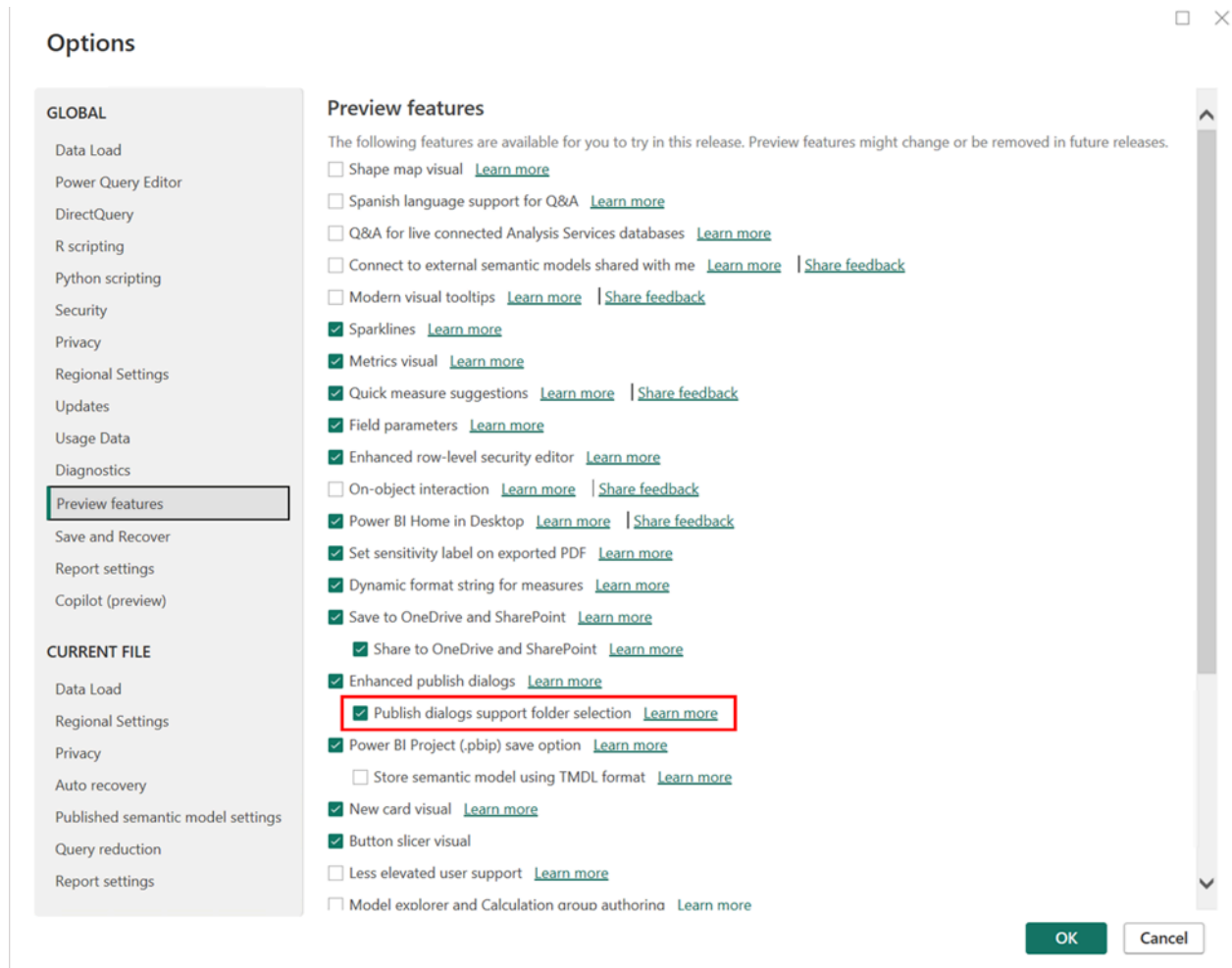
## Organize items in folders (preview)

Folders are organizational units inside a workspace that enable users to efficiently organize and manage artifacts in the workspace. Select **New folder** and assign it a name.



You can create nested subfolders in a folder in the same way, up to 10 levels deep. You can also move a single or multiple items to folders and subfolders.

To publish reports from Power BI Desktop to specific folders in the service, make sure that the **Publish dialogs support folder selection** setting is enabled in the **Preview features** tab in the options menu.



## 5. Check your knowledge

<https://learn.microsoft.com/en-us/training/modules/manage-workspaces-power-bi-service/5-knowledge-check>

# Check your knowledge

Completed

## 6. Summary

# Summary

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## Completed

In this module, you learned about the **Power BI service** and how it enables seamless sharing and collaboration on reports, dashboards, and semantic models. You explored key components such as **workspaces**, where users organize and manage Power BI content, and **apps**, which provide a streamlined way to share multiple reports and dashboards with larger audiences.

Additionally, you learned how to **publish reports** from Power BI Desktop, manage **role-based access** to workspaces, and utilize **dashboards** for high-level insights.

## Learn more

For more information about the topics discussed in this module, see:

- [Power BI service per-user and capacity-based licenses](#)
- [Workspaces in Power BI](#)
- [Roles in workspaces in Power BI](#)
- [Create folders in workspaces](#)

# Manage semantic models in Power BI

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## 1. Introduction

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/1-introduction>

## Introduction

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Completed

When your semantic models are published to your organization's workspace in Microsoft Power BI service, everyone who needs access to those semantic models can find them in a central location, which provides opportunities for collaboration between teams. It also reduces the duplication of effort because one semantic model can be used by multiple users for different business reasons. For instance, one semantic model can be used to create multiple Power BI reports. Because preparing and cleaning data can be time-consuming, sharing semantic models can be a productivity boost for report authors.

Effective management of semantic models is crucial for organizational performance. Automating refresh processes ensures users always have up-to-date data, while promoting key models helps users identify the best options. Parameters can enhance decision-making by enabling tasks like configuring incremental refreshes or running "what-if" scenarios. Additionally, maintaining a reliable gateway for accessing on-premises data from the cloud is essential, as connectivity issues can disrupt productivity and decision-making. Proactive preparation for such issues is vital to minimize their impact.

## 2. Use a Power BI gateway to connect to on-premises data sources

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/4-power-bi-gateway>

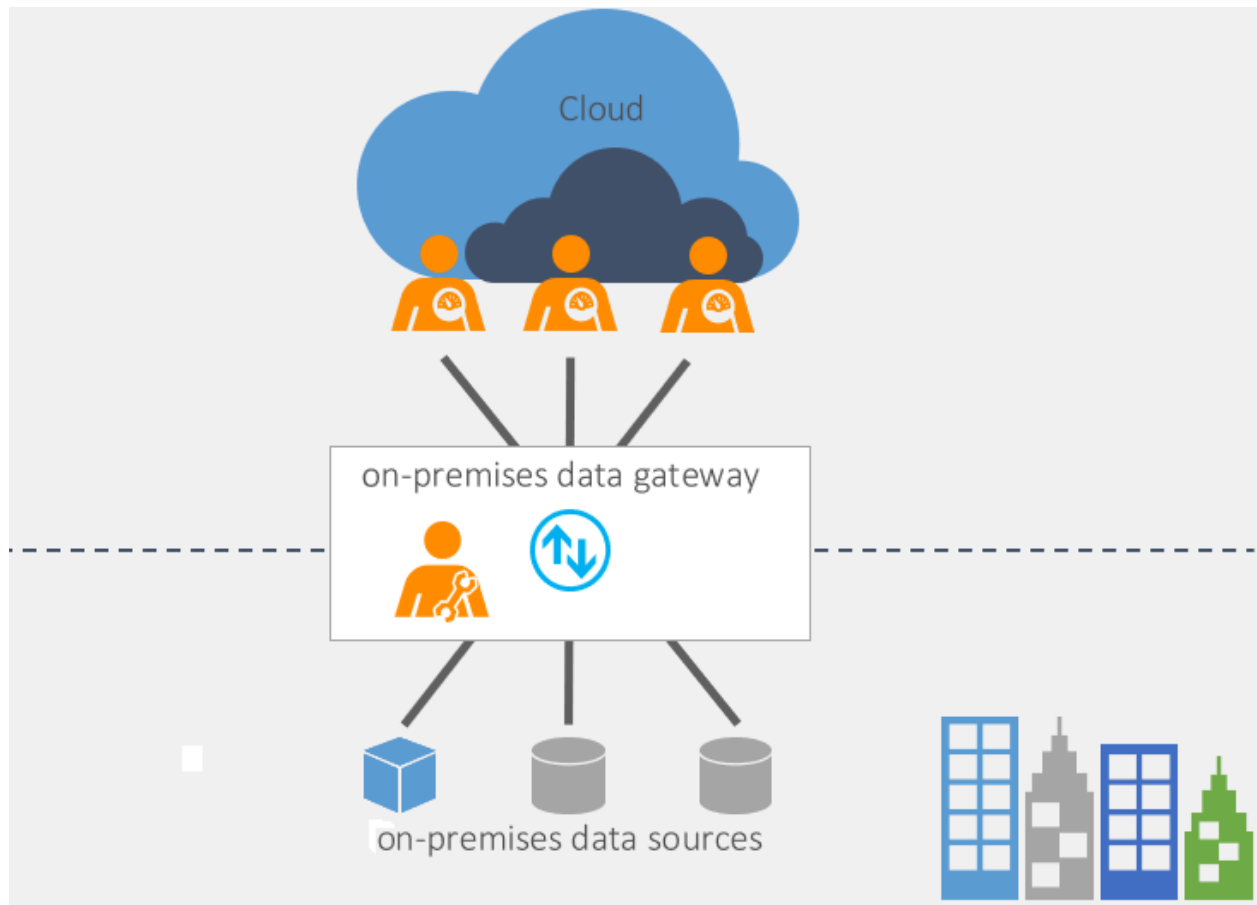
## Use a Power BI gateway to connect to on-

# premises data sources

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Completed

A Power BI Gateway is a bridge that connects on-premises data sources to Power BI, Power Automate, Power Apps, and other Microsoft cloud services. On-premises data sources are those that aren't stored in the cloud. It enables secure data transfer between on-premises systems and Microsoft cloud services without moving the data to the cloud.



Two types of on-premises gateways are:

- **Standard mode** - Allows multiple users to connect to multiple on-premises data sources and is suitable for complex scenarios.
- **Personal mode** - Allows one user to connect to data sources. This type of gateway can only be used with Power BI. It can't be shared with other users, making it suitable for situations where you're the sole report creator in your organization. You'll install the gateway on your local computer, which needs to stay online for the gateway to work.

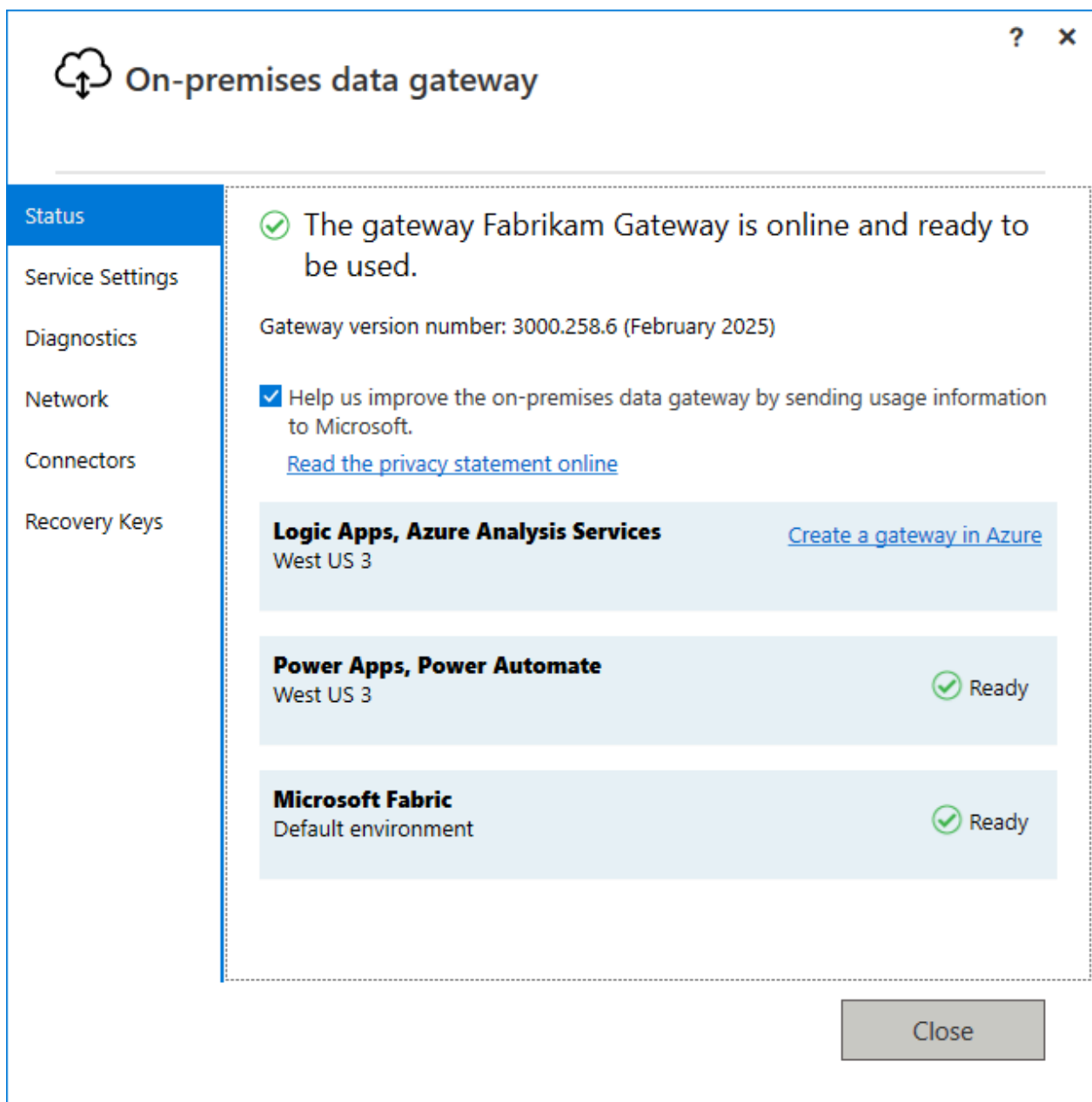
## Note

We won't cover virtual network (VNet) data gateways in this module. VNet data gateways are used to connect to Azure Virtual Networks and are typically used in more complex scenarios.

## Use an on-premises gateway

Before you can connect to your on-premises data source, you need to [install the on-premises data gateway](#), and then configure it to suit your organizational needs. An admin in your organization usually completes this task.

When the on-premises gateway is installed and configured on a server, the admin starts the gateway and then signs in using a Microsoft 365 organization account.



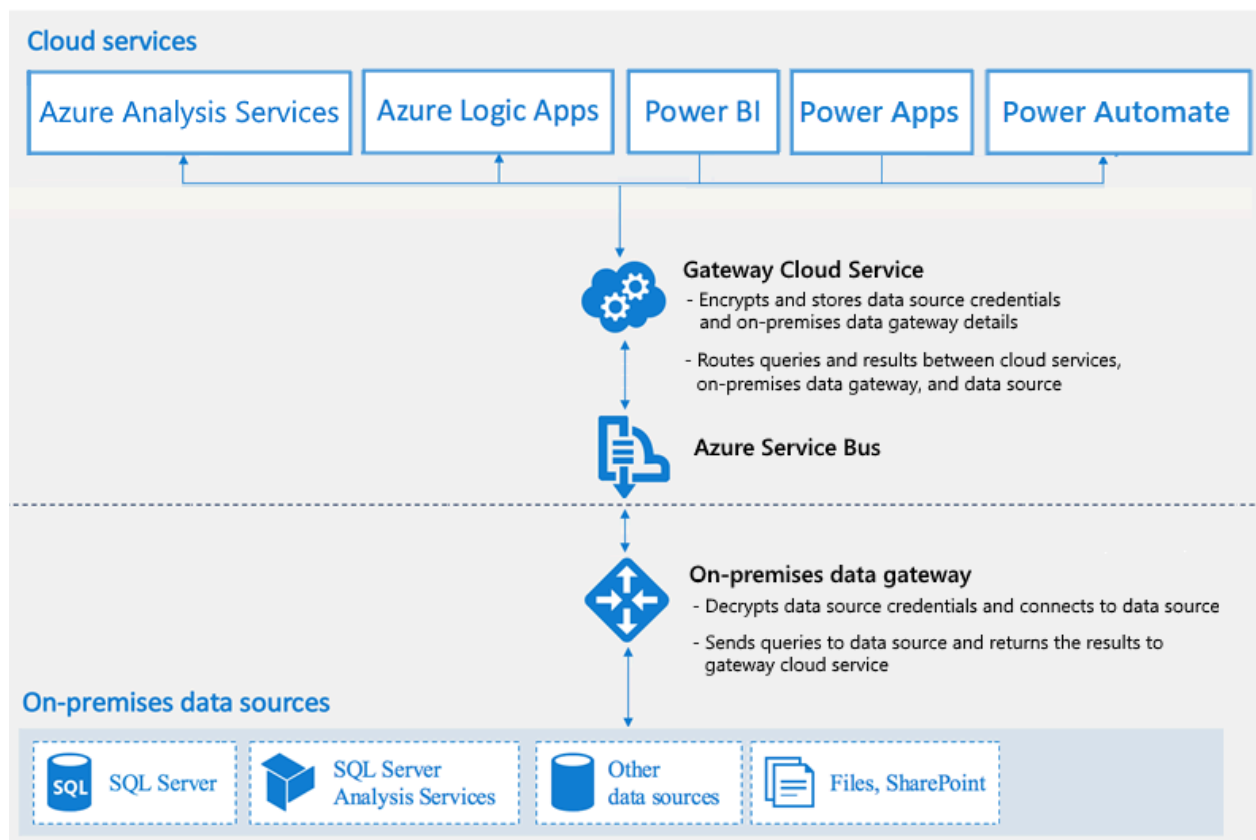


When you're working in the cloud and interacting with an element that is connected to an on-premises data source, the following actions occur:

1. The cloud service creates a query and the encrypted credentials for the on-premises data source. The query and credentials are sent to the gateway queue for processing.
2. The gateway cloud service analyzes the query and pushes the request to Microsoft Azure Service Bus.
3. Service Bus sends the pending requests to the gateway.
4. The gateway gets the query, decrypts the credentials, and then connects to one or more data sources with those credentials.
5. The gateway sends the query to the data source to be run.
6. The results are sent from the data source back to the gateway and then to the cloud service. The service then uses the results.

## On-premises data gateway

One gateway for multiple cloud services and experiences



## Add a data source to a gateway

Before you can set up scheduled refreshes for your reports which require access to on-premises data sources, you need to add the data source to the gateway. This is usually done by the admin in your

organization.

In the Power BI Service, select the **Settings**  icon, and then select **Manage connections and gateways**.

## Resources and extensions

[Manage personal storage](#) →

[Power BI settings](#) →

[Manage connections and gateways](#) →

[Manage embed codes](#) →

[Azure Analysis Services migrations](#) →

Then, you can create a new data source or edit an existing one. Provide the name of the **gateway cluster**, a name for the **connection** and a **connection type** (for example: SQL Server). You'll also need to provide the **server name** and **database name**, and the **authentication method**. The authentication method can be either Basic, Windows, OAuth 2.0, or Service Principal.

## New connection ✕

  
On-premises

  
Virtual network

  
Cloud

**Gateway cluster name \***  

Fabrikam Gateway

**Connection name \***  

AdventureWorks

**Connection type \***  

SQL Server

**Server \***   

Ex: test.corp.contoso.com

**Database \***   

Ex: ContosoDB

**Authentication**   
**Authentication method \***  

☐ Skip test connection

## Troubleshoot service connectivity

Cloud services, such as SharePoint, do not require a gateway because the data is already in the cloud. You only need to provide your authorization credentials to set up a data source connection.

If your report fails to refresh, ensure that your data source credentials are up to date.

Settings for [redacted]

[Refresh history](#)

▶ Gateway connection

▶ Data source credentials

⊗ Your data source can't be refreshed because the credentials are invalid. Please update your credentials and try again.

SharePoint⊗ [Edit credentials](#)

▶ Parameters

▶ Scheduled refresh

▶ Featured Q&A questions

▶ Endorsement

If your data source credentials are not up to date, you'll need to take further action to investigate and resolve the issue.

For more information, see [Troubleshooting refresh scenarios](#).

To find the current data center region that you're in, see [Set the data center region](#).

### 3. Configure a semantic model scheduled refresh

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/5-dataset-refresh>

## Configure a semantic model scheduled refresh

Completed

The **Scheduled refresh** feature in Power BI allows you to define the frequency and time slots to refresh a particular dataset. Scheduling the refresh of your data will save you time because you don't have to manually refresh the data. It also ensures that users can access the most up-to-date data.

In this example, you are creating a report, but then realize that the version of the employee data that you're using isn't the most up to date. You check the refresh status and notice that it was last refreshed some time ago, and no refresh is scheduled to take place.

|  | Name            | Type          | Task | Owner         | Refreshed           | Next refresh |
|-----------------------------------------------------------------------------------|-----------------|---------------|------|---------------|---------------------|--------------|
|  | Employee Report | Report        | —    | Sales Contoso | 3/17/2025, 1:32:... | —            |
|  | Employee Report | Semantic m... | —    | Sales Contoso | 3/17/2025, 1:3...   | N/A          |

Considering how important it is to have accurate data, you need to find a solution. Usually, the data is updated weekly, but you don't want to return to the report every week to manually refresh the semantic model, and you know that you occasionally forget to do so. Therefore, you decide to use the **Scheduled refresh** functionality in Power BI Service to solve this problem.

## Set up a refresh schedule

Before you can set up a refresh schedule, you need to have created a gateway connection.

To set up a refresh schedule for your semantic model, follow these steps:

1. Go to the workspace where the report and semantic model are located.
2. Hover over the semantic model for which you want to set up the schedule and then select the **Schedule refresh** icon.

|  | Name            | Type           | Task | Owner          | Refreshed             | Next refresh          |
|-------------------------------------------------------------------------------------|-----------------|----------------|------|----------------|-----------------------|-----------------------|
|  | Employee Report | Report         | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | —                     |
|  | Employee Report | Semantic model | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | 3/17/2025, 2:00:00 PM |

3. On the **Settings** page, turn on the **Scheduled refresh** feature.
4. Select the **Refresh frequency** and ensure that the correct time zone is selected.
5. Add the time(s) that you want the refresh to occur. You can configure up to eight daily time slots, if your semantic model is on shared capacity, or 48 time slots on Power BI Premium.
6. When you have finished configuring the scheduled refresh, select **Apply**.

### Note

While you can set a time for the refresh, be aware that the refresh might not take place at that exact time. Power BI starts scheduled refreshes on a best effort basis. The goal is to initiate the refresh within 15 minutes of the scheduled time slot, but a delay of up to one hour can occur if the service can't allocate the required resources sooner.

In this example, you want the system to refresh the employee data on a daily basis, at 8:00 AM, 11:00 AM, 1:00 PM, and 4:00 PM, as illustrated in the following image.

## Refresh

### Time zone

① Time zone configuration is applied not only to determine the schedule refresh time but also to establish the current date and time for incremental refresh models during on-demand and API refreshes. [Learn more](#)

(UTC) Coordinated Universal Time ▼

### Configure a refresh schedule

Define a data refresh schedule to import data from the data source into the semantic model. [Learn more](#)

☒ On

### Refresh frequency

Daily ▼

### Time

8 ▼ 00 ▼ AM ▼ ×

11 ▼ 00 ▼ AM ▼ ×

1 ▼ 00 ▼ PM ▼ ×

4 ▼ 00 ▼ PM ▼ ×

[Add another time](#)

### Send refresh failure notifications to

☒ Semantic model owner

☐ These contacts:

Enter email addresses

Apply

Discard

## Perform an on-demand refresh

In addition to the scheduled refreshes, you can refresh a semantic model at any time by performing an on-demand refresh. This type of refresh doesn't affect the next scheduled refresh time.

For example, you might want to refresh now because you need to view the most recent data and can't wait for the next refresh time, or you might want to test your gateway and data source configuration.

To perform an on-demand refresh, hover over the semantic model that you want to refresh and then select the **Refresh now** icon.

|  | Name            | Type                                                                                                                                                                                                  | Task | Owner          | Refreshed             | Next refresh          |
|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|-----------------------|-----------------------|
|  | Employee Report | Report                                                                                                                                                                                                | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | —                     |
|  | Employee Report | <div>  ...</div> Semantic model | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | 3/17/2025, 2:00:00 PM |

## Check the refresh status and history

You can check the refresh status and history at any time. This feature is useful if you want to find out when the last refresh occurred and when the next one is scheduled. It is also good practice to check the status of your semantic models occasionally to check if refresh errors have occurred.

A quick way to check the refresh status is to view the list of semantic models in a workspace.

|  | Name            | Type           | Task | Owner          | Refreshed             | Next refresh          |
|-----------------------------------------------------------------------------------|-----------------|----------------|------|----------------|-----------------------|-----------------------|
|  | Employee Report | Report         | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | —                     |
|  | Employee Report | Semantic model | —    | Sales Conto... | 3/17/2025, 1:32:05 PM | 3/17/2025, 2:00:00 PM |

If a semantic model displays a small warning icon, you'll know that the semantic model is currently experiencing an issue. Select the warning icon to get more information.

|  | Name            | Type          | Task | Owner         | Refreshed                                                                                                 | Next refresh          |
|-----------------------------------------------------------------------------------|-----------------|---------------|------|---------------|-----------------------------------------------------------------------------------------------------------|-----------------------|
|  | Employee Report | Report        | —    | Sales Contoso | 3/17/2025, 1:28:10 PM                                                                                     | —                     |
|  | Employee Report | Semantic m... | —    | Sales Contoso | 3/17/2025, 1:28:10 PM  | 3/17/2025, 2:00:00 PM |

You should also check the refresh history occasionally to review the success or failure status of past synchronization cycles. To view the refresh history, open the semantic model's settings page and then select **Refresh history**.

### Refresh history ×

Scheduled OneDrive Direct Lake OneLake Integration

| Details              | Type      | Start                  | End                    | Status    | Message                                                                       |
|----------------------|-----------|------------------------|------------------------|-----------|-------------------------------------------------------------------------------|
| <a href="#">Show</a> | On demand | 3/17/2025, 12:31:39 PM | 3/17/2025, 12:31:53 PM | Completed |                                                                               |
| <a href="#">Show</a> | Scheduled | 2/24/2025, 8:13:00 PM  | 2/24/2025, 8:13:00 PM  | Failed    | Exceeded the refresh request limit for this dataset within the last 24 hours. |
| <a href="#">Show</a> | Scheduled | 2/24/2025, 5:10:00 PM  | 2/24/2025, 5:10:00 PM  | Failed    | Exceeded the refresh request limit for this dataset within the last 24 hours. |
| <a href="#">Show</a> | On demand | 2/24/2025, 4:08:53 PM  | 2/24/2025, 4:09:02 PM  | Completed |                                                                               |
| <a href="#">Show</a> | On demand | 2/24/2025, 4:07:20 PM  | 2/24/2025, 4:07:29 PM  | Completed |                                                                               |
| <a href="#">Show</a> | On demand | 2/24/2025, 4:05:19 PM  | 2/24/2025, 4:05:29 PM  | Completed |                                                                               |

Close

### Note

If no user visits the report or any dashboard built on the semantic model, Power BI disables the refresh schedule after two months of inactivity. The refresh schedule is also disabled after four

consecutive failures or when the service detects an unrecoverable error that requires a configuration update, such as invalid or expired credentials. It is not possible to change the consecutive failures threshold.

## 4. Configure incremental refresh settings

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/6-incremental-refresh>

# Configure incremental refresh settings

Completed

The **Incremental refresh** feature in Power BI is a popular feature because it allows you to refresh large semantic models quickly and as often as you need, without having to reload historical data each time.

Traditionally, complex code was required for running incremental refreshes, but you can now define a refresh policy within Power BI Desktop. The refresh policy is applied when you publish to Power BI service, which then does the work of managing partitions for optimized data loads, resulting in the following benefits:

- **Quicker refreshes** - Only data that needs to be changed gets refreshed. For example, if you have five years' worth of data, and you only need to refresh the last 10 days because that is the only data that has changed, the incremental refresh will refresh only those 10 days of data. Undoubtedly, the time it takes to refresh 10 days of data is much shorter than five years of data.
- **More reliable refreshes** - You no longer need to keep your long-running data connections open to schedule a refresh.
- **Reduced resource consumption** - Because you only need to refresh the smaller the amount of data, the overall consumption of memory and other resources is reduced.

### Warning

Incremental refresh should only be used on data sources and queries that support query folding. Query folding is the process where Power Query translates data transformations (eg filters) into native queries that are executed directly by the data source during import. If query folding isn't supported, incremental refresh could lead to a bad user experience because it will still pull all data, potentially multiple times.



In this example, the Sales team has come to you with a dilemma. The data in their report is already out-of-date. It isn't feasible for you to manually refresh the data by adding a new file because the refreshes need to happen regularly to match the frequency of the sales transactions that are occurring. Also, the manual refresh task is becoming more difficult because the semantic models have millions of rows. Consequently, you need to implement a better data refresh solution.

You can define an incremental refresh policy to solve this business problem. This process involves the following steps:

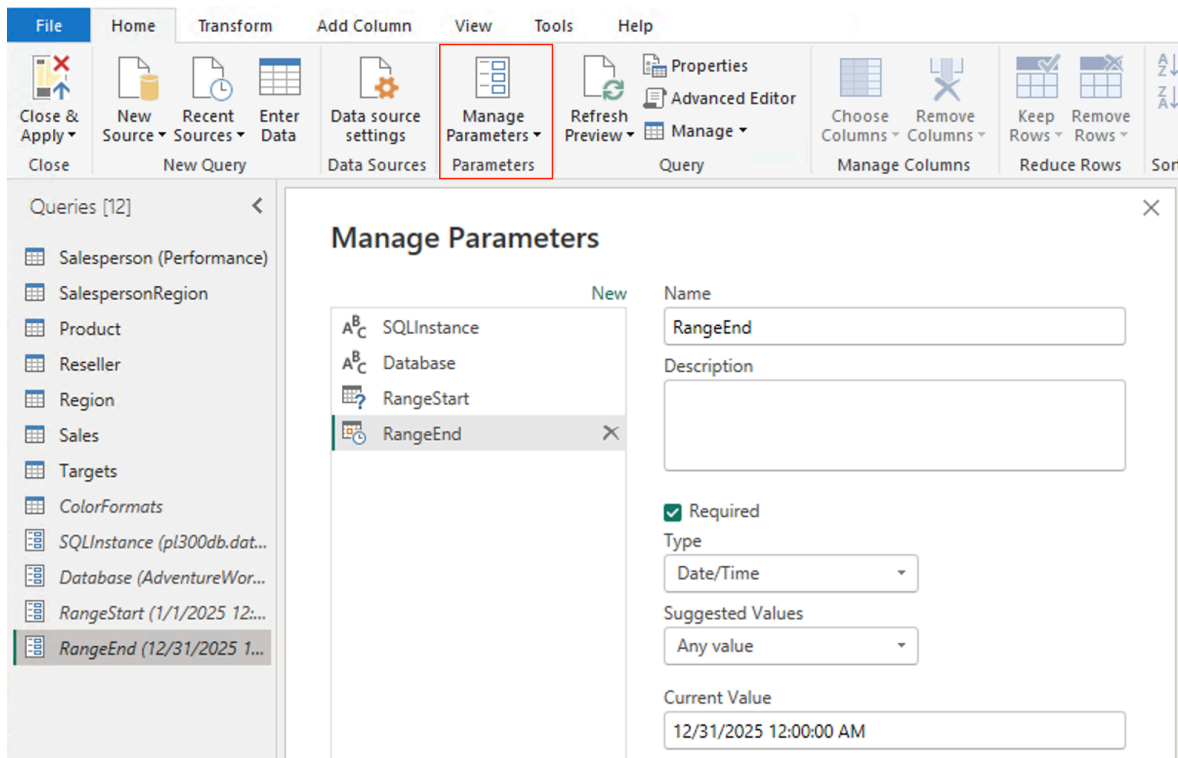
1. Define the filter parameters.
2. Use the parameters to apply a filter.
3. Define the incremental refresh policy.
4. Publish changes to Power BI service.

## Define filter parameters

Whether you are using incremental refresh or not, large semantic models are commonly filtered when they are imported into Power BI Desktop because the PBIX file is limited by the memory resources that are available on the desktop computer. For incremental refresh, the semantic models are filtered by two date/time parameters: **RangeStart** and **RangeEnd**. These parameters have a dual purpose. In Power BI Desktop, they are the filtering window because they restrict the used data to the range that is listed in the start and end dates. After they have been published to the service, the parameters are taken over to be the sliding window to determine what data to pull in.

To define the parameters for the incremental refresh, follow these steps:

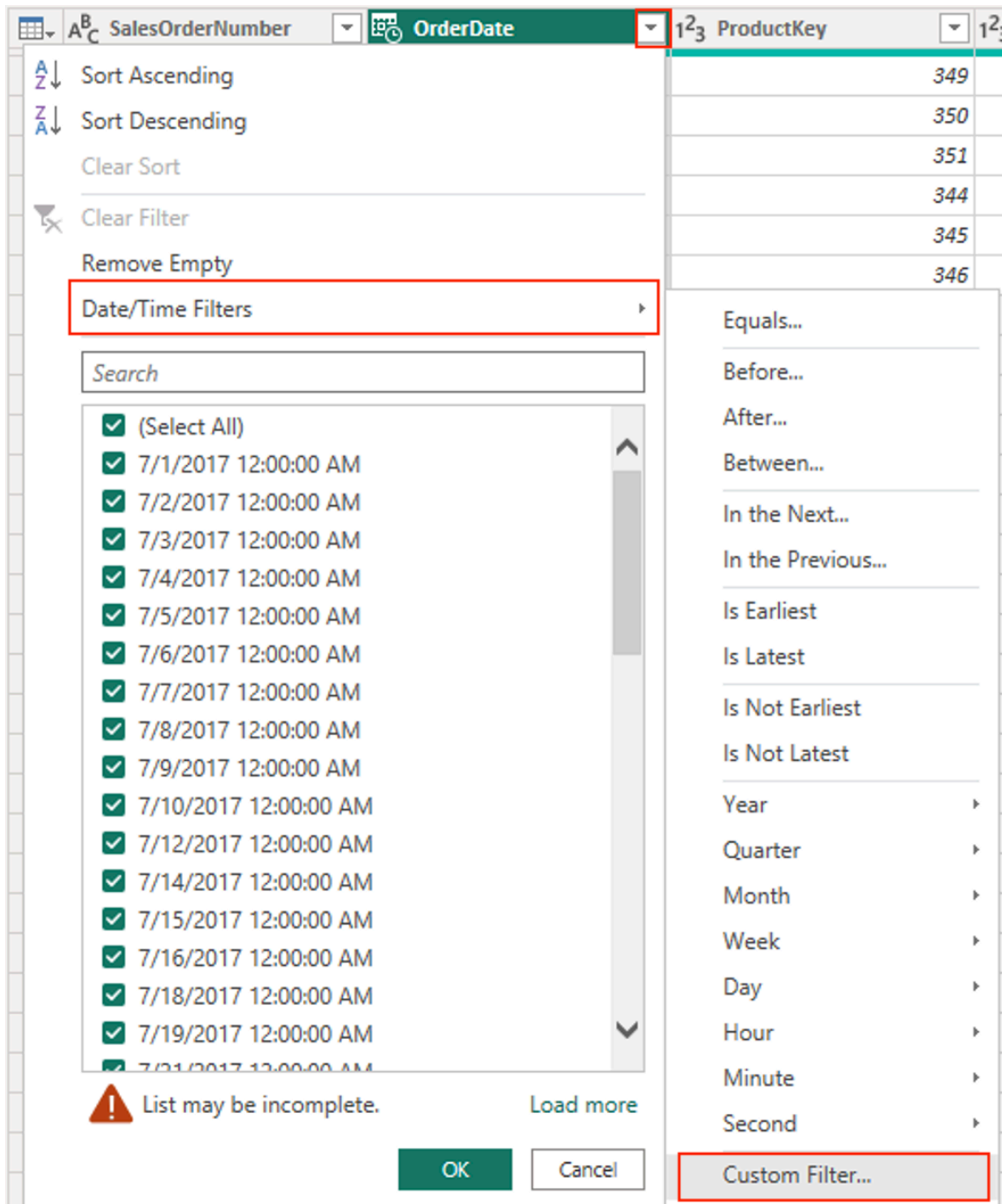
1. Open your semantic model in Power Query Editor.
2. On the **Home** tab, select **Manage Parameters**.
3. On the **Parameters** window that displays, add two new parameters, **RangeStart** and **RangeEnd**, ensuring that for both parameters, the **Type** is set to **Date/Time** and the **Suggested Value** is set to **Any value**.
4. Regarding the **Current Value**, for the **RangeStart** parameter, enter the date on which you want to begin the import, and for the **RangeEnd** parameter, enter the date on which you want the import to end. Think of it like this: you are importing data on your desktop computer, and you want to import a limited range of data, but not all of it.



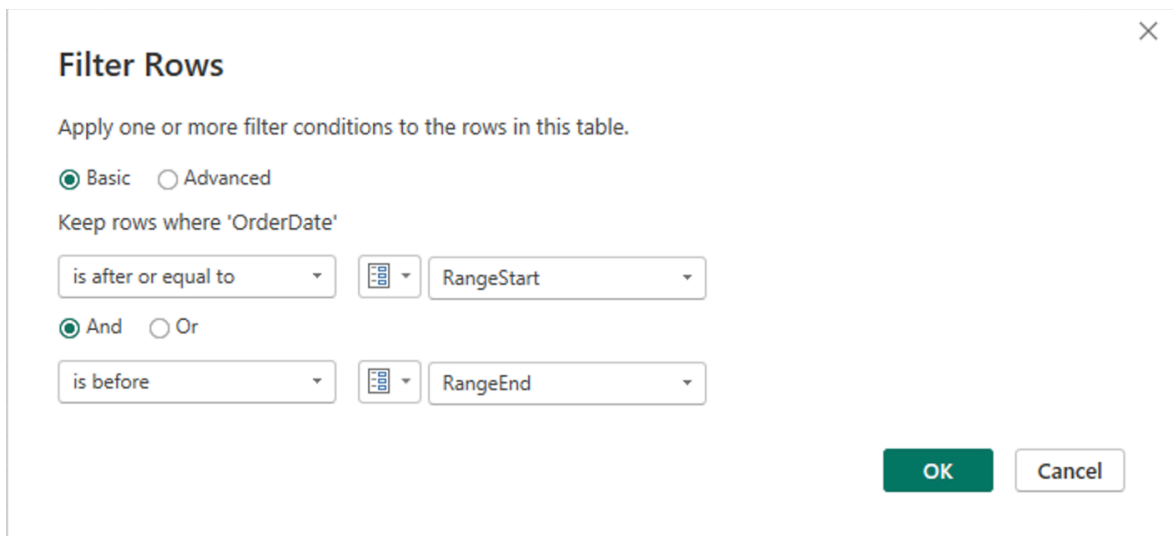
## Apply the filter

When you have defined the new parameters, you can apply the filter by following these steps:

1. Go to the applicable **Date** column and then right-click that column and select **Custom Filter**.



2. In the **Filter Rows** window that displays, to avoid the double counting of rows, make sure that you keep rows where **OrderDate** is after or equal to the **RangeStart** parameter and before the **RangeEnd** parameter.

The image shows a 'Filter Rows' dialog box with a close button (X) in the top right corner. The title 'Filter Rows' is at the top left. Below the title is the instruction 'Apply one or more filter conditions to the rows in this table.' There are two radio buttons: 'Basic' (selected) and 'Advanced'. Below this is the text 'Keep rows where 'OrderDate''. The first filter condition is 'is after or equal to' (selected from a dropdown), followed by a table icon dropdown and 'RangeStart' (selected from a dropdown). Below this is another set of radio buttons: 'And' (selected) and 'Or'. The second filter condition is 'is before' (selected from a dropdown), followed by a table icon dropdown and 'RangeEnd' (selected from a dropdown). At the bottom right are 'OK' and 'Cancel' buttons.

**Filter Rows**

Apply one or more filter conditions to the rows in this table.

☒ Basic ☐ Advanced

Keep rows where 'OrderDate'

is after or equal to  RangeStart

☒ And ☐ Or

is before  RangeEnd

**OK** Cancel

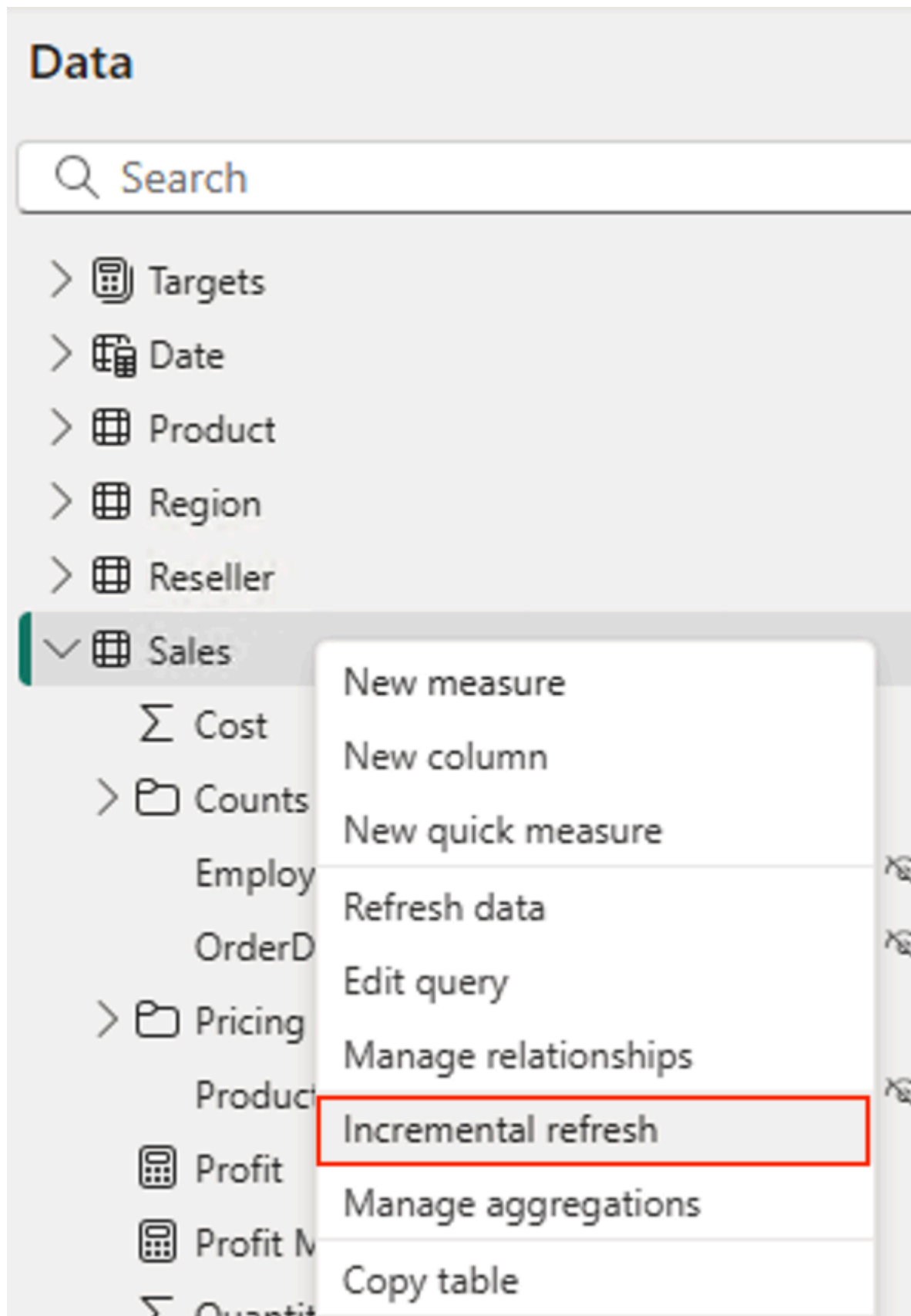
3. Select **Close and Apply** from the Power Query Editor.

You should now see a subset of the semantic model in Power BI Desktop.

## Define the incremental refresh policy

When you have filtered the data, you can define the incremental refresh policy for the data table, which sets up the refresh process.

Right-click the applicable table and then select **Incremental refresh**.



On the **Incremental refresh** window that displays, turn on the **Incremental refresh** option. Then, configure the refresh as required. In this example, you will define a refresh policy to store data for

five full calendar years, plus data for the current year up to the current date, and incrementally refresh 10 days of data.

## Incremental refresh and real-time data

Refresh large tables faster with incremental refresh. Plus, get the latest data in real time with DirectQuery (Premium only). [Learn more](#)

i These settings will apply when you publish the dataset to the Power BI service. Once you do that, you won't be able to download it back to Power BI Desktop. [Learn more](#)

### 1. Select table

Orders

### 2. Set import and refresh ranges

☒ Incrementally refresh this table

Archive data starting 

5

Years

 before refresh date

Data imported from 1/1/2017 to 11/17/2022 (inclusive)

Incrementally refresh data starting 

3

Days

 before refresh date

Data will be incrementally refreshed from 11/18/2022 to 11/20/2022 (inclusive)

### 3. Choose optional settings

☐ Get the latest data in real time with DirectQuery (Premium only) [Learn more](#)

Selected table cannot be folded for DirectQuery.

☐ Only refresh complete days [Learn more](#)

☐ Detect data changes [Learn more](#)

### 4. Review and apply

Archived

Incremental Refresh

The first refresh operation in Power BI service will load the historical data for the last five years. The subsequent refresh operations are incremental, and they will refresh the data that was changed in the last 10 days up to the current date. The incremental refreshes will also remove calendar years that are older than five years prior to the current date.

## Publish to Power BI service

30 / 81

When you have defined the incremental refresh policy in Power BI Desktop, to apply that refresh policy, you need to publish the report to Power BI service.

For more information, see [Incremental refresh on Power BI](#).

## 5. Manage and promote semantic models

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/7-manage-datasets>

# Manage and promote semantic models

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Completed

Business intelligence involves collaboration, and sharing semantic models across workspaces is a powerful way to collaborate within your organization. However, if your organization has many different semantic models that can be accessed by many users, you might want to take measures to manage those semantic models. For instance, you might want to direct your users to the most up-to-date and highest-quality semantic models in your workspaces, or you might want to restrict the reuse of semantic models across your workspaces.

To ensure that your organization has consistent data for making decisions and a healthy data culture, it's important to create and share optimized semantic models and then endorse those semantic models as the *one source of truth*. Report creators can then reuse those endorsed semantic models to build accurate, standardized reports.

Power BI provides three ways to endorse your semantic models:

- **Promotion** - Enables you to highlight content that you think is valuable, worthwhile, and ready for others to use. It encourages the collaborative spread of content within the organization.
- **Certification** - Request certification for a promoted semantic model. Certification can be a highly selective process, so only the truly reliable and authoritative semantic models are used across the organization.
- **Master data** - Being labeled as master data means that the data item is regarded by the organization as being core, single-source-of-truth data, such as customer lists or product codes. This is a feature from Microsoft Fabric, which we won't further discuss in this module.

In this example, you and the other teams are using a workspace in Power BI service to organize all your reports and dashboards. However, you begin to receive emails from confused users who expected to see a sales report and are now looking at a product report instead. You need to make

some changes to direct your users to the semantic models that they should be accessing, and you can accomplish this task with the endorsing capability in Power BI.

In this example, the certification type of endorsement is best suited for the Sales team because it will require users to have special access before they can view the Sales dashboards. By implementing the certification, you'll lead your users to the most appropriate reports and dashboards, avoiding the inevitable confusion that might arise with building and sharing a diversity of reports.

Though you'll soon learn how to certify the semantic model, you'll first learn how to promote a semantic model, in case you prefer to use that method.

## Promote a semantic model

To promote content, you must have write permissions on the workspace where the content you want to promote is located.

To promote a semantic model, go to the workspace in Power BI service, and then open the settings page for the semantic model that you want to promote. In this example, you want to promote the Sales semantic model.

Select the **Endorsement** setting.

General Dashboards **Semantic models** Workbooks Reports Dataflows App

Sales Semantic Model

### Settings for Sales Semantic Model

[View semantic model](#)

This semantic model has been configured by [admin@xxxx.onmicrosoft.com](#).

Last refresh succeeded: 3/17/2025, 1:32:05 PM  
[Refresh history](#)

- Semantic model description
- Gateway and cloud connections
- Data source credentials
- Parameters
- Refresh
- Data connections
- Q&A
- Featured Q&A questions
- Endorsement and discovery**
- Request access

In the **Endorsement** settings, select the **Promoted** option, and then select **Apply**.



#### 4 Endorsement and discovery

Help coworkers find your quality content by endorsing this semantic model and making it discoverable. [Learn more](#)

☐ None

This semantic model will appear in search results but isn't endorsed.

☒ Promoted

When you're ready to distribute the semantic model to your coworkers, promote it to let them know.

☐ Certified

Certify your semantic model to show coworkers that it's been reviewed and meets your org's certification criteria. [How do I get my semantic model certified?](#)

☐ Master data

This Semantic model is a core source of organizational data records. [How do I get my semantic model endorsed as master data?](#)

☒ Make discoverable

Allow users without access to this semantic model to discover it and request permissions to access the data [Learn more](#)

ⓘ This semantic model will be made discoverable. Others in your org will be able to find it by such details as name, tables, columns, etc. [Learn more](#)

Apply

Discard

When you return to your workspace, a badge in the **Endorsement** column for that semantic model will appear, indicating that it's ready for viewing by all of your users.

| Name                                                                                                   | Type ↓         | Task | Owner         | Refreshed          | Next refresh | Endorsement                                                                         | Sensitivity | Included in app |
|--------------------------------------------------------------------------------------------------------|----------------|------|---------------|--------------------|--------------|-------------------------------------------------------------------------------------|-------------|-----------------|
|  Sales Semantic Model | Semantic mo... | —    | Sales Contoso | 3/17/2025, 1:32... | N/A          |  | —           |                 |

## Certify a semantic model

Content certification is a big responsibility, and only authorized users can certify content. Other users can request content certification.

To request certification for a semantic model, you start the same way as you did to promote the semantic model in **Endorsement** section. If it is greyed out, your admins will provide details in a link titled, "*How do I get my semantic model certified?*" in the **Certified** section.

#### 4 Endorsement and discovery

Help coworkers find your quality content by endorsing this semantic model and making it discoverable. [Learn more](#)

☐ None

This semantic model will appear in search results but isn't endorsed.

☐ Promoted

When you're ready to distribute the semantic model to your coworkers, promote it to let them know.

☒ Certified

Certify your semantic model to show coworkers that it's been reviewed and meets your org's certification criteria. [How do I get my semantic model certified?](#)

☐ Master data

This Semantic model is a core source of organizational data records. [How do I get my semantic model endorsed as master data?](#)

☒ Make discoverable

Allow users without access to this semantic model to discover it and request permissions to access the data [Learn more](#)

ⓘ This semantic model will be made discoverable. Others in your org will be able to find it by such details as name, tables, columns, etc. [Learn more](#)

Apply

Discard

For more information, see [Promote your semantic model](#) or [Certify semantic models](#).

## 6. Use lineage and impact analysis

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/9a-lineage>

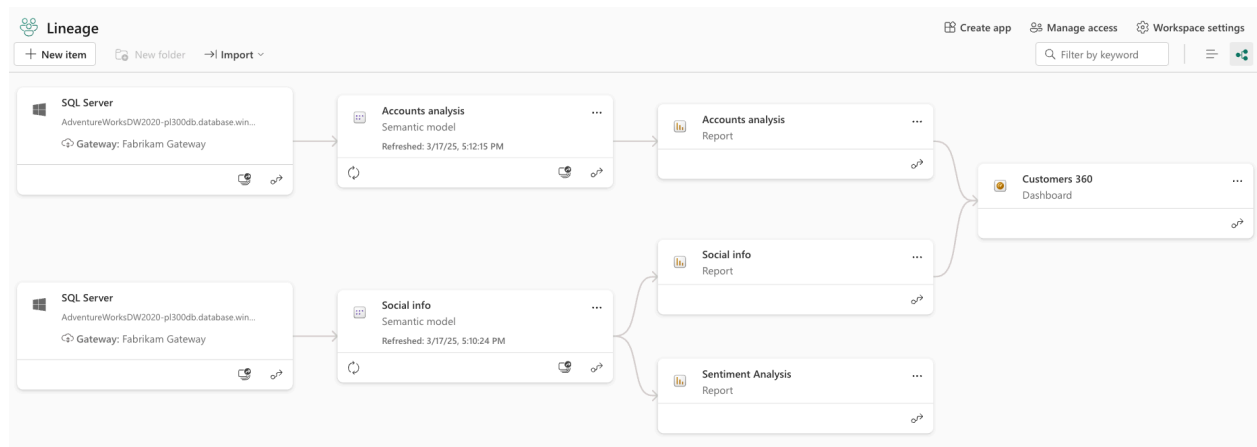
# Use lineage and impact analysis

Completed

Understanding the flow of data from the data source to its destination can be a challenge. Questions like "What happens if I move this data?" or "Why isn't this report up to date?" can be hard to answer. They might require a team of experts or deep investigation to understand. Power BI's data lineage view helps you answer these questions.

## Explore lineage view

In lineage view, you see the lineage relationships between all the artifacts in a workspace



Every workspace automatically has a lineage view. You need at least a Contributor role in the workspace to view it. In this view, you see all the workspace artifacts and how the data flows from one artifact to another.

You see the data sources from which the semantic models get their data. If a data source is connected via an on-premises gateway, the gateway information is added to the data source card.

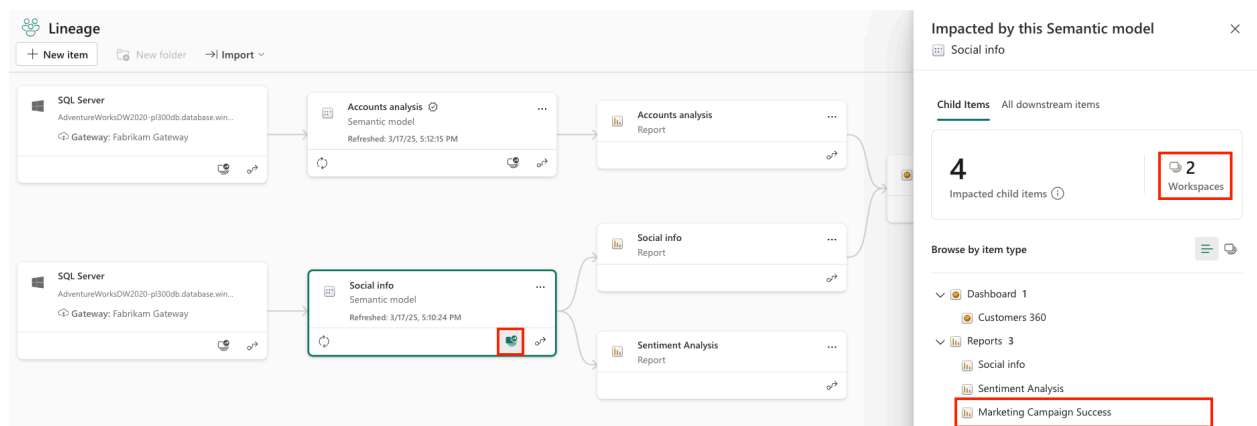
On semantic models, you see the last refresh time, and if the semantic model is certified or promoted.

## Perform semantic model impact analysis

When you make changes to a semantic model, or are considering making changes, it's important to be able to assess the potential impact of those changes on downstream reports and dashboards that depend on that semantic model

Performing this impact analysis is useful for semantic models that are shared across workspaces, where it's complicated to get a clear picture of downstream dependencies.

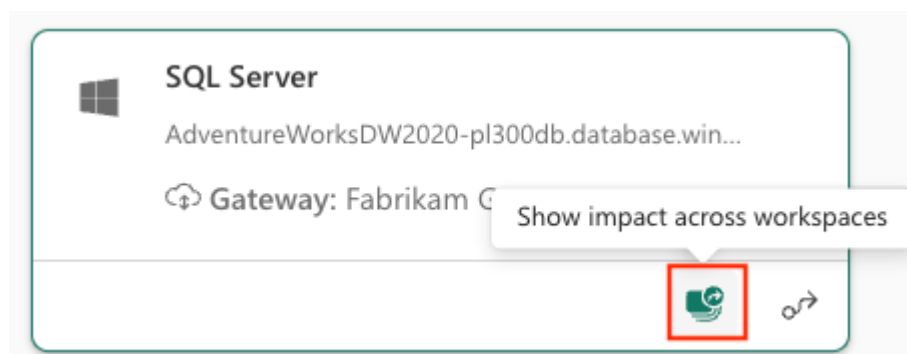
To perform semantic model impact analysis, select the impact analysis button on the semantic model card. The following screenshot demonstrates there's an additional report that depends on the semantic model. The report is in a different workspace, and the semantic model is shared with that workspace.



## Perform data source impact analysis

Data source impact analysis helps you see where your data source is being used throughout your organization. This can be useful when the data source is temporarily or permanently taken offline, and you want to get an idea about who is impacted.

Similar to semantic model impact analysis, you can select the impact analysis button on the data source card.



## 7. Boost performance with query caching (Fabric or Premium capacity)

# Boost performance with query caching (Fabric or Premium capacity)

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Completed

With the **Query Caching** feature, you can use the local caching services of Power BI to process query results. Instead of relying on the semantic model to calculate queries, you use cloud resources on your Fabric or Premium capacities in the Power BI service to load your report. Query caching ensures constant performance instead of overloading the semantic model resources.

Building on the scenario, you notice that some of your semantic models are causing the reports to load more slowly than before, an issue that is starting to annoy your users. The Sales team wants to know how they can improve performance and make these reports load faster. You decide to use **Query Caching** to solve this problem.

## Query caching

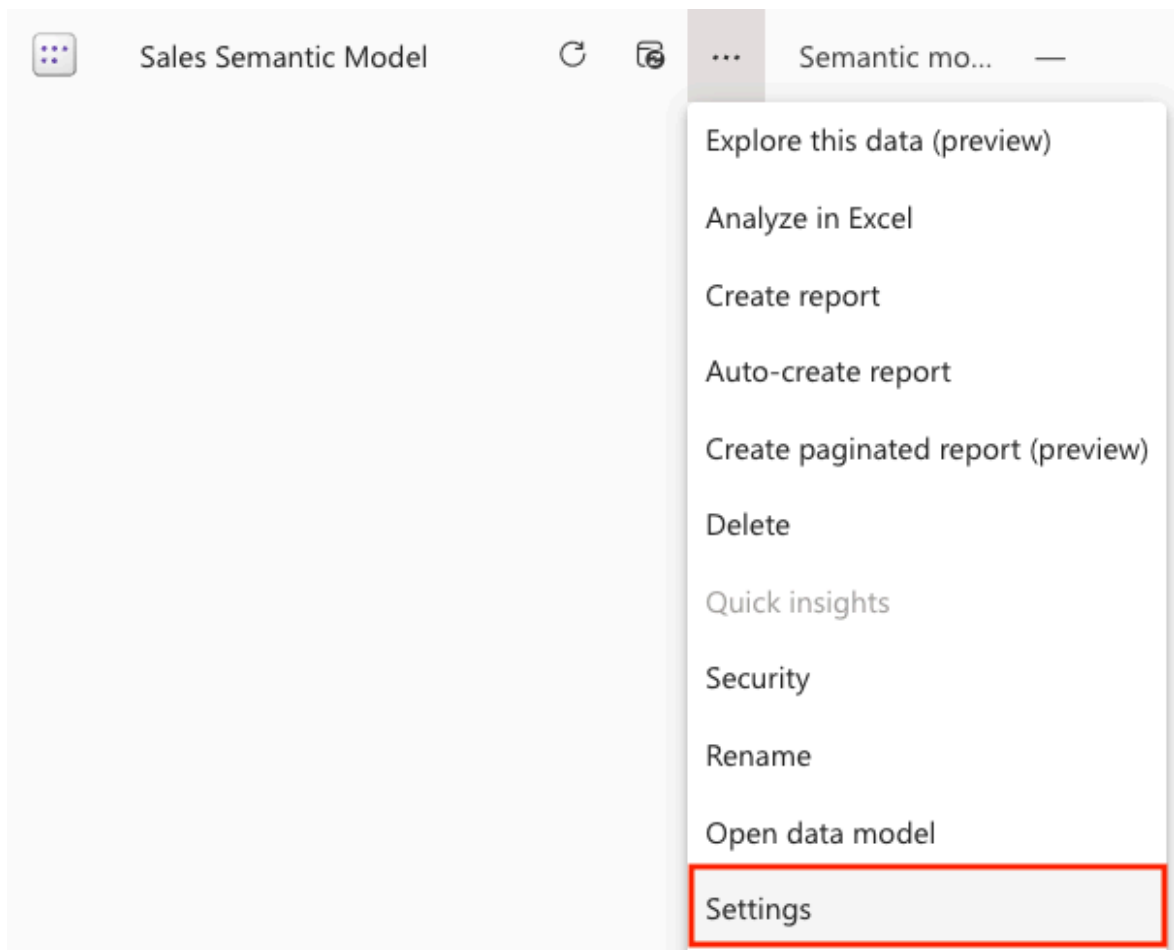
**Query Caching** is a feature that maintains cache results on a user and report basis. Query caching reduces load time and increases query speed, especially for semantic models that aren't refreshed often and are accessed frequently. This service is only available to users with Microsoft Fabric, Power BI Premium or Power BI Embedded.

The caching is performed the first time a user opens the report. The service only does query caching for the initial page that they land on. In other words, queries aren't cached when you interact with the report. Several benefits to using query caching include:

- Improvement of the performance of reports, dashboards, and dashboard tiles.
- It respects bookmarks and default filters.
- Cached query results are specific to the user.
- All security labels are followed.
- It reduces the load on your dedicated capacity.

To access and configure query caching, follow these steps:

1. Go to a semantic model in your workspace and open its **Settings** page. In this example, you enable query caching for **SalesModel**.



2. Select the **semantic models** tab and expand the **Query Caching** options, as shown in the following image.

#### Query Caching

- ☐ Capacity default: query caching Off
- ☐ Off: Do not cache query results for this semantic model
- ☒ On: Speed up reports by using previously saved query results. [Learn more](#)

Apply

Discard

3. On the **Query Caching** page, choose one of the available options. The default option is that query caching is turned off; however, you can also select **Off**, which turns off query caching for the specific semantic model in question. If you select **On**, query caching is turned on for this specific semantic model only. For this example, you'll select **On** for your semantic model because you want to apply query caching to your specific semantic model.

#### Note

Switching from **On** to **Off** clears all previously saved query results. When turning off query caching (either through the default or the **Off** option), a small delay occurs in query loading because the report queries are running against the semantic model and it does not have saved queries to fall back on.

### Warning

If many semantic models have query caching enabled, and a refresh occurs, a reduction in performance might occur because a large number of queries are being processed at once.

For more information, see [Query Caching in Power BI](#).

## 8. Check your knowledge

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/10-check>

# Check your knowledge

---

Completed

## 9. Summary

<https://learn.microsoft.com/en-us/training/modules/manage-datasets-power-bi/11-summary>

# Summary

---

Completed

This module allowed you to take advantage of the following features of Power BI to help you manage your semantic models:

- Two data refresh options to help you automate the refresh process and make it more efficient.
- Endorsement features for your most critical semantic models to help your users identify the semantic models that they should use.

- The on-premises gateway and ideas on how to troubleshoot potential connectivity issues.

These semantic model management techniques will help you to increase the ease of access and up-to-date nature of your semantic models, and will help you build high-quality reports and dashboards so that your users can make real-time decisions.

# Choose a content distribution method

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## 1. Introduction

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/1-introduction>

## Introduction

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Completed

Power BI provides powerful tools to share and distribute insights across your organization, ensuring the right people have access to the right data at the right time.

Imagine you're a business analyst responsible for delivering actionable insights to various teams in your organization. You've created a set of reports and dashboards that are critical for decision-making, but you're unsure of the best way to share them securely and effectively. Should you use workspace roles, item-level sharing, or Power BI Apps? How do you ensure your content adheres to governance policies while tracking its usage and performance?

In this module, you'll explore the different sharing models available in Power BI, including workspace roles, item-level sharing, and Power BI Apps. You'll learn how to create, update, and manage Power BI Apps, configure audiences, and apply data governance principles such as endorsing content and applying sensitivity labels. Additionally, you'll discover how to track reports and dashboards by subscribing to them, and monitoring usage metrics.

By the end of this module, you'll be able to confidently choose the right content distribution method in Power BI, ensuring secure, effective, and governed sharing of insights across your organization.

## 2. Understand sharing models

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/2-understand-sharing-models>

## Understand sharing models

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Completed

Data analysts often need to share Power BI content with different audiences while maintaining control over access and permissions.

In this unit, you'll explore how sharing in Power BI Service can help you manage access to reports, dashboards, and semantic models effectively. For example, a retail company might use workspace roles to collaborate internally, share specific reports with external partners through item-level sharing, and distribute curated content to a broader audience in the company using Power BI Apps.

## Workspace roles

Power BI Service provides four distinct workspace roles: Viewer, Contributor, Member, and Admin. These roles determine the level of access and permissions a user has within a workspace. It's important to note that workspace roles operate on an all-or-nothing basis, meaning that users with access to a workspace can view or interact with all the reports, dashboards, and semantic models within it. You cannot selectively exclude specific items from being shared when using this approach.

### Viewer

The Viewer role is the most restrictive role in a workspace. Users with this role can only view and interact with the content, such as reports and dashboards, but cannot make any changes. This role is ideal for stakeholders who need to consume data without modifying it.

This is also the only role where Row-Level Security (RLS) will be enforced. RLS ensures that users can only view the data they are authorized to see, based on the security rules defined in the dataset. This makes the Viewer role particularly useful for scenarios where sensitive or restricted data needs to be shared securely.

### Contributor

The Contributor role allows users to create, edit, and delete content within the workspace, such as reports and semantic models. However, Contributors cannot manage workspace settings or assign roles to others. This role is suitable for team members who actively develop and maintain Power BI content.

### Member

The Member role provides all the permissions of a Contributor, with the added ability to manage workspace settings and assign roles to others. Members can also publish apps from the workspace, making this role ideal for team leads or power users who need more control over the workspace.

### Admin

The Admin role grants full control over the workspace. Admins can perform all actions, including managing permissions, deleting the workspace, and assigning roles. This role is typically reserved for

workspace owners or IT administrators who oversee the workspace's overall management.

Workspace roles can be assigned to individuals, security groups, Microsoft 365 groups, and distribution lists, making it easy to manage access for large teams or organizations.

## Item level sharing

Item-level sharing in Power BI Service provides a more granular approach to sharing content compared to workspace roles. While workspace roles grant access to all items within a workspace, item-level sharing allows you to share specific reports or dashboards with selected individuals or groups. This method is particularly useful when you want to maintain tighter control over who can access sensitive or restricted content.

When you share a report or dashboard, recipients can view and interact with the content but cannot edit it. Additionally, they gain access to the underlying semantic model unless Row-Level Security (RLS) is applied. RLS ensures that users only see the data they are authorized to view, adding an extra layer of security for sensitive datasets.

Item-level sharing also offers flexibility in how you share content. You can share via links or directly grant access to specific individuals or groups. Sharing links can be configured to allow access to "People in your organization," "People with existing access," or "Specific people." Each option provides varying levels of control, enabling you to tailor access based on your organization's needs.

One of the key advantages of item-level sharing is that it overcomes the "all-or-nothing" limitation of workspace roles. For example, you can share a single report with external partners without exposing other workspace content. However, it's important to manage permissions carefully to ensure that only authorized users can access the shared content.

## Power BI Apps

Power BI Apps provide a streamlined way to share collections of dashboards, reports, and other content with a larger audience without requiring them to be part of your workspace or sharing individual items separately. This approach is particularly useful for organizations that need to distribute curated content to specific groups or even the entire organization while maintaining control over access and updates.

One of the key advantages of Power BI Apps is the ability to package multiple pieces of content into a single, cohesive experience. This eliminates the need to manage permissions for individual items, simplifying the process for both content creators and consumers. Users can access the app through a direct link, the Apps marketplace or AppSource, or even have it automatically installed in their Power BI accounts if configured by an admin. This flexibility ensures that the right content reaches the right audience efficiently.

Another significant benefit of using Power BI Apps is the control it provides when updating content. The workspace acts as a staging area where changes can be made and tested without immediately affecting the published app. Once the updates are ready, the app can be republished, ensuring that

users only see the finalized version. This capability is invaluable for maintaining consistency and avoiding disruptions, especially in scenarios where reports and dashboards are frequently updated.

It's important to note that each workspace can only have one app, and the content included in the app must originate from that workspace. This limitation ensures that the app remains tightly coupled with its source workspace, simplifying management and ensuring consistency across shared content.

### 3. Create a Power BI app

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/3-create-power-bi-app>

## Create a Power BI app

---

Completed

Organizations often rely on Power BI apps to distribute insights securely and efficiently to various teams. Imagine you're part of a team responsible for delivering data insights to both the sales and marketing departments. Each department requires access to specific dashboards and reports relevant to their goals. By mastering app management and audience customization, you'll ensure that every team gets the right data while maintaining control over access and visibility.

Here, you'll explore the steps to create and publish Power BI apps, update or delete existing apps, and configure multiple audiences to streamline content distribution.

### Create, update, delete

To create, update, or unpublish a Power BI app, follow these steps:

#### Create a Power BI App

1. **Set up the app:** In the workspace, select **Create app**. Provide a name, description, and optional theme color. Add a support site link and contact information if needed.
2. **Add content:** On the Content tab, select **Add content** to include dashboards, reports, or other items from the workspace. Arrange the content in the desired order.
3. **Publish the app:** Once the setup and content are finalized, click **Publish app**. A shareable link will be generated for distribution.

#### Update a Power BI App

1. **Open the workspace:** Navigate to the workspace associated with the app. Select the **Edit app** pencil icon.

2. **Make changes:** Modify the app's content, setup, or other settings as needed. Changes remain in the workspace until republished.
3. **Republish the app:** Select **Update app** to apply the changes. Users with access will automatically see the updated version.

## Unpublish a Power BI App

- **Unpublish the app:** In the workspace, select **More options (...)** > **Unpublish app**.

### Note

**Impact of unpublishing:** This action removes the app from all users and deletes their customizations, such as bookmarks and comments. The workspace and its contents remain intact.

## Audiences

Audiences in Power BI apps allow you to tailor the content visibility and access for different groups of users within your organization. This feature is particularly useful when you need to distribute specific dashboards, reports, or other content to distinct teams or departments while maintaining centralized control over permissions and visibility.

### What is an Audience in Power BI Apps?

An audience in Power BI apps is a defined group of users who have access to a specific subset of content within an app. By creating multiple audiences, you can customize which content is visible to each group, ensuring that users only see the data relevant to their roles or responsibilities. For example, you might create separate audiences for sales, marketing, and finance teams, each with access to different reports and dashboards.

### Why Use Audiences?

Using audiences simplifies content management and enhances security. Instead of creating multiple apps or workspaces for different teams, you can manage all content within a single app and control visibility at the audience level.

### How to Use Audiences

To set up audiences in a Power BI app:

1. **Create an Audience Group:** On the Audience tab during app creation or editing, select **New Audience** and name the group.
2. **Customize Content Visibility:** Use the hide/show icons next to each item in the workspace to determine what content is visible to the audience. Hidden content won't appear in the app for that audience unless explicitly allowed via advanced settings.

3. **Assign Users or Groups:** In the Manage audience access pane, specify the users or groups who should belong to the audience. You can also configure advanced permissions, such as allowing users to share or build content with semantic models.
4. **Publish the App:** Once the audiences and their content visibility are configured, publish the app. Users will see only the content assigned to their respective audience groups.

#### Note

To create or update an app, you need a Power BI Pro or Premium Per User (PPU) license. For app users:

- If the workspace for this app is not in a Power BI Premium capacity, all users need Power BI Pro or PPU licenses to view the app.
- If the workspace is in a Power BI Premium capacity (F64 or higher Fabric capacity), users without Pro or PPU licenses can view the app content, but they cannot copy reports or create reports based on the underlying semantic models.

## 4. Apply data governance principles

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/4-apply-data-governance-principles>

# Apply data governance principles

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Completed

Ensuring the quality and security of your organization's data is critical. Power BI provides tools to help you manage and protect your content effectively. Let's explore two essential practices for maintaining trustworthy and secure Power BI content. The first one is about endorsing your content, which helps users identify high-quality data. The second practice involves applying sensitivity labels to protect sensitive information.

## Endorse your content

Endorsing your Power BI content is a crucial step in ensuring that users can easily identify and trust high-quality, authoritative data. Power BI provides two types of endorsements: promotion and certification. These endorsements help users navigate through large volumes of content and locate reliable resources for their needs.

**Promotion** allows content owners or members with write permissions in a workspace to highlight content they believe is valuable and ready for broader use. This collaborative approach encourages the sharing of useful data across the organization. Promoted content is marked with a badge, making it easily recognizable in lists and searches.

**Certification**, on the other hand, signifies that the content meets the organization's quality standards and is deemed authoritative. Only authorized reviewers, as defined by the Power BI administrator, can certify content. Certification ensures that users can rely on the content for critical decision-making. Certified content is also labeled with a distinct badge and is prioritized in searches.

By endorsing content, whether through promotion or certification, organizations can foster trust and improve the discoverability of valuable Power BI resources. Badges are visible in Power BI Desktop when creating a new report and searching for existing semantic models. This visibility ensures that report creators can easily identify and select high-quality, endorsed datasets, streamlining the report-building process and promoting the use of trusted data sources.

## Apply a sensitivity label

Applying sensitivity labels in Power BI is a key step in ensuring that sensitive data is appropriately classified and protected throughout its lifecycle. Sensitivity labels, powered by Microsoft Purview Information Protection, allow users to tag content with labels such as "Confidential" or "Highly Confidential," which help enforce data protection policies without hindering collaboration or productivity.

To apply a sensitivity label in the Power BI service, navigate to the desired report, dashboard, semantic model, or dataflow. Use the "More options" menu to access the settings, where you can select the appropriate sensitivity label from the dropdown list under the "Sensitivity label" section. Once applied, the label is visible in the workspace and persists when the content is exported to supported formats like Excel, PowerPoint, or PDF. This ensures that the protection settings associated with the label travel with the data, safeguarding it even outside Power BI.

In Power BI Desktop, sensitivity labels can be applied directly to .pbix files. Simply select the "Sensitivity" option from the toolbar and choose the appropriate label. The label is then displayed in the status bar and is applied to the file when saved. If the file is later published to the Power BI service, the label is inherited by the associated report and semantic model. Conversely, when downloading a labeled file from the service, the most restrictive label between the report and semantic model is applied to the .pbix file.

By applying sensitivity labels, organizations can ensure that their data remains secure and compliant with internal and external regulations, while also providing clear guidance to users on how to handle sensitive content.

## 5. Track report or dashboard usage

## Track report or dashboard usage

---

Completed

Organizations often need to distribute reports and dashboards effectively to ensure that critical insights reach the right audience at the right time. For example, a retail company might use subscriptions to send sales performance dashboards to store managers daily, while also monitoring usage metrics to identify which reports are most valuable to their teams.

### Subscribe to a report or dashboard

Subscribing to a report or dashboard in Power BI allows users to stay informed about critical data and insights without needing to manually check for updates. By setting up subscriptions, users can receive regular email updates containing snapshots or attachments of reports or dashboards, ensuring they remain up-to-date with the latest information.

The subscription process is straightforward and highly customizable. In Power BI service, navigate to the report or dashboard and select the Subscribe option from the menu bar. Users can define the frequency of updates, such as hourly, daily, weekly, or monthly, and specify the time of delivery. Additionally, subscriptions can include a preview image, a link to the report or dashboard, and even attachments in formats like PDF or PowerPoint for reports hosted in Premium capacity workspaces. This flexibility ensures that users receive the information in a format and schedule that best suits their needs.

### Track usage metrics and performance

Monitoring and tracking usage metrics and performance in Power BI is essential for understanding how your reports and dashboards are being utilized across your organization. By analyzing usage data, you can identify which reports are driving the most engagement and which may require updates or additional promotion. This insight allows you to prioritize your efforts and focus on creating content that delivers the most value.

Usage metrics reports provide detailed information about report views, unique viewers, and performance trends. For example, you can track how often a report is accessed, the number of unique users interacting with it, and the typical time it takes to load. These metrics help you identify high-performing reports and pinpoint potential bottlenecks or areas for improvement. Additionally, slicing the data by distribution method or platform can reveal how users are accessing your content, whether through the Power BI service, mobile devices, or embedded applications.

Performance metrics are equally important, as they highlight the user experience when interacting with your reports. By analyzing opening times and performance trends, you can detect issues such as

slow load times or browser-specific challenges. Addressing these issues ensures a smoother experience for your users, which can lead to increased adoption and satisfaction.

## 6. Check your knowledge

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/6-knowledge-check>

# Check your knowledge

---

Completed

## 7. Summary

<https://learn.microsoft.com/en-us/training/modules/choose-content-distribution-method/7-summary>

# Summary

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Completed

In this module, we tackled the complexities of securely and effectively sharing Power BI content within an organization. Business analysts often struggle to balance accessibility with governance, ensuring insights reach the right audience without compromising security. By exploring workspace roles, item-level sharing, and Power BI Apps, we provided actionable solutions to these challenges. We also delved into data governance practices, such as endorsing content and applying sensitivity labels, to foster trust and safeguard sensitive information.

## Learn more

For more information about the topics discussed in this module, see:

- [Roles in workspaces in Power BI](#)
- [Apps in Power BI](#)
- [Endorsement - Promoting and certifying Power BI content](#)
- [Monitor usage metrics in the workspaces](#)
- [Email subscriptions for reports and dashboards in the Power BI service](#)



# Create dashboards in Power BI

## 1. Introduction to dashboards

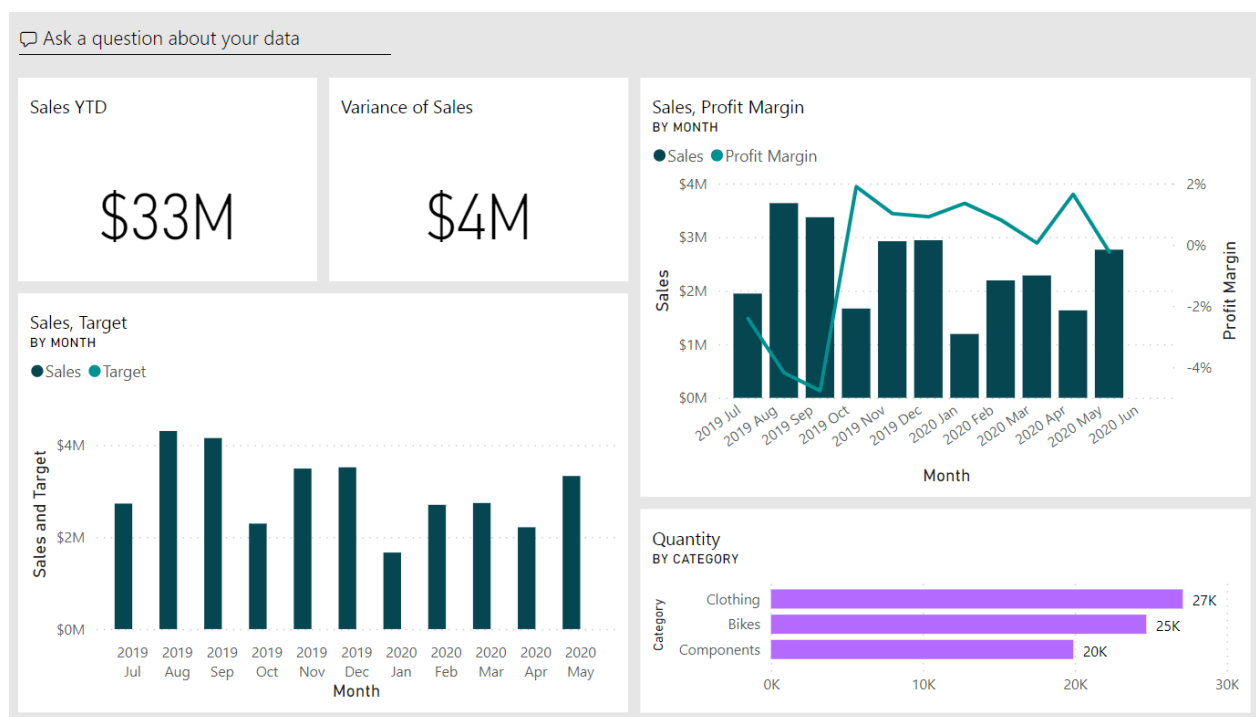
<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/1-introduction>

## Introduction to dashboards

Completed

Microsoft Power BI dashboards are different than Power BI reports. Dashboards are made up of visuals from different reports and allow report consumers to create a single page of targeted data insights, with the option to explore more in a report.

Well-built dashboards capture the most important highlights of the story that you're trying to tell.



## Dashboards vs. reports

The Power BI dashboard is similar to a dashboard in a car - you want to have the most important information for the consumer to see immediately. For additional insights, consumers can follow

through to the corresponding report.

Dashboards are often the next step after building your reports in Power BI Desktop. Consider the following differences when deciding how to create reports and dashboards:

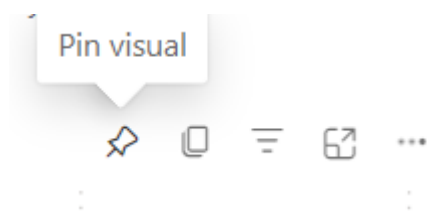
| Feature                 | Dashboards                                    | Reports                                                                          |
|-------------------------|-----------------------------------------------|----------------------------------------------------------------------------------|
| Purpose                 | Provides a high-level overview of key metrics | Offers detailed, multi-page data analysis                                        |
| Where do you create it? | Power BI service                              | Power BI Desktop                                                                 |
| Pages                   | Single page                                   | Multiple pages                                                                   |
| Interactivity           | Static tiles                                  | Highly interactive with features like drill-through, filtering, and highlighting |
| Data sources            | Can connect to multiple data sources          | Typically based on a single semantic model                                       |
| Usage                   | Ideal for quick insights and monitoring       | Suitable for in-depth analysis and exploration                                   |

Both dashboards and reports can be refreshed to show the latest data.

## Get started with dashboards

Dashboards are created by *pinning* report visuals, and are then called *tiles* within reports. When you make changes to the visuals in the report, and then republish to Power BI Service, changes are reflected on the dashboard.

First log into the Power BI service and navigate to a workspace with reports. Open a report and in the visual header, select the **Pin Visual** icon. You can choose to pin this visual to a new or existing dashboard.





## Pin to dashboard

Select an existing dashboard or create a new one.

### Where would you like to pin to?

☒ Existing dashboard

☐ New dashboard

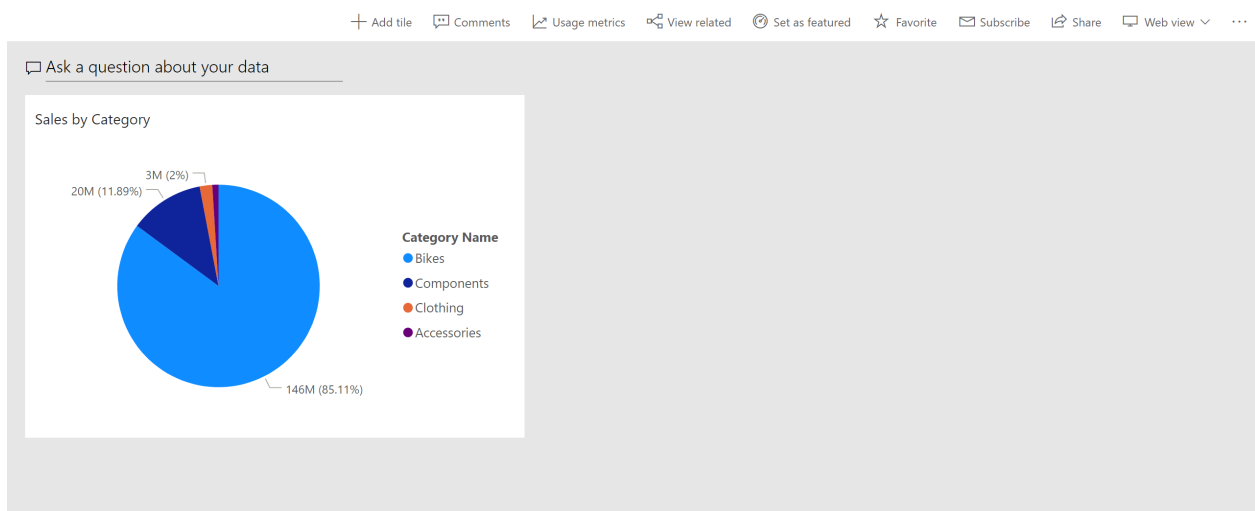
Select existing dashboard

Sales Analysis.pbix

Pin

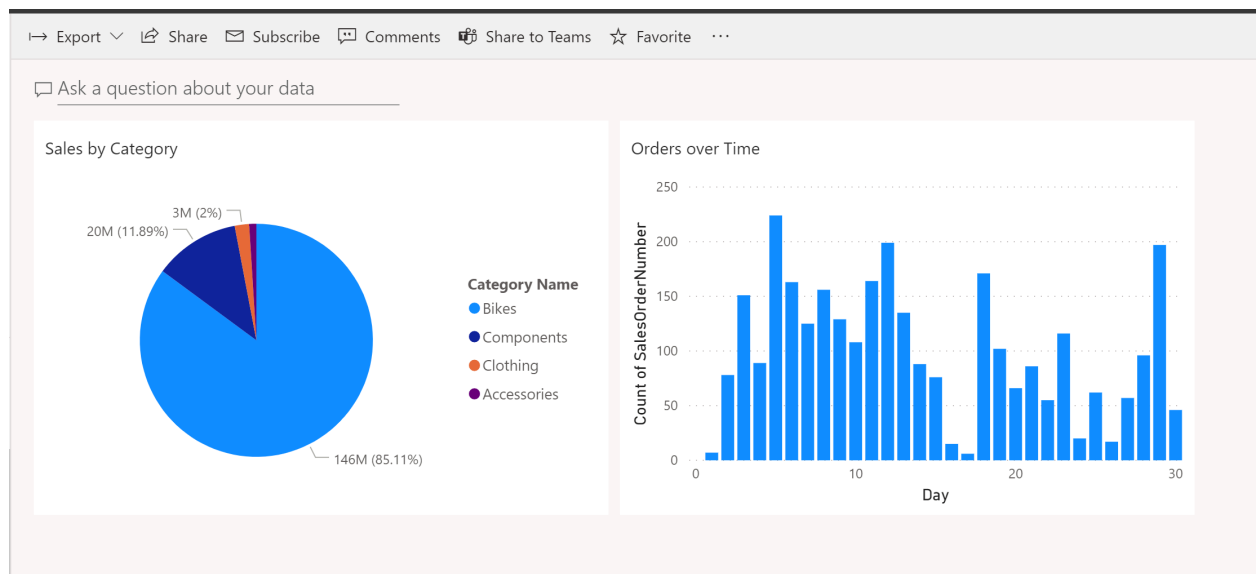
Cancel

After pinning your visuals, you can resize and move the visuals to suit your needs.



### Pin a tile from a different report

One of biggest benefits of a dashboard is being able to pin a visual that is sourced from a different semantic model. In the following image, we show two separate tiles pinned from different reports.



Repeat this process until your dashboard has the data you want to show.

For more information, see [Introduction to dashboard tiles](#).

## 2. Configure data alerts

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/2-data-alerts>

# Configure data alerts

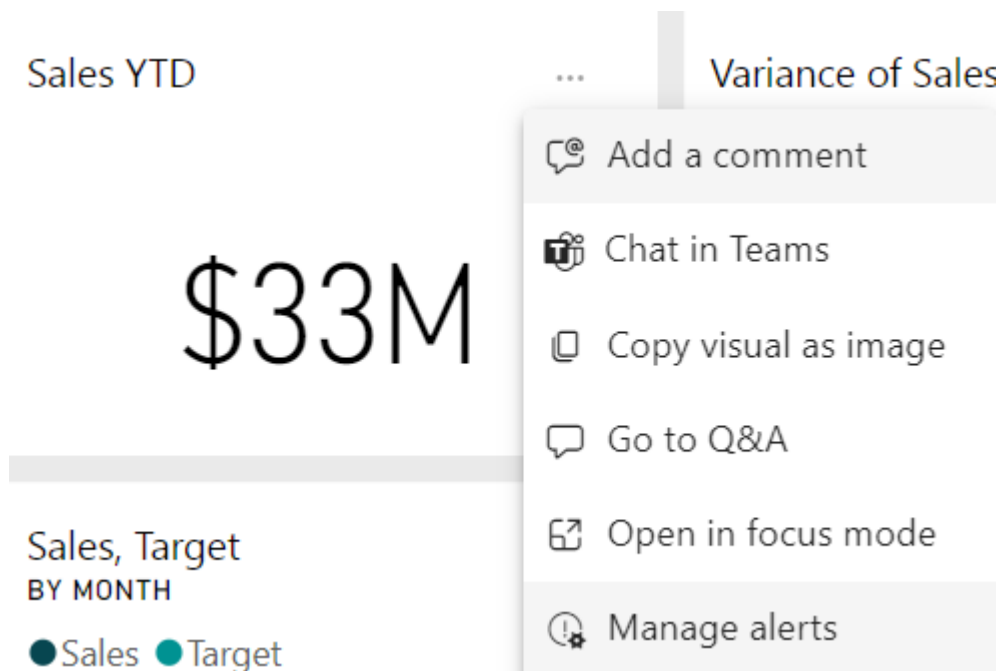
Completed

Configuring data alerts is a simple process to complete for a dashboard in Power BI. Data alerts can notify you or a user that a specific data point is above, below, or at a specific threshold that you can set.

## Configure alerts

These alerts are features that are only available on Power BI service and they're available on such report elements such as KPI visuals, gauges, and cards.

After you have uploaded your reports to Power BI service and have pinned your chosen visuals to a dashboard, select the ellipsis (...) in the corner of the tile you want to set an alert for and then select **Manage Alerts**.



Select + **Add Alert Rule**, which will add a new alert. Ensure that the **Active** toggle switch is turned **On**, name the alert, and then set the condition.

Next, you can choose the threshold that you want to create the alert for, which includes options for **Above** or **Below** a specific threshold.

Finally, select how frequently you want alerts. These alerts are sent directly to your Notification Center in Power BI, and you can also configure emails.

## Manage alerts

+ Add alert rule

^ Sales YTD



Active

☒ On

Alert title

Sales YTD

Set alerts rule for

Sales YTD

Condition

Above



Threshold

33139748.07

Maximum notification frequency

- ☒ At most every 24 hours  
☐ At most once an hour

Alerts are only sent if your data changes.

By default, you'll receive notifications on the service in the notification center.

☒ Send me email, too

This feature is available to all consumers to configure as they so choose. You can also enable or disable the alert by using the toggle switch.

For more information, see [Data Alerts in Power BI service](#).

### 3. Explore data by asking questions

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/3-explore-data>

## Explore data by asking questions

Completed

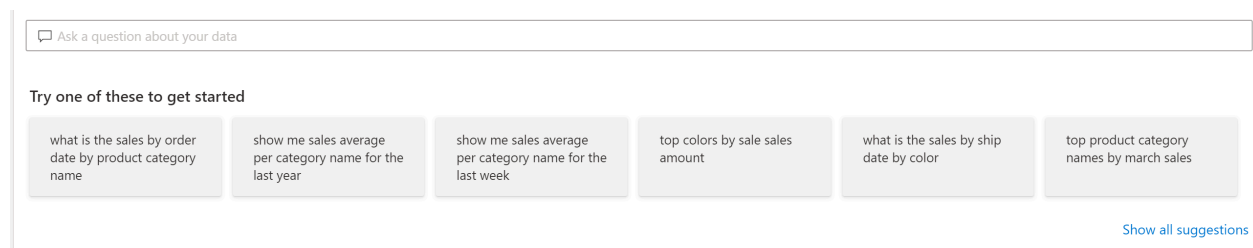
Power BI dashboards are about having a user-friendly experience. When users first interact with data, they often have additional questions and reach out to you. A few questions might be manageable to answer, but this isn't sustainable.

Power BI solves this problem with the Q&A visual. From the dashboard view, users can use the **Ask a question about your data** feature, which increases engagement between users and the dashboard.

### Q&A feature

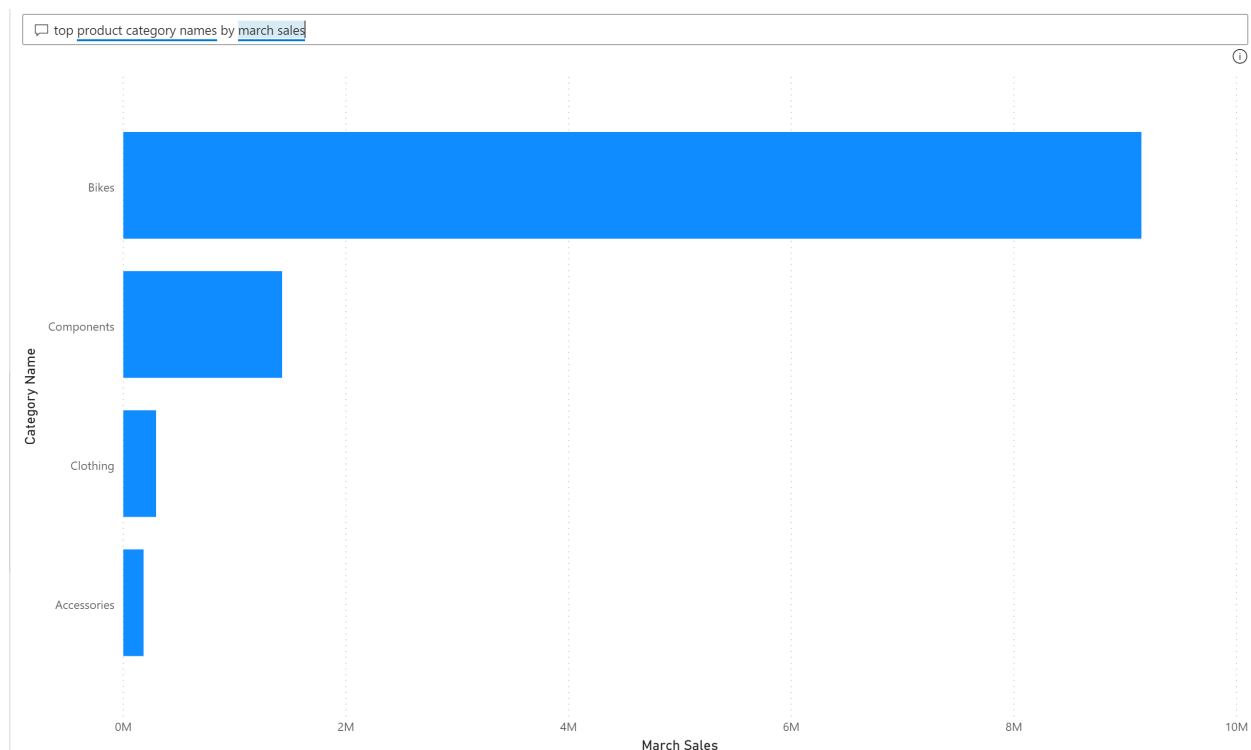
The Q&A feature is a tool within Power BI Desktop that allows you to ask natural-language questions about the data.

To locate the Q&A feature, go to your dashboard in Power BI service. Along the top ribbon is the **Ask a question about your data** search box. Some prompts are also available to help get you started.



The Q&A visual consists of three main elements:

- **Question box:** Use natural language to ask questions about the data. Example: *What were the average sales amount by category?*
- **Pre-populated suggestion tiles:** Questions to help users consider how to phrase their questions. Example, *top product category names by march sales* tile results as a bar chart with category name and March sales.
- **Pin visual:** Pin the visual created with Q&A to a new or existing dashboard.



With the Q&A feature, users can interact directly with the visual to ask their data questions, which will increase their interactions with the visual and save time.

## 4. Review Quick insights

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/4-quick-insights>

# Review Quick insights

Completed

The **Quick insights** feature in Power BI uses machine learning algorithms to go over your entire semantic model and produce insights (results) for you quickly. This feature is a great way to build dashboards when you don't know where to start. It also helps you find insights you might have missed when building your reports. From the insights that Power BI discovers, you can generate appealing, interactive visualizations.

### Note

This feature is available in the Power BI service only. Also, this feature doesn't work with DirectQuery; it only works with data that is imported to Power BI.



## Get quick insights on your semantic model

To get quick insights on your semantic model, open your Power BI service and workspace, locate your report, and select the ... > **Quick insights**.

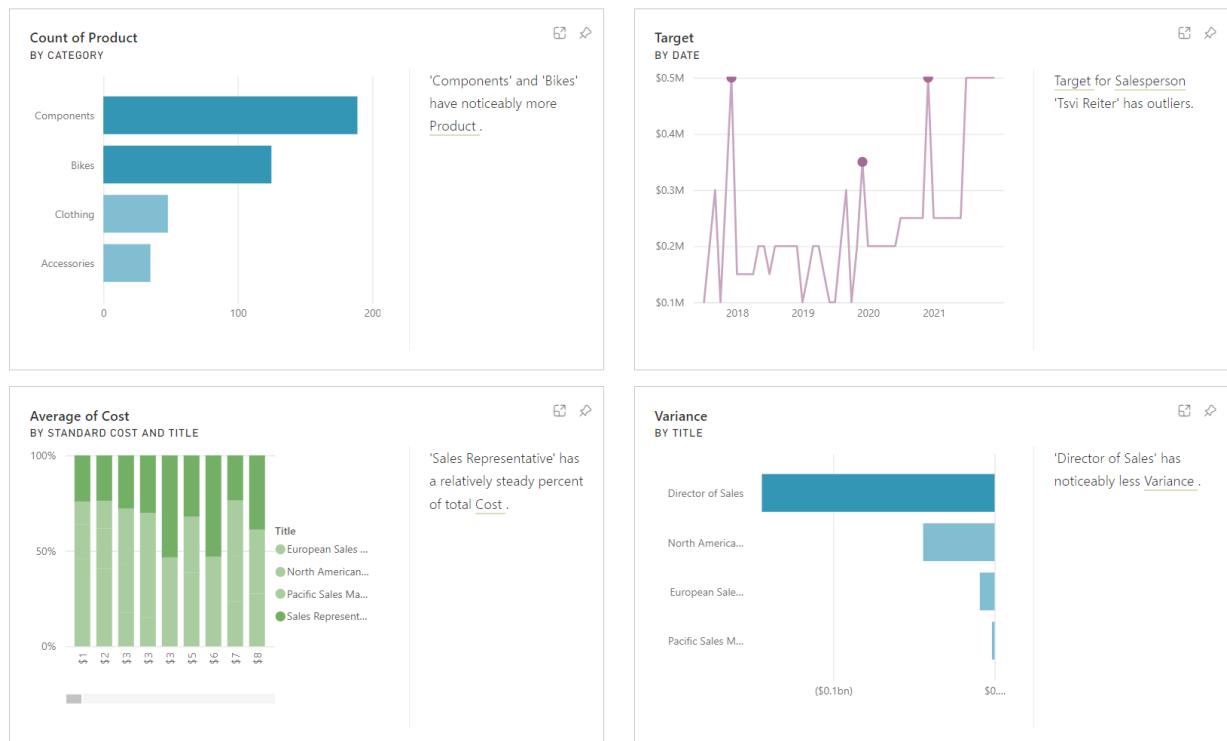
|  | Name                                                                                                  |                                                                                                                                                                        | Type              |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|  |  Sales Analysis      |   | ...               |
|  |  Sales Analysis      |                                                                                                                                                                        | Explore this data |
|  |  Sales Analysis.pbix |                                                                                                                                                                        | Analyze in Excel  |
|                                                                                   |                                                                                                       |                                                                                                                                                                        | Delete            |
|                                                                                   |                                                                                                       |                                                                                                                                                                        | Quick insights    |

Power BI uses various algorithms to search for trends in your semantic model. This process might take a few seconds, but you receive a pop-up message when the insights are ready.

Select **View insights** to open the **Quick Insights** page for the selected semantic model, and then view the insights that Power BI has found for you. The **Quick Insights** page contains up to 40 separate insight cards, and each card has a chart or graph plus a short description.

## Quick Insights for Sales Analysis

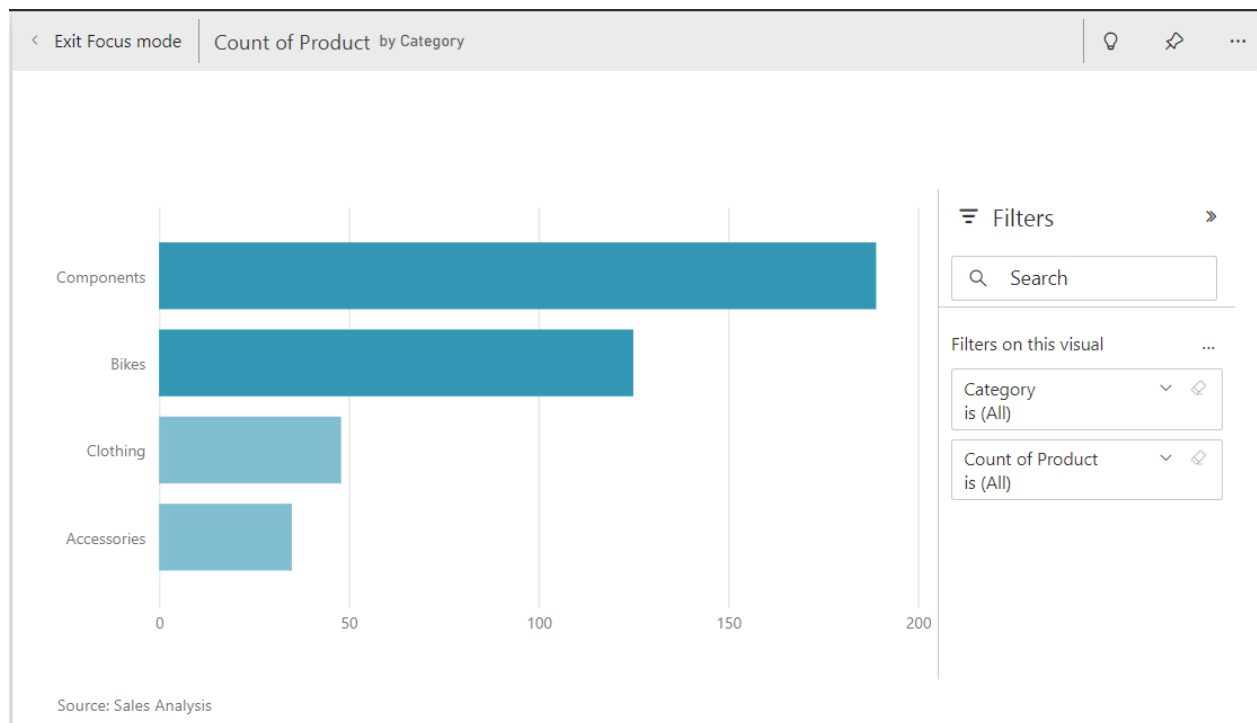
A subset of your data was analyzed and the following insights were found. [Learn more](#)



## Interact with the quick insights results

If you see a compelling insight card, you can even pin it to your dashboard.

To take a closer look at a particular insight card on the **Quick Insights** page, select an insight card to open. The insight screen opens in **Focus** mode.



You can then perform the following actions:

- Filter the visualization by using the available options in the **Filters** panel.
- Pin the insight card to a dashboard by selecting **Pin visual**.
- Run insights on the card (scoped insights) by selecting **Get insights** in the upper-right corner. The scoped insights allow you to drill into your data.
- Return to the original insights canvas by selecting **Exit Focus mode** in the upper-left corner.

## 5. Add a dashboard theme

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/5-dashboard-theme>

# Add a dashboard theme

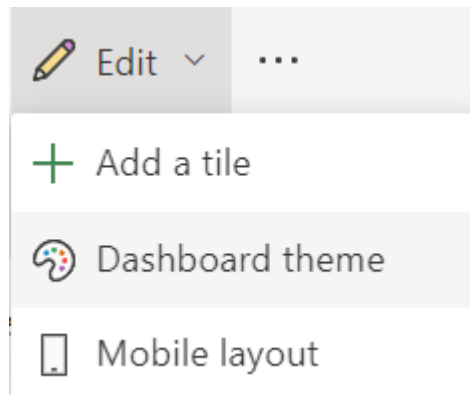
Completed

When building dashboards, you can create a cohesive picture by applying the same theme as in your reports. Or apply a specific theme to reports and dashboards so that all report elements or tiles are uniform.

This consideration is important when you're building multiple dashboards. Power BI provides options to apply a theme directly to a dashboard as well as all visuals of a report.

## Themes in Power BI

Various themes are available for use in Power BI service. Go to a dashboard, select the edit dropdown arrow, and then select **Dashboard theme**.

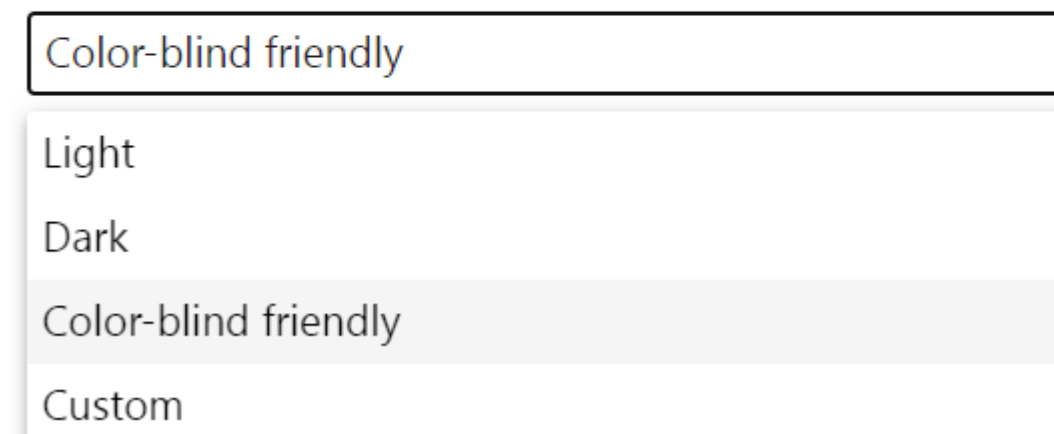


This selection will open a window, where you can choose from various themes, including **Light** (the default theme), **Dark**, **Color-blind friendly**, and **Custom**, where you can create your own theme. You can also upload your own JSON theme or download the current theme.

### Dashboard theme

🕒 Sales Analysis

⤶ Upload JSON theme    ⤵ Download JSON theme



For instance, if you select **Custom**, you can add your own background image, or you can change the background color, tile color, the opacity, or even the font color, as shown in the following figure.

Custom

▼

Background Image

Image URL

Background color

▼

Tile background

▼

Tile font color

▼

Tile opacity

Now, you can customize your report to cater specifically to your needs.

## 6. Pin a live report page to a dashboard

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/6-pin-live-report>

# Pin a live report page to a dashboard

Completed

Power BI allows you to pin live report pages to dashboards, ensuring that your visuals reflect real-time changes. The iterative process of building reports and dashboards as business requirements evolve becomes easier with this feature.

## Pin a live page

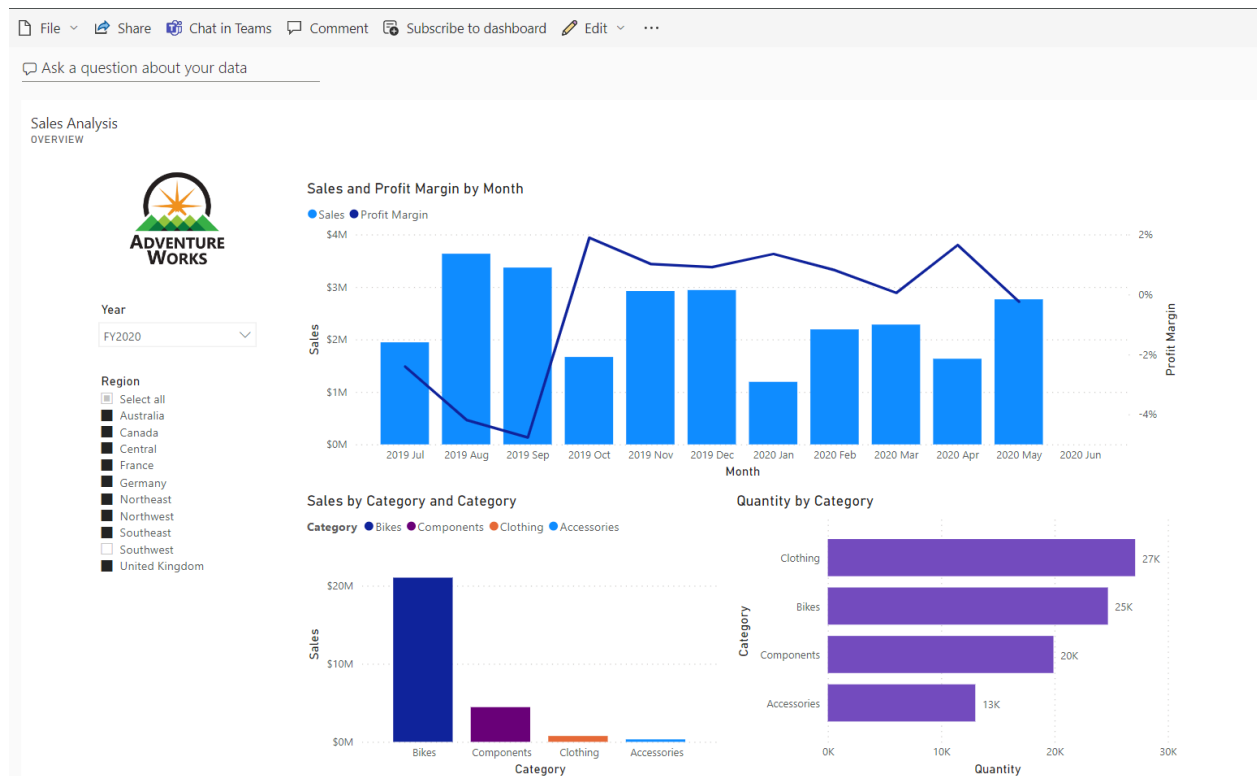
The **Pin a live page** feature reflects real-time changes, ensuring that your reports always stay up-to-date.

You can also pin entire report pages to a dashboard. These visuals are *live*, meaning that any changes you make on the report are immediately reflected on the selected dashboard.

Pinning a report page is a simple way to pin all visuals at once. All slicers and filters still work and that the visuals have the same data as in the report. The visuals appear as a page, so there are no reformatting options.

Any changes that you make to the underlying report automatically show on the dashboard when the page is refreshed.

To pin an entire page, select the ellipsis (...) on the navigation bar of the report and then select **Pin to a dashboard > (Select dashboard) > Pin live**.



### Tip

Dashboards are intended to be a collection from various sources, not just as a "launching pad" for reports. We recommend that you pin at the tile level first and foremost, and if needed, the entire report page can also be pinned. Seeing an entire report page in a dashboard tile can be difficult.

For more information, see [Pin an entire report page](#).

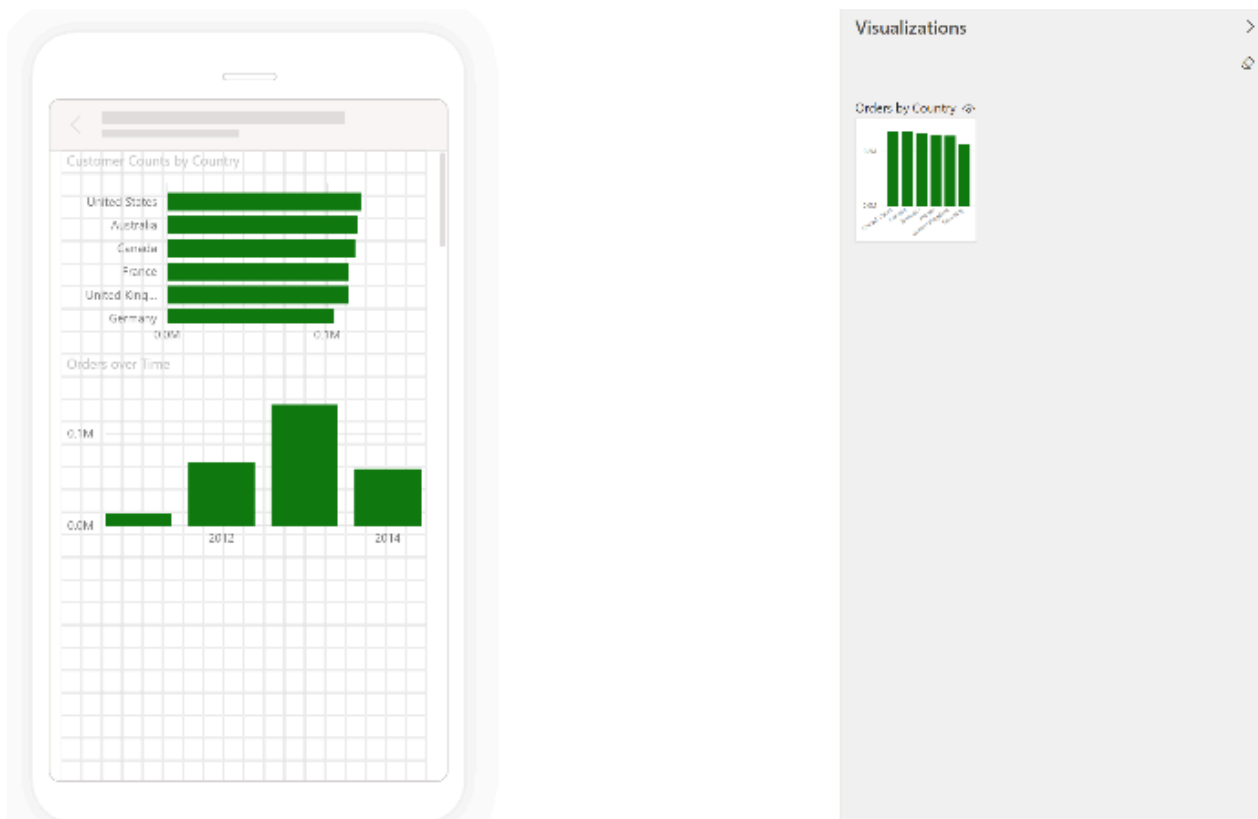
## 7. Set mobile view

## Set mobile view

### Completed

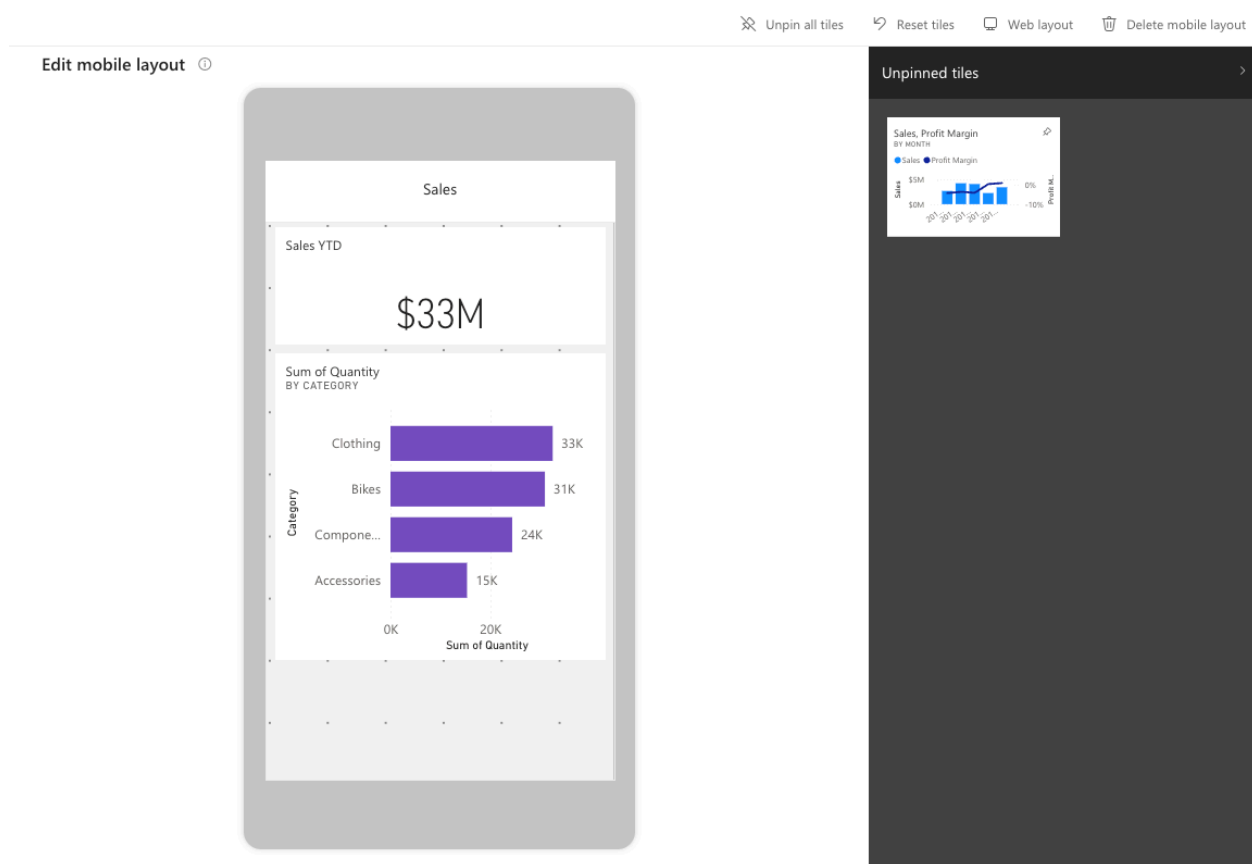
Power BI reports are built in Power BI Desktop and then deployed to Power BI service, where they can be viewed and shared. However, if you're building dashboards for your organization and need reports and dashboards viewable on mobile devices, Power BI offers a mobile layout configuration to meet your needs.

To navigate to mobile view in Power BI Desktop, select **View** on the ribbon and then select **Mobile Layout**, which will redirect you to the mobile view, as shown in the following figure.



In the mobile view in Power BI Desktop, you're able to accomplish several tasks. The mobile view shows you how it will look to users in the Power BI Mobile app. You can add visuals, resize them, and change the formatting. Use the grid view to orient your visuals with more ease and overlay visuals on top of each other. This feature can be useful if you want to insert a visual on top of an image.

Alternatively, you can also optimize your dashboards for mobile view in Power BI service. To see a dashboard in mobile view, select the Edit drop down arrow on the home ribbon and select **Mobile layout**. Then you can choose which tiles that you want to see on the mobile view.



You can also resize and reorient the tiles and visuals in whichever order you want. When you're satisfied with the phone dashboard layout, switch back to web view by selecting **Web layout** in the top menu.

For more information, see [Optimize a dashboard for mobile phones](#).

## 8. Exercise - Create dashboards in Power BI

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/10-lab>

# Exercise - Create dashboards in Power BI

Completed

## Access your environment

Before you start this lab (unless you are continuing from a previous lab), select **Launch lab** above.

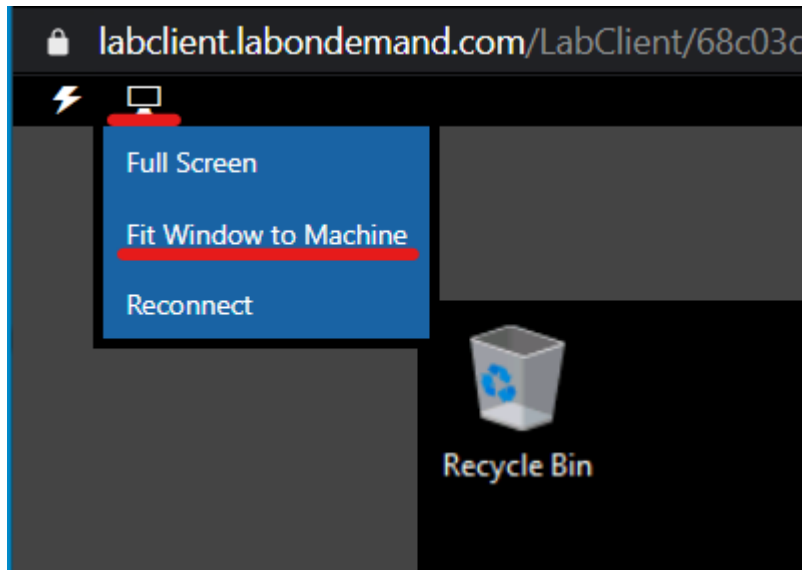
You are automatically logged in to your lab environment as data-ai\student.



You can now begin your work on this lab.

### Tip

To dock the lab environment so that it fills the window, select the PC icon at the top and then select **Fit Window to Machine**.



The estimated time to complete the exercise is 30 minutes.

### Note

This exercise uses the Power BI service. You'll need to use your organizational account to log in. If you don't have one or can't use yours, you can create a free [Microsoft 365 Developer account](#) to complete the exercise.

Alternatively, you can use these [setup instructions](#) to create your own lab environment, then follow these [exercise instructions](#).

### Tip

A virtual machine containing the client tools you need is provided, along with the exercise instructions. Use the button above to launch the virtual machine.

*A limited number of concurrent sessions are available - if the hosted environment is unavailable, try again later.*

## 9. Check your knowledge

## Check your knowledge

---

Completed

### 10. Summary

<https://learn.microsoft.com/en-us/training/modules/create-dashboards-power-bi/12-summary>

## Summary

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Completed

In this module, you have learned about dashboards: what they are, why you need them, and what tiles and pinning are in relation to dashboards. You have also learned how to accomplish several tasks around dashboards, such as:

- Setting mobile view.
- Adding a theme to the visuals in your dashboard.
- Configuring data classification.
- Pinning a live report page to a dashboard.

With this new knowledge, consider how you can transform the data that you have to create a story. Dashboards can help you visualize that story.

For more information, see [Introduction to dashboards](#).

# Secure data access in Power BI

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## 1. Introduction

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/1-introduction>

## Introduction

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Completed

Imagine you work for Tailspin Traders, a company that maintains a database of sales, products, and employee information. You want to create a single report where employees in a specific department can only view the sales data relevant to their department.

Instead of creating and managing separate reports for each department, you can use **Row Level Security (RLS)** in Power BI. RLS allows you to control access to data at the row level, ensuring that users only see data pertinent to their role. This approach not only simplifies report management but also enhances data security and compliance.

There are several ways to implement RLS in Power BI. The **Static** method is suitable for a small number of roles that rarely change. The **Dynamic** method is better for a large number of roles that change frequently. Alternatively, you can use **single sign-on (SSO)** for some data sources that use Direct Query, enforcing data permissions at the data source level.

Additionally, you can use **Object-level security (OLS)** to restrict access to specific tables and columns like employee salaries or personal information. This method is useful when you need to restrict access to sensitive data at the object level.

## 2. Configure row-level security with the static method

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/2-static-method>

## Configure row-level security with the static

# method

---

Completed

As a data modeler, you set up RLS by creating one or more roles. A role has a unique name in the model, and it usually includes one or more rules. Rules enforce filters on model tables by using Data Analysis Expressions (DAX) filter expressions.

The **static** method in row-level security (RLS) uses a fixed value in the DAX filter, while the dynamic method uses a DAX function.

## Note

By default, a data model has no roles. A data model without roles means that users (who have permission to query the data model) have access to all model data.

It's possible to define a role that includes no rules. In this case, the role provides access to all rows of all model tables. This role set up would be suitable for an admin user who is allowed to view all data.

RLS involves several configuration steps. Begin by creating a report in Microsoft Power BI Desktop, which includes importing data, applying star schema design principles, and creating report visuals. Then, set up RLS roles using DAX and test them within Power BI Desktop. Once the roles are configured, deploy the report to Microsoft Power BI service, add members to the roles, and conduct final testing in the Power BI service.

## Create a report in Power BI Desktop

Follow the typical steps to create a report in Power BI Desktop. Use Microsoft Power Query to retrieve and clean the data. Then, confirm that the relationships exist between the tables by using the **Modeling** tab. We recommend you apply **star schema** design principles to produce a model comprising dimension and fact tables. It's common to set up Power BI to enforce rules that filter dimension tables, allowing model relationships to efficiently propagate those filters to fact tables.

Your next step is to create a Power BI report.

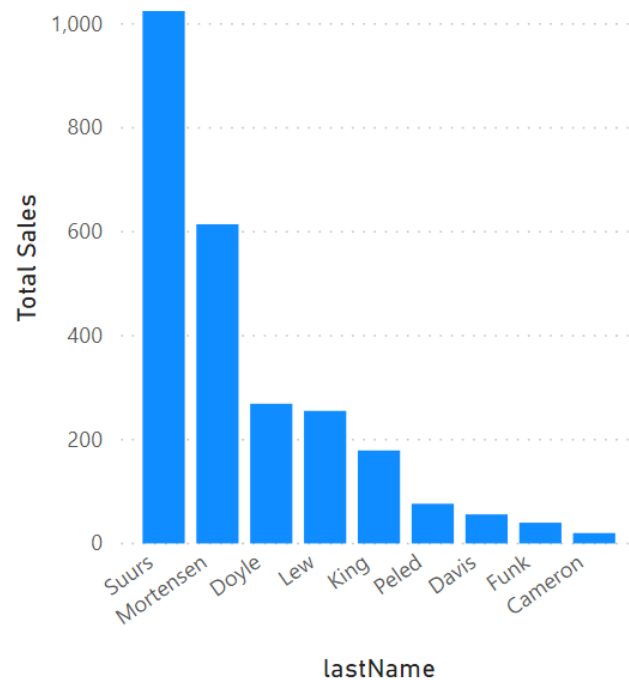
# 2.54K

Total Sales

## Top Products Sales

| product                | department | Total Sales     |
|------------------------|------------|-----------------|
| True Coat              | Automotive | 980.00          |
| Driver - Stiff Shaft   | Sports     | 399.99          |
| Leather Sandels        | Clothing   | 223.94          |
| Frisbee Golf Set       | Sports     | 196.00          |
| Boxing gloves          | Sports     | 99.00           |
| Golf Balls - Dual Core | Sports     | 97.50           |
| Hoodie                 | Clothing   | 89.98           |
| Athletic Shorts        | Clothing   | 71.00           |
| Putting Green          | Sports     | 59.25           |
| Tire Guard             | Automotive | 44.99           |
| Spider, spider         | Game       | 44.50           |
| Bathing Trunks         | Clothing   | 42.99           |
| Window Scrape          | Automotive | 39.96           |
| Invest in it All       | Game       | 31.99           |
| Santo Domingo          | Game       | 31.00           |
| Settlers of Air        | Game       | 24.99           |
| Lords of Avalon        | Game       | 19.99           |
| V-Neck T-Shirt         | Clothing   | 19.99           |
| Weighted Bands         | Sports     | 17.98           |
| <b>Total</b>           |            | <b>2,535.04</b> |

## Top Employees



Notice how the preceding table has rows for all sales, including all departments. You will be limiting visibility so that only employees of a specific department can see their own sales.

## Create RLS roles in Power BI Desktop

Power BI row-level security (RLS) uses DAX to control who can see which data. Consider it as always adding another filter to the appropriate users, regardless of the filters, slicers, or interactions that the users choose on a Power BI report.

To create RLS roles in Power BI Desktop, select the **Modeling** tab, and then select **Manage Roles**. On the **Manage security roles** page, create a role for each department, and then add a filter or DAX expression to it. For instance, you can create a role called **Game** and then add the filter or DAX expression **[Department] = "Game"**. Then, whenever a member of that role interacts with the report, Power BI will add that filter to their interactions, thus limiting what they see.

A fixed value is used in the filter on the right side of the equal sign (in this case, "Game"). The intention is that, if you ever need to add a category, you will need to create a new role with a new value in the DAX expression.

## Manage security roles

Create new security roles and use filters to define row-level data restrictions.

Roles

+ New

Automotive

Clothing

Game

Sports

Select tables

Employee

Product

Region

Reseller

Sales

SalespersonRe...

Targets

Filter data

+ New

Select all

Delete

Group

Ungroup

Show data if

All

of these rules are true

| Column                              | Condition | Value |
|-------------------------------------|-----------|-------|
| <input type="checkbox"/> Department | Equals    | Game  |
| + New                               |           |       |

Switch to DAX editor

Save

Close

The DAX filter is applied to every interaction, slicer, and filter that the user applies. If you have a DAX filter that performs poorly, the user experience will be negatively impacted. Therefore, keep the DAX filter as simple as possible.

## Test the roles in Power BI Desktop

You can validate that the filter is working by selecting the **Modeling** tab and then selecting **View as Roles**.

The image shows the Power BI Desktop ribbon with the 'Modeling' tab selected. In the 'Security' group, the 'View as' button is highlighted with a red box. Other buttons visible include 'Manage roles', 'Q&A setup', 'Language', and 'Linguistic schema'.

In the **View as roles** window, select the **Game** role. The report now renders as if you were in that role, and you will only see the records that are included in the Game department.

You can undo this filter by selecting **View as roles** again and then selecting **None**.

## Deploy the report to Power BI service

You can deploy the report to Power BI service by selecting the **Publish** button on the **Home** tab and then selecting a workspace.

## Add members to the role in Power BI service

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To add members to the role in Power BI service, go to your workspace in Power BI service. Find the semantic model that you created with the same name as your report. Select the ellipsis (...) button and then select **Security**.

In the **Row-Level Security** screen, you can add Microsoft Entra ID users and security groups to the security role. When members are added to this role, the DAX filter that you previously defined will be applied to them. If members are not added to the role, but they have access to the report, RLS will not apply to them. You can add the three people in the Game department to the **Game** role. Now, when those members sign in, they will only see the report with data that applies to them.

## Row-Level Security

Automotive (0)

Clothing (0)

Game (0)

Sports (0)

Members (0)

People or groups who belong to this role

Enter email addresses

Add

### Note

RLS only applies to **viewers** in a workspace. Workspace members assigned Admin, Member, or Contributor roles have edit permissions for the semantic model, and therefore, RLS does not apply to them

### Tip

When possible, it's a good practice to map roles to security groups. That way, there will be fewer mappings, and you can delegate the group membership management to the network administrators.

## Test the roles in Power BI service

Testing roles in Power BI service allows you to simulate and verify that the row-level security (RLS) configurations are working as intended. Select the ellipsis (...) next to the **Game** role on the **Row-Level Security** screen and then selecting **Test as role**.

This selection will display the report as if you were a member of the role in Power BI service.

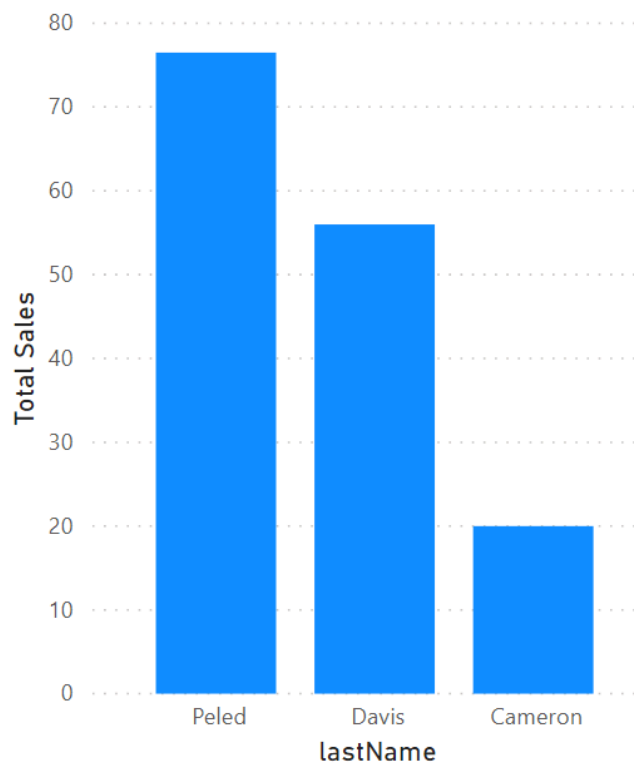
# 152.47

Total Sales

## Top Products Sales

| product          | department | Total Sales   |
|------------------|------------|---------------|
| Spider, spider   | Game       | 44.50         |
| Invest in it All | Game       | 31.99         |
| Santo Domingo    | Game       | 31.00         |
| Settlers of Air  | Game       | 24.99         |
| Lords of Avalon  | Game       | 19.99         |
| <b>Total</b>     |            | <b>152.47</b> |

## Top Employees



Now that you understand how to configure RLS with the static method, let's explore how to do it dynamically.

### 3. Restrict access to Power BI model objects

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/3b-restrict-access-to-power-bi-model-objects>

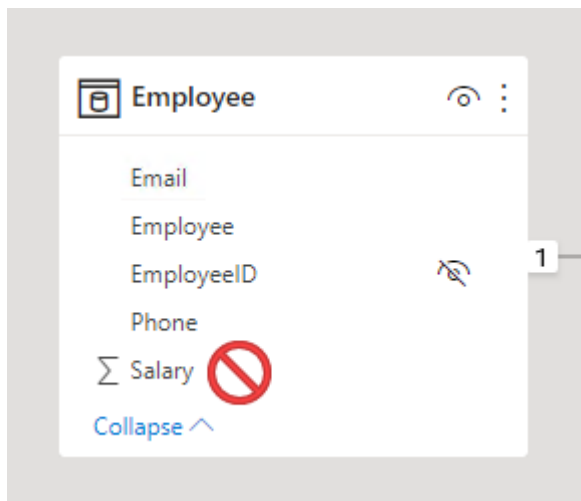
## Restrict access to Power BI model objects

Completed

As a data modeler, you can consider restricting user access to Power BI model objects. **Object-level security (OLS)** can restrict access to specific tables and columns, and their metadata. Typically, you apply OLS to secure objects that store sensitive data, like employee personal data.



Consider an example at Tailspin Traders. This organization has a data warehouse dimension table named **DimEmployee**. The table includes columns that store employee name, phone, email address, and salary. While general report consumers can see employee name and contact details, they must not be able to see salary values. Only senior Human Resources staff are permitted to see salary values. So, the data modeler used OLS to grant access to the salary column only to specific Human Resources staff.

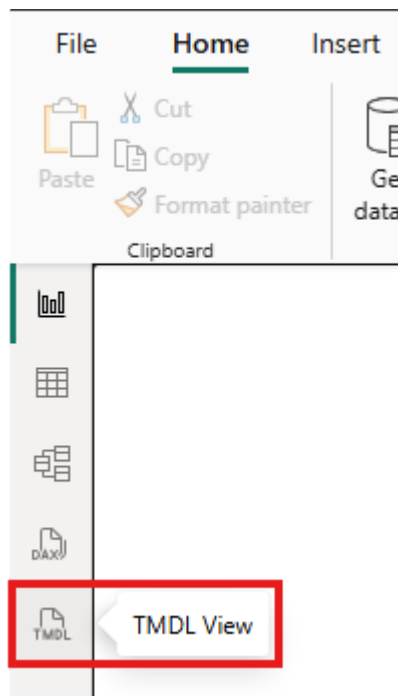


## Set up OLS

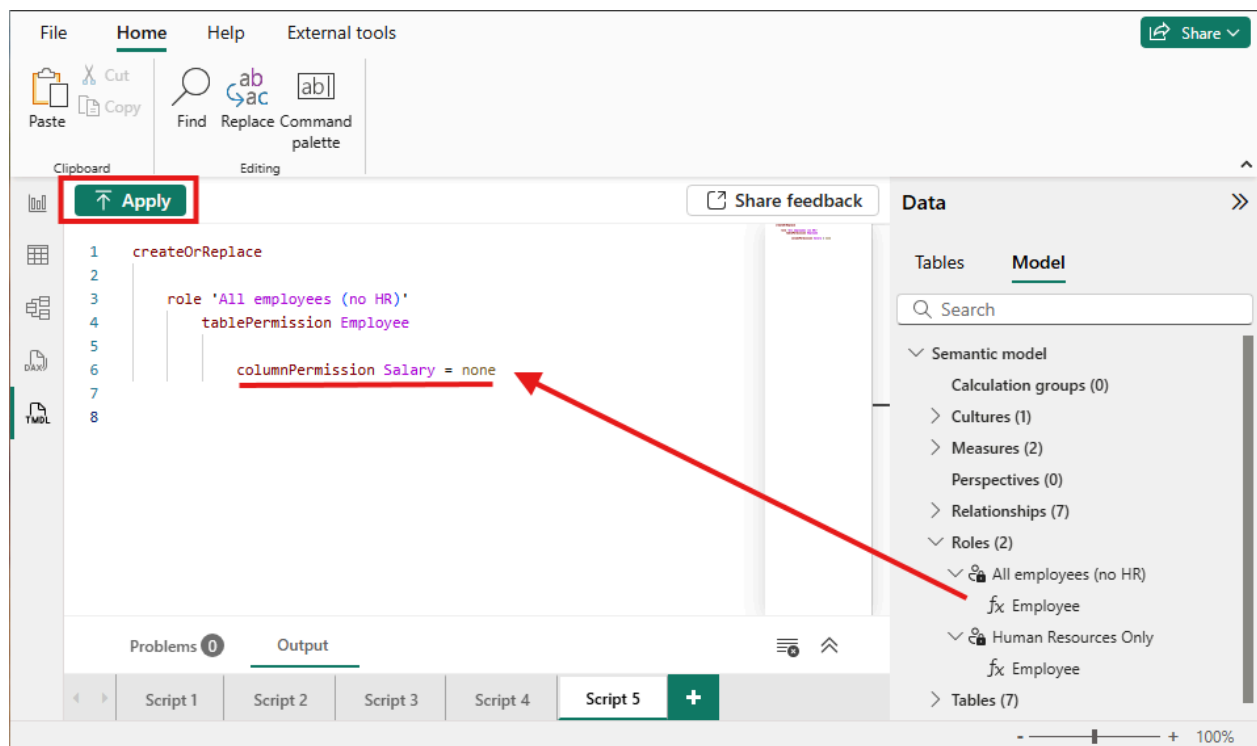
To set up OLS, you start by creating roles. You can create roles in Power BI Desktop in the same way you do when setting up RLS. Next, you need to add OLS rules to the roles. This capability isn't supported by Power BI Desktop, so you'll need to take a different approach, for example by using the TMDL view for Power BI Desktop (currently in preview). This feature lets you script, modify, and apply changes using **Tabular Model Definition Language (TMDL)**, providing an alternative experience to semantic modeling using code, instead of a graphical user interface such as Model view.

To turn on this public preview feature, go to **File > Options and settings > Options > Preview features** and check the box next to **TMDL View**.

Once the preview feature is enabled, the TMDL view tab will appear on the left side of the Power BI Desktop window:



When first opening TMDL view, the code editor will be empty, you can script any semantic model object such as table, measure, column or role by selecting the objects from the **Data pane** (you can find the **Role** in the **Model** view) and dragging them into the code editor.



By default, all model tables and columns aren't restricted. You can set them to **None** or **Read**. When set to **None**, users associated with the role can't access the object. When set to **Read**, users associated with the role can access the object. When you're restricting specific columns, ensure the table isn't set to **None**.

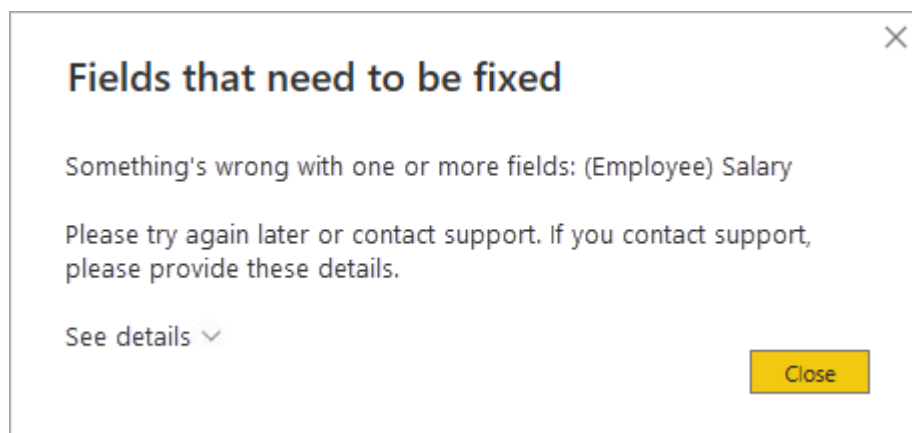
```
createOrReplace
  role 'All Employees (no HR)'
    tablePermission Employee
      columnPermission Salary = none
```

When you're ready, you can select the **Apply** button to execute the TMDL script against the semantic model and have your TMDL code changes applied in a single step.

Once you've added the OLS rules, you can publish the model to the Power BI service. Use the same process for RLS to map accounts and security groups to the roles.

## Considerations

In a Power BI report, when a user doesn't have permission to access a table or column, they'll receive an error message. The message will inform them that the object doesn't exist.

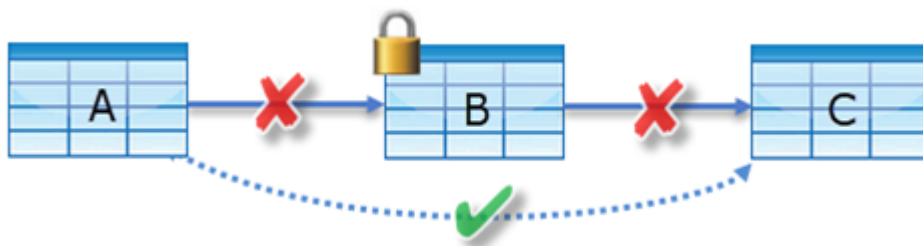


Consider carefully whether OLS is the right solution for your project. When a user opens a Power BI report that queries a restricted object (for them), the error message could be confusing and will result in a negative experience. To them, it looks like the report is broken. A better approach might be to create a separate set of models or reports for the different report consumer requirements.

## Restrictions

There are restrictions to be aware of when implementing OLS.

Row-level security and object-level security cannot be combined from different roles because it could introduce unintended access to secured data. Also, you can't set table-level security if it breaks a relationship chain. For example, if there are relationships between tables A and B, and B and C, you can't secure table B. If table B is secured, a query on table A can't transit the relationships between table A and B, and B and C. In this case, you could set up a separate relationship between tables A and C.



However, model relationships that reference a secured column will work, providing that the column's table isn't secured.

Lastly, while it isn't possible to secure measures, a measure that references secured objects is automatically restricted.

## 4. Configure row-level security with the dynamic method

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/3-dynamic-method>

# Configure row-level security with the dynamic method

Completed

Defining static rules is simple and effective. However, be aware of disadvantages: setting up static rules can involve significant effort to create and set up. It would also require you to update and republish the dataset when new regions or departments are onboarded.

If there are many rules to set up and you anticipate adding new rules in the future, consider creating **dynamic** rules instead, without the need to continue maintaining it dynamically.

Defining dynamic rules is simple and effective when a model table stores username or email address values. They allow you to enforce a data-driven RLS design. For example, when salespeople are added to, or removed from, the **Employees** table (or are assigned to different regions), this design approach just works.

As the admin at Tailwind Traders, you want Power BI row-level security to only show sales to the person who made them. In this example, Russel King has made four sales. When viewing your report, Russel should only see the sales that he's responsible for and no other sales. You can configure row-level security exactly the way you configured it previously, with only a single change. Instead of creating four roles, you only need to create one role. The DAX filter for that role would look similar to the following image.

## Manage security roles

Create new security roles and use filters to define row-level data restrictions.

Roles

+ New

EmployeeEmailAddre...

Select tables

Employee

Product

Region

Reseller

Sales

SalespersonRe...

Targets

Filter data

Switch to default editor

1 [EmailAddress] = USERPRINCIPALNAME()

Filter the data that this role can see by entering a DAX filter expression that returns a True/False value. For example: [Entity ID] = "Value"

Save

Close

Notice that instead of the fixed string, such as **Game** or **Clothing**, this uses a DAX function in the row-level security filter. The `userprincipalname()` function will compare the email address from the Employees table with the email that the user entered when signing in to Power BI service. If Russel King uses the email address `russel@tailwindtraders.com` to sign in to Power BI service, the system will compare that value to the email address in the Employees table. Assuming that a relationship has been created between Employees and Sales, Russel will only see his four sales.

There are three specific DAX functions:

- **USERNAME** or **USERPRINCIPALNAME** – Returns the Power BI authenticated user as a text value.
- **CUSTOMDATA** - Returns the **CustomData** property passed in the connection string. Non-Power BI reporting tools that connect to the dataset by using a connection string can set this property, like Microsoft Excel.

### Note

Be aware that the USERNAME function returns the user in the format of DOMAIN\username when used in Power BI Desktop. However, when used in the Power BI service, it returns the format of the user's User Principal Name (UPN), like username@adventureworks.com. Alternatively, you can use the USERPRINCIPALNAME function, which always returns the user in the user principal name format.

## 5. Use single sign-on (SSO) for DirectQuery sources

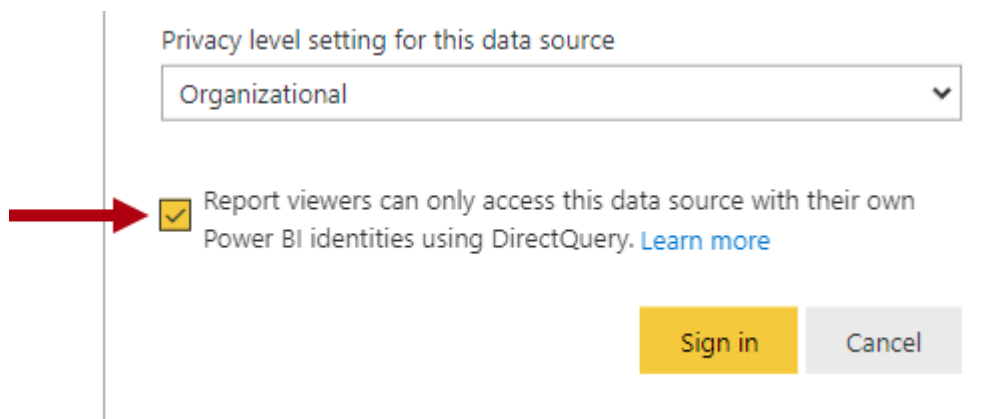
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## Use single sign-on (SSO) for DirectQuery sources

Completed

When your data model has DirectQuery tables and their data source supports SSO, the data source can enforce data permissions. This way, the database enforces RLS, and Power BI datasets and reports honor the data source security.

Consider that Tailspin Traders has an Azure SQL Database for their sales operations that resides in the same tenant as Power BI. The database enforces RLS to control access to rows in various database tables. You can create a DirectQuery model that connects to this database without roles and publish it to the Power BI service. When you set the data source credentials in the Power BI service, you **enable SSO**. When report consumers open Power BI reports, Power BI passes their identity to the data source. The data source then enforces RLS based on the identity of the report consumer.



Privacy level setting for this data source

Organizational

☒ Report viewers can only access this data source with their own Power BI identities using DirectQuery. [Learn more](#)

Sign in Cancel

### Note

Calculated tables and calculated columns that reference a DirectQuery table from a data source with SSO authentication aren't supported in the Power BI service.

## 6. Check your knowledge

## Check your knowledge

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Completed

### 7. Summary

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/5-summary>

## Summary

---

Completed

This module described row-level security (RLS), the ability in Power BI to limit what a user sees on a specific report. RLS targets the data to a specific user, for instance, only allowing a manager to see the salary of their direct reports. RLS is implemented with a combination of Power BI Desktop and Power BI service.

To implement RLS, you can create a DAX formula that restricts their data access, which makes RLS versatile. You can use DAX to indicate that someone can only see records in the United States or sales transactions that are below a certain dollar amount. This programmatic approach means that RLS can be used in a variety of solutions.

After you have created the DAX formula in a specific security role, you can deploy the report and then add users to that role.

When you develop a DirectQuery model for data sources that support SSO, Power BI can leverage the data source RLS. In this case, as a data modeler, you don't need to create model roles.

RLS is an effortlessly implemented, powerful security feature of Power BI.

### Learn more

Row Level Security:

- [Understand star schema and the importance for Power BI](#)
- [Model relationships in Power BI Desktop](#)
- [Row-level security \(RLS\) with Power BI](#)
- [USERNAME](#)

- [USERPRINCIPALNAME](#)
- [CUSTOMDATA](#)

Single sign-on

- [Enable SSO on Azure SQL Database with DirectQuery](#)
- [Azure SQL Database Row-level security](#)

Object Level Security

- [Object-level security](#)

## 8. Exercise - Enforce row-level security in Power BI

<https://learn.microsoft.com/en-us/training/modules/row-level-security-power-bi/lab>

# Exercise - Enforce row-level security in Power BI

---

Completed

In this exercise, you learn how to:

- Enforce row-level security
- Choose between dynamic and static methods

This lab takes approximately **20** minutes to complete.

### Note

A virtual machine containing the client tools you need is provided, along with the exercise instructions. Use the "Launch lab" button to launch the virtual machine.

*A limited number of concurrent sessions are available. If the hosted environment is unavailable, please try again later.*

Alternatively, you can [open the instructions in a separate window](#).

## Access your environment

Before you start this lab (unless you are continuing from a previous lab), select **Launch lab** above.



You are automatically logged in to your lab environment as data-ai\student.

You can now begin your work on this lab.

### Tip

To dock the lab environment so that it fills the window, select the PC icon at the top and then select **Fit Window to Machine**.

