



# Power BI Service

Module 2



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# Learning Units covered in this Module

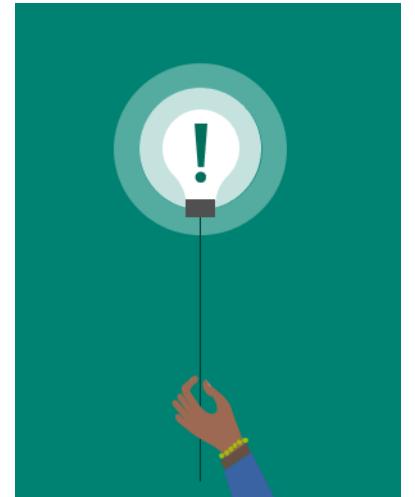
- Lesson 1: Get Data
- Lesson 2: Pinning and Navigation
- Lesson 3: Keeping Data Current
- Lesson 4: Q&A and Quick Insights
- Lesson 5: Sharing
- Lesson 6: Connect from Excel
- Lesson 7: Mobile Reports
- Lesson 8: Administration, Licensing and Governance

# Lesson 1: Get Data

# Objectives

After completing this learning unit, you will be able to:

- Describe the various data sources types Power BI Service connects



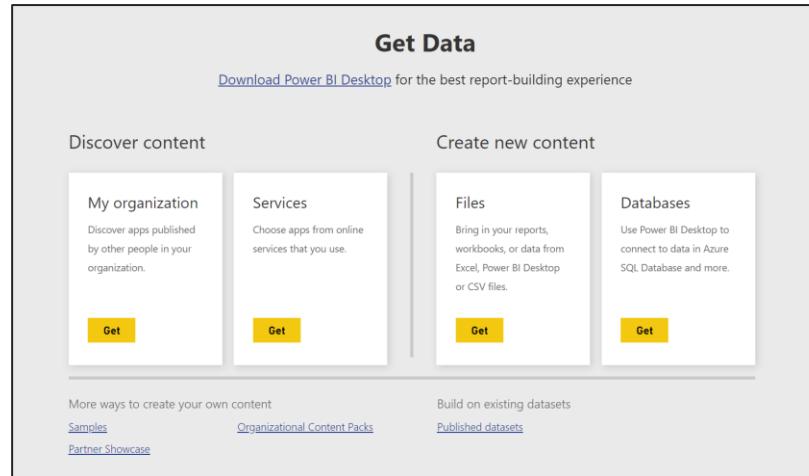
# Get Data

## Connect Data

- You can start by **connecting to data directly in the service**, without going into Desktop or Microsoft Excel first



- Data can come from:
  - Your Organization
  - Services
  - Files
  - Databases

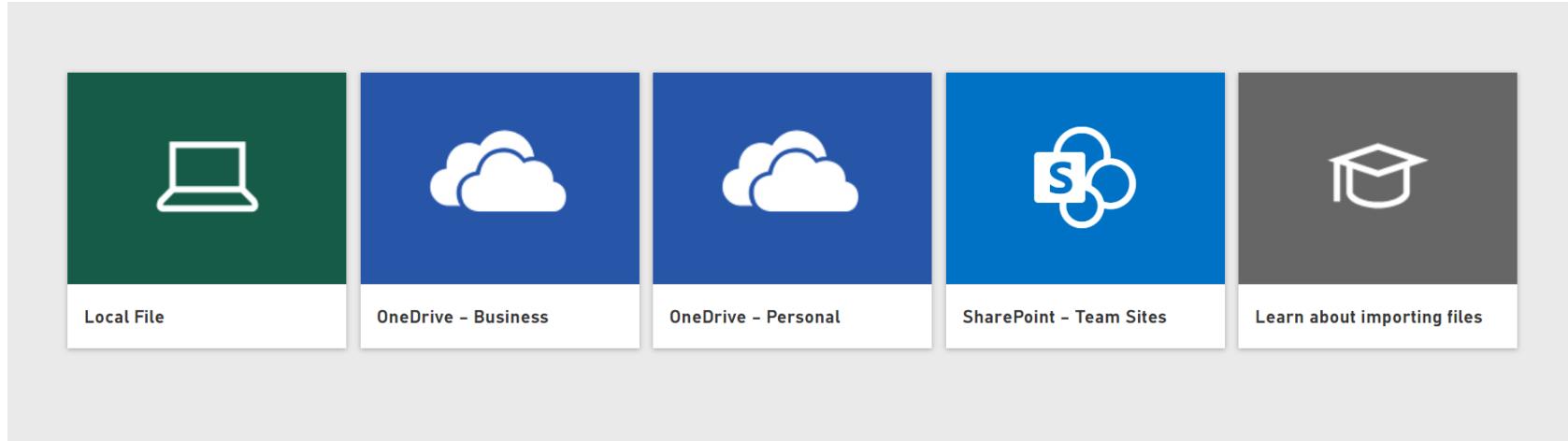


- After connecting, a **dataset** and associated **reports** and **dashboards** are available
- The **data sources available in the PBI Desktop are not the same** that are available directly from the service, but **a .pbix file is a valid source**

# Get Data

## Import or Connect to Data - Files

When you select the **Files** option, the data can come from **on-premises or cloud sources**

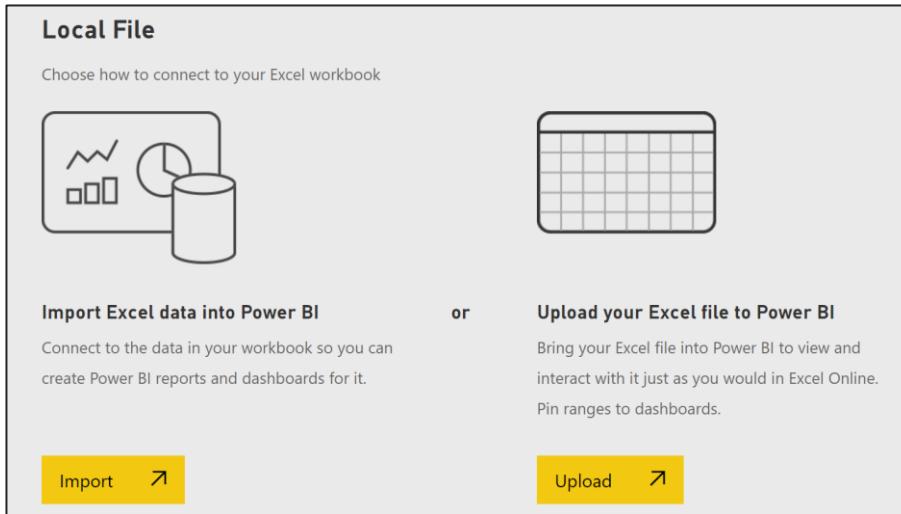


- **Excel (.xlsx, xlsm)** – import the file or the Data Model
- **Power BI Desktop** – the model and the visualizations are imported into the service
- **.csv file** – data should be comma separated and must have a header  
*Replacements must have the same name*

# Get Data

## Import or Connect to Data - Files

When you connect to **Excel**, there are two options:



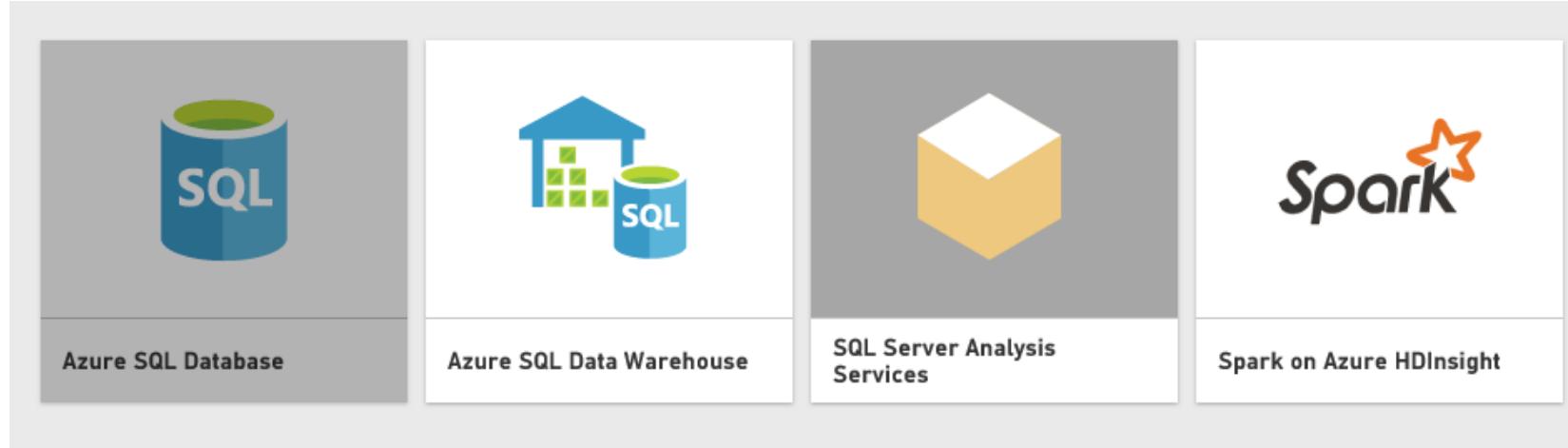
The **first**,  
expects a **Data Model**  
in the file.

→ The **second**,  
will allow you to see the **Excel file** inside of **Power BI**  
and even edit it and use parts of it for dashboards  
(*OD4B or SharePoint, only*)

Updates will reflect automatically in Power BI (~1h) (*for Excel and Desktop*)

# Get Data

Import or Connect to Data - Databases

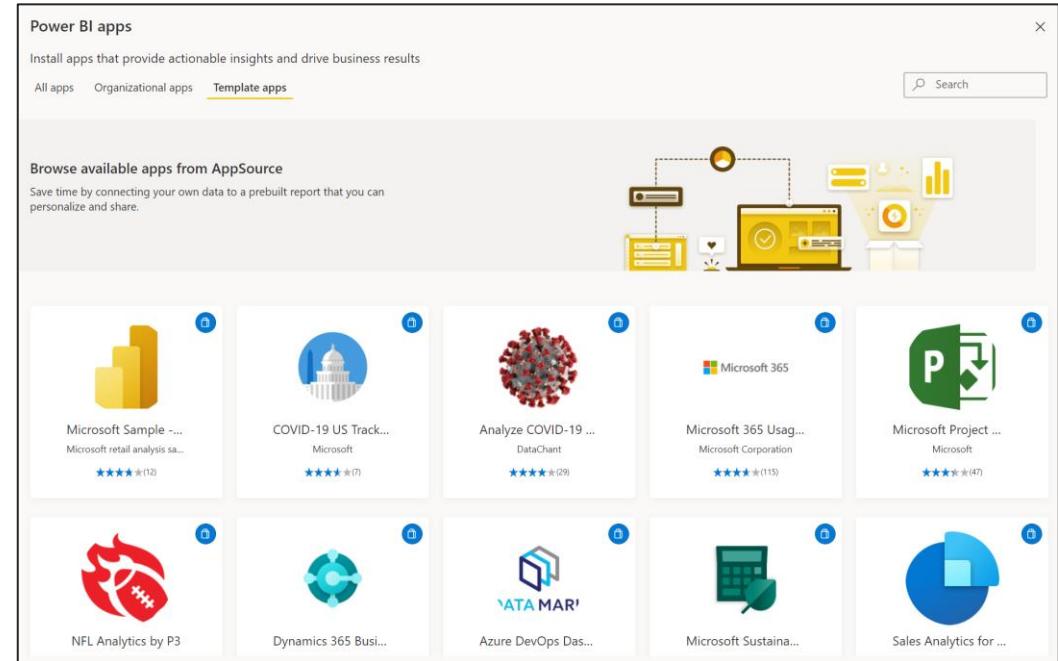


- Should start development from Power BI Desktop and then publish to Power BI Service
- SQL Server Analysis Services option can connect to published dataset and build reports directly in Power BI Service.

# Get Data

## Services (Template Apps)

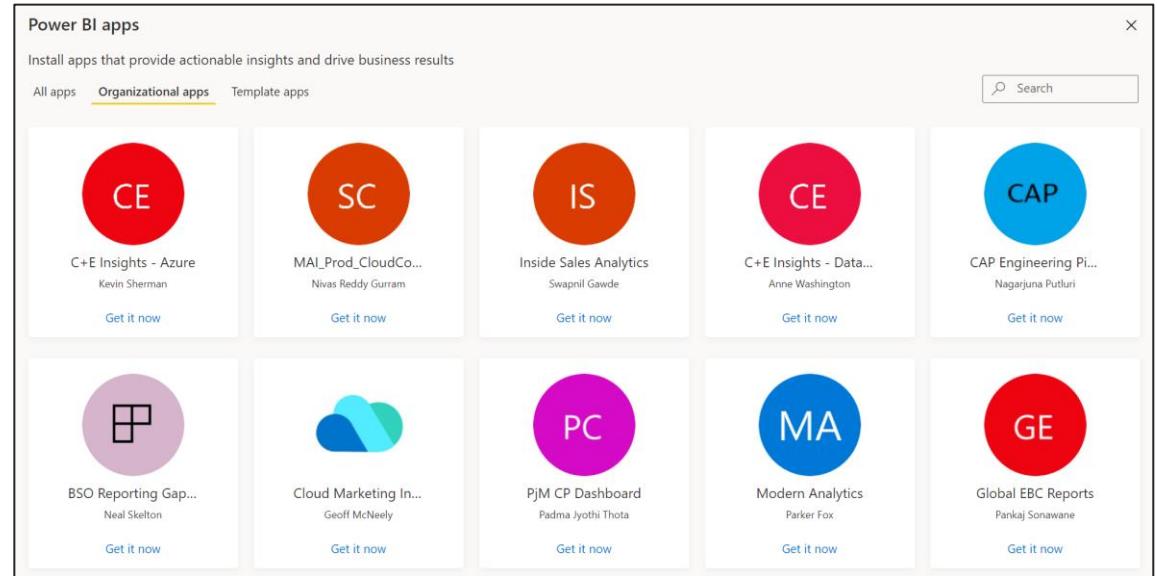
- Template apps are collections of **dashboards**, **reports**, and **datasets** that connect to **third-party services** such as **Salesforce**, **Microsoft Dynamics**, and **Google Analytics**.
- After installing the **app**, it creates a Power BI workspace with a **dashboard** and a set of Power BI **reports** that **automatically show your data** and provide visual insights about your business.
- In the workspace, you can modify the **dashboard** and **reports** to meet the needs of your organization, and then **distribute them to your colleagues** as an **app**.



# Get Data

## My Organization (Organizational Apps)

- Organizational apps are collections of **dashboards**, **reports**, and **datasets** that connect to **organizational data**.
- Those dashboards, reports and datasets are created in the **workspaces** by **collaborating with colleagues**.
- If you want to **distribute** official content to a large audience in your organization, you can **publish an app** from your workspace.



# Dataflows

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Bring **self-service data preparation** capabilities to the service, through a **Power Query** experience, online.

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**Centralizes ETL processes** and eliminates the need to duplicate logic in Power BI Desktop datasets

---

Builds a **common repository with entities** that can be reused for additional transformations or for report creation through the Desktop or accessed via **Direct Query**

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A dataflow is a first-class object that is **stored within a workspace**

---

**Support for CDM** entities, mapping any data to pre-defined data structures

---

PBI Dataflows get benefit of intelligence of **Cognitive Services**

With **Promotion** and **Certification** data flows encourage the use of standardized dataflows and increases the visibility of valuable, high-quality dataflows.

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**Automated machine learning (AutoML) for dataflows** enables business analysts to train, validate, and invoke Machine Learning (ML) models directly in Power BI.

**Questions?**



# Knowledge Check

Which file sources can be imported to Power BI Service?

What are template apps?

What are organizational apps?

# Lesson 2: Pinning and Navigation

# Objectives

After completing this learning, you will be able to:

- Explored Power BI Interface components
- Demonstrate how visualizations can be pinned to dashboard
- Demonstrate how to edit and use reports
- Demonstrate features of dashboards
- Explore how to track usage metrics of reports and dashboards



# Pinning and Navigation

## Power BI Interface

The screenshot shows the Microsoft Power BI interface. The top navigation bar includes the Microsoft logo, 'Power BI', 'My workspace', a search bar, and various icons for notifications, settings, and help. On the left, a sidebar lists navigation options: Home, Favorites, Recent, Create, Apps, Shared with me, Deployment pipelines, Learn, Workspaces, and My workspace (which is currently selected). The main content area is titled 'Get Data' and features a call to action: 'Download Power BI Desktop for the best report-building experience'. Below this, there are two sections: 'Discover content' and 'Create new content'. The 'Discover content' section contains four cards: 'My organization' (Discover apps published by other people in your organization), 'Services' (Choose apps from online services that you use), 'Files' (Bring in your reports, workbooks, or data from Excel, Power BI Desktop or CSV files), and 'Databases' (Use Power BI Desktop to connect to data in Azure SQL Database and more). Each card has a yellow 'Get' button. At the bottom, there are links for 'Samples', 'Organizational Content Packs', 'Partner Showcase', 'Published datasets', and a 'Get data' button in the bottom-left corner.

Microsoft | Power BI My workspace

Search

Home

Favorites >

Recent >

Create

Apps

Shared with me

Deployment pipelines

Learn

Workspaces >

My workspace

Get Data

Download Power BI Desktop for the best report-building experience

Discover content

My organization

Discover apps published by other people in your organization.

Get

Services

Choose apps from online services that you use.

Get

Files

Bring in your reports, workbooks, or data from Excel, Power BI Desktop or CSV files.

Get

Databases

Use Power BI Desktop to connect to data in Azure SQL Database and more.

Get

More ways to create your own content

Samples

Organizational Content Packs

Partner Showcase

Build on existing datasets

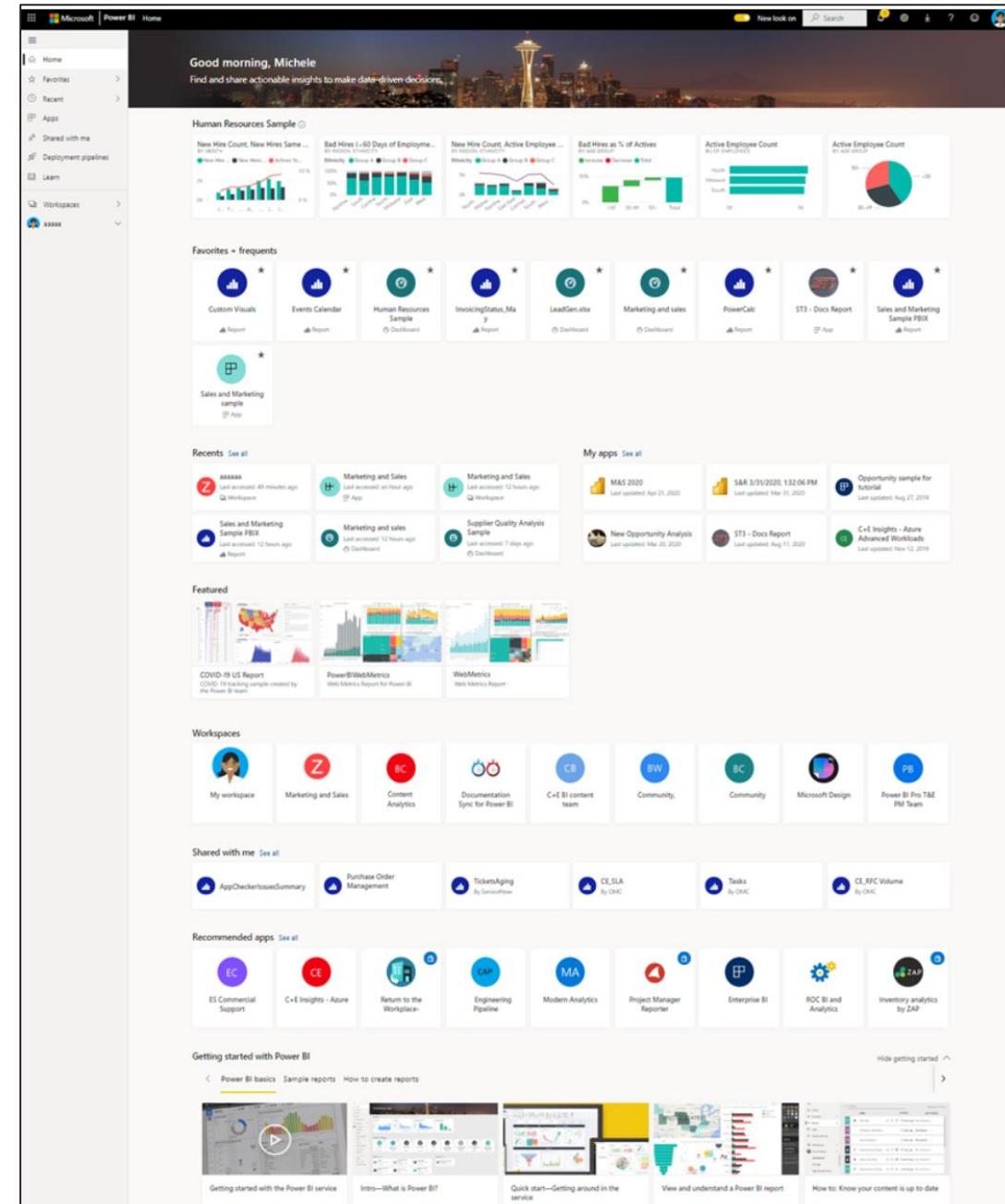
Published datasets

Get data

# Pinning and Navigation

## Power BI Home

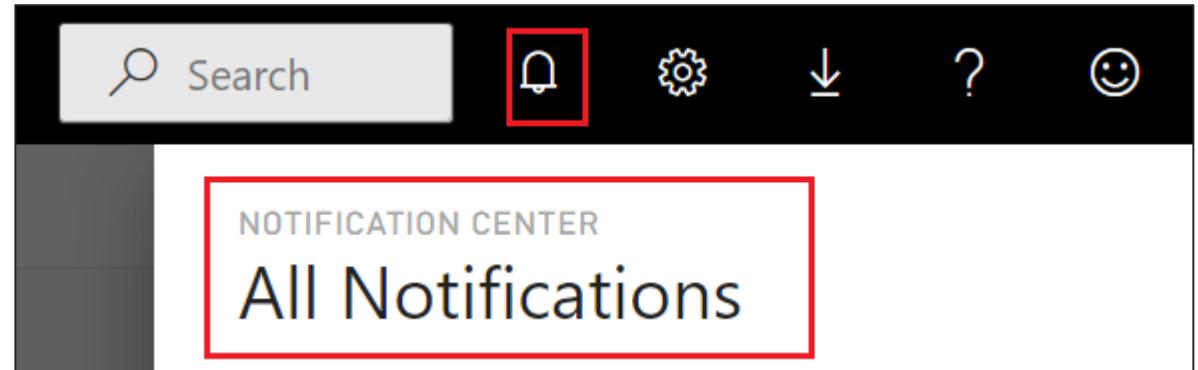
- **Favorite, recent, frequent** and **featured** content
- Most **recent workspaces** and **app**
- **Learning resources** for your journey
- **Global search** for all content
- **Featured content** on Power BI Home:  
Administrators or designated promoters have a **dedicated section** on Home to promote reports, dashboards, and apps and set the **default recommended content for their end users**



# Pinning and Navigation

## Power BI Notification Center

- **Important information** related to your Power BI experience in one place
- Notification **on all platforms** – web (Power BI Service) and mobile app
- Includes **data driven alerts**



# Pinning and Navigation

## Power BI App Workspace

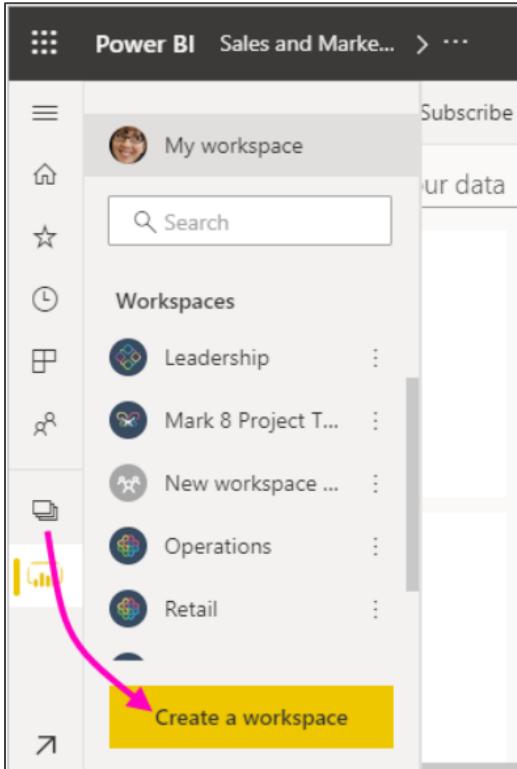
### Container for hosting Power BI contents

(Dashboard, Report, Workbook, Dataset and Dataflow)

**My Workspace:** Default Workspace tied to a user account. Can share dashboards and reports from My Workspace but is not recommended.

**App Workspace:** Shared environment to collaborate with colleagues on Power BI content, including creation of Power BI Apps.

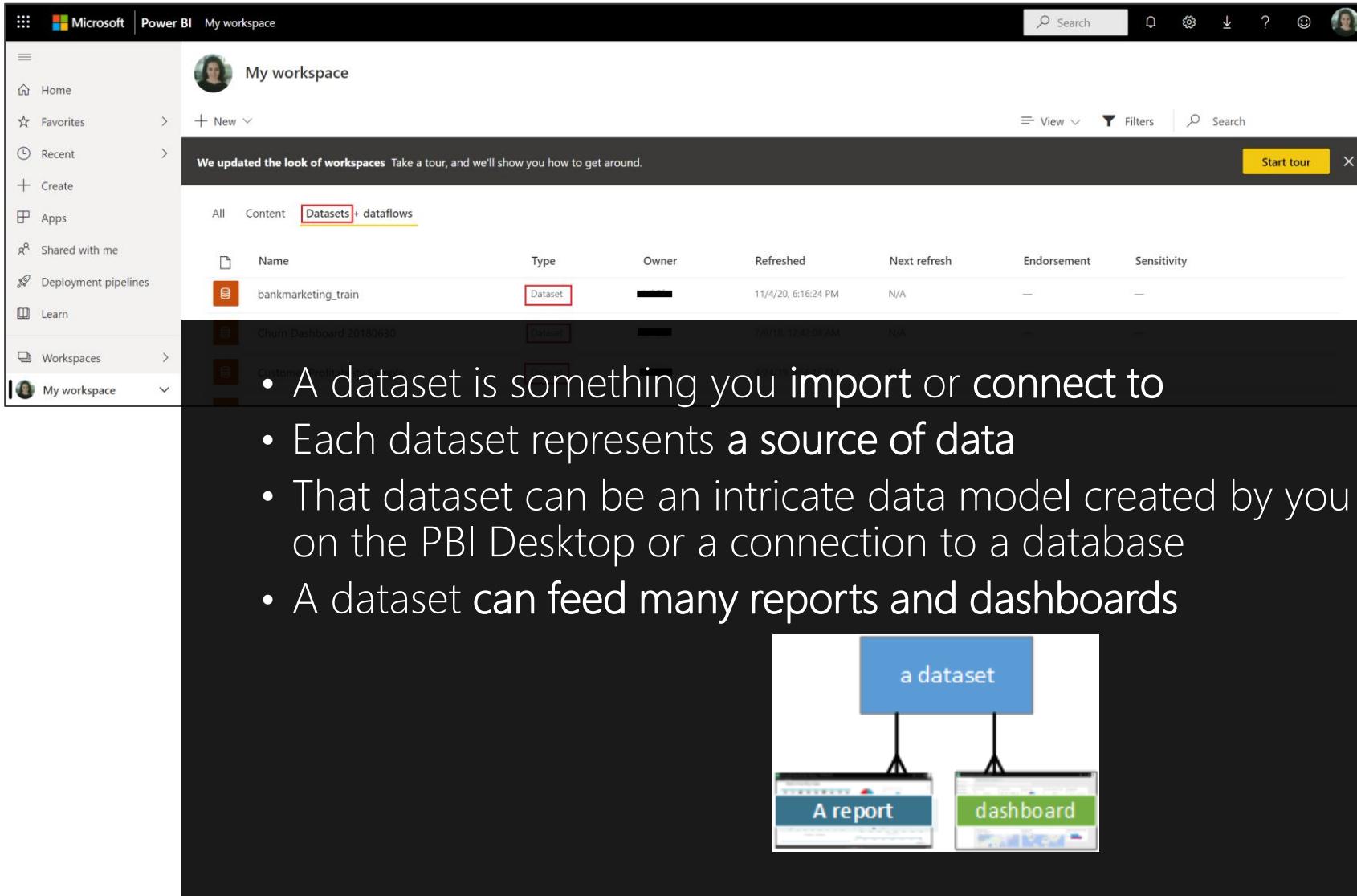
\*Power BI app workspaces covered in detail in *Lesson 5 - Sharing*.



All	Content	Datasets + dataflows	Type	Owner	Refreshed	Next refresh	Endorsement	Sensitivity
	Name ↑							
	Churn Dashboard 20180630		Report	██████	7/9/18, 12:42:08 AM	—	—	—
	Customer Profitability Sample		Dashboard	██████	—	—	—	—
	Customer Profitability Sample		Report	██████	4/24/19, 3:56:15 PM	—	—	—
	Customer Profitability Sample		Workbook	██████	4/24/19, 3:56:15 PM	—	—	—
	DIAD-ReportFinal		Report	██████	7/23/15, 1:36:47 AM	—	—	—

# Pinning and Navigation

## Dataset



The screenshot shows the Microsoft Power BI workspace interface. On the left is a navigation sidebar with options like Home, Favorites, Recent, Create, Apps, Shared with me, Deployment pipelines, Learn, Workspaces, and My workspace. The main area is titled "My workspace" and shows a "We updated the look of workspaces" message with a "Start tour" button. Below this is a search bar and filter controls. A table lists datasets, with "bankmarketing\_train" selected. The table columns are Name, Type, Owner, Refreshed, Next refresh, Endorsement, and Sensitivity. The "Datasets" tab is highlighted. In the bottom right corner of the slide, there is a callout diagram illustrating the relationship between a dataset and reports/dashboards.

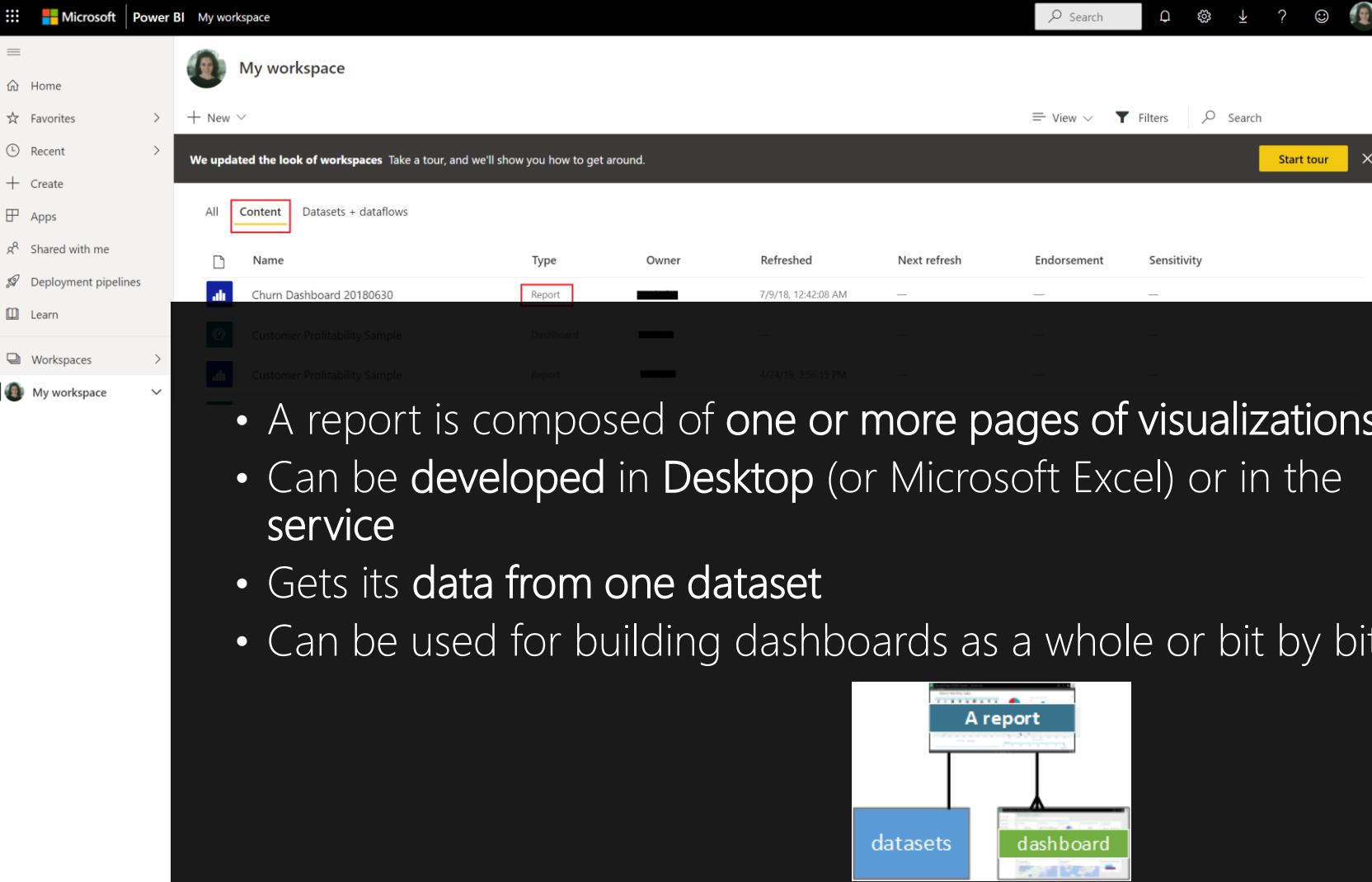
- A dataset is something you import or connect to
- Each dataset represents a source of data
- That dataset can be an intricate data model created by you on the PBI Desktop or a connection to a database
- A dataset can feed many reports and dashboards



The diagram consists of three main components: a blue rectangular box labeled "a dataset" at the top, and two smaller rectangular boxes below it labeled "A report" and "dashboard". Two lines with arrowheads connect the "dataset" box to both the "report" and "dashboard" boxes, indicating a relationship where the dataset feeds into both.

# Pinning and Navigation

## Report



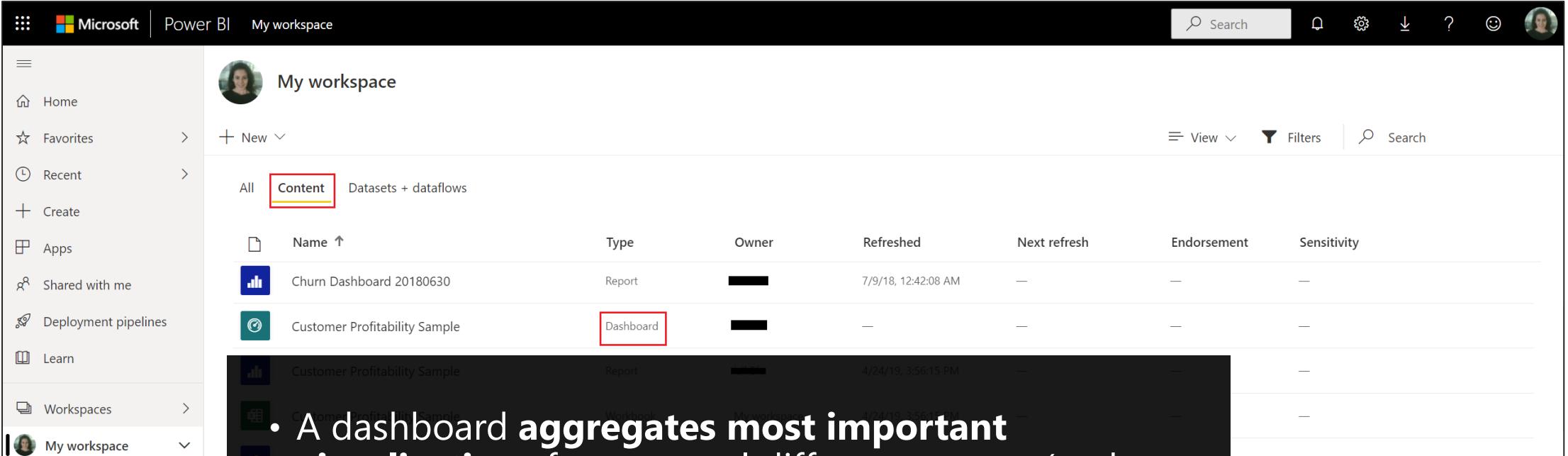
The screenshot shows the Microsoft Power BI workspace interface. On the left is a navigation sidebar with options like Home, Favorites, Recent, Create, Apps, Shared with me, Deployment pipelines, Learn, Workspaces, and My workspace. The main area is titled "My workspace" and shows a "Content" view with a table of datasets and dataflows. A yellow box highlights the "Content" tab and the "Report" column header. A tooltip box contains the following text:

- A report is composed of **one or more pages of visualizations**
- Can be **developed in Desktop** (or Microsoft Excel) or in the **service**
- Gets its **data from one dataset**
- Can be used for building dashboards as a whole or bit by bit

Below the table, there is a diagram illustrating the components of a report. It shows a central "A report" card connected by lines to two boxes at the bottom: a blue box labeled "datasets" and a green box labeled "dashboard".

# Pinning and Navigation

## Dashboard



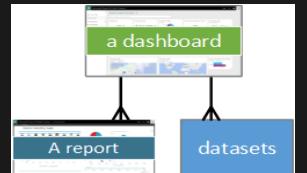
The screenshot shows the Microsoft Power BI workspace interface. On the left is a navigation sidebar with options like Home, Favorites, Recent, Create, Apps, Shared with me, Deployment pipelines, Learn, Workspaces, and My workspace. The 'My workspace' section is currently selected. The main area is titled 'My workspace' and shows a list of content items under the 'Content' tab. The list includes:

Name	Type	Owner	Refreshed	Next refresh	Endorsement	Sensitivity
Churn Dashboard 20180630	Report	[redacted]	7/9/18, 12:42:08 AM	—	—	—
Customer Profitability Sample	Dashboard	[redacted]	—	—	—	—
Customer Profitability Sample	Report	[redacted]	4/24/19, 3:56:15 PM	—	—	—
Customer Profitability Sample	Workbook	[redacted]	4/24/19, 3:56:15 PM	—	—	—

A callout box highlights the 'Content' tab and the 'Dashboard' entry for the 'Customer Profitability Sample' item.

**• A dashboard **aggregates most important visualizations** from several different reports (and datasets)**

- It is composed of **tiles** and **widgets**
- Tiles **can be updated in real-time**
- Each tile can **navigate back** to its **underlying report** or to a **custom URL**



# Pinning and Navigation

## Report - Pinning

**Individual visualizations** can be pinned to dashboards as **tiles**

The screenshot shows a Power BI interface. On the left, there is a bar chart titled "Count of Customer Id BY EDUCATION" with the following data:

Education Level	Count
Partial High School	285
Graduate Degree	322
High School	582
Partial College	717
Bachelors	██████████ (redacted)

A red box highlights the pinning icon (a square with a diagonal line) in the top right corner of the visualization area. A tooltip window is displayed over the visualization, showing the same chart title and data.

To the right of the visualization, a modal dialog box titled "Pin to dashboard" is open. It contains the following text and options:

Select an existing dashboard or create a new one.

Where would you like to pin to?

Existing dashboard

New dashboard

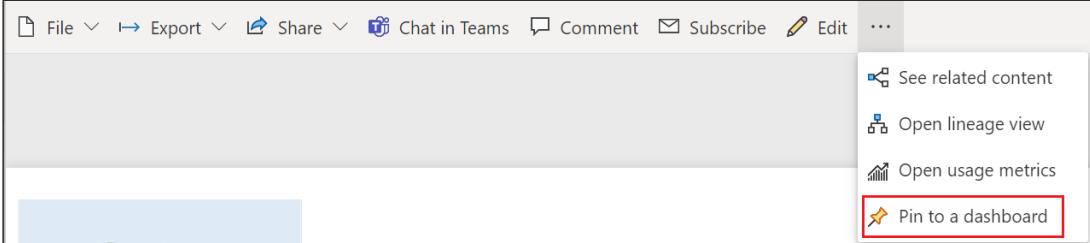
Adventure Works Customer Analytics

Pin Cancel

# Pinning and Navigation

## Report - Pinning

- **An entire page** can be pinned to a dashboard

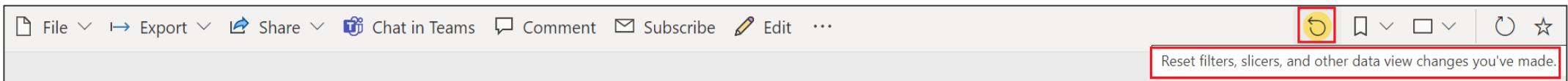


- They become **live tiles** and can be interacted with straight from the dashboard with the same interactivity as in Reading View
- When a change happens in this report, the **changes are synchronized to the dashboard**
- **This does not happen with individual visualizations**

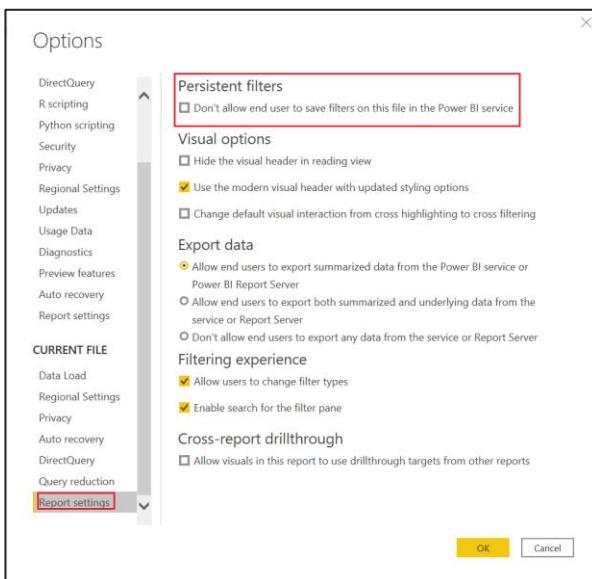
# Pinning and Navigation

## Report – Persistent Filters

- Power BI reports will now automatically retain the **filters**, **slicers**, and **other data view changes** per **user**
- To see the original selection, click “**Reset to default**”



- **Could be disabled optionally** from PBI desktop by report creators:



# Pinning and Navigation

## Report – Personal & Authored Bookmarks

- Report consumers can **create their own set of bookmarks for each report by capturing various states** of a report page (including filters, slicers, and state of visuals)
- Can **give user friendly names** and **return to each state** with just one click!
- Make any bookmark that you create the **default view**, so you can land on your favorite view of the report every time you open it.
- **Authored bookmarks** (created by report owner) will also be visible to and can be accessed by report consumers

The screenshot shows a Power BI report interface. At the top, there's a ribbon bar with various icons: Pages, File, Export, Share, Chat in Teams, Comment, Subscribe, Edit, and three dots. To the right of the ribbon, there are several pinned items: a yellow circle icon, a red square icon with a white outline, a white square icon with a black outline, a refresh icon, and a star icon. Below the ribbon, the report title 'US Sales Analysis' is displayed, featuring the Tailspin Toys logo. On the left side, there's a sidebar with 'Pages' listed: 'US Sales' and 'US Sales Scenario'. The main content area shows a visualization with the 'Tailspin Toys' logo. In the top right corner of the main area, there's a small yellow circular icon with a blue outline. A context menu is open from this icon, with a red box highlighting the 'Personal bookmarks' option. The menu includes: 'Personal bookmarks' (highlighted), 'Capture this report's current state', 'Add a personal bookmark', and 'Show more bookmarks'. On the far right edge of the screen, there's a vertical scroll bar labeled 'Filters'.

# Pinning and Navigation

## Report - URL Parameters

Every report has a **universal URL link** that is unique to it

It is possible to pass on parameters on that URL to automatically filter the report when it is rendered

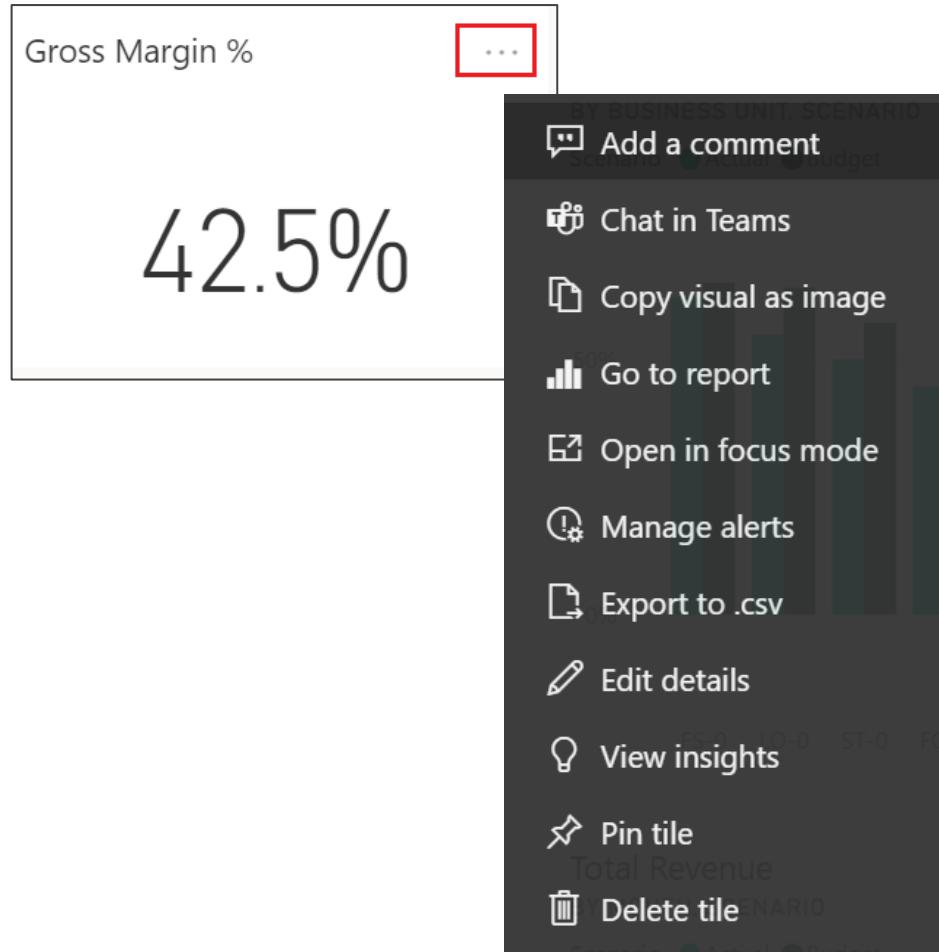
There is a specific format that needs to be followed

```
<reportURL>?filter=<Table>/<Field1> eq 'value' and <Table>/<Field2> eq 'value2'
```

```
<report URL>?filter=Store/Territory eq 'NC' and Sales/Month eq 'May'
```

# Pinning and Navigation

## Dashboard - Tiles



### Tile details

\* Required

Details

Display title and subtitle

Title \*

Subtitle

Functionality

Display last refresh time

Set custom link

URL \*

Open custom link in the same tab?

Yes

No

[Restore default](#)

**Apply** **Cancel**

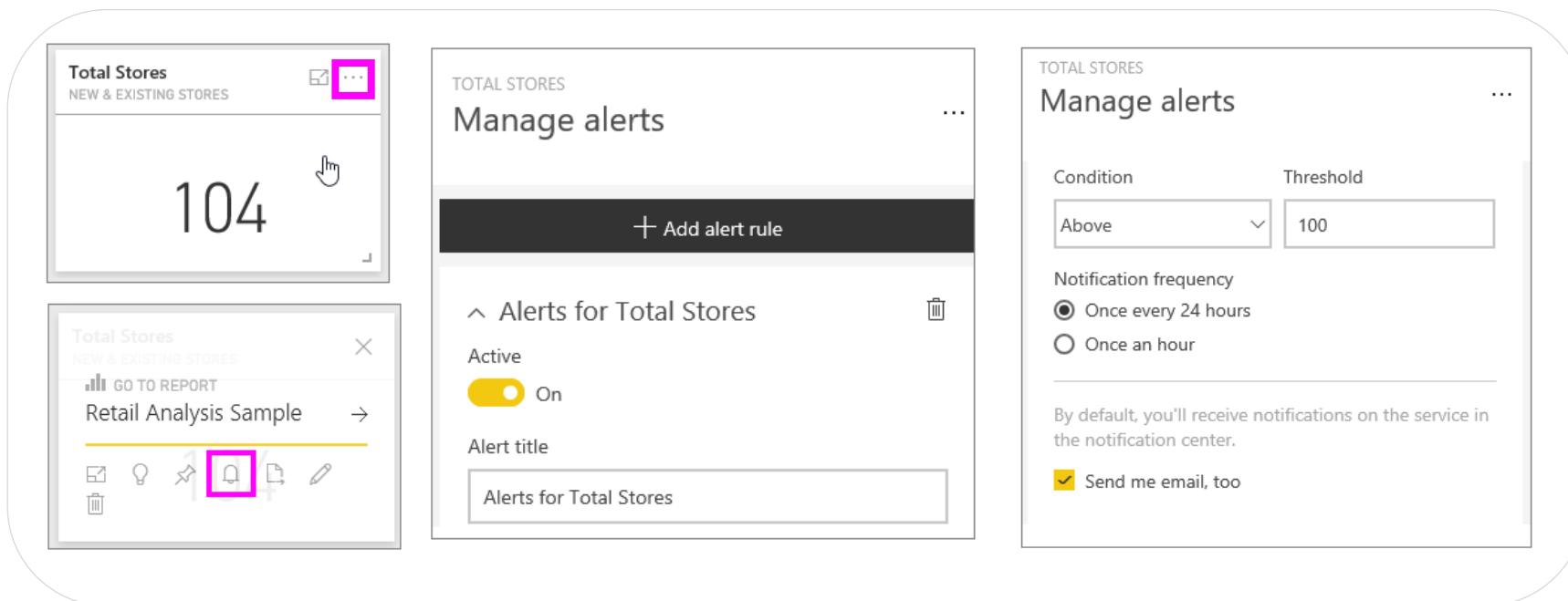
# Pinning and Navigation

## Dashboard – Data driven alerts

**Get notifications** when a metric on your dashboard exceeds a set threshold

**Alerts** work for numeric tiles **featuring cards and gauges**

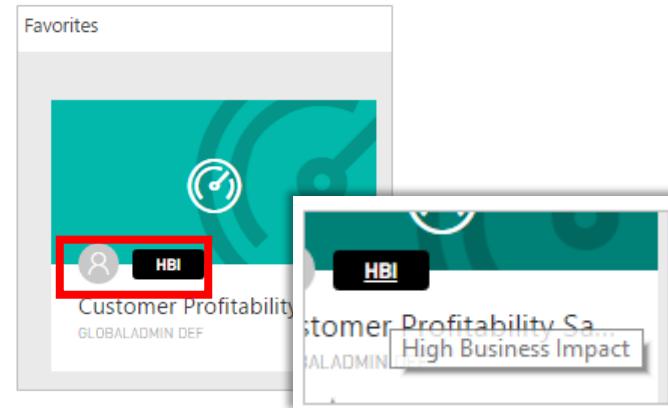
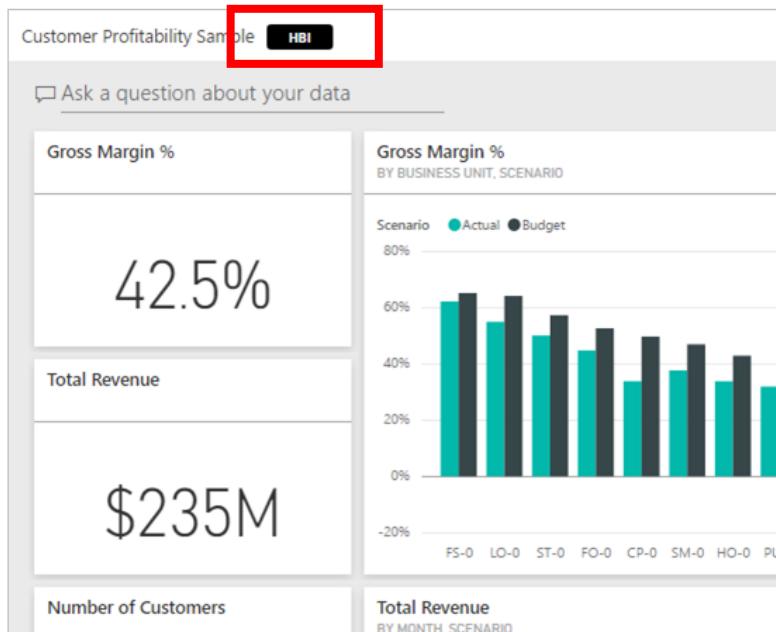
**Fully synchronized** across platforms – set and view alerts in mobile app and Power BI Service.



# Pinning and Navigation

## Dashboard – Data Classification

Raise **awareness** of those viewing your dashboards about **the level of security** that should be used

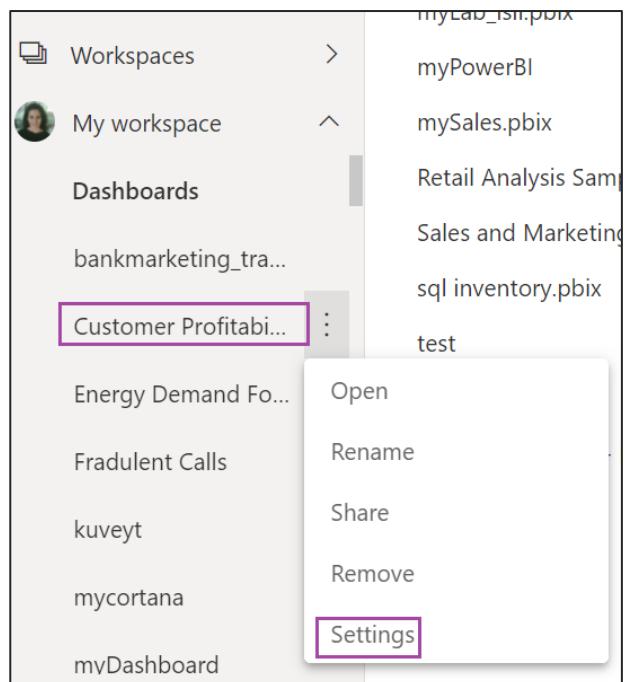


- **Tag your dashboards** with classifications defined by your company's IT
- Tags show up **next to the dashboard name**
- Hover over tag to view **full name of classification**

# Pinning and Navigation

## Dashboard – Data Classification

All dashboards start out with a **default classification type**



Settings for Customer Profitability Sample

Q&A

Q&A allows users to find data and create charts using natural language from datasets used on a dashboard. [Learn more](#)

Show the Q&A search box on this dashboard

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Dashboard tile flow

Tile flow automatically aligns your content to the canvas

Turn on tile flow

---

Data classification

Medium Business Impact

Apply Discard

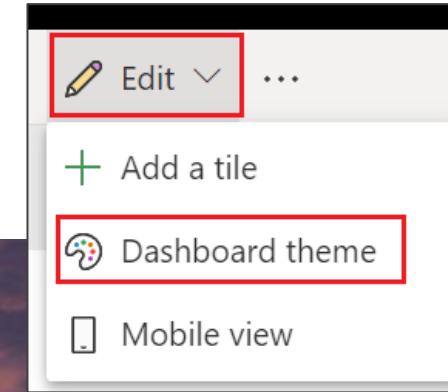
A screenshot of the 'Customer Profitability Sample' settings page. It shows various configuration options like Q&A and tile flow. The 'Data classification' section is highlighted with a red box. Inside this box, a dropdown menu is set to 'Medium Business Impact'. At the bottom of the box are 'Apply' and 'Discard' buttons.

Dashboard owner can **change the classification**

# Pinning and Navigation

## Dashboard Theme

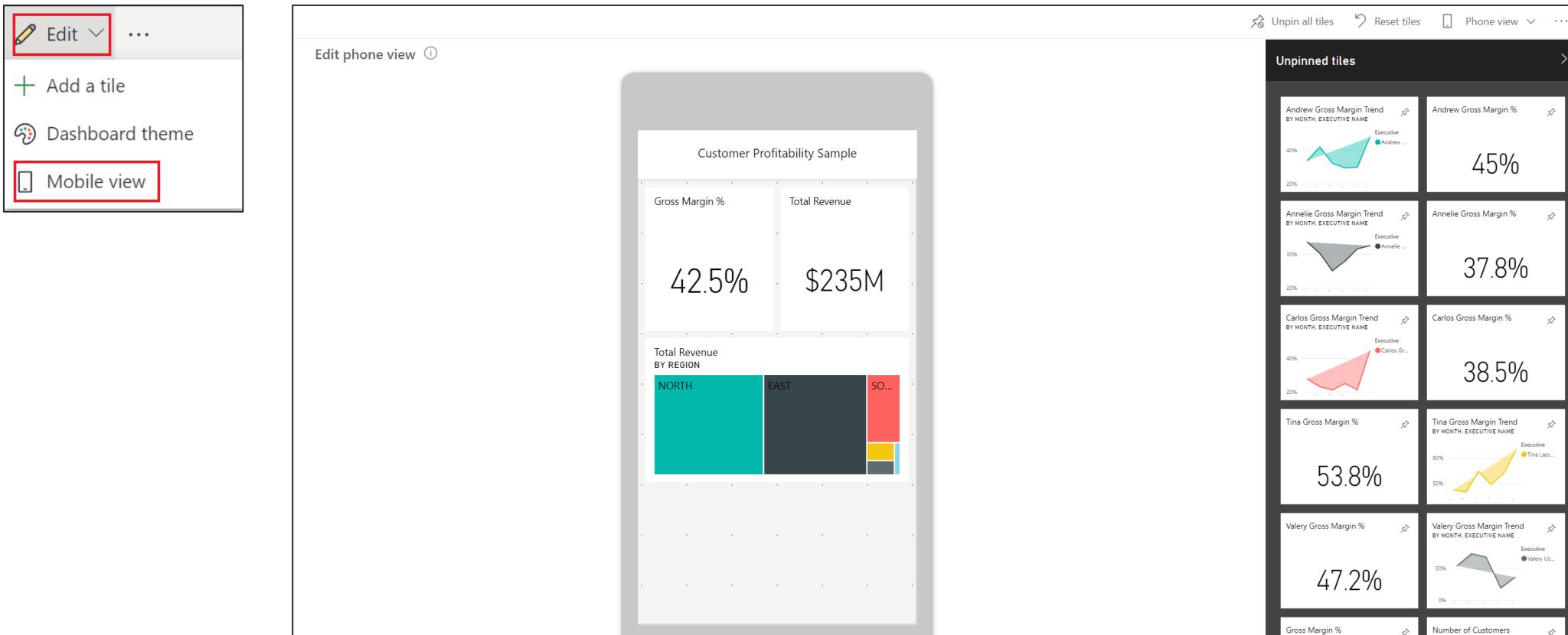
- Apply themes on dashboards



# Pinning and Navigation

## Dashboard – Phone View

- Create a **customized view** of any dashboard that you own specifically for phones
- **Drag, resize, pin/unpin tiles** to the phone view



# Pinning and Navigation

## Dashboard & Report - Usage Metrics

- Quickly understand how your **reports and dashboards** are being used

The screenshot shows a Microsoft Power BI interface. At the top, there's a navigation bar with File, Share, Chat in Teams, Comment, Subscribe, Edit, and a three-dot menu. Below the navigation bar, there's a search bar with the placeholder "Ask a question about your data". On the left, there's a card titled "Gross Margin % BY BUSINESS UNIT, SCENARIO" with a scenario filter for Actual and Budget. On the right, a context menu is open over a report view, with the option "Open usage metrics" highlighted by a red box. The main area displays a "PBI usage report" with various metrics and charts. One chart shows "Report views" over time, and another shows "Report viewers". A sidebar on the left provides report usage and performance details. The bottom right corner shows a list of users and their report views.

User	Report views
sepmeyr@microsoft.com	38
kwave@microsoft.com	34
isquem@microsoft.com	24
jocaplan@microsoft.com	19
randy@microsoft.com	14
taivern@microsoft.com	12
v-verac@microsoft.com	11

# Pinning and Navigation

## Dashboard & Report - Usage Metrics

- Out-of-the box report with usage for the last 90 days
- **Understand if content is being accessed via web or phone** – good to indicate if a phone layout is needed
- Breakdown of report views by users – **helps identify the top users.**
- Identify which dashboards and reports are **important** and which should be **phased out**
- You can create a **copy of the report** and access the dataset!
- Available on both **reports and dashboards**

# Pinning and Navigation

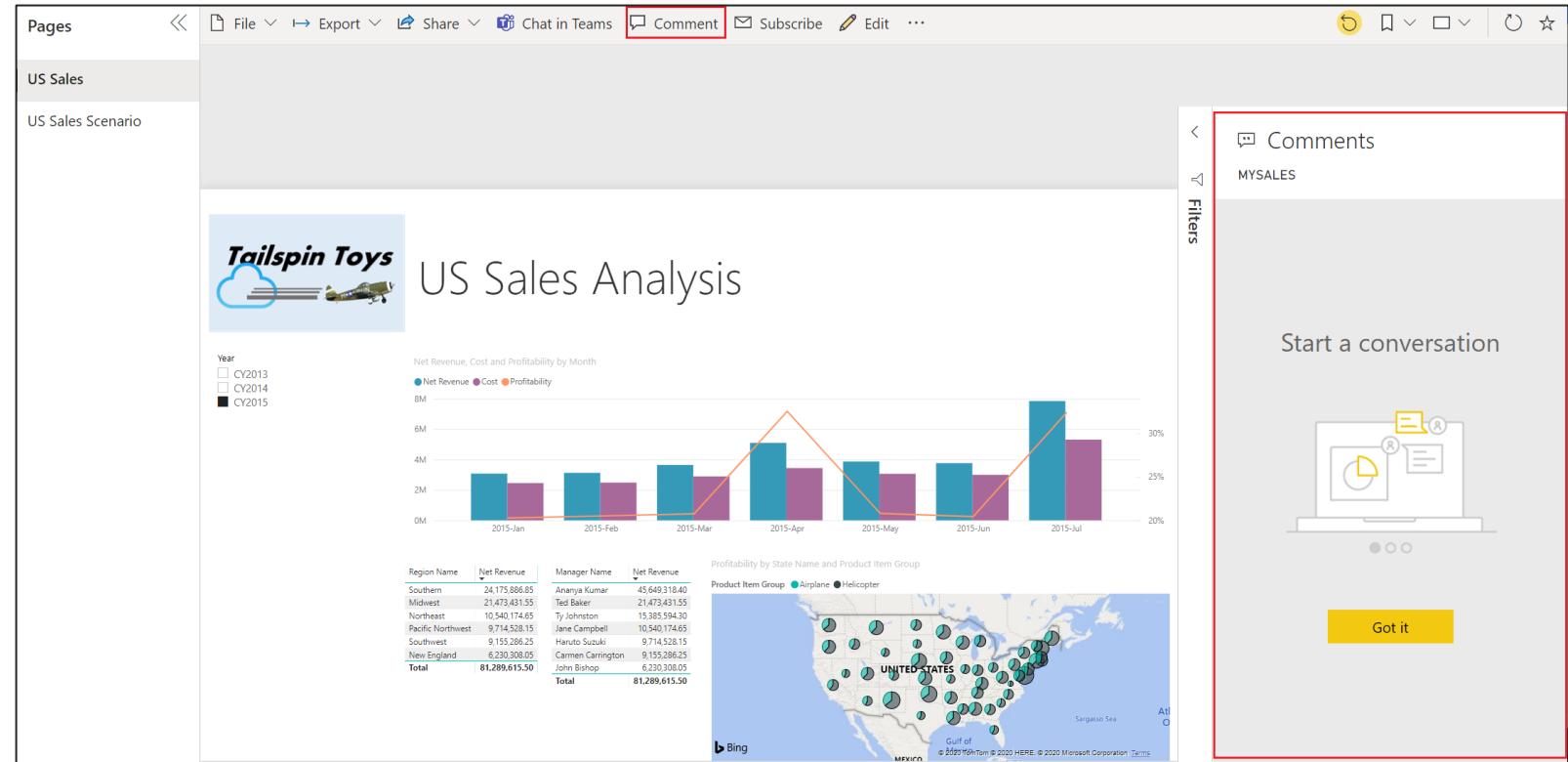
## Dashboard & Report – Comments

Directly **add comments** to dashboards and reports and specific visuals to **discuss your data**

Pull people into your conversation by **@mentioning** others within your organization

Commenting is **tightly integrated with mobile**

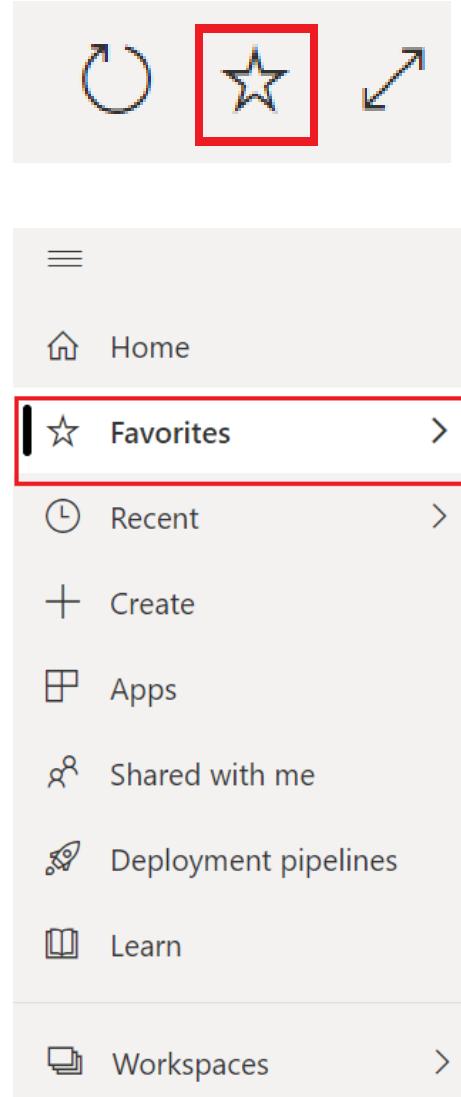
Available on both **dashboards and reports**



# Pinning and Navigation

## Dashboard & Report - Favorites

- Add a dashboard or report to favorites from the **upper right corner**
- The most **relevant dashboards and reports** can be defined as favorites
- They will appear in a **dedicated area**
- Work across groups
- **Fully synchronized across platforms** – can set or view from mobile app and Power BI Service
- Available on both **dashboards and reports**



# Pinning and Navigation

## Dashboard & Report - View Related

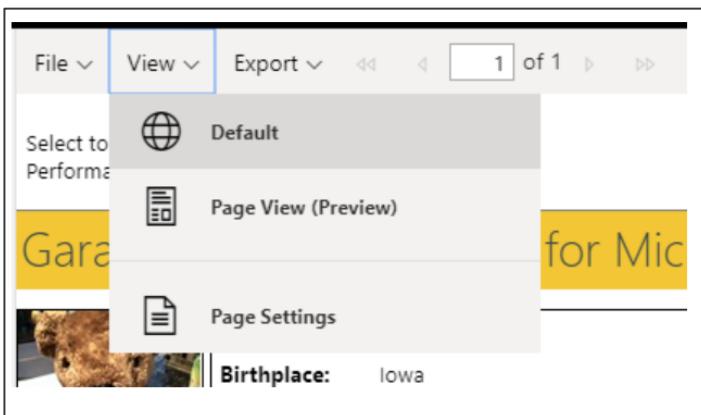
Quickly understand what are **the related objects** to either your **dataset, report or dashboard**.

The screenshot shows the Power BI desktop interface. At the top, there's a ribbon with File, Share, Chat in Teams, Comment, Subscribe, Edit, and a three-dot menu. Below the ribbon, there's a search bar with the placeholder "Ask a question about your data". On the left, there's a card titled "Gross Margin % BY BUSINESS UNIT, SCENARIO" showing a value of "12.50%". On the right, there's a "See related content" dropdown menu with options: "See related content" (highlighted with a red box), "Open lineage view", "Open usage metrics", and "Set as featured". To the right of the dropdown is a "Related content" panel. This panel includes a "Customer Profitability Sample" dataset under "My workspace", a "Customer Profitability Sample" report under "REPORTS", and another "Customer Profitability Sample" dataset under "DATASETS". The "Last refresh: 4/24/2019, 3:56:15 PM" message is also visible.

# Pinning and Navigation

Paginated reports (Power BI Premium)

- Bring **SSRS paginated reports to Power BI Premium**
- Create reports using Power BI **Report Builder** and publish to Power BI Service
- Supported **only on Power BI Premium** workspaces



A screenshot of the Power BI service interface. The top navigation bar shows 'My Workspace' and 'WWI - Account Statement v2'. The main area displays a paginated report titled 'Buying Group Account Statement' for 'Tailspin Toys'. It shows an invoice range from May 01, 2016, to May 31, 2016, and a buying group of 201 customers. The report includes a logo for 'Wide World Importers' and an invoice number '73507-70431'. The invoice details section shows an invoice date of May 31, 2016, and a delivery time of 'Received By'. The invoice table lists items such as 'DBA joke mug - you might be a DBA if (White)', 'Ogre battery-powered slippers (Green) XL', 'Packing knife with metal insert blade (Yellow) 18mm', and "'The Gu' red shirt XML tag t-shirt (White) 3XS'. The total for the invoice is \$1,434.05.

# Demonstration

## Pinning and Navigation

Explore dashboards, reports, workspace, pinning and navigation on all



**Questions?**



# Knowledge Check

What can be captured with Bookmarks in Reports?

Why do you use Comment tab in Dashboards?

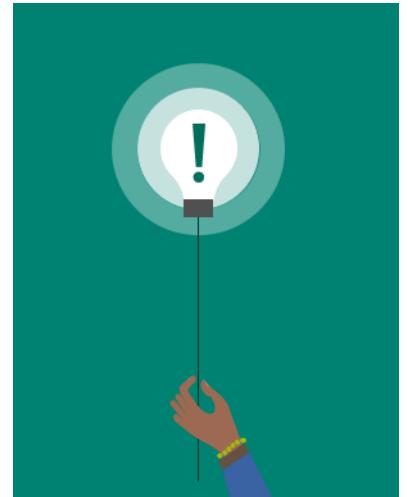
Why is Usage Metrics in Dashboards useful?

# Lesson 3: Keeping Data Current

# Objectives

After completing this learning, you will be able to:

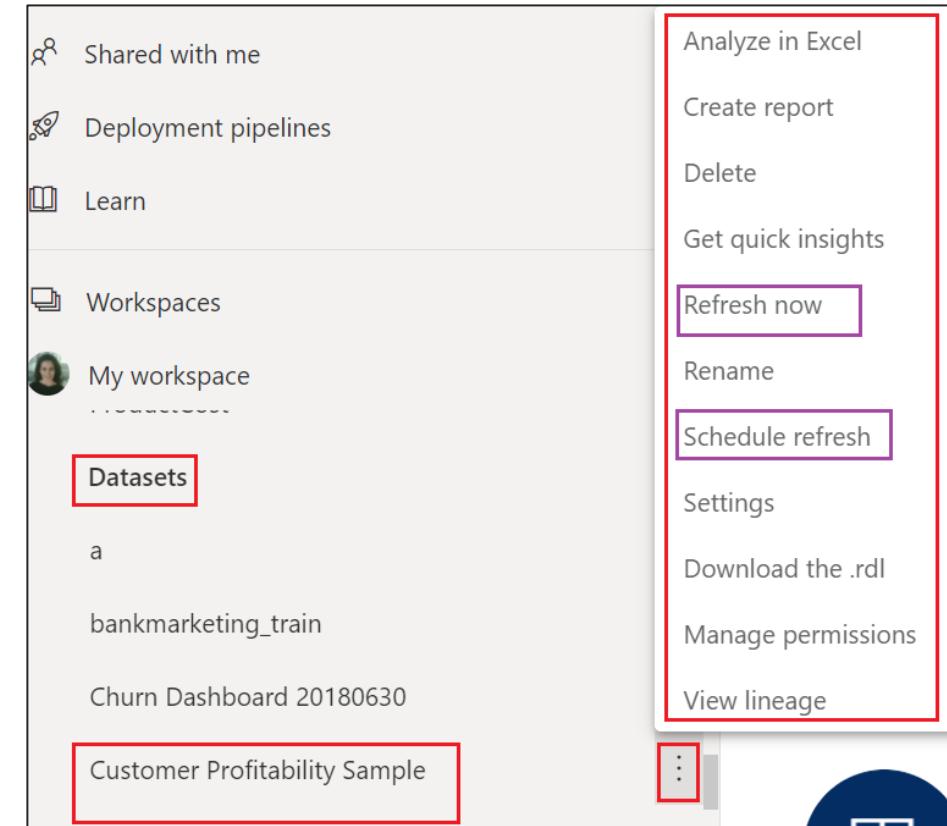
- Demonstrate data refresh options
- Demonstrate why we require gateways



# Keeping Data Current

## Data Refresh

- When a **dataset** is created in Power BI it might have several **data sources**
- When you refresh data in Power BI, you're updating data in the dataset with new data from data sources**
- Some data sources might be **live or self-updateable**
- Refresh Now** performs the operation immediately based on the definition of the data sources



# Keeping Data Current

## Data Refresh

The **Scheduled Refresh** option allows configuration of **credentials** and schedule

▲ Data source credentials

ppr\_applicationDB-XXXXXXXXXX.database.windows.net,1433    [Edit credentials](#)

AzureBlob    [Edit credentials](#)

OneDrive - Personal    [Edit credentials](#)

Configure IAMMovementReport<sup>x</sup>

Server  
XXXXXXXXXX.database.windows.net,1433

Database  
ppr\_applicationDB

Authentication method  
Basic

User name  
user

Password  
\*\*\*\*\*

[Sign in](#)   [Cancel](#)

# Keeping Data Current

## Data Refresh – Data Source Types

### **Automatic Refresh** – no user configuration is required

- Template apps from 3<sup>rd</sup> party services – Typically, once a day
- Files loaded from Microsoft OneDrive/ Microsoft SharePoint Online – refreshes every hour (can be overridden)

### **Live with Direct Query** – Data is always in sync with the data source. No schedule can be defined

- Microsoft Azure SQL Database
- Microsoft Azure SQL Data Warehouse
- Spark on Microsoft Azure HDInsight
- SSAS (Multidimensional and Tabular) – requires a Gateway and allows row-level-security

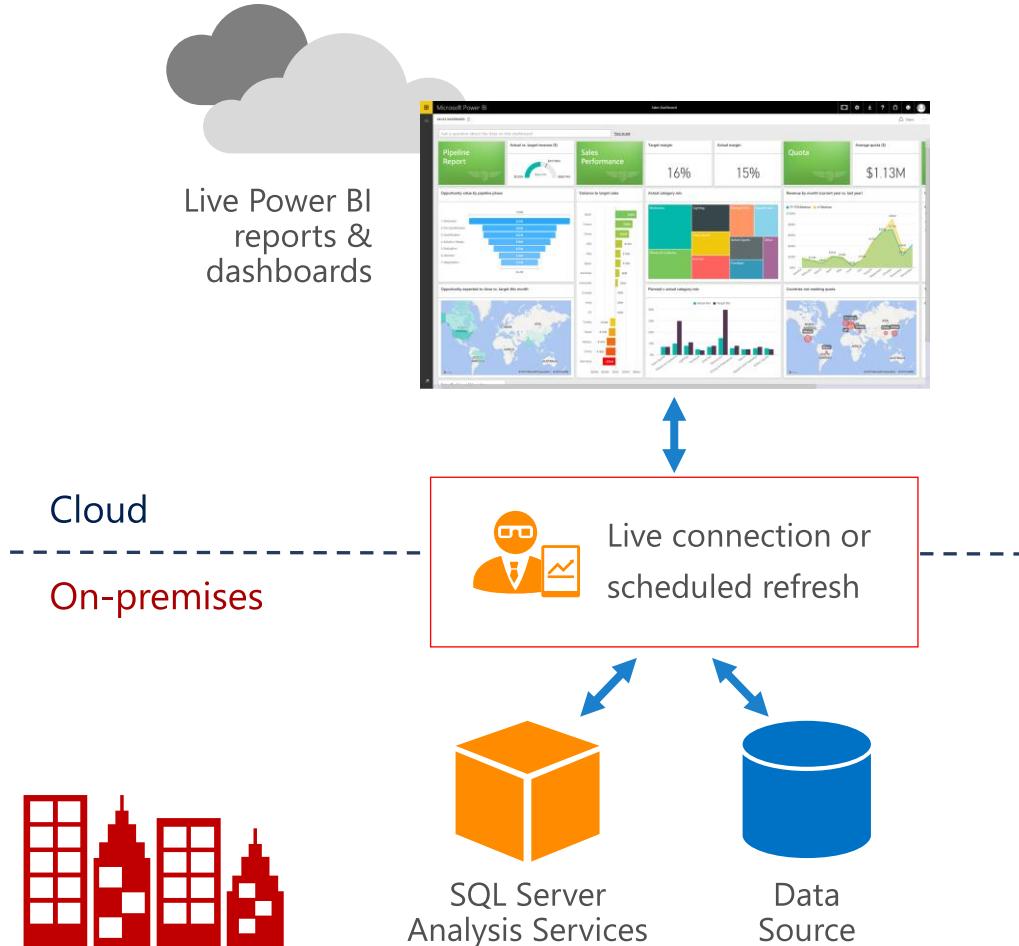
### **Real-time data coming from Power BI API or Microsoft Stream Analytics or PubNub**

### **Refreshable Data Sources** – a schedule can be defined in Power BI service

- SQL Azure Database
- SQL Server On-Premises – requires a Gateway
- File stored in OneDrive
- ...

# Keeping Data Current

## Gateways



Access on-premises data  
any way you like

→ Scheduled refresh

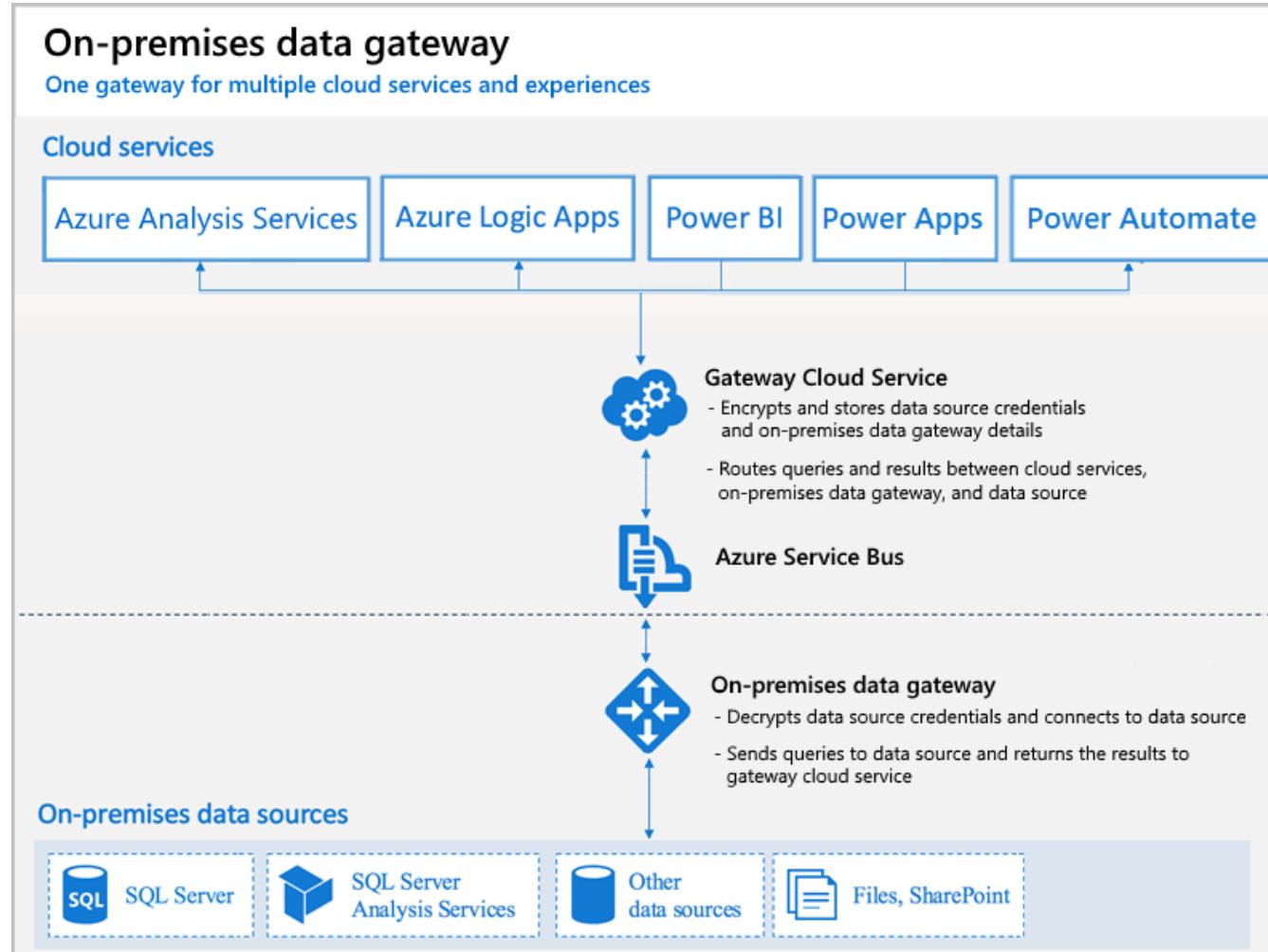
→ Live connection

Connect to on-premises SQL  
Server and Analysis Services models

→ Tabular and multidimensional

# Keeping Data Current

## Gateways - Overview



# Keeping Data Current

Gateways – On-premises data gateway (personal mode)

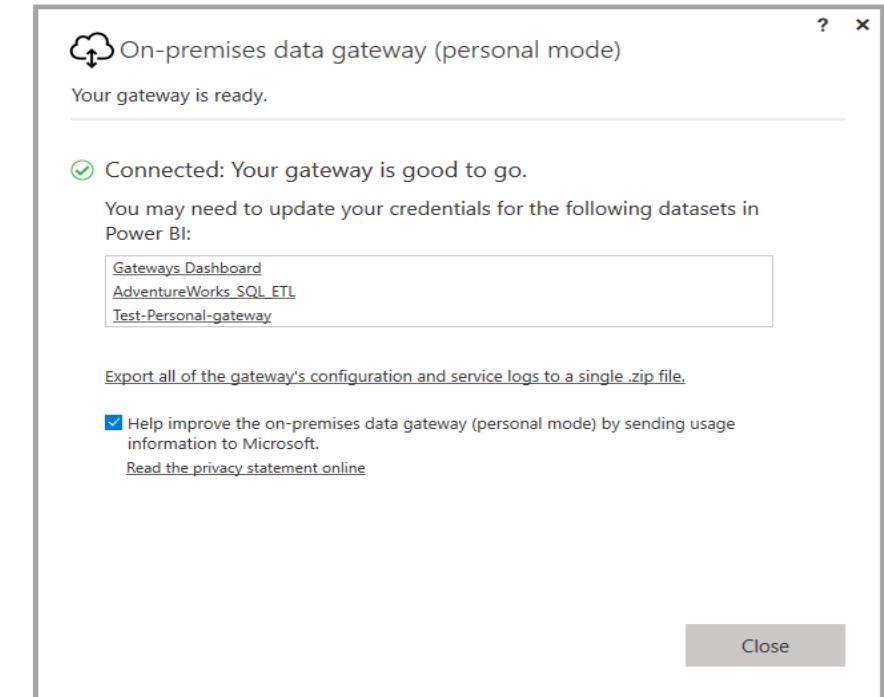
Allows datasets on the service to **access data on-premises on a scheduled refresh**

Runs as a **service or application** on a computer, typically from a business user, and can serve **multiple sources**

No need for IT intervention but **computer has to be online**

When a gateway is **installed**, a status is shown in **Scheduled Refresh**

Possible to **combine on-prem and cloud data sources** – can be configured from **gateway cluster settings**



# Keeping Data Current

Gateways – On-premises data gateway (Standard Mode)

Allows datasets on the service to **access data on-premises on a scheduled refresh or live**

Runs as a service on a **server** and can serve multiple users and sources

**Typically set up by IT allows access segregation and monitoring**

**Supported data source types** (via Excel Data Model or PBI Desktop)

- **SQL Server** (Live also)
- **Analysis Services** (Live also and with Row-Level-Security)
- **SAP HANA** (Live also)
- **File**
- **Folder**
- **Oracle** (Live also) / **DB2** / **MySQL** / **Sybase**
- **Teradata** (Live also)
- **SharePoint list (on-premises)**
- **Web/Odata**
- ...

# Keeping Data Current

Gateways – On-premises data gateway (Personal vs Standard Mode)

	On-premises data gateway	On-premises data gateway (personal)
<b>Cloud services supported</b>	Power BI, PowerApps, Azure Logic Apps, Power Automate, Azure Analysis Services, dataflows	Power BI
<b>Runs</b>	As configured by users who have access to the gateway	As you for Windows authentication and as configured by you for other authentication types
<b>Can install only as computer admin</b>	Yes	No
<b>Centralized gateway and data source management</b>	Yes	No
<b>Import data and schedule refresh</b>	Yes	Yes
<b>DirectQuery support</b>	Yes	No
<b>Live Connect support for Analysis Services</b>	Yes	No

# Keeping Data Current

## Gateways – Network Proxy and Firewalls

### Network Proxy

- Recommended to use domain accounts as service logon account to bypass the Proxy Server user authentication requirements.
- Some proxies usually allow **80** and **443 traffic only**.
- In such scenario you can enable PBI Gateway to use HTTPS only by selecting the Gateway Properties→Network→Azure Service Bus Connectivity Mode.
- Please note that this will considerably affect the performance.

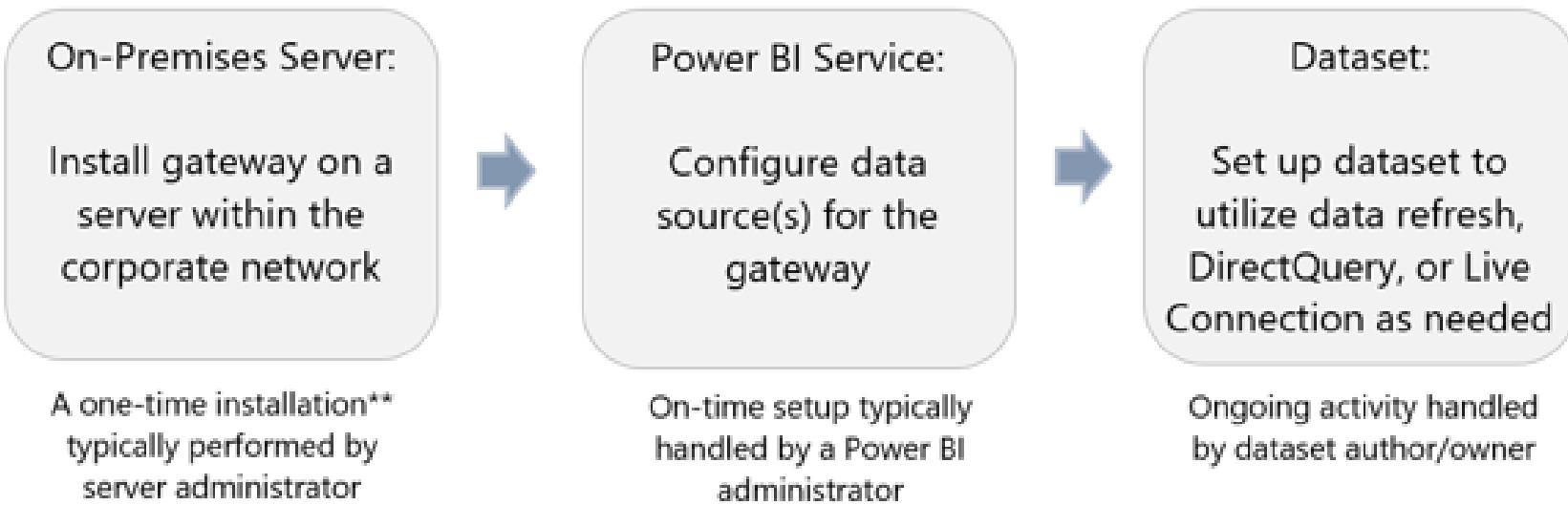
### Firewalls

- No Inbound Ports needed.
- If firewall is blocking outbound traffic then it is recommended to whitelist the IP addresses, for your data region, in your firewall. You can find out your datacenter from the **Power BI Service**.
- Azure IP address list is publicly available.
- This list is updated weekly.

# Keeping Data Current

## Gateways - Setup

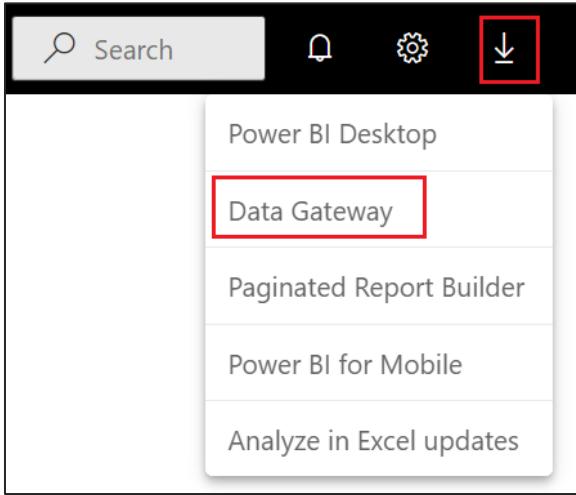
Setting up the On-premises data gateway involves the following process:



*Technical Guidance available in the [Planning a Power BI Enterprise Deployment](#) whitepaper*

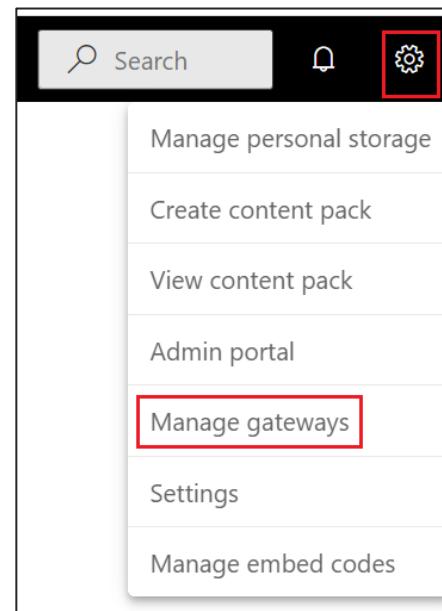
# Keeping Data Current

## Gateways



The data gateway is managed from the service

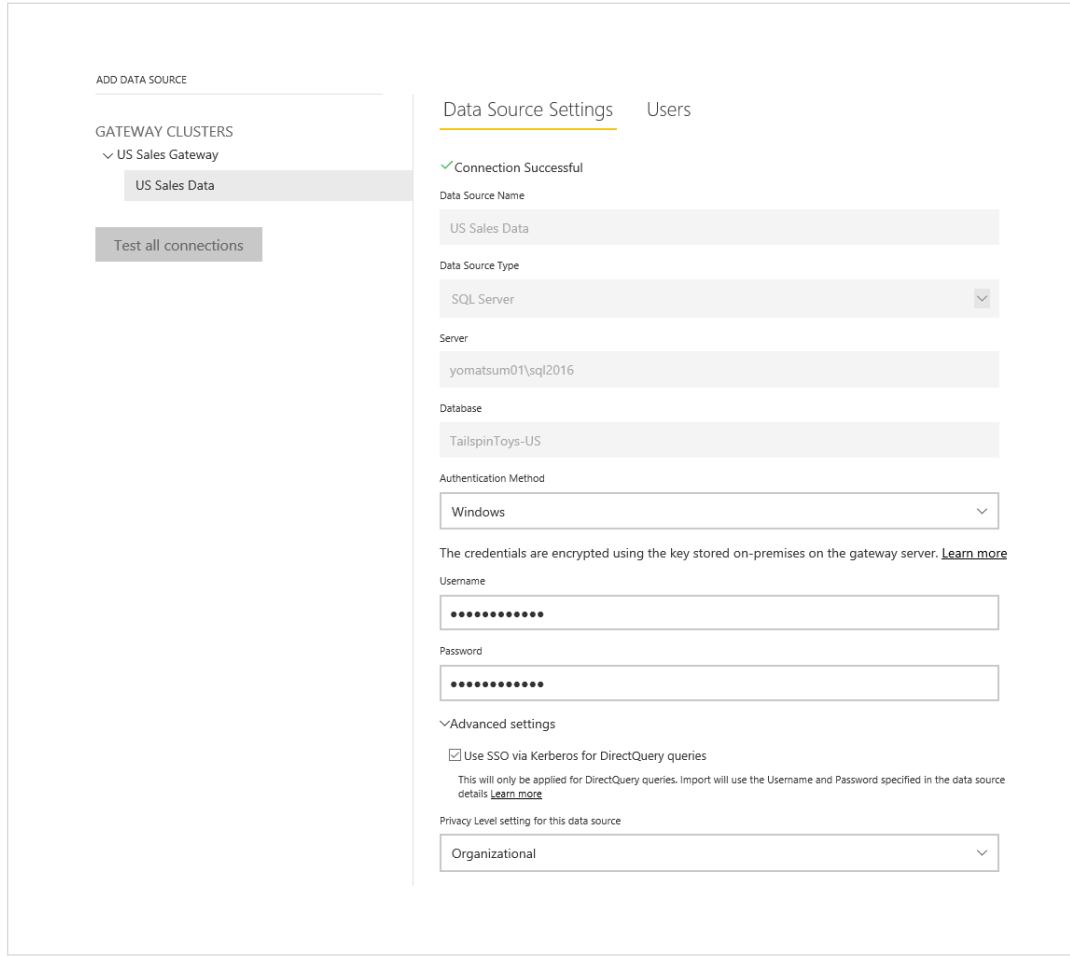
Can be **downloaded** from powerbi.com and **installed** on-prem



# Keeping Data Current

## Gateways – Manage Data Gateway

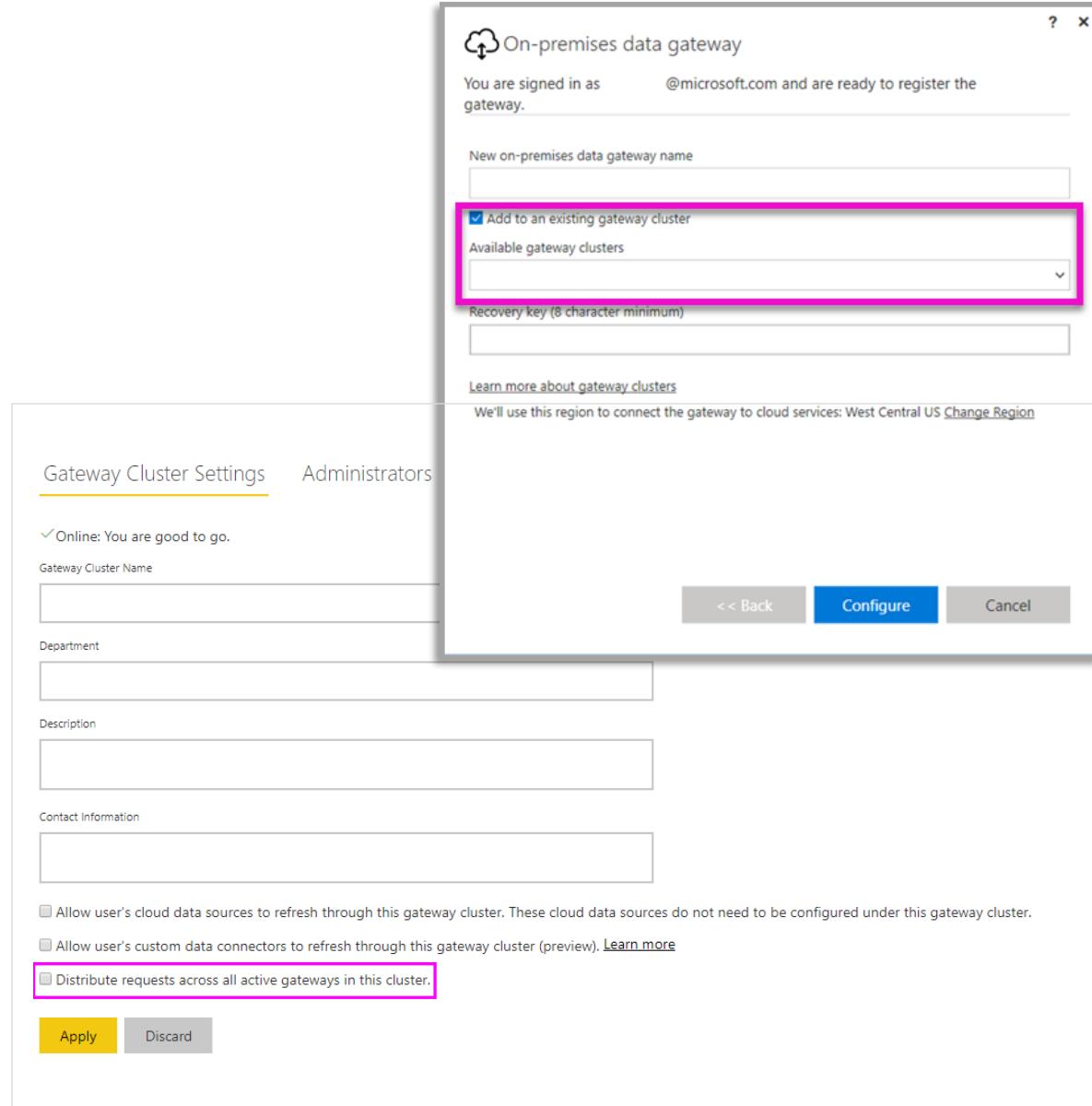
- **Data Sources** are added here
- **Security** is also defined centrally
- Some data sources are supported **Single Sign-on** for DirectQuery based reports
- Users with access can use this connection in their Power BI Desktop reports
- Users can create schedules to update their data
- For **SSAS, UPN Mapping** can be defined in the service, per data source.
- The dataset owner's security context (**UPN**) can be used for **refresh-based reports** (public preview)



# Keeping Data Current

## Gateways – Manage Data Gateway

- Supports **high availability clusters** of gateways
- **Distribute requests traffic** across all gateways in a cluster (scale-out)
- Can use gateways for **cloud data sources** too
- Manage gateway clusters using **PowerShell**



# Keeping Data Current

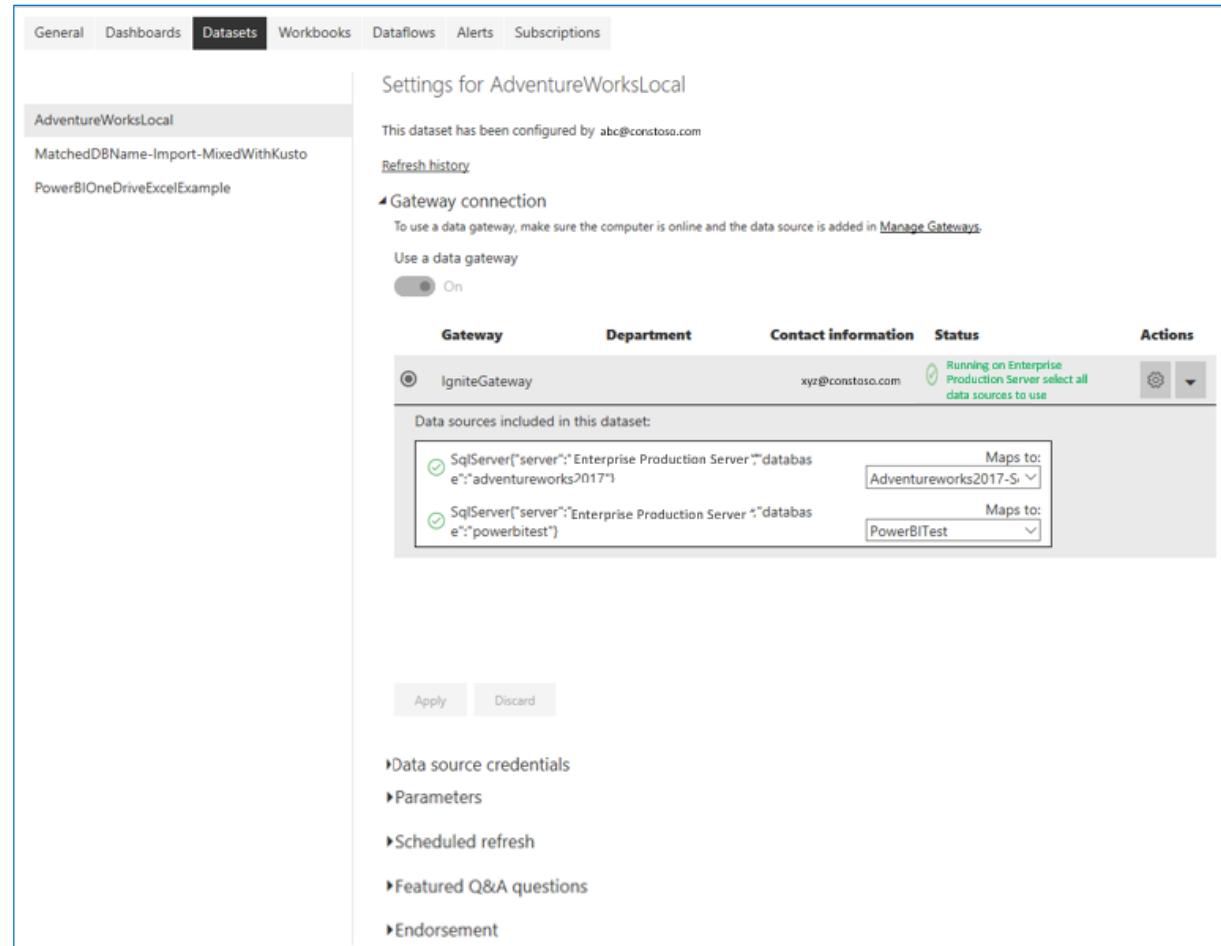
## Gateways – Dataset settings

All data sources used in a Dataset should be registered on the gateway

Map the data source in the dataset to the correct connection on the gateway

Dataset automatically uses the configured data source credentials on the gateway

Clicking “Apply” binds the dataset to the selected data sources on the gateway

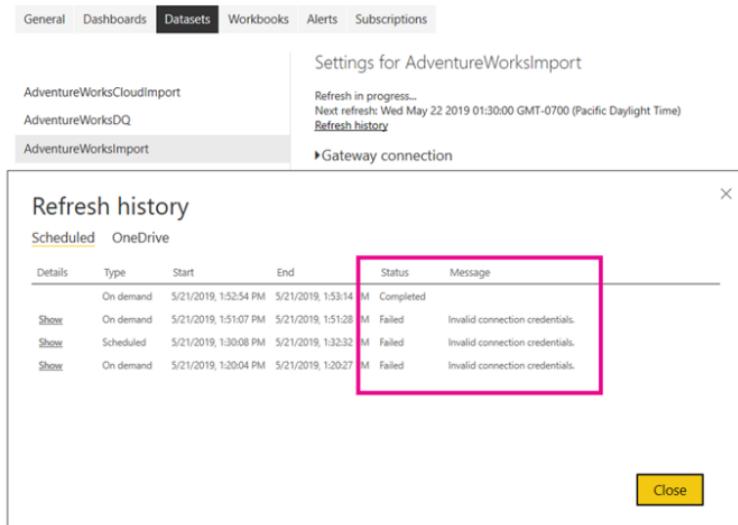


# Keeping Data Current

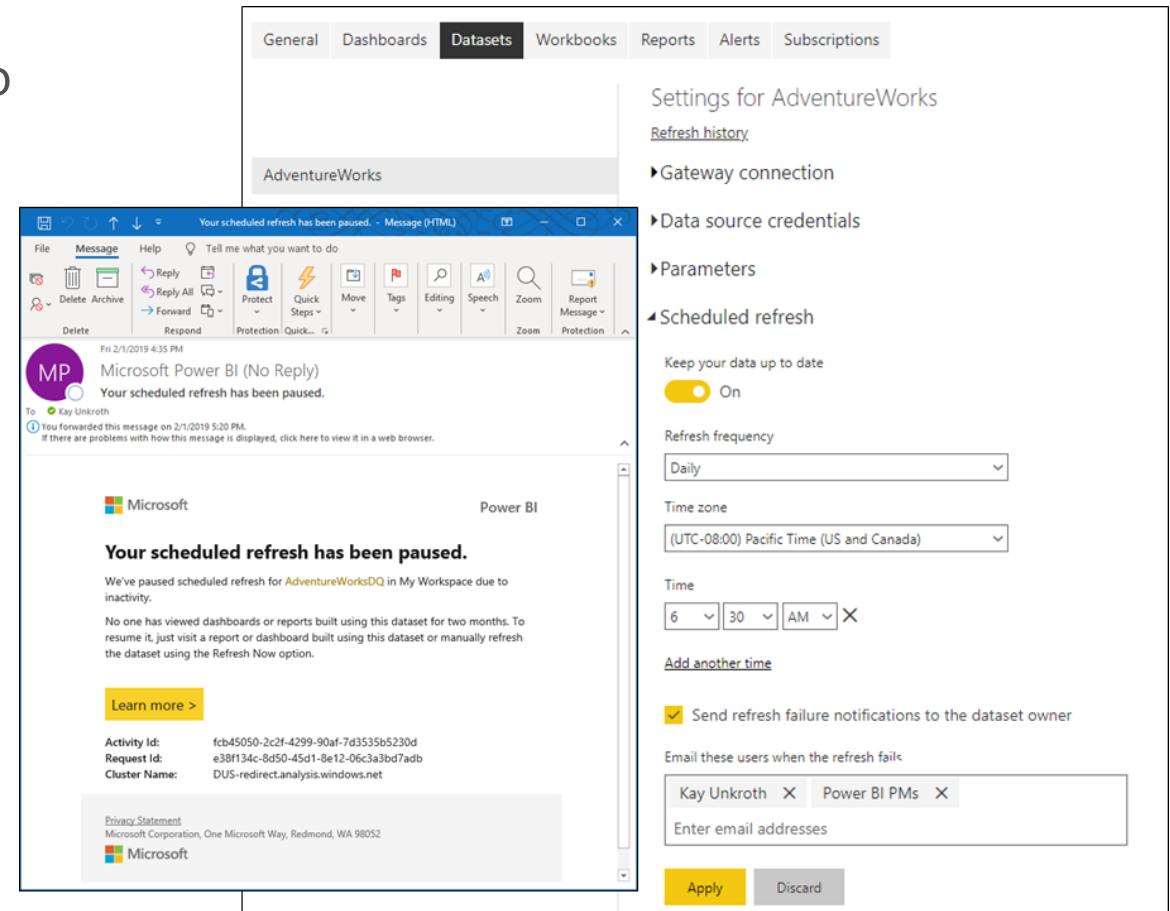
## Managing Power BI Dataset Refresh Failures

Can view details of each refresh from **Refresh History** under Dataset settings

Can set **refresh failure notification emails** to dataset owner as well as other users.



Details	Type	Start	End	Status	Message
Show	On demand	5/21/2019, 1:52:54 PM	5/21/2019, 1:53:14	M	Completed
Show	On demand	5/21/2019, 1:51:07 PM	5/21/2019, 1:51:28	M	Failed
Show	Scheduled	5/21/2019, 1:30:08 PM	5/21/2019, 1:32:32	M	Failed
Show	On demand	5/21/2019, 1:20:04 PM	5/21/2019, 1:20:27	M	Failed



Your scheduled refresh has been paused. - Message (HTML)

General Dashboards Datasets Workbooks Reports Alerts Subscriptions

Settings for AdventureWorks

AdventureWorks

Your scheduled refresh has been paused.

To: Kay Unkroth

Fri 2/1/2019 4:35 PM

Microsoft Power BI (No Reply)

You forwarded this message on 2/1/2019 5:20 PM.

If there are problems with how this message is displayed, click here to view it in a web browser.

Microsoft Power BI

**Your scheduled refresh has been paused.**

We've paused scheduled refresh for **AdventureWorksDQ** in My Workspace due to inactivity.

No one has viewed dashboards or reports built using this dataset for two months. To resume it, just visit a report or dashboard built using this dataset or manually refresh the dataset using the Refresh Now option.

[Learn more >](#)

Activity Id: fcb45050-2c2f-4299-90af-7d353b5230d  
Request Id: e38f134c-8d50-45d1-8e12-06c3a3bd7adb  
Cluster Name: DUS-redirect.analysis.windows.net

Privacy Statement  
Microsoft Corporation, One Microsoft Way, Redmond, WA 98052

Send refresh failure notifications to the dataset owner

Email these users when the refresh fails  
Kay Unkroth X Power BI PMs X

Enter email addresses

Apply Discard

# Keeping Data Current

## Gateways – Best Practices

1. Keep the **gateway up to date** always.
2. Keep **windows up to date** on the server.
3. Do not deploy the **Gateway** on a **Domain Controller**.
4. The recovery key which is supplied while installing the gateway will be needed if you ever need to **migrate**, **restore** or **take over a gateway**. Be sure to keep this key in a safe place.
5. You can use the **Gateway Service Name – PBIEgwService** to start and stop the service thru scripts.
6. Use the **Data source** and **Server names / IP Addresses** from the Reports while configuring the gateway. Naming differences will not be able to identify the right Gateway to use for PBI Service deployment.
7. Standardize naming as much as possible to distinctly identify/manage the Gateway Data sources.

# Keeping Data Current

Data Refresh - Using Power Automate

---

**Trigger** refreshes for your datasets in Power BI based on hundreds of **Automate** triggers.

---

Trigger might be based on changes to items in your SharePoint list or updates to an Excel file in OneDrive or SharePoint Online or a complex day and time **schedule**, etc..

# Keeping Data Current

Data Refresh – Using Power BI REST APIs



**Programmatically refresh datasets** in Power BI Service **using APIs**.



**Retrieve refresh history** for any dataset that you own.



Easily **automate** and **scale out** Power BI data refresh management.



**Integrate data refresh** into your existing ETL or deployment processes:



For e.g. trigger Power BI data refresh as the last step in your Azure Data Factory ETL pipeline

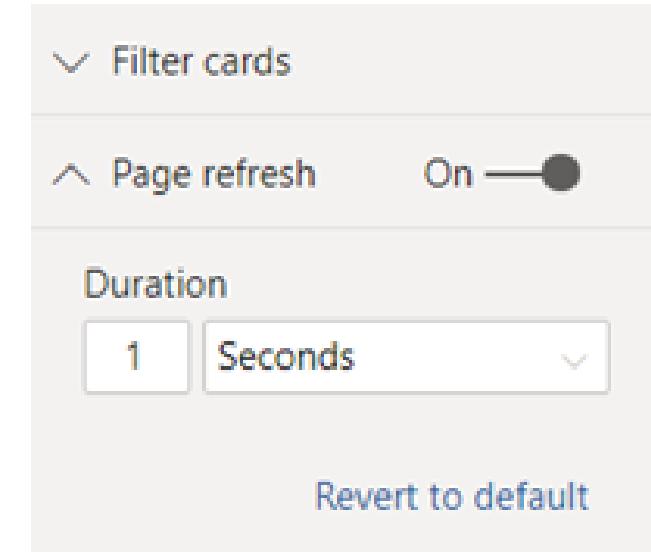
# Keeping Data Current

## Automatic Page Refresh

Allows near real-time page level updates of DQ.

Minimum refresh times apply:

- **Desktop** minimum = 1 second
- **Standard Workspace** minimum = 30 minutes
- **Premium Workspace** minimum = as low as the minimum set by the capacity admin



**Questions?**



# Knowledge Check

How can you group data sources in terms of refresh policy?

Why do we need gateways?

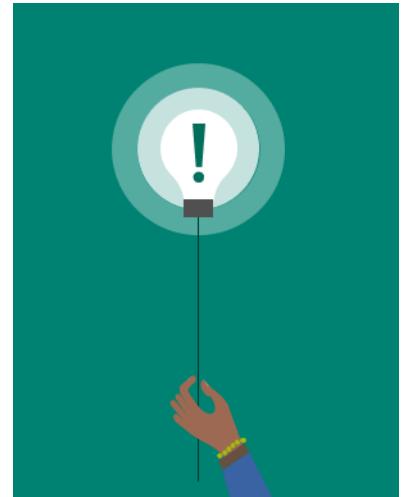
What are some methods to trigger a data refresh?

# Lesson 4: Q&A and Quick Insights

# Objectives

After completing this learning, you will be able to:

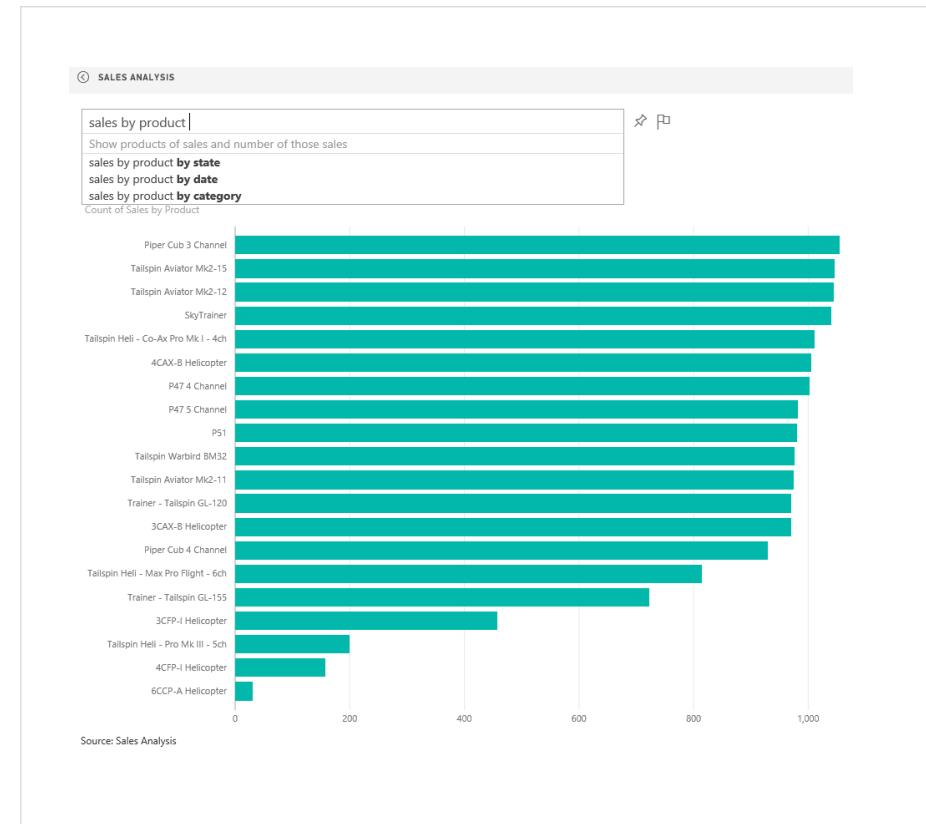
- Describe how Q&A is used
- Describe the types of Quick Insights



# Q&A and Quick Insights

## Q&A

- Allows **querying a model** with **natural language**
- **Has auto-completion**, restatement
- **Results** can be shown in the form of **charts and graphs**
- Access Q&A from the **dedicated bar on a dashboard** or from individual reports in Edit mode.
- The result can be **pinned to the initial dashboard** or to **a new one** and can be visually enhanced
- Supports **on-premises data sources**

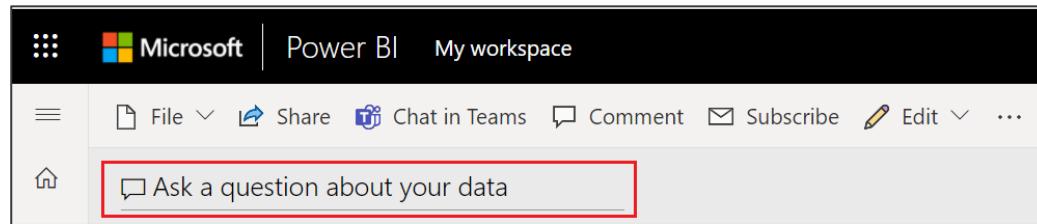


# Q&A and Quick Insights

## Q&A

### Q&A in Dashboard

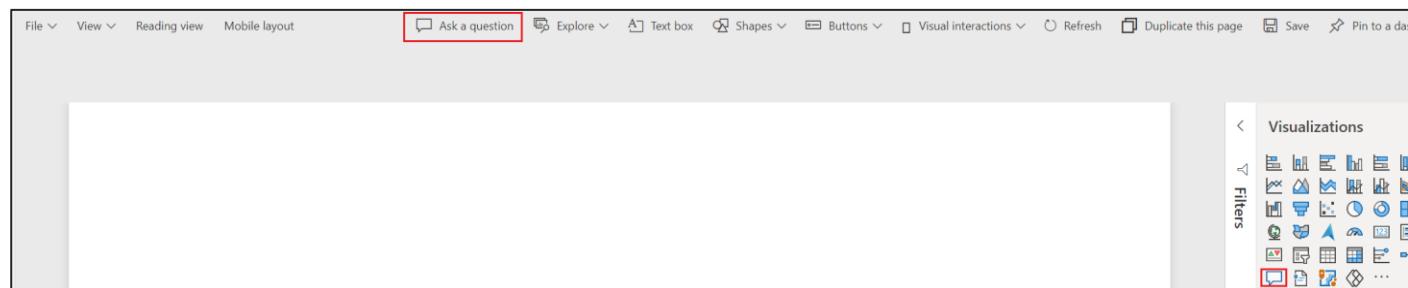
**Picks dataset automatically** from the ones used on the dashboard



### Q&A in Report (in Edit view of Power BI Service)

Must have **edit permissions** for the report and underlying dataset.

When used inside Reports in Edit mode, **picks the dataset tied to the Report**



# Q&A and Quick Insights

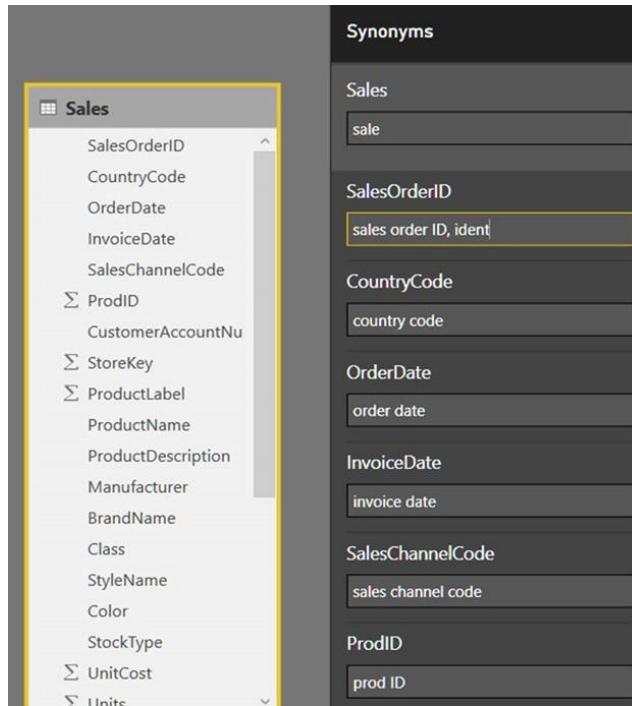
## Q&A

Relyes on names of **tables**, **columns** and **calculated fields**, so naming them correctly is very important

Can use **Synonyms** which can be defined in the Model View in Power BI Desktop

Picks the **visualization automatically** but it is possible to change the output format

Possible to define **Featured Questions in datasets** that show up as suggestions



### ► Featured Q&A Questions

Featured questions are shown as suggestions for this dataset in the Q&A question box.

X

[Add a question](#)

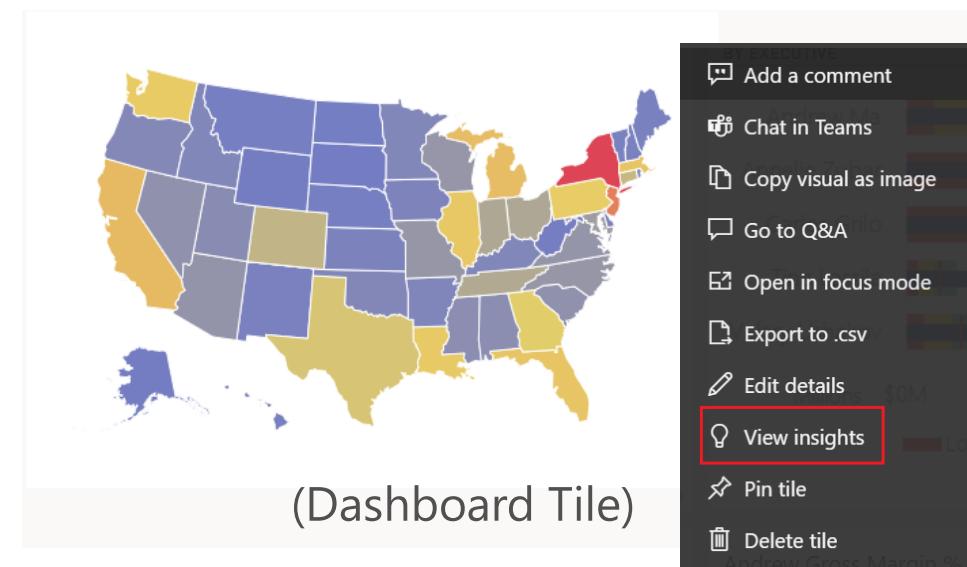
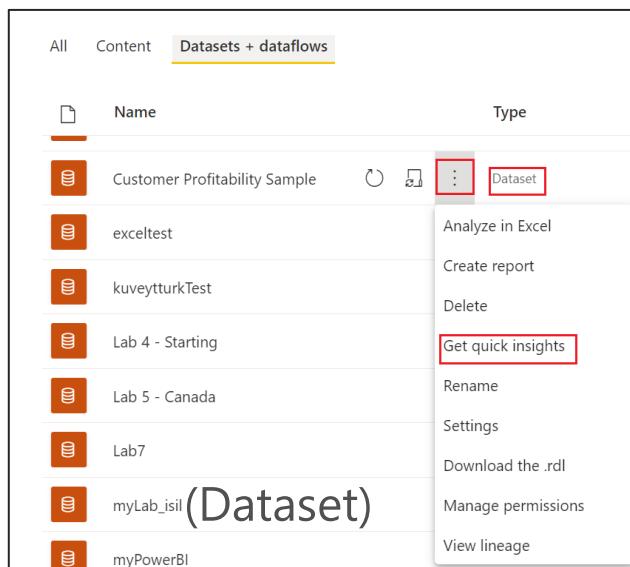
**Apply**

**Discard**

# Q&A and Quick Insights

## Quick Insights

**Searches** subsets of data in the **dataset** or **dashboard tile** (upholds all filters) and applies **algorithms to detect interesting facts about your data**, **Scans** as much as it can in an **allotted amount of time** (not configurable, yet)

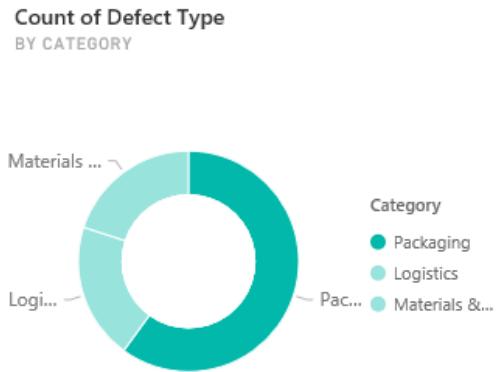


Many visualizations are returned which can be **pinned** to dashboards.

# Q&A and Quick Insights

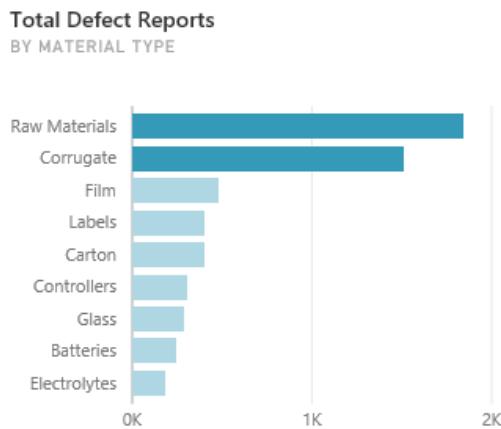
## Quick Insights - Types

**Majority** - Finds cases where most of a total value can be attributed to a single factor when broken down by another dimension.



MAJORITY  
'Packaging'  
accounts for the  
majority of 'Defect  
Type' for  
'Hardware'.

**Outliers** - Highlights cases where, for a measure in the model, one or two members of a dimension have much larger values than other members of the dimension.

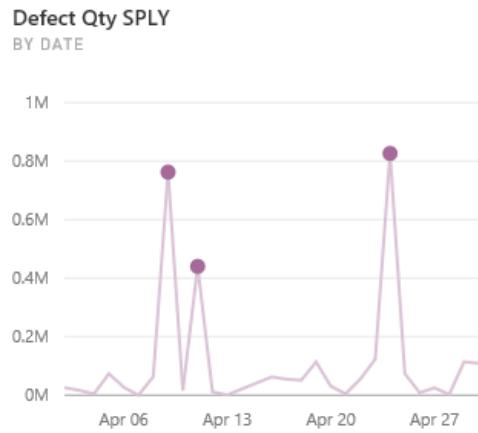


CATEGORY OUTLIERS  
'Raw Materials' and  
'Corrugate' have  
noticeably greater  
'Total Defect  
Reports'.

# Q&A and Quick Insights

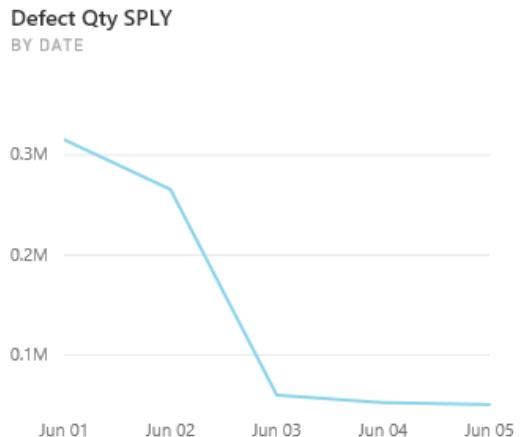
## Quick Insights - Types

**Time Series Outliers** - For data across a time series, detects when there are specific dates or times with values significantly different than the other date/time values.



TIME SERIES OUTLIERS  
'Defect Qty SPLY'  
for 'Apr' has  
outliers.

**Time Series Trends** - Detects upward or downward trends in time series data.

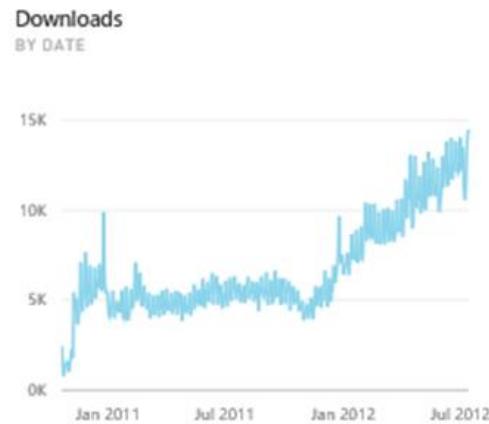


TREND  
'Defect Qty SPLY' is  
trending  
downwards for '23'.

# Q&A and Quick Insights

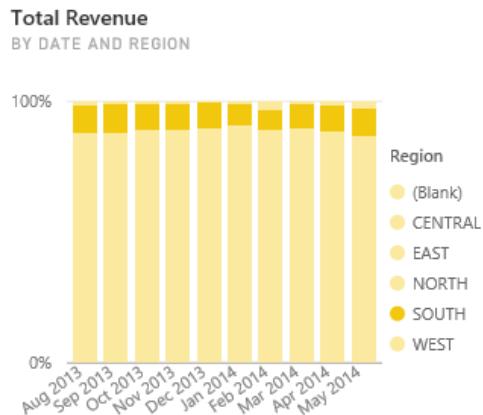
## Quick Insights - Types

**Time Series Seasonality** - Finds periodic patterns in time series data, such as weekly, monthly, or yearly seasonality.



**SEASONALITY**  
'Downloads' for 'Europe' shows seasonality.

**Steady share** - Highlights cases where there is a parent-child correlation between the share of a child value in relation to the overall value of the parent across a continuous variable.

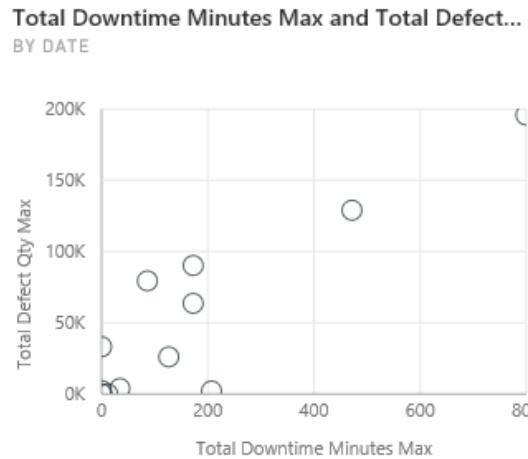


**STEADY SHARE**  
'SOUTH' has a relatively steady percent of total 'Total Revenue'.

# Q&A and Quick Insights

## Quick Insights - Types

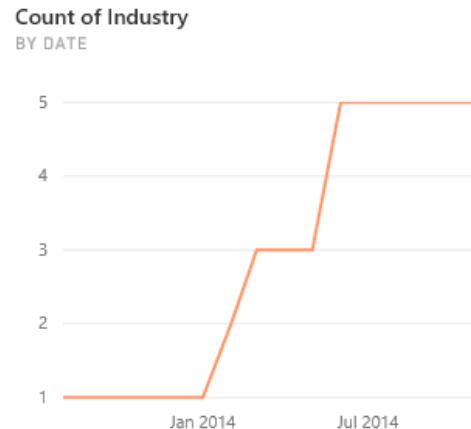
**Correlation** - Detects cases where multiple measures show a correlation between each other when plotted against a dimension in the dataset.



### CORRELATION

There is a correlation between 'Total Downtime Minutes Max' and 'Total Defect Qty Max' for '6'.

**Change points in a time series** - Highlights when there are significant changes in trends in a time series of data



### CHANGE POINTS

'Industry' for 'ST-0' and 'NORTH' shows several trends.

# Demonstration

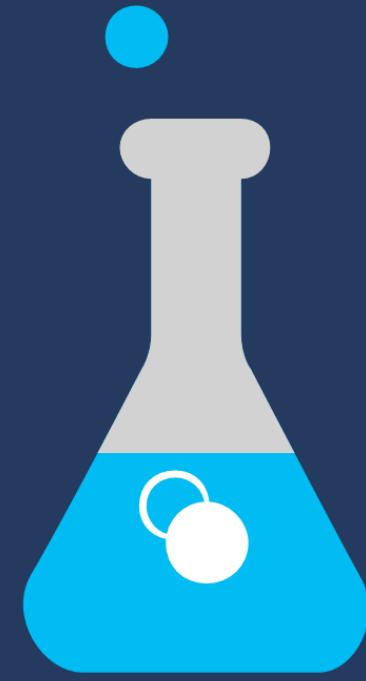
Q&A and Quick Insights

Explore Q&A and Quick Insights



# Power BI Service

- Exercise 1: Signing-in to Power BI
- Exercise 2: Exploring the Power BI dashboard interface
- Exercise 3: Assembling a Power BI Dashboard
- Exercise 4: Keeping Data Current



LAB

**Questions?**



# Knowledge Check

Why do we use Q&A?

What is Quick Insights?

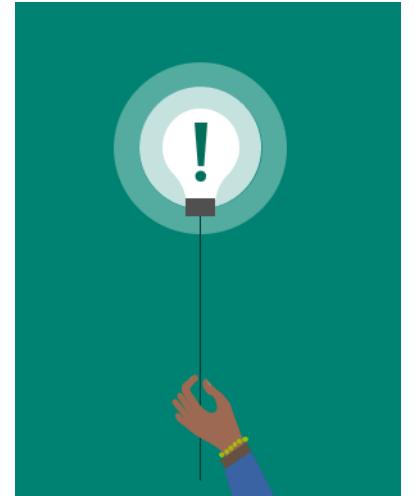
What are the types of Quick Insights?

# Lesson 5: Sharing

# Objectives

After completing this learning, you will be able to:

- Describe sharing methods with Power BI Service
- Describe data security basics within Power BI Service

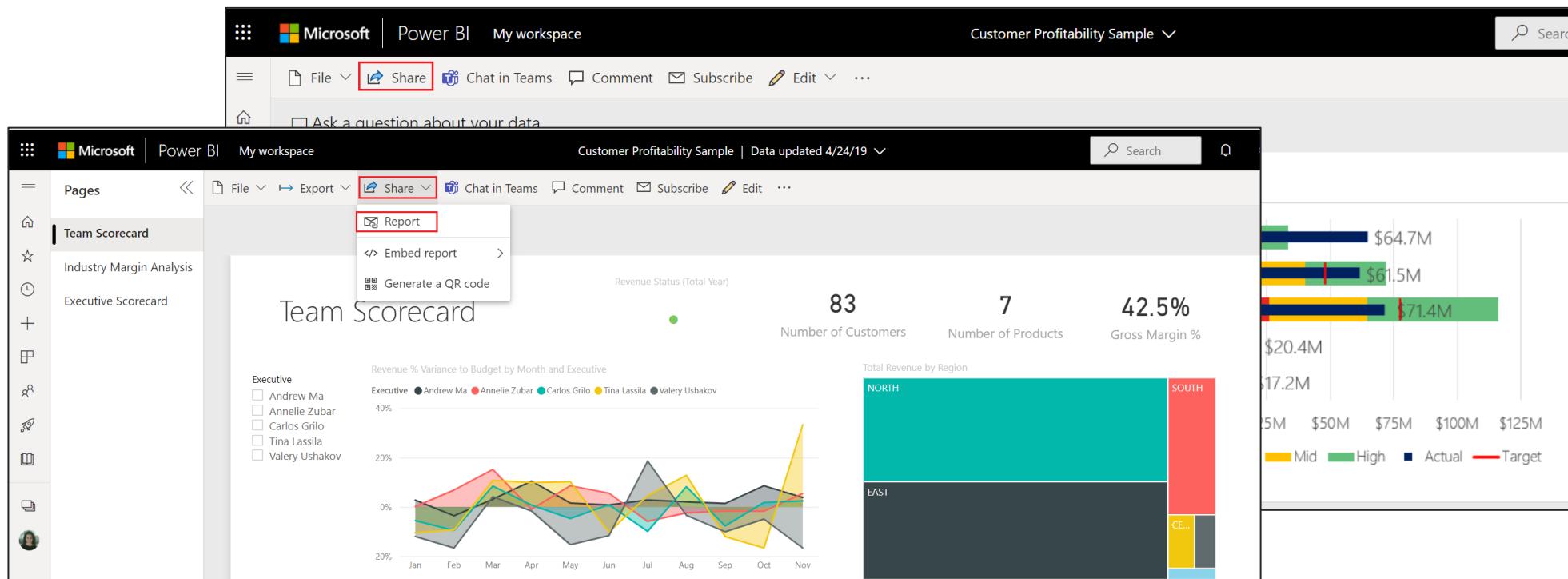


# Sharing

## Peer-to-Peer/Peer-to-Distribution Group

**Share dashboards** and **underlying reports** or **only reports** with colleagues **inside and outside** of your organization

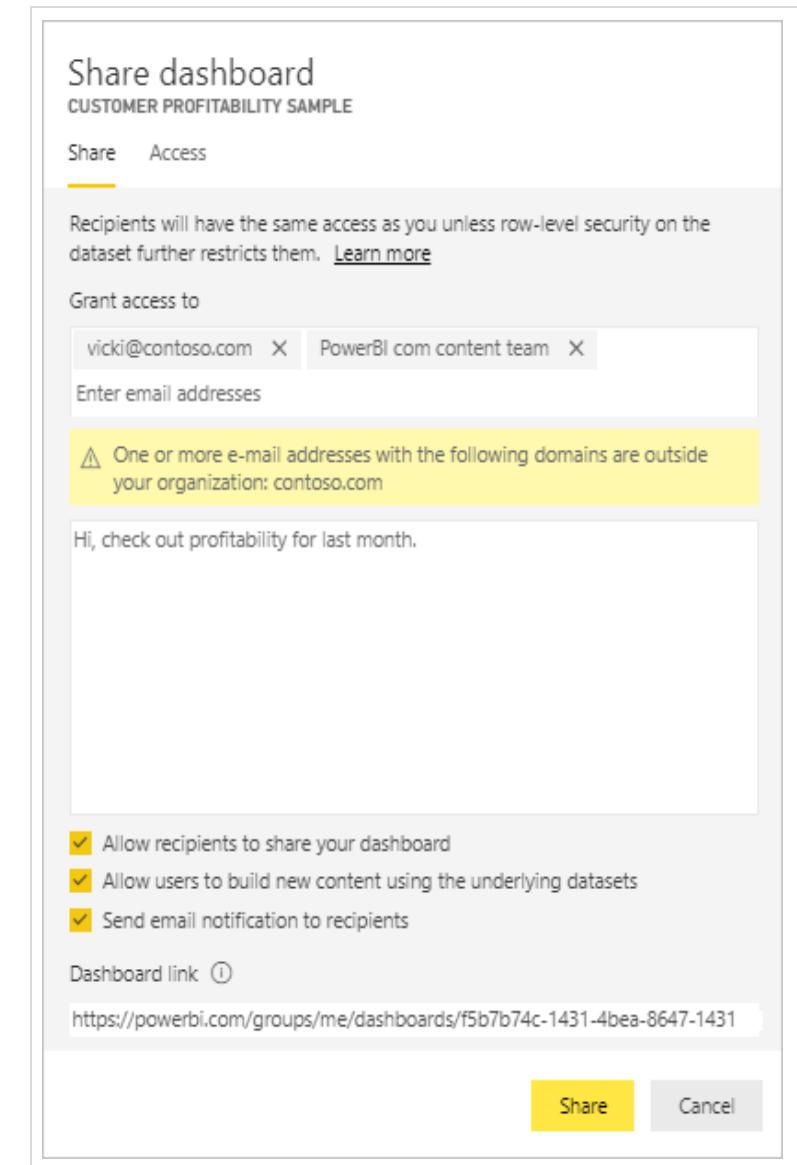
Shared reports and dashboards shows up in the **Shared with me** tab



# Sharing

## Peer-to-Peer/Peer-to-Distribution Group

- Recipient e-mail can be a **distribution group** (if using Office 365 for email)
- Can control if recipients can **re-share**.
- **Recipients** get an e-mail with a link (lasts one month)
- Users get **read access** by default
- **Build permission** allows end users to create new reports using the underlying datasets



# Sharing

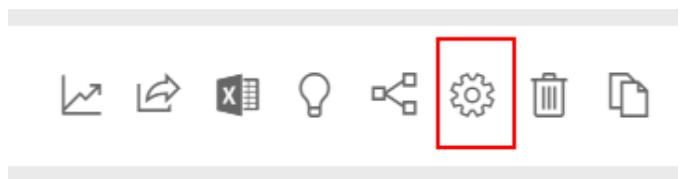
## Peer-to-Peer/Peer-to-Distribution Group

- Recipients can **see the dashboard and interact with reports** in the Reading View
- **Changes** made by the **owner** are available for **everyone** when saved
- When re-sharing is enabled, users outside the organization can also share if their domain is registered in your tenant
- If users already have access to a dashboard, they can **access it directly via the dashboard's URL**
- **Users outside the organization** must **bookmark the URL**, it will not appear in their **My Workspace**

# Sharing

## Peer-to-Peer/Peer-to-Distribution Group

- **Report settings** including Export options, filtering experience and more can be configured.



Report name

**Persistent filters**  
Don't allow end user to save filters on this report.

**Visual options**  
Hide the visual header in reading view.  
  
Use the modern visual header with updated styling options.  
  
Change default visual interaction from cross highlighting to cross filtering.

**Export data**  
Choose the type of data you allow your end users to export.

**Filtering experience**  
Enable the updated filter pane, and show filters in the visual header for this report  
  
Allow users to change filter types

**Cross-report drillthrough**  
Allow visuals in this report to use drillthrough targets from other reports

**Comments**  
Allow users to add comments to this report.

# Sharing

## Peer-to-Peer/Peer-to-Distribution Group

Can see with **whom** the dashboard or report **is currently shared** and revoke re-sharing rights individually

People outside the organization are listed as **Guest**

The screenshot shows a user interface for sharing a dashboard. At the top left, there's a button labeled "Share dashboard". Below it, a message says "Shared with David". Underneath, there are two buttons: "Invite" and "Shared with". A "Shared with" button is highlighted with a gray background. To the right of these buttons is a "Share Link" section containing a URL: <https://.../groups/me/dashboards/d79cd3b1a20>. Below the link, a section titled "This dashboard has been shared with:" lists three users: Maggie (Owner), David (Can view ...), and vicki@contoso.com (Guest). A "Cancel invite" button is next to the guest entry. A context menu is open over the "Shared with" button, showing options: "Can view ...", "Cancel invite", "Stop sharing", and "Disable reshares".

# Sharing

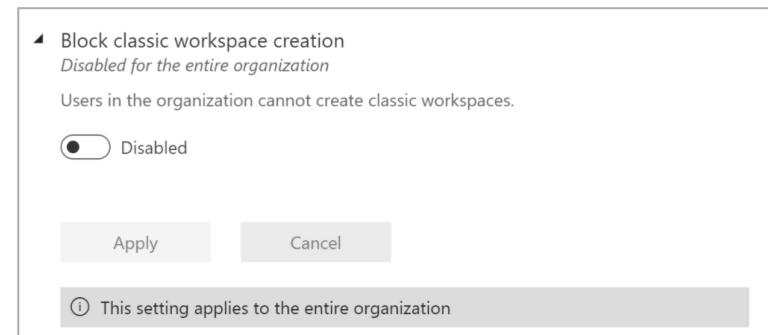
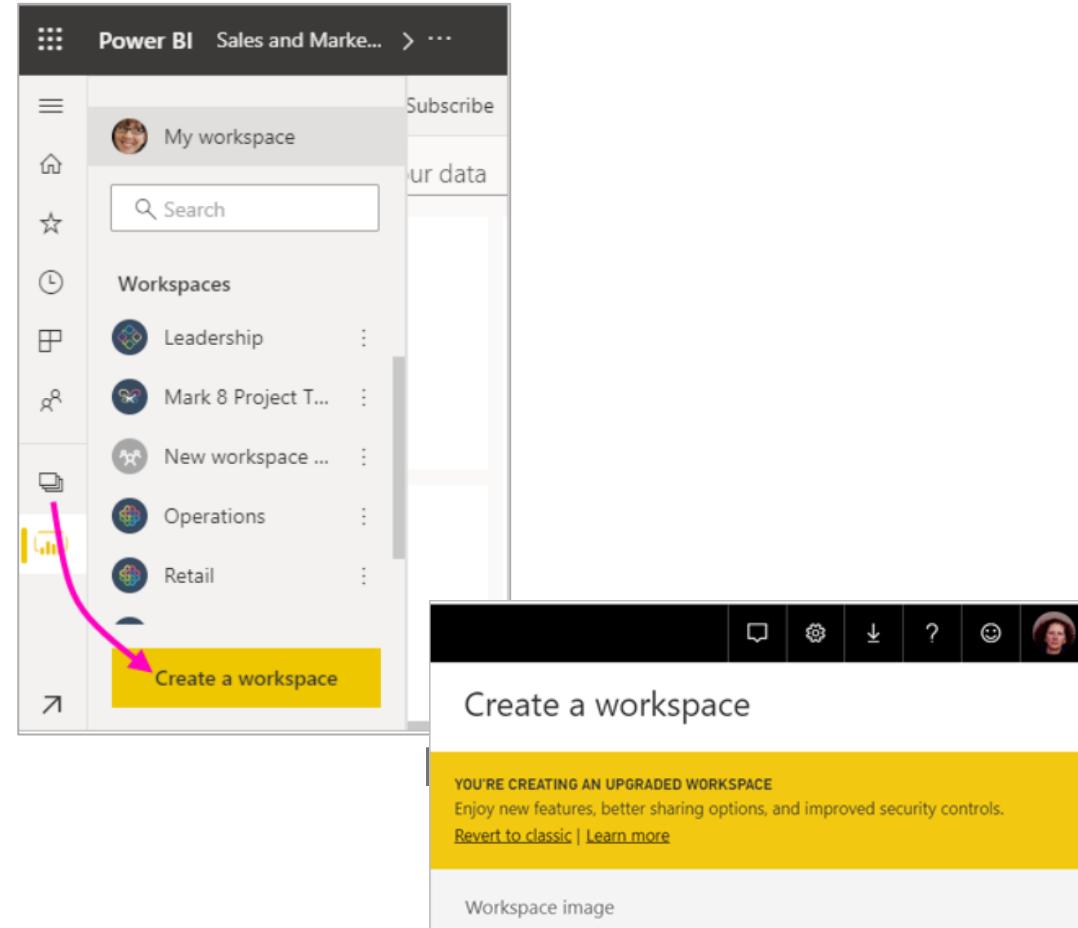
## App Workspaces (a.k.a. Group Workspaces)

- Place to **collaborate with colleagues** to create collections of dashboards, reports, and paginated reports, which can be **bundled into an app and distributed** to your whole organization, or to specific people or groups.
- Group workspace allows **several people to take ownership** of a certain set of content
- **Allows content to be organized** according to specific governance rules (department, business area)
- A dashboard in a Group can also be **shared with another peer directly** via the peer-to-peer method

# Sharing

## App Workspaces

- **Classic workspace (v1)** experience automatically creates an Office 365 group in the background. Office 365 offers other group services, such as sharing files on OneDrive for Business, conversations in Exchange, shared calendar and tasks, and so on
- **New workspace (v2)** experience (**default**): decoupled from Office 365 groups and provides additional functionalities for sharing and management.
- There is a Power BI tenant setting that can **block classic workspace creation**. If classic workspace creation is blocked for your organization, you cannot create classic workspace anymore.



# Sharing

## New workspace (v2)

- **Manage access to workspaces easily** using security groups, distribution lists, individuals and even Office 365 Groups
- **Different permissions** per user and more **granular workspaces roles** for more flexible permissions management in a workspace
- Creates a workspace in Power BI **without creating an Office 365 group**
- New tools for Power BI Admins to **effectively manage workspaces**, including APIs for Admins
- Power BI admin **can control who can create** workspaces in Power BI
- **Can't create or consume organizational content pack** from the new workspaces.

### Create a workspace

YOU'RE CREATING AN UPGRADED WORKSPACE  
Enjoy new features, better sharing options, and improved security controls.  
[Revert to classic](#) | [Learn more](#)

Workspace image

Workspace name

Demo V2 Workspace

Available

Description

Describe this workspace

Learn more about workspace settings

Advanced ▾

\*Organizational content packs are set to be retired and replaced with Power BI Apps.

# Sharing

## New workspace (v2) - Roles

Capability	Admin	Member	Contributor	Viewer
Update and delete the workspace.	X			
Add/remove people, including other admins.	X			
Add members or others with lower permissions.	X	X		
Publish and update an app.	X	X		
Share an item or share an app.	X	X		
Allow others to reshare items.	X	X		
Create, edit, and delete content in the workspace.	X	X	X	
Publish reports to the workspace, delete content.	X	X	X	
View an item.	X	X	X	X
Create a report in another workspace based on a dataset in this workspace.	X	X	X	X 1
Copy a report.	X	X	X	X 1

Access

Demo V2 Workspace - Sajas

Add admins, members or contributors. [Learn more](#)

Enter email addresses

Member

Admin

Member

Contributor

Viewer

NAME	PERMISSION	...
Sajas Salahuddeen	Admin	...

**1** Requires a Power BI Pro license and [Build permission for datasets](#).

# Sharing

## Classic workspace (v1) - Roles

Members with **Admin** privileges can manage access to the group

**Access** is set to either **View** or **Edit** for **everyone** in the group (except Admins)

### Edit workspace

Name  
Production

Privacy  
Private - Only approved members can see what's inside  
Members can only view Power BI content ▾

Workspace members  
Enter email addresses  
Add

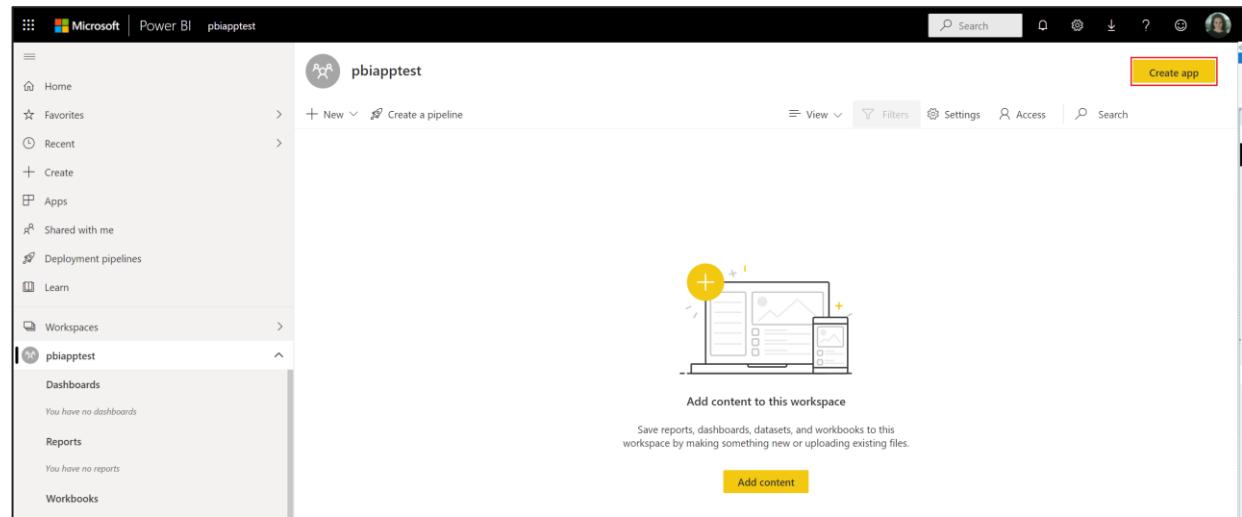
admin@spe566825.onmicrosoft.com	Admin	▼	✖
pbouser1@spe566825.onmicrosoft.com	Member	▼	✖

Advanced ▾

# Sharing

## Power BI Apps

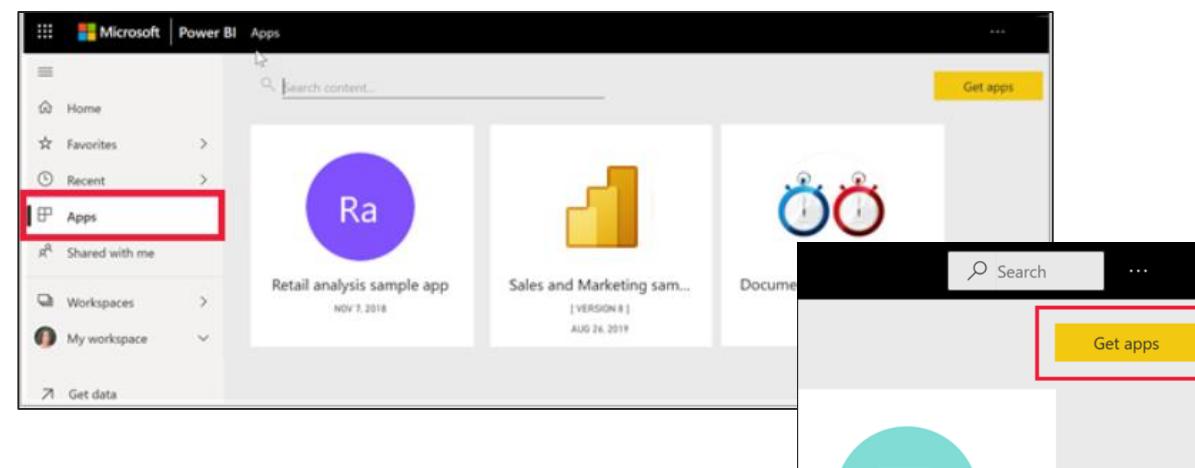
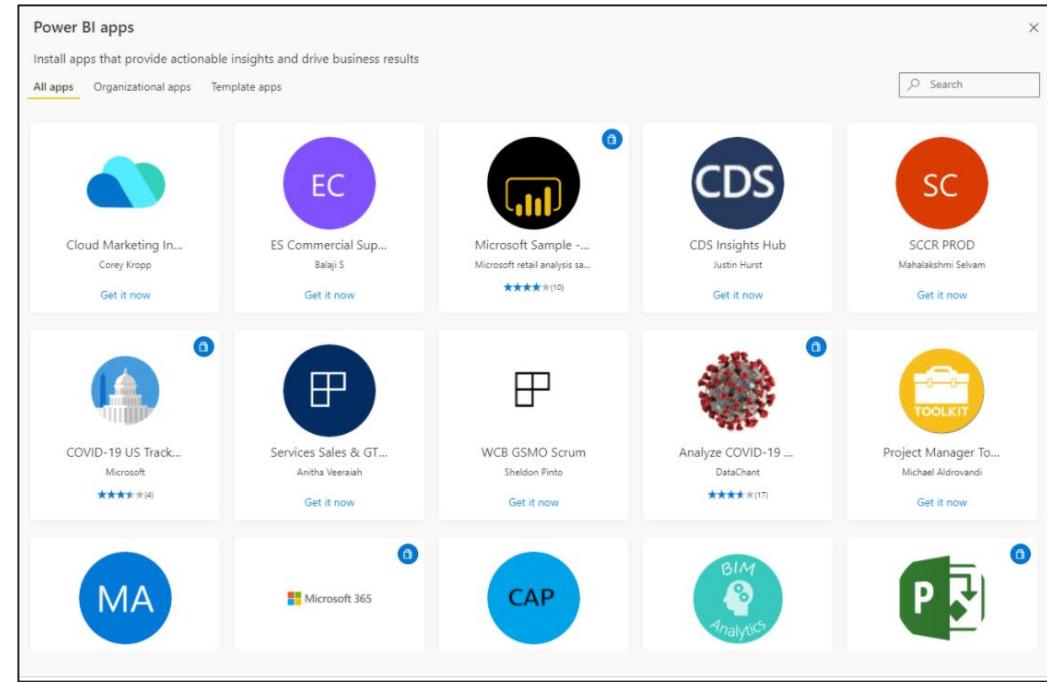
- An **app** is a Power BI content type that **combines** related **dashboards** and **reports**, **all in one place**.
- When the **dashboards** and **reports** in your workspace are ready, you choose which dashboards and reports you want to **publish**, then you **publish them as an app**.



# Sharing

## Power BI Apps

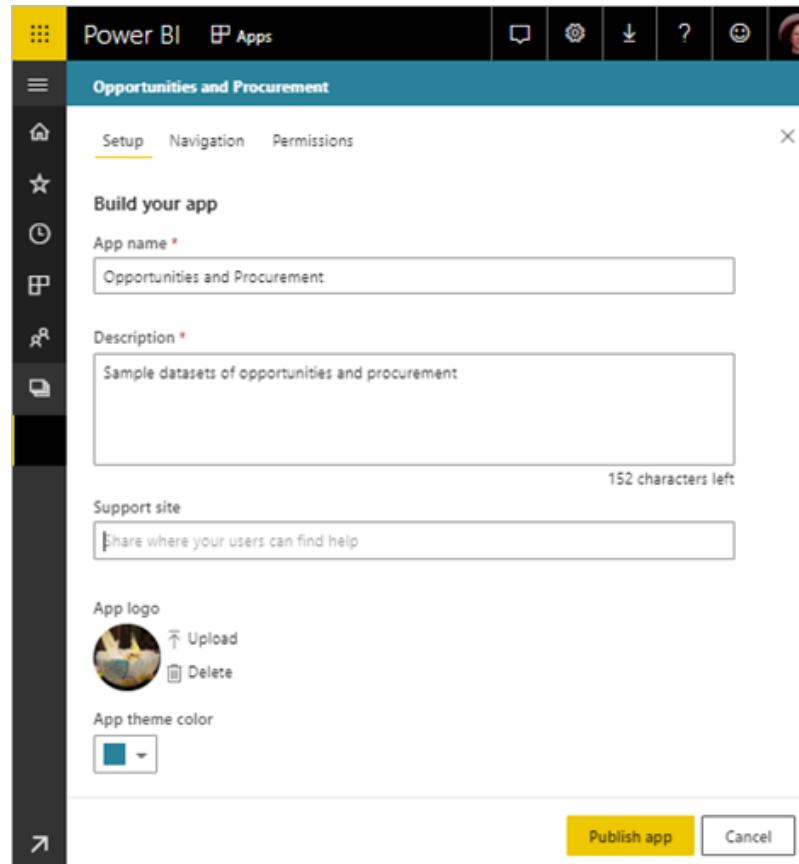
- Apps are created by **Power BI designers** who **distribute** and **share** the apps with their **colleagues**.
- The **new contact list** for apps makes it easier for app users to get help when they need it and for app owners to receive notifications about the app. (available in new workspace)
- The **new option to allow contributors to update app content** helps workspace admins manage access more effectively. . (available in new workspace)



# Sharing

## Power BI Apps

**Customize app** including name, icon, theme and more.



# Sharing

## Power BI Apps

Customize app navigation and organize content in app using **Navigation Builder**.

Navigation builder **can be turned off** to use legacy navigation

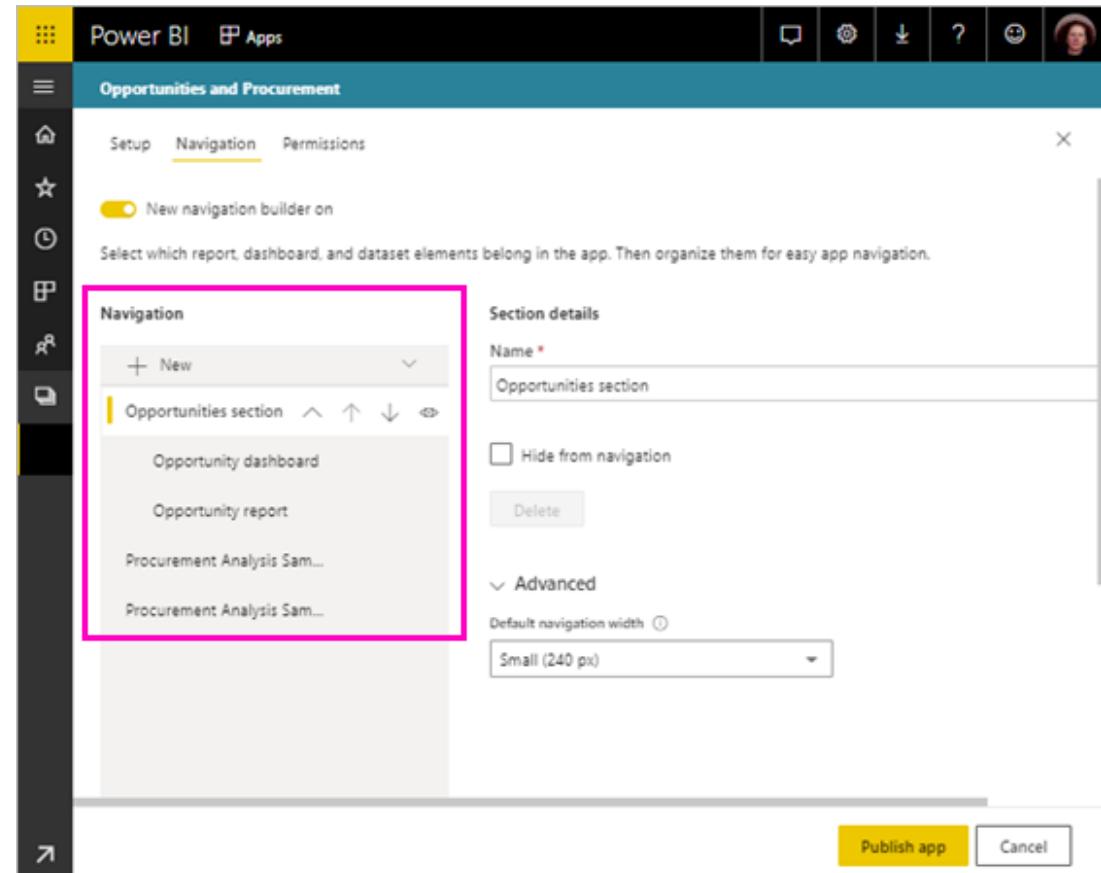
### New navigation builder



On

### App landing page i

- Specific content
- None



# Sharing

## Power BI Apps

**Share app** with entire organization or with specific people or groups

The screenshot shows the 'Permissions' tab of the 'Opportunities and Procurement' app settings. It includes sections for 'Access' and 'Additional permissions'. The 'Access' section allows users to choose between 'Entire organization' (unchecked) and 'Specific individuals or group' (checked). A text input field for entering email addresses is provided. An informational note states: 'If this app uses datasets from other workspaces, you may need to manage permissions manually to make sure everyone has access to the data.' Below this, a note says: 'This app will be created in a Power BI Premium workspace. As long as the workspace remains a Premium workspace, anyone in your organization can be given access to it.' A help icon is present next to the workspace note.

End users get **read permission** to app content.

Can also assign **build or copy permission** to end users.

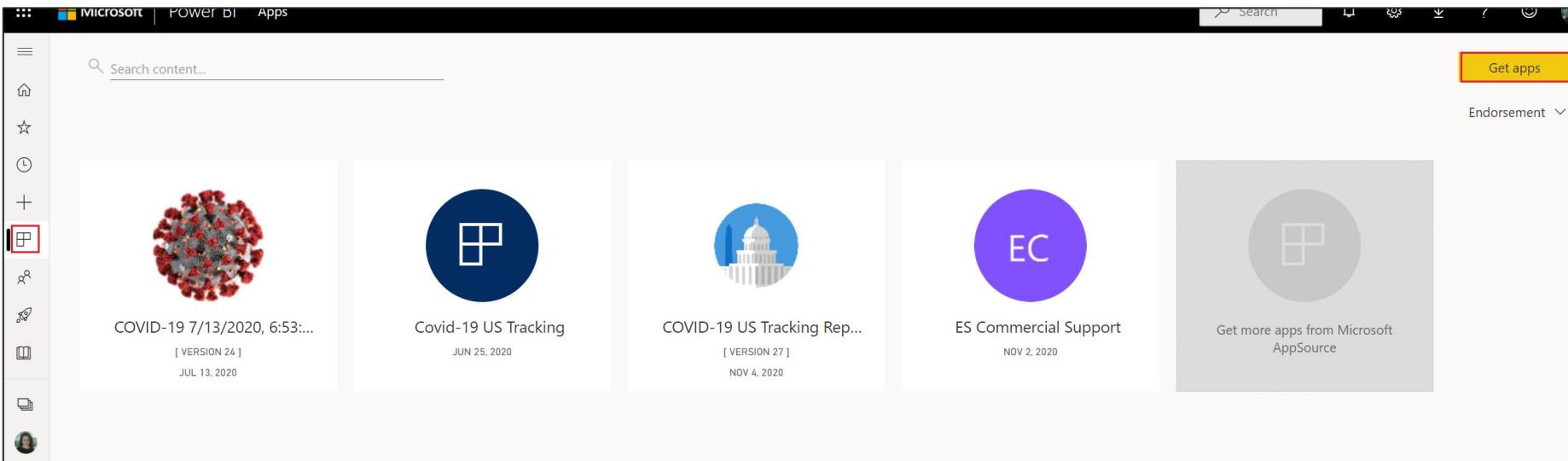
Allow all users to connect to the app's underlying datasets using the Build permission. [Learn more](#)

Allow users to make a copy of the reports in this app. [Learn more](#)

# Sharing

## Power BI Apps

- Users can **install app** through a link provided to them or through “**Get Apps**”

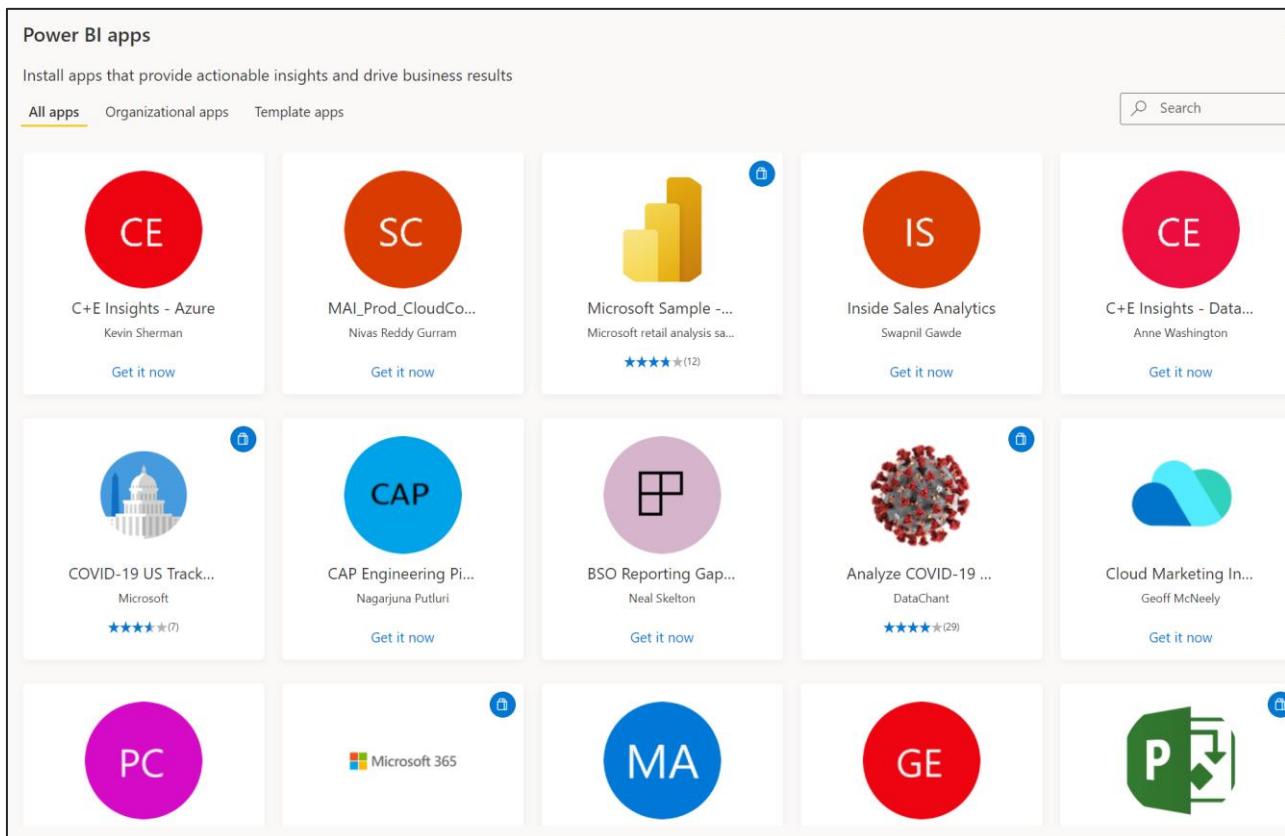


- Apps can also be pushed to the end users automatically by enabling **Install app automatically**
- Users will get **automatic updates** after installing app. Data will be refreshed according to the specification made by the publisher

# Sharing

## Power BI Apps

**Get Apps** provides a searchable portal to search and select Apps



# Sharing

## Power BI App Workspaces, Apps & Content Packs

Users can only **see** the data in the workspaces that they have access to.

Use the **Peer to Peer** sharing for **tentative** and **adhoc** sharing purposes.

Use **App workspaces** as your Development environment to **collaborate**, share so on.

Use **Apps** to **distribute** the content to end users in the organization or groups within.

Use **Organizational Content Packs** if you want users to customize and **forego the lineage** of the reports/dashboards. Users can also use **Power BI Shared datasets** to achieve some of this functionality as well

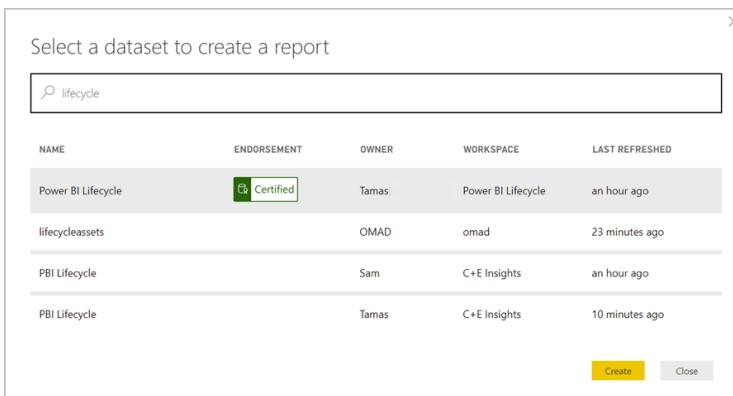
Use restrictions on who can publish the content by using security groups and other active directory means.

*\*You can't create organizational content packs or install them in the new workspace experiences. Apps supersede content packs; so use apps if they will serve the purpose. Content packs are set to be retired.*

# Sharing

## Shared and certified datasets

- Use a **single dataset to build multiple reports** across different workspaces
- **New discovery experience** in the Power BI service and Desktop to help users discover relevant shared datasets
- Capabilities for dataset owners and tenant administrators to **control the use of shared data**
- **Copy reports** - Make copy of report and modify as needed. No need to re-create the data model!
- **Build permission for datasets** - People with build permission can build new content on the dataset inside Power BI and outside (Excel and other tools)
- **Read Permission for datasets** – People with read permission can export summarized data but not the whole underlying data



\* New features are enabled only for the new Workspace experience (v2), and not the classic Workspaces based on Office 365 Groups

# Sharing

## Certified and Promoted reports and apps

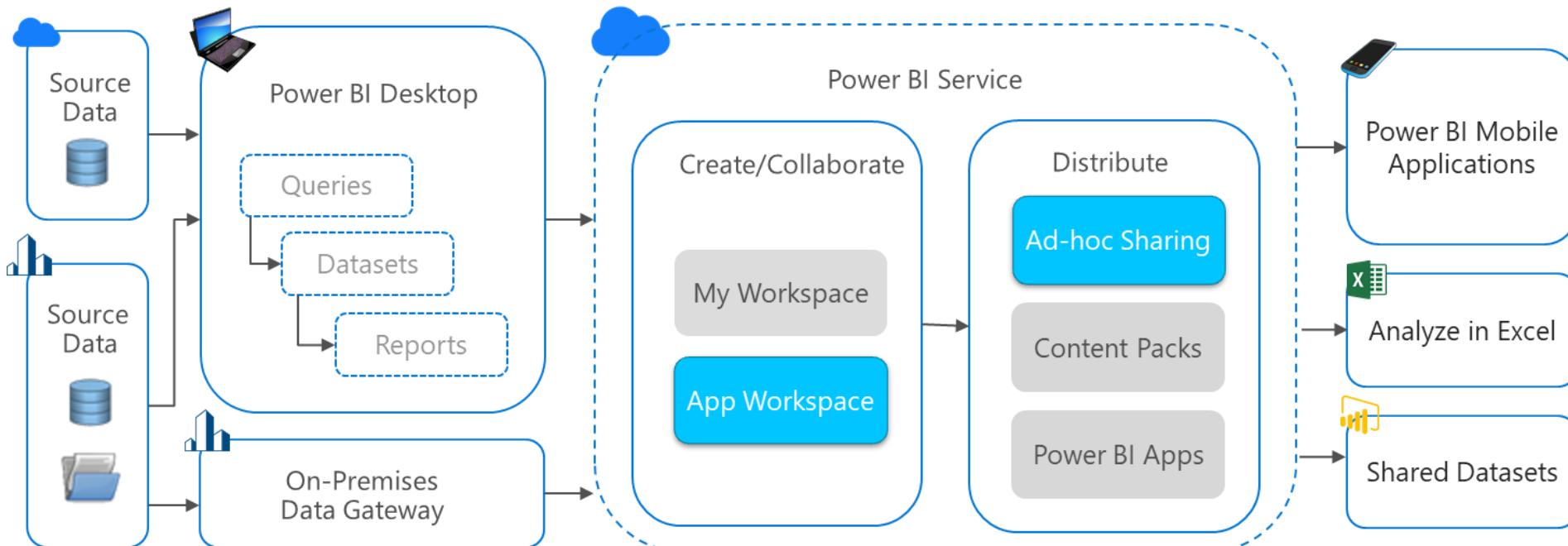
- With **certification**, organizations can **distinguish** their **most valued** and **trusted content**.
- You should use **endorsement** for the content items (apps, reports, datasets, dataflows) you want people to **find, use**, and possibly **re-share**.
- For example, when you're sharing data with a **broad audience**, a Power BI best practice is to share that data via an **app**.
- If you still find it useful to share reports **directly**, however, then endorse the **report itself**.

The screenshot shows the Power BI web interface. At the top, there's a navigation bar with a back button, forward button, refresh button, and a URL field containing <https://powerbi.com/groups/me/reports>. Below the navigation is a dashboard titled "Power BI Operations & Development". It features a summary card with "28.9%" and "3.0" and a "HR Overview" card. A yellow arrow points to the "Certified" badge in the HR Overview card. Below the dashboard is a "Profit&Loss Waterfall" card. At the bottom, there's a "FinanceCorp" section with a table of content items. A yellow arrow points to the "Endorsement" column in this table, specifically highlighting a "B Certified" badge.

The screenshot shows the Power BI mobile app interface. At the top, there's a search bar and a menu icon. Below it is a card with a "Update app" button. A yellow arrow points to the "Endorse this app" button. To the right, a modal window titled "Settings for BizHealth Account..." is open. It contains fields for "Report name" (BizHealth Account Revenues), "Description", and "Contact". In the "Endorsement (preview)" section, there are three rows: one for "B Certified" (status: Yes, Sensitivity: --, Include in app: Yes), one for "Promoted" (status: Yes, Sensitivity: --, Include in app: Yes), and one for another "Promoted" entry (status: Yes, Sensitivity: --, Include in app: Yes). A yellow arrow points to the "Confidentiality User" dropdown in this section. At the bottom, there's a note about endorsements and a "Learn more" link.

# Sharing

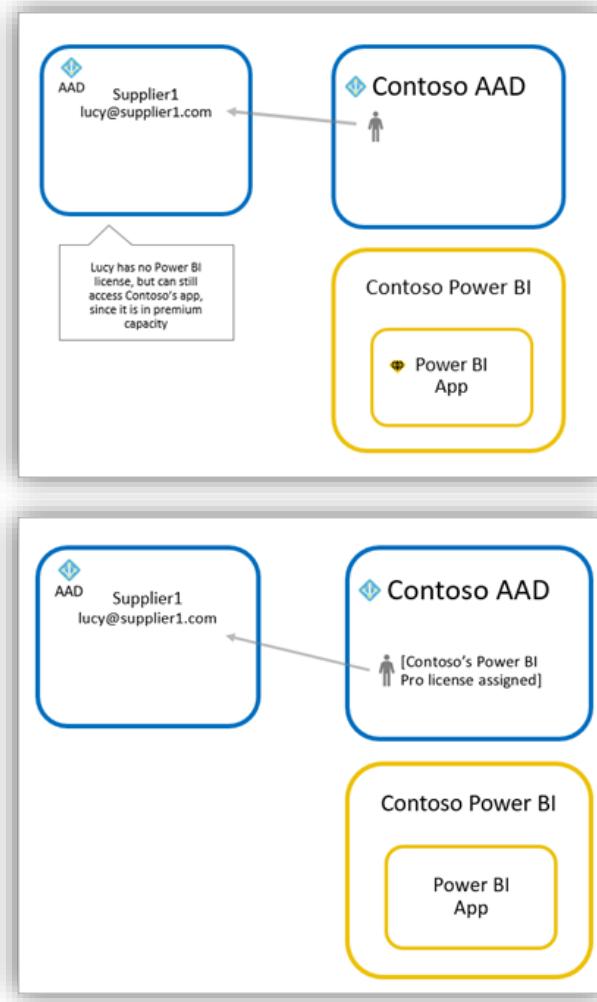
## Power BI Sharing - End to end workflow



# Sharing

## External Guest Access

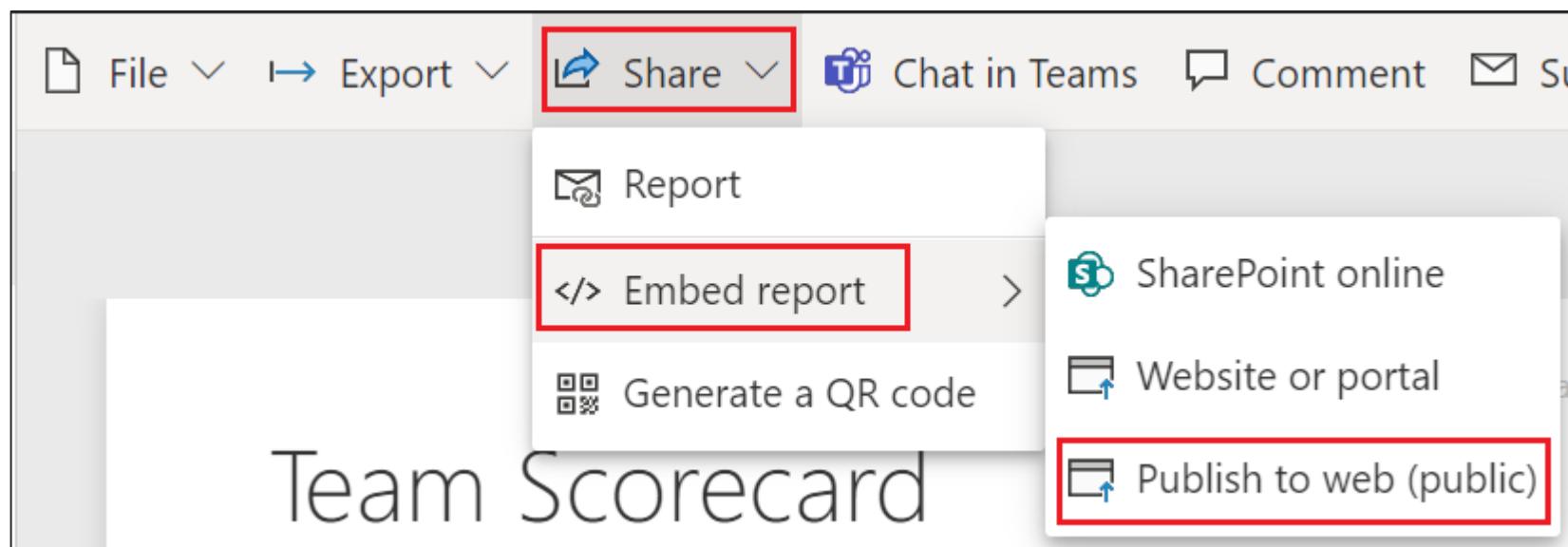
- Power BI + **Azure AD B2B** helps **seamlessly distribution** of Power BI Apps and dashboard to external users
- External users **can be licensed in three ways**
  - Premium Capacity
  - Assigned Power BI Pro license
  - Brings their own Pro license
- Mobile App **is also supported**



# Sharing

## Public Share

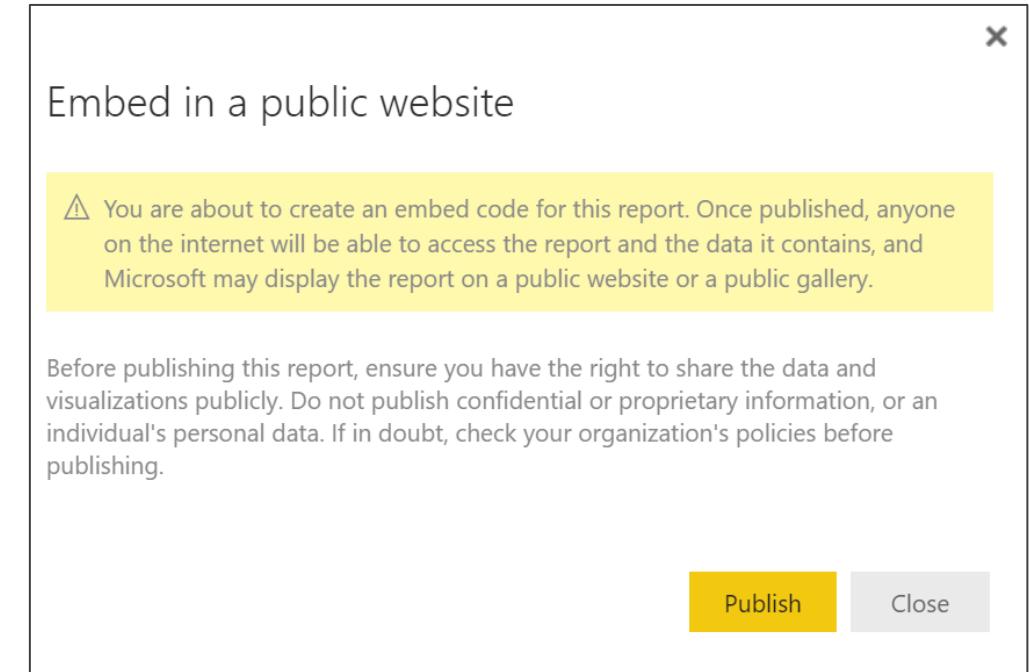
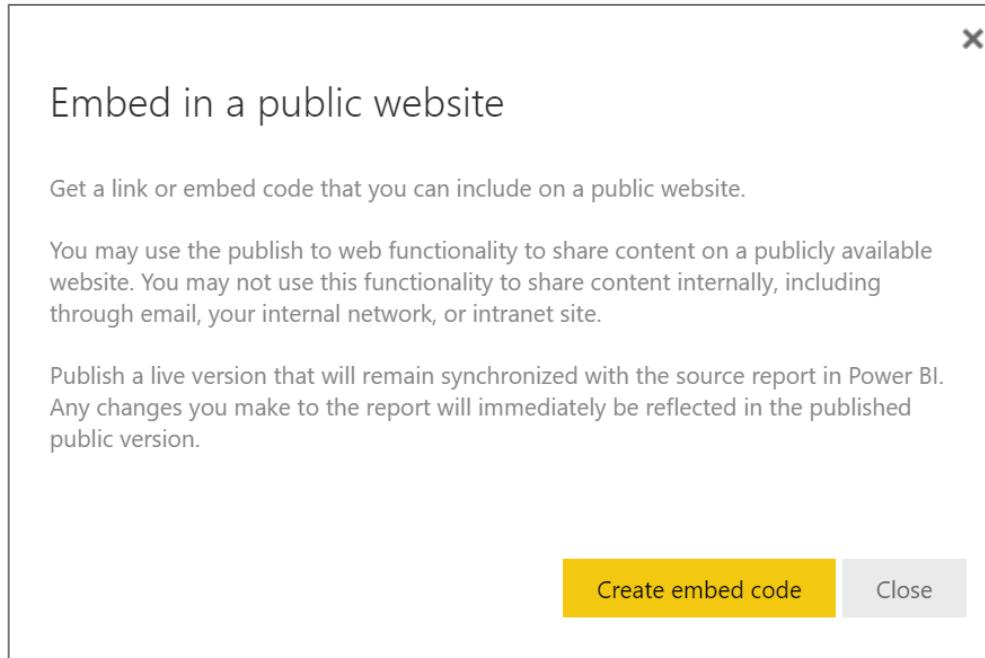
- **Embed interactive visualizations online** such as blog posts, websites or social media
- Visuals can be edited, updated, refreshed or un-shared after publishing
- Sharing starts on a report



# Sharing

## Public Share

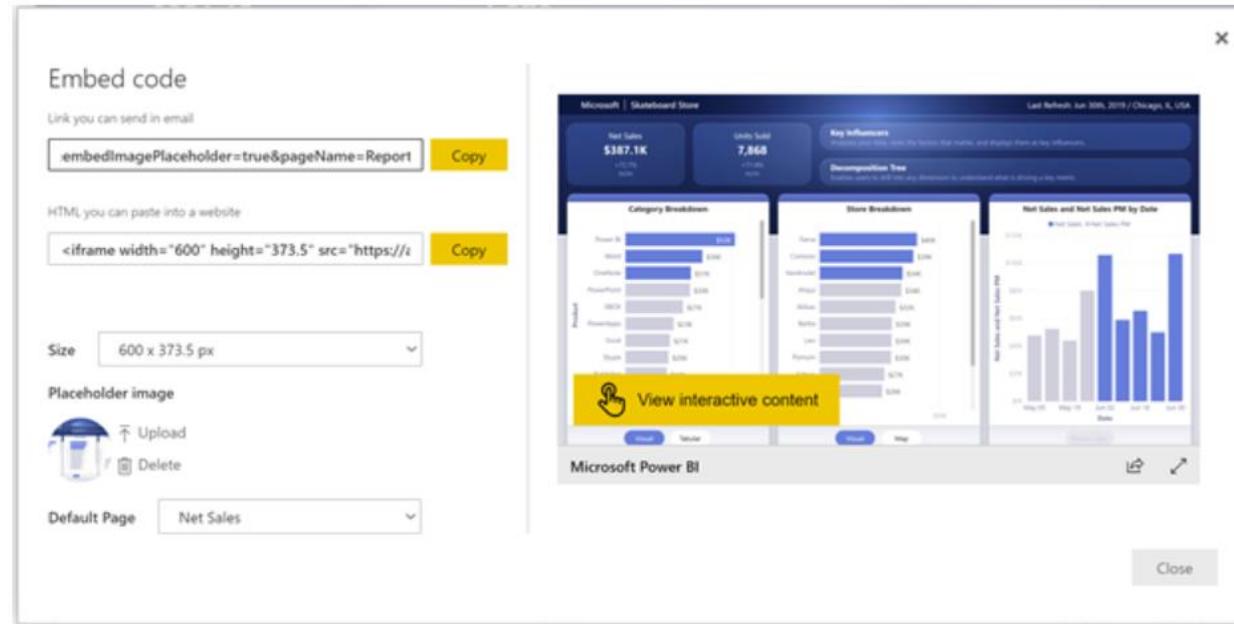
- A link and html code will be generated
- Be aware that data will be **available to everyone and in sync (1h lag)**



# Sharing

## Public Share

- A report can only have one embedded code
- Custom visuals are supported



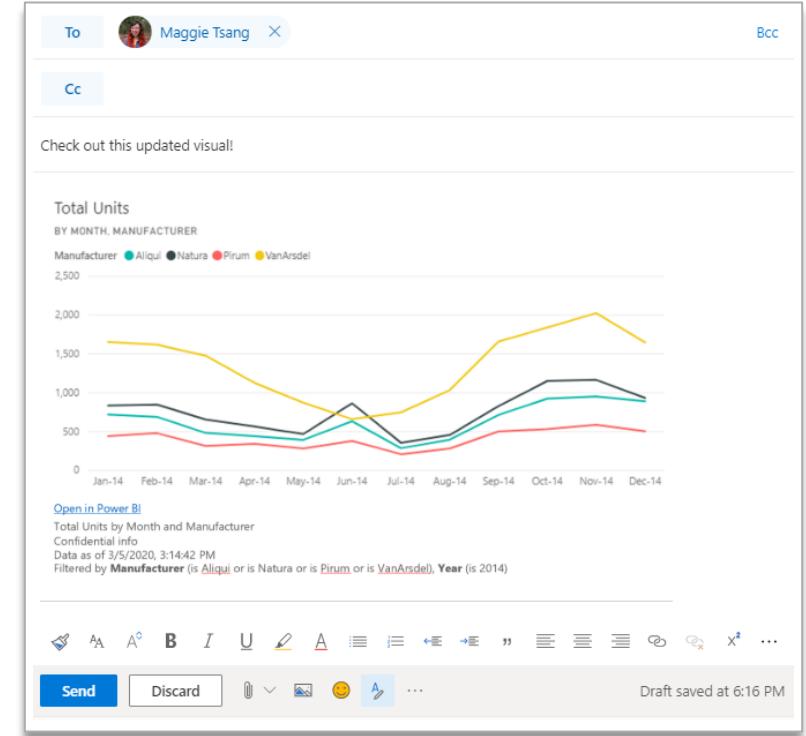
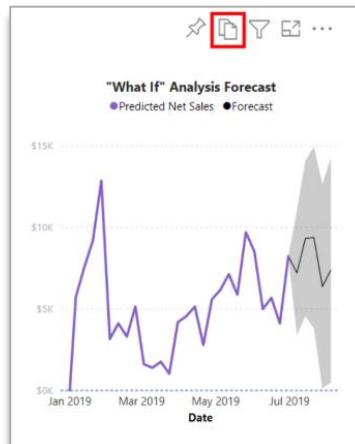
- A **preview pane** shows you how your report looks when embedded
- **Placeholder image** to make a faster loading experience
- **Default page picker** so your report opens on the right page
- **New data refresh experience:** Publish to web uses a cache to help your reports scale to large numbers of users. It works by caching query results for 60 minutes.
- **New Heavy Usage Experience:** Publish to web is designed to be very scalable and help you reach very large audiences with little need to think about scalability.

# Sharing

## Copy Visual as an Image

You can copy a static image of the visual in the Service along with the visual's metadata including:

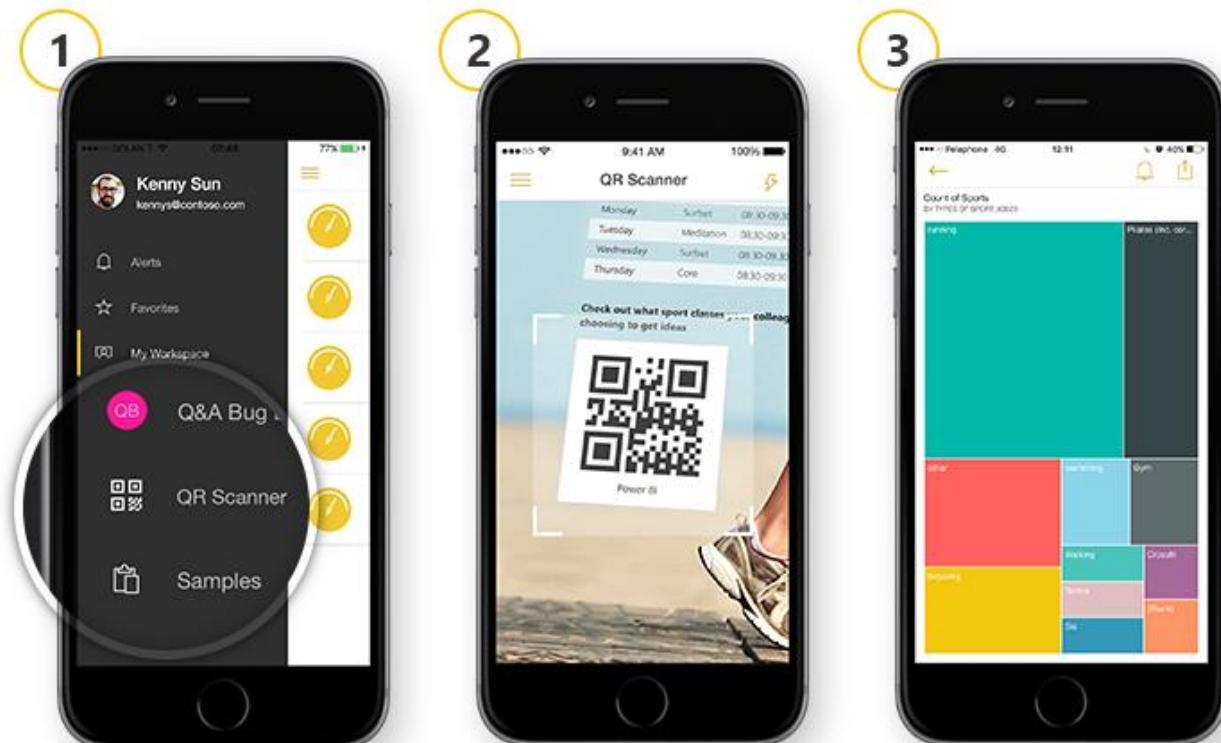
- A link back into the Power BI dashboard or report
- The title of the report or dashboard the content was copied from
- If the image contains confidential information
- The time stamp of when the data was last updated
- The filters applied to the visual



# Sharing

## QR Code

Access data by simply **scanning a bar code** on your device

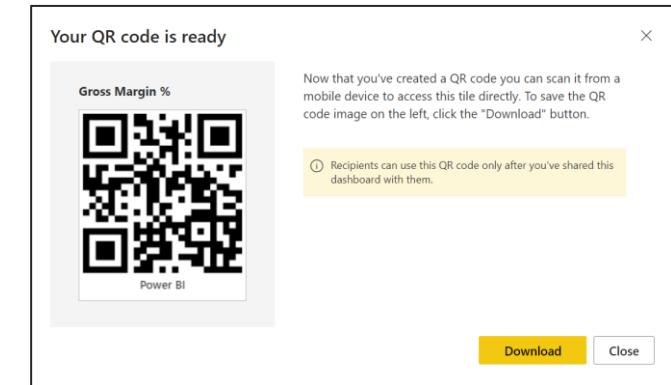
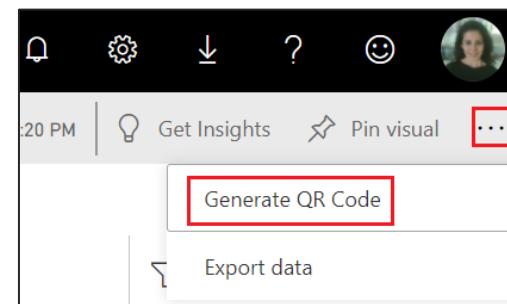
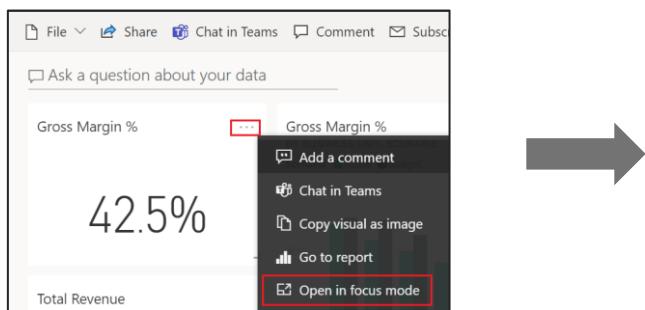


# Sharing

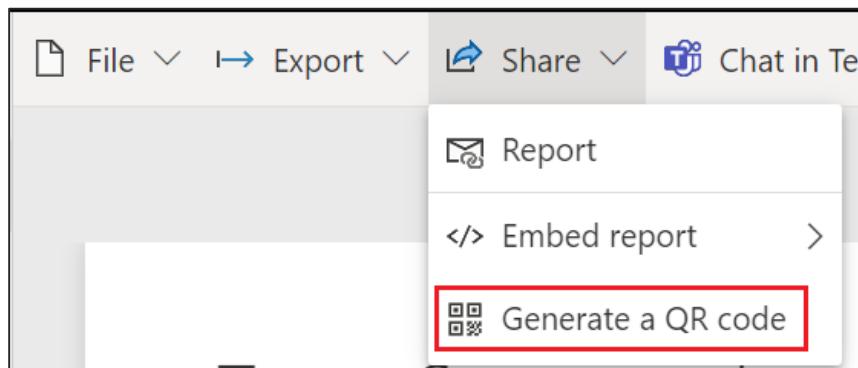
## QR Code

- Print, e-mail, include the QR code in a presentation (.jpg)
- Use augmented reality and overlay data over the world

For the **tiles** in a **dashboard**:



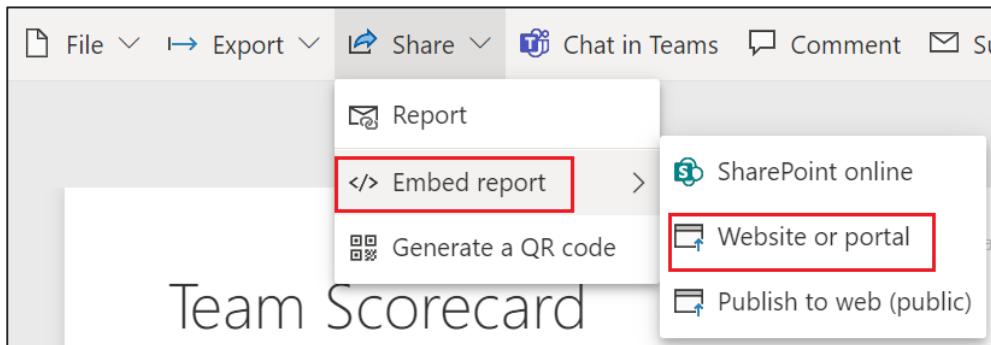
For the **reports**:



# Sharing

## Secure Embed

- Easily and **securely embed reports** in internal web portals, whether cloud-based or hosted on-premises
- **No-code embedding** into any portal that accepts a URL or iFrame to embed
- Embedded report **respects all item permissions and data security** through row-level security (RLS) defined in Power BI Service
- Embed option also **supports URL Filters and URL settings**



Secure embed code

Here's a link you can use to embed this content:

```
https://app.powerbi.com/reportEmbed?reportId=3b998909-65d9-4624-98ce-41da56af140
```

HTML you can paste into your blog or website

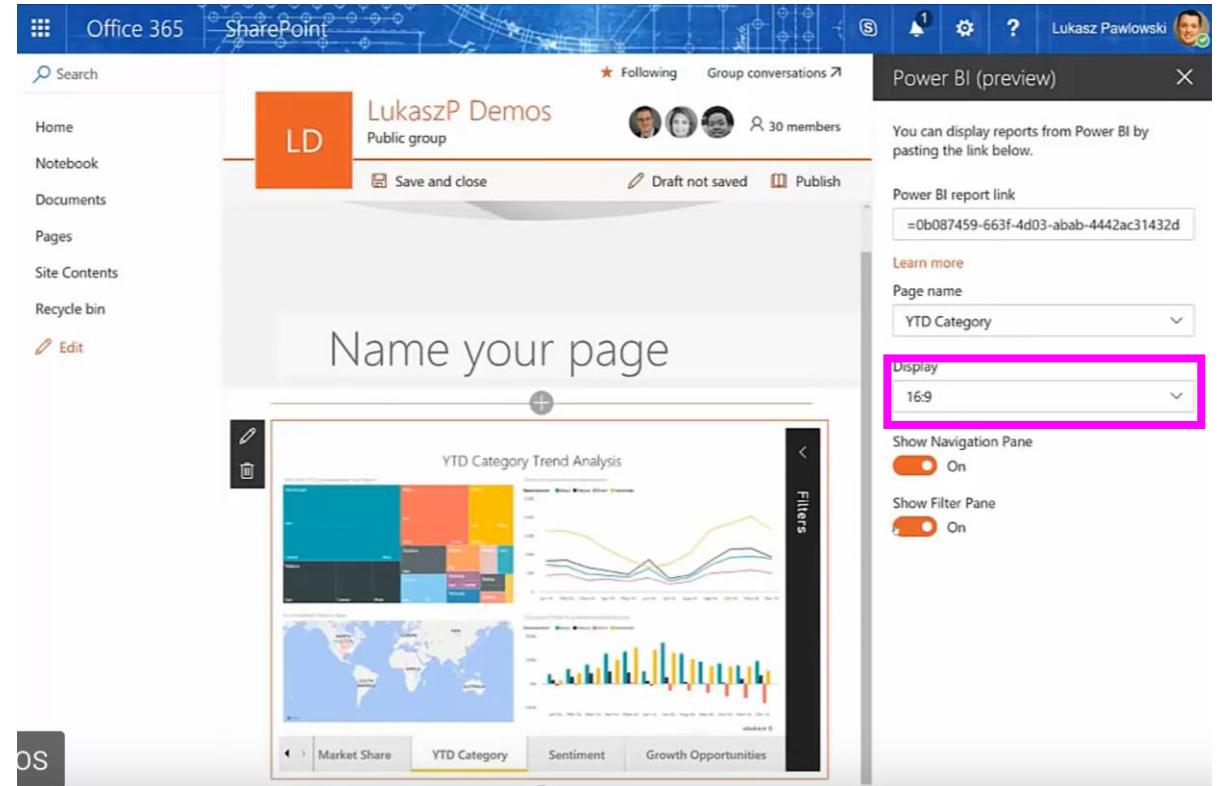
```
<iframe width="2278" height="1282" src="https://app.powerbi.com/reportEmbed?reportId=3b998909-65d9-4624-98ce-41da56af140"></iframe>
```

**Close**

# Sharing

## Integrate with SharePoint Online

- A **web part** exists to allow easy integration of a Power BI report into a SharePoint Online page.
- Users must have **access** to both the SharePoint page and the Power BI report.
- **Single sign-on** experience between the two platforms



# Sharing

## E-mail subscriptions

- Subscribe yourself and other users to emails of the **report pages** or **dashboard** that matter most.
- Once subscribed, Power BI will regularly send snapshots of the content along with link to the report whenever the data changes.
- Set up **time-based scheduling** for email subscriptions.
- Subscriptions can **run daily or weekly on specified day and time**.
- Subscriptions can also be **run on-demand**.

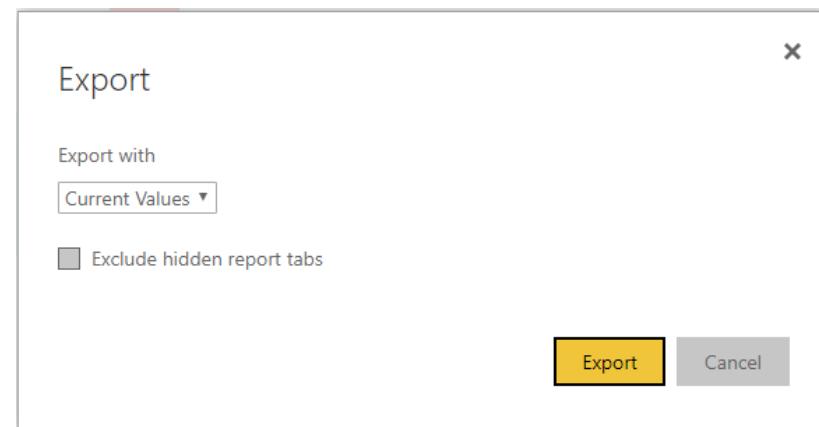
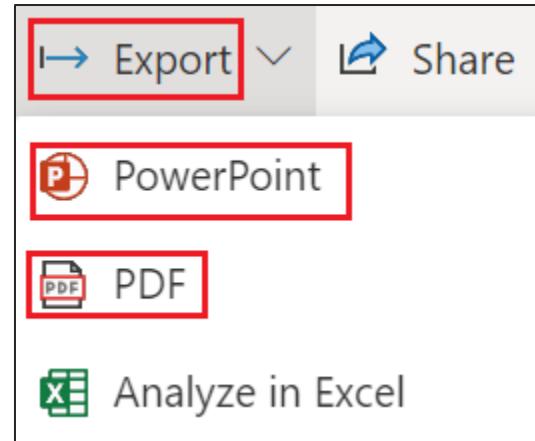


The screenshot shows the 'Add another subscription' dialog box. At the top, there is a yellow header bar with a '+' icon and the text '+ Add another subscription'. Below this, the 'Report page' dropdown is set to 'Sales Analysis'. The 'Frequency' dropdown is set to 'Daily'. Under 'Scheduled Time', all days of the week are checked. The 'Start date' is set to 2/20/2019 and the 'End date (optional)' is set to M/d/yyyy. A checkbox for 'Also give access to this report' is checked. A note at the bottom states: 'Emails will be sent daily at 09:00 AM Eastern Standard Time starting 2/20/2019.'

# Sharing

## Export to PowerPoint & PDF

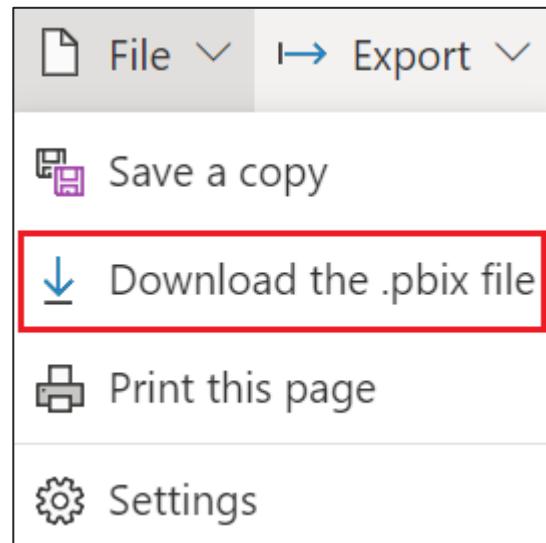
- Capability of exporting **Reports to PowerPoint** or **PDF** (static export)
- Each page becomes a slide in PowerPoint and a page in PDF
- A **link** is generated for the original report along with a “**Title**” **slide** in PowerPoint
- Can **export “Current data”** on report based on selected slicers, filters etc..



# Sharing

## Download Power BI Desktop files

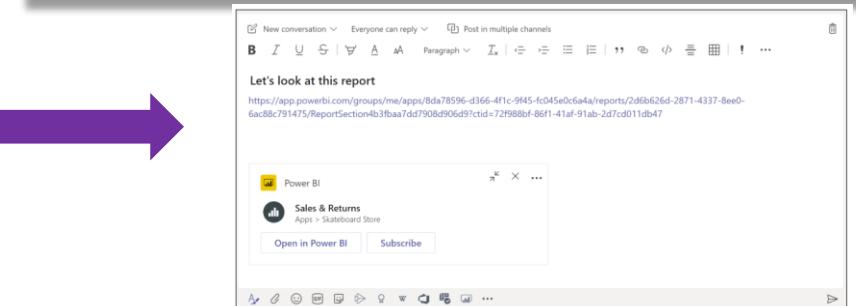
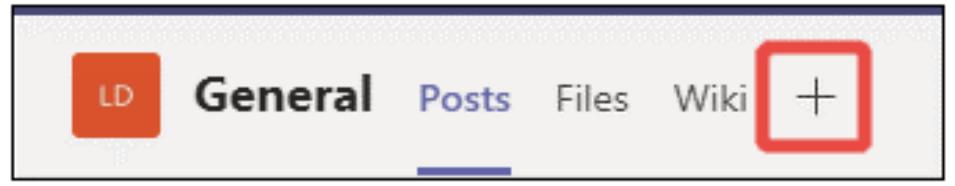
- You can **recover a file from the service** if you lose the original from your local computer, download someone else's report if you are part of a group, and get the latest version of the report if you made changes in the web.
- Only files **uploaded after November 2016** will be available for download.



# Sharing

## Microsoft Teams

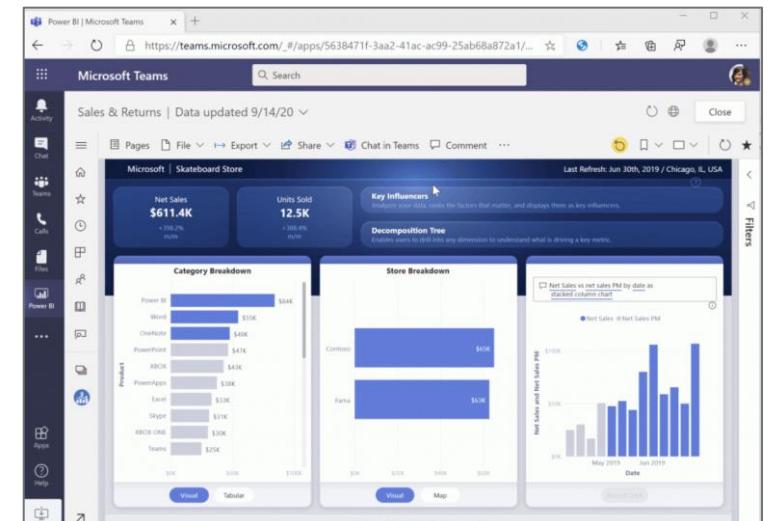
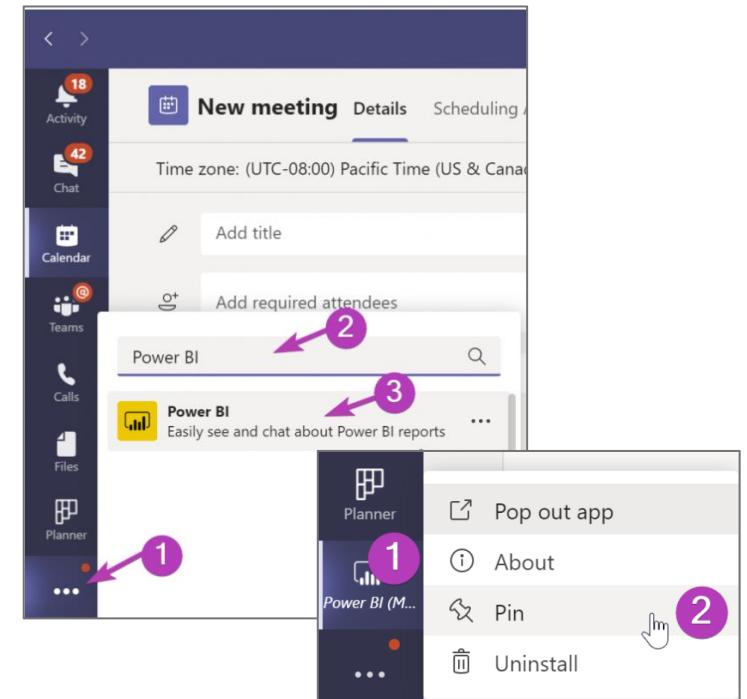
- **Power BI Tab** is a great way to cultivate the habit of data driven decision making.
- Adding reports where you collaborate, helps co-worker find and track the data they need to achieve their objectives.
- It is a great way to manage change in your organization. As new people join a team, the data they need is right there and ready for them to use.
- **Link previews** help users know which item the link goes to and provide rich information and actions to help colleagues find, open, and subscribe to the data they need to help make better decisions.



# Sharing

## Microsoft Teams

- PBI App for Teams
- Find your reports faster with Power BI in Teams Search
- Start a Chat in Teams from Power BI



# Sharing

## Data Security – Sovereign Clouds / National Clouds

Along with the commercial (global) cloud, Power BI is available in three separate National clouds:

- US Government
- Germany
- China

Offers same levels of security, privacy, compliance and transparency as the global version of Power BI, combined with a **unique model for local regulations** on service delivery, data residency, access, and control.

*Note: All the commercial features are not available in all national clouds.*

# Sharing

## Data Security – Data in Power BI

**Imported data** - Data is moved to Power BI and leveraging it's in memory engine.

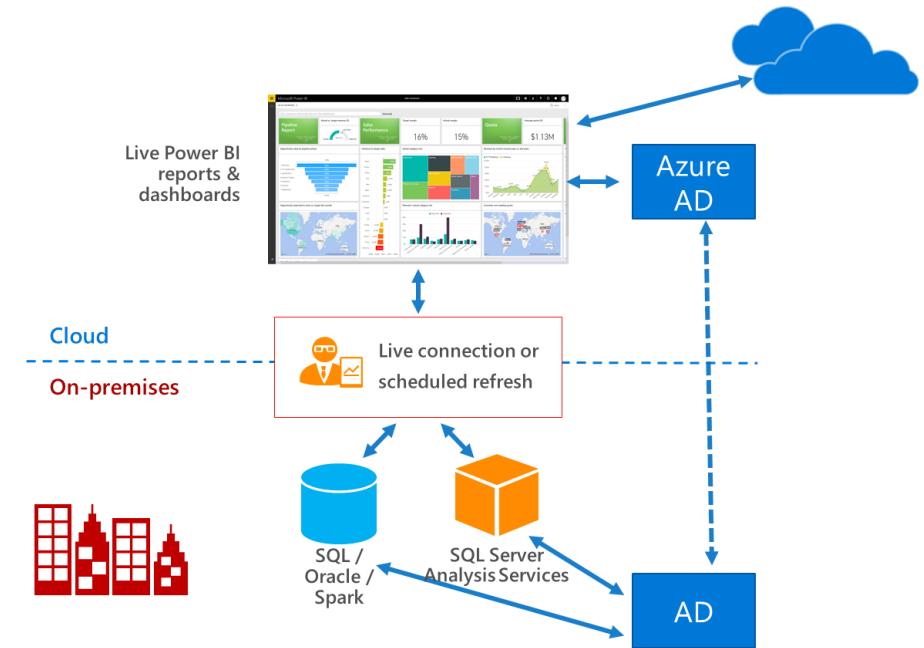
- Uses saved credentials to refresh

**Live connection or Direct Query** - Data is stays in original location

- Uses saved credentials or passes username to data source directly.

**Pushed data**

- Data is pushed to Power BI and leveraging it's in memory



# Sharing

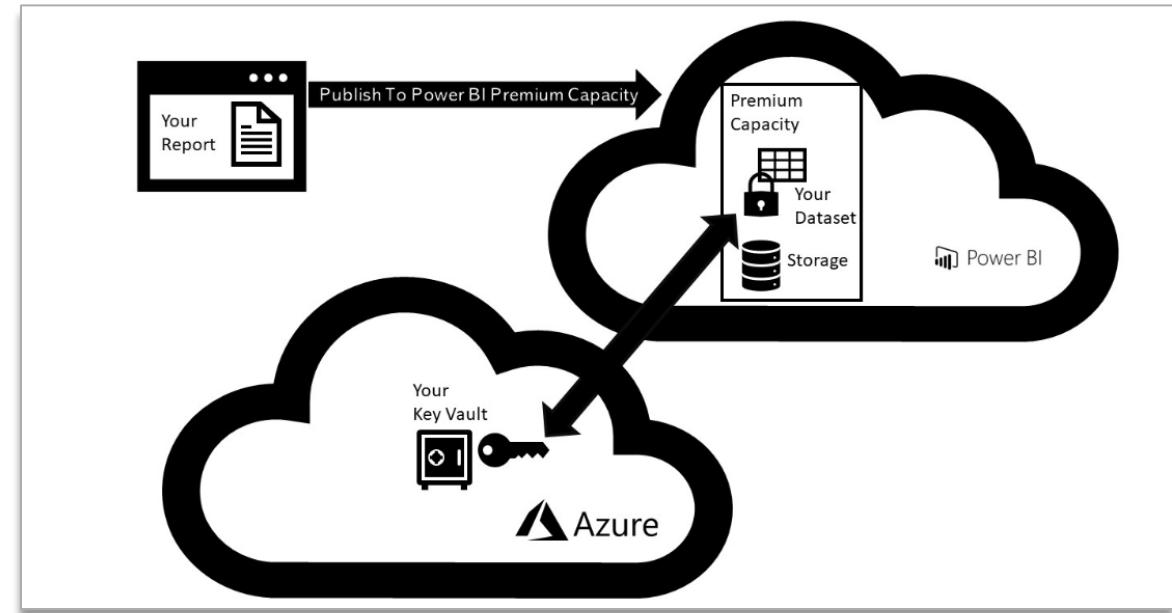
## Data Security – Data Storage in Power BI

Data Source	Metadata/Visual cache	Credentials	Data
Analysis Services (on-prem or Azure)	Nothing stored except reference to DB in Azure SQL, Encrypted. Visual cache stored in Azure BLOB storage, Encrypted	Credentials not needed so not stored.	Nothing stored at rest in Power BI service.
Direct Query	Stored in Azure BLOB storage, Encrypted	Model created in service: stored as part of connection string stored in Azure BLOB storage, Encrypted  Imported from desktop: Stored in Azure SQL, Encrypted.  (Encryption key is stored on the machine running the Gateway on customer site.)	Nothing stored at rest in Power BI service.
Pushed data (i.e. non-Direct Query, non-AS on-prem)	Stored in Azure BLOB storage, Encrypted	(Not applicable)	Stored in Azure SQL (V2) / Azure Blob Storage (V1), Encrypted
ETL/Cached data	Stored in Azure BLOB storage, Encrypted	Salesforce/OneDrive: refresh tokens stored in Azure SQL DB, Encrypted  Refresh dataset: stored in Azure SQL DB, Encrypted  Non-refresh dataset: No credentials stored	Stored in Azure BLOB storage, Encrypted

# Sharing

## Data Security – Bring Your Own Key (BYOK)

- This feature gives enterprises the ability to configure the encryption key used to encrypt their data when it's stored in the Microsoft cloud.
- This feature is available for Power BI Premium.
- It applies to datasets in import mode.
- Datasets using DirectQuery Live Connect do not store the data at rest, therefore are not covered by BYOK.



# Sharing

## Data Security - Gateways

---

Gateways use an **encrypted channel for communications** and **Data Compression**.

---

**Credentials** for data sources are **encrypted asymmetrically** so that they cannot be decrypted in the cloud.

---

The credentials are sent to the machine, running the gateway, on-premises where they are decrypted when the data sources are accessed.

---

Only **outbound ports** are required and are **well identified** (actual IPs can be white listed for increased security)

---

With Gateways and Live Connections, your **data can stay on-prem – only query responses are transferred** to the cloud runtime.

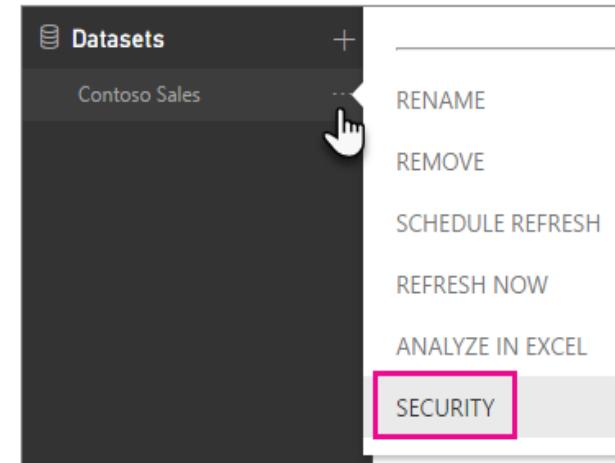
---

**Enterprise Gateway** can be used in conjunction with **ExpressRoute**

# Sharing

## Data Security - Row-Level-Security

- **Roles and rules** defined (using Power BI Desktop) in the data model **restrict the data** that users can see at the **row level for each dataset**
- **Manage security** on the data model from Power BI Service.



### Add Member

(user has to be within organization)

A screenshot of the "Row-Level Security" dialog. It shows a list of "United States (0)" and a "Members (0)" section. Below is a "People or groups who belong to this role" section with an "Enter email addresses" input field and an "Add" button. A pink rectangle highlights the "Enter email addresses" input field.

### Remove member

A screenshot of the "Members (1)" dialog. It shows a list of "People or groups who belong to this role" with an "Enter email addresses" input field and an "Add" button. Below is a list of members with a delete icon (an "X" inside a square). A pink rectangle highlights the delete icon.

### Validate role

A screenshot of the "Row-Level Security" dialog. It shows a list of "United States (1)" and a "Members (1)" section. Below is a "Test as role" button and an "Enter email addresses" input field. A pink rectangle highlights the "Test as role" button.

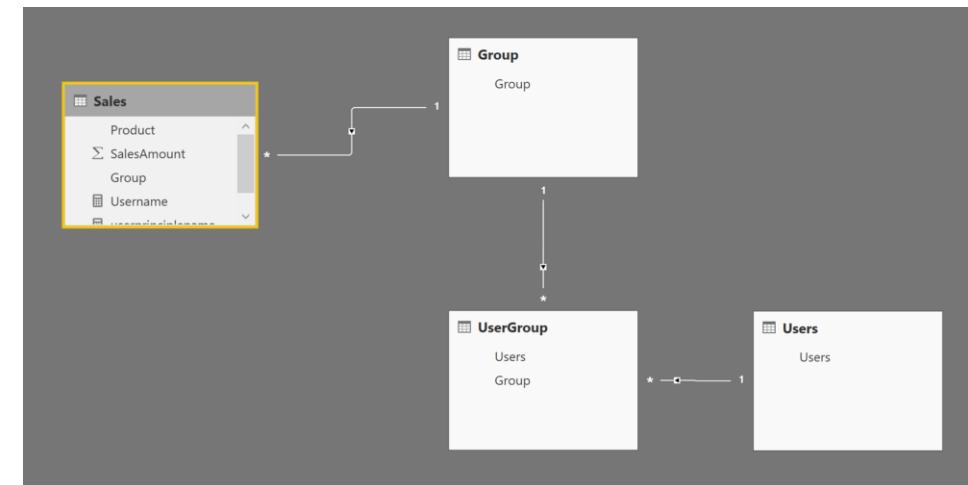
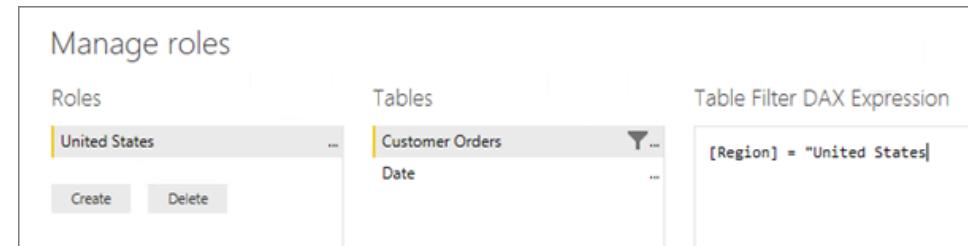
**Note** - Permissions are cumulative across roles and can contradict!

# Sharing

## Data Security - Row-Level-Security

**Static:** The filtering condition is pre-determined at Power BI Desktop creation.  
**E.g.:** Region = "United States"

**Dynamic:** The filtering condition is evaluated run-time because of using DAX functions such as **UserName()** in the filtering conditions. Aptly suited for implementing the logged in user role.



# Sharing

## Data Security - Row-Level-Security (Limitations)

You can define RLS only on the datasets created using Power BI Desktop client.

Only Import, and Direct Query connections are supported. Live connections to Analysis Services are handled in the on-premises model.

Cortana is not supported with RLS at this time.

External sharing is not currently supported with datasets that use RLS.

App Workspaces need to be configured for the members to have viewer rights for RLS to work.

# Demonstration

## Security

Explore Sharing Options, Row Level Security



**Questions?**



# Knowledge Check

What is a workspace?

What is Power BI app and what is it used for?

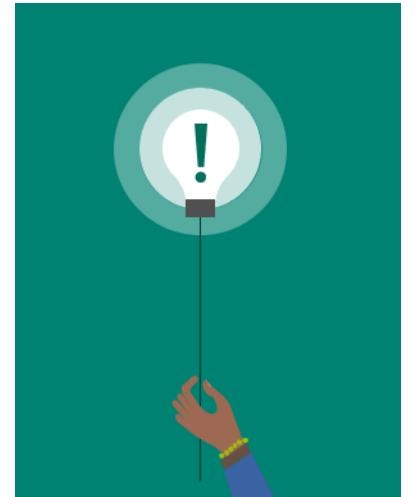
What are the options for data security and why are they used?

# Lesson 6: Connect from Excel

# Objectives

After completing this learning, you will be able to:

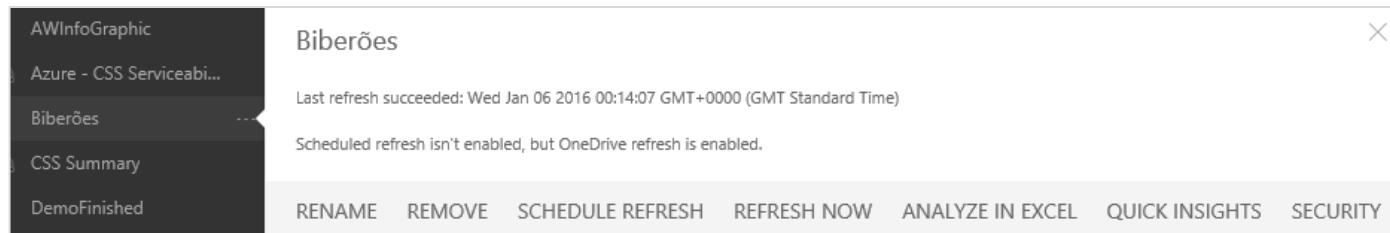
- Describe how to consume your Power BI data models in Excel



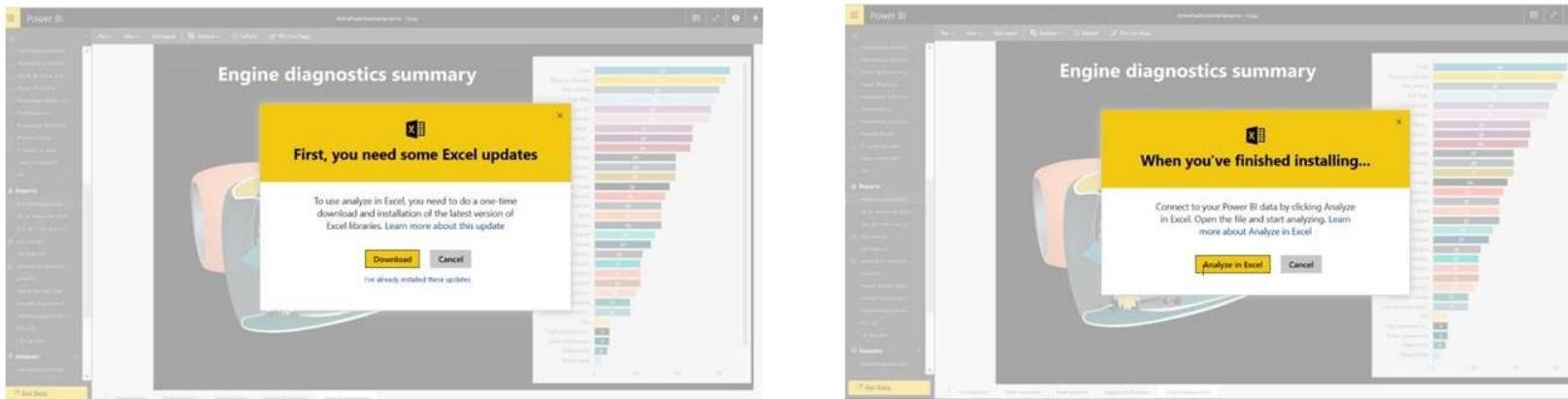
# Connect from Excel

## Consume your Power BI data models in Excel

- Access a dataset and consume it with native Excel visualizations – pivot-tables, pivot-charts or slicers but not Power View



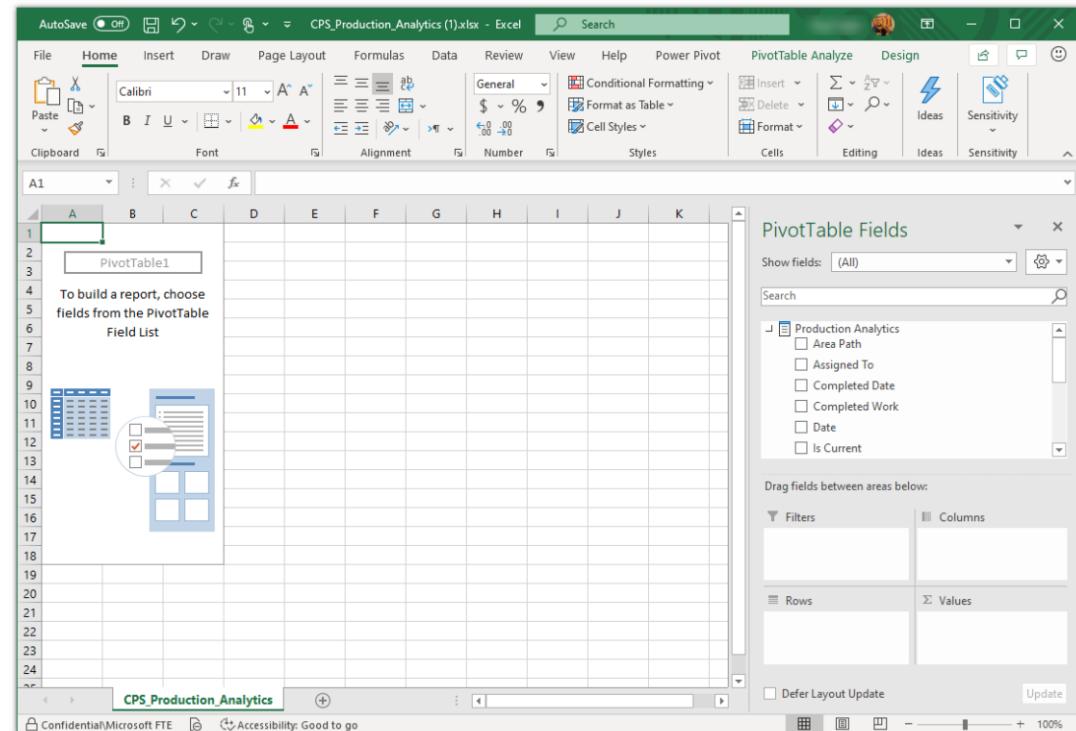
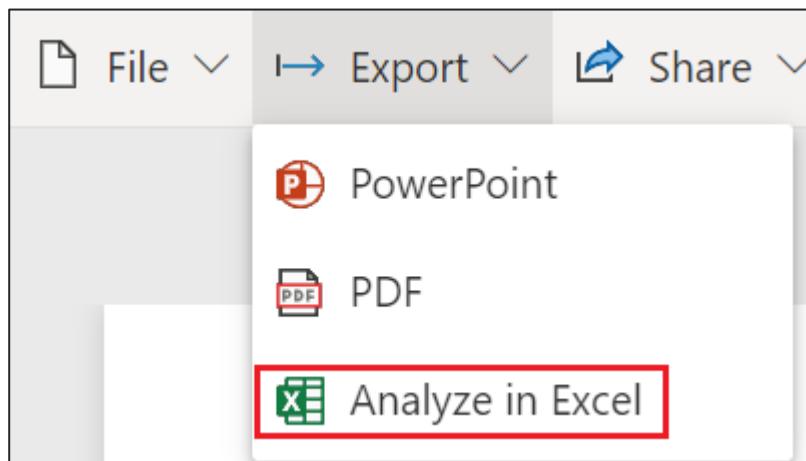
- You might need to update your client libraries



# Connect from Excel

Consume your Power BI data models in Excel - **Analyze in Excel**

- When you click on Analyze in Excel in the Power BI service it will download an **Excel file that includes a PivotTable connection to the Power BI dataset**, instead of the .ODC file that was used before
- Explicit measures must be created in order to use them in the **Values** part of pivot-tables



**Questions?**



# Knowledge Check

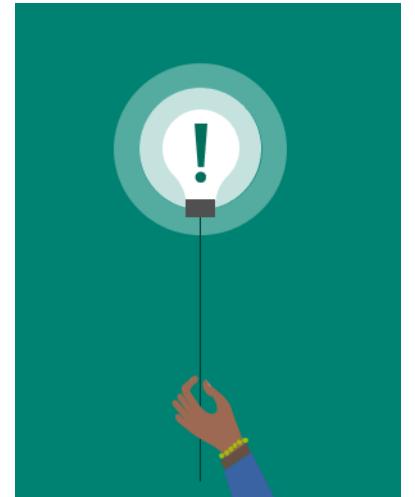
How can you consume your PBI data models in Excel?

# Lesson 7: Mobile Reports

# Objectives

After completing this learning, you will be able to:

- Describe supported platforms for the mobile app
- Demonstrate the feature of mobile app



# Mobile Reports

## Mobile Apps – Platforms

- Apps are available **for iPad, iPhone, Apple Watch, Android and Windows Devices**

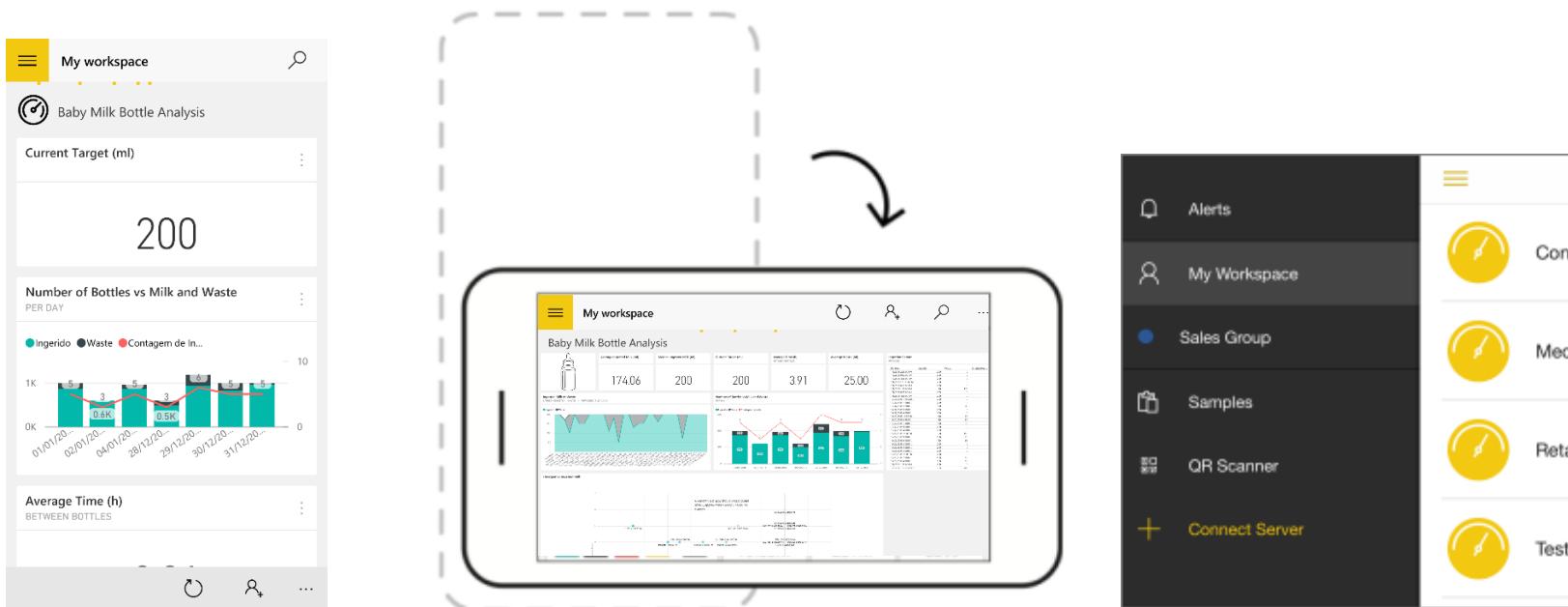


- **Features** may vary across platforms but tend to be the same in the future
- The mobile apps can also be used with **SQL Server 2016 Mobile Reports and KPIs** and require no Power BI licensing
- Supports **Single Sign-On (SSO)** in the Power BI mobile **Windows app**

# Mobile Reports

## Mobile Apps – Dashboards

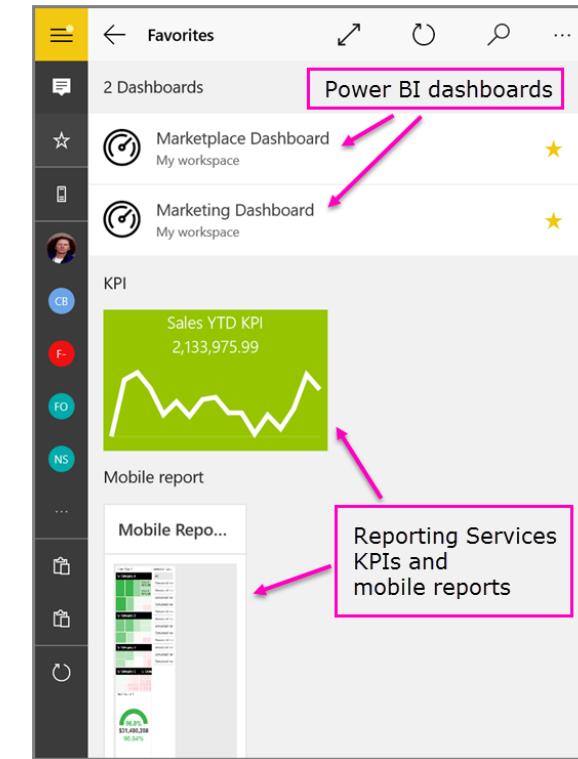
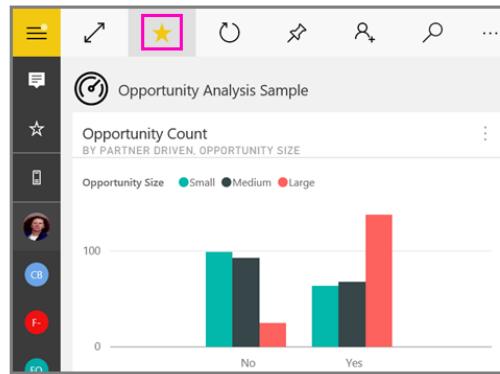
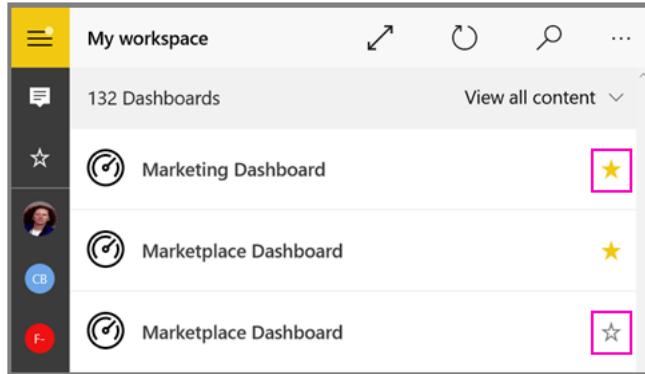
- **Interact** with dashboards in **your workspace** or groups'
- When the dashboard is open it displays a series of tiles and supports real-time
- Flip it to display the entire dashboard and pinch to zoom



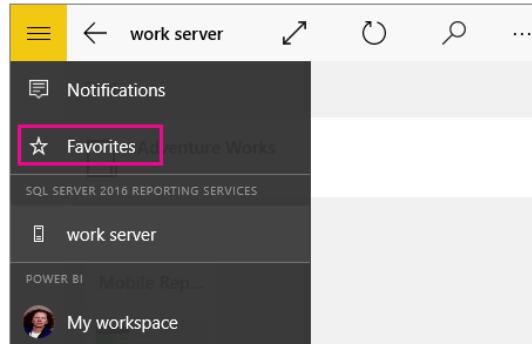
# Mobile Reports

## Mobile Apps – Favorite Dashboards

- Favorites is your landing page in the Power BI Mobile app
- Make **a Power BI dashboard** a favorite in the mobile apps



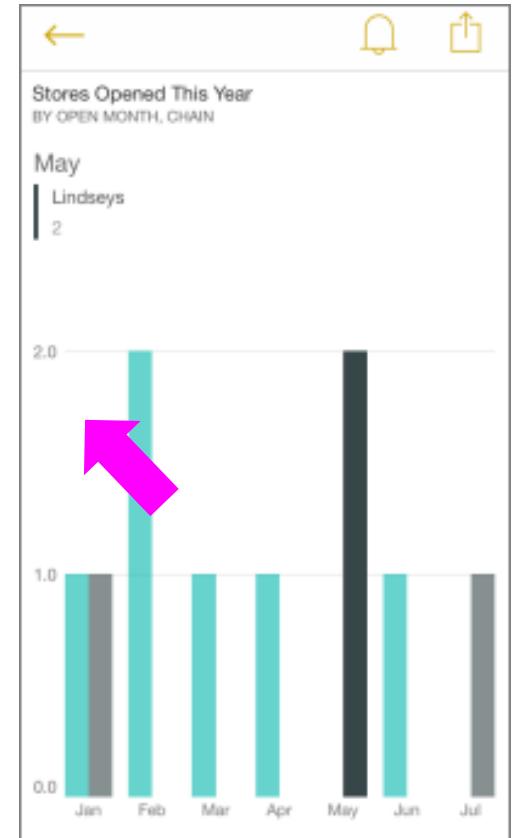
- **View** your favorite Power BI dashboards, and Reporting Services mobile reports and KPIs



# Mobile Reports

## Mobile Apps – Tiles

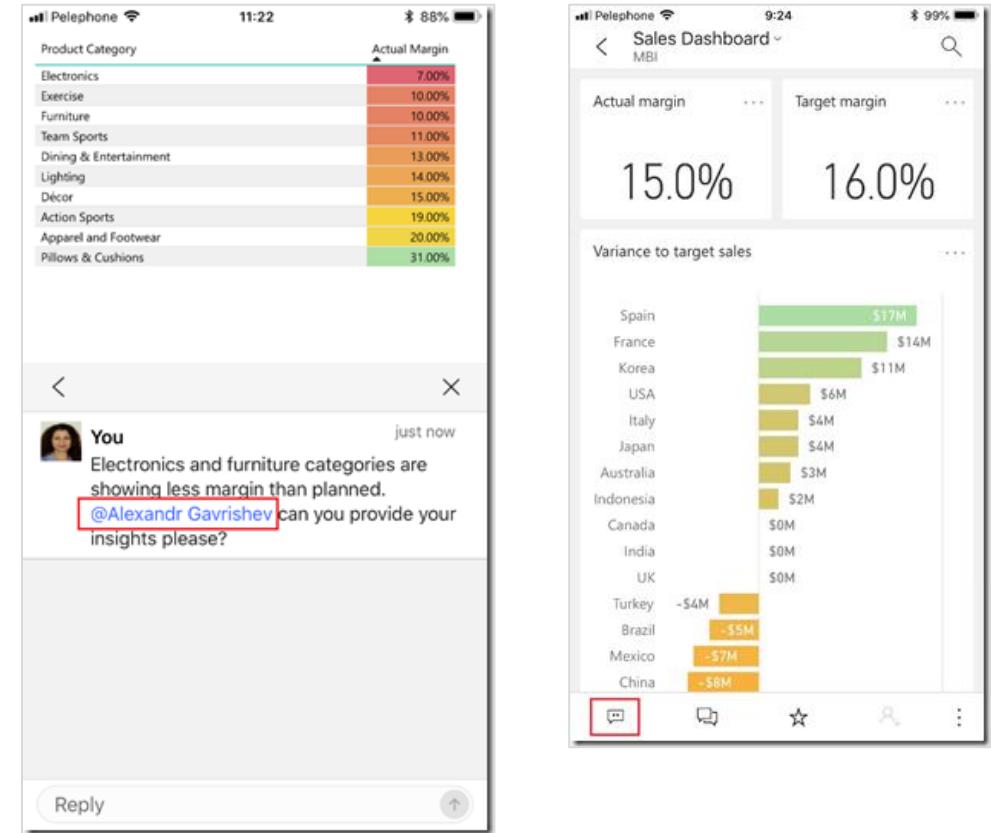
- Interact with **tiles** by clicking them and opening in **Focus Mode**
- Select a bar in the bar chart for detail
- Spin a pie chart to show the values for each category



# Mobile Reports

## Mobile Apps - Dashboard comments

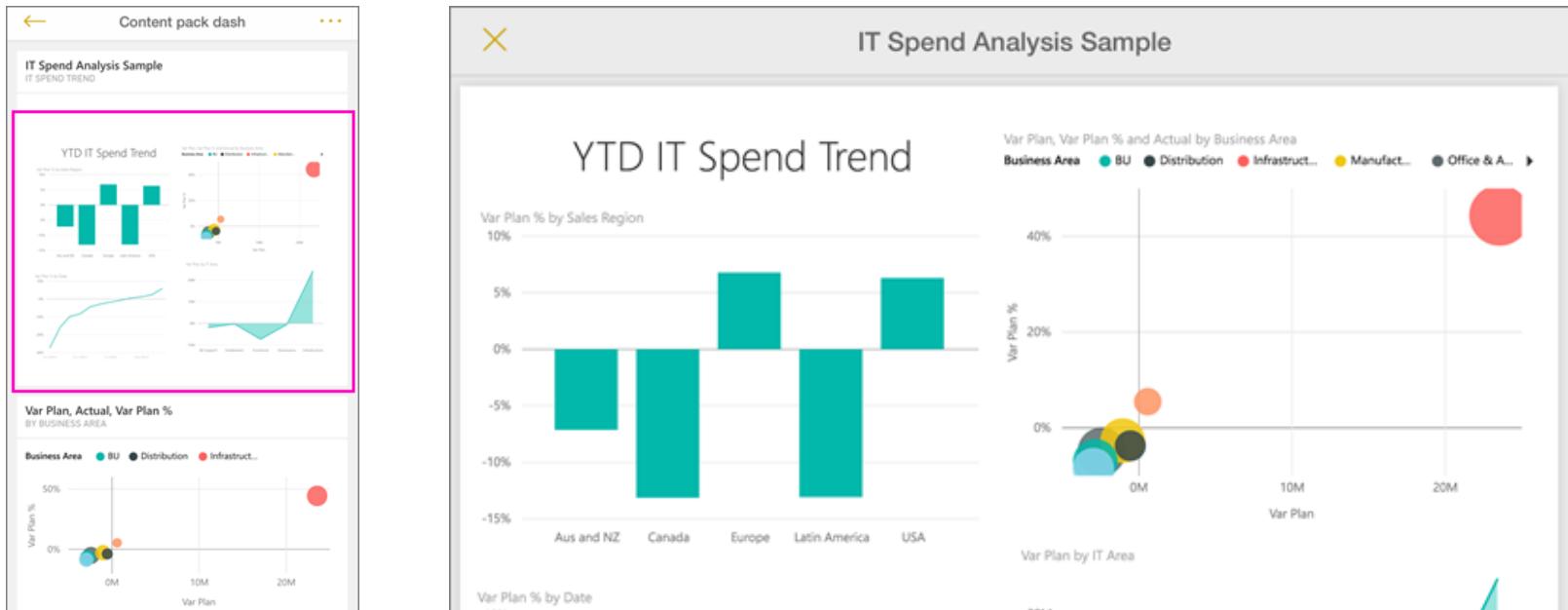
- Directly **add comments** to dashboards and specific visuals to **discuss your data**
- Pull people into your conversation by **@mentioning** others within your organization



# Mobile Reports

## Mobile Apps – Reports

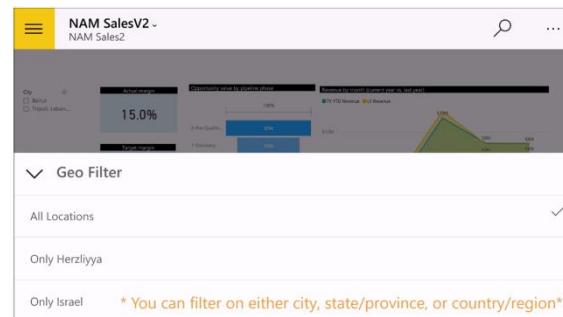
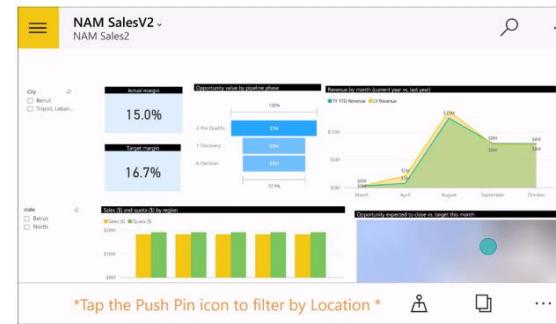
- **Open the underlying report and interact** with it with all features such as drill down & up, cross-highlighting and cross-filtering and **live data sources**
- **Pinch** and **zoom** are available in all report views making it easier for you to zoom in and out of your report content



# Mobile Reports

## Mobile Apps – Filtering Reports

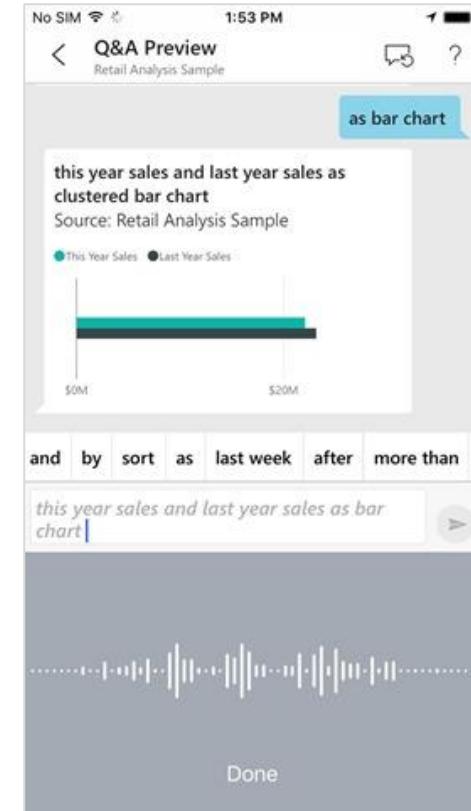
- **Persistent filters** automatically saves filters and slicers you set in the mobile app
- **Filter your report by your current location** in just one tap, including filtering by the city, state, or country in which you're currently located.



# Mobile Reports

## Mobile Apps – Q&A

- Useful for quickly generating **insights that might not be readily available.**
- A statement can be written and the output can be changed.
- It supports voice recognition, too.



# Mobile Reports

## Mobile Apps – Share

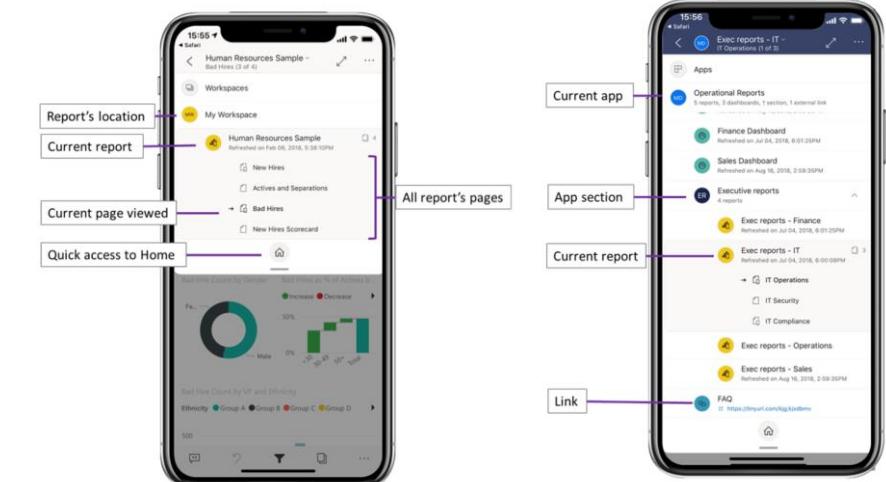
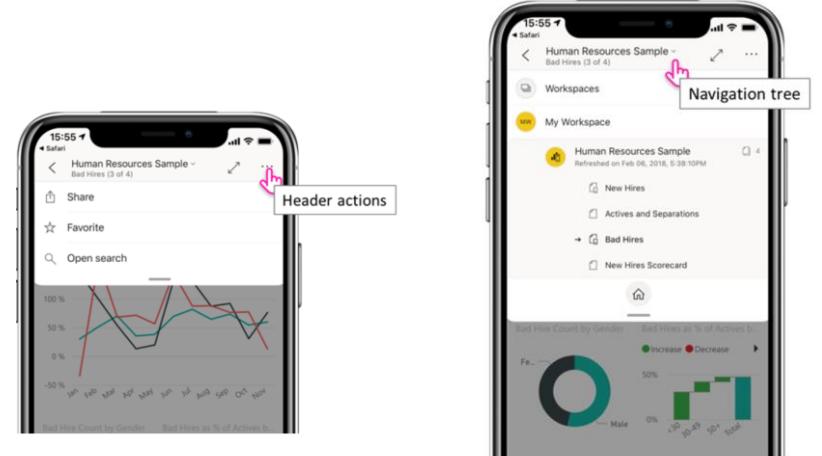
- **Share dashboards peer-to-peer** with users in the organization or external to the organization via B2B
- Share snapshots of tiles via e-mail
- **You can add annotations** – lines, text or stamps before you share



# Mobile Reports

## Mobile Apps – Updated Headers

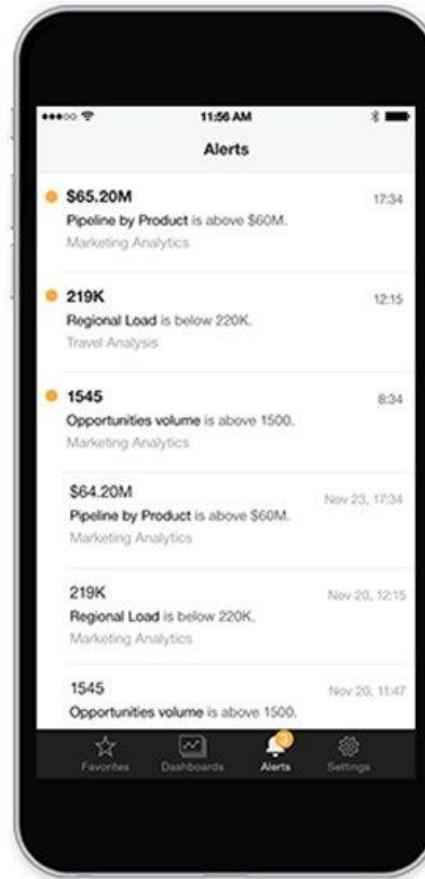
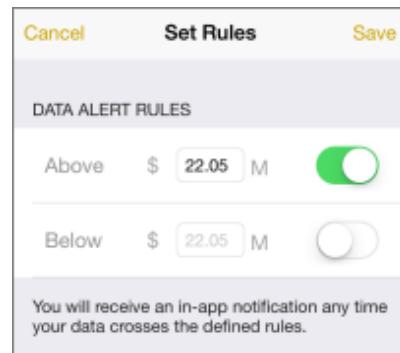
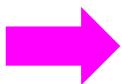
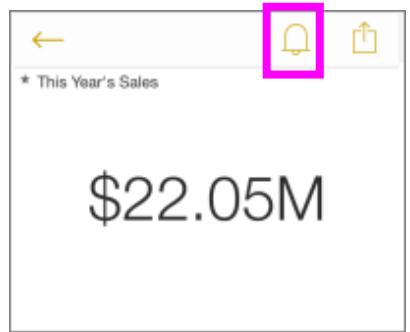
- **Share action in Headers** enables you to quickly share a link to an item with your colleagues, using any collaboration app you have on your device, such as Microsoft Teams, a mail app, etc..
- **Navigation tree** shows you the location hierarchy of your content.
- You can easily navigate up the **content hierarchy**, go to sibling content, or quickly get to your home page.
- While viewing a report page, you'll find all visible **report pages**, making it easy to **jump** from one page to another.
- While viewing part of an app, the navigation tree will contain all the **app's content-sections, links**, and all the reports and dashboards that are part of the app.



# Mobile Reports

## Mobile Apps – Alerts

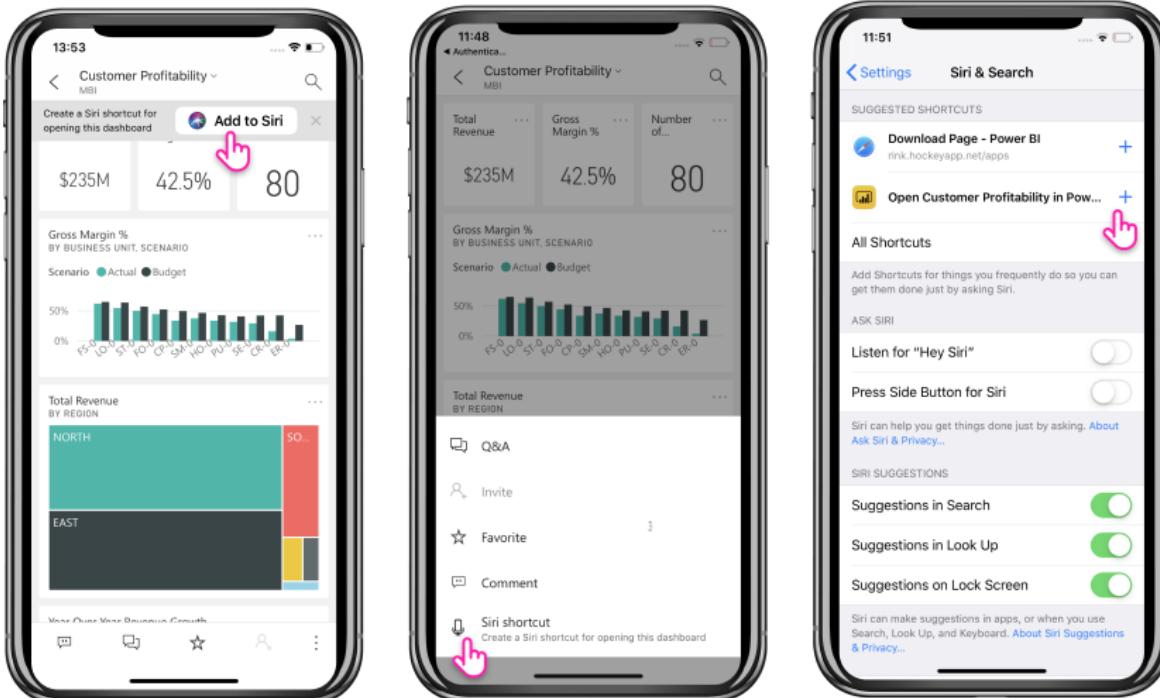
- Set limits for your data in a tile and get notifications



# Mobile Reports

## Mobile Apps – Siri shortcuts (Preview)

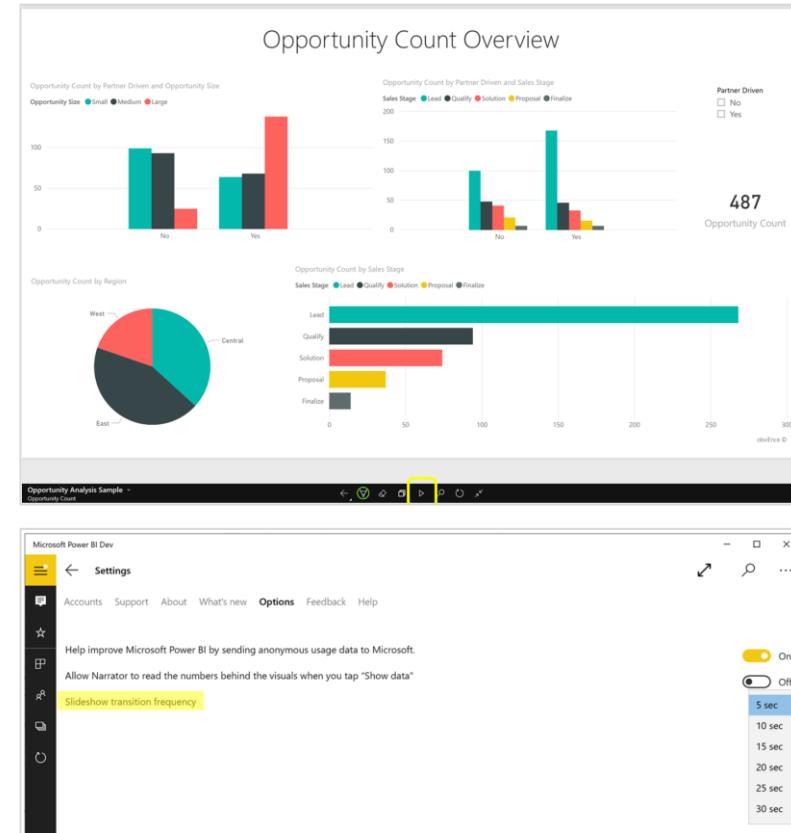
- Power BI Mobile iOS app is **integrated with Siri shortcuts**
- **Get easy and quick access** to your frequently used reports or dashboards



# Mobile Reports

Mobile Apps – Presentation Mode & Auto play a slideshow on startup (Windows only)

- Using Power BI Windows app with presentation mode enables you to **present, collaborate, and have productive discussions** while using your data in your Power BI dashboards and reports.
- You can now apply **personal** and **report bookmarks** to report pages when presenting in presentation mode on your Windows app.
- You can choose a **report** to **automatically play** in a **slideshow** when the Power BI Windows app is **launched**.
- This is useful for creating a **kiosk-like experience** that runs a report in public displays without any manual intervention



# Mobile Reports

## Mobile Apps – Offline

While you are offline you can access **all your dashboards in My Workspace**

You can also access any **previously accessed dashboards**

You have read-only access to **reports previously accessed, but no interactivity**

**Visual queues for available content** exist for ease of use

**Power BI refreshes the data automatically every two hours** on the device (can be turned off). **The cache lasts indefinitely.**

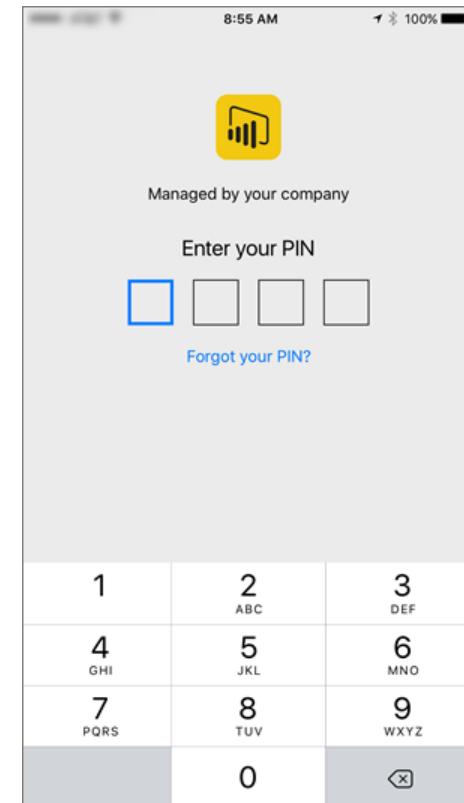
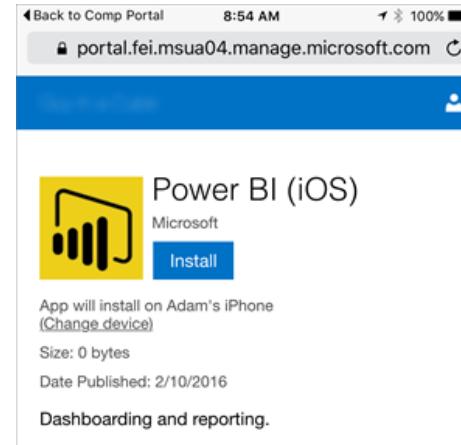
250 MB limit for data offline

Whole Excel workbooks are not available

# Mobile Reports

## Mobile Apps – Enterprise Ready

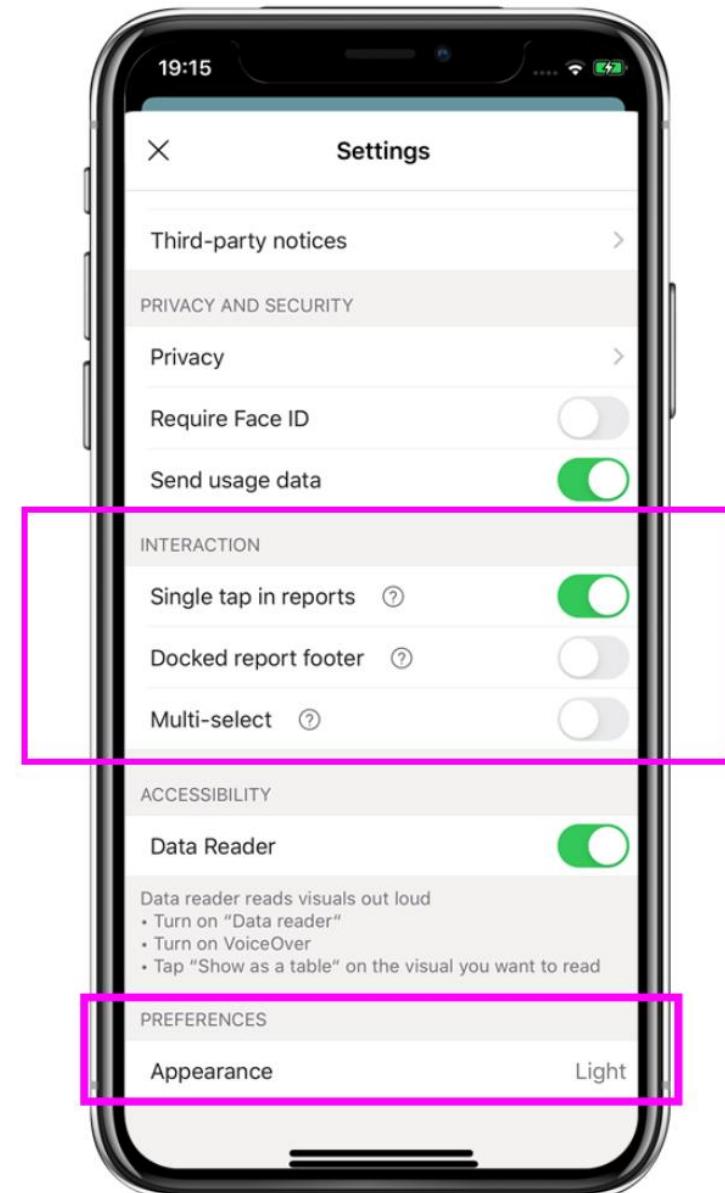
- **Microsoft Intune** allows organizations to manage devices and applications
- Configure Access **PIN**
- **Control encryption** when data is at rest
- Application is installed through Company Portal app
- Can configure Power BI app to require **Face ID, Touch ID, or passcode** in iOS



# Mobile Reports

## Mobile Apps – Interaction Settings

- **Interaction Settings** section has several items that you can configure to define how the app behaves:
  - **Single tap** in reports (phone only)
  - Docked report **footer** (phone only)
  - **Report refresh** (Android phone only)
- **Preferences**
  - **Light** and **dark** mode
  - In dark mode, all **screens and dialogs** are presented in a **dark** theme. But Power BI content, such as reports and dashboards will not change, and will stay with the same colors and themes as published by the person who created them.



# Demonstration

## Mobile Reports

Demonstrate features of Power BI app



**Questions?**



# Knowledge Check

Which platforms are supported for mobile apps?

In offline mode, can you access all your dashboards & reports?

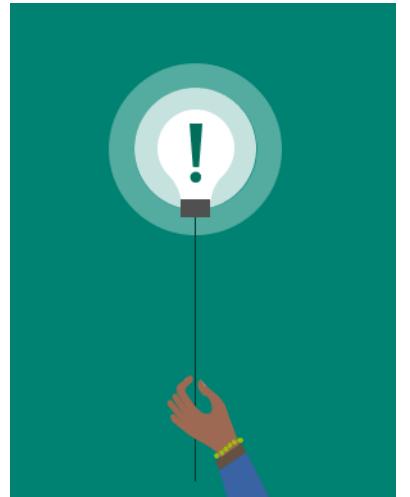
How can you define alerts in mobile apps?

# Lesson 8: Administration, Licensing and Governance

# Objectives

After completing this learning, you will be able to:

- Explore admin portal
- Describe licensing models
- Enterprise Governance



# Power BI Admin Portal

- Power BI admin role is a role in Azure AD
- Office 365 user admins can assign users to be Power BI admins within the Office 365 Admin center, or via PowerShell script.

The screenshot shows two side-by-side windows from the Microsoft 365 Admin Center.

**Left Window (User Overview):**

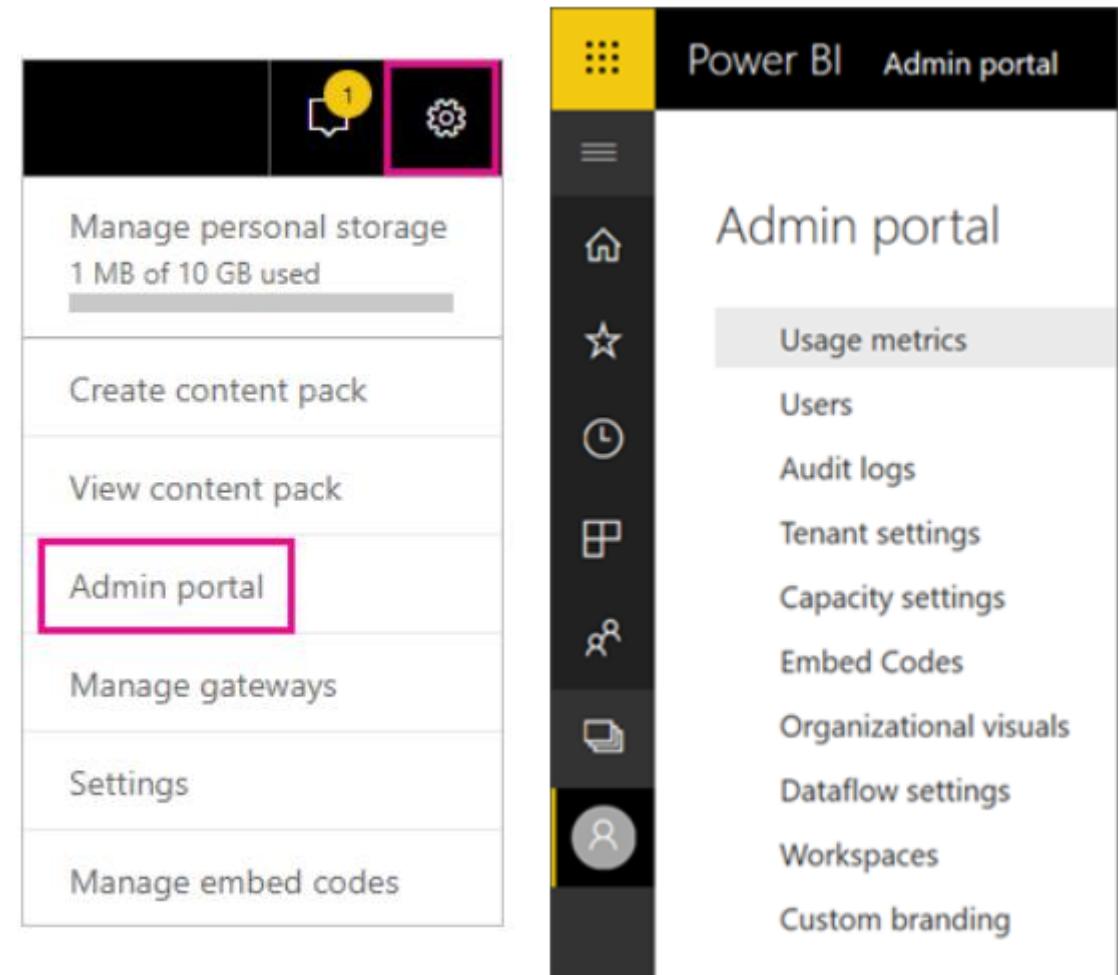
- Office 365 Admin Center:** The main navigation bar on the left includes Home, Users (selected), Active users, Deleted users, Groups, Resources, Billing, Support, Settings, Setup, Reports, Health, and Admin centers.
- User Details:** A list of user properties:
  - Product licenses: Power BI (free)
  - Group memberships (5): ContentPackTable, deleteGroup, GroupCreationBeforeOption, GroupCreationEnabled, More
  - Sign-in status: Sign-in allowed
  - Roles: Global administrator (with an **Edit** button highlighted with a red box)
  - Display name: Vars Vas
  - Office phone
- Mail Settings:** Includes Manage multi-factor authentication.

**Right Window (Edit User Roles):**

- Edit user roles:** A modal dialog where the user can choose an administrator role for the selected user.
- Role Selection:** The "Customized administrator" role is selected.
  - User (no administrator access)
  - Global administrator
  - Customized administrator
    - Billing administrator
    - Exchange administrator
    - Password administrator
    - Skype for Business administrator
    - Power BI service administrator
    - Service administrator
    - SharePoint administrator
    - User management administrator
- Buttons:** Save and Cancel.

# Power BI Admin Portal

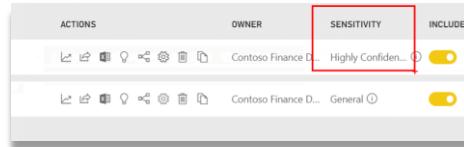
- It enables you to manage the Power BI settings for your organization.
- It includes items such as usage metrics, access to the Microsoft 365 admin center, and tenant settings.
- The full admin portal can be accessed by global admins and users who have the Power BI service administrator role.
- If you're not in one of these roles, you only see Capacity settings in the portal.



# Enterprise Information Management Capabilities

## Power BI data protection enhancements

- **Classify** and **label sensitive data** in Power BI – Microsoft Information Protection sensitivity labels applied



- Protect **sensitive** data upon export from Power BI – MIP sensitivity labels persisted
- **Monitor** and **protect user activity** on **sensitive data** within Power BI – Leveraging Microsoft Cloud App Security, Power BI sessions and user activity can be monitored
- **Label inheritance** upon **creation of new content from its parent**
- Sensitivity labels persist when a **Power BI report is embedded in an app**
- Sensitivity label inheritance from **Power BI to Excel** for live data connections
- Sensitivity labels in **embedded reports and dashboards** – public preview
- Excel file to **inherit the Power BI dataset's sensitivity label** when using a **PivotTable** connection

## Power BI data lineage

- **Power BI data lineage view** visualizes the entire data journey within a given workspace, making it easy to determine upstream and downstream dependencies of artifacts, examine artifact information
- **Search** is supported
- **Data source impact analysis** helps you see where your data source is being used throughout your organization.

# Licensing - Power BI Portfolio

## Power BI Desktop

Licensed by user

**Free** report authoring  
and ad-hoc data  
exploration

## Power BI Free

Licensed by user

Quick, easy-to-use  
self-service analytics  
for **personal use**

## Power BI Pro

Licensed by user

Quick, **self-service**  
easy-to-use analytics  
for users requiring  
**collaboration**,  
dashboard sharing,  
ad hoc analysis, and  
report publishing

## Power BI Premium

Licensed by user

**New way** to license  
**premium** features on a  
**per user** basis.

**All** the Pro license  
capabilities, along with  
features like **paginated  
reports, AI, and other  
capabilities** only  
available in Premium  
today.

## Power BI Premium

Licensed by capacity

An add-on to **Power BI  
Pro** for projects  
requiring **large scale  
data, performance,  
multi-geo and multi-  
geo**

**Large models in  
Power BI Premium**  
size of the dataset is  
instead limited by the  
Power BI Premium  
capacity size

Power BI Premium Feature Comparison

	Premium Per User	Premium Per Capacity
Model Size Limit	100GB	Up to 400GB
Refresh rate	48/day	48/day
Paginated Reports	✓	✓
AI Capabilities (AutoML, Impact Analysis, Cognitive Services)	✓	✓
Advanced Dataflows Features (Direct Query, etc.)	✓	✓
Usage-based Aggregate Optimization	✓	✓
Application Lifecycle Management (Deployment Pipelines)	✓	✓
XMLA Endpoint Connectivity	✓	✓
Enhanced automatic page refresh	✓	✓
Deployment Pipelines	✓	✓
Multi-Geo Support	✗	✓
Unlimited Distribution	✗	✓
Power BI reports on-premises	✗	✓
Bring Your Own Key	✗	✓

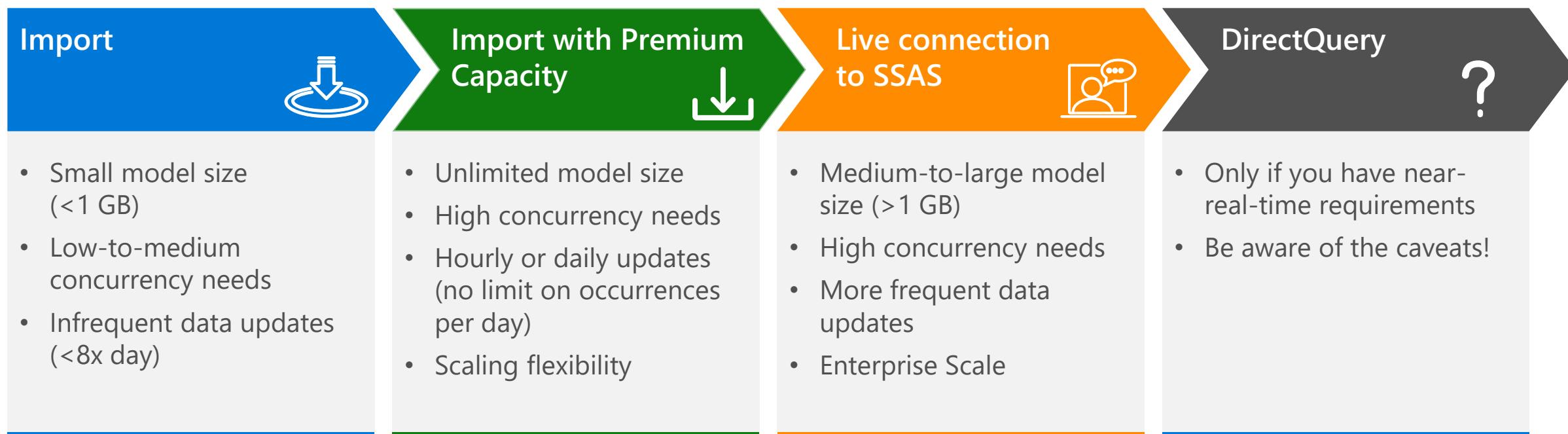


With **Gen 2**, additional  
**benefits** on  
**performance, scale**  
and **management**  
capabilities

# Enterprise Governance

## Managed Self Service BI – Key Data Source Considerations

- Model Size and Complexity
- Data Update Frequency
- Concurrency
- Latency



# Enterprise Governance

## Managed Self Service BI – Additional Data Source Considerations

Guidelines and data points in the previous table are based on typical usage and may be affected by several other factors as well, including:

Query complexity

Row level security

Network latency and/or data center location

Usage patterns (e.g., dashboards vs. reports vs. interactive filtering)

Refresh frequency of the dataset—can be multiplicative factor

# Enterprise Governance

## Managed Self Service BI – Enablement Roles

**Corporate Sponsor** – Ability to influence organisational strategy around the use of BI tools

**Data/Information Security Manager** – Knowledge of IT Service management, auditing, security and Data Classification.

**Data Steward** – Data modelling, mashups and provisioning

**Power BI Champion** – Subject matter experts (SMEs) who are also Excel/BI savvy and develop full understanding of the capabilities of Power BI

**Data Architect** – Knowledge of on premise and cloud data technologies and ability to transform business specification to technical requirement.

**BI Developer** – Full understanding of the capabilities of the Microsoft BI platform

**Power BI Administrator** – Knowledge of IT Service management, authentication, Licensing and Gateway management.

**BAU Support Specialist** – Service and gateway monitoring and configuration, Power BI Development, Release management, Power BI Service Management, Escalation point.

**Support Infra** – SME Teams / Yammer Groups / Forums / DGs / Teams to assist the end – user with Power BI Development and conduct timely trainings.

# Enterprise Governance

## Managed Self Service BI – Security and Compliance

Automate pro license assignment to users who need it the most

Use Power BI audit logs and PowerShell to automate pro license assignment to active Pro trial users. <https://aka.ms/ckyfh0>

Prevent access off corporate networks

Configure Azure Active Directory Conditional Access. <https://aka.ms/nw75r3>

Control features like data export, anonymous access, external sharing

Set enterprise controls in the Power BI Admin Portal.

Control use of mobile features (PIN code, share sheet restrictions)

Set up Intune Mobile Application Management <https://aka.ms/wenojj>

Audit Power BI activity and Access Control

Power BI auditing in Office 365 Portal and AAD conditional access

# Power BI Service

- Exercise 1: Row Level Security
  - Creating security roles in Power BI Desktop
- Exercise 2: Row Level Security
  - Adding users to security roles in Power BI Service
- Exercise 3: Sharing – Creating App Workspaces & Apps



**Questions?**



# Knowledge Check

What is the difference between Power BI Pro and Power BI Premium?

What are some of the tenant settings in Power BI Admin portal?

What is the primary tool used for monitoring Premium Capacity?

# Module Summary

Create Dashboards: Explore components of Power BI Service to create dashboards

Navigation and pinning within dashboards

Data Refresh Models in Power BI Service

Sharing via Power BI Service

Integration with Mobile App

Integration with Excel

Licensing Models for Power BI Service



# Demonstration

## What's Next?

Let's look at what is coming soon  
to Power BI in roadmap



**Questions?**



# Knowledge Check

What can be pinned to dashboards?

Can you edit reports via Power BI Service and how?

Why do we need on-premises gateways?

What are the data refresh options?

What are the types of Quick Insights?

Can you integrate Power BI with Excel?

What are the supported platforms for Power BI apps?

What are the available licensing models?