

## 1. ◆ Power BI Desktop

- **What it is:** A free Windows application you install locally.
- **Purpose:** Used to **connect to data, clean/transform it, build reports, create DAX measures, and design dashboards.**
- **Key features:**
  - Connect to many data sources.
  - Use **Power Query** to transform/clean data.
  - Create relationships, DAX measures, visuals, and report pages.
  - Save work as a .pbix file.
- **Limitations:** Not for sharing. If you want others to see your report, you need to publish it.

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## ◆ Power BI Service (Online)

- **What it is:** A cloud-based platform (<https://app.powerbi.com>).
- **Purpose:** Used to **publish, share, collaborate, and consume reports/dashboards.**
- **Key features:**
  - Host and view reports created in Desktop.
  - Share dashboards with your team/organization.
  - Schedule automatic data refresh.
  - Create workspaces, apps, and dashboards.
  - Row-level security enforcement.
  - Mobile app access.
- **Requires license:** Free account works for personal use; for sharing you need **Pro or Premium.**

👉 In short:

- **Desktop = where you build.**
- **Service = where you publish, share, and collaborate.**
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## 2. ◆ Steps to Publish from Power BI Desktop to Power BI Service

1. **Finish your report** in Power BI Desktop (.pbix file).
2. On the **Home ribbon**, click **Publish** → **My Workspace** (or another workspace you have access to).
  - If it's your first time, you'll be prompted to **sign in** with your Power BI account.
3. Wait for the upload. Once published, you'll see a message:  
“Success! We published your report to the Power BI Service.” with a link: *Open in Power BI*.
4. Click the link or go to <https://app.powerbi.com> → log in.
5. In the Service, find your report inside the workspace you selected:
  - **Reports** → interactive report (same as Desktop visuals).
  - **Datasets** → the data model behind it (used for refresh, new reports).

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#### ◆ After Publishing (in the Service)

- **Share it:** Share with colleagues (Pro license required).
  - **Pin visuals:** From the report, pin visuals to dashboards.
  - **Schedule refresh:** If connected to a database/Excel, set refresh schedule (Datasets → Settings → Scheduled refresh).
  - **Workspaces/Apps:** Organize multiple reports in workspaces and publish as apps.
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#### In short:

- Build in **Desktop** → click **Publish** → open it in **Service** → then **share, refresh, and collaborate**.

### 3. ◆ What is a Workspace?

A **workspace** in Power BI is like a **container/folder in the cloud** where you store, manage, and share your reports, dashboards, datasets, and dataflows. Think of it as a **team project space** inside the Power BI Service.

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#### ◆ Types of Workspaces in Power BI

##### 1. My Workspace

- Personal space for your own reports and dashboards.
- Only you (the creator) can see it by default.
- Best for **learning, testing, or personal reports**.
- Limited sharing capabilities.

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##### 2. Workspaces (formerly App Workspaces)

- Collaborative workspaces for teams/projects.
- Multiple users can access with different roles (Admin, Member, Contributor, Viewer).
- From here, you can publish an **App** (a packaged, read-only version of reports/dashboards for end users).
- Best for **enterprise collaboration and sharing**.

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#### ◆ Workspace Roles

- **Admin** → Full control (add/remove members, publish apps).
- **Member** → Edit and share content.
- **Contributor** → Create/edit reports and dashboards but can't publish apps.
- **Viewer** → Read-only access to reports and dashboards.

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#### In short:

- **My Workspace** → your personal sandbox.
- **Workspaces** → team collaboration + app publishing.

#### 4. ◆ Workspace

- A **collaborative environment** where a team creates and manages content (reports, dashboards, datasets, dataflows).
- Multiple users can work together with different roles (Admin, Member, Contributor, Viewer).
- It's like a **kitchen** where the team prepares the meal.
- Content in a workspace is editable and can change frequently.

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#### ◆ App

- A **packaged, read-only version** of the content from a workspace.
- Published from a workspace to a larger audience.
- End users who get the App **can view and interact** with dashboards/reports but **cannot edit them**.
- It's like the **restaurant menu** where customers see the finished dishes, not the messy kitchen.
- Apps are ideal for **distribution at scale** (e.g., entire department/company).

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### ✓ Key Differences

Feature	Workspace	App
Purpose	For building, collaborating, editing content	For distributing finished reports/dashboards
Audience	Small team (creators, developers)	Larger audience (consumers)
Access	Edit + view (depending on role)	View-only (interactive, but no editing)
Control	Roles: Admin, Member, Contributor, Viewer	Controlled by publisher
Versioning	Work-in-progress	Polished, finalized version

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#### 👉 Think of it this way:

- **Workspace = backstage (creation & collaboration)**
- **App = front stage (final polished experience for viewers)**

#### 5. ◆ Power BI License Types

##### 1. Power BI Free

- ✓ Included with a Microsoft account.
- ✓ Can use **Power BI Desktop** fully (create reports, visuals, datasets).
- ✓ Can publish to **My Workspace** in Power BI Service.
- ✗ Cannot **share** reports with others.
- ✗ Cannot collaborate in shared **Workspaces**.
- ✗ Limited to **personal use only**.

**Best for:** learning, personal projects, testing.

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## 2. Power BI Pro (paid per user, ~\$10/month)

- All Free features + **sharing and collaboration**.
- Publish to and collaborate in **Workspaces**.
- Share dashboards and reports with other **Pro users**.
- Export to PowerPoint/Excel, email subscriptions.
- Every user who needs to **view shared content** also needs a Pro license (unless the org has Premium capacity).

**Best for:** teams and organizations that need to share & collaborate.

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## 3. Power BI Premium (Per User) (~\$20/month per user)

- Includes all **Pro features**.
- Access to **premium features** without requiring dedicated capacity:
  - Larger dataset size (up to 100 GB per dataset).
  - More frequent refresh rates (up to 48x/day).
  - Paginated reports (pixel-perfect reporting).
  - AI features (text/image analytics, AutoML).
- Can share content with **Free users** (if published to Premium capacity workspace).

**Best for:** advanced users who need bigger datasets, AI, or distribution to Free users.

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## 4. Power BI Premium (Capacity-based) (enterprise-level, starts ~\$5K/month)

- Dedicated **cloud or on-premises capacity** for the organization.
- Supports **large-scale deployment** (thousands of users).
- Free users can view shared content (no need for Pro for viewers).
- On-premises reporting with **Power BI Report Server**.
- Larger refresh, storage, and dataset limits.
- Very expensive — usually only for enterprises.

**Best for:** large organizations with many viewers, high performance needs, or hybrid (cloud + on-prem).

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### Summary Table

License	Feature /	Free	Pro	Premium (Per User)	Premium (Capacity)
Desktop	Create in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Service	Publish to	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Feature / License	Free	Pro	Premium (Per User)	Premium (Capacity)
Share with others	✗ (Pro needed)	✓	✓	✓ (Free users can view)
Collaboration in Workspace	✗	✓	✓	✓
Max dataset size	1 GB	1 GB	100 GB	400 GB
Daily refreshes	8	8	48	48
AI & Paginated Reports	✗	✗	✓	✓
Cost per user	Free	~\$10	~\$20	~\$5K+/month

👉 In short:

- **Free** = Personal use only.
- **Pro** = Team collaboration, but everyone must have Pro.
- **Premium Per User** = Advanced features for individuals.
- **Premium Capacity** = Enterprise-level, lets Free users consume content.

## 6. ◆ 1. Use Power BI Premium Capacity

- If your organization has **Premium capacity**, you can publish the report into a **Premium workspace**.
- ✓ Free users will then be able to **view** the report in Power BI Service (no Pro needed).
- ✗ But: they **cannot edit** or collaborate — only view.

### ◆ 2. Publish to Web (⚠ public option)

- You can create a public link to your report (File → Publish to Web).
- ✓ Anyone with the link (even without Power BI) can view it in a browser.
- ✗ It's **not secure** — anyone can access if they have the link, and it may show up in search engines.
- ⚠ Not recommended for sensitive or business data.

### ◆ 3. Export or Embed

- **Export to PDF or PowerPoint** → send static version of the report.
- **Embed in SharePoint / Teams** → but recipients will still need proper licenses unless Premium is used.
- **Embed securely in a website/app** → requires Pro or Premium for authentication.

### Best practice:

- For internal secure sharing → use **Premium capacity**.
- For casual/public sharing → **Publish to Web** (with caution).
- For one-time sharing → **Export to PDF/PowerPoint**.

## 7. What is a Semantic Model (Dataset) in Power BI?

In Power BI, a **semantic model** (previously called a *dataset*) is:

- The **data model** you build in Power BI Desktop (or directly in the service).
- It contains:
  - **Tables** (imported or connected via DirectQuery/Live connection)
  - **Relationships** between tables
  - **Measures** (DAX calculations like SUM, RANKX, etc.)
  - **Calculated columns**
  - **Hierarchies** (e.g., Year → Quarter → Month)
  - **Metadata** (field names, formatting, descriptions)

 In short: it's the **brain of your report** — defining *what data exists and how it should be interpreted*. That's why Microsoft started calling it a *semantic model* — it provides semantic meaning (business logic, calculations) on top of raw data.

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## Where is it stored in the Power BI Service?

When you **publish a .pbix report** from Power BI Desktop to the Service:

1. The **report file** (visuals, pages, formatting) is uploaded.
2. The **semantic model (dataset)** is stored **in the workspace** you publish to.
  - You'll see it appear as a separate item under **Datasets + Dataflows** in the Service.
  - Multiple reports can connect to the same semantic model.
  - It lives in the cloud (Power BI Service), within the workspace's storage.

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## Why is this important?

- A single **semantic model** can serve **many reports** (reusability).
- Governance: admins can manage refresh schedules, security (Row-Level Security), and data sources in one place.
- Performance: semantic model optimizations (aggregations, measures) affect all connected reports.

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### Quick Example:

- You publish a **Sales.pbix** file.
- In the Service, you'll see:
  - **Sales Report** (the visuals/pages)
  - **Sales Semantic Model** (the dataset powering it)
- You can then build another report (e.g., "Sales by Region") and connect it to the **same semantic model** — no need to duplicate the data.

## 8. ◆ How Scheduled Refresh Works in Power BI Service

When you publish a **semantic model (dataset)** from Power BI Desktop to the Service, the Service stores a copy of the data (if you used **Import mode**). To keep that data up to date, you can configure a **Scheduled Refresh**.

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### ✓ Steps in the Process

1. You set up a refresh schedule in the Service:
    - Go to **Workspace** → **Semantic Model (Dataset)** → **Settings** → **Scheduled Refresh**.
    - Define frequency (**Daily/Hourly**) and time slots.
    - Configure credentials for the data source (through a **Gateway** if on-premises).
  2. At the scheduled time:
    - Power BI Service connects to your data source (SQL, Excel, API, etc.).
    - It runs the queries and reloads data into the semantic model.
  3. Reports update automatically:
    - Once refresh completes, reports and dashboards that use the dataset show the latest data.
    - If dashboards are pinned, tiles get updated after refresh.
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### ◆ Important Notes

- **Import Mode:**
    - Needs scheduled refresh (data is stored in Power BI).
    - Default limits:
      - Pro: up to **8 refreshes per day**.
      - Premium: up to **48 refreshes per day**.
  - **DirectQuery / Live Connection:**
    - No scheduled refresh needed — queries run **live** against the source.
    - You might still schedule *metadata refreshes* (to update schema changes).
  - **Data Gateway:**
    - Required if data source is **on-premises** (e.g., SQL Server, Oracle, local Excel file).
    - Not needed for **cloud sources** (Azure SQL, SharePoint Online, etc.).
  - **Notifications:**
    - You can configure email alerts if a scheduled refresh fails.
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### ✓ Example

Suppose you have a **Sales dataset** connected to a SQL Server database (on-premises).

- You install and configure an **On-premises Data Gateway**.
- In Power BI Service, you set the dataset to refresh at **8:00 AM and 4:00 PM** daily.

- At those times, the Service uses the gateway to query SQL Server and reloads the semantic model.
  - Your dashboards show fresh sales numbers automatically.
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👉 In short: **Scheduled Refresh = automated data pull** into the Power BI Service at defined times, so your users always see up-to-date insights.

### 9. ◆ Dataset (Semantic Model)

- A **dataset** (now called a **semantic model**) is the **model inside Power BI** that:
  - Stores **imported data** (if Import mode).
  - Defines **relationships, measures (DAX)**, and **calculated columns**.
  - Powers your **reports**.
- Created when you **publish a PBIX file** from Power BI Desktop, or when you build a report directly in the Service.
- **Refresh schedule** updates the dataset with fresh data from the source.
- Lives inside a **workspace**.

👉 Think of it as: **the ready-to-use brain** of your report.

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### ◆ Dataflow

- A **dataflow** is an **ETL (Extract–Transform–Load) process** in Power BI Service.
- Built using **Power Query Online** (the same M language used in Desktop).
- Lets you:
  - Connect to raw data sources.
  - Clean, transform, and shape data.
  - Store transformed data as tables in **Azure Data Lake storage** (behind the scenes).
- Can be reused by multiple datasets and reports.
- Supports **computed entities** (reuse transformations), **AI enrichments**, and incremental refresh.

👉 Think of it as: **the data preparation layer** in the cloud.

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### ◆ Key Differences

Feature	Dataset (Semantic Model)	Dataflow
Purpose	Model & serve data to reports	Prepare, clean & store data
Where built	Power BI Desktop or Service	Power BI Service (Power Query Online)
Storage	Inside the workspace (PBIX import)	Azure Data Lake Gen2

Feature	Dataset (Semantic Model)	Dataflow
<b>Reusability</b>	Usually tied to one report (can be reused, but not easily)	Can be reused across many datasets/reports
<b>Transformations</b>	Light (in Power Query inside Desktop)	Heavy-duty, centralized
<b>Refresh</b>	Refresh dataset from source	Refresh dataflow, then dataset can pull from it
<b>Best for</b>	Reporting (measures, visuals)	Enterprise ETL layer (clean data once, use everywhere)

### ✓ Example

- Your company has a messy **Sales Excel file** uploaded daily.
- You create a **Dataflow** to clean it (remove blanks, split columns, unify formats).
- Then you connect your **Dataset** (semantic model) to that cleaned dataflow.
- Reports are built on top of the dataset.

So the flow is:

**Data Source → Dataflow (cleaning) → Dataset (modeling) → Report (visuals)**

### 👉 Simple analogy:

- **Dataflow = kitchen (where raw food is cleaned & prepped).**
- **Dataset = the dish (ready to be served).**

## 10. ♦ When to use a Dataflow (instead of just a Dataset)

You'd use a **dataflow** when you need to:

### 1. Reuse transformations across multiple reports/datasets

- If several reports use the *same raw source*, instead of duplicating Power Query steps in each dataset, you clean data once in a dataflow.
- Example: Customer master table used by Finance, Sales, and Marketing.

### 2. Centralize & standardize data preparation (ETL)

- Keeps transformations consistent (e.g., same date formatting, same column naming).
- Reduces errors and version mismatches between reports.

### 3. Work with large / complex data

- Dataflows store results in **Azure Data Lake Gen2**, offloading heavy transformation work from Desktop to the cloud.
- Useful if Power Query steps are too slow on local machines.

### 4. Enable collaboration across teams

- One BI team can manage dataflows (data engineers), while analysts build datasets/reports on top.
- Avoids every analyst re-inventing the wheel with different transformations.

## 5. Incremental refresh at the data-prep level

- You can configure incremental refresh in dataflows to avoid reloading millions of rows every time.
- Makes refresh much faster.

## 6. Leverage AI enrichment (Premium feature)

- Dataflows can apply sentiment analysis, image tagging, and text analytics during transformation.

### ◆ Why not just use Datasets?

- Datasets are great for **report-specific models** (relationships, measures, KPIs).
- But:
  - Each dataset has its own **Power Query transformations**.
  - If you have 5 datasets, you might duplicate the same data-cleaning logic 5 times.
  - This leads to inconsistency and higher maintenance.

### Example Scenarios

- **Use Dataflow:**
  - Your company has a shared “**Product Master**” Excel file that is needed in Sales, Inventory, and HR reports.
  - You build one **Product Dataflow** (cleaning applied once).
  - All datasets connect to it → guaranteed consistent, clean product data.
- **Use Dataset only:**
  - You’re building a small one-off report, where data is only used in this report.
  - Simpler and faster to just build transformations inside the dataset.

### Rule of thumb:

- **Dataflow = reusable, enterprise-level data prep (ETL).**
- **Dataset = modeling and reporting layer for a specific analysis.**

## 11. ◆ What is a Dashboard in Power BI Online?

- A **dashboard** is a **single-page canvas** in the Power BI Service (not in Desktop).
- It’s made up of **tiles** that are *pinned* from one or multiple reports or datasets.
- A dashboard can show a high-level overview (KPIs, visuals, cards, etc.) at a glance.
- Clicking a tile usually takes you back to the underlying **report** for details.

 Think of it as the **executive summary**.

#### ◆ What is a Report in Power BI?

- A **report** is a multi-page, interactive collection of visuals built in Power BI Desktop or the Service.
- Each visual comes from a **single semantic model (dataset)**.
- Reports support:
  - Slicers, filters, drillthrough, bookmarks, tooltips.
  - Multiple pages for detailed exploration.

👉 Think of it as the **detailed analysis tool**.

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#### ◆ Key Differences:

Feature	Dashboard (Service)	Report (Desktop/Service)
Pages	Single page only	Multi-page allowed
Created in	Power BI Service	Power BI Desktop (or Service)
Content	Tiles pinned from reports/datasets	Visuals directly from dataset
Data sources	Can combine visuals from <i>multiple datasets/reports</i>	Comes from <i>one dataset only</i>
Interactivity	Limited (mainly click → go to report)	Full interactivity (slicers, filters, drillthrough)
Use case	High-level overview for executives	Detailed analysis & exploration

#### ✓ Example

- You build a **Sales Report** with 5 pages (Sales by Region, Sales by Product, Trends, etc.).
  - Your CEO only wants to see:
    - Total Sales (card)
    - Sales Trend (line chart)
    - Top 5 Products (bar chart)
  - You **pin those visuals** from the report to a **Sales Dashboard**.
  - The CEO opens the **dashboard** each morning to see KPIs at a glance, and clicks a tile if they want deeper insights (which takes them into the full report).
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#### 👉 In short:

- **Reports** = detailed, multi-page, interactive.
- **Dashboards** = single-page, high-level summary (often cross-report).

## 12. ◆ How to Pin a Visual to a Dashboard

### 1. Open the report

- In Power BI Service (not Desktop), navigate to the workspace.

- Open the report that contains the visual you want.
2. **Select the visual**
    - Hover over the visual (chart, card, KPI, etc.).
    - You'll see a  **Pin icon** appear in the upper-right corner.
  3. **Click the Pin icon**
    - A pop-up will ask:
      - Do you want to pin to an **existing dashboard**?
      - Or create a **new dashboard**?
  4. **Choose the dashboard**
    - If existing: pick from the list in the same workspace.
    - If new: type a name and Power BI will create it.
  5. **Done** 
    - The visual is now added as a **tile** on the dashboard.
    - Go to the dashboard → you'll see the pinned tile.
    - Clicking the tile will bring you back to the **original report** for details.

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#### ◆ Notes

- You can pin **individual visuals** or an **entire report page** (via “Pin a live page”).
- Pinned visuals are **snapshots** (they show the latest data when refreshed, but formatting/filters are from when you pinned it).
- If you want a more interactive experience, use **live page pinning** instead of single visuals.



Example:

You have a report called *Sales Analysis*. It has a bar chart of *Top 10 Products*.

- You pin it to a dashboard called *Executive Sales Dashboard*.
- Now, your manager only needs to open the dashboard to see the chart at a glance — no need to go into the full report.

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### 13. ◆ What is Mobile View in Power BI?

- The **Mobile View** is a special **layout option** in Power BI reports that lets you rearrange visuals for an optimal experience on **phones and tablets**.
- You don't change the data — you just control how visuals are displayed on smaller screens.
- You access it in **Power BI Desktop** (View → Mobile Layout) or in the **Power BI Service**.

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#### ◆ Why is it Useful?

1. **Optimized for small screens** 

- Normal report pages are designed for desktops/laptops. On phones, they appear cluttered or require too much scrolling.
- In mobile view, you can stack key visuals vertically (like a news feed) so they're easy to read.

2. **Better user experience for executives & field workers**
    - Many decision-makers check KPIs quickly on their phones.
    - A clean, mobile-friendly layout makes adoption higher.
  3. **Control over what's important**
    - You don't need to show *every* chart — just put the **most critical KPIs and visuals** in the mobile layout.
  4. **Interactive & consistent**
    - The mobile view still supports filters, slicers, drillthrough, and interactivity.
    - Data is always synced with the full report.
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### ✓ Example

Suppose you built a **Sales Report** with:

- A line chart for monthly trends
- A bar chart for top products
- A map of sales by region
- A KPI card for total revenue

👉 On desktop, it's a nice grid.

👉 On mobile view, you might:

- Put the KPI card **at the top** (big and clear).
- Place the line chart **next** (scroll-friendly).
- Show only the most relevant bar chart.
- Hide the map if it doesn't fit well.

This way, a sales manager on the go can open their phone, scroll down, and get insights in **5 seconds**.

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### 👉 In short:

- **Mobile View** = phone-friendly layout of your report.
- **Why useful** = better readability, higher adoption, and focus on the most important KPIs.

## 14. ◆ What is a Paginated Report in Power BI?

- A **Paginated Report** is a type of report designed for **pixel-perfect, printable, and highly formatted** output.
  - Unlike interactive Power BI reports (built in Power BI Desktop with visuals and slicers), paginated reports:
    - Are built using **Power BI Report Builder** (separate tool).
    - Are optimized to **fit pages** (like A4, Letter, etc.) and can span across **multiple pages**.
    - Can be **exported/printed** to formats like PDF, Word, Excel, or CSV.
  - They are called *paginated* because the report is formatted to flow across **pages** automatically.
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### ◆ When Would You Use a Paginated Report?

You would use it when:

1. **Operational / Regulatory Reporting** 
  - When you need **detailed tabular data** (e.g., invoices, purchase orders, balance sheets).
  - Example: A bank's monthly statement for each customer.
2. **Pixel-Perfect Layouts** 
  - When the exact placement of rows, columns, headers, footers, and branding must match requirements.
  - Example: Government forms, invoices, or certificates.
3. **Large Data Tables** 
  - When you need to show **all records in detail** (thousands of rows) rather than just summaries or visuals.
  - Example: Exporting a full customer or sales list for auditing.
4. **Printing or PDF Distribution** 
  - When end users need to **print reports** regularly, or receive reports via email subscription in PDF/Excel format.

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◆ Key Differences:

	Feature	Power BI Interactive Reports	Paginated Reports
For	Tool	Power BI Desktop	Power BI Report Builder
	Purpose	Interactive, visual analysis	Printable, pixel-perfect layouts
	Data	Summarized/aggregated	Detailed, tabular
	Best	Dashboards, KPIs, exploration	Invoices, statements, regulatory forms
Export	Limited (Excel, PDF but not perfect formatting)	Full fidelity exports (PDF, Word, Excel, CSV)	

 In short:  
Paginated reports are used when you need **print-friendly, highly formatted, detailed documents** — like invoices, financial statements, or regulatory submissions — rather than interactive dashboards.

## 15. ◆ Export to PDF or PowerPoint in Power BI Service

1. **Open your report**
  - Go to the Power BI Online Service (<https://app.powerbi.com>).
  - Open the report you want to export.
2. **Use the Export option**
  - In the top menu bar, click **File → Export**.
  - You'll see two options:
    - **Export to PDF**

- **Export to PowerPoint (PPTX)**

3. **Choose Export Format**

- If you choose **PDF**:
  - Power BI will render each report page as a PDF page.
  - Useful for sharing or printing.
- If you choose **PowerPoint (PPTX)**:
  - Each report page becomes a slide.
  - Filters and slicers applied at the time of export will be reflected.

4. **Wait for processing**

- Power BI will prepare the file (this can take a few seconds to a few minutes depending on report size).

5. **Download the file**

- Once ready, the **PDF or PPTX file** will automatically download to your device.

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- ◆ **Important Notes**

- Exports are **static snapshots** (no interactivity, no slicers, no drill-through).
- Some visuals (custom visuals or very large tables) may not export correctly.
- **Paginated Reports** (if you use Report Builder) support more advanced, page-perfect PDF/Excel export.

- 16. ◆ **What does “Live Connection” mean?**

- A **Live Connection** means your Power BI report is connected **directly to a data source**, without importing the data into Power BI’s in-memory model.
- Instead of storing the data inside Power BI, the report **queries the source system in real time** whenever you interact with visuals.

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- ◆ **How does it work in Power BI Service?**

When you publish a report with a live connection:

1. **The dataset is not imported** into Power BI Service.
  - The report only stores a connection string (pointing to the data source).
2. **Queries run against the source**
  - When a user views a visual, Power BI sends a query (usually DAX or SQL) directly to the data source.
3. **No Scheduled Refresh needed**
  - Since the data is always queried live, there’s no need for scheduled refresh.
  - However, the report speed depends on the performance of the source system.

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- ◆ **Common Live Connection Sources**

- **Analysis Services (SSAS)** – Tabular or Multidimensional models
- **Azure Analysis Services**

- **Power BI Datasets** (you can connect a report live to an existing dataset in the Service)

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- **Advantages of Live Connection**

- Always up-to-date data (no refresh delays)
  - ✓ Centralized data model managed in Analysis Services or Power BI Dataset
  - ✓ Smaller report files (no data stored inside the PBIX)
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- **Limitations of Live Connection**

- ✗ Can't combine multiple sources in the same dataset (no data mashups)
  - ✗ Limited modeling capabilities (you can't create new tables/relationships in Desktop)
  - ✗ Performance depends on the source system (may be slower for big queries)
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**short:**

A **Live Connection** in Power BI Service means the report connects directly to a central dataset or Analysis Services model. The data always stays in the source system, and Power BI just queries it in real time when users interact with visuals.

## 17. • What is RLS?

**Row-Level Security (RLS)** is a way to restrict data access for specific users by filtering the rows they can see.

- Instead of giving every user access to the full dataset, you define rules (filters) that limit which rows of data are visible.
  - Example:
    - A Sales Manager in **France** should only see **France's sales data**, not other countries.
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- **How to Set Up RLS**

### 1. Define Roles in Power BI Desktop

- Go to **Modeling** → **Manage Roles**
- Create a role and add a **DAX filter**
  - Example:
  - [Country] = "France"
  - Or for dynamic security:
  - [Email] = USERPRINCIPALNAME()

(This way, the logged-in user only sees their own rows.)

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### 2. Publish the Report to Power BI Service

- After publishing, the roles go with the dataset.
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### 3. Assign Users to Roles in Power BI Online

- In the **Power BI Service**:

- Go to the **dataset settings** → **Security**.
  - Add users or security groups to the roles you defined.
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#### 4. Testing

- In Power BI Desktop: **Modeling** → **View As Roles**.
  - In Power BI Service: you can also test by “View as Role” under the dataset security settings.
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##### ◆ Where is RLS Applied in Power BI Online?

- **Dataset level:** RLS is enforced at the dataset hosted in the service.
  - **Reports and Dashboards:** Any report or dashboard built on top of that dataset inherits the security.
  - **Apps:** If you publish an app, RLS is still enforced for end users.
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##### ◆ Types of RLS

1. **Static RLS** – Rules are hardcoded (e.g., [Region] = "Europe").
  2. **Dynamic RLS** – Rules use functions like `USERPRINCIPALNAME()` so that different users see different data dynamically.
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##### ◆ Key Limitations

- RLS works only with **Import** and **DirectQuery** datasets.
  - It does **not** apply to Live Connections to Analysis Services (security is handled in the source).
  - You must have a **Pro license** (or the dataset must be in a Premium workspace) to share with others.
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In

short:

RLS lets you control **who sees what data** in Power BI. You define roles with DAX filters in Desktop, publish to the Service, then assign users to those roles. The filters are always enforced in reports, dashboards, and apps.

#### 18. ◆ Steps to Test RLS in Power BI Service

1. **Go to your workspace**
  - Open the workspace where you published your report/dataset.
2. **Open the dataset's security settings**
  - Find your dataset → Click the **More options (:) → Security**.
  - You'll see the roles you created in Power BI Desktop (e.g., *SalesFrance*, *SalesGermany*).
3. **Use “Test as role” feature**
  - In the Security pane, pick a role (e.g., *SalesFrance*).
  - Click **Test as role**.
  - Power BI will open the report, but filtered according to that role's RLS rule.
4. **Test as a specific user** (Dynamic RLS case)

- If you set up dynamic RLS using USERPRINCIPALNAME(), you can also test by typing in a specific user’s email.
  - Power BI will simulate what that user would see.
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#### ◆ Important Notes

- **In Desktop:** You can also test using **Modeling → View as Roles**.
  - **In Service:** The “Test as role” is closer to real behavior because it applies with actual online identities.
  - **Reports, dashboards, and apps** — all will follow the RLS rules automatically once the dataset enforces them.
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In

short:

In Power BI Service, you test RLS by going to the **dataset → Security → Test as role**, and optionally by testing as a specific user if dynamic RLS is used.

### 19. ◆ What are Apps in Power BI?

- An **App** in Power BI is a **packaged collection of dashboards, reports, and datasets** published from a workspace.
- They are designed for **end users** who just need to view and interact with content, not edit it.
- Think of an app like a “read-only” version of a workspace that’s **clean, user-friendly, and easy to distribute**.

#### Key Features of Apps:

- ✓ **Single access point** – Users see only the curated content you want them to.
  - ✓ **Read-only experience** – Users can view and interact, but can’t edit reports.
  - ✓ **Distribution** – You can share apps with individuals, security groups, or the whole organization.
  - ✓ **Updates** – When you update the workspace content, you just re-publish the app, and users get the new version.
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#### ◆ Types of Workspaces for Apps

- **My Workspace** → Cannot publish apps.
  - **Shared/Collaborative Workspaces** → Can publish apps if you have a Pro license (or Premium capacity).
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#### ◆ How to Publish an App in Power BI Service

##### 1. Prepare your workspace

- Add the reports, dashboards, and datasets you want.
- Make sure everything is organized and ready.

##### 2. Click “Publish app”

- In the workspace, look for the “**Publish app**” button (top-right).

##### 3. Configure app settings

- **Name & Description:** Give your app a clear name and summary.
- **Navigation:** Choose how reports/dashboards appear in the app (you can reorder them for a nice UX).
- **Permissions:** Decide who can access the app:
  - Specific users
  - Security groups
  - Entire organization

#### 4. Publish

- Once published, users will see it in their **Apps section** in Power BI Service (or mobile app).

#### 5. Update the app when needed

- If you make changes in the workspace (new visuals, fixes, etc.), just click **Update app** to push changes to users.

#### ◆ Why use Apps instead of just Sharing Reports?

- **Scalable:** Easier to distribute to many users.
- **Professional look:** Clean navigation and structure.
- **Secure:** Permissions are managed in one place.
- **Efficient:** You don't need to share reports one by one.



In

**short:**

An **App** in Power BI is a curated, read-only package of dashboards and reports published from a workspace. You publish it by preparing the workspace → clicking **Publish app** → configuring settings → sharing with users.

#### 20. ◆ 1. Centralized Sharing & Collaboration

- Publish reports and dashboards once, and share with teams or the entire organization.
- Users don't need Desktop or PBIX files — they access content via browser or mobile app.
- Workspaces support co-authoring, so multiple people can work on the same project.

#### ◆ 2. Row-Level Security (RLS) & Governance

- Admins can control who sees what data (dynamic filtering by user).
- Security is enforced centrally at the dataset level, ensuring compliance.
- Integration with **Azure Active Directory (AAD)** for enterprise identity management.

#### ◆ 3. Scheduled Refresh & Real-Time Updates

- Datasets can be set to refresh automatically (up to 8/day with Pro, 48/day with Premium).
- Live and DirectQuery connections support real-time dashboards.
- Reduces IT overhead — no need for manual refreshes.

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#### ◆ 4. Scalability with Workspaces & Apps

- Workspaces allow collaboration (developers) vs. Apps for clean distribution (end users).
  - Apps provide a professional, read-only view with controlled navigation.
  - Scales from small teams to thousands of users.
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#### ◆ 5. Dataflows for Reusable ETL

- Centralized data prep (Power Query in the cloud).
  - Dataflows can be reused across multiple datasets, reducing duplication.
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#### ◆ 6. Integration with Microsoft Ecosystem

- Works seamlessly with Excel, Teams, SharePoint, and Azure.
  - Embed dashboards in Teams channels or SharePoint pages.
  - Use Power Automate for alerts and workflows.
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#### ◆ 7. Mobile & Cloud Accessibility

- Access reports from anywhere via web or mobile app.
  - Dashboards can be optimized for mobile view.
  - Great for executives who need KPIs on the go.
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#### ◆ 8. Enterprise-Grade Performance (Premium Capacity)

- Dedicated cloud resources for faster performance.
  - Larger dataset sizes (up to 400 GB).
  - Advanced AI capabilities, paginated reports, and deployment pipelines.
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In

short:

Power BI Online Service brings **scalability, governance, real-time data, collaboration, and secure distribution** — making it enterprise-ready compared to Power BI Desktop, which is more for individual report development.