

Power BI Service

Overview of Key Personas in Power BI

Creator

- Builds and publishes content like reports and dashboards.
- Works with semantic models and dataflows to create insights.

Analyzer

- Consumes and interprets reports and dashboards.
- Uses Power BI's tools to analyze and gain insights from the data.

Collaborator

- Manages user-based roles, configures access, and organizes content.
- Sets up environments in apps and workspaces for effective collaboration.

Workspaces in Power BI

Types of Workspaces

1. My Workspace

- Personal workspace for a single user.
- Limited access: only the creator can view and manage content.
- **Core Uses:** Stores semantic models, reports, and dashboards for individual use.

2. Shared Workspace

- Collaborative workspace for multiple users.
- Allows for team collaboration and shared content creation.
- **Core Uses:** Supports dataflows, enables shared editing of semantic models, and serves as a hub for organizational content.

Workspaces in Power BI (Actions)

Workspace Actions

- Content Types:
 - **Reports:** Visual insights built on semantic models.
 - **Dashboards:** Single-page overviews aggregating multiple visuals.
 - **Paginated Reports:** Optimized for printing and PDF generation

Semantic Models and Dataflows in Power BI

Semantic Models

- **Definition:** Structured data models defining relationships, calculations, and formats.
- Key Features:
 - Can be as simple as a CSV upload or as complex as a multi-table model.
 - Models can be shared with permissions to modify, share, or use in additional content creation.
 - Creating a semantic model in a workspace can automatically generate a dashboard.

Dataflows

- **Definition:** Cloud-based data preparation using Power Query, enabling ETL (Extract, Transform, Load) operations.
- Core Benefits:
 - Supports centralized data storage for reuse across workspaces.
 - Allows scheduled ETL processes and reusable transformation logic.
 - Facilitates collaboration by enabling multiple models and dataflows to share data

Power BI Service Workflow

End-to-End Workflow

1. Dataflow

- **Purpose:** ETL process in the cloud using Power Query.
- **Output:** Creates tables that can be reused and scheduled for refresh.

2. Semantic Model

- **Purpose:** Structured data model defining relationships, calculations, and formats.
- **Output:** Forms the foundation for reports and dashboards.

3. Reports

- **Purpose:** Collection of visuals that generate insights from the semantic model.
- **Output:** Interactive, multi-page views of data insights.

4. Dashboards

- **Purpose:** Single-page display aggregating key visuals.
- **Output:** Provides a high-level overview and can consolidate visuals from multiple reports.

Key Point

- A **Semantic Model** can be shared across multiple reports and workspaces, centralizing data for consistent analysis.

Data Connection Options and Data Gateways

Data Connection Options

- **Discover Existing Content:** Access and use pre-existing datasets and models.
- **Create New Semantic Models:** Import data from various sources like CSV, databases, PBIX files, and more.

Data Gateways

- **Purpose:** Connects on-premises data sources to Power BI Service without moving data to the cloud.
- Key Benefits:
 - Maintains data security and compliance.
 - Supports scheduling and secure data transfers.
- Types of Gateway Modes:
 - **Personal Mode:** Limited to individual use.
 - **Standard Mode:** Supports multiple users, direct query, and data flows across multiple cloud services.

Installation and Configuration

- Requires sign-in with a Power BI Service account for setup.
- After installation, verify the gateway registration in Power BI Service to confirm connectivity.

Creating and Using Dataflows in Power BI

Creating a Dataflow

- **Step 1:** Create the dataflow in Power BI Service.
 - Connect to various data sources, apply transformations, and save as tables.
 - No gateway needed if using sources like OneDrive.
- **Step 2:** Access the dataflow in Power BI Desktop.
 - Use Get Data → Dataflows to load tables.
- **Step 3:** Publish to Power BI Service.
 - Dataflow appears as a new semantic model, ready for further use.

Dataflow Capabilities

- **Reusable Transformations:** ETL logic can be shared and reused across models and reports.
- **Scheduling:** Automate refreshes to ensure up-to-date data.
- **Centralized Data Storage:** Acts as a single source of truth for an organization.

Key Points:

- **Incremental Refresh:** Can be set up in dataflows for optimized data processing.
- **Multi-Table Support:** Dataflows can include multiple tables, accessible in Power BI Desktop.

Reports and Dashboards in Power BI

Reports

- **Definition:** Multi-page collections of visuals created from a semantic model, offering in-depth insights.
- Modes:
 - **Reading Mode:** For end-users to view and interact with visuals.
 - **Edit Mode:** For creators to add or modify visuals and layouts.
- Capabilities:
 - Create visuals, charts, and add bookmarks for customized views.
 - Visuals can be pinned to dashboards to provide a consolidated view.

Dashboards

- **Definition:** Single-page display aggregating visuals from various reports.
- Key Features:
 - **Pinning Tiles:** Pin individual visuals or entire report pages for easy access.
 - **Live Page Pinning:** Enables slicer functionality and interactive elements on dashboards.
 - **Personal Bookmarks:** User-created views only accessible by the creator.

Data-Driven Alerts, Q&A, and Quick Insights in Power BI

Data-Driven Alerts

- **Definition:** Notifications triggered when a metric reaches a specified threshold.
- **Supported Visuals:** Gauge charts, KPI cards, and standard cards (not available on live-pinned pages).
- **Use Cases:** Monitor critical metrics and receive alerts for key changes or targets met.

Q&A

- **Purpose:** Allows users to ask natural language questions about data.
- Key Features:
 - Recognizes synonyms and terms, underlining recognized terms in blue.
 - Generates initial visuals based on user questions, with options for customization.
 - **Scope Insights:** Drill down within generated insights for deeper analysis.

Quick Insights

- **Definition:** AI-generated insights that identify trends and patterns in the semantic model.
- Capabilities:
 - Produces up to 32 insight cards automatically.
 - **Limitations:** Not available with DirectQuery or when using Row-Level Security (RLS).
 - **Scoped Insights:** Generate insights within the context of another insight for targeted analysis.

Mobile Layout and Embedding Content in Power BI

Mobile Layout

- **Purpose:** Optimizes dashboards and reports for mobile viewing.
- Key Features:
 - **Manual Layout Design:** Drag and drop visuals to create a custom mobile experience.
 - **Auto-Create Option:** Provides a starting point, but manual adjustments are often required for optimal design.
 - **Customization:** Adjust the size and layout of visuals for mobile devices.

Embedding Content

- **Purpose:** Share Power BI content securely or publicly via various embedding options.
- Options:
 - **Secure Embed:** Embed content within internal web pages, accessible only by authorized users.
 - **Publish to Web:** Make content publicly accessible; suitable for open-access reports (ensure data sensitivity).
 - **SharePoint and URL Embed:** Embed reports directly in SharePoint or through direct URLs for seamless integration.
- **Web Content Tile:** Allows for embedding live webpages by adding iframe HTML snippets to dashboards.

Sharing and Collaboration in Power BI

Sharing Options

- **Individual Reports and Dashboards:** Share specific content with individual users for viewing and interaction (no editing).
- **Workspace Sharing:** Provides full collaboration with team members, including editing and access to datasets, reports, and dashboards.
- **Publish an App:** Allows large-scale sharing within the organization, with options to tailor access for different audiences.

Embedding and Publishing

- **Secure Embed:** Embed content within internal environments like SharePoint or a secure URL.
- **Publish to Web:** Makes content publicly accessible (use with caution for data sensitivity).
- **Embedding for External Users:** Share content securely with external users via Azure Active Directory B2B.

Limits and Permissions

- **Sharing Limits:** Max of 100 shares per individual at a time or 500 total shares.
- **License Requirements:** Recipients need a Pro or Premium Per User (PPU) license or access via Premium capacity to view shared content.
- **Hierarchy:** Pro users can share with PPU users, but PPU cannot share with Pro users.

User Roles and Permissions in Power BI

User Roles

- **Viewer:** Read-only access; can view reports and dashboards but cannot interact with datasets or dataflows.
- **Contributor:** Can create, edit, and delete content but cannot add new users or manage roles.
- **Member:** Has all Contributor permissions plus the ability to add users with lower permissions, publish/update apps, and share items or apps.
- **Admin:** Full control over workspace, including adding/removing users and managing workspace settings.

Permission Levels by Role

- **Viewer:** Ideal for end-users who only need to consume reports.
- **Contributor:** For users responsible for content creation without admin control.
- **Member:** Suitable for team leads or project owners who need to manage workspace users.
- **Admin:** Typically for workspace owners or IT administrators with oversight of all workspace activities.

License Tiers

- Each workspace can be hosted in different license tiers (Pro, PPU, or Premium).
- Permissions and access depend on the user's license and the workspace's licensing tier.

Publishing Apps and Usage Metrics in Power BI

Publishing Apps

- **Purpose:** Share curated content with large audiences within or outside the organization.
- Steps to Publish:
 - Create an app from a workspace, configure its name, description, and navigation.
 - Select content from the workspace to include, and define the audience.
- Sharing Options:
 - **Internal Sharing:** For organization members using Azure Active Directory.
 - **External Sharing:** For external users via Azure Active Directory B2B.

Usage Metrics

- Report Usage:
 - Track opens, views, and unique users interacting with reports and dashboards.
- Report Performance:
 - Monitor report load times, device types, and browsers used by viewers.
- Key Metrics:
 - Gain insights into content engagement, including most viewed reports and popular visuals.

Row-Level Security (RLS) in Power BI

Overview of RLS

- **Purpose:** Controls data visibility at the row level, allowing specific data access for individual users or groups.
- Types of RLS:
 - **Static RLS:** Predefined filters restrict data visibility for specific audiences.
 - **Dynamic RLS:** Adjusts data visibility dynamically based on the user accessing the report.

Static RLS

- Implementation:
 - Use DAX expressions to filter rows without directly referencing columns or tables.
 - Define roles and apply filters in Power BI Desktop or Power BI Service.
- **Testing:** Use the "View As" option to simulate different roles and verify data visibility.

Dynamic RLS

- Implementation:
 - Requires a lookup table with user information and DAX functions like `USERPRINCIPALNAME`.
 - Adjusts data visibility based on the user's identity (e.g., email).
- **Testing:** Use "View As" and "Other User" options in Power BI to confirm correct access control.

Limitations

- RLS only applies to users with Viewer roles; higher permissions (Contributor or above) bypass RLS restrictions.

Power BI Service Administration

Admin Roles

- Microsoft 365 Admins:
 - Oversee and manage Microsoft 365 services, typically handled by IT or Business Owners.
 - Common roles include **Global Admin**, **Billing Admin**, **License Admin**, and **User Admin**.
- Power Platform & Fabric Admins:
 - Full access to Microsoft Fabric Management Studio, usually managed by IT Directors or Team Leads.
 - Role: Power Platform or Fabric Administrator.
- Capacity Admins:
 - Manage and restart embedded capacity, often handled by IT Directors or Team Leads.
 - Role: Power BI Premium Admin.

Admin Portal and Tenant Settings

- Tenant Settings:
 - Control access and manage user settings across the organization.
- Customization:
 - Allows admins to adjust visual elements, content access, and overall service appearance.

Tenant Settings and Customization in Power BI

Tenant Settings

- **Purpose:** Controls and manages Power BI Service settings across the organization.
- Key Options:
 - **Content Sharing:** Define how users can share reports and dashboards within and outside the organization.
 - **Export Settings:** Configure permissions for exporting data and visuals.
 - **Data Connectivity:** Manage and secure data connections (e.g., Data Gateways).
 - **Audit and Compliance:** Track activities for compliance and auditing purposes.

Customization

- **Service Appearance:** Adjust branding, colors, and logos to align with company branding.
- **Embed Settings:** Customize options for embedding Power BI reports in internal and external applications.
- **Help and Support Links:** Set up custom links for internal help documentation or support.

Scheduled Refresh and Data Lineage in Power BI

Scheduled Refresh

- **Purpose:** Ensures data in Power BI reports and dashboards is always up-to-date.
- Configuration:
 - **Dataflows:** Refresh first, updating the data sources and transformations.
 - **Semantic Models:** Refresh after dataflows to synchronize updates in reports and dashboards.
- **Frequency Options:** Set up daily, weekly, or custom schedules based on data freshness requirements.
- **Dependencies:** Scheduled refreshes for dataflows should complete before semantic model refreshes to maintain data accuracy.

Data Lineage

- **Purpose:** Visual representation of the data flow from source to final reports or dashboards.
- Benefits:
 - Helps trace data origins and transformations, ensuring transparency and accuracy.
 - Simplifies troubleshooting by showing dependencies across datasets, dataflows, and reports.

Row-Level Security (RLS) vs. Object-Level Security (OLS) in Power BI

Row-Level Security (RLS)

- **Purpose:** Controls access to specific rows of data based on user roles.
- Implementation:
 - Define RLS roles with DAX filters that limit data visibility by user.
 - Supports both static and dynamic security options to customize access.
- **Example Use Case:** Restricting regional managers to only view data relevant to their region.

Object-Level Security (OLS)

- **Purpose:** Controls access to specific tables and columns within a dataset.
- Implementation:
 - Configure OLS in tools like Tabular Editor, which enables selective visibility for tables or columns.
 - Useful for restricting sensitive fields (e.g., salary or personal identifiers) from unauthorized users.
- **Example Use Case:** Hiding salary information in HR reports for non-HR personnel.

Comparison

- **RLS:** Controls data visibility at the row level.
- **OLS:** Controls visibility of entire tables or columns.

Power BI Licensing and Capacity Options

Licensing Types

- Power BI Free:
 - Basic access for individual use.
 - Limited to personal workspaces and no sharing options.
- Power BI Pro:
 - Enables sharing, collaboration, and access to shared workspaces.
 - Required for users to share content and view shared reports outside of Premium capacity.
- Power BI Premium Per User (PPU):
 - Provides Pro-level access with additional Premium features, such as larger dataset capacity and AI features.
 - Ideal for users who need advanced functionality but don't require full Premium capacity.
- Power BI Premium:
 - Capacity-based license that supports larger datasets, higher refresh rates, and organizational sharing.
 - Includes access to advanced features like AI-driven analytics and paginated reports.
 - Allows sharing with Free users when content is published to Premium capacity.

Capacity Options

- Shared Capacity:
 - Available in Power BI Pro and PPU.
 - Resources are shared among users and managed by Microsoft.
- Dedicated Capacity:
 - Exclusive to Power BI Premium.
 - Provides dedicated resources for performance optimization and larger workloads.

Power BI Reports and Dashboards: Best Practices

Report Design Best Practices

- **Consistent Layout and Formatting:** Maintain uniform color schemes, fonts, and layouts for a cohesive look.
- **Use of Hierarchies and Drill-Throughs:** Organize data with hierarchies and enable drill-throughs to improve navigation.
- **Interactive Filters:** Incorporate slicers and filters to allow users to explore data and customize views.

Dashboard Design Best Practices

- **Single-Page Layout:** Keep dashboards to one page for quick, at-a-glance insights.
- **Pin Key Visuals:** Pin essential metrics and visuals that highlight important insights.
- **Use of Live Pages:** Pin live report pages to retain slicer functionality and interactivity on dashboards.

Performance Optimization

- **Limit Data Volume:** Use filters and aggregations to reduce dataset size, improving load time.
- **Optimize Visuals:** Minimize the number of visuals per page and avoid complex calculations to enhance performance.
- **Scheduled Refreshes:** Set refresh schedules that align with data update frequencies to keep reports up-to-date without straining resources.

Key Takeaways for Power BI Success

1. Master the Power BI Workflow

- Understand the end-to-end flow: Dataflows → Semantic Models → Reports → Dashboards.
- Effective use of data connections, scheduled refreshes, and data lineage ensures consistent data quality.

2. Collaborate and Share Effectively

- Use appropriate workspaces and roles (Viewer, Contributor, Member, Admin) for team collaboration.
- Share reports and dashboards securely, utilizing embedding options and publishing apps for large audiences.

3. Optimize Performance

- Leverage best practices in report design, dashboard layout, and scheduled refreshes.
- Use Row-Level and Object-Level Security to ensure data accessibility and privacy.

4. Stay Organized with Licensing and Permissions

- Choose the right licensing model (Pro, Premium, PPU) for your organization's needs.
- Manage user roles and permissions to maintain data governance and compliance.

5. Explore Advanced Features

- Utilize advanced analytics (Q&A, Quick Insights) and customization options (tenant settings, branding) to maximize Power BI's potential.