Microsoft Fabric Introduction

Microsoft Fabric unifies data engineering, data science, data warehousing, real-time analytics, and Power BI into a single SaaS platform.

1. How to Access Microsoft Fabric
Fabric is not available for personal Microsoft accounts (like @outlook.com); you must use an organizational (work or school) account.

A. Enable the Fabric Trial
If your organization hasn't already purchased Fabric capacity, you can start a free 60-day trial to access all features.

1. Go to app.fabric.microsoft.com.
2. Sign in with your work credentials.
3. Click the **Account Manager** (your profile picture) in the top-right corner.
4. Select **Start Trial**.
    - *Note: If this button is missing, your IT administrator may have disabled trials in the tenant settings.*

B. Check Admin Settings (For Administrators)
If you are an admin or need to ask one to enable it:

- Go to the **Admin Portal** (Gear Icon > Admin Portal).
- Under **Tenant Settings**, locate **Microsoft Fabric**.
- Enable **"Users can create Fabric items"** (this can be applied to the whole organization or specific security groups).

2. Navigating the Interface
Fabric uses a "Persona" based navigation. Instead of seeing every tool at once, you switch contexts based on the job you are doing.

- **The Experience Switcher:** Look for the icon in the **bottom-left corner** of the screen (it usually looks like the Power BI logo or the logo of your current workload).
- **Clicking this icon** opens a menu listing the core workloads:
    - **Power BI:** For visualization and reporting.
    - **Data Factory:** For data ingestion (Pipelines & Dataflows Gen2).
    - **Synapse Data Engineering:** For Lakehouses and Spark Notebooks.
    - **Synapse Data Warehouse:** For SQL-based warehousing.
    - **Synapse Data Science:** For machine learning models.
    - **Real-Time Intelligence:** For streaming data (KQL).

3. Using the Core Features

A typical Fabric workflow follows this path: **Ingest → Store → Process → Visualize**.

Create a Workspace (The Container)

Everything in Fabric lives in a Workspace.

1. Select **Workspaces** from the left navigation bar.
2. Click **+ New Workspace**.
3. Name it (e.g., "Fabric_Demo").
4. **Crucial Step:** Expand **Advanced** and under **License Mode**, ensure you select **Trial** or **Fabric Capacity** (F64, etc.). *Pro mode will not allow you to create Fabric items like Lakehouses*.

Ingest Data (Data Factory)

1. Use the Experience Switcher (bottom left) to select **Data Factory**.
2. Click **Data Pipeline** to copy data from a source (like SQL Server or an Excel file) into Fabric.
3. Alternatively, use **Dataflow Gen2** for a low-code "Power Query" experience to transform data before loading it.

Store & Engineer Data (Data Engineering)

1. Switch to **Data Engineering**.
2. Create a **Lakehouse**. This is your unified storage for both files (unstructured) and tables (structured).
3. Once created, you can drag and drop files into the "Files" section, or use **Notebooks** (Spark/Python) to process that data into "Tables."

Analyze with SQL (Data Warehouse)

If you prefer SQL over Python:

1. Switch to **Data Warehouse**.
2. You can write standard T-SQL queries against the same data you just ingested, thanks to **OneLake** (the data doesn't need to be moved; it is accessible by both the Lakehouse and Warehouse engines simultaneously).

Visualize (Power BI)

1. Inside your Lakehouse or Warehouse, click the button **New Semantic Model** (or "New Power BI Dataset").
2. Select the tables you want to report on.
3. Click **New Report**. This opens the familiar Power BI web interface to build charts and graphs directly on your Fabric data.

Summary of Key Terminology

Term	Definition
OneLake	The "OneDrive for Data." A single, unified storage system for the entire organization. All Fabric engines (SQL, Spark, KQL) read from here.
Capacity	The computing power you pay for. All your queries and data movement consume "Capacity Units" (CUs).
Direct Lake	A new connection mode in Power BI that reads directly from OneLake, offering the speed of "Import" mode without the need to refresh data.

The Pricing Tier (The "Menu")

There are many tiers, but these are the most common ones.

Note: Prices are estimated US commercial pricing. "Reserved" assumes a 1-year commitment paid monthly.

SKU	Capacity Units (CU)	Pay-As-You-Go (Monthly Est.)	Reserved (Monthly Est.)	Equivalent To	Good For...
F2	2 CU	~$262	~$155	N/A	Testing, Learning, very small ETL jobs.
F4	4 CU	~$525	~$310	N/A	Small teams, light data engineering.
F8	8 CU	~$1,050	~$620	Power BI Embedded (A1)	Small production workloads.
F32	32 CU	~$4,200	~$2,480	N/A	Medium workloads, complex ETL.
F64	**64 CU**	**~$8,410**	**~$4,960**	**Power BI Premium P1**	**The Enterprise Standard (Unlocks Free Viewers).**
F128	128 CU	~$16,820	~$9,920	Power BI Premium P2	Large Enterprises.

2. The "Magic Number": Why F64 is Critical

The most important distinction in Fabric pricing is the **F64** threshold.

- **Below F64 (F2 - F32):** These are "Engine Only" SKUs. You get the technology (Spark, Data Factory, etc.), but **you do not get unlimited distribution**. Every person who looks at a report must still have a **Power BI Pro** license ($10/user/mo).

- **At F64+:** This matches the old **P1** capability. You get "Unlimited Distribution." People with a **Free** license can view reports/content, provided the content sits in an F64 capacity.

Rule of Thumb: If you have 500+ users who just need to *view* reports, buying an **F64 (Reserved)** is usually cheaper than buying 500 **Pro** licenses.

3. P-SKU vs. F-SKU

Microsoft is retiring P-SKUs. If you have a P1 now, you will eventually be migrated to an F64.

Feature	Power BI Premium (P-SKU)	Microsoft Fabric (F-SKU)
Billing Model	Flat Monthly Rate (Commitment)	Pay-As-You-Go **OR** Reserved Instance
Pause/Resume	No. You pay 24/7.	**Yes.** You can pause an F-SKU on weekends/nights to save money (PAYG only).
Scaling	Difficult (Requires new contract/purchase)	**Instant** (Change a slider in Azure Portal)
Azure Integration	Separate	Native (Lives in your Azure Subscription)
Workloads	Mostly Power BI	Power BI + Data Factory + Spark + Warehouse

4. User Licenses

Buying the Fabric Capacity (the engine) does not mean you don't need user licenses (the driver's license).

- **Power BI Pro ($10/mo/user):** Required for anyone **publishing** or **creating** content. Even if you have an F2048 super-computer, your developers still need Pro licenses.
- **Power BI Premium Per User ($20/mo/user):** A middle ground for users who need AI features/large models but the company doesn't have an F64 capacity.
- **Fabric (Free):** Required for users who only view content (if you have F64+) or for data engineers who *only* work on the non-Power BI parts (like writing Spark notebooks).
    - Licensing Limit: Unlimited (You can share with 10,000+ people, and they don't need licenses).
    - Performance Limit: Depends on complexity, but typically supports 500–2,000 active concurrent users.

Since an F64 costs roughly **$5,000/month** (Reserved), you should calculate when it is cheaper to buy the capacity vs. buying individual licenses.

- **The Math:** A Power BI Pro license is ~$10-14/user/month.
- **The Break-Even:** If you have more than **~350 to 500 users**, buying an F64 is usually cheaper than buying Pro licenses for everyone.
    - *500 users x $10 = $5,000/mo (Same price as F64, but F64 gives you the extra Data Engineering engines).*

Summary Recommendation: If you have **over 500 consumers** (viewers), the **F64** is almost always the right choice. If you have fewer than 250 users, it is usually cheaper to stick with **Power BI Pro** licenses and a smaller F-SKU (like F2 or F4) just for the backend data processing.

5. Hidden Cost: OneLake Storage

Unlike Power BI Premium, which had "pooled" storage limits, Fabric charges for storage separately, similar to Azure Data Lake Storage (ADLS).

- **Price:** Roughly **$0.023 per GB per month**.
- **Implication:** For most companies, this is negligible compared to the compute cost (F-SKU), but for data-hoarding organizations, it can add up.