Lesson-20

1. How does Power BI handle large datasets in the Online Service, and what is the role of Premium Capacity in this?

- In the Power BI Service, datasets are stored in-memory using the VertiPaq engine. However, the standard (Pro) license has limitations (dataset size up to 1 GB and limited refreshes per day).
- **Premium Capacity** removes these restrictions by providing dedicated cloud resources, larger dataset sizes (up to 400 GB depending on SKU), more frequent refreshes (up to 48/day), incremental refresh, and faster query performance. It is designed for enterprises with large-scale data models and high concurrency needs.

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2. What are the differences between Import mode, DirectQuery, and Live Connection in Power BI Service?

- **Import Mode**: Data is copied into Power BI's in-memory engine. Fast performance, allows complex DAX, but requires scheduled refreshes. Dataset size limited by capacity.
- **DirectQuery**: No data is stored in Power BI. Queries are sent to the source in real-time. Useful for very large datasets but performance depends on source system. Limited DAX functionality compared to Import.
- **Live Connection**: Directly connects to Analysis Services (Tabular or Multidimensional) or Power BI datasets. No data is imported into Power BI. All calculations are handled at the source. Provides centralized semantic model governance.

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3. Explain deployment pipelines in Power BI Online. What stages do they include?

- Deployment pipelines allow organizations to manage content lifecycle (Dev → Test → Production).
- **Stages**:
    1. **Development** – Initial building and testing by developers.
    2. **Test** – Validation, QA, and stakeholder review.
    3. **Production** – Published for business users.

- Pipelines help track changes, compare environments, and promote reports/datasets while maintaining governance.

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4. How can Power BI Service integrate with Microsoft Teams or SharePoint for collaboration?

- Power BI reports and dashboards can be embedded directly in **Microsoft Teams** channels or chats, allowing teams to view and discuss insights without leaving Teams.
- In **SharePoint Online**, Power BI web parts allow embedding reports in pages for broader access.
- Both integrations ensure a collaborative environment where data insights are part of everyday workflows.

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5. What is the XMLA endpoint in Premium and how does it benefit developers or enterprise BI teams?

- The **XMLA (XML for Analysis) endpoint** allows read/write connections to Power BI datasets hosted in Premium workspaces.
- Benefits:
    - Developers can use external tools (SSMS, Tabular Editor, Excel) to query, script, or deploy models.
    - Enables automation, enterprise-level semantic modeling, and CI/CD processes.
    - Provides flexibility for advanced BI teams to manage large models beyond the Power BI UI.

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6. Describe how usage metrics and audit logs work in Power BI Service.

- **Usage Metrics**: Show how often reports/dashboards are viewed, by whom, and when. Helps report owners track adoption and engagement.
- **Audit Logs** (via Microsoft 365 compliance center): Provide detailed event-level information such as dataset refresh, report access, sharing activity, and export events. Used for governance, compliance, and monitoring.

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7. How do you manage workspace access and permissions for different users?

- Power BI workspaces support **role-based access control**:
    - **Admin** – Full control (including adding/removing users).
    - **Member** – Can edit content.
    - **Contributor** – Can add/edit content but not manage users.
    - **Viewer** – Read-only access.
- Access can be assigned at workspace or report level, ensuring proper security alignment.

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8. How can data governance be enforced in Power BI Service?

- **Centralized Workspaces**: Organize reports by domain with restricted permissions.
- **Row-Level Security (RLS)**: Restricts what data each user can see.
- **Sensitivity Labels & Information Protection**: Apply Microsoft Purview labels for compliance.
- **Certified/Promoted Datasets**: Encourage reuse of trusted data sources.
- **Audit Logs & Monitoring**: Track usage and ensure compliance with policies.
- **Deployment Pipelines**: Ensure controlled promotion of content.

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9. What are the limitations of Row-Level Security when using DirectQuery or Live Connection?

- With **DirectQuery**:
    - RLS is applied at the data source query level, which can impact performance (slower queries).
    - Some complex RLS filters may not be supported depending on the source.
- With **Live Connection**:
    - RLS must be defined in the source model (e.g., Analysis Services). Power BI cannot override or extend it.
    - Users are limited to the security rules of the underlying model.

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10. Explain how you can refresh a dataset via Power Automate or REST API.

- **Power Automate**: A flow can be created that triggers a dataset refresh (manually, on schedule, or based on events). It uses the built-in Power BI connector.
- **REST API**: Developers can programmatically trigger dataset refreshes, check refresh history, or set refresh schedules using API endpoints. Useful for integration with external ETL pipelines or CI/CD workflows.