Power Platform
COMMUNITY CONFERENCE

SEPTEMBER 18–20, 2024 • *Workshops: Sept 16, 17 & 21*

MGM GRAND • *Las Vegas, NV*

Power Platform
COMMUNITY CONFERENCE

Direct Lake in Fabric: The Next Step in Semantic Models After Import and Direct Query

Miguel Félix

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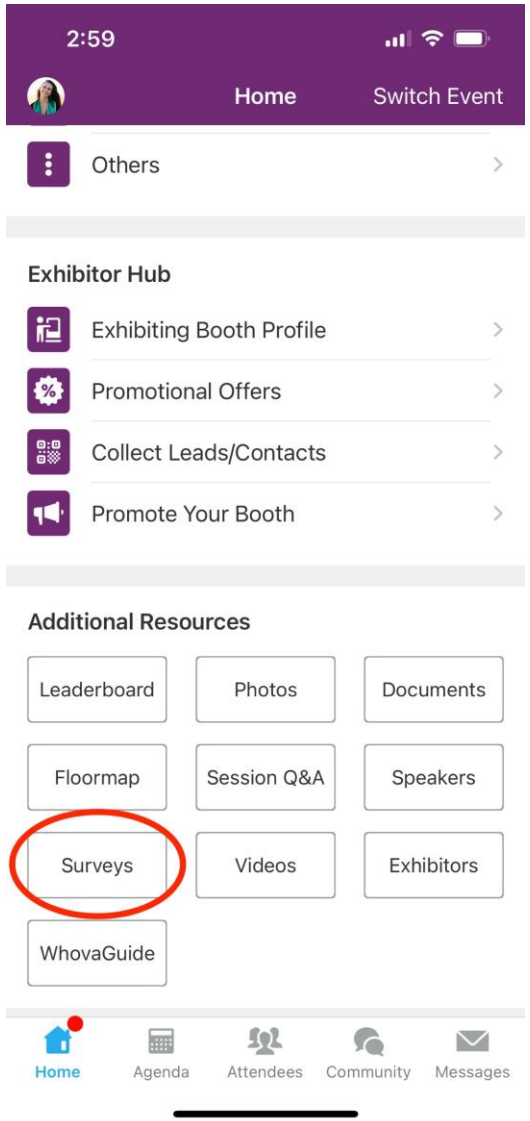

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MIGUEL FÉLIX

Lead BI Architect

Microsoft Data Platform MVP

Super User at Fabric Community

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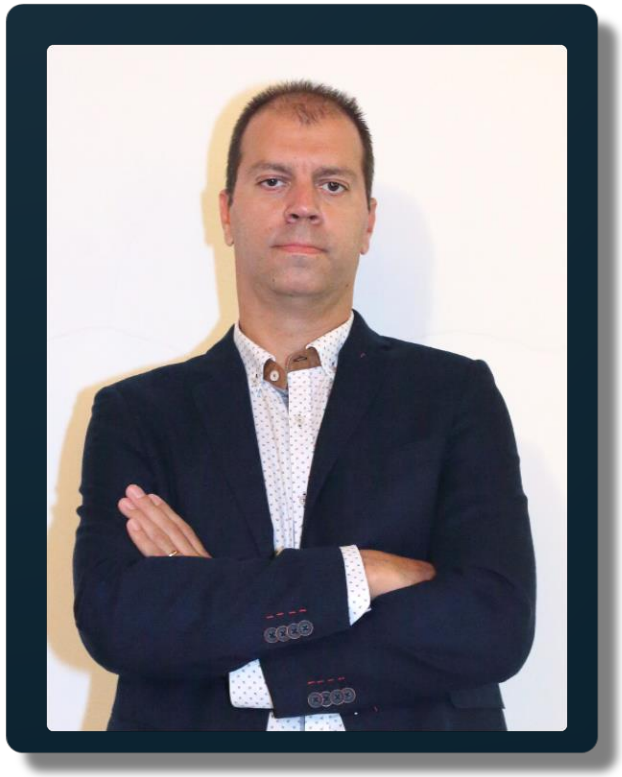


AGENDA

01

ONELAKE

Main concepts

Parquet Files

02

DIRECT LAKE

Main concepts

03

DEMO

Directlake vs Direct Query

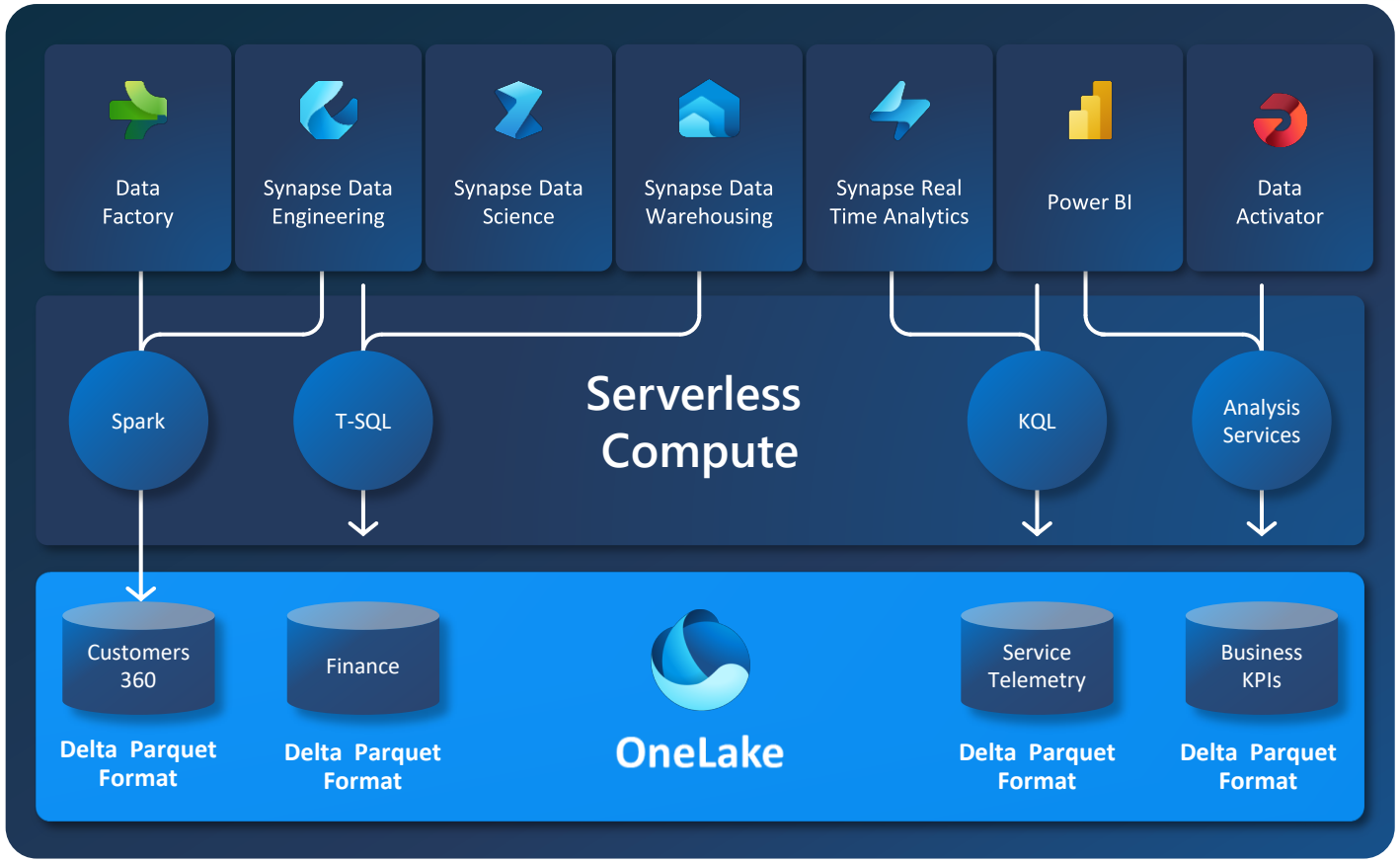
ONELAKE

Main concepts
Parquet Files

01

OneLake

The OneDrive for data

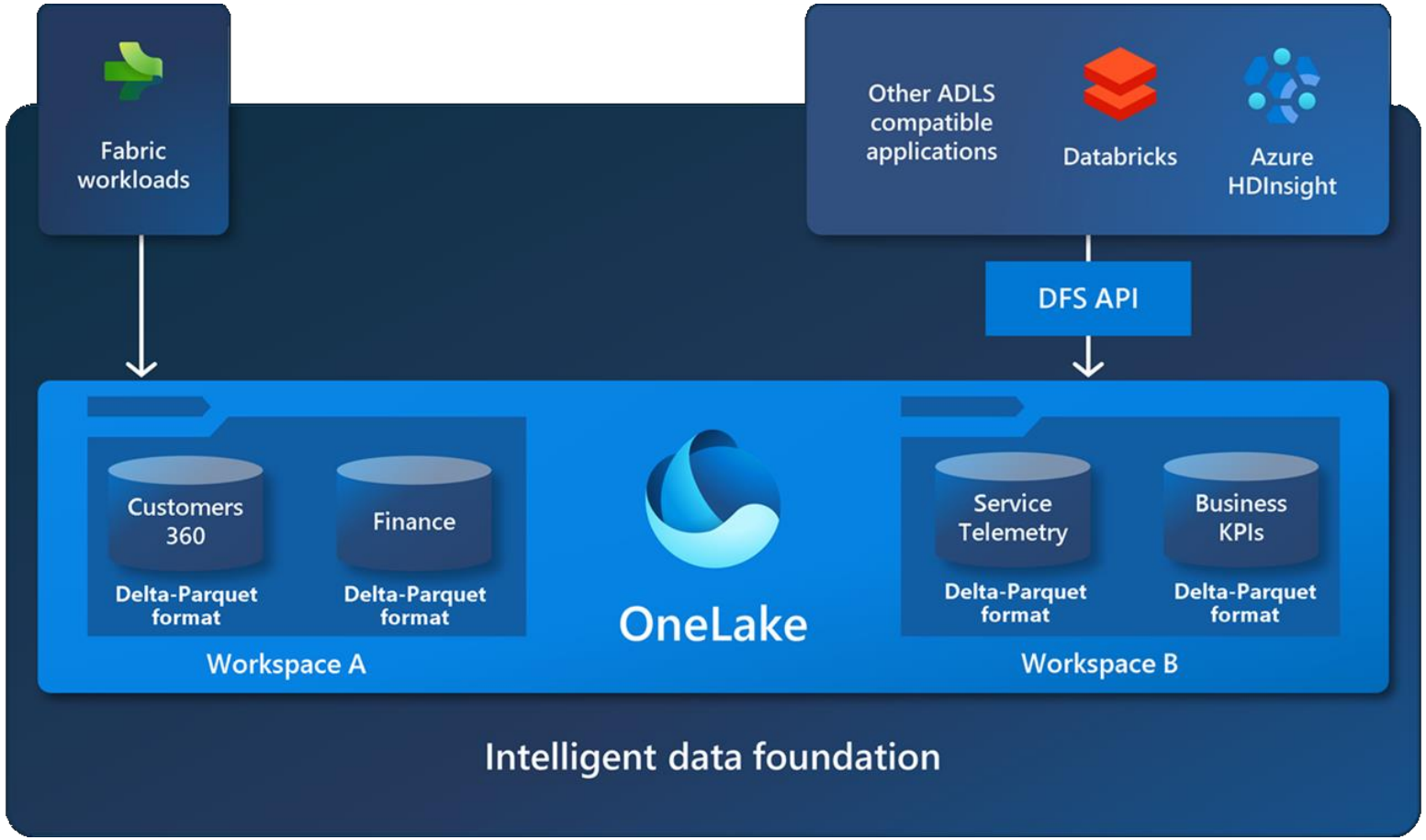


- All the compute engines store their data automatically in OneLake
- The data is stored in a single common format
- Delta – Parquet, an open standards format, is the storage format for all tabular data in Analytics vNext
- Once data is stored in the lake, it is directly accessible by all the engines without needing any import/export
- All the compute engines have been fully optimized to work with Delta Parquet as their native format
- Shared universal security model is enforced across all the engines

https://learn.microsoft.com/en-us/fabric/get-started/microsoft-fabric-overview (September 2024)

OneLake

The OneDrive for data



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OneLake + Parquet Files

OneLake Stores Structured Tables as Delta Parquet

Column 1 Product	Column 2 Customer	Column 3 Country	Column 4 Date	Column 5 Sales Amount
Ball	John Doe	USA	2023-01-01	100
T-Shirt	John Doe	USA	2023-01-02	200
Socks	Maria Adams	UK	2023-01-01	300
Socks	Antonio Grant	USA	2023-01-03	100
T-Shirt	Maria Adams	UK	2023-01-02	500
Socks	John Doe	USA	2023-01-05	200

@DataMozart

Data compression - various encoding and compression algorithms, Provide reduced memory consumption

Columnar storage – files are organized by column, rather than by row, which saves storage space and speeds up analytics queries

Language agnostic – developers may use different programming languages to manipulate the data in the Parquet file

Open-source format – no vendor lock-in

Support for complex data types

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OneLake + Parquet Files

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	Column 1 Product	Column 2 Customer	Column 3 Country	Column 4 Date	Column 5 Sales Amount
Row Group 1	Ball	John Doe	USA	2023-01-01	100
	T-Shirt	John Doe	USA	2023-01-02	200
Row Group 2	Socks	Maria Adams	UK	2023-01-01	300
	Socks	Antonio Grant	USA	2023-01-03	100
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	Socks	John Doe	USA	2023-01-05	200

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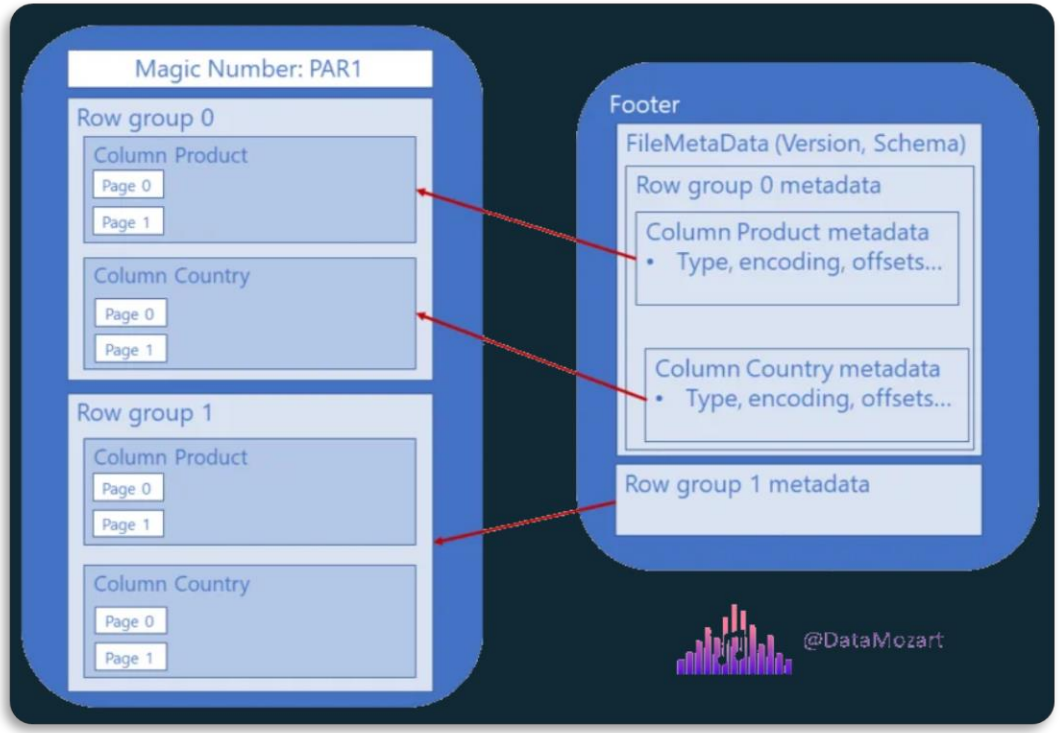

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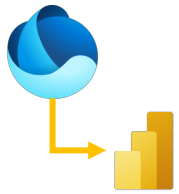


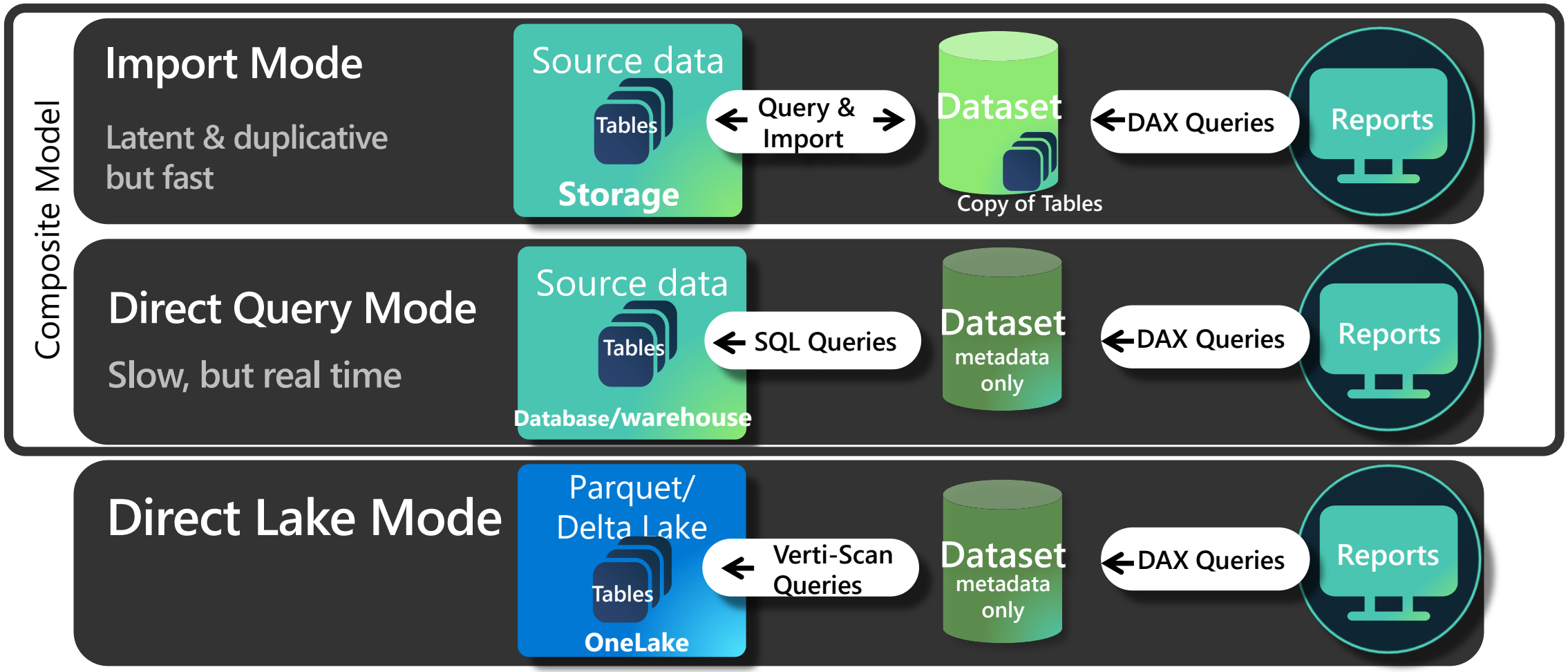
DIRECT LAKE

Main concepts

02

Direct Lake

Best of Import and DirectQuery for High Scale, Performant, Real Time Reporting



https://learn.microsoft.com/en-us/fabric/get-started/microsoft-fabric-overview (September 2024)

Direct Lake

Best of Import and DirectQuery for High Scale, Performant, Real Time Reporting

- Semantic model capability for analysing very large data volumes.
- Based on loading parquet-formatted files directly from a data lake without having to query a Lakehouse or Warehouse,
- Eliminates the import requirement by loading the data directly from OneLake. (removes duplication of data)
- Fast-path to load the data from the lake straight into the Power BI engine, ready for analysis.
- Unlike DirectQuery, there is no translation from DAX or MDX to other query languages or query execution on other database systems, yielding performance

- Avalilable on **Lakehouse or Warehose**
- **SQL Endpoint** for querying and a default model with all the tables
- **XMLA endpoint read-write** support using tools like SQL Server Management Studio, Tabular Editor and DAX Studio
- Database object **Compatibility level 1604 or higher**
- **Fallback** occurs when exceeds the limits for the SKU or features that don't support Direct Lake (settings available)
- **Data changes are automatically reflected** (settings available)

https://learn.microsoft.com/en-us/fabric/get-started/microsoft-fabric-overview (September 2024)

Direct Lake

Fallback

Fabric/Power BI SKUs	Parquet files per table	Row groups per table	Rows per table (millions)	Max model size on disk/OneLake[1] (GB)	Max memory (GB)
F2	1,000	1,000	300	10	3
F4	1,000	1,000	300	10	3
F8	1,000	1,000	300	10	3
F16	1,000	1,000	300	20	5
F32	1,000	1,000	300	40	10
F64/FT1/P1	5,000	5,000	1,500	Unlimited	25
F128/P2	5,000	5,000	3,000	Unlimited	50
F256/P3	5,000	5,000	6,000	Unlimited	100
F512/P4	10,000	10,000	12,000	Unlimited	200
F1024/P5	10,000	10,000	24,000	Unlimited	400
F2048	10,000	10,000	24,000	Unlimited	400

Direct Lake semantic models read delta tables directly from OneLake.

A query can fall back to DirectQuery mode when:

- DAX query exceeds limits for the SKU,
- Usage of features that don't support Direct Lake mode (example SQL views in a Warehouse)

DirectQuery mode use SQL to retrieve the results from the SQL endpoint of the Lakehouse or Warehouse, which can have an impact on query performance.

Guardrails define resource limits for Direct Lake mode beyond which a fallback to DirectQuery mode is necessary to process DAX queries.

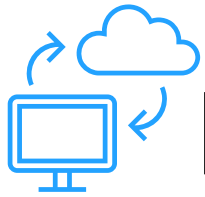
Max Memory represents the upper memory resource limit for how much data can be paged in.

https://learn.microsoft.com/en-us/fabric/get-started/microsoft-fabric-overview (September 2024)

Direct Lake
Issues and limitations

- Direct Lake models can only contain tables and views from a **single Lakehouse or Data Warehouse**.
- Direct Lake tables cannot currently be mixed with other table types(**Composite models** are not yet supported).
- DateTime relationships are not supported in Direct Lake models.
- **Calculated columns and calculated tables** are not yet supported.
- Some data types may not be supported.
- Direct Lake tables do not support complex delta table column types. Binary and Guid semantic types are also unsupported.
- Table relationships require the data types of their key columns to coincide. Primary key columns must contain unique values.
- The length of string column values is limited to 4,000 Unicode characters.
- Embedded scenarios that rely on embedded entities are not yet supported.
- **Tables based on T-SQL-based views cannot be queried** in Direct Lake mode (Fallback to DirectQuery mode).
- **Validation is limited** for Direct Lake models. User selections are assumed correct, and no queries will validate cardinality and cross filter selections for relationships, or for the selected date column in a date table.
- The Direct Lake tab in the Refresh history only lists Direct Lake-related refresh failures. Successful refreshes are currently omitted.

https://learn.microsoft.com/en-us/fabric/get-started/microsoft-fabric-overview (September 2024)



DEMO

Direct Lake vs Direct Query

03

Power BI | Temperature + Guardrails DLak

app.powerbi.com/groups/6fd614b5-23ec-4faa-a72d-81316c95ea73/list?experience=power-bi&subfolderId=17402

Power BI Direct Lake 2024

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Workspaces
Direct Lake 2024
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Direct Lake 2024

Create deployment pipeline | Create app | Manage access | Workspace settings

+ New item | New folder (preview) | Upload

Source control 2 | Filter by keyword | Filter

Direct Lake 2024 > Direct Lake Mode

Name	Git status	Type	Task	Owner	Refreshed	Next refresh	Endorsement	Sensitivity	Included in app
DLake Guardrails	Uncommitted	Notebook	—	Miguel Felix	—	—	—	—	
DLake Mulitple Tables	Synced	Semantic model	—	Direct Lake 2024	9/10/24, 3:30:12 PM	N/A	—	—	
DLLakehouse	Synced	Lakehouse	—	Miguel Felix	—	—	—	—	
DLLakehouse	—	Semantic model ...	—	Direct Lake 2024	2/17/24, 12:13:16 PM	N/A	—	—	
DLLakehouse	—	SQL analytics en...	—	Direct Lake 2024	9/15/24, 9:03:15 AM	N/A	—	—	
Rename semantic model columns (public)	Synced	Notebook	—	Miguel Felix	—	—	—	—	
Temperature + Guardrails DLake	Uncommitted	Notebook	—	Miguel Felix	—	—	—	—	

Fabric-Branches | Last synced: 9/10/2024 at 9:21 AM | bda07806

ENG PT 09:11 15/09/2024

Direct Lake

Advantages and use cases

- Advantages:
  - ✓Advanced data processing
  - ✓Optimized Near Real-Time Access with Improved Performance
  - ✓Unified Data Management
  - ✓…
- Use Cases
  - ✓Financial Sector
  - ✓Supply Chain
  - ✓Health
  - ✓…

THANK YOU

Special shout-out:
Sandeep Pawar (Fabric Guru)
Nikola Ilic (Data Mozart)

https://www.linkedin.com/in/miguel-a-s-felix/

https://twitter.com/MFelixPBI

https://pbiportugal.com