EmPower your BI Architecture

Riccardo Perico

Nice to meet you

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10 years working, training and speaking in Microsoft «Data Realm»

MCP: MTA, MCSA

Silver Contributor

Agenda? The right questions

1. What's Storage Mode **and** which one best suits to me?
2. Do I need an On-premises Data Gateway?
3. How to refresh my data?
4. Is it just on-cloud solution?
5. Can I «encapsulate» PowerBI?
6. Do I need to care about dataflows?
7. Can I have some advisable scenarios?

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What's Storage Mode and which one best suits to me?

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Storage Mode: Import Mode
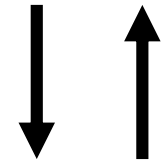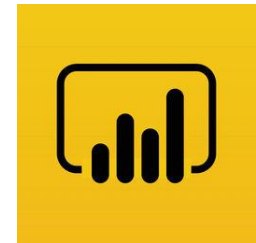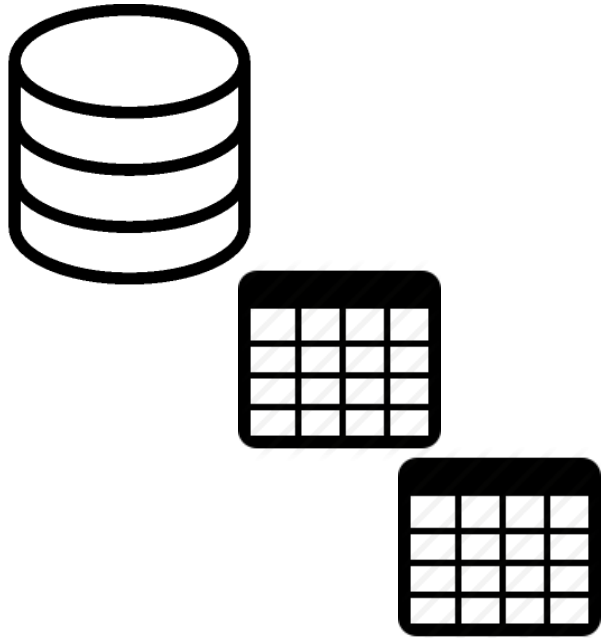
Data Model Cached into RAM

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Storage Mode: Import Mode

- Model **Cached** inside Power BI Service
- High **Compression** thanks to VertiPaq
- Full **Power BI functionalities and DAX** functions support
- **Multiple Data Sources** mashup (all available)
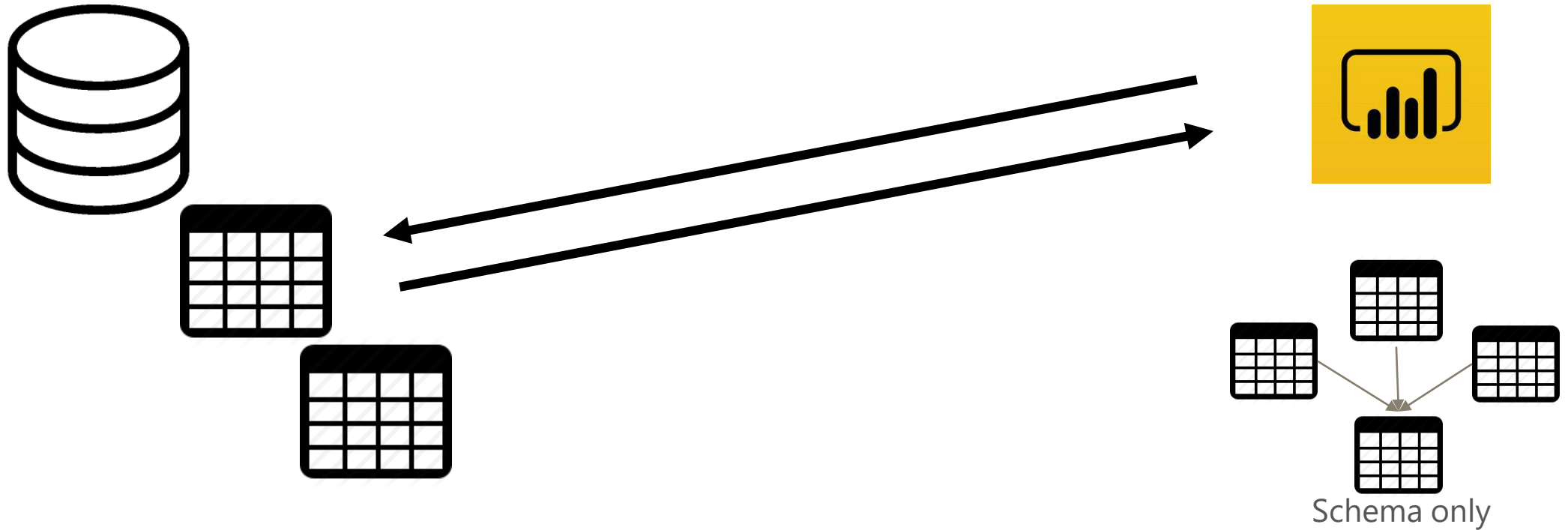- **10 GB** model size for PREMIUM / **1 GB** for PRO

![damag logo]

Large models for Power BI Premium

40X LARGER*

10 GB   400 GB
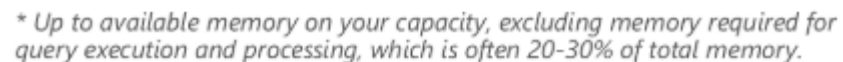
S9V2 Standard ★

1,280 Query Processing Units

Up to 400 GB Cache

Dedicated service

SSL

20,629.41
EUR/MONTH (ESTIMATED)

*Up to available memory on your capacity, excluding memory required for query execution and processing, which is often 20-30% of total memory.
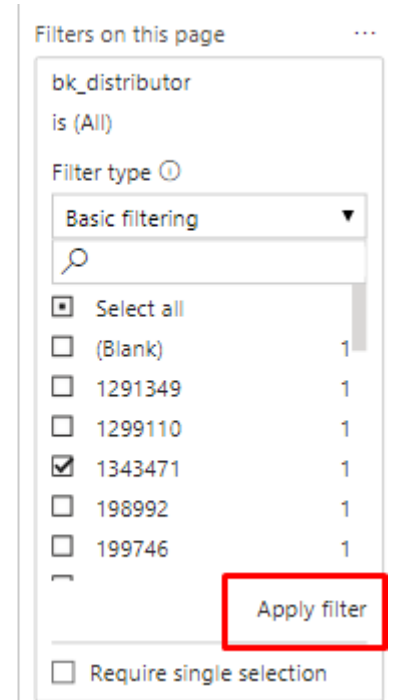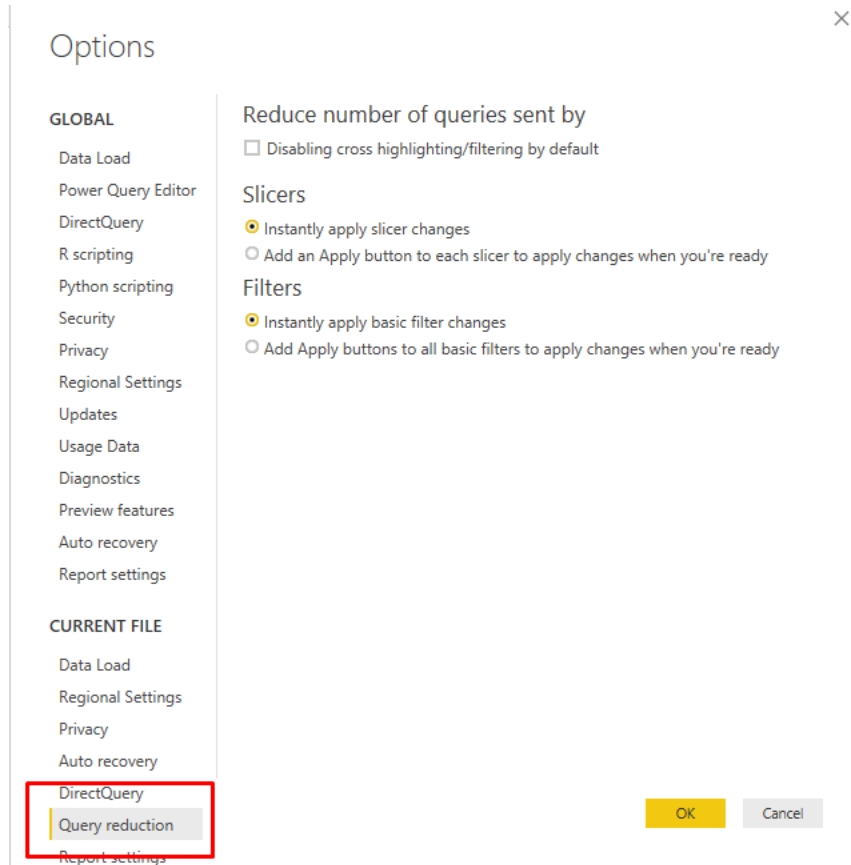
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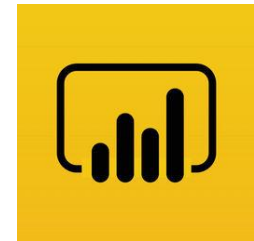# Storage Mode: Direct Query

Schema only

Storage Mode: Direct Query

- **Limited data sources**
- Not full **Power Query and DAX** support
- Pay attention to **performance** (1 render = 1 query)

- Overcome model **size limits**
- **Real-time / Near Real-time** scenarios

Direct Query: Quick Tip

Storage Mode: Live Connection

PowerBI acts just like an interface

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Storage Mode: Live Connection

- Data Sources: **AAS**, **SSAS** Tabular/Multidimensional and **PBI dataset**
- Data **Preparation** and Data **Modeling** done in the source
- Interaction with report = **DAX query sent to source**

- **Overcome** model **size limits**
- **Partitioned Load**
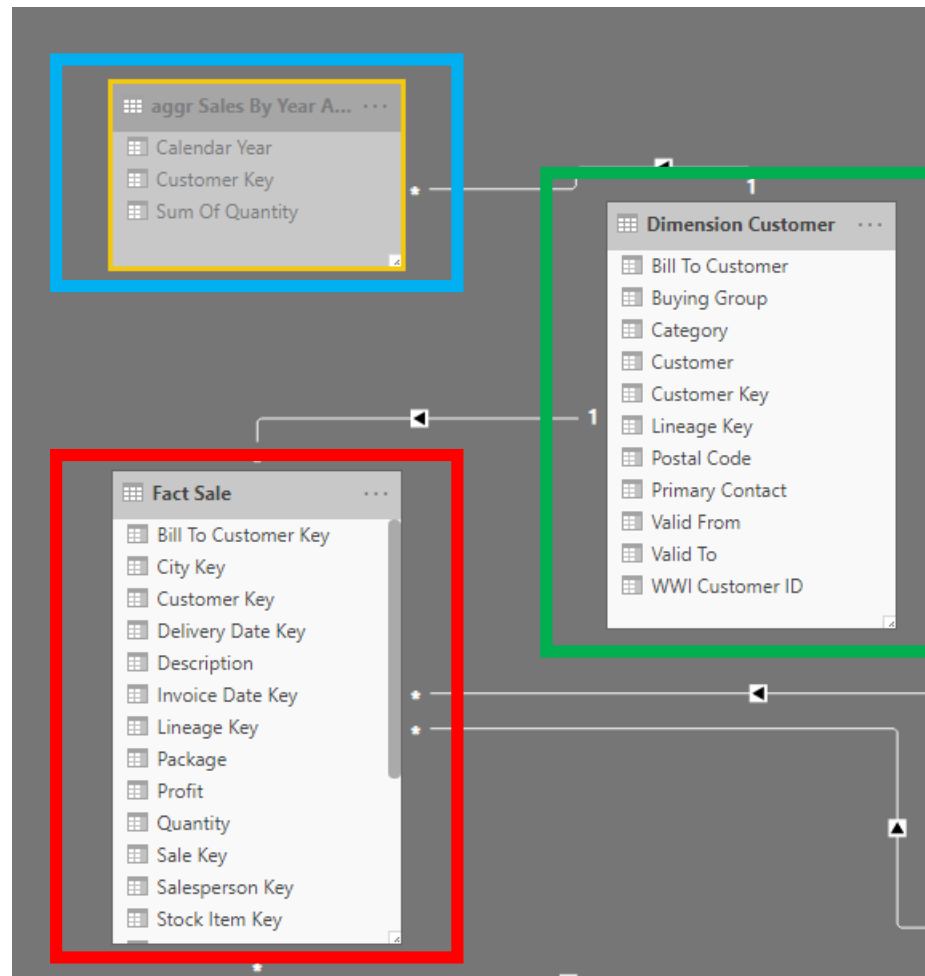- Tends to be **faster than DQ**

- **Never prefer «Import»** over «Live Connection» for supported sources
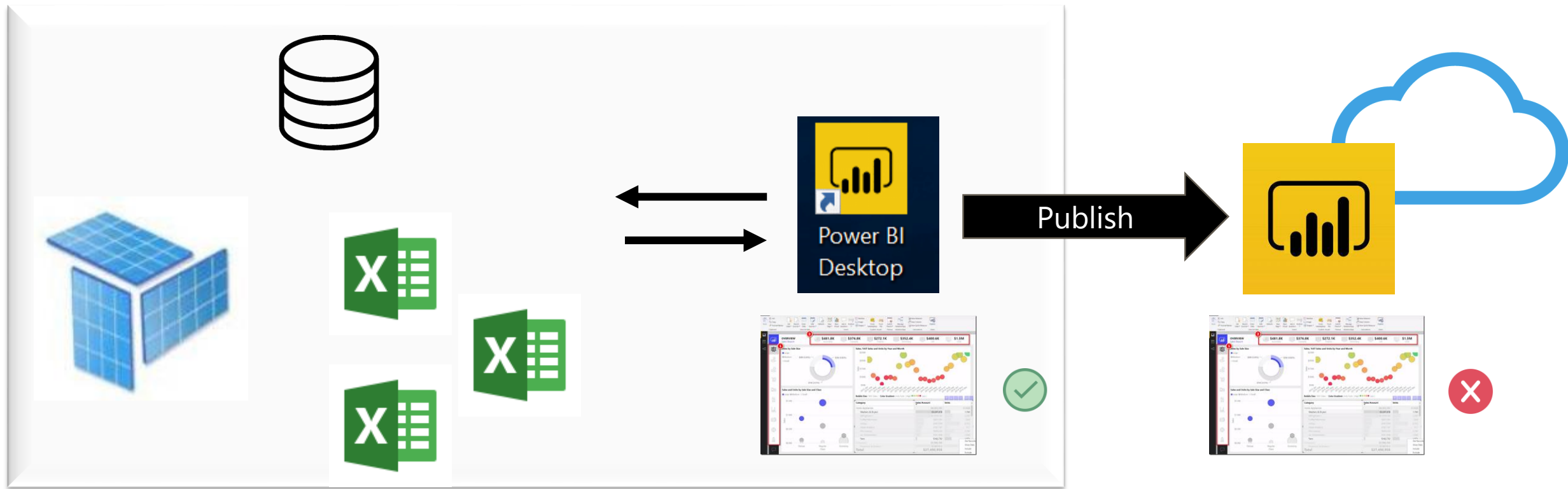
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Storage Mode: Composite

Import Mode

Dual Mode
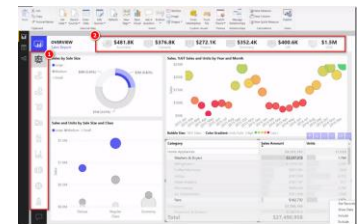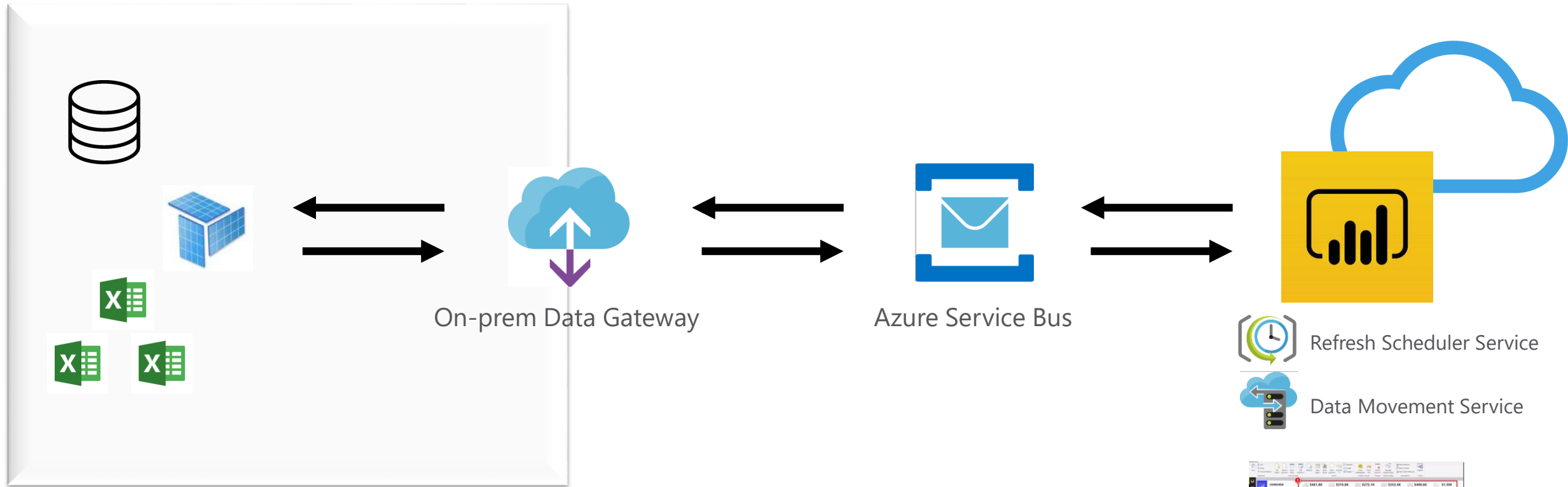
Direct Query

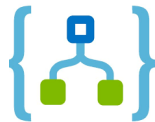# Do I need an On-premises Data Gateway?

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Let's draw a typical scenario

On-prem Data Gateway is the way

On-prem Data Gateway

Azure Service Bus

Refresh Scheduler Service

Data Movement Service
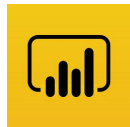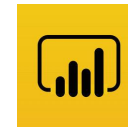
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Gateway: 2 types

On-premises data gateway (Enterprise)

All Storage Mode Support

Scheduled Refresh Support

On-premises data gateway (Personal mode)

Import Mode Support

Scheduled Refresh Support
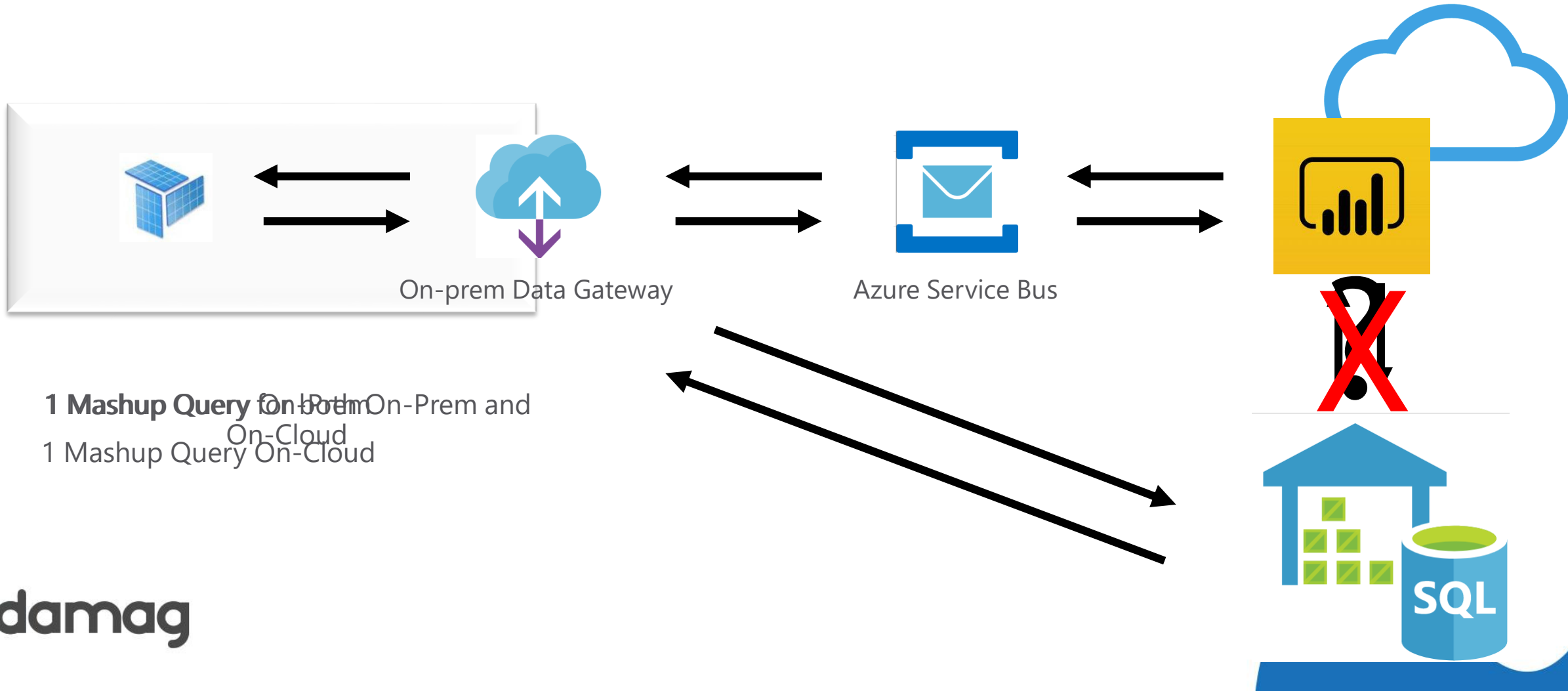
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Gateway: Architecture security

- **Credentials stored locally** and in Power BI Service
- **Data Source credentials encrypted** and stored in the cloud only gateway can decrypt

- **Gateway polling** → No inbound port to open
- **Outbound port** to open TCP: 443, 5671, 5672, 9530...9534

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Gateway: Considerations

- Keep gateways' name/**recovery key** in a safe place (migration, take over and recovery)
- **Do not install Personal and then Enterprise**
- **Sometimes 2 gateways** are needed: Import + DQ/Live
- **Create a cluster for High-Availability**: round robin or balanced load
- **On-premises data gateway app** helps you
- New **Powershell 6 cmdlets** to manage Gateway
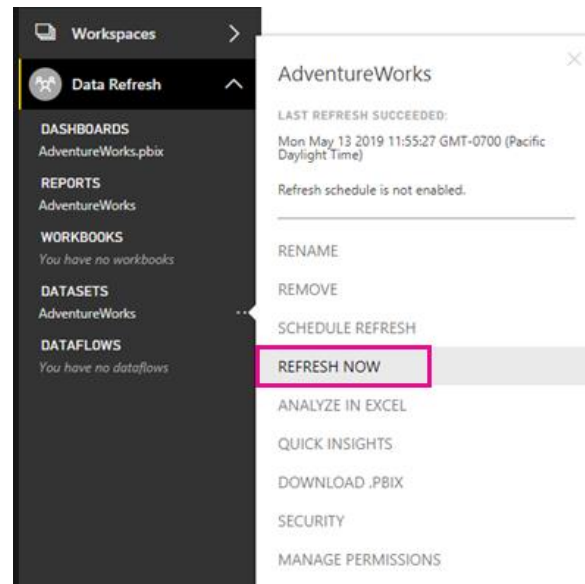
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On-prem & On-Cloud Mashup

On-prem Data Gateway

Azure Service Bus

1 Mashup Query on Both On-Prem and On-Cloud

1 Mashup Query On-Cloud

SQL

Demo: Mashup and Gateway

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How to refresh my data?

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Data are old... let's refresh!

Storage Mode	Refresh Needed	Max Refresh Per Day	Max Refresh Time
Import Mode Pro	✓	8	2 hours
Import Mode Premium	✓	48	5 hours
Direct Query	✗		-
Live Connection	✗		-
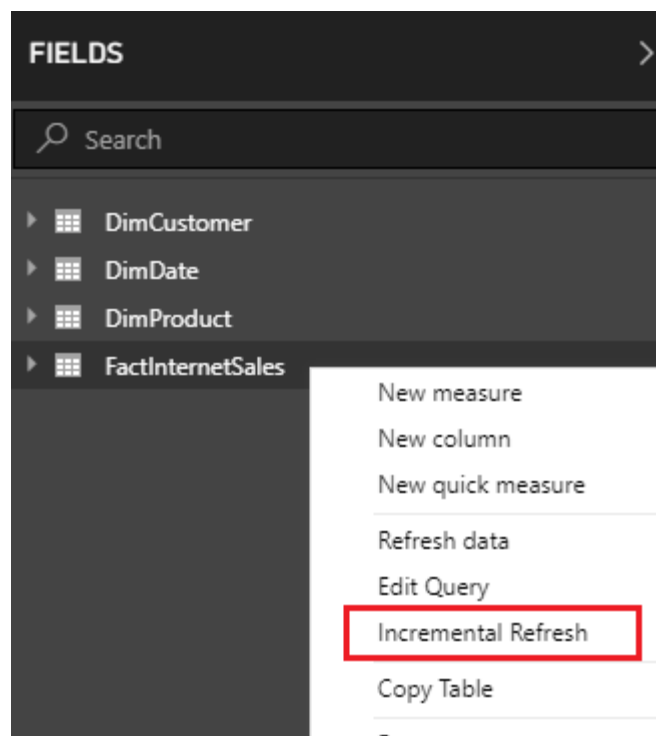
![damag logo]

Too much data?

FOR PRO IS COMING

Is it just on-cloud solution?

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Cloud is not the only option

Publish / Upload

Power BI Desktop

Power BI Report Server

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Can I «encapsulate» PowerBI?

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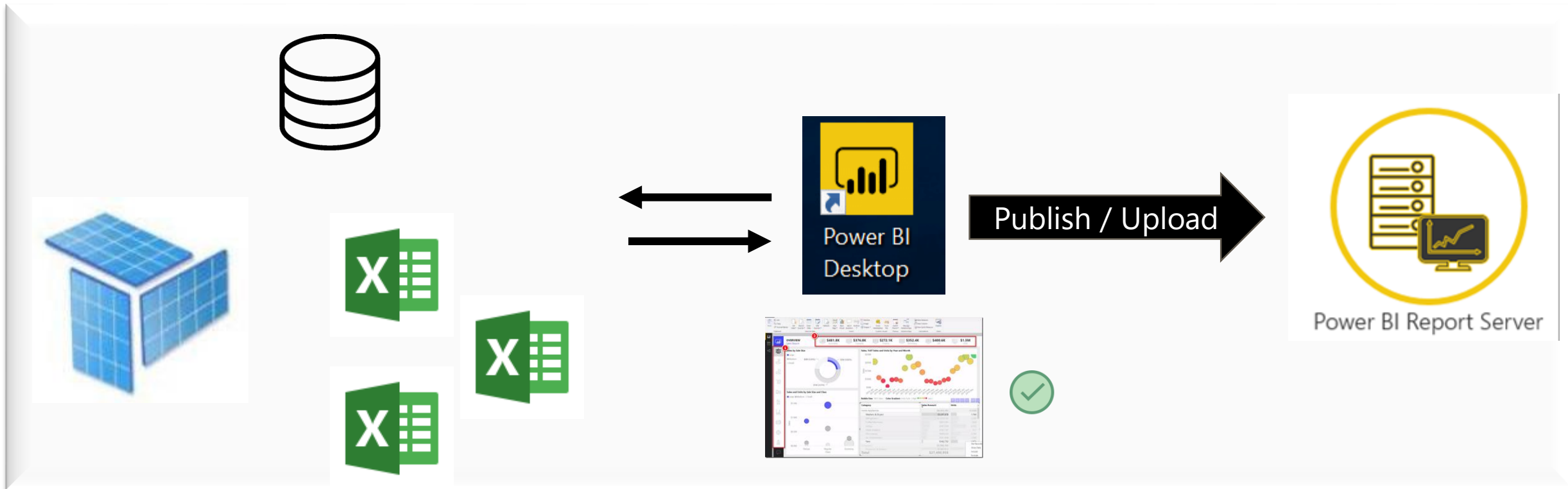
Encapsulate Power BI: 2 options

Opt. 1: Embedded in SharePoint Online

Pros

- Centralized UX
- Easy setup

Cons

- Only reports
- Users won't use service
- Permissions management

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Opt. 2: Power BI Embedded

Pros

- Full custom application
- Reports, Dashboards, Datasets and also Q&A
- End user do not need a Power BI Pro License

Cons

- Licensing: buckets of range renders
- Registration and management
- Not all service's features
- Web developer needed

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Do I need to care about dataflows?

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dataflows: as-is

Power Query → Date, Customer, Sales → Sales.pbix

Power Query → Date, Vendor, Purchases → Purchases.pbix

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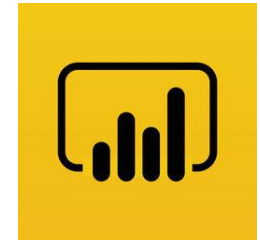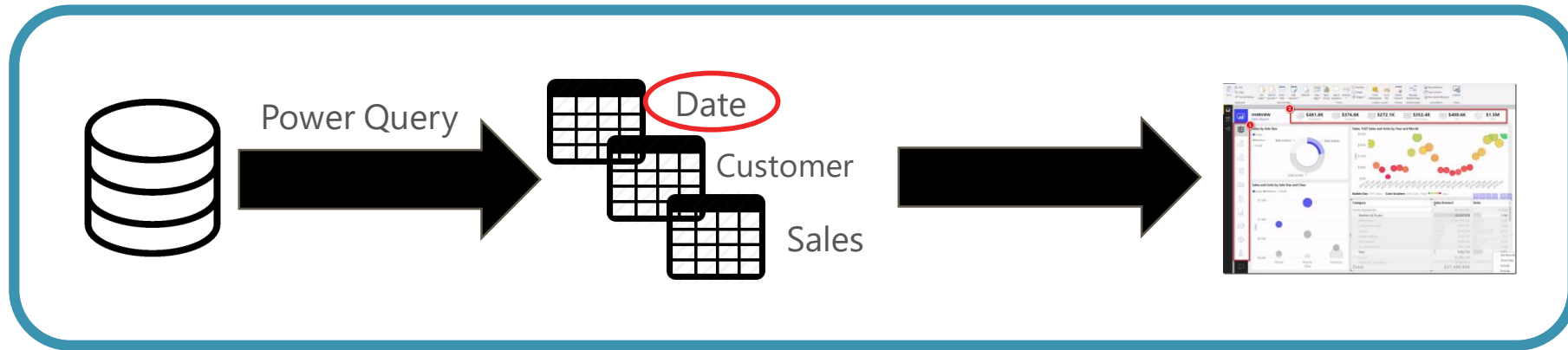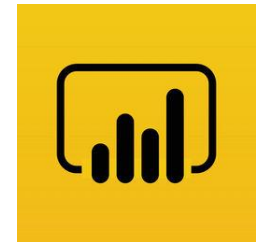
dataflows: a new paradigm

dataflows: 2 steps forward

Data Preparation
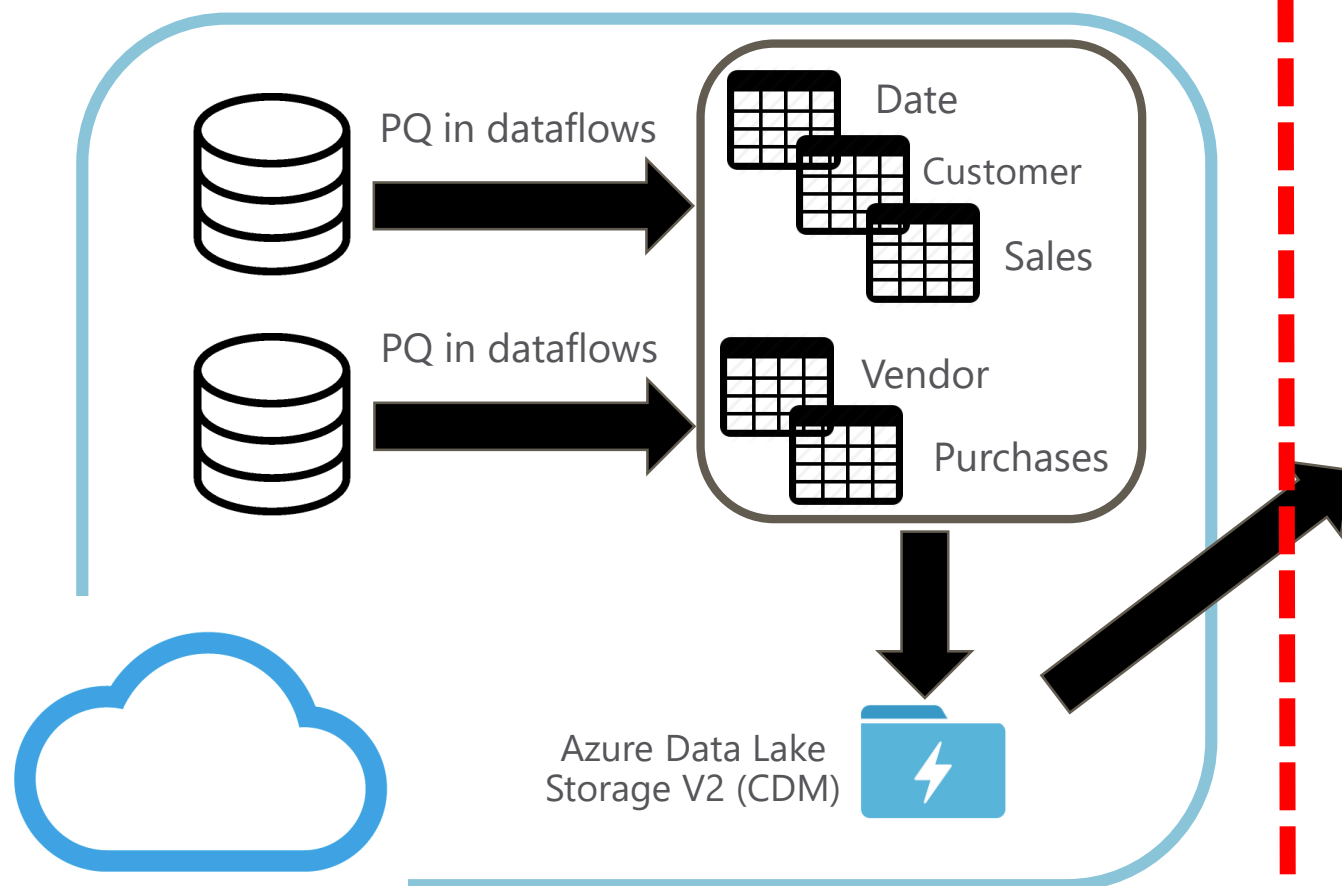
Data Modeling

Data Presentation
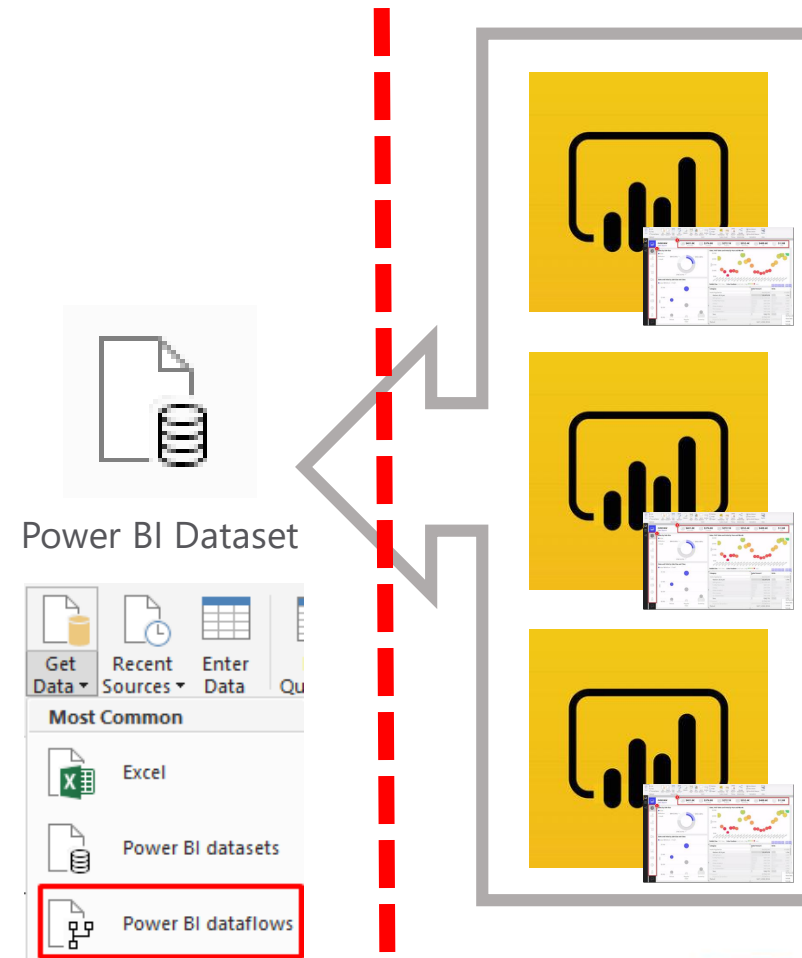
dataflows: pros

- Centralization of data preparation (reusability and standardization)
- Isolating refresh (1 table a time)
- Attach an existing ADLS v2 (preview)
- Speed up dataset refresh

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dataflows: summary pt. 1

Power BI dataflows FAQ

- ✓ A new capability for self-service data preparation in Power BI
- ✓ Delivered in a familiar Power Query experience
- ✓ Built on the foundation of Azure Data Lake Storage gen2
- ✓ Utilize the CDM folder format for data storage
- ✓ A tool for business users to drive data reuse without requiring IT involvement
- ✓ Enable Excel-like data lineage and orchestration

- ✗ NOT a replacement for datasets
- ✗ NOT a replacement for a data warehouse
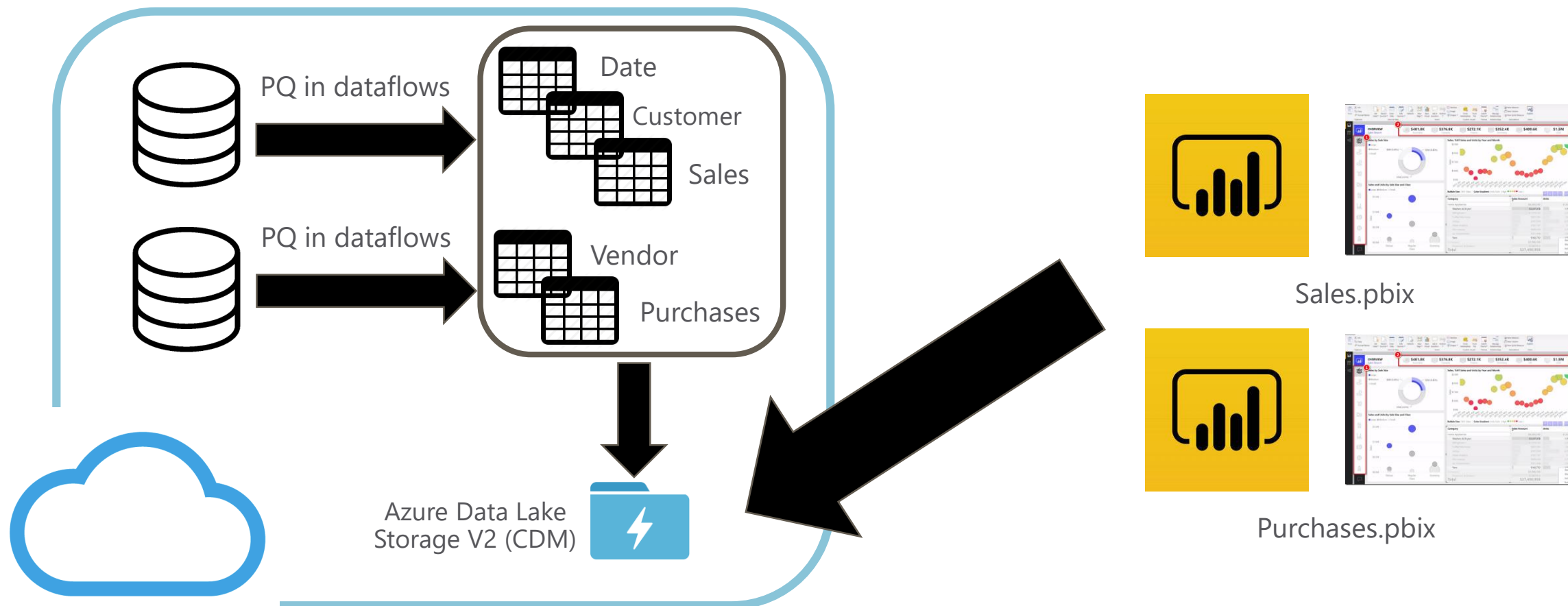- ✗ NOT a replacement for Azure Data Factory or SSIS
- ✗ NOT a Premium-only feature
- ✗ NOT an additional cost or fee
- ✗ NOT spelled with a space or any capital letters

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🐦 @DAVERUIJTER | AMSTERDAM | JULY 24th

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dataflows: summary pt. 2

	Power BI dataflows	Power BI datasets
Implementation	CDM folder	Analysis Services tabular model
Storage[2]	CSV files	Vertipaq
Metadata[3]	Common Data Model – model.json	BISM
Development	Power Query Online	Power Query in Power BI Desktop
Primary purpose[4]	Data reuse	Data analysis
Reuse[5]	Acts as data source in multiple datasets	Shared datasets across workspaces
Scope of reuse[6]	Entity level reuse	Dataset level reuse
Mashup with other data sources[7]	Yes	No
Used for reporting[8]	Not directly	Yes
Reuse outside Power BI[9]	Yes, through ADLSg2	Yes, through XMLA
Data access methods[10]	Import	Import, DirectQuery
Connection methods[11]	Import	Live Connection
What else am I missing?	Please let me know!	Seriously, you should let me know.

https://ssbipolar.com/2019/10/14/power-bite-dataflows-vs-datasets/

Demo: dataflows, datasets, refresh... all in!

Can I have some advisable scenarios?

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Some guidelines

Relational DWH	AAS/SSAS	Model Size	Advice
Yes	No	Under 1 GB	Storage Mode: Import Data License: Pro Data Preparation: Power Query or dataflows
No	No	Under 1 GB	Storage Mode: Import Data (also shared dataset) License: Pro Data Preparation: dataflows
Yes	Yes	-	Storage Mode: Live Query Connection License: Pro
Yes/No	No	Over 1 GB	Storage Mode: Import Data License: Premium Data Preparation: Power Query or dataflows
Yes/No	No	Over 1 GB	Storage Mode: Direct Query or Dual Mode with Aggregations License: Pro Data Preparation: Power Query

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Useful Links

- Live or Import? http://tiny.cc/fa9uaz
- Gateway http://tiny.cc/lb9uaz
- PowerShell Cmdlets for data gateway: http://tiny.cc/ebia1
- Incremental Refresh: http://tiny.cc/4c9uaz
- dataflows & CDM: http://tiny.cc/5d9uaz
- Dataflows best practices: http://tiny.cc/dmgebi
- Shared Datasets replace SSAS: http://tiny.cc/8imtbz

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Q&A

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- - - - -Thank you- - - -

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