



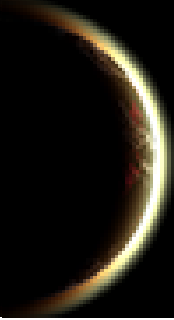
POWER BI WORLD TOUR

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Welcome!

Power BI User Group (PUG)

Copenhagen



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Connect to Data in Power BI Desktop

Just Thorning Blindbæk

Consultant, Trainer and Speaker

Connect to Data in Power BI Desktop

- Basic introduction to data connectivity in Power BI Desktop
- It's fun and easy to connect
- Currently 73 connectors and more to come!
- Understanding of the four connectivity modes

Session Agenda

- Discover and import data
- Clean, transform and reshape data
- Merge and combine
- Power Query Formula Language
- Connectivity modes

Meet Your Presenter

- Microsoft BI consultant at justB
- Trainer at Orange Man
- Founder of MsBIP.dk
- Worked with Microsoft BI in 11 years
- Strong focus on the front-end
 - Analysis Services
 - Reporting Services
 - PerformancePoint Services
 - Excel and Power Pivot
 - Power BI
- just@blindbaek.dk / blog.justB.dk



Introduction

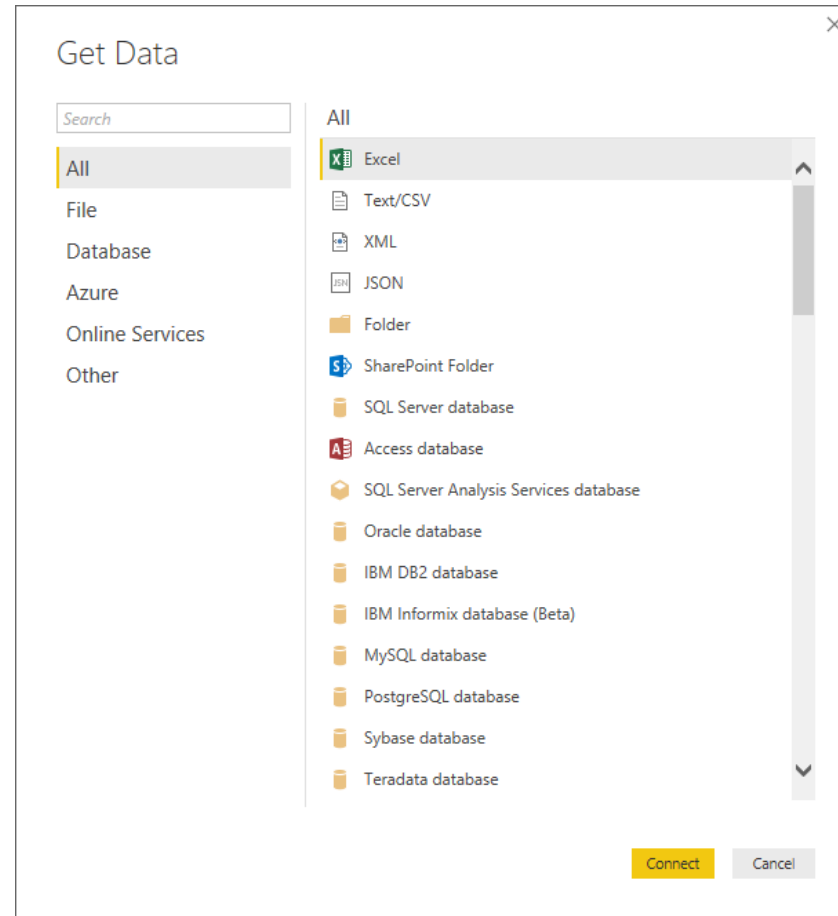
Introduction

Self-Service ETL

- Background as Power Query in Excel
- Now called “Get and transform” in Excel 2016 and Power BI Desktop
- Importing data from multiple data sources
- Cleaning and transforming that data
- Making the data import process easily repeatable

Discover and import data

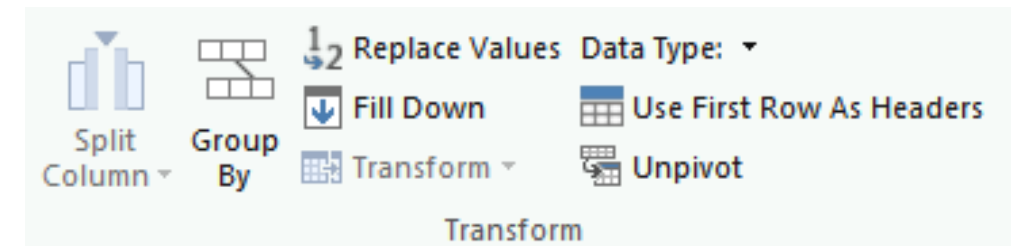
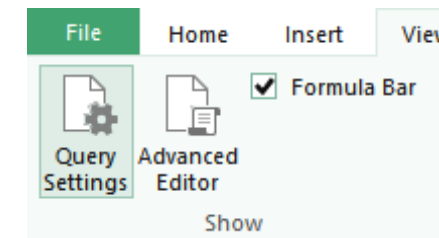
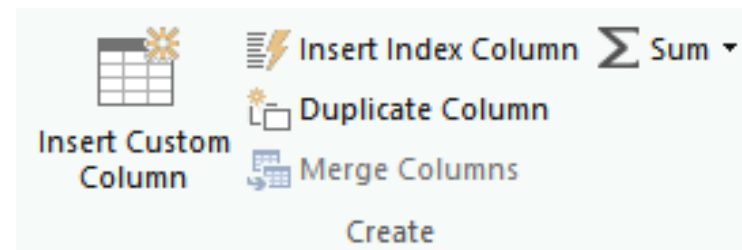
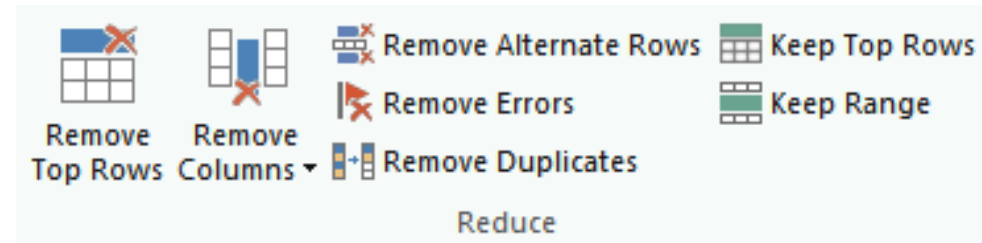
- Data profiling
- Connectors
 - Files
 - Database
 - Azure
 - Online Services
 - Other
 - Create your own



Demo

Clean, transform and reshape data

- Reduce rows
- Transform
- Combine
- Add columns



Where Does The Work Take Place?

- Where possible, Power Query pushes processing work back to the data source
 - This is called 'query folding'
- So, for example, with SQL Server as the data source, a multi-step transform is translated into a single SQL query
- This can't happen with certain data sources such as csv and webpages, for obvious reasons
- In general this improves performance but you can prevent it happening in code

Demo

The M Language

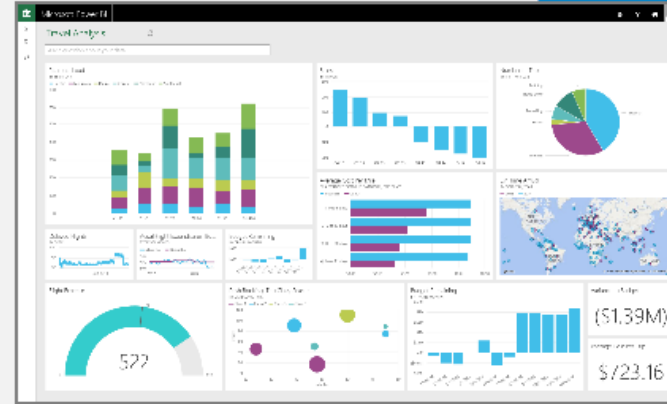
- Power Query is a GUI built on top of the M language
- M is a functional language similar to F#
- For more complex queries it is possible to write your own code in M
- It's not consistent with Excel formula language or VBA 😞
- But it is extremely powerful and fun to use 😊

Connectivity modes

Introduction

- Power Query is the key to allowing data refresh against multiple data sources from on-premises and the cloud
- Both scheduled refresh and direct refresh
- Need to install Gateway component on-premises

Live Power BI
reports &
dashboards



Live
connection

Live
query

Direct
query

Scheduled
refresh

Import
data

Cloud

On-premises



SQL Server
Analysis Services

Data
Source

Data
Source

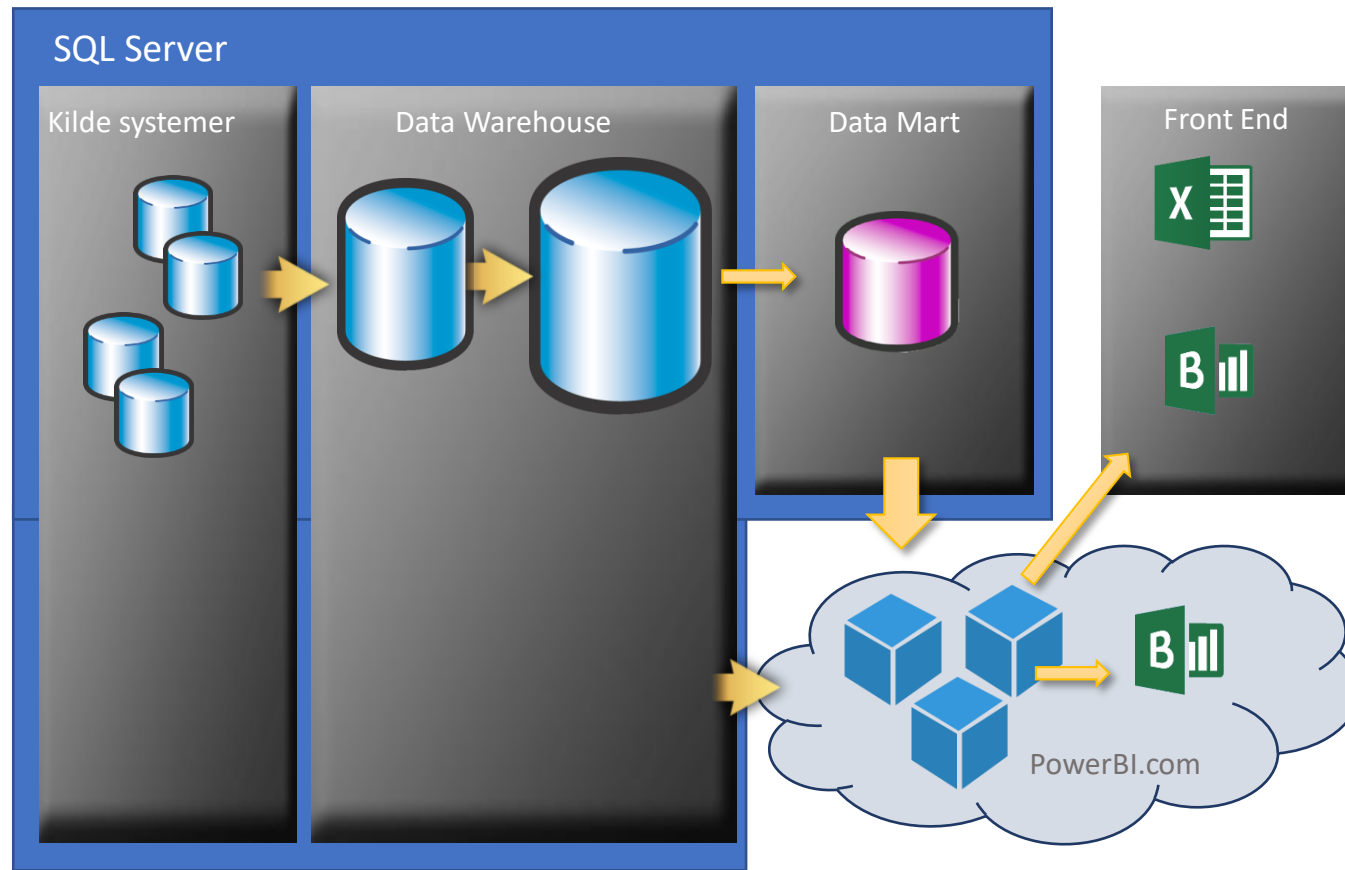
On-premises
Data Gateway



Import data

- Scheduled refresh
- Row-level security in data model
- Sources – All 😊
 - SQL Server
 - Analysis Services
 - SAP Hana, SAP BW
 - Oracle, Teradata, IBM DB2, IBM Informix Database, Sybase, MySQL
 - ODBC
 - SharePoint lists
 - Web og OData
 - File (CSV, XML, Text, Excel, Access)

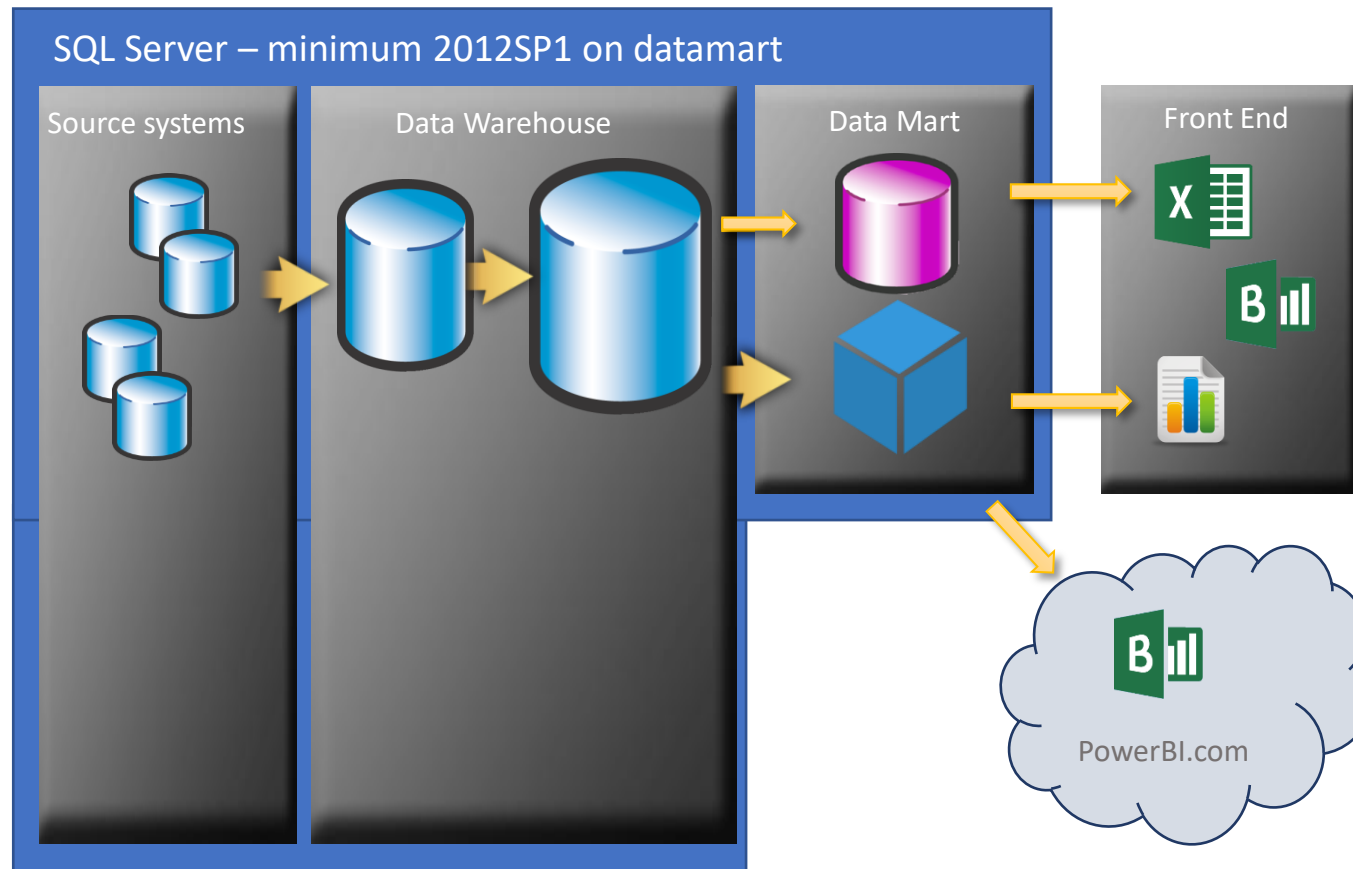
Power BI Service, Import data



Live query

- Row level security with EffectiveUserName property
- Sources
 - SQL Server Analysis Services Tabular
 - SQL Server Analysis Services Multidimensional
 - Azure Analysis Services (Tabular)

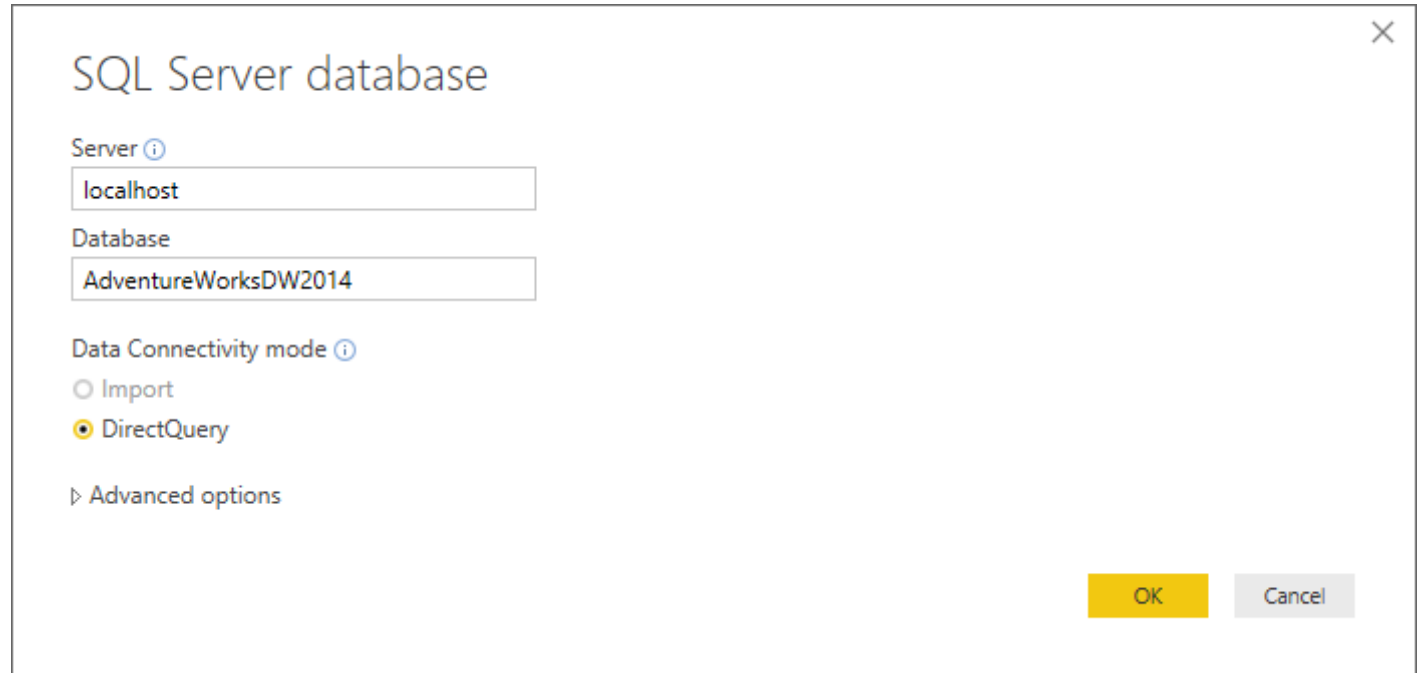
Power BI Service, Live query



Demo

Direct Query

- Scenario:
 - Near-real time data
 - Etc. Sales today
- Sources
 - SQL Server
 - SAP HANA
 - Oracle
 - Teradata



SQL Server database

Server ⓘ
localhost

Database
AdventureWorksDW2014

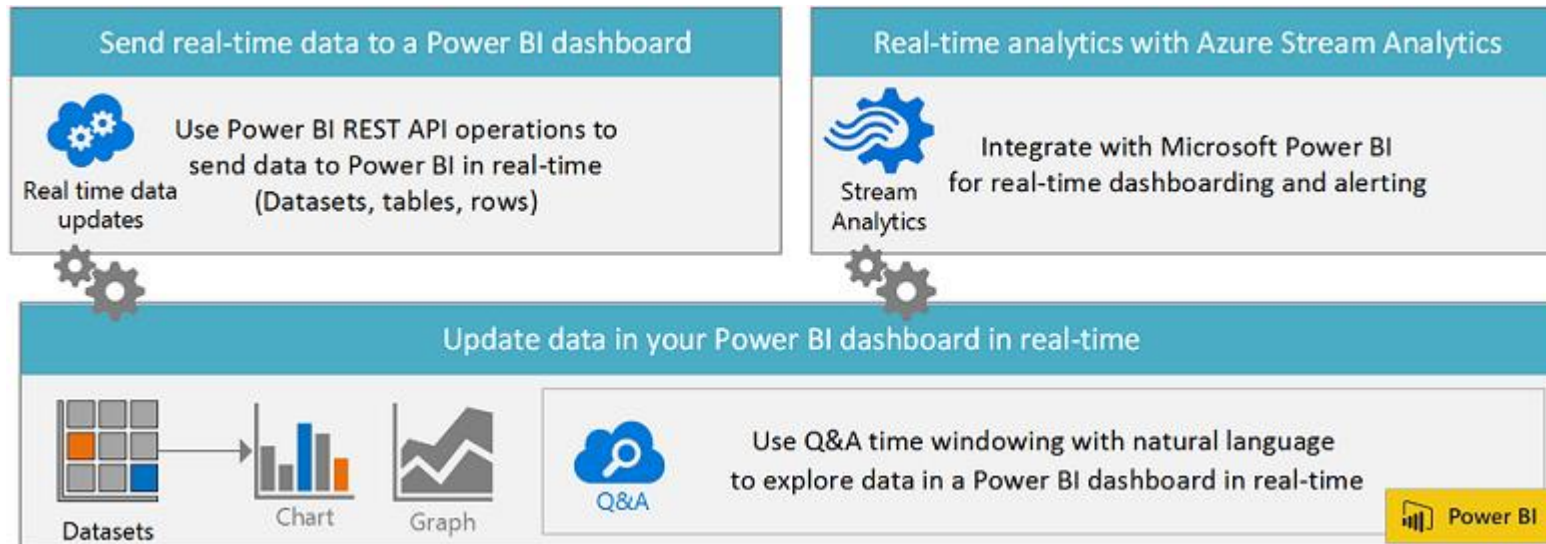
Data Connectivity mode ⓘ
☐ Import
☒ DirectQuery

▸ Advanced options

OK Cancel

Real-time

- Stream (push) data to dataset
- Rest API / Azure Stream Analytics integration
- Limitations
 - 10.000 max rows per single POST rows request
 - 1.000.000 rows added per hour per dataset

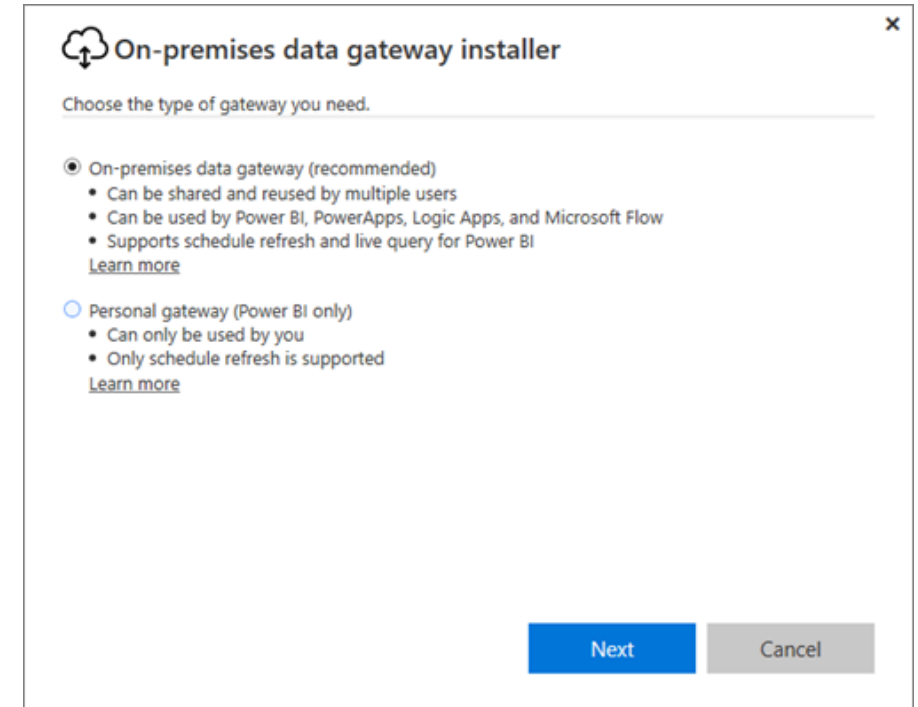


Connectivity modes recap

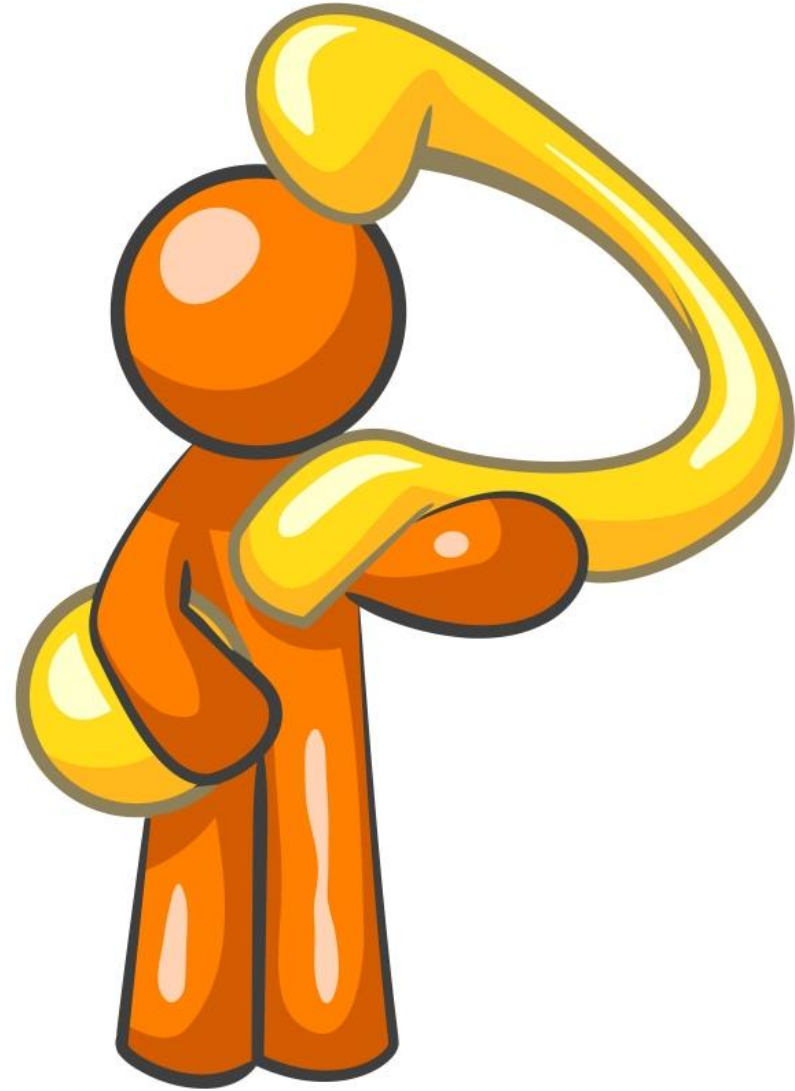
| | Import | Live Query | Direct Query | Real-time |
|--------------------|-------------------|--------------------|-------------------|--------------------|
| Sources | Muliple sources | Single source | Single source | Single source |
| Transformations | No limitations | No transformations | Some limitations | No transformations |
| Modelling | No limitations | Create measures | Some limitations | Create measures |
| Report performance | Best | Good | Depend on source | Best |
| Latency | Scheduled refresh | Depend on source | Near real-time | Real-time |
| Row Level Security | Fixed credentials | Pass credentials | Fixed credentials | Fixed credentials |

On-premises data gateway

- Needed with Live Query, Direct Query and Scheduled refresh
- Install and configure
 - Windows Service account
 - Ports
- Monitoring and auditing



Questions and input





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