

# Mastering Composite Models

*as Power BI Self-Service Developer*

David Kofod Hanna



# A big thank you to our *amazing* partners

**sogeti**  
Part of Capgemini

**webdashboard**

**plainwater**  
de kracht van heldere data

**iq̄bs**

**KASPAROV  
FINANCE & BI**

**Kimura**

**S Sifters**

**creates.**

**valcon**

**Tabular Editor**

**GET  
RESPONSIVE**

**9Δ nine  
altitudes**

**ONE  
PORTAL**

**ilionx**  
experts in eenvoud

**DATAKINGDOM**

**POWERBI WHITE LABEL  
.COM**

**DE DATA  
GENERATIE**

**THE  
DATA  
COOKS**

**mountdata**  
guide to impact

**sopra steria**

**Boom Insights**  
DATA-DRIVEN DECISION MAKING

**dexs**

**dashData**  
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**MINOVA**  
Management Information Consulting

**SIGNON**  
ICT TRAININGEN +

**ANOTHER  
DIMENSION**  
YOUR PORTAL TO DATA CLARITY

**Fabri Code** </>

**Azurro  
Finance**

**Power BI  
Connector** by DAVISTA

**Quanto**  
collective analytics

**Thanks**

# David Kofod Hanna



Senior Advisor, Data Storytelling @ twoday

+200 courses as Academy Trainer and a decade as consultant  
Certified Tabular Editor 3 Trainer, DP-600, PL-300, CPUX-F



Passionate about guiding self-service Power BI

developers for more enterprise manageable concepts in a consumable and practical way



Born on beautiful “Sunshine island”: Bornholm

Lives in Silkeborg with wife and 3 kids  
Love football and running half-marathons



# Mastering Composite Models

*Power BI for the Self-Service Developer*

## Live connection vs. Composite Model



The Holy Grail for Self-Service BI and implications for Enterprise setup

## Enriching our Semantic Model



Let's dive into what's possible for the Self-Service developer now

## The Pitfall of Using Calculation Groups



How the remote and local data sources impacts our model and especially calculation groups

## I'm from IT – How can I Disable it?



Depending on your setup, you can consider disabling this feature.

## Final Considerations



A guide to those who consider using composite model with direct query on Power BI semantic models



**Who consider themselves as  
Self-Service Power BI Developers?**



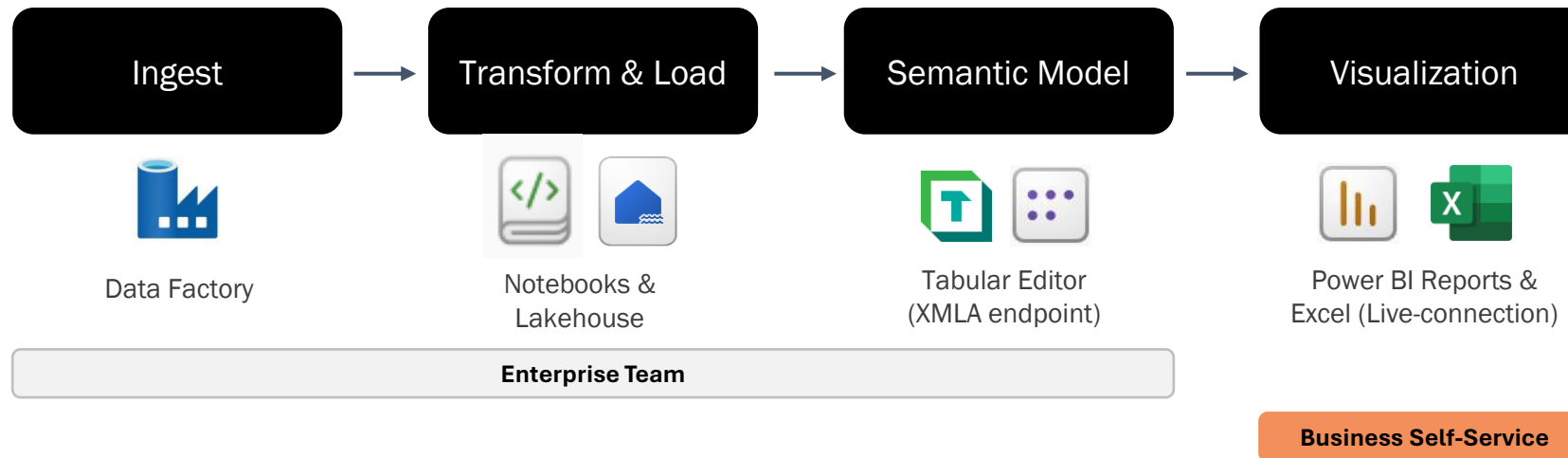
**Who consider themselves as  
Enterprise (Power) BI Developers?**



**How many have explored  
Composite Models with  
Direct Query to Power BI Semantic  
Model?**

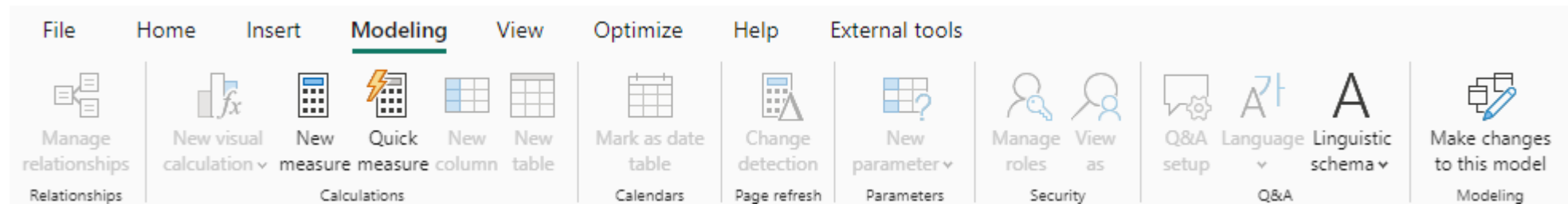
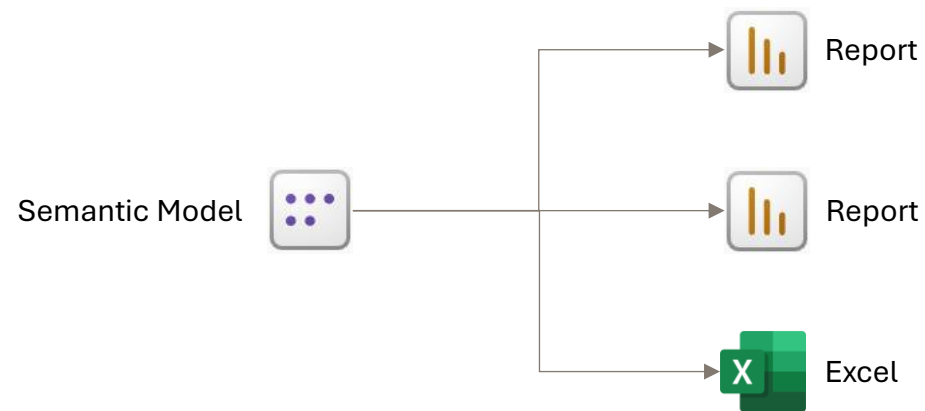


# Scenario





# I Love Live-Connection, but ...



**Demo**

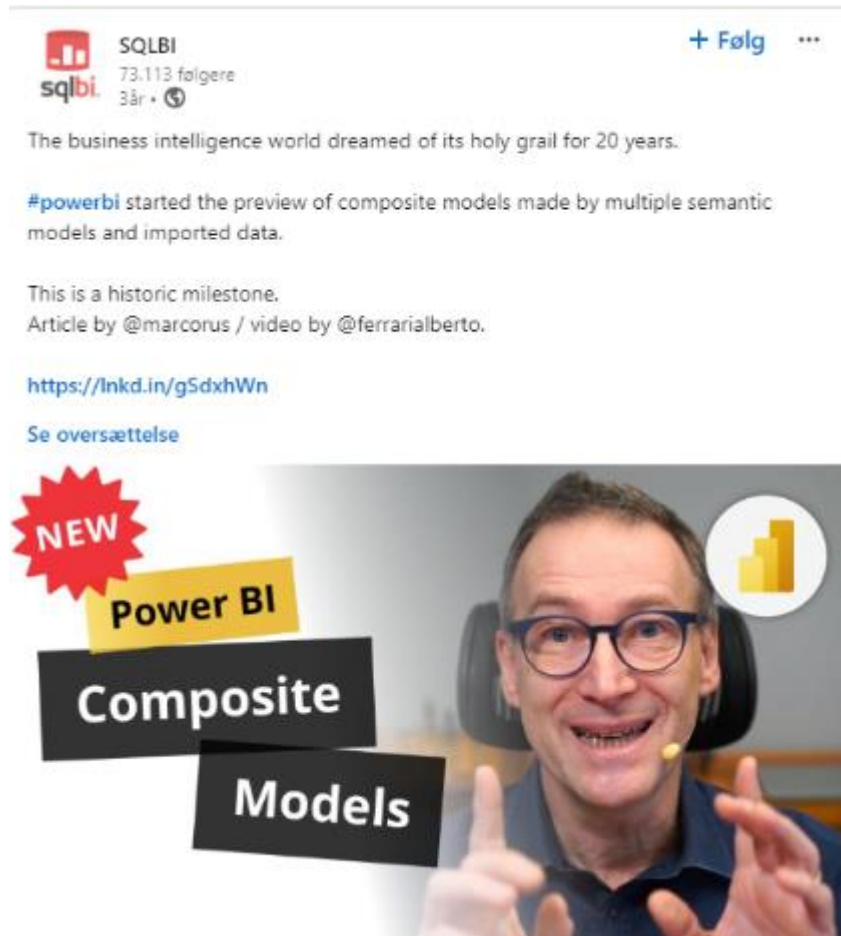
”

Roche's Maxim of Data Transformation:

**Data should be transformed  
as far upstream as possible, and  
as far downstream as necessary.**

# The Holy Grail for self-service BI


Public Preview in Dec 2020 and General Available in Apr 2023




The screenshot shows a LinkedIn post from the account SQLBI. The post text reads: "The business intelligence world dreamed of its holy grail for 20 years. #powerbi started the preview of composite models made by multiple semantic models and imported data. This is a historic milestone. Article by @marcorus / video by @ferrarialberto." Below the text is a link to a LinkedIn article: <https://lnkd.in/gSdxhWn>. The video thumbnail features a man with glasses and a headset, smiling and gesturing. Overlaid on the video are several text elements: a red starburst with the word "NEW", a yellow banner with "Power BI", a black banner with "Composite", and another black banner with "Models". A small bar chart icon is also visible in the top right corner of the video frame.

# Composite Model (“Mixed storage mode”)

**Extend Enterprise Model\***




Direct Query on  
Power BI  
Semantic Model




Import


**I Want It All In One Page \*\***



Direct Query on  
Power BI  
Semantic Model




Direct Query on  
Power BI  
Semantic Model




Direct Query on  
Power BI  
Semantic Model

**Near-live + Historic analysis**



Direct Query to  
Database



Import

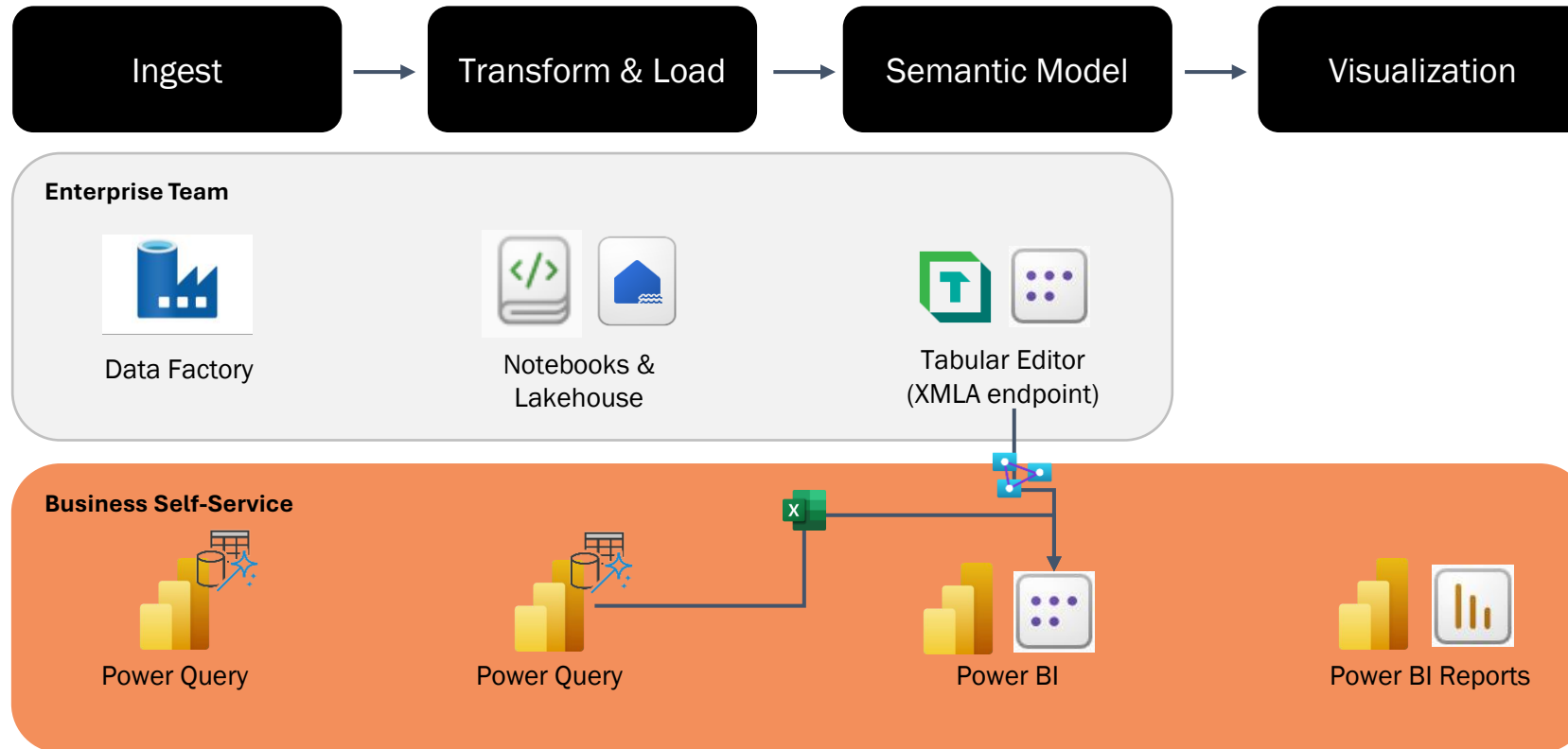
\*Using composite models with Power BI semantic models and Analysis Services, you can build a composite model using a Direct Query connection to connect to Power BI semantic models, Azure Analysis Services (AAS), and SQL Server 2022 Analysis Services

\*\* By Bernat Agulló Roselló: <https://www.esbrina-ba.com/i-want-it-all-in-one-page/>

	Option 1 Dashboard	Option 2 Score Cards	Option 3 DirectQuery	Option 4 The mother of all models	Option 5 The daughter of all models
Easy to set up	✓	✓	⚠	✗	⚠
Easy to maintain	✗	✗	✓	✗	✓
Data from different workspaces	⚠	✓	✓	✓	✓
It reuses the existing logic	✓	✓	✓	⚠	✓
Performance	✓	✓	⚠	⚠	✓
Works in embedded scenarios	✓	✓	✗	✓	✓
Interactivity	✗	⚠	✓	✓	✓
Customization	⚠	✗	✓	✓	✓
Reliability	✓	⚠	⚠	✓	✓
Works without Premium Capacity	✓	✓	⚠	⚠	✗

# Customizable managed self-service BI

*discipline at the core and flexibility at the edge*



**Demo**



Wholesale



Retail





# discipline at the core and **flexibility** at the edge



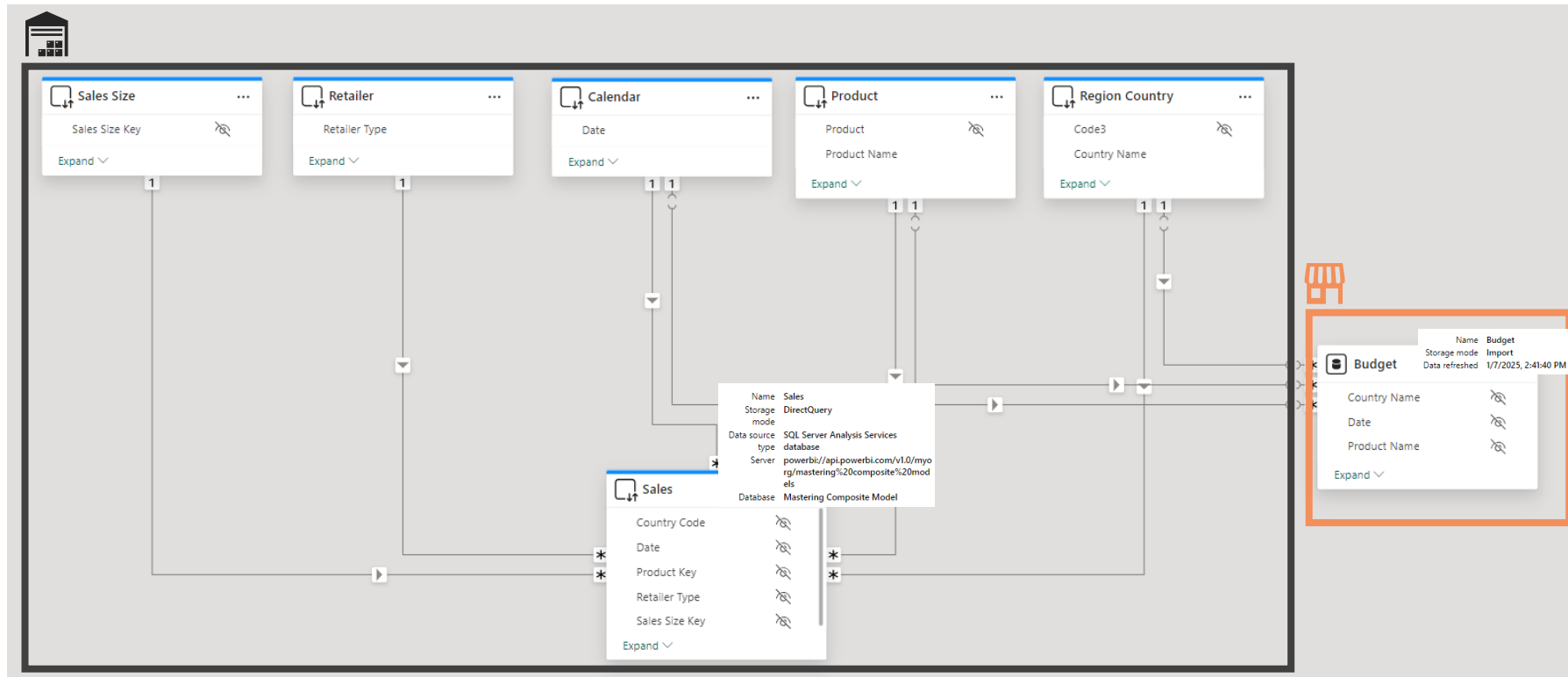
Wholesale  
(Remote)  
Enterprise Team



Retail  
(Local)  
Self-Service Business Dev



# Remote & Local



**Who loves to include a  
calculation group in their  
semantic model?**



# Calculation Group 101

## SELECTEDMEASURE()

Reusable calculation items based on measures in the report canvas

- Time Intelligence (*MTD, QTD, YTD, LY, YOY %*)
- Unit conversion (*show figures in abs, in k, in m*)
- Format String Expressions (*like dynamic format string for measures*)
- Handling Multiple Dates (*USERRELATIONSHIP to switch between order and invoice date*)
- Custom Date Periods as slicer in report
- And more ...

**Demo**

## Consideration ...

# Create perspectives to exclude calculation group when create composite model

### Connect to your data

Search | Settings

Select the database or specific tables you'd like to connect to. [Learn more](#)

- powerbi://api.powerbi.com/v1.0/myorg/Mastering%20Composite%20Models
  - Mastering Composite Model
    - Sales
    - Time Intelligence
    - Calendar
    - Product
    - Region Country
    - Retailer
    - Sales Size

### Connect to your data

Search | Settings

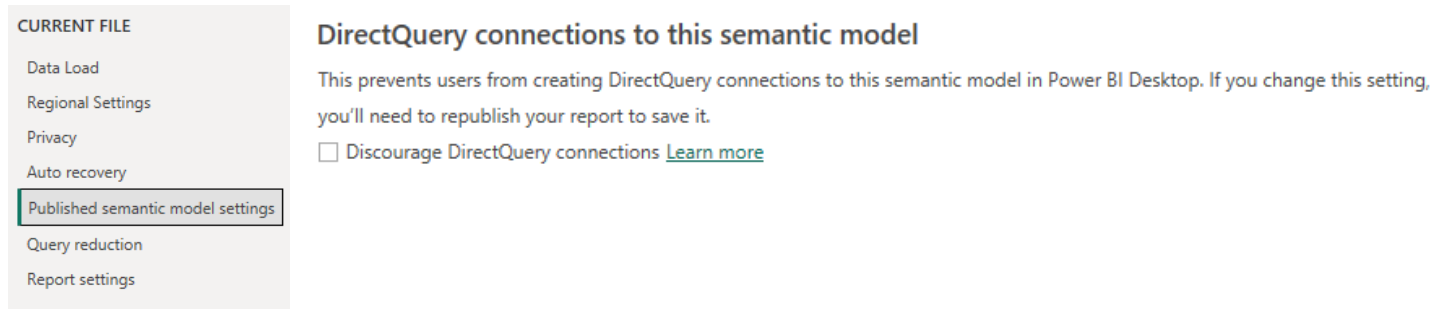
A perspective will connect you to the whole model, but only show you the subset of data curated by the model author for your convenience. [Learn more](#)

- powerbi://api.powerbi.com/v1.0/myorg/Mastering%20Composite%20Models
  - Mastering Composite Model
    - Sales
      - Sales
      - Calendar
      - Product
      - Region Country
      - Retailer
      - Sales Size



# I'm from IT or Enterprise team: How can I disable this?

- **[Individual model]**  
**Power BI Desktop settings** before publishing



The screenshot shows the 'Published semantic model settings' pane in Power BI Desktop. On the left, a navigation menu lists: CURRENT FILE, Data Load, Regional Settings, Privacy, Auto recovery, Published semantic model settings (highlighted), Query reduction, and Report settings. The main pane is titled 'DirectQuery connections to this semantic model'. It contains the text: 'This prevents users from creating DirectQuery connections to this semantic model in Power BI Desktop. If you change this setting, you'll need to republish your report to save it.' Below this text is a checkbox labeled 'Discourage DirectQuery connections' with a link to 'Learn more'. The checkbox is currently unchecked.

- **[Tenant]**  
**Admin Portal in Tenant Settings**

## Export and sharing settings

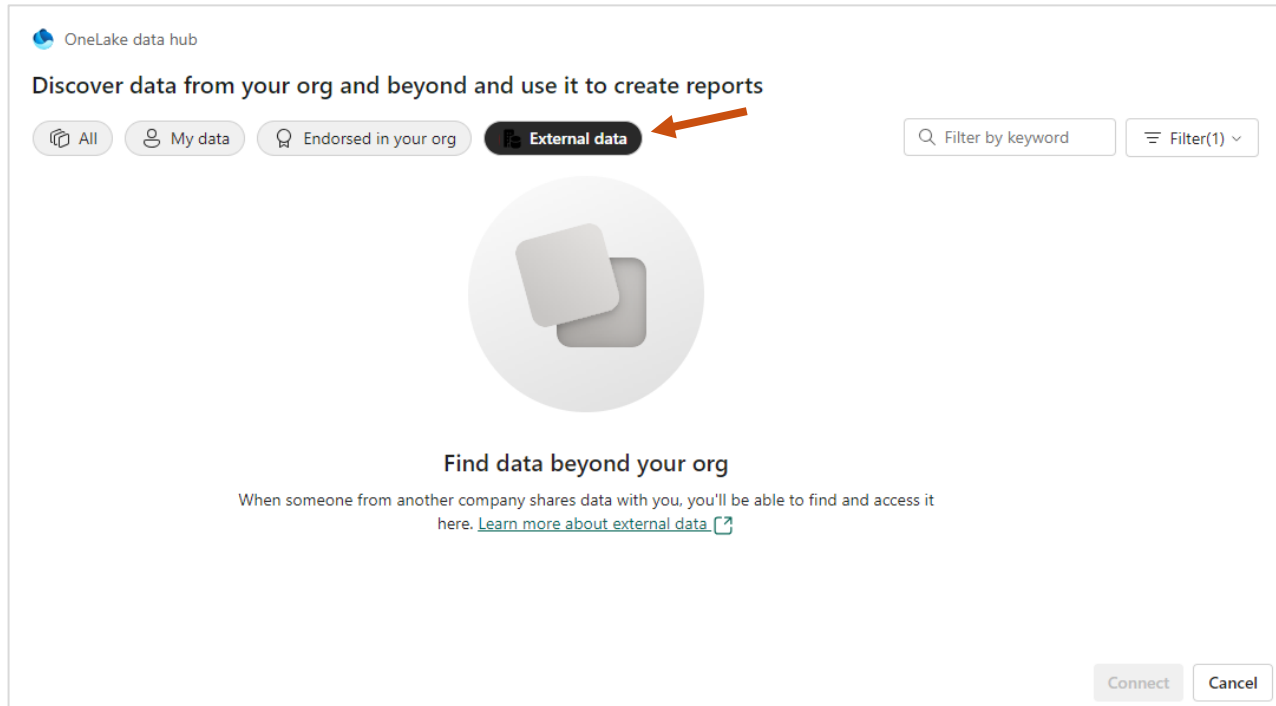
- ⚡ Allow **DirectQuery** connections to Power BI semantic models  
*Enabled for the entire organization*

**DirectQuery** connections allow users to make changes to existing semantic models or use them to build new ones. [Learn More](#)

Enabled



# What about sharing semantic models to external partners?




## Export and sharing settings

- Guest users can work with **shared semantic** models in their own tenants  
*Enabled for the entire organization*

Authorized guest users can discover semantic models shared with them in the OneLake data hub (in Power BI Desktop), and then work with these semantic models in their own Power BI tenants.

Enabled


 This setting applies to the entire organization

Apply Cancel

- Allow specific users to turn on external data sharing  
*Enabled for the entire organization*

Turn off this setting to prevent all users from turning on external data sharing. If this setting is on, all or specific users can turn on the external data sharing option, allowing them to share data with authorized guest users. Authorized guest users can then discover, connect to, and work with these **shared semantic** models in their own Power BI tenants.

Enabled

 If this setting is on, users can allow authorized guest users to work with shared semantic models in their own Power BI tenants and your data might be moved to a different region.

Connect to external semantic models shared with me



# Summary of Considerations for Composite Models

- ⚠️ **Choose the right storage mode** for your need and whenever possible add to existing shared model and create live-connection\*
- **Composite models are NOT for the enterprise team** to create and deliver large models with relationships
- **Composite models are for the business self-service** developers to provide **flexibility** at the edge
- Be aware of implications of composite models when using **calculation groups** and calculating measures between **remote** and **local** data source groups
- Calculation group with **format string expression** or measures with **dynamic format string** works only for **model measures in remote – even in live connection**
- Be aware of **security implications** of a query sent to remote model can **include data values from local** model
- Be aware of **performance** as composite models will not benefit from **visual caches** across reports as with live-connection, assume **referentially integrity** and **multiple query** types
- Be aware of **ownership** (read access to semantic model in Power BI workspace app vs. Org App in Fabric) and **avoid** creating **chain-on-chain-on-chain** models
- **Shared expressions** (parameters in Power Query), **Translations** and **RLS are not imported** from the remote model nor possible to add for remote model objects
- Consumers of a composite model see the results of the **OLS** rules that were applicable to the **author** of the composite model when they created the model
- **Potential break** connection to composite model if **renaming** semantic model or workspace (hard coded for name and not ID)
- For “I Want It All In One Page Dashboard” check **Metric Sets** for a more reuseable assets
- As default enabled, but based on your scenario you can **disable** it on individual semantic models or at tenant level (and in addition investigate **external** semantic models)
- **Naming convention “Local”** if duplicates and Enterprise team semantic model owner can utilize **Perspectives** to share subsets of model excl. remote calculation groups
- **Avoid renaming global objects** as measure, table or column even though you can in composite model - why complicate it and especially if potential migrating.
- As with Live-connection, add **model documentation with INFO.VIEW** functions or **measure expression as description** field for self-service developers

## \*Tools for migrating report-level objects:

 Notebooks in Fabric (*Michael Kovalsky's Semantic Link Labs*)

 Tabular Editor (*C# Scripts and copy M code from local model*)

 ALM Toolkit (*Compare and merge .bim*)

”

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as far upstream as possible, and  
as far downstream as necessary.**

# Resources to study more

- <https://learn.microsoft.com/en-us/power-bi/guidance/composite-model-guidance> by Microsoft
- <https://learn.microsoft.com/en-us/power-bi/transform-model/desktop-composite-models#working-with-a-composite-model-based-on-a-semantic-model> by Microsoft
- <https://learn.microsoft.com/en-us/power-bi/connect-data/desktop-report-lifecycle-datasets> by Microsoft
- [Data modeling for experts with Power BI - SQLBits](#) by Jeroen ter Heerd and Marc Lelijveld
- <https://www.sqlbi.com/articles/new-composite-models-in-power-bi-a-milestone-in-business-intelligence/> by SQLBI
- <https://www.sqlbi.com/articles/introducing-wholesale-and-retail-execution-in-composite-models/> by SQLBI
- [Introducing Composite Models in Power BI - SQL Day 2023](#) by Alberto Ferrari
- <https://learn.microsoft.com/en-us/power-bi/guidance/powerbi-implementation-planning-usage-scenario-customizable-managed-self-service-bi> by Microsoft
- <https://medium.com/microsoft-power-bi/how-to-share-fabric-power-bi-semantic-models-with-external-users-16ab8bf8e14e> by Jon Stjernegaard Vøge

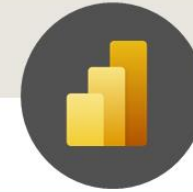
# Thank you!



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 Connect on LinkedIn



## POWER BI

SHARING IS CARING

### Power BI Learning Resource Overview

You can filter on priority or subject. Click on URL's to be navigated to the awesome content available for your learning.

Priority	Title	URL	Created by	Key learning	Subject
Must	DAX 101: Demystifying C				associated Power understand, it's small bit sized sub-pts of Evaluation
Must	DAX Concepts on White				How and Filter relate the
Must	Making DAX Easy				ies, concept that is
Must	DAX Star Schema				is an integration
Must	Explaining what a Lakehouse				lated to make regional Filter based schema
Must	Learn the Fundamentals of Power BI				schema is
Must	Power BI usage scenarios				Analytics, but
Must	Power BI implementation				them in this
					organization, Governance
					ate thought and iterations, is series cover



 Open Free Learning Resource Power BI Report

## Session Feedback



## Event Feedback

