

# Mastering Composite Models

*as Power BI Self-Service Developer*

David Kofod Hanna



*A big thank you to our amazing partners*

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Part of Capgemini

**webdashboard**

**plainwater**  
de kracht van heldere data

**iqbs**

**KASPAROV**  
FINANCE & BI

**Kimura**

**S** Sifters

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**ilionx**  
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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?**



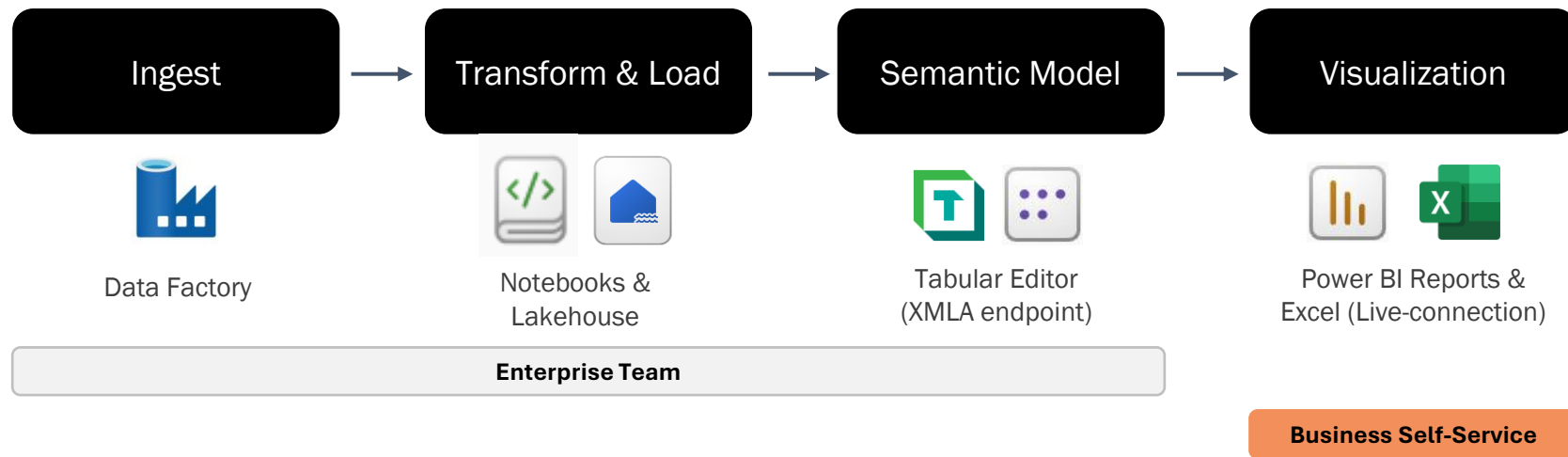
**Who consider themselves as  
Enterprise (Power) BI Developers?**



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

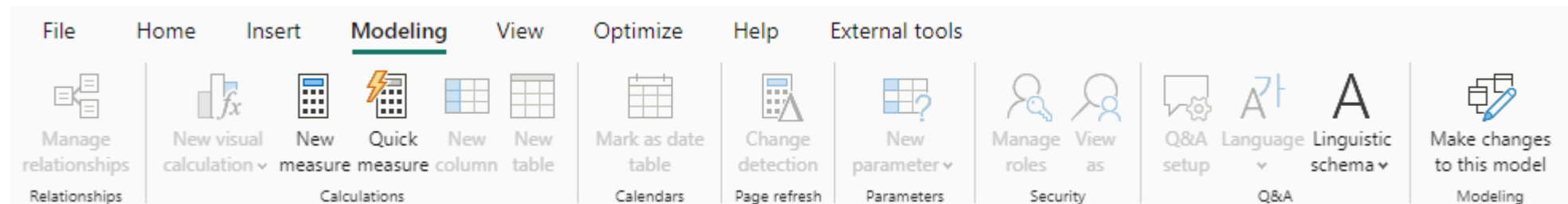
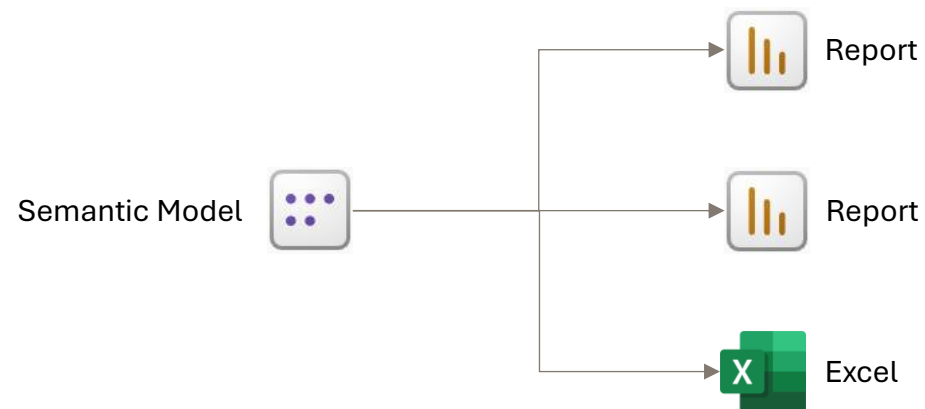


# Scenario





# I Love Live-Connection, but ...



**Demo**

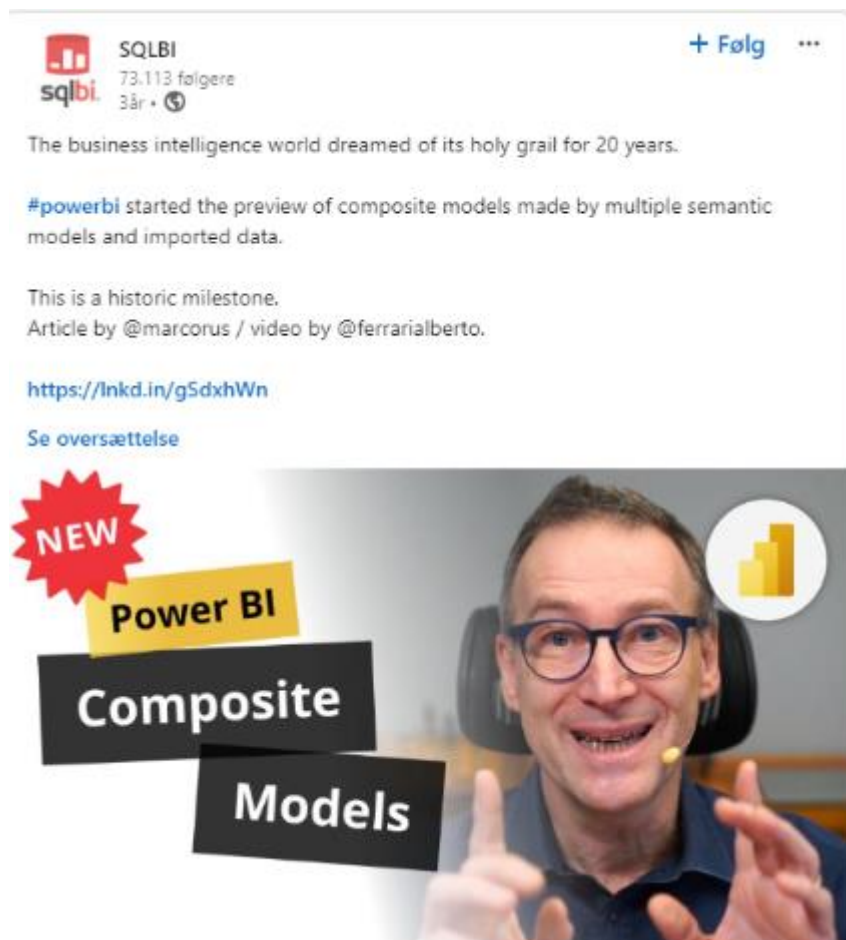
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Roche's Maxim of Data Transformation:

**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




<https://www.sqlbi.com/articles/new-composite-models-in-power-bi-a-milestone-in-business-intelligence/>


# Composite Model (“Mixed storage mode”)



## Extend Enterprise Model\*




Direct Query on  
Power BI  
Semantic Model




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




## 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

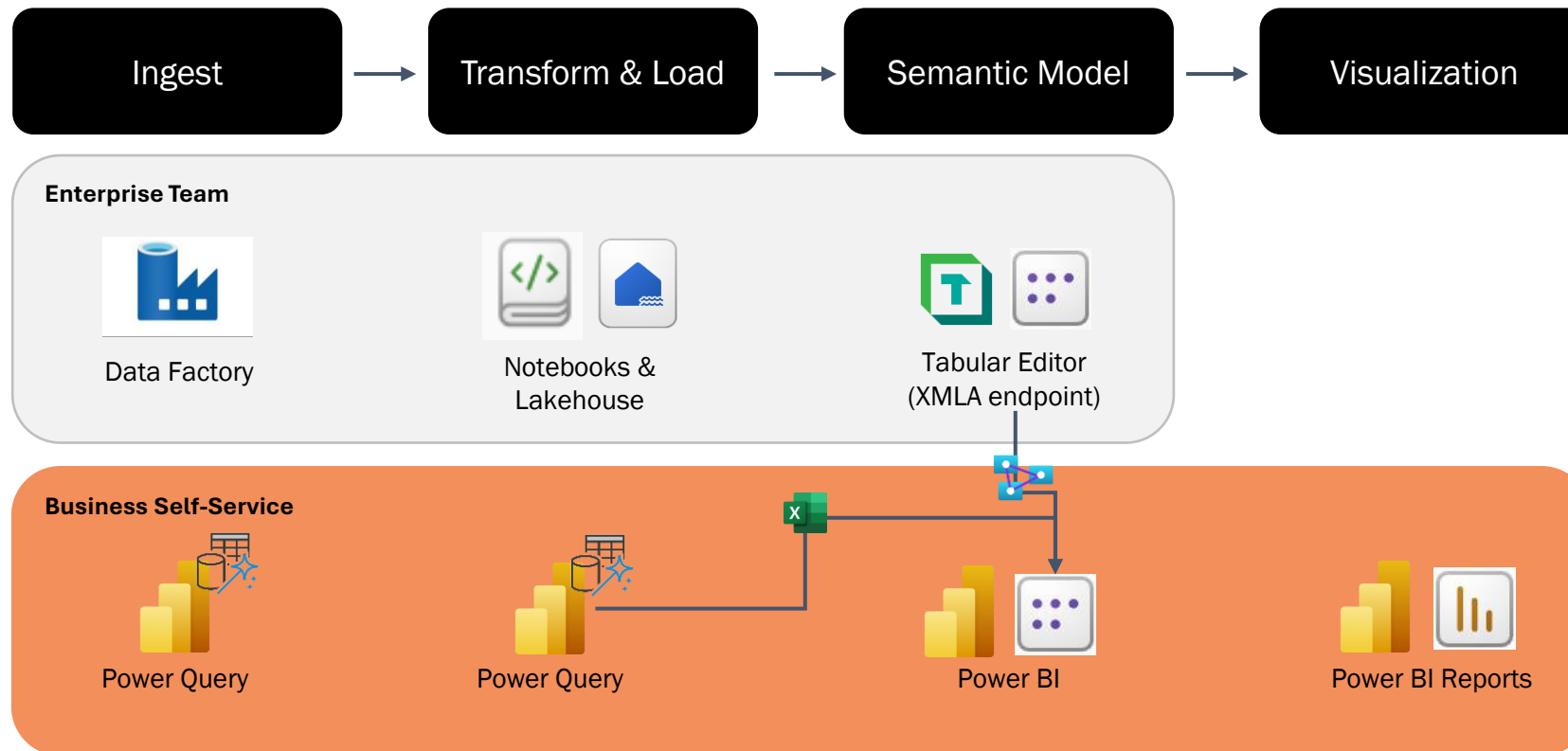
\*\* By Bernat Agulló Roselló: <https://www.esbrina-ba.com/i-want-it-all-in-one-page/>

	Option 1	Option 2	Option 3	Option 4	Option 5
	Dashboard	Score Cards	DirectQuery	The mother of all models	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



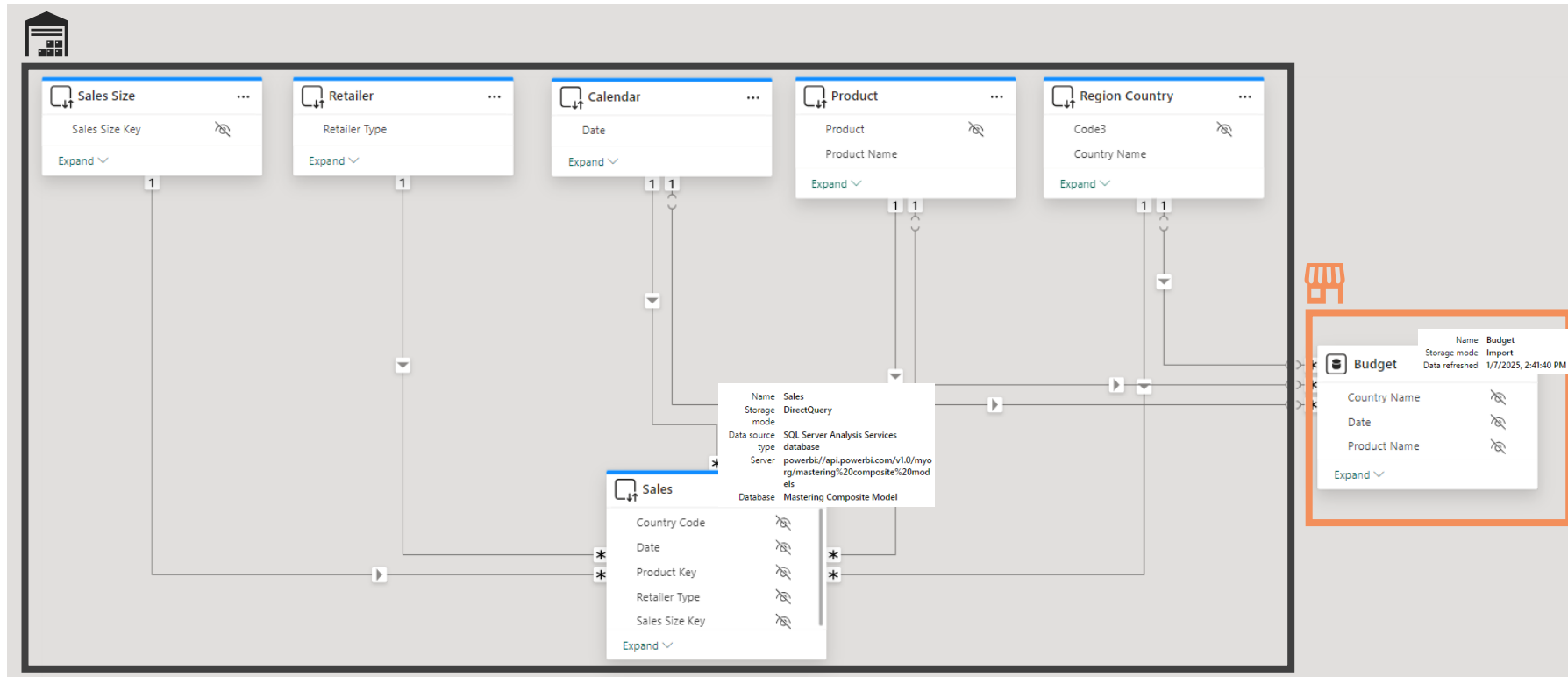
Wholesale  
(Remote)  
Enterprise Team



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

Databases

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

Submit

Cancel

Connect to your data

Perspectives

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

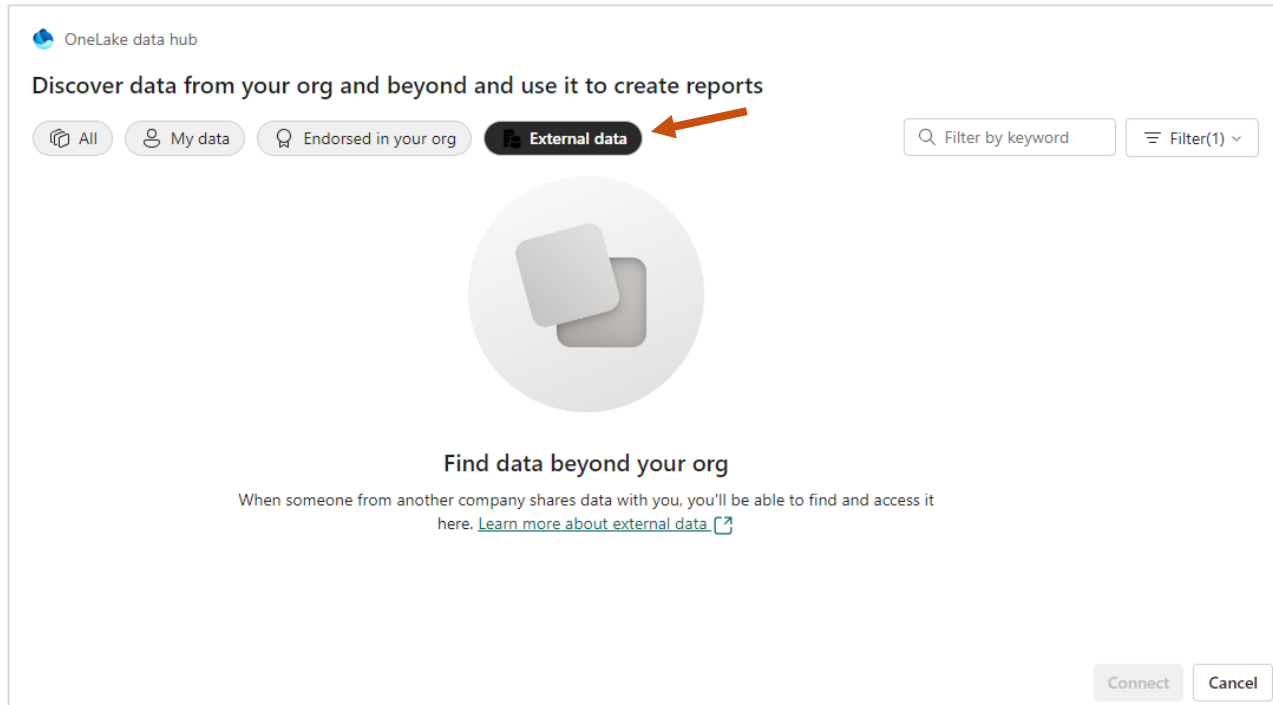
Retailer

Sales Size

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



# 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 Stjernaard Vöge




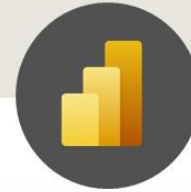
# Thank you!



**David Kofod Hanna**  
Senior Advisor @ twoday Data & AI



 Connect on LinkedIn



 Open Free Learning  
Resource Power BI Report

## Session Feedback



## Event Feedback

