

Power BI “X Files”

5 Things They “Forgot” to Tell You...

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Thank you!



Many thanks to our sponsors, without whom such an event would not be possible.

Nikola Ilic

Data Platform Consultant & Trainer



- *I'm making music from the data!*
- Power BI and “all the data things” addict, blogger, speaker...
- Father of 2, **B**ar**c**a & Leo Messi fan...



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PLURALSIGHT

WHAT'S IN FOR YOU?

- ✓ 5 things you won't find in docs
- ✓ 5 things you won't find in courses



DISCLAIMER!



This is **NOT** a beginner-friendly session!

This is **NOT** a session for data
visualization wizards!





Agenda



n Title



X FILE #1

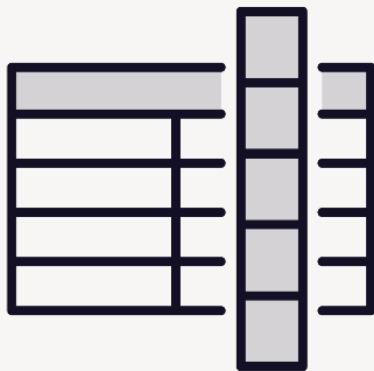
DAX Fusion



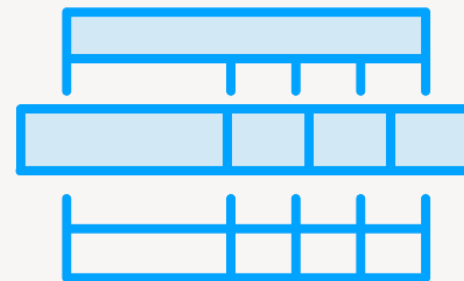
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What is DAX Fusion?

- ✓ DAX optimization technique
- ✓ Reduces the number of Storage Engine queries



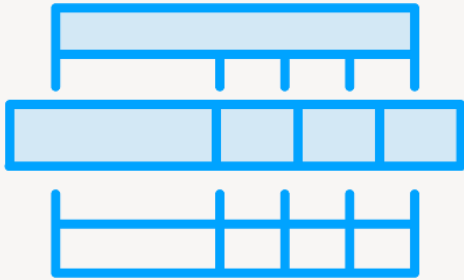
Vertical



Horizontal



Horizontal Fusion



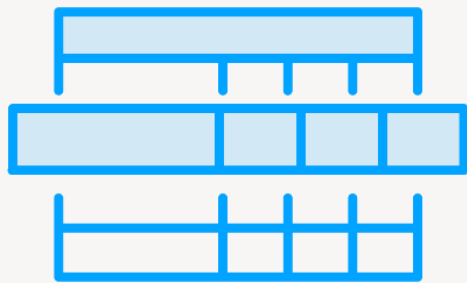
Horizontal

- ✓ Same calculation – different filter(s)
- ✓ Usually much better performance

***Available out-of-the-box since
September 2022***



Horizontal Fusion – Before September 2022



Horizontal

Sales Amount
Computers



Query
1

Sales Amount
Cell Phones



Query
2

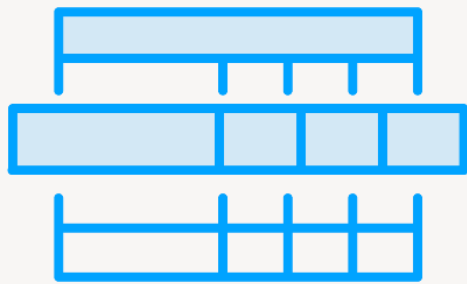
Sales Amount
Audio



Query
3



Horizontal Fusion – After September 2022



Horizontal

Sales Amount
Computers

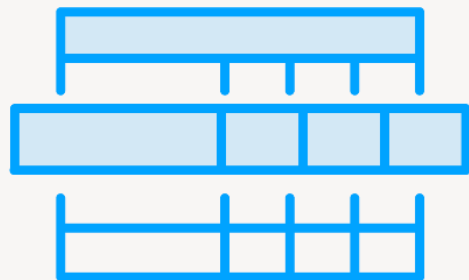
Sales Amount
Cell Phones

Sales Amount
Audio

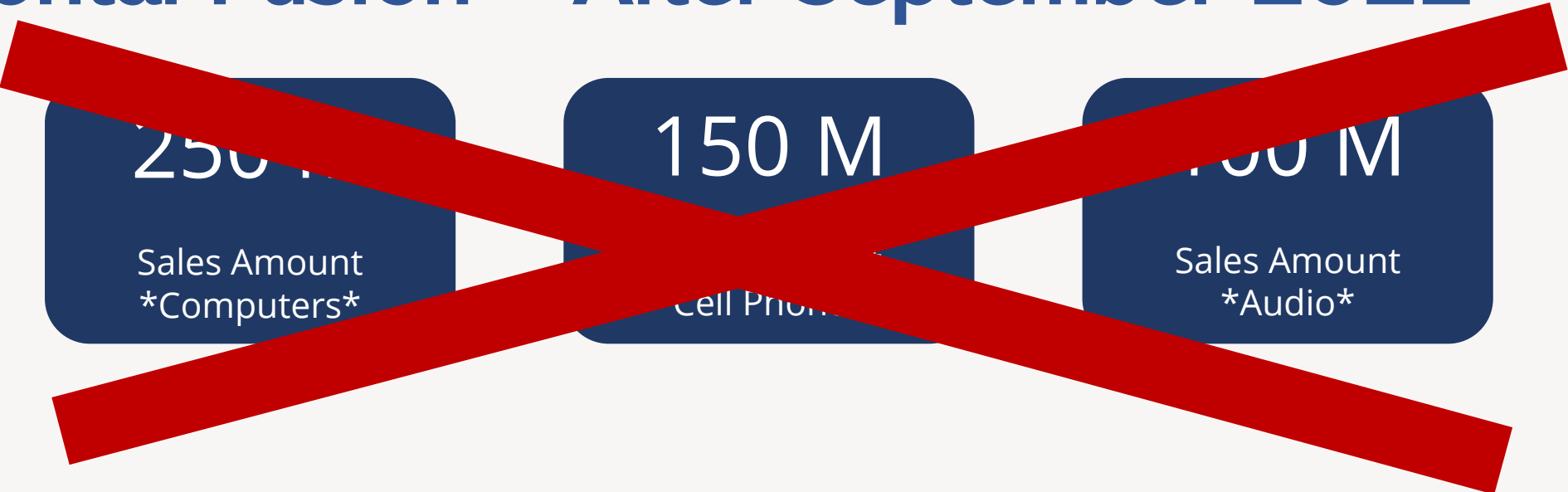
Query 1



Horizontal Fusion – After September 2022



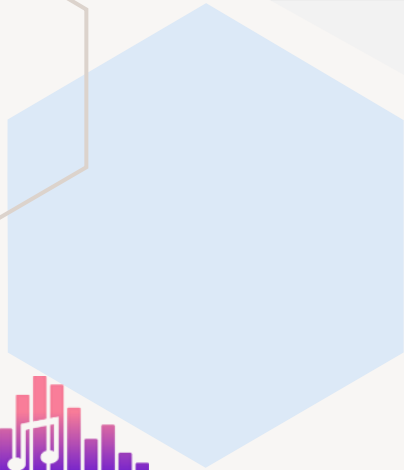
Horizontal



Sales Amount Computers	Sales Amount Cell Phones	Sales Amount Audio
250 M	150 M	100 M

Horizontal Fusion

DEMO





X FILE #2

Cache me if you can



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Cache me if you can

DEMO



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Visual cache

User A



Contoso



Litware

User B



Contoso



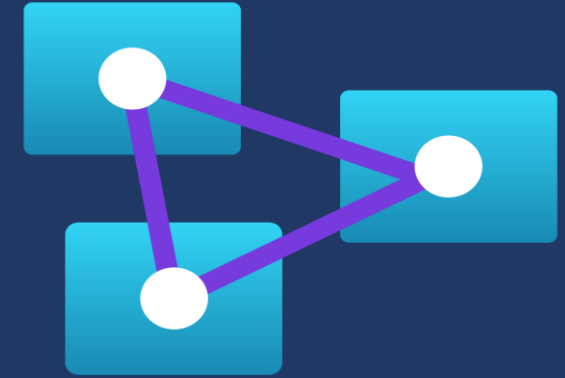
Litware

Data cache

Data cache Contoso



Data cache Litware



Analysis Services





Two cache types in Power BI/Tabular

Visual cache

Data cached in the session scope

Data cache

Data cached in the scope of the AS instance





X FILE #3

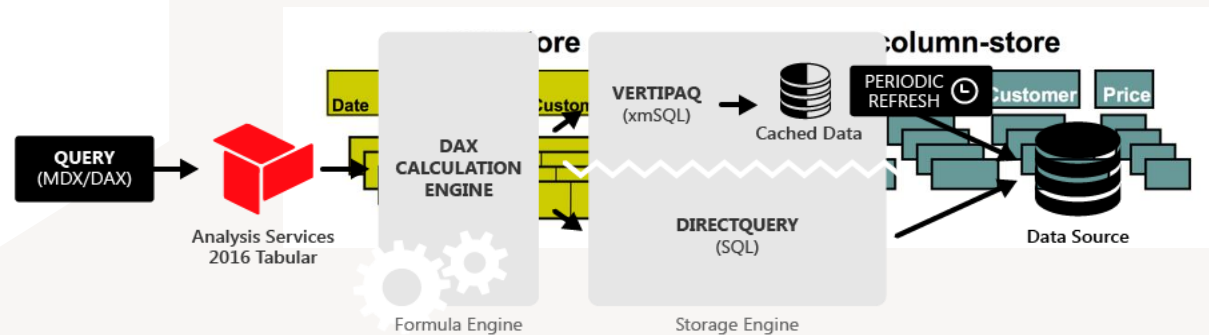
**Dark art of table
processing**



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What is a VertiPaq?

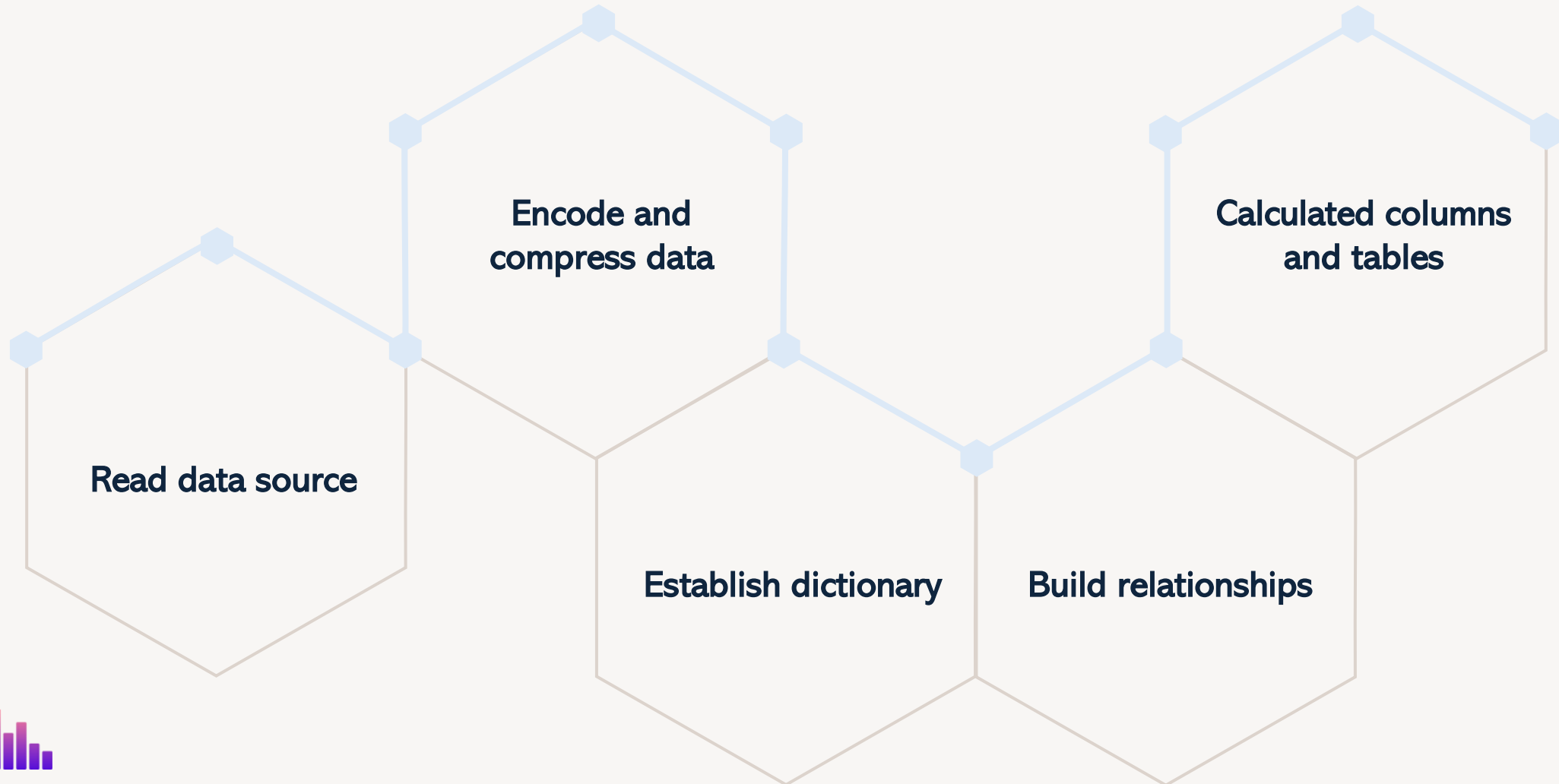
- ✓ Row-store vs columnar databases
- ✓ Formula engine vs storage engine



Source: The Definitive Guide to DAX, 2nd Edition (M.Russo & A.Ferrari)



Import Mode In-Depth



Two Phases of Data Processing

1

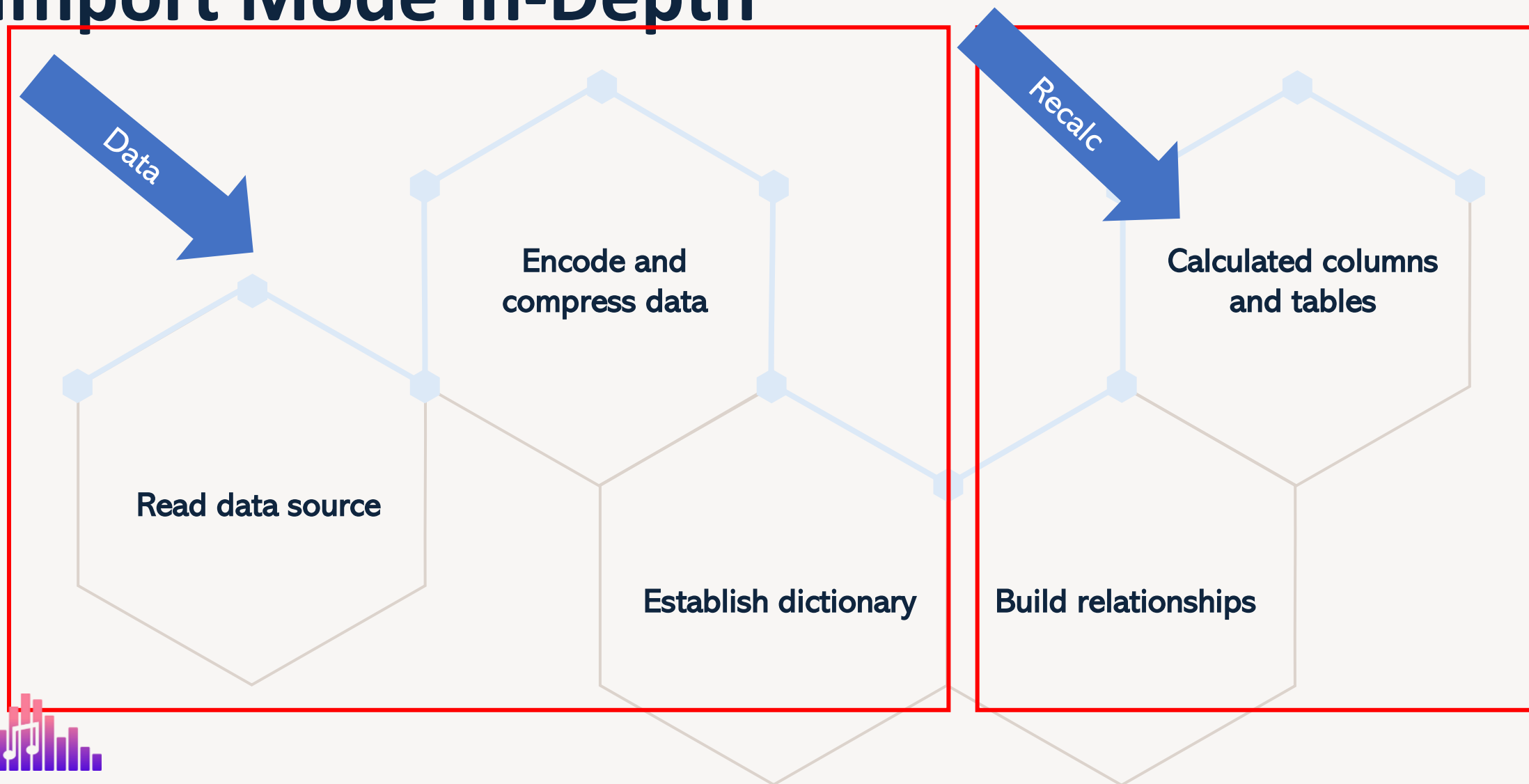
Data

2

Recalc



Import Mode In-Depth



Tabular Processing Options

Mode	Scope	Description
Process Data	Table/Partition	Load data into a table/partition <u>without rebuilding</u> hierarchies or relationships or recalculating calculated columns/measures
Process Recalc	Database	Updates and recalculates hierarchies, relationships, and calculated columns
Process Full	Database/Table/Partition	SSAS drops all data in the object and then processes the object. Requires the most resources
Process Default	Database/Table/Partition	Detects the state of an object and performs processing necessary to deliver unprocessed or partially processed objects to a fully processed state. Hierarchies, calculated columns, and relationships are recalculated
Process Add	Partition	Incrementally update partition with new data



Choosing the Right Strategy...

1

Process Data on each table/partition to create updated dictionaries for each column

2

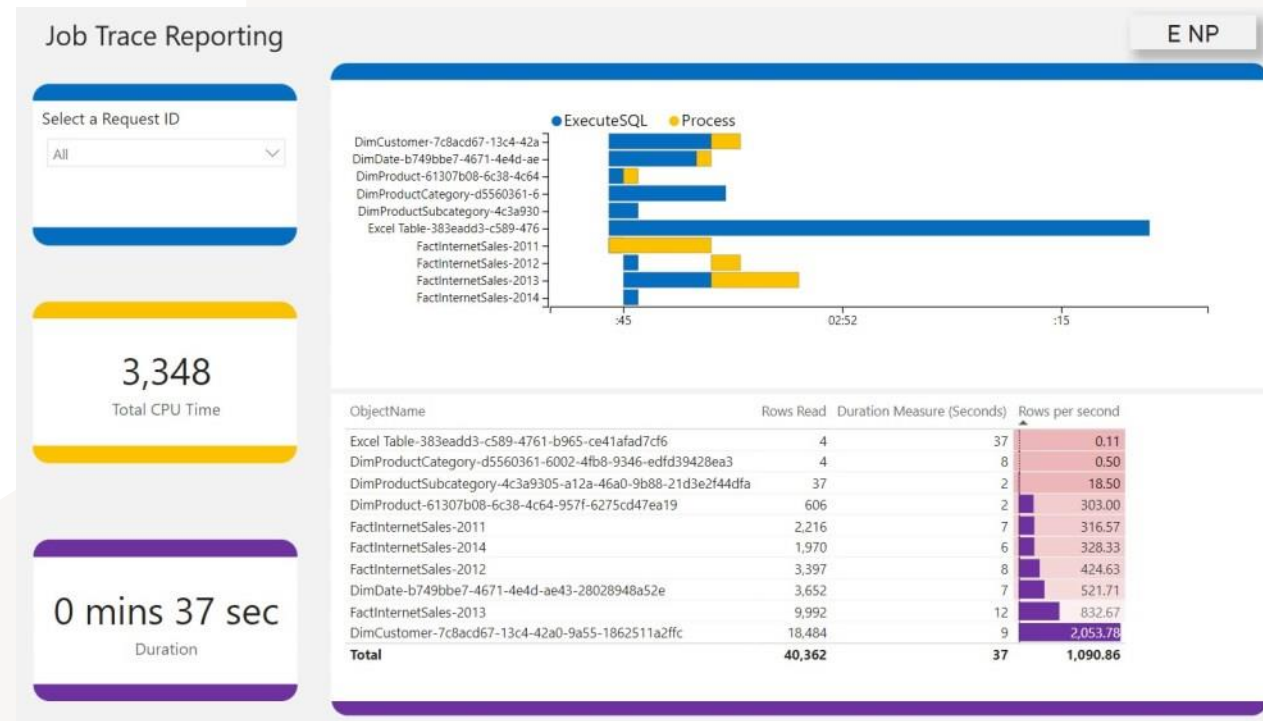
Process Recalc on the database

*Calculated columns/Relationships/Hierarchies unavailable
between the start of 1 and the end of 2!!!*



Choosing the Right Strategy...

Phil Seamark's blog post on visualizing the Power BI refresh process





Taking it a step further...

Michael Kovalsky's blog on automating the processing



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X FILE #4

Fold on tight



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What is Query Folding?

- ✓ Translate M to a query language
- ✓ Pushing heavy lifting on the data source

Ability to generate a single SQL query that's going to be executed on the data source side!



Query Folding and Data Sources

- ✓ Relational database engines
- ✓ Odata, SSAS, Sharepoint lists, Exchange, AD...
- ✓ **Some sources don't support folding at all!**



Query Folding and Data Transformations

- ✓ Not all transformations will fold!
- ✓ Subtle differences are sometimes decisive



- ✓ Removing/Renaming columns
- ✓ Filtering rows
- ✓ Grouping/Summarizing
- ✓ Merging/Appending queries from the same source
- ✓ Simple Custom columns
- ✓ Pivot/Unpivot



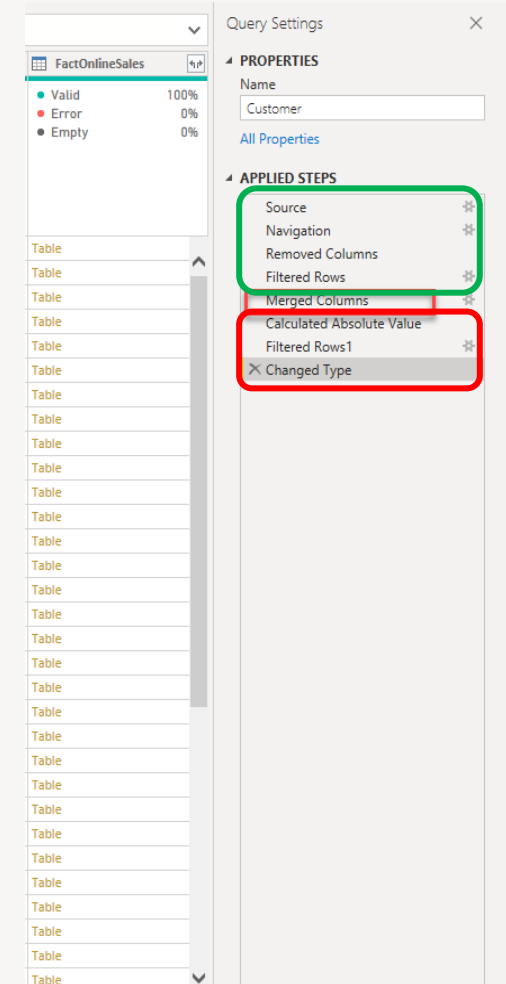
- ✓ Merging queries from different sources
- ✓ Appending queries from different sources
- ✓ Complex Custom columns
- ✓ Index columns
- ✓ Changing column data type (“it depends”)!

Query Folding – why should I care?

- ✓ Data refresh more efficient
- ✓ With DirectQuery/Dual the query must fold!
- ✓ Incremental refresh
- ✓ ~~ALL or NOTHING?~~

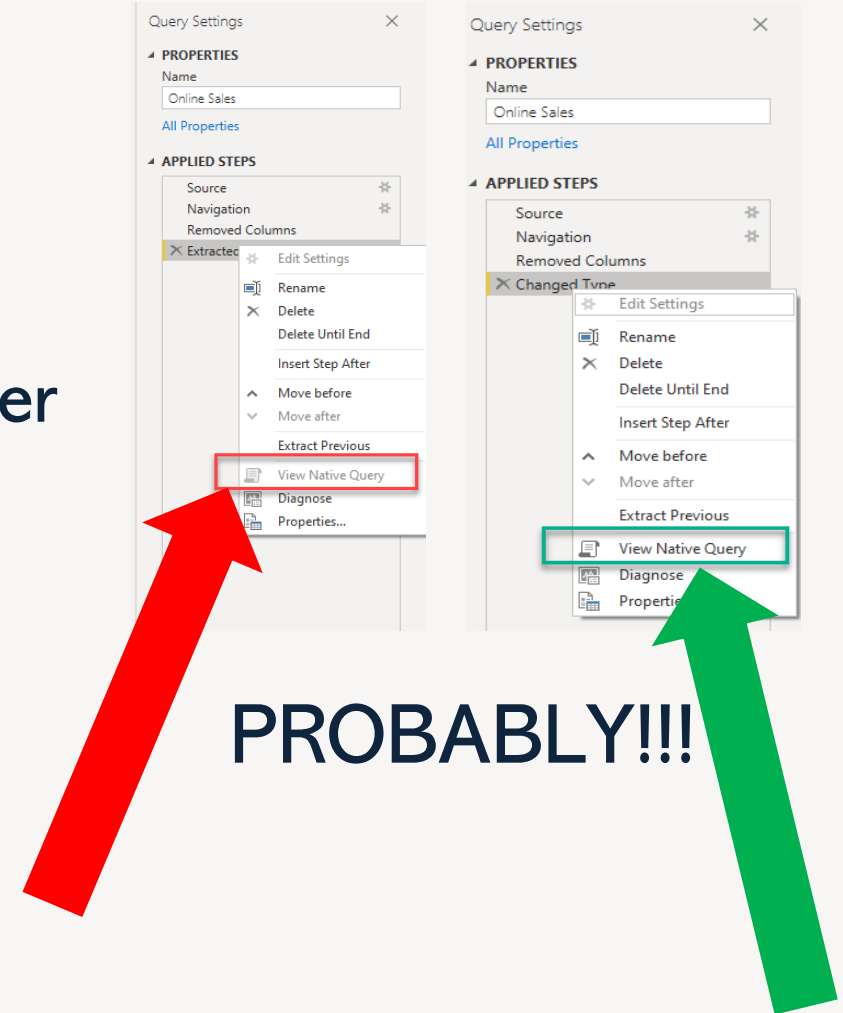
- Slow report
- Slow visuals
- Large data model

IT'S NOT BECAUSE OF QUERY (NON)FOLDING!!!



How do you know if the query folds?

- ✓ View Native Query
- ✓ It's not 100% correct!!!
- ✓ Use Query Diagnostics in PQ Editor or SQL Server Profiler
- ✓ Feature in Power Query Online!





Fold on tight

DEMO



X FILE #5

**Secret sauce of
professionals**



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Scenario

DimSalesTerritory
> SalesTerritoryRegion
> SalesTerritoryCountry
> SalesTerritoryGroup

Sales Territory

Dimension Name

Power BI is all about DAX,
Tabular...

➤ Attribute



Which language does *Excel* use when connecting to *Tabular*?



ISAVAILABLEINMDX

- Set to TRUE by default
- Why not FALSE?!



***MANY POWER BI DEVELOPERS ARE NOT AWARE OF
THE PROPERTY!***





Secret sauce of professionals

DEMO



Lesson Learned...

- Hidden gems in Tabular
- Increase efficiency + keep functionalities

WIN-WIN SITUATION!



Some things to keep in mind...



➤ DISTINCTCOUNT, MIN, MAX...

IT DEPENDS 😊



Summary

DAX Fusion

Horizontal and
vertical

Cache me if you can

Visual vs data cache

Dark art of table processing

Process Data vs
Process Recalc

Fold on tight

Don't break the
fold!

Secret sauce of professionals

Hidden little gem
that can make you a
Power BI hero





Thank you

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Feedback please!



<https://feedback.dsmuc.de/>