Power BI Desktop – Interactive Reports & Dashboards

Part 2

IT1.4.2

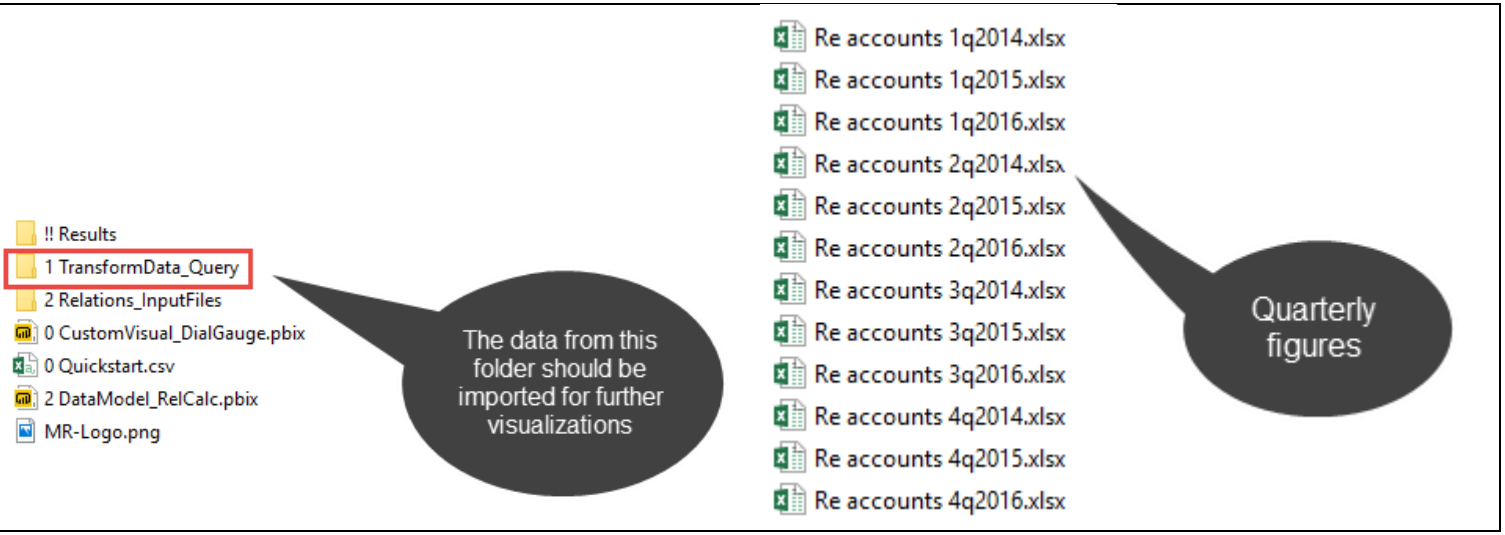
Last updated: 06.12.2018

Agenda - Power BI Desktop

1. Transform Data – Working with the Query Editor

Data - Import Data from Folder

- The folder 1 QueryEditor_ TransformData contains quarterly figures



- Every Excel file contains data with the same table structure

	A	B	C	D	E	F	G
1	Category	Classic	AA	Unit Linke	Critical Illnes	Group Ins.	TOP LIFE
2	Income						
3	Reinsurance premiums net of cancellations	75.823,65	164.636,15	22.946,00	254,88	440,58	24.752,74
4	Reserve for outstanding claims as at the end of the preceding quarter	0,00	0,00	0,00	0,00	0,00	0,00
5	Outgo						
6	Claims payments	0,00	38.555,57	0,00	0,00	0,00	7.500,00
7	Reserve for outstanding claims as at the end of the quarter concerned	0,00	0,00	0,00	0,00	0,00	0,00
8	Profit Participation	-16.345,16	48.237,47	9.527,83	112,81	195,01	0,00

- All data should be summarized in one table – see result on the right
- The file name contains the information Year / Quarter:
- This information is additionally needed as separate columns

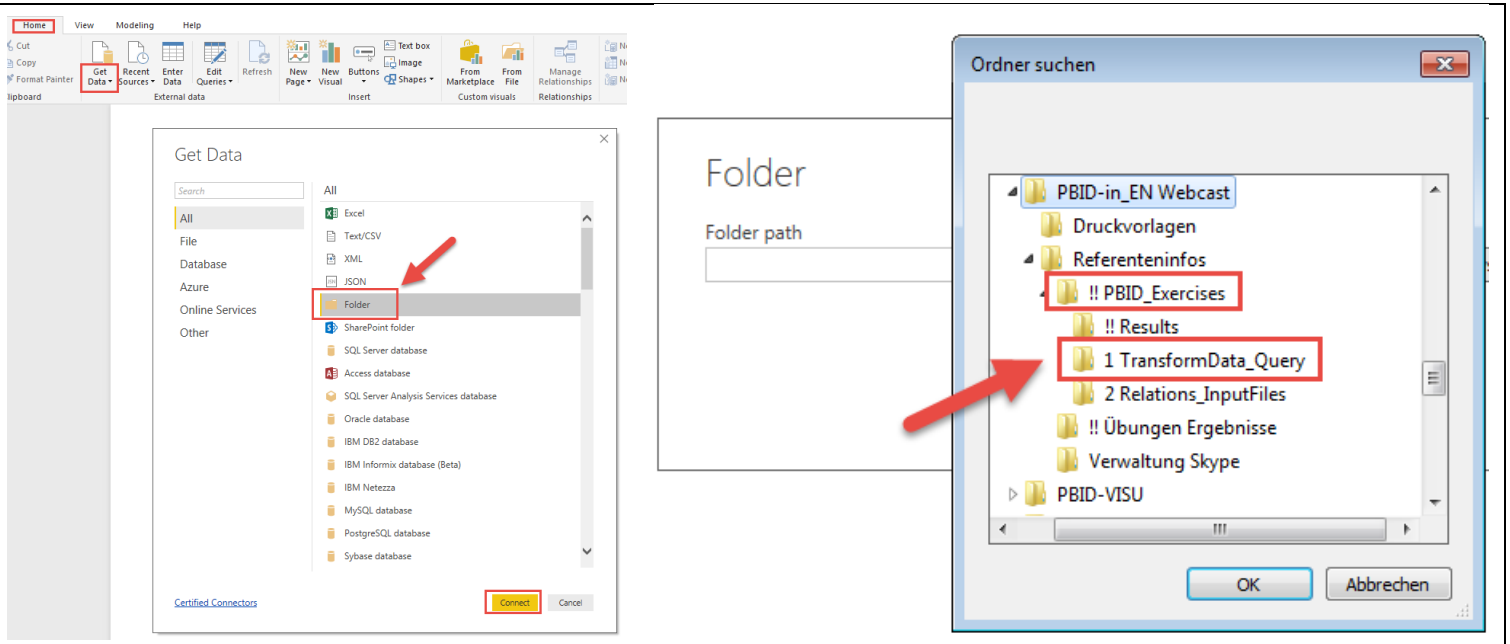
	Year	Quarter	Category	Product	Value
1	2014	1	Reinsurance premiums net of cancellations	Classic	54324,06
2	2014	1	Reinsurance premiums net of cancellations	AA	106697
3	2014	1	Reinsurance premiums net of cancellations	Unit Linked	27802,11
4	2014	1	Reinsurance premiums net of cancellations	Critical Illness	394,56
5	2014	1	Reinsurance premiums net of cancellations	Group Ins.	467,2044
6	2014	1	Reinsurance premiums net of cancellations	TOP LIFE	12544,91
7	2014	1	Reserve for outstanding claims as at the end of the preceding quarter	Classic	6833,333333
8	2014	1	Reserve for outstanding claims as at the end of the preceding quarter	AA	70729,68401
9	2014	1	Reserve for outstanding claims as at the end of the preceding quarter	Unit Linked	10770,75823
10	2014	1	Reserve for outstanding claims as at the end of the preceding quarter	Critical Illness	0
11	2014	1	Reserve for outstanc ding quarter	Group Ins.	0
12	2014	1	Reserve for outstanc ding quarter	TOP LIFE	7500
13	2014	1	Claims payments	Classic	0
14	2014	1	Claims payments	AA	99249,92788
15	2014	1	Claims payments	Unit Linked	17537,61744
16	2014	1	Claims payments	Critical Illness	0
17	2014	1	Claims payments	Group Ins.	2500
18	2014	1	Claims payments	TOP LIFE	14250
19	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Classic	0
20	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	AA	79135,09526
21	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Unit Linked	3884,578132
22	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Critical Illness	0
23	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Group Ins.	0
24	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	TOP LIFE	5000

Result

Exercise 1

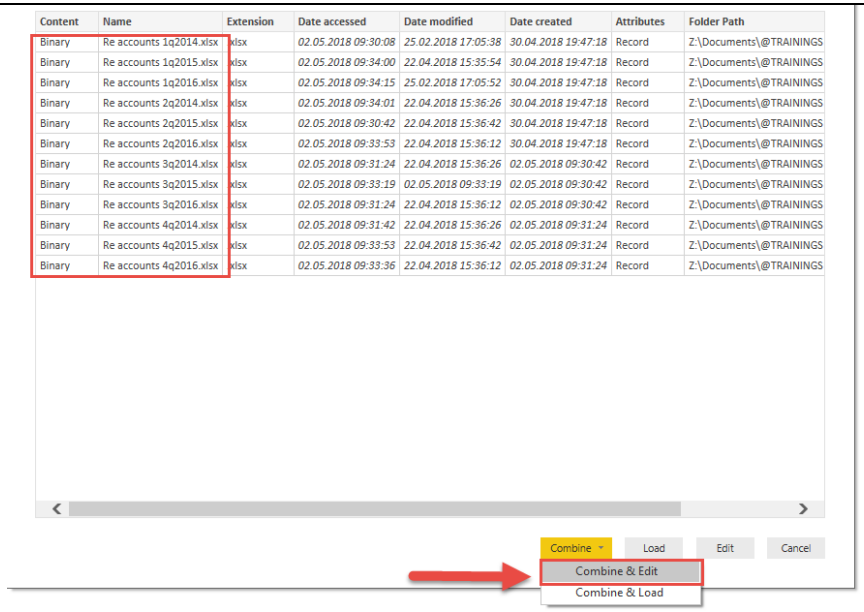
Start

- Please open **Power BI Desktop** & start with an empty .PBIX-file
- Via ***Home / Get Data / More / Folder*** you start the import process

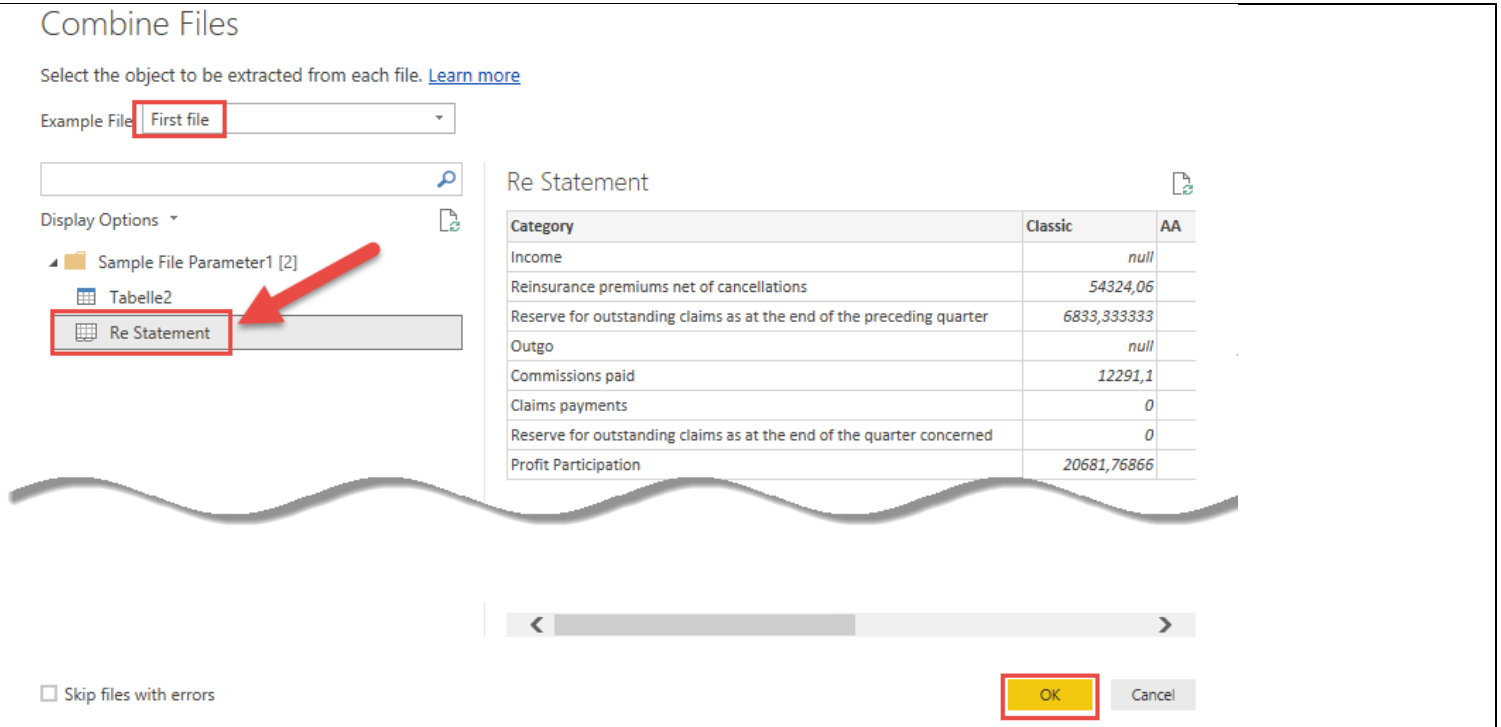


- You receive a list with all entries from the folder
- Open the Query Editor with ***Combine & Edit***

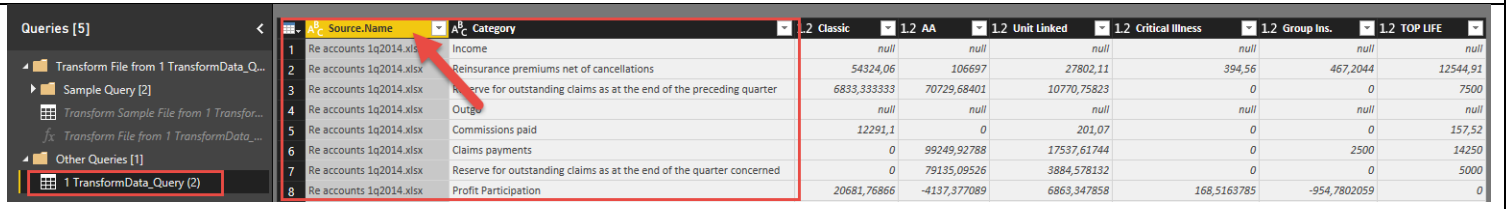
- This command combines all binaries in a given folder
- As long as they have the same file type and structure you will get a consistent list of data



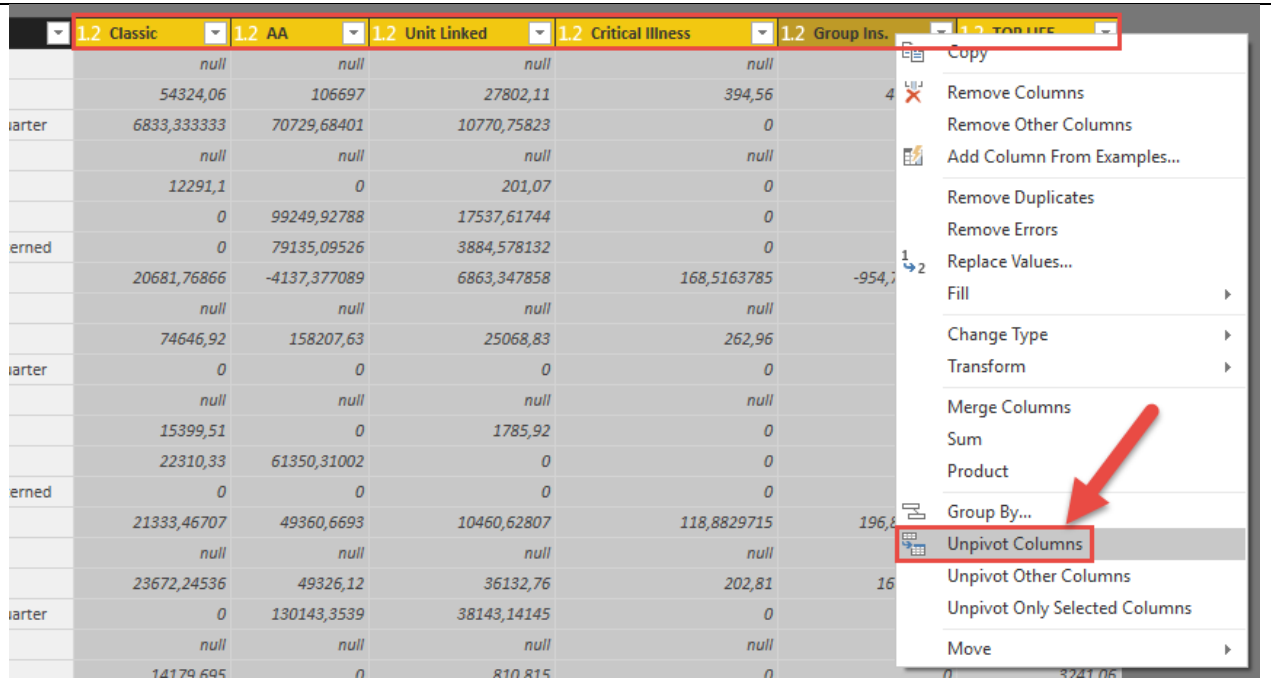
- Select Re Statement as data source & click ***OK***



- Here you can see the complete list already with all data from all files from the folder-import
- Additionally, the column Source.Name shows information for year & quarter



- In order to change the pivot-layout of the table select the highlighted columns
- Then right-click one of these column titles & select ***Unpivot Columns***



- The result is an unpivoted data table

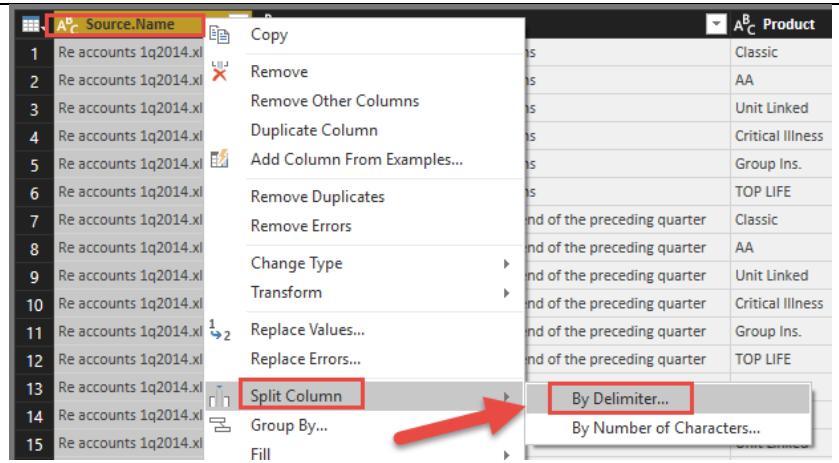
	Source.Name	Category	Attribute	Value
1	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	Classic	54324,06
2	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	AA	106697
3	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	Unit Linked	27802,11
4	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	Critical Illness	394,56
5	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	Group Ins.	467,2044
6	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	TOP LIFE	12544,91
7	Re accounts 1q2014.xlsx	Reserve for outstanding claims as at the end of the preceding quarter	Classic	6833,333333
8	Re accounts 1q2014.xlsx	Reserve for outstanding claims as at the end of the preceding quarter	AA	70729,68401
9	Re accounts 1q2014.xlsx	Reserve for outstanding claims as at the end of the preceding quarter	Unit Linked	10770,75823
10	Re accounts 1q2014.xlsx	Reserve for outstanding claims as at the end of the preceding quarter	Critical Illness	0

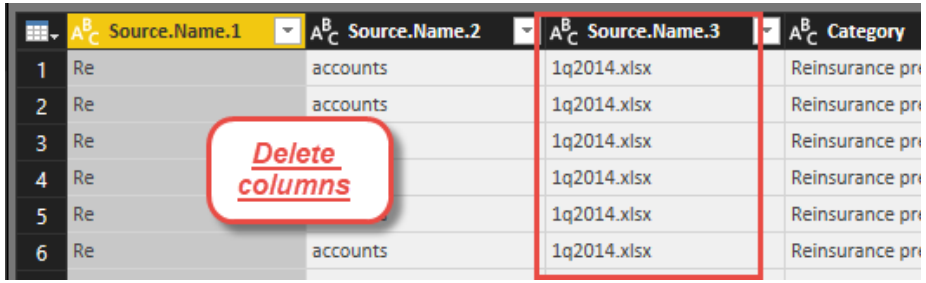
- Please double-click the column title Attribute & change it to Product

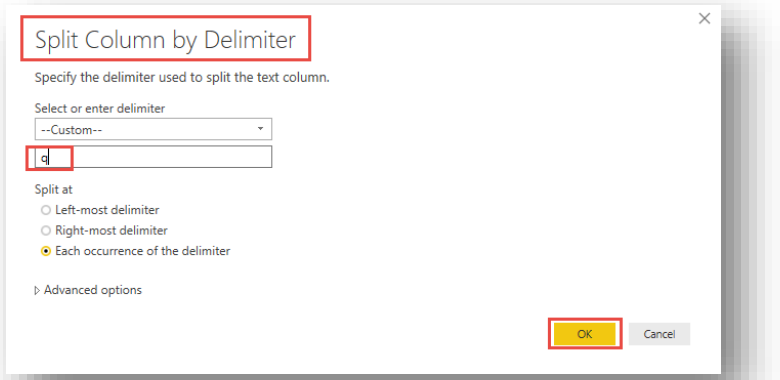
	Source.Name	Category	Product	Value
1	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	Classic	54324,06
2	Re accounts 1q2014.xlsx	Reinsurance premiums net of cancellations	AA	106697

Exercise 2

- Finally, you should split the column Source.Name in order to provide your data with the information of **year** & **quarter**
- Try the various possibilities of the ***Split Column*** command & delete all columns not needed
- Rename the column that contains the quarter data to Quarter and the column that contains the year data to Year







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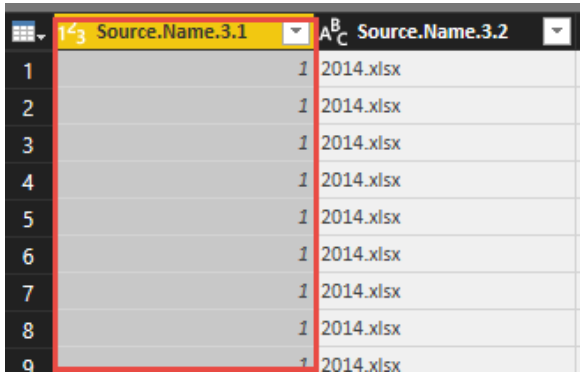

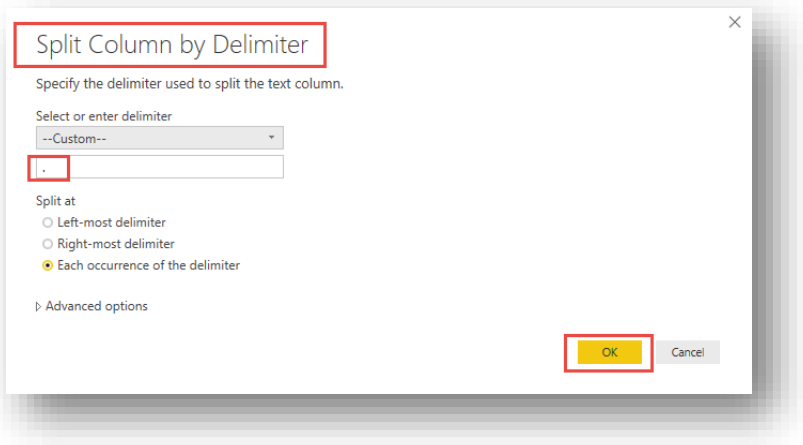

->

	Source.Name.3.1	Source.Name.3.2.1
1	1	2014
2	1	2014
3	1	2014
4	1	2014
5	1	2014
6	1	2014
7	1	2014

Result

	Year	Quarter	Category	Product	Value
1	2014	1	Reinsurance premiums net of cancellations	Classic	54324,06
2	2014	1	Reinsurance premiums net of cancellations	AA	106697
3	2014	1	Reinsurance premiums net of cancellations	Unit Linked	27802,11
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13	2014	1	Claims payments	Classic	0
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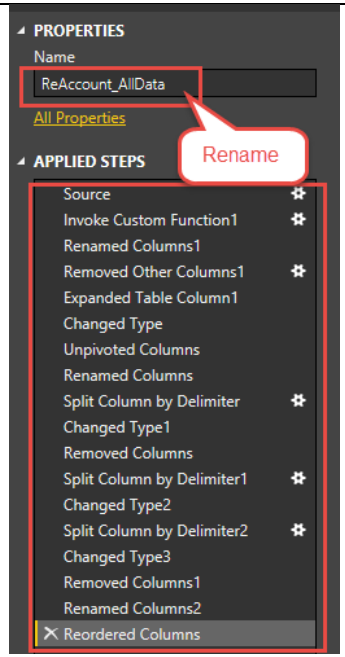
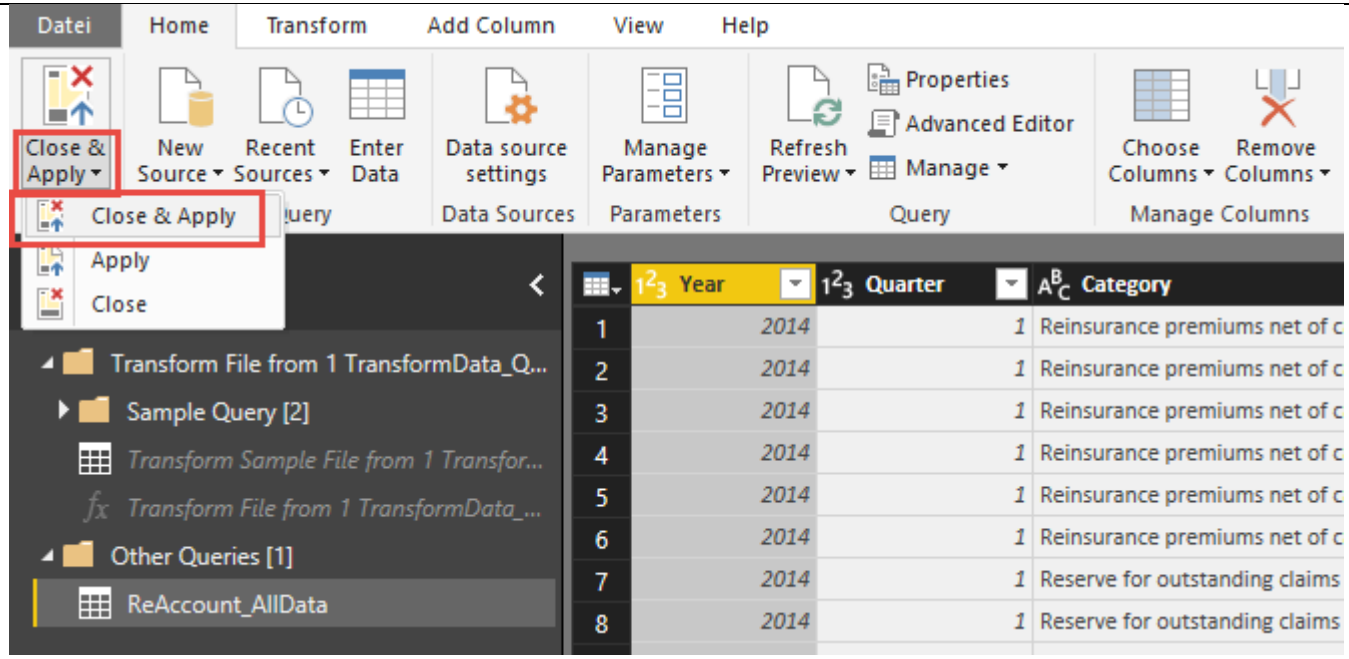
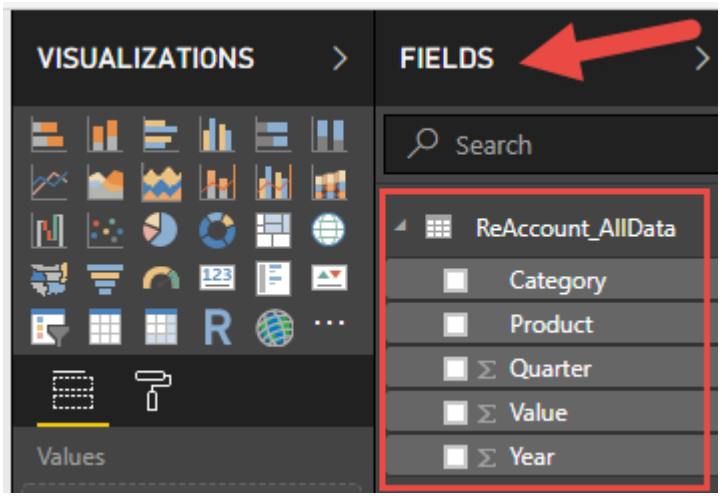
22	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Critical Illness	0
23	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	Group Ins.	0
24	2014	1	Reserve for outstanding claims as at the end of the quarter concerned	TOP LIFE	5000
25	2014	1	Profit Participation	Classic	20681,76866
26	2014	1	Profit Participation	AA	-4137,377089

- Rename the table to ReAccount_AllData
- The ***Applied Steps*** pane provides you with access to all steps you performed to transform your data in the necessary form



- With ***Close & Apply*** the connected data will now be imported into the data model

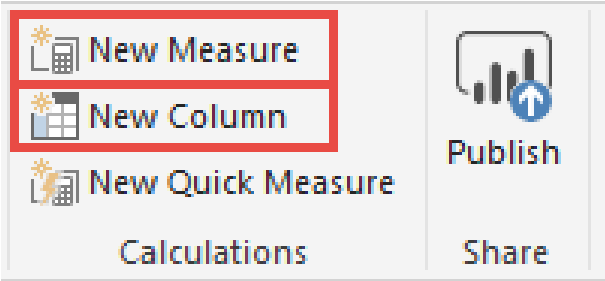


VISUALIZATIONS
FIELDS
Search
ReAccount_AllData
Category
Product
Quarter
Value
Year
Values

In your data model you use **DAX** (**D**ata **A**nalysis **E**xpressions) to calculate additional values

- Calculations can be performed with **calculated columns** or **calculated fields** (= **Measures**) Measures are preferable because they are more performant and use no storage place



DAX refers to columns & tables & not to cells (like Excel)

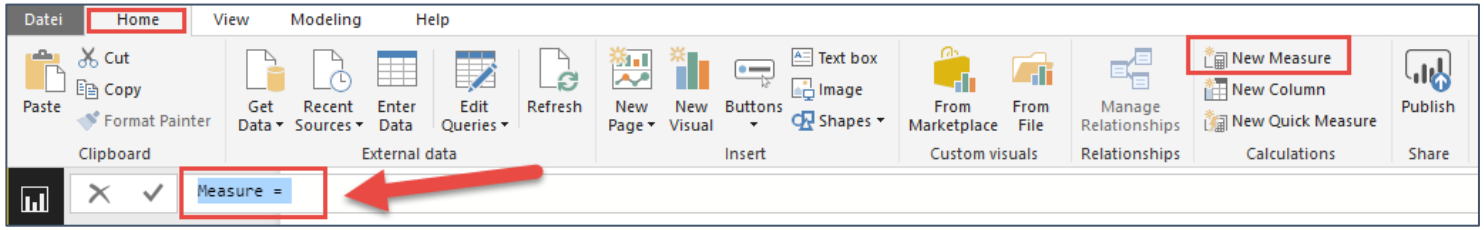
Difference between a **Calculated Column** and a **Measure**

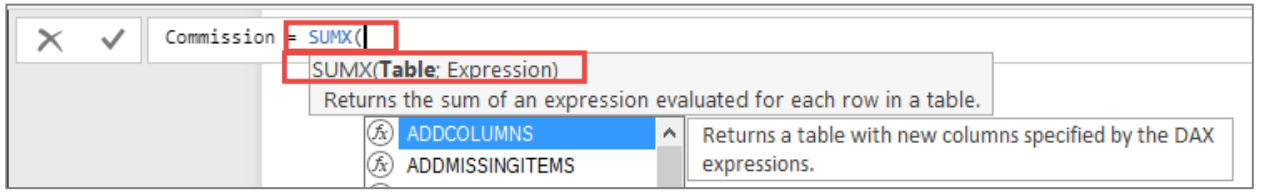
- Measures and calculated columns serve different purposes.
- Table columns, whether unchanged or calculated, belong to tables and require storage space. The data in the tables is only updated during loading or refresh.
- Measures, on the other hand, are calculated in-memory. Therefore they are faster and do not require any memory space. For this reason, the use of measures should be used whenever possible instead of creating calculated columns.
- In addition, once columns are loaded or updated, they can no longer be changed.
- Measures, on the other hand, react to user interactions.

- A Commission of 2 % of the corresponding value has to be calculated & visualized

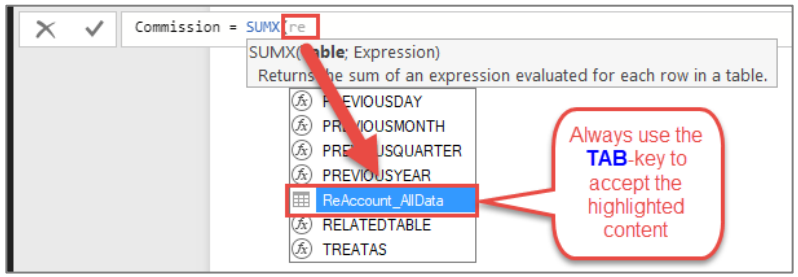
Exercise 3

- Create a new measure:
  Home / New Measure
- **Intellisense** provides you with information about the selected function
- The function **SUM** aggregates – the function **SUMX** iterates through all rows of the column Value & multiplies the value by 2%

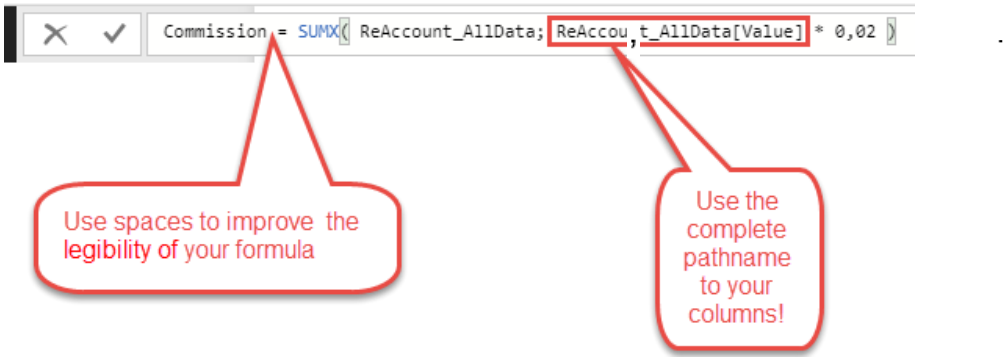




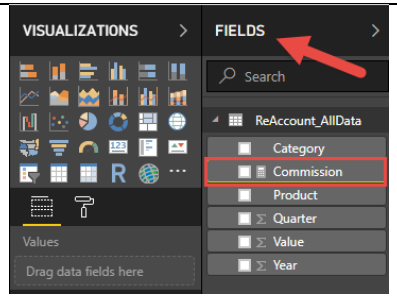
- Start typing the name of the table & accept the highlighted content with the ***TAB***-key



- Recommendations creating formulas:
  1. use spaces
  2. use the complete pathname addressing fields

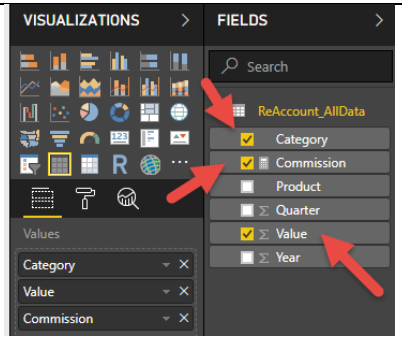


- When you confirm your formula with ***Return*** no result is shown - as you might expect it from Excel
- The new measure is simply shown in the field list on the right

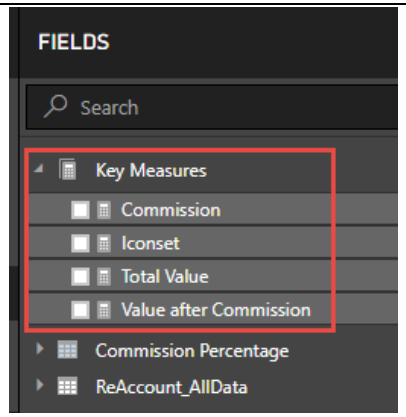


- In order to visualize & check the measure, always use the visual ***Table***
- Drag & drop the necessary fields to the reporting canvas & check the values
- Finally delete the table

Category	Value	Commission
Claims payments	$759.123,71	$15.182,47
Profit Participation	$549.877,24	$10.997,54
Reinsurance premiums net of cancellations	$2.562.887,39	$51.257,75
Reserve for outstanding claims as at the end of the preceding quarter	$890.792,54	$17.815,85
Reserve for outstanding claims as at the end of the quarter concerned	$799.144,31	$15.982,89
Total	**$5.561.825,19**	**$111.236,50**



- For a better overview of all measures it is recommended to create a **support table** that contains all calculations of your data model
- However, it is not connected to your data model



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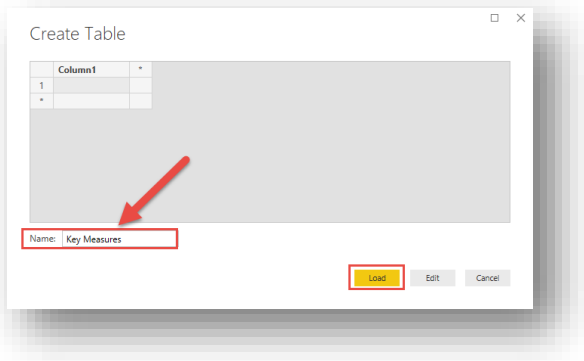
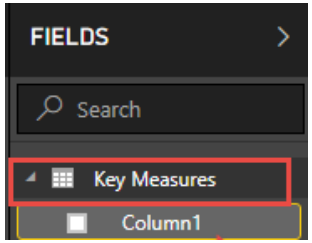
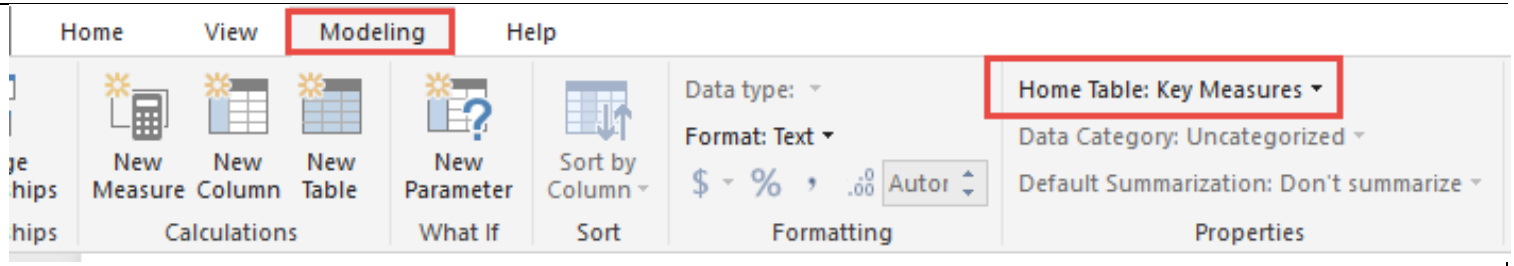


Exercise 4

- Create the table Key Measures: ***Home / Enter Data***
- An empty table is shown – please enter the table name in the left bottom corner
- As a result, an empty table is shown in the ***Fields*** pane

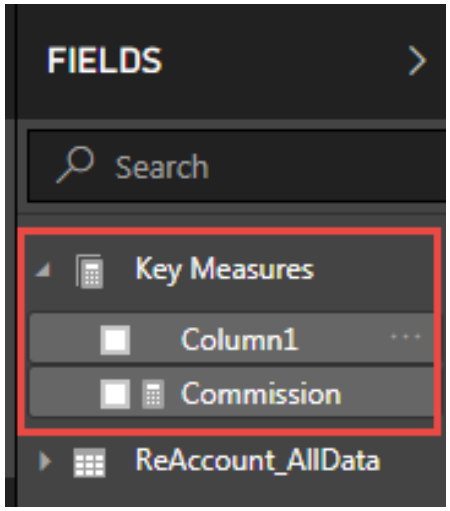


- Now highlight the measure Commission
- With the command ***Modeling / Home Table*** you can decide where your measures should be stored



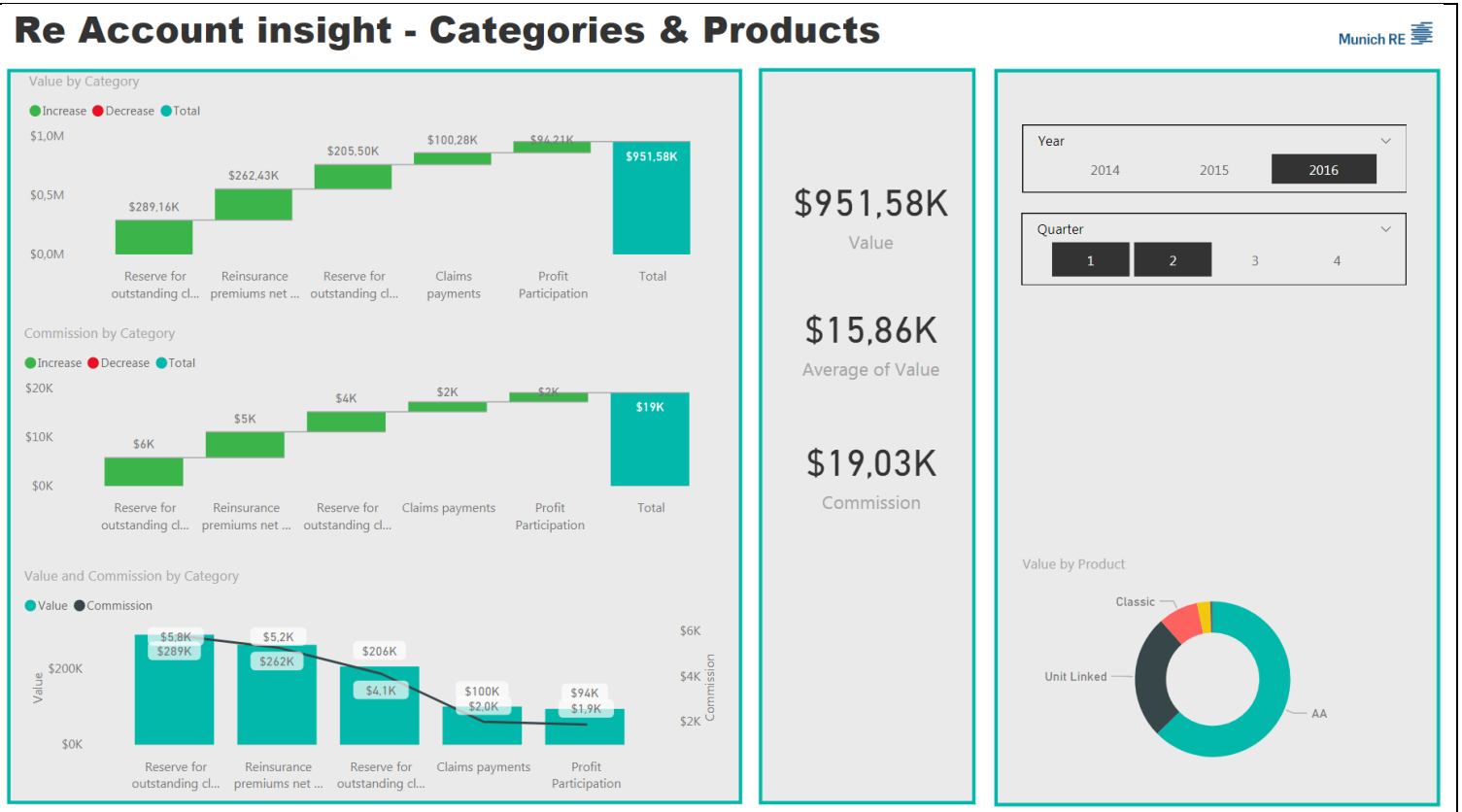
- **Please note**:
  it is not possible to drag & drop fields in the ***Field*** pane!

- The table **Key Measures** contains the measure & a field **Column1**
- Please delete or hide that empty column
- Finally close the ***Fields*** pane & open it again
  -> the support table is placed at the top of the list of tables



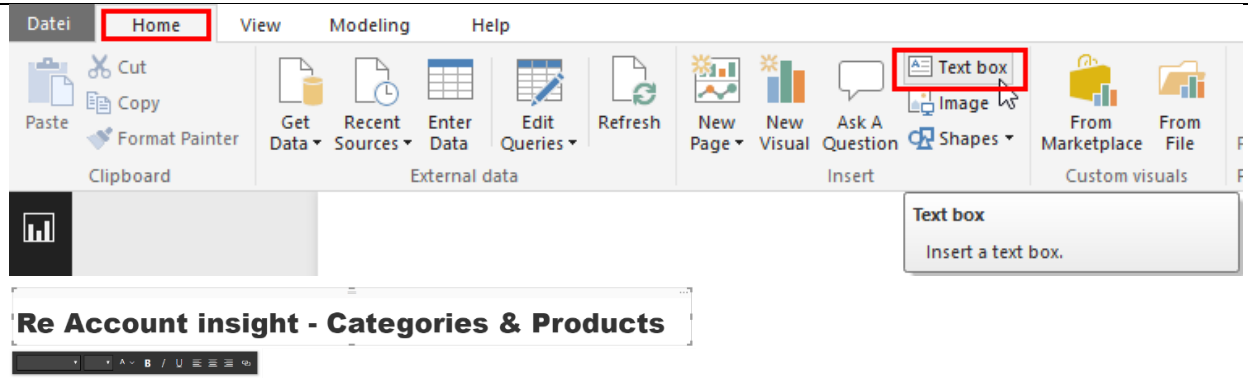
Report Re Account insight

- With all necessary fields available you can start to create the report



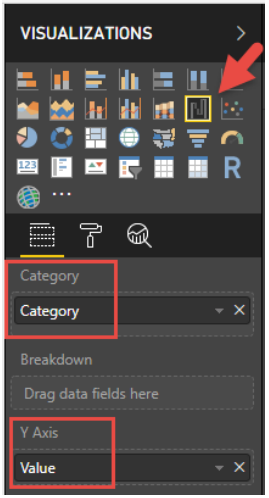
Exercise 5

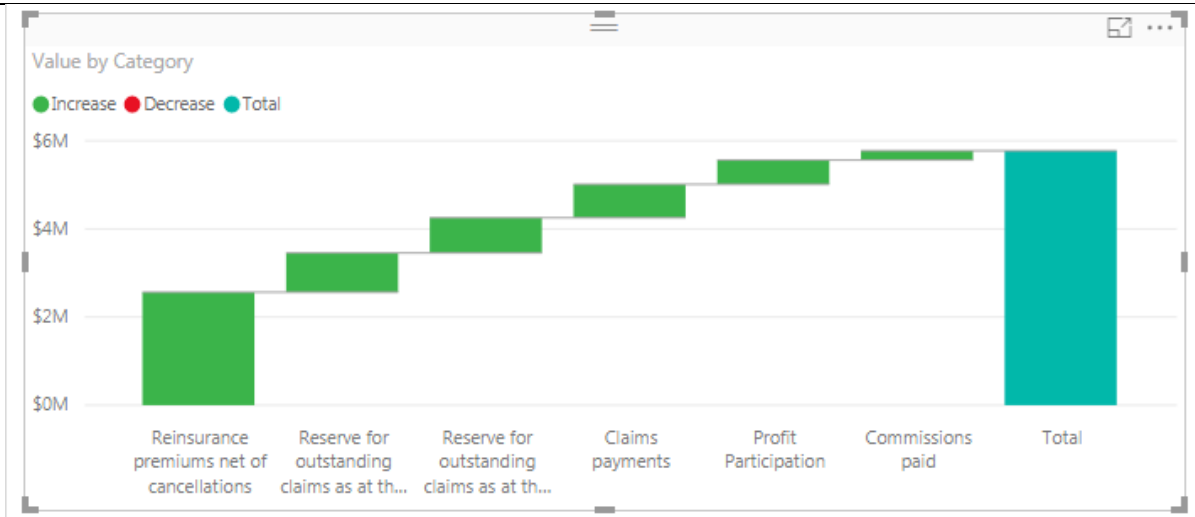
- Start with the title – ***Home / Textbox***



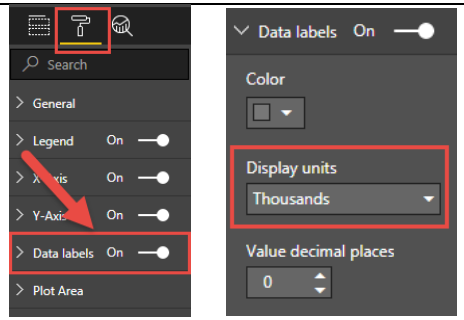
- Insert the report title & format it:
  Font: Arial Black
  Size: 28pt

- Create a ***Waterfall Chart***

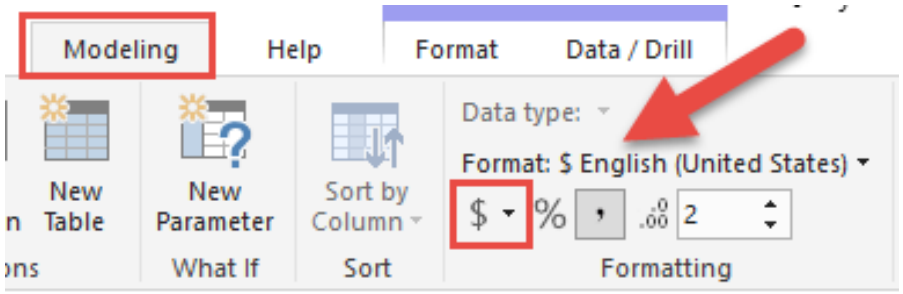




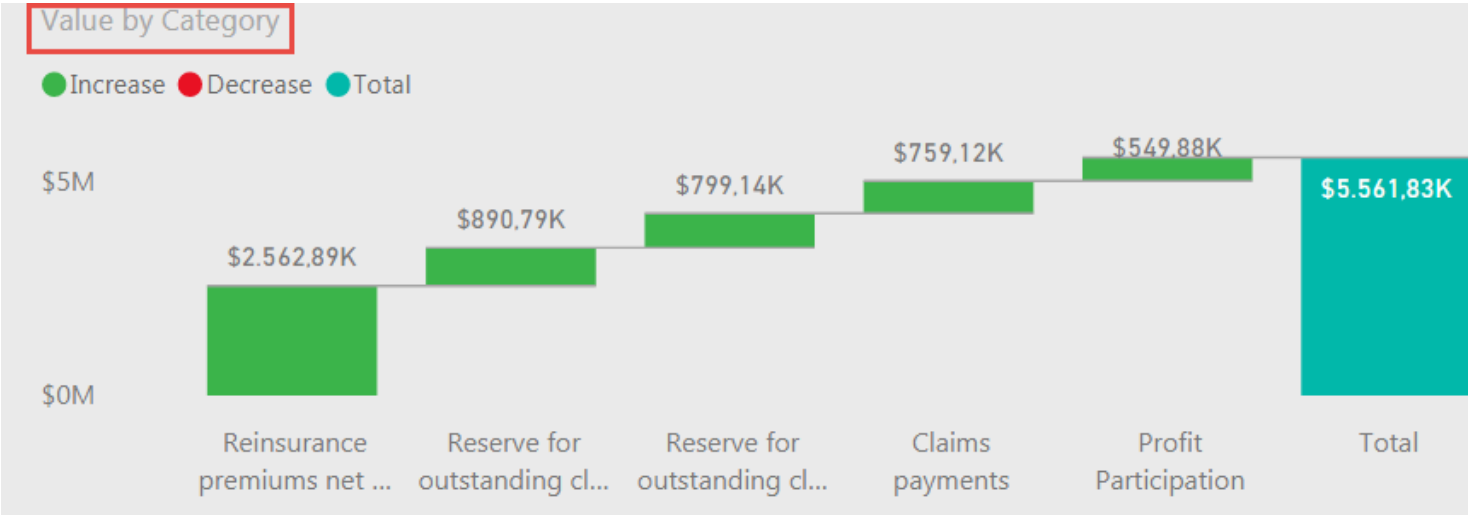
- Activate the ***Data Labels***



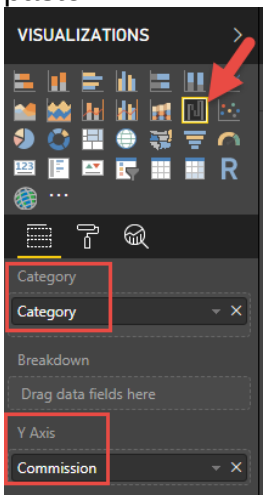
- If you want to show the figures as currency, select (!) the field Value in the ***Fields*** pane
- Switch to the tab ***Modeling*** where you can select the currency symbol

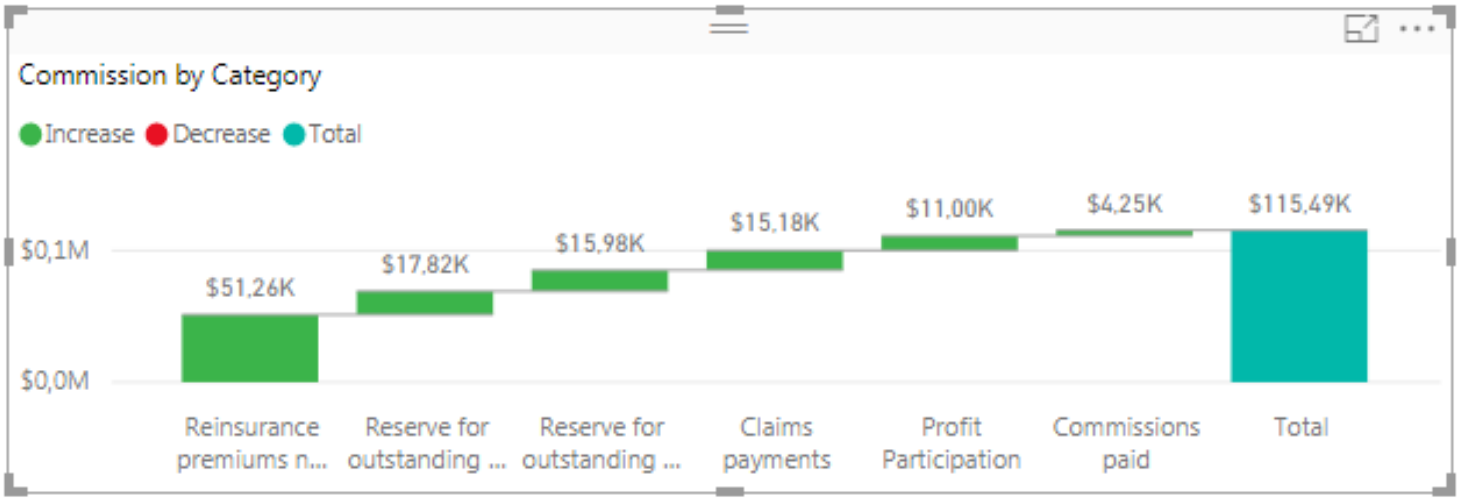


- Result



- Create a *second* ***Waterfall Chart*** via copy & paste

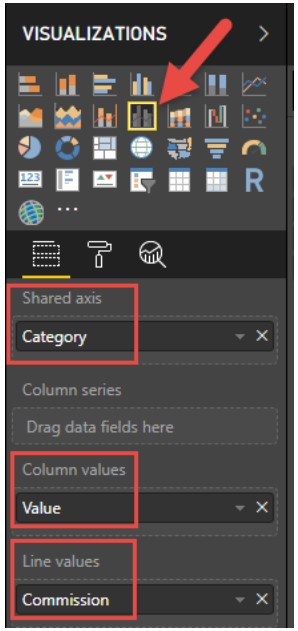


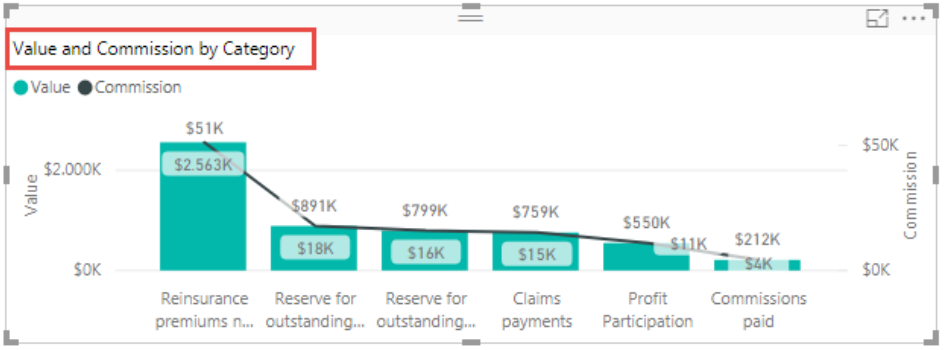


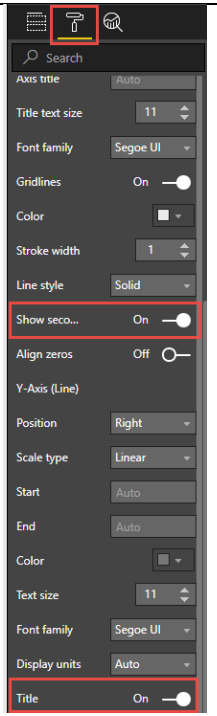
- Change the **format** of the data labels for the field Commission as described above

- Create a ***Line & clustered column chart***

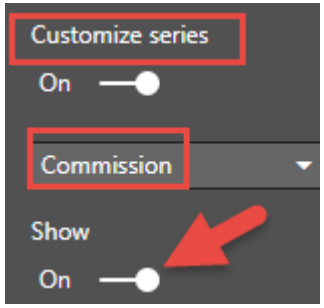
- Activate the ***Titles***
- Activate ***Data Labels***



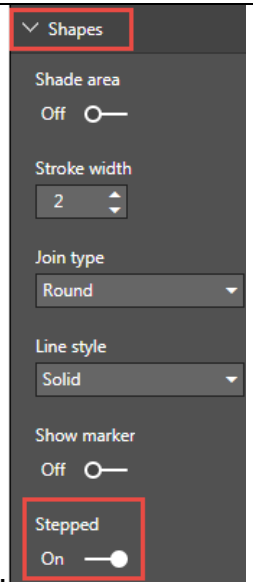




- - With ***Customize series (On)***, you can also specify here whether the labels for both data series should be displayed
- The format of the line in the Combochart can be converted under ***Shapes*** to the variant ***Stepped***

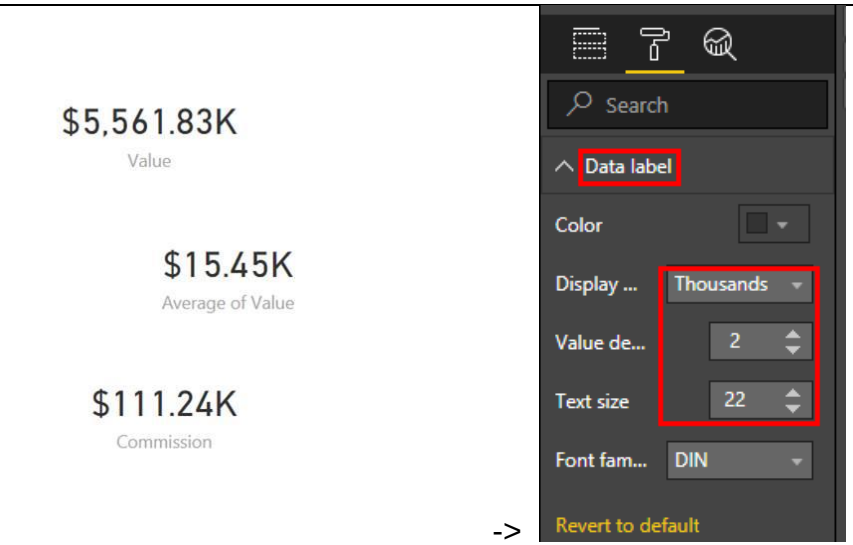


.....

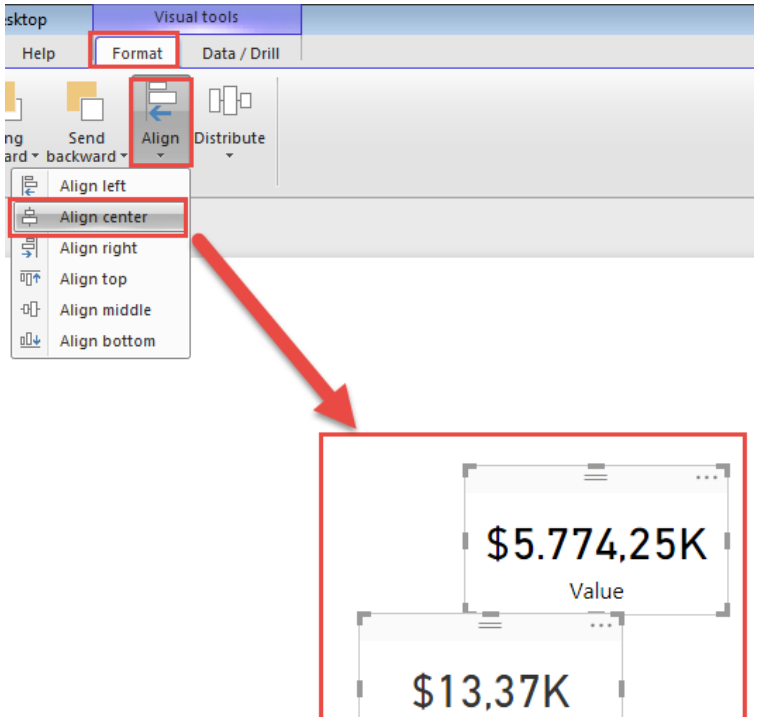


Exercise 6

- Create 3 ***Card*** visuals
- Format the numbers as shown in the screenshot

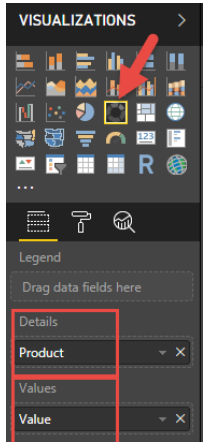


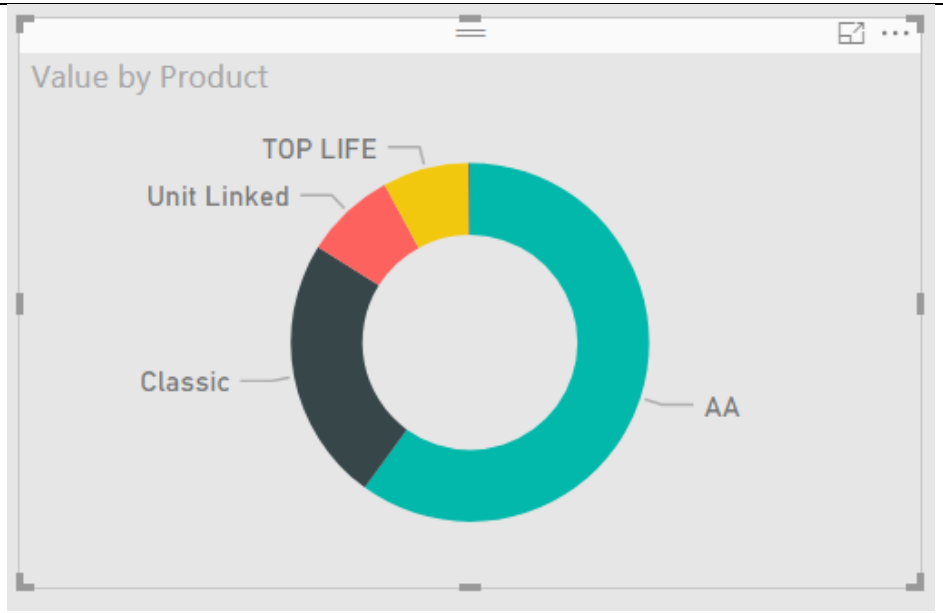
- **Tip**:
  with the commands ***Align*** & ***Distribute*** you can for example define the exact position of the card visuals



Exercise 7

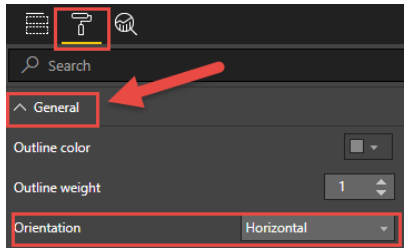
- Create a ***Donut***

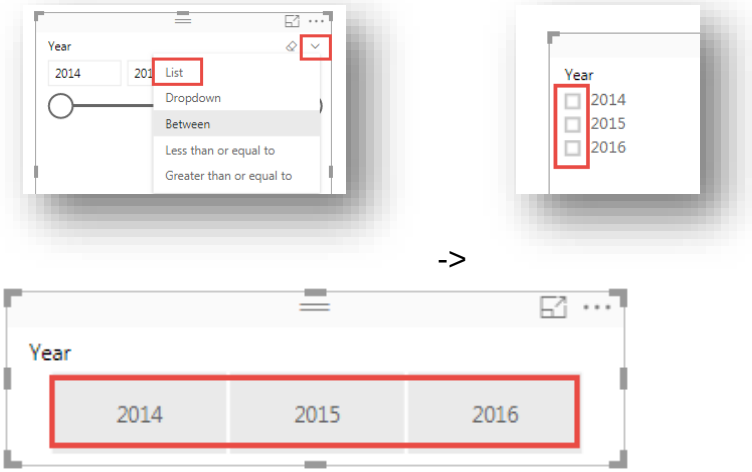




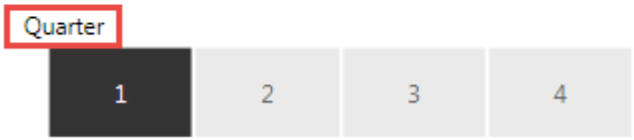
Exercise 8

- Create a ***Slicer*** for Year
- Switch the layout of the slicer to ***list***
- After that you can switch to ***Orientation***: ***Horizontal***

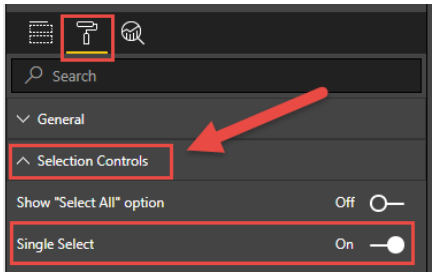




- Copy the slicer & change Year to Quarter

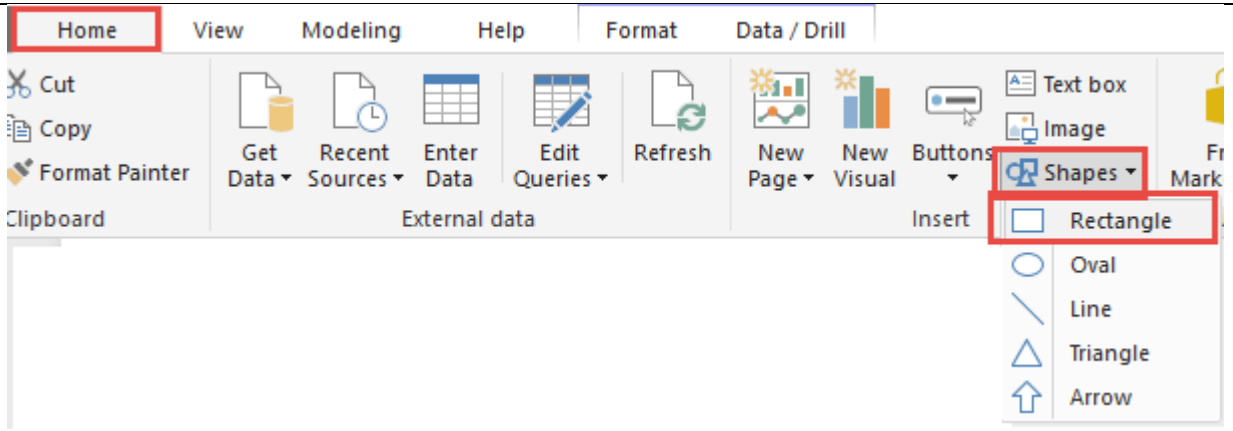


- For Quarter: switch to ***Single select: Off***

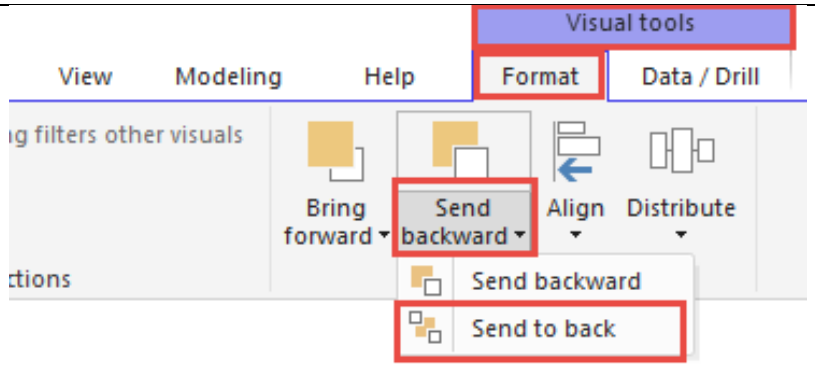


Exercise 9

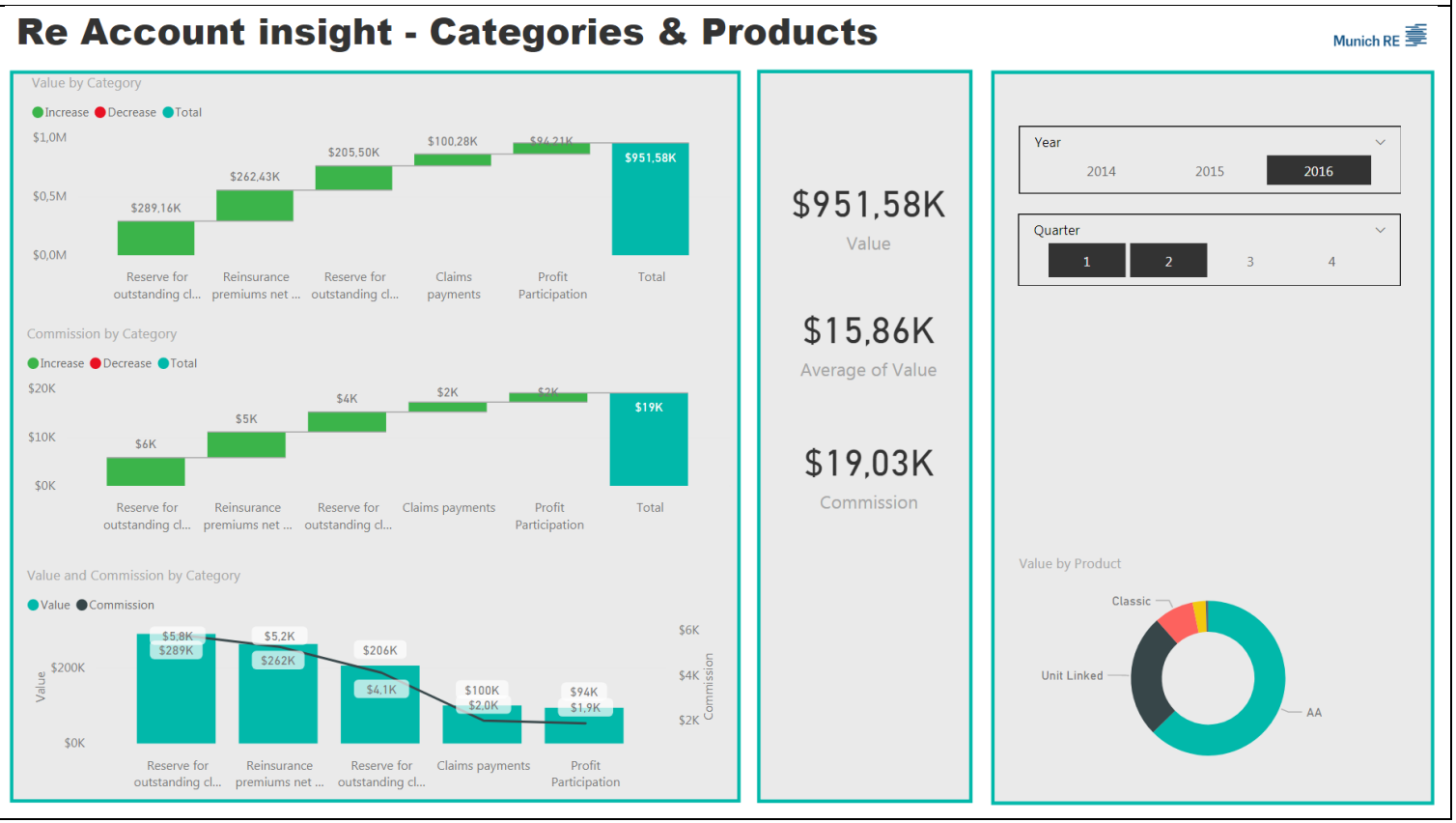
- Group the visuals with ***Home*** / ***Shapes: Rectangle***



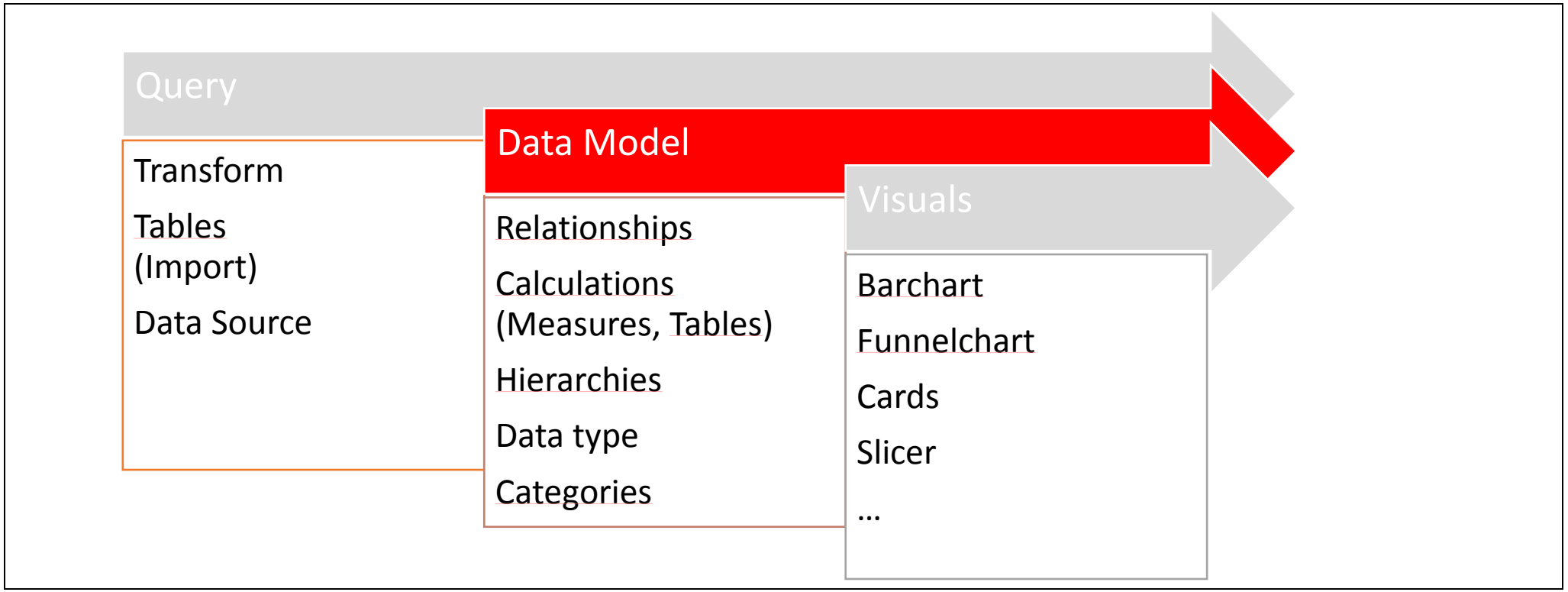
- Like in PowerPoint you can send the rectangle – once you have shaped it to a suitable size – to the back:
  Visual tools / Format / Send backward / Send to back



- Result



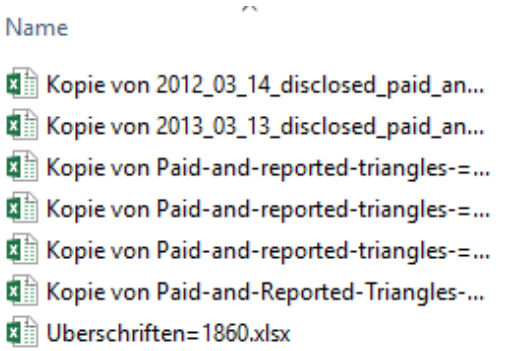
2. Data Model – Relationships & Calculations



Data

- Please have a look at the folder 2 Relations_InputFiles & open one of the Excel files
- With the **folder import** all data of all Excel files are imported & automatically appended in a PBIX-file
- It is important that you close the Excel file again!

- Now open the file 2 Data Model_RelCalc.pbix
- The PBIX-file already contains all data from the folder-import: 2 Relations_InputFiles



->

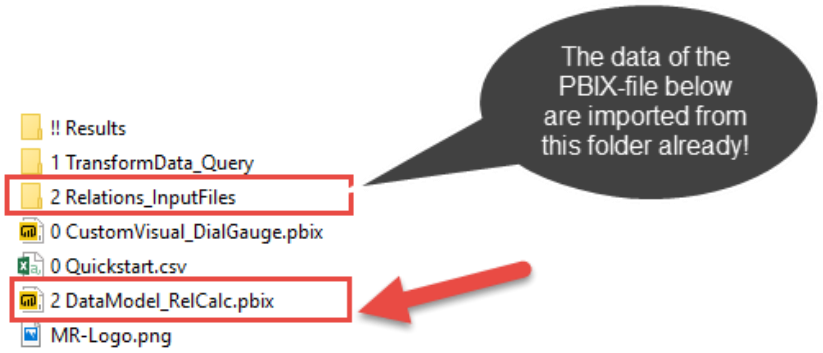
Property

Reported loss development in loss ratios

Treaty Year	Ultimate Premium €m	Development Year 1	2	3	4	5	6	7	8	9	10	11	12
2000	2.275	60,6%	76,4%	79,4%	79,2%	79,8%	78,9%	80,4%	82,3%	82,1%	82,0%	81,8%	81,5%
2001	2.573	76,7%	90,5%	94,2%	94,9%	92,7%	92,7%	93,1%	92,6%	93,0%	92,7%	92,4%	
2002	2.916	50,7%	56,5%	57,2%	59,4%	59,5%	59,4%	59,2%	59,0%	59,0%	59,1%		
2003	3.053	39,3%	46,7%	46,0%	45,3%	46,0%	46,0%	46,9%	46,9%	46,9%			
2004	2.998	42,8%	55,4%	58,7%	58,9%	59,7%	59,4%	59,3%	59,3%				
2005	3.072	59,7%	79,8%	83,9%	84,0%	84,1%	83,9%	84,0%					
2006	3.449	29,0%	38,0%	41,2%	42,7%	43,1%	43,5%						
2007	3.685	33,5%	50,5%	51,5%	52,6%	53,6%							
2008	3.655	37,1%	48,7%	51,2%	51,8%								
2009	3.435	34,8%	57,0%	58,2%									
2010	3.288	38,4%	56,8%										
2011	3.557	12,6%											

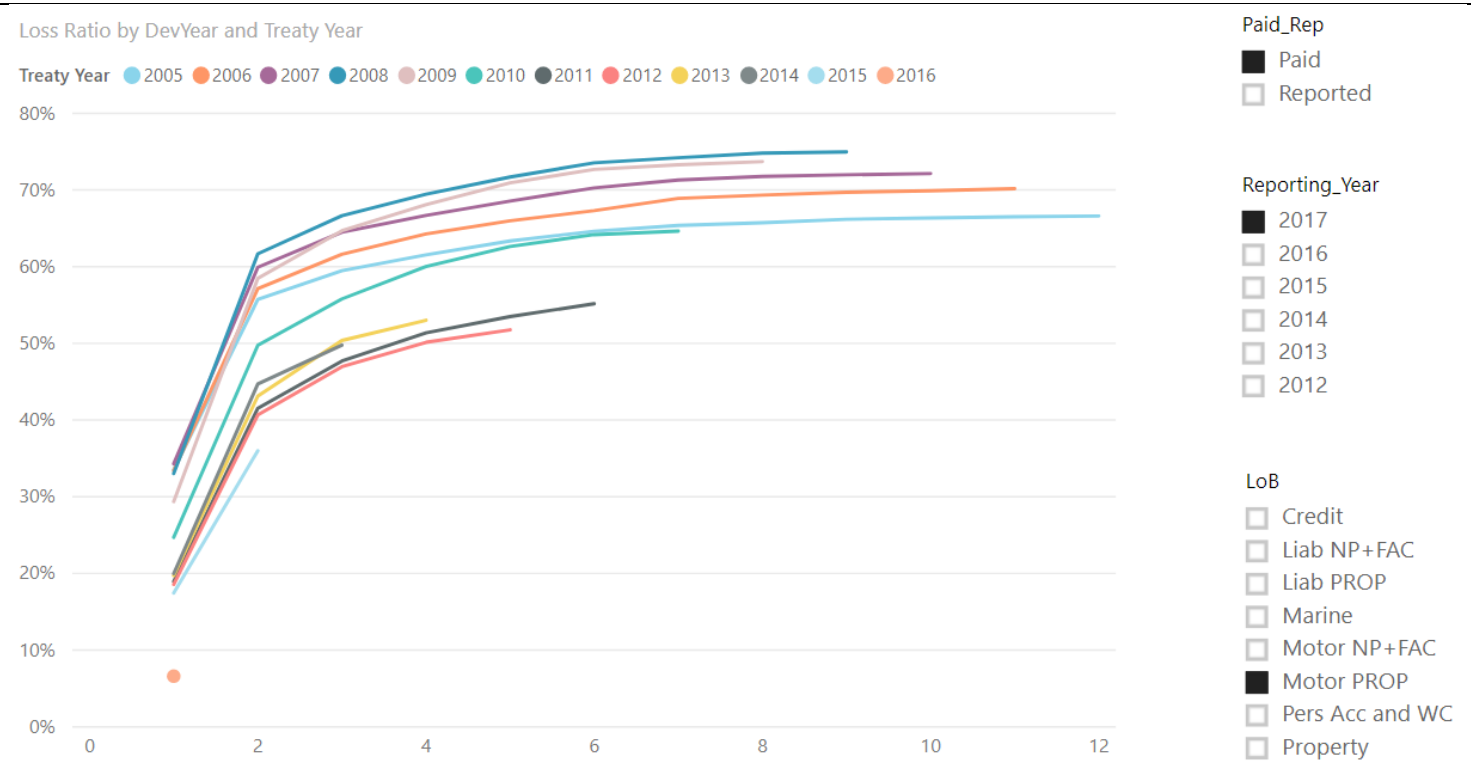
Reported loss development in absolute amounts

Treaty Year	Ultimate Premium €m	Development Year 1	2	3	4	5	6	7	8	9	10	11	12
2000	2.275	1.380	1.738	1.806	1.803	1.816	1.796	1.828	1.872	1.867	1.866	1.861	1.855
2001	2.573	1.973	2.329	2.425	2.442	2.386	2.387	2.395	2.382	2.394	2.386	2.379	
2002	2.916	1.479	1.648	1.667	1.733	1.734	1.730	1.727	1.721	1.720	1.724		
2003	3.053	1.201	1.427	1.403	1.384	1.404	1.404	1.431	1.433	1.433			
2004	2.998	1.281	1.660	1.759	1.764	1.788	1.782	1.779	1.777				
2005	3.072	1.835	2.452	2.576	2.581	2.583	2.577	2.581					
2006	3.449	1.000	1.310	1.420	1.472	1.487	1.500						
2007	3.685	1.234	1.859	1.896	1.938	1.974							
2008	3.655	1.358	1.779	1.871	1.893								
2009	3.435	1.196	1.956	1.998									
2010	3.288	1.263	1.867										
2011	3.557	447											



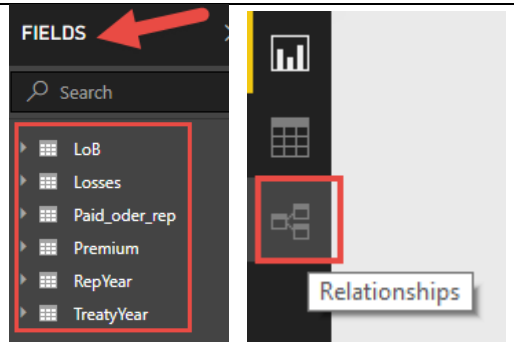
Result

- A ***Line chart*** & ***Slicers*** as shown on the right should be generated
- Therefore, the input data from the folder have to be transformed – as you will see in the PBIX-file

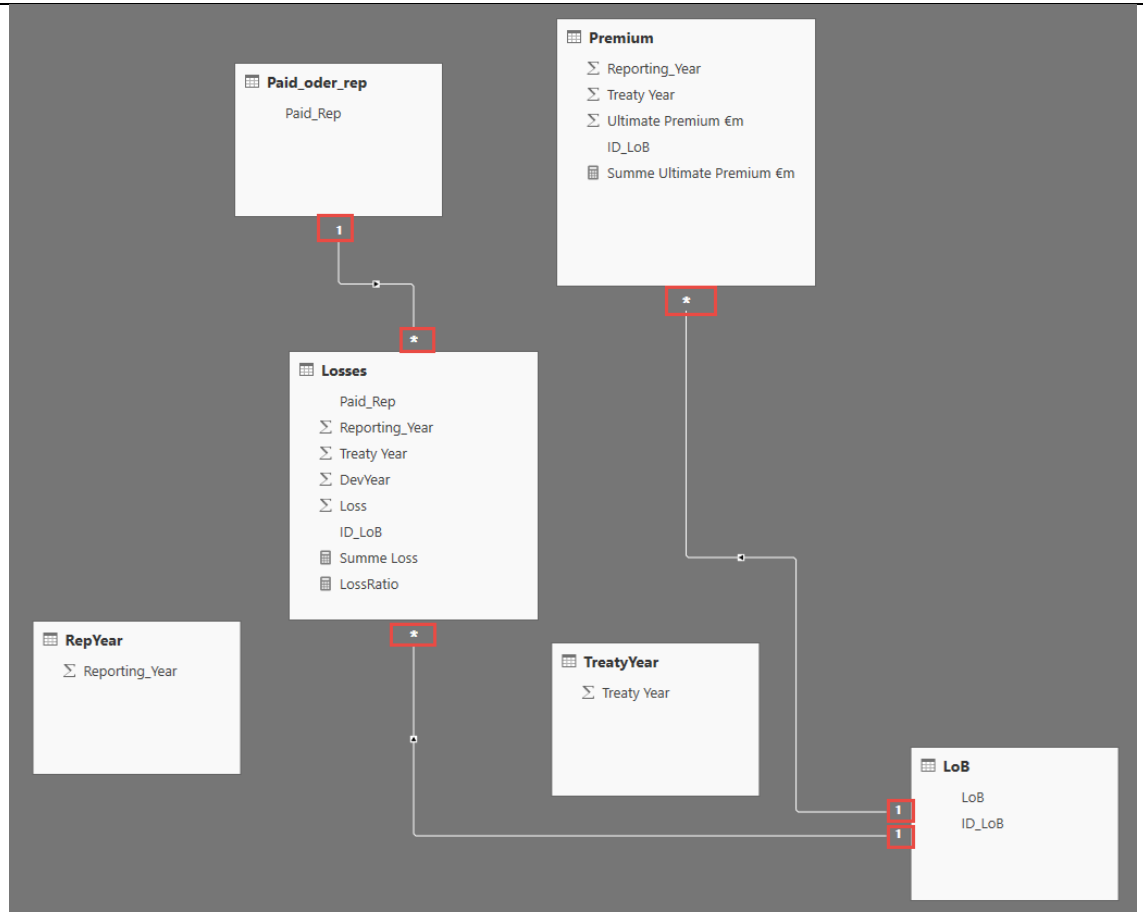


1 Using Relationships

- The tables are already imported
- If you want to create visualizations with more than one table you have to create relationships between the tables
- So firstly, let's have a look at the ***Relationships***

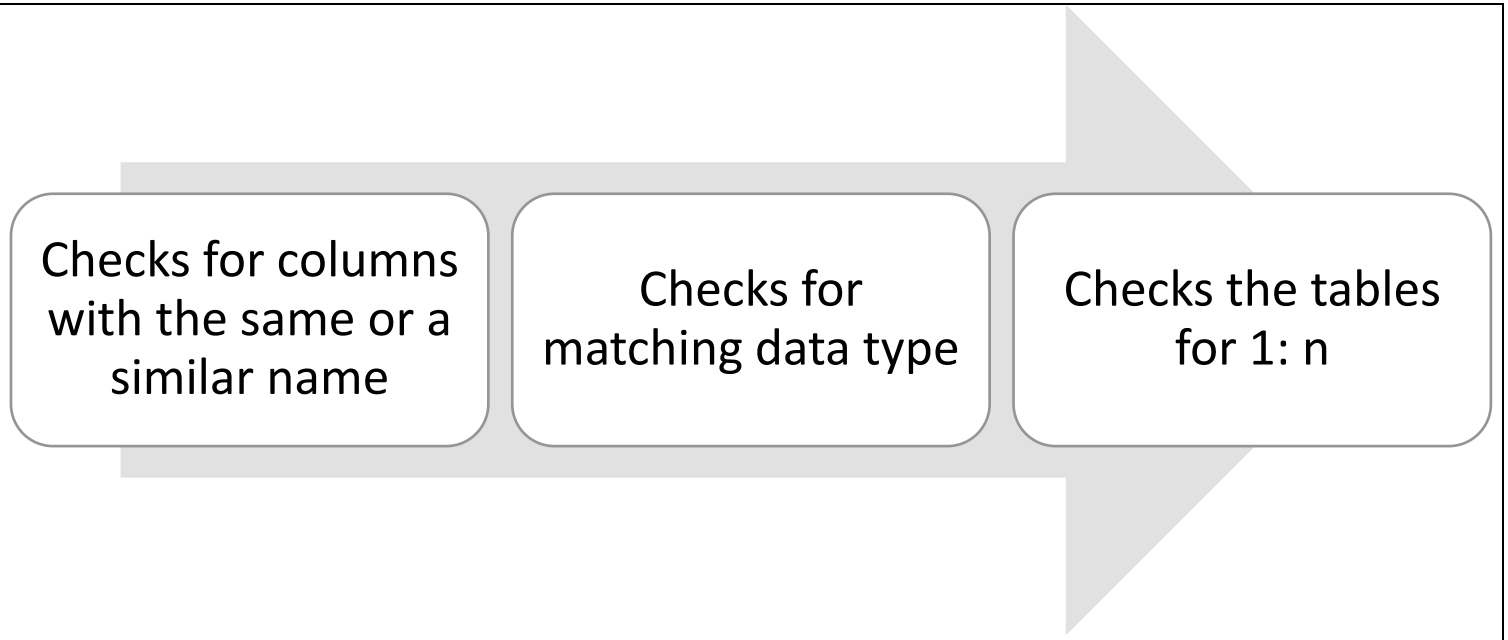


- The Relationship view shows some relationships already – they are created by a feature of Power BI Desktop called ***Autodetect***
- Have a look at the relations between LoB & Losses: LoB represents the **1-side** & Losses the **many-side** of the Connection
- This means: the value ID_LoB in the table LoB is unique, whereas the value ID-LoB in the table Losses & Premium appears one or several times
- If the value ID_LoB in the table LoB is not unique the relationship cannot be generated automatically nor manually

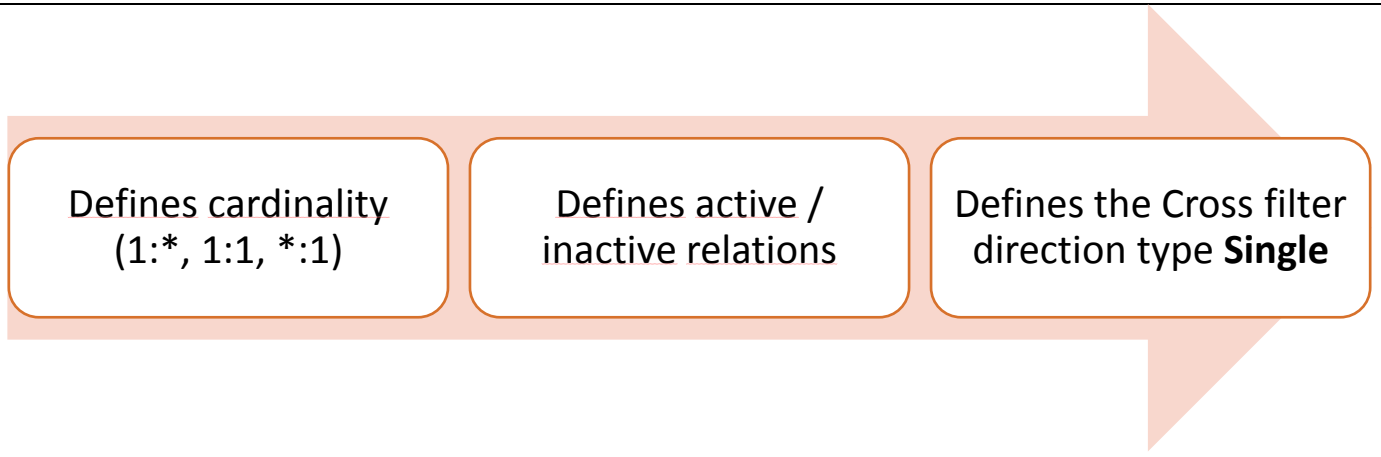


How does Autodetect Handles Relationships?

- Power BI Desktop won't necessarily create all relationships
- If it doesn't have a very high confidence what to do, it won't create the relationship

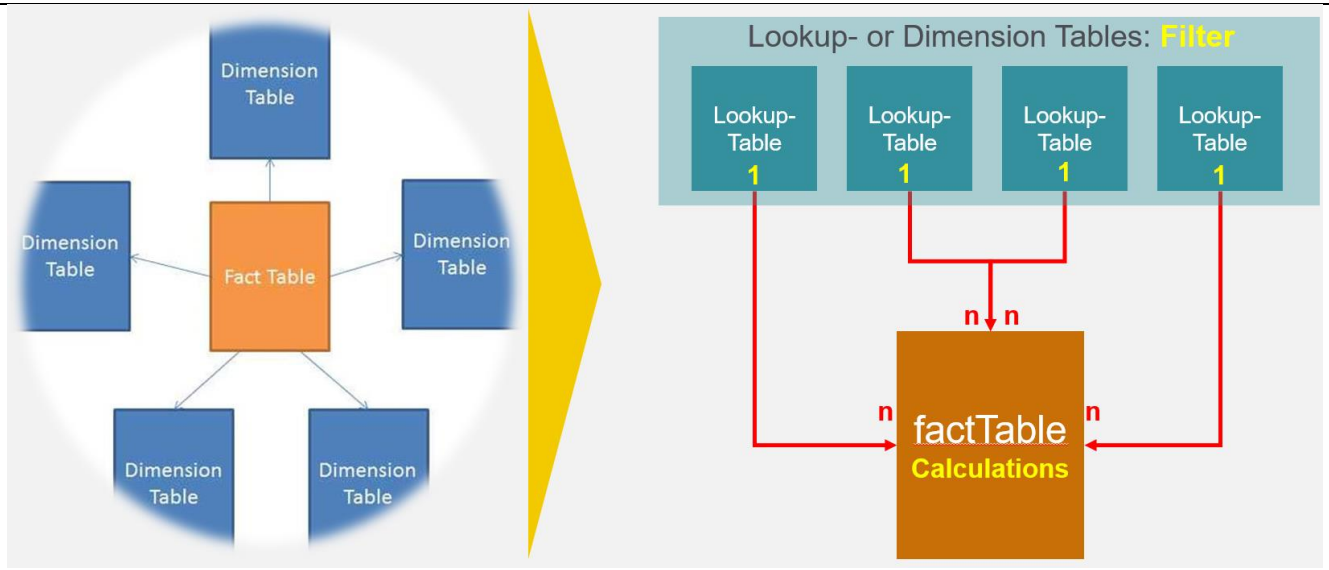


- ***Autodetect*** defines cardinality -> which table is on the **1-side** & which is on the **many-side**
- Power BI Desktop may set a relationship to **inactive** if there is some ambiguity present
- So, be sure to review all of the relationships in your dataset, and don't rely entirely on the ***Autodetect*** functionality



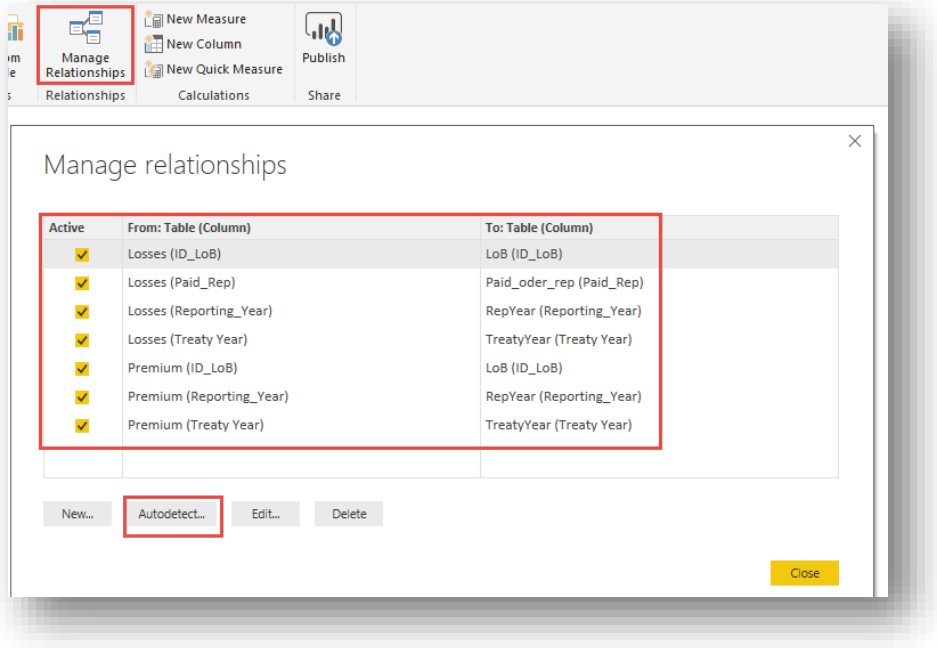
Data model – Star scheme

- The tables on the 1-side are used to set **filters**
- These filters always run to the tables on the many-side
- The tables on the many-side then **calculate & aggregate** what is filtered
- In order to visualize how the filters flow, it is helpful to arrange the tables according to their functionality in the data model

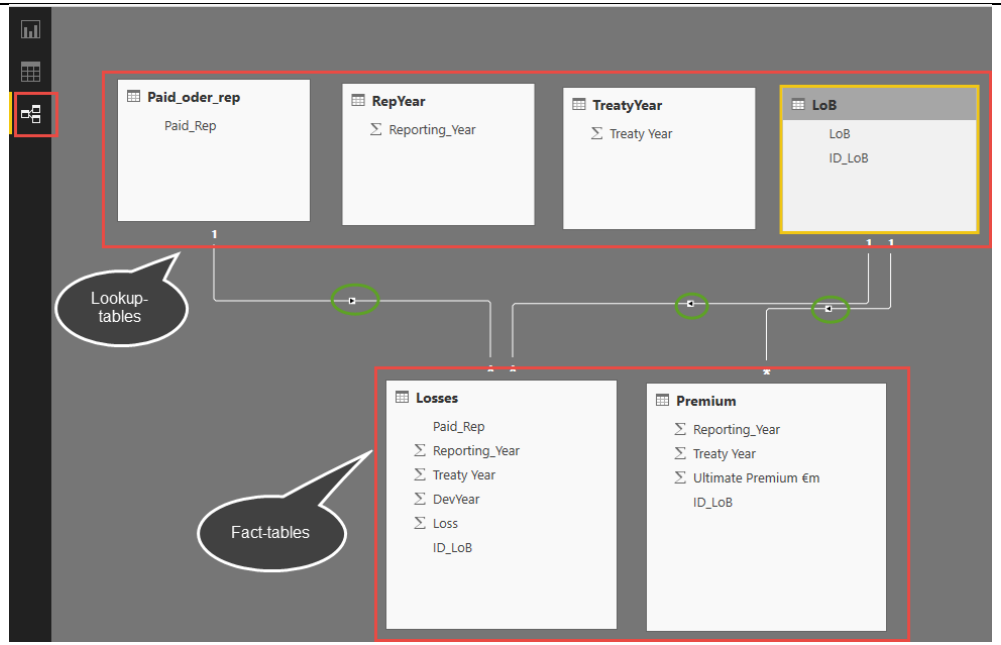


Exercise 1

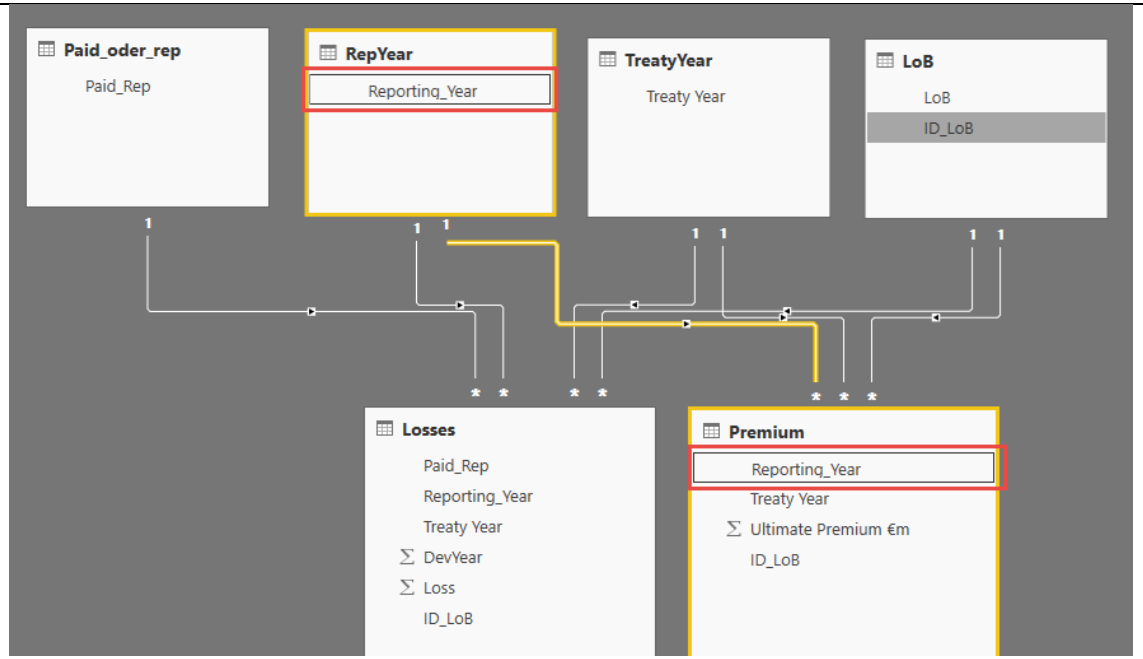
- Switch to the ***Relationships*** window & click on ***Home / Manage Relationships***
- Start the ***Autodetect***-function – all relations then should be created



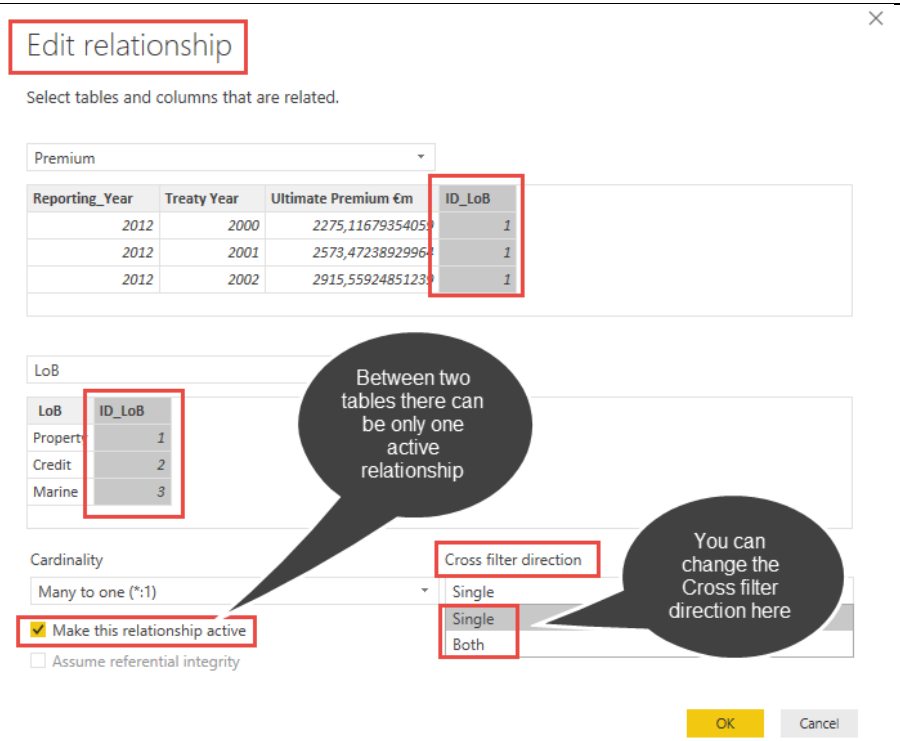
- Rearrange the tables in the way shown on the right
- The arrows show the direction in which the filters flow (Cross filter direction ***Single***)



- For safety reasons you should always check if the corresponding fields are connected – you can do that by hovering over the relationship line
  -> you can see then which fields are connected
- When you create relationships, the standard Cross-filter-direction is always **Single**

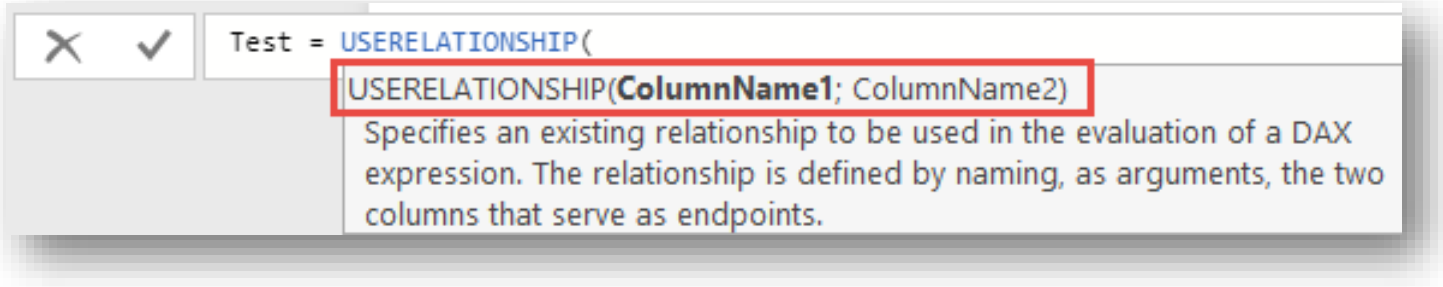


- Doubleclick one of the relationships:
  a dialogue is opened, where you can edit the relationship
- Avoid using the Cross-filter direction **Both** when you deal with Lookup-tables which are shared from more than one fact-table



Please note:

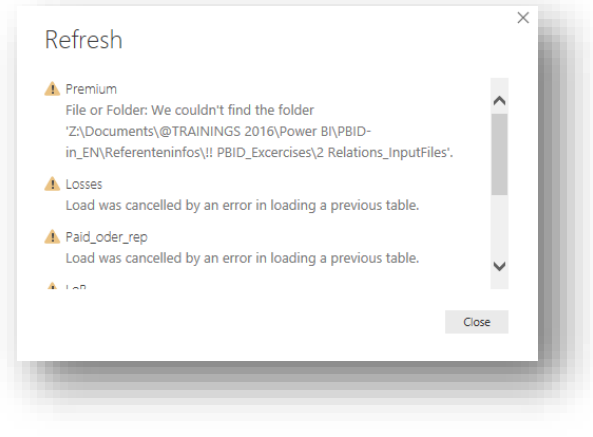
- If you create more than one relationship between two tables only one relationship is active, all additional relationships are automatically set to ***Inactive***
  -> this is shown by a dotted line
- These relationships are not used by the data model
- You can change the status of a relationship from not-active to active with the DAX-function USERELATIONSHIP()



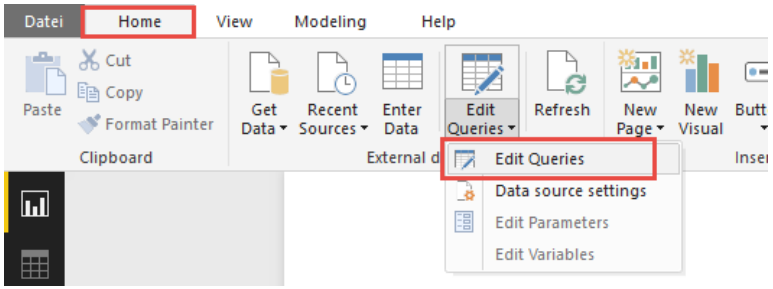
2 Refreshing the Data Model

Exercise 2

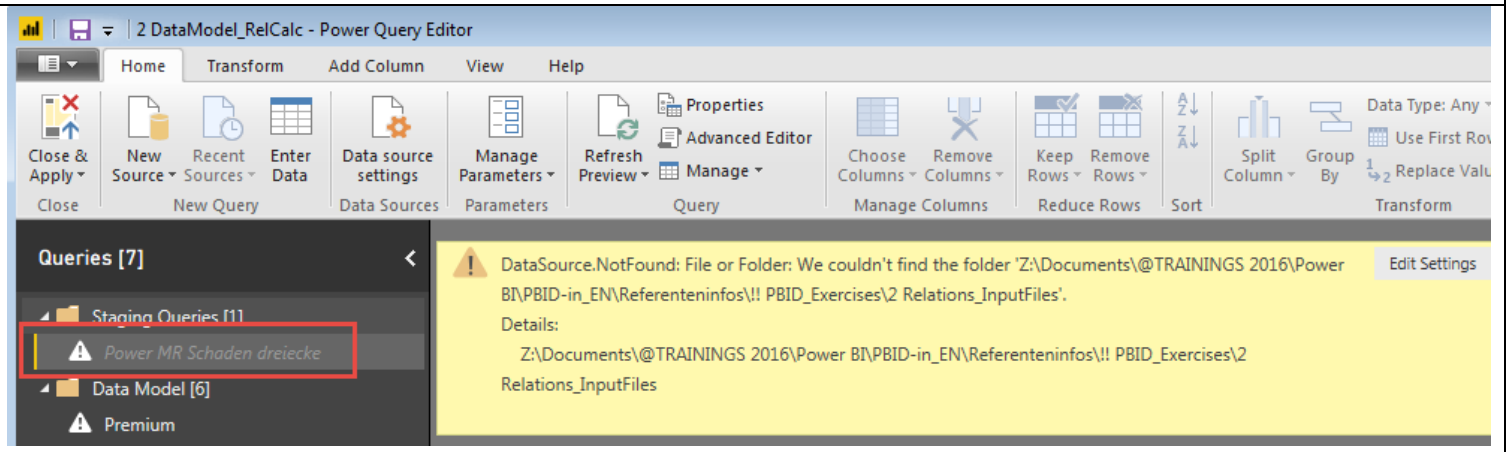
- To be sure that you are working with the newest & freshest data, please go to ***Home / Refresh***
- The Refresh displays an error message because the path to the data source cannot be found
- You have to open the Query Editor & correct the path: ***Home / Edit queries***



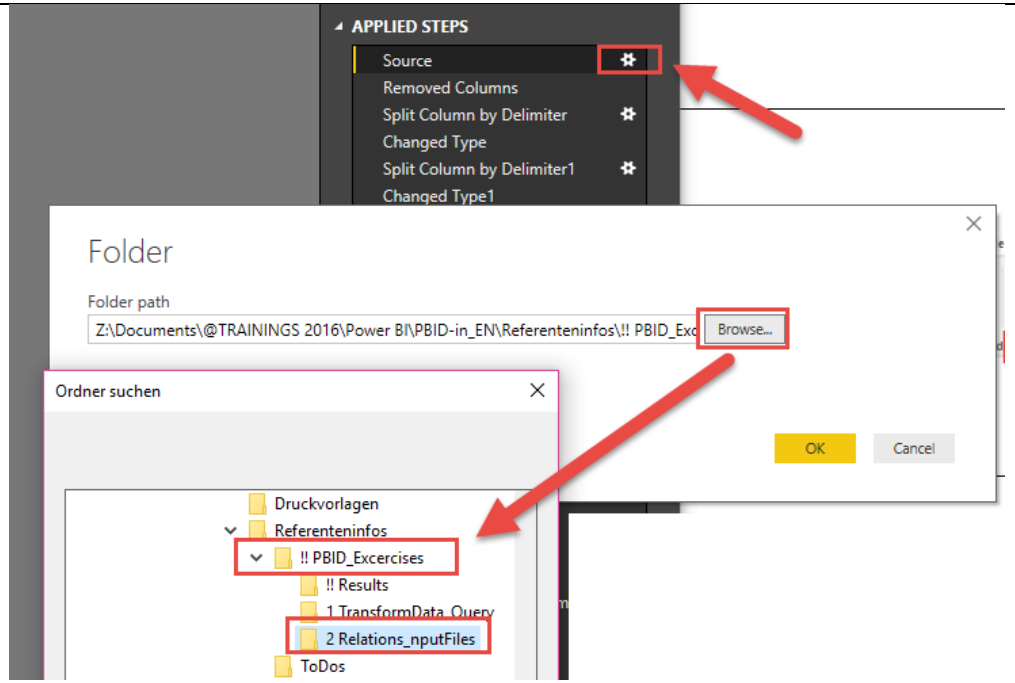
->



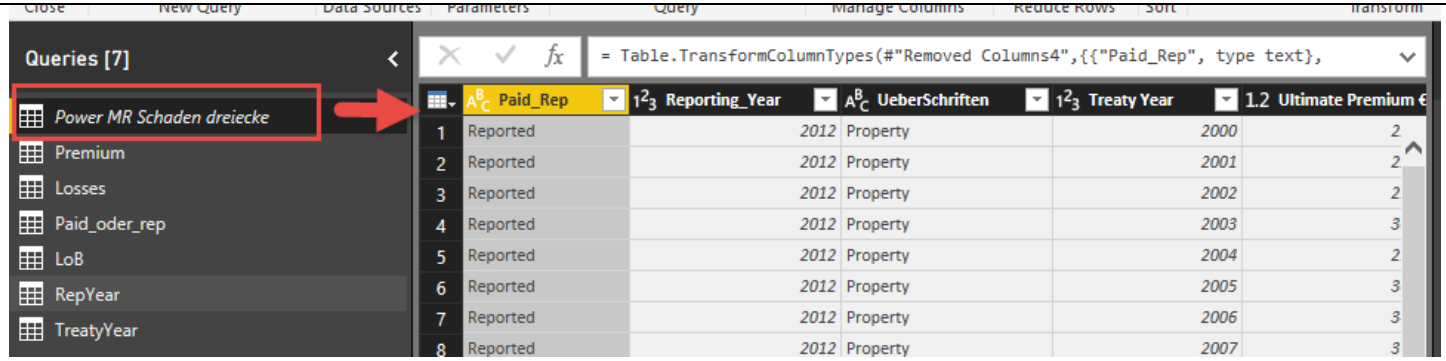
- In the Query Editor the triangle in the first query indicates an error for the first query Power MR Schaden dreiecke



- Under the title ***Applied Steps*** you find the line ***Source***: please click on the ***cogwheel*** icon here:
  it shows a dialogue where you can change the path to the folder which is used for the folder import



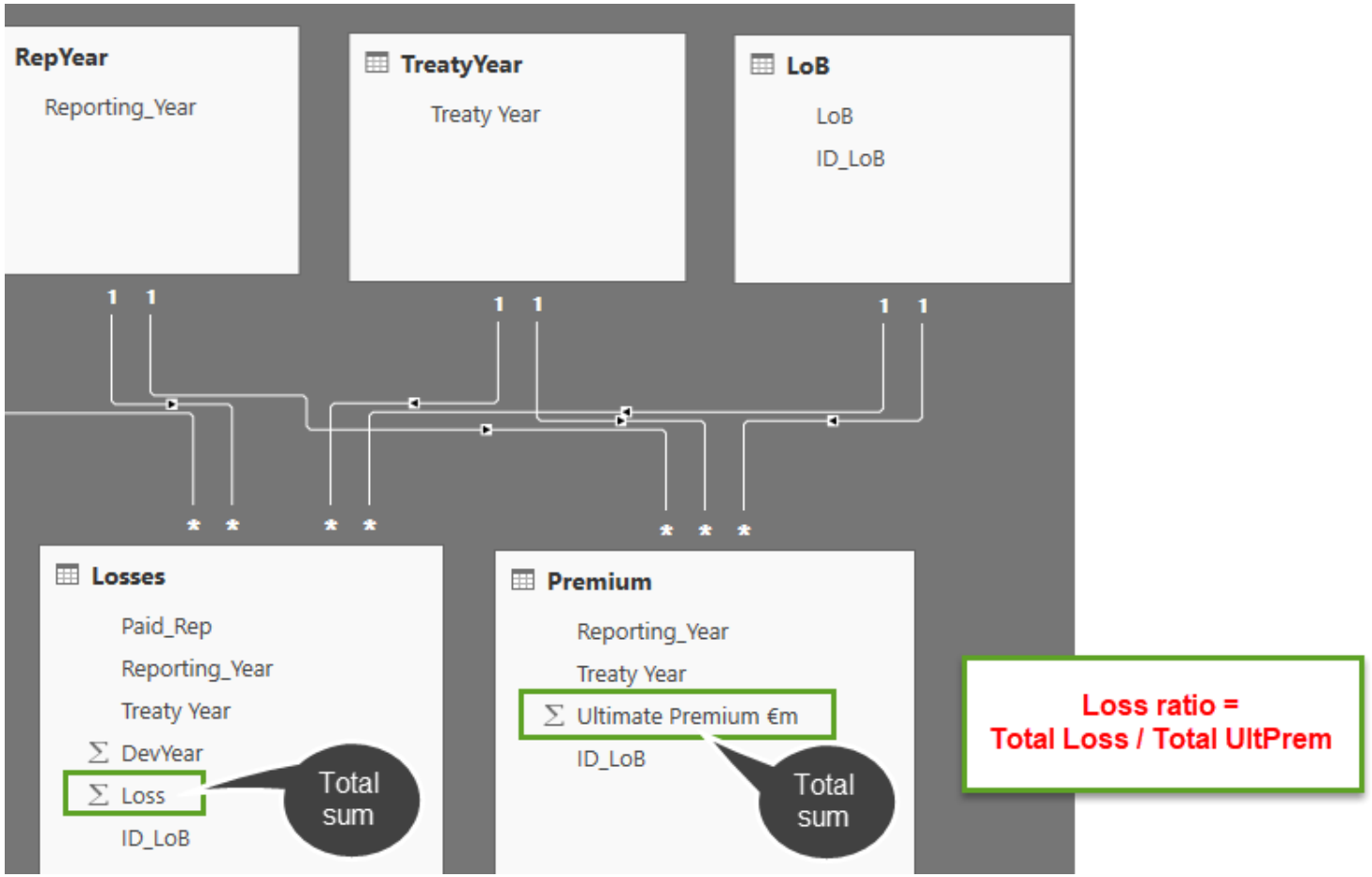
- As soon as the folder path is corrected the data refresh works correctly & shows the updated queries
- If the data update is delayed just click the ***Refresh***-button again
- Finally click on ***Close & Apply*** in the left top corner to load the data into the data model



3 Calculating with Measures

- The visualization with the line chart requires a calculation Loss ratio:
  this calculation needs the total sum of Loss & the total sum of Ultimate Premium €m

UltPrem



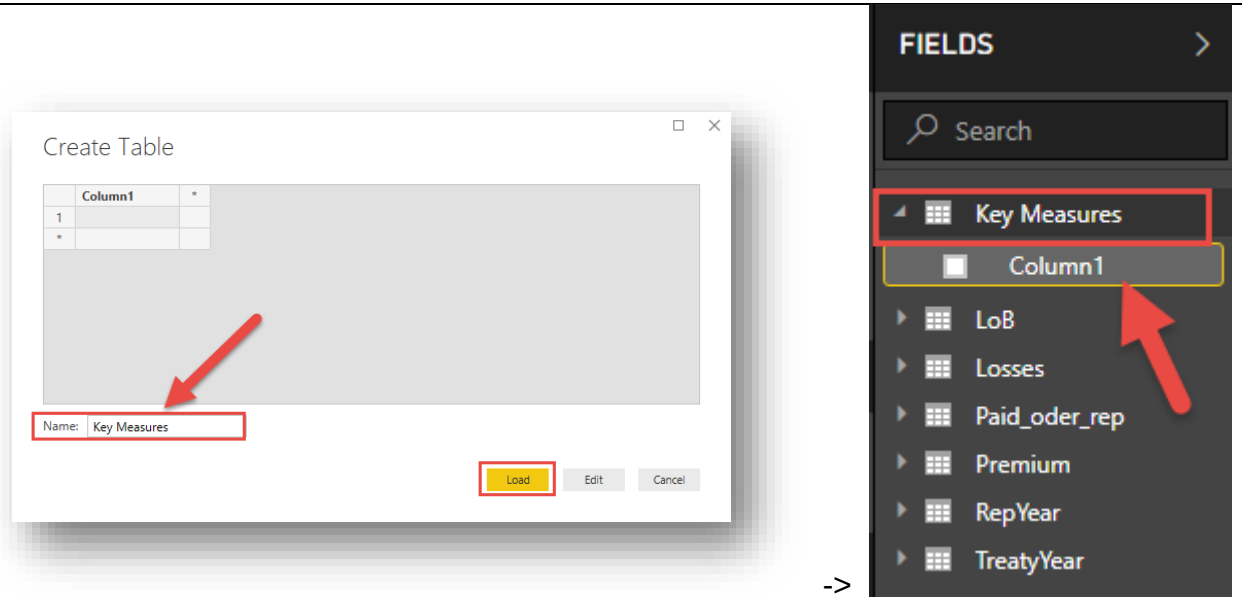
3 Creating measures

- Always apply measures even for the simplest calculations:
  it is much easier later to combine measures for more complex calculations
- This approach is called **measure branching**

- For a better overview of all measures it is recommended to create a **support table** that contains all calculations of your data model – it is not connected to your data model

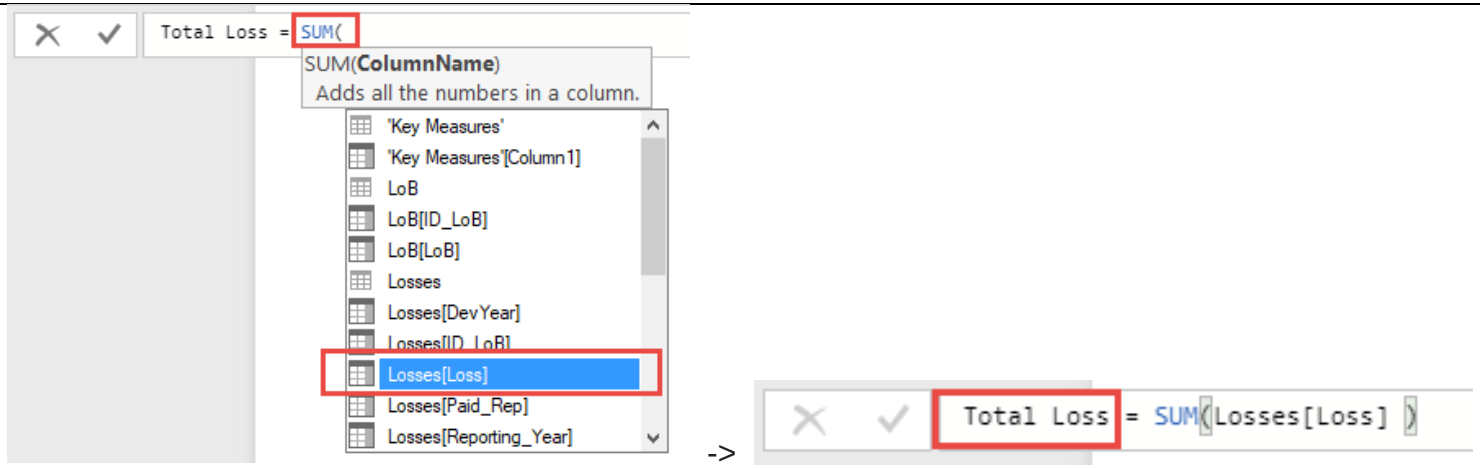
Exercise 3

- Create the table Key Measures:
  Home / Enter Data
- An empty table is shown – please enter the table name in the left bottom corner
- As a result, an empty table is shown in the ***Fields*** pane

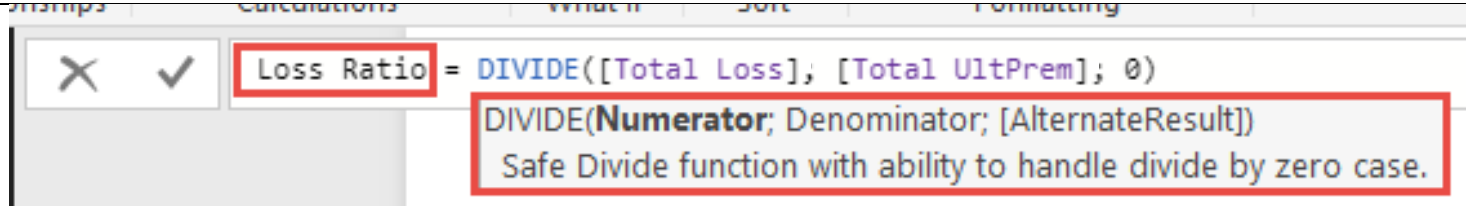
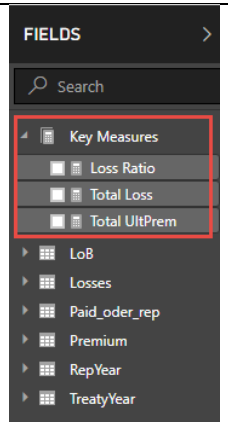


Exercise 4

- Highlight the new table
- Calculate Total Loss:
  Home / New Measure
- Use the function SUM
- The new measure will appear in the support table Key Measures

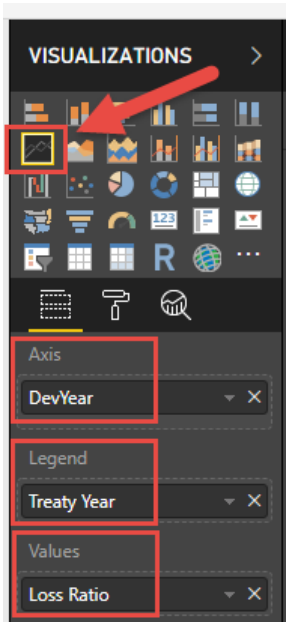


- Calculate Total UltPrem

- Now it is very easy to calculate the measure Loss ratio with the help of these two measures - For the division you should use the function DIVIDE: this function prevents error messages caused by division with zero values - Change the format of the measure Loss Ratio to **%**	
- In the table Key Measures all necessary measures are shown now	

Exercise 5

- You should now create the visual ***Line chart*** …



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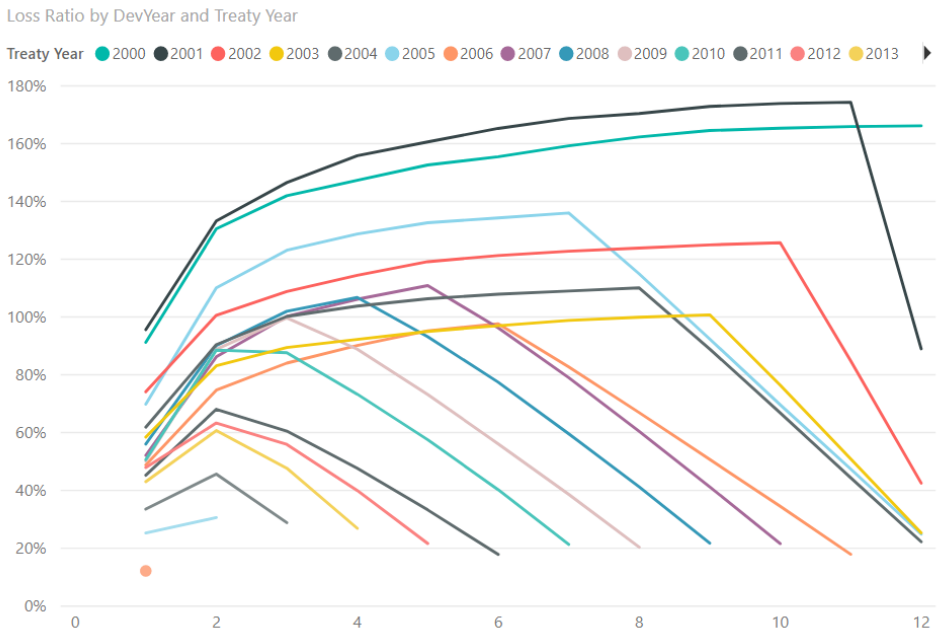
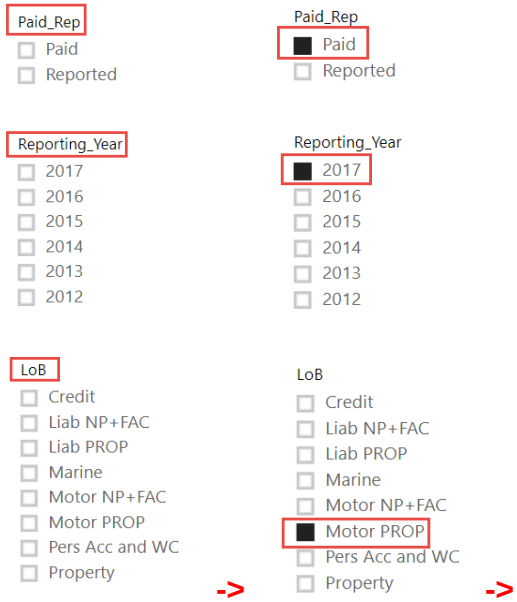


- … & the slicers for Paid_rep, Reporting Year & LoB
- Please note:
  it is **essential** to use the fields from the **Lookup tables** to create the slicers
- Only when you choose values for the slicer the ***Line chart*** will show the correct visualization



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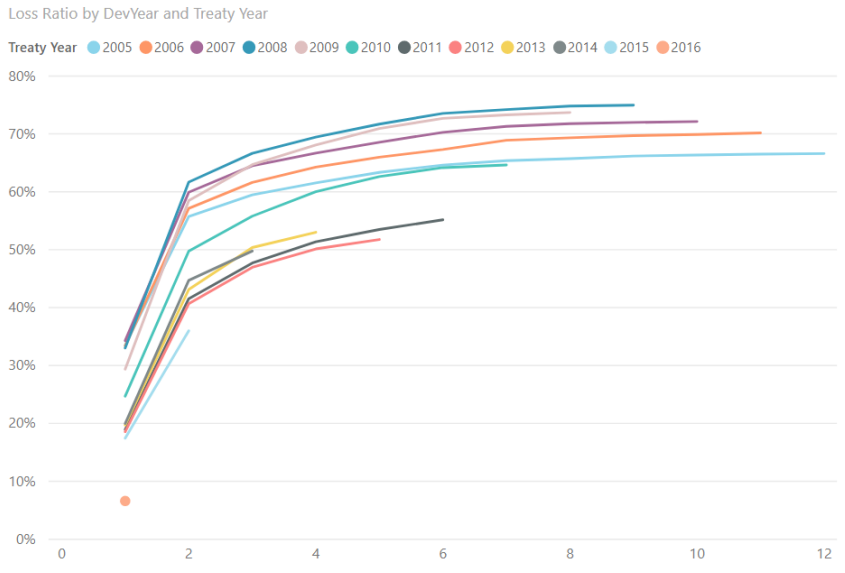
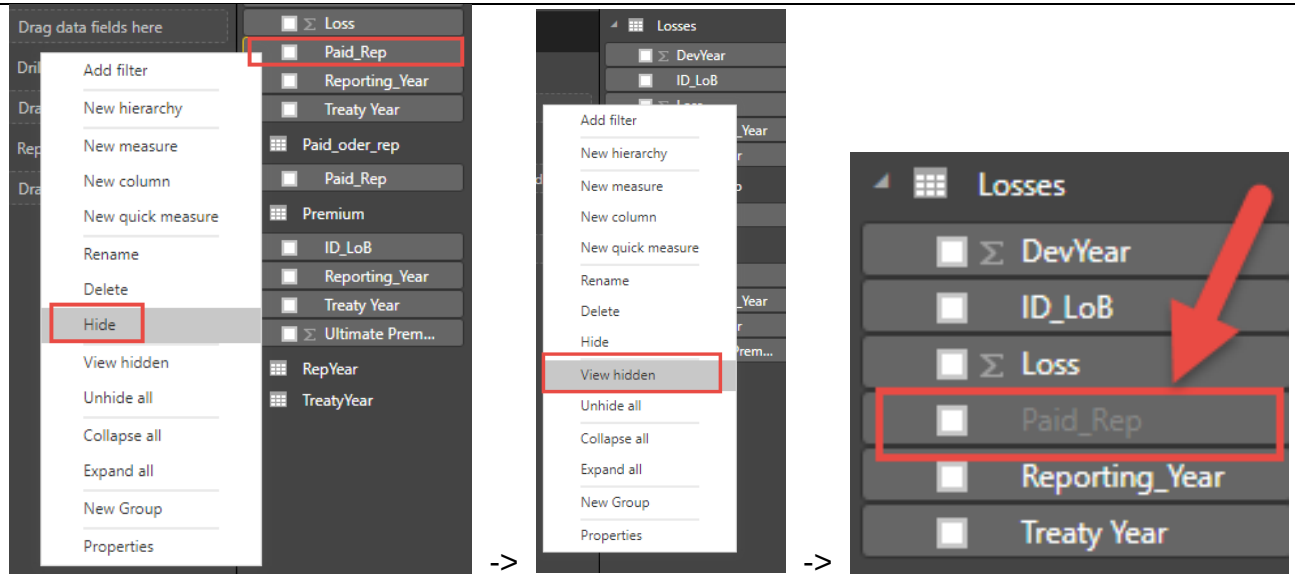


Improving Usability

- To prevent people from using certain fields you can hide these fields:
- Hidden fields can be used in the Data Model but they are not shown to the user
- Rightclick the said field & choose ***Hide***
- If you want to see all hidden fields for administration purposes, rightclick any field & select ***View hidden***
- All hidden entries are then displayed in gray



Exercise 6

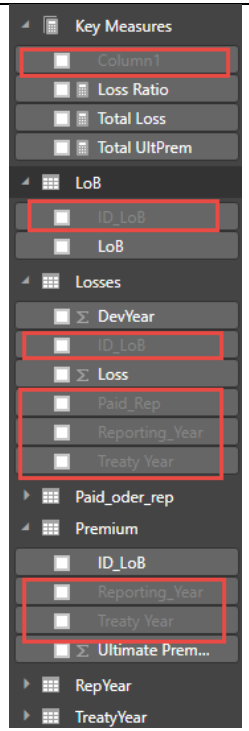
- Hide for example the following fields:

  Table Key Measures: Column1

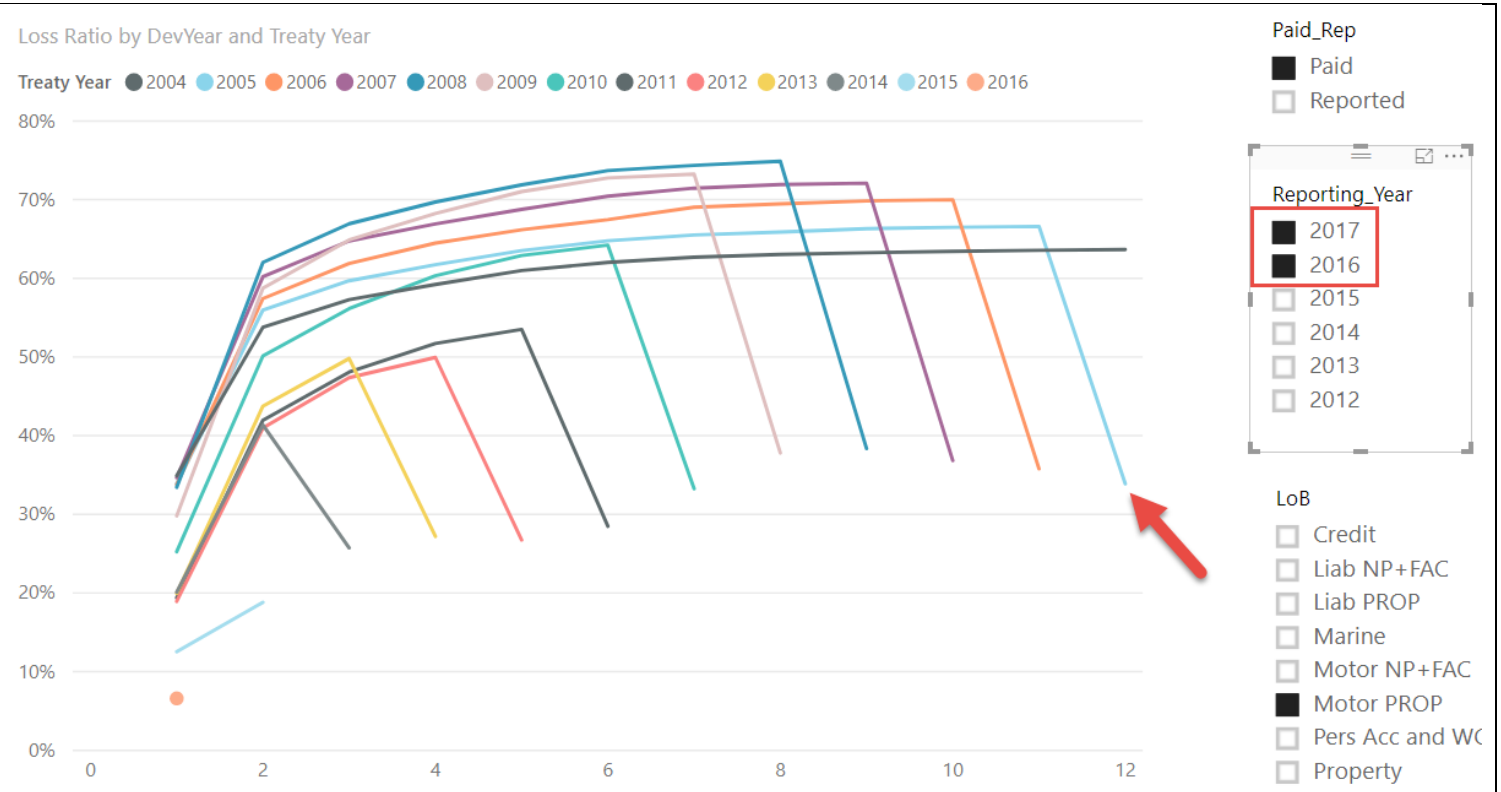
  Table LoB: ID_LoB

  Table Losses:
  ID_LoB / Reporting Year /
  Paid_Rep / Reporting Year

  Table Premium:
  Reporting Year / Treaty Year



- It is possible to choose two or more fields in a slicer
- If you select for example more than one Reporting Year (CTRL & mouse); this can show undesirable effects on the ***Line chart***
- In case you want to prevent the user from using more than one year in the slicer Reporting Year you have to customize the measure Loss Ratio
- You need a formula that verifies if the context is being sliced by one value in order to estimate a percentage against a predefined scenario
- In this case you want to compare Total Loss against Total UltPrem:
  then you need to know if the context is filtered by a single year
- Also, if the comparison is meaningless you want to return BLANK

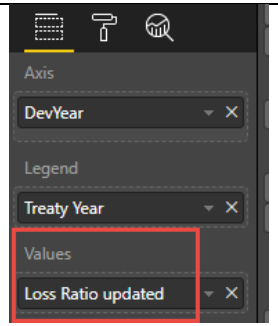


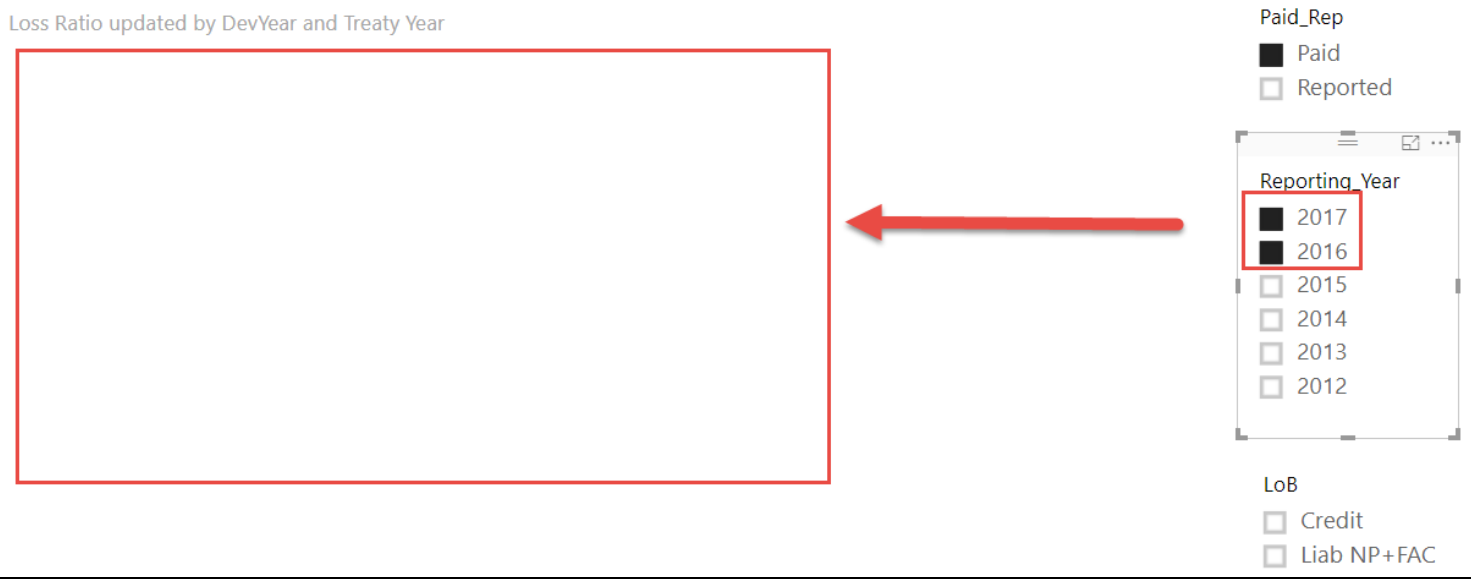
Exercise 7

- The function HASONEVALUE allows you to determine, that the graph is only shown, when only one reporting year is choosen in the slicer

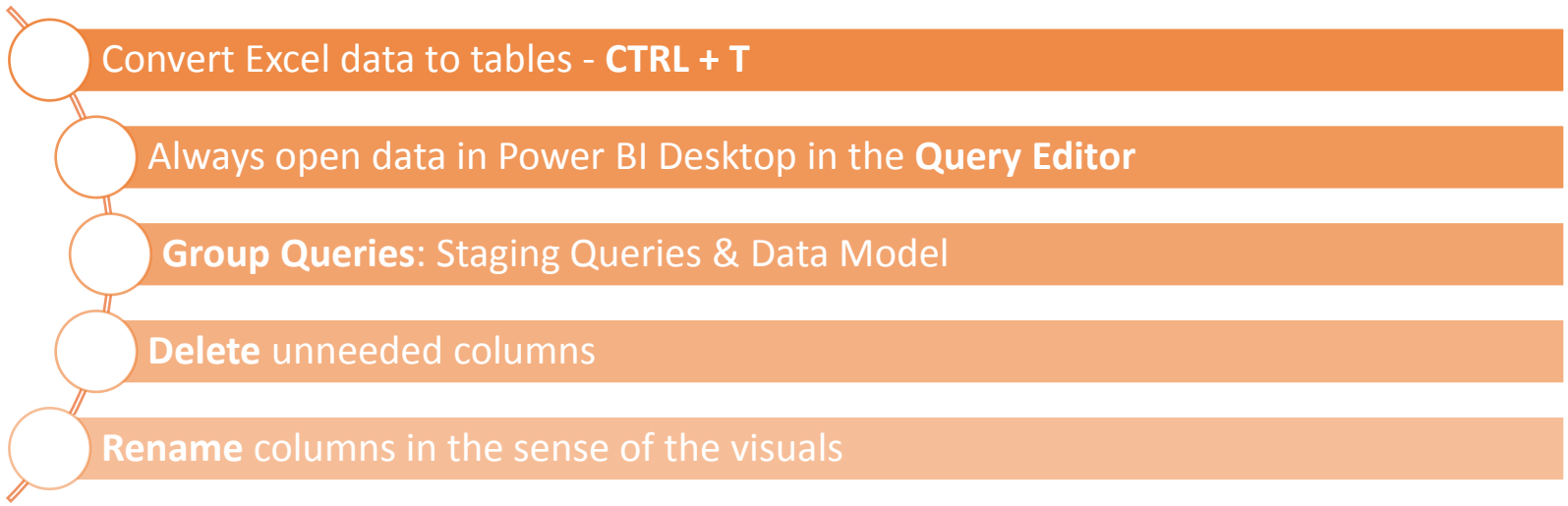
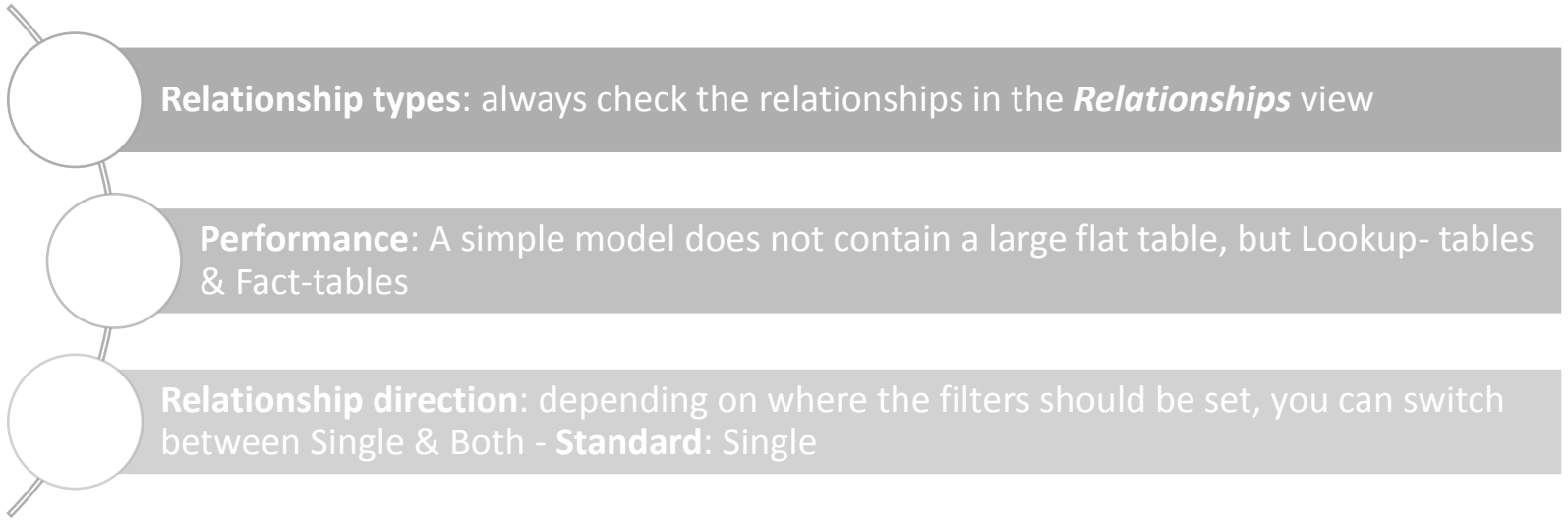
```
Loss Ratio updated =
        IF(HASONEVALUE(RepYear[Reporting_Year]),
          DIVIDE([Total Loss], [Total UltPrem], 0),
           BLANK()
          )
```

->

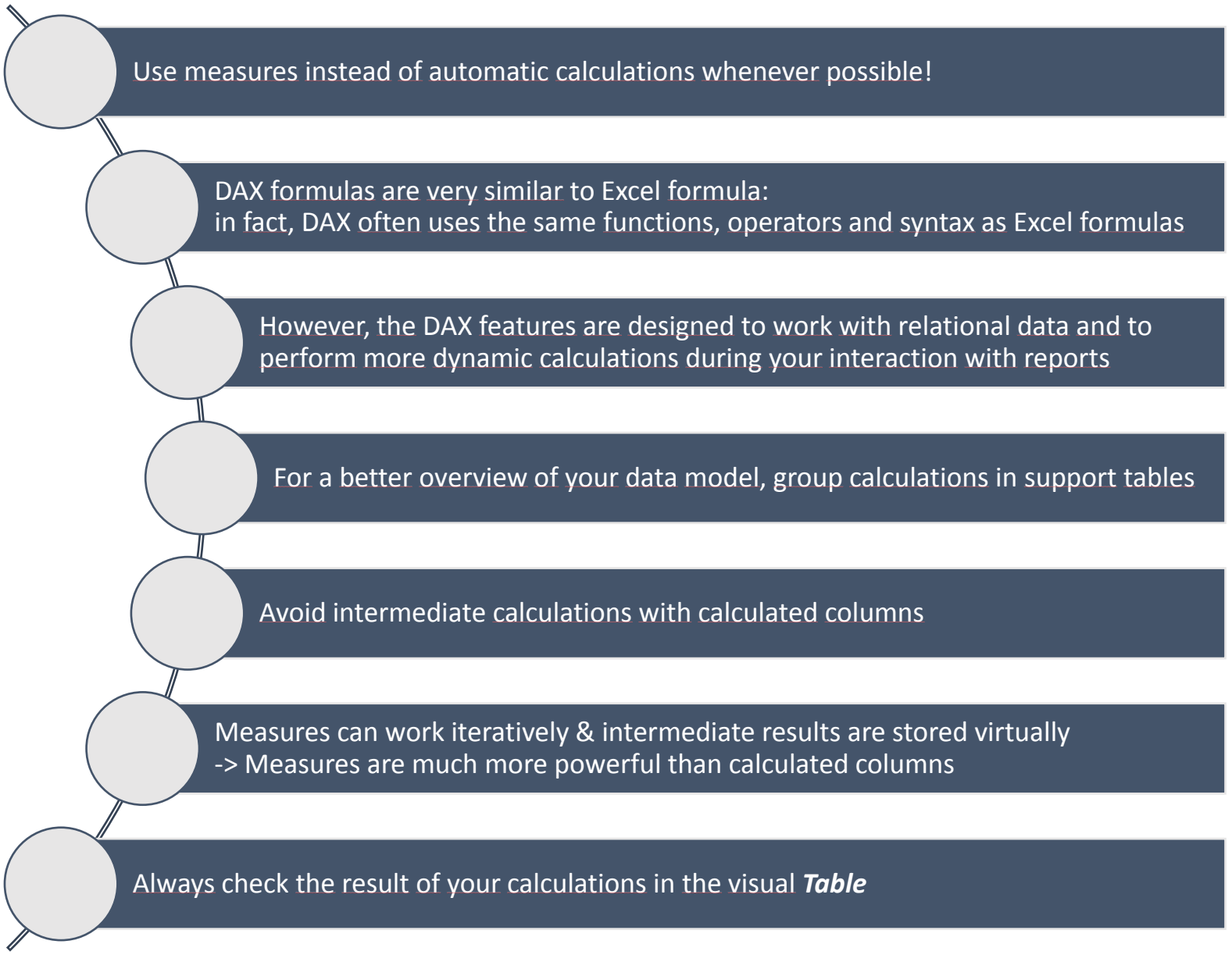


- Update the measure Loss Ratio & replace it in the ***Line chart***	
- Then you can check what happens if you select one or two reporting years: with two years having been selected here, no ***Line chart*** is shown	

Takeaways

Organize Queries - Transform Data	
Data Model - Create Relationships	

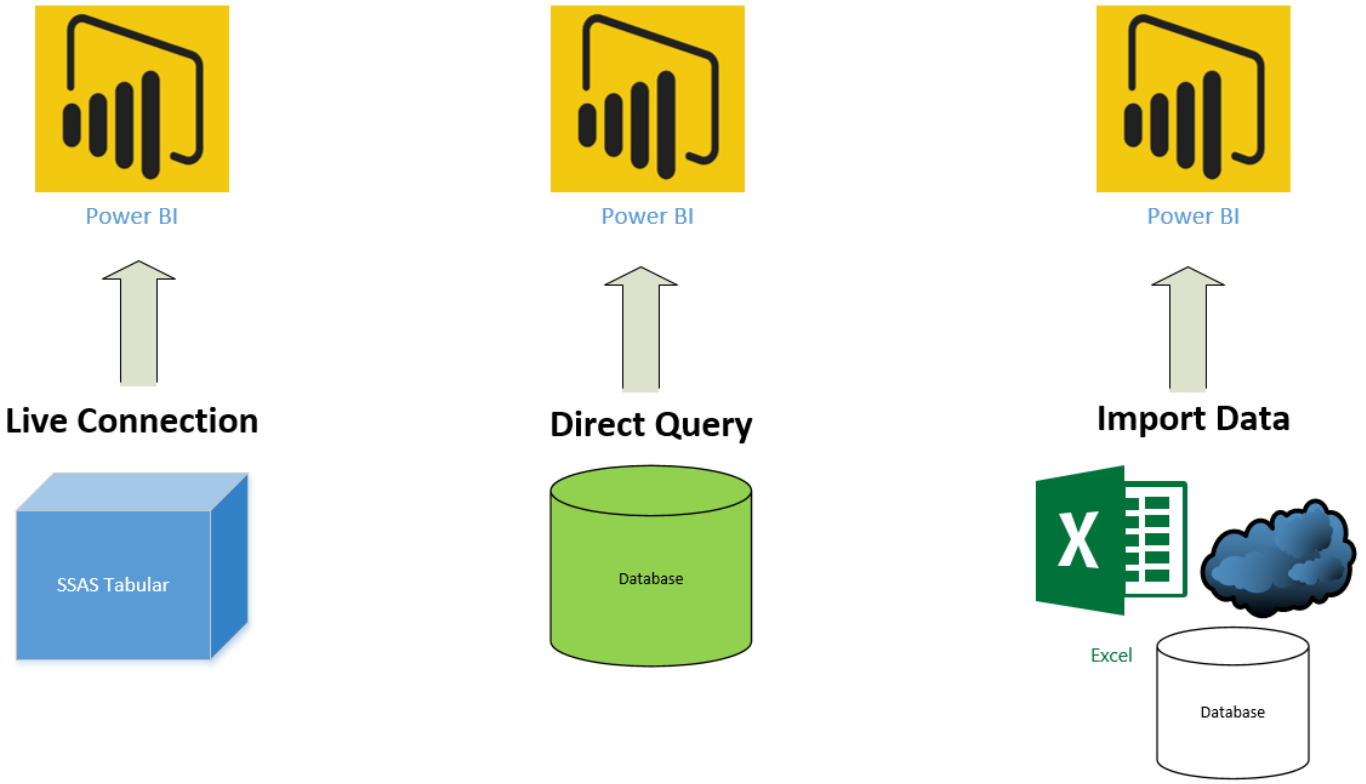
Measures
- Grouping & Calculation



Branching Measures	Always create measures, no matter how simple the calculation is Branch in your calculations with measures Add context via Slicer & Visualizations
Visualizations	Copy elements whenever possible - that makes you much faster Name your measures clearly and meaningfully - the titles of the visuals then no longer have to be changed each time a measure is used Control the interactivity of the filters: ***Edit Interactions*** Customize the tooltips Think in grids - use visual means to help you to read the visualizations As a graphical background, you can also prepare a PowerPoint slide that you save as a graphic and use as wallpaper for your reports

3. Appendix

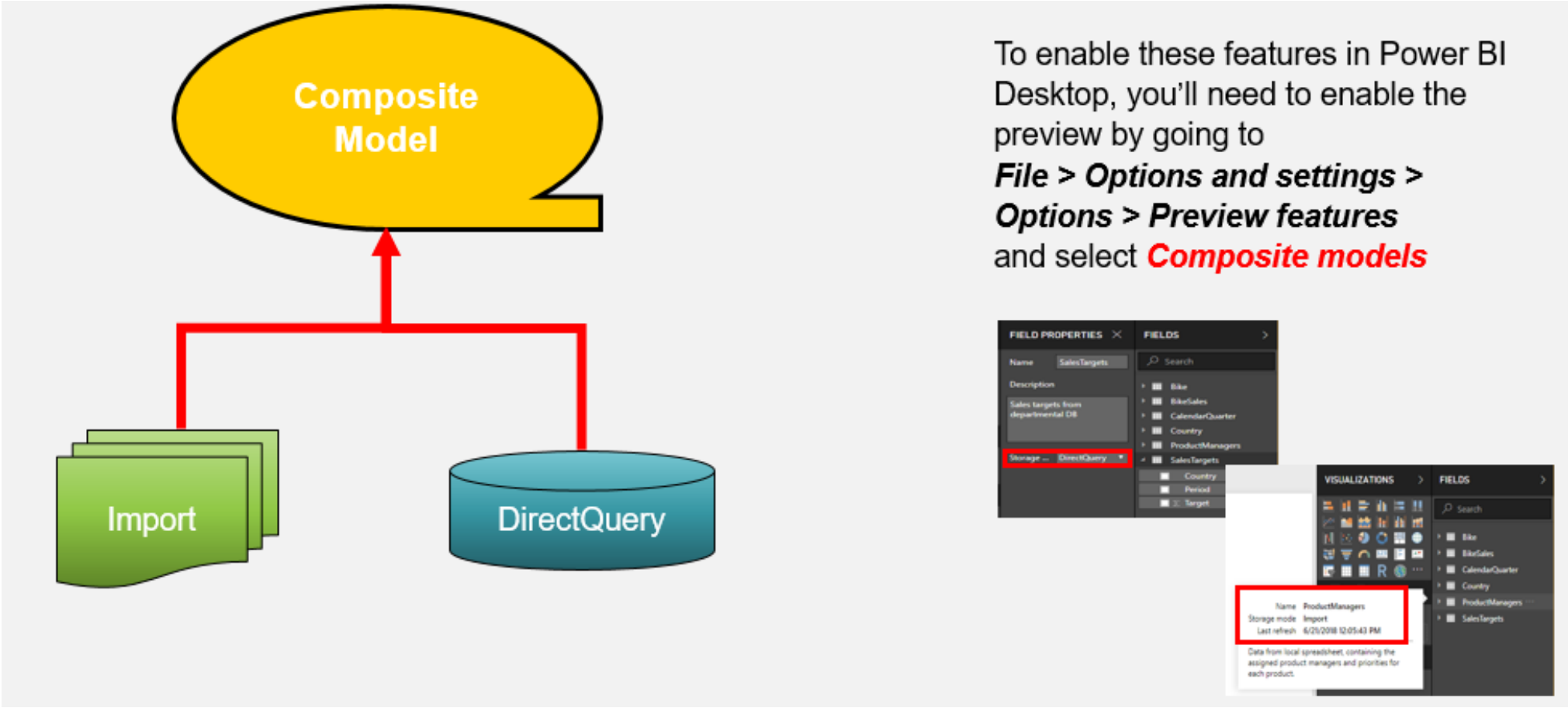
Which connection for which use?

DirectQuery, Live Connection or Import Data?	

Which method is the most performant?	**Import Data** • Is the fastest option: • Data is loaded into the memory of the server and all queries are processed immediately. **Live Connection** • is the next option in this list, especially if the SSAS Tabular or Power BI service is used, as these are both in-memory technologies that run faster than Multi-Dimensional Cubes. **DirectQuery** • Is the slowest connection type • You must consider the performance optimization of your data source. -> winner here: **Import Data**
Which method is more flexible?	**Import Data** • Here you get the full functionality of Power BI • Full Power Query functionality and DAX measures as well as visualizations **DirectQuery** • Offers you only a few power query options (all operations where no query fold can be used are not available) • Many DAX features are not available • The query speed is very slow compared to the other two options **Live Connection** • • Even if your company does not yet have an SSAS solution and you have a huge database, this option is better than DirectQuery because in SSAS you have MDX or DAX to handle many calculations and modeling tasks -> winner again: **Import Data**

Which method is better scalable?	**Import Data** • has a size limit of 1 GB per model (with the Free license) **DirectQuery** und **Live Connection** • You get better scalability. • The data sources support a much larger amount of data -> **winner**: **Live Connection** & **DirectQuery**

Preview: Composite Model



What is a Composite Model?	A model that combines data from more than one DirectQuery source or combines DirectQuery with imported data is called a **composite model**. If you previously connected to a data source in Power BI using **DirectQuery**, you could not connect to a different data source in the same report (all tables must be from a single database). The new composite model eliminates this limitation and makes it possible to seamlessly combine data from one or more DirectQuery sources and / or combine data from a mix of DirectQuery sources and imported data in a single report. This means you can combine multiple DirectQuery sources with multiple import sources. If your report contains some DirectQuery tables and some import tables, the status bar in the bottom right corner of your report will show Mixed storage mode. If you click here, all tables can easily be switched to import mode. For example, with the composite model, it is possible to create a model that combines • Sales data from an enterprise data warehouse using DirectQuery • with sales target data in a SQL Server department database using DirectQuery • along with some data imported from a spreadsheet
Composite Model – only with the TABULAR Model	• **TABULAR Model** is the powerful bridge from Excel / Power Pivot to a professional BI server application as part of a self-service BI strategy. The consistent investment by Microsoft and the high speed of innovation - especially in conjunction with Power BI - ensure relative future security. Disadvantages are the smaller range of functions, the higher hardware requirements and the small number of reference projects. • **MULTIDIMENSIONAL cubes** are still the professional solution for large data volumes and high model complexity. Disadvantages include the high level of IT orientation and the lack of self-service BI capability, the increased need for know-how and the lack of further development of the technology in the last two releases of SQL Server.

Preview: **Dual Storage Mode**	**Composite models** also include a new feature called **dual-storage mode**. If you are currently using **DirectQuery**, all visualizations will cause queries to be sent to the back-end source, even if they are simple visualizations, such as: a slicer with all product categories. The ability to define a table to have dual storage mode means that a copy of the data for that table is also imported. All visualizations that reference only columns from this table use the imported data and do not need a query about the underlying source. The benefits are improved performance and lower load on the back-end source. However, when querying large tables with **DirectQuery**, the dual table acts as a DirectQuery table, so no table data needs to be imported to be linked to an imported table. **Note** that changing a DirectQuery table to an import table is an irreversible operation; It cannot be changed back to **DirectQuery** or back to **Dual**. Also **note** that there are **two restrictions** during the preview period: • DirectQuery only supports the **tabular model** (no multi-dimensional model) • You **cannot publish** files of this new model type in the **Power BI service**.

Update July	**Reporting** • New visual header with more flexibility & formatting • Wallpaper formatting • Tooltips for table & matrix Turn tooltips off for visuals • Slicer accessibility • Stepped line support in line & combo charts • Turn off combo chart data labels for line or column & individual series **Modelling** • Composite model – Dual storage mode (only in Power BI Desktop) • Many-to-Many Relationship (only in Power BI Desktop) • …
Update August	**Reporting** • Print reports through Export to PDF • Create bookmark groups • … **Analytics** • Conditional formatting by values • Q&A in Power BI Desktop generally available • … **Modeling** • Data categories for measures • …