

Microsoft Power Tools for Data Analysis #29
Data Models: Order & Ship Dates. Data Model Required? Reports Required?
Data Modeling & DAX or Worksheet Formulas?
Notes from Video:

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1) **Fact Table With Two Date Columns: Order Date and Ship Date, how do We Data Model? How do we Report or Visualize? :**

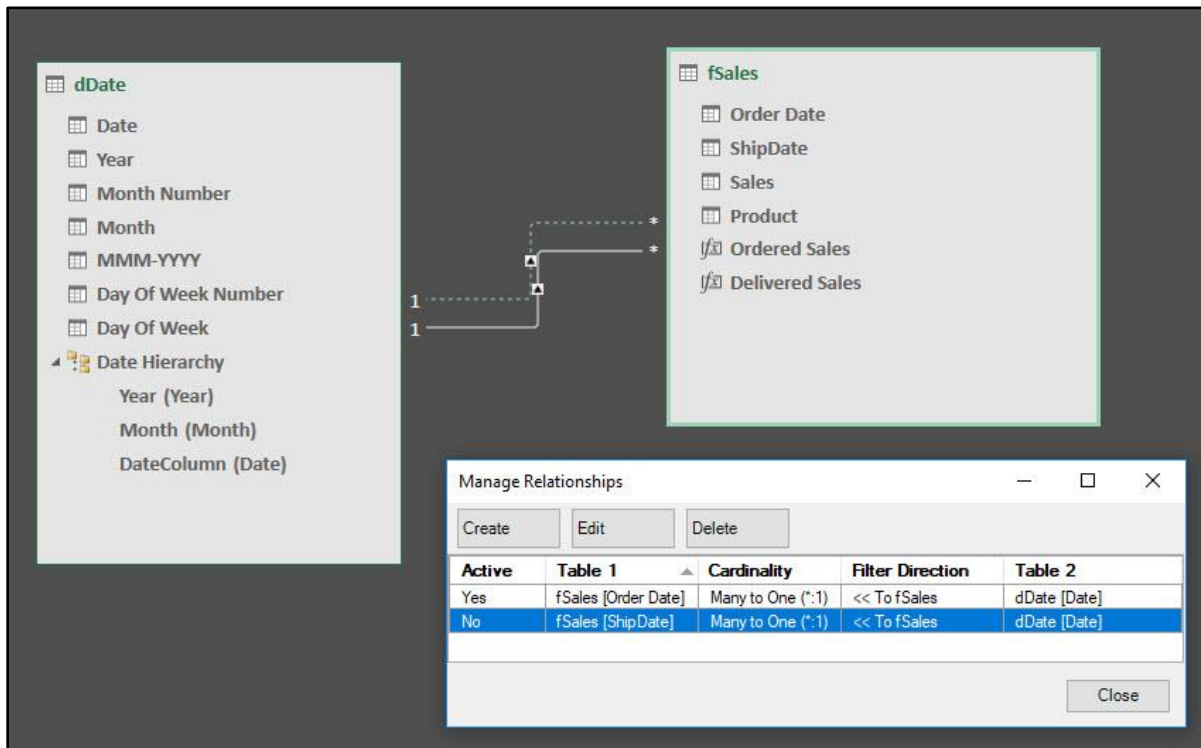
- i. As seen in the below picture, sometimes a Fact Table has two date columns, such as a Order Date (when the order was placed) and a Ship Date (when items were shipped). For example, in the below picture the highlighted rows show that we have some sales that were ordered in the year 2019, and of those sales, some where ordered and shipped in 2019 and some were ordered in 2019 but shipped in 2020. Depending on our reporting requirements, we will either have to perform Data Modeling in different ways when we want a DAX Report or Visualization, or if our goal is a worksheet solution, we will have to create different types or Worksheet Formulas.

OrderDate	ShipDate	Sales	Product
09/23/2019	12/24/2019	45.23	Quad
11/25/2020	01/02/2021	310.66	Carlota
07/23/2020	08/18/2020	63.95	Quad
12/05/2019	01/26/2020	93.83	Sunshine
12/23/2021	04/08/2022	83.52	Aspen
04/13/2019	07/27/2019	260.68	Aspen
08/27/2019	11/26/2019	135.41	Yanaki
10/25/2019	11/14/2019	217.5	Quad
01/11/2021	03/17/2021	176.81	Carlota
09/11/2020	10/31/2020	208.25	Quad
07/25/2019	10/27/2019	310.21	Sunshine
07/05/2019	09/20/2019	215	Aspen
06/09/2020	10/30/2020	172.67	Aspen
10/14/2021	02/09/2022	315.74	Yanaki
08/31/2021	10/22/2021	125.02	Quad
06/15/2021	07/27/2021	286.15	Carlota
12/15/2021	01/01/2022	256.71	Carlota
09/23/2019	01/01/2020	200.1	Quad

- ii. **DAX Side-By-Side Order & Ship Date Report.** When there are two or more Date Columns in a Fact Table and we require a report that shows us the sales by Order Date and by Ship Date as a Side-By-Side report, the report would look like this:

DAX Side-By-Side Order and Ship Date Report		
Year	Ordered Sales	Delivered Sales
2019	\$1,477.96	\$1,184.03
2020	\$755.53	\$738.80
2021	\$1,243.95	\$898.64
2022		\$655.97
Grand Total	\$3,477.44	\$3,477.44

- iii. When we want a Side-By-Side Report, our Data Model requires that we use a Single Date Dimension Table with an Active and Inactive Relationship, as seen here:



- iv. The two DAX Formulas that we will need to create the report are as follows:

Ordered Sales:=SUM(fSales[Sales])

Delivered Sales:=CALCULATE(SUM(fSales[Sales]),USERRELATIONSHIP(fSales[ShipDate],dDate[Date]))

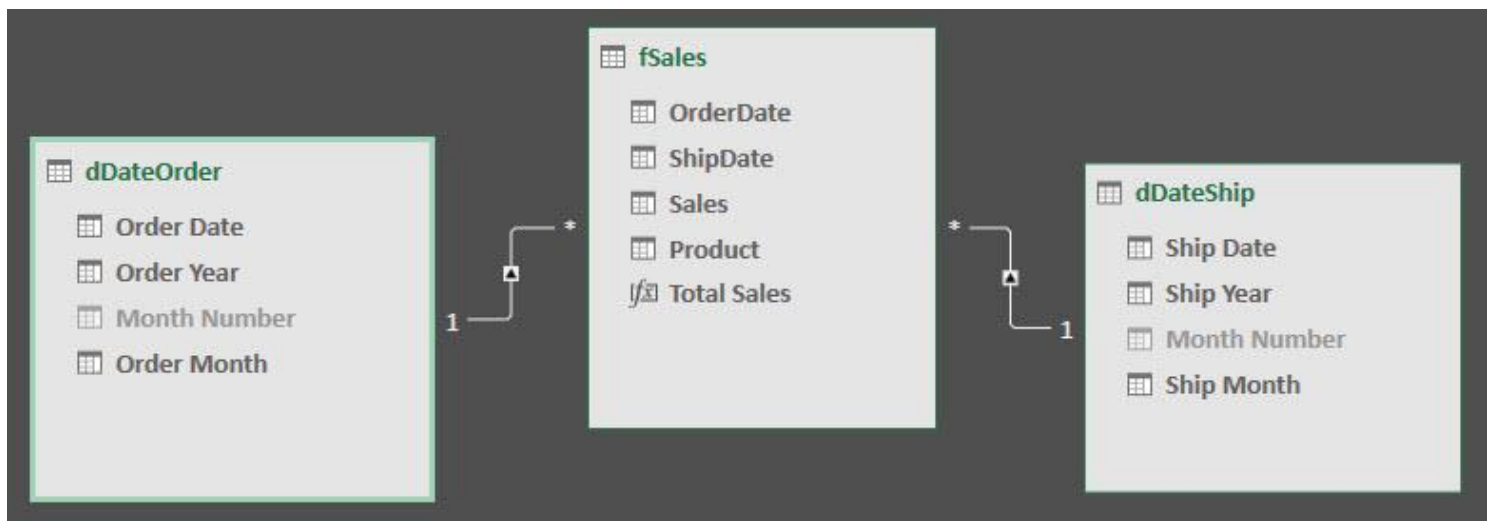
- v. **USERRELATIONSHIP function :**

1. USERRELATIONSHIP Only works in CALCULATE Function.
2. USERRELATIONSHIP Only works on an inactive relationship. “Can’t Invent a Relationship with it.”
3. USERRELATIONSHIP(Foreign Key for Inactive Relationship , Primary Key for Inactive Relationship)
4. Dotted Line is Inactive Relationship
5. Relationship is activated during evaluation of formula only.

- vi. DAX Cross Tabulated Order & Ship Date Report. When there are two or more Date Columns in a Fact Table and we require a report that shows us the sales by Order Date and by Ship Date as a Cross Tabulated report, the report would look like this:

DAX Cross Tabulated Order and Ship Date Report					
Total Sales	Ship Year ▾				
Order Year ▾	SY 2019	SY 2020	SY 2021	SY 2022	Grand Total
OY 2019	\$1,184.03	\$293.93			\$1,477.96
OY 2020		\$444.87	\$310.66		\$755.53
OY 2021			\$587.98	\$655.97	\$1,243.95
Grand Total	\$1,184.03	\$738.80	\$898.64	\$655.97	\$3,477.44

- vii. When we want a Cross Tabulated Report, our Data Model requires that we use Two Date Dimension Tables, as seen below. When we have 2 data tables like this, the DAX Measure for adding sales is a simple SUM Function.



- viii. Because we have two Date Dimension Tables, it is smart to name things in a logical way, including the Table Name, Field Names and even the conditions and criteria that will sit in the Row and Column Area of your PivotTable or Power BI Matrix Visualization, as seen here for the dDateOrder Table:

[Order Year] ▾	fx="OY "&YEAR([Order Date])			
Order Date	Order Year	Month Num...	Order Month	
1	1/1/2019	OY 2019	1	January
2	1/2/2019	OY 2019	1	January
3	1/3/2019	OY 2019	1	January
4	1/4/2019	OY 2019	1	January
5	1/5/2019	OY 2019	1	January
6	1/6/2019	OY 2019	1	January
7	1/7/2019	OY 2019	1	January
8	1/8/2019	OY 2019	1	January

Navigation tabs at the bottom: fSales | **dDateOrder** | dDateShip

ix. Worksheet Formulas for either a Side-By-Side or Cross Tabulated Order & Ship Date Report. Below you can see the Data Set, Worksheet Formula Reports and the Worksheet Formulas necessary:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		OrderDate	ShipDate	Sales	Product			Worksheet Formula Side-By-Side Order and Ship Date Report:							
3		09/23/2019	12/24/2019	45.23	Quad			Year	Ordered Sales	Delivered Sales					
4		11/25/2020	01/02/2021	310.66	Carlota			2019	1,477.96	1,184.03					
5		07/23/2020	08/18/2020	63.95	Quad			2020	755.53	738.80					
6		12/05/2019	01/26/2020	93.83	Sunshine			2021	1,243.95	898.64					
7		12/23/2021	04/08/2022	83.52	Aspen			2022		655.97					
8		04/13/2019	07/27/2019	260.68	Aspen			Totals	3,477.44	3,477.44					
9		08/27/2019	11/26/2019	135.41	Yanaki			Worksheet Formula Cross Tabulated Order and Ship Date Report:							
10		10/25/2019	11/14/2019	217.5	Quad			Shipped Sales							
11		01/11/2021	03/17/2021	176.81	Carlota			OY/SY Year	SY 2019	SY 2020	SY 2021	SY 2022	Totals		
12		09/11/2020	10/31/2020	208.25	Quad			OY 2019	1,184.03	293.93			1,477.96		
13		07/25/2019	10/27/2019	310.21	Sunshine			OY 2020		444.87	310.66		755.53		
14		07/05/2019	09/20/2019	215	Aspen			OY 2021			587.98	655.97	1,243.95		
15		06/09/2020	10/30/2020	172.67	Aspen			Totals	1,184.03	738.80	898.64	655.97	3,477.44		
16		10/14/2021	02/09/2022	315.74	Yanaki										
17		08/31/2021	10/22/2021	125.02	Quad										
18		06/15/2021	07/27/2021	286.15	Carlota										
19		12/15/2021	01/01/2022	256.71	Carlota										
20		09/23/2019	01/01/2020	200.1	Quad										
21															
22		Formula in cell I5: =SUMIFS(\$D\$3:\$D\$20,\$B\$3:\$B\$20,">="&\$H5,\$B\$3:\$B\$20,"<="&EOMONTH(\$H5,11))													
23															
24		Formula in cell I15: =SUMIFS(\$D\$3:\$D\$20,\$B\$3:\$B\$20,">="&\$H15,\$B\$3:\$B\$20,"<="&EOMONTH(\$H15,11),\$C\$3:\$C\$20,">="&I\$14,\$C\$3:\$C\$20,"<="&EOMONTH(I\$14,11))													
25															