

PowerBI Relationships

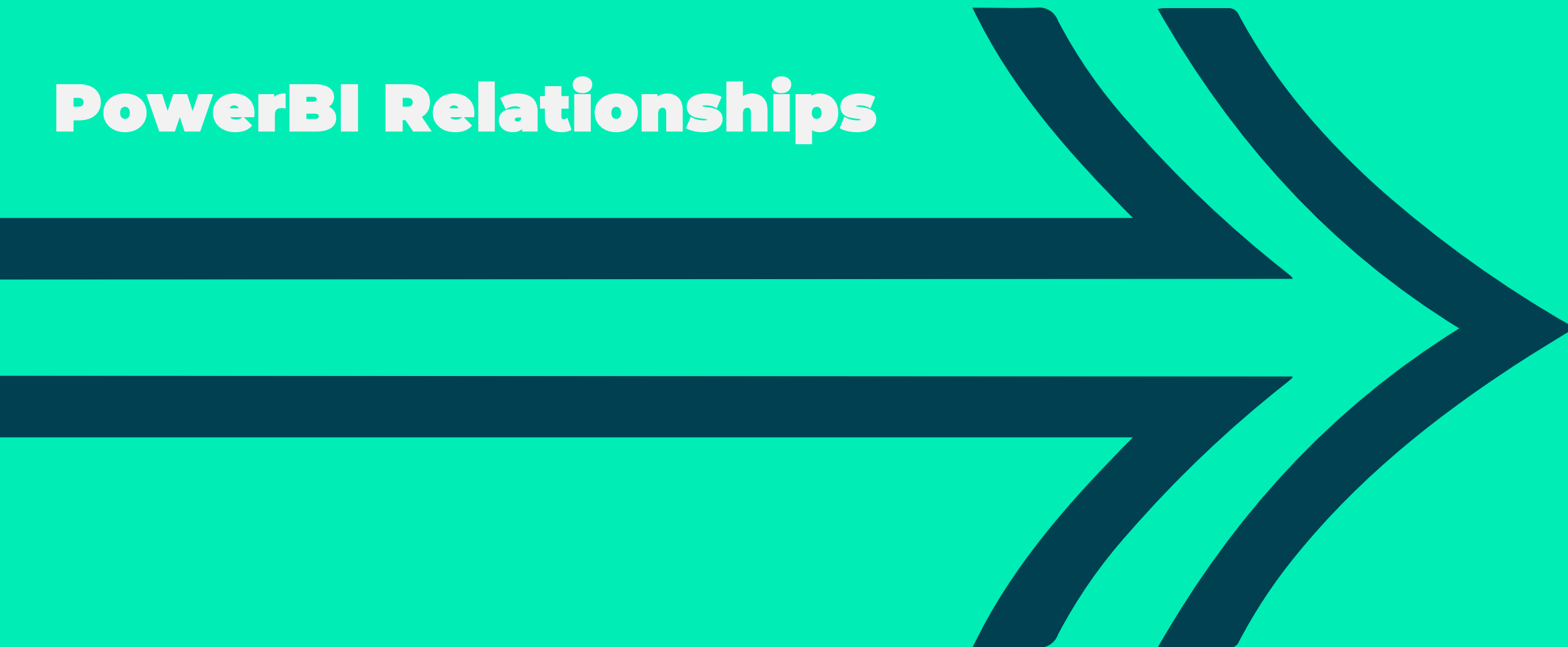
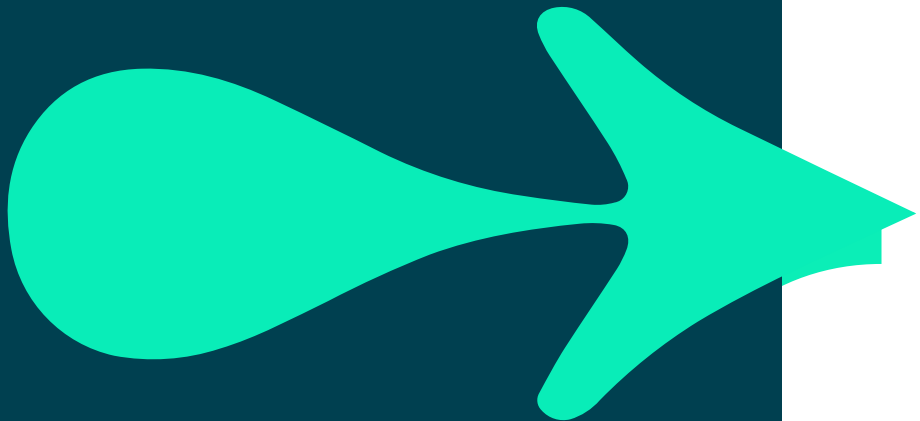


TABLE RELATIONSHIPS IN POWER BI



When data is held in more than one table, we need to define relationships between the tables.

Consider what the real-world relationship is between the data.

Consider how you want to use the data in each table.

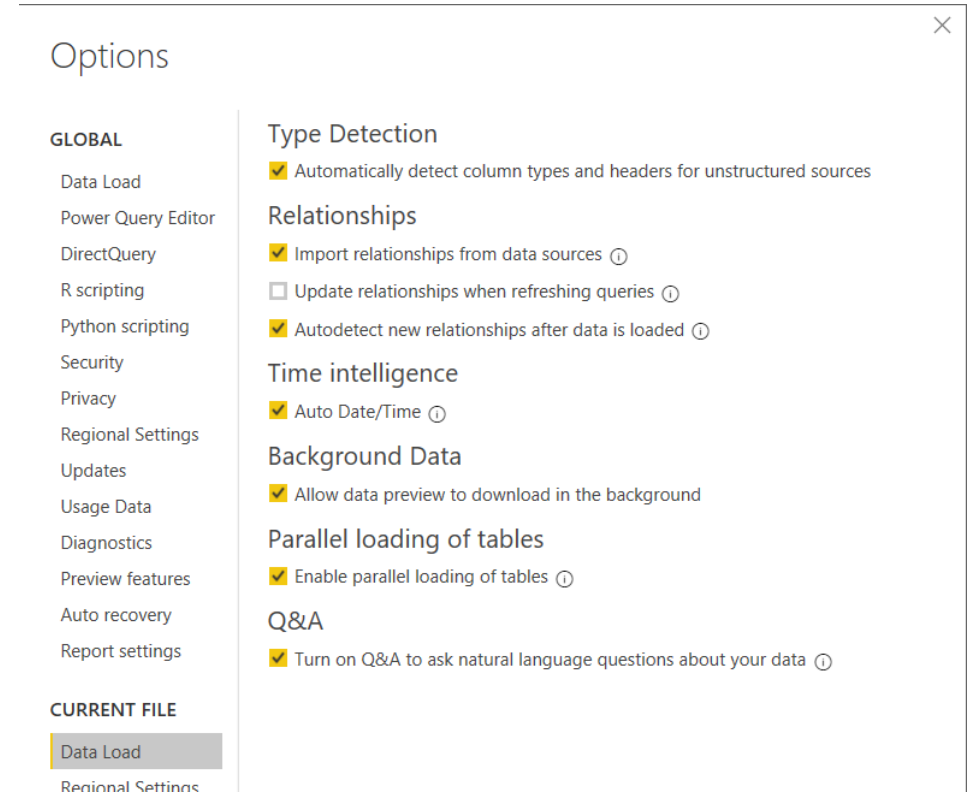
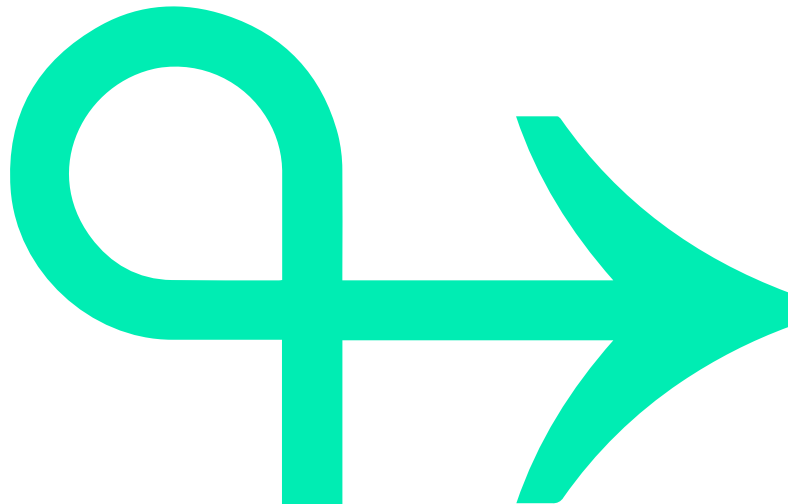
- Filter
- Calculation
- Breakdown

Similar to a SQL Join.

Creating relationships

Power BI desktop can create relationships automatically via auto-detect.

These need to be verified.



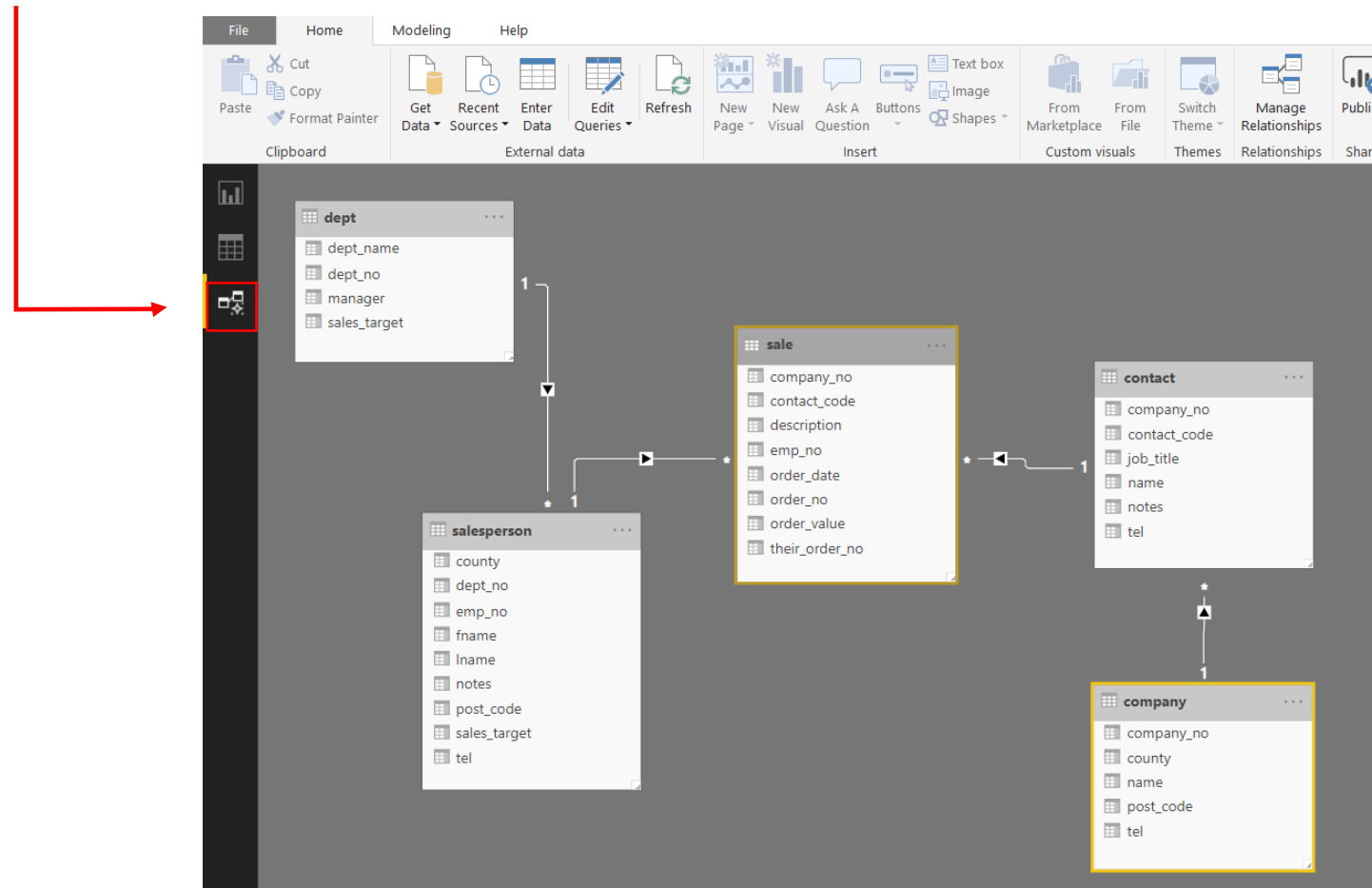


Demo

With QASore.db

QA Creating relationships

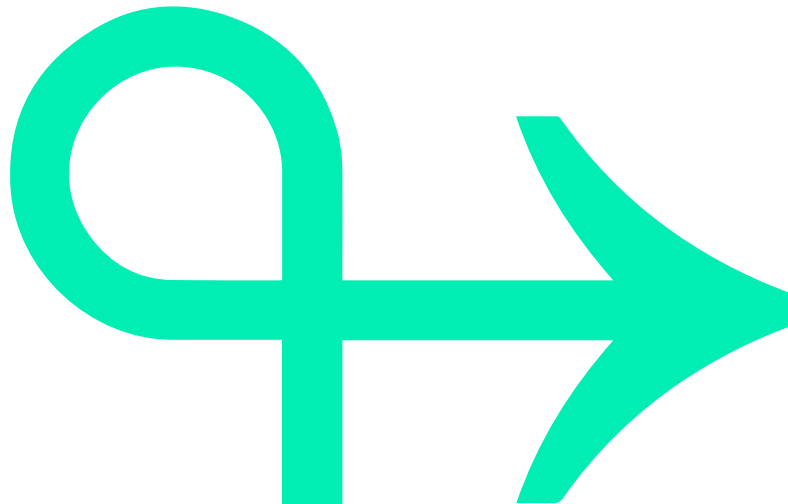
Other mechanism is to create the relationships manually in the Model View.



Creating relationships

When creating a relationship, we set a number of aspects:

- Tables to link.
- Join keys.
- Cardinality.
- Relationship active or inactive.
- Cross-Filter direction.



Edit relationship

Select tables and columns that are related.

salesperson									
emp_no	fname	lname	dept_no	sales_target	county	post_code	tel		
10	Alan	Brick	1	9	Surrey	RT8 8LP	0171-908-8765	Joined in Sept 19	
20	Billy	Custard	2	14	Hampshire	RF3 9UD	(0306)7871	Bright Prospect	
30	Chris	Digger	2	7	Hampshire	W45 TY3	(0908)922211	Should be promc	

dept				
dept_no	dept_name	manager	sales_target	
1	Animal Products	Adam Apricot	5	
2	Business Systems	Barbara Banana	15	
3	Credit Control	Paul Peach	25	

Cardinality	Cross filter direction
Many to one (*:1)	Single
<input checked="" type="checkbox"/> Make this relationship active	<input type="checkbox"/> Apply security filter in both directions
<input type="checkbox"/> Assume referential integrity	

OK

Cancel

Tables and join keys

If Auto-detect is enabled, Power BI will suggest table and join keys.

Check for correctness.

Composite keys are not supported!

Edit relationship

Select tables and columns that are related.

salesperson

emp_no	fname	lname	dept_no	sales_target	county	post_code	tel	
10	Alan	Brick	1		9 Surrey	RT8 8LP	0171-908-8765	Joined in Sept 19
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dept

dept_no	dept_name	manager	sales_target
1	Animal Products	Adam Apricot	5
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Cardinality

Many to one (*:1)

Cross filter direction

Single

☒ Make this relationship active

☐ Apply security filter in both directions

☐ Assume referential integrity

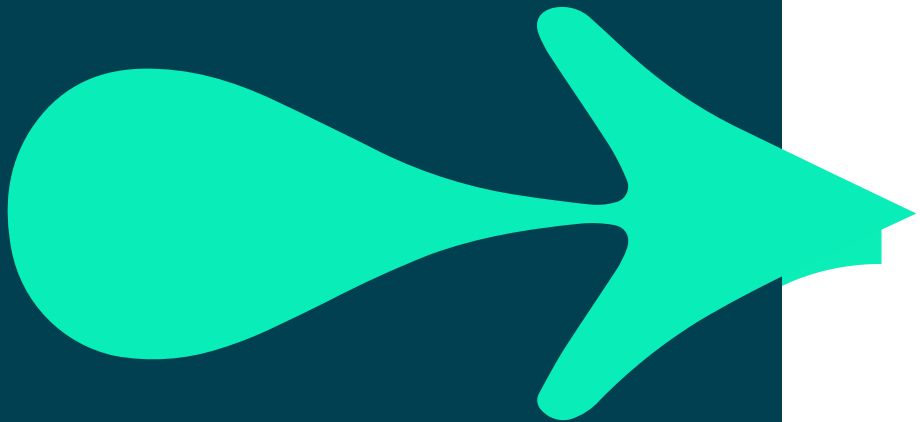
OK

Cancel

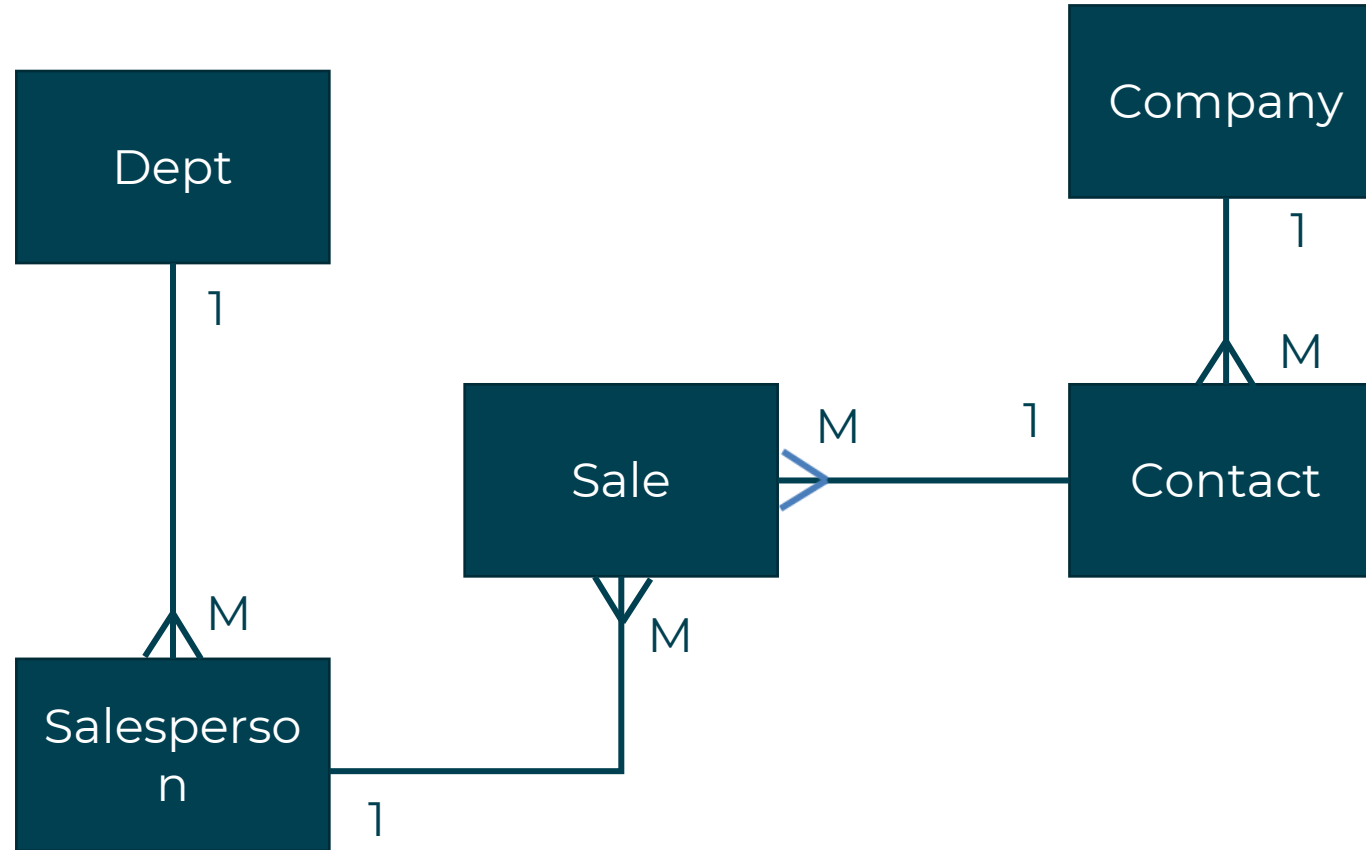
CARDINALITY

In the relational model, cardinality defines how one table (or entity) relates to another:

- One-to-one
- One-to-many
- Many-to-one
- Many-to-many



Cardinality



Cardinality



In Power BI, read the relationship from top to bottom and select appropriate cardinality.

Edit relationship

Select tables and columns that are related.

salesperson								
emp_no	fname	lname	dept_no	sales_target	county	post_code	tel	
10	Alan	Brick	1		9 Surrey	RT8 8LP	0171-908-8765	Joined in Sept 19
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Cardinality

Many to one (*:1)

Cross filter direction

Single

☒ Make this relationship active

☐ Apply security filter in both directions

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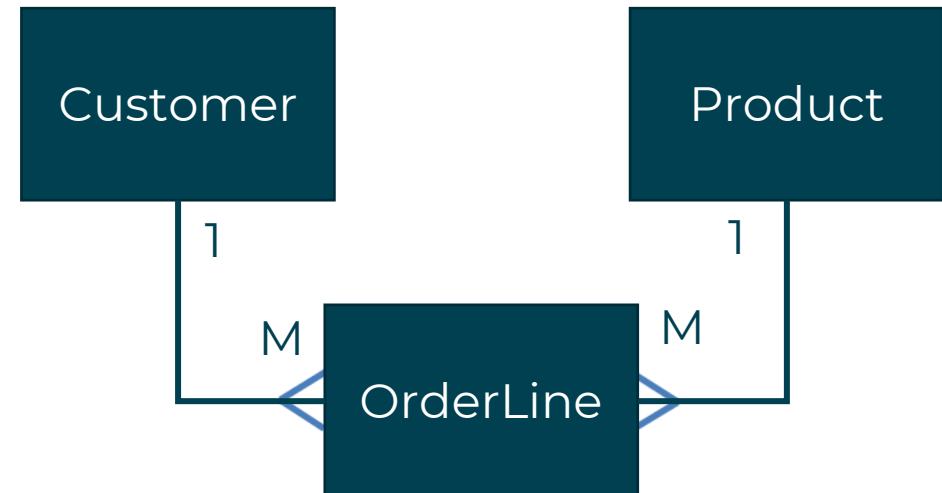
OK

Cancel

QA Cardinality

Many-to-many:

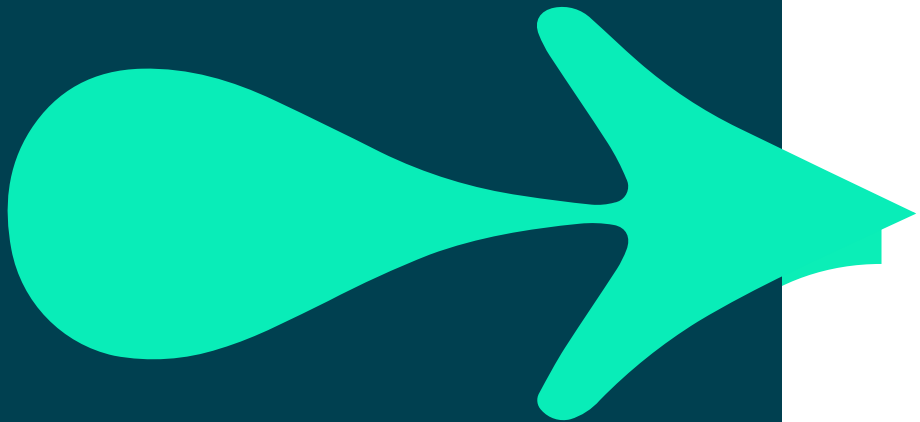
- Can't be implemented unless an intersection table is used.



CARDINALITY

Many-to-many relationships are available in Power BI, but use them with caution as you may get unpredictable results.

It is always best to resolve the many-to-many with an intersection table.



ACTIVE AND INACTIVE RELATIONSHIPS

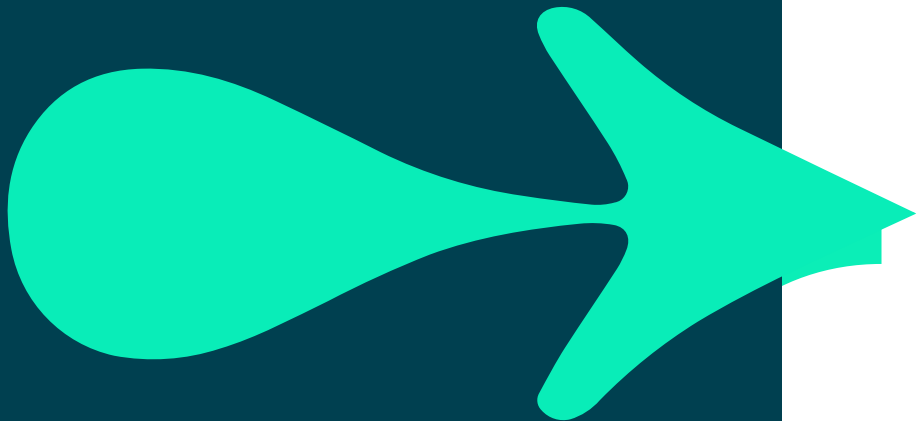
There may be more than one path to get from one table to another.

- Can cause ambiguity.

Power BI needs a default path to act on. This is the one set as Active. All other paths are set to Inactive.

- Inactive shown as a dotted line in Model View.

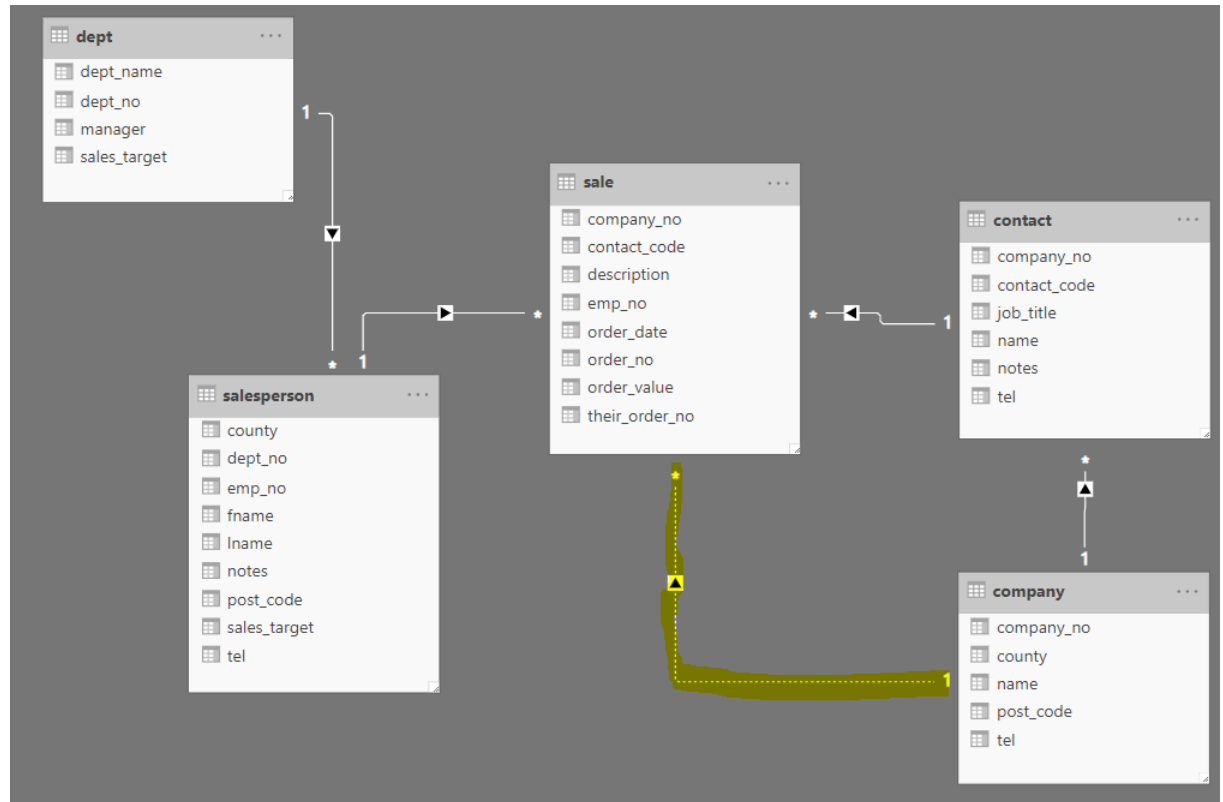
Power BI has algorithms to calculate the optimal path, but it's always a good idea to review this.



Active and inactive relationships

Sale can get to company directly or via contact.

Picks an optimal route and sets the other as inactive with a dotted line.



QA Active and inactive relationships

Edit relationship

Select tables and columns that are related.

sale							
order_no	emp_no	their_order_no	company_no	contact_code	order_value	order_date	
100	60	AA1	1000	MM	7	24/06/2000 00:00:00	IBM
200	60	Ord34	3000	QQ	6	01/05/2000 00:00:00	MS
300	60	Ord39	2000	OO	12	14/07/2000 00:00:00	25 S

company				
company_no	name	tel	county	post_code
1000	Happy Heaters PLC	(01306)345672	London	SE3 89L
2000	Icicle Igloos Inc	0181-987-1265	London	N1 4LH
3000	Judo Jeans PLC	0171-478-2990	London	N9 2FG

Cardinality

Many to one (*:1)

Cross filter direction

Single

☐ Make this relationship active

☐ Apply security filter in both directions

☐ Assume referential integrity

OK

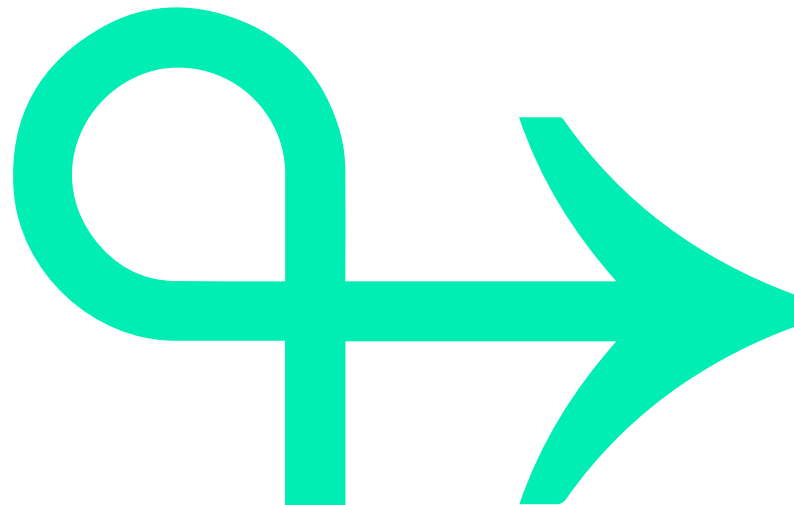
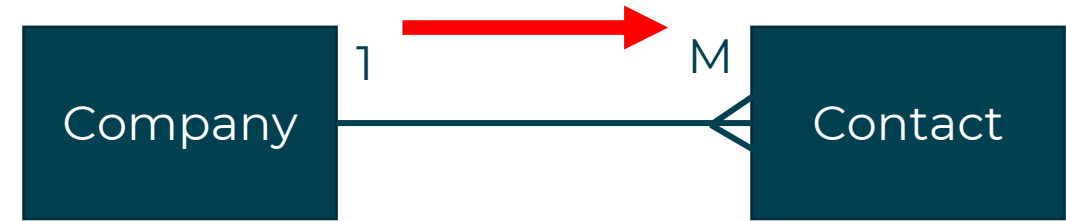
Cancel

Cross-filter direction

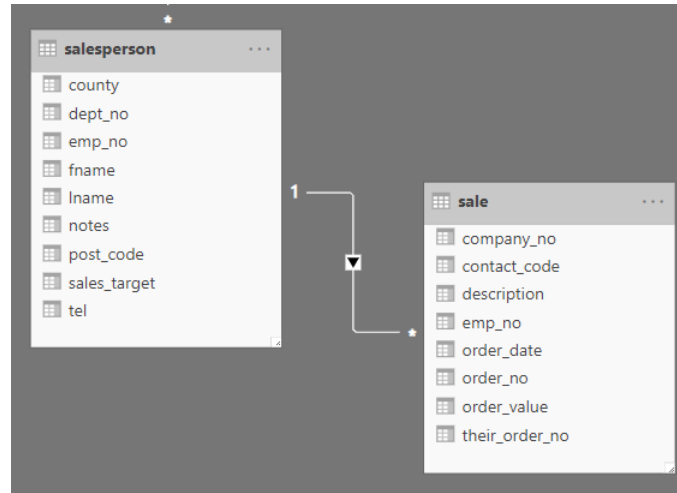
Power BI has a cross-filter direction property when configuring relationships between tables.

Controls direction of data flow when you want to view or filter data in a query involving table relationships.

Default flow direction is from the one to the many side.



QA Cross-filter direction



One -> Many from salesperson to sale.

Arrow on link shows flow of filter.

Interpret as **salesperson filters data in sale**.

Power BI will auto-detect but, again, it's worth checking this yourself!

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Select tables and columns that are related.

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100	60	AA1	1000	MM	7	24/06/2000 00:00:00	IBM	
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Cardinality

Many to one (*:1) Single

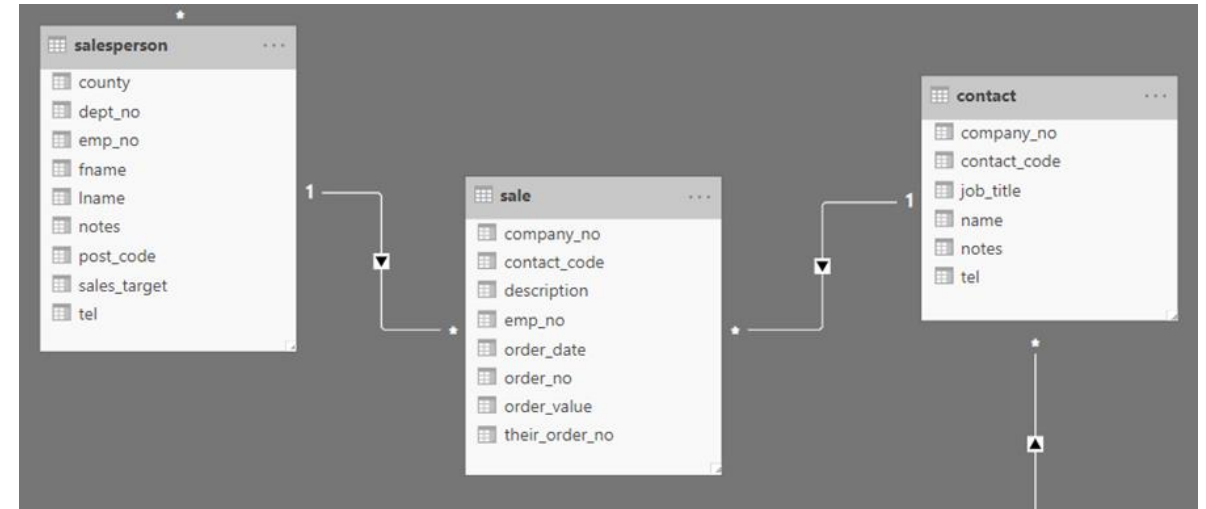
☒ Make this relationship active

☐ Apply security filter in both directions

☐ Assume referential integrity

QA Cross-filter direction

- Can become tricky when you want to filter on tables not linked directly with an aggregation.
- Assume we want to see contacts sold to by a salesperson:
 - Contact Table: Contact Name
 - Salesperson: Salesperson Name
- The tables aren't linked directly but go via Sale with cross-filter direction towards Sale.



QA Cross-Filter Direction

- We can easily create a visualisation:
- We may have trouble once we change to an aggregation and count the contacts by Salesperson.
 - The count is a flat count of the number of contacts in the contact table and is not broken down by sales person.

Contacts sold to by Salesperson

Sales Person	Contact Name
Alan Brick	Munching Mike
Fred Goalie	Munching Mike
Alan Brick	Ollie Octopus
Fred Goalie	Ollie Octopus
Ernest Flipper	Purposeful Peter
Fred Goalie	Quentin Quail
Fred Goalie	Robber Red
Fred Goalie	Terrible Tim

Contacts sold to by Salesperson

Sales Person	Count of Contact Name
Alan Brick	9
Billy Custard	9
Chris Digger	9
Dick Ernst	9
Ernest Flipper	9
Fred Goalie	9
Total	9

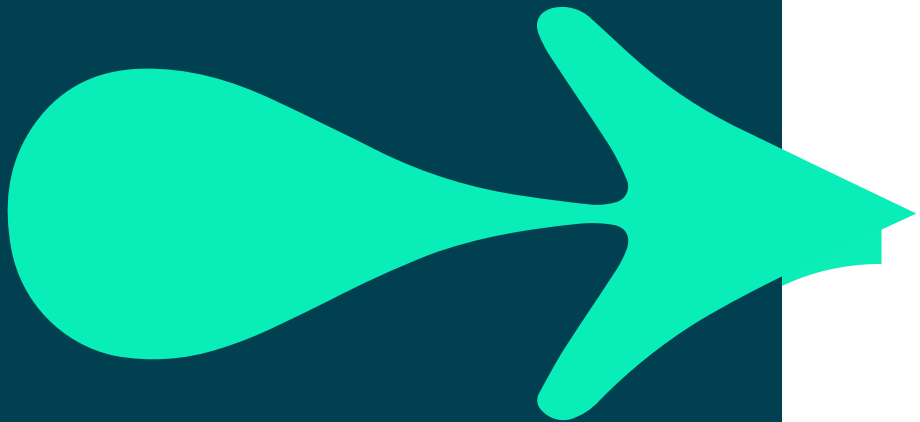
CROSS- FILTER DIRECTION

There are two reasons for this:

- Only single direction filtering set on tables.
- Picking the column to count from the wrong table.

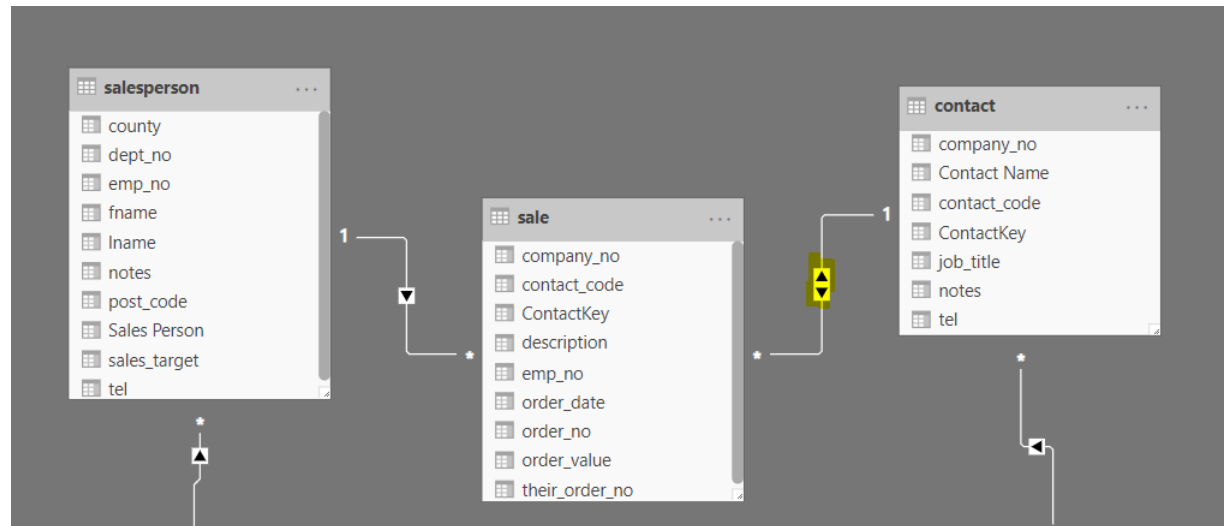
Address either of these to resolve the problem.

In the next few slides, we will look at both in turn.



QA Cross-filter direction: Single direction filtering set on tables

Change the cross-filter to **both** between Sale and Contact so that Salesperson can flow up to Contact for filtering.



- You've fixed the visualisation!

Contacts sold to by Salesperson	
Sales Person	Count of Contact Name
Alan Brick	2
Ernest Flipper	1
Fred Goalie	5
Total	9

Cross-filter direction: Changing the column to be counted



Alternatively, change the column for aggregating (counting) by going back to the Sale table.

- Contact key

Sales Person	Count of ContactKey
Alan Brick	2
Ernest Flipper	1
Fred Goalie	5
Total	6

Note that the total does not add up the count of contacts in the table; it gives a distinct count overall.

- Can fix with advanced DAX expression.
- If in doubt, leave Total section off the visualisation.