



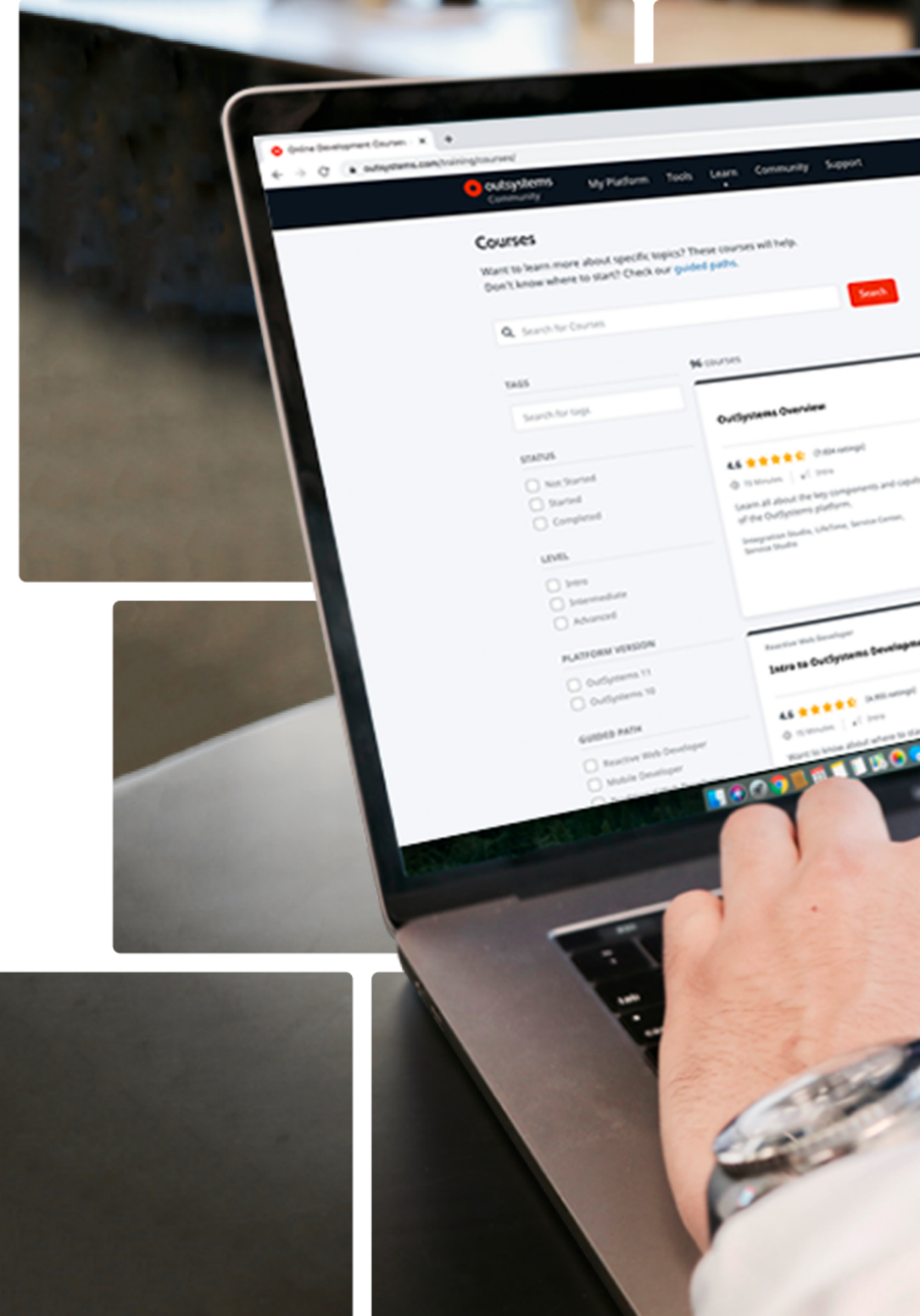
Advanced Aggregates

Advanced Queries with Aggregates

Multiple Sources

Calculated Attributes

Aggregating Records



What is an Aggregate?

An Aggregate is a **visual** element that allows you to define a **query to fetch data** from entities with sources, filters, and sorting.

Multiple Sources

The screenshot shows the OutSystems console for a data model named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A join is defined between them with the condition 'Customer.Id = Order.CustomerId'. Below the join configuration, a table displays the resulting data, which is a combination of the two sources. The table has columns for Customer attributes (Name, Email, Address, ZIPCode) and Order attributes (Description, CreatedOn). The data shows that each customer has one or more orders associated with them.

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn
Anthony Howell	anthonyphowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Coffee	2018-10-09 10:30:20
Heather DeJesus	heatherdejesus@gustr.com	Postbox 244	3923	Printers for the Lisbon Office	2018-10-10 10:29:04
Jay Silver	jaymsilver@rhyta.com	Passiewijk 328	4120	Laptop and keyboard	2018-10-08 10:29:31
Jay Silver	jaymsilver@rhyta.com	Passiewijk 328	4120	Speakers	2018-10-04 10:30:31
Peter Garcia	petergarcia@gustr.com	Vakthem 17	980 20		1900-01-01 00:00:00
Stephen Green	stephensgreen@dayrep.com	Nansens vei 29	5063	Smartphone case	2018-10-05 10:30:00
William Owens	williampowens@armyspy.com	847 Dickens St	1619		1900-01-01 00:00:00

- Aggregates can have **multiple Sources**
- OutSystems automatically creates the **Joins** when Entities have relationships

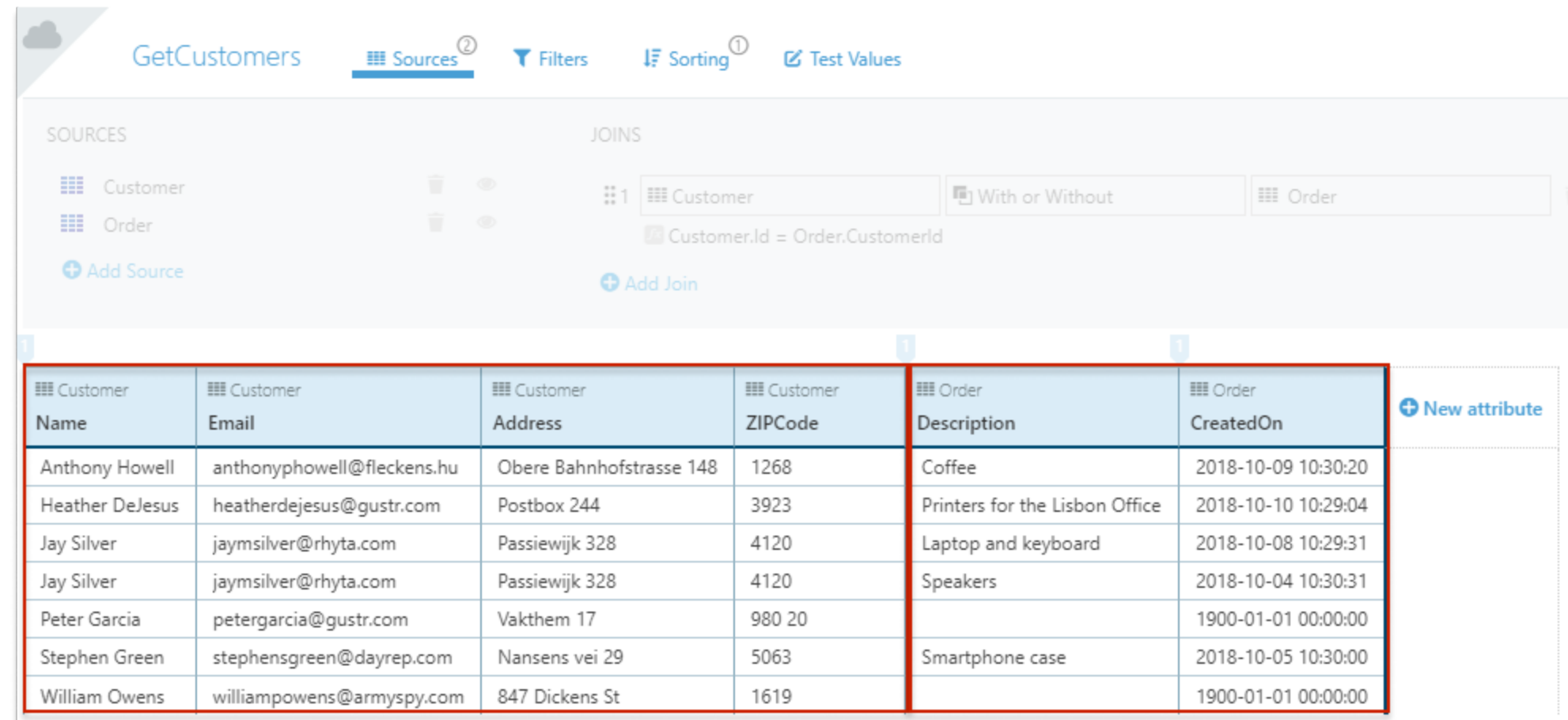
Multiple Sources

The screenshot displays the OutSystems Studio interface for a data model named 'GetCustomers'. The 'SOURCES' panel on the left lists two entities: 'Customer' and 'Order', each with a trash icon and an eye icon. A red box highlights this panel. The 'JOINS' panel on the right shows a join between 'Customer' and 'Order' with the condition 'Customer.Id = Order.CustomerId'. Below these panels is a table of data with columns for Customer Name, Email, Address, ZIPCode, Order Description, and Order CreatedOn.

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn
Anthony Howell	anthonyphowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Coffee	2018-10-09 10:30:20
Heather DeJesus	heatherdejesus@gustr.com	Postbox 244	3923	Printers for the Lisbon Office	2018-10-10 10:29:04
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Multiple Sources



The screenshot shows the OutSystems 'GetCustomers' aggregate editor. At the top, there are tabs for 'Sources', 'Filters', 'Sorting', and 'Test Values'. The 'Sources' tab is active, showing a list of sources: 'Customer' and 'Order'. Below this, a 'JOINS' section shows a join between 'Customer' and 'Order' with the condition 'Customer.Id = Order.CustomerId'. The join is labeled '1' and 'With or Without'. Below the join configuration, a table displays the resulting data. The table has columns for 'Customer Name', 'Customer Email', 'Customer Address', 'Customer ZIPCode', 'Order Description', and 'Order CreatedOn'. The data rows show customer information and their associated orders.

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn
Anthony Howell	anthonyphowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Coffee	2018-10-09 10:30:20
Heather DeJesus	heatherdejesus@gustr.com	Postbox 244	3923	Printers for the Lisbon Office	2018-10-10 10:29:04
Jay Silver	jaymsilver@rhyta.com	Passiewijk 328	4120	Laptop and keyboard	2018-10-08 10:29:31
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Multiple Sources

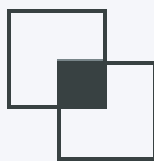
The screenshot shows the OutSystems console for an aggregate named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A 'JOINS' section is highlighted with a red box, showing a join between 'Customer' and 'Order' with the condition 'Customer.Id = Order.CustomerId'. Below the joins, a table displays the resulting data, which is a combination of the two sources. The table has columns for Customer Name, Email, Address, ZIPCode, Order Description, and Order CreatedOn. The data shows that each customer has one or more orders associated with them.

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn
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Peter Garcia	petergarcia@gustr.com	Vakthem 17	980 20		1900-01-01 00:00:00
Stephen Green	stephensgreen@dayrep.com	Nansens vei 29	5063	Smartphone case	2018-10-05 10:30:00
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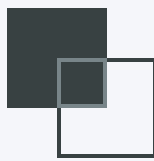
- Aggregates can have **multiple Sources**
- OutSystems automatically creates the **Joins** when Entities have relationships

Join Examples

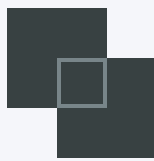
- Aggregates support three types of Joins



Only With



With or Without



With



Customer

Customer Id	Customer Name	Customer Address	Customer ZIPCode
24	Anthony Howell	Obere Bahnhofstrasse 148	1268
16	Bradley Murray	276 Vassileos Alexandrou Avenue	8100
10	Brian Fallon	Příční 1029	756 43
23	Brigid Heavner	1719 Devenish St	1378
19	Charlene Strang	Hantverkarg 95	134 00
5	Donald Cummings	Avenida João C Real 96	3850-562
7	Faith White	Ποσειδώνος 138	8027
4	Gerald Bell	Copacabana 7902	12500
12	Heather Dejesus	Λήτους 162	2237
6	Jason Slack	Wegedoorn 166	9461 KJ



Order

Customer Id	Customer Name	Customer Address	Customer ZIPCode
24	Anthony Howell	Obere Bahnhofstrasse 148	1268
16	Bradley Murray	276 Vassileos Alexandrou Avenue	8100
10	Brian Fallon	Příční 1029	756 43
23	Brigid Heavner	1719 Devenish St	1378
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4	Gerald Bell	Copacabana 7902	12500
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Only With

GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer Only With Order

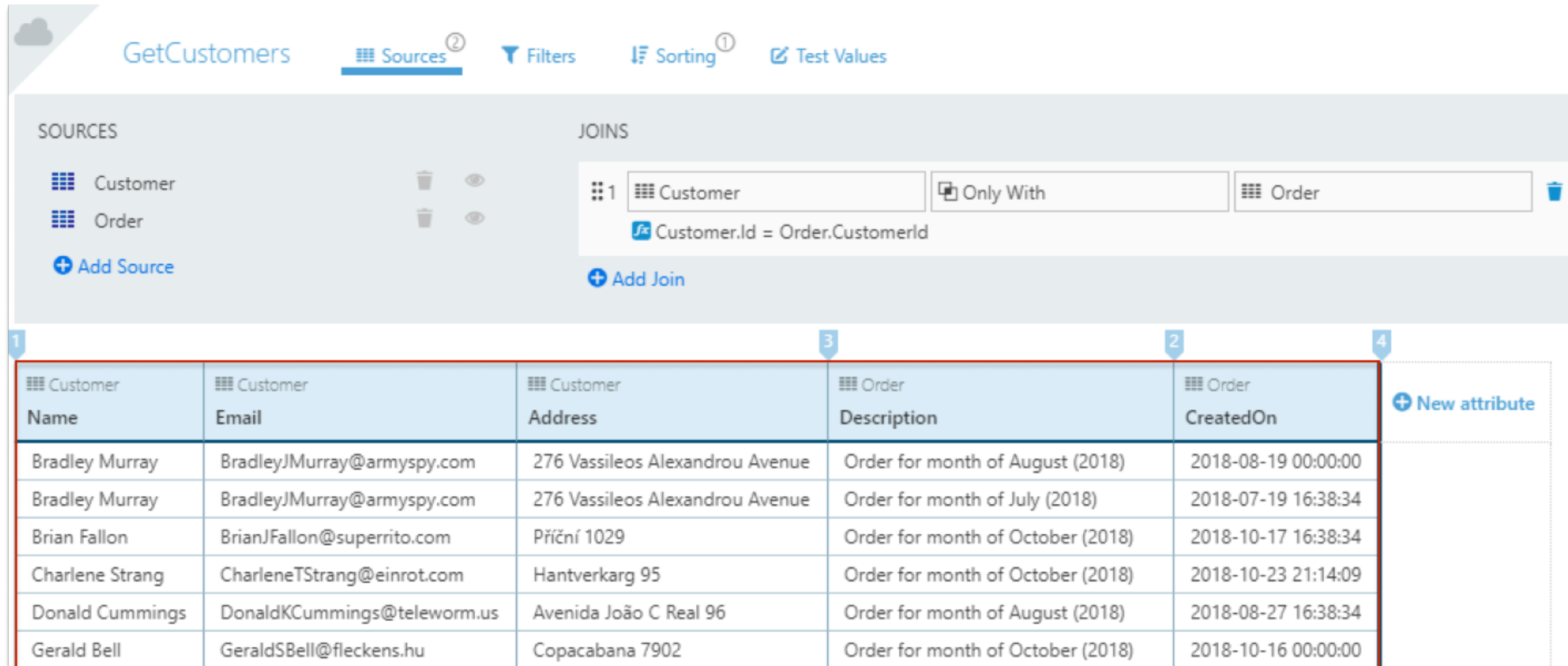
Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn	+ New attribute
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00	
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34	
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34	
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09	
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	Order for month of August (2018)	2018-08-27 16:38:34	
Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	Order for month of October (2018)	2018-10-16 00:00:00	

- Returns only records where there is a match between Entities

Only With



GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer Only With Order
Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	Order for month of August (2018)	2018-08-27 16:38:34
Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	Order for month of October (2018)	2018-10-16 00:00:00

+ New attribute

- Returns only records where there is a match between Entities

Only With

GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer Only With Order
Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	Order for month of August (2018)	2018-08-27 16:38:34
Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	Order for month of October (2018)	2018-10-16 00:00:00

+ New attribute

- Returns only records where there is a match between Entities

With or Without

The screenshot shows the OutSystems query editor for a query named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A join is configured between them using the 'With or Without' operator. The join condition is 'Customer.Id = Order.CustomerId'. Below the join configuration, a table displays the results of the query. The table has five columns: 'Customer Name', 'Customer Email', 'Customer Address', 'Order Description', and 'Order CreatedOn'. The results show six rows of data, including customers like Anthony Howell, Bradley Murray, Brian Fallon, Brigid Heavner, and Charlene Strang, along with their associated order descriptions and creation dates.

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148		1900-01-01 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St		1900-01-01 00:00:00
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09

- Returns all rows from the *left* Entity even if there is no match in the *right* Entity

With or Without

The screenshot shows the OutSystems query editor for a query named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A join is configured with the 'With or Without' operator, and the join condition is 'Customer.Id = Order.CustomerId'. The query results are displayed in a table with 5 columns: Customer Name, Customer Email, Customer Address, Order Description, and Order CreatedOn. The table contains 6 rows of data, including customers with no matching orders.

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148		1900-01-01 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St		1900-01-01 00:00:00
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09

- Returns all rows from the *left* Entity even if there is no match in the *right* Entity

With or Without

The screenshot shows the configuration for a data service named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A join is configured between these two sources using the 'With or Without' operator. The join condition is 'Customer.Id = Order.CustomerId'. Below the configuration, a table displays the results of the query. The table has five columns: 'Customer Name', 'Customer Email', 'Customer Address', 'Order Description', and 'Order CreatedOn'. The results show six rows, with the row for 'Brigid Heavner' highlighted in red, indicating it is the only row from the 'Customer' source that has a matching 'Order'.

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148		1900-01-01 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St		1900-01-01 00:00:00
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09

- Returns all rows from the *left* Entity even if there is no match in the *right* Entity

With or Without

The screenshot shows the configuration for a data service named 'GetCustomers'. The 'Sources' tab is active, showing two sources: 'Customer' and 'Order'. A join is configured between these two sources using the 'With or Without' operator. The join condition is 'Customer.Id = Order.CustomerId'. Below the configuration, a table displays the results of the query. The table has five columns: 'Customer Name', 'Customer Email', 'Customer Address', 'Order Description', and 'Order CreatedOn'. The results show six rows, with the second and third rows highlighted in red, indicating a match between the Customer and Order entities.

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148		1900-01-01 00:00:00
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34
Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St		1900-01-01 00:00:00
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	Order for month of October (2018)	2018-10-23 21:14:09

- Returns all rows from the *left* Entity even if there is no match in the *right* Entity

GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer With Order

Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn	+ New attribute
			Order for month of September (2018)	2018-09-09 16:38:34	
			Order for month of October (2018)	2018-10-16 16:38:34	
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148		1900-01-01 00:00:00	
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of August (2018)	2018-08-19 00:00:00	
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34	
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	Order for month of October (2018)	2018-10-17 16:38:34	

- Returns all rows from both Entities

GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
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JOINS

1 Customer With Order

Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Order Description	Order CreatedOn	+ New attribute
			Order for month of September (2018)	2018-09-09 16:38:34	
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Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	Order for month of July (2018)	2018-07-19 16:38:34	
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- Returns all rows from both Entities

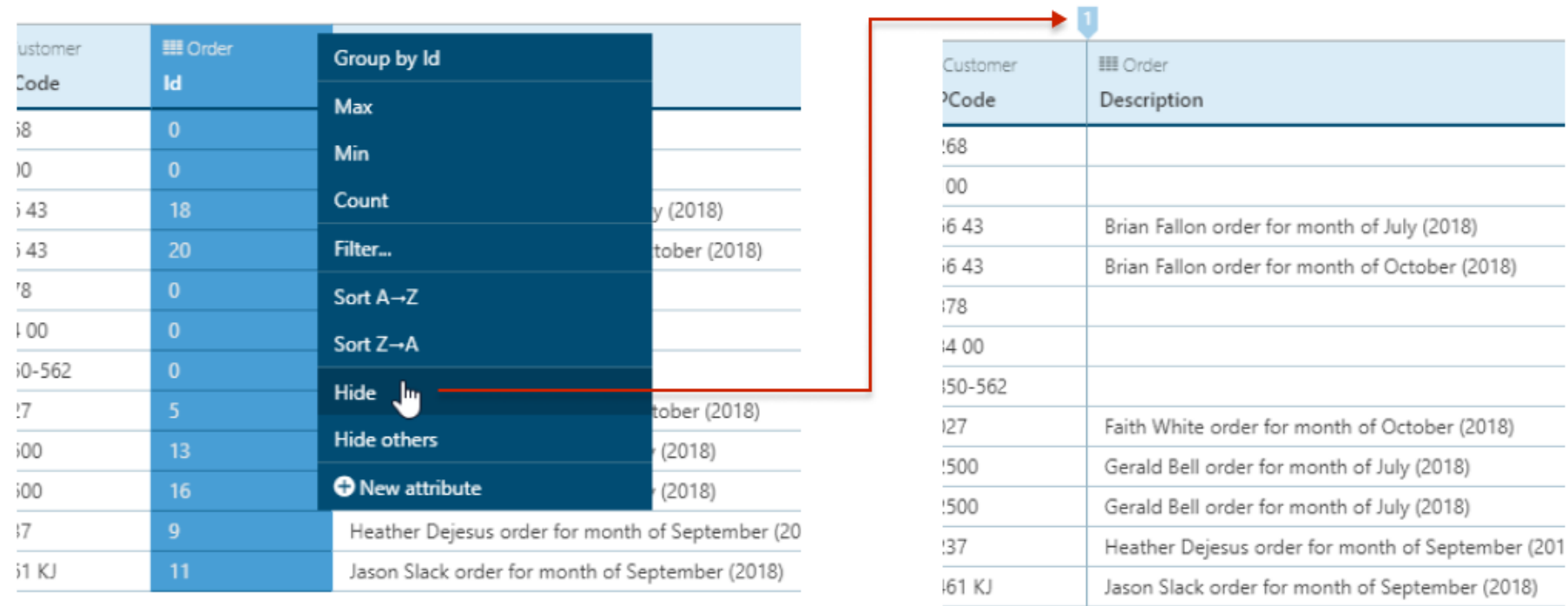
Aggregate Joins in SQL

`SELECT ... FROM {Entity1}` `INNER JOIN`
`LEFT JOIN` `{Entity2} ON {Condition}`
`FULL OUTER JOIN`

JOINS

1	Customer	<div>Only With</div> <div>With or Without</div> <div>With</div>	Order	
Customer.Id = Order.CustomerId				
+ Add Join				

Hiding Columns



Customer Code	Order Id	
18	0	
10	0	
143	18	y (2018)
143	20	tober (2018)
18	0	
100	0	
10-562	0	
17	5	tober (2018)
100	13	y (2018)
100	16	y (2018)
17	9	Heather Dejesus order for month of September (20
11 KJ	11	Jason Slack order for month of September (2018)

Customer Code	Order Description
18	
100	
143	Brian Fallon order for month of July (2018)
143	Brian Fallon order for month of October (2018)
178	
1400	
150-562	
127	Faith White order for month of October (2018)
1500	Gerald Bell order for month of July (2018)
1500	Gerald Bell order for month of July (2018)
137	Heather Dejesus order for month of September (201
161 KJ	Jason Slack order for month of September (2018)

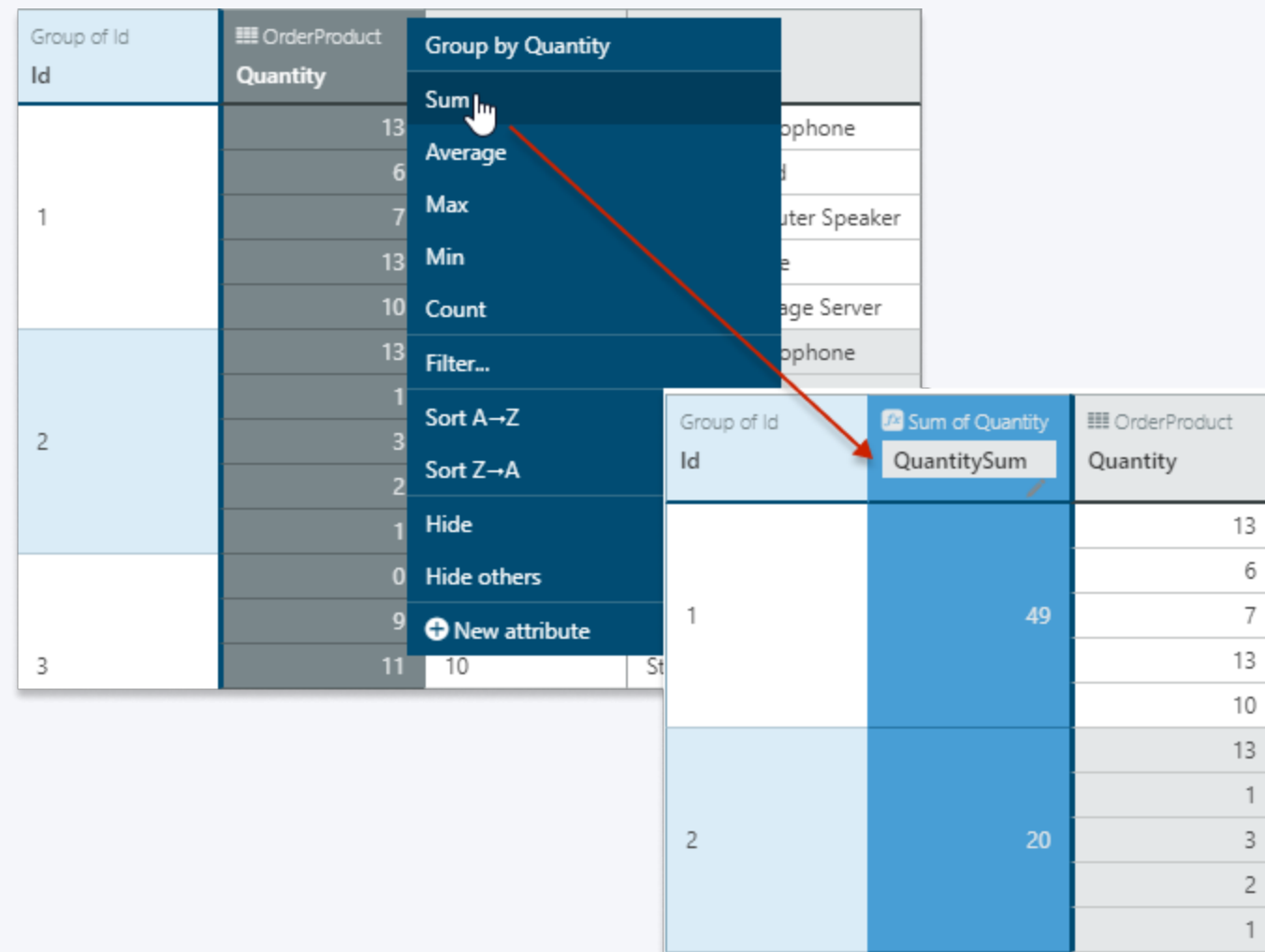
- Hide columns for previewing purposes
 - Does not affect the Aggregate's output
- The attributes used outside the Aggregate determine which columns are fetched

Calculated Attributes

- Custom values computed from other attributes in the same Aggregate
- Become part of the query's output
- Expression with access to
 - Source Entity attributes in the Aggregate
 - Built-in Functions
 - CurrDate(), DiffDays(), ...
 - Variables

OrderProduct	Product	Quantity * Price
Quantity	Price	TotalPrice
10	3.49	34.9
4	350.6	1402.4
7	12.25	85.75
14	9.45	132.3
9	12.5	112.5
3	120.89	362.67
2	3.49	6.98
13	350.6	4557.8
1	12.25	12.25
6	9.45	56.7

Aggregating Records



Group of Id	Id	OrderProduct	Quantity
1	13	ophone	
	6		
	7	uter Speaker	
	13		
	10	age Server	
2	13	ophone	
	1		
	3		
	2		
	1		
3	0		
	9		
	11	St	

Group of Id	Id	Sum of Quantity	OrderProduct	Quantity
1		49		13
				6
				7
				13
				10
2		20		13
				1
				3
				2
				1

- Group multiple rows together
 - Example: Group by Orders to find # of Products per Order
- Apply a function on a group of values
 - Sum, Average, Min, Max, Count
- Only the aggregated (blue) columns are part of the output