



# Advanced Data Queries

---

Aggregates



# Topics

- Advanced Queries
- Aggregates
  - Multiple Sources
  - Joins
  - Calculated Attributes
  - Aggregating Records

# Advanced Queries

Retrieving the correct data from the database can often be complex

There are more advanced options available in Aggregates

- Multiple Sources
- Calculated attributes
- Aggregated functions

Also possible to write SQL statements

- SQL Tool

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

**Group by Quantity**

- Sum
- Average
- Max
- Min
- Count
- Filter...
- Sort A→Z
- Sort Z→A
- Hide
- Hide others
- + New attribute

# Multiple Sources




Aggregates can have **multiple Sources** and when those Entities have relationships, OutSystems automatically create the **Joins**

The screenshot shows the 'GetCustomers' aggregate editor in OutSystems. The 'SOURCES' section on the left lists 'Customer' and 'Order' entities. The 'JOINS' section in the center shows a join between 'Customer' and 'Order' with the condition 'Customer.Id = Order.CustomerId'. Below these sections is a table displaying the aggregated data.

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn
Anthony Howell	anthonyhowell@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

# 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

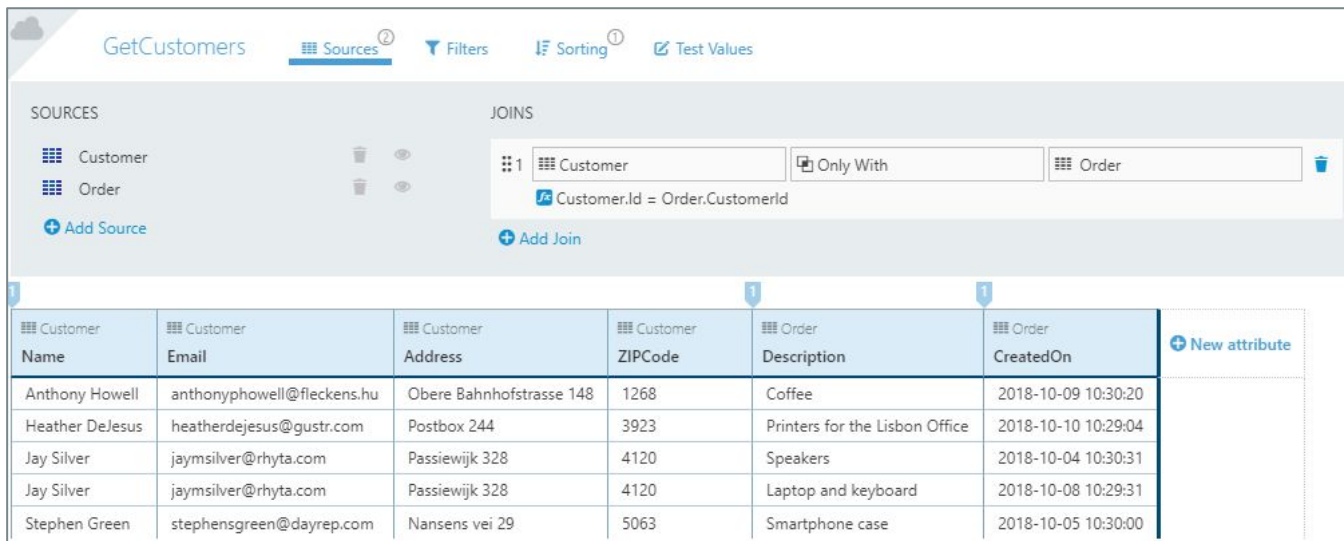
Order

Order Id	Order Description	Order CustomerId
17	Anthony Howell order for month of August (2018)	24
34	Anthony Howell order for month of August (2018)	24
36	Anthony Howell order for month of August (2018)	24
5	Bradley Murray order for month of August (2018)	16
32	Brian Fallon order for month of August (2018)	10
31	Brian Fallon order for month of July (2018)	10
7	Brian Fallon order for month of October (2018)	10
6	Brian Fallon order for month of September (2018)	10
3	Brigid Heavner order for month of September (2018)	23
2	Brigid Heavner order for month of September (2018)	23

# Only With

Returns only records where there is a match between Entities

- **Only** Customers **with** Orders are returned (SQL **INNER JOIN**)



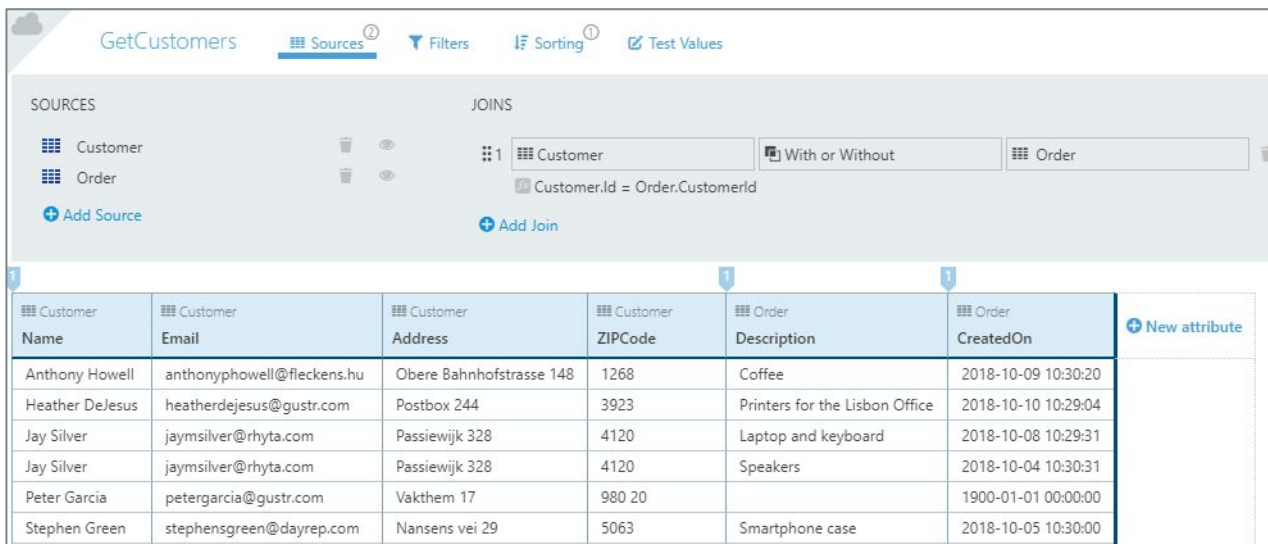
The screenshot displays the OutSystems console for a query named 'GetCustomers'. The 'SOURCES' section lists 'Customer' and 'Order' entities. The 'JOINS' section shows an 'Only With' join between 'Customer' and 'Order' with the condition 'Customer.Id = Order.CustomerId'. Below the configuration, a table displays the results of the query, showing 5 records where a customer has an order.

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	Speakers	2018-10-04 10:30:31
Jay Silver	jaymsilver@rhyta.com	Passiewijk 328	4120	Laptop and keyboard	2018-10-08 10:29:31
Stephen Green	stephensgreen@dayrep.com	Nansens vei 29	5063	Smartphone case	2018-10-05 10:30:00

# With or Without

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

- Customers **with or without** Orders (SQL **LEFT JOIN**)



GetCustomers

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer With or Without Order

Customer.Id = Order.CustomerId

+ Add Join

Customer Name	Customer Email	Customer Address	Customer ZIPCode	Order Description	Order CreatedOn	+ New attribute
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	stephengreen@dayrep.com	Nansens vei 29	5063	Smartphone case	2018-10-05 10:30:00	





Returns all rows from both Entities (SQL **FULL OUTER JOIN**)

GetCustomers Sources Filters Sorting Test Values

SOURCES

- Customer
- Order
- + Add Source

JOINS

1 Customer With Order

Customer.Id = Order.CustomerId

+ Add Join

Customer	Customer	Customer	Customer	Order	Order	
Name	Email	Address	ZIPCode	Description	CreatedOn	+ New attribute
				Yogurts for the office	2018-10-08 14:26:15	
				IT Books	2018-10-09 14:25:50	
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	Speakers	2018-10-04 10:30:31	
Jay Silver	jaymsilver@rhyta.com	Passiewijk 328	4120	Laptop and keyboard	2018-10-08 10:29:31	
Peter Garcia	petergarcia@gustr.com	Vakthem 17	980 20		1900-01-01 00:00:00	
Stephen Green	stephengreen@dayrep.com	Nansens vei 29	5063	Smartphone case	2018-10-05 10:30:00	



# Calculated Attributes

Custom attributes computed from other attributes in the same query

Become part of the query's output type

OrderProduct	Product	
Quantity	Price	+ New attribute
14	1.79	
12	2.99	
6	9.98	
8	2.6	
0	2.99	
7	39	
2	2.49	
5	4.25	
7	4.99	



OrderProduct	Product		
Quantity	Price	Attribute1	+ New attribute
14	1.79		
12	2.99		
6	9.98		
8	2.6		
0	2.99		
7	39		
2	2.49		
5	4.25		
7	4.99		



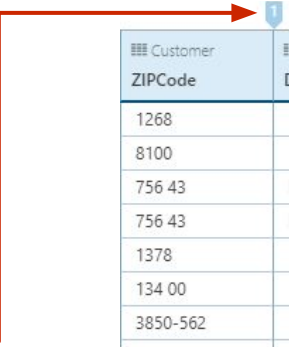
OrderProduct	Product	Quantity * Price
Quantity	Price	TotalPrice
14	1.79	25.06
12	2.99	35.88
6	9.98	59.88
8	2.6	20.8
0	2.99	0
7	39	273
2	2.49	4.98
5	4.25	21.25
7	4.99	34.93

# Hiding Columns

Hide columns for previewing purposes

- Does not affect the Aggregate's **output** at runtime

The columns used outside the query determine which columns are fetched



Customer	Order
ZIPCode	Id
1268	0
8100	0
756 43	18
756 43	20
1378	0
134 00	0
3850-562	0
8027	5
12500	13
12500	16
2237	9
9461 KJ	11

Customer	Order
ZIPCode	Description
1268	
8100	
756 43	Brian Fallon order for month of July (2018)
756 43	Brian Fallon order for month of October (2018)
1378	
134 00	
3850-562	
8027	Faith White order for month of October (2018)
12500	Gerald Bell order for month of July (2018)
12500	Gerald Bell order for month of July (2018)
2237	Heather Dejesus order for month of September (2018)
9461 KJ	Jason Slack order for month of September (2018)

# Aggregating Records

Group multiple rows together (Group by Orders to find # of Products per Order)

- Call a function on the aggregated rows: **Sum, Average, Min, Max, Count**

Only the Aggregated (blue) columns are part of the output

Group of Id	OrderProduct	Quantity	
			Group by Quantity
			Sum
			Average
			Max
			Min
			Count
			Filter...
			Sort A→Z
			Sort Z→A
			Hide
			Hide others
			New attribute
1		13	Telephone
		6	
		7	Computer Speaker
		13	
		10	Image Server
		13	Telephone
2		1	
		3	Computer Speaker
		2	
		1	Image Server
		0	Telephone
		9	
3		11	Stereo Computer Speaker

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

GetProductsWithOrders
List
Current
Id
QuantitySum
EOF
BOF
CurrentRowIndex
Length
Empty
Count

# Summary

- Defining Advanced Queries
- Aggregates
  - Multiple Sources
  - Joins
  - Calculated Attributes
  - Aggregating Records



# **Advanced Data Queries - Aggregates**

## **Thank You!**