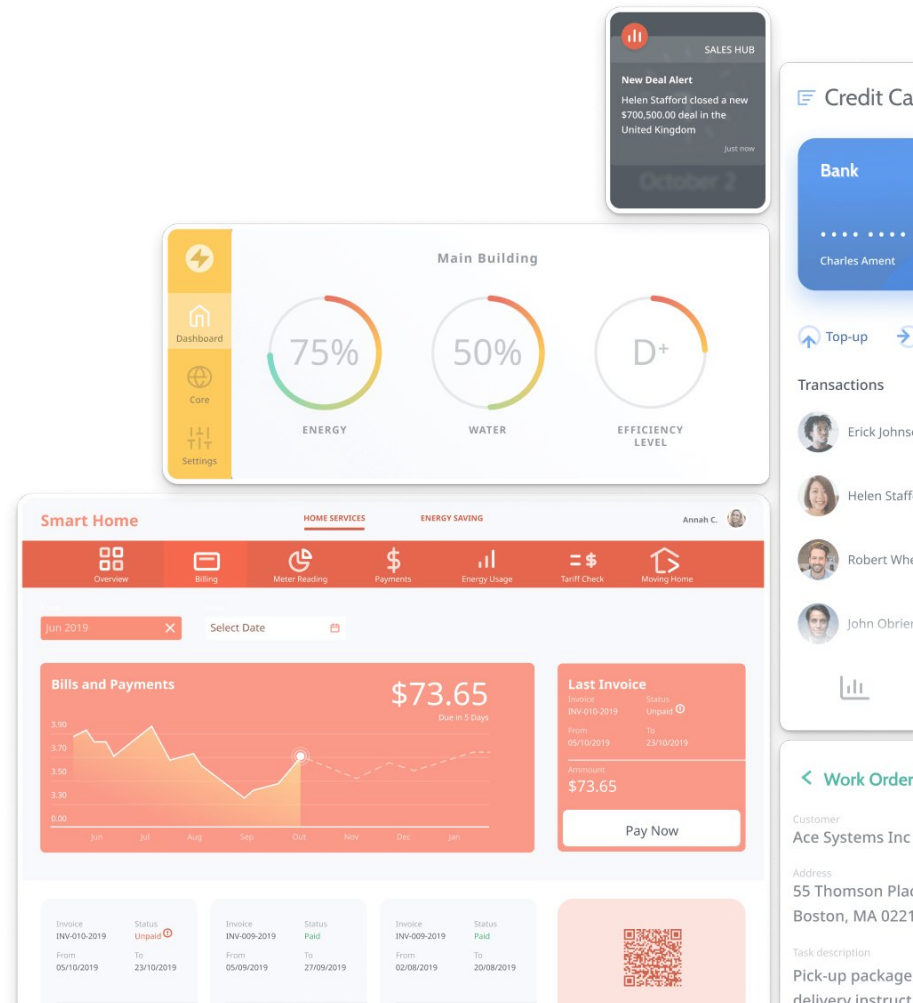


Advanced Aggregates



What you will learn here

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

What is an Aggregate?

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

Advanced Queries with Aggregates

3 Sources No Filters No Sorts No Test Values

Sources

- OrderProduct
- Order
- Product

ADD SOURCE

Joins

- 1 OrderProduct Only With Order OrderProduct.OrderId = Order.Id
- 2 OrderProduct Only With Product OrderProduct.ProductId = Product.Id

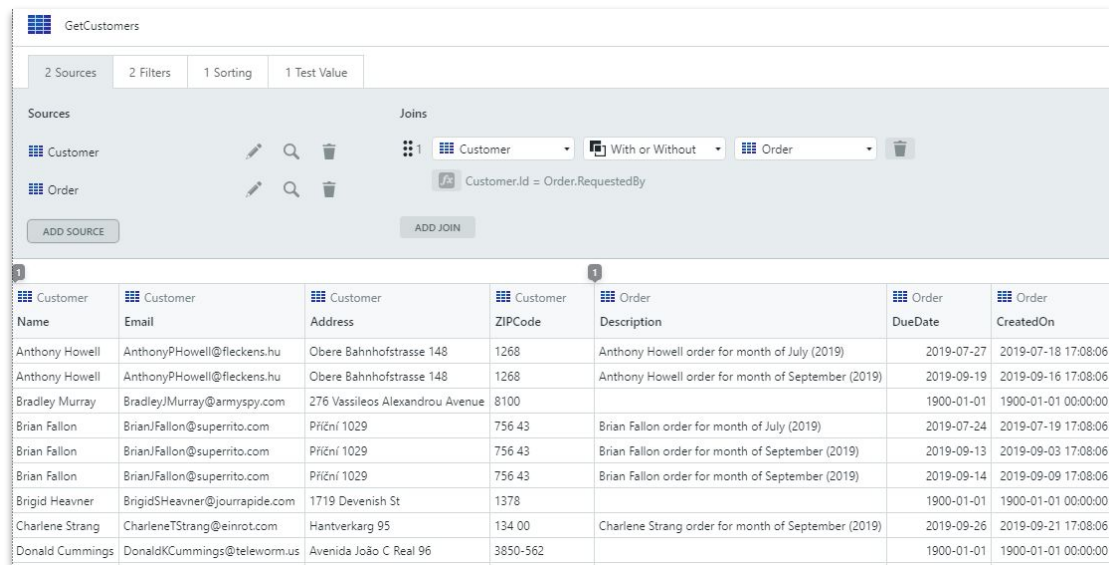
ADD JOIN

Output

Group of Id	Sum of Quantity	OrderProduct	OrderProduct	OrderProduct	Order	Order
Id	QuantitySum	Id	OrderId	ProductId	Description	DueDate
1	33	1	1	7	Brian Fallon order for month of July (2019)	2019-07-24
		2	1	2	Brian Fallon order for month of July (2019)	2019-07-24
		3	1	15	Brian Fallon order for month of July (2019)	2019-07-24
		4	1	14	Brian Fallon order for month of July (2019)	2019-07-24
		5	1	4	Brian Fallon order for month of July (2019)	2019-07-24
2	41	6	2	7	Faith White order for month of August (2019)	2019-08-13
		7	2	2	Faith White order for month of August (2019)	2019-08-13
		8	2	15	Faith White order for month of August (2019)	2019-08-13
		9	2	14	Faith White order for month of August (2019)	2019-08-13

- Retrieving the correct data from the database can often be complex
- Aggregates have some advanced options that can easily be used
 - Multiple Sources
 - Calculated attributes
 - Aggregation functions

Multiple Sources



2 Sources 2 Filters 1 Sorting 1 Test Value

Sources

- Customer
- Order

Joins

1 Customer With or Without Order

Customer.Id = Order.RequestedBy






ADD SOURCE ADD JOIN

Customer	Customer	Customer	Customer	Order	Order	Order
Name	Email	Address	ZIPCode	Description	DueDate	CreatedOn
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Anthony Howell order for month of July (2019)	2019-07-27	2019-07-18 17:08:06
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Anthony Howell order for month of September (2019)	2019-09-19	2019-09-16 17:08:06
Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	8100		1900-01-01	1900-01-01 00:00:00
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	756 43	Brian Fallon order for month of July (2019)	2019-07-24	2019-07-19 17:08:06
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	756 43	Brian Fallon order for month of September (2019)	2019-09-13	2019-09-03 17:08:06
Brian Fallon	BrianJFallon@superrito.com	Příční 1029	756 43	Brian Fallon order for month of September (2019)	2019-09-14	2019-09-09 17:08:06
Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St	1378		1900-01-01	1900-01-01 00:00:00
Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	134 00	Charlene Strang order for month of September (2019)	2019-09-26	2019-09-21 17:08:06
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	3850-562		1900-01-01	1900-01-01 00:00:00

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

Join Examples

Customer

 Customer	 Customer	 Customer	 Customer	 Customer
Id	Name	Email	Address	ZIPCode
24	Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148	1268
16	Bradley Murray	BradleyJMurray@armyspy.com	276 Vassileos Alexandrou Avenue	8100
10	Brian Fallon	BrianJFallon@supernito.com	Příční 1029	756 43
23	Brigid Heavner	BrigidSHeavner@jourrapide.com	1719 Devenish St	1378
19	Charlene Strang	CharleneTStrang@einrot.com	Hantverkarg 95	134 00
5	Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	3850-562
7	Faith White	FaithHWhite@rhyta.com	Ποσειδωνος 138	8027
4	Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	12500

Order

 Order	 Order	 Order	 Order	 Order
Id	Description	DueDate	CreatedOn	ShippedOn
1	Brian Fallon order for month of July (2019)	2019-07-24	2019-07-19 17:08:06	1900-01-01
2	Faith White order for month of August (2019)	2019-08-13	2019-08-05 17:08:06	1900-01-01
3	Serena Andrews order for month of July (2019)	2019-07-29	2019-07-26 17:08:06	1900-01-01
4	Mary Goodman order for month of June (2019)	2019-06-23	2019-06-18 17:08:06	1900-01-01
5	Anthony Howell order for month of July (2019)	2019-07-27	2019-07-18 17:08:06	1900-01-01
6	Jason Slack order for month of September (2019)	2019-10-04	2019-09-24 17:08:06	1900-01-01
7	Peter Garcia order for month of September (2019)	2019-09-27	2019-09-23 17:08:06	1900-01-01
8	Brian Fallon order for month of September (2019)	2019-09-13	2019-09-03 17:08:06	1900-01-01

Aggregates support three types of Joins



Only With



With or Without



With

Only With

2 Sources

No Filters

No Sorts

No Test Values

Sources

Joins

Customer

Order

ADD SOURCE

1

Customer

Only With

Order

Customer.Id = Order.RequestedBy

ADD JOIN

1

Customer	Customer	Customer	Customer	Order	Order	Order
Name	Email	Address	ZIPCode	Description	DueDate	CreatedOn
Brian Fallon	BrianFallon@superrito.com	Příční 1029	756 43	Brian Fallon order for month of July (2019)	2019-07-24	2019-07-19 17:08:06
Faith White	FaithHWhite@rhyta.com	Ποσειδώνος 138	8027	Faith White order for month of August (2019)	2019-08-13	2019-08-05 17:08:06
Serena Andrews	SerenaAAndrews@cuvox.de	Rua Fortaleza 146	85810-050	Serena Andrews order for month of July (2019)	2019-07-29	2019-07-26 17:08:06
Mary Goodman	MaryBGoodman@fleckens.hu	Avda. Rio Nalon 38	33180	Mary Goodman order for month of June (2019)	2019-06-23	2019-06-18 17:08:06
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Anthony Howell order for month of July (2019)	2019-07-27	2019-07-18 17:08:06
Jason Slack	JasonKSlack@cuvox.de	Wegedoorn 166	9461 KJ	Jason Slack order for month of September (2019)	2019-10-04	2019-09-24 17:08:06
Peter Garcia	PeterEGarcia@gustr.com	Vakthem 17	980 20	Peter Garcia order for month of September (2019)	2019-09-27	2019-09-23 17:08:06
Brian Fallon	BrianFallon@superrito.com	Příční 1029	756 43	Brian Fallon order for month of September (2019)	2019-09-13	2019-09-03 17:08:06
Anthony Howell	AnthonyPHowell@fleckens.hu	Obere Bahnhofstrasse 148	1268	Anthony Howell order for month of September (2019)	2019-09-19	2019-09-16 17:08:06
Jo Hansen	JoKHansen@cuvox.de	Dózsa György út 9.	3510	Jo Hansen order for month of June (2019)	2019-06-23	2019-06-19 17:08:06

Only returns records where there is a match between Entities

With or Without

2 Sources

No Filters

No Sorts

No Test Values

Sources

Joins

Customer

Order

1

Customer

With or Without

Order

Customer.Id = Order.RequestedBy

ADD SOURCE

ADD JOIN

Customer	Customer	Customer	Customer	Order	Order	Order
Name	Email	Address	ZIPCode	Description	DueDate	CreatedOn
Jay Silver	JayMSilver@rhyta.com	Passiewijk 328	4120	Jay Silver order for month of July (2019)	2019-07-06	2019-07-05 17:08:06
Jay Silver	JayMSilver@rhyta.com	Passiewijk 328	4120	Jay Silver order for month of July (2019)	2019-07-11	2019-07-03 17:08:06
Peter Garcia	PeterEGarcia@gustr.com	Vakthem 17	980 20	Peter Garcia order for month of September (2019)	2019-09-27	2019-09-23 17:08:06
Mickey Thill	MickeyTThill@fleckens.hu	ul. Koszykowa 133	00-564		1900-01-01	1900-01-01 00:00:00
Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	12500		1900-01-01	1900-01-01 00:00:00
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	3850-562		1900-01-01	1900-01-01 00:00:00
Jason Slack	JasonKSlack@cuvov.de	Wegedoorn 166	9461 KJ	Jason Slack order for month of September (2019)	2019-10-04	2019-09-24 17:08:06
Faith White	FaithHWhite@rhyta.com	Ποσειδώνος 138	8027	Faith White order for month of August (2019)	2019-08-13	2019-08-05 17:08:06
Faith White	FaithHWhite@rhyta.com	Ποσειδώνος 138	8027	Faith White order for month of September (2019)	2019-09-14	2019-09-07 00:00:00
Faith White	FaithHWhite@rhyta.com	Ποσειδώνος 138	8027	Faith White order for month of July (2019)	2019-07-06	2019-07-03 17:08:06

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

With

2 Sources No Filters No Sorts No Test Values

Sources

Joins

Customer Order

Customer With Order

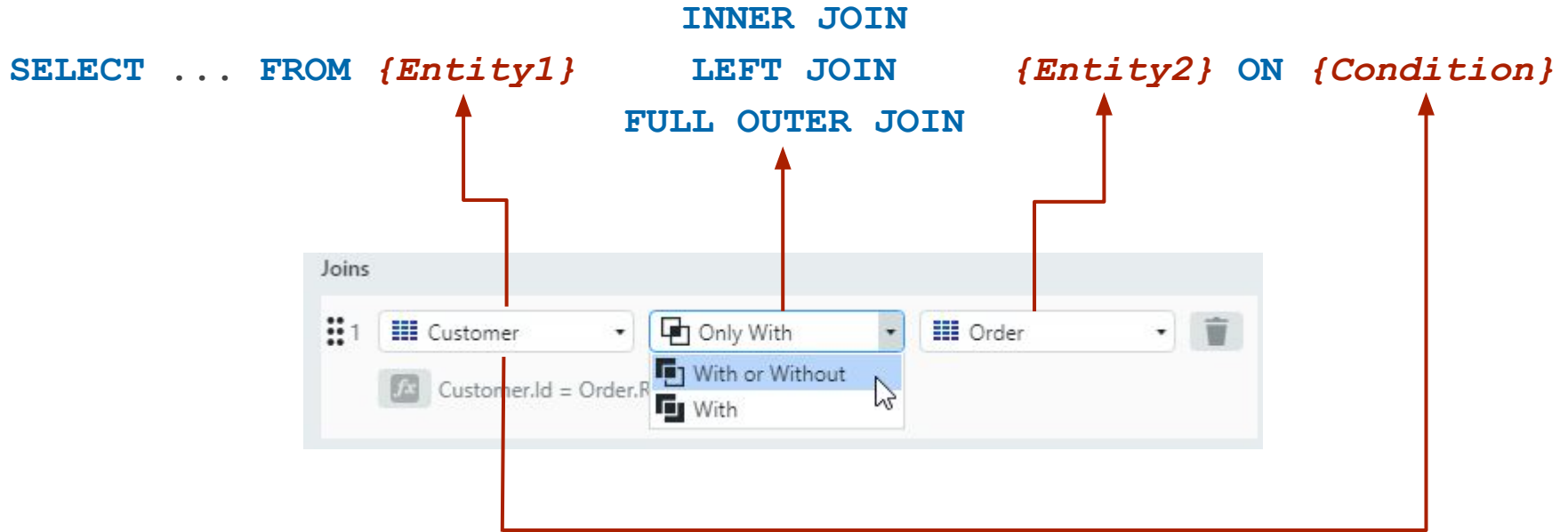
Customer.Id = Order.RequestedBy

ADD SOURCE ADD JOIN

Customer	Customer	Customer	Customer	Order	Order	Order
Name	Email	Address	ZIPCode	Description	DueDate	CreatedOn
				New Shipment of Port Wlne	2021-10-28	2021-10-13 17:43:02
				Laptops Order for the Next Quarter	2021-10-21	2021-10-08 17:43:34
Jay Silver	JayMSilver@rhyta.com	Passiewijk 328	4120	Jay Silver order for month of July (2019)	2019-07-06	2019-07-05 17:08:06
Jay Silver	JayMSilver@rhyta.com	Passiewijk 328	4120	Jay Silver order for month of July (2019)	2019-07-11	2019-07-03 17:08:06
Peter Garcia	PeterEGarcia@gustr.com	Vakthem 17	980 20	Peter Garcia order for month of September (2019)	2019-09-27	2019-09-23 17:08:06
Mickey Thill	MickeyTThill@fleckens.hu	ul. Koszykowa 133	00-564		1900-01-01	1900-01-01 00:00:00
Gerald Bell	GeraldSBell@fleckens.hu	Copacabana 7902	12500		1900-01-01	1900-01-01 00:00:00
Donald Cummings	DonaldKCummings@teleworm.us	Avenida João C Real 96	3850-562		1900-01-01	1900-01-01 00:00:00
Jason Slack	JasonKSlack@cuvovx.de	Wegedoorn 166	9461 KJ	Jason Slack order for month of September (2019)	2019-10-04	2019-09-24 17:08:06
Faith White	FaithHWhite@rhyta.com	Ποσειδώνος 138	8027	Faith White order for month of August (2019)	2019-08-13	2019-08-05 17:08:06

Returns all rows from both Entities

Aggregate Joins in SQL



Hiding Columns

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

The screenshot shows a data tool interface with a table containing data from two aggregates: 'Customer' and 'Order'. The 'Customer' aggregate has a 'ZIPCode' column, and the 'Order' aggregate has an 'Id' column. The table displays 11 rows of data. A context menu is open over the table, showing options like 'Max', 'Min', 'Count', 'Filter...', 'Sort A-Z', 'Sort Z-A', 'Hide', and 'Hide others'. The 'Hide' option is selected, and a red arrow points from it to the 'Order' aggregate header.

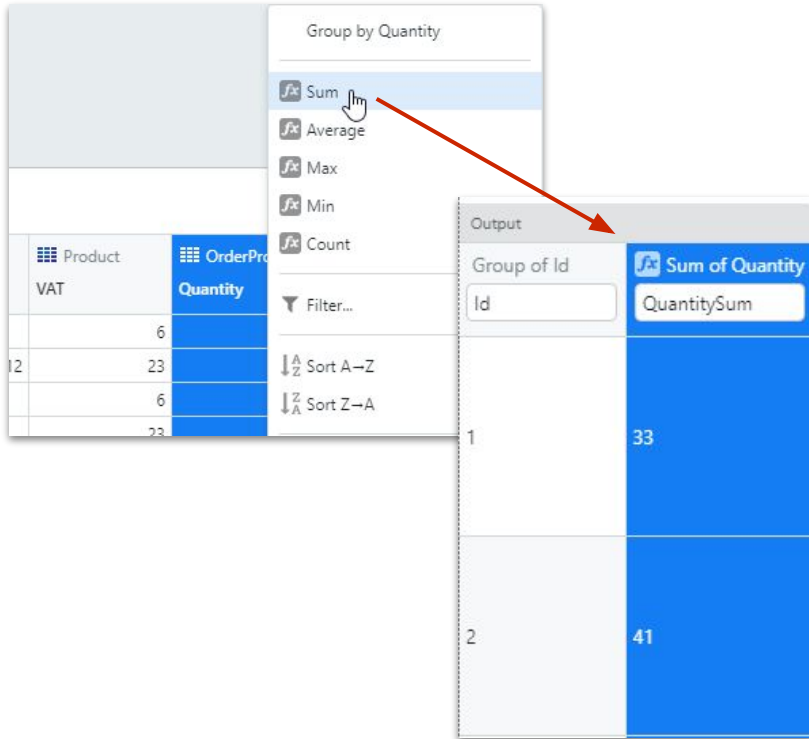
Customer	Order
ZIPCode	Id
756 43	1
8027	2
85810-050	3
33180	4
1268	5
9461 KJ	6
980 20	7
756 43	8
1268	9
3510	10
8027	11

Calculated Attributes

OrderProduct	Product	Quantity * Price
Quantity	Price	TotalPrice
14	4.99	69.86
5	4.99	24.95
5	4.99	24.95
8	4.99	39.92
9	4.99	44.91
3	4.99	14.97
9	4.99	44.91

- 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

Aggregating Records



The screenshot illustrates a data aggregation process. On the left, a data table is shown with columns 'Product' and 'Quantity'. A menu titled 'Group by Quantity' is open, listing aggregation functions: Sum, Average, Max, Min, and Count. A red arrow points from the 'Sum' option in the menu to the 'Sum of Quantity' field in the 'Output' table on the right. The 'Output' table has two columns: 'Group of Id' and 'Sum of Quantity'. The 'Group of Id' column contains values 1 and 2, and the 'Sum of Quantity' column contains values 33 and 41.

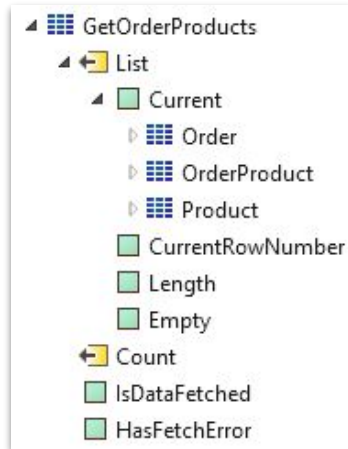
Product	Quantity
VAT	6
12	23
	6
	23

Group of Id	Sum of Quantity
1	33
2	41

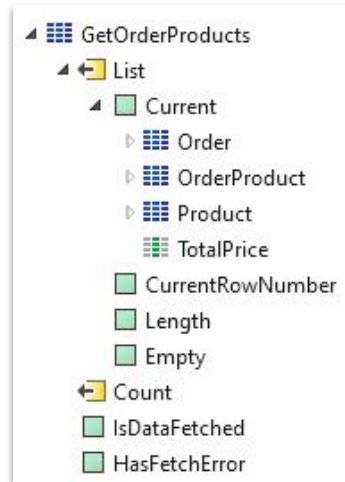
- Group multiple rows together
 - Example: Group by Orders to find number of Products per Order
- Apply a function on a group of values
 - Sum
 - Average
 - Min, Max
 - Count
- Only the aggregated columns are part of the output

Aggregates Output (Revisited)

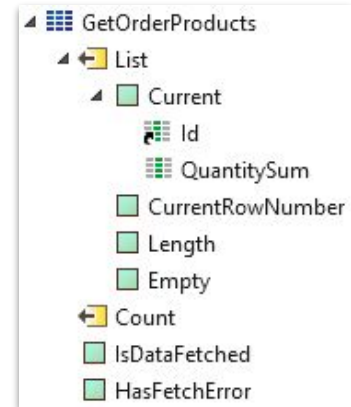
Multiple Sources



Calculated Attributes



Aggregated Columns



Questions?



Thank You!

