



INSTITUTO SUPERIOR TÉCNICO

AID

Northwind Data Warehouse

Final Project

AUTHORS

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2021/2022 - 1ST SEMESTER

11th November 2021

1 SQL Code - northwind_dw.sql

```
DROP DATABASE IF EXISTS northwind_dw;

CREATE DATABASE IF NOT EXISTS northwind_dw;

USE northwind_dw;

CREATE TABLE dim_customer(
    CustomerID  VARCHAR(5),
    CompanyName VARCHAR(40),
    City        VARCHAR(15),
    Country     VARCHAR(15),
    PRIMARY KEY (CustomerID)
);

CREATE TABLE dim_product(
    ProductKey  INTEGER,
    ProductID   INTEGER,
    ProductName VARCHAR(40),
    CategoryName VARCHAR(15),
    Version     INTEGER,
    Date_From   DATETIME,
    Date_To     DATETIME,
    PRIMARY KEY (ProductKey)
);

CREATE TABLE dim_supplier(
    SupplierID  INTEGER,
    CompanyName VARCHAR(40),
    City        VARCHAR(15),
    Country     VARCHAR(15),
    PRIMARY KEY (SupplierID)
);

CREATE TABLE dim_shipper(
    ShipperID   INTEGER,
    CompanyName VARCHAR(40),
    PRIMARY KEY (ShipperID)
);

CREATE TABLE dim_time(
    TimeID      DATETIME,
    YearID      INTEGER,
    MonthID     INTEGER,
```

```

MonthName VARCHAR(255),
DayID      INTEGER,
PRIMARY KEY (TimeID)
);

CREATE TABLE fact_order (
  OrderID      INTEGER,
  Sales        DOUBLE,
  Quantity     INTEGER,
  CustomerID   VARCHAR(5),
  ProductKey   INTEGER,
  SupplierID   INTEGER,
  ShipperID    INTEGER,
  TimeID       DATETIME,
  PRIMARY KEY (OrderID, ProductKey),
  FOREIGN KEY (CustomerID) REFERENCES dim_customer (CustomerID),
  FOREIGN KEY (ProductKey) REFERENCES dim_product (ProductKey),
  FOREIGN KEY (SupplierID) REFERENCES dim_supplier (SupplierID),
  FOREIGN KEY (ShipperID) REFERENCES dim_shipper (ShipperID),
  FOREIGN KEY (TimeID) REFERENCES dim_time (TimeID)
);

```

2 Transformations

2.1 Customer Dimension - dim_customer

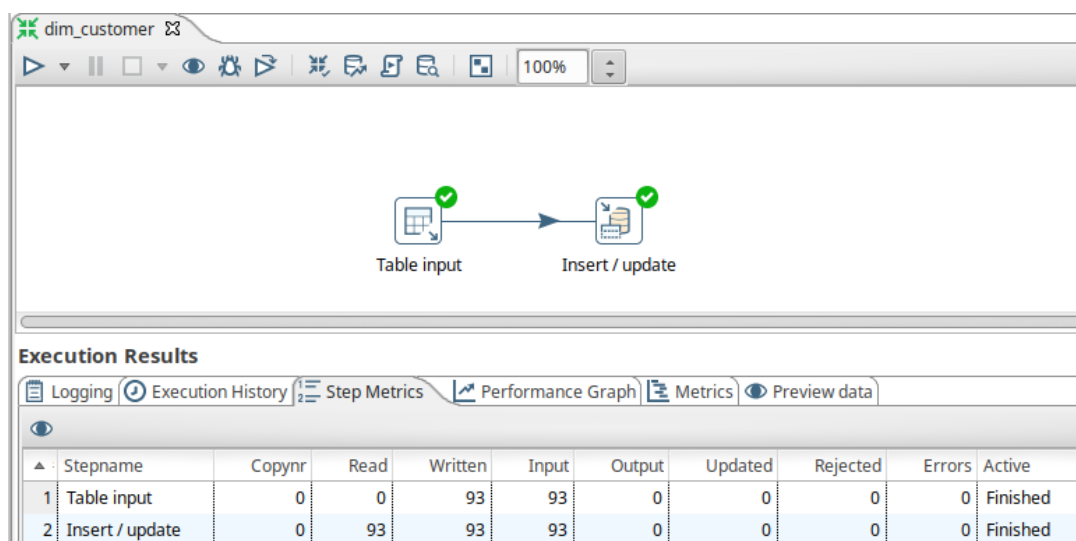


Figure 1: Customer Dimension - Transformation

Table input

Step name: Table input

Connection: northwind

SQL:

```
SELECT
  CustomerID
, CompanyName
, City
, Country
FROM northwind.Customers
```

Line 1 Column 0

Store column info in step ☐

Enable lazy conversion ☐

Replace variables in script ☐

Insert data from step

Execute for each row? ☐

Limit size: 0

Buttons: Help, OK, Preview, Cancel

Examine preview data

Rows of step: Table input (93 rows)

	CustomerID	CompanyName	City	Country
1	ALFKI	Alfreds Futterkiste	Berlin	Germany
2	ANATR	Ana Trujillo Emparedados y helados	Mxico D.F.	Mexico
3	ANTON	Antonio Moreno Taquera	Mxico D.F.	Mexico
4	AROUT	Around the Horn	London	UK
5	BERGS	Berglunds snabbkp	Lule	Sweden
6	BLAUS	Blauer See Delikatessen	Mannheim	Germany
7	BLONP	Blondesddl pre et fils	Strasbourg	France
8	BOLID	Blido Comidas preparadas	Madrid	Spain
9	BONAP	Bon app'	Marseille	France
10	BOTTM	Bottom-Dollar Markets	Tsawassen	Canada
11	BSBEV	B's Beverages	London	UK
12	CACTU	Cactus Comidas para llevar	Buenos Aires	Argentina
13	CENTC	Centro comercial Moctezuma	Mxico D.F.	Mexico
14	CHOPS	Chop-suey Chinese	Bern	Switzerland
15	COMMI	Comrcio Mineiro	Sao Paulo	Brazil
16	CONSH	Consolidated Holdings	London	UK

Buttons: Close, Show Log

Figure 2: Customer Dimension - Table Input (Configuration + Preview)

Insert / update

Step name: Insert / update

Connection: northwind_dw

Target schema: northwind_dw

Target table: dim_customer

Commit size: 100

Don't perform any updates ☐

The key(s) to look up the value(s):

	Table field	Comparator	Stream field1	Stream field2
1	CustomerID	=	CustomerID	

Update fields:

	Table field	Stream field	Update
1	CustomerID	CustomerID	Y
2	CompanyName	CompanyName	Y
3	City	City	Y
4	Country	Country	Y

Buttons: Help, OK, Cancel, SQL

Examine preview data

Rows of step: Insert / update (93 rows)

	CustomerID	CompanyName	City	Country
1	ALFKI	Alfreds Futterkiste	Berlin	Germany
2	ANATR	Ana Trujillo Emparedados y helados	Mxico D.F.	Mexico
3	ANTON	Antonio Moreno Taquera	Mxico D.F.	Mexico
4	AROUT	Around the Horn	London	UK
5	BERGS	Berglunds snabbkp	Lule	Sweden
6	BLAUS	Blauer See Delikatessen	Mannheim	Germany
7	BLONP	Blondesddl pre et fils	Strasbourg	France
8	BOLID	Blido Comidas preparadas	Madrid	Spain
9	BONAP	Bon app'	Marseille	France
10	BOTTM	Bottom-Dollar Markets	Tsawassen	Canada
11	BSBEV	B's Beverages	London	UK
12	CACTU	Cactus Comidas para llevar	Buenos Aires	Argentina
13	CENTC	Centro comercial Moctezuma	Mxico D.F.	Mexico
14	CHOPS	Chop-suey Chinese	Bern	Switzerland
15	COMMI	Comrcio Mineiro	Sao Paulo	Brazil
16	CONSH	Consolidated Holdings	London	UK
17	DRACD	Drachenblut Delikatessen	Aachen	Germany
18	DUMON	Du monde entier	Nantes	France
19	EASTC	Eastern Connection	London	UK
20	ERNSH	Ernst Handel	Graz	Austria
21	FAMIA	Familia Arquibaldo	Sao Paulo	Brazil
22	FISSA	FISSA Fabrica Inter. Salchichas S.A.	Madrid	Spain
23	FOUIG	Foies gourmandes	Lille	France

Buttons: Close

Figure 3: Customer Dimension - Insert/Update (Configuration + Preview)

2.2 Supplier Dimension - dim_supplier

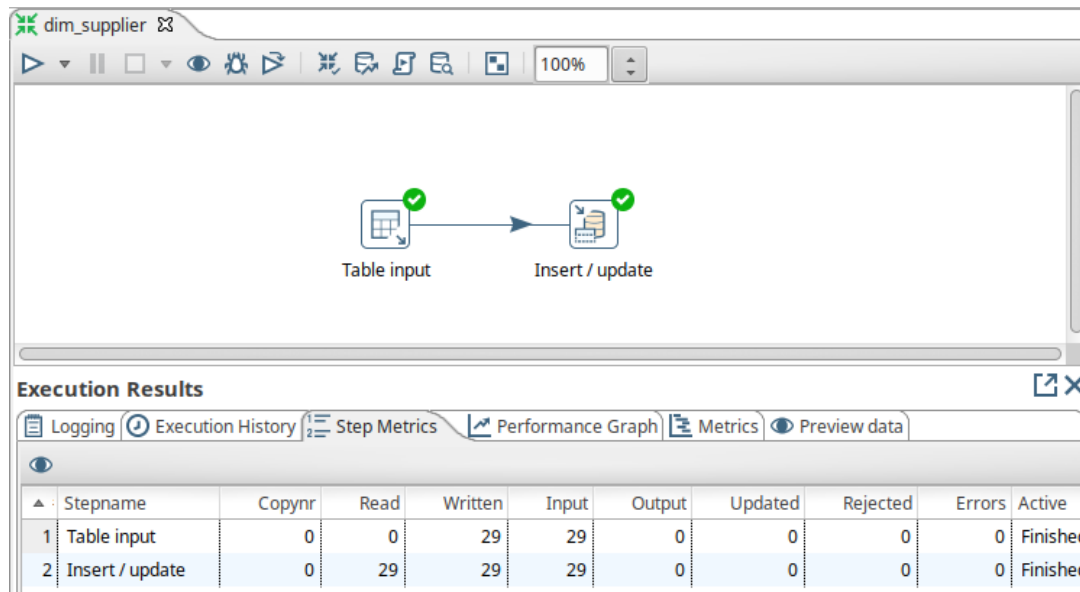


Figure 4: Supplier Dimension - Transformation

Table input

Step name

Table input

Connection

northwind

Edit...

New...

Wizard...

SQL

Get SQL select statement...

```
SELECT
  SupplierID
, CompanyName
, City
, Country
FROM northwind.Suppliers
```

Line 1 Column 0

Store column info in step meta data

Enable lazy conversion

Replace variables in script?

Insert data from step

Execute for each row?

Limit size

0

Help

OK

Preview

Cancel

Examine preview data

Rows of step: Table input (29 rows)

	SupplierID	CompanyName	City	Country
1	1	Exotic Liquids	London	UK
2	2	New Orleans Cajun Delights	New Orleans	USA
3	3	Grandma Kelly's Homestead	Ann Arbor	USA
4	4	Tokyo Traders	Tokyo	Japan
5	5	Cooperativa de Quesos 'Las Cabras'	Oviedo	Spain

Close

Show Log

Figure 5: Supplier Dimension - Table Input (Configuration + Preview)

Insert / update

Step name

Insert / update

Connection

northwind_dw

Edit...

New...

Wizard...

Target schema

northwind_dw

Browse...

Target table

dim_supplier

Browse...

Commit size

100

Don't perform any updates:

☐

The key(s) to look up the value(s):

	Table field	Comparator	Stream field1	Stream field2
1	SupplierID	=	SupplierID	

Get fields

Update fields:

	Table field	Stream field	Update
1	SupplierID	SupplierID	Y
2	CompanyName	CompanyName	Y
3	City	City	Y
4	Country	Country	Y

Get update fields

Edit mapping

Help

OK

Cancel

SQL

Examine preview data

Rows of step: Insert / update (29 rows)

	SupplierID	CompanyName	City	Country
1	1	Exotic Liquids	London	UK
2	2	New Orleans Cajun Delights	New Orleans	USA
3	3	Grandma Kelly's Homestead	Ann Arbor	USA
4	4	Tokyo Traders	Tokyo	Japan
5	5	Cooperativa de Quesos 'Las Cabras'	Oviedo	Spain

Close

Figure 6: Supplier Dimension - Insert/Update (Configuration + Preview)

2.3 Shipper Dimension - dim_shipper

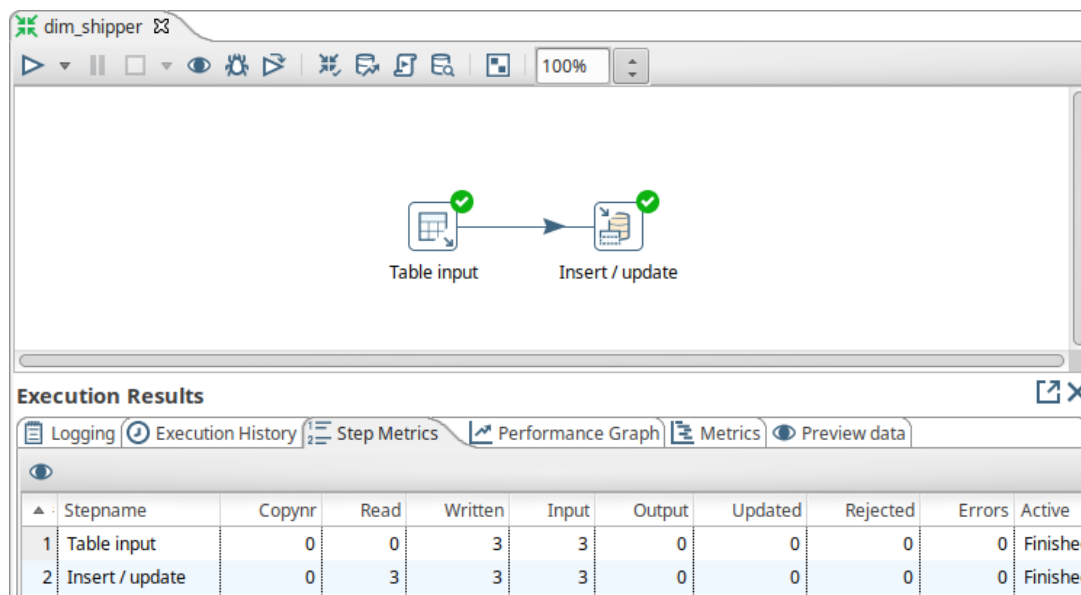


Figure 7: Shipper Dimension - Transformation

Table input

Step name

Table input

Connection

northwind

▼

Edit...

New...

Wizard...

SQL

Get SQL select statement...

```
SELECT
  ShipperID
, CompanyName
FROM northwind.Shippers
```

Line 1 Column 0

Store column info in step meta data ☐

Enable lazy conversion ☐

Replace variables in script? ☐

Insert data from step

▼

Execute for each row? ☐

Limit size

0

Help

OK

Preview

Cancel

Examine preview data

Rows of step: Table input (3 rows)

▲	ShipperID	CompanyName
1	1	Speedy Express
2	2	United Package
3	3	Federal Shipping

Close

Show Log

Figure 8: Shipper Dimension - Table Input (Configuration + Preview)

Insert / update

Step name

Insert / update

Connection

northwind_dw

Edit...

New...

Wizard...

Target schema

northwind_dw

Browse...

Target table

dim_shipper

Browse...

Commit size

100

Don't perform any updates:

☐

The key(s) to look up the value(s):

	Table field	Comparator	Stream field1	Stream field2
1	ShipperID	=	ShipperID	

Get fields

Update fields:

	Table field	Stream field	Update
1	ShipperID	ShipperID	Y
2	CompanyName	CompanyName	Y

Get update fields

Edit mapping

Help

OK

Cancel

SQL

Examine preview data

Rows of step: Insert / update (3 rows)

	ShipperID	CompanyName
1	1	Speedy Express
2	2	United Package
3	3	Federal Shipping

Close

Figure 9: Shipper Dimension - Insert/Update (Configuration + Preview)

2.4 Product Dimension - dim_product

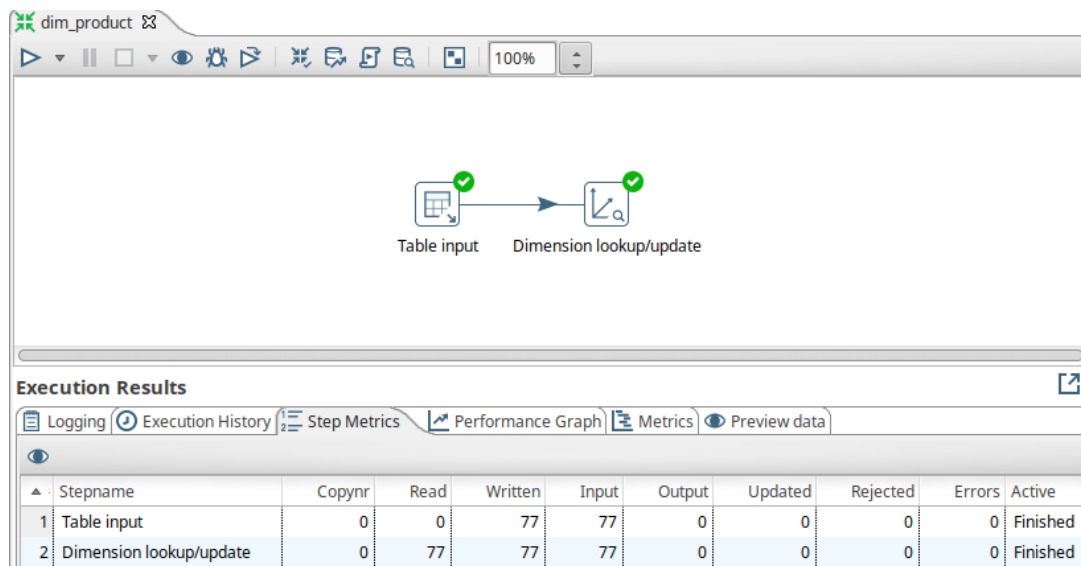


Figure 10: Product Dimension - Transformation

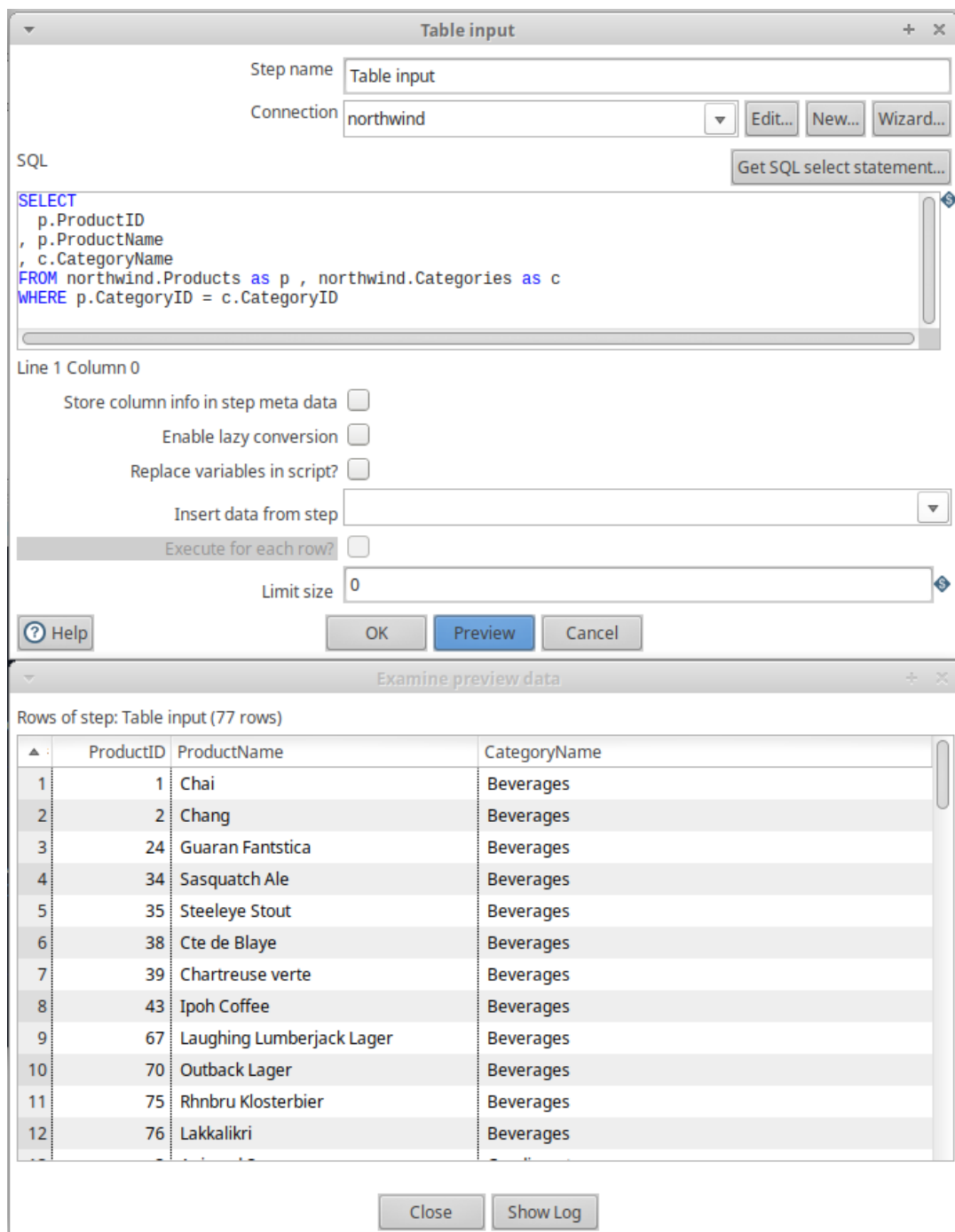


Figure 11: Product Dimension - Table Input

Dimension lookup/update

Step name:

Update the dimension? ☒

Connection:

Target schema:

Target table:

Commit size:

Enable the cache? ☒

Pre-load the cache? ☐

Cache size in rows (0 = cache all):

Keys **Fields**

Key fields (to look up row in dimension):

	Dimension field	Field in stream
1	ProductID	ProductID

Technical key field:

Creation of technical key

☒ Use table maximum + 1

☐ Use sequence

☐ Use auto increment field

Version field:

Stream Datefield:

Date range start field: Min. year:

Use an alternative start date? ☐

Table date range end: Max. year:

Figure 12: Product Dimension - Dimension Lookup (Keys Configuration)

Dimension lookup/update

Step name
Dimension lookup/update

Update the dimension?
☒

Connection
northwind_dw
Edit...
New...
Wizard...

Target schema
northwind_dw
Browse...

Target table
dim_product
Browse...

Commit size
100

Enable the cache?
☒

Pre-load the cache?
☐

Cache size in rows (0 = cache all)
5000

Keys
Fields

Lookup/Update fields

	Dimension field	Stream field to compare with	Type of dimension update
1	ProductName	ProductName	Insert
2	CategoryName	CategoryName	Insert

Technical key field
ProductKey
New name

Creation of technical key
☒ Use table maximum + 1
☐ Use sequence
☐ Use auto increment field

Version field
Version

Stream Datefield

Date range start field
Date_From
Min. year
1900

Use an alternative start date?
☐
<Select Option>

Table date range end
Date_To
Max. year
2199

OK
Cancel
Get Fields
SQL

Help

Figure 13: Product Dimension - Dimension Lookup (Fields Configuration)

Examine preview data

Rows of step: Dimension lookup/update (77 rows)

	ProductID	ProductName	CategoryName	ProductKey
1	1	Chai	Beverages	1
2	2	Chang	Beverages	2
3	24	Guaran Fantstica	Beverages	3
4	34	Sasquatch Ale	Beverages	4
5	35	Steeleye Stout	Beverages	5
6	38	Cte de Blaye	Beverages	6
7	39	Chartreuse verte	Beverages	7
8	43	Ipoh Coffee	Beverages	8
9	67	Laughing Lumberjack Lager	Beverages	9
10	70	Outback Lager	Beverages	10
11	75	Rhnbru Klosterbier	Beverages	11
12	76	Lakkalikri	Beverages	12
13	3	Aniseed Syrup	Condiments	13
14	4	Chef Anton's Cajun Seasoning	Condiments	14

Close

Figure 14: Product Dimension - Dimension Lookup (Preview)

2.5 Time Dimension - dim_time

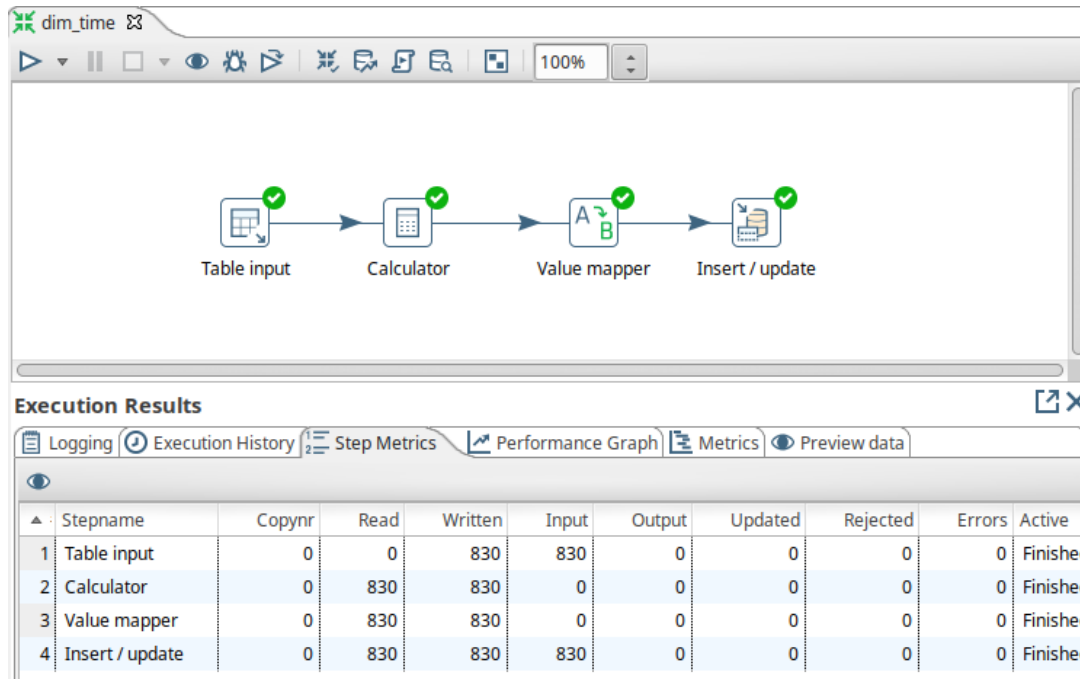


Figure 15: Time Dimension - Transformation

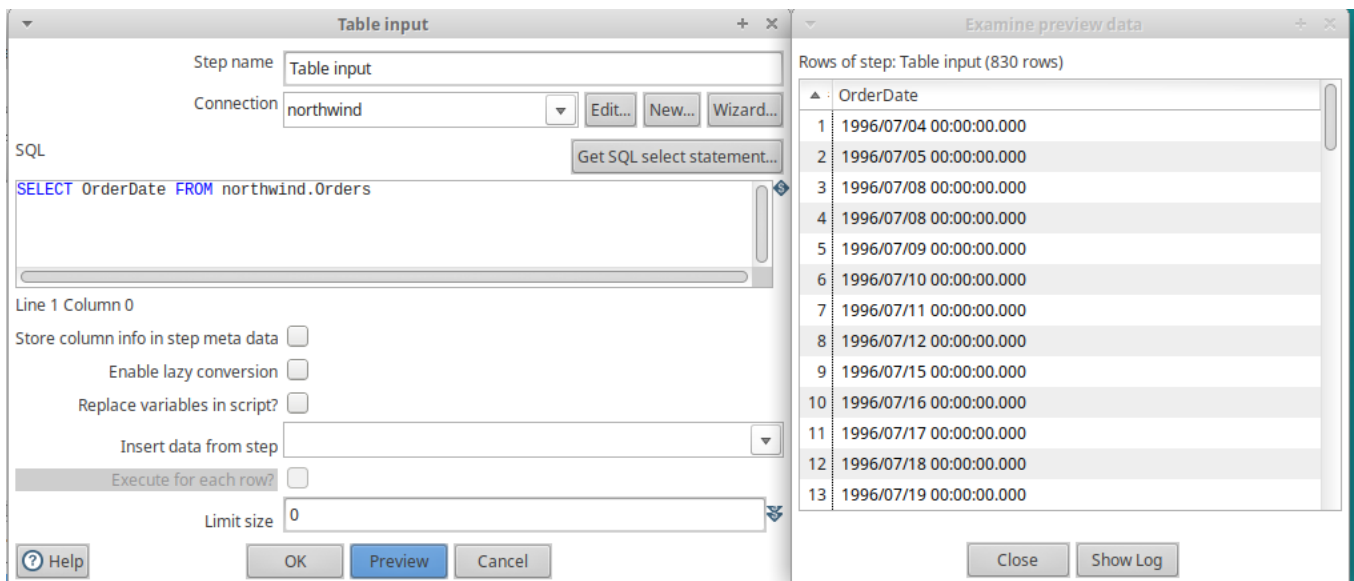


Figure 16: Time Dimension - Table Input (Configuration + Preview)

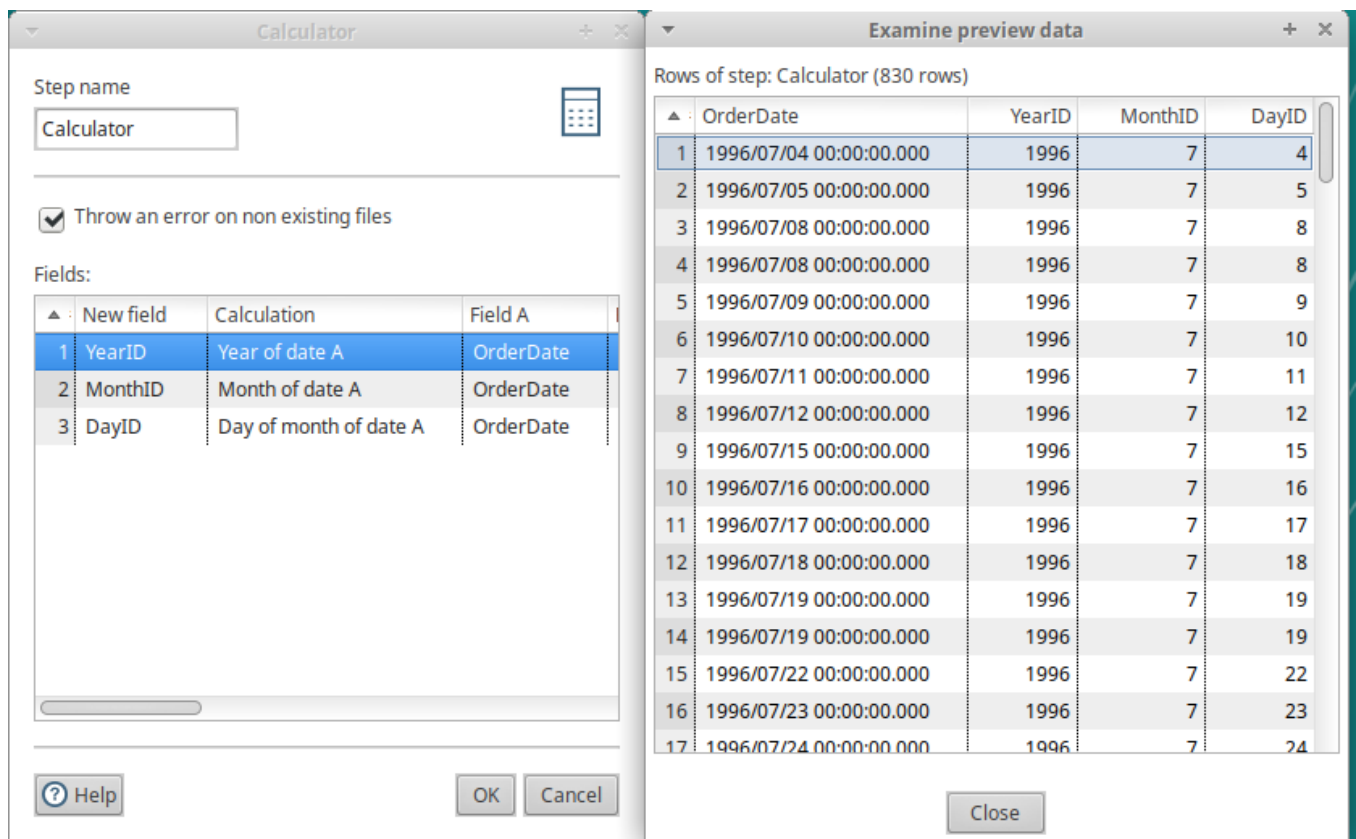


Figure 17: Time Dimension - Calculator (Configuration + Preview)

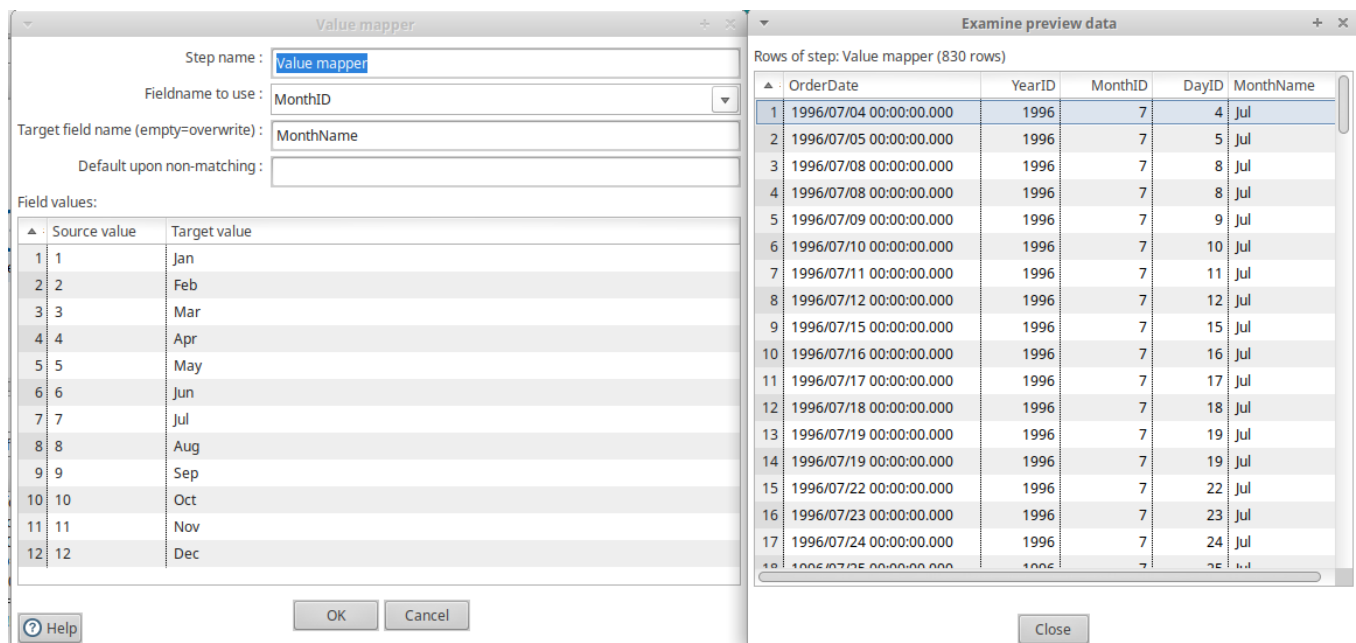


Figure 18: Time Dimension - Value Mapper (Configuration + Preview)

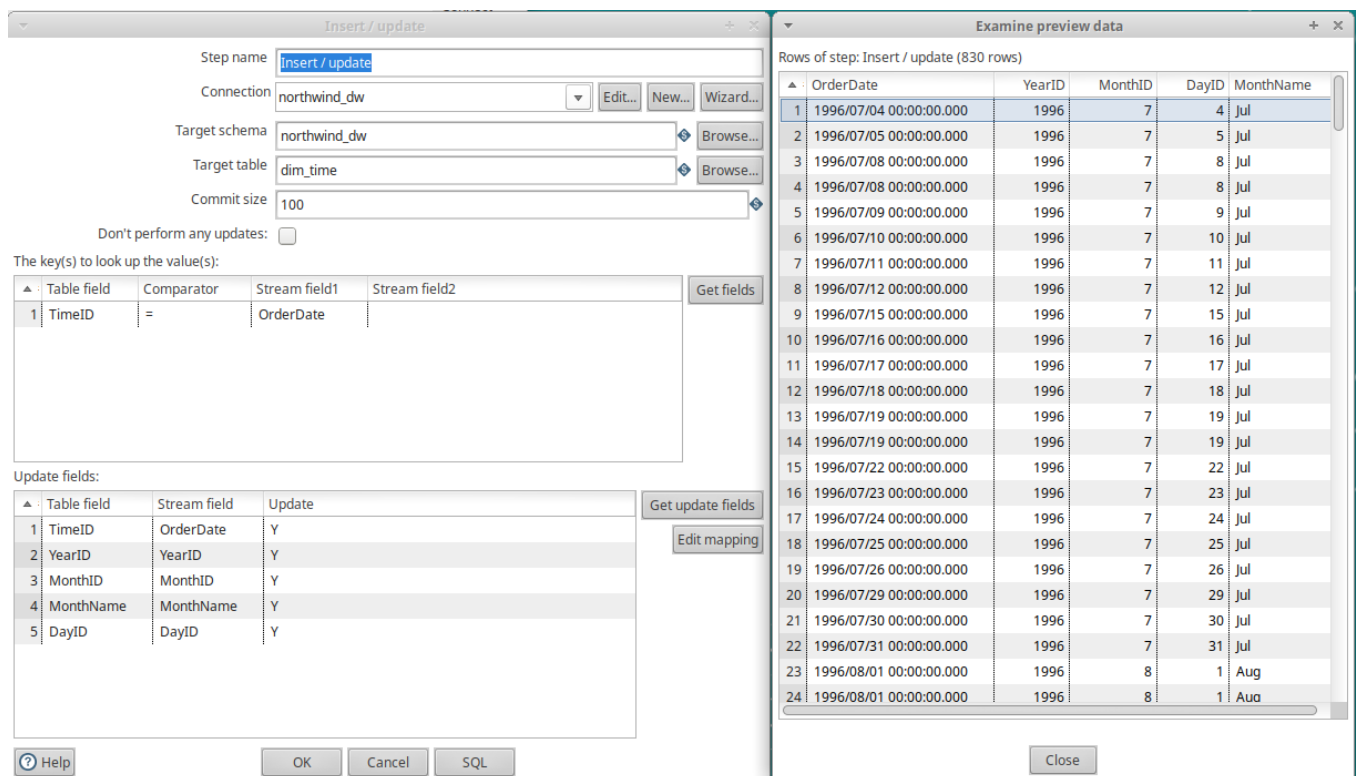


Figure 19: Time Dimension - Insert/Update (Configuration + Preview)

2.6 Fact Table - fact_order

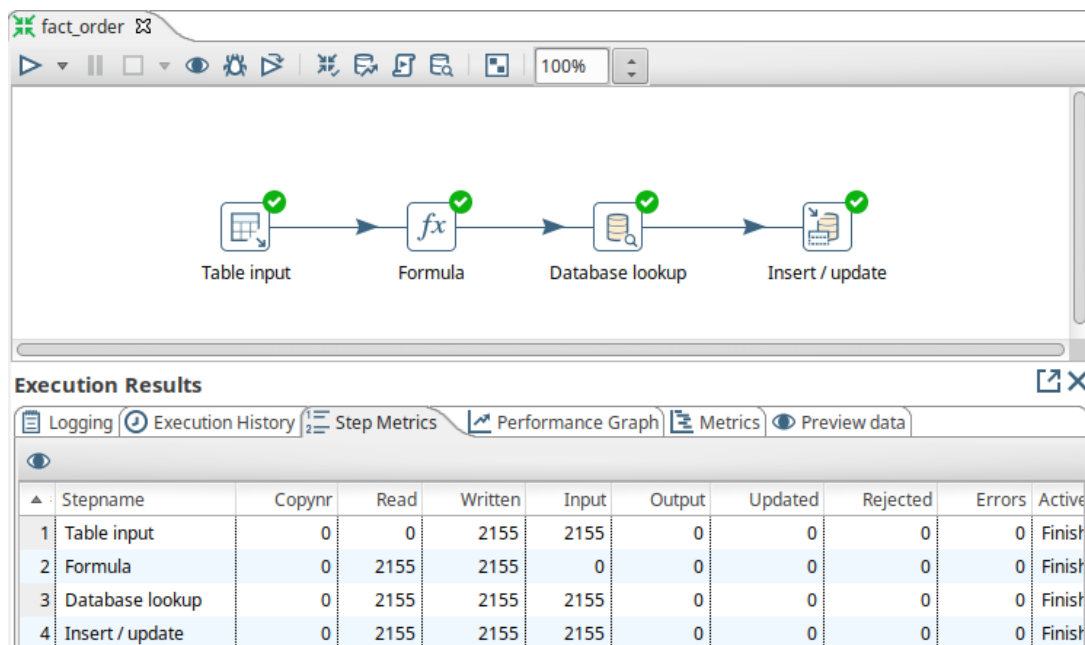


Figure 20: Fact Table - Transformation

Table input

Step name: Table input

Connection: northwind

SQL

```

select o.OrderID, o.OrderDate, o.CustomerID, o.ShipVia as ShipperID,
       p.SupplierID,
       od.ProductID, od.UnitPrice, od.Quantity, od.Discount
from Orders as o,
     OrderDetails as od,
     Products as p
where o.OrderID = od.OrderID and
      od.ProductID = p.ProductID;

```

Line 1 Column 0

☐ Store column info in step meta data
☐ Enable lazy conversion
☐ Replace variables in script?

Insert data from step

☐ Execute for each row?

Limit size

 0

Help

OK

Preview

Cancel

Examine preview data

Rows of step: Table input (1000 rows)

	OrderID	OrderDate	CustomerID	ShipperID	SupplierID	ProductID	UnitPrice	Quantity	Discount
1	10248	1996/07/04 00:00:00.000	VINET	3	5	11	14.0	12	0.0
2	10248	1996/07/04 00:00:00.000	VINET	3	20	42	9.8	10	0.0
3	10248	1996/07/04 00:00:00.000	VINET	3	14	72	34.8	5	0.0
4	10249	1996/07/05 00:00:00.000	TOMSP	1	6	14	18.6	9	0.0
5	10249	1996/07/05 00:00:00.000	TOMSP	1	24	51	42.4	40	0.0
6	10250	1996/07/08 00:00:00.000	HANAR	2	19	41	7.7	10	0.0
7	10250	1996/07/08 00:00:00.000	HANAR	2	24	51	42.4	35	0.15
8	10250	1996/07/08 00:00:00.000	HANAR	2	2	65	16.8	15	0.15
9	10251	1996/07/08 00:00:00.000	VICTE	1	9	22	16.8	6	0.05
10	10251	1996/07/08 00:00:00.000	VICTE	1	26	57	15.6	15	0.05
11	10251	1996/07/08 00:00:00.000	VICTE	1	2	65	16.8	20	0.0
12	10252	1996/07/09 00:00:00.000	SUPRD	2	8	20	64.8	40	0.05
13	10252	1996/07/09 00:00:00.000	SUPRD	2	15	33	2.0	25	0.05
14	10252	1996/07/09 00:00:00.000	SUPRD	2	28	60	27.2	40	0.0
15	10253	1996/07/10 00:00:00.000	HANAR	2	14	31	10.0	20	0.0
16	10253	1996/07/10 00:00:00.000	HANAR	2	18	39	14.4	42	0.0
17	10253	1996/07/10 00:00:00.000	HANAR	2	23	49	16.0	40	0.0
18	10254	1996/07/11 00:00:00.000	CHOPS	2	10	24	3.6	15	0.15

Close

Show Log

Figure 21: Fact Table - Table Input (Configuration + Preview)

Formula

Step name

Fields:

	New field	Formula	Value type	Length	Precision	Replace value
1	Sales	[UnitPrice]*[Quantity]*(1-[Discount])	Number			

Help

OK

Cancel

Examine preview data

Rows of step: Formula (1000 rows)

	OrderID	OrderDate	CustomerID	ShipperID	Supplier	ProductID	UnitPrice	Quantity	Discount	Sales
1	10248	1996/07/04 00:00:00.000	VINET	3	5	11	14.0	12	0.0	168.0
2	10248	1996/07/04 00:00:00.000	VINET	3	20	42	9.8	10	0.0	98.0
3	10248	1996/07/04 00:00:00.000	VINET	3	14	72	34.8	5	0.0	174.0
4	10249	1996/07/05 00:00:00.000	TOMSP	1	6	14	18.6	9	0.0	167.4
5	10249	1996/07/05 00:00:00.000	TOMSP	1	24	51	42.4	40	0.0	1696.0
6	10250	1996/07/08 00:00:00.000	HANAR	2	19	41	7.7	10	0.0	77.0
7	10250	1996/07/08 00:00:00.000	HANAR	2	24	51	42.4	35	0.15	1261.4
8	10250	1996/07/08 00:00:00.000	HANAR	2	2	65	16.8	15	0.15	214.2
9	10251	1996/07/08 00:00:00.000	VICTE	1	9	22	16.8	6	0.05	95.76
10	10251	1996/07/08 00:00:00.000	VICTE	1	26	57	15.6	15	0.05	222.3
11	10251	1996/07/08 00:00:00.000	VICTE	1	2	65	16.8	20	0.0	336.0
12	10252	1996/07/09 00:00:00.000	SUPRD	2	8	20	64.8	40	0.05	2462.4
13	10252	1996/07/09 00:00:00.000	SUPRD	2	15	33	2.0	25	0.05	47.5
14	10252	1996/07/09 00:00:00.000	SUPRD	2	28	60	27.2	40	0.0	1088.0
15	10253	1996/07/10 00:00:00.000	HANAR	2	14	31	10.0	20	0.0	200.0
16	10253	1996/07/10 00:00:00.000	HANAR	2	18	39	14.4	42	0.0	604.8
17	10253	1996/07/10 00:00:00.000	HANAR	2	23	49	16.0	40	0.0	640.0
18	10254	1996/07/11 00:00:00.000	CHOPS	2	10	24	3.6	15	0.15	45.9
19	10254	1996/07/11 00:00:00.000	CHOPS	2	25	55	19.2	21	0.15	342.72

Close

Stop

Get more rows

Figure 22: Fact Table - Formula (Configuration + Preview)

Examine preview data

Rows of step: Database lookup (1000 rows)

	OrderID	OrderDate	CustomerID	ShipperID	SupplierID	ProductID	UnitPrice	Quantity	Discount	Sales	ProductKey
1	10248	1996/07/04 00:00:00.000	VINET	3	5	11	14.0	12	0.0	168.0	38
2	10248	1996/07/04 00:00:00.000	VINET	3	20	42	9.8	10	0.0	98.0	50
3	10248	1996/07/04 00:00:00.000	VINET	3	14	72	34.8	5	0.0	174.0	47
4	10249	1996/07/05 00:00:00.000	TOMSP	1	6	14	18.6	9	0.0	167.4	62
5	10249	1996/07/05 00:00:00.000	TOMSP	1	24	51	42.4	40	0.0	1696.0	64
6	10250	1996/07/08 00:00:00.000	HANAR	2	19	41	7.7	10	0.0	77.0	73
7	10250	1996/07/08 00:00:00.000	HANAR	2	24	51	42.4	35	0.15	1261.4	64
8	10250	1996/07/08 00:00:00.000	HANAR	2	2	65	16.8	15	0.15	214.2	22
9	10251	1996/07/08 00:00:00.000	VICTE	1	9	22	16.8	6	0.05	95.76	48
10	10251	1996/07/08 00:00:00.000	VICTE	1	26	57	15.6	15	0.05	222.3	53
11	10251	1996/07/08 00:00:00.000	VICTE	1	2	65	16.8	20	0.0	336.0	22
12	10252	1996/07/09 00:00:00.000	SUPRD	2	8	20	64.8	40	0.05	2462.4	27
13	10252	1996/07/09 00:00:00.000	SUPRD	2	15	33	2.0	25	0.05	47.5	42
14	10252	1996/07/09 00:00:00.000	SUPRD	2	28	60	27.2	40	0.0	1088.0	44
15	10253	1996/07/10 00:00:00.000	HANAR	2	14	31	10.0	20	0.0	200.0	40
16	10253	1996/07/10 00:00:00.000	HANAR	2	18	39	14.4	42	0.0	604.8	7
17	10253	1996/07/10 00:00:00.000	HANAR	2	23	49	16.0	40	0.0	640.0	34
18	10254	1996/07/11 00:00:00.000	CHOPS	2	10	24	3.6	15	0.15	45.9	3
19	10254	1996/07/11 00:00:00.000	CHOPS	2	25	55	19.2	21	0.15	342.72	60
20	10254	1996/07/11 00:00:00.000	CHOPS	2	4	74	8.0	21	0.0	168.0	65
21	10255	1996/07/12 00:00:00.000	RICSU	3	1	2	15.2	20	0.0	304.0	2
22	10255	1996/07/12 00:00:00.000	RICSU	3	7	16	13.9	35	0.0	486.5	25
23	10255	1996/07/12 00:00:00.000	RICSU	3	17	36	15.2	25	0.0	380.0	70
24	10255	1996/07/12 00:00:00.000	RICSU	3	28	59	44.0	30	0.0	1320.0	43
25	10256	1996/07/15 00:00:00.000	WELLI	2	24	53	26.2	15	0.0	393.0	58
26	10256	1996/07/15 00:00:00.000	WELLI	2	12	77	10.4	12	0.0	124.8	24
27	10257	1996/07/16 00:00:00.000	HILAA	3	11	27	35.1	25	0.0	877.5	31

Database lookup

Step name

Database lookup

Connection

northwind_dw

Look up schema

northwind_dw

Look up table

dim_product

Enable cache?

Cache size in rows (0=cache everything)

0

Load all data from table

The key(s) to look up the value(s):

	Table field	Comparator	Field1	Field2
1	ProductID	=	ProductID	
2	Date_From	<=	OrderDate	
3	Date_To	>	OrderDate	

Values to return from the lookup table:

	Field	New name	Default	Type
1	ProductKey			Integer

Do not pass the row if the lookup fails

Fail on multiple results?

Order by

Figure 23: Fact Table - Database Lookup (Configuration + Preview)

Examine preview data

Rows of step: Insert / update (1000 rows)

	OrderID	OrderDate	CustomerID	ShipperID	SupplierID	ProductID	UnitPrice	Quantity	Discount	Sales	ProductKey
1	10248	1996/07/04 00:00:00.000	VINET	3	5	11	14.0	12	0.0	168.0	38
2	10248	1996/07/04 00:00:00.000	VINET	3	20	42	9.8	10	0.0	98.0	50
3	10248	1996/07/04 00:00:00.000	VINET	3	14	72	34.8	5	0.0	174.0	47
4	10249	1996/07/05 00:00:00.000	TOMSP	1	6	14	18.6	9	0.0	167.4	62
5	10249	1996/07/05 00:00:00.000	TOMSP	1	24	51	42.4	40	0.0	1696.0	64
6	10250	1996/07/08 00:00:00.000	HANAR	2	19	41	7.7	10	0.0	77.0	73
7	10250	1996/07/08 00:00:00.000	HANAR	2	24	51	42.4	35	0.15	1261.4	64
8	10250	1996/07/08 00:00:00.000	HANAR	2	2	65	16.8	15	0.15	214.2	22
9	10251	1996/07/08 00:00:00.000	VICTE	1	9	22	16.8	6	0.05	95.76	48
10	10251	1996/07/08 00:00:00.000	VICTE	1	26	57	15.6	15	0.05	222.3	53
11	10251	1996/07/08 00:00:00.000	VICTE	1	2	65	16.8	20	0.0	336.0	22
12	10252	1996/07/09 00:00:00.000	SUPRD	2	8	20	64.8	40	0.05	2462.4	27
13	10252	1996/07/09 00:00:00.000	SUPRD	2	15	33	2.0	25	0.05	47.5	42
14	10252	1996/07/09 00:00:00.000	SUPRD	2	28	60	27.2	40	0.0	1088.0	44
15	10253	1996/07/10 00:00:00.000	HANAR	2	14	31	10.0	20	0.0	200.0	40
16	10253	1996/07/10 00:00:00.000	HANAR	2	18	39	14.4	42	0.0	604.8	7
17	10253	1996/07/10 00:00:00.000	HANAR	2	23	49	16.0	40	0.0	640.0	34
18	10254	1996/07/11 00:00:00.000	CHOPS	2	10	24	3.6	15	0.15	45.9	3
19	10254	1996/07/11 00:00:00.000	CHOPS	2	25	55	19.2	21	0.15	342.72	60
20	10254	1996/07/11 00:00:00.000	CHOPS	2	4	74	8.0	21	0.0	168.0	65
21	10255	1996/07/12 00:00:00.000	RICSU	3	1	2	15.2	20	0.0	304.0	2
22	10255	1996/07/12 00:00:00.000	RICSU	3	7	16	13.9	35	0.0	486.5	25
23	10255	1996/07/12 00:00:00.000	RICSU	3	17	36	15.2	25	0.0	380.0	70
24	10255	1996/07/12 00:00:00.000	RICSU	3	28	59	44.0	30	0.0	1320.0	43

Insert / update

Step name

Insert / update

Connection

northwind_dw

Target schema

northwind_dw

Target table

fact_order

Commit size

100

Don't perform any updates:

The key(s) to look up the value(s):

	Table field	Comparator	Stream field1	Stream field2
1	OrderID	=	OrderID	
2	ProductKey	=	ProductKey	

Update fields:

	Table field	Stream field	Update
1	OrderID	OrderID	Y
2	ProductKey	ProductKey	Y
3	TimeID	OrderDate	Y
4	CustomerID	CustomerID	Y
5	ShipperID	ShipperID	Y
6	SupplierID	SupplierID	Y
7	Quantity	Quantity	Y
8	Sales	Sales	Y

Figure 24: Fact Table - Insert/Update (Configuration + Preview)

3 Load Data Warehouse Job

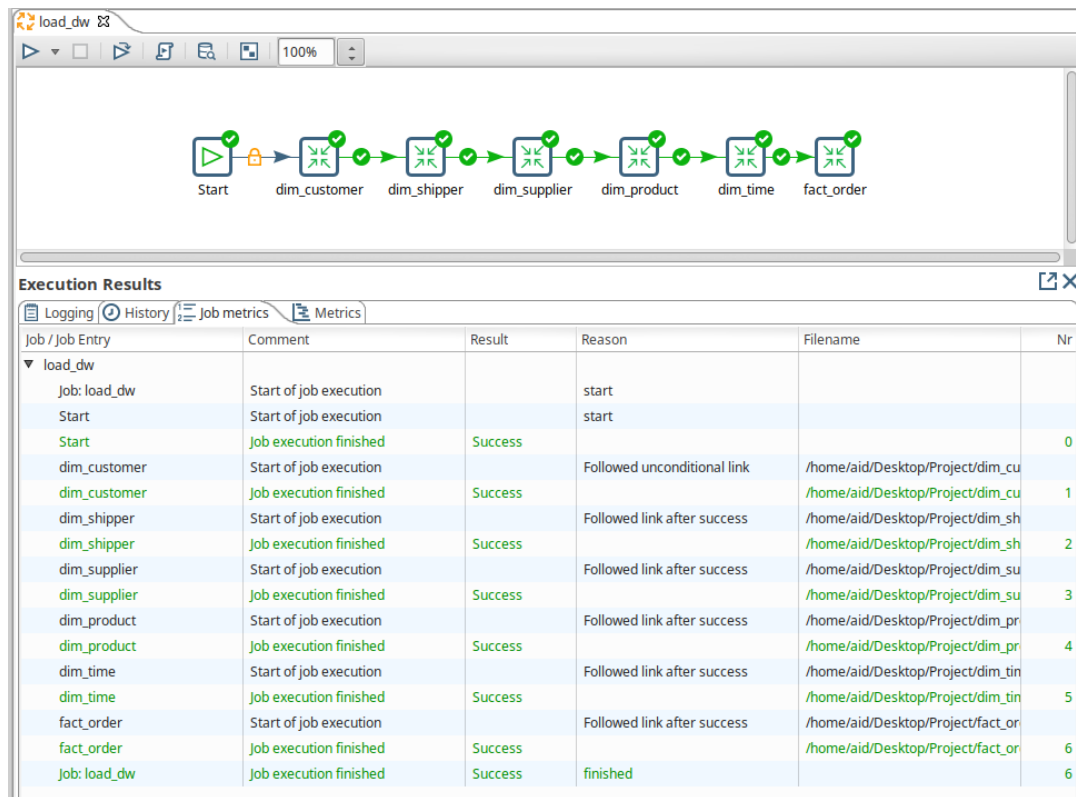


Figure 25: Data Warehouse - Load Job

4 XML code for the cube definition

```
<Schema name="northwind_dw">
  <Cube
    name="Orders"
    visible="true"
    cache="true"
    enabled="true">
    <Table
      name="fact_order">
    </Table>
    <Dimension
      type="StandardDimension"
      visible="true"
      foreignKey="CustomerID"
      name="Customer">
      <Hierarchy
        name="Customer Hierarchy"
        visible="true"
```

```
hasAll="true"
allMemberName="All Customers"
primaryKey="CustomerID">
<Table
  name="dim_customer">
</Table>
<Level
  name="Country"
  visible="true"
  column="Country"
  type="String"
  uniqueMembers="false"
  levelType="Regular">
</Level>
<Level
  name="City"
  visible="true"
  column="City"
  type="String"
  uniqueMembers="false"
  levelType="Regular">
</Level>
<Level
  name="Company Name"
  visible="true"
  column="CompanyName"
  type="String"
  uniqueMembers="false">
</Level>
</Hierarchy>
</Dimension>
<Dimension
  type="StandardDimension"
  visible="true"
  foreignKey="ShipperID"
  name="Shipper">
<Hierarchy
  name="Shipper Hierarchy"
  visible="true"
  hasAll="true"
  allMemberName="All Shippers"
  primaryKey="ShipperID">
<Table
  name="dim_shipper">
</Table>
```

```
<Level
  name="Company Name"
  visible="true"
  column="CompanyName"
  uniqueMembers="false"
  levelType="Regular">
</Level>
</Hierarchy>
</Dimension>
<Dimension
  type="StandardDimension"
  visible="true"
  foreignKey="SupplierID"
  name="Supplier">
  <Hierarchy
    name="Supplier Hierarchy"
    visible="true"
    hasAll="true"
    allMemberName="All Suppliers"
    primaryKey="SupplierID">
    <Table
      name="dim_supplier">
    </Table>
    <Level
      name="Country"
      visible="true"
      column="Country"
      type="String"
      uniqueMembers="false"
      levelType="Regular">
    </Level>
    <Level
      name="City"
      visible="true"
      column="City"
      type="String"
      uniqueMembers="false"
      levelType="Regular">
    </Level>
    <Level
      name="Company Name"
      visible="true"
      column="CompanyName"
      type="String"
      uniqueMembers="false"
```



```
        levelType="Regular">
    </Level>
</Hierarchy>
</Dimension>
<Dimension
  type="StandardDimension"
  visible="true"
  foreignKey="ProductKey"
  name="Product">
  <Hierarchy
    name="Product Hierarchy"
    visible="true"
    hasAll="true"
    allMemberName="All Products"
    primaryKey="ProductKey">
    <Table
      name="dim_product">
    </Table>
    <Level
      name="Categories"
      visible="true"
      column="CategoryName"
      type="String"
      uniqueMembers="false"
      levelType="Regular">
    </Level>
    <Level
      name="Names"
      visible="true"
      column="ProductName"
      type="String"
      uniqueMembers="false"
      levelType="Regular">
    </Level>
  </Hierarchy>
</Dimension>
<Dimension
  type="TimeDimension"
  visible="true"
  foreignKey="TimeID"
  name="Time">
  <Hierarchy
    name="Time Hierarchy"
    visible="true"
    hasAll="true"
```

```
allMemberName="All Years"
primaryKey="TimeID">
<Table
  name="dim_time">
</Table>
<Level
  name="Year"
  visible="true"
  column="YearID"
  type="Integer"
  uniqueMembers="false"
  levelType="TimeYears">
</Level>
<Level
  name="Month"
  visible="true"
  column="MonthName"
  ordinalColumn="MonthID"
  type="String"
  uniqueMembers="false"
  levelType="TimeMonths">
</Level>
<Level
  name="Day"
  visible="true"
  column="DayID"
  type="Integer"
  uniqueMembers="false"
  levelType="TimeDays">
</Level>
</Hierarchy>
</Dimension>
<Measure
  name="Sales"
  column="Sales"
  datatype="Numeric"
  formatString="$ #,###.00"
  aggregator="sum"
  visible="true">
</Measure>
<Measure
  name="Quantity"
  column="Quantity"
  formatString="#,###"
  aggregator="sum"
```

```

    visible="true">
  </Measure>
</Cube>
</Schema>

```

5 OLAP Analysis

5.1 Sales by customer country and year

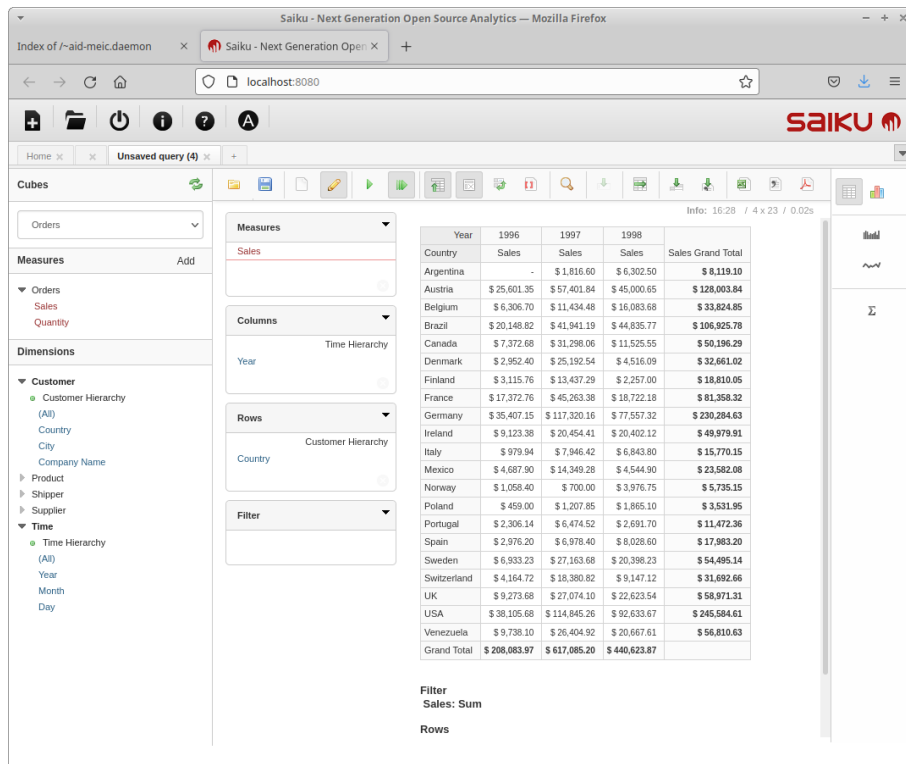


Figure 26: Sales by customer country and year to discover the country, the year, and the pair country-year with the most sales

5.2 Sales by product category and year

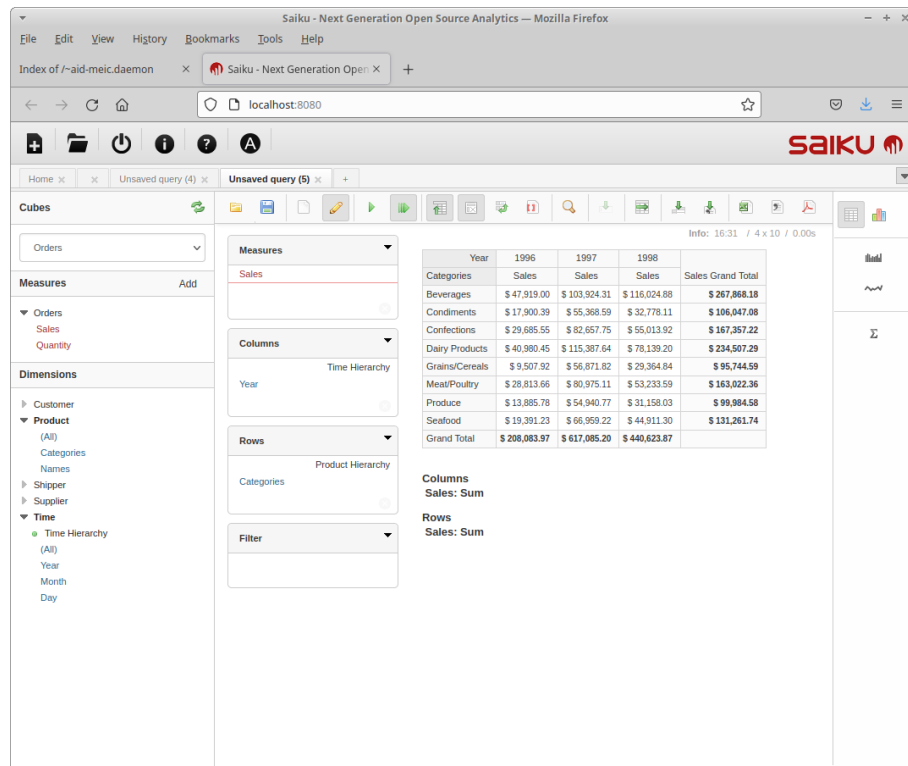


Figure 27: Sales by product category and year to discover the category, the year, and the pair category-year with the most sales

5.3 Quantity by shipping company and year

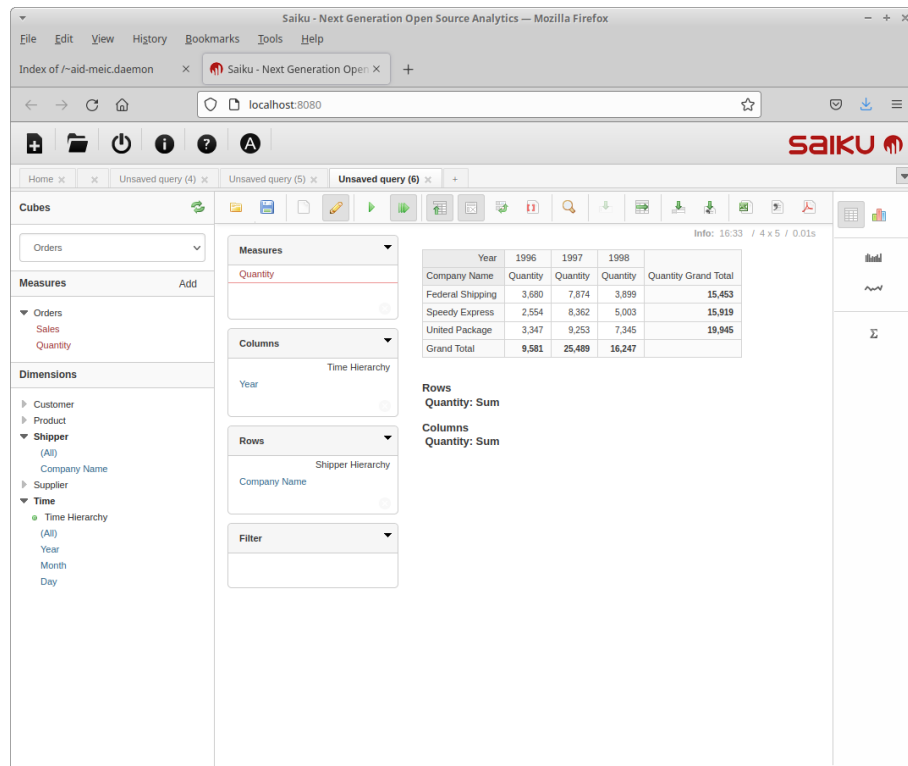


Figure 28: Quantity by shipping company and year to discover the shipper, the year, and the pair shipper-year with the most quantity

5.4 Sales by customer country and product category

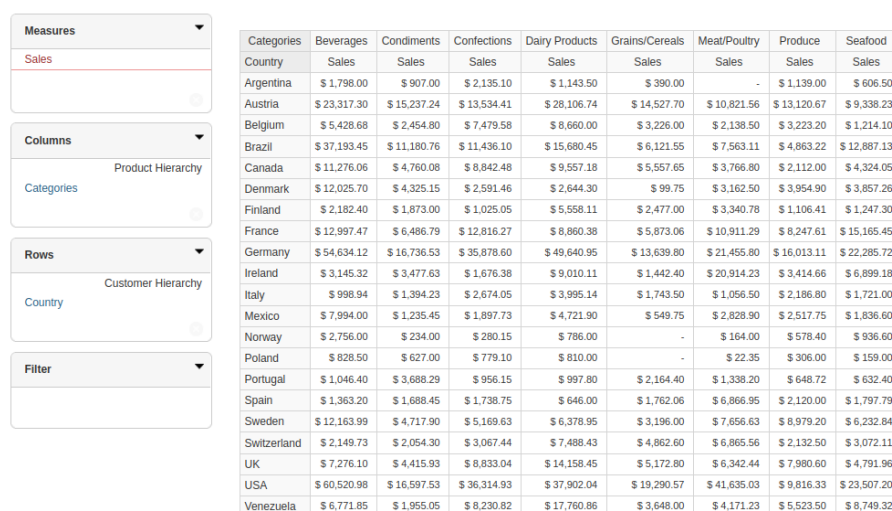


Figure 29: Sales by customer country and product category to identify the pairs of country-category with no sales at all

5.5 Quantity by supplier country and customer country

Measures
Quantity

Columns
Country
Supplier Hierarchy

Rows
Country
Customer Hierarchy

Filter

Country	Australia	Brazil	Canada	Denmark	Finland	France	Germany	Italy	Japan	Netherlands	Norway	Singapore	Spain	Sweden	UK	USA
Country	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Argentina	13	-	10	3	12	4	49	32	17	-	10	7	30	-	43	99
Austria	666	283	431	72	72	585	565	397	310	70	301	142	158	147	262	706
Belgium	102	12	49	15	48	160	231	111	36	-	115	150	-	-	187	176
Brazil	469	145	122	94	226	583	559	316	217	60	164	165	54	113	413	547
Canada	276	60	152	-	-	239	164	175	99	46	79	97	35	50	229	283
Denmark	99	50	188	32	60	77	204	24	43	-	38	-	-	-	140	185
Finland	92	20	38	40	20	85	13	100	100	-	110	37	31	54	62	63
France	517	40	311	56	154	120	341	294	174	68	151	142	57	120	176	533
Germany	708	93	577	162	348	1,166	1,169	629	377	121	385	405	175	507	1,161	1,210
Ireland	208	-	15	-	75	250	259	156	138	-	103	42	40	-	62	290
Italy	79	50	20	24	58	22	86	116	5	5	20	40	6	70	38	184
Mexico	141	35	10	21	60	74	112	45	52	15	71	96	101	-	86	105
Norway	28	23	-	-	-	30	39	-	-	-	15	9	-	-	2	25
Poland	2	12	37	-	-	30	30	30	20	-	-	-	-	-	41	3
Portugal	58	10	20	-	10	51	17	70	24	6	-	72	-	-	56	139
Spain	154	18	49	20	14	19	148	23	15	5	-	4	-	28	82	139
Sweden	234	18	128	25	104	202	352	96	44	121	38	86	56	139	225	367
Switzerland	283	15	42	30	22	120	178	153	105	-	111	28	-	-	115	16
UK	375	105	105	58	95	200	101	376	93	40	184	36	65	220	257	432
USA	1,163	97	928	306	233	748	1,030	800	514	66	536	280	175	421	1,033	1,020
Venezuela	379	39	112	98	125	268	493	254	168	-	95	40	67	138	354	306

Figure 30: Quantity by supplier country and customer country to identify the pairs of countries with no quantities being shipped between them

5.6 Quantity by product category and shipping company

Measures
Quantity

Columns
Shipper Hierarchy
Company Name

Rows
Product Hierarchy
Categories

Filter

Company Name	Federal Shipping	Speedy Express	United Package
Categories	Quantity	Quantity	Quantity
Beverages	2,781	2,942	3,809
Condiments	1,491	1,991	1,816
Confections	2,629	2,338	2,939
Dairy Products	2,560	3,145	3,444
Grains/Cereals	1,235	1,430	1,897
Meat/Poultry	1,403	971	1,825
Produce	1,025	708	1,257
Seafood	2,329	2,394	2,958

Figure 31: Quantity by product category and shipping company to identify the pairs of category-shipper with no quantity at all

This analysis was supposed to allow the identification of pairs of category-shipper with no quantity at all, however, the data did not reproduce such situation.