Data Analysis and Integration

Project

Group 24:

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Data Warehouse tables

```
DROP DATABASE IF EXISTS northwind_dw;

CREATE DATABASE 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 (
    ProductID INTEGER,
    ProductIdentifier INTEGER,
    ProductName VARCHAR(40),
    CategoryName VARCHAR(15),
    VERSION INT,
    DATE_FROM DATETIME,
    DATE_TO DATETIME,
    PRIMARY KEY (ProductID)
);

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

CREATE TABLE dim_shipper (
```

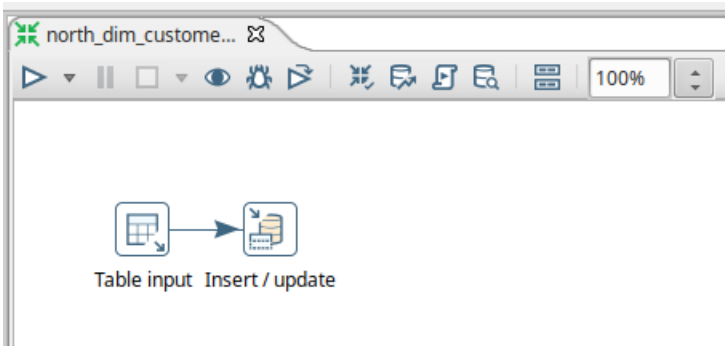
```
    ShipperID INTEGER,
    CompanyName VARCHAR(40),
    PRIMARY KEY (ShipperID)
);

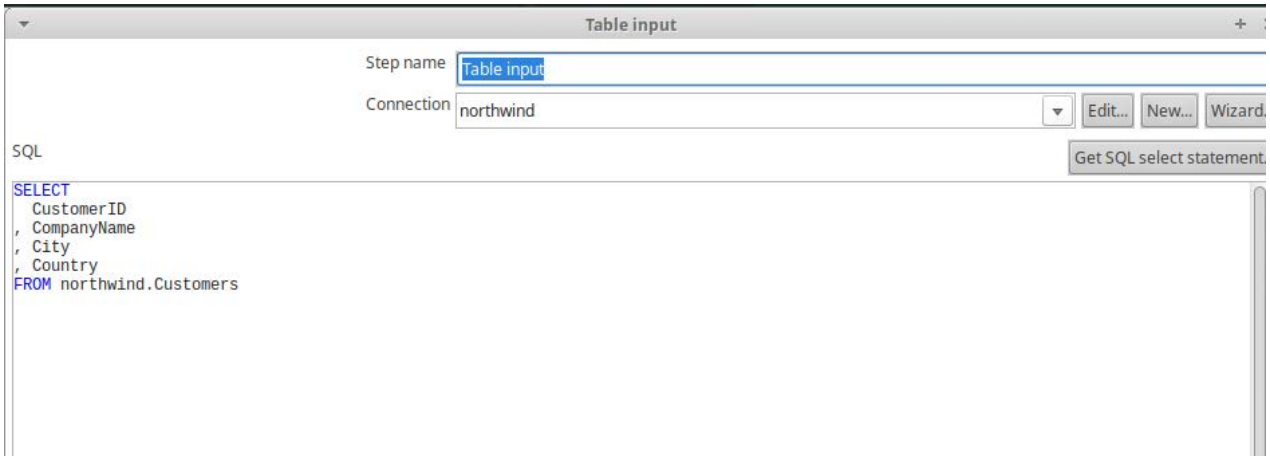
CREATE TABLE dim_time (
    TimeID DATE,
    YearID INTEGER,
    MonthID INTEGER,
    MonthName VARCHAR(255),
    DayID INTEGER,
    PRIMARY KEY (TimeID)
);

CREATE TABLE fact_order (
    OrderID INTEGER,
    CustomerID VARCHAR(5),
    ProductID INTEGER,
    SupplierID INTEGER,
    ShipperID INTEGER,
    TimeID DATE,
    UnitPrice DECIMAL(10,4),
    Quantity SMALLINT(2),
    Discount REAL,
    Sales DOUBLE,
    PRIMARY KEY (OrderID),
    FOREIGN KEY (CustomerID) REFERENCES dim_customer (CustomerID),
    FOREIGN KEY (ProductID) REFERENCES dim_product (ProductID),
    FOREIGN KEY (SupplierID) REFERENCES dim_supplier (SupplierID),
    FOREIGN KEY (ShipperID) REFERENCES dim_shipper (ShipperID),
    FOREIGN KEY (TimeID) REFERENCES dim_time (TimeID)
);
```

Transformations

Dim_customer

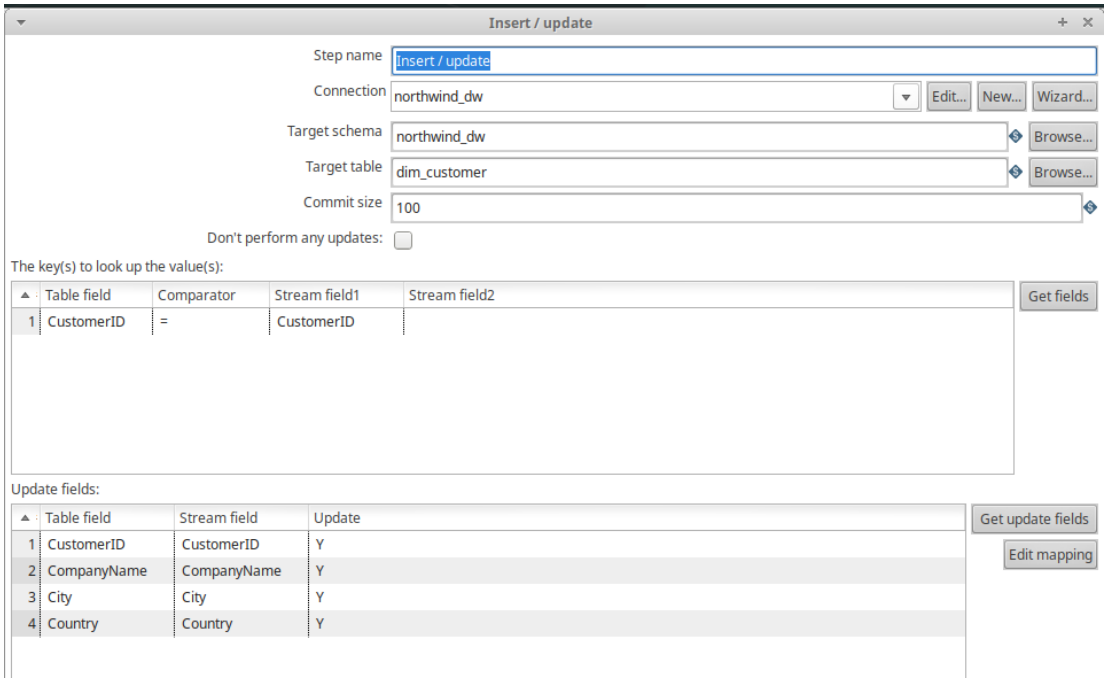


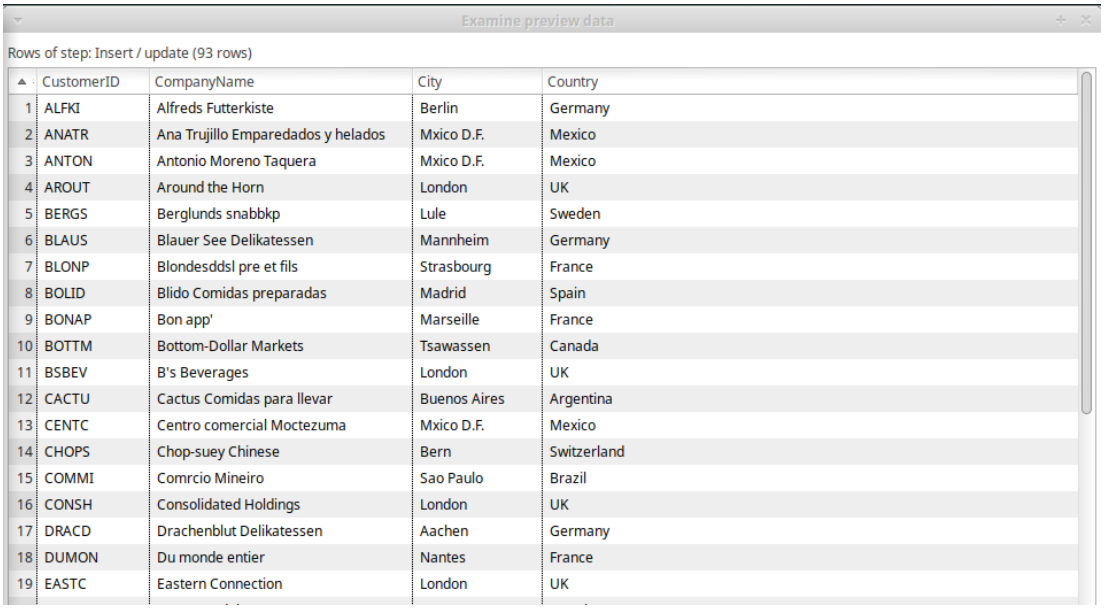


Examine preview data

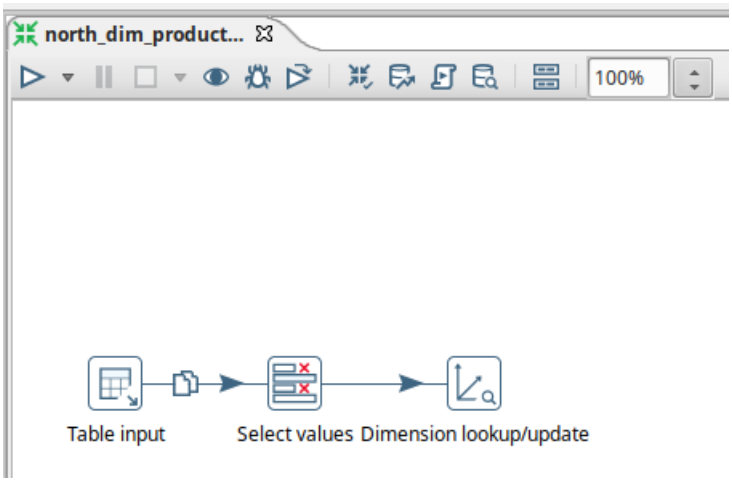
Rows of step: Table input (93 rows)

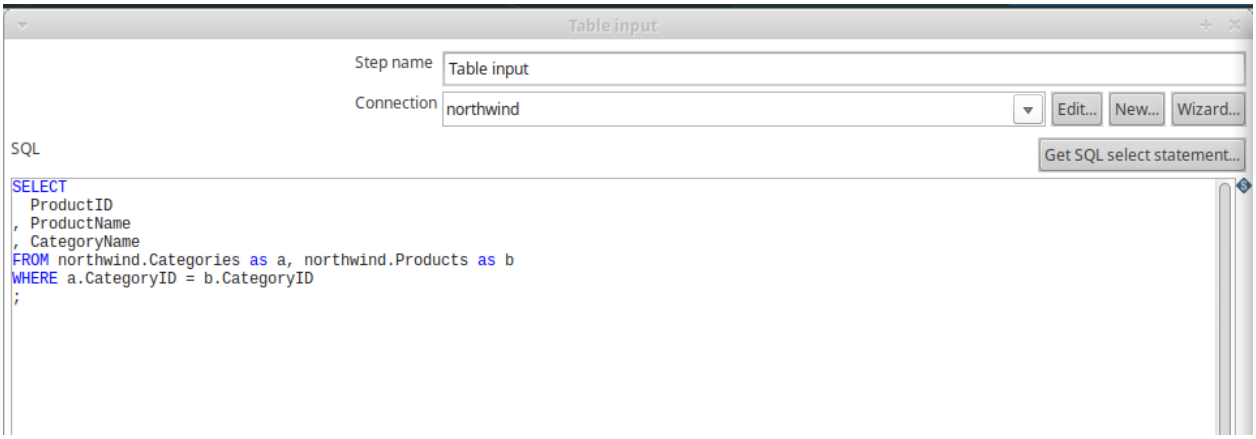
	CustomerID	CompanyName	City	Country
1	ALFKI	Alfreds Futterkiste	Berlin	Germany
2	ANATR	Ana Trujillo Emparedados y helados	Mxico D.F.	Mexico
3	ANTON	Antonio Moreno Taquera	Mxico D.F.	Mexico
4	AROUT	Around the Horn	London	UK
5	BERGS	Berglunds snabbkp	Lule	Sweden
6	BLAUS	Blauer See Delikatessen	Mannheim	Germany
7	BLONP	Blondesddsl 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

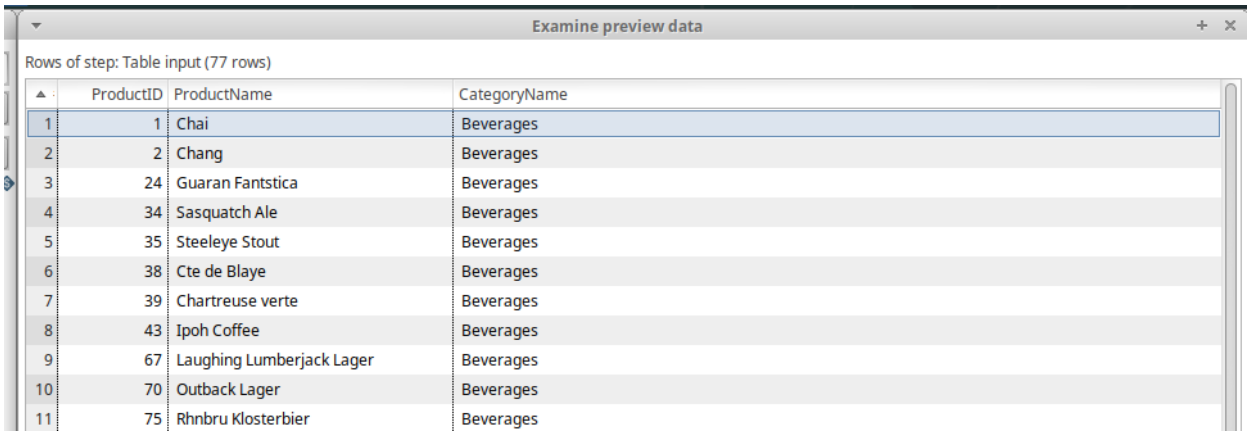

Insert / update
Step name
Insert / update
Connection
northwind_dw
Edit...
New...
Wizard...
Target schema
northwind_dw
Browse...
Target table
dim_customer
Browse...
Commit size
100
Don't perform any updates:
The key(s) to look up the value(s):
Table field
Comparator
Stream field1
Stream field2
1 CustomerID = CustomerID
Get fields
Update fields:
Table field
Stream field
Update
1 CustomerID CustomerID Y
2 CompanyName CompanyName Y
3 City City Y
4 Country Country Y
Get update fields
Edit mapping


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 Blondesddsl 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

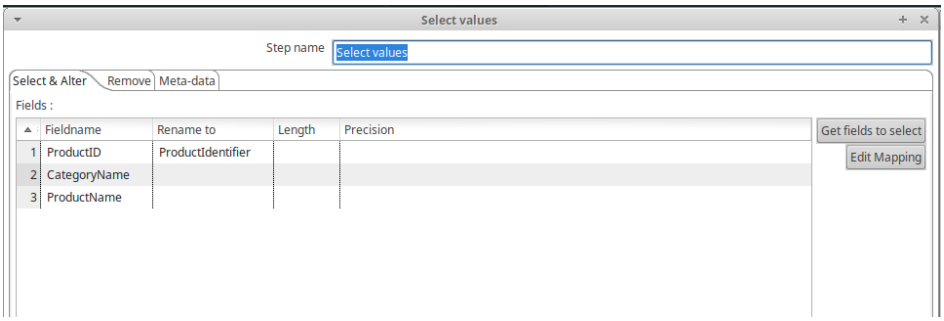
Dim_product

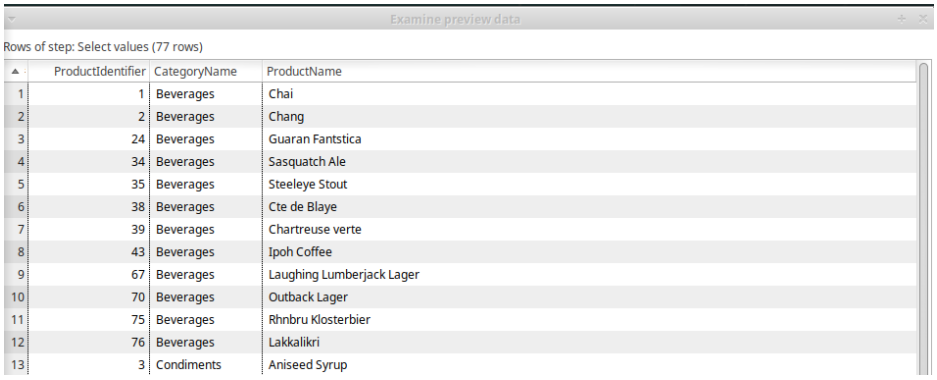


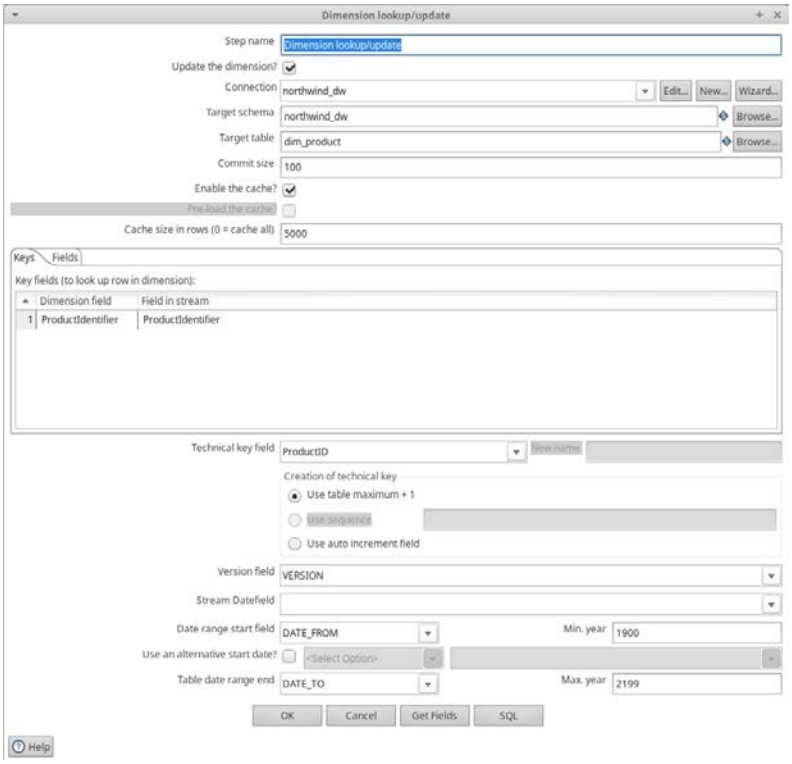


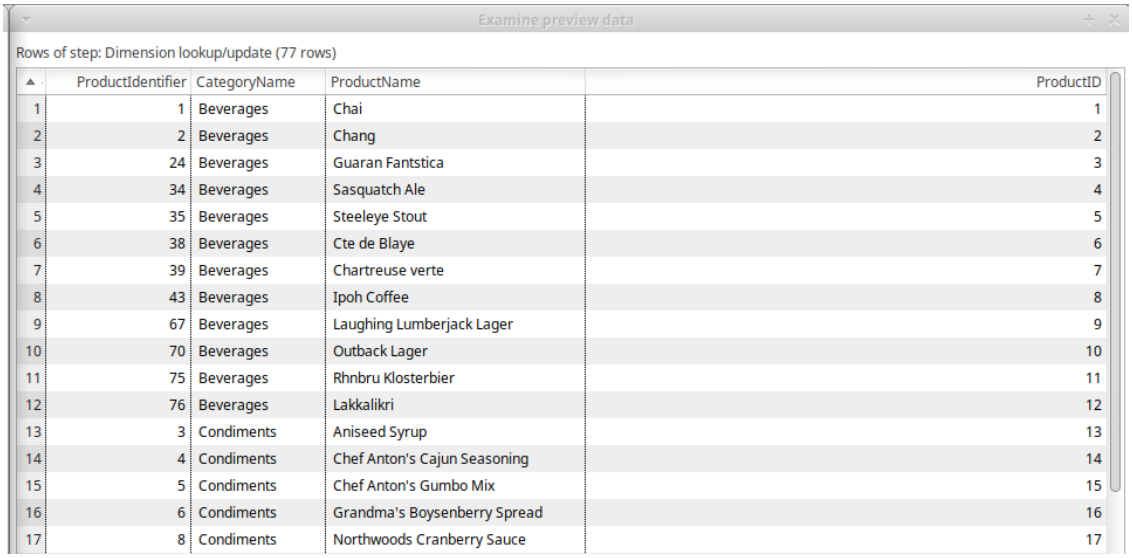


	ProductID	ProductName	CategoryName
1	1	Chai	Beverages
2	2	Chang	Beverages
3	24	Guaran Fantstica	Beverages
4	34	Sasquatch Ale	Beverages
5	35	Steeleye Stout	Beverages
6	38	Cte de Blaye	Beverages
7	39	Chartreuse verte	Beverages
8	43	Ipoh Coffee	Beverages
9	67	Laughing Lumberjack Lager	Beverages
10	70	Outback Lager	Beverages
11	75	Rhnbru Klosterbier	Beverages


Select values
Step name
Select values
Select & Alter
Remove
Meta-data
Fields :
Fieldname
Rename to
Length
Precision
1 ProductID ProductIdentifier
2 CategoryName
3 ProductName
Get fields to select
Edit Mapping

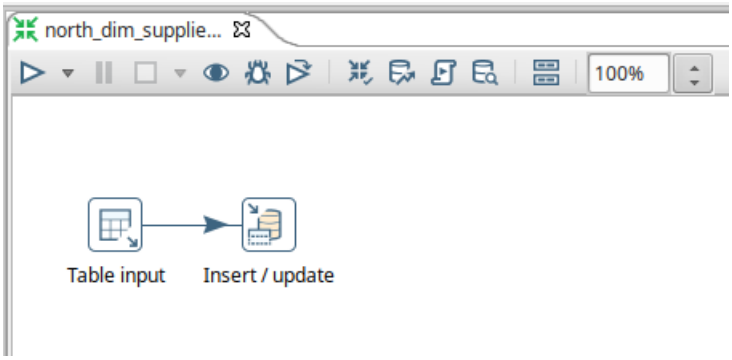

Examine preview data
Rows of step: Select values (77 rows)
ProductIdentifier CategoryName ProductName
1 1 Beverages Chai
2 2 Beverages Chang
3 24 Beverages Guaran Fantstica
4 34 Beverages Sasquatch Ale
5 35 Beverages Steeleye Stout
6 38 Beverages Cte de Blaye
7 39 Beverages Chartreuse verte
8 43 Beverages Ipoh Coffee
9 67 Beverages Laughing Lumberjack Lager
10 70 Beverages Outback Lager
11 75 Beverages Rhnbru Klosterbier
12 76 Beverages Lakkalikri
13 3 Condiments Aniseed Syrup

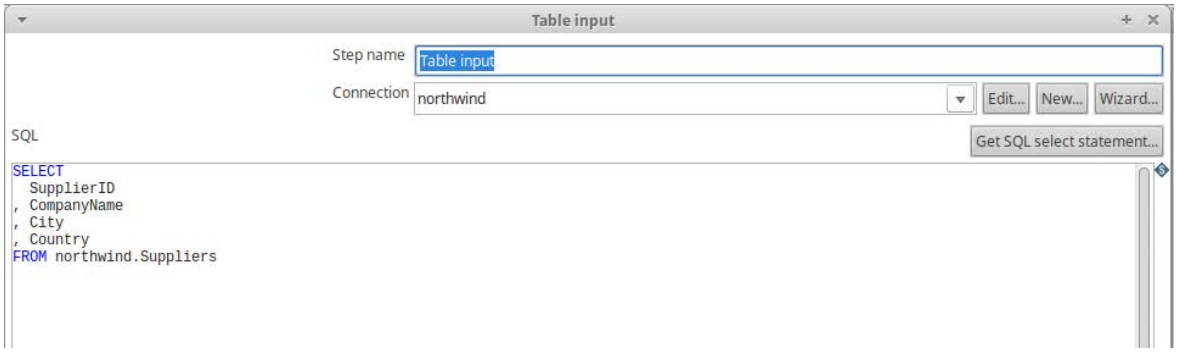

Dimension lookup/update
Step name
Dimension lookup/update
Update the dimension?
Connection
northwind_dw
Edit...
New...
Wizard...
Target schema
northwind_dw
Browse...
Target table
dim_product
Browse...
Commit size
100
Enable the cache?
Pre-load the cache?
Cache size in rows (0 = cache all)
5000
Keys
Fields
Key fields (to look up row in dimension):
Dimension field
Field in stream
1 ProductIdentifier ProductIdentifier
Technical key field
ProductID
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



	ProductIdentifier	CategoryName	ProductName	ProductID
1	1	Beverages	Chai	1
2	2	Beverages	Chang	2
3	24	Beverages	Guaran Fantstica	3
4	34	Beverages	Sasquatch Ale	4
5	35	Beverages	Steeleye Stout	5
6	38	Beverages	Cte de Blaye	6
7	39	Beverages	Chartreuse verte	7
8	43	Beverages	Ipoh Coffee	8
9	67	Beverages	Laughing Lumberjack Lager	9
10	70	Beverages	Outback Lager	10
11	75	Beverages	Rhnbru Klosterbier	11
12	76	Beverages	Lakkalikri	12
13	3	Condiments	Aniseed Syrup	13
14	4	Condiments	Chef Anton's Cajun Seasoning	14
15	5	Condiments	Chef Anton's Gumbo Mix	15
16	6	Condiments	Grandma's Boysenberry Spread	16
17	8	Condiments	Northwoods Cranberry Sauce	17

Dim_Supplier





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
6	6	Mayumi's	Osaka	Japan
7	7	Pavlova, Ltd.	Melbourne	Australia
8	8	Specialty Biscuits, Ltd.	Manchester	UK

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

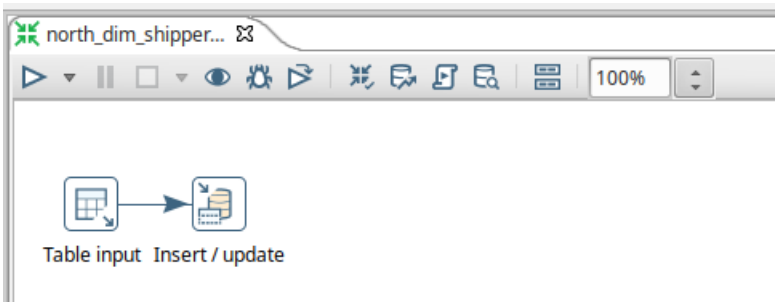
[Get update fields] [Edit mapping]

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
6	6	Mayumi's	Osaka	Japan
7	7	Pavlova, Ltd.	Melbourne	Australia
8	8	Specialty Biscuits, Ltd.	Manchester	UK
9	9	PB Knckebrd AB	Gteborg	Sweden

Dim_shipper


north_dim_shipper...
100%
Table input
Insert / update

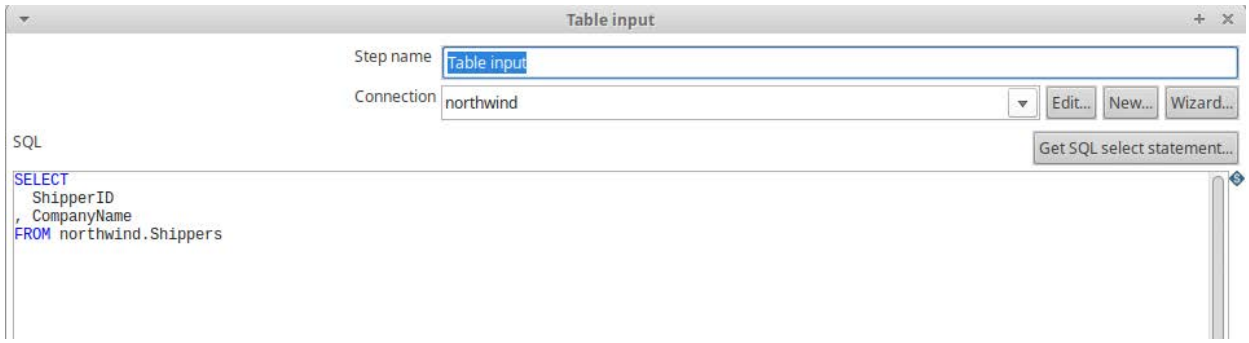
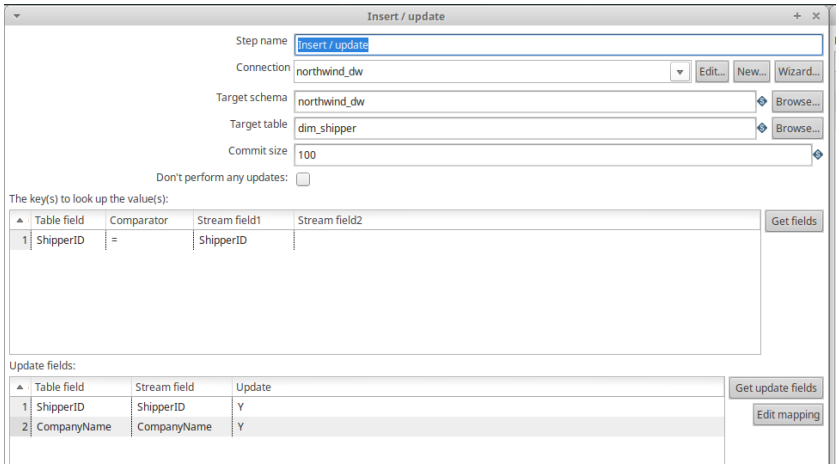
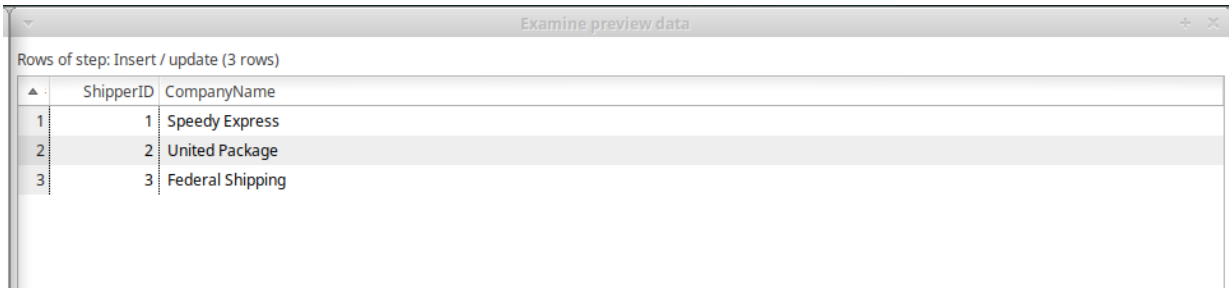


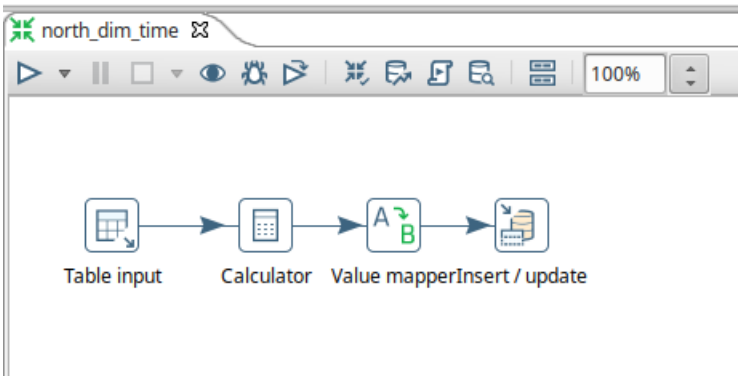
Table input
Step name
Table input
Connection
northwind
Edit...
New...
Wizard...
SQL
Get SQL select statement...
SELECT
ShipperID
, CompanyName
FROM northwind.Shippers


Examine preview data
Rows of step: Table input (3 rows)
ShipperID
CompanyName
1
1
Speedy Express
2
2
United Package
3
3
Federal Shipping


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
Get fields
1
ShipperID
=
ShipperID
Update fields:
Table field
Stream field
Update
Get update fields
Edit mapping
1
ShipperID
ShipperID
Y
2
CompanyName
CompanyName
Y


Examine preview data
Rows of step: Insert / update (3 rows)
ShipperID
CompanyName
1
1
Speedy Express
2
2
United Package
3
3
Federal Shipping

Dim_time


north_dim_time
100%
Table input
Calculator
Value mapper
Insert / update

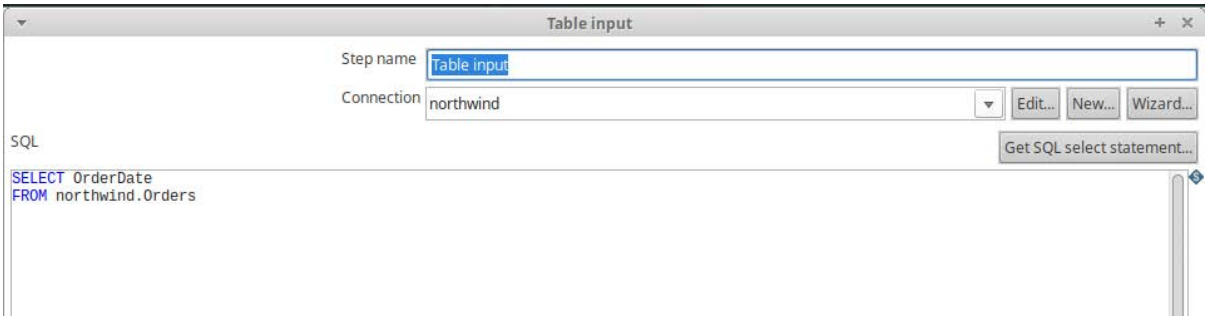
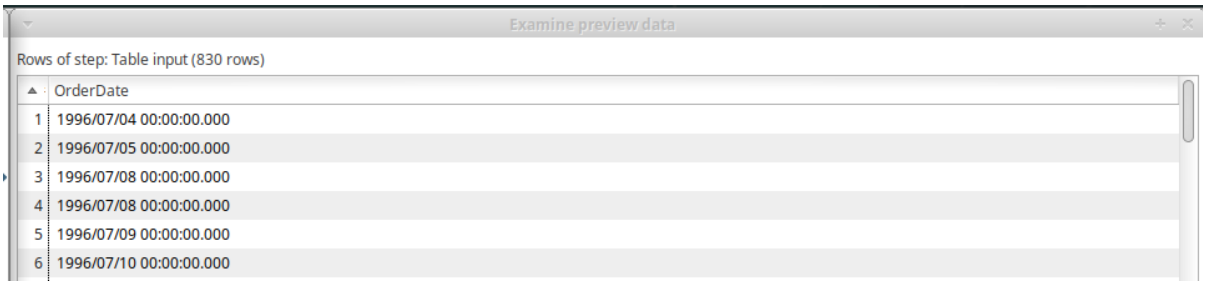
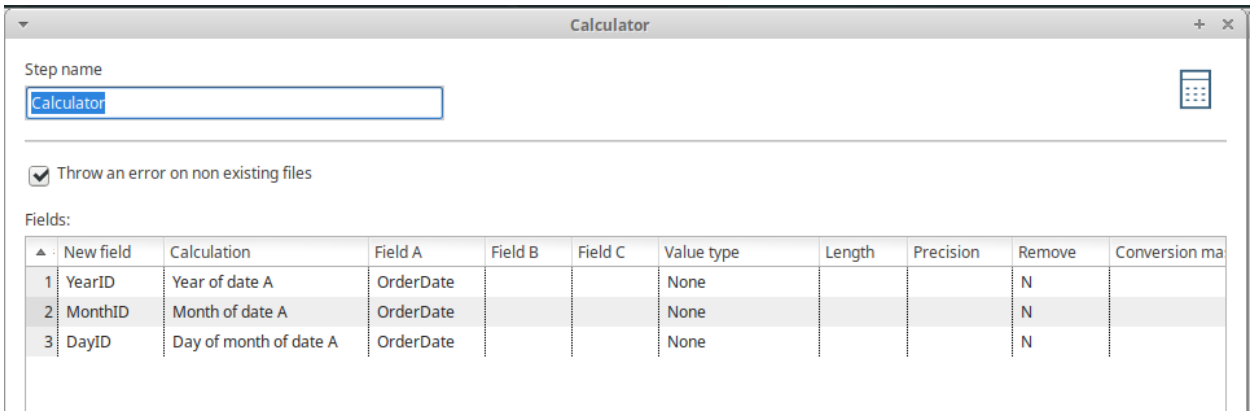
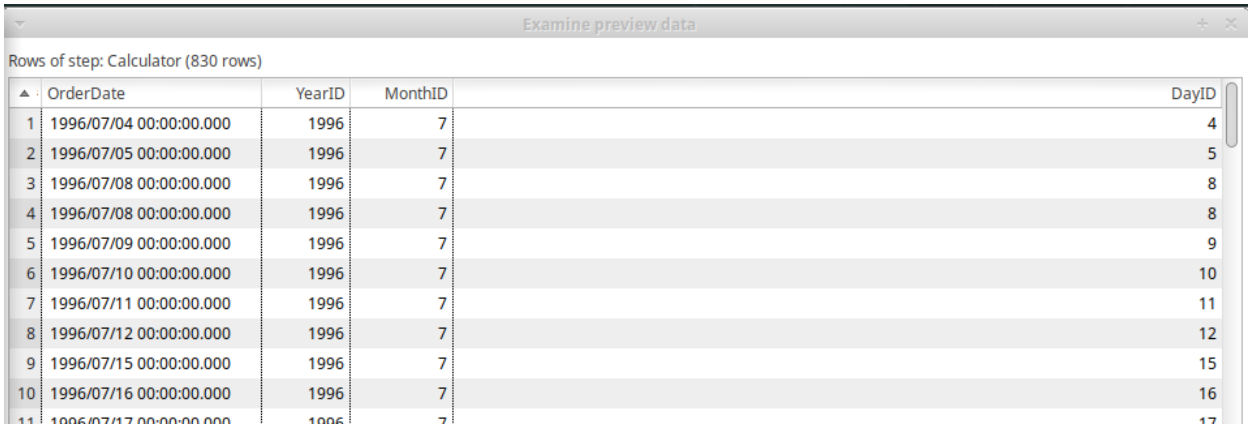


Table input
Step name
Table input
Connection
northwind
Edit...
New...
Wizard...
SQL
Get SQL select statement...
SELECT OrderDate
FROM northwind.Orders

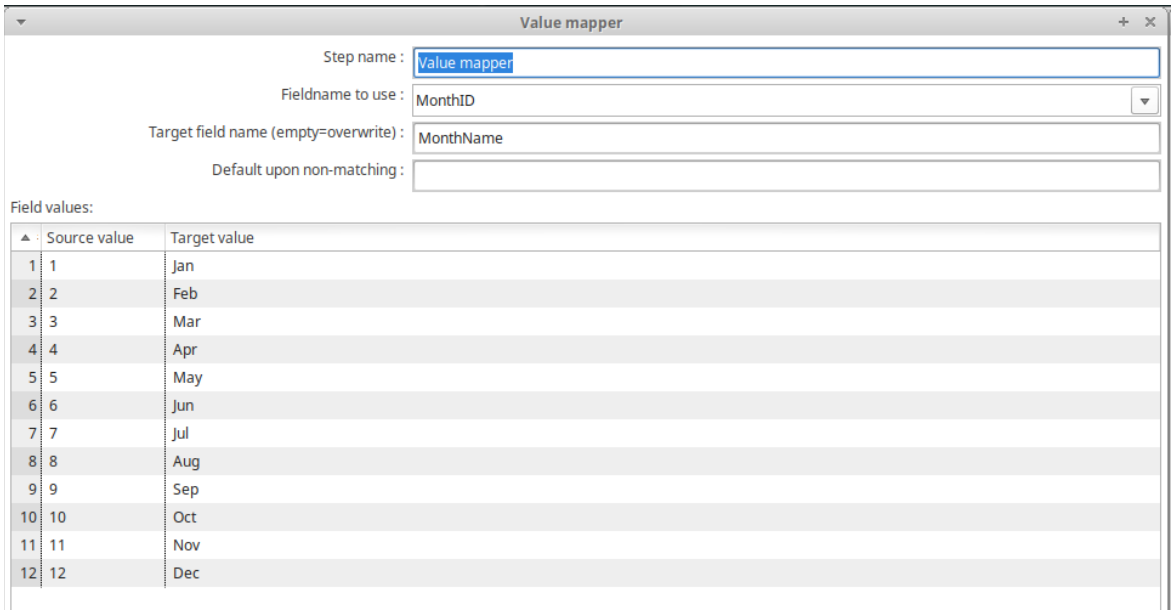

Examine preview data
Rows of step: Table input (830 rows)
OrderDate
1
1996/07/04 00:00:00.000
2
1996/07/05 00:00:00.000
3
1996/07/08 00:00:00.000
4
1996/07/08 00:00:00.000
5
1996/07/09 00:00:00.000
6
1996/07/10 00:00:00.000



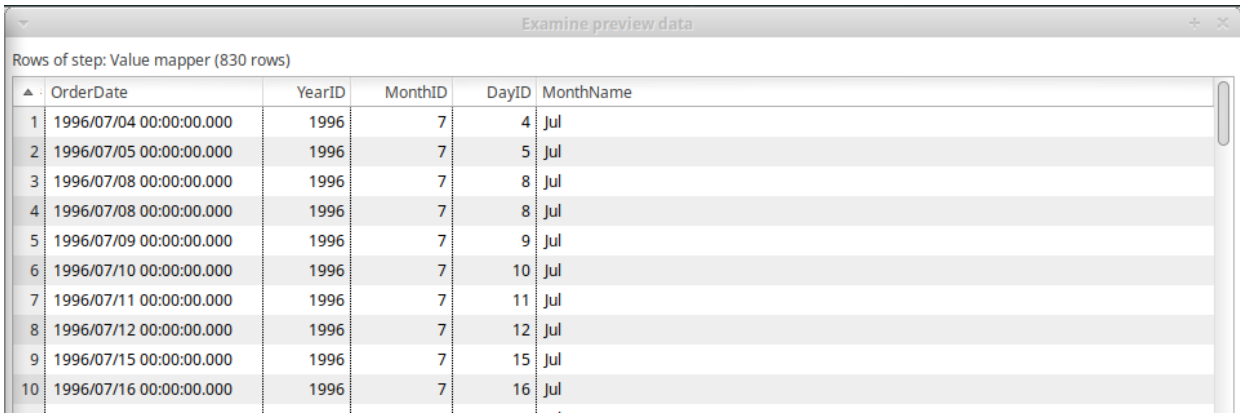
	New field	Calculation	Field A	Field B	Field C	Value type	Length	Precision	Remove	Conversion ma
1	YearID	Year of date A	OrderDate			None			N	
2	MonthID	Month of date A	OrderDate			None			N	
3	DayID	Day of month of date A	OrderDate			None			N	



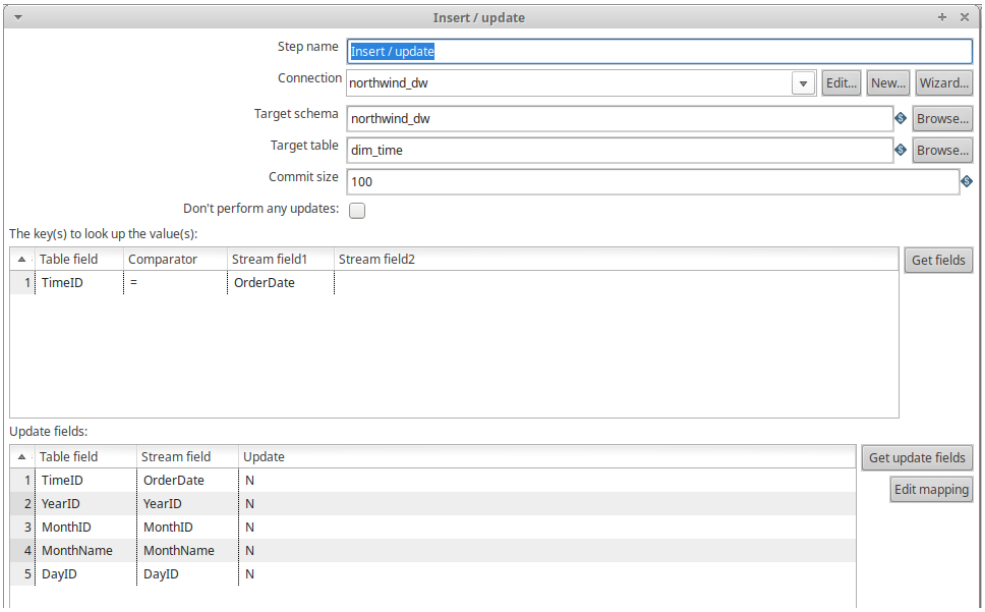
	OrderDate	YearID	MonthID	DayID
1	1996/07/04 00:00:00.000	1996	7	4
2	1996/07/05 00:00:00.000	1996	7	5
3	1996/07/08 00:00:00.000	1996	7	8
4	1996/07/08 00:00:00.000	1996	7	8
5	1996/07/09 00:00:00.000	1996	7	9
6	1996/07/10 00:00:00.000	1996	7	10
7	1996/07/11 00:00:00.000	1996	7	11
8	1996/07/12 00:00:00.000	1996	7	12
9	1996/07/15 00:00:00.000	1996	7	15
10	1996/07/16 00:00:00.000	1996	7	16
11	1996/07/17 00:00:00.000	1996	7	17

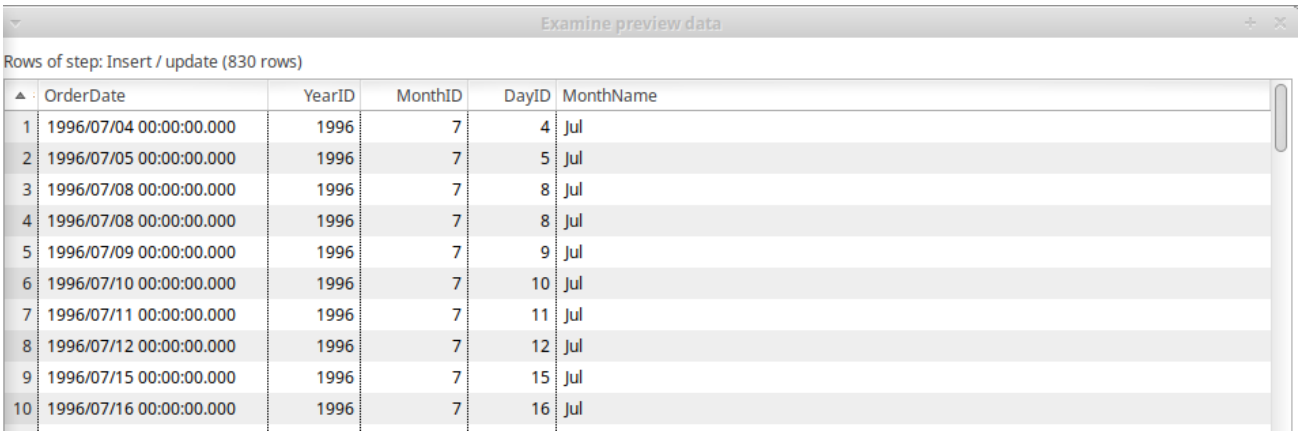


	Source value	Target value
1	1	Jan
2	2	Feb
3	3	Mar
4	4	Apr
5	5	May
6	6	Jun
7	7	Jul
8	8	Aug
9	9	Sep
10	10	Oct
11	11	Nov
12	12	Dec



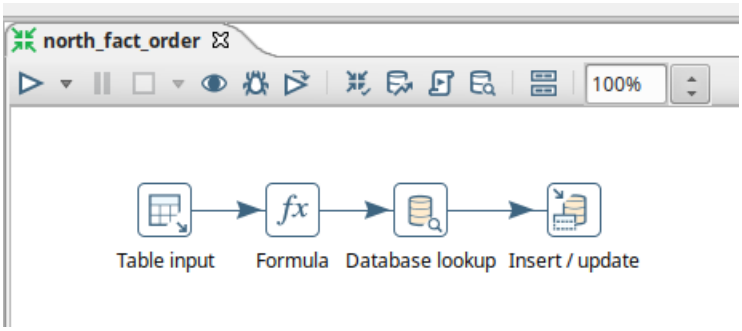
	OrderDate	YearID	MonthID	DayID	MonthName
1	1996/07/04 00:00:00.000	1996	7	4	Jul
2	1996/07/05 00:00:00.000	1996	7	5	Jul
3	1996/07/08 00:00:00.000	1996	7	8	Jul
4	1996/07/08 00:00:00.000	1996	7	8	Jul
5	1996/07/09 00:00:00.000	1996	7	9	Jul
6	1996/07/10 00:00:00.000	1996	7	10	Jul
7	1996/07/11 00:00:00.000	1996	7	11	Jul
8	1996/07/12 00:00:00.000	1996	7	12	Jul
9	1996/07/15 00:00:00.000	1996	7	15	Jul
10	1996/07/16 00:00:00.000	1996	7	16	Jul

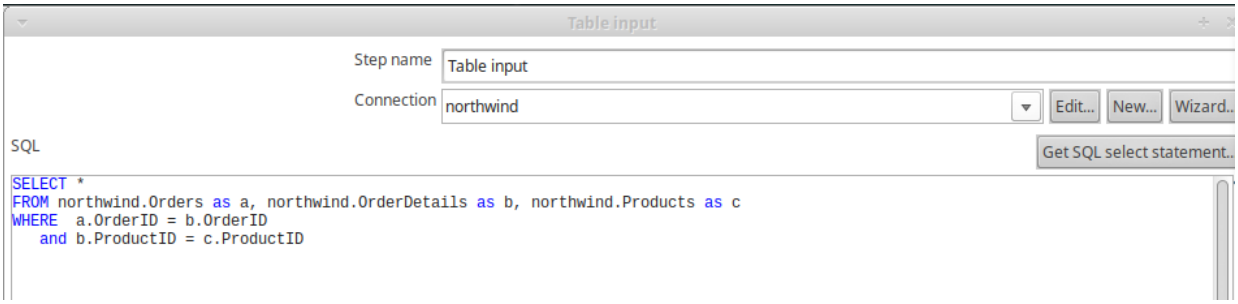


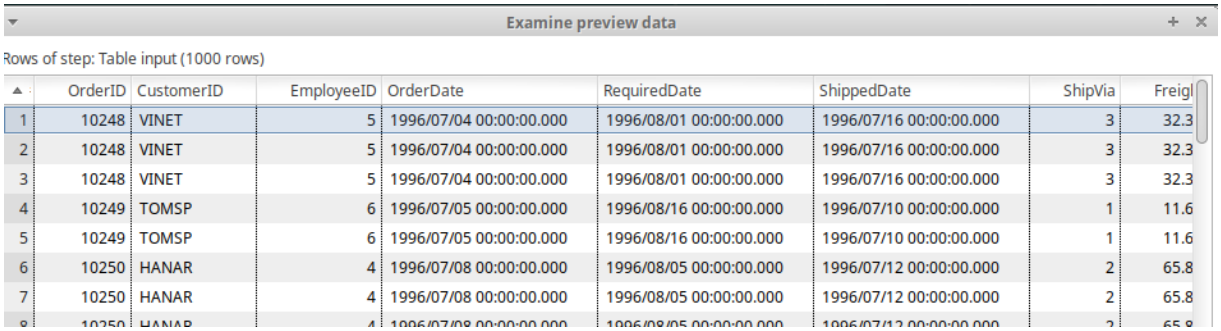


	OrderDate	YearID	MonthID	DayID	MonthName
1	1996/07/04 00:00:00.000	1996	7	4	Jul
2	1996/07/05 00:00:00.000	1996	7	5	Jul
3	1996/07/08 00:00:00.000	1996	7	8	Jul
4	1996/07/08 00:00:00.000	1996	7	8	Jul
5	1996/07/09 00:00:00.000	1996	7	9	Jul
6	1996/07/10 00:00:00.000	1996	7	10	Jul
7	1996/07/11 00:00:00.000	1996	7	11	Jul
8	1996/07/12 00:00:00.000	1996	7	12	Jul
9	1996/07/15 00:00:00.000	1996	7	15	Jul
10	1996/07/16 00:00:00.000	1996	7	16	Jul

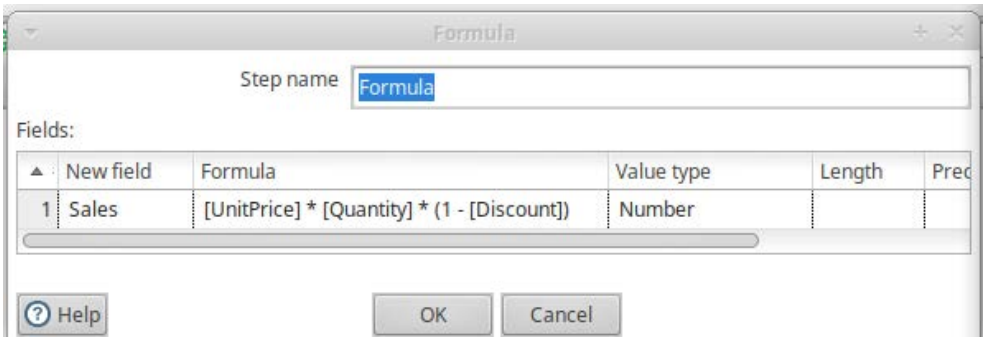
Fact_order







	OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate	ShipVia	Freigl
1	10248	VINET	5	1996/07/04 00:00:00.000	1996/08/01 00:00:00.000	1996/07/16 00:00:00.000	3	32.3
2	10248	VINET	5	1996/07/04 00:00:00.000	1996/08/01 00:00:00.000	1996/07/16 00:00:00.000	3	32.3
3	10248	VINET	5	1996/07/04 00:00:00.000	1996/08/01 00:00:00.000	1996/07/16 00:00:00.000	3	32.3
4	10249	TOMSP	6	1996/07/05 00:00:00.000	1996/08/16 00:00:00.000	1996/07/10 00:00:00.000	1	11.6
5	10249	TOMSP	6	1996/07/05 00:00:00.000	1996/08/16 00:00:00.000	1996/07/10 00:00:00.000	1	11.6
6	10250	HANAR	4	1996/07/08 00:00:00.000	1996/08/05 00:00:00.000	1996/07/12 00:00:00.000	2	65.8
7	10250	HANAR	4	1996/07/08 00:00:00.000	1996/08/05 00:00:00.000	1996/07/12 00:00:00.000	2	65.8



Examine preview data

Rows of step: Formula (1000 rows)

	SupplierID	CategoryID	QuantityPerUnit	UnitsInStock	UnitsOnOrder	ReorderLevel	Discontinued	Sales
	1	1	10 boxes x 20 bags	39	0	10	N	576.0
	1	1	10 boxes x 20 bags	39	0	10	N	122.4
	1	1	10 boxes x 20 bags	39	0	10	N	180.0
	1	1	10 boxes x 20 bags	39	0	10	N	360.0
	1	1	10 boxes x 20 bags	39	0	10	N	54.0
	1	1	10 boxes x 20 bags	39	0	10	N	108.0
	1	1	10 boxes x 20 bags	39	0	10	N	450.0
	1	1	10 boxes x 20 bags	39	0	10	N	202.5

Database lookup

Step name: Database lookup

Connection: northwind_dw [Edit...] [New...] [Wizard...]

Lookup schema: northwind_dw [Browse...]

Lookup table: dim_product [Browse...]

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	ProductIdentifier	=	ProductID	
2	DATE_FROM	<=	OrderDate	
3	DATE_TO	>	OrderDate	

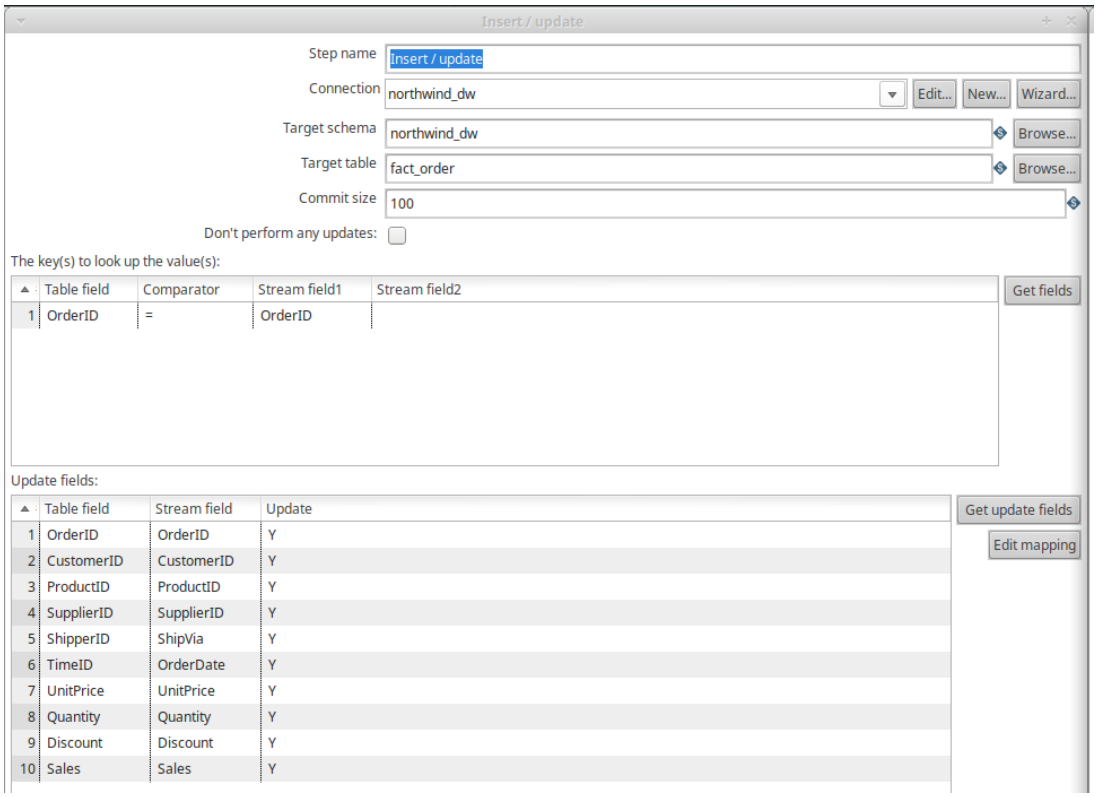
Values to return from the lookup table :

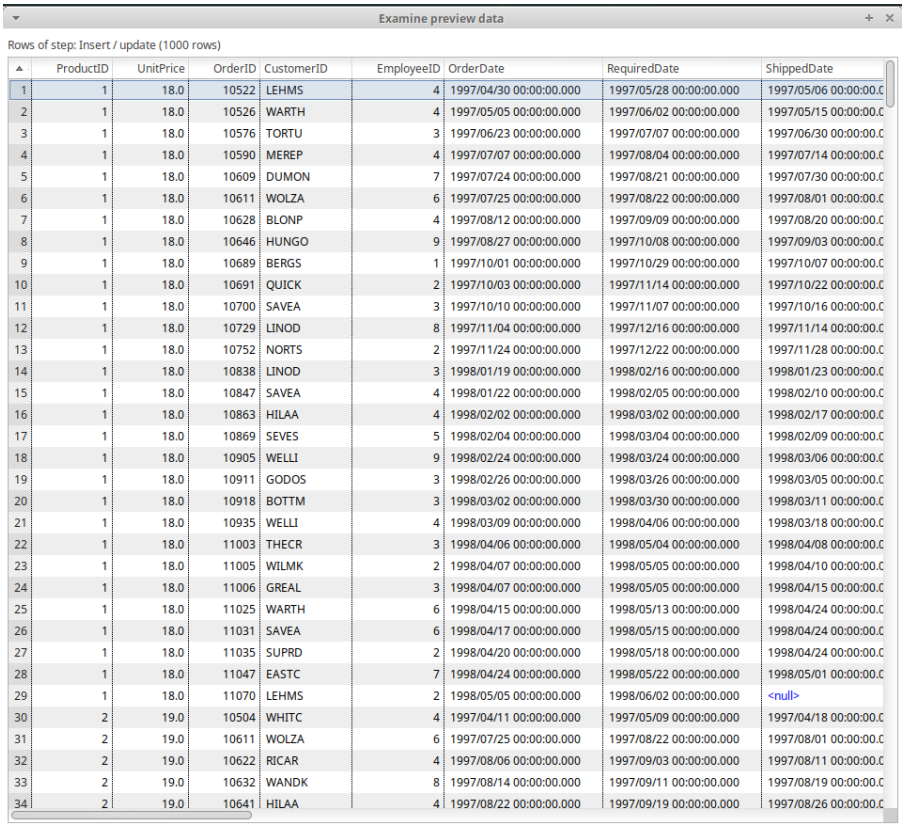
	Field	New name	Default	Type
1	ProductID			Integer

Examine preview data

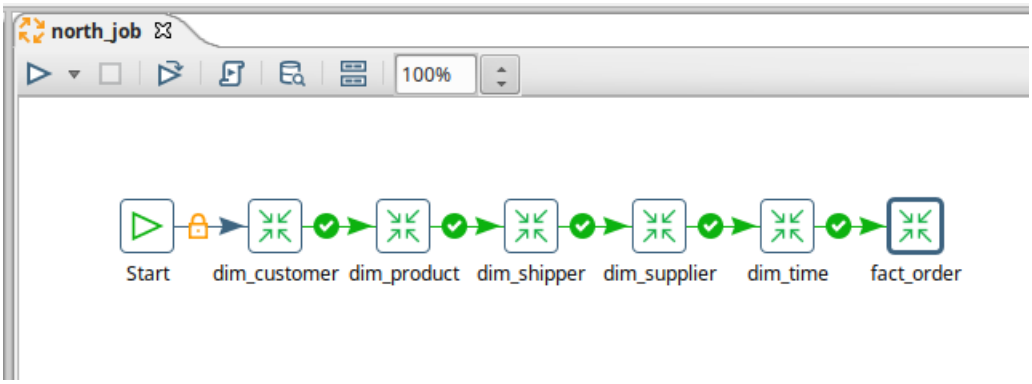
Rows of step: Database lookup (1000 rows)

	ProductID	UnitPrice	OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate
1	1	18.0	10522	LEHMS	4	1997/04/30 00:00:00.000	1997/05/28 00:00:00.000	1997/05/06 00:00:00.0
2	1	18.0	10526	WARTH	4	1997/05/05 00:00:00.000	1997/06/02 00:00:00.000	1997/05/15 00:00:00.0
3	1	18.0	10576	TORTU	3	1997/06/23 00:00:00.000	1997/07/07 00:00:00.000	1997/06/30 00:00:00.0
4	1	18.0	10590	MEREP	4	1997/07/07 00:00:00.000	1997/08/04 00:00:00.000	1997/07/14 00:00:00.0
5	1	18.0	10609	DUMON	7	1997/07/24 00:00:00.000	1997/08/21 00:00:00.000	1997/07/30 00:00:00.0
6	1	18.0	10611	WOLZA	6	1997/07/25 00:00:00.000	1997/08/22 00:00:00.000	1997/08/01 00:00:00.0
7	1	18.0	10628	BLONP	4	1997/08/12 00:00:00.000	1997/09/09 00:00:00.000	1997/08/20 00:00:00.0
8	1	18.0	10646	HUNGO	9	1997/08/27 00:00:00.000	1997/10/08 00:00:00.000	1997/09/03 00:00:00.0
9	1	18.0	10689	BERGS	1	1997/10/01 00:00:00.000	1997/10/29 00:00:00.000	1997/10/07 00:00:00.0
10	1	18.0	10691	QUICK	2	1997/10/03 00:00:00.000	1997/11/14 00:00:00.000	1997/10/22 00:00:00.0


Insert / update
Step name
Insert / update
Connection
northwind_dw
Edit...
New...
Wizard...
Target schema
northwind_dw
Browse...
Target table
fact_order
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
OrderID
=
OrderID
Get fields
Update fields:
Table field
Stream field
Update
1 OrderID OrderID Y
2 CustomerID CustomerID Y
3 ProductID ProductID Y
4 SupplierID SupplierID Y
5 ShipperID ShipVia Y
6 TimeID OrderDate Y
7 UnitPrice UnitPrice Y
8 Quantity Quantity Y
9 Discount Discount Y
10 Sales Sales Y
Get update fields
Edit mapping


Examine preview data
Rows of step: Insert / update (1000 rows)
ProductID UnitPrice OrderID CustomerID EmployeeID OrderDate RequiredDate ShippedDate
1 1 18.0 10522 LEHMS 4 1997/04/30 00:00:00.000 1997/05/28 00:00:00.000 1997/05/06 00:00:00.0
2 1 18.0 10526 WARTH 4 1997/05/05 00:00:00.000 1997/06/02 00:00:00.000 1997/05/15 00:00:00.0
3 1 18.0 10576 TORTU 3 1997/06/23 00:00:00.000 1997/07/07 00:00:00.000 1997/06/30 00:00:00.0
4 1 18.0 10590 MEREP 4 1997/07/07 00:00:00.000 1997/08/04 00:00:00.000 1997/07/14 00:00:00.0
5 1 18.0 10609 DUMON 7 1997/07/24 00:00:00.000 1997/08/21 00:00:00.000 1997/07/30 00:00:00.0
6 1 18.0 10611 WOLZA 6 1997/07/25 00:00:00.000 1997/08/22 00:00:00.000 1997/08/01 00:00:00.0
7 1 18.0 10628 BLONP 4 1997/08/12 00:00:00.000 1997/09/09 00:00:00.000 1997/08/20 00:00:00.0
8 1 18.0 10646 HUNGO 9 1997/08/27 00:00:00.000 1997/10/08 00:00:00.000 1997/09/03 00:00:00.0
9 1 18.0 10689 BERGS 1 1997/10/01 00:00:00.000 1997/10/29 00:00:00.000 1997/10/07 00:00:00.0
10 1 18.0 10691 QUICK 2 1997/10/03 00:00:00.000 1997/11/14 00:00:00.000 1997/10/22 00:00:00.0
11 1 18.0 10700 SAVEA 3 1997/10/10 00:00:00.000 1997/11/07 00:00:00.000 1997/10/16 00:00:00.0
12 1 18.0 10729 LINOD 8 1997/11/04 00:00:00.000 1997/12/16 00:00:00.000 1997/11/14 00:00:00.0
13 1 18.0 10752 NORTS 2 1997/11/24 00:00:00.000 1997/12/22 00:00:00.000 1997/11/28 00:00:00.0
14 1 18.0 10838 LINOD 3 1998/01/19 00:00:00.000 1998/02/16 00:00:00.000 1998/01/23 00:00:00.0
15 1 18.0 10847 SAVEA 4 1998/01/22 00:00:00.000 1998/02/05 00:00:00.000 1998/02/10 00:00:00.0
16 1 18.0 10863 HILAA 4 1998/02/02 00:00:00.000 1998/03/02 00:00:00.000 1998/02/17 00:00:00.0
17 1 18.0 10869 SEVES 5 1998/02/04 00:00:00.000 1998/03/04 00:00:00.000 1998/02/09 00:00:00.0
18 1 18.0 10905 WELLI 9 1998/02/24 00:00:00.000 1998/03/24 00:00:00.000 1998/03/06 00:00:00.0
19 1 18.0 10911 GODOS 3 1998/02/26 00:00:00.000 1998/03/26 00:00:00.000 1998/03/05 00:00:00.0
20 1 18.0 10918 BOTTM 3 1998/03/02 00:00:00.000 1998/03/30 00:00:00.000 1998/03/11 00:00:00.0
21 1 18.0 10935 WELLI 4 1998/03/09 00:00:00.000 1998/04/06 00:00:00.000 1998/03/18 00:00:00.0
22 1 18.0 11003 THECR 3 1998/04/06 00:00:00.000 1998/05/04 00:00:00.000 1998/04/08 00:00:00.0
23 1 18.0 11005 WILMK 2 1998/04/07 00:00:00.000 1998/05/05 00:00:00.000 1998/04/10 00:00:00.0
24 1 18.0 11006 GREAL 3 1998/04/07 00:00:00.000 1998/05/05 00:00:00.000 1998/04/15 00:00:00.0
25 1 18.0 11025 WARTH 6 1998/04/15 00:00:00.000 1998/05/13 00:00:00.000 1998/04/24 00:00:00.0
26 1 18.0 11031 SAVEA 6 1998/04/17 00:00:00.000 1998/05/15 00:00:00.000 1998/04/24 00:00:00.0
27 1 18.0 11035 SUPRD 2 1998/04/20 00:00:00.000 1998/05/18 00:00:00.000 1998/04/24 00:00:00.0
28 1 18.0 11047 EASTC 7 1998/04/24 00:00:00.000 1998/05/22 00:00:00.000 1998/05/01 00:00:00.0
29 1 18.0 11070 LEHMS 2 1998/05/05 00:00:00.000 1998/06/02 00:00:00.000 <null>
30 2 19.0 10504 WHITC 4 1997/04/11 00:00:00.000 1997/05/09 00:00:00.000 1997/04/18 00:00:00.0
31 2 19.0 10611 WOLZA 6 1997/07/25 00:00:00.000 1997/08/22 00:00:00.000 1997/08/01 00:00:00.0
32 2 19.0 10622 RICAR 4 1997/08/06 00:00:00.000 1997/09/03 00:00:00.000 1997/08/11 00:00:00.0
33 2 19.0 10632 WANDK 8 1997/08/14 00:00:00.000 1997/09/11 00:00:00.000 1997/08/19 00:00:00.0
34 2 19.0 10641 HILAA 4 1997/08/22 00:00:00.000 1997/09/19 00:00:00.000 1997/08/26 00:00:00.0

Job



XML code for the cube definition

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  <Cube name="Orders" visible="true" cache="true" enabled="true">
    <Table name="fact_order">
    </Table>
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highCardinality="false" name="Customer">
      <Hierarchy name="Customer Hierarchy" visible="true" hasAll="true"
allMemberName="All Customers" primaryKey="CustomerID">
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uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
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        <Level name="City" visible="true" column="City" type="String"
uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
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        <Level name="Company Name" visible="true" column="CompanyName"
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highCardinality="false" name="Product">
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```

```
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levelType="Regular">
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    </Dimension>
    <Dimension type="TimeDimension" visible="true" foreignKey="TimeID"
highCardinality="false" name="Time">
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allMemberName="All years" primaryKey="TimeID">
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uniqueMembers="false" levelType="TimeYears" hideMemberIf="Never">
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ordinalColumn="MonthID" type="String" uniqueMembers="false"
levelType="TimeMonths" hideMemberIf="Never">
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            </Annotation>
          </Annotations>
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        <Level name="Day" visible="true" column="DayID" type="Integer"
uniqueMembers="false" levelType="TimeDays" hideMemberIf="Never">
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highCardinality="false" name="Shipper">
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allMemberName="All Shippers" primaryKey="ShipperID">
        <Table name="dim_shipper">
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        <Level name="Company Name" visible="true" column="CompanyName"
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```

```
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        </Level>
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uniqueMembers="false" levelType="Regular">
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    <Measure name="Quantity" column="Quantity" datatype="Integer"
formatString="#,###" aggregator="sum" visible="true">
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    <Measure name="Sales" column="Sales" datatype="Numeric" formatString="$
#,###.00" aggregator="sum" visible="true">
    </Measure>
  </Cube>
</Schema>
```

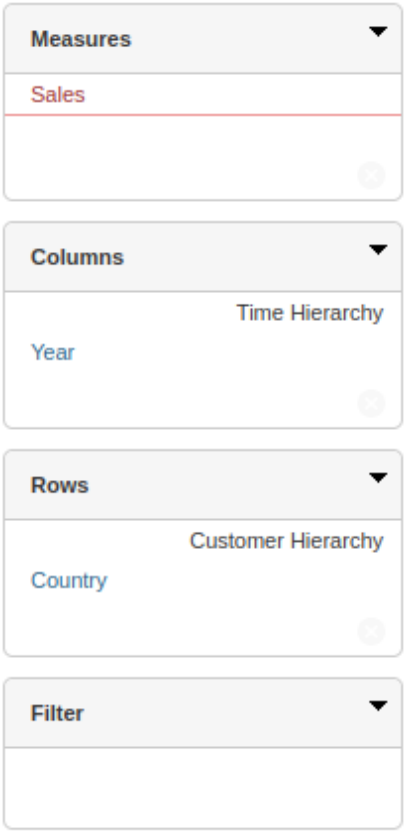
Analysis queries

Query a) Analyze sales by customer country and year to discover the country, the year, and the pair country-year with the most sales.

The country with the most sales is USA.

The year in which the most sales happened is 1997.

The pair country-year with the most sales is USA – 1998.



Year	1997	1998	1996	
Country	Sales	Sales	Sales	Sales Grand Total
USA	$ 35,725.98	$ 37,222.08	$ 14,684.16	**$ 87,632.22**
Germany	$ 35,774.75	$ 21,990.46	$ 12,310.00	**$ 70,075.21**
Austria	$ 25,462.18	$ 14,621.35	$ 12,208.86	**$ 52,292.39**
Brazil	$ 15,926.64	$ 28,710.96	$ 4,427.44	**$ 49,065.05**
France	$ 17,905.74	$ 7,351.26	$ 4,545.82	**$ 29,802.82**
UK	$ 7,825.55	$ 9,384.13	$ 5,273.80	**$ 22,483.47**
Venezuela	$ 11,601.40	$ 6,410.68	$ 1,889.83	**$ 19,901.91**
Canada	$ 8,259.53	$ 7,419.48	$ 1,959.48	**$ 17,638.48**
Ireland	$ 6,159.03	$ 7,771.14	$ 3,318.76	**$ 17,248.93**
Sweden	$ 8,894.03	$ 5,729.27	$ 1,415.23	**$ 16,038.52**
Switzerland	$ 4,991.20	$ 4,496.79	$ 1,624.00	**$ 11,111.99**
Belgium	$ 3,879.08	$ 4,662.70	$ 1,529.60	**$ 10,071.38**
Denmark	$ 4,827.83	$ 3,448.59	$ 555.00	**$ 8,831.41**
Finland	$ 5,023.05	$ 1,117.30	$ 2,401.76	**$ 8,542.11**
Italy	$ 4,311.90	$ 2,541.10	$ 477.80	**$ 7,330.80**
Mexico	$ 4,108.51	$ 1,468.50	$ 1,543.60	**$ 7,120.61**
Spain	$ 2,753.80	$ 2,375.95	$ 615.30	**$ 5,745.05**
Portugal	$ 2,881.47	$ 253.80	$ 1,134.14	**$ 4,269.41**
Argentina	$ 872.50	$ 2,221.00	-	**$ 3,093.50**
Poland	$ 697.50	$ 1,357.60	$ 159.00	**$ 2,214.10**
Norway	$ 664.00	$ 696.25	$ 258.00	**$ 1,618.25**
Grand Total	**$ 208,545.64**	**$ 171,250.36**	**$ 72,331.58**	

Columns
Sales: Sum

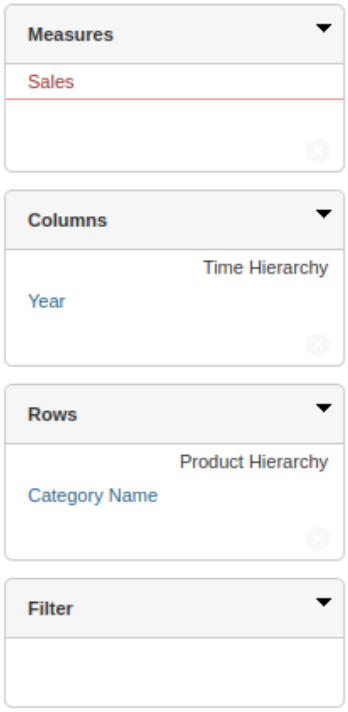
Rows
Sales: Sum

Query b) Analyze sales by product category and year to discover the category, the year, and the pair category-year with the most sales.

The product category with the most sales is Seafood.

The year in which the most sales happened is 1997.

The pair category-year with the most sales is Seafood – 1997.



Year	1996	1997	1998	
Category Name	Sales	Sales	Sales	Sales Grand Total
Beverages	$ 3,002.88	$ 3,487.95	$ 2,997.38	**$ 9,488.21**
Condiments	$ 1,961.40	$ 7,633.18	$ 6,620.39	**$ 16,214.96**
Confections	$ 2,762.94	$ 13,451.96	$ 18,399.67	**$ 34,614.57**
Dairy Products	$ 12,367.31	$ 23,052.00	$ 35,711.04	**$ 71,130.34**
Grains/Cereals	$ 7,329.46	$ 27,169.92	$ 8,745.97	**$ 43,245.35**
Meat/Poultry	$ 13,277.04	$ 48,461.25	$ 31,394.80	**$ 93,133.09**
Produce	$ 12,454.80	$ 31,480.72	$ 34,429.97	**$ 78,365.49**
Seafood	$ 19,175.75	$ 53,808.67	$ 32,951.15	**$ 105,935.57**
Grand Total	**$ 72,331.58**	**$ 208,545.64**	**$ 171,250.36**	

Columns
Sales: Sum

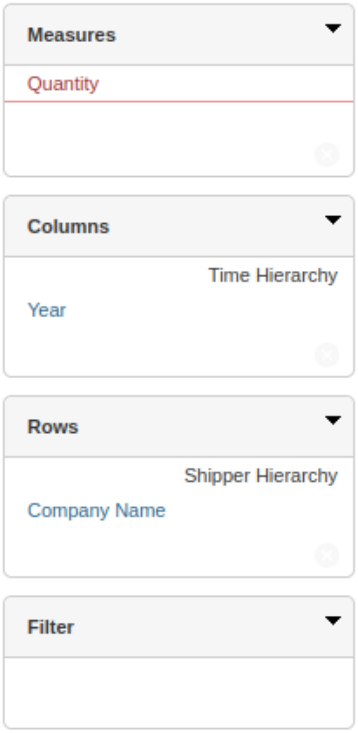
Rows
Sales: Sum

Query c) Analyze quantity by shipping company and year to discover the shipper, the year, and the pair shipper-year with the most quantity.

The shipper with the most quantity is United Package.

The year in which the most quantity was shipped is 1997.

The pair shipper-year with the most quantity is United Package - 1997.



Year	1996	1997	1998	
Company Name	Quantity	Quantity	Quantity	Quantity Grand Total
Federal Shipping	1,314	3,050	1,575	**5,939**
Speedy Express	715	3,052	1,919	**5,686**
United Package	1,197	3,552	2,619	**7,368**
Grand Total	**3,226**	**9,654**	**6,113**	

Columns
Quantity: Sum

Rows
Quantity: Sum

Query d) Analyze sales by customer country and product category to identify the pairs of country-category with no sales at all.

The pairs country-category with no sales at all are:

Argentina – Beverages;

Austria – Beverages;

Belgium – Beverages; Belgium – Condiments; Belgium – Confections; Belgium – Produce;

Canada – Beverages;

Denmark – Beverages;

Ireland – Beverages; Ireland – Condiments;

Mexico – Produce; Norway – Beverages;

Norway – Confections; Norway – Meat/Poultry; Norway – Produce;

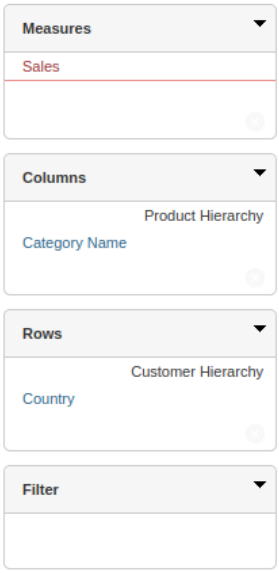
Poland – Beverages; Poland – Condiments; Poland – Confections; Poland – Dairy Products;

Portugal – Condiments; Portugal – Confections;

Spain – Condiments; Spain – Dairy Products;

Sweden – Condiments;

Switzerland – Beverages; Switzerland – Condiments; Switzerland-Confections; Switzerland – Dairy Products;



Info: 15:29 / 9 x 23 / 0.01s

Category Name	Beverages	Condiments	Confections	Dairy Products	Grains/Cereals	Meat/Poultry	Produce	Seafood
Country	Sales	Sales	Sales	Sales	Sales	Sales	Sales	Sales
Argentina	-	$ 126.00	$ 292.50	$ 821.00	$ 40.00	$ 500.00	$ 285.00	$ 1,029.00
Austria	-	$ 2,991.45	$ 591.33	$ 10,871.20	$ 6,648.90	$ 5,864.00	$ 16,086.83	$ 9,238.68
Belgium	-	-	-	$ 2,163.80	$ 74.50	$ 4,104.00	-	$ 3,729.08
Brazil	$ 699.85	$ 3,127.38	$ 1,466.91	$ 19,266.76	$ 2,845.18	$ 11,399.80	$ 1,253.00	$ 9,006.17
Canada	-	$ 840.00	$ 399.00	$ 895.08	$ 1,307.00	$ 4,508.30	$ 5,666.72	$ 4,022.38
Denmark	-	$ 232.09	$ 766.00	$ 736.00	$ 697.50	$ 1,277.10	$ 3,136.38	$ 1,986.35
Finland	$ 346.56	$ 532.80	$ 244.80	$ 1,196.00	$ 393.00	$ 3,199.25	$ 142.50	$ 2,487.20
France	$ 1,471.20	$ 1,020.15	$ 5,703.89	$ 2,352.50	$ 1,778.62	$ 2,012.50	$ 7,222.88	$ 8,241.08
Germany	$ 1,552.40	$ 3,096.40	$ 3,514.79	$ 5,857.58	$ 7,554.30	$ 16,473.60	$ 14,231.98	$ 17,794.17
Ireland	-	-	$ 7,596.09	$ 540.55	$ 1,628.16	$ 3,419.40	$ 1,933.38	$ 2,131.35
Italy	$ 110.00	$ 885.00	$ 621.00	$ 660.50	$ 1,662.90	$ 773.30	$ 443.70	$ 2,174.40
Mexico	$ 403.20	$ 138.00	$ 753.80	$ 1,631.95	$ 1,169.06	$ 1,218.50	-	$ 1,806.10
Norway	-	$ 500.00	-	$ 462.25	$ 164.00	-	-	$ 492.00
Poland	-	-	-	-	$ 106.00	$ 669.00	$ 1,019.10	$ 420.00
Portugal	$ 285.12	-	-	$ 1,190.00	$ 749.02	$ 1,453.00	$ 268.39	$ 323.88
Spain	$ 465.00	-	$ 1,984.45	-	$ 253.50	$ 773.20	$ 1,161.90	$ 1,107.00
Sweden	$ 472.50	-	$ 1,705.13	$ 744.44	$ 3,365.48	$ 3,086.40	$ 1,129.43	$ 5,535.14
Switzerland	-	-	-	-	$ 1,510.50	$ 2,228.00	$ 2,557.16	$ 4,816.33
UK	$ 1,104.38	$ 196.20	$ 2,181.75	$ 2,176.11	$ 3,099.33	$ 6,424.20	$ 1,587.40	$ 5,714.10
USA	$ 2,178.00	$ 1,937.00	$ 5,040.64	$ 16,379.45	$ 6,831.64	$ 19,021.71	$ 19,973.76	$ 16,270.03
Venezuela	$ 400.00	$ 592.50	$ 1,752.50	$ 3,185.18	$ 1,366.75	$ 4,727.83	$ 266.00	$ 7,611.15

Query e) Analyze quantity by supplier country and customer country to identify the pairs of countries with no quantities being shipped between them.

The pairs of countries with no quantities being shipped between them are:

Argentina - Australia; Argentina – Brazil; Argentina – Denmark; Argentina – Netherlands; Argentina – Norway; Argentina – Singapore; Argentina – Spain; Argentina – Sweden;

Austria – Brazil; Austria – Denmark; Austria – Spain; Austria -UK;

Belgium – Australia; Belgium – Brazil; Belgium – Denmark; Belgium – Netherlands; Belgium – Spain; Belgium – Sweden; Belgium – UK; Belgium – USA;

Brazil – Japan;

Canada – Brazil; Canada – Denmark; Canada – Finland; Canada – Spain; Canada – USA;

Denmark – Brazil; Denmark – Denmark; Denmark – Japan; Denmark – Netherlands; Denmark – Norway; Denmark – Singapore; Denmark – Spain; Denmark – Sweden; Denmark – UK;

Finland – Denmark; Finland – Netherlands; Finland – Sweden; Finland – Singapore;

France – Netherlands; France – Sweden;

Germany – Brazil;

Ireland – Brazil; Ireland – Denmark; Ireland – Japan; Ireland – Netherlands; Ireland – Spain; Ireland – Sweden; Ireland – UK;

Italy – Norway; Italy – Singapore; Italy – Spain;

Mexico – Denmark; Mexico – Sweden; Mexico – UK;

Norway – Brazil; Norway – Canada; Norway – Denmark; Norway – Finland; Norway – France; Norway – Italy; Norway – Japan; Norway – Netherlands; Norway – Spain; Norway – Sweden; Norway – UK;

Poland – Brazil; Poland – Denmark; Poland – Finland; Poland – Italy; Poland – Japan; Poland – Netherlands; Poland – Norway; Poland – Singapore; Poland – Spain; Poland – Sweden; Poland – USA;

Portugal – Brazil; Portugal – Denmark; Portugal – Japan; Portugal – Netherlands; Portugal – Norway; Portugal – Spain; Portugal – Sweden;

Spain – Brazil; Spain – Denmark; Spain – Netherlands; Spain – Norway; Spain – Singapore; Spain – Spain; Spain – Sweden;

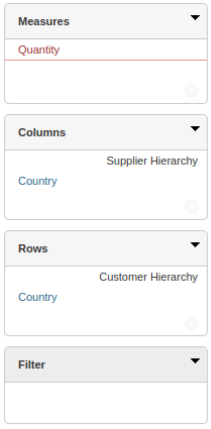
Sweden – Brazil; Sweden – Denmark; Sweden – Japan; Sweden – Netherlands; Sweden - Singapore; Sweden – Spain; Sweden – Sweden;

Switzerland – Brazil; Switzerland – Denmark; Switzerland – Netherlands; Switzerland – Singapore; Switzerland – Spain; Switzerland – Sweden; Switzerland – UK;

UK – Brazil; UK – Netherlands;

USA – Japan; USA – Sweden;

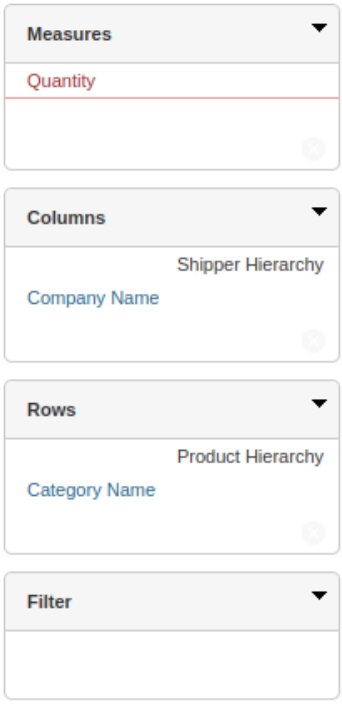
Venezuela – Brazil; Venezuela – Denmark; Venezuela – Netherlands; Venezuela – Sweden;



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	-	-	10	-	2	4	35	26	5	-	-	-	-	-	18	60
Austria	311	-	146	-	50	350	296	30	186	70	196	28	-	35	-	82
Belgium	-	-	10	-	48	110	40	31	20	-	90	100	-	-	-	-
Brazil	192	50	90	85	162	289	288	187	-	54	124	40	19	43	102	71
Canada	64	-	117	-	-	50	93	155	30	46	15	29	-	40	87	-
Denmark	54	-	90	-	25	27	101	24	-	-	-	-	-	-	-	64
Finland	15	20	10	-	10	41	3	50	75	-	110	31	12	-	-	6
France	124	30	231	10	104	45	151	141	55	-	107	40	10	-	69	117
Germany	329	-	293	2	348	493	429	221	57	12	195	214	20	127	95	251
Ireland	113	-	15	-	35	89	151	65	-	-	53	20	-	-	-	50
Italy	40	10	10	20	58	16	56	30	5	5	-	-	-	40	23	89
Mexico	62	20	10	-	30	49	50	20	10	15	10	71	24	-	-	30
Norway	13	-	-	-	-	-	18	-	-	-	15	9	-	-	-	5
Poland	2	-	27	-	-	30	30	-	-	-	-	-	-	-	15	-
Portugal	18	-	20	-	10	42	7	28	-	-	-	54	-	-	10	33
Spain	44	-	19	-	5	19	96	2	15	-	-	-	-	-	35	40
Sweden	154	-	48	-	104	45	157	60	-	-	38	-	-	-	35	150
Switzerland	112	-	12	-	2	40	50	30	41	-	96	-	-	-	-	10
UK	161	-	47	43	80	175	9	162	3	-	97	30	5	105	35	85
USA	251	8	740	42	195	335	525	333	-	6	295	152	10	-	137	156
Venezuela	122	-	80	-	65	97	189	144	40	-	77	30	-	120	50	162

Query f) Analyze quantity by product category and shipping company to identify the pairs of category-shipper with no quantity at all.

There are no pairs of product category – shipper with no quantity at all.



Company Name	Federal Shipping	Speedy Express	United Package	
Category Name	Quantity	Quantity	Quantity	Quantity Grand Total
Beverages	152	79	249	**480**
Condiments	257	132	469	**858**
Confections	282	432	670	**1,384**
Dairy Products	865	590	781	**2,236**
Grains/Cereals	649	582	834	**2,065**
Meat/Poultry	952	977	1,005	**2,934**
Produce	870	539	907	**2,316**
Seafood	1,912	2,355	2,453	**6,720**
Grand Total	**5,939**	**5,686**	**7,368**	

Rows
Quantity: Sum

Columns
Quantity: Sum