

Data Analysis and Integration

Project

Group 24

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

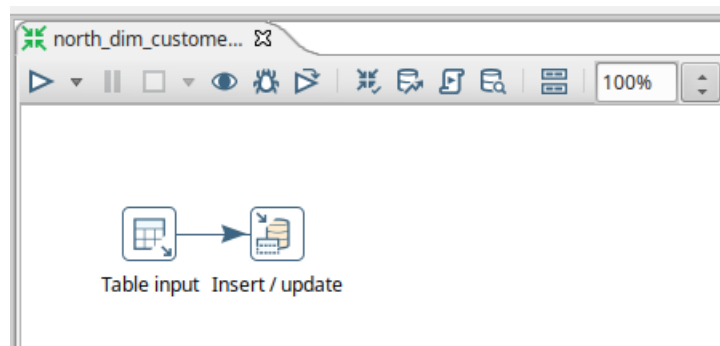


Table input

Step name

Table input

Connection

northwind

▼

Edit...

New...

Wizard...

SQL

Get SQL select statement.

```

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

```

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:

Connection:

Target schema:

Target table:

Commit size:

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

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

Dim_product

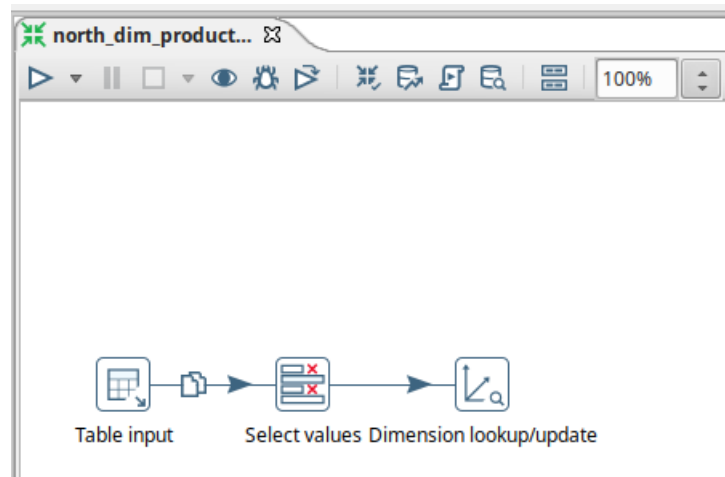


Table input

Step name: Table input

Connection: northwind

SQL

```
SELECT
  ProductID
, ProductName
, CategoryName
FROM northwind.Categories as a, northwind.Products as b
WHERE a.CategoryID = b.CategoryID
;
```

Get SQL select statement...

Examine preview data

Rows of step: Table input (77 rows)

	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

Step name:

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

Step name:

Update the dimension? ☒

Connection: Edit... New... Wizard...

Target schema: Browse...

Target table: Browse...

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 ProductIdentifier	ProductIdentifier

Technical key field: New name:

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:

OK Cancel Get Fields SQL

Help

Examine preview data

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

	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

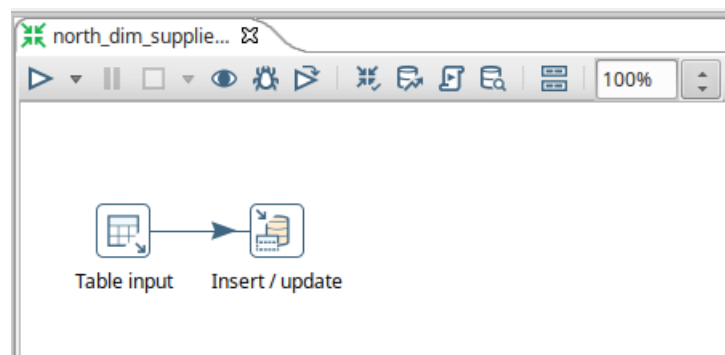


Table input

Step name:

Connection: Edit... New... Wizard...

SQL

```

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

Get SQL select statement...

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

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

Target schema Browse...

Target table Browse...

Commit size

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

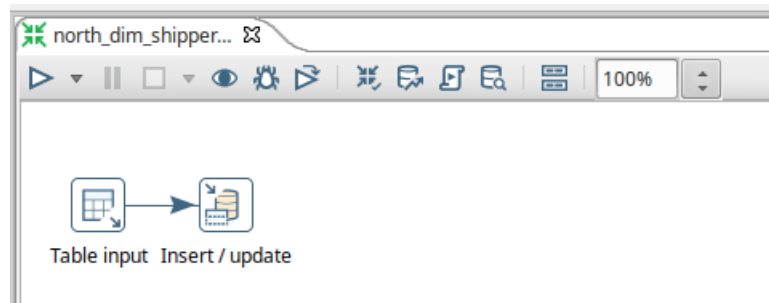


Table input

Step name:

Connection: Edit... New... Wizard...

SQL

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

Get SQL select statement...

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:

Connection: Edit... New... Wizard...

Target schema: Browse...

Target table: Browse...

Commit size:

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

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

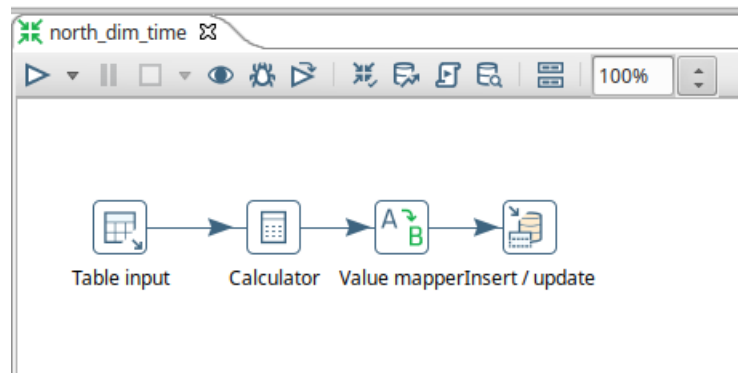


Table input	
Step name	Table input
Connection	northwind
SQL	<pre>SELECT OrderDate FROM northwind.Orders</pre>

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

Calculator

Step name

Calculator

☒ Throw an error on non existing files

Fields:

	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	

Examine preview data

Rows of step: Calculator (830 rows)

	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

Value mapper

Step name :

Value mapper

Fieldname to use :

MonthID

Target field name (empty=overwrite) :

MonthName

Default upon non-matching :

Field values:

	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

Examine preview data					
Rows of step: Value mapper (830 rows)					
▲	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

Insert / update				
Step name <input type="text" value="Insert / update"/>				
Connection <input type="text" value="northwind_dw"/> <input type="button" value="Edit..."/> <input type="button" value="New..."/> <input type="button" value="Wizard..."/>				
Target schema <input type="text" value="northwind_dw"/> <input type="button" value="Browse..."/>				
Target table <input type="text" value="dim_time"/> <input type="button" value="Browse..."/>				
Commit size <input type="text" value="100"/>				
Don't perform any updates: <input type="checkbox"/>				
The key(s) to look up the value(s):				
▲	Table field	Comparator	Stream field1	Stream field2
1	TimeID	=	OrderDate	
<input type="button" value="Get fields"/>				
Update fields:				
▲	Table field	Stream field	Update	
1	TimeID	OrderDate	N	<input type="button" value="Get update fields"/> <input type="button" value="Edit mapping"/>
2	YearID	YearID	N	
3	MonthID	MonthID	N	
4	MonthName	MonthName	N	
5	DayID	DayID	N	

Examine preview data					
Rows of step: Insert / update (830 rows)					
▲	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

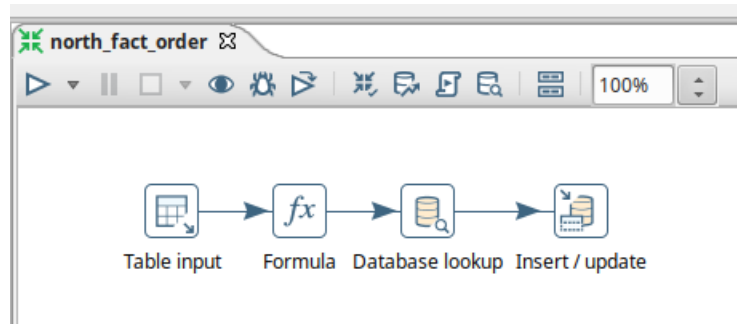


Table input

Step name: Table input

Connection: northwind

SQL

```
SELECT *  
FROM northwind.Orders as a, northwind.OrderDetails as b, northwind.Products as c  
WHERE a.OrderID = b.OrderID  
and b.ProductID = c.ProductID
```

Get SQL select statement...

Examine preview data

Rows of step: Table input (1000 rows)

	OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate	ShipVia	Freight
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
8	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

Formula

Step name: Formula

Fields:

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

Help OK Cancel

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

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

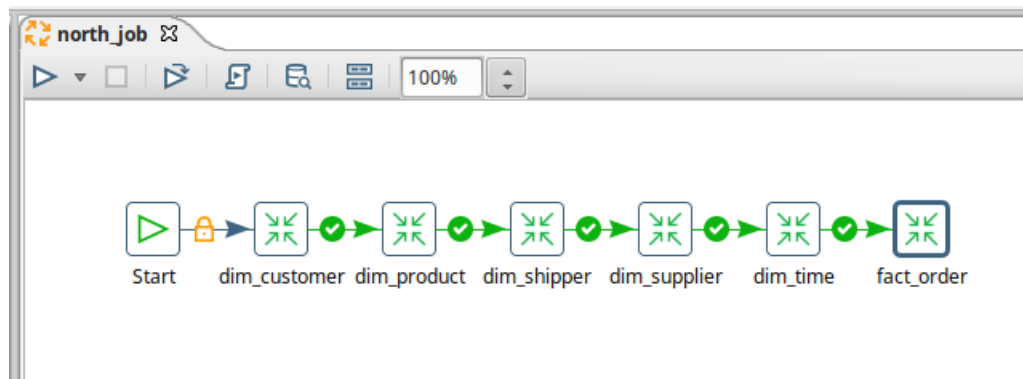
Edit mapping

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 00:00:00.000
2	1	18.0	10526	WARTH	4	1997/05/05 00:00:00.000	1997/06/02 00:00:00.000	1997/05/15 00:00:00.000
3	1	18.0	10576	TORTU	3	1997/06/23 00:00:00.000	1997/07/07 00:00:00.000	1997/06/30 00:00:00.000
4	1	18.0	10590	MEREP	4	1997/07/07 00:00:00.000	1997/08/04 00:00:00.000	1997/07/14 00:00:00.000
5	1	18.0	10609	DUMON	7	1997/07/24 00:00:00.000	1997/08/21 00:00:00.000	1997/07/30 00:00:00.000
6	1	18.0	10611	WOLZA	6	1997/07/25 00:00:00.000	1997/08/22 00:00:00.000	1997/08/01 00:00:00.000
7	1	18.0	10628	BLONP	4	1997/08/12 00:00:00.000	1997/09/09 00:00:00.000	1997/08/20 00:00:00.000
8	1	18.0	10646	HUNGO	9	1997/08/27 00:00:00.000	1997/10/08 00:00:00.000	1997/09/03 00:00:00.000
9	1	18.0	10689	BERGS	1	1997/10/01 00:00:00.000	1997/10/29 00:00:00.000	1997/10/07 00:00:00.000
10	1	18.0	10691	QUICK	2	1997/10/03 00:00:00.000	1997/11/14 00:00:00.000	1997/10/22 00:00:00.000
11	1	18.0	10700	SAVEA	3	1997/10/10 00:00:00.000	1997/11/07 00:00:00.000	1997/10/16 00:00:00.000
12	1	18.0	10729	LINOD	8	1997/11/04 00:00:00.000	1997/12/16 00:00:00.000	1997/11/14 00:00:00.000
13	1	18.0	10752	NORTS	2	1997/11/24 00:00:00.000	1997/12/22 00:00:00.000	1997/11/28 00:00:00.000
14	1	18.0	10838	LINOD	3	1998/01/19 00:00:00.000	1998/02/16 00:00:00.000	1998/01/23 00:00:00.000
15	1	18.0	10847	SAVEA	4	1998/01/22 00:00:00.000	1998/02/05 00:00:00.000	1998/02/10 00:00:00.000
16	1	18.0	10863	HILAA	4	1998/02/02 00:00:00.000	1998/03/02 00:00:00.000	1998/02/17 00:00:00.000
17	1	18.0	10869	SEVES	5	1998/02/04 00:00:00.000	1998/03/04 00:00:00.000	1998/02/09 00:00:00.000
18	1	18.0	10905	WELLI	9	1998/02/24 00:00:00.000	1998/03/24 00:00:00.000	1998/03/06 00:00:00.000
19	1	18.0	10911	GODOS	3	1998/02/26 00:00:00.000	1998/03/26 00:00:00.000	1998/03/05 00:00:00.000
20	1	18.0	10918	BOTTM	3	1998/03/02 00:00:00.000	1998/03/30 00:00:00.000	1998/03/11 00:00:00.000
21	1	18.0	10935	WELLI	4	1998/03/09 00:00:00.000	1998/04/06 00:00:00.000	1998/03/18 00:00:00.000
22	1	18.0	11003	THECR	3	1998/04/06 00:00:00.000	1998/05/04 00:00:00.000	1998/04/08 00:00:00.000
23	1	18.0	11005	WILMK	2	1998/04/07 00:00:00.000	1998/05/05 00:00:00.000	1998/04/10 00:00:00.000
24	1	18.0	11006	GREAL	3	1998/04/07 00:00:00.000	1998/05/05 00:00:00.000	1998/04/15 00:00:00.000
25	1	18.0	11025	WARTH	6	1998/04/15 00:00:00.000	1998/05/13 00:00:00.000	1998/04/24 00:00:00.000
26	1	18.0	11031	SAVEA	6	1998/04/17 00:00:00.000	1998/05/15 00:00:00.000	1998/04/24 00:00:00.000
27	1	18.0	11035	SUPRD	2	1998/04/20 00:00:00.000	1998/05/18 00:00:00.000	1998/04/24 00:00:00.000
28	1	18.0	11047	EASTC	7	1998/04/24 00:00:00.000	1998/05/22 00:00:00.000	1998/05/01 00:00:00.000
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 00:00:00.000
31	2	19.0	10611	WOLZA	6	1997/07/25 00:00:00.000	1997/08/22 00:00:00.000	1997/08/01 00:00:00.000
32	2	19.0	10622	RICAR	4	1997/08/06 00:00:00.000	1997/09/03 00:00:00.000	1997/08/11 00:00:00.000
33	2	19.0	10632	WANDK	8	1997/08/14 00:00:00.000	1997/09/11 00:00:00.000	1997/08/19 00:00:00.000
34	2	19.0	10641	HILAA	4	1997/08/22 00:00:00.000	1997/09/19 00:00:00.000	1997/08/26 00:00:00.000

Job



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"
highCardinality="false" 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" hideMemberIf="Never">
        </Level>
        <Level name="City" visible="true" column="City" type="String"
uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
        </Level>
        <Level name="Company Name" visible="true" column="CompanyName"
type="String" uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
        </Level>
      </Hierarchy>
    </Dimension>
    <Dimension type="StandardDimension" visible="true" foreignKey="ProductID"
highCardinality="false" name="Product">
      <Hierarchy name="Product Hierarchy" visible="true" hasAll="true"
allMemberName="All Products" primaryKey="ProductID">
        <Table name="dim_product">
        </Table>
```



```

        <Level name="Category Name" visible="true" column="CategoryName"
type="String" uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
        </Level>
        <Level name="Product Name" visible="true" column="ProductName"
ordinalColumn="ProductName" type="String" uniqueMembers="false"
levelType="Regular" hideMemberIf="Never">
        </Level>
        <Level name="Product Identifier" visible="true"
column="ProductIdentifier" type="Integer" uniqueMembers="false"
levelType="Regular">
        </Level>
    </Hierarchy>
</Dimension>
    <Dimension type="TimeDimension" visible="true" foreignKey="TimeID"
highCardinality="false" 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" hideMemberIf="Never">
            </Level>
            <Level name="Month" visible="true" column="MonthName"
ordinalColumn="MonthID" type="String" uniqueMembers="false"
levelType="TimeMonths" hideMemberIf="Never">
                <Annotations>
                    <Annotation name="AnalyzerDateFormat">
                        <![CDATA[[yyyy].[MMM]]]>
                    </Annotation>
                </Annotations>
            </Level>
            <Level name="Day" visible="true" column="DayID" type="Integer"
uniqueMembers="false" levelType="TimeDays" hideMemberIf="Never">
            </Level>
        </Hierarchy>
    </Dimension>
    <Dimension type="StandardDimension" visible="true" foreignKey="ShipperID"
highCardinality="false" 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"
type="String" uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
            </Level>

```

```
    </Hierarchy>
  </Dimension>
  <Dimension type="StandardDimension" visible="true" foreignKey="SupplierID"
highCardinality="false" name="Supplier">
    <Hierarchy name="Supplier Hierarchy" visible="true" hasAll="true"
allMemberName="All Suplliers" primaryKey="SupplierID">
        <Table name="dim_supplier">
        </Table>
        <Level name="Country" visible="true" column="Country" type="String"
uniqueMembers="false" levelType="Regular" hideMemberIf="Never">
        </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>
  <Measure name="Quantity" column="Quantity" datatype="Integer"
formatString="#,###" aggregator="sum" visible="true">
  </Measure>
  <Measure name="Sales" column="Sales" datatype="Numeric" formatString="$
#,###.00" aggregator="sum" visible="true">
  </Measure>
</Cube>
</Schema>
```

Analysis queries

Query a)

Measures

Sales

Columns

Time Hierarchy

Year

Rows

Customer Hierarchy

Country

Filter

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

Columns

Sales: Sum

Rows

Sales: Sum

Query b)

Measures

Sales

Columns

Time Hierarchy

Year

Rows

Product Hierarchy

Category Name

Filter

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)

Measures

Quantity

Columns

Time Hierarchy

Year

Rows

Shipper Hierarchy

Company Name

Filter

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)

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

Measures

Sales

Columns

Product Hierarchy

Category Name

Rows

Customer Hierarchy

Country

Filter

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)

Info: 15:38 / 17 x 23 / 0.02s

Measures

Quantity

Columns

Supplier Hierarchy

Country

Rows

Customer Hierarchy

Country

Filter

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

Measures

Quantity

Columns

Supplier Hierarchy

Country

Rows

Customer Hierarchy

Country

Filter

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

Query f)

Measures

Quantity

Columns

Shipper Hierarchy

Company Name

Rows

Product Hierarchy

Category Name

Filter

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