Advanced Power BI Modeling Techniques

by Martin Schoombee

28twelve CONSULTING

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About Me

"I help people make sense of their data"

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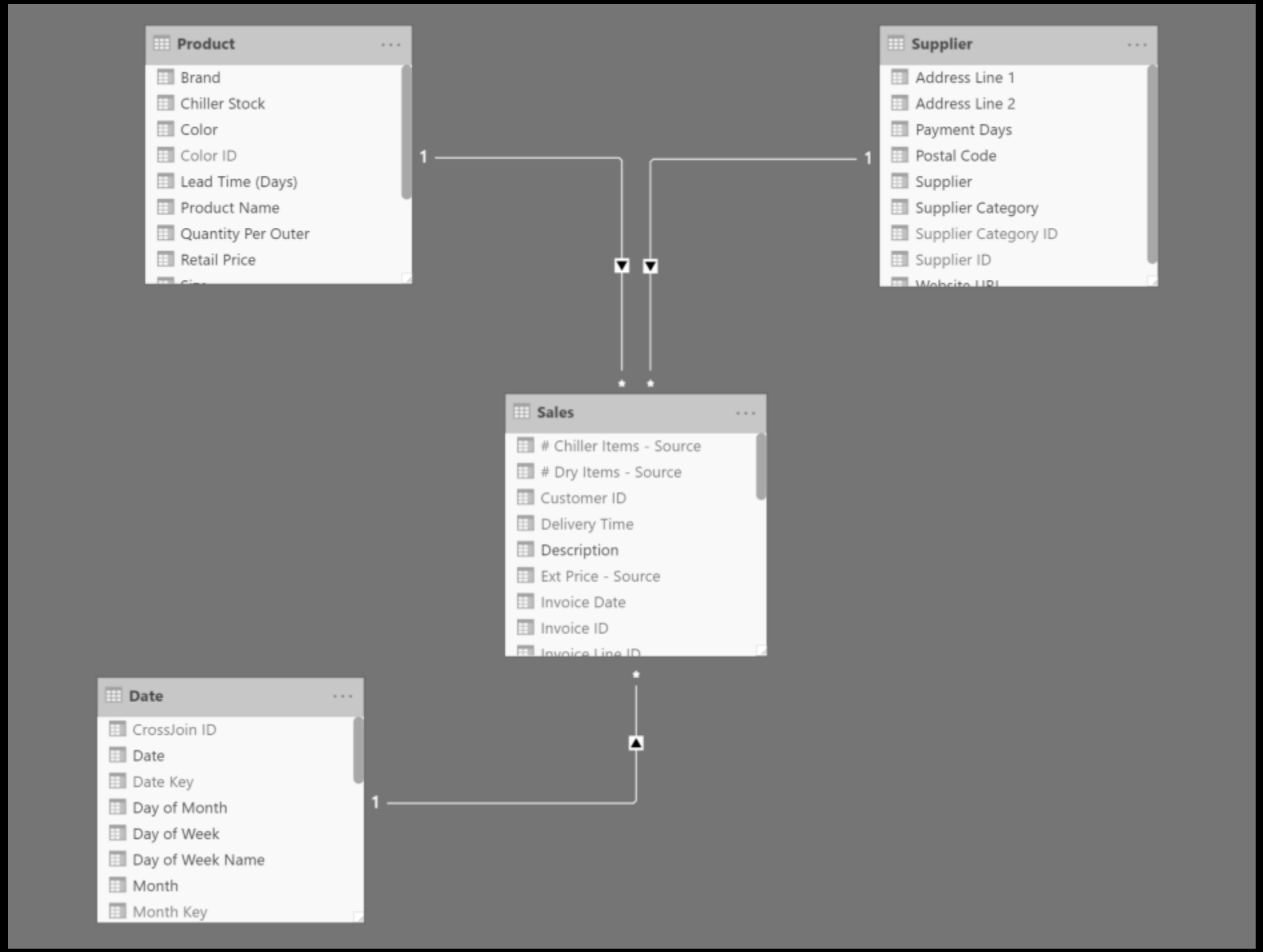
Agenda

- Measure Table
- Dynamic Currency Conversions
- Role-Playing Dimensions

Measure Table?


Product
Brand
Chiller Stock
Color
Color ID
Lead Time (Days)
Product Name
Quantity Per Outer
Retail Price
Supplier
Address Line 1
Address Line 2
Payment Days
Postal Code
Supplier
Supplier Category
Supplier Category ID
Supplier ID
Sales
Chiller Items - Source
Dry Items - Source
Customer ID
Delivery Time
Description
Ext Price - Source
Invoice Date
Invoice ID
Date
CrossJoin ID
Date
Date Key
Day of Month
Day of Week
Day of Week Name
Month
Month Key
1
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1

Supplier Category	Qty	Ext Price	Profit
Clothing Supplier	2,624,338	$53,407,430.60	$21,929,432.50
Novelty Goods Supplier	525,778	$11,849,641.64	$6,071,706.15
Packaging Supplier	5,696,347	$115,763,819.96	$51,663,616.75
Toy Supplier	104,165	$17,022,547.25	$6,064,425.50
Total	**8,950,628**	**$198,043,439.45**	**$85,729,180.90**

Measure Name	Clothing Supplier	Novelty Goods Supplier	Packaging Supplier	Toy Supplier	**Total**
Qty	2,624,338	525,778	5,696,347	104,165	**8,950,628**
Ext Price	53,407,431	11,849,642	115,763,820	17,022,547	**198,043,439**
Profit	21,929,433	6,071,706	51,663,617	6,064,426	**85,729,181**

Clothing Supplier			Novelty Goods Supplier		
Qty	Ext Price	Profit	Qty	Ext Price	Profit
2,624,338	$53,407,430.60	$21,929,432.50	525,778	$11,849,641.64	$6,071,706.15

Step 1

Create a calculated table

ROW DAX Function (Table manipulation)

Syntax | Return values | Examples | Articles

Returns a single row table with new columns specified by the DAX expressions.

Syntax

```
ROW ( <Name>, <Expression> [, <Name>, <Expression> [, … ] ] )
```

PARAMETER	ATTRIBUTES	DESCRIPTION
Name	Repeatable	Name of the new column.
Expression	Repeatable	The expression for the column.

Return values

TABLE An entire table or a table with one or more columns.

A single row table.

UNION DAX Function (Table manipulation)

Syntax | Return values | Remarks | Related

Returns the union of the two tables whose columns match.

Syntax

```
UNION ( <Table> [, <Table> [, … ] ] )
```

PARAMETER	ATTRIBUTES	DESCRIPTION
Table	Repeatable	A table that will participate in the crossjoin union.

Return values

TABLE An entire table or a table with one or more columns.

A table that contains all the rows from each of the table expressions.

```
My Measures =
UNION
(
    ROW("Measure Name", "Qty", "Sort Order", 1)
,   ROW("Measure Name", "Ext Price", "Sort Order", 2)
,   ROW("Measure Name", "Profit", "Sort Order", 3)
)
```

DATATABLE DAX Function (Table manipulation)

Syntax | Return values | Remarks | Examples | Articles

Returns a table with data defined inline.

Syntax

```
DATATABLE ( <name>, <type> [, <name>, <type> [, … ] ], <data> )
```

PARAMETER	ATTRIBUTES	DESCRIPTION
name	Repeatable	A column name to be defined.
type	Repeatable	A type name to be associated with the column.
data		The data for the table.

Return values

TABLE An entire table or a table with one or more columns.

A table declaring an inline set of values.

```
My Measures =
DATATABLE
(
    "Measure Name", STRING
,   "Sort Order", INTEGER
,   {
        {"Qty", 1}
    ,   {"Ext Price", 2}
    ,   {"Profit", 3}
    }
)
```

Table Constructor

12/09/2018 • 2 minutes to read • Contributors

Returns a table of one or more columns.

Syntax

DAX

Copy

```
{ <scalarExpr1>, <scalarExpr2>, … }
{ ( <scalarExpr1>, <scalarExpr2>, … ), ( <scalarExpr1>, <scalarExpr2>, … ), … }
```

Parameters

Term	Definition
scalarExprN	Any DAX expression that returns a scalar value.

Return value

A table of one or more columns. When there is only one column, the name of the column is Value. When there are N columns where N > 1, the names of the columns from left to right are Value1, Value2, ..., ValueN.

```
1 My Measures =
2 {
3     ("Qty", 1)
4 ,   ("Ext Price", 2)
5 ,   ("Profit", 3)
6 }
```

Step 2

Define a measure

```
Value =
SWITCH
(
    FIRSTNONBLANK('My Measures'[Measure Name], 1)
,   "Qty", [Qty]
,   "Ext Price", [Ext Price]
,   "Profit", [Profit]
,   BLANK()
)
```

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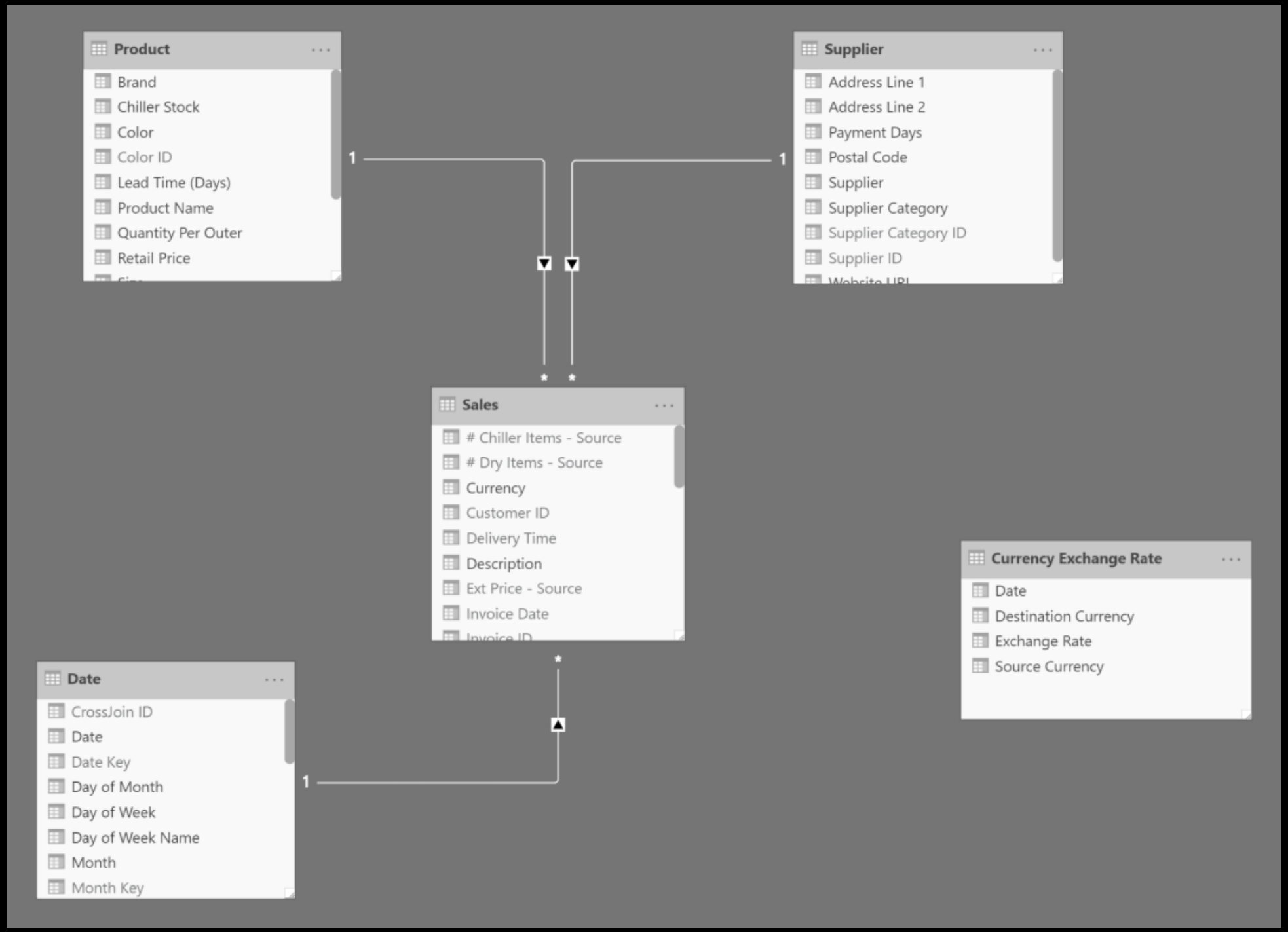
Dynamic Currency Conversion

Photo by Sharon McCutcheon on Unsplash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Supplier Category
Supplier Category ID
Supplier ID
Sales
Chiller Items - Source
Dry Items - Source
Currency
Customer ID
Delivery Time
Description
Ext Price - Source
Invoice Date
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CrossJoin ID
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Date Key
Day of Month
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Month Key
Currency Exchange Rate
Date
Destination Currency
Exchange Rate
Source Currency
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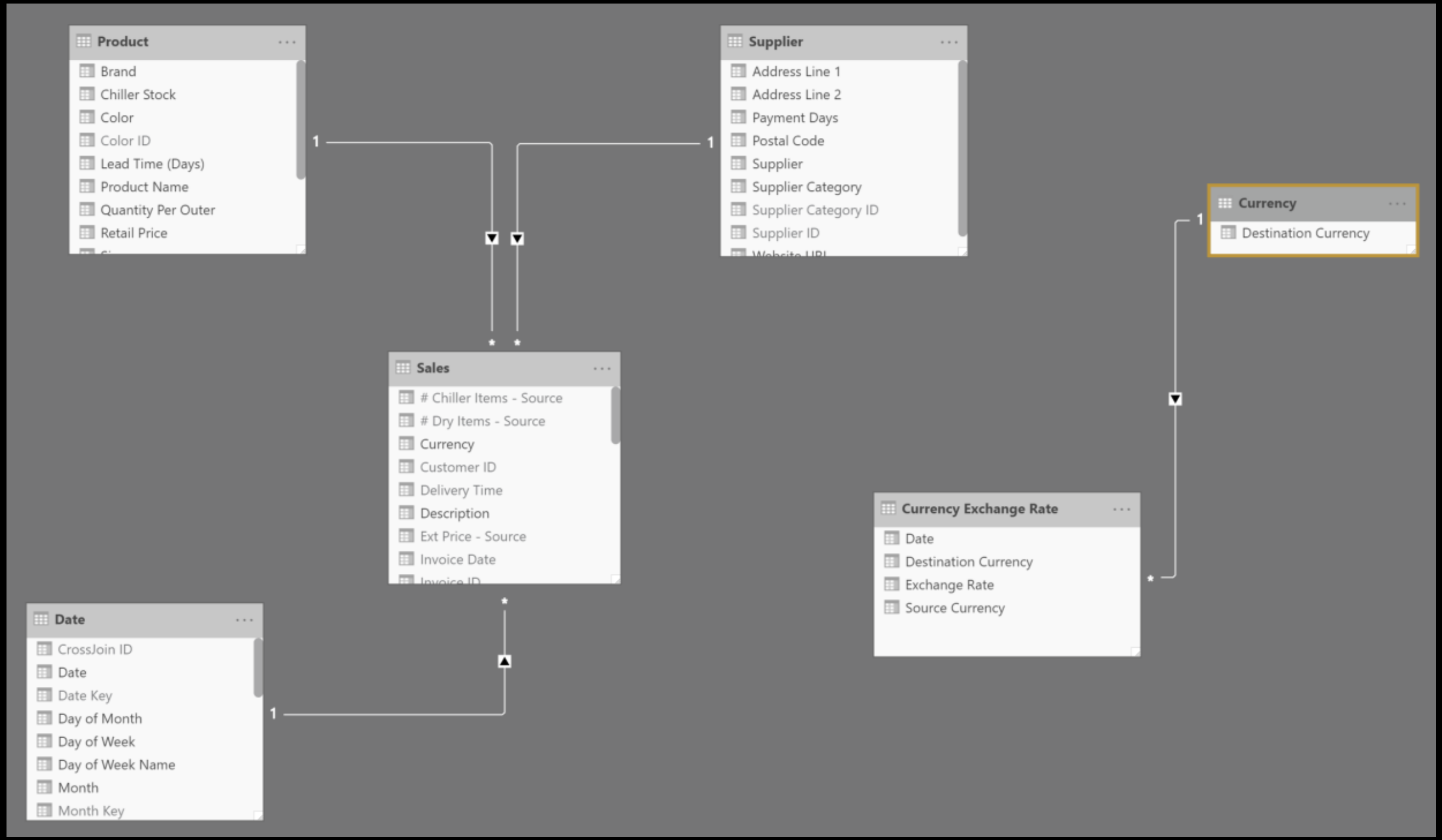
Demo Time

Step 1

Create a filter dimension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Invoice Date
Currency Exchange Rate
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Destination Currency
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Date Key
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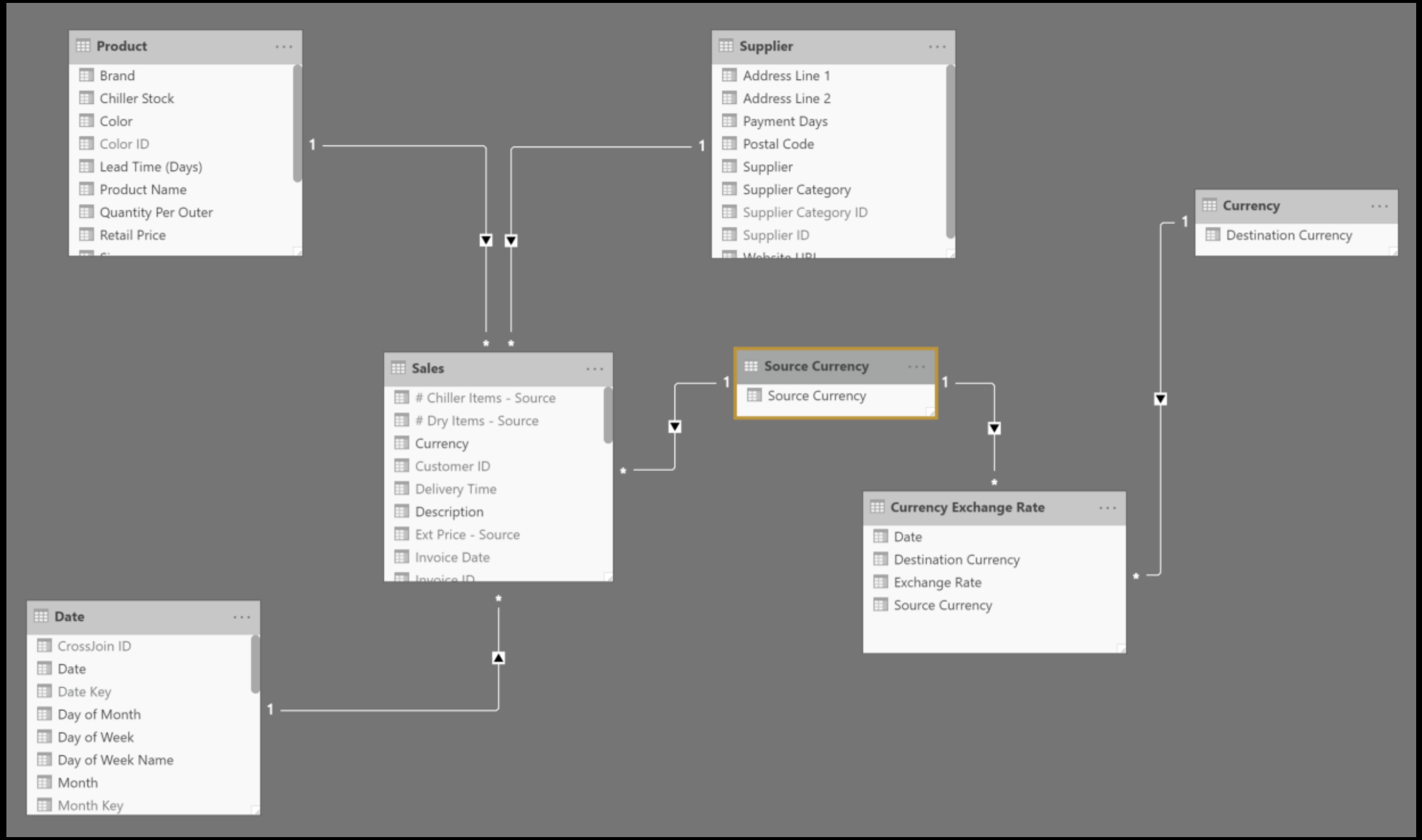
Step 2

Create a bridge table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Supplier ID
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Dry Items - Source
Currency
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Description
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Invoice Date
Source Currency
Source Currency
Currency Exchange Rate
Date
Destination Currency
Exchange Rate
Source Currency
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CrossJoin ID
Date
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Day of Week
Day of Week Name
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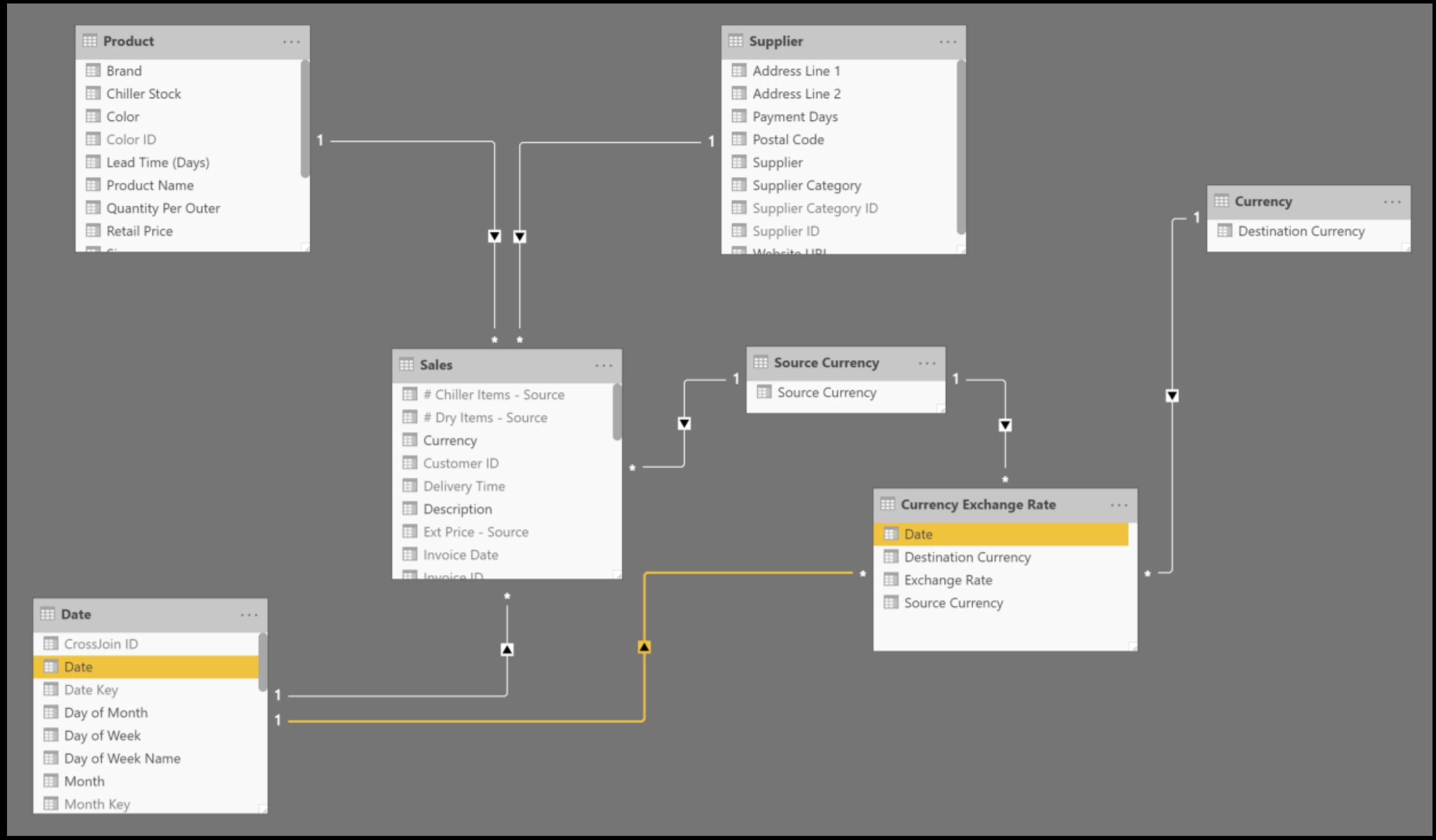
Step 3

Add a relationship to the Date entity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Source Currency
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Currency Exchange Rate
Date
Destination Currency
Exchange Rate
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Step 4

Create the measures

```
Exchange Rate = MAX('Currency Exchange Rate'[Exchange Rate])
```

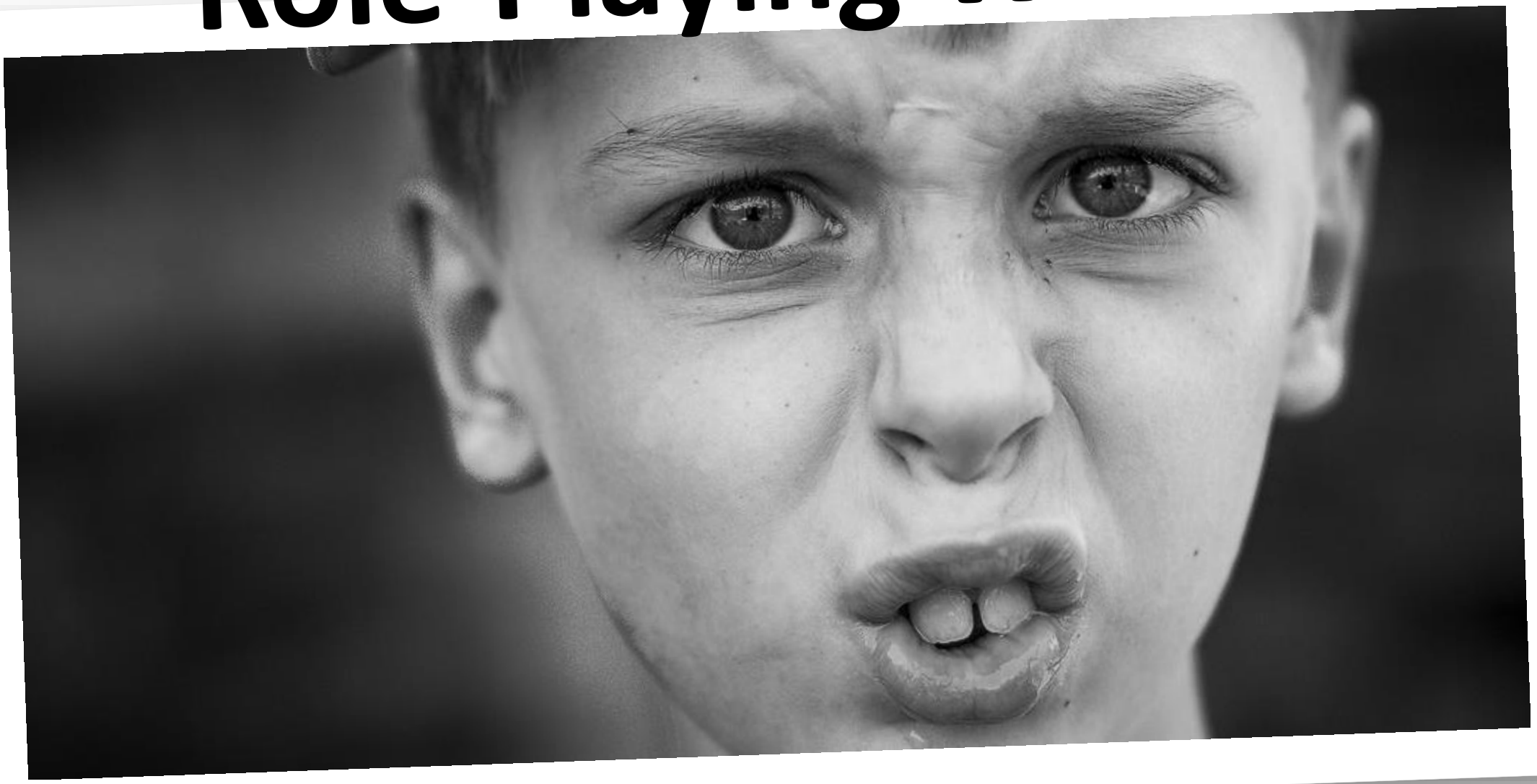
```
New Ext Price =
IF
(
    HASONEVALUE('Currency'[Destination Currency])
,   SUMX
    (
        Sales
    ,   [Ext Price] * [Exchange Rate]
    )
,   CALCULATE
    (
        SUMX
        (
            Sales
        ,   [Ext Price] * [Exchange Rate]
        )
    ,   'Currency'[Destination Currency] = "USD"
    )
)
```

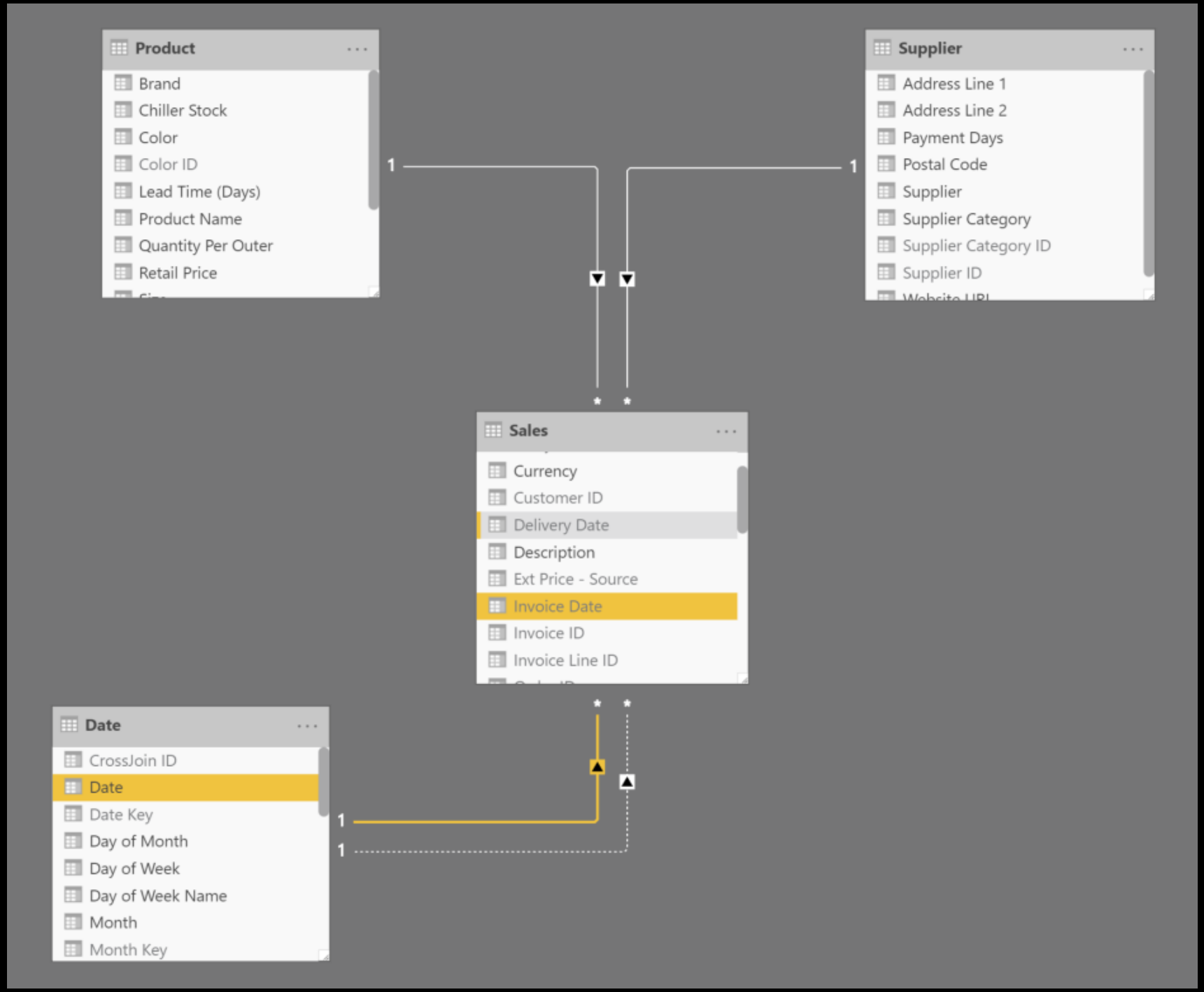
Demo Time

Role-Playing Dimensions

Photo by Manasvita S on Unsplash

Role-Playing What?

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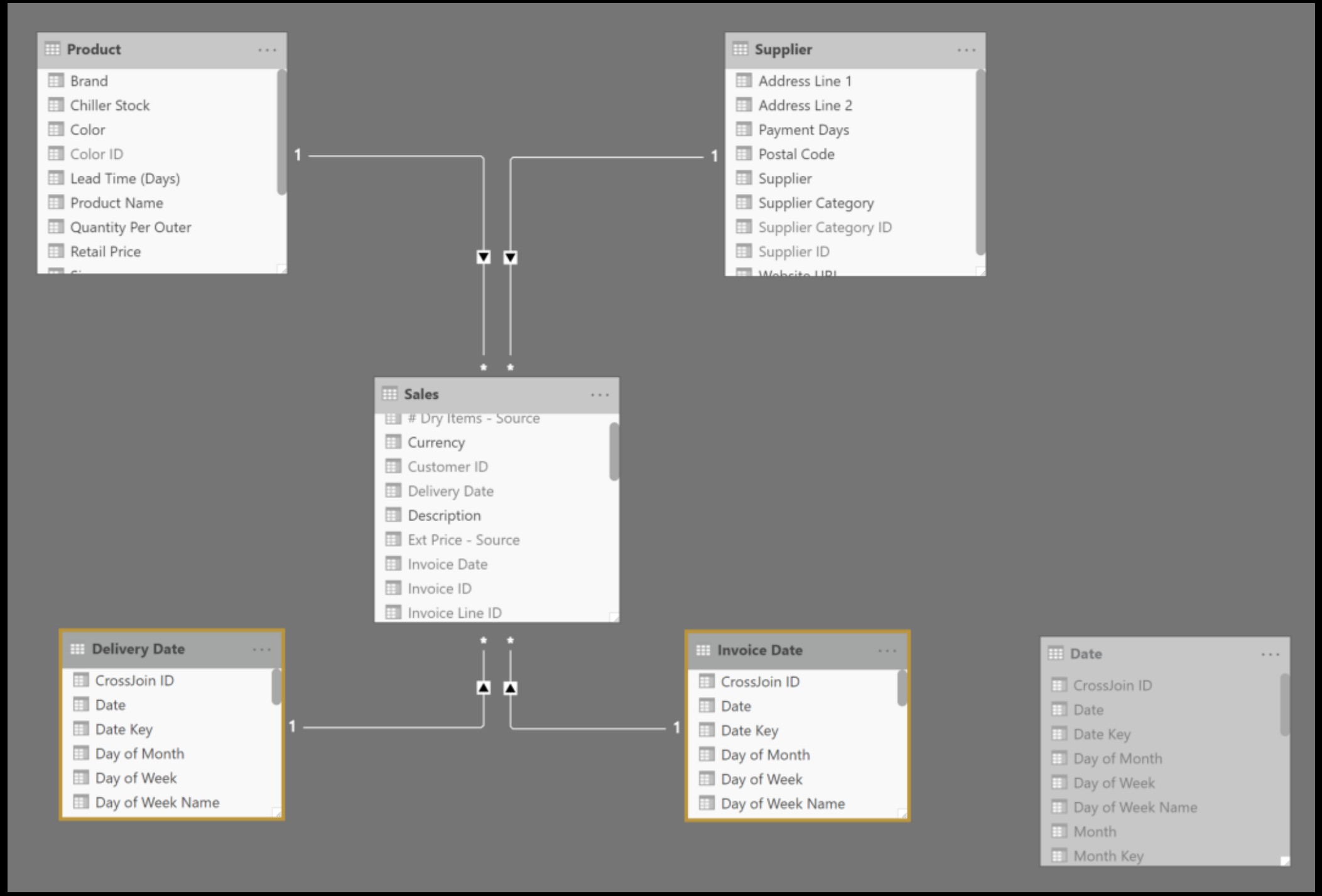
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Dry Items - Source
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Delivery Date
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Delivery Date
CrossJoin ID
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Invoice Date
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Date Key
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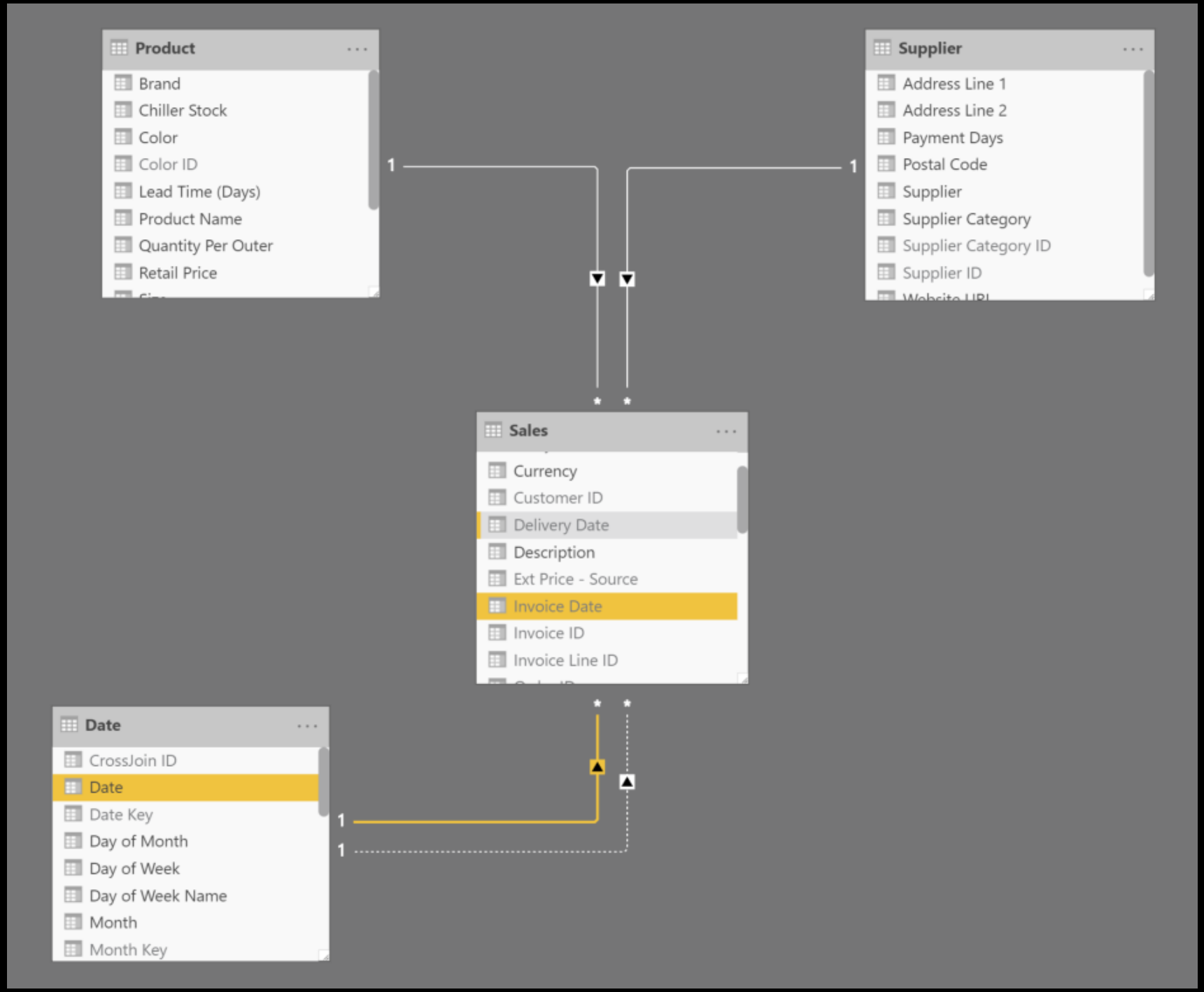
Month Key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Customer ID
Delivery Date
Description
Ext Price - Source
Invoice Date
Invoice ID
Invoice Line ID
Date
CrossJoin ID
Date
Date Key
Day of Month
Day of Week
Day of Week Name
Month
Month Key
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```
Ext Price by Invoice Date =
CALCULATE
(
    [Ext Price]
,   USERELATIONSHIP(Sales[Invoice Date], 'Date'[Date])
)



Ext Price by Delivery Date =
CALCULATE
(
    [Ext Price]
,   USERELATIONSHIP(Sales[Delivery Date], 'Date'[Date])
)
```

Demo Time

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