



DATA MODELLING SSIS ETL & DATA ANALYSIS SSAS

Report submission as a requirement for the module of “Data
Warehousing”

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```

USE [master]
GO
ALTER DATABASE [Superstore] SET SINGLE_USER WITH ROLLBACK IMMEDIATE
GO
USE [master]
GO
DROP DATABASE IF EXISTS [Superstore]
GO
CREATE DATABASE [Superstore]
GO
USE [Superstore]
GO

CREATE TABLE [dbo].[Product](
    [product_key] [int] IDENTITY(1,1) PRIMARY KEY,
    [product_brand] [nvarchar](30) NOT NULL,
    [product_id] [int] NOT NULL,
    [product_sku] [nvarchar](20) UNIQUE NOT NULL,
    [product_name] [nvarchar](60) NOT NULL,
    [product_curr_price] [money] NOT NULL,
    [product_cost] [money] NOT NULL,
    [product_weight] [float] NOT NULL,
    [recyclable] [bit] NULL,
    [low_fat] [bit] NULL)
GO

CREATE TABLE [dbo].[Store](
    [store_key] [int] IDENTITY(2,1) PRIMARY KEY,
    [store_id] [int] NOT NULL,
    [store_name] [nvarchar](15) UNIQUE NOT NULL,
    [store_type] [nvarchar](20) NOT NULL,
    [store_street] [nvarchar](30) NOT NULL,
    [store_city] [nvarchar](20) NOT NULL,
    [store_district] [nvarchar](30) NOT NULL,
    [store_state] [nvarchar](30) NOT NULL,
    [store_region] [nvarchar](35) NOT NULL,
    [region_id] [smallint] NOT NULL,
    [store_country] [nvarchar](20) NOT NULL,
    [store_phone] [nvarchar](20) NOT NULL,
    [stock_date] [date] NOT NULL,
    [first_opened_date] [date] NOT NULL)
GO

CREATE TABLE [dbo].[Customer](
    [customer_key] [int] IDENTITY(3,1) PRIMARY KEY,
    [customer_id] [int] NOT NULL,
    [customer_acc_num] [nvarchar](30) UNIQUE NOT NULL,
    [first_name] [nvarchar](20) NOT NULL,
    [last_name] [nvarchar](20) NOT NULL,
    [customer_address] [nvarchar](60) NOT NULL,
    [customer_city] [nvarchar](20) NOT NULL,
    [customer_state_province] [nvarchar](20) NOT NULL,
    [customer_postal_code] [nvarchar](10) NOT NULL,
    [customer_country] [nvarchar](20) NOT NULL,
    [marital_status] [nvarchar](1) NULL,
    [yearly_income] [nvarchar](15) NULL,
    [gender] [nvarchar](1) NOT NULL,
    [total_children] [int] NULL,
    [num_children_at_home] [int] NULL,
    [education] [nvarchar](30) NULL,
    [birthdate] [date] NOT NULL,
    [acct_open_date] [date] NOT NULL,
    [member_card] [nvarchar](15) NOT NULL,
    [occupation] [nvarchar](20) NULL,
    [homeowner] [nvarchar](1) NULL,)
GO

CREATE TABLE [dbo].[Time](
    [Date] [date] PRIMARY KEY,
    [day_name] [nvarchar](10) NULL,
    [day] [tinyint] NULL,
    [month] [tinyint] NULL,
    [month_name] [nvarchar](10) NULL,
    [Quarter] [tinyint] NULL,
    [Year] [smallint] NULL
)
GO

CREATE TABLE [dbo].[Transactions](
    [transaction_id] [int] IDENTITY(1,1) PRIMARY KEY,
    [customer_key] [int] REFERENCES [dbo].[Customer] ([customer_key]),
    [product_key] [int] REFERENCES [dbo].[Product] ([product_key]),
    [store_key] [int] REFERENCES [dbo].[Store] ([store_key]),
    [transaction_date] [date] REFERENCES [dbo].[Time] ([date]),
    [Quantity] [smallint] NOT NULL)
GO

```

Customer ETL

Importing from Source

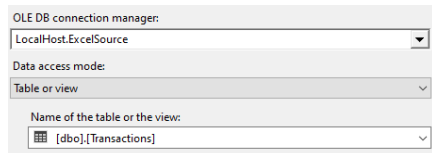


Figure 1: Customer connection source

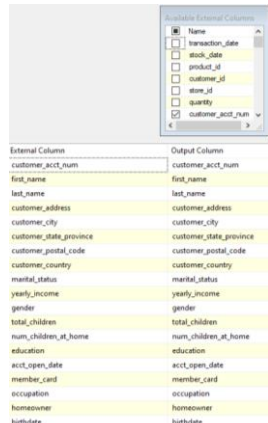


Figure 2: Customer selecting columns to import

Transformations

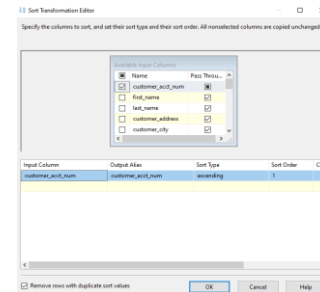


Figure 3: Removing duplicates from customer

Input Column	Output Alias	Data Type	Length
homeowner	Fixed trunc homeowner	Unicode string [DT_WSTR]	1
occupation	Fixed trunc occupation	Unicode string [DT_WSTR]	20
member_card	Fixed trunc member_c...	Unicode string [DT_WSTR]	15
education	Fixed trunc ducation	Unicode string [DT_WSTR]	30
gender	Fixed trunc gender	Unicode string [DT_WSTR]	1
yearly_income	Fixed trunc yearly_inc...	Unicode string [DT_WSTR]	15
marital_status	Fixed trunc marital_st...	Unicode string [DT_WSTR]	1
customer_postal_code	Fixed trunc customer_...	Unicode string [DT_WSTR]	10
customer_state_provi...	Fixed trunc customer_...	Unicode string [DT_WSTR]	20
customer_city	Fixed trunc customer_...	Unicode string [DT_WSTR]	20
customer_address	Fixed trunc customer_...	Unicode string [DT_WSTR]	60
last_name	Fixed trunc last_name	Unicode string [DT_WSTR]	20
first_name	Fixed trunc first_name	Unicode string [DT_WSTR]	20
customer_country	Fixed trunc customer_...	Unicode string [DT_WSTR]	20
num_children_at_home	Fix int num_children_...	four-byte signed integer ...	
total_children	Fix int of total_children	four-byte signed integer ...	
customer_acct_num	Fixed trunc customer_...	Unicode string [DT_WSTR]	30

Figure 4: Customer data conversion

Loading to destination

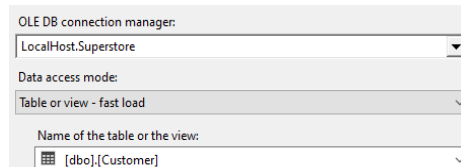


Figure 5: Customer destination connection

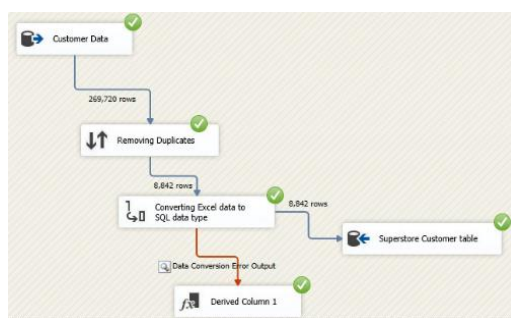


Figure 7: Customer ETL task run successfully

Input Column	Destination Column
Fixed trunc customer_p...	customer_id
Fixed trunc customer_p...	customer_acct_num
Fixed trunc customer_p...	first_name
Fixed trunc customer_p...	last_name
Fixed trunc customer_p...	customer_address
Fixed trunc customer_p...	customer_city
Fixed trunc customer_p...	customer_state_province
Fixed trunc customer_p...	customer_postal_code
Fixed trunc customer_p...	marital_status
Fixed trunc customer_p...	yearly_income
Fixed trunc customer_p...	gender
Fix int num_children_at...	total_children

Figure 6: Customer column mapping

customer_id	customer_acct_num	first_name	last_name	customer_address	customer_city	customer_state_province	customer_postal_code	customer_country	marital_status	yearly_income	gender	total_children	num_children_at_home	education	birthdate
1	10013550900	William	Murphy	4304 Heber Drive	Ballard	WA	75883	USA	S	\$90K - \$110K	M	2	0	Partial High School	1911-08-28
2	10016228100	John	Sweet	673 Noah Court	Port Orchard	WA	26604	USA	S	\$130K - \$150K	F	4	0	Graduate Degree	1915-09-17
3	10018780800	Elizabeth	Jantzer	2676 Premier Pl.	Ladner	BC	45638	Canada	M	\$70K - \$90K	F	1	0	Graduate Degree	1963-08-13
4	10022514500	Beverly	DeMar	1955 Montgomery Ave	National City	CA	16430	USA	M	\$30K - \$50K	M	3	2	High School Degree	1923-07-26
5	10020209900	Joan	Card	6400 St. Johns Lane	Port Hammond	BC	37579	Canada	M	\$30K - \$50K	M	2	1	Partial College	1952-01-13
6	10030158758	Ida	Holmes	1568 Delta Fair Blvd.	La Cruz	Sinaloa	87935	Mexico	M	\$70K - \$90K	F	2	2	High School Degree	1980-02-24
7	10064045800	Lillian	Chandler	1354 Catalpa Court	Tacoma	WA	90050	USA	M	\$30K - \$50K	M	3	3	Partial High School	1945-12-06
8	10068825500	Maylou	Burkett	9431 D Bel Ar Dr.	Puyallup	WA	75702	USA	M	\$30K - \$50K	F	3	1	High School Degree	1973-02-07
9	10070767400	Melvin	Drake	9471 Shelly Dr.	Bremerton	WA	74945	USA	S	\$10K - \$30K	M	2	0	Bachelor Degree	1969-12-25
10	10072162151	Natalie	Barber	1706 Vallejo	Palo Alto	CA	31234	USA	S	\$30K - \$50K	M	2	0	High School Degree	1969-03-07
11	10072816610	Emilia	Richendollar	2000 Thornwood Dr.	Portland	OR	94672	USA	S	\$50K - \$110K	F	2	0	High School Degree	1933-06-11
12	10107293725	Marjyn	Pudom	6445 Cadwell Street	Mayville	WA	95521	USA	M	\$10K - \$30K	F	0	0	Partial High School	1931-03-29
13	10125892200	James	Trujillo	7941 Cristobal	Grossmont	CA	23887	USA	S	\$70K - \$90K	M	2	0	High School Degree	1962-05-28
14	10128703117	M. Benjas		4055 Leonard Ct.	Guadalajara	Jalisco	62356	Mexico	S	\$50K - \$70K	M	2	0	Bachelor Degree	1962-06-25

Figure 8: Data successfully loaded to SQL

Product ETL

Importing from Source

OLE DB connection manager:
 LocalHost.ExcelSource

Data access mode:
 Table or view

Name of the table or the view:
 [dbo].[Transactions]

Figure 9: Product connection source

External Column	Output Column
product_brand	product_brand
product_name	product_name
product_sku	product_sku
product_retail_price	product_retail_price
product_cost	product_cost
product_weight	product_weight
recyclable	recyclable
low_fat	low_fat

Figure 10: Product selecting columns to import

Transformations

Sort Transformation Editor

Specify the columns to sort, and set their sort type and their sort order. All nonselected columns are copied unchanged.

Available Input Columns:

- product_brand
- product_name
- product_sku
- product_retail_price
- product_cost
- product_weight
- recyclable

Input Column: product_sku, Output Alias: product_sku, Sort Type: ascending, Sort Order: 1

Remove rows with duplicate sort values

Figure 11: Removing duplicates from product

Data Conversion Transformation Editor

Configure the properties used to convert the data type of an input column to a different data type. The column is converted, set the length, precision, scale, and code page of the column.

Available Input Columns:

- product_brand
- product_name
- product_sku
- product_retail_price
- product_cost

Input Column	Output Alias	Data Type	Length
product_brand	Converted product_br...	Unicode string (DT_WSTR)	30
product_name	Converted product_na...	Unicode string (DT_WSTR)	60
product_sku	Converted product_sku	Unicode string (DT_WSTR)	20
product_retail_price	Converted product_re...	currency (DT_C)	
product_cost	Converted product_co...	currency (DT_C)	
product_weight	Converted product_w...	double-precision float (D...	
recyclable	Converted recyclable	Boolean (DT_BOOL)	
low_fat	Converted low_fat	Boolean (DT_BOOL)	

Figure 12: Customer data conversion

Loading to Destination

OLE DB connection manager:
 LocalHost.Superstore

Data access mode:
 Table or view - fast load

Name of the table or the view:
 [dbo].[Product]

Figure 13: Product destination connection

Input Column	Destination Column
product_id	product_id
product_sku	product_sku
product_brand	product_brand
product_name	product_name
product_retail_price	product_retail_price
product_cost	product_cost
product_weight	product_weight
recyclable	recyclable
low_fat	low_fat

Figure 14: Product column mapping

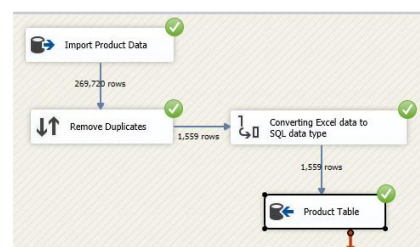


Figure 15: Product ETL task run successfully

Results

product_id	product_sku	product_brand	product_name	product_retail_price	product_cost	product_weight	recyclable	low_fat
58	1324830267	Big Time	Big Time Frozen Pancakes	3.24	1.17	16.3	1	NULL
59	1618	13330791961	Musical	0.96	0.32	13.5	NULL	1
60	1619	13302412881	Plays	1.38	0.65	14.9	1	NULL
61	1620	13403943181	Token	2.80	0.92	11	1	NULL
62	1621	13452650096	Gulf Coast	3.43	1.68	13.2	NULL	NULL
63	1622	13572012086	Prostate	2.30	1.01	21.9	1	NULL
64	1623	13620550381	Red Wing	2.59	1.04	20.1	NULL	NULL
65	1624	13621910214	CDP	3.40	1.22	10.4	NULL	NULL
66	1625	13634505010	Tall Tale	1.63	0.57	15.6	1	1
67	1626	13646225011	Giant	1.65	0.78	19.9	1	1
68	1627	13654881091	Horatio	2.82	0.96	18.3	1	NULL
69	1628	13646247130	Gentle	1.34	0.66	19.5	1	NULL
70	1629	14104428817	Pig Tail	2.21	1.06	19.5	1	1
71	1630	14283847212	Faux Products	0.65	0.20	20.6	1	NULL
72	1631	14302275004	Elbony	2.83	0.96	20	1	1

Query executed successfully. (local) [15.0 RTM] WIN-10-CHRM311-administ... Superstore 00:00:00 1,559 rows

Figure 16: Product data successfully loaded to SQL

Store ETL

Importing from Source

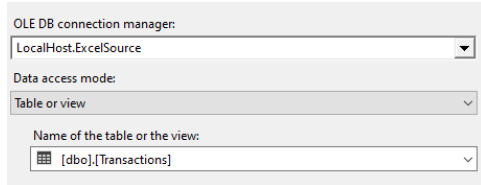


Figure 17: Store connection source

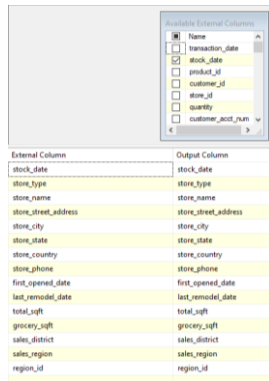


Figure 18: Store selecting columns to import

Transformations

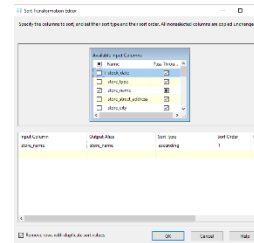


Figure 19: Removing duplicates from Store

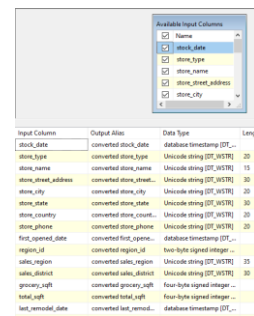


Figure 20: Store data conversion

Loading to destination

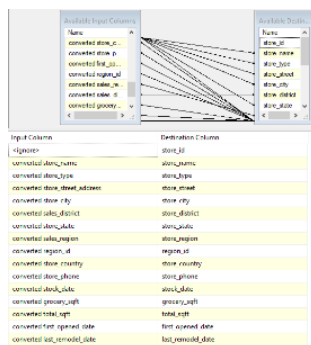


Figure 22: Store column mapping

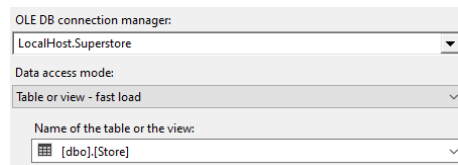


Figure 21: Store destination connection

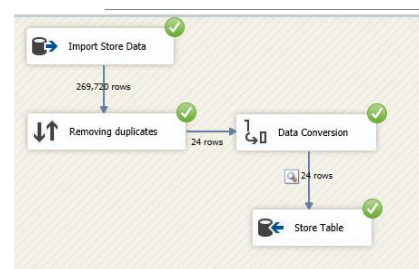


Figure 23: Store ETL task run successfully

18 FROM [Superstore].[dbo].[Store]

store_id	store_name	store_type	store_street	store_city	store_district	store_state	store_region	region_id	store_country	store_phone	stock_date	grocery_sft	total_sft	first_opened_date	last_remodel_date
1	Store 1	Supermarket	2853 Bailey Rd	Acapulco	Acapulco	Guerrero	Mexico West	20	Mexico	262-555-5124	1990-05-03	17475	23593	1982-01-09	1990-12-05
2	Store 10	Supermarket	7894 Rotherham Dr	Ottawa	Ottawa	Verscutz	Mexico Central	24	Mexico	212-555-4774	1998-04-08	26354	34791	1979-04-13	1982-01-30
3	Store 11	Supermarket	5371 Holland Circle	Portland	Portland	OR	North West	22	USA	688-555-8995	1997-01-02	16232	20319	1976-09-17	1982-05-15
4	Store 12	Deluxe Supermarket	1120 Westchester Pl	Hidalgo	Hidalgo	Zacatecas	Mexico Central	25	Mexico	151-555-1702	1998-02-03	21938	30584	1968-03-25	1993-12-18
5	Store 13	Deluxe Supermarket	5179 Valley Ave	Salem	Salem	OR	North West	23	USA	977-555-2724	1997-04-28	18670	27694	1957-04-13	1997-11-10
6	Store 14	Small Grocery	4365 Indigo Ct	San Francisco	San Francisco	CA	Central West	1	USA	135-555-4888	1997-06-01	15321	22478	1957-11-24	1958-01-07
7	Store 15	Supermarket	5006 Highland Drive	Seattle	Seattle	WA	North West	18	USA	893-555-1024	1997-02-28	13305	21215	1963-07-24	1973-10-19
8	Store 16	Supermarket	5922 La Salle Ct	Spokane	Spokane	WA	North West	87	USA	643-555-3645	1997-03-03	22063	30268	1974-08-23	1977-07-13
9	Store 17	Deluxe Supermarket	490 Radson Road	Tacoma	Tacoma	WA	North West	84	USA	855-555-5581	1997-04-10	22123	33858	1970-05-30	1976-06-23
10	Store 18	Mid-Size Grocery	6764 Glen Road	Hidalgo	Hidalgo	Zacatecas	Mexico Central	25	Mexico	528-555-8317	1998-04-12	30351	38382	1969-06-28	1975-08-30
11	Store 19	Deluxe Supermarket	6644 Sundance Drive	Vancouver	Vancouver	BC	Canada West	5	Canada	862-555-7395	1998-04-21	16418	23112	1977-03-27	1990-10-25
12	Store 2	Small Grocery	5203 Catalano Way	Bellingham	Bellingham	WA	North West	78	USA	605-555-6203	1997-07-14	22271	28206	1970-04-02	1973-06-04
13	Store 20	Mid-Size Grocery	2766 Maxwell Ln	Victoria	Victoria	BC	Canada West	6	Canada	897-555-1931	1998-04-03	27463	34452	1980-02-06	1987-04-09
14	Store 21	Deluxe Supermarket	4093 Steven Circle	San Andres	Mexico City	DF	Mexico Central	106	Mexico	493-555-4781	1998-02-22	25453	32717	1986-02-07	1990-04-16
15	Store 22	Small Grocery	9606 Alupam Loop	Walla Walla	Walla Walla	WA	North West	88	USA	881-555-5117	1997-04-13	24837	35918	1951-01-24	1969-10-17

Query executed successfully. (local) (15.0 RTM) WIN-10-CMM531\Administ... Superstore: 00:00:00 24 rows

Figure 24: Store data successfully loaded to SQL

Time ETL

Importing from Source

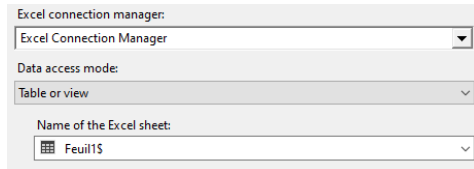


Figure 25: Time connection source

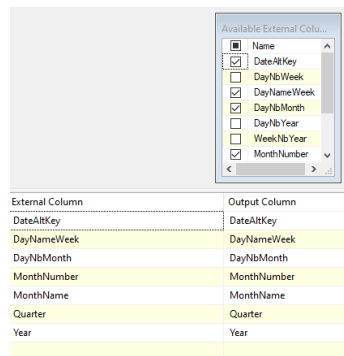


Figure 26: Time selecting columns to import.

Transformations

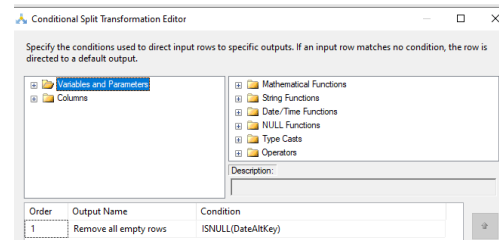


Figure 27: Removing NULL rows from Time

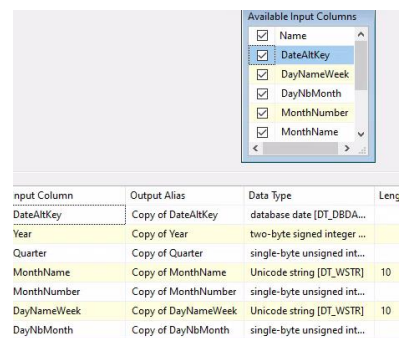


Figure 28: Time data conversion

Loading to destination

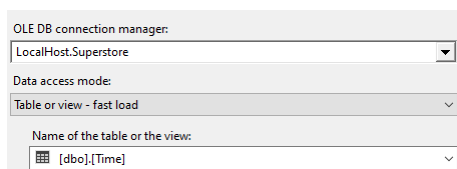


Figure 29: Time destination connection

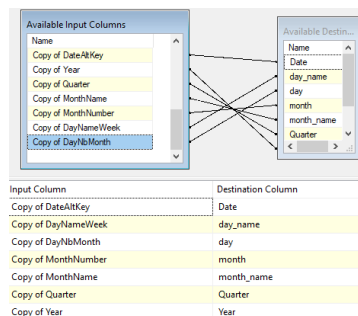


Figure 30: Time column mapping

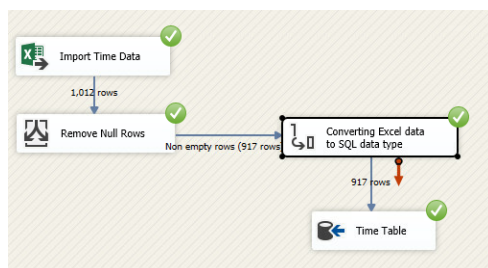


Figure 31: Time ETL task run successfully

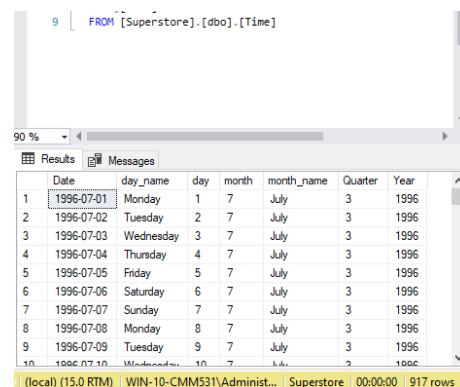


Figure 32: Time data successfully loaded to SQL

Transformation ETL

Importing from Source

OLE DB connection manager:
 LocalHost.ExcelSource
 Data access mode:
 Table or view
 Name of the table or the view:
 [dbo].[Transactions]

Figure 33: Transactions connection source

Available External Columns

- ☒ Name
- ☒ transaction_date
- ☐ stock_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id
- ☒ quantity
- ☐ customer_acct_num

External Column	Output Column
transaction_date	transaction_date
product_id	product_id
customer_id	customer_id
store_id	store_id
quantity	quantity

Figure 34: Transaction selecting columns to import

Transformation

Available Input Columns

- ☒ Name
- ☒ transaction_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id

Input Column	Output Alias	Data Type
product_id	Copy of product_id	four-byte signed integer ...
customer_id	Copy of customer_id	four-byte signed integer ...
store_id	Copy of store_id	four-byte signed integer ...
quantity	Copy of quantity	two-byte signed integer ...
transaction_date	Copy of transaction_date	database time [DT,DBT...

Figure 35: Transaction data conversion

OLE DB connection manager:
 LocalHost.Superstore
 Use a table or a view:
 [dbo].[Store]

Figure 36: Store look-up

Available Input Columns

- ☒ Name
- ☒ transaction_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id
- ☒ quantity
- ☒ Copy of product_id
- ☒ Copy of customer_id

Available Lookup Columns

- ☒ Name
- ☒ Ind...
- ☒ store_key
- ☐ store_id
- ☐ store_name
- ☐ store_type
- ☐ store_street
- ☐ store_city
- ☐ store_dist...

Lookup Column	Lookup Operation	Output Alias
store_key	Replace 'Copy of store_id'	store_key

Figure 37: Mapping store_key to transactions

OLE DB connection manager:
 LocalHost.Superstore
 Use a table or a view:
 [dbo].[Product]

Figure 38: Product look-up

Available Input Columns

- ☒ Name
- ☒ transaction_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id
- ☒ quantity
- ☒ Copy of product_id
- ☒ Copy of customer_id

Available Lookup Columns

- ☒ Name
- ☒ Ind...
- ☒ product_key
- ☐ product_id
- ☐ product_sku
- ☐ product_name
- ☐ product_unit_price
- ☐ product_cost
- ☐ product_weight

Lookup Column	Lookup Operation	Output Alias
product_key	Replace 'Copy of product_id'	product_key

Figure 39: Mapping product_key to transactions

OLE DB connection manager:
 LocalHost.Superstore
 Use a table or a view:
 [dbo].[Customer]

Figure 40: Customer look-up

Available Input Columns

- ☒ Name
- ☒ transaction_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id
- ☒ quantity
- ☒ product_key
- ☒ Copy of customer_id

Available Lookup Columns

- ☒ Name
- ☒ Ind...
- ☒ customer_key
- ☐ customer_id
- ☐ customer_acct_num
- ☐ first_name
- ☐ last_name
- ☐ customer_address
- ☐ customer_city

Lookup Column	Lookup Operation	Output Alias
customer_key	Replace 'Copy of customer_id'	customer_key

Figure 41: Mapping customer_key to transactions

Loading to destination

OLE DB connection manager:
 LocalHost.Superstore
 Data access mode:
 Table or view - fast load
 Name of the table or the view:
 [dbo].[Transactions]

Figure 42: Transaction destination connection

Available Input Columns

- ☒ Name
- ☒ transaction_date
- ☒ product_id
- ☒ customer_id
- ☒ store_id
- ☒ quantity
- ☒ product_key
- ☒ customer_key

Available Destination Columns

- ☒ Name
- ☒ Ind...
- ☒ transaction_id
- ☒ customer_key
- ☒ product_key
- ☒ store_key
- ☒ transaction_date
- ☒ Quantity

Input Column	Destination Column
transaction_id	transaction_id
customer_key	customer_key
product_key	product_key
store_key	store_key
transaction_date	transaction_date
Quantity	Quantity

Figure 43: Transaction column mapping



Figure 44: Transactions ETL task run successfully

Query Results (local) (15.0 KTM) WIN-10-CHM331\Administ... Superstore 00:00:02 268,720 rows

transaction_id	customer_key	product_key	store_key	transaction_date	Quantity
269721	2156	4155	54	1997-01-01	3
269722	6864	3202	62	1997-01-01	1
269723	2156	4476	54	1997-01-01	4
269724	2156	4530	54	1997-01-01	2
269725	2156	4655	54	1997-01-01	4
269726	1614	3949	54	1997-01-01	2
269727	6767	3535	54	1997-01-01	3

Figure 45: Transactions data successfully loaded to SQL

Product Dimension

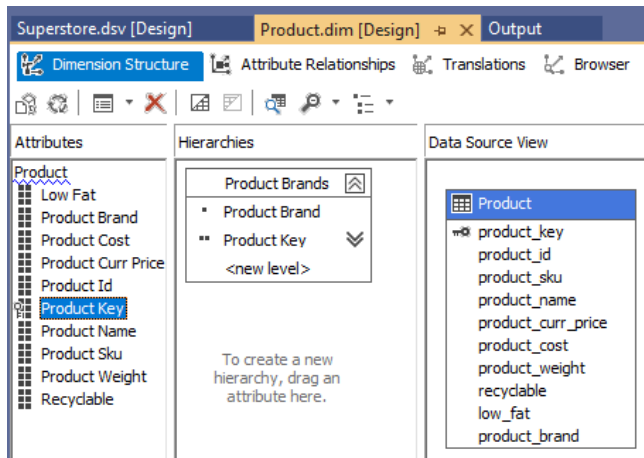


Figure 42: Product Dimension SSAS

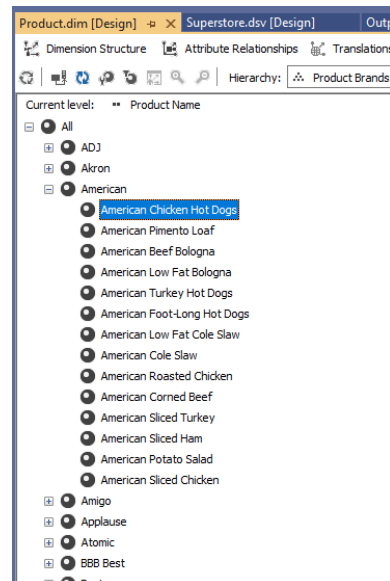


Figure 43: Product hierarchy in Browser

Customer Dimension

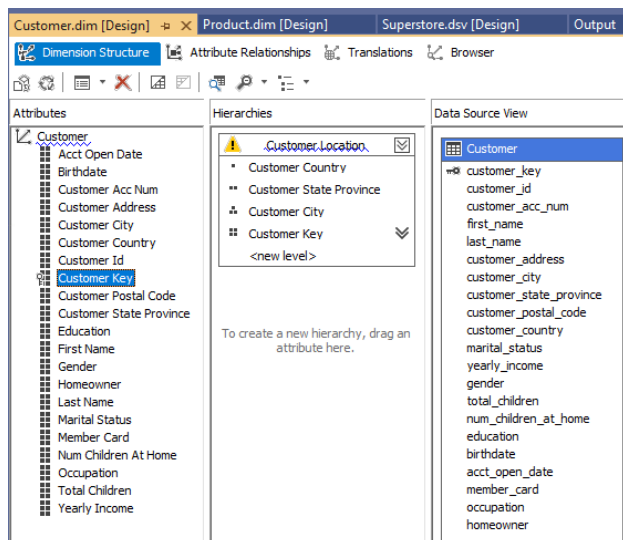


Figure 44: Customer dimension SSAS

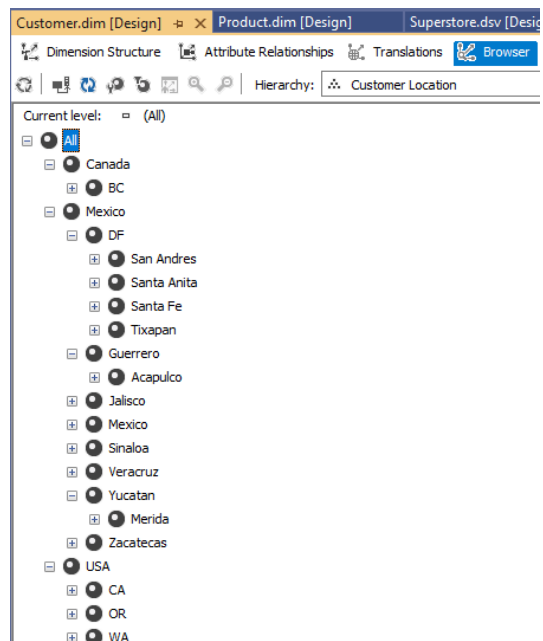


Figure 45: Customer hierarchy in Browser

Store Dimension

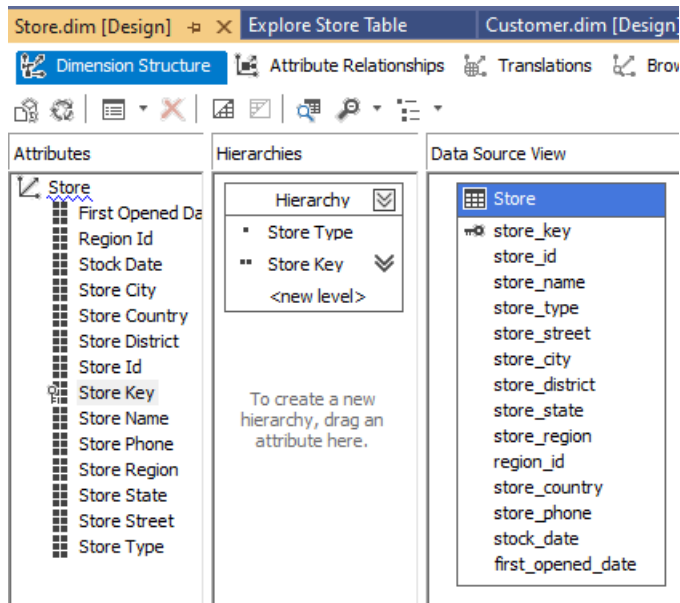


Figure 46: Store Dimension SSAS

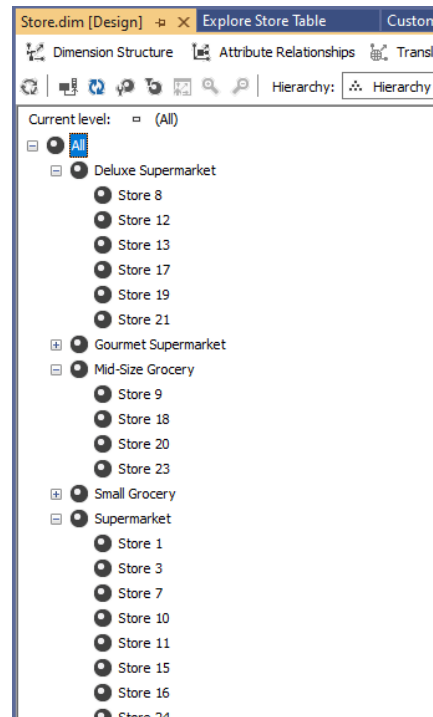


Figure 47: Store hierarchy in browser

Time Dimension

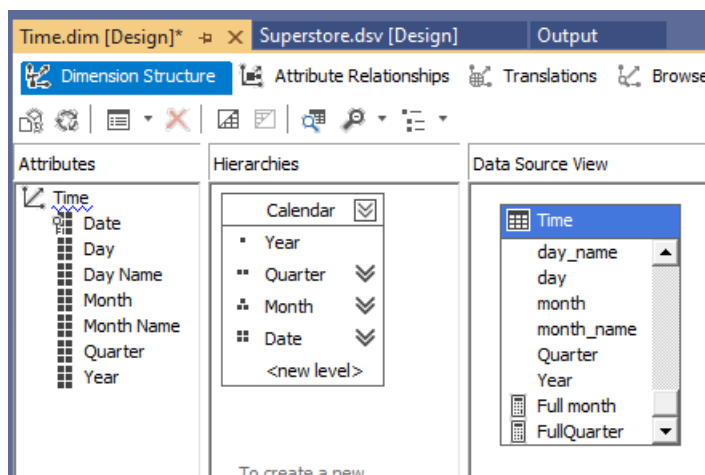


Figure 48: Time Dimension SSAS

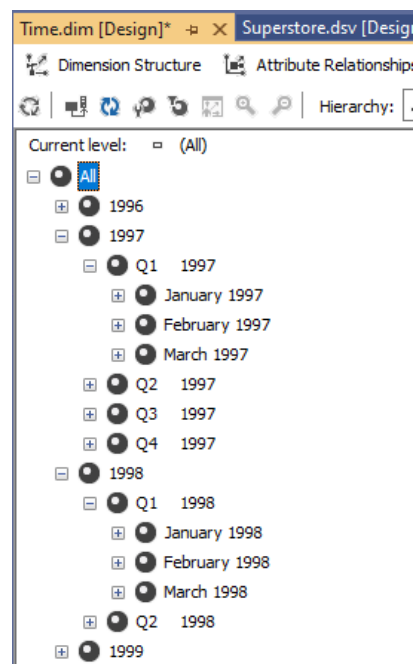


Figure 49 Time hierarchy in browser

Transaction Fact Table

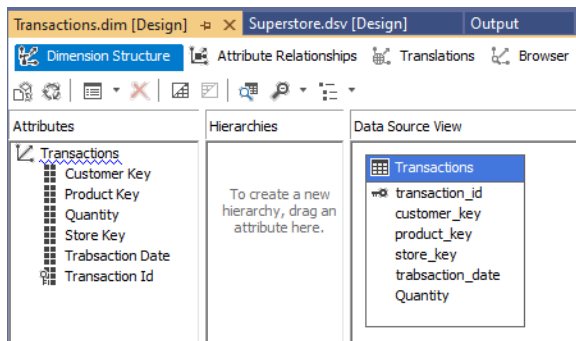


Figure 50: Transaction Fact SSAS

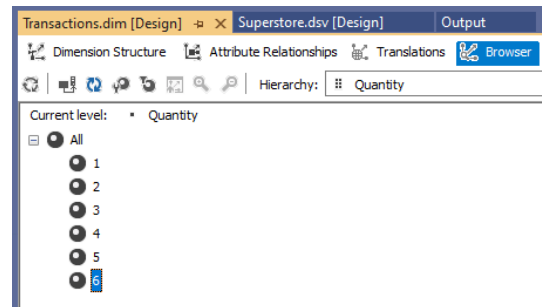


Figure 51: Transaction browser tab

MDX Queries

Query 1

```
WITH MEMBER Measures.MTDQuantity AS
SUM(PERIODSTODATE([Time].[Calendar].[month],
[Time].[Calendar].CURRENTMEMBER), [Measures].[Quantity])
SELECT {[Measures].[Quantity], Measures.[MTDQuantity]} ON COLUMNS,
DESCENDANTS([Time].[Calendar].[Year].[1998].children) ON ROWS
FROM SuperstoreCube
```

Query 2

```
WITH MEMBER Measures.[Last month Quantity] AS
SUM(PERIODSTODATE([Time].[Calendar].[month],
[Time].[Calendar].PREVMEMBER), [Measures].[Quantity])
MEMBER Measures.[MTDQuantity] AS
SUM(PERIODSTODATE([Time].[Calendar].[month],
[Time].[Calendar].CURRENTMEMBER), [Measures].[Quantity])
MEMBER Measures.[MoM Quantity %] AS
FORMAT((Measures.[MTDQuantity] - Measures.[Last month Quantity]) /
Measures.[Last month Quantity], '#.0%')

SELECT {[Measures].[Quantity], Measures.[Last month Quantity],
Measures.[MoM Quantity %]} ON COLUMNS,
[Time].[Calendar].[Year].&[1998].children ON ROWS
FROM SuperstoreCube
```

	Quantity	Last month Quantity	MoM Quantity %
January 1998	46313	26796	72.8%
February 1998	44431	46313	-4.1%
March 1998	46334	44431	4.3%
April 1998	45049	46334	-2.8%
May 1998	45085	45049	.1%
June 1998	45611	45085	1.2%
July 1998	46671	45611	2.3%
August 1998	44777	46671	-4.1%
September 1998	47964	44777	7.1%
October 1998	43945	47964	-8.4%
November 1998	53807	43945	22.4%
December 1998	56729	53807	5.4%

Figure 53: MDX Query 2

	Quantity	MTDQuantity
January 1998	46313	46313
1	633	633
2	1797	2430
3	1460	3890
4	1792	5682
5	2439	8121
6	1158	9279
7	1661	10940
8	(null)	10940
9	1572	12512
10	3981	16493
11	1422	17915
12	3443	21358
13	1545	22903
14	650	23553
15	1471	25024
16	1995	27019
17	3830	30849
18	1771	32620
19	1588	34208
20	1039	35247
21	1728	36975
22	1618	38593
23	432	39025
24	1756	40781
25	646	41427
26	1071	42498
27	829	43327
28	862	44189
29	1476	45665
30	648	46313
31	(null)	46313
February 1998	44431	44431
1	1894	1894
2	2151	4045
3	646	4691
4	1063	5754
5	1895	7649
6	2000	10749

Figure 52: MDX Query 1