Workshop

- Microsoft Power BI
- AdventureWorksLT DB
- Microsoft Azure
  - Azure SQL

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Sample Databases

AdventureWorks

AdventureWorks201x & AdventureWorksDW201x

- AdventureWorks sells bikes & related products (parts & accessories) through two sales channels:
  - direct to customers via internet
  - indirectly through resellers (or stores or bike shops)

- Business transactions tracked are sales, purchases & inventory

- These transactions may have some of the following dimensions:
  - Products sold or purchased - Product Hierarchy: Products, Product Subcategories & Product Categories
  - Address for customer, employees, stores & others - Geography Hierarchy: City, State, Country
  - Resellers (or Store or Bike Shops)
  - Customers (Individuals buying over the internet)
  - Ship, Order, Due, Purchase & other Dates - Date Hierarchy - Year, Quarter, Month, Day
  - Employees: including salespeople
  - Vendors: product and part suppliers
  - Sales promotions

AdventureWorks201x & AdventureWorksDW201x

- AdventureWorks201x
  - OLTP (on-line transactional processing) database
  - System of record (SOR) for AdventureWorks company
  - Normalized ER Model

- AdventureWorks201x
  - Sales
  - Inventory
  - Purchasing Sales

- AdventureWorksDW201x
  - Data Warehouse (DW)
  - Data source is AdventureWorks201x (sort of…)
  - Dimensional data model

- AdventureWorksDW201x
  - Internet Sales
  - Reseller Sales
  - Inventory

AdventureWorks201x & AdventureWorksDW201x

- Microsoft's documentation has not been kept up-to-date (similar to most IT's BI & DW documentation BTW) but is useful when understanding the overall model and business rules:
  - Schemas in AdventureWorks
  - AdventureWorks Data Dictionary
  - Adventure Works Cycles Business Scenarios
- Additional documentation
  - AdventureWorks – Data Dictionary – by Dataedo (sells data dictionary software & ERD)
  - AdventureWorks (printer friendly).pdf - pdf of above
- AdventureWorks Data Model (both old)
  - AdventureWorks OLTP Database Diagram
  - AdventureWorks DW Schema

Sample Databases

AdventureWorksLT

Sample Databases

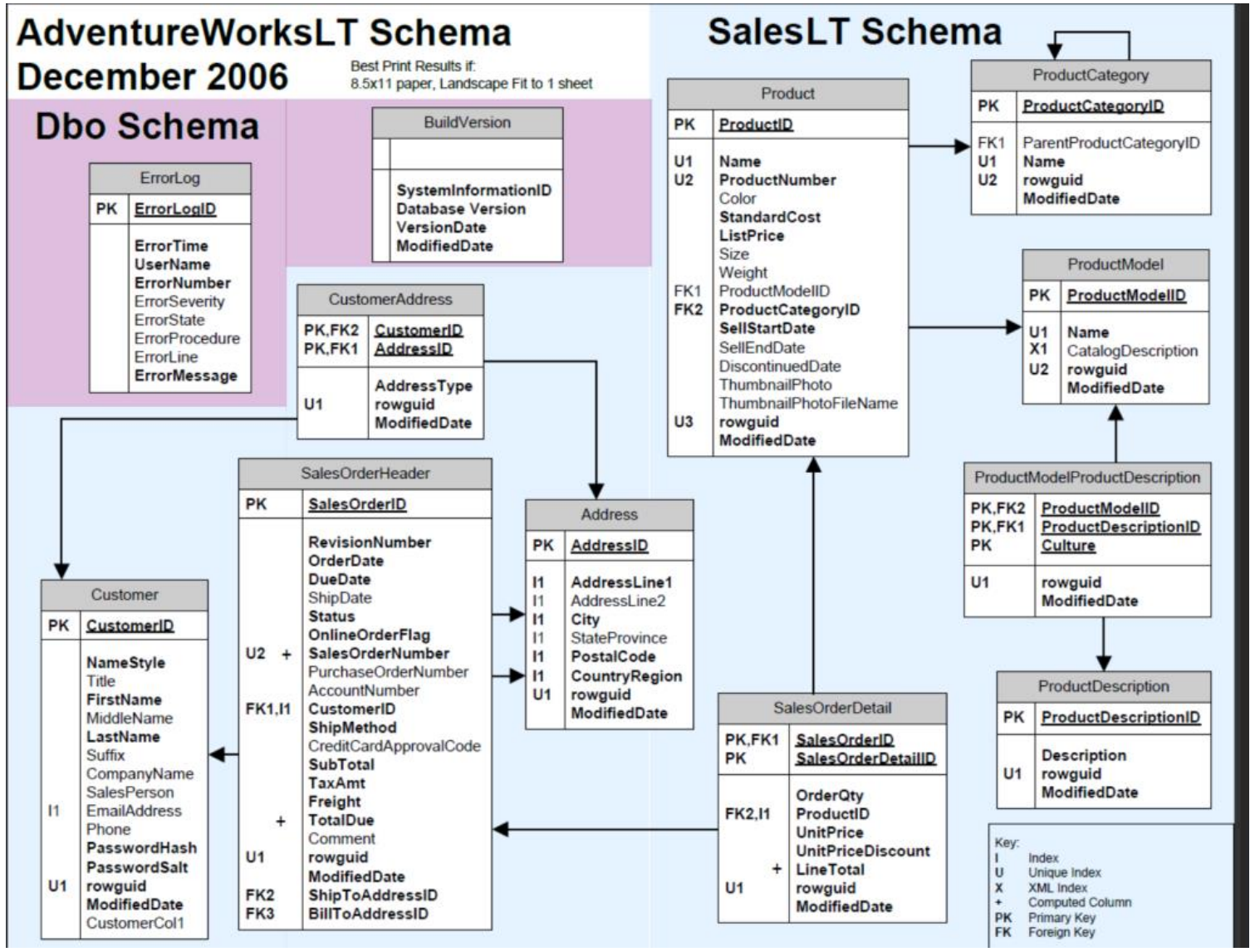
- AdventureWorksLT is a sample database created by Microsoft and available for SQL Server and Azure SQL

- AdventureWorksLT is a subset of the AdventureWorks database sample with is an OLTP (on-line transaction processing) database in 3NF.
  - Not a random sample as all orders are from same day
  - Total sales $ from SalesOrderHeader & SalesOrderDetail does not match!

AdventureWorksLT: Tables and Row Counts

table name	row count
Address	450
Customer	847
CustomerAddress	417
Product	295
ProductCategory	41
ProductDescription	762
ProductModel	128
ProductModelProductDescription	762
SalesOrderDetail	542
SalesOrderHeader	32

AdventureWorksLT Data Model



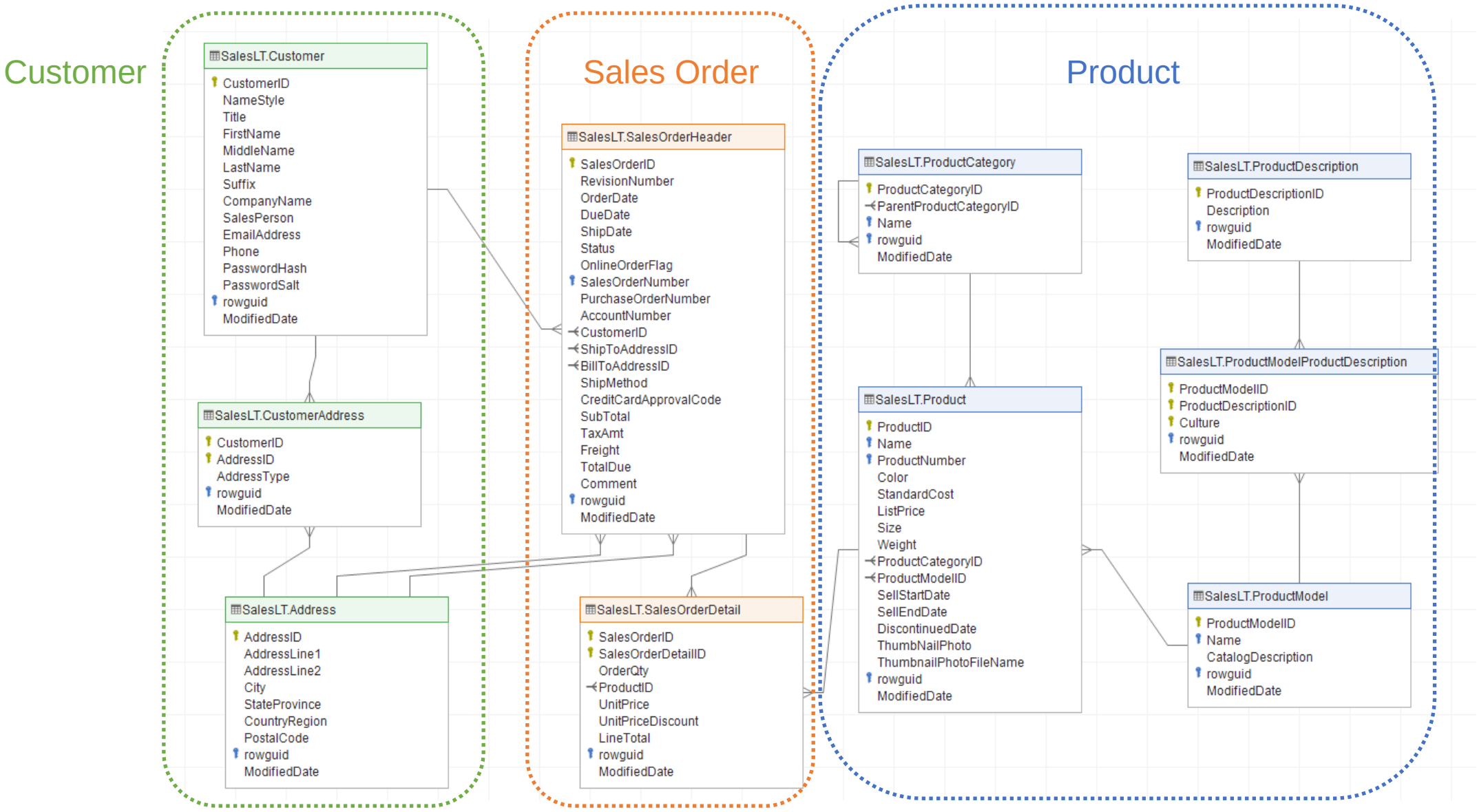
Three business entities involved:

- Sales Order (sales transaction)
- Product (what was sold)
- Customer(who purchased products)

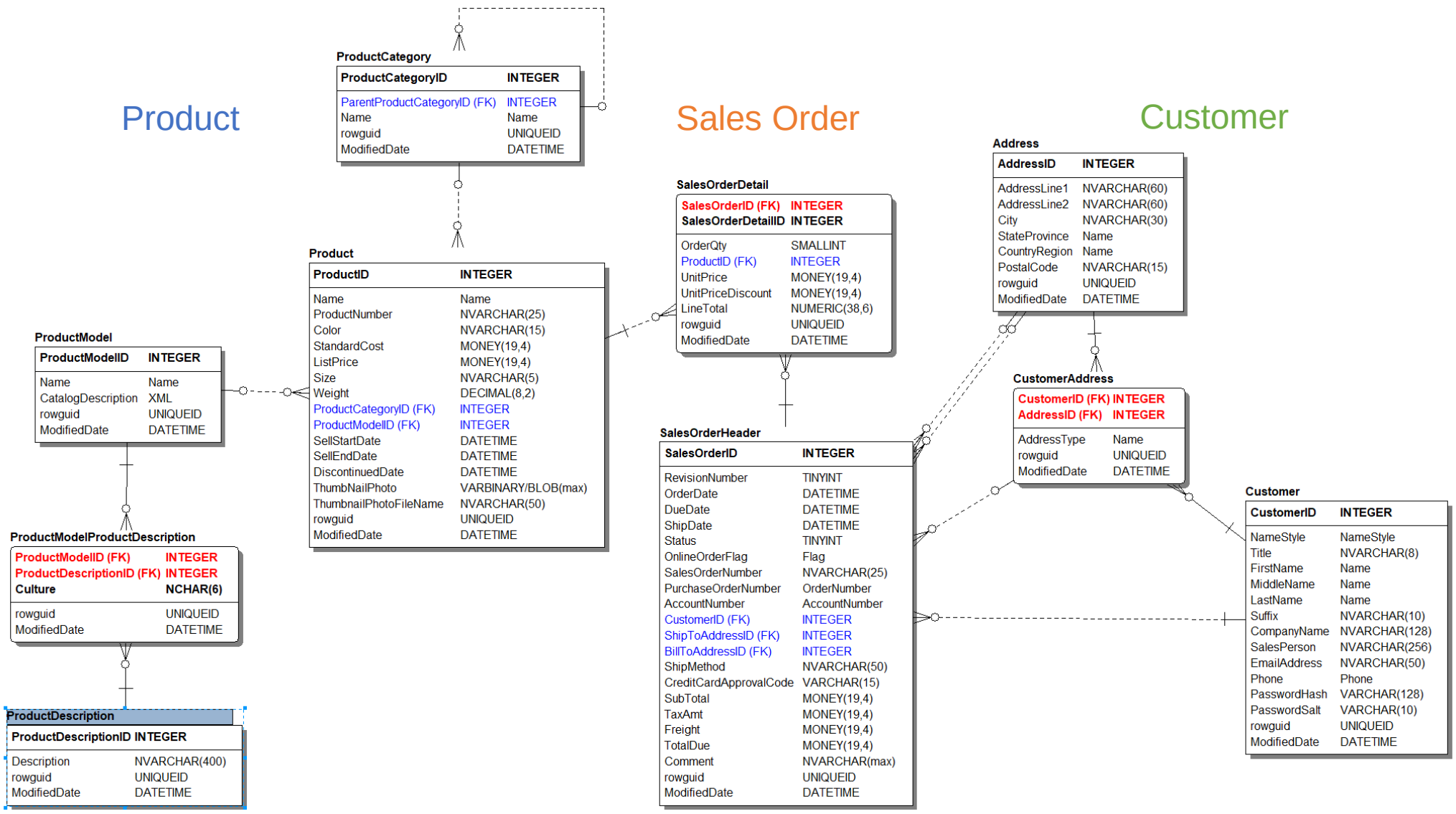
Entity-Relationship (ER) Model

- Transactions
  - SalesOrderHeader
  - SalesOrderDetail
- What is sold:
  - Products
- Product Hierarchy: (3 levels)
  - Product
  - Product Category (2 levels)
- Who sold to:
  - Customer
    - People
    - Company – Resells the bikes
- Where:
  - Address (Address Line, City, CountryRegion)

AdventureWorksLT Data Model (Dataedo)

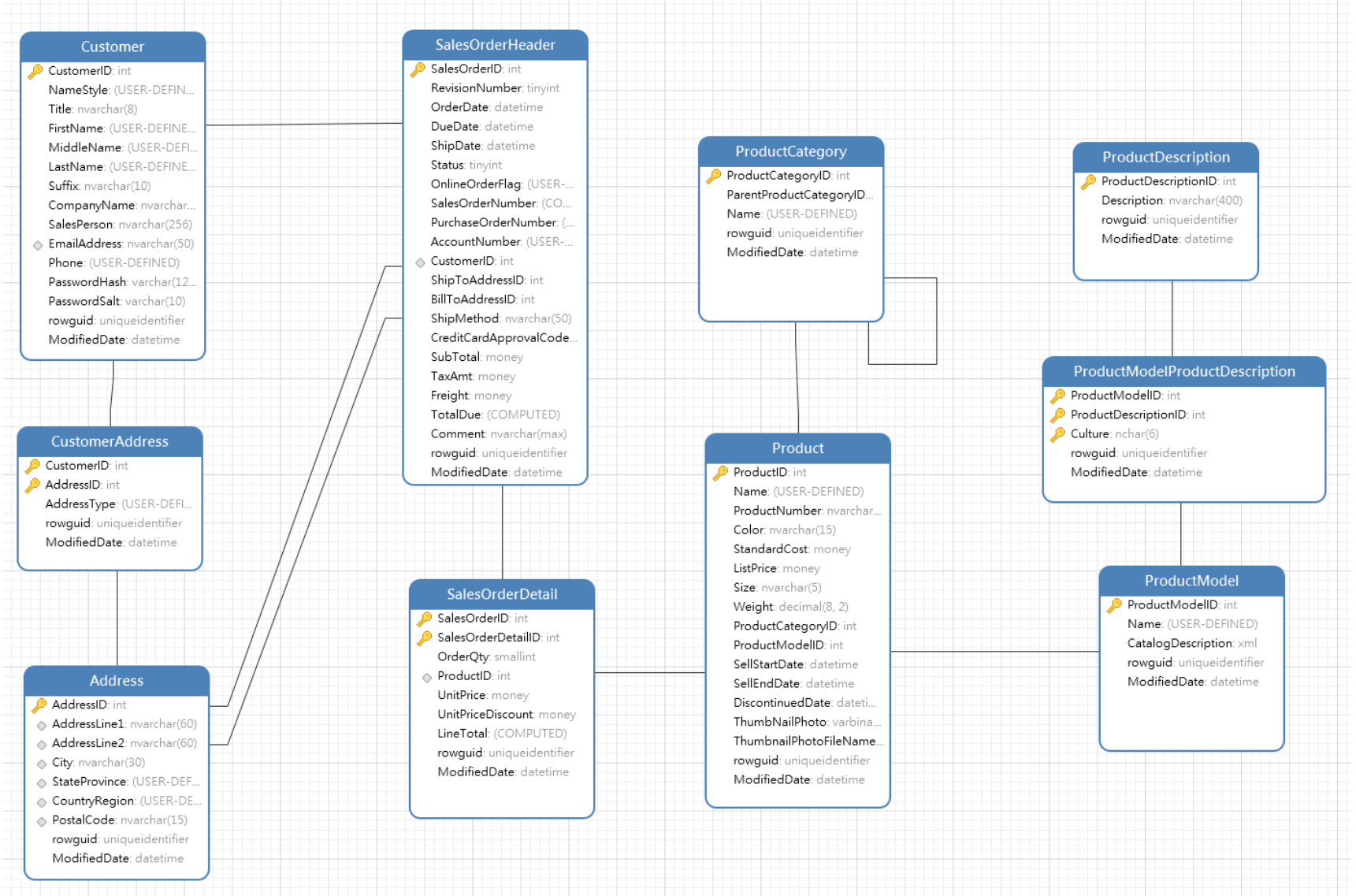


AdventureWorksLT Data Model (ER/Studio)



AdventureWorksLT Data Model (Navicat)

Customer Sales Order Product



Microsoft PowerBI

Accessing AdventureWorksLT

AdventureWorksLT: Business Questions

a) Total sales
   - Using SalesOrderHeader (ties to customer)
   - Using SalesOrderDetail (ties to product)

b) Total sales by country – ranked/sorted (highest to lowest)

c) Total sales by country, state & city (hierarchy)

d) Total sales by customer (person) – ranked/sorted (highest to lowest)

e) Total sales by customer (company) – ranked/sorted (highest to lowest)

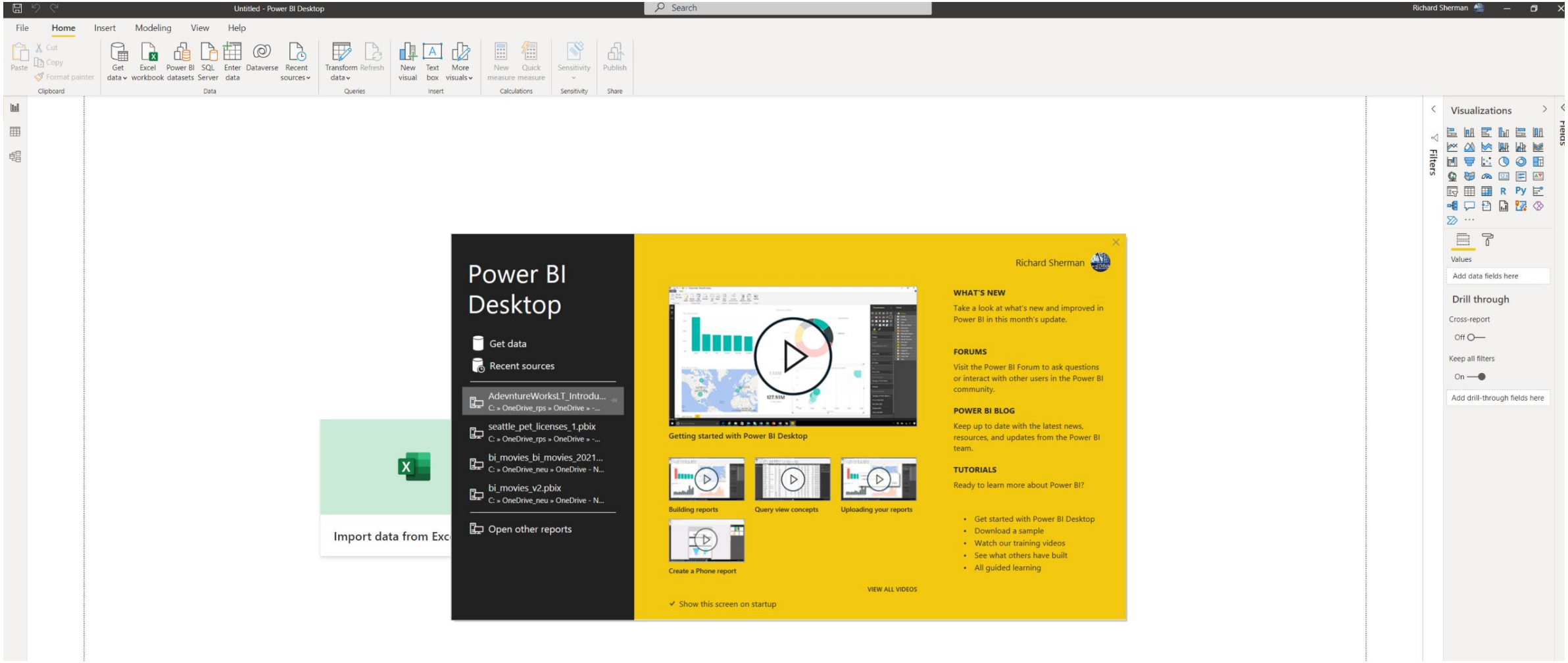
f) Sales by product category (hierarchy)

g) Sales by product name – ranked/sorted (highest to lowest)

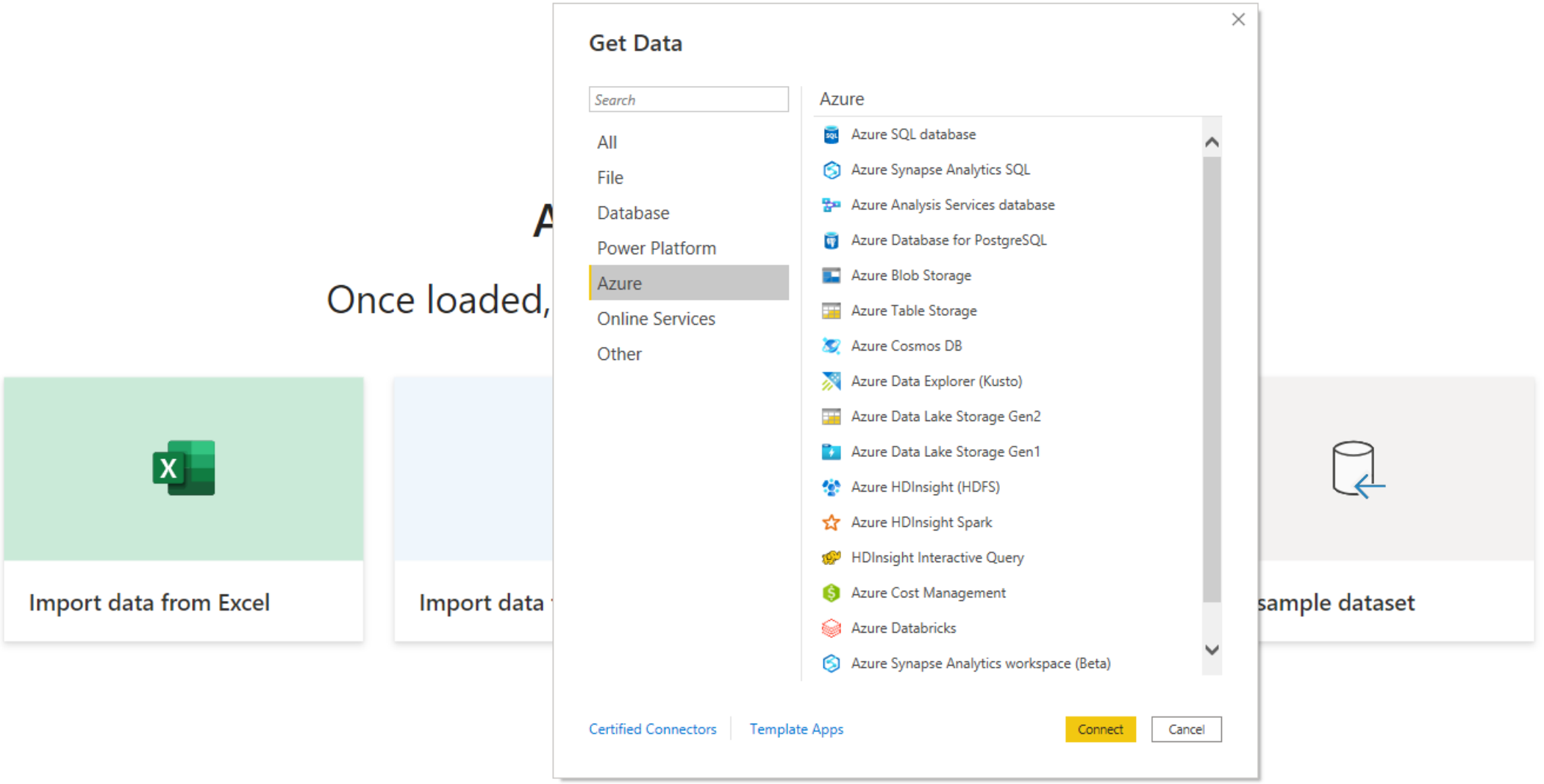
h) Sales by Product with Company filter

i) Comparison querying with SalesOrderHeader vs SalesOrderDetail

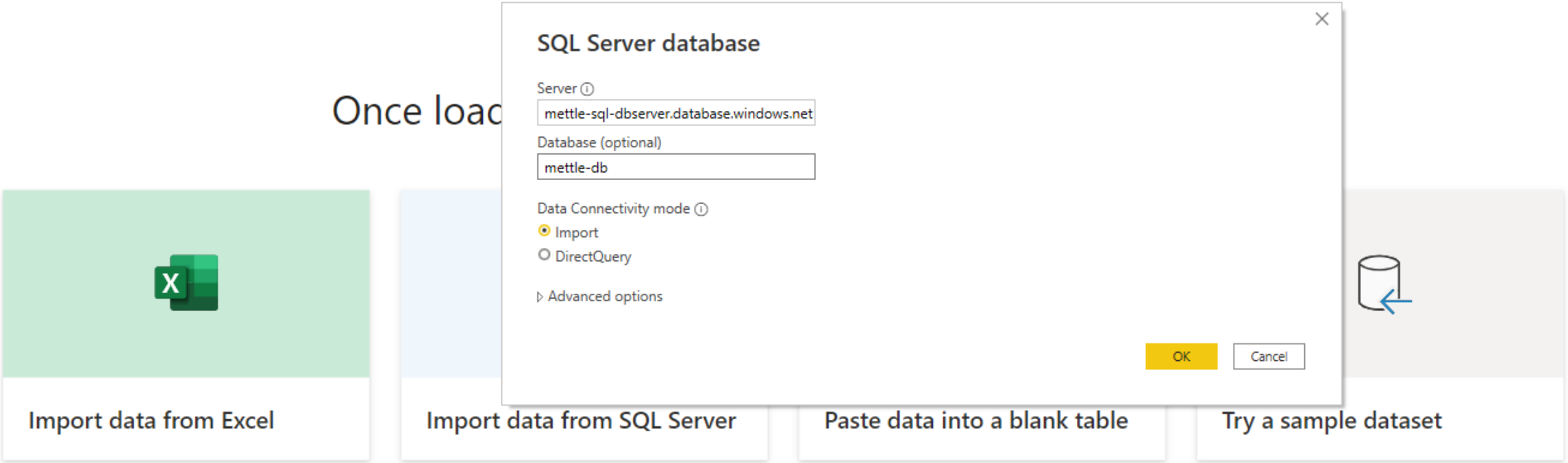
Get Data



Get Data



Get Data

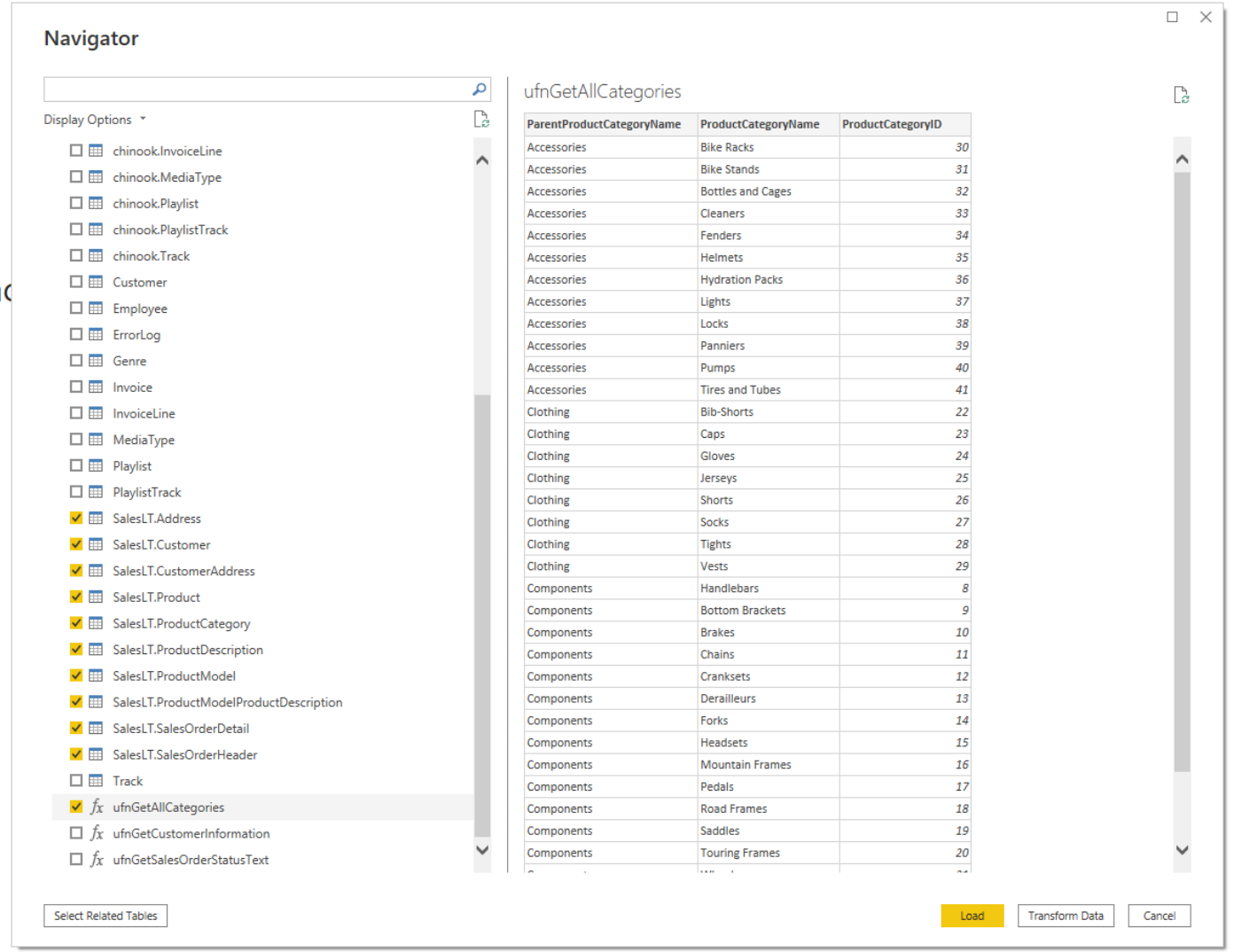


Get data from another source →

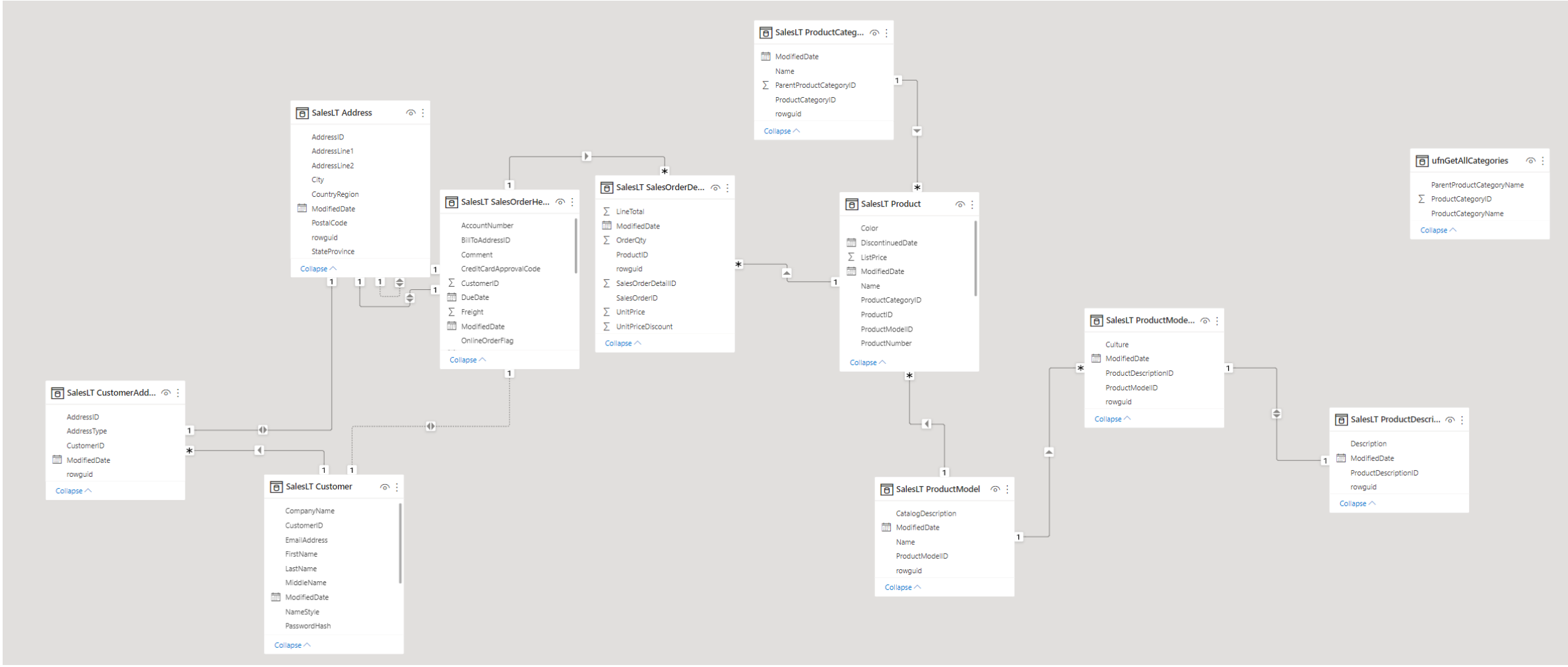
Get Data

Onc

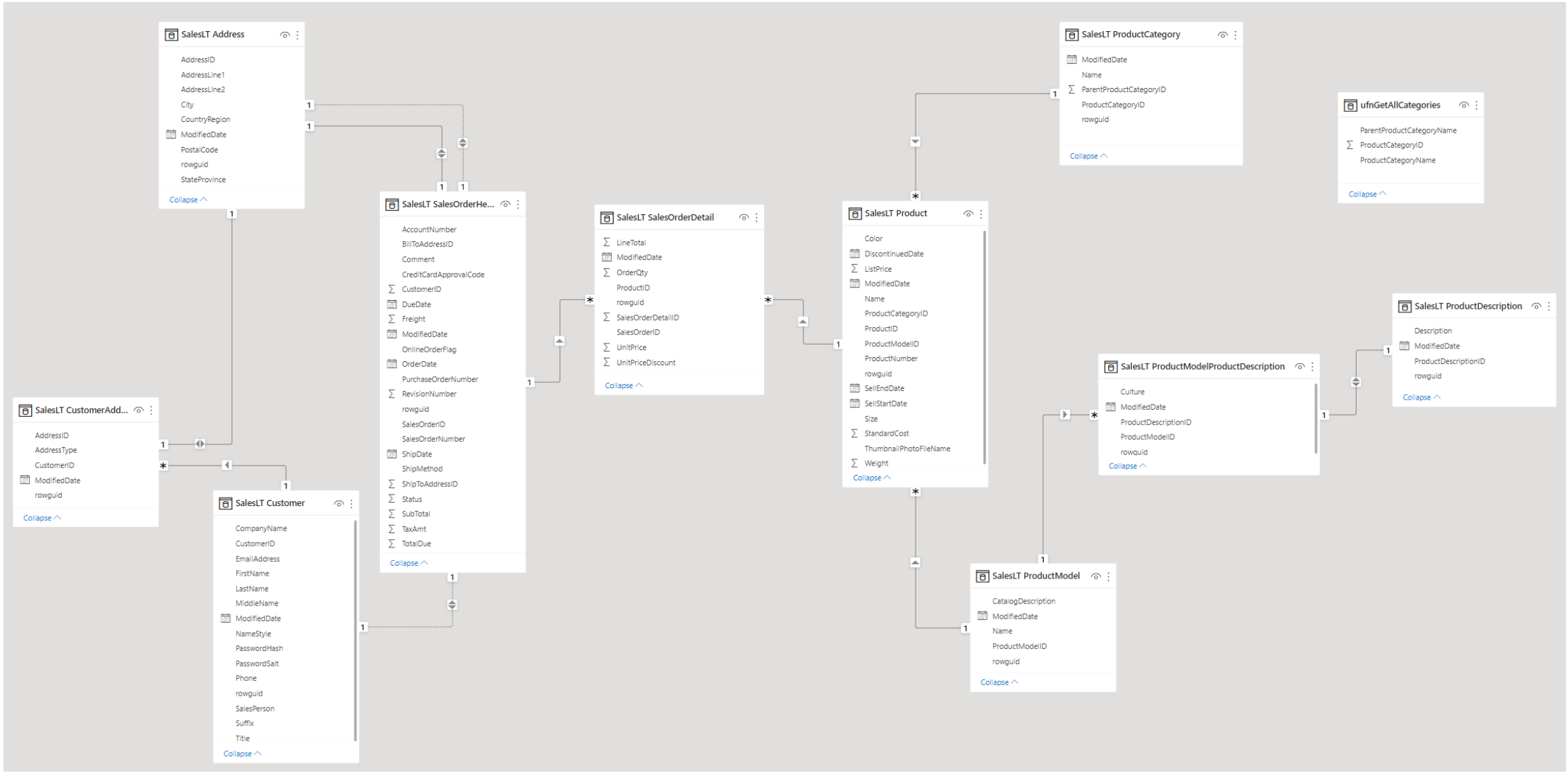
Import data from Excel



AdventureWorksLT: Data Model (Default)



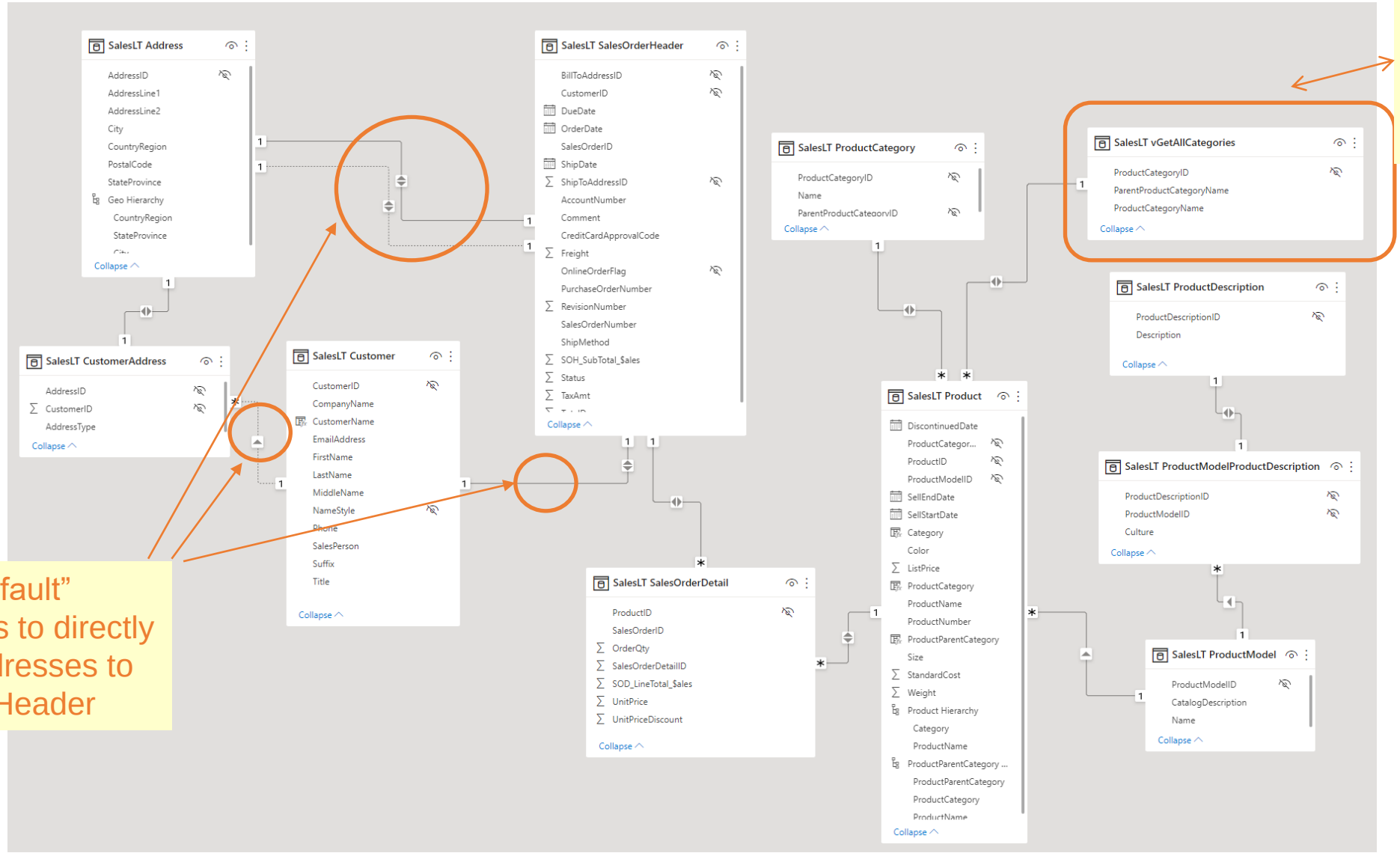
AdventureWorksLT: Data Model (Default)



AdventureWorksLT: Data Model & Worksheets

- Create formulas
  - Create a full name: CustomerName = CONCATENATE('SalesLT Customer'[LastName],CONCATENATE(", ",'SalesLT Customer'[FirstName]))
  - Create a relationship between tables: ProductCategory = RELATED('SalesLT vGetAllCategories'[ProductCategoryName])
  - Create a relationship between tables: ProductParentCategory = RELATED('SalesLT vGetAllCategories'[ParentProductCategoryName])
- Create hierarchical relationships
  - Product Category
  - Geo (Address)
- Alter Relationships
- Format dates & dollars
- Hide columns

AdventureWorksLT Data Model

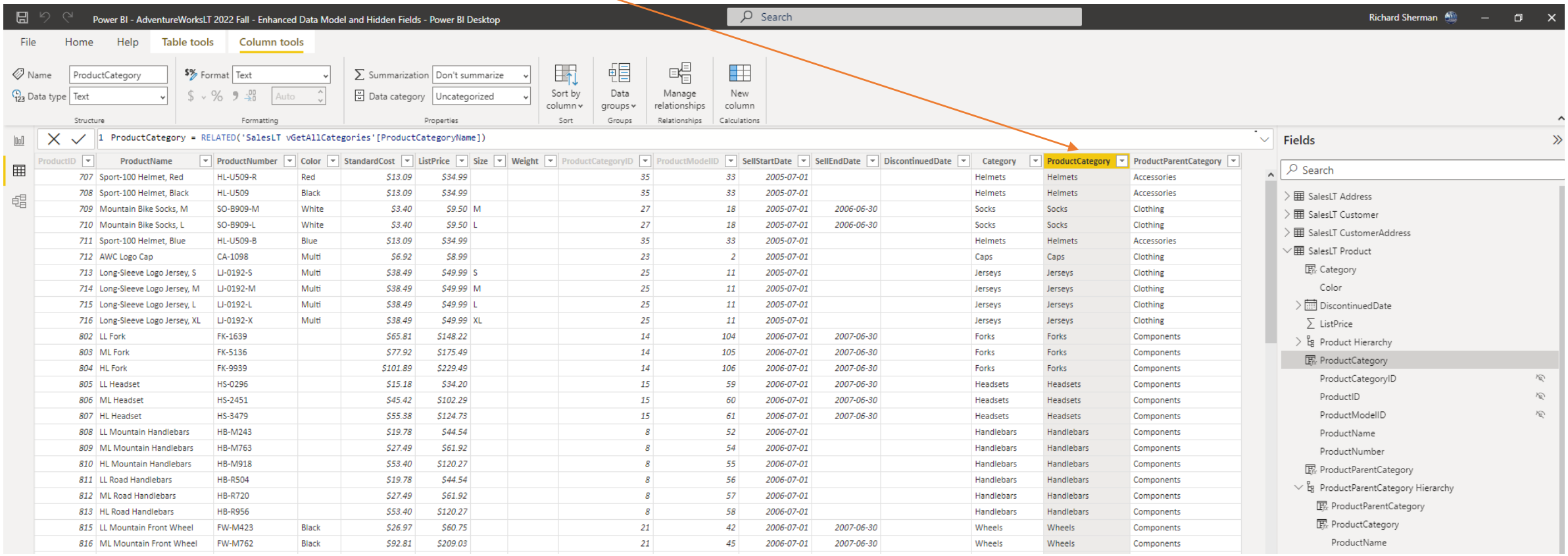


This view added to data model create product hierarchy

Revised “default” relationships to directly connect addresses to SalesOrderHeader

AdventureWorksLT: Data Worksheets

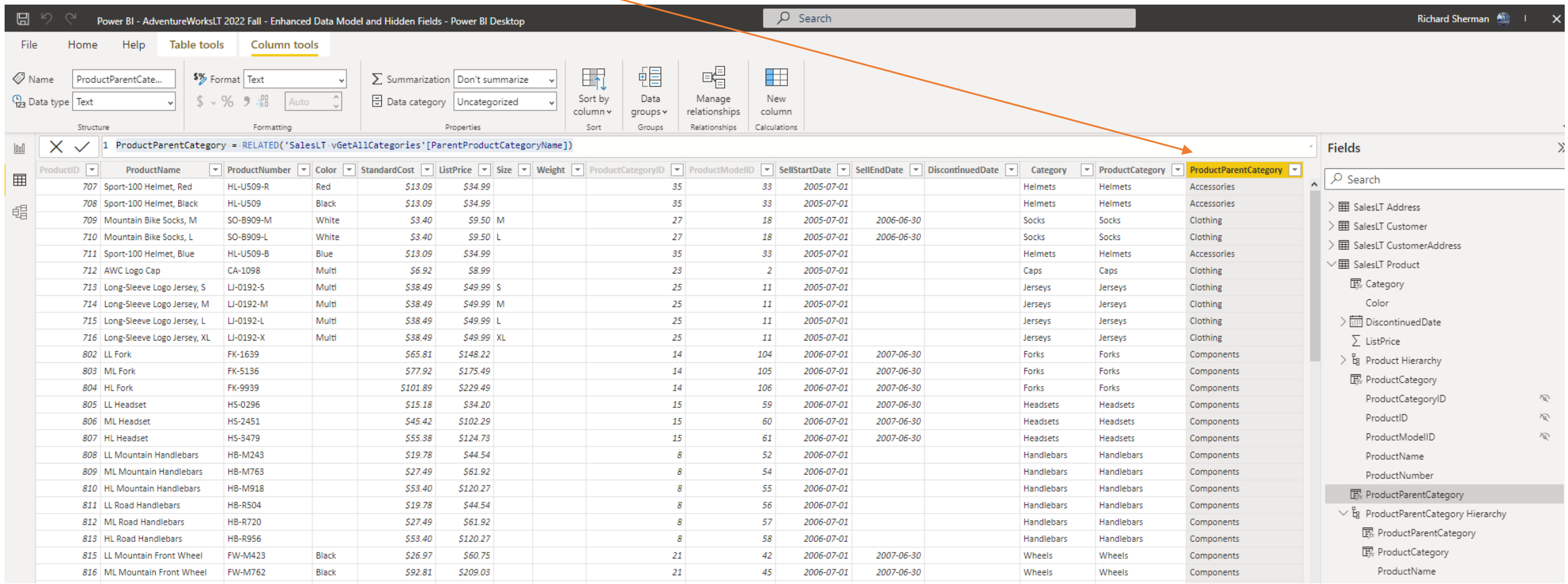
```
ProductCategory = RELATED('SalesLT vGetAllCategories'[ProductCategoryName])
```



ProductID	ProductName	ProductNumber	Color	StandardCost	ListPrice	Size	Weight	ProductCategoryID	ProductModelID	SellStartDate	SellEndDate	DiscontinuedDate	Category	ProductCategory	ProductParentCategory
707	Sport-100 Helmet, Red	HL-U509-R	Red	$13.09	$34.99			35	33	2005-07-01			Helmets	Helmets	Accessories
708	Sport-100 Helmet, Black	HL-U509	Black	$13.09	$34.99			35	33	2005-07-01			Helmets	Helmets	Accessories
709	Mountain Bike Socks, M	SO-B909-M	White	$3.40	$9.50	M		27	18	2005-07-01	2006-06-30		Socks	Socks	Clothing
710	Mountain Bike Socks, L	SO-B909-L	White	$3.40	$9.50	L		27	18	2005-07-01	2006-06-30		Socks	Socks	Clothing
711	Sport-100 Helmet, Blue	HL-U509-B	Blue	$13.09	$34.99			35	33	2005-07-01			Helmets	Helmets	Accessories
712	AWC Logo Cap	CA-1098	Multi	$6.92	$8.99			23	2	2005-07-01			Caps	Caps	Clothing
713	Long-Sleeve Logo Jersey, S	LJ-0192-S	Multi	$38.49	$49.99	S		25	11	2005-07-01			Jerseys	Jerseys	Clothing
714	Long-Sleeve Logo Jersey, M	LJ-0192-M	Multi	$38.49	$49.99	M		25	11	2005-07-01			Jerseys	Jerseys	Clothing
715	Long-Sleeve Logo Jersey, L	LJ-0192-L	Multi	$38.49	$49.99	L		25	11	2005-07-01			Jerseys	Jerseys	Clothing
716	Long-Sleeve Logo Jersey, XL	LJ-0192-X	Multi	$38.49	$49.99	XL		25	11	2005-07-01			Jerseys	Jerseys	Clothing
802	LL Fork	FK-1639		$65.81	$148.22			14	104	2006-07-01	2007-06-30		Forks	Forks	Components
803	ML Fork	FK-5136		$77.92	$175.49			14	105	2006-07-01	2007-06-30		Forks	Forks	Components
804	HL Fork	FK-9939		$101.89	$229.49			14	106	2006-07-01	2007-06-30		Forks	Forks	Components
805	LL Headset	HS-0296		$15.18	$34.20			15	59	2006-07-01	2007-06-30		Headsets	Headsets	Components
806	ML Headset	HS-2451		$45.42	$102.29			15	60	2006-07-01	2007-06-30		Headsets	Headsets	Components
807	HL Headset	HS-3479		$55.38	$124.73			15	61	2006-07-01	2007-06-30		Headsets	Headsets	Components
808	LL Mountain Handlebars	HB-M243		$19.78	$44.54			8	52	2006-07-01			Handlebars	Handlebars	Components
809	ML Mountain Handlebars	HB-M763		$27.49	$61.92			8	54	2006-07-01			Handlebars	Handlebars	Components
810	HL Mountain Handlebars	HB-M918		$53.40	$120.27			8	55	2006-07-01			Handlebars	Handlebars	Components
811	LL Road Handlebars	HB-R504		$19.78	$44.54			8	56	2006-07-01			Handlebars	Handlebars	Components
812	ML Road Handlebars	HB-R720		$27.49	$61.92			8	57	2006-07-01			Handlebars	Handlebars	Components
813	HL Road Handlebars	HB-R956		$53.40	$120.27			8	58	2006-07-01			Handlebars	Handlebars	Components
815	LL Mountain Front Wheel	FW-M423	Black	$26.97	$60.75			21	42	2006-07-01	2007-06-30		Wheels	Wheels	Components
816	ML Mountain Front Wheel	FW-M762	Black	$92.81	$209.03			21	45	2006-07-01	2007-06-30		Wheels	Wheels	Components

AdventureWorksLT: Data Worksheets

```
ProductParentCategory = RELATED('SalesLT vGetAllCategories'[ParentProductCategoryName])
```



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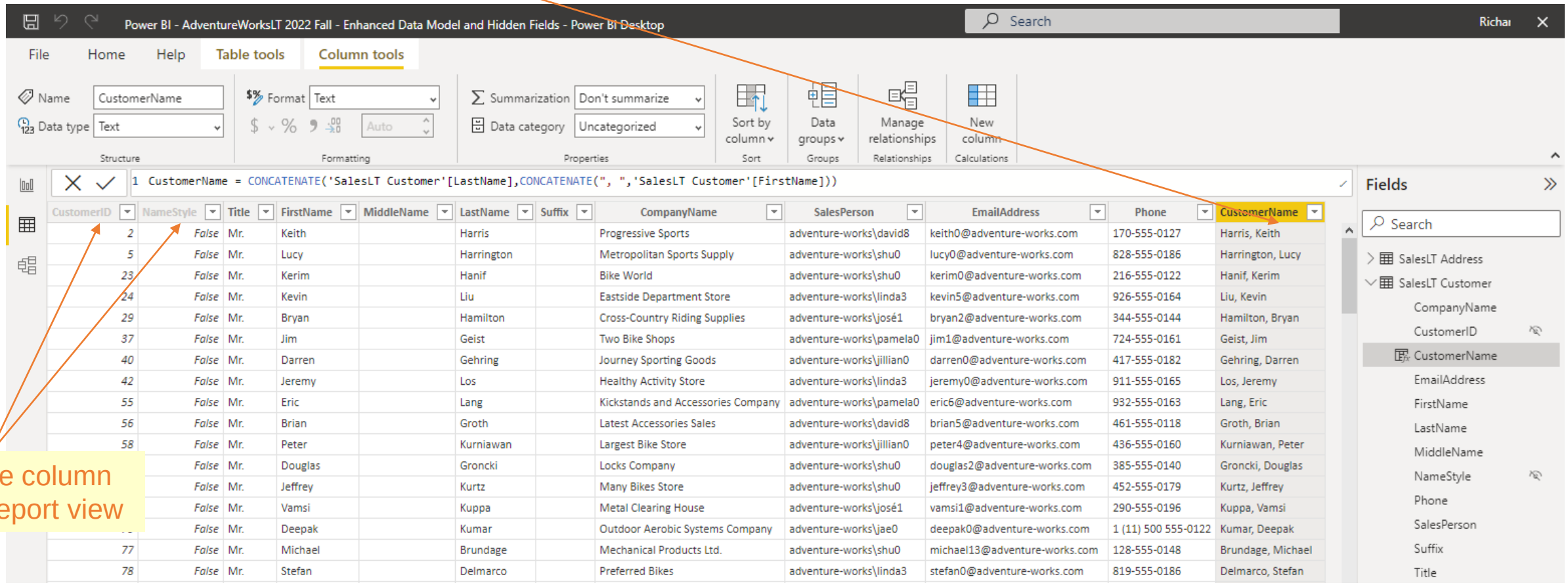
AdventureWorksLT: Data Worksheets

```
CustomerName = CONCATENATE('SalesLT Customer'[LastName],CONCATENATE(", ",'SalesLT Customer'[FirstName]))
```



CustomerID	NameStyle	Title	FirstName	MiddleName	LastName	Suffix	CompanyName	SalesPerson	EmailAddress	Phone	CustomerName
2	False	Mr.	Keith		Harris		Progressive Sports	adventure-works\david8	keith0@adventure-works.com	170-555-0127	Harris, Keith
5	False	Mr.	Lucy		Harrington		Metropolitan Sports Supply	adventure-works\shu0	lucy0@adventure-works.com	828-555-0186	Harrington, Lucy
23	False	Mr.	Kerim		Hanif		Bike World	adventure-works\shu0	kerim0@adventure-works.com	216-555-0122	Hanif, Kerim
24	False	Mr.	Kevin		Liu		Eastside Department Store	adventure-works\linda3	kevin5@adventure-works.com	926-555-0164	Liu, Kevin
29	False	Mr.	Bryan		Hamilton		Cross-Country Riding Supplies	adventure-works\josé1	bryan2@adventure-works.com	344-555-0144	Hamilton, Bryan
37	False	Mr.	Jim		Geist		Two Bike Shops	adventure-works\pamela0	jim1@adventure-works.com	724-555-0161	Geist, Jim
40	False	Mr.	Darren		Gehring		Journey Sporting Goods	adventure-works\jillian0	darren0@adventure-works.com	417-555-0182	Gehring, Darren
42	False	Mr.	Jeremy		Los		Healthy Activity Store	adventure-works\linda3	jeremy0@adventure-works.com	911-555-0165	Los, Jeremy
55	False	Mr.	Eric		Lang		Kickstands and Accessories Company	adventure-works\pamela0	eric6@adventure-works.com	932-555-0163	Lang, Eric
56	False	Mr.	Brian		Groth		Latest Accessories Sales	adventure-works\david8	brian5@adventure-works.com	461-555-0118	Groth, Brian
58	False	Mr.	Peter		Kurniawan		Largest Bike Store	adventure-works\jillian0	peter4@adventure-works.com	436-555-0160	Kurniawan, Peter
	False	Mr.	Douglas		Groncki		Locks Company	adventure-works\shu0	douglas2@adventure-works.com	385-555-0140	Groncki, Douglas
	False	Mr.	Jeffrey		Kurtz		Many Bikes Store	adventure-works\shu0	jeffrey3@adventure-works.com	452-555-0179	Kurtz, Jeffrey
	False	Mr.	Vamsi		Kuppa		Metal Clearing House	adventure-works\josé1	vamsi1@adventure-works.com	290-555-0196	Kuppa, Vamsi
	False	Mr.	Deepak		Kumar		Outdoor Aerobic Systems Company	adventure-works\jae0	deepak0@adventure-works.com	1 (11) 500 555-0122	Kumar, Deepak
77	False	Mr.	Michael		Brundage		Mechanical Products Ltd.	adventure-works\shu0	michael13@adventure-works.com	128-555-0148	Brundage, Michael
78	False	Mr.	Stefan		Delmarco		Preferred Bikes	adventure-works\linda3	stefan0@adventure-works.com	819-555-0186	Delmarco, Stefan

Hide column in report view

AdventureWorksLT: Data Worksheets