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IT3021

DWBI Assignment2- Report

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1. Introduction

The components that were covered/completed during assignment 01 (green color) and those that will be covered/completed in assignment 02 are shown in the data warehouse and business intelligence architecture diagram below (orange color).

The primary goal of assignment 01 was to extract data from sources to the staging layer and load it into the target data warehouse "Assignment1 DWH" after performing required transformations on the data stored in the staging layer, whereas the primary goal of assignment 02 was to create a cube from the data warehouse and use it for report generation in Excel (to demonstrate OLAP Operations) or browsing in SSDT or SSMS using Analysis Servlet.

Tools Used:

- **MS SQL Server** (Database Engine, Analysis Service, Reporting Service) for Database and Server
- **Excel** for Generate reports and dashboards
- **SSDT** for Generate/Develop Cube
- **Report Builder** for Generate/Develop SSRS Reports

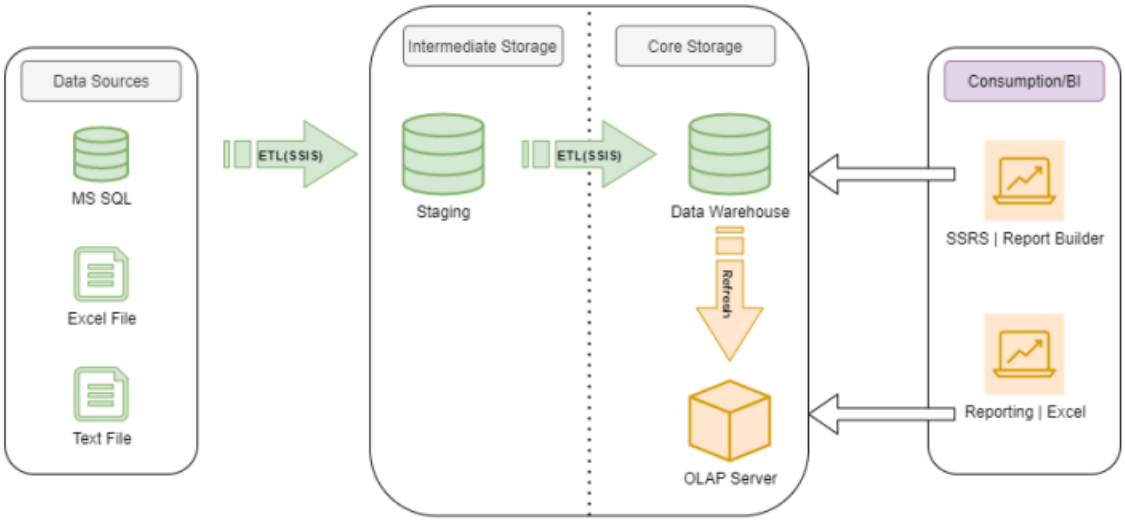


Figure 1 : DW and BI Architecture

2. Data Source

The data warehouse solution "Assingment1 DWH" implemented for the "Food & Goods orders in Brazil" dataset in fulfillment of assignment 01. As described in the previous section, the primary source of data for assignment 2 will be the data warehouse solution "Assingment1 DWH." The data warehouse is made up of six major tables that are divided into dimensions and fact tables. One fact table, "FactOrders," and five-dimensional tables, "DimDate," "DimOrderDetails," "DimStores," "DimPayment," "DimChannel," and "DimDelivery" are all included in the solution.

FactOders - Contains Order wise transactional data (measures) along with foreign keys fort the dimensional tables.

DimDate - Contains periodic information and a surrogate key to map with fact table

DimOrderDetails – Contain status of the orders with surrogate key to map with fact table

DimStores – Contain all the Store details with related with hub details .and have a surrogate key to map with fact table

DimPayment – Contain all the payment details with surrogate key to map with fact table

DimChannel – Contain Channel Details with specific surrogate key to map with fact table

DimDelivery – Contain details about deliveries and drivers with surrogate key to map with fact table

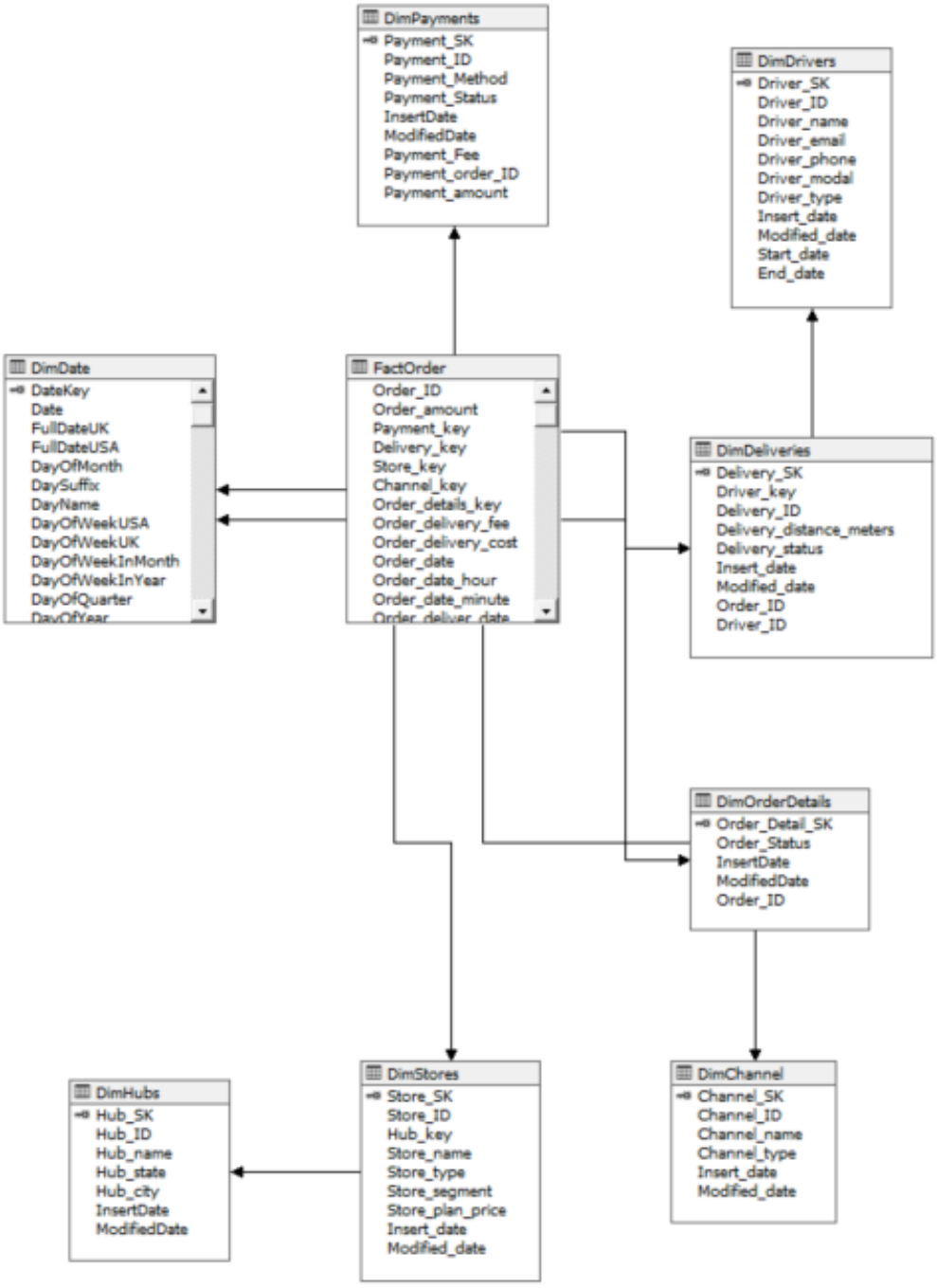


Figure 2 :Data Source View Diagram

3. SSAS Cube Implementation

3.1. Data Sources

The first step after developing a new SSAS package "Assignment2" for the cube implementation was to connect the data warehouse "Assignment1 DWH" developed in assignment one to extract the data to the newly constructed package. After the operation was completed successfully, a new data source named "DS Assignment1 DWH" was created.

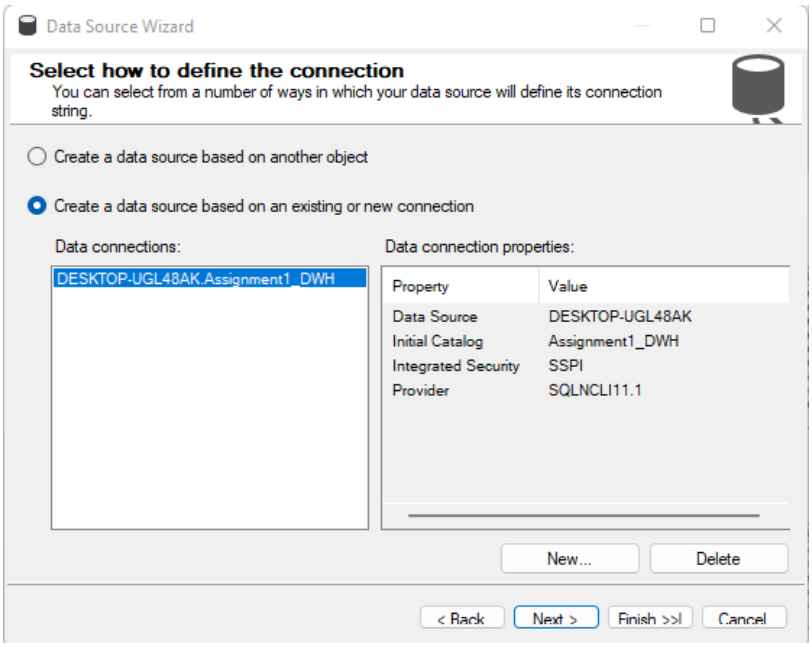


Figure 3 :DW Selection for the Data Source

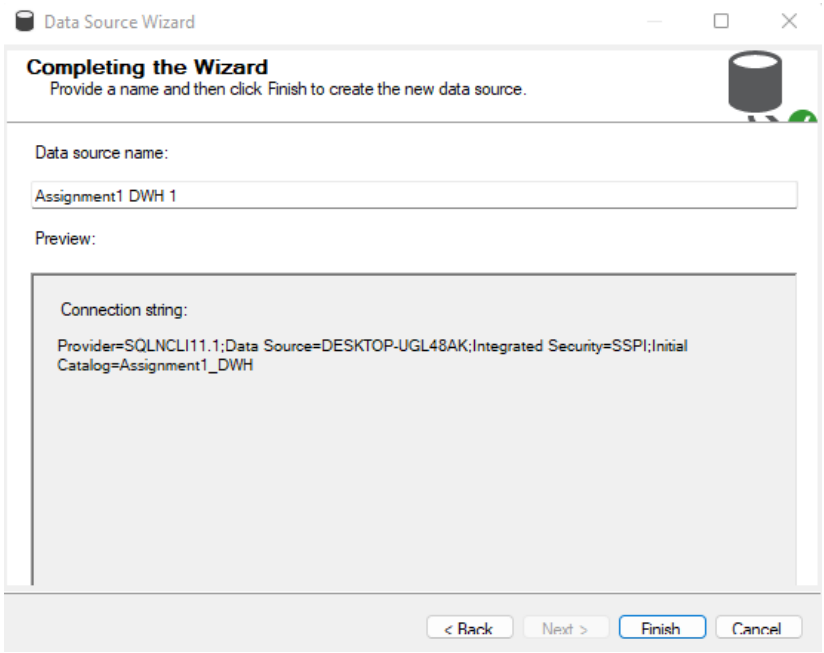


Figure 4 : Execution process of DS

3.2. Data Source View (DSV)

The next step was to develop a view to do the mapping between the dimensions and fact tables after the data source was created. The data source "DS_Assignment1_DWH" was chosen as the initial step, and all relevant tables were added to the include objects. The process was then run after giving the new source view the name "DSV_Assignment_ 2".

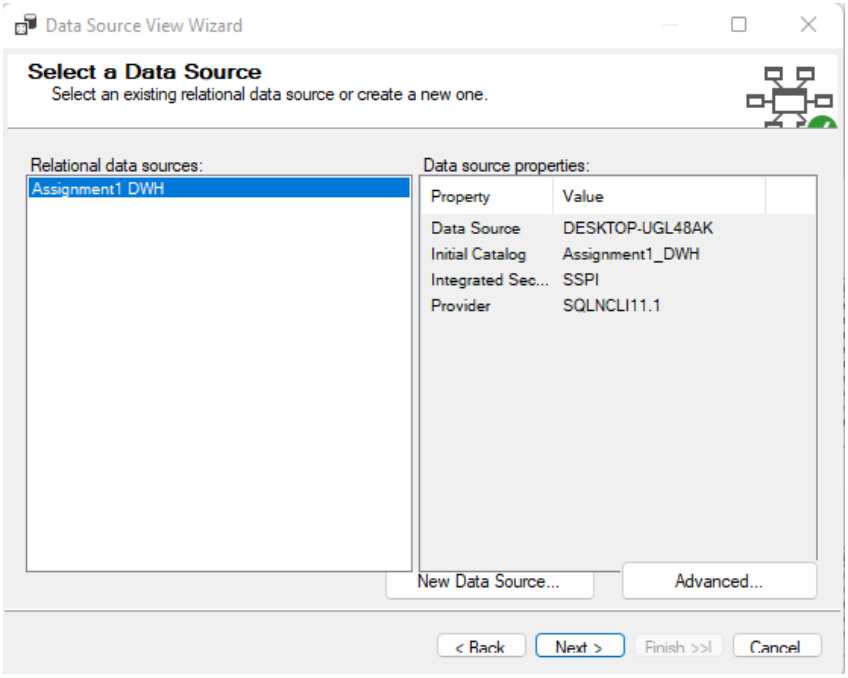


Figure 5 :Select the DS to DSV

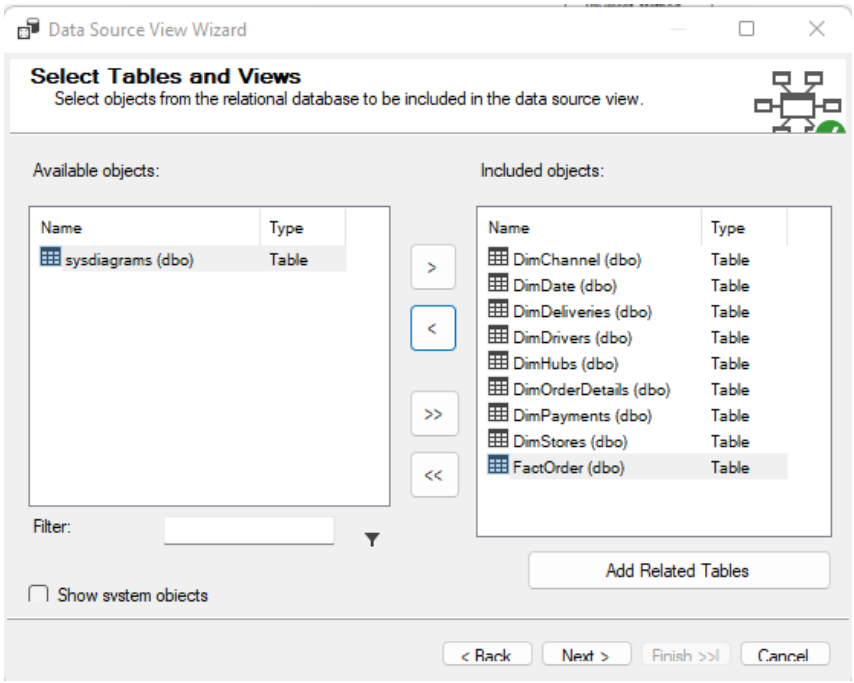


Figure 6 :Select Dimensions to the DSV

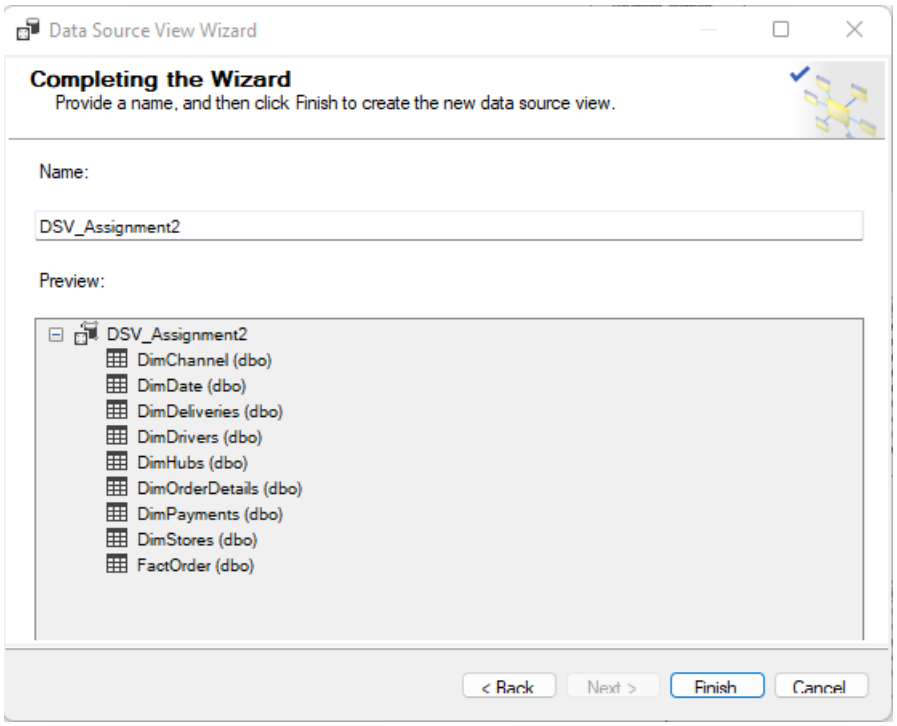


Figure 7 :Provide name to the DSV and execute

After the successfully execution process, the mapped relation DSV is showed in the figure 2.

3.3. Cube Deployment

The next phase was to develop the cube when the mapping was completed. To make a new cube, the current tables in the views are used, then the fact table is chosen as the measure group table, which lists all of the FactOrders' measures, and finally all of the required dimensions are picked, in this case all three dimensions. After giving the new cube the name "Assignment 2 cube," the process was completed. When the cube is successfully run, the dimensions and facts are mapped, with the dimensions highlighted in blue and the fact table highlighted in yellow.

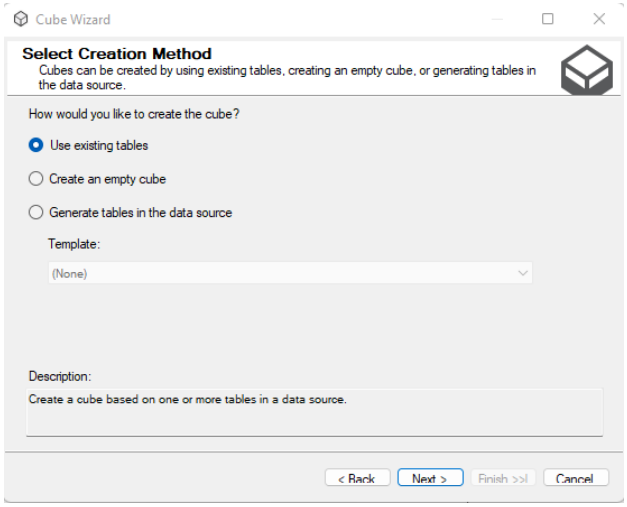


Figure 8 :Selecting Cube Creation Method

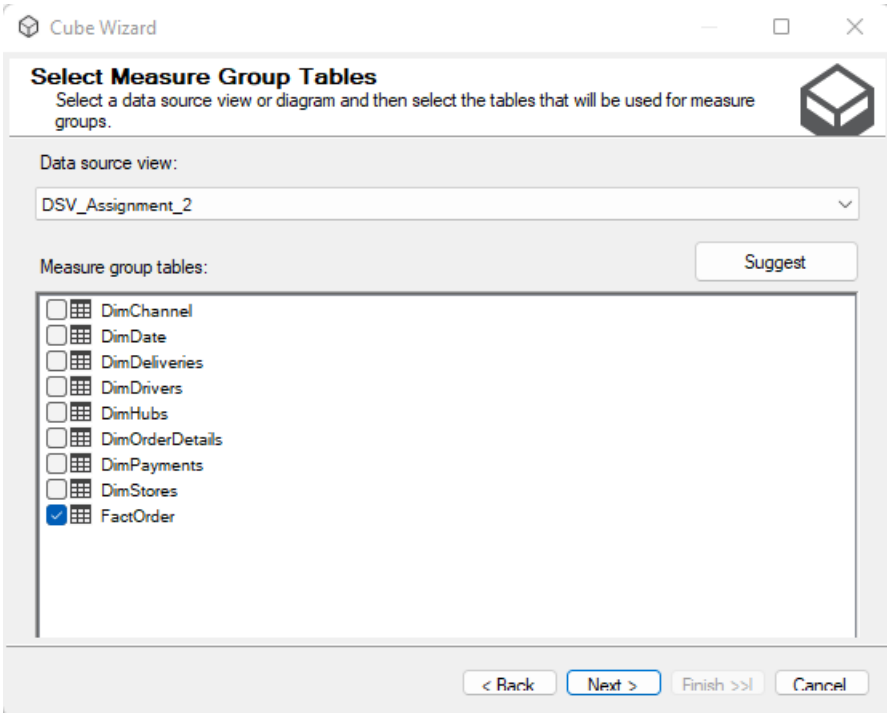


Figure 9 :Selecting Measure group Tables for the Cube

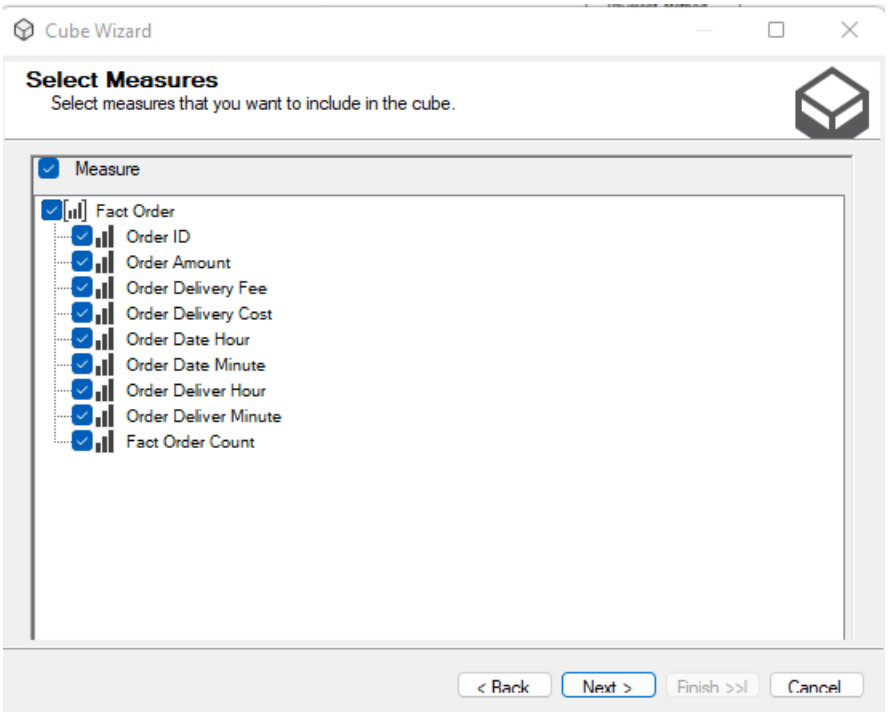


Figure 10 :selecting Measures to the Cube

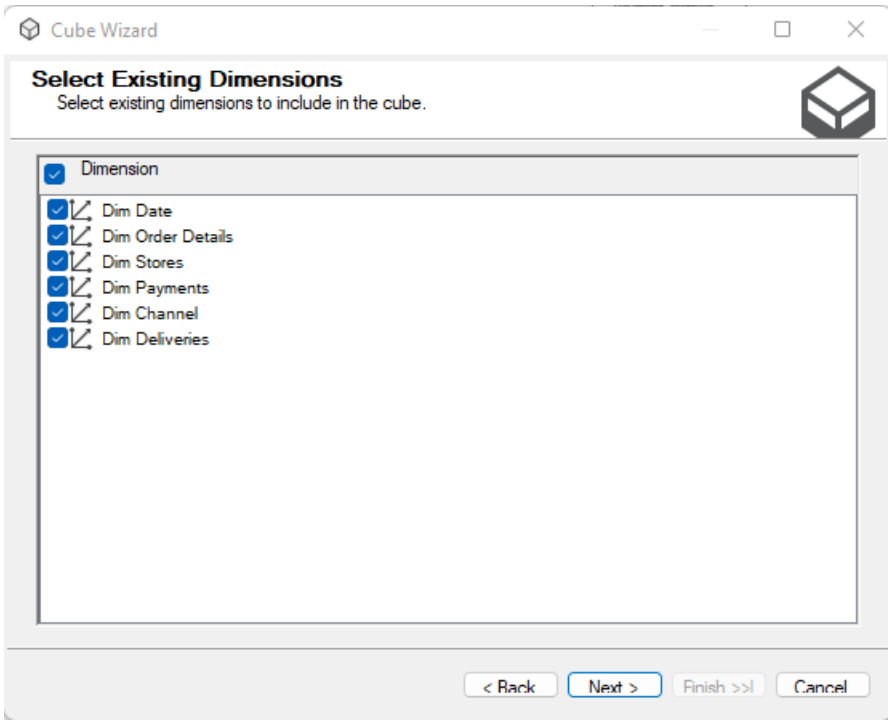


Figure 11 :Selecting dimension to the Cube

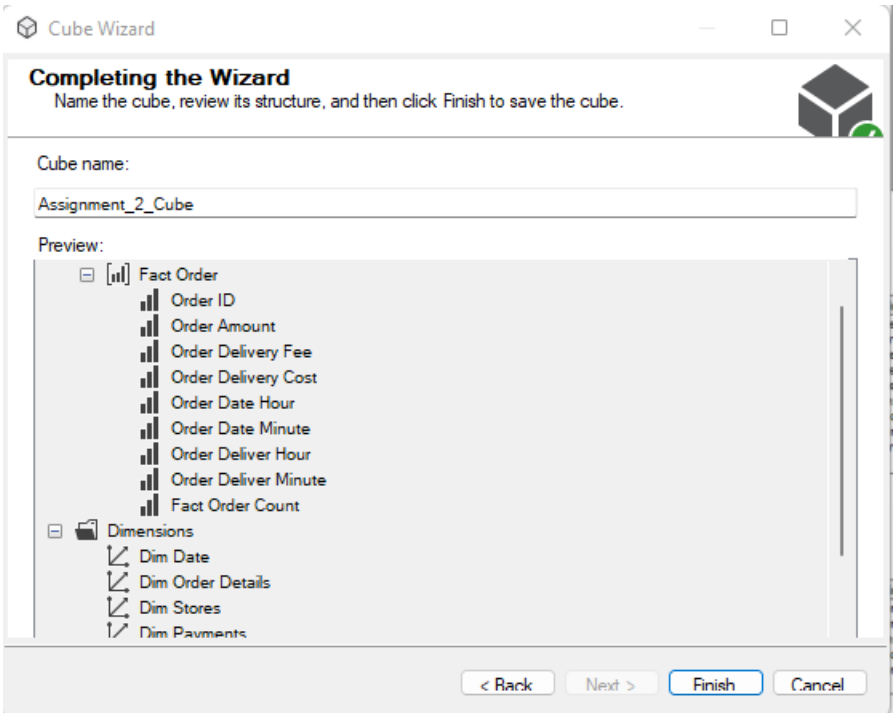


Figure 12 :finalize Preview and Execution of the Cube

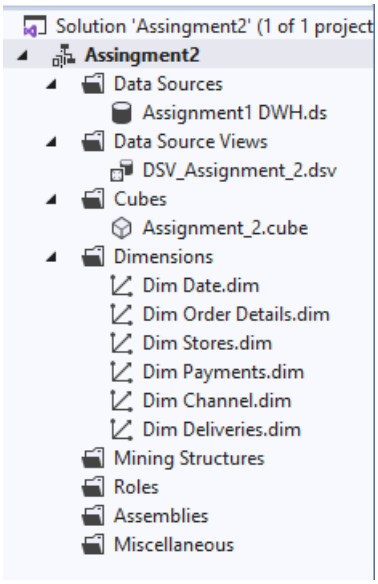


Figure 13 : Final project Structure

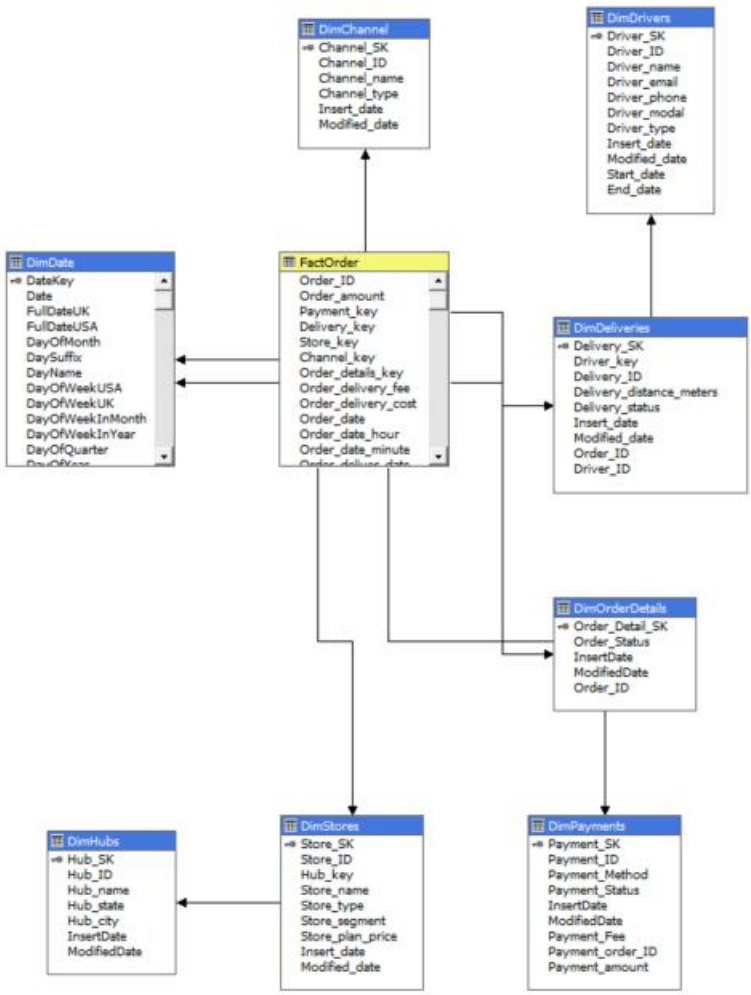


Figure 14 :Generated Cube

3.4. Development of Hierarchies

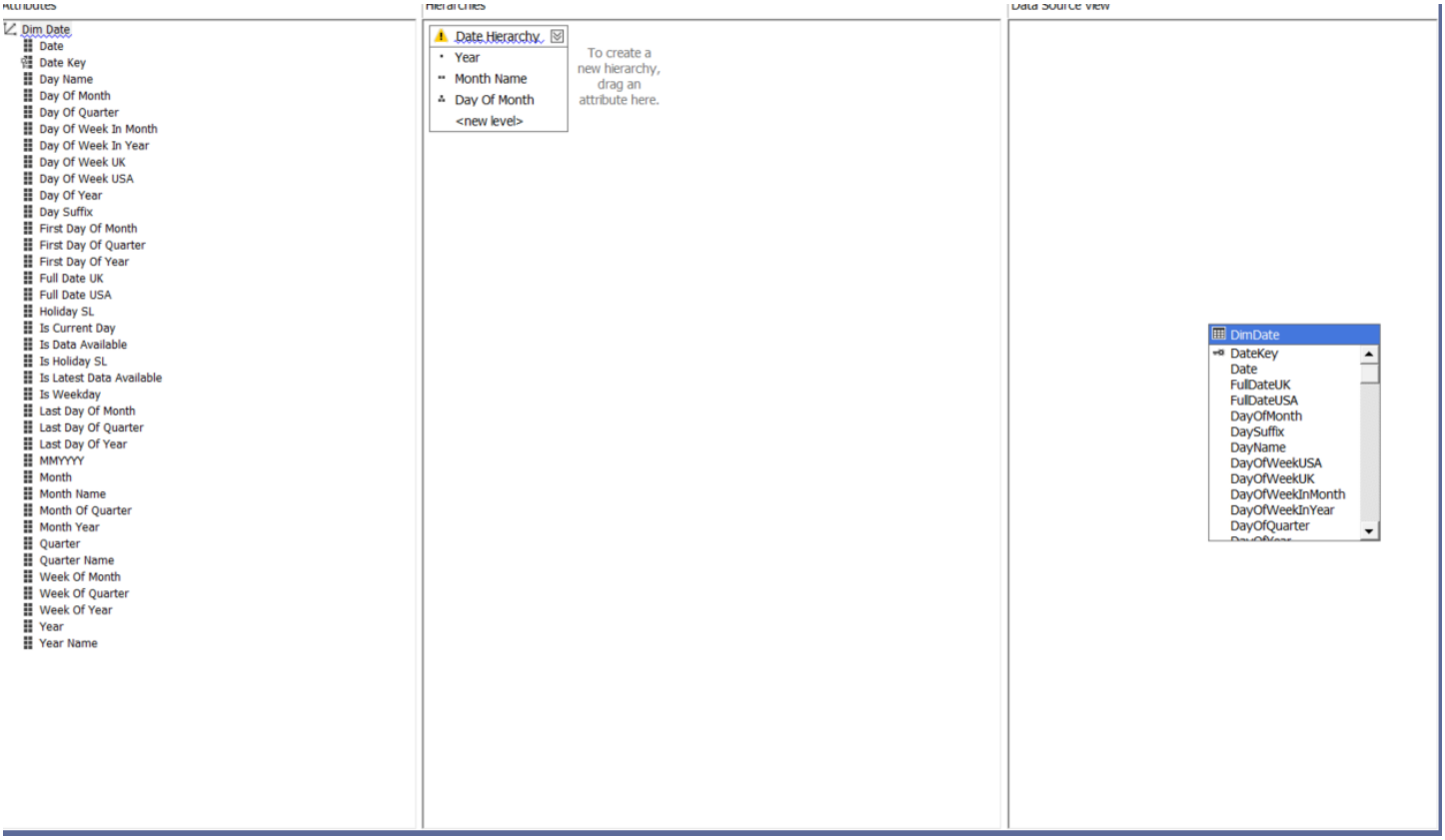


Figure 15 :DimDate hierarchy

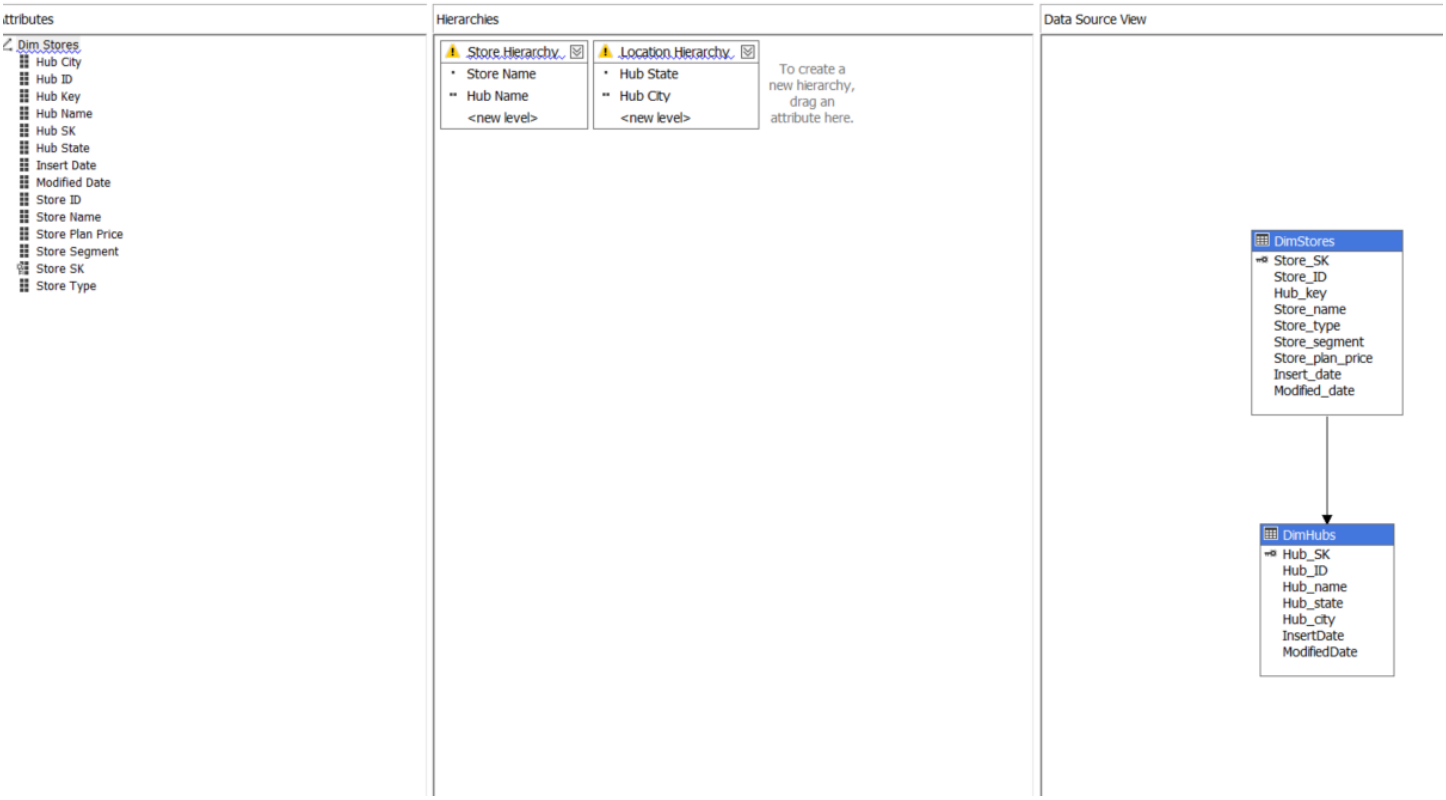


Figure 16 :DimStore Hierarchy

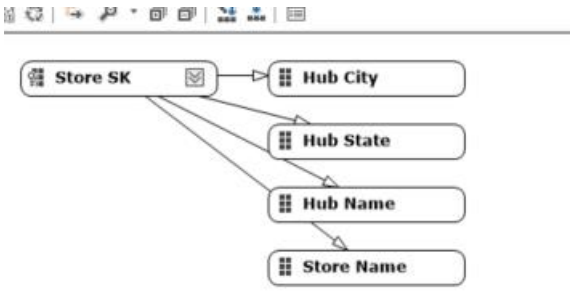


Figure 18 :dimStore Relation

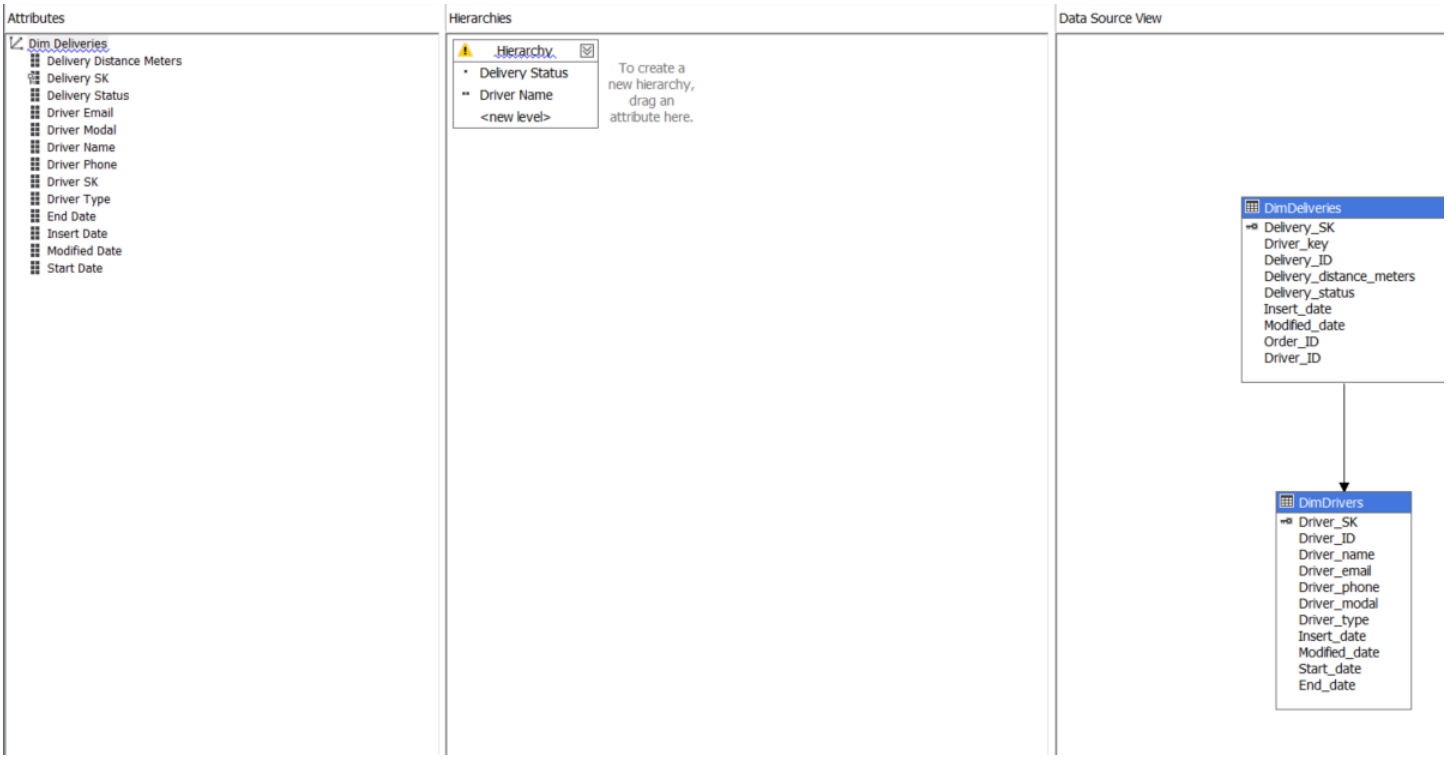


Figure 17 :Dimdeliveries Hierarchy

3.5. KPI Development

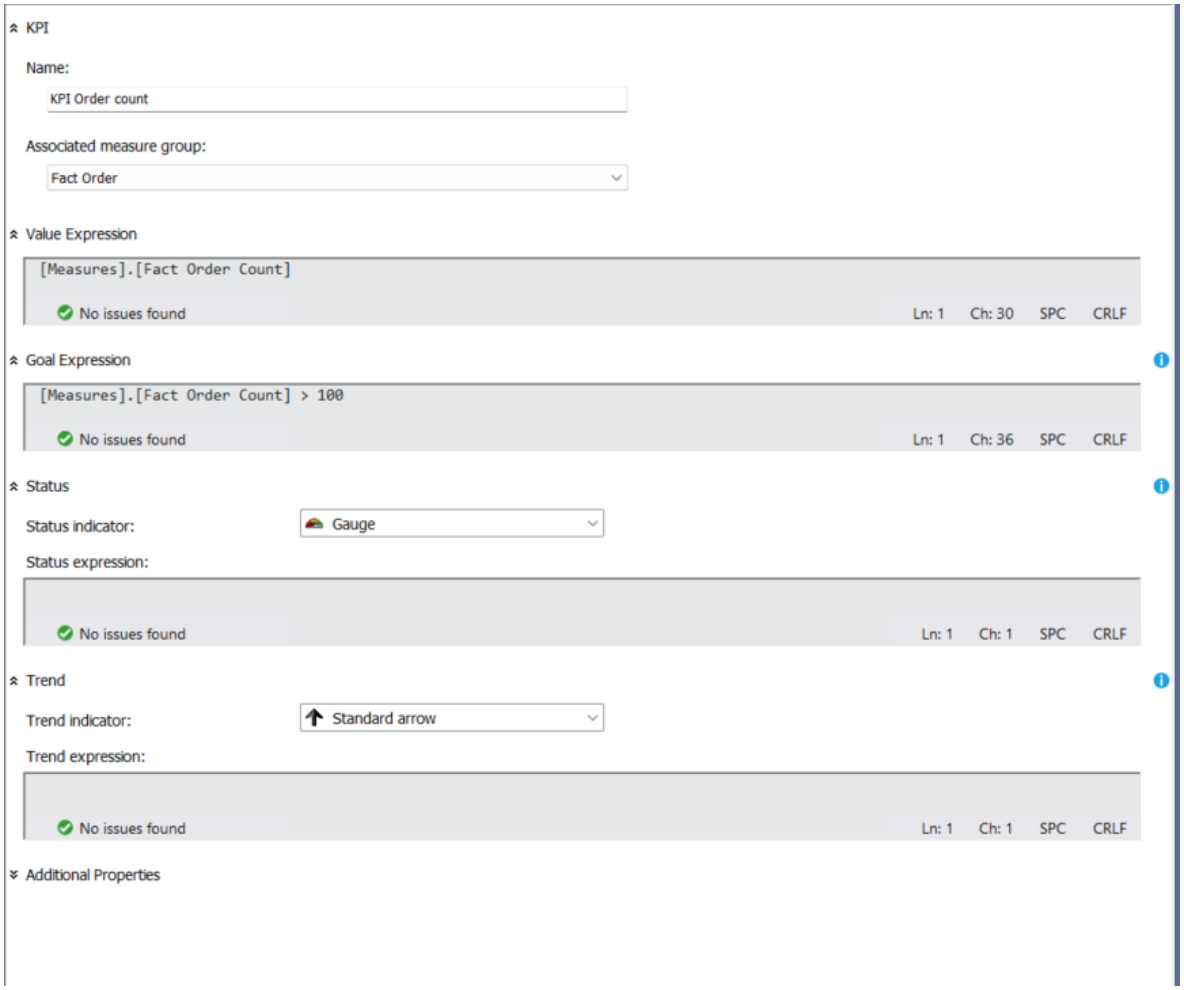


Figure 19 :Order Count KPI

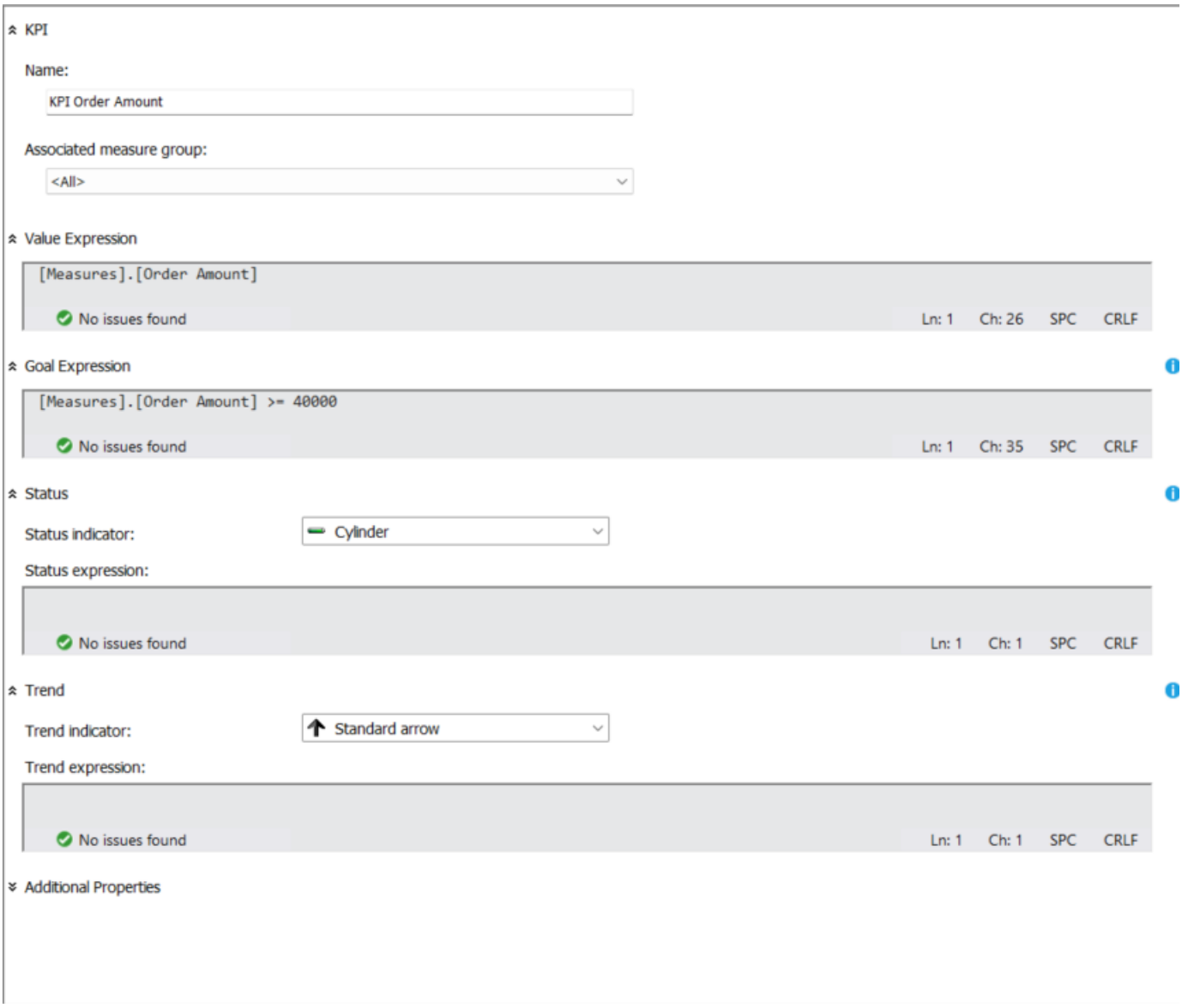


Figure 20 :order Amount KPI

3.6. Deployment of Cube

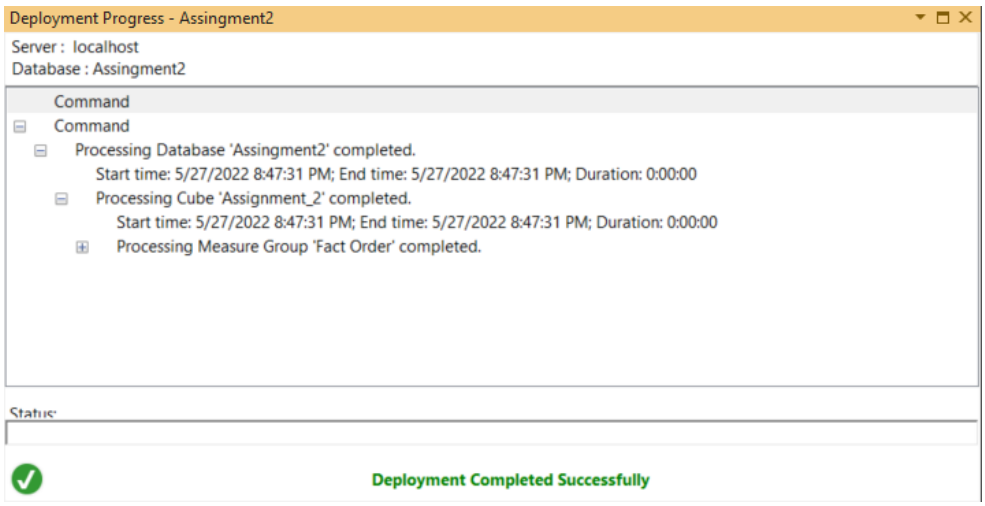


Figure 21 :cube Deployment

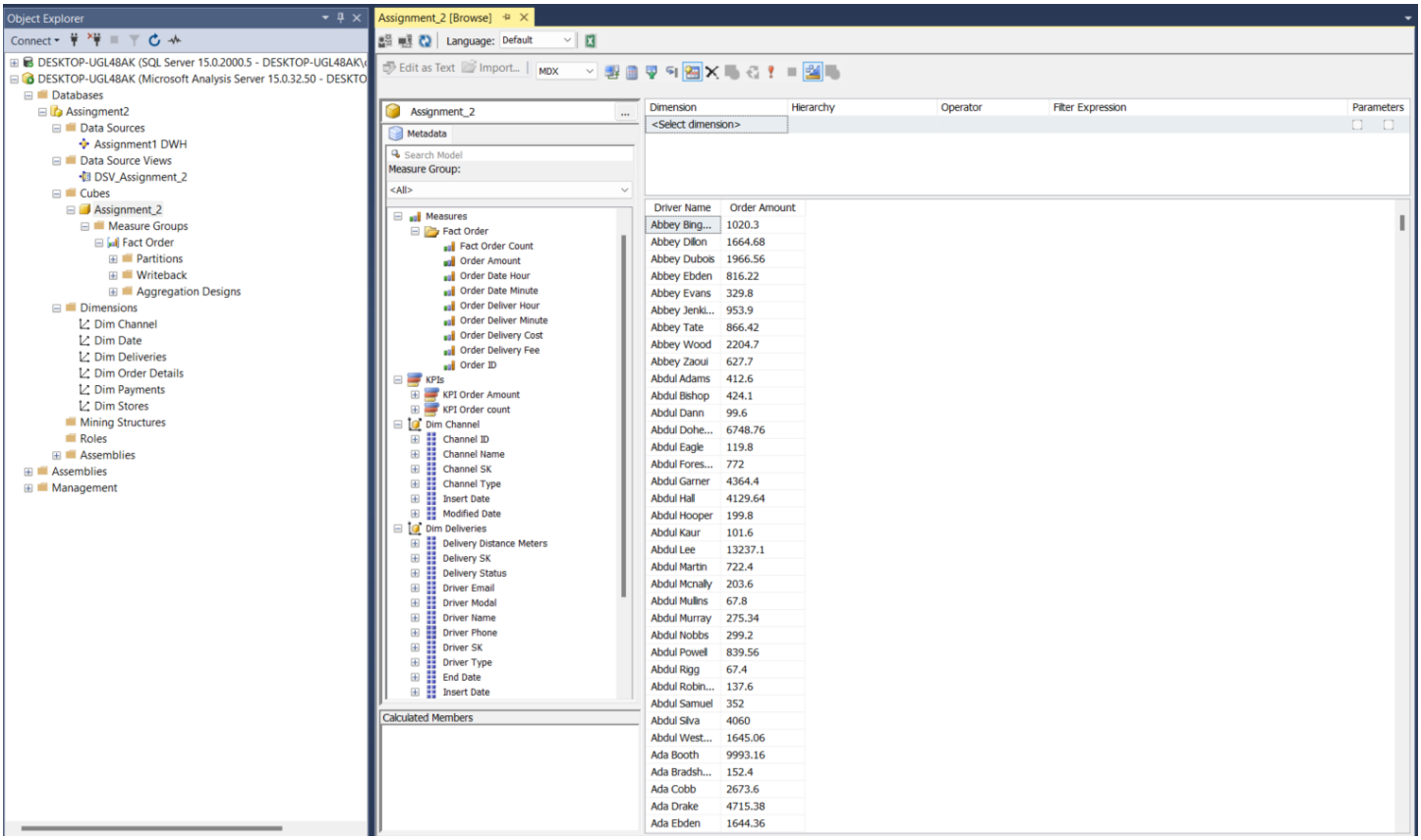


Figure 22 :Cube Resalt Test

4. Demonstration of OLAP Operations

4.1. Connection Setup

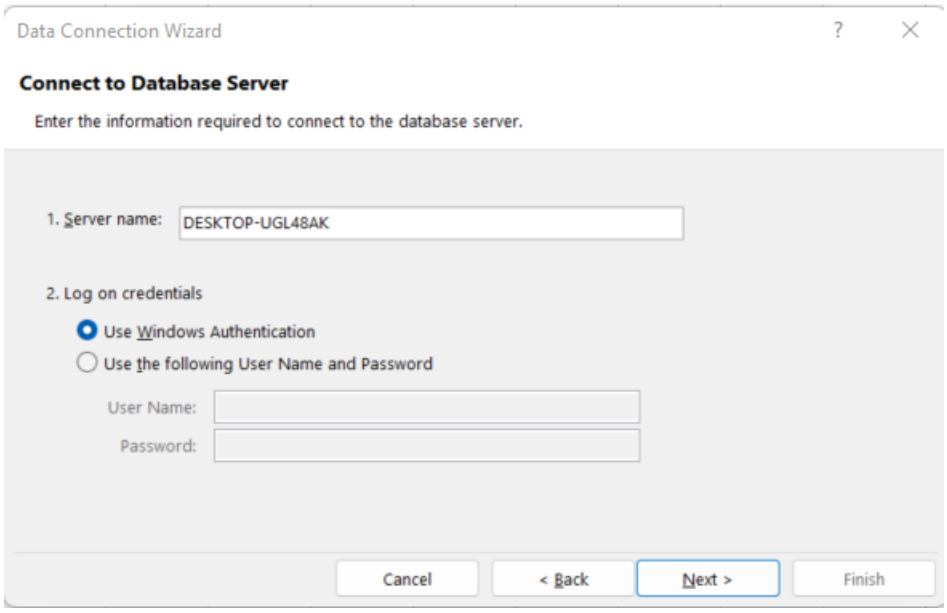


Figure 23 :Excel Connection setup

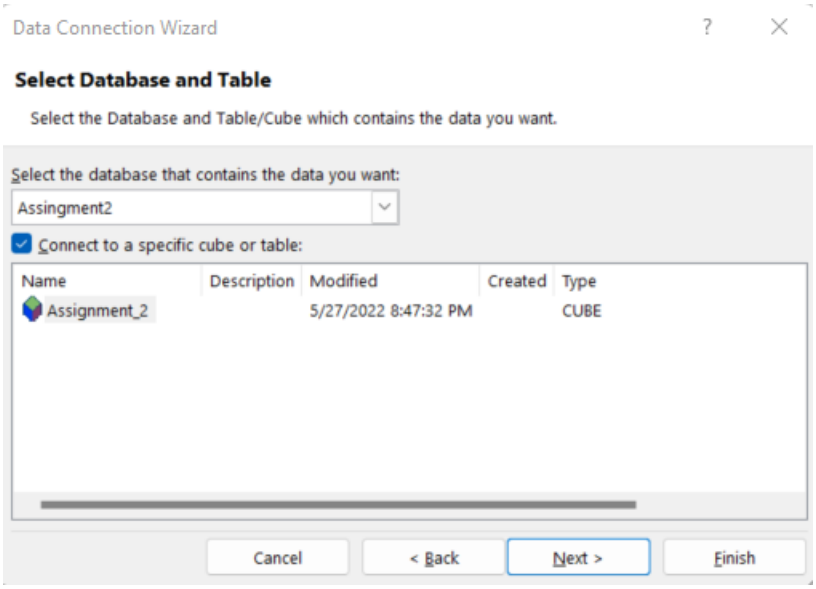


Figure 24 :Excel Database Selection

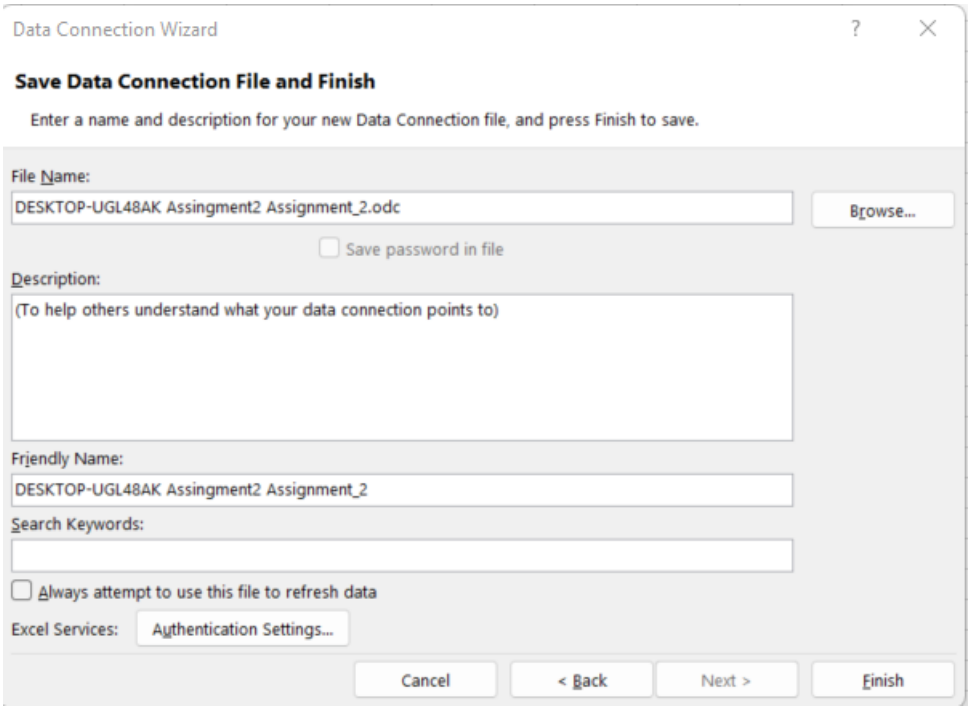


Figure 25 :Excel Connection Create and execute

4.2. Excel Reports with OLAP Operations

a) Roll-up

Row Labels	Order Delivery Fee	Order Delivery Cost
⊟AVENUE SHOPPING		
⊞CICI PIRPU	679.2	2052.56
⊞CIPIOURMU	59.8	40.18
⊟CIRACIOU		
Abdul Lee	0	12
Alessia Fox	0	20.38
Alessia Lunt	0	39.5
Alexander Burge	0	15.04
Anthony Varndell	0	12
Barry Boyle	0	10
Barry Callan	0	59.18
Benjamin Warren	0	48.9
Bob Antcliff	0	10.02
Caleb Welsch	0	18
Carter Hale	0	44.16
Chelsea Graham	0	12
Colleen Gordon	0	76
Danielle Walton	0	21.74
Danny Donnelly	0	7.04
Davina Martin	0	44
Drew Dixon	0	9.72
Enoch Burnley	0	29.32
Jayden Horton	0	10.58
Jazmin Alcroft	0	17.4
Johnathan Griffiths	0	637.46
Johnny Brooks	0	36.04
Kieth Bradley	0	39.14
Macy Notman	0	50.68
Marvin Nobbs	0	84.48
Mason Graham	0	12
Matthew Tindall	0	64.2
Nate Parr	0	55.52
Rosa Silva	0	38.2
Shannon Greenwood	0	13.24
Tony Dubois	0	18.6
Tony Hill	0	12

Figure 26 :OLAP Roll-up

b) Drill-down

Row Labels	Fact Order Count	Order Amount
2019		
April	3016	301204.3004
August	3174	289918.5002
December	3286	336986.6802
February	2986	264523.48
January	3370	319108.44
July	3184	333697.32
June	3024	283089
March	3274	313404.78
May	3274	291695.16
November	3224	324459.52
October	3168	287905.1
September	3080	286236.6
2020	38666	3697268.199
2021	38224	3852913.019
2022	92	7794.86
Grand Total	115042	11190204.96

Figure 27 :OLAP Drill-down

c) Slice

Row Labels	Fact Order Count	Order Amount
RCOUMILES		
AVENUE SHOPPING		
ONLINE	6	338.6
COFFEE SHOPPING		
ONLINE	8	349.4
FORTRAN SHOPPING		
ONLINE	6	518.8
HOTMILK SHOPPING		
ONLINE	8	408.2
RAP SHOPPING		
ONLINE	36	1620
SAMPA SHOPPING		
ONLINE	18	1030.6
SMALL SHOPPING		
ONLINE	84	3537.4
SUBWAY SHOPPING		
ONLINE	60	2281.8
Grand Total	226	10084.8

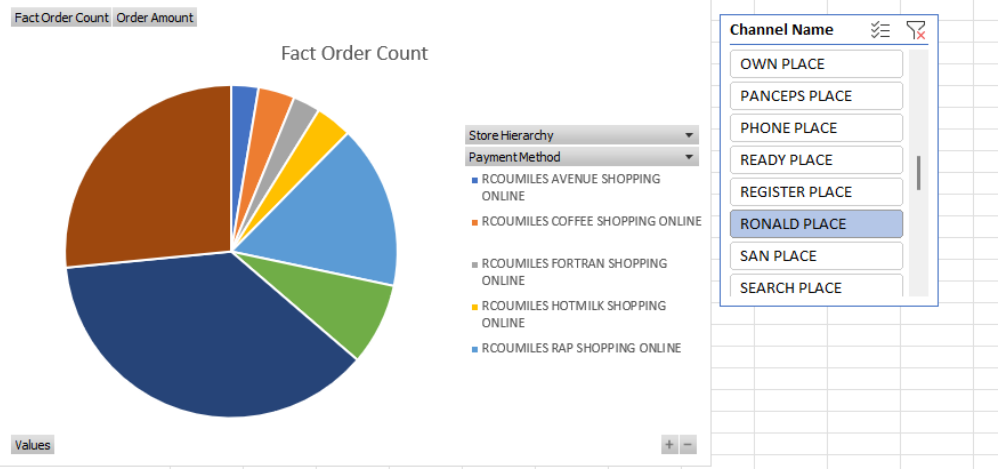


Figure 28 :OLAP Slice

d) Dice

Row Labels	Fact Order Count	Order Delivery Cost	Order Delivery Fee
Bernadette Robinson	2	10	6.9
Chris Forester	2	10	0
Daron Wilcox	2	33.08	10
Domenic Corbett	4	16.22	6.9
Doug Moore	2	0	0
Ember Harper	2	21.14	6
Eryn Collis	2	15.7	0
Faith Price	2	9.42	0
Grace Kelly	2	16.9	19.8
Jules Stubbs	2	25.16	23.8
Kieth Howard	2	12	13.8
Kimberly Hill	2	0	13.8
Lexi Harvey	2	17.78	0
Lily Gosling	2	17.48	0
Mark Owens	2	10	13.8
Melody White	2	10.28	0
Mina Potts	2	14	0
Rosa Silva	2	16.16	0
Rowan Bayliss	2	24	0
Ruth Uttley	2	16.58	10
Ryan Swift	2	6.84	0
Grand Total	**44**	**302.74**	**124.8**

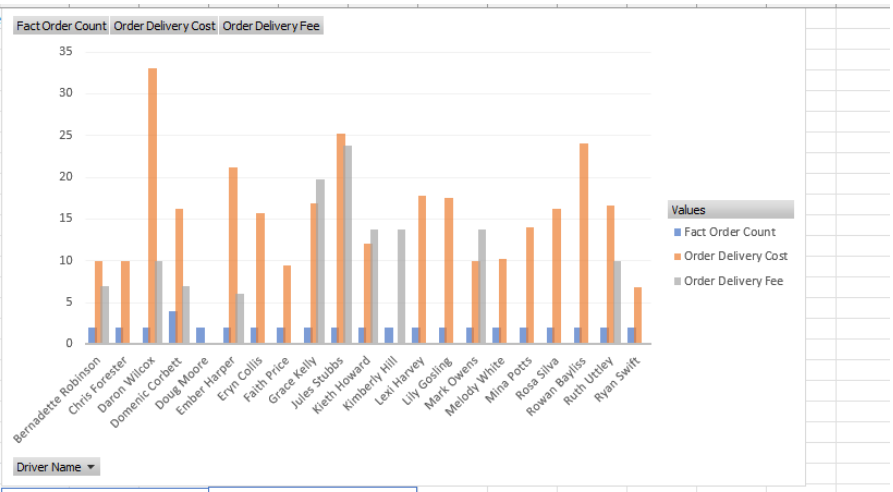


Figure 29 :OLAP Dice

e) Pivot

Below is a transposed pivot table.

Row Labels	Abbey Bingha	Abbey Dillo	Abbey Dubo	Abbey Ebde	Abbey Evar	Abbey Jenkir	Abbey Tat	Abbey Woo	Abbey Zaor	Abdul Adam	Abdul Bishc	Abdul Dan	Abdul Dohert	Abdul Eagl	Abdul Foreste	Abdul Garne	Abdul Ha	Abdul Hoope	Abdul Kau	Abdul Le	Abdul Mar
Fact Order Count	6	18	38	10	6	8	18	12	6	4	4	2	96	2	18	84	56	2	2	150	1
Order Amount	1020.3	1664.68	1966.56	816.22	329.8	953.9	866.42	2204.7	627.7	412.6	424.1	99.6	6748.76	119.8	772	4364.4	4129.6	199.8	101.6	13237	722.
KPI Order Amount Go	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
KPI Order count Goal	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE

Figure 30 :OLAP Transposed Pivot

Row Labels	Fact Order Count	Order Amount	KPI Order Amount Goal	KPI Order count Goal
Abbey Bingham	6	1020.3	FALSE	FALSE
Abbey Dillon	18	1664.68	FALSE	FALSE
Abbey Dubois	38	1966.56	FALSE	FALSE
Abbey Ebden	10	816.22	FALSE	FALSE
Abbey Evans	6	329.8	FALSE	FALSE
Abbey Jenkins	8	953.9	FALSE	FALSE
Abbey Tate	18	866.42	FALSE	FALSE
Abbey Wood	12	2204.7	FALSE	FALSE
Abbey Zaoui	6	627.7	FALSE	FALSE
Abdul Adams	4	412.6	FALSE	FALSE
Abdul Bishop	4	424.1	FALSE	FALSE
Abdul Dann	2	99.6	FALSE	FALSE
Abdul Doherty	96	6748.76	FALSE	FALSE
Abdul Eagle	2	119.8	FALSE	FALSE
Abdul Forester	18	772	FALSE	FALSE
Abdul Garner	84	4364.4	FALSE	FALSE
Abdul Hall	56	4129.64	FALSE	FALSE
Abdul Hooper	2	199.8	FALSE	FALSE
Abdul Kaur	2	101.6	FALSE	FALSE
Abdul Lee	150	13237.1	FALSE	TRUE
Abdul Martin	16	722.4	FALSE	FALSE
Abdul Mcnally	2	203.6	FALSE	FALSE
Abdul Mullins	2	67.8	FALSE	FALSE

Figure 31 :OLAP Pivot

4.3. **SSRS reports**

SQL Server Services Configuration Manager was configured, and the web portal was visited using the URL before creating SSRS Reports.

a) Matrix

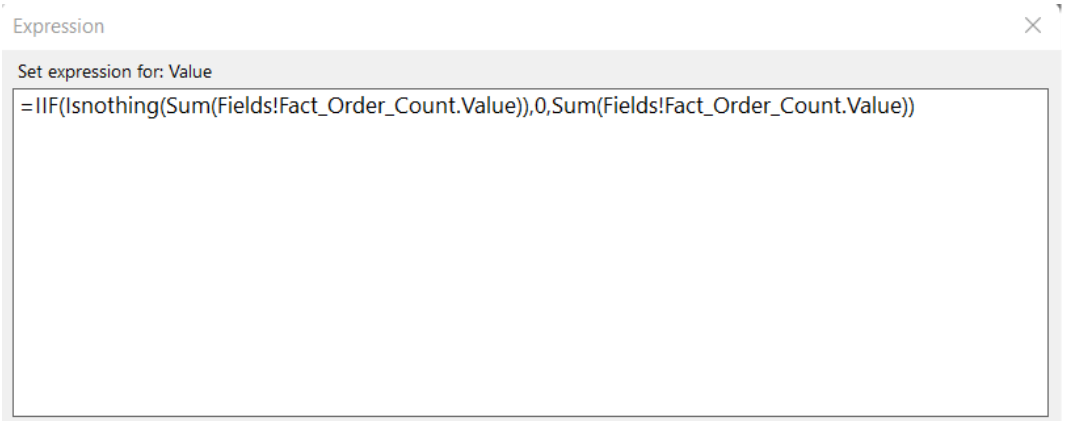
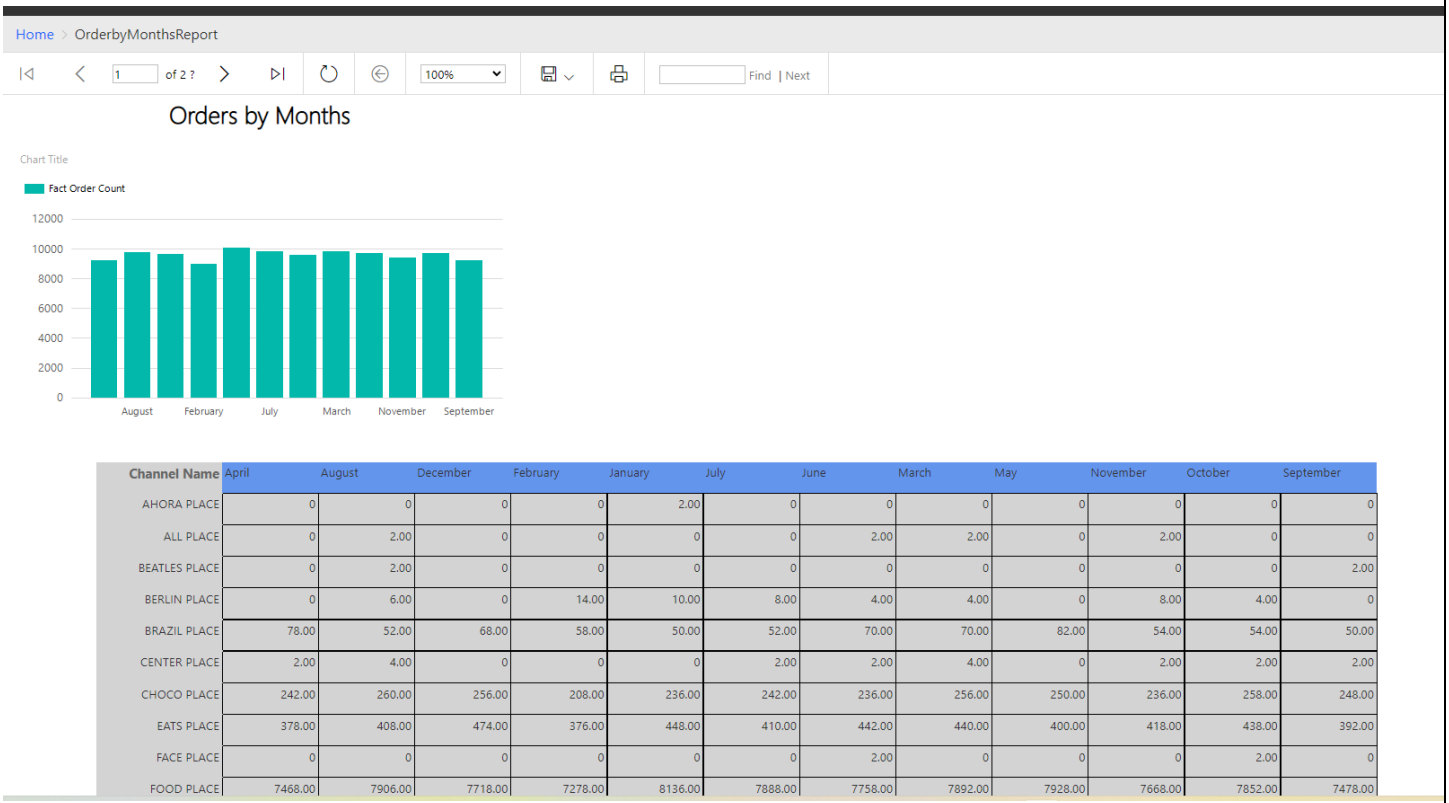


Figure 32 :SSRS null Expression



Channel Name	April	August	December	February	January	July	June	March	May	November	October	September
AHORA PLACE	0	0	0	0	2.00	0	0	0	0	0	0	0
ALL PLACE	0	2.00	0	0	0	0	2.00	2.00	0	2.00	0	0
BEATLES PLACE	0	2.00	0	0	0	0	0	0	0	0	0	2.00
BERLIN PLACE	0	6.00	0	14.00	10.00	8.00	4.00	4.00	0	8.00	4.00	0
BRAZIL PLACE	78.00	52.00	68.00	58.00	50.00	52.00	70.00	70.00	82.00	54.00	54.00	50.00
CENTER PLACE	2.00	4.00	0	0	0	2.00	2.00	4.00	0	2.00	2.00	2.00
CHOCO PLACE	242.00	260.00	256.00	208.00	236.00	242.00	236.00	256.00	250.00	236.00	258.00	248.00
EATS PLACE	378.00	408.00	474.00	376.00	448.00	410.00	442.00	440.00	400.00	418.00	438.00	392.00
FACE PLACE	0	0	0	0	0	0	2.00	0	0	0	2.00	0
FOOD PLACE	7468.00	7906.00	7718.00	7278.00	8136.00	7888.00	7758.00	7892.00	7928.00	7668.00	7852.00	7478.00

Figure 33 :SSRS Metrix

b) **Multi Parameter**

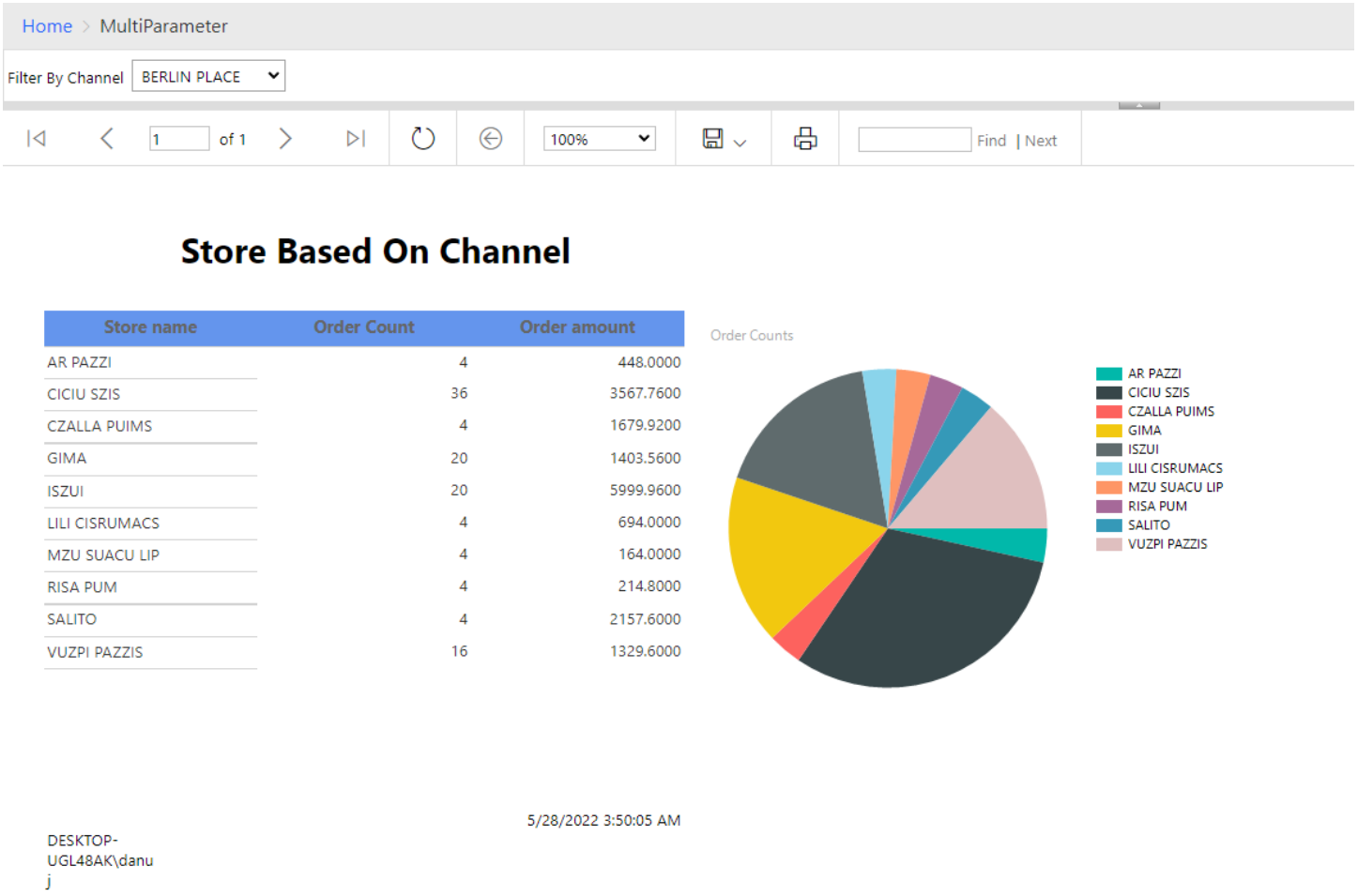


Figure 34 :SSRS MultiParameter

c) Drill Down

Annual Store Sales Sales

Year	Store Name	Order Amount	Fact Order Count	Order Delivery Cost	Order Delivery Fee
⊞ 2019	Total	3632228.8807999 4	38060	289994.46000000 1	226554.01999996 6
⊞ 2020	Total	3697268.1991999 4	38666	294690.66000000 1	229267.59999996 4
⊞ 2021	Total	3852913.0185999	38224	291553.3	231264.99999996 4
⊟ 2022	CIRIROI U CAI	59.8	2	19.54	0
	IPUPIEMAI	234.4	2	11.5	23.8
	IUMPICA	3769.7	30	209.38	357
	LUPIMUIM	276.8	4	33.64	24
	MICI PULA	111.6	2	12	0
	MUMRIFAM	79.8	2	9.4	9.8
	MURPURI OUS GURAIS	69.8	2	13.44	11.8
	MZU PLICA	50.6	2	10.2	0
	O GARI!	32	2	10	0
	PAPA SUCIS	493.6	8	45.72	39.4
	PAZZI ZUM	319.24	6	55.14	0
	PIGUE PIPACO	163.2	4	33.62	0
	PILIOU RAS	201.2	2	16.6	16
	PIMRIMA	199.2	4	26.92	13.8
	RC OUMILEES	217.8	4	42.5	19.6
	SALITO	824.4	2	12.06	0
	SIZMUO RICAUMS	71.8	2	18.7	0
	SPILUMI	328.84	6	46.38	45.6
	SUPSIO	233.18	4	36	23.6
	USPUMUI CIRAICI	57.9	2	10	0
	Total	7794.86	92	672.74	584.4
Total		**11190204.958599**	**115042**	**876911.159999995**	**687671.020000094**

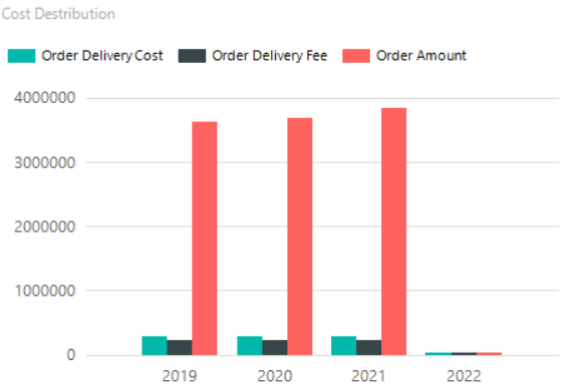


Figure 35 :SSRS Drill-down

d) **Drill Through**

Driver Report

Driver Name	Store Name	Order Count
Harmony Armstrong	CZALLA PUIMS QSQ	2
Elise Hill	MICI PULA	2
Joy Powell	MICI PULA	2
Kamila Haines	MICI PULA	2
Oliver Hilton	MICI PULA	2
Harmony Armstrong	CZALLA PUIMS LISI	2
Mike Hunt	CZALLA	2
Bob Gray	CICIU SZIS	2
Chadwick	GIMA	2
Daphne Harris	CICIU SZIS	2
Emery Adler	VUZPI PAZZIS	2
Emery Adler	VUZPI PAZZIS	2
Gil Nielson	CICIU SZIS	2
Gwen Stone	GIMA	2
Gwen Stone	GIMA	2

Figure 37 :SSRS Drill-through parent table

Views | Zoom | Navigation | Print

Drivername Harmony Armstrong

Driver Report

Year	Order Amount	Fact Order Count	Order Delivery Fee
2019	2598.08	32	134.8
2020	4707.64	54	301.4
2021	3967.16	44	142.8
Total	**11272.88**	**130**	**579**

Figure 36 :SSRS Drill-through child table

References

[1] [Online]. Available: https://www.techbrothersit.com/2016/01/how-to-replace-null-values-in-ssrs.html#:~:text=If%20we%20are%20getting%20the,and%20Isnothing%20functions%20in%20expressions..