

Imagine you are (would be) in this situation

- Your main source is Microsoft Dynamics
- You need to integrate other datasources
 - Historical Microsoft Dynamics database
 - Legacy ERP system
 - Excel budgets & Weather report (sales team)
 - Google Analytics & Mailchimp (marketing team)
 - ...

Question #1: Power BI or BI4Dynamics Data Warehouse?

Criteria	DATA WAREHOUSE (=SQL)	POWER BI
Out-of-the box content (for Dynamics)	Best on the market	
Implementation time	Few days	
Cost of license or services	License << Services	
Flexibility (customizations)	No Code	
Usage of internal resources	Yes (know Dynamics)	
Processing time	Very fast	
Scalability	No problem. Ever.	
Cost of infrastructure	Azure VM for 150 GB db =200\$/month	
User experience	No waiting	
Integrations of other sources		

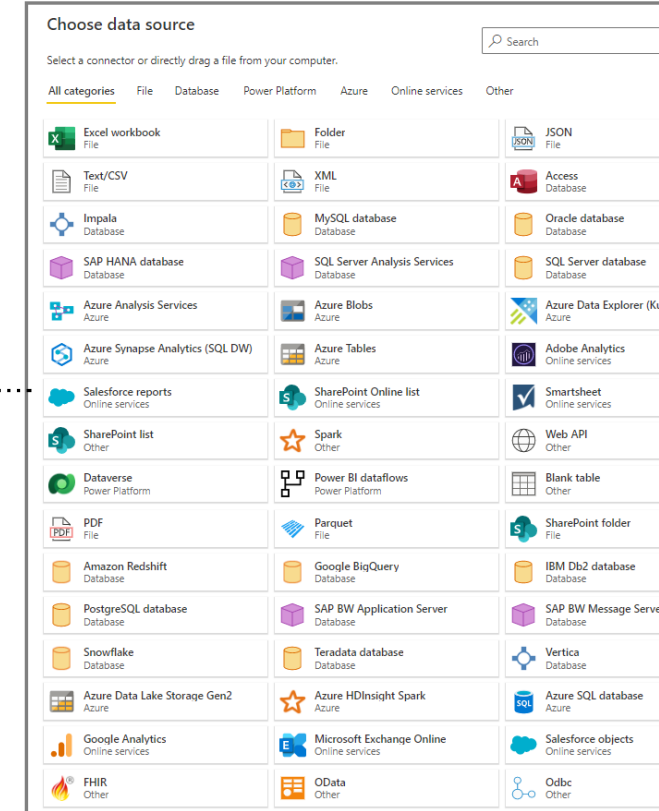
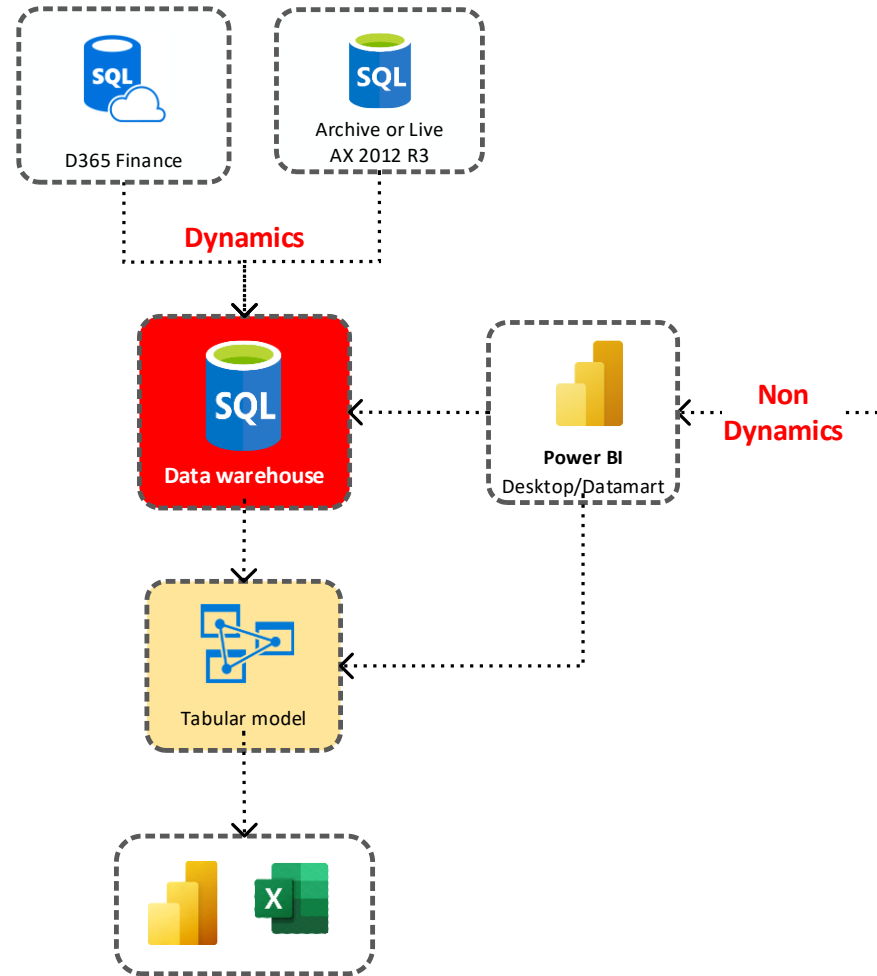
Question 2: What & how needs to be done?

- **Dynamics**

- **Integrated** into Data Warehouse

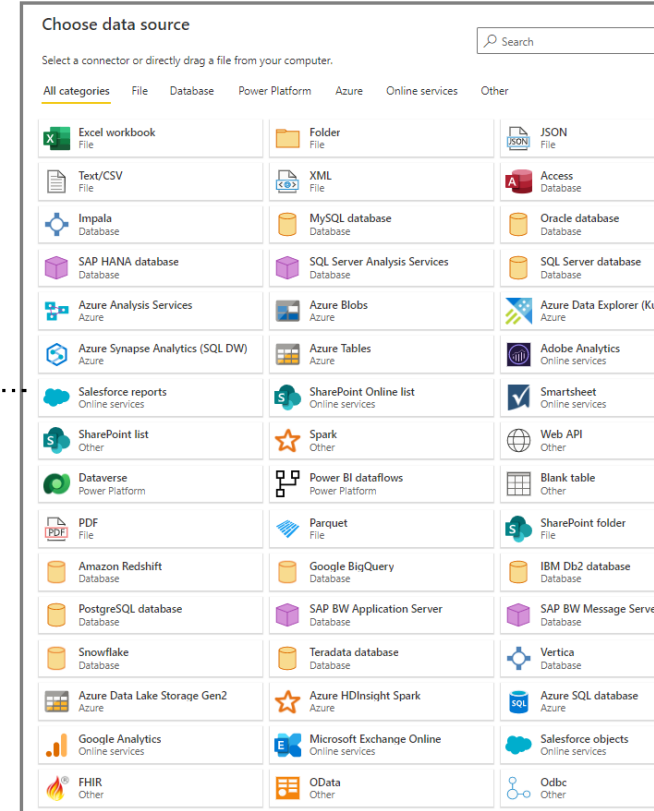
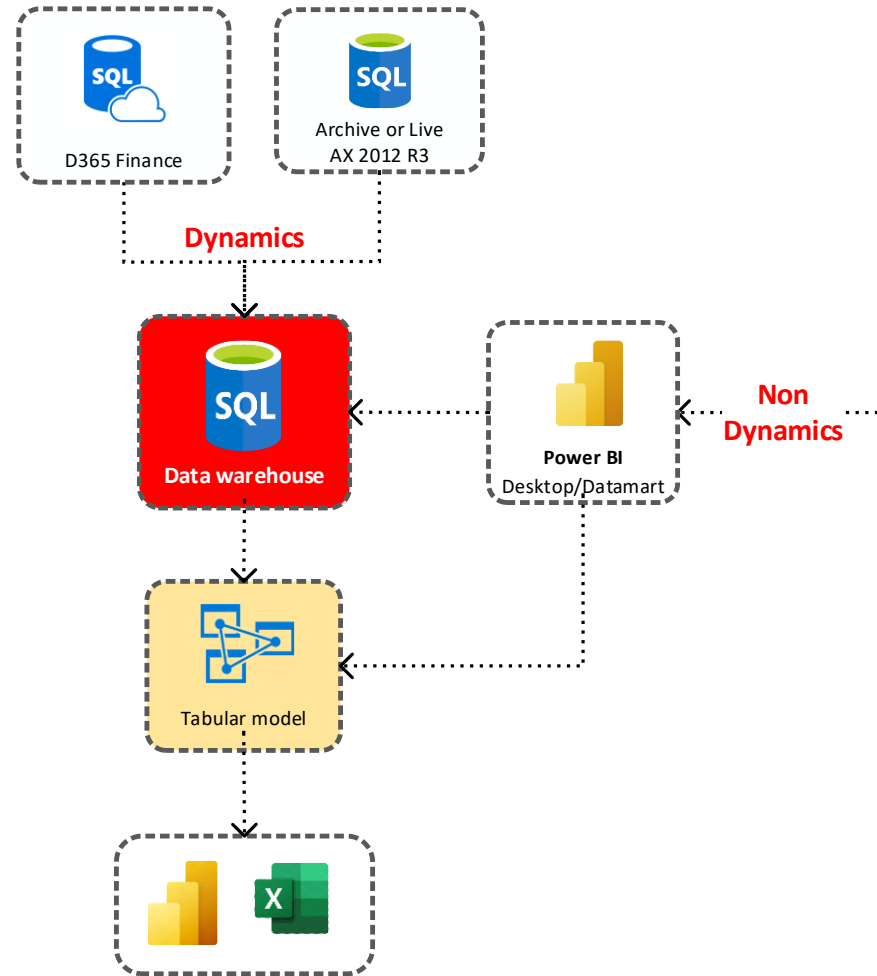
- **Non-Dynamics**

- **Prepared and integrated** into Data Warehouse
- **Composed** with Corporate Tabular Model



Question #3: Who does it?

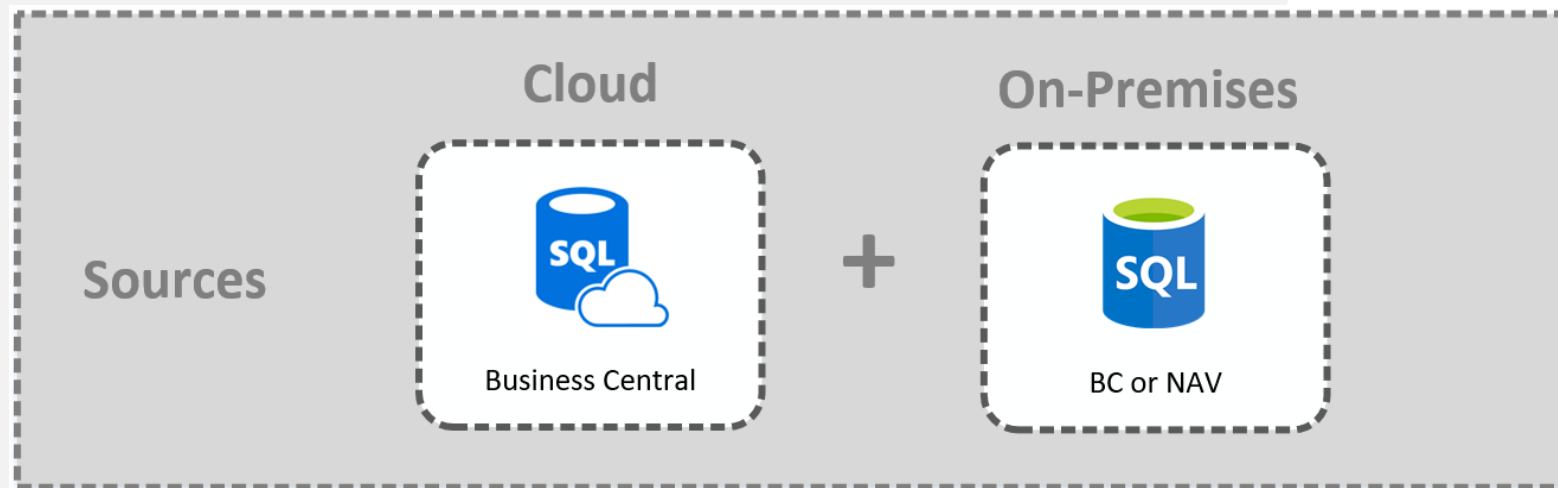
- Software
- IT team
- Business user



1A: Integrate different Dynamics sources

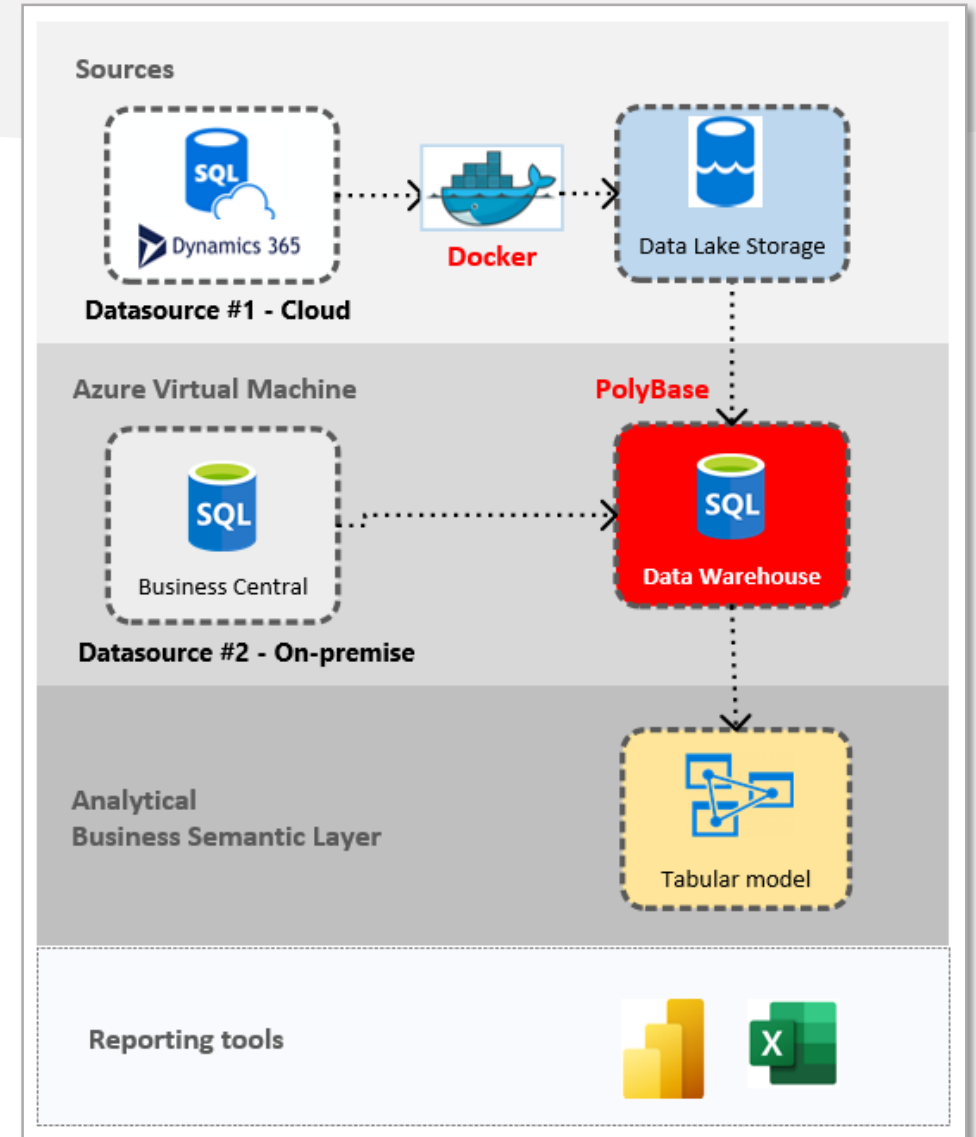
Cloud: D365 Business Central

On-Premises: Microsoft Dynamics BC/NAV



Full data integration

- **Connector for NAV 2009+ / BC**
- **NAV / BC database can be live or archive**
 - Timestamp per datasource
 - Incremental load (active datasource)
 - One-time load (passive datasource)
- **All application area**
 - Document level granularity
 - Financial dimensions (mapping available)
 - Account schedules (all available)



Specifics

All companies

bi4-dfo-export-/BI4Dynamics BC Cloud and On-Prem

- BI4Dynamics ME
- BI4DynamicsSI
- Cronus CANADA
- Cronus DENMARK
- CRONUS UK Ltd.

bi4-dfo-export-/Demo Database NAV (17-0)

- CRONUS International Ltd_

bi4-dfo-export-/NAV 2009-Multi-Company y15-y18

- NL 2009
- UK 2009

Company Configuration

NL 2009

Company short name:

Country:

Local Currency:

Additional Currency:

Add dimension

Copy to all

Save

Select a local dimension:

Map to global dimension:

Global Dimensions

Initialize a global dimension by adding an unique dimension from the current company.

Initialize global dimension

1

2

Add dimension

Challenges

- **Table names, Extensions**

	DataSourceTableID	DataSourceID	TableID	TableNameSql	TableNameStage	TableType	ExistsInDataSource
1	275	1	0	Acc. Schedule Line	Acc_ Schedule Line	0	1
2	276	2	85	Acc_ Schedule Line\$437dbf0e-84ff-417a-965d-ed2bb...	Acc_ Schedule Line	0	1
3	277	3	85	Acc_ Schedule Line	Acc_ Schedule Line	0	1

- **Global dimensions**

```
LEFT OUTER JOIN dim.[Vendor] [Buy From Vendor] ON [Buy From Vendor].[Vendor_No.] = [GLTransactionsView].[GLEntr
LEFT OUTER JOIN dim.[Customer] [Bill To Customer] ON [GLTransactionsView].[GLEntry_SourceType] = 1 AND [Bill To
LEFT OUTER JOIN dim.[ClosedPeriod] [Closed Period] ON [Closed Period].[ClosedPeriodID] = [GLTransactionsView].[
LEFT OUTER JOIN dim.[DocumentGL] [Document GL] ON [Document GL].[GLEntry_EntryNo.]=[GLTransactionsView].[GLEntr
LEFT OUTER JOIN dim.[SourceGL] [Source GL] ON [Source GL].[SourceType] = [GLTransactionsView].[GLEntry_SourceTy
-- NAV Global dimensions
LEFT OUTER JOIN help.[DimensionSetEntry] [DimensionSetEntry1] ON 1 = DimensionSetEntry1.[DimensionID] AND [GLTr
LEFT OUTER JOIN help.[DimensionSetEntry] [DimensionSetEntry2] ON 2 = DimensionSetEntry2.[DimensionID] AND [GLTr

LEFT OUTER JOIN help.[LedgerEntryDimension] [LedgerEntryDimension1] ON 1 = LedgerEntryDimension1.[DimensionID]
LEFT OUTER JOIN help.[LedgerEntryDimension] [LedgerEntryDimension2] ON 2 = LedgerEntryDimension2.[DimensionID]
-- NAV Global dimensions END
```


Results

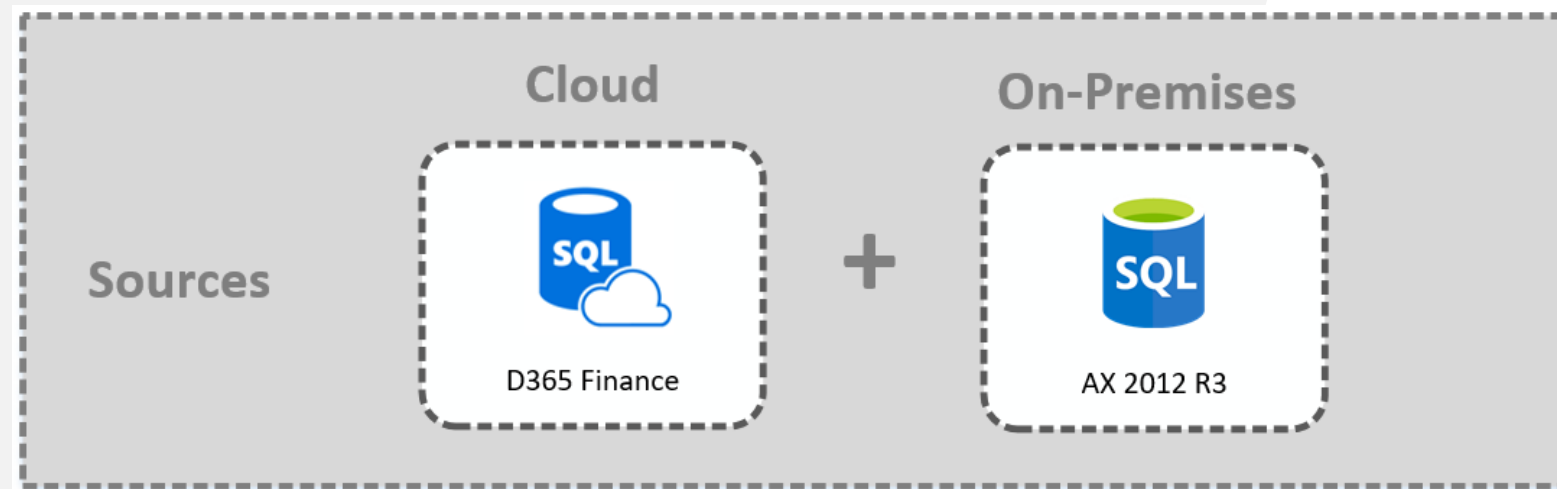
	A	B	C	D
1	Data Source ID	Data Source Database Name	Company short name	Net Sales
2	1	BI4Dynamics BC Cloud and On-Prem	Canada	3,347,078.60
3	2	Demo Database NAV (17-0)	UK	90,842.92
4	3	NAV 2009-Multi-Company y15-y18	NL	30,297,069.18
5	Grand Total			33,734,990.70

	A	B	C	D	E	F	G
1	Net Sales		FD Department				
2	Data Source ID	FD Customer Group Code	ADM	N/A	PROD	SALES	Grand Total
3	1	LARGE	125.10			875.50	1,000.60
4		MEDIUM	2,392.30			1,698.00	4,090.30
5		N/A		3,335,254.10			3,335,254.10
6		SMALL			2,352.70	4,380.90	6,733.60
7	2	LARGE				8,009.67	8,009.67
8		MEDIUM				34,078.08	34,078.08
9		N/A				4,331.40	4,331.40
10		SMALL				44,423.77	44,423.77
11	3	1-KLEIN BEDRIJF		704,809.55		14,145,952.34	14,850,761.89
12		2-MIDDEL BEDRIJF		331,924.75		5,214,395.92	5,546,320.67
13		3-GROOT BEDRIJF		1,011,557.80		4,318,304.90	5,329,862.70
14		4-STAAT		507,785.81		2,553,499.38	3,061,285.19
15		5-INTERCOMPANY		392,889.98		1,115,948.75	1,508,838.73
16	Grand Total		2,517.40	6,284,221.99	3,228.20	27,445,023.11	33,734,990.70

1B: Integrate different Dynamics sources

Cloud: D365 Finance & Operations

On-Premises: Microsoft Dynamics AX 2012 R3



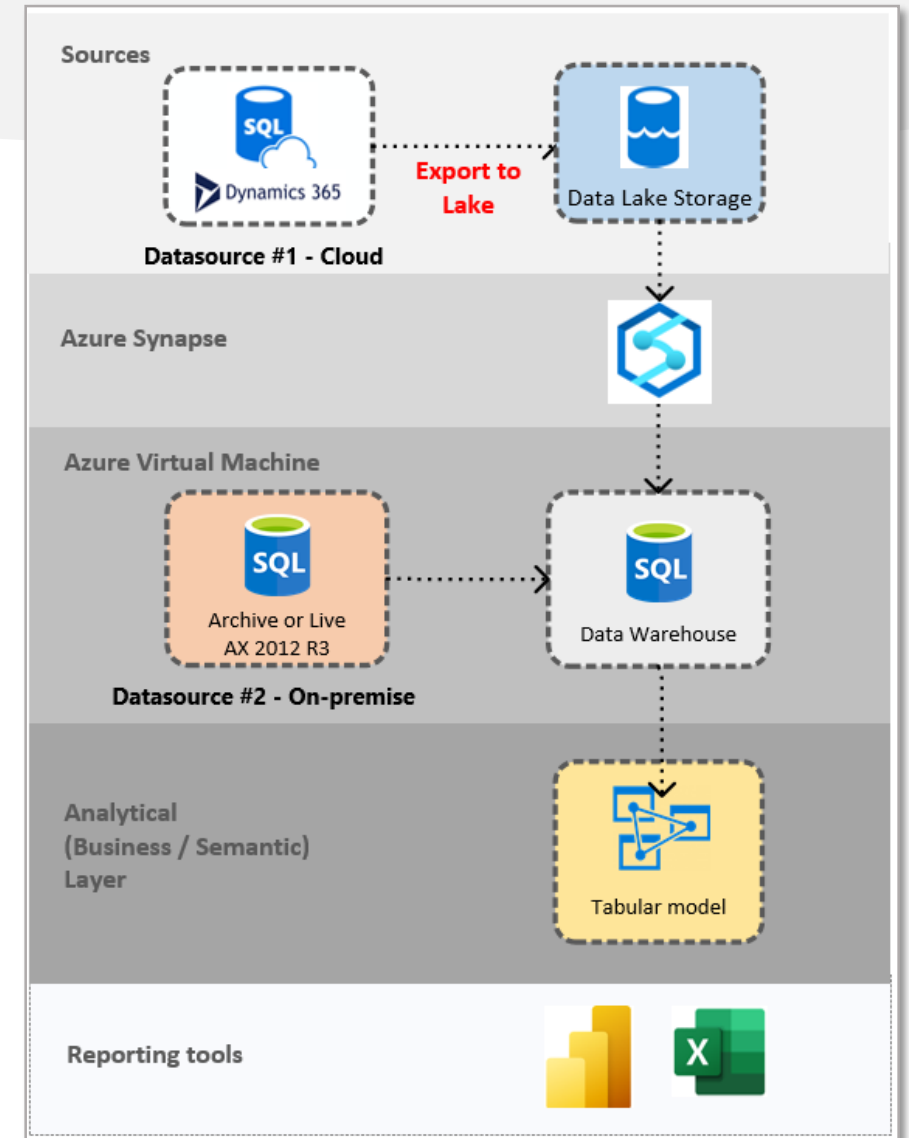
Full data integration

- **Connector for DFO Cloud & AX 2012 R3**

- Multiple DFO / AX instances
- AX database can be live or archive
 - Incremental load (active datasource)
 - One-time load (passive datasource)

- **All application areas**

- Document level granularity
- Financial dimensions (mapping available)



Results

Data Source ID	Data Source Server Name	Company Name	Net Sales POS	Receivables Overdue
1	mn-synapse-ondemand.sql.azuresynapse.net	Contoso Azure	2,783,585.31	465.86
2	bi4-dfo-export-	Contoso Consulting USA		10,634,876.83
		Contoso Process Industry		13,183,954.65
		Contoso Retail USA	14,648,678.05	946.88
Grand Total			17,432,263.36	23,820,244.22

Date YMD 2022 - June

Name	Net Sales POS	Net Sales POS	Net Sales POS	Net Sales POS	Net Sales POS	Discount	Sales Price POS
	Net Sales POS	YOY	YOY Variance	YOY Variance %	YTD Variance %	per Store	Amount % POS
Current	662,648.88	560,360.35	102,288.53	18.25%	-13.28%	30,120.40	35.03%
-1M	525,953.60	553,499.32	-27,545.72	-4.98%	-18.73%	23,906.98	29.20%
-2M	551,932.94	518,894.48	33,038.46	6.37%	-22.16%	25,087.86	26.73%
-3M	560,071.28	512,236.33	47,834.95	9.34%	-29.42%	25,457.79	29.96%
Grand Total	662,648.88	560,360.35	102,288.53	18.25%	-13.28%	30,120.40	35.03%

Net Sales POS	Data Source id	
Row Labels	1	2
		Grand Total
2020	7,650,310.25	7,650,310.25
2020 - January	1,238,806.14	1,238,806.14
2020 - February	516,675.26	516,675.26
2020 - March	569,428.14	569,428.14
2020 - April	553,837.78	553,837.78
2020 - May	552,150.28	552,150.28
2020 - June	585,025.30	585,025.30
2020 - July	574,627.88	574,627.88
2020 - August	591,859.12	591,859.12
2020 - September	546,742.04	546,742.04
2020 - October	549,223.38	549,223.38
2020 - November	563,395.94	563,395.94
2020 - December	808,538.99	808,538.99
2021	6,998,367.80	6,998,367.80
2021 - January	577,564.62	577,564.62
2021 - February	576,354.15	576,354.15
2021 - March	546,995.09	546,995.09
2021 - April	518,894.48	518,894.48
2021 - May	582,837.81	582,837.81
2021 - June	560,360.35	560,360.35
2021 - July	548,117.49	548,117.49
2021 - August	542,826.82	542,826.82
2021 - September	553,841.65	553,841.65
2021 - October	594,628.82	594,628.82
2021 - November	557,787.92	557,787.92
2021 - December	838,158.60	838,158.60
2022	2,783,585.31	2,783,585.31
2022 - January	53,508.51	53,508.51
2022 - February	562,425.80	562,425.80
2022 - March	560,071.28	560,071.28
2022 - April	551,932.94	551,932.94
2022 - May	525,953.60	525,953.60
2022 - June	529,693.19	529,693.19
Grand Total	2,783,585.31	14,648,678.05

There is more about integration...

Ongoing Business change
Checking data warehouse health
Monitoring processing times
Creating documentation
Monitoring Azure costs

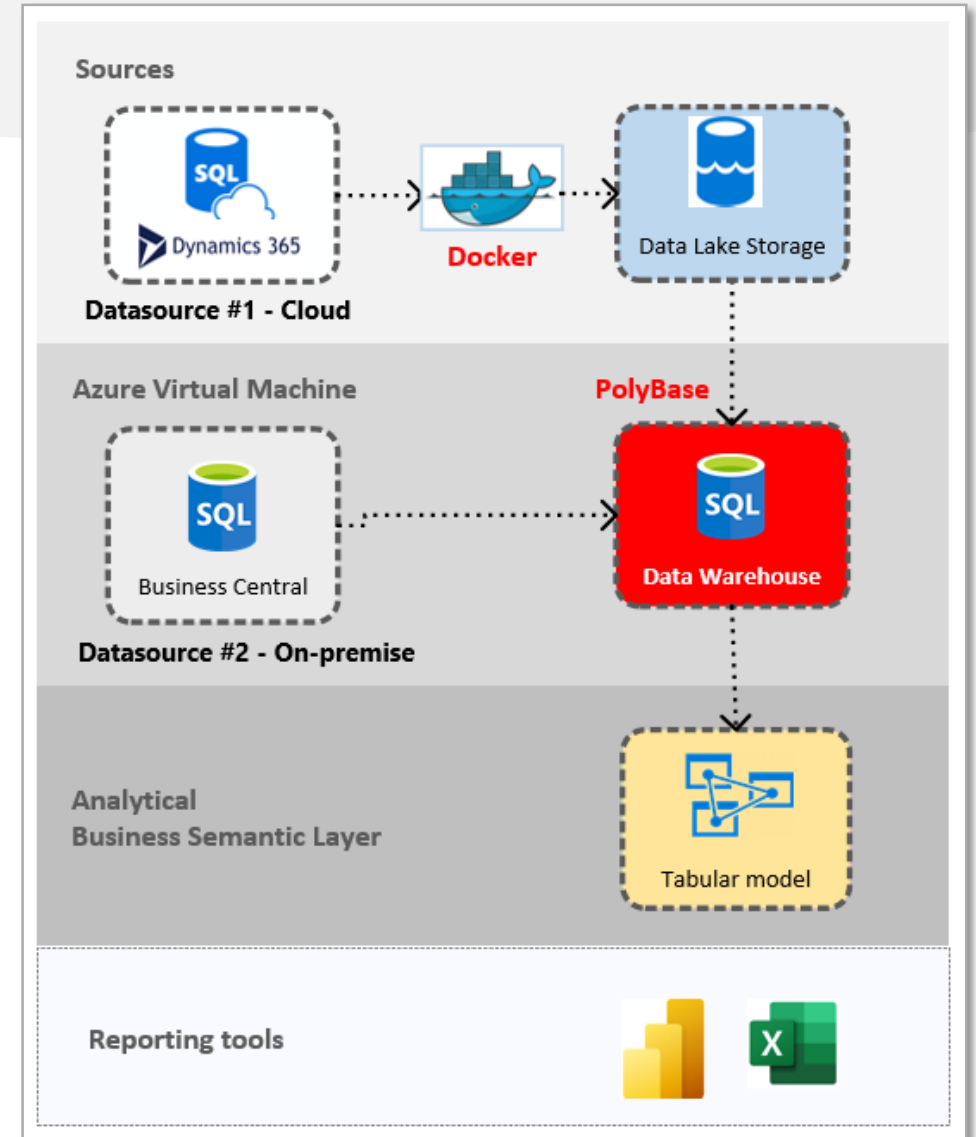
Technical and business process

- **Integration Services**

- Standard: filter AR/AP/INV balances
- Custom (project)
 - Mapping old and new dimension attributes
 - Fix erroneous transactions in BI

- **Impact on business**

- BC: Faster processing and operational reporting
- Reporting is moving from ERP to BI



Checking data warehouse health

- Data warehouse dimensions

	ID	Date	TableName	Scheme	Stage#	Dw#	Diff#	Diff
1	9	2022-06-26 19:32:42.537	Currency	dim	144	144	0	0
2	1	2022-06-26 19:32:42.537	Customer	dim	144	144	0	0
3	13	2022-06-26 19:32:42.537	Document GL	dim	216306	216306	0	0
4	14	2022-06-26 19:32:42.537	Document Sales	dim	110	110	0	0
5	15	2022-06-26 19:32:42.537	Document Sales Order	dim	44	44	0	0
6	3	2022-06-26 19:32:42.537	Fixed Asset	dim	18	18	0	0
7	4	2022-06-26 19:32:42.537	GL Account	dim	541	541	0	0
8	6	2022-06-26 19:32:42.537	Item	dim	314	314	0	0
9	10	2022-06-26 19:32:42.537	Item Variant	dim	4	4	0	0
10	11	2022-06-26 19:32:42.537	Job	dim	2	2	0	0
11	5	2022-06-26 19:32:42.537	Location	dim	16	16	0	0
12	7	2022-06-26 19:32:42.537	Resource	dim	24	24	0	0
13	8	2022-06-26 19:32:42.537	Sales Person	dim	24	24	0	0
14	12	2022-06-26 19:32:42.537	Unit Of Measure	dim	33	33	0	0
15	2	2022-06-26 19:32:42.537	Vendor	dim	142	142	0	0

- Data warehouse facts

	ID	Date	TableName	Scheme	Stage#	Dw#	Diff#
1	1	2022-06-26 19:34:44.937	GL Budget Transactions	fact	2633	2633	0
2	2	2022-06-26 19:34:44.937	GL Cash Flow Transactions	fact	0	0	0
3	3	2022-06-26 19:34:44.937	GL Transactions	fact	216306	216306	0
4	4	2022-06-26 19:34:44.937	Sales Budget Values	fact	6963	6963	0
5	5	2022-06-26 19:34:44.937	Sales Delivery-Return Receipt	fact	62	62	0
6	6	2022-06-26 19:34:44.937	Sales Delivery-Shipment	fact	88	88	0
7	7	2022-06-26 19:34:44.937	Sales Orders	fact	96	96	0
8	8	2022-06-26 19:34:44.937	Sales Orders Archive	fact	6	6	0
9	9	2022-06-26 19:34:44.937	Sales Shipped Quantities	fact	32341	32341	0
10	10	2022-06-26 19:34:44.937	Sales Values-Item	fact	51165	51165	0
11	11	2022-06-26 19:34:44.937	Sales Values-NotItem-Sales Invoice	fact	6	6	0
12	12	2022-06-26 19:34:44.937	Sales Values-NotItem-Service Credit Memo	fact	0	0	0
13	13	2022-06-26 19:34:44.937	Sales Values-NotItem-Service Invoice	fact	0	0	0

Monitoring processing times

Stage - load

Stage table	1	3	4	6	8	10	Total
RETAILTRANSACTIONSALSTRANS	21	21	23	22	19	23	23
SALESLINE	17	16	18	17	15	16	18
CUSTINVOICETRANS	13	11	12	14	12	12	14
INVENTTRANS	11	11	11	12	10	10	12
RETAILTRANSACTIONTABLE	8	7	8	9	8	9	9
RETAILTRANSACTIONPAYMENTTRANS	7	7	7	8	6	7	8
INVENTTRANSORIGIN	5	5	4	4	4	5	5
GENERALJOURNALACCOUNTENTRY	4					4	4
PURCHLINE	2	2	2	2	2	2	2
CUSTTRANS	2	2	2	2	2	2	2
Total	21	21	23	22	19	23	23

Stage - index

Stage table	10	Total
IX_WIZ_GLAnalysisGLAnalysis_GENERALJOURNALACCOUNTENTRY	0	0
Total	0	0

DW dim

DW Name	1	3	10	Total
LoadDocumentInventoryInvoice	1	1	0	1
LoadDocumentInventory	1	1	1	1
LoadDocumentSalesOrderLine	1	0	0	1
LoadRetailTransaction	1	0	0	1
LoadReceivablesStateTransactions	0	0	0	0
LoadSalesByReceipt	0	0	0	0
LoadDocumentCustomer	0	0	0	0
LoadDocumentPurchaseOrderLine	0	0	0	0
Total	1	1	1	1

DW fact

DW Name	1	3	10	Total
LoadSalesInvoice	4	5	4	5
LoadRetailSalesTransactions	3	4	3	4
LoadSalesOrders	3	3	3	3
LoadPayablesTransactions	0	3	0	3
LoadInventoryTransactions		2	2	2
LoadInventoryState		2	1	2
LoadPurchaseOrders	1	2	1	2
LoadRetailPayments	1	1	1	1
Total	4	5	4	5

DW Facts

Log ID	Start Day	Start Time	DW Name	Process Type	Time (min)	Time (s)	Rows Inserted	Rows Deleted	Ins/min
6193	06-25	12:16	LoadSalesInvoice	0	4.0	240	3,739,944		935,700
4734	06-25	09:45	LoadSalesInvoice	0	3.9	235	3,487,388		891,400
3297	06-24	14:19	LoadSalesInvoice	0	4.7	284	3,739,944		790,700
1429	06-23	11:07	LoadSalesInvoice	0	4.1	248	3,487,388		842,600
Total					16.8	1,007	14,454,664		861,500

Analytical Table by Event Subclass

TableName	CompressSegment	ExecuteSql	Process	ReadData	VertiPaq	Total
RetailSalesTransactions	0.7	8.4	7.4	6.8	3.0	26.4
SalesOrders	0.3	5.2	3.3	3.2	0.7	12.6
InventoryState	0.2	5.6	2.9	2.9	1.0	12.6
SalesInvoice	0.3	5.6	2.6	2.6	0.1	11.2
PayablesState	0.2	5.4	2.3	2.1	0.9	10.9
Total	1.6	30.3	18.5	17.4	5.8	73.7

BI4DYNAMICS

Project documentation

12
Cubes48
Measure
groups177
Dimensions3104
Measures

Instance name	BI4Dynamics DFO Cloud and AX on-Premise
BI4Dynamics version	9.1.0
Physical cubes (12)	Common Measures, FA Analysis, GL Analysis, Inventory Analysis, Payables Analysis, Product Information Analysis, Production Analysis, Project Analysis, Purchase Analysis, Receivables Analysis, Retail Analysis, Sales Analysis,
Data warehouse	
Server	bi4-dfo-export-
Database	BI4Dynamics DFO Cloud and AX on-Premise
SQL edition	standard
SQL version	15
Analysis database	
Server	powerbi/api.powerbi.com/v1.0/myorg/BI4Dynamics%20Integrations
Database	BI4Dynamics DFO Cloud and AX on-Premise
SQL edition	enterprise
SQL version	X

SETUP

Datasources

ID	Server name	Database name	Version
1	mn-synapse-ondemand.sql.azure.synapse.net	https://dfo.dfs.core.windows.net/dynamics365-financeandoperations/bi4-dynamics-uat.operations.dynamics.com	7.0
2	bi4-dfo-export-	AX2012R3	6.3

Companies

Comp ID	Data source ID	Company code	Company	Country	Local curr	Add. curr
1	1	001	Contoso Azure	USA	USD	USD
2	2	uspi	Contoso Process Industry	USA	USD	USD
3	2	usrt	Contoso Retail USA	USA	USD	USD
4	2	ussi	Contoso Consulting USA	USA	USD	AED

Setup table

Parameter	Value
Fiscal date type	0
Language	1033
Language code	EN-US
Process type	0
Payables period	6
Payables compression	2
Receivables period	6
Receivables compression	2
Inventory period	6
Inventory compression	2

Sales Analysis

Overview of measures and dimensions

Object name	Count
Measure groups	9
- DW based measure groups	9
Measures	610
- DW base Measures	46
- DW custom Measures	64
- DAX extended DW based measures	406
- Calculated measures	94
Dimensions	49
From Field	8
From Enum	
From Table	
Custom	41

Measure group and dimension table

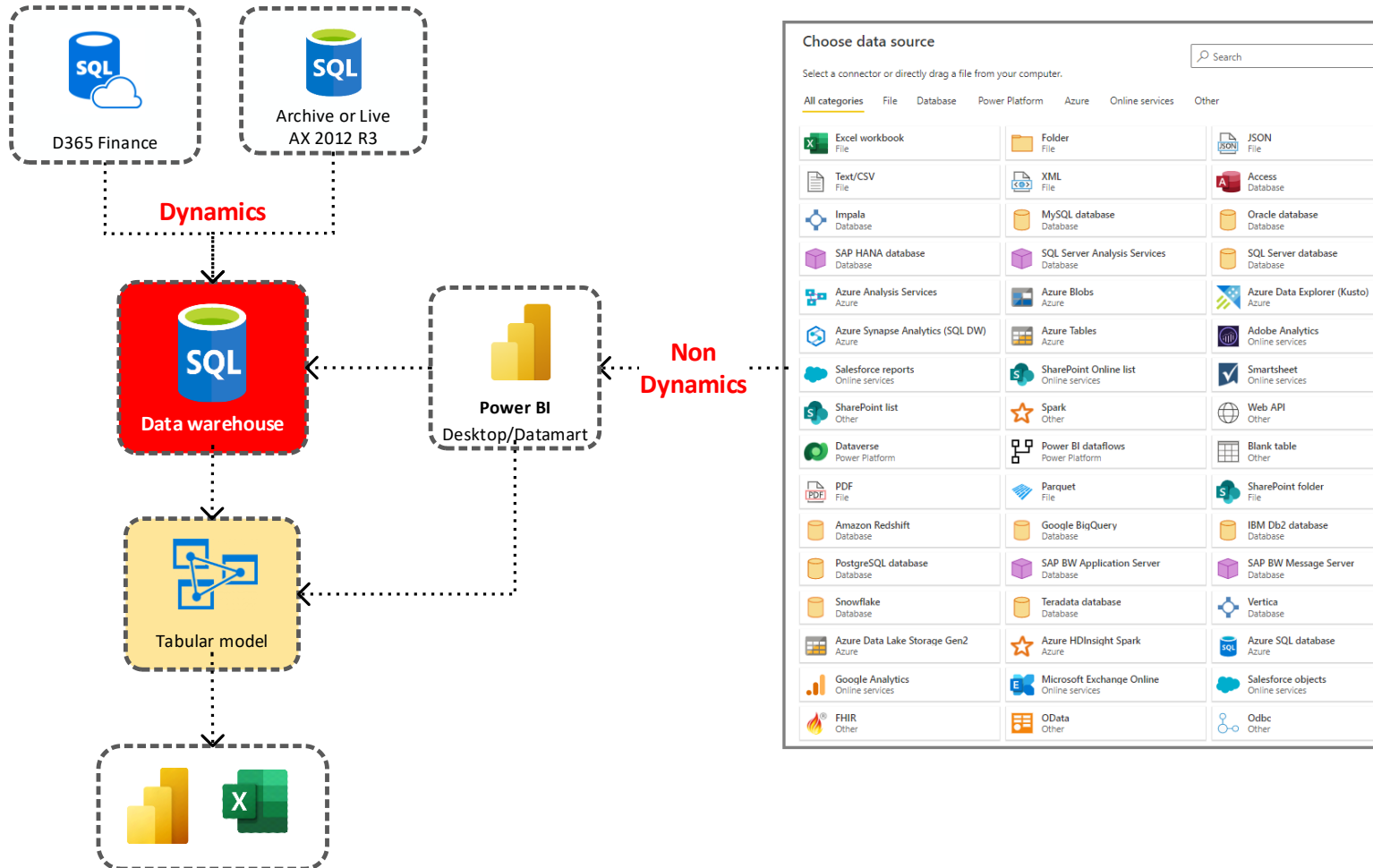
Dimensions	Sales Invoice (#Sales Invoice)	Sales Invoice - Charges Line (#Sales Invoice - Charges Line)	Sales Invoice - Misc Charges (#Sales Invoice - Misc Charges)	Sales Invoice - Charges Header (#Sales Invoice - Charges Header)	Sales Delivery (#Sales Delivery)	Sales Orders (#Sales Orders)	Sales Quote (#Sales Quotes)	Sales Opportunity (#Sales Opportunities)	Sales Forecast (#Sales Forecasts)
Account Manager					X	X	X		
Bill Of Lading					X				
Bill To Customer	X	X	X	X	X	X	X		
Charges	X	X		X					
Closed Date								X	
Commission Sales Group	X	X	X						
Contact Person						X	X		
Country						X	X		
Currency	X	X	X	X	X	X	X		X
Date	X	X	X	X	X	X		X	X
Delivery Mode					X	X	X		
Delivery Reason Code							X		
Delivery Term					X	X	X		
Document Sales Invoice	X	X	X	X					
Document Sales Opportunity							X	X	
Document Sales Order					X	X	X		
Document Sales Order Line					X	X			
Document Sales Quotation							X		
Employee	X	X	X	X		X	X		
Expiry Date							X		
Follow Up Date							X		
Forecast End Date									X
Forecast Model									X
General Type	X	X	X	X					
Inventory Batch	X	X	X	X					
Inventory Dimensions	X	X	X	X					
Inventory Serial	X	X	X	X					
Inventory Size	X	X	X	X					
Item	X	X	X	X	X	X	X		X
Location	X	X	X	X	X	X	X		X
Opened Date								X	
Packing Slip					X				
Payment Term					X				
Procurement Category	X	X	X	X	X	X	X		
Project						X	X		X
Project Category							X		

Quotation Reject Reason							X		
Quotation Status							X		
Quotation Type							X		
Reason Code	X	X	X	X					
Requested Receipt Date							X		
Requested Shipping Date							X		
Return Reason Code	X	X	X	X			X		
Sales Pool						X	X		
Sales Status							X		
Sales Type							X		
Sell To Customer	X	X	X	X	X	X	X	X	X
Tax Group	X								
Unit Of Measure	X	X	X	X			X		

#2: Add Non-Dynamics sources to Data Warehouse

**Power Query-based BI4Dynamics ETL
Power BI Datamart (preview)**

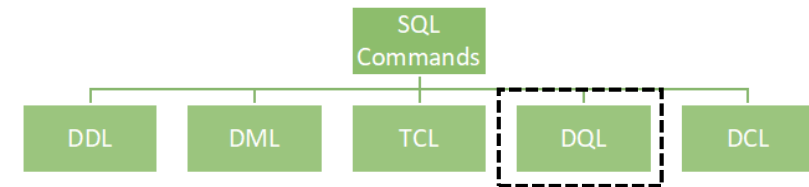
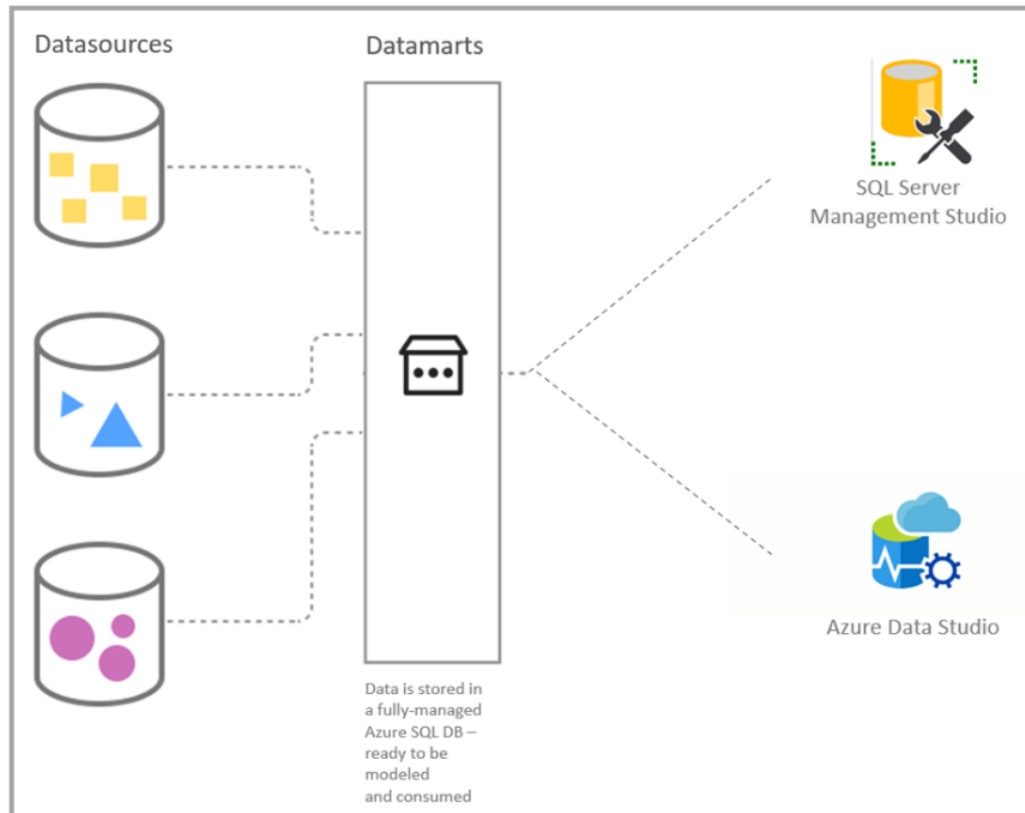
Add Non-Dynamics Sources



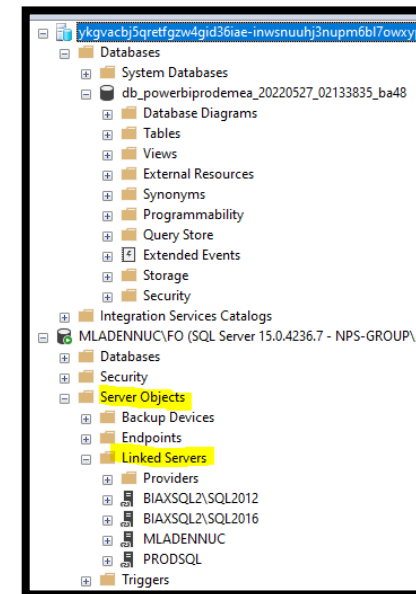
Power BI Datamart (preview)

Analyze outside the editor

Datamarts provide a SQL DQL (query) experience through your own development environment – such as SSMS or Azure Data Studio. You must run the latest version of the tools and authenticate using Azure Active Directory or MFA. The login process is the same as the sign-in process for Power BI.



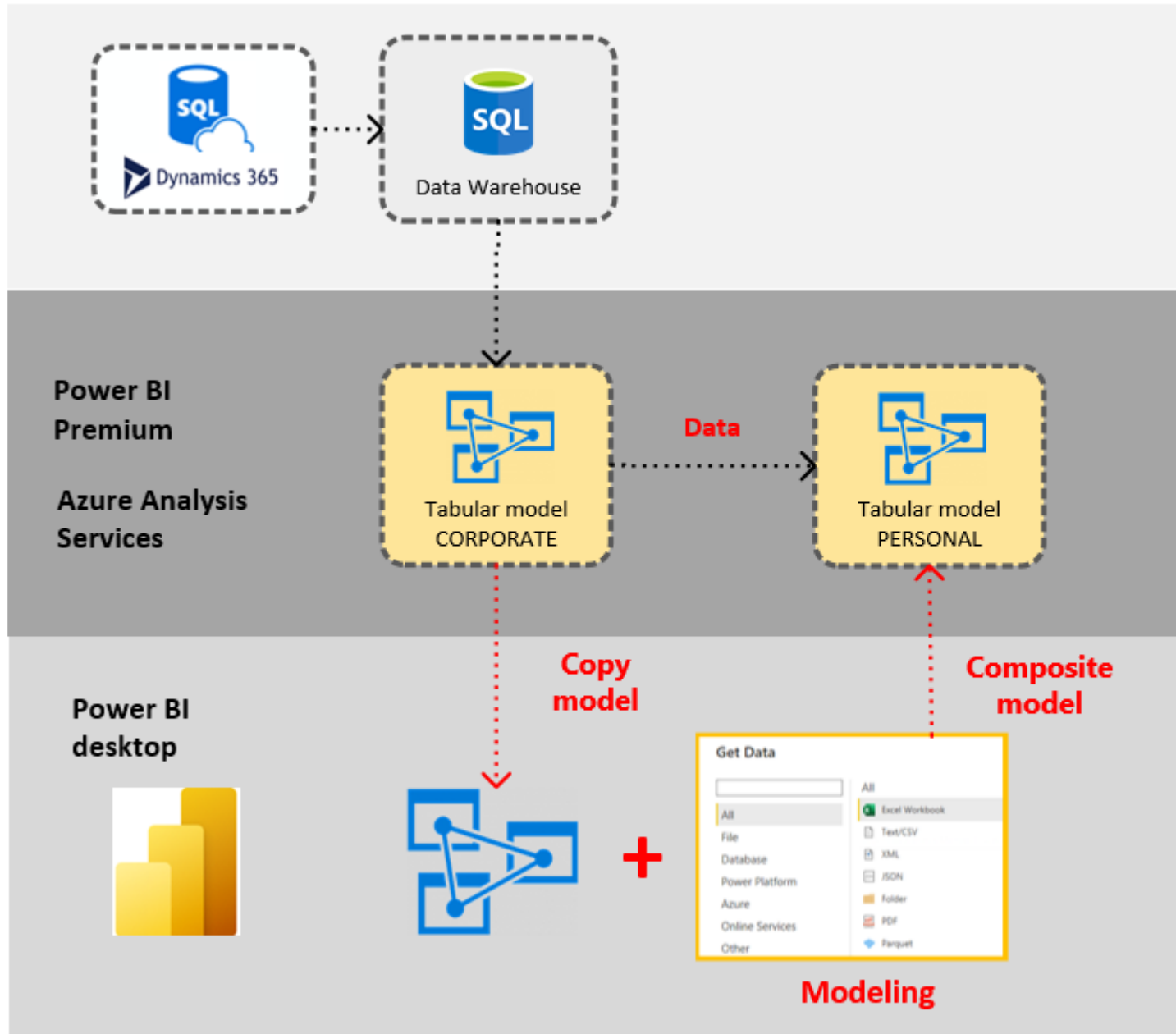
You can only write DQL (not DDL or DML)



Support for Linked Server connection

#3: Add Non-Dynamics sources to Tabular Model

Build a composite model using Power BI Premium (Per User) or Azure Analysis Service (Standard)



Reporting

