



PowerBI, DirectQuery and SQL Server. Is it a good choice?

A close-up portrait of a man with short, light-colored hair, wearing a blue collared shirt. He is looking slightly to his left with a neutral expression. In the background, there is a painting of a cathedral or church with multiple towers.

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- Services Delivery Excellence Team for PaaS databases.
 - 14 Years @ Microsoft
 - Supported SQL Server Core, Analysis Services and SQL Server On Azure VMs or other RDBMS.
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-
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Environment Analysis

- HyperScale, Gen5 and 4 vCores
- Volumen Data and Main Characteristics
- Model

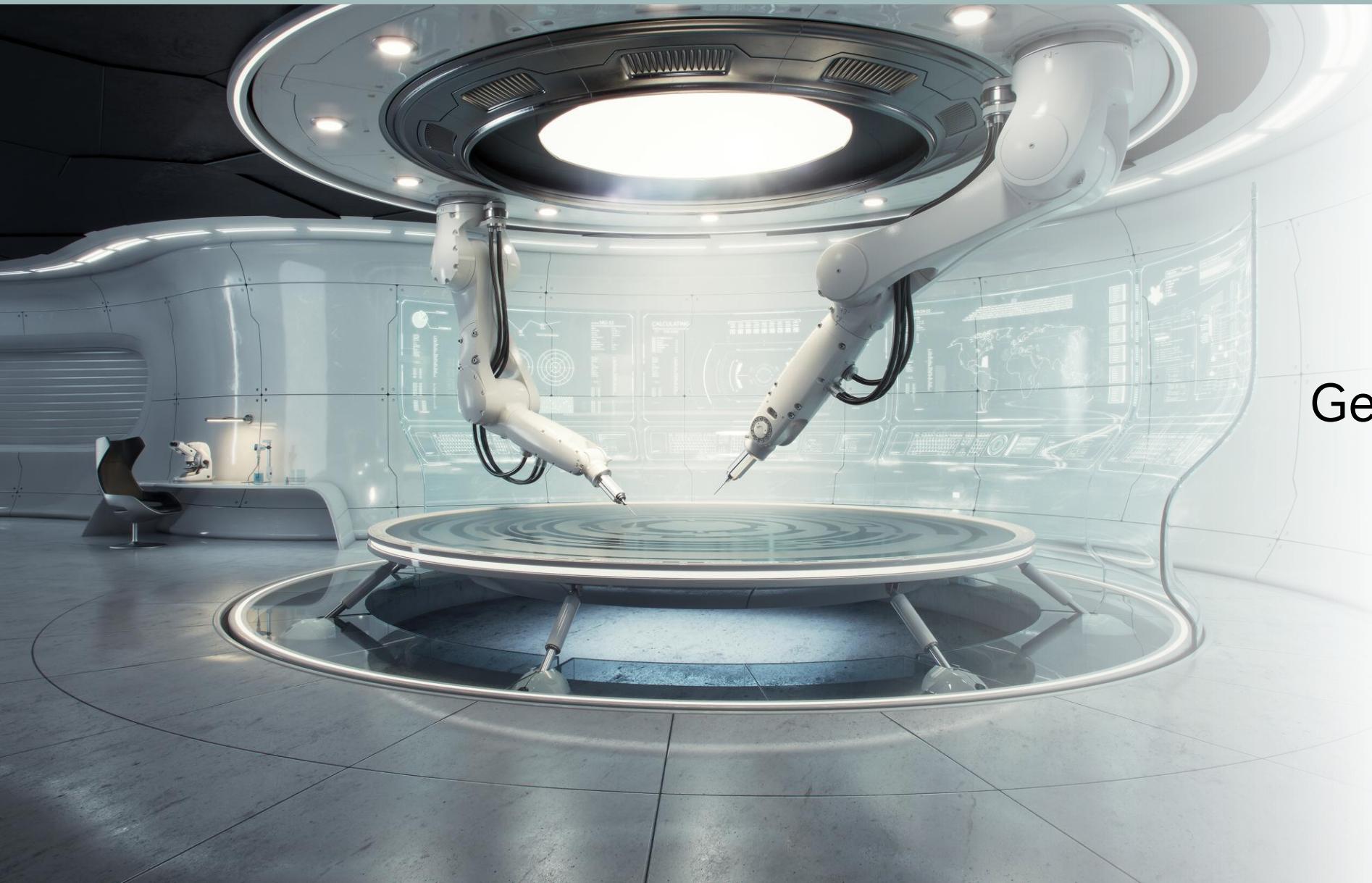
The query

- Knowing the query
- Working on the query

Business Scenarios:

- Reporting by Fiscal Month
- Reporting by Total Including Tax, Total Excluding Tax per Fiscal Month Label and City
- Reporting by Total Including Tax, Total Excluding Tax per Fiscal Month Label, Stock and filtering per month
- Reporting by Total Sales (Count) per Fiscal Month and Employee
- Reporting by Total Sales

Environment details



HyperScale
Gen5 with 4 vCores

Volume Data Overview



PowerBIHyperScaleDemo

Results Messages

	TableName	SchemaName	RowCounts	TotalSpaceKB	UsedSpaceKB	UnusedSpaceKB
1	City	Dimension	116295	95664	94248	1416
2	Customer	Dimension	403	928	304	624
3	Date	Dimension	1461	1568	896	672
4	Employee	Dimension	213	1152	320	832
5	Payment Method	Dimension	6	288	64	224
6	Sale	Fact	234767360	701836128	701825040	11088
7	SaleColumnStoreIndex	Fact	234767360	233056000	233035072	20928
8	SaleColumnStoreIndexWithOutPartition	Fact	234972160	807672	792456	15216
9	SaleDemo	Fact	2000000	244240	239944	4296
10	Stock Item	Dimension	672	1416	672	744
11	Supplier	Dimension	28	288	64	224
12	Transaction Type	Dimension	15	288	64	224

PowerBIHyperScaleDemo_V1

Results Messages

	TableName	SchemaName	RowCounts	TotalSpaceKB	UsedSpaceKB	UnusedSpaceKB
1	City	Dimension	116295	94800	94392	408
2	Customer	Dimension	403	960	336	624
3	Date	Dimension	1461	1216	608	608
4	Employee	Dimension	213	648	192	456
5	Payment Method	Dimension	6	288	64	224
6	Sale	Fact	234767360	408821824	408821696	128
7	SaleColumnStoreIndex	Fact	234767360	28260000	28259536	464
8	SaleColumnStoreIndexWithPartition	Fact	234767360	982920	967744	15176
9	SaleWithOutColumnStoreIndex	Fact	73551872	193094088	193051584	42504
10	Stock Item	Dimension	672	1440	696	744
11	Supplier	Dimension	28	288	64	224
12	Transaction Type	Dimension	15	288	64	224

Dimension.Stock Item

Columns	
Stock Item Key (PK, int, not null)	
WWI Stock Item ID (int, not null)	
Stock Item (nvarchar(100), not null)	
Color (nvarchar(20), not null)	
Selling Package (nvarchar(50), not null)	
Buying Package (nvarchar(50), not null)	
Brand (nvarchar(50), not null)	
Size (nvarchar(20), not null)	
Lead Time Days (int, not null)	
Quantity Per Outer (int, not null)	
Is Chiller Stock (bit, not null)	
Barcode (nvarchar(50), null)	
Tax Rate (decimal(18,3), not null)	
Unit Price (decimal(18,2), not null)	
Recommended Retail Price (decimal(18,2), null)	
Typical Weight Per Unit (decimal(18,3), not null)	
Photo (varbinary(max), null)	
Valid From (datetime2(7), not null)	
Valid To (datetime2(7), not null)	
Lineage Key (int, not null)	

Dimension.Date

Columns	
Date (PK, date, not null)	
Day Number (int, not null)	
Day (nvarchar(10), not null)	
Month (nvarchar(10), not null)	
Short Month (nvarchar(3), not null)	
Calendar Month Number (int, not null)	
Calendar Month Label (nvarchar(20), not null)	
Calendar Year (int, not null)	
Calendar Year Label (nvarchar(10), not null)	
Fiscal Month Number (int, not null)	
Fiscal Month Label (nvarchar(20), not null)	
Fiscal Year (int, not null)	
Fiscal Year Label (nvarchar(10), not null)	
ISO Week Number (int, not null)	

Dimension.Employee

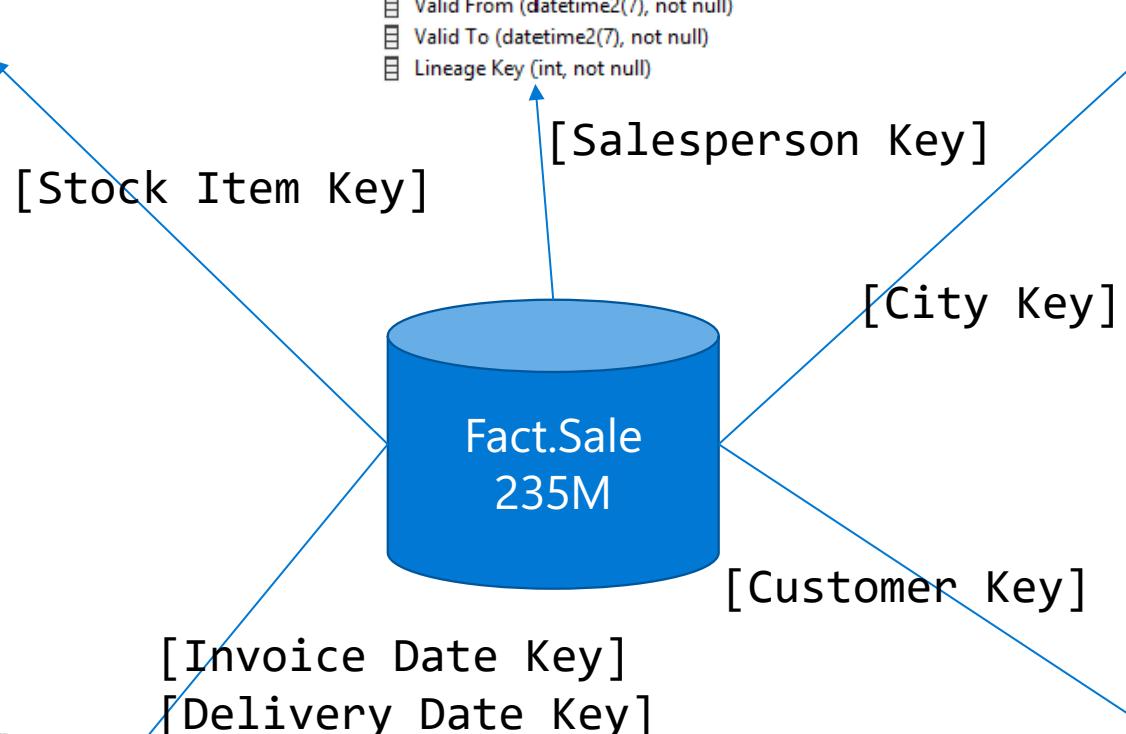
Columns	
Employee Key (PK, int, not null)	
WWI Employee ID (int, not null)	
Employee (nvarchar(50), not null)	
Preferred Name (nvarchar(50), not null)	
Is Salesperson (bit, not null)	
Photo (varbinary(max), null)	
Valid From (datetime2(7), not null)	
Valid To (datetime2(7), not null)	
Lineage Key (int, not null)	

Dimension.City

Columns	
City Key (PK, int, not null)	
WWI City ID (int, not null)	
City (nvarchar(50), not null)	
State Province (nvarchar(50), not null)	
Country (nvarchar(60), not null)	
Continent (nvarchar(30), not null)	
Sales Territory (nvarchar(50), not null)	
Region (nvarchar(30), not null)	
Subregion (nvarchar(30), not null)	
Location (geography, null)	
Latest Recorded Population (bigint, not null)	
Valid From (datetime2(7), not null)	
Valid To (datetime2(7), not null)	
Lineage Key (int, not null)	

Dimension.Customer

Columns	
Customer Key (PK, int, not null)	
WWI Customer ID (int, not null)	
Customer (nvarchar(100), not null)	
Bill To Customer (nvarchar(100), not null)	
Category (nvarchar(50), not null)	
Buying Group (nvarchar(50), not null)	
Primary Contact (nvarchar(50), not null)	
Postal Code (nvarchar(10), not null)	
Valid From (datetime2(7), not null)	
Valid To (datetime2(7), not null)	
Lineage Key (int, not null)	



The Query

- Capture the query generated by Power BI
- Use **Query Data Store** to analyze duration, reads, CPU
- View **execution plan** and identify bottlenecks (scans, hash joins)

Reporting by Fiscal Month



- **Tables:**
 - Dimension.Date (Fiscal Month Label) and Fact.Sale (Total Including Tax, Total Excluding Tax)
- **Page:**
 - Page#1_TotalPerFiscalMonthLabel.sql
- **Initial Performance Problem:**
 - Took 4 minutes
- **Solution:**
 - 0 s - Page#1_TotalPerFiscalMonthLabel_Solution using Indexed View that coverages the query.

Reporting by Total Including Tax, Total Excluding Tax per Fiscal Month Label and City



- **Tables:**
 - Dimension.Date (Fiscal Month Label)
 - Dimension.City (City)
 - Fact.Sale (Total Including Tax, Total Excluding Tax)
- **Page:**
 - #2 Fiscal Month By City
- **Initial Performance Problem:**
 - Took 4 minutes
- **Solution:**
 - **15 s** - Page#2_Fiscal Month By City_Solution using Indexed View that coverages the query.

Reporting by Total Including Tax, Total Excluding Tax per Fiscal Month Label, Stock and filtering per month



- **Tables:**
 - Dimension.Date (Fiscal Month Label)
 - Dimension.Stock (Item)
 - Fact.Sale (Quantity)
 - Filtered by 3 different dates
- **Page:**
 - #3 Stock Total Fiscal Month
- **Initial Performance Problem:**
 - Took 4 minutes
- **Solution:**
 - **3 s - #3 Stock Total Fiscal Month_Solution** using using partitioning also ColumnStore Index.

Reporting by Total Sales (Count) per Fiscal Month and Employee



- **Tables:**
 - Dimension.Date (Fiscal Month Label)
 - Dimension.Employee (SalesPersonKey)
 - Fact.Sale (SalesPersonLey)
 - Filtered by salespersonKey=1
- **Page:**
 - #4 Stock by SalesPerson
- **Initial Performance Problem:**
 - Took 4 minutes
- **Solution:**
 - **20** s - #4 Stock by SalesPerson_Solution using using partitioning also ColumnStore Index.

Reporting by Total Sales



- **Tables:**
 - Multiple
- **Page:**
 - #5 ColumnStoreIndex Fiscal Month All
- **Initial Performance Problem:**
 - Multiple times.
- **Solution:**
 - **Reduce 10x s - #5 ColumnStoreIndex Fiscal Month All _Solution** using using ColumnStore Index.



Session Goals: Troubleshooting

Real Troubleshooting Workflow Step-by-step:

- Capture the query generated by Power BI
- Use **Query Data Store** to analyze duration, reads, CPU
- View **execution plan** and identify bottlenecks (scans, hash joins)
- Apply optimization techniques:
- Create **indexed views** for repeated aggregations
- Add **supporting indexes** on join/filter keys
- Use **Clustered Columnstore Index** on large fact tables
- **Partition tables** using time-based keys (e.g., [Delivery Date Key])
- Re-analyze execution plans and performance metrics



Session Goals: Best Practices

- Use **Indexed Views** - Pre-aggregates data for better performance
- Use **SCHEMABINDING** - Required for indexed views
- **Avoid runtime aggregation** - Reduces CPU and IO at query time
- **Create indexes on join keys** - Helps the optimizer build better execution plans
- Use **Columnstore Index** - Excellent for large analytical workloads
- Partition Fact Tables - Improves manageability and query pruning



Conclusions

- Power BI DirectQuery can perform **well** on large datasets
- Schema and indexing design in SQL is **critical**
- Hyperscale (Gen5, 4 vCores) enables scale-out and storage separation
- Indexed views, columnstore, and partitioning drastically **improve performance**
- Use Query Store for data-driven tuning decisions



- **Questions you may have**



Thank you.

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A close-up photograph of a young man with dark hair and a slight smile. He is resting his chin on his right hand, with his fingers partially hidden under his chin. His gaze is directed upwards and to the right. In the background, a woman with blonde hair is visible, looking towards the same direction. The lighting is soft, suggesting an indoor environment.

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Queries in future? *Ping them!*

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