```
print("SQL Server Analysis Services (SSAS)")
```

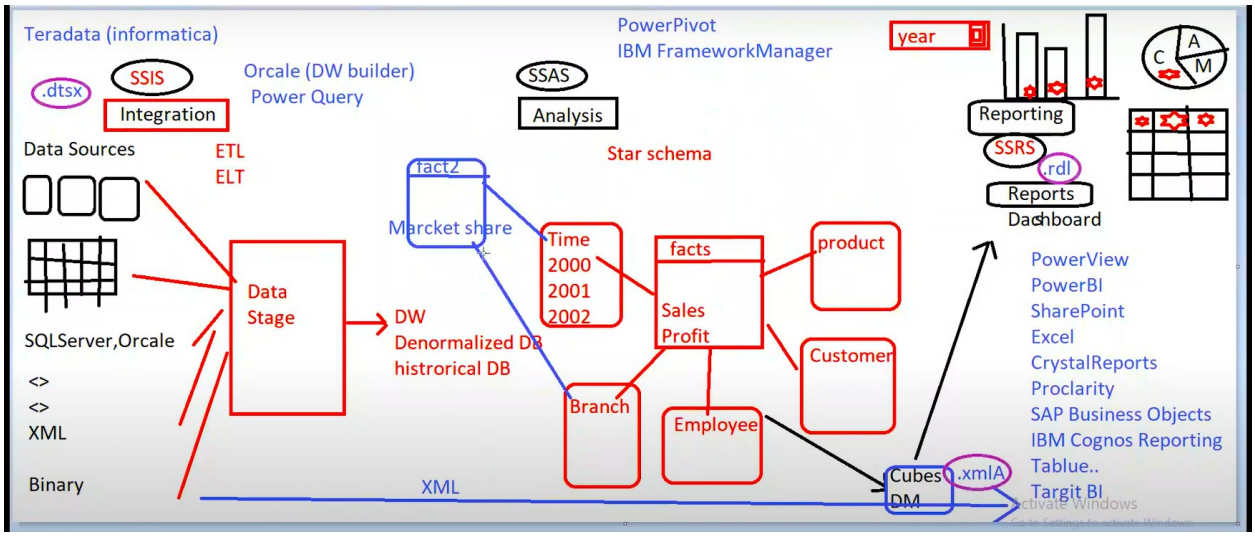
```
SQL Server Analysis Services (SSAS)
```

```
print("ETL Pipeline To Build Data Warehouse OLAP Than Make Analysis")
print("Data Warehousing: OLTP--->>ETL--->>OLAP")
print("SQL Server Analysis Services (SSAS)")
print("Microsoft Analysis Services")
print("OLAP (Online Analytical Databases)")
print("Data mining")
print("OLAP Cubes For Analytics")
print("Microsoft Analysis Services")
print("SQL Server Analysis Services (SSAS) is a Multidimensional
Online Analytical Processing (OLAP) Server and an Analytics Engine
used for Data Mining.")
print("Multidimensional is 3D X--Y--Z")
```

```
ETL Pipeline To Build Data Warehouse OLAP Than Make Analysis
Data Warehousing: OLTP--->>ETL--->>OLAP
SQL Server Analysis Services (SSAS)
Microsoft Analysis Services
OLAP (Online Analytical Databases)
Data mining
OLAP Cubes For Analytics
Microsoft Analysis Services
SQL Server Analysis Services (SSAS) is a Multidimensional Online
Analytical Processing (OLAP) Server and an Analytics Engine used for
Data Mining.
Multidimensional is 3D X--Y--Z
```

```
print("2 SQL Server Analysis Service-SSAS.")
```

```
2 SQL Server Analysis Service-SSAS.
```



```
print(".dtsx Format File")
print("A .dtsx file is a package file used by Microsoft SQL Server
Integration Services (SSIS)")
print(".cube Format File")
print("A .cube file of SQL Server Analysis Services (SSAS), a .cube
file")
print(".rdl Format File")
print("A .rdl file of SQL Server Reporting Services (SSRS), a .rdl
file")
print("background XML files")
print("1>>SQL Server Reporting Services")
print("2>>Microsoft Power BI")
print("3>>Tableau: Business Intelligence and Analytics Software")
print("Data and Information Visualization")
print("Dashboard Design Figma")
print("Data Analytics Charts")
print("Oracle Warehouse Builder")
print("Data-Warehouse | MySQL")
print("Smart Data Solutions - Teradata - Data-Driven Decisions")
```

```
.dtsx Format File
A .dtsx file is a package file used by Microsoft SQL Server
Integration Services (SSIS)
.cube Format File
A .cube file of SQL Server Analysis Services (SSAS), a .cube file
.rdl Format File
A .rdl file of SQL Server Reporting Services (SSRS), a .rdl file
background XML files
1>>SQL Server Reporting Services
2>>Microsoft Power BI
3>>Tableau: Business Intelligence and Analytics Software
Data and Information Visualization
Dashboard Design Figma
Data Analytics Charts
Oracle Warehouse Builder
Data-Warehouse | MySQL
Smart Data Solutions - Teradata - Data-Driven Decisions
```

```
print("Introduction To Data Warehouse")
```

```
Introduction To Data Warehouse
```

Data Warehouse

- A data warehouse is a De-Normalized DB

  "subject-oriented, integrated, time-varying, non-volatile collection of data in support of the management's *decision-making process."*

```
print("1>>Subject Oriented موجه نحو الموضوع")
print("2>>Integrated مدمج")
print("3>>Time Varying متغير الوقت")
print("4>>Non-volatile memory ذاكرة غير متطايرة")
```

```
1>>Subject Oriented موجه نحو الموضوع
2>>Integrated مدمج
3>>Time Varying متغير الوقت
4>>Non-volatile memory ذاكرة غير متطايرة
```

```
print("Make SQL Server Job To Run Code At Specific Time")
```

```
Make SQL Server Job To Run Code At Specific Time
```

Data Warehouse V's OLTP Summary

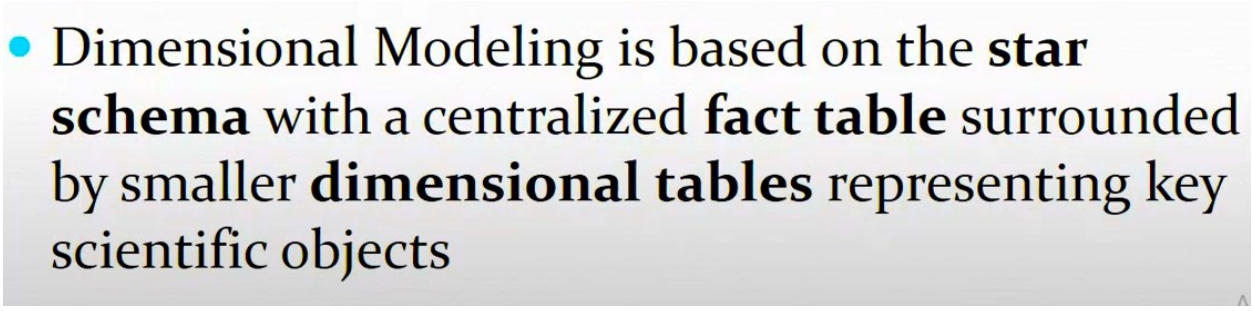
Data Warehouse	OLTP
Works with Enterprise Wide information	Works with small pieces of information
Updated on a schedule	Updated in real-time
De-Normalised	Normalised
Large to Very Large Database	Small to Large Database
Read Queries	Update, Insert Queries
Non-Volatile	Volatile Data
Applications that analyse the business	Applications that run the business

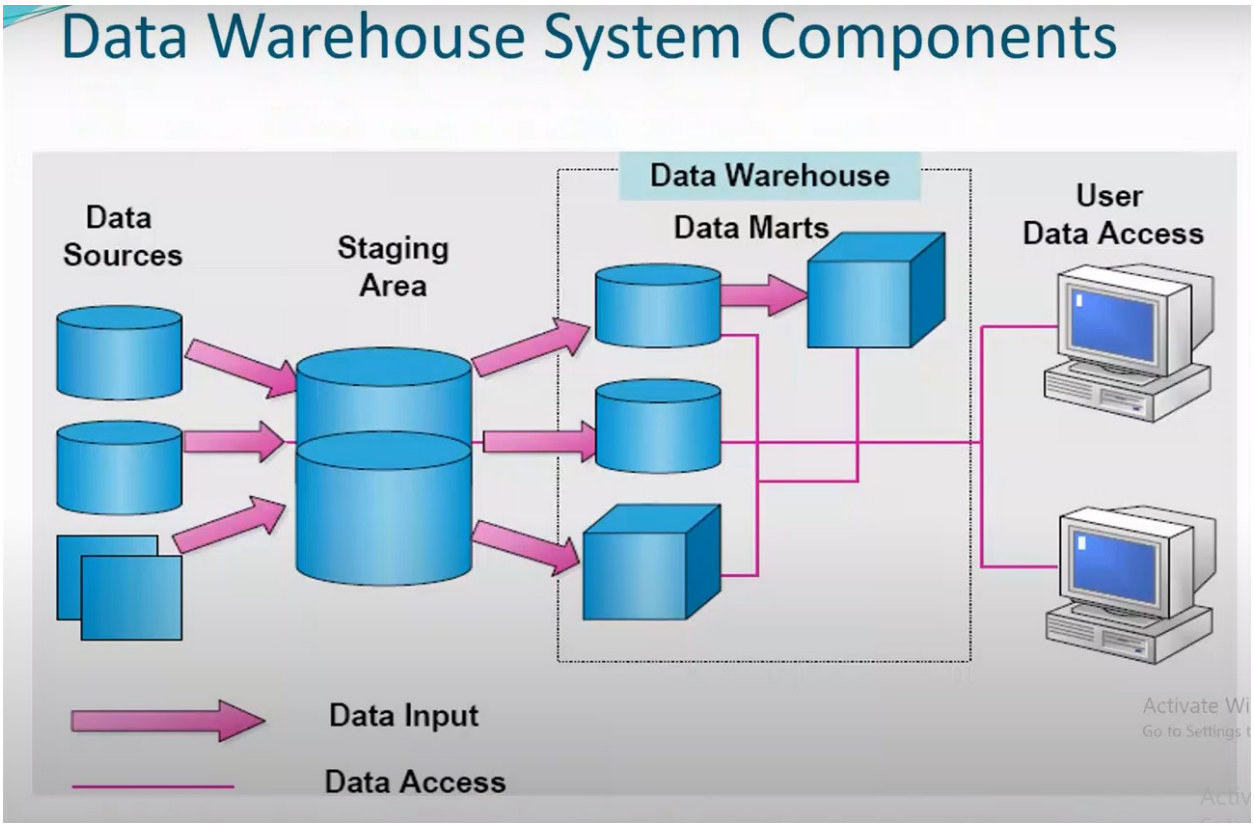
```
print(">>>Optimize---Business<<<تحسين الأعمال")
```

```
>>>Optimize---Business<<<تحسين الأعمال
```


```
print("Data Warehousing and BI Dimensional Model")
print("Data Warehouse Designers")
```

```
Data Warehousing and BI Dimensional Model
Data Warehouse Designers
```



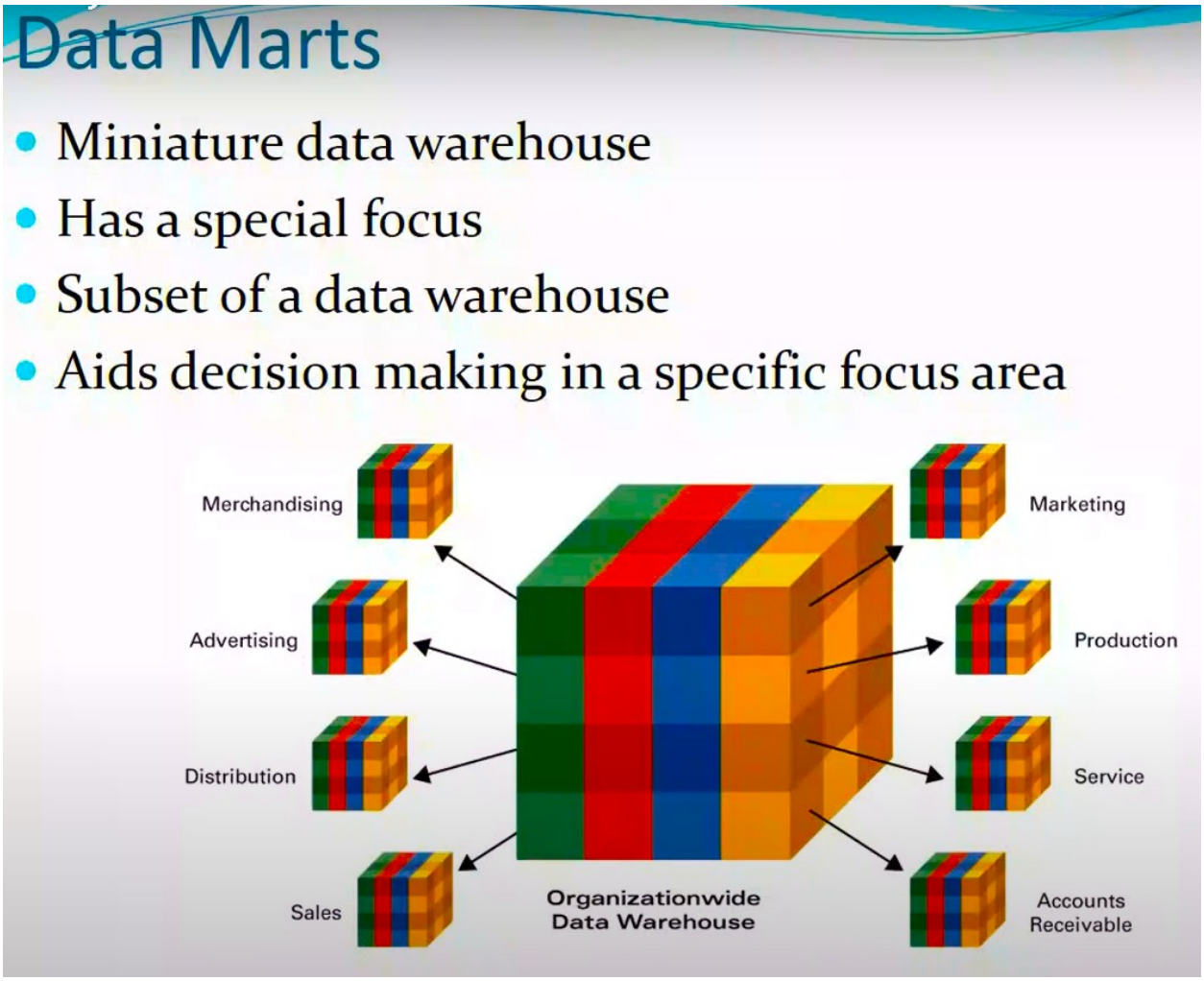



```
print("A Staging Area>>>Is Route point To a Destination. نقطة الطريق إلى الوجهة")
```

```
A Staging Area>>>Is Route point To a Destination.نقطة الطريق إلى الوجهة
```

```
print("Link Between ETL and Data Warehouse")
print(" ETL processes Extract, Cleanse, and Organize ")
```

```
Link Between ETL and Data Warehouse
 ETL processes Extract, Cleanse, and Organize
```



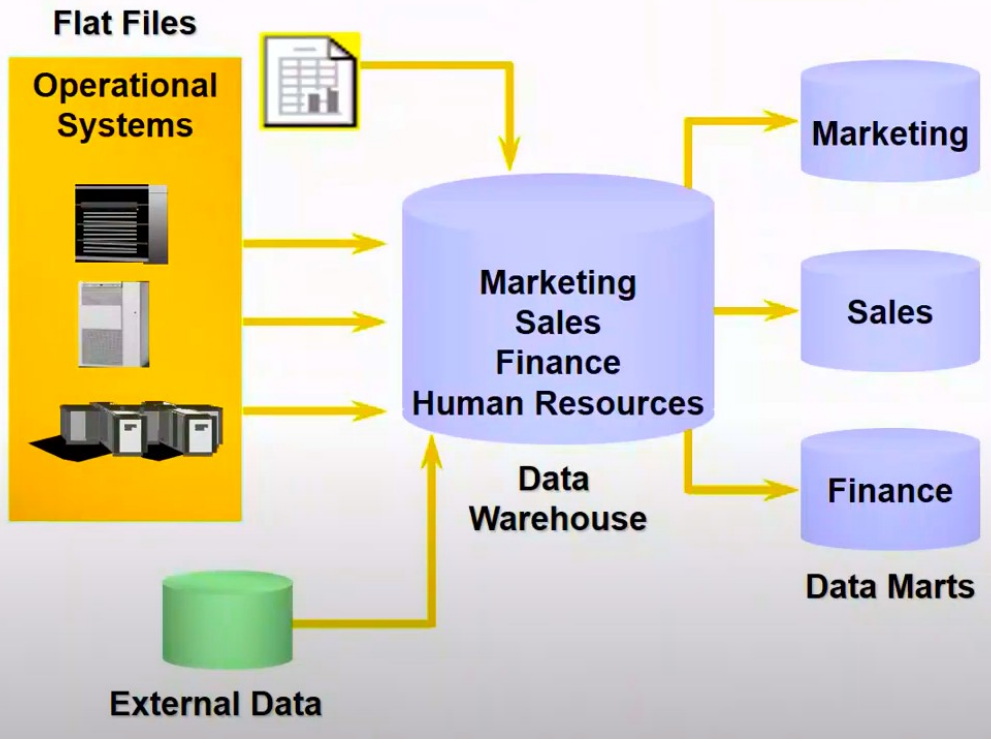

```
print("A data mart is a subset of a data warehouse focused on a particular line of business, department or subject area.")
```

```
A data mart is a subset of a data warehouse focused on a particular line of business, department or subject area.
```

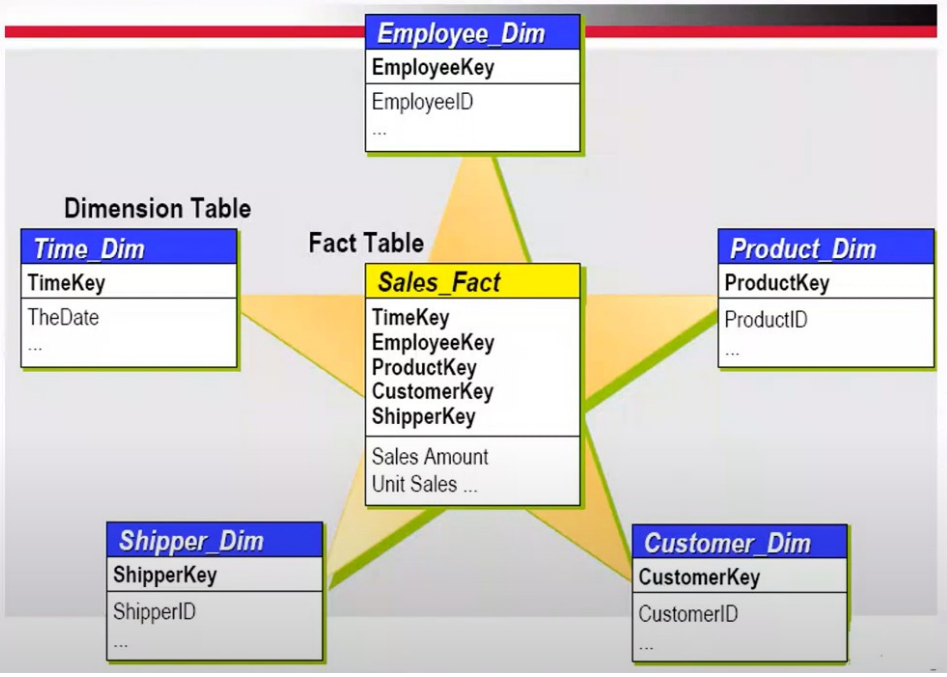
```
print("Data Mart is Departmental Data Warehouse")
```

```
Data Mart is Departmental Data Warehouse
```

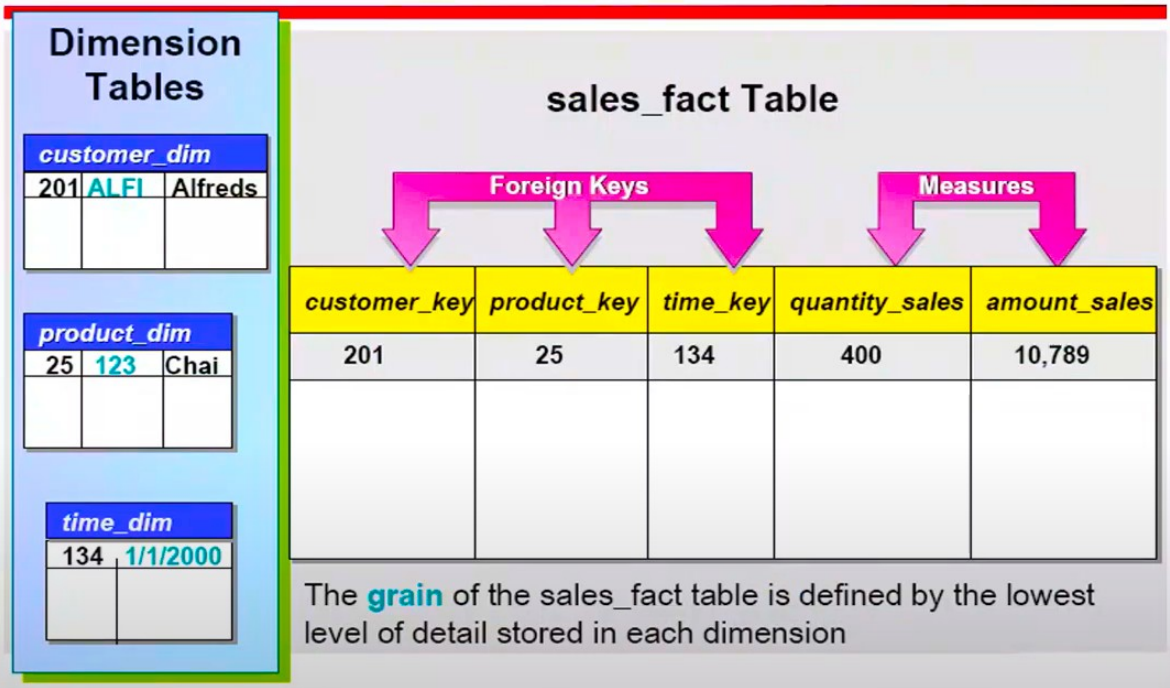
Dependent Data Mart

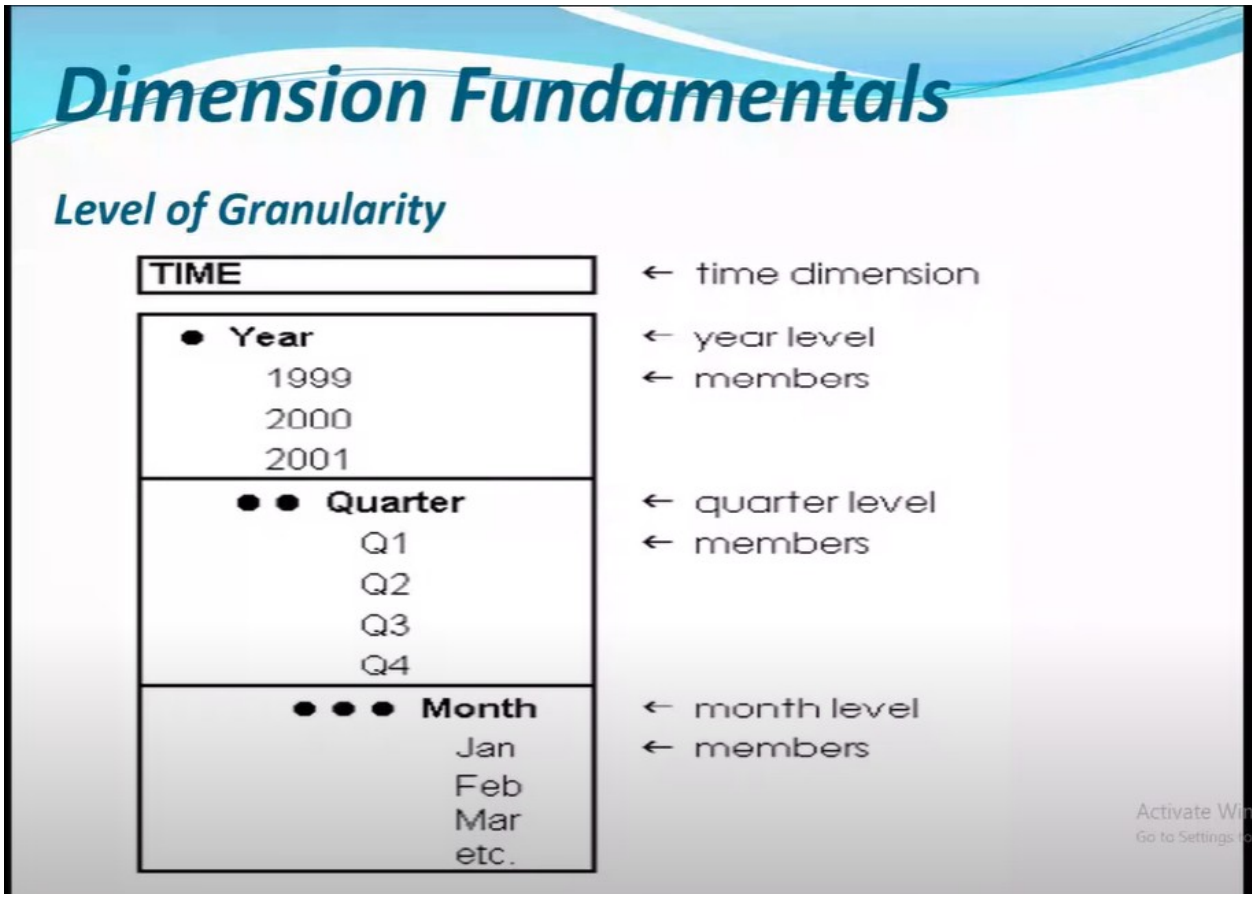


The Star Schema



Fact Table Components

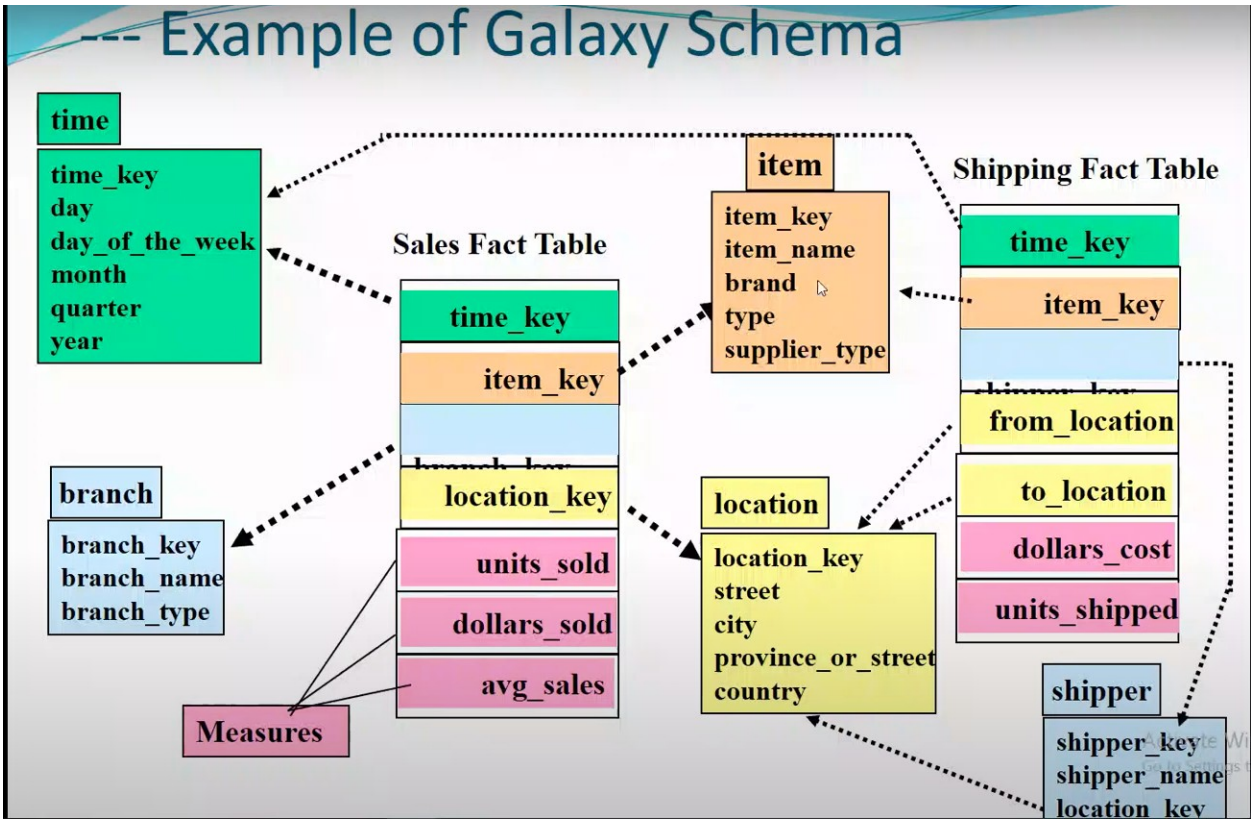





```
print("Level Of Details مستوى التفاصيل")
```

```
Level Of Details مستوى التفاصيل
```

--- Example of Galaxy Schema



-- Data Cubes ...

Fact relation

sale	Product	Client	Amt
	p1	c1	12
	p2	c1	11
	p1	c3	50
	p2	c2	8

Two-dimensional cube

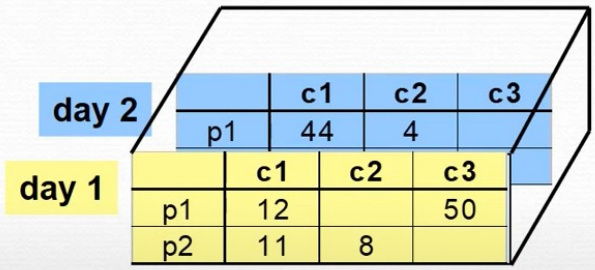
	c1	c2	c3
p1	12		50
p2	11	8	

Data Cubes …

Fact relation

sale	Product	Client	Date	Amt
	p1	c1	1	12
	p2	c1	1	11
	p1	c3	1	50
	p2	c2	1	8
	p1	c1	2	44
	p1	c2	2	4

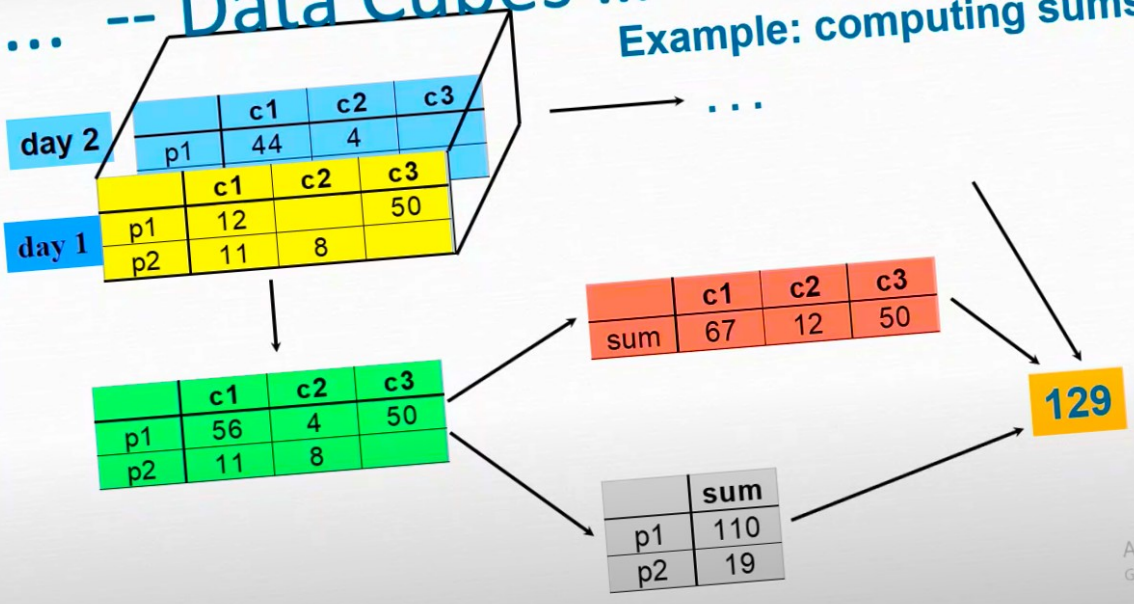
3-dimensional cube



… -- Data Cubes …

Example: computing sums

. . .

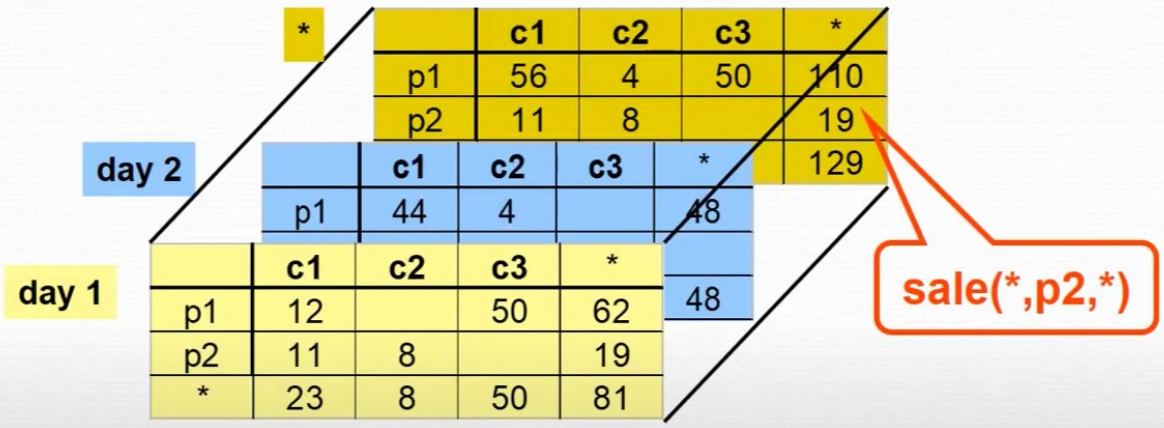


Data Cubes ...

- In multidimensional data model together with measure values usually we store summarizing information (aggregates)

	c1	c2	c3	Sum
p1	56	4	50	110
p2	11	8		19
Sum	67	12	50	**129**

The Cube Operator ...




```
print("Cube-slicers قطاعة المكعبات")
```

```
Cube-slicers قطاعة المكعبات
```

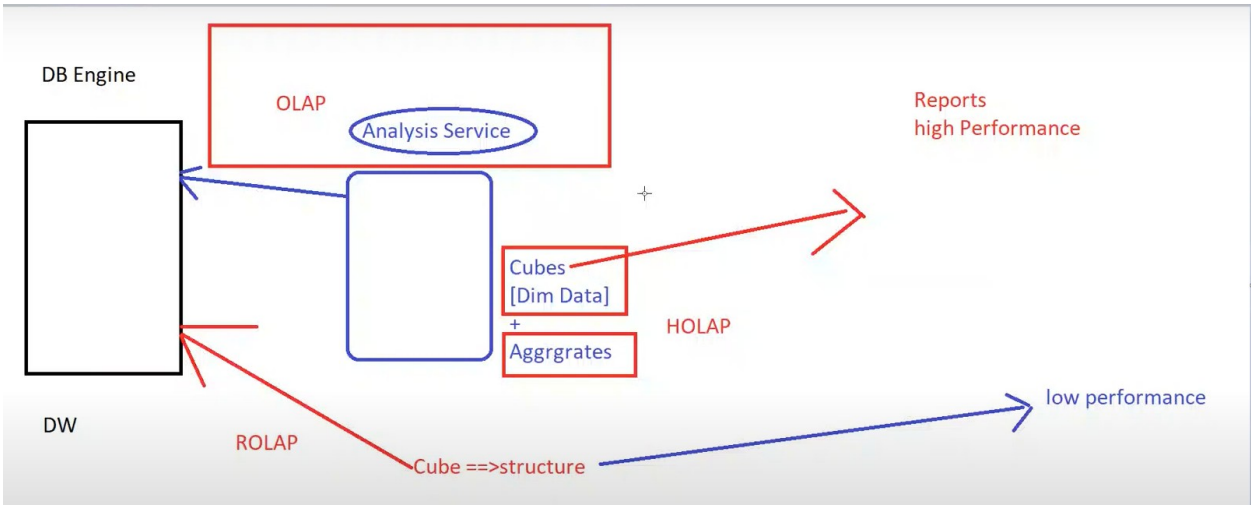
Data Analysis

How does SSAS Store this Data?

- MOLAP
  - records both data and summary values in Analysis Services proprietary file format (Most Efficient) At the end it is an object class
- ROLAP
  - records both data and aggregations in a relational database.
- HOLAP
  - stores data in a relational database while aggregations are stored in multidimensional format.

```
print("Data presentation>>>>>>>>>Excel and SSRS")
```

```
Data presentation>>>>>>>>>Excel and SSRS
```




```
print("Difference Between ROLAP, MOLAP and HOLAP")
```

```
Difference Between ROLAP, MOLAP and HOLAP
```

```
print("Difference between ROLAP, MOLAP and HOLAP")
```

```
Difference between ROLAP, MOLAP and HOLAP
```

```
print("Advantages of ROLAP")
print("Advantages of MOLAP")
print("Advantages of HOLAP ")
```

```
Advantages of ROLAP
Advantages of MOLAP
Advantages of HOLAP
```

```
print("ROLAP is used for handle the large amount of data.يتم استخدام
ROLAP للتعامل مع كمية كبيرة من البيانات.")
print("ROLAP tools don’t use pre-calculated data Cubes.لا تستخدم أدوات
ROLAP مكعبات بيانات محسوبة مسبقًا.")
print("Data can be stored Efficiently.يمكن تخزين البيانات بكفاءة.")
```

```
ROLAP is used for handle the large amount of data.يتم استخدام ROLAP
للتعامل مع كمية كبيرة من البيانات.
ROLAP tools don’t use pre-calculated data Cubes.لا تستخدم أدوات ROLAP
مكعبات بيانات محسوبة مسبقًا.
Data can be stored Efficiently.يمكن تخزين البيانات بكفاءة.
```

```
print("MOLAP is basically used for complex calculations.يتم استخدام
MOLAP بشكل أساسي لإجراء الحسابات المعقدة.")
print("MOLAP is optimal for operation such as slice and dice.يعد MOLAP
مثاليًا للعمليات مثل التقطيع والتقطيع.")
print("MOLAP allows fastest indexing to the pre-computed summarized
data.يتيح MOLAP الفهرسة الأسرع للبيانات الملخصة المحسوبة مسبقًا.")
```

```
MOLAP is basically used for complex calculations.يتم استخدام MOLAP بشكل
أساسي لإجراء الحسابات المعقدة.
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MOLAP allows fastest indexing to the pre-computed summarized data.يتيح
MOLAP الفهرسة الأسرع للبيانات الملخصة المحسوبة مسبقًا.
```

```
print("HOLAP provides the functionalities of both MOLAP and ROLAP.يوفر
HOLAP وظائف كل من MOLAP و ROLAP.")
print("HOLAP provides Fast Access at all Levels of Aggregation.يوفر
HOLAP وصولاً سريعًا إلى جميع مستويات التجميع.")
```

```
HOLAP provides the functionalities of both MOLAP and ROLAP.يوفر HOLAP
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HOLAP provides Fast Access at all Levels of Aggregation.يوفر HOLAP وصولاً
سريعًا إلى جميع مستويات التجميع.
```
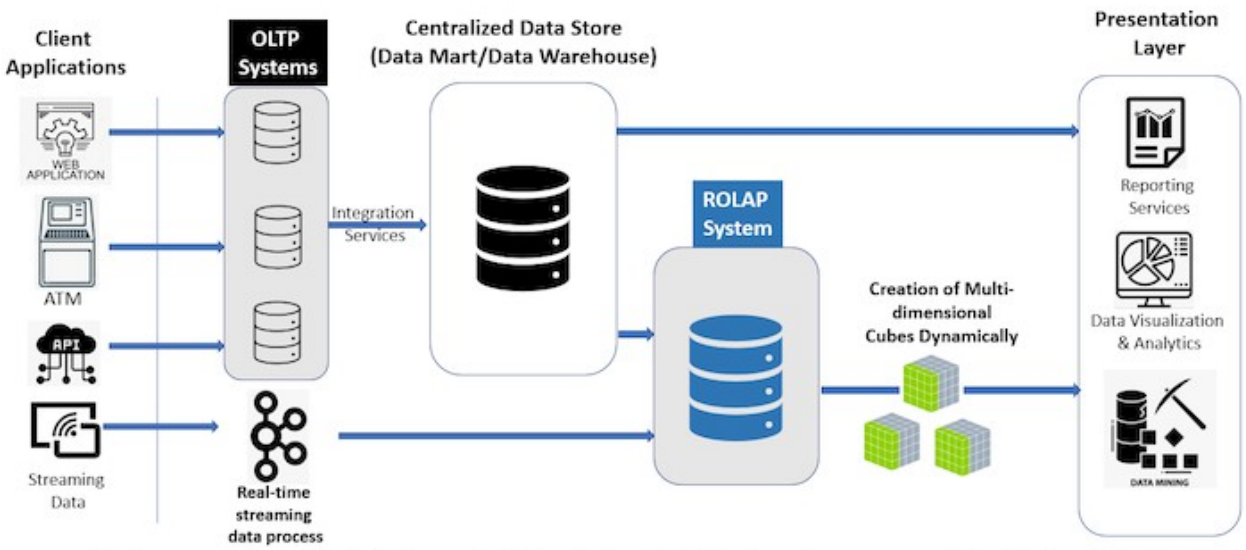
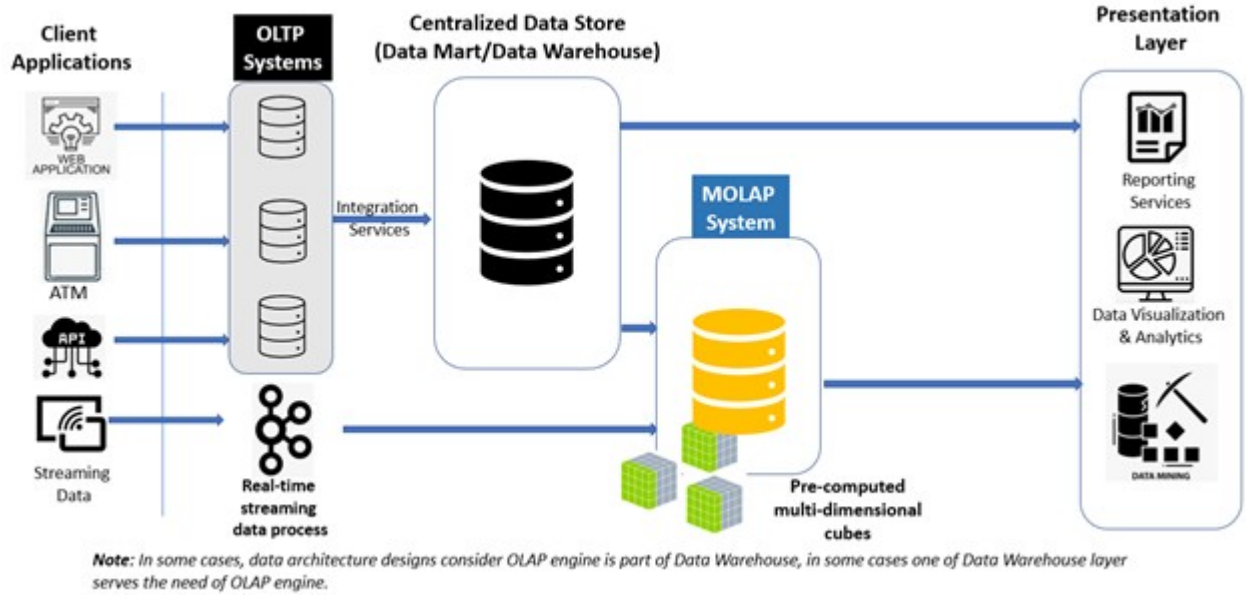



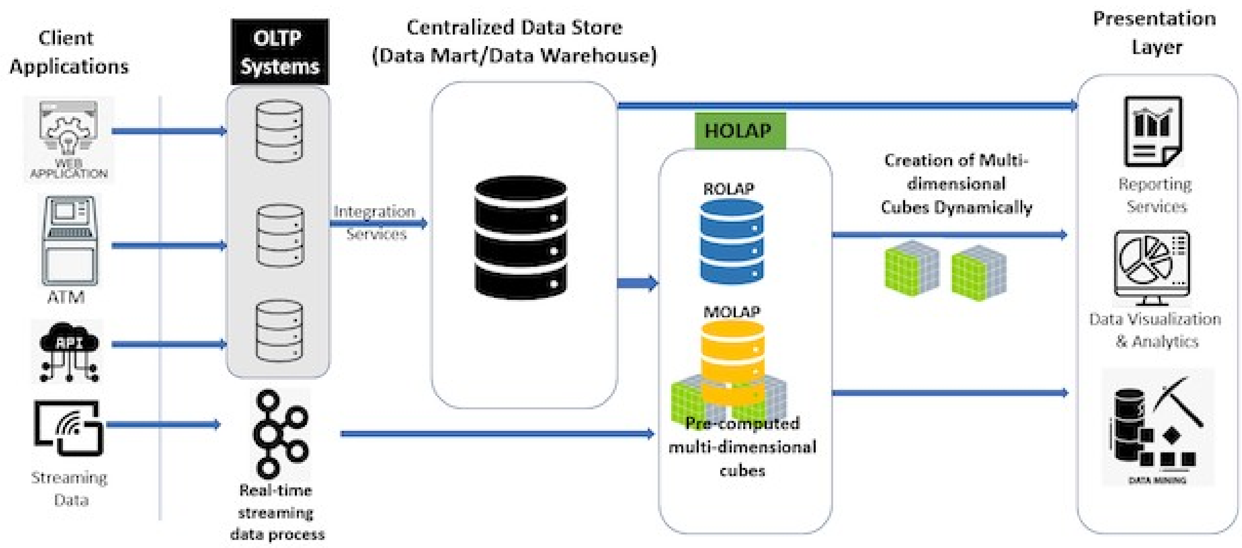

```
print("ROLAP System:Creation of Multi-Dimensional Cubes Dynamically نظام ROLAP: إنشاء مكعبات متعددة الأبعاد ديناميكيًا")
```

```
ROLAP System:Creation of Multi-Dimensional Cubes Dynamicallyنظام ROLAP: إنشاء مكعبات متعددة الأبعاد ديناميكيًا
```




```
print("MOLAP System:Pre-computed multi-dimensional cubesنظام MOLAP: مكعبات متعددة الأبعاد محسوبة مسبقًا")
```

```
MOLAP System:Pre-computed multi-dimensional cubesنظام MOLAP: مكعبات متعددة الأبعاد محسوبة مسبقًا
```



Note: In some cases, data architecture designs consider OLAP engine is part of Data Warehouse, in some cases one of Data Warehouse layer serves the need of OLAP engine.

```
print("$$$$$$"*20)
```

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
```

```
print("Aggregate Functions")
```

```
Aggregate Functions
```

```
print("Aggregate Functions are Often used with the GROUP BY")
```

```
Aggregate Functions are Often used with the GROUP BY
```

```
print("SELECT statement&The GROUP BY")
```

```
SELECT statement&The GROUP BY
```

```
print("The Most Commonly Used Aggregate Functions:-")
```

```
The Most Commonly Used Aggregate Functions:-
```

```
print("MIN(),MAX(),COUNT(),SUM() and AVG()")
```

```
MIN(),MAX(),COUNT(),SUM() and AVG()
```

```
print("Minimum,Maximum,Count,Summation(Total) & Average")
```

```
Minimum,Maximum,Count,Summation(Total) & Average
```

```
print("Mean,Median,Mode & Percentages")
```

```
Mean,Median,Mode & Percentages
```

```
print("Forecasting:-Forecasting involves making predictions Used in
Business and Investing")
```

Forecasting:-Forecasting involves making predictions Used in Business and Investing

```python
print("My Road vancouver Canada to seattle Usa")
```

```
My Road vancouver Canada to seattle Usa
```

```python
print("Business Intelligence Analyst Vancouver Canada")
```

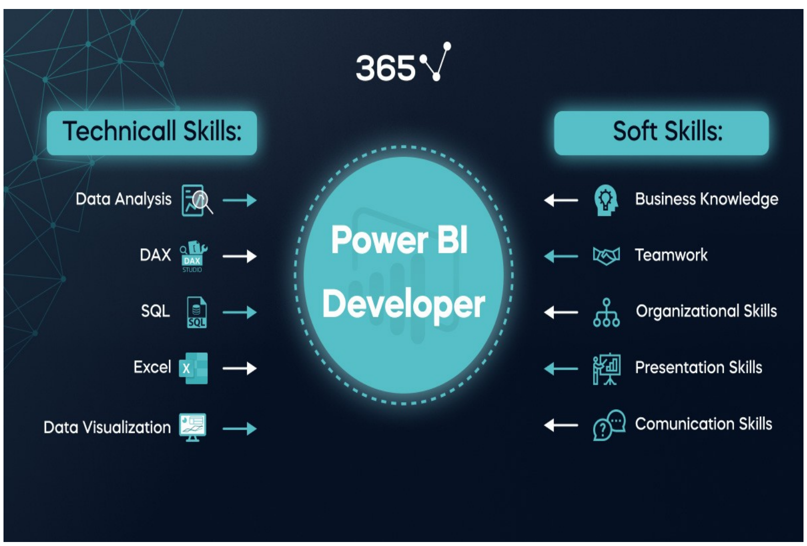
```
Business Intelligence Analyst Vancouver Canada
```

```python
print("Business Intelligence Analyst Seattle Usa")
```

```
Business Intelligence Analyst Seattle Usa
```

```python
print("Power-BI-Engineer")
print("Business Intelligence Analyst")
print("Data-Engineering")
print("Data Scientist and Machine Learning")
```

```
Power-BI-Engineer
Business Intelligence Analyst
Data-Engineering
Data Scientist and Machine Learning
```




```python
print("$$$"*40)
```

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
```