REPORT: DE Training (28/10/2024)
DAY 1
C.Sai Anand

Data Engineer: Gathers data from various sources, processes it, and loads it into databases. This process is known as **ETL** (Extract, Transform, Load) and is crucial for organizing raw data and making it ready for analysis.

Data Analyst: Focuses on analyzing data to find insights. They also perform an **ELT** process, where data is loaded and then transformed inside the database to make it usable for reports and analysis.

Data Scientist: Combines data engineering with ML models. They particularly utilise historical data to build models and make predictions, such as forecasting future trends or customer behaviors.

Structured Data: Organized in tables with the help of rows and columns, where each row is a record and columns are fields. For example, a customer table has rows for each customer and columns for details like name and address. This data is stored in **relational databases** using primary and foreign keys.

Semi-structured Data: Not organized in tables but still has a clear structure, like **JSON** and **XML** files.

Unstructured Data: Does not follow a particular structure; includes images, audio, video, and text files. Often stored in **non-relational databases**.

Database: An organized collection of data where we can perform CRUD operations (Create, Read, Update, Delete) on the data we are having.

SQL (Structured Query Language): A language to manage and retrieve structured data from relational databases.

Data Warehouse: A large database used to store **historical** data, which allows companies to keep a record of past data for long-term analysis. Like if database is fulled we can transfer the record date to ware house which directly leaves the space to database and store more data.

Data Mart: **A subset of a data warehouse** designed to serve specific departments or data needs.

OLTP (Online Transactional Processing): Handles daily, real-time data transactions from users. It's quick and ideal for ongoing operations (e.g., online purchases or bank transactions).

OLAP (Online Analytical Processing): Used for analyzing historical data, supporting analysts in generating reports and insights. It's slower but designed to handle large volumes of data.

Examples of HDFC Bank

- **OLTP Example**: Daily transaction data (e.g., current bank statements).
- **OLAP Example**: Historical data, such as comparing monthly statements from last year to this year.

Operational Data Store : ODS : USED FOR OPERATIONAL REPORTING AND SUPPORTS CURRENT OR NEAL REALTIME REPORTING REQUIREMENTS

Just go through for better understanding

ARCH : AFTER EVERY SIX MONTHS, NEED TO SEND DATA FROM OLTP TO OLAP

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1 2 3 4 5 6 7 8 9 10 11 12
OLTP

OLTP : AUG SEPT OCT NOV DEC JAN (2024)
OLAP : JAN TO JULY 2023

CEO : COMPARE JAN (2023) WITH JAN (2024)

ODS : ANOTHER SAGING DATABASE WHERE YOU CAN SEND THE DATA OF JAN 2024 MONTH TO ODS AND FROM ODS DATA AND FROM DWH (data warehouse) DATA WE CAN CREATE A REPORT.

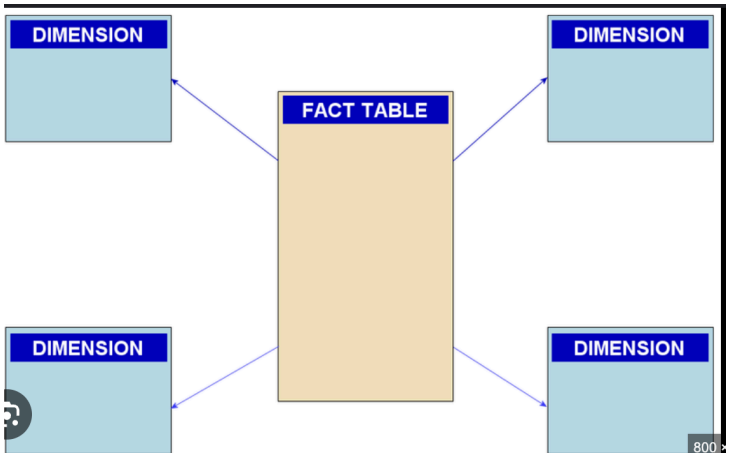
OLTP : ERD : ENTITY RELATIONSHIP DIAGRAM : MASTER AND TRANSACTIONAL TABLES
OLAP : DIMENSION AND FACT TABLES

Database Schemas and Diagrams

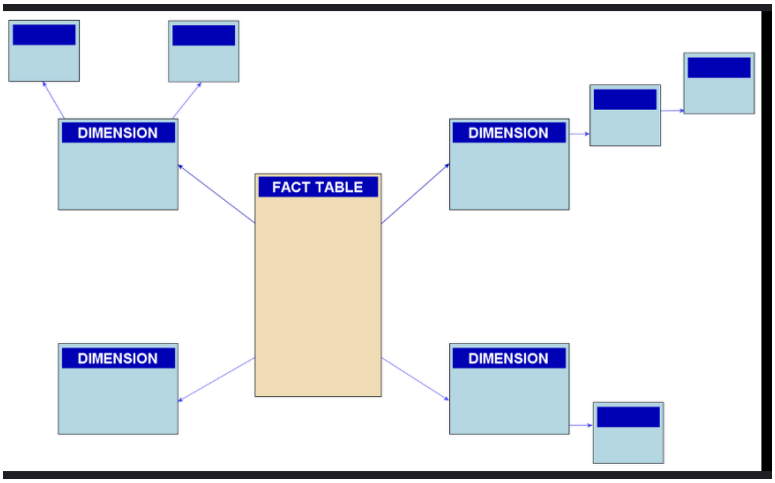
- **ERD (Entity Relationship Diagram)**: Used in OLTP databases to show relationships between tables. Includes:
    - **Master Tables**: Basic information, like customers or products, with less data.
    - **Transactional tables**: store actual transactions, like sales.
- **Dimensional and Fact Tables**: In OLAP:
    - **Dimension Tables**: Provide descriptive details (e.g., customer information).
    - **Fact Tables**: Store measurable data, like sales numbers, linked to dimension tables.

Schema Types

- **Star Schema**: **Dimension** tables connect **directly** to the **central fact** table.



- **Snowflake Schema**: A variation where **dimension tables** are further **broken down** into **additional tables**



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- **Galaxy Schema**: A complex schema used in large-scale databases with **multiple fact tables.**
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