**Types of Data Warehouses:**

* Centralized repository for storing large volumes of structured and unstructured data.
* Essential for data analysis, business intelligence, and reporting.
* Different types serve different purposes and are optimized for business requirements.

**How do Data Warehouses work:**

* **Data Extraction:** Collects relevant data from various sources like transactional databases, CRM, and ERP systems for the warehouse. Focuses on gathering only pertinent information.
* **Data Transformation:** Processes extracted data for consistency and accuracy by removing duplicates, consolidating sources, checking errors, and harmonizing formats.
* **Data Loading (ETL):** Transfers processed data to the warehouse in batches or real-time, ensuring it is constantly updated and ready for analysis.
* **Data Storage:** Organizes data using schemas like star or snowflake for optimized querying, storing it in dimensional models with facts (numerical) and dimensions (attributes).
* **Data Indexing and Partitioning:** Enhances query performance by creating data pointers (indexing) and splitting large tables into smaller, manageable parts (partitioning).
* **Metadata Management:** Maintains metadata that details data sources, organization, and usage, helping users understand data origin and history.
* **Data Access and Querying:** Integrates BI tools for analysis, reporting, and dashboards, enabling users to execute queries and make data-driven decisions.

# **Types of Data Warehouses:**

**1. Enterprise Data Warehouse (EDW):**

* Manages data from multiple business areas for a unified organizational view.
* Combines data from internal systems and external sources.
* Uses star/snowflake schemas with facts and dimensions for efficient organization.
* Enables advanced queries, analysis, and insights for decision-making.
* Needs infrastructure, upkeep, and quality control investments. (drawback)

**2.Operational Data Store(ODS):**

An Operational Data Store (ODS) consolidates and integrates real-time data from various operational sources like ERP (Enterprise Resource Planning)and CRM(Customer Relationship Management ) for short-term decision-making and operational analysis, without retaining historical data, and supports fast read/write operations for loading data into an EDW.

**3. Data Mart:**

* A Data Mart can be defined as an element of a Data Warehouse system designed to hold data from a particular business division, department or user type.
* It is created to serve the specific interests of a specific class of people.

**4. Cloud Data Warehouses:**

Cloud Data Warehouses are data storage and analysis solutions hosted on the cloud, providing scalable platforms for efficient data management.

**5. Big Data Warehouses:**

Big Data Warehouses are advanced systems designed to handle large volumes of structured and unstructured data generated at high speed.

**6. Virtual Data Warehouse:**

A Virtual Data Warehouse offers a logical view of data from multiple sources without physically storing it in one central location.

**7. Hybrid Data Warehouse:** A Hybrid Data Warehouse integrates both on-premises and cloud-based data storage and processing for flexible data management.

**8. Real-time Data Warehouse:** A Real-time Data Warehouse processes and analyses data as it is generated, offering immediate insights.

### **Advantages of Data Warehouse:**

1. **Improved Decision-Making**
2. **Time Efficiency**
3. **Data Quality and Consistency**
4. **Historical Analysis**
5. **Supports Business Intelligence (BI)**

### **Disadvantages of Data Warehouse:**

1. **High Cost**
2. **Complexity**
3. **Data Latency**
4. **Data Storage Requirements**
5. **Dependence on ETL**