ADS Assignment 6

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**1. Introduction**

**Objective:** The objective here is to design and implement a data warehouse system for a company's customer order processing system. The data warehouse will consolidate data from various operational databases to facilitate analysis and reporting.

**Scope:** The scope we have includes extracting data from existing databases related to customer orders, stores, items, and sales. The data warehouse will support online analytical processing (OLAP) to provide insights into customer behavior, store performance, and inventory management across multiple locations.

**2. Business Requirement**

**Application Specification:** The data warehousing system will provide functionalities to meet the following business requirements:

1. Analyze store inventory to determine the availability of specific items across different locations.
2. Identify orders that can be fulfilled by a given store based on available stock.
3. Determine stores holding items ordered by specific customers.
4. Monitor stock levels of items across stores.
5. Provide detailed information on customer orders, including items ordered and store details.
6. Retrieve customer location information.
7. Calculate stock levels of a particular item in specific cities.
8. Retrieve detailed information about customer orders, including items, quantities, stores, and cities.

**3. Functional Specification**

**Input**: Data from operational databases including customer information, store details, item information, orders, and stored items.

**Output:** Online analytical processing (OLAP) functionalities allowing users to perform roll up, drill down, slice, and dice operations based on dimension tables such as Customer, Store, Item, and Order.

**4. Data Warehousing Design**

**- Stepwise Procedure:**

1. Identify relevant data sources from existing operational databases.

2. Design dimension tables including Customer, Store, Item, and Order, along with their attributes.

3. Design a fact table(s) to store transactional data such as ordered items and stored items.

4. Implement a star schema for efficient querying and analysis, with dimension tables surrounding a central fact table.

5. Establish relationships between dimension and fact tables to enable data retrieval and analysis.

**Data Warehousing Design:**

Star Schema Methodology:

Fact Table: Sales\_Fact

Order\_number (Foreign Key)

Customer\_ID (Foreign Key)

Store\_ID (Foreign Key)

Product\_ID (Foreign Key)

Order\_date

Quantity\_ordered

Ordered\_price

Dimension Tables:

Customer\_Dimensions

Customer\_ID (Primary Key)

Customer\_name

City\_ID (Foreign Key)

First\_purchase\_date

Store\_Details

Store\_ID (Primary Key)

City\_ID (Foreign Key)

Contact\_number

Product\_Attributes

Product\_ID (Primary Key)

Description

Size

Weight

Unit\_cost

City\_Information

City\_ID (Primary Key)

City\_name

State

**5. Data Cube Implementation**

- Automate the process of loading data into data cubes based on defined dimensions and measures.

- Implement OLAP functionalities using data cubes to support roll up, drill down, slice, and dice operations.

**6. Observations**

a. **Online Analytical Processing Reports:** Users can generate OLAP reports by invoking commands or panels to perform various analytical operations such as aggregating data, filtering, and visualizing insights.

b. **Data Verification:** OLAP reports should be verified by cross-referencing the data with the source relational tables to ensure accuracy and consistency.

**7. Conclusion**

The implementation of the data warehousing system has successfully met the business requirements by providing a comprehensive platform for analyzing customer orders, store inventory, and sales data. By leveraging OLAP functionalities and adhering to the designed star schema, the data warehouse enables users to gain valuable insights for decision-making and strategic planning. Ongoing data verification and validation are essential to ensure the reliability and integrity of the analytical reports generated by the system.