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Title:	Data Warehouse Construction – Star schema and Snowflake schema
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Aim: To Build a Data Warehouse – Star Schema and Snowflake Schema

Objective: A data warehouse is a large store of data collected from multiple sources within a business. The objective of the data warehouse system is to provide consolidated, flexible, meaningful data storage to the end user for reporting and analysis.

Theory:

In general, the warehouse design process consists of the following steps:

1. Choose a business process to model (e.g., orders, invoices, shipments, inventory, account administration, sales, or the general ledger). If the business process is organizational and involves multiple complex object collections, a data warehouse model should be followed. However, if the process is departmental and focuses on the analysis of one kind of business process, a data mart model should be chosen.
2. Choose the business process grain, which is the fundamental, atomic level of data to be represented in the fact table for this process (e.g., individual transactions, individual daily snapshots, and so on).
3. Choose the dimensions that will apply to each fact table record. Typical dimensions are time, item, customer, supplier, warehouse, transaction type, and status.
4. Choose the measures that will populate each fact table record. Typical measures are numeric additive quantities like dollars sold and units sold.

Star Schema:

The most common modeling paradigm is the star schema, in which the data warehouse contains:

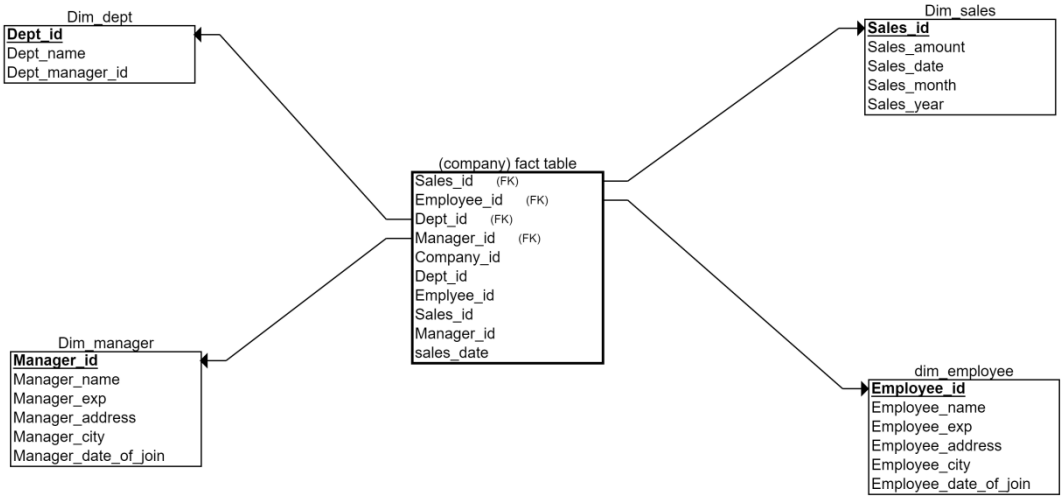
- a large central table (fact table) containing the bulk of the data, with no redundancy, and
- a set of smaller attendant tables (dimension tables), one for each dimension.

Snowflake Schema:

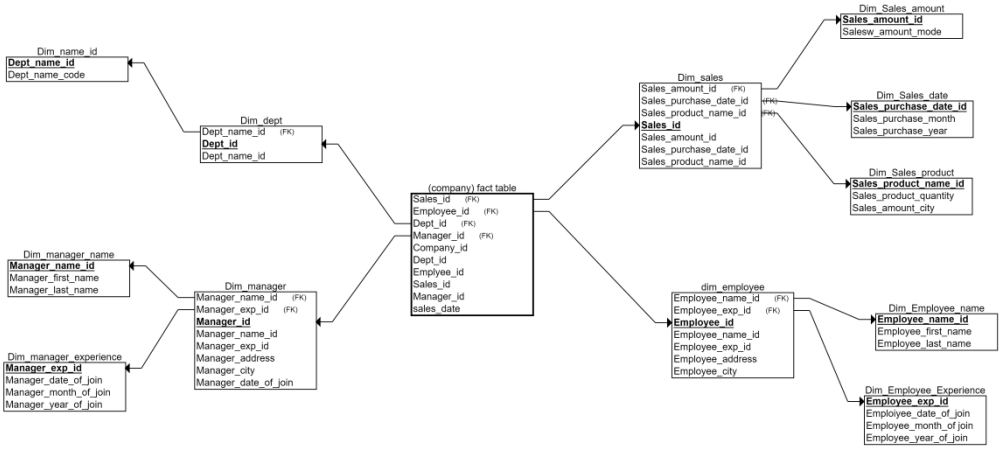
- The snowflake schema is a variant of the star schema model, where some dimension tables are normalized, thereby further splitting the data into additional tables.
- The resulting schema graph forms a shape similar to a snowflake.
- The major difference between the snowflake and star schema models is that the dimension tables of the snowflake model may be kept in normalized form to reduce redundancies.
- Such a table is easy to maintain and saves storage space.
- However, this space savings is negligible in comparison to the typical magnitude of the fact table.

Construction of Star schema and Snowflake schema:

Star schema



Snowflake schema



Conclusion:

What are the main differences between the Star Schema and Snowflake Schema in terms of structure and design?

Ans. The **Star Schema** features a central fact table connected directly to dimension tables, forming a star-like structure. Each dimension table is denormalized, containing all related attributes without further splitting. This simplicity makes querying faster and easier to understand, but the denormalization can lead to data redundancy and increased storage.

In contrast, the **Snowflake Schema** normalizes dimension tables by breaking them into related sub-tables. This results in a more complex structure with dimension tables linked to multiple hierarchical levels, resembling a snowflake. This design reduces data redundancy and storage needs, but queries are more complex and require more joins, which can slow down performance.

Which schema did you find easier to design and implement? Why?

Ans. The **Star Schema** is generally easier to design and implement due to its straightforward structure. With a single fact table connected to denormalized dimension tables, it simplifies both the design process and query writing. The lack of normalization reduces the complexity of table relationships, making it faster to retrieve data without multiple joins. This schema is intuitive and easy to visualize, which helps in understanding data flows. On the other hand, the **Snowflake Schema** involves more complexity due to normalized tables and relationships, making it harder to design and potentially slower for querying.