Unit 3

Designing the Target structure

Designing The Target Structure

- we have our entire source structures defined in the data warehouse Builder.
- But before we do anything with them, we need to design what our target data warehouse structure id going to look like
- Which will help to figure out , we can start mapping data from source to the target.

Data warehouse design

- When it comes to the design of a data warehouse , there is basically one option that makes the most sense for how we will structure our database and that is the dimensional model.
- This is way of looking at the data from a business perspective that makes the data simple, understanding and easy to query for the business end user.

- It doesn’t require a database administrator to be able to retrieve data from it.
- A normalized model removes redundancies in data by storing information in discrete tables, and then referencing those tables when needed.
- This is an advantage for a transactional system because information needs to be entered at only one place in the database , without duplicate any information already entered.

- For example in the ACME Toys and gizmos Transactional database each time a transaction is recorded for the sales of an item at a register , a record needs to be added only to the transaction table.
- In the table all details regarding the information to identity the register , the item information and thee employee who proceed the transaction do not need to be entered because the information is already stored in separate tables

Dimensional design

- A dimensional model takes the business rule of our organization and represent them in the database in more understanding way.
- A business manager looking at sales data is naturally going to think more along the lines of how many gizmos did I sell last month in all stores in the south and how does that compare to how many I sold in the last month last year?
- Managers just want to know the result , don’t want to worry about how many tables need to be joined
- Users can think of the data as a cube and edges of the cubes as dimension labeled as stores, product and time frame

Cube and dimension

- The dimensions become the business characteristics about the sales(Cubes are the main objects in online analytic processing (OLAP), a technology that provides fast access to data in a data warehouse. A cube is a set of data that is usually constructed from a subset of a data warehouse and is organized and summarized into a multidimensional structure defined by a set of dimensions and measures.)
- TIME DIMENSIONS : user can look back in time and check various time periods
- STORE DIEMENSIONS : information can be retrieved by store and location
- PRODUCT DIMENSION : various product for sales can be broken out.

- Think of the dimension as the edges of a cube and the intersection of the dimension as the measures , we are interested in for the particular combination of time , store product.
- think of the width of the cube as the PRODUCT DIMENSIONS , every piece of information in the same row refers to same product, so there are many rows
- Think of the height of the cube going up and down as the STORE DIMENSION every piece of information in a column represents one single stores so there are many columns as there are stores.
- Finally think of the dept of the cube as the time dimensions , so any piece of information in the rows and column at the same dept represents the same point in time

- The intersection of each of these three dimensions locates a single individual cube is the big cube . In this case its dollar sales for a single product in a single stores at a single point of time

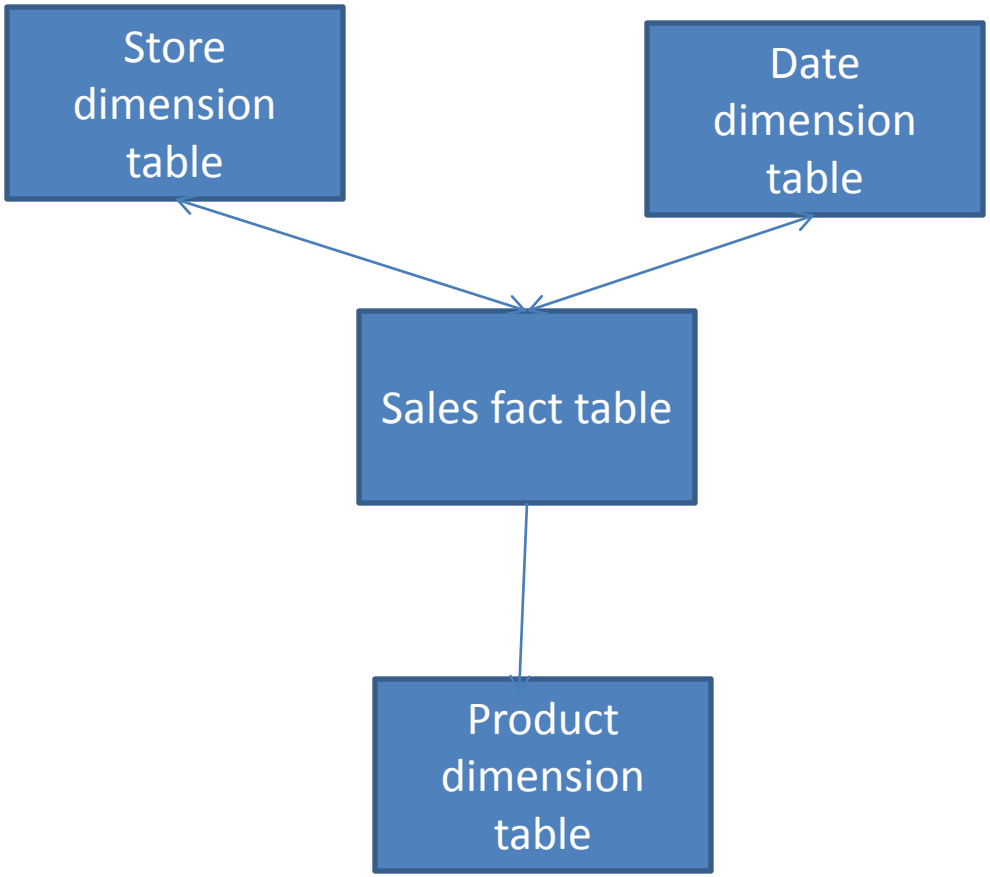
Implementation of a dimensional model in a database

- Now before we finalize our model for the ACME TOY and Gizmos data warehouse .
- Let look the implementation of the model how it get physically represented in database.
- There are two options a relational and multi dimensional implementation.

Relational implementation (star schema)

- For a relational data warehouse design , the relational characteristics are retained between tables.
- But a design principle is followed to keep the number of levels of foreign key relationship to a minimum.
- Its much faster and easier to understand if we don't have to include multiple levels of referenced tables.
- For this reason , a data warehouse dimensional design that is represented relationally in the database , will have one main table to hold the primary facts , we want to store

- The er- diagram of such a implementation would be shaped somewhat like a star and thus the term start schema is used to refer to this kind of an implementation.
- The main table in the middle is referred to as fact table because it holds the fact , that we are intersected in about our organization
- The tables surrounding the fact tables are known as dimension tables. These are the dimensions of the cube.
- Its is job of data warehouse design to determine what piece of information need to be included .


Store dimension table
Date dimension table
Sales fact table
Product dimension table

- For a data warehouse however the query time and simplicity is of paramount importance over the duplication of data.
- Look at an exmaple for ACME toys anD gizmos
- Every product in our store is associated with a department
- If we have dimension for product information , one piece of information about the product would be the department it is in.

- We would creating a table department table to store department description with one row for each department and would use short key code to refer to the department record in the product table
- But in our data warehouse we would include that department information descriptions in the product dimensions
- This will result in the same information being duplicated for each product in the department.

- To avoid such a problem we will need to de-normalize our data warehouse implementation and might want to include another level basically dimension table referenced by another dimension tables . This is a variation of the star-schema referred to as snowflake schema because with this type of implementation , dimension tables are partially normalized to pull common data out into secondary dimensions tables.

Multidimensional implementation (OLAP)

- A multidimensional implementation requires a database with special features that allow it to store cubes as actual objects in the database.
- It also provides advanced calculation and analytic content built into the database to facilitate advanced analytic querying .
- It is utilized to build a highly specialized data marts or a subset of the data warehouse (A data mart is a simple form of a data warehouse that is focused on a single subject (or functional area), such as Sales, Finance, or Marketing. Data marts are often built and controlled by a single department within an organization.)
- The data mart then draws its data to load from the main data warehouse which would be a relational dimensional star schema