**DATAWAREHOUSE ASSESSMENT**

**1.Category of a product may change over a period of time. Historical category information (current category as well as all old categories) has to be stored. Which SCD type will be sutiable to implement this requirement? What kind of structure changes are required in a dimenstion table to implement SCD type 2 and type 3.**

* Slowly Changing Dimension Type 2 also known SCD Type 2 is one of the most commonly used type of Dimension table in a Data Warehouse.
* This keeps current as well as historical data in the table.
* It allows you to insert new records and changed records using a new column.
* This method tracks historical data by creating multiple records for a given natural key in the dimensional tables with separate surrogate keys and/or different version numbers.

Example: Here I’m taking scenario where dimension is changing slowly and it require history to be maintained. If the supplier CHANGES the version numbers.

|  |  |  |  |
| --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** |
| 101 | ABC | S1 | 0 |
| 102 | XYZ | S2 | 1 |

AFTER FEW DAYS

|  |  |  |  |
| --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** |
| 101 | ABC | S1 | 1 |
| 102 | XYZ | S2 | 1 |

FULL LOAD FOR SCD2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** | **START\_DATE** | **END\_DATE** |
| 101 | ABC | S1 | 0 | DATE1 | NULL |
| 102 | XYZ | S2 | 1 | DATE1 | NULL |

INCREMENTAL LOAD FOR SCD2

The Start date/time of the changed row is equal to the End date/time of the previous row. The null End\_Date in row indicates the current tuple version

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** | **START\_DATE** | **END\_DATE** |
| 101 | ABC | S1 | 0 | DATE1 | DATE3 |
| 102 | XYZ | S2 | 1 | DATE1 | NULL |
| 103 | ABC | S1 | 1 | DATE3 | NULL |

**SCD3**

* Slowly Changing Dimension Type 3 also known SCD Type 3 is one of the most commonly used type of Dimension table in a Data Warehouse.
* This method tracks changes using separate columns and preserves limited history.
* The Type 3 preserves limited history as it is limited to the number of columns designated for storing historical data.

|  |  |  |  |
| --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** |
| 101 | ABC | S1 | 0 |
| 102 | XYZ | S2 | 1 |

AFTER FEW DAYS

|  |  |  |  |
| --- | --- | --- | --- |
| **SUPPLIER\_KEY** | **SUPPLIER\_NAME** | **SUPPLIER** | **VERSIONS** |
| 101 | ABC | S1 | 1 |
| 102 | XYZ | S2 | 1 |

**FULL LOAD FOR SCD3**

In the following example, an additional column has been added to the table to record the supplier's original version - only the previous version is stored.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SUPPLIER\_KEY | SUPPLIER\_NAME | SUPPLIER | VERSIONS | PREVIOUS VERSION |
| 101 | ABC | S1 | 0 | NULL |
| 102 | XYZ | S2 | 1 | NULL |

**INCREMENTAL LOAD FOR SCD3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SUPPLIER\_KEY | SUPPLIER\_NAME | SUPPLIER | VERSIONS | PREVIOUS VERSION |
| 101 | ABC | S1 | 1 | 0 |
| 102 | XYZ | S2 | 1 | NULL |

**2. What is surrogate key? Why it is required?**

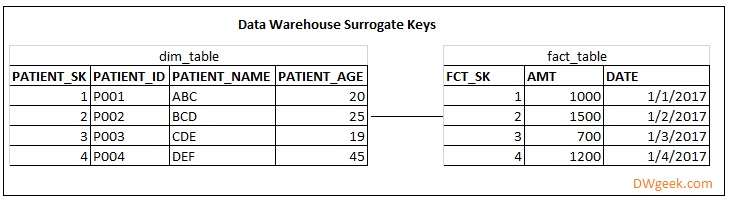
* It is sequentially generated unique number attached with each and every record in a Dimension table in any **Data Warehouse**.
* Basically it’s an artificial key that is used as a substitute for a Natural Key (NK). We should have defined NK in our tables as per the business requirement and that might be able to uniquely identify any record.
* It join between the fact and dimension tables and is necessary to handle changes in dimension table attributes.
* The Primary Key identifies the unique row in the database while the Surrogate Key identifies a unique entity in the model
* It is UNIQUE since it is sequentially generated integer for each record being inserted in the table.
* It is SEQUENTIAL since it is assigned in sequential order as and when new records are created in the table, starting with one and going up to the highest number that is needed.

**DRAWBACKS OF PRIMARY KEY AND NATURAL KEYS**

* Natural keys do not apply uniform rules for each record.
* Natural keys do not stand the test of time.
* Natural keys can be easily confused with each other.

**ADVANTAGES OR WHY SURROGATE KEYS ARE USED**

* **Performance**: Fast response times often mean efficient joins between facts and dimensions
* **Changing Source Systems**: Using natural keys tightly ties a data warehouse’s integrity to the stability of the source system.
* **Slow Changing Dimensions**: It is often a requirement to track historical values of dimension records.
* **Surrogate keys are unique.** Because surrogate keys are system-generated, it is impossible for the system to create and store a duplicate value.
* **Surrogate keys apply uniform rules to all records.** The surrogate key value is the result of a program, which creates the system-generated value. Any key created as a result of a program will apply uniform rules for each record.
* **Surrogate keys stand the test of time.** Because surrogate keys lack any context or business meaning, there will be no need to change the key in the future.
* **Surrogate keys allow for unlimited values.** Sequential, timestamp, and random keys have no practical limits to unique combinations



**4. What is a semi-additive measure? Give an example.**

Semi-additive facts are facts that can be summed up for some of the dimensions in the fact table, but not the others.

Eg: Daily balances fact can be summed up through the customers dimension but not through the time dimension **.**

**Current\_Balance** is a semi-additive fact, as it makes sense to add them up for all accounts (what's the total current balance for all accounts in the bank?), but it does not make sense to add them up through time (adding up all current balances for a given account for each day of the month does not give us any useful information)

Customer\_dim

|  |
| --- |
| Date |
| Account |
| Current\_balance(SA) |
| Profit |
| daily\_balance |

**3.Stores are grouped in to multiple clusters. A store can be part of one or more clusters. Design tables to store this store-cluster mapping information.**