Slowly Changing Dimensions is a concept in data warehousing that refers to the way dimensions change over time. SCD is commonly used in business intelligence and analytics to maintain the historical data for analysis.

**Types of SCDs,**

**SCD Type 1:**

* In this type, the dimension attribute is overwritten with the new value whenever a change occurs.
* No historical information is preserved, and only the latest value is available.

Example: Consider a customer dimension where the "Address" attribute gets updated. In SCD1, the new address replaces the old address, and no history of changes is maintained.

**SCD Type 2**:

* SCD2 preserves a complete history of dimension attribute changes by creating new records for each change.
* It maintains a slowly evolving dimension table, including both current and historical values.
* A surrogate key is used to uniquely identify each version of the dimension record.

Example: Consider a customer dimension where the “Address” attribute gets updated. When a customer changes their address, a new record is created with a new surrogate key and the new address. The old record remains with the old address, allowing analysis of historical data.

**SCD Type 3:**

* SCD3 captures limited historical information by adding extra columns to the dimension table.
* These additional columns store specific historical attributes, such as "Previous Address" and "Current Address,".

Example: Taking the customer dimension, in SCD3, the dimension table would have columns like "Address," "Previous Address," and "Current Address." When an address changes, the new address is stored in "Address," and the previous and current addresses are saved in their respective columns.

**SCD Type 4:**

* SCD4 introduces a separate table to store historical information, reducing the size of the main dimension table.
* It involves creating a bridge table that captures the historical relationships between dimensions.
* The bridge table links the primary dimension table to the separate historical dimension table.

Example: Suppose you have a product dimension with attributes like "Product Name" and "Product Category." In SCD4, when a product category changes, a new record is inserted into the bridge table, linking the old category to the new category, and maintaining the historical relationship.