Class 8

Dimensional modeling

Learning Objectives

- Define 2 kinds of changes in dimensions
- Define 4 types of handling slow changes
- Define 1 type of handling large changes

Changing Dimensions

- Dimension attributes evolve over time
  - For example, customers change their names, move, have children, adjust their Incomes

- For every dimension attribute, need to identify "Changes" strategy
  - May use combination of strategies within same dimension table

Changing Dimensions

- Slowly Changing Dimensions
- Large Changing Dimensions

Slowly Changing Dimensions

- When dimensions change not very frequently
- 3 types of handling the changes

Type 1: overwrite the value
Type 2: add a dimension row
Type 3: add a dimension column

Slowly Changing Dimensions

Type 1: overwrite the value

Product Key	Product Description	Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Education	ABC922-Z

Product Key	Product Description	Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Strategy	ABC922-Z

Slowly Changing Dimensions

❐ What if Cust 3A422 moves to CA on 12/1/2005?

❐ Using Type 1:

Customer Dim

Cust Key	Cust_ Code	Last_Name	Zip
1	3A422	Thornthwaite	94025 ~~48~~
2	1B427	Jones	10019

Order Facts

Cust_Key	Date	Amount
1	12/23/2003	$200.00
1	12/23/2004	$800.00
2	8/9/2004	$12.00
1	12/23/2005	$100.00

❐ Report request for Sales by Zip on 12/24/05:

Zip	Order Amount
94025	1,100.00
10019	12.00

Slowly Changing Dimensions

Type 2: add a dimension row

Product Key	Product Description	Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Education	ABC922-Z
25984	IntelliKidz 1.0	Strategy	ABC922-Z

Slowly Changing Dimensions

☐ Using Type 2 (must have surrogate key):

Customer Dim

Cust Key	Cust_Code	Last_Name	Zip	Eff_Date	End_Date	Is_Current	Change Reason
1	3A422	Thornthwaite	48192	12/23/1998	11/30/2005	N	NW
2	1B427	Jones	10019	8/9/2004	12/31/9999	Y	NW
3	3A422	Thornthwaite	94025	12/1/2005	12/31/9999	Y	ZP

Report request on 12/24/05: Sales by Zip

State	Order Amount
48192	1,000.00
94025	100.00
10019	12.00

Order Facts

Cust_Key	Date	Amount
1	12/23/2003	$200.00
1	12/23/2004	$800.00
2	8/9/2004	$12.00
3	12/23/2005	$100.00

Slowly Changing Dimensions

Type 3: add a dimension column

Product Key	Product Description	Department	Prior Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Strategy	Education	ABC922-Z

Slowly Changing Dimensions

3 Ways to Handle Changing Dims
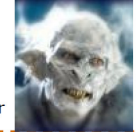
Overwrite

- ✓ **Type 1**
  - ✓ + Simple & Fast
  - ✓ + No Dim Key Chg.
  - ✓ - Lose history
  - ✓ - Must rebuild aggregates

Add a Row

- ✓ **Type 2**
  - ✓ + Preferred Method
  - ✓ + Partitions History
  - ✓ + No Data Changes
  - ✓ Hint: Current Row Indicator

Add a Column

- ✓ **Type 3**
  - ✓ + Alternate Reality
  - ✓ - Limited # of Apps
    - ✓ Lose Intermed.
    - ✓ Can use "Prior"
  - ✓ - Can't trend changes
  - ✓ Common – Sales Org

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Hybrid Slowly Changing Dimension Techniques

Product Key	Product Description	Current Department	Historical Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Education	Education	ABC922-Z

Product Key	Product Description	Current Department	Historical Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Strategy	Education	ABC922-Z
25984	IntelliKidz 1.0	Strategy	Strategy	ABC922-Z

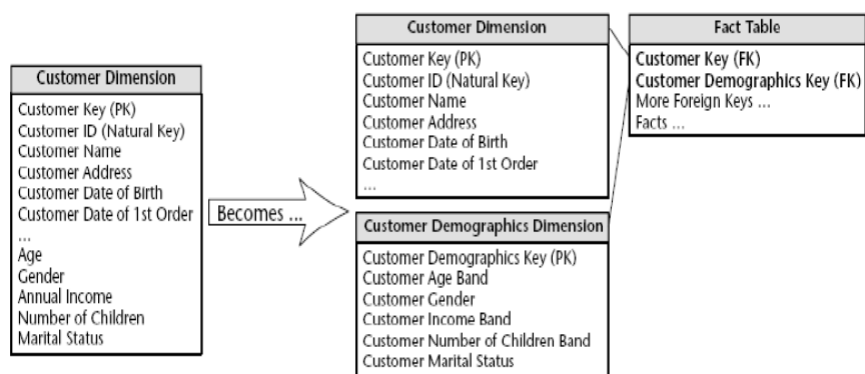| Product Key	Product Description	Current Department	Historical Department	SKU Number (Natural Key)
12345	IntelliKidz 1.0	Critical Thinking	Education	ABC922-Z
25984	IntelliKidz 1.0	Critical Thinking	Strategy	ABC922-Z
31726	IntelliKidz 1.0	Critical Thinking	Critical Thinking	ABC922-Z

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Large Changing Dimensions

Minidimension

DEMOGRAPHIC KEY	AGE	GENDER	INCOME LEVEL
1	20-24	Male	<$20,000
2	20-24	Male	$20,000-$24,999
3	20-24	Male	$25,000-$29,999
18	25-29	Male	$20,000-$24,999
19	25-29	Male	$25,000-$29,999

Table 6.3 Sample Rows from a Demographic Minidimension

Large Changing Dimensions

Customer Dimension

Customer Key (PK)
Customer ID (Natural Key)
Customer Name
Customer Address
Customer Date of Birth
Customer Date of 1st Order
...
Age
Gender
Annual Income
Number of Children
Marital Status

Becomes ...

Customer Dimension

Customer Key (PK)
Customer ID (Natural Key)
Customer Name
Customer Address
Customer Date of Birth
Customer Date of 1st Order
...

Fact Table

Customer Key (FK)
Customer Demographics Key (FK)
More Foreign Keys ...
Facts ...

Customer Demographics Dimension

Customer Demographics Key (PK)
Customer Age Band
Customer Gender
Customer Income Band
Customer Number of Children Band
Customer Marital Status

The fact table serves to track the changes