



# Slow Changing Dimensions

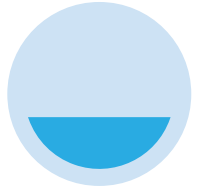


**Katz**

Katz School  
of Science and Health

Review of Types 1-3

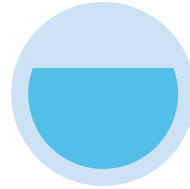




## Type 1: Overwrite

Simplest and cleanest

Appropriate for error correction or deciding not to retain history

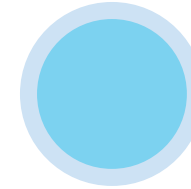


## Type 2: Add a new dimension

Requires generalized PK

Add change reasons

Timestamps of changes



## Type 3: Add a new field

More than one perspective or assigned value

Choose a query time to get the alternate perspective

# Type I: Slowly Changing Dimensions

## Type 1: Overwrite the Changed Attribute

- Situation: Tracking the change history of this attribute has no analytic value

- Original Record

<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>
12345	Sim City 3000	Educational SW

- Updated Record

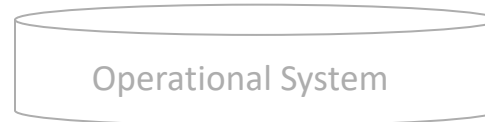
<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>
12345	Sim City 3000	Strategy SW

# Type I: Slowly Changing Dimensions

## Overwrite history

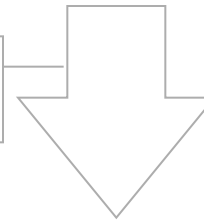
Prior state of table

STATUS_KEY	STATUS_CODE	STATUS_DESC
1	OPEN	Open



New description read from system

STATUS_CODE	STATUS_DESC
OPEN	Open Orders



Post-update state of table

STATUS_KEY	STATUS_CODE	STATUS_DESC
1	OPEN	Open Orders

# Type II: Slowly Changing Dimensions

## Type 2: Add a New Dimension Record

- Situation: Maintains history as new dimension record (need to access two records to determine the change date)

- Original Record

<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>
12345	Sim City 3000	Educational SW

- Updated Record

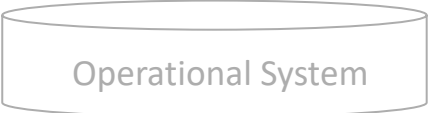
<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>
13456	Sim City 3000	Strategy SW

# Type II: Slowly Changing Dimensions

## Keep history

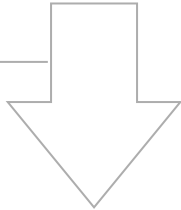
Prior state of table

STATUS_KEY	STATUS_CODE	STATUS_DESC	EFF_FROM_DT	EFF_TO_DT
1	OPEN	Open	01/01/1970	12/31/2999



New description read from system

STATUS_CODE	STATUS_DESC
OPEN	Open Orders



1<sup>st</sup> January 2005

Post-update state of table

STATUS_KEY	STATUS_CODE	STATUS_DESC	EFF_FROM_DT	EFF_TO_DT
1	OPEN	Open	01/01/1970	12/31/2004
2	OPEN	Open Orders	01/01/2005	12/31/2999



New columns added to enable key lookup during fact loading

# Issues with Type II SCDs

## Even simple name changes cause problems

DEPT_KEY	DESCR	DEPTID	EFF_FROM_DT
1	U.S. Ops.	000001	01/01/1900
2	Eastern Region	000002	01/01/1900
3	East	000002	01/03/2005

Change of name from  
'Eastern Region' to 'East'



Report for January 2005

Department	Month	Invoice \$
Eastern Region	Jan	\$200,000

Report for March 2005

Department	Month	Invoice \$
East	Mar	\$300,000

Report for all 2005

Department	Year	Invoice \$
Eastern Region	2005	\$200,000
East	2005	\$300,000

# Type III: Slowly Changing Dimensions

## Type 3: Add a “Prior” Attribute

- Situation: Maintains history as new dimensional attribute

- Original Record

<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>
12345	Sim City 3000	Educational SW

- Updated Record

<u>Item Key</u>	<u>Item Desc</u>	<u>Dept</u>	<u>Prior Dept</u>
12345	Sim City 3000	Strategy SW	Educational SW



# Options for Slowly Changing Dimensions

## Hybrid Approach

- Use Type 2 to track changes as they occur
- Include “current” Type 3 attribute, treated as Type 1

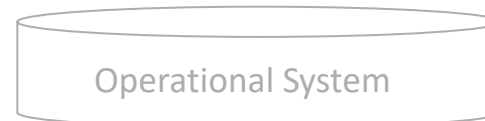
Item Key	Item Desc	“As Was” Dept	“Current” Dept
12345	Sim City 3000	Strategy SW	Simulation SW
13456	Sim City 3000	Strategy SW	Simulation SW
14567	Sim City 3000	Simulation SW	Simulation SW

# Type II / Type III Hybrid SCDs

Keep history + keep current on each row

Prior state of table

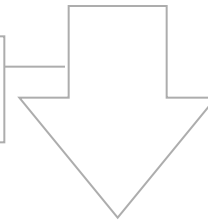
STATUS_KEY	STATUS_CODE	CURR_STATUS	HIST_STATUS	EFF_FROM_DT	EFF_TO_DT
1	OPEN	Open	Open	01/01/1970	12/31/2999



New description read from system

STATUS_CODE	STATUS_DESC
OPEN	Open Orders

1<sup>st</sup> January 2005

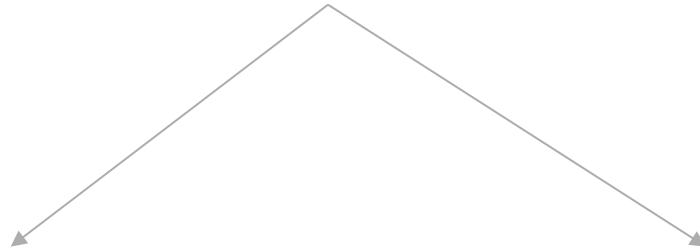


Post-update state of table

STATUS_KEY	STATUS_CODE	CURR_STATUS	HIST_STATUS	EFF_FROM_DT	EFF_TO_DT
1	OPEN	Open Orders	Open	01/01/1970	12/31/2004
2	OPEN	Open Orders	Open Orders	01/01/2005	12/31/2999

# Type II / Type III Hybrid SCDs

```
select    product_name, product_cname, quarter, sum(sum_sales)
from      dim_product, dim_time, fact_sales
where     dim_product.product_key = fact_sales.product_key
and       dim_time.date_key = fact_sales.date_key
group by  product_name, product_cname, quarter
```



Name	Quarter	Invoice \$
Marathon	Q1	\$500,000
Snickers	Q1	\$250,000
Skittles	Q2	\$300,000

Using historical name

Name	Quarter	Invoice \$
Snickers	Q1	\$750,000
Skittles	Q2	\$300,000

Using current name