Dimensional Modeling Techniques

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Ralph Kimball introduced the data warehouse/business intelligence industry to dimensional modeling in 1996 with his seminal book, *The Data Warehouse Toolkit*. Since then, the Kimball Group has extended the portfolio of best practices.

Drawn from *The Data Warehouse Toolkit, Third Edition*, the "official" Kimball dimensional modeling techniques are described on the following links and attached .pdf:

Fundamental Concepts

- Gather business requirements and data realities
- Collaborative dimensional modeling workshops
- Four step dimensional design process
- Business processes
- Grain
- Dimensions for descriptive context
- Facts for measurements
- Star schemas and OLAP cubes
- Graceful extensions to dimensional models

Basic Fact Table Techniques

- Fact table structure
- Additive, semi-additive, and non-additive facts
- Nulls in fact tables
- Conformed facts
- Transaction fact tables
- Periodic snapshot fact tables
- Accumulating snapshot fact tables
- Factless fact tables
- Aggregated fact tables or cubes
- Consolidated fact tables

Basic Dimension Table Techniques

- Dimension table structure
- Dimension surrogate keys
- Natural, durable and supernatural keys
- Drilling down
- Degenerate dimensions
- Denormalized flattened dimensions

- Multiple hierarchies in dimensions
- Flags and indicators as dimension attributes
- Null attributes in dimensions
- Calendar date dimension
- Role playing dimensions
- Junk dimensions
- Snowflaked dimensions
- Outrigger dimensions

Integration via Conformed Dimensions

- Conformed dimensions
- Shrunken rollup dimensions
- Drilling across
- Value chain
- Enterprise data warehouse bus architecture
- Enterprise data warehouse bus matrix
- Opportunity/stakeholder matrix

Slowly Changing Dimension Techniques

- Type 0: Retain original
- Type 1: Overwrite
- Type 2: Add new row
- Type 3: Add new attribute
- Type 4: Add mini-dimension
- Type 5: Add mini-dimension and Type 1 outrigger
- Type 6: Add Type 1 attributes to Type 2 dimension
- Type 7: Dual Type 1 and Type 2 dimensions

Dimension Hierarchy Techniques

- Fixed depth positional hierarchies
- Slightly ragged/variable depth hierarchies
- Ragged/variable depth hierarchies

Advanced Fact Table Techniques

- Fact table surrogate key
- Centipede fact table
- Numeric values as attributes or facts
- Lag/duration facts
- Header/line fact tables
- Allocated facts
- Profit and loss fact tables using allocations

- Multiple currency facts
- Multiple units of measure
- Year-to-date facts
- Multipass SQL to avoid fact-to-fact table joins
- Timespan tracking in fact tables
- Late arriving facts

Advanced Dimension Table Techniques

- Dimension-to-dimension table joins
- Multivalued dimensions and bridge tables
- Behavior tag time series
- Behavior study group
- Aggregated facts as dimension attributes
- Dynamic value banding
- Text comments
- Multiple time zones
- Measure type dimensions
- Step dimensions
- Hot swappable dimensions
- Abstract generic dimensions
- Audit dimensions
- Late arriving dimensions

Special Purpose Schemas

- Supertype and subtype schemas for heterogeneous products
- Real-time fact tables
- Error event schemas

Here’s the .pdf version of Kimball Dimensional Modeling Techniques.