5.2. Decision Support

In this lecture we look at...

5.2.01. Introduction

- Decision support systems (DSS)
- Duplicates of live systems, historical archiving
- Primarily read-only
- Load and refresh operations
- Integrity
  - Assumptions about initial data
- Large, indexed, redundancy

5.2.02. DSS Management

- Design
  - Logical
    - Temporal keys, required to distinquish historical data (since:to current & during:within interval)
  - Physical (Hash indexes, Bitmap indexes)
    - Controlled Redundancy
  - Synchronisation/update propogation
    - Synchronous (update driven)
    - Asynchronous (query driven)

5.2.03. Data Preparation

- Extract
  - pulling from live database system(s)
- Cleansing
- Transformation and Consolidation
  - migrating from live or legacy system design

    to DSS design
- Load (DSS live/query-able)
- Refresh (latest update)

5.2.04. Querying

- Boolean expression complexity
  - heavy WHERE clauses
- Join complexity
  - Normalised databases, many tables
  - Facts distributed across tables

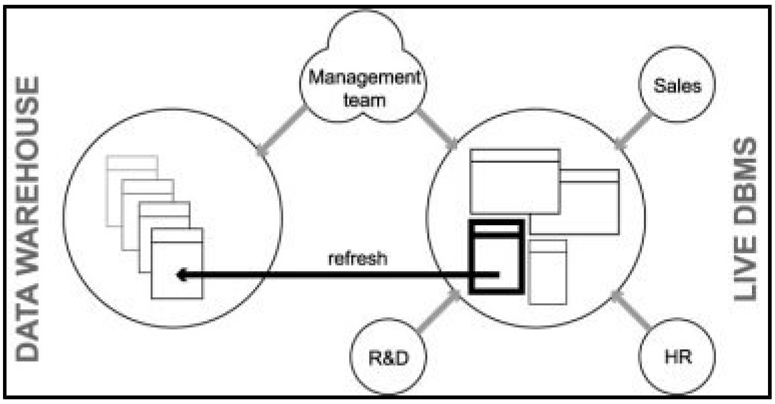
- ○ Joins required to answer complex questions
- Function and Analytic complexity
    - Often require non-DBMS functions
    - Smaller queries with interleaved code

5.2.05. Data Warehouse

- Specific example of DSS
- Subject-orientated
    - e.g. customers/products
- Non-volatile
    - once inserted, items cannot be updated
- Time variant
    - Temporal keys
- Accuracy and granularity issues

5.2.06. DB Company organisation

- By example



5.2.07. Dimensional Schema

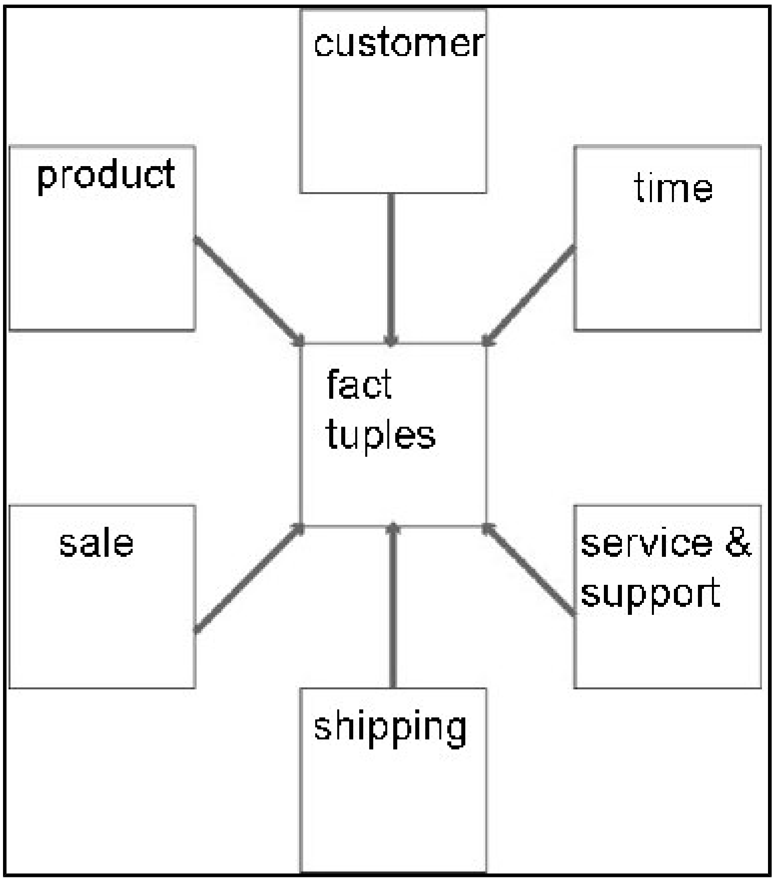
- Consider product, customer, sales data
- Each sale represents a specific event
    - when a product was purchased
    - when a customer bought something
    - when a sale was recorded
- Each can be thought of as an axis

  or dimension (3D)
- Each occurred at a moment in time (4D)

5.2.08. Star schemae and Hypercubes

- Data centralised in ‘fact’ table

- Referencing creates star pattern
- Dimensions as satellite tables
- Normalising creates snowflake schema



5.2.09. Hypercubes

- Hypercube is also a multi-processor topology inspired by a 4D shape
- Used by Intel’s iPSC/2
- Good at certain database operations
- e.g. Duplicate removal
- MIMD