INTRODUCTION TO BUSINESS INTELLIGENCE

Lecture 5

Agenda

Data warehouse implementation approaches
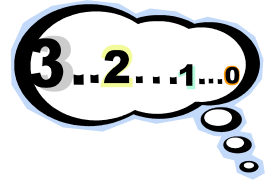
Types of data warehouse models

Data warehouse implementation methodologies

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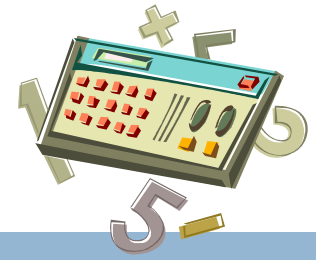
Data warehouse implementation approaches
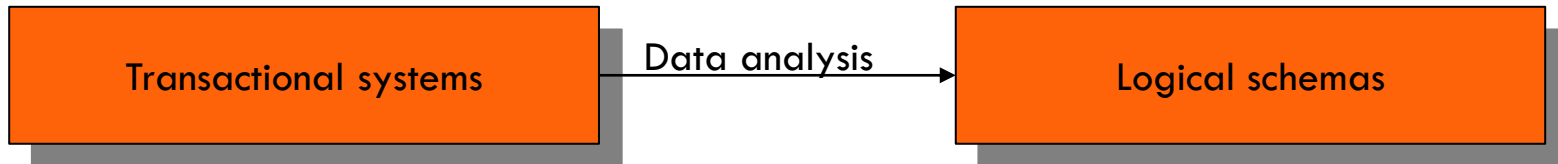
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Data warehouse implementation

☐ data-driven approach

☐ goal-driven approach

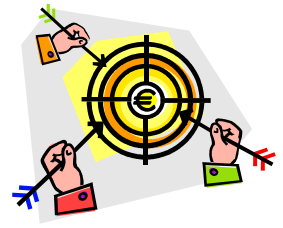☐ user-driven approach

Data driven approach

☐ Data modeling in the warehouse begins with analyzing transactional data sources to derive logical data schemas.

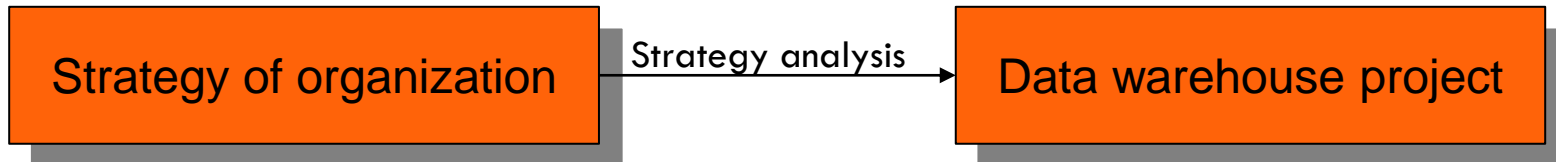| Transactional systems | Data analysis → | Logical schemas |

A goal-driven approach

- Adjusting the data warehouse to the strategy and business requirements of the corporation in which the implementation takes place.

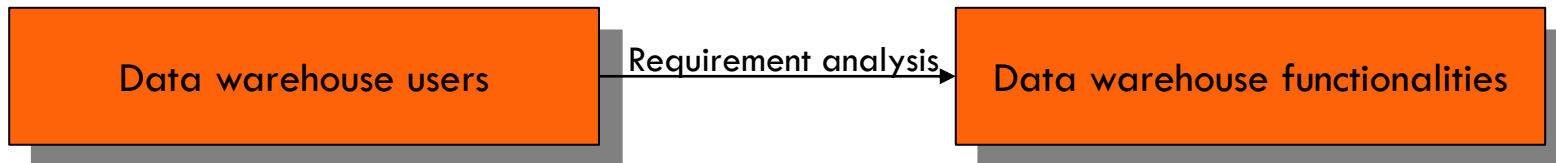| Strategy of organization	→ Strategy analysis →	Data warehouse project

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User driven approach

□ The goal is to reach future users of the data warehouse and analyze their requirements for the functionality of the data warehouse.
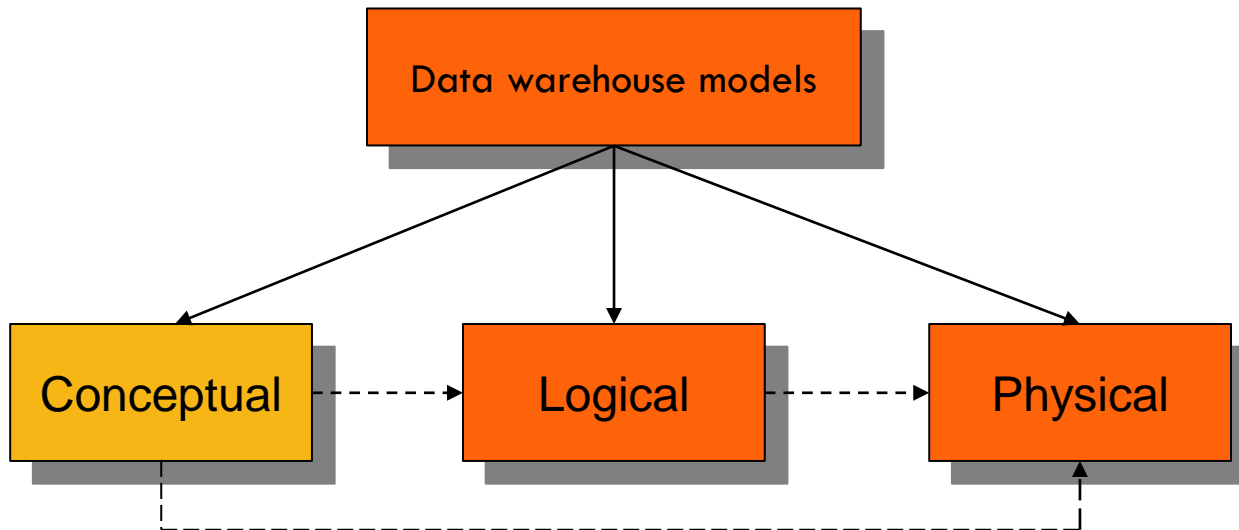
Data warehouse users	Requirement analysis →	Data warehouse functionalities

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Types of data warehouse models

Conceptual

Logical

Physical

Data warehouse modeling

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        ┌─────────────────────────┐
        │  Data warehouse models  │
        └─────────────────────────┘
         ↙          ↓           ↘
┌────────────┐ ┌──────────┐ ┌──────────┐
│ Conceptual │⇢│ Logical  │⇢│ Physical │
└────────────┘ └──────────┘ └──────────┘
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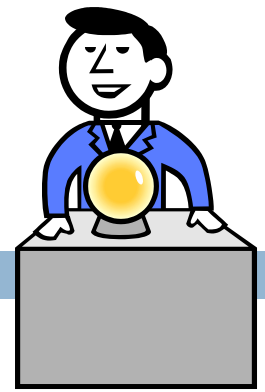
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Conceptual model - components

- Specifies the information requirements for a data warehouse.

- The creation of a conceptual schema should be preceded by an analysis of the requirements of future users of the designed data warehouse.
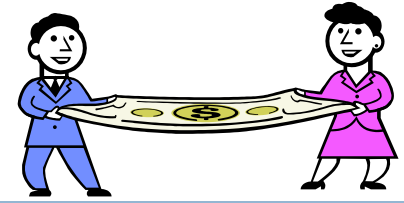
Conceptual model
- principles of creation

- Behavioral data does not change.

- The event always occurs at a specific point in time.

- The time attribute is used in two ways:

  - as part of filtering the choice in the query,

  - support in linking dimensions during high-level grouping.

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Conceptual model - components

- Components for treating historical data:
  - entity (set of circumstances or dimension),
  - relationship (hierarchy),
  - attribute.
- Each of these components can be classified with retrospection.

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Conceptual model - retrospective

□ A retrospective can be:

- ◘ true - the object faithfully reproduces the past,

- ◘ false - means that along with changes in the value of the object, the values of its history will also change,

- ◘ persistent - causes that the value of the object does not change over time.
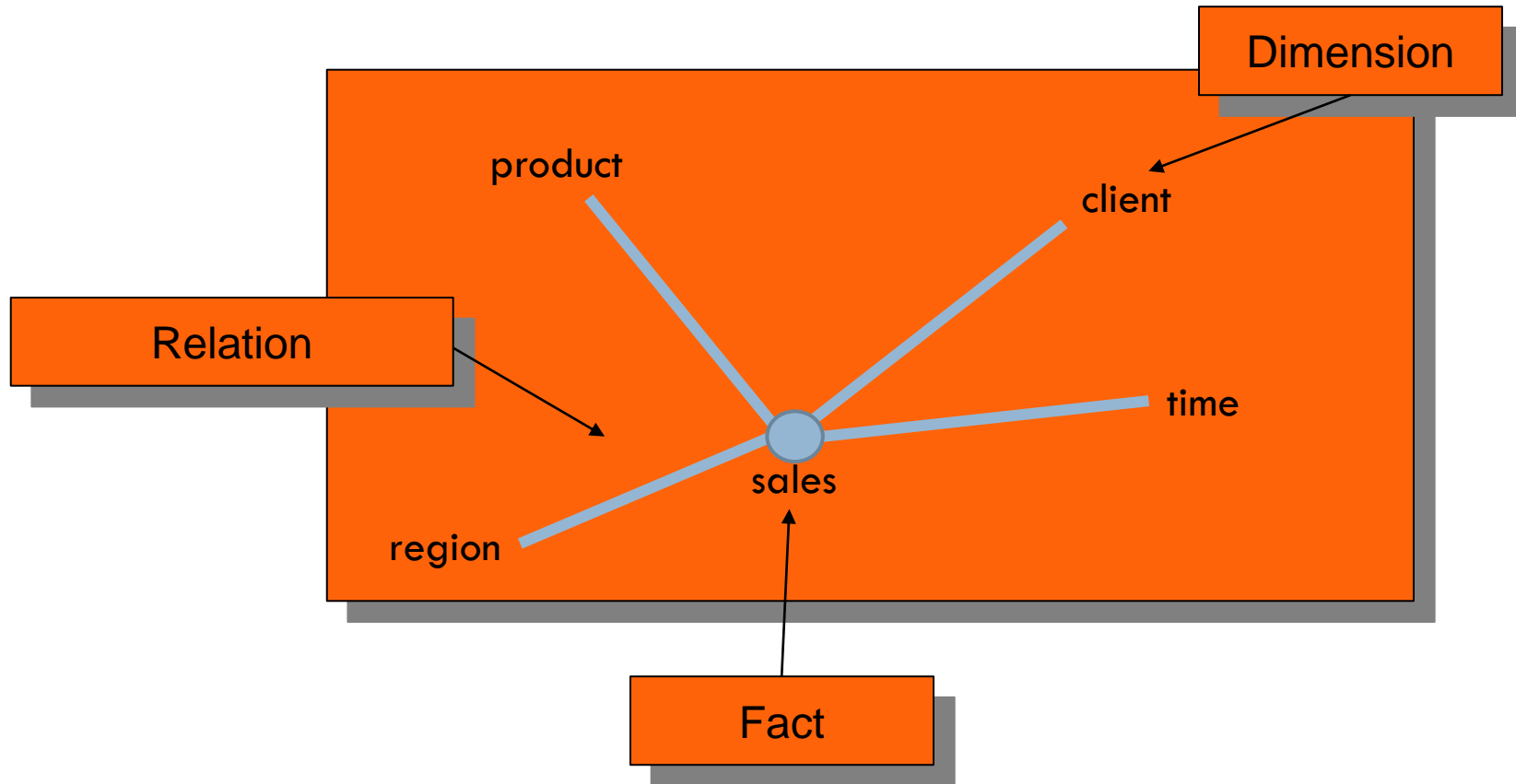
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Conceptual model - dot modeling

- A common method for creating conceptual models for a data warehouse.

- It was first used in July 1997.

- It allows people without IT knowledge to comprehensively build their own conceptual models through the individual perception of their own organizations in terms of dimensions.

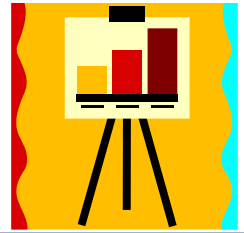- It provides a structured way to construct a logical model from a conceptual model.

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Conceptual model

Dimension

product

client

Relation

time

sales

region

Fact

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Conceptual model

- There are three components in the conceptual model:
    - a point representing the facts to which the subject area name is applied in the dimensional model,
    - dimension names reflecting the dimensions of the warehouse,
    - connectors placed between facts and dimensions, or dimensions and groupings to show dimensions or the hierarchical structure of the warehouse.

Data warehouse modeling
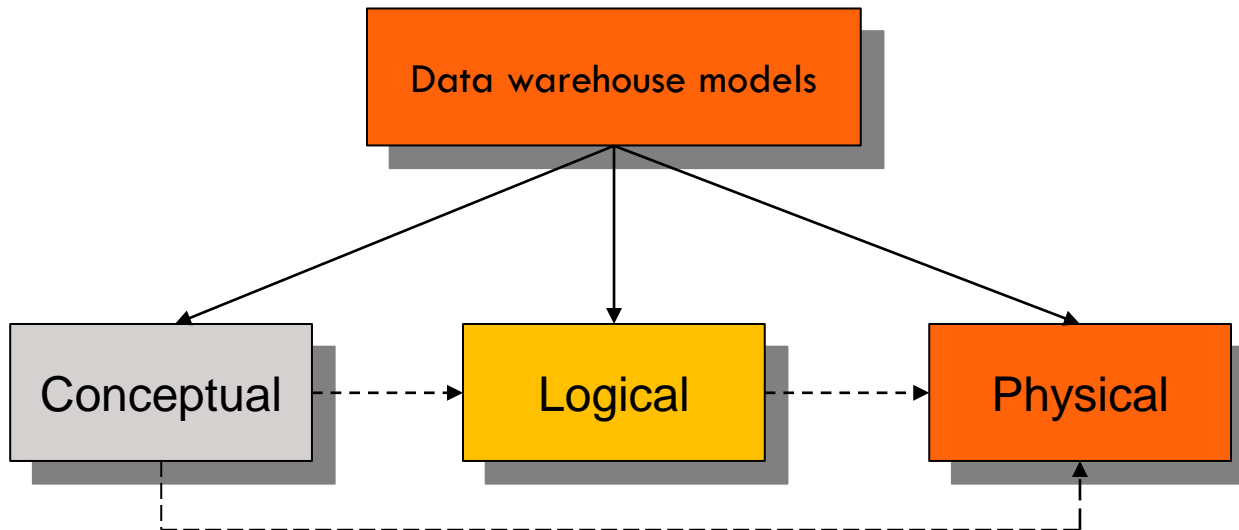
Logical modeling
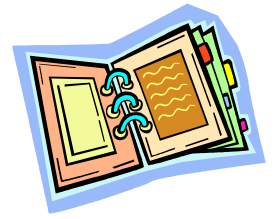
☐ Researching the possibilities and implementation solutions of the general conceptual model in data warehouses.

☐ First of all, the possibility of implementing the concept of retrospection from the conceptual model is examined.

☐ Currently, the logical modeling stage is most often skipped, with designers moving directly from the conceptual model to the physical model.

Data warehouse modeling
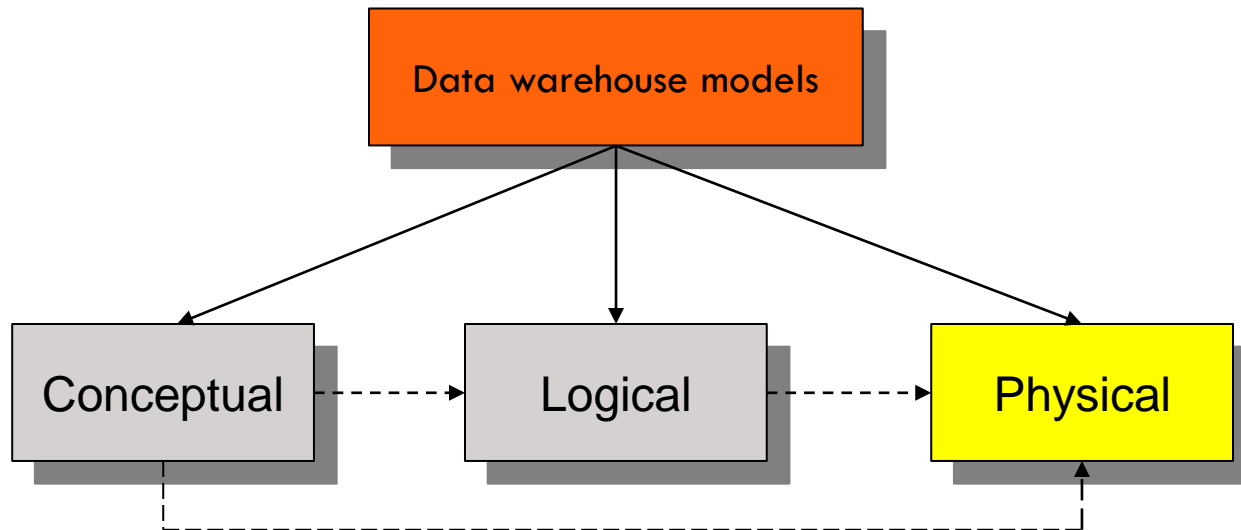
Physical modeling

- It reflects the **physical structure** of the database.

- Defines a structure that conforms to the properties of the **database dictionary.**

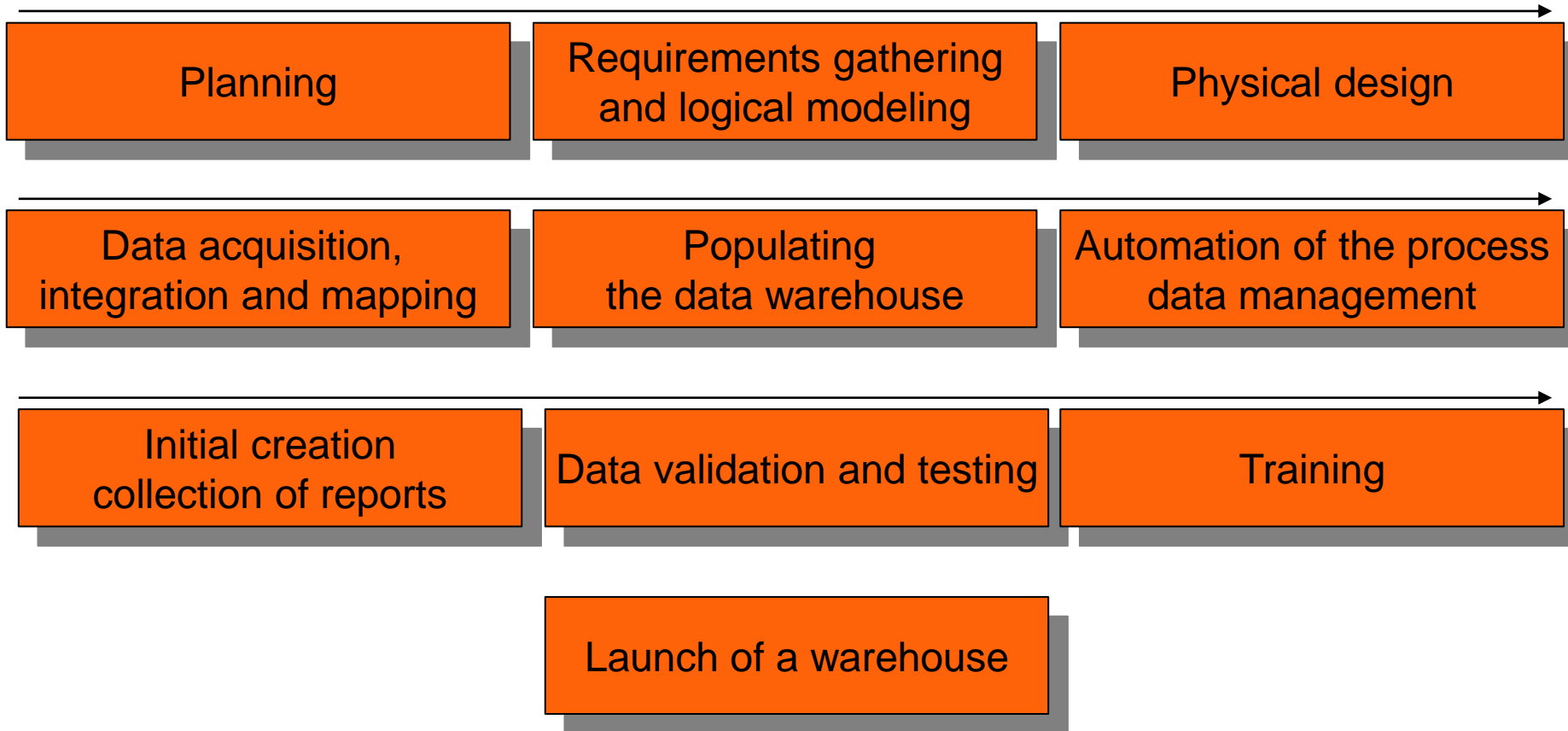- It is a set of table **definitions, perspectives,** and other **database components.**

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Data warehouse implementation methodology

Differences in data warehouse implementation methodologies

- purpose of the warehouse
- the way of modeling the requirements
- data modeling
- support for normalization and denormalization
- supported architecture types

- implementation strategy
- metadata management
- designing queries
- scalability
- change management

Data warehouse design stages

Planning	Requirements gathering and logical modeling	Physical design
Data acquisition, integration and mapping	Populating the data warehouse	Automation of the process data management
Initial creation collection of reports	Data validation and testing	Training

Launch of a warehouse

Data warehouse implementation - planning (1)

defining the scope of the project

creating a project plan

identifying responsible actors

defining individual tasks and the effects of their implementation

defining deadlines

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Data warehouse implementation - requirements gathering and logical modeling (2)

conducting interviews with users

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documenting the results

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defining logical models

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creating a multidimensional model of organization

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Data warehouse implementation - physical database design and development (3)

database design

⬇

identifying keys

⬇

preparation of data aggregation strategy

⬇

capacity planning

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Tables design

Tables
- ADDRESSES
- CATEGORIES
- CHANNELS
- CITIES
- COUNTRIES
- CUSTOMERS
- ORDERS
- ORDER_ITEMS
- PRODUCTS
- PROMOTIONS
- PROMO_CATEGORIES
- PROMO_SUBCATEGORIES
- REGIONS
- External Tables
- Views
- Materialized Views

Global Explorer
- Public Transformations
- Public Experts
- Public User Defined Moc
- Public Data Rules
- Icon Sets
- Security
  - Users
  - Roles

Users and their roles

Aggregated data

Data warehouse implementation - data acquisition, integration and mapping (4)

defining the best data source

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preparation of conversion specification

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mapping source data to target data

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performing analysis for data integration

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reassess your planned capacity

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Data warehouse implementation - data acquisition, integration and mapping (4)

Defining data sources

Data mapping

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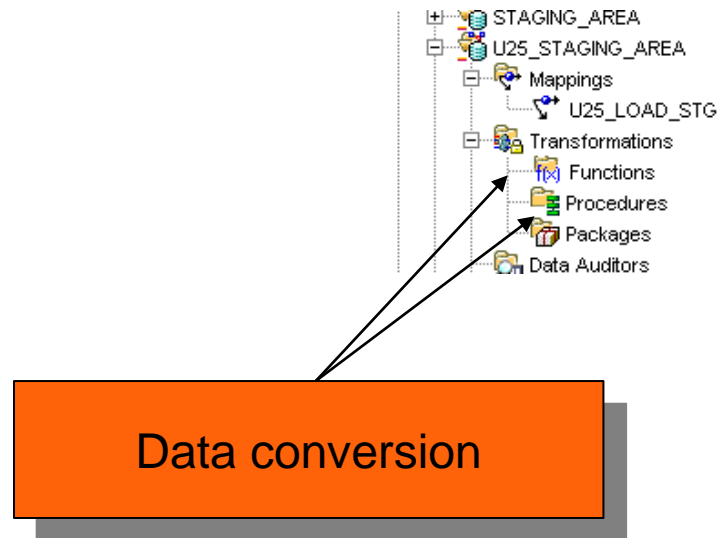# Data warehouse implementation - filling the data warehouse (5)

data conversion

data extraction and transfer

data input

creating a strategy to handle exceptions

Data warehouse implementation - filling the data warehouse (5)

STAGING_AREA
U25_STAGING_AREA
  Mappings
    U25_LOAD_STG
  Transformations
    Functions
    Procedures
    Packages
  Data Auditors

Data conversion

Data warehouse implementation - automating the data management process (6)

automation of the data extraction process

creating archiving and data recovery procedures

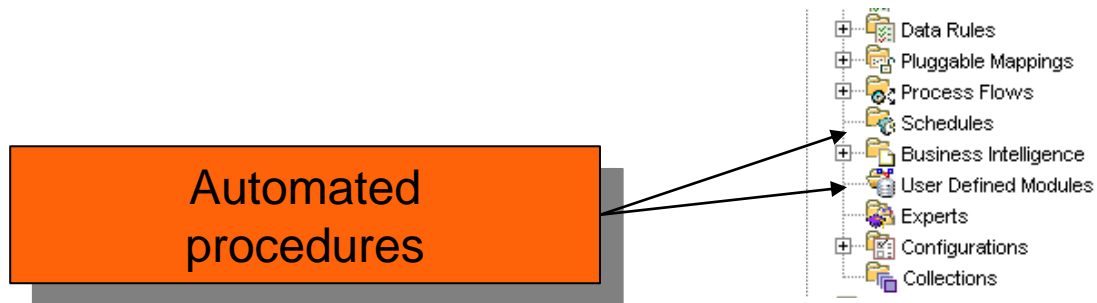data conversion automation

testing automated procedures

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Data warehouse implementation - automating the data management process (6)

Automated procedures

- Data Rules
- Pluggable Mappings
- Process Flows
- Schedules
- Business Intelligence
- User Defined Modules
- Experts
- Configurations
- Collections

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Data warehouse implementation - creating an initial set of reports (7)

development of navigation structures

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preparation of basic reports

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testing reports

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application documentation

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Data warehouse implementation - creating an initial set of reports (7)

Reporting and analysis

- Schedules
- Business Intelligence
  - Business Definitions
  - Business Presentations
- User Defined Modules

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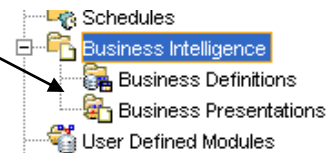
Data warehouse implementation - data validation and testing (8)

data control with an initial set of reports

data control using standard processes

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Correctness check

Applications
Data Profiles
Data Rules
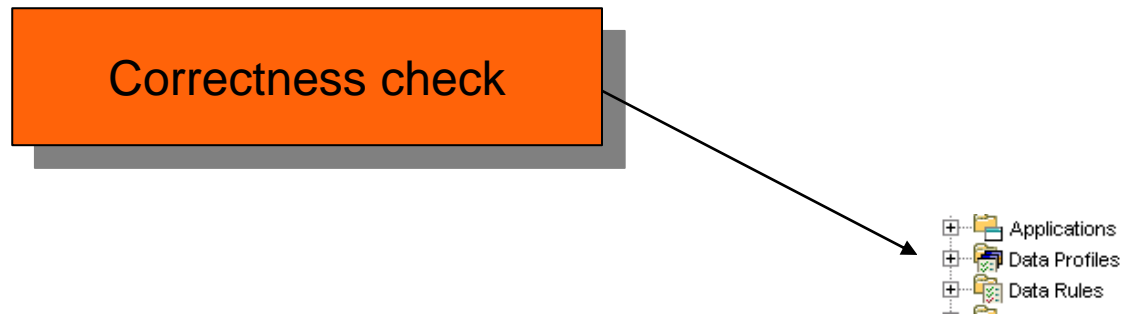
Data warehouse implementation - training (9)

creating user support procedures

designing training programs

internal advertising of a data warehouse

Implementation of a data warehouse - launching a warehouse (10)

installing and testing physical infrastructures

procedures for detecting and resolving data integrity problems

creating procedures for adding new reports and developing the application

deployment of decision support applications

establishing metadata management procedures

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Question

Designing a data warehouse usually begins with model development:

- ☐ logical

- ☐ physical

- ☐ conceptual

- ☐ implementation

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