6. Database Design (2/2)

5.3 Database Design Method

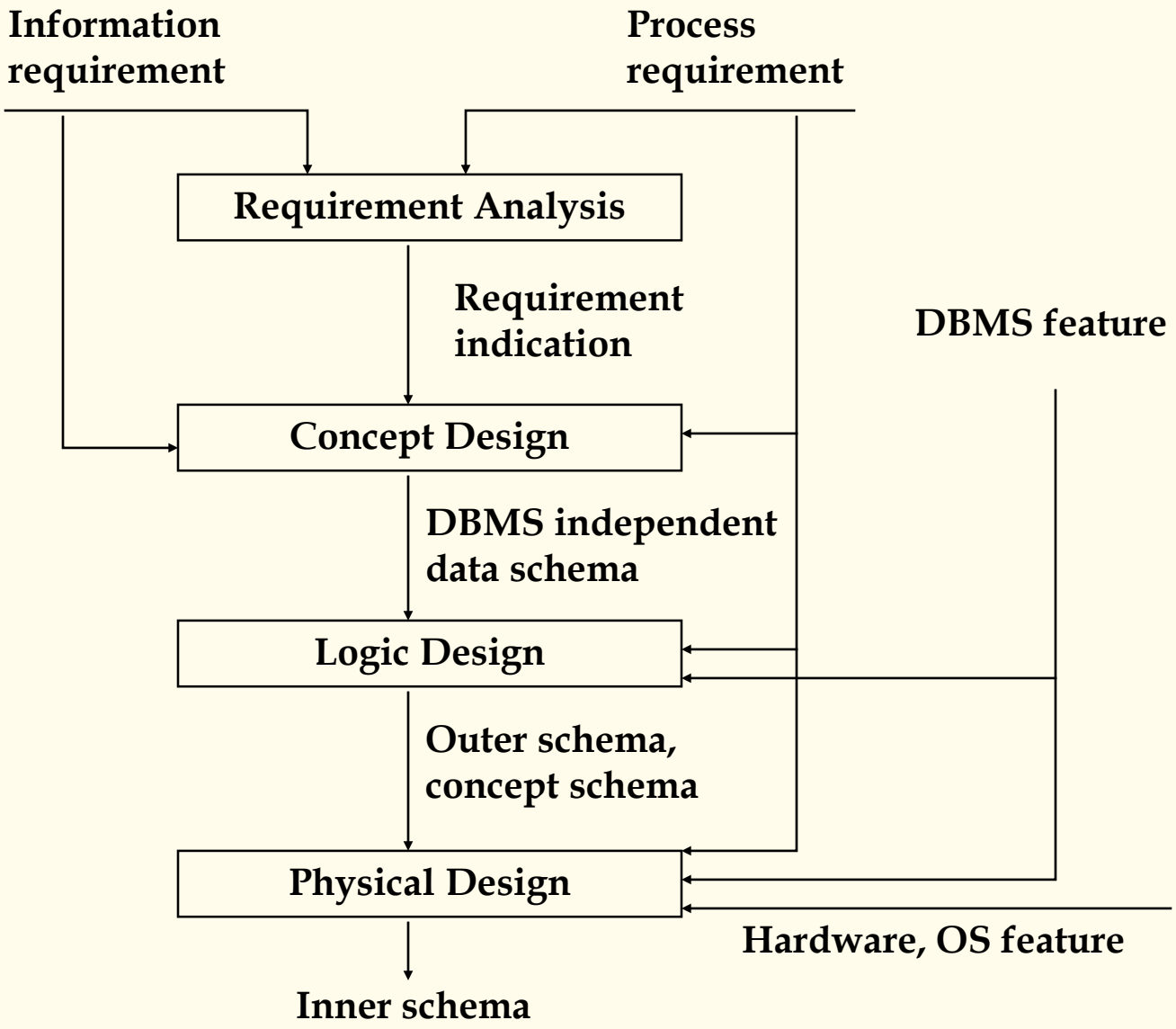
- **Procedure oriented method**

  This method takes business procedures as center, the database schema is designed basically in accordance directly with the vouchers, receipts, reports, etc. in business. Because of no detailed analysis on data and inner relationships between data, although it is fast at the beginning of the project, it is hard to ensure software quality and the system will be hard to fit future changes in requirement and environment. So this method is not suitable for the development of a large, complex system.

- **Data oriented method**

  This method design the database schema based on the detailed analysis on data and inner relationships between data which are involved in business procedures. It takes data as center, not procedures. It can not only fulfill the current requirements, but also some potential requirements. It is liable to fit future changes in requirement and environment. It is recommended in the development of large, complex systems.

Database Design Flow



Requirement Analysis

A very important part of system requirement analysis. In requirement analysis phase, the data dictionary and DFD (or UML) diagrams are the most important to database design.

- **Dictionary and DFD**
  - Name conflicts
    - Homonym(the same name with different meanings)
    - Synonym(the same meaning in different names)
  - Concept conflicts
  - Domain conflicts
- **About coding**
  - Standardization of information
  - Identifying entities
  - Compressing information
- **Through requirement analysis, all information must be with unique source and unique responsibility.**

Concept Design

Based on data dictionary and DFD, analyze and classify the data in data dictionary, and refer to the processing requirement reflected in DFD, identify entities, attributes, and relationships between entities. Then we can get concept schema of the database.

- Identify Entities
- Define the relationships between entities
- Draw ER diagram and discuss it with user
  - It is proposed to use ER design tools such as ERWin, Rose, etc.

Logic Design

According to the entities and relationships in ER diagram, define tables and views in target DBMS. Basic standard is 3NF.

- Translate entities and relationships in ER diagram to tables
- Naming rule of table and attribute
- Define the type and domain of every attribute
- Suitable denormalization
- Necessary view
- Consider the tables in legacy system
- Interface tables

Physical Design

For relational database, the main task in this phase is to consider creating necessary indexes according to the processing requirements, including single attribute indexes, multi attributes indexes, cluster indexes, etc. Generally, the attribute often as query conditions should have index.

Other problems:

- Partition design
- Stored procedure
- Trigger
- Integrity constraints