Three schema or level Architecture

- External, Conceptual, Internal
- Called ANSI/SPARC architecture after committee that proposed it
- ANSI (American National Standards Institute) (SPARC) is Systems Planning and Requirements Committee
- Three levels are only descriptions of data
- Data actually exists only at physical level
- Not all DBMSs may not separate three levels completely, but userful way of thinking about system

Internal Level

- This is the only level where data actually exists
- Other levels are only descriptions of data
- Describes physical storage structure of database
- Describes access paths to data

Conceptual Level

- Describes structure of whole database for enterprise
- Includes conceptual schema
- Hides details of physical storage structures
- Describes
  - Entities
  - Data types
  - Relationships
  - Constraints

External Level

- View tailored to particular user or group of users
- Includes a number of external schema or user views

Mappings

- Transforms requests and results between levels
- DBMS must transform query posed at external level into request that is meaningful at physical level
- External/Conceptual mapping
- Conceptual/Internal mapping

Data Independence

- Logical data independence
  - Can change conceptual schema without changing external schemas or application programs
  - e.g., add new record type, delete record type, add new field
- Physical data independence
  - Can change internal schema without having to change conceptual or external schema
  - Reorganize physical files used by DBMS to improve performance