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**Three Level Architecture Basis Data**

**Database Environment**

* 1. The Three-Level ANSI-SPARC Architecture

**The ANSI-SPARC database architecture** uses three levels of abstraction: external, conceptual, and internal.

* + 1. **External Level**

The **external** level consists of the users’ views of the database. It is also called **view level**. The reason this level is called “view” is because several users can view their desired data from this level which is internally fetched from database with the help of conceptual and internal level mapping.

*(External level terdiri dari tampilan database pengguna. Level ini biasa disebut view level beberapa pengguna dapat melihat data yang diinginkan dari level ini yang secara internal diambil dari database dengan bantuan conceptual and internal level mapping.)*

* + 1. **Conceptual Level**

The **conceptual** level is the community view of the database. This level contains the logical structure of the entire database as seen by the DBA. It is a complete view of the data requirements of the organization that is independent of any storage considerations.

*(Conceptual level adalah tampilan komunitas dari database. Tingkat ini berisi struktur logic dari seluruh database seperti yang terlihat oleh Database Administrator.)*

The conceptual level represents:

* all entities, their attributes, and their relationships;
* the constraints on the data;
* semantic information about the data;
* security and integrity information.
  + 1. **Internal Level**

The **internal** level is the computer’s view of the database. This level describes how the data is stored in the database.

*(Internal level adalah tampilan komputer dari database. Tingkatan ini menjelaskan bagaimana data disimpan dalam database..)*

The internal level is concerned with such things as:

* storage space allocation for data and indexes;
* record descriptions for storage (with stored sizes for data items);
* record placement;
* data compression and data encryption techniques.
  + 1. **Schemas, Mappings, and Instances**
* Schemas
* **Database schema :** description of the database structure.
* **Multiple external schemas / subschema :** correspond to different views of the data.
* **Conceptual schema** : describes all the entities, attributes, and relationships together with integrity constraints.
* **Internal schema** : complete description of the internal model, containing the definitions of stored records, the methods of representation, the data fields, and the indexes and storage structures used.
* Mappings
* **External/conceptual mapping** : transforms requests and results between the external and conceptual levels.
* **Conceptual/internal mapping** : transforms requests and results between the conceptual and internal levels.
* Instances
* **Database instance** : The data in the database at any particular point in time.
  + 1. **Data Independence**

A major objective for the three-level architecture is to provide data independence. Data independence makes each level immune to changes to lower levels.

*(Tujuan utama three-level architecture adalah untuk memberikan kebebasan data. Independensi data membuat setiap level kebal terhadap perubahan ke level yang lebih rendah.)*

There are two kinds of data independence:

* **Logical data independence** refers to the immunity of the external schemas to changes in the conceptual schema.
* **Physical data independence** refers to the immunity of the conceptual schema to changes in the internal schema.