

DBMS Term Paper

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1 ABSTRACT

In the era of technology we can't imagine a single day without using apps or websites for our needs. From paying fee on college website, booking online ticket, online tax payment, applying for exam all these require a good management of users data and here Database Management system comes into picture. A database management system (or DBMS) is just like the computerized data-keeping system. Users of the system are given facilities for performing several kinds of operations on system for either manipulating the data in the database or the database structure management.

2 INTRODUCTION

Data working with business stakeholders and also potential users of the information system. Data modeling can be performed in various types of projects and in multiple phases of projects. Data models are progressive hence; there is no such thing as the final data model for a business or application.

- Process of producing a data model for the data to be stored in a database
- It is a conceptual representation of Data objects, the relationships between different data objects, and the rules.
- Data modeling aids in the visual representation of data and enforces business rules, regulatory compliances, and government policies on the data.
- An abstract model that organizes data description, data semantics, and consistency constraints of data.

- The data model emphasizes on which data is needed and how it should be organized instead of what operations will be performed on data.
- Data Model aids to build conceptual models and set a relationship between data items.

3 CONTENT

There are three different types of data models made while progressing from requirements to the actual database to be used for the information system. The data requirements are initially considered as the conceptual data model that is essentially a set of technology independent specifications about the data and is used to discuss initial requirements with the business stakeholders. The conceptual model is then converted into a logical data model, which documents structures of the data that can be implemented in databases. Implementation of one conceptual data model might require multiple logical data models. The last step in data modeling is converting the logical data model to a physical data model that arranges the data into tables, and accounts for access, performance and storage details. Data modeling not only defines data elements, but also their structures and the relations between them.

Data modeling techniques and methodologies are used to model data in a standard, consistent, predictable manner to manage it as a resource. Data models defines how the logical structure of a database can be modeled. Data Models are fundamental entities used to introduce abstraction in a DBMS. Data models show how data is connected to each other and the way they are processed and stored inside the system.

The very first type of data model could be flat data-models, where all the data that are used are kept in the same plane. Earlier data models were not so scientific, hence they were prone to introduce lots of duplications and update anomalies. It provides the conceptual tools for describing the design of a database at each stage of data abstraction. Therefore, there are four data models used for understanding the structure of the database: modeling is a process that is used to define and analyze data requirements needed to support the several processes within the scope of corresponding information

systems in organizations.

- Relational Data

A relational database is a collection of information that organizes data points with defined relationships for easy use. In the relational database model, the data structures – including data tables, indexes and views – remain separate from the physical storages, database administrators to edit the physical data storage without altering the logical data structure.

- Entity-Relationship Data Model

An entity–relationship model describes interrelated things of interest in a specific domain of knowledge. A basic ER model is composed of entity types (which classify the things of interest) and specifies relationships that can be present between entities (instances of those entity types).

- Object-based Data Model

In object based data models, the pivot is on the way data is represented. The data is divided into multiple entities each of which have some defining properties. Moreover, these data entities are interconnected with each other through some relationships.

So, in object based data models the entities are based on real world models, and how the data is in real life.

- Semi structured Data Model Semi-structured data is data that does not obey to a data model but has some structure. It does not have a fixed or inflexible schema. It's data that does not reside in a relational database but that has some organizational properties that make it easier to analyze. With some methods, we can store them in the relational database.

Data modeling process :

The procedure of designing a database involves producing the previously described three types of schemas that are conceptual, logical and physical. The database design documented in these schemas are converted through a Data Definition Language, which can then be used to generate a database. A fully attributed data model has detailed descriptions for every item within it. The term "database design" can describe many distinct parts of the design of an overall database system. Principally ,it can be thought of the logical

design of the base data structures that are used to store the data. In the relational model these are tables and views. In an object database the entities and relationships map directly to the object classes and named relationships. As a discipline, data modeling ask stakeholders to evaluate data processing and storage in painstaking detail. Data modeling techniques have distinct conventions that show which symbols are used to represent the data, how models are laid out, and how business requirements are conveyed. All approaches provide formalized workflows that comprise a sequence of tasks to be performed in repetitive manner. Those workflows generally look like this:

- Identify the entities. The process of data modeling starts with the identification of the things, events or concepts that are represented in the data set which is to be modeled. Each entity should be cohesive and logically discrete from all others.

Identify key properties of each entity. Each entity type can be different from all others because it has one or more unique properties that are called attributes. For instance, an entity called “customer” might has such attributes as a first name,telephone number, last name, and salutation while an entity called “address” might include a street name and number,country and zip code a city, state.

- Identify relationships among entities. The earliest draft of a data model will the nature of the relationships each entity share with the others. In the above example, each customer “lives at” an address. If that model were expanded to include an entity called “orders,” each order would be shipped to and billed to an address as well. These relationships are usually documented via unified modeling language.
- Map attributes to entities completely. This will make sure the model reflects how the business will use the data. Several formal data modeling patterns are in vast use. Object-oriented developers often apply analysis patterns or design patterns, whereas stakeholders from other business domains may turn to other patterns.
- Assign keys as needed, and decide on a degree of normalization that balances the need to reduce redundancy with performance

requirements. Normalization is a technique for organization of data models (and the databases they represent) in which numerical identifiers, called keys, are assigned to groups of data to represent relationships among them without repeating the data. For instance, if customers are each assigned to a key, that key can be linked to both their address and their order history without having to repeat this information in the table of customer names. Normalization tends to reduce the amount of storage space a database will require, but it can also cost to query performance.

- Finalize and validate the data model. Data modeling is an repetitive process that should be repeated and refined as business needs change. Finalize and validate the data model.

4 CONCLUSION

Data modelling is the process of analysing and defining all the different data the business collects and produces, as well as the relationships between those bits of data. The process of modelling the data creates a visual representation of data as it is used at the business, and the process itself is an exercise in understanding and clarifying the data requirements.

5 REFERENCE

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