

Database design paper



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A database is a computerized application that facilitates a structured collection of information that stores, organizes, and retrieves data efficiently. The data is raw units that create the foundation of information for a database application to access, manipulate, and present it in a useful way. A database is implemented and structured according to the needed database model. The models are hierarchical, network, object-oriented, and relational. The most popular and widely used database model was developed by Edgar F.

Cod, it is the relational database. Origins of database history dates back to 1960 when computers became cost-effective for private companies, libraries, governmental business, and medical records. One major computerized transaction processing system built by IBM and American Airlines. According to Saber Holdings (2003-2010), "The state-of-the-art mainframe system processed 84,000 telephone calls per day. The initial research, development and installation investment in this system took 400 man-years of effort at a development cost of almost \$40 million" (Sasser's, Para.). Database Architecture Database Architecture is the physical arrangement of a database. Developed from thematic theory and structural models, database architecture is built on the use of query language and database management systems (DB'S) principles to exploit data storage arrangement and organization. According to Gray (2004), "Database system architectures are undergoing revolutionary changes. Most importantly, algorithms and data are being unified by integrating programming languages with the database system" (Abstract, Para. 1).

Database architecture consists of three levels or views; 1. External View - External schema represents data as a set of relations. It specifies a view of the data that should not be seen by some users. Security levels are implemented and the view for users is simplified. 2. Conceptual View - Hides details of the physical level. The conceptual data is presented as a set of tables. A database management system must change mapping from conceptual to physical. This level is referred to the physical data independence rule from Cod's 12 rules. 3.

Internal View - This level is referred to as the physical view level. It identifies how the data is stored on the physical storage structure of the database and files. Relational Databases In 1969, Dir. Edgar F. Cod, a pioneer in computing, developed the relational model. In June 1970, Dir. Cod published an important document " A Relational Model of Data for Large Shared Data Banks," that defined the characteristics of a database in the language of first-order predicate logic. He defined a set of rules that constituted what a relational database was.

His 13 rules, known as Cod's 12 Rules because it is zero based, became a foundation for database software development research. According to Dwell (1994-2003), " Probably Cod's biggest overall achievement was to make database management into a science; he put the field on solid scientific footing by providing a theoretical framework within which a variety of important problems could be attacked in a scientific manner" (Cod's Fundamental Contributions, Para. 2). Relational Database Architecture Structured Query Language (SQL) or other database languages are a fundamental part of relational database architecture.

To manipulate data within a database a set of commands and statements must be defined by the READS application. The application permits data access control, schema creation, modification, query, data insertion, update, and delete. A database receives a query for the information contained in tables, rows, columns, and records. Microsoft Office Access application is a relational database management system with a graphical user interface. The software is only used as a front-end application because of the possibility of corrupted data when a dropped network connection occurs while writing to MS Access back-end file.

A split-architecture is highly recommended by Microsoft. Relational databases support mathematical sets of operations, namely Cartesian product, intersection, difference, and union. Relational databases also support unique to this type of model. Many benefits in using relational databases are excellent security, use of an easy to read language (SQL), support dynamic views instead of just static, supports new hardware technologies, supports implementation of distributed systems, and is very scalable. The industry I work in is power utility SCADA systems.

Real-time databases are used to read telemarketing values (Analog), obtain states of equipment (Binaries or discrete data), and provide remote control over electrical breakers (Controls). Our main database is called a " Master Station. " It polls slave devices every two seconds for data, depending on the medium the slave device is using (fiber optics, microwave radio, or telephony services), and it usually takes six seconds for a turn-around response. The slave device contains a real-time database as well. Both master and slave databases must match to allow the points to be valid.