A database is a self-described collection of integrated relationships, which contains relational data items among themselves as well as data items themselves [1]. As human society progresses, databases become more powerful and have an increasingly wide range of applications and fields of use. DBMS users include database administrators (DBAs), application programmers and end users.

Ancient government departments, school libraries, hospitals, commercial firms, etc. developed their own complex database systems based on the founding principles, many of which have been used to date. Terminology databases were created by private companies in the mid-1960s to increase the cost-effectiveness of their data storage capacity [2]. Terminology databases have direct access to disks and drums, allowing shared interactive use rather than daily batch processing. Two typical data models are the network model CODASYL (Conference on Data Systems Language) and the hierarchical model IMS (Information Systems Management), where a well-known commercial application success story is IBM's SABRE reservation system, which helps American Airlines travel services manage reservation data. [3]

The modern relational database model differs from the traditional database model in that searching data by content for applications is the principle on which modern relational databases are built. 1970s E.F.Codd establishes a schema or logical organisation of databases disconnected from physical storage and the database INGRES is developed by the University of California, Berkeley and then successfully used commercially, while relational databases (RDBMS) are created. Databases gradually achieved data storage and data integrity, and in the 1980s relational systems were used in large numbers in commercial services. [4]

The rapid growth of all industries has led to an explosion in the volume, diversity and speed of modern data giving rise to new technologies for processing and analysing huge and complex big data, for example. [5] The 'Internet of Everything' is driving exponential growth in data, with more and more data needing to be stored and analysed. This exponential growth in data has led to an increase in the frequency and granularity of data collection, while increasing the challenges for the data management industry. [6] Traditional businesses have had problems with databases not being able to handle data sets that are larger than the capacity of typical database software to capture, store, manage and analyse in order to obtain a better user experience. The upgrading of hardware and software processing technologies has placed greater demands on the expertise of database managers in the storage and management of big data, as well as on the development skills of developers. The skills required of database managers include: programming, statistics, mathematics, business acumen and communication skills. [7] At the same time, database management systems are now facing a lack of technical resources, especially good database administrators (DBAs) and data architects. [8]

While traditional database management systems only had the ability to store data in a structured format, new systems for storing and analysing unstructured data are gaining popularity with the development of Big Data technology. Unstructured data is derived from internet searches, web logs, radio frequency identification, etc. and is combined with structured data. [9]

Traditional relational database management systems (RDBMS) offer a faster and richer environment, as well as more stable data sharing and hybrid data formats. [10] RDBMS have the disadvantage of limitations associated with the memory available on a single server, so it is limited to solving relatively small sizes. traditional databases that have dominated since the 1980s are Oracle, SQL and MySQL databases, and NoSQL is one of the world's largest data warehouses. [11]Hadoop is the most widely used open source Big Data technology, with vendor products such as Oracle, SAS and IBM integrated with Hadoop functionality. [10]

DBAs are information technology personnel responsible for ensuring the continued use of functionality and efficiency of databases and the applications that access them.Their role is to establish, manage and support access to data for specific database technologies[12],and they achieve observable results through the application of knowledge, skills and attitudes[13]. The rapid development of new technologies such as big data, cloud computing and virtualisation has placed greater skill requirements on DBAs. Skills fall into two main categories: professional and technical skills as well as interpersonal skills. Interpersonal skills include excellent written and verbal communication skills as well as excellent communication skills, the ability to focus and pay close attention to detail, and problem-solving skills to ensure interaction with different teams, end users and executives in the organisation. Specialist technical skills are knowledge of computer systems, database management systems, etc. The technical requirements of the DBA are increasing as new technologies emerge. The roles of DBAs, system administrators and developers are blurred with each other, so typically DBAs need to have a reservoir of knowledge in information science, computer science, etc., as well as hands-on experience to work with Hadoop systems[14]. Due to the constant emergence of new technologies and innovative systems, DBAs need to have strong organisational skills, logical and analytical skills and the ability to learn throughout their lives. [14]

Modern traditional databases offer many advantages such as on-the-fly querying, efficient access, concurrency control, crash recovery and security, but they also have two significant disadvantages: firstly, the data can be irregular and does not conform to a strict schema. In relational systems, null values are often used when the data is irregular, and it is difficult to design a suitable object-oriented schema to accommodate databases with irregular data, and secondly, it is difficult to decide on the right database in advance, with database structures changing rapidly, data elements changing type and adding data that does not conform to previous structures, and data schemas being modified frequently. However, traditional databases are constantly being optimised and innovated, resulting in a wide range of databases with many functions. The Lore system at Stanford University, for example, is designed specifically to manage semi-structured information, primarily for lightweight object repositories with novel features such as dynamic structure summaries and access to data from external sources.Lore data can be used for one or more irregular or incomplete schemas, and has numerous features that can be used by the public. [15]

Financial companies generate large amounts of data in their daily transactions. Before modern databases, the particular organisation of data in secondary storage led to limitations in the company's data management. The company implemented a database that followed a logical relational structure between multiple documents by sorting and merging the included files/documents and building the database on top of indexes and links[16]. This database structure is easy to use, the relationships between tables within the structure are implicit and a large number of database managers can act as direct users and sources of the database[17]. Database management work ensures that the company's data resources are used accurately and securely for all application activities. Data management activities include data collection, integrity and testing, storage, maintenance, security, organisation/structure of data to match the information needs of the user, taking, etc. [18]. In contrast to the pre-computer era, these activities were performed by administrative staff supported by punch cards and machine drives [19]. The main objectives of the database concept are to minimise data redundancy and to achieve data independence. The steps in the creation of a company database are the identification of data requirements, the interpretation of the required data and the transfer of data into the data. Database managers need to write efficient data processing computer code to enable the management of the database. [18]

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