

Parts of a Database System

by Sophia



WHAT'S COVERED

Modern database systems have many pieces working together to support business needs. This tutorial explores the five main parts of a database system, including hardware, software, people, procedures, and data, in two parts:

1. Introduction
2. Components of Database Systems
 - a. Hardware
 - b. Software
 - c. People
 - d. Procedures
 - e. Data

1. Introduction

As you learned in the prior tutorial, the issues with flat file systems make the use of a database much more effective and efficient. Whereas flat file systems contain separate and unrelated files, a database stores logically related data in separate tables within the same system. This structure helps organize how data is stored, accessed, and managed, all in one place. The database system has five main parts, including the hardware, software, people, procedures, and data.

2. Components of Database Systems

a. Hardware

Hardware refers to all of the physical devices that the database system interacts with. This can include the servers that the database is connected to, as well as the desktop, workstations, tablets, and mobile devices that connect to the database. In addition, hardware also includes the network components, storage devices, and other devices that may be unique to a database system, such as a digital key reader or automated teller machine.



b. Software

The **software** in the database system can consist of the programs that organize the database system and provide interactions to users. There is the operating system software that helps to manage the hardware components and allows the other key software to run on the servers and computers. Some common operating systems include Windows, Linux, Mac OS, UNIX, Android, and iOS. The database management system (DBMS) software is what manages the database within the entire database system. Some common DBMS software includes PostgreSQL, Oracle, MySQL, MS Access, and MS SQL Server.

The other types of software in a database system are the applications or utilities that are used to access and manipulate data. These are the programs that are used to interact with the DBMS to insert data, query data, and create reports. There are various tools and utilities that are also used to help create the database structures and control access. One such utility is the web interface that you use in this course to access the PostgreSQL database to be able to run SQL commands.

c. People

The people include the various types of users in the database system. There are generally five different types of users that are defined based on job functions within the database. **System administrators** oversee the entire database/information system to ensure that everything is operating optimally. **Database administrators**, or DBAs, are the users that manage the database management system specifically and ensure that the database is running correctly. DBAs control access and optimize the queries.

Database designers design the database structure and architect the database to ensure that the database design not only fits the business needs but also functions optimally. System analysts and programmers design and implement the application programs that interact with the database management systems. They create the web applications, applications, and reporting systems that end users use to interact with the data. Lastly, you have **end users**, which are the individuals that use the applications to run the day-to-day operations of the organization. Different end users will interact with different levels of the information from the database.



DID YOU KNOW

Sales, marketing, customer service, directors, or even the CEO of a company would be considered an end user of a database system.

d. Procedures

Procedures are the rules or instructions that define how the database is designed and how it is used. This is a key aspect of the database design process, as it ensures that the specific way that a business operates is correctly reflected in the database design and setup. These procedures can also include various methods to monitor and audit the data based on a business process or laws.

e. Data

Lastly, you have **data**, which are just the raw facts that are used to build information.

The entire database system has to fit within an organization's operational structure. Depending on the business and the size and complexity of the organization, there may be varying amounts of each part of the database system.



TERMS TO KNOW

Hardware

All of the physical devices that the database system interacts with.

Software

The programs that organize the database system and provide interactions to users.

System administrator

Person who oversees the entire database/information system to ensure that everything is operating optimally.

Database administrator (DBA)

User of the database management system who ensures that the database is running correctly.

Database designer

Architect of the database who ensures that it fits the business needs and functions optimally.

End user

User of the applications to run the day-to-day operations of the organization.

Procedures

The rules or instructions that define how the database is designed and how it is used.

Data

The raw facts that are used to build information.



SUMMARY

There are five main parts of a database system, including hardware, software, people, procedures, and data. Hardware covers the physical objects used. Software involves the programs for interacting with the data, or raw facts used to build information, by performing certain procedures that define how the database is used. A variety of people in different roles are also part of a database management

system, including system administrators, database administrators, database designers, programmers, and end users. These people all work together to create and maintain the database system of a company or organization.

Next time, you will examine the differences between relational databases and non-relational databases.

Source: Authored by Vincent Tran



TERMS TO KNOW

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