ABSTRACT

Database is widely used today. Within this report, necessary explanations are made on database, database types, database management system and details. The main subject is the database server and the information required for SQL, known as the database management system. We briefly explained the components included in the architecture by showing the Microsoft SQL server architecture as an image. Local network connection via tcp. Finally, we explained the difference between the web server and database server that are commonly used together.

What is the Database?

Database means storing the data on a certain area. They are things that are kept on a regular basis, are manageable and easily accessible. If we want to constantly update the data in our database, we need a database if we want to prevent duplicate data.

What are the features of a good database:

1) The data can be entered quickly and easily.
2) The data is stored securely.
3) No maintenance required
4) Esnektir may also give a burden to the future needs of the customer.
5) The presence of non-matching records is blocked.

Database management system (DBMS)

Database management system, System software for creating and managing databases. The database management system allows users and programmers to create, retrieve, update and manage data in a systematic way.

The database manages 3 important things:

1) Data
2) Provides data that is accessed, locked, or modified in the database infrastructure
3) Database schema that defines database logical structure

What Types of Database

Oracle, SQL Server, Microsoft Access, MySQL, DB2, Paradox. Today, there are many database products on the market. So, choosing a platform for your organization's structure can be a bit difficult. Database management systems can be divided into two groups as desktop databases and server databases. In general, desktop databases are focused on single-user applications and depend on standard personal computers.

Server databases are focused on multi-user applications. It includes mechanisms to ensure the reliability and consistency of the data. These databases are designed to work on high performance servers. It is important that you have identified your needs before deciding on any database. Once you have planned to buy an expensive server-based database, you can understand that a desktop database is better for you. Likewise, once you have decided on a desktop database, your needs can lead you to server-based databases.

The following questions can help you in choosing a database:

* Who will use the database and what tasks will this person perform?
* How often will the data be changed? Who will make these changes?
* Who will provide information technology support for the database?
* What hardware is available? Do you have a budget for additional equipment?
* Who will be responsible for maintaining the data?
* Will data access be provided over the internet?

Once you have answered these questions, you will be ready to evaluate the database management systems. Because of your complex requirements, you might think that multi-user server platforms (such as SQL Server or Oracle) will be more useful to you. On the other hand, you can also think that a desktop database like Microsoft Access will suffice to meet your needs.

Desktop Databases

Desktop databases are a low-cost solution that you can choose to store non-complicated data and address needs. The name of the desktop database is designed to work on desktop computers. Microsoft Access, FoxPro, FileMaker Pro, Paradox, and Lotus Approach are examples of desktop databases you may be familiar with.

The benefits of using a desktop database are as follows:

* Desktop databases are not expensive. Desktop databases are much cheaper than server-based databases. This is the most multiplier advantage of desktop databases.

* Desktop databases are useful. Deep SQL knowledge is not required when using these systems. Desktop database management systems are easy to use. Users do not have difficulty in this regard.

* Desktop databases provide web solutions. Many modern desktop databases allow you to publish data on the web in static or dynamic format.

Server Databases

Server databases such as Microsoft SQL Server, Oracle, and IBM DB2 make it easy to manage large amounts of data effectively. Many users can access and update the data at the same time. If your budget is sufficient, a server-based database can offer a unique data management solution.

The benefits of using a server-based system are as follows:

-> Flexibility. Server-based databases can come from any data management problem. Developers are also happy with these systems. Server databases are the systems you need to choose if your budget is sufficient.

-> Strong performance. Server-based databases provide strong performance. You can get the performance you want from these databases. Modern databases can manage multiple high-speed processors, clustered servers, high-bandwidth connectivity, and degradation-resistant storage technology.

-> Scalability. If you are willing to provide the necessary hardware resources, server databases can manage the rapidly increasing number of users and data.

This article has provided some basic information to help you in the database selection process. It is advisable to consider the points mentioned above before deciding.

DATABASE SERVER

A database server is a computer system that provides other computers with services related to accessing and retrieving data from a database. Access to the database server may occur via a "front end" running locally on a user's machine (eg, phpMyAdmin), or "back

end" running on the database server itself. After the information within the database is retrieved it is outputted to the user requesting the data.

Many companies utilize a database server for storage. Users can access the data by executing a query language specific to the database. For example, SQL is a good example of a query language.

SQL Server Management

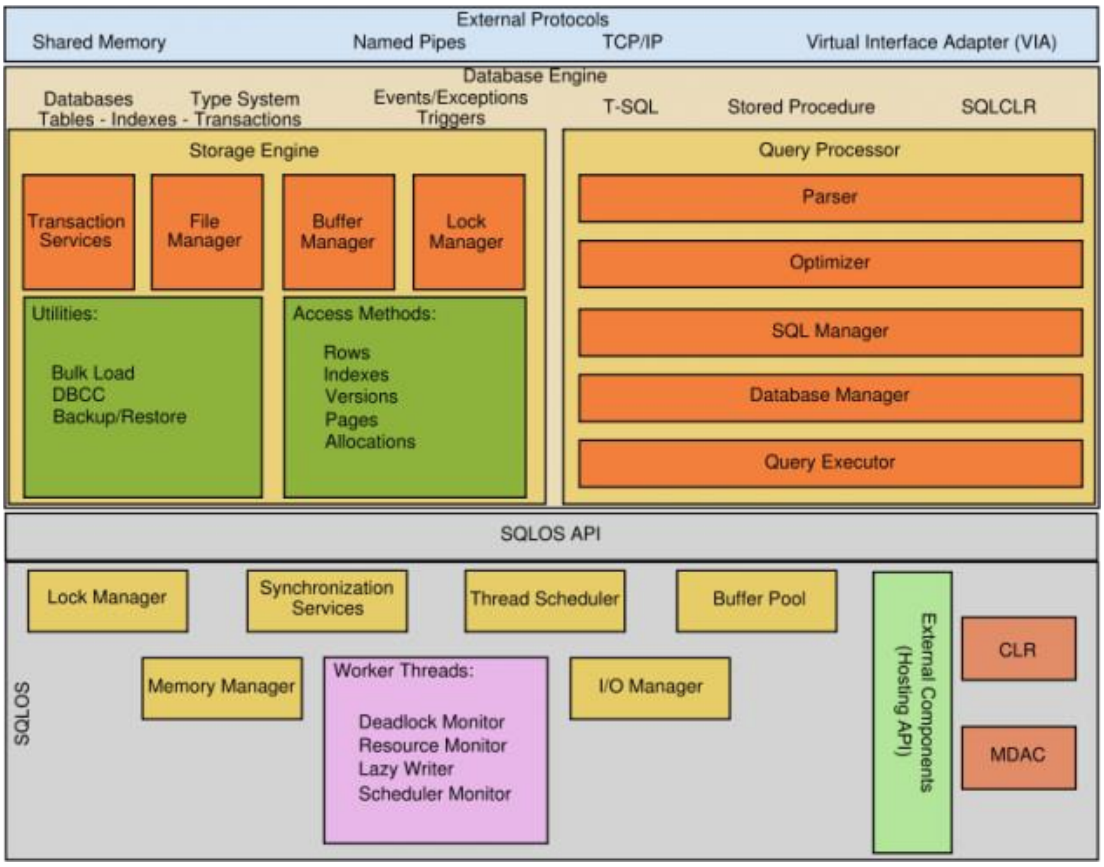
SQL Server is a relational database management system developed by Microsoft. In the relational database system, the data are kept in tabular form, and these tables may be related to each other in an interrelated sense. There are various versions of Microsoft SQL Server as antivirus. Express versions are free of charge. They are used for educational purposes.It is more accurate to specify SQL Server as a service rather than as an application.

SQL Server is a database management system that has such an important database, it has a rich feature that is indispensable for web sites, other enterprise applications, desktop applications that continuously process data. Each of these features also requires separate expertise. So for reporting on a SQL server, for software development, for data protection, for data management is actually different from the specialization branches.

Programmers We use the SQL server for software development to manage more data. You can not develop a desktop application on a SQL server on a WEB application, but you can use it within these applications to best manipulate the data here. It is highly likely that you will be using programming languages such as Visual Basic.NET and C #, which are highly compatible with SQL Server as programming languages. You can use and manipulate your data as you wish using the T-SQL code on the platform on which you have developed your application

When the user system is connected to a WEB application, the server of the WEB application will be run first and all the information reflected to the user through this server will come from a database management system located on the backside of the system.

Microsoft's resources include the following diagram for SQL Server architecture.



When we look at this diagram, there are 3 main components related to the antivirus SQL Server database architecture.

1. SQL Server Network Interface (SNI)
2. Database Engine

2.1. Relational Engine

2.2. Storage Engine

3. SQL OS

1) SQL Server Network Interface: Provides network management between the client and the server as the name implies. It provides 4 protocols: Shared memory, TCP / IP, Named Pipes and Virtual Interface Adapter (VIA). The settings of these protocols can be managed via the SQL Server Configuration Manager named program.

Shared memory: This is the simplest and fastest protocol and is used automatically when SQL Server and the client are on the same machine. No adjustable features are available.

TCP / IP: This is the most popular protocol and allows you to access the SQL server via IP. This port can be changed with default port 1433.

Named Pipes: can be used if the SQL server and client are on the same local area network. It uses the TCP port 445. SQL Server alias can also be defined and used over wide area network, but it is advised not to choose to run slowly.

Virtual Interface Adapter (VIA): This protocol is known as the highest performing protocol, requiring special hardware.

Client requests are converted to Tabular Data Stream (TDS) by this network interface and sent to the server over the network. TDS was originally designed by Sybase and is an application layer protocol for data transfer between the database server and the client. There are endpoints on the server that will listen to these TDS packets. Each network protocol has a unique TDS endpoint. The list of these endpoints can be retrieved from the named view sys.endpoints.

When we run a query, it will be enough to run "Client Statistics" with the query on Management Studio to see the TDS package size between the server and the client.

2. Database Engine

2.1) Relational Engine: This engine, known as a query processor, analyzes the SQL queries and extracts it into logical units such as keywords, parameters, operators and identifiers.The query determines the needs for the operation of the NN and decides how to supply these needs from the shortest path (Optimizing the execution plans). It reports the request to the storage engine and processes the result from it, providing the user with the appropriate format (typical result list, XML ...). He is generally responsible for the following tasks.

-Query Processing

-Memory Management

-Thread and Task Management

-Buffer Management

-Distributed Query Processing

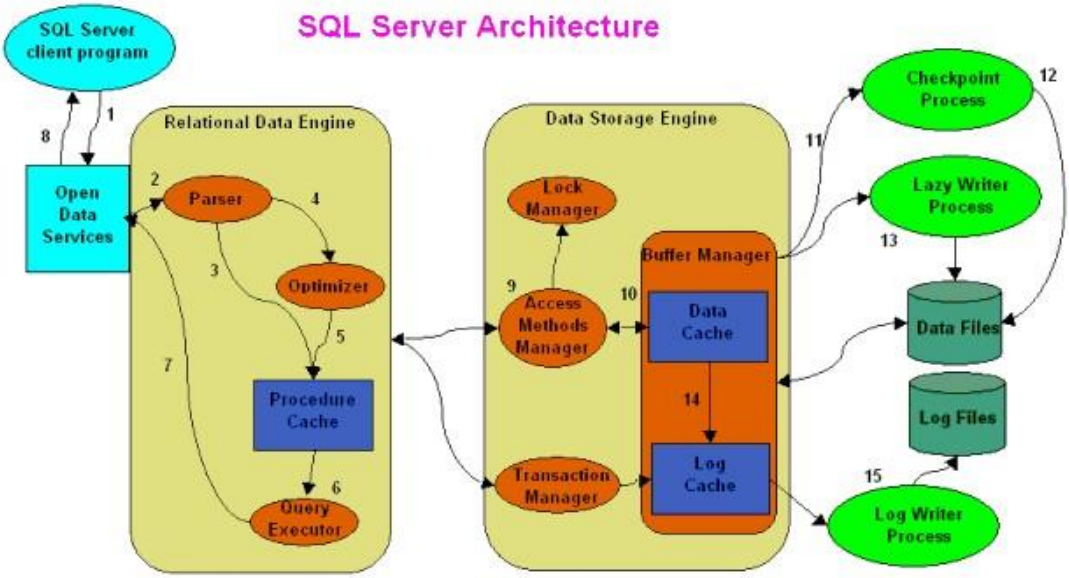
2.2) Storage Engine: The storage engine manages the database and log files of the database and is responsible for writing the data correctly in storage systems (Disk, SAN ...) and reading them from these systems if needed. So the I / O manager is here.

Executes logging and recovery operations. BACKUP, RESTORE, DBCC expressions and batch transfer functions are also managed by this engine. In addition, Transaction Manager manages the transaction and lock mechanism in the case where simultaneous operation of queries known as concurrency via named task and users access the same data at the same time. When a query is sent to SQL Server, it is checked whether there is an execution plan to execute this query in the Buffer Pool in the Query Processor section. Otherwise, the Query Optimizer creates an execution plan immediately or in the plan direction Query Executor, from the storage engine.The Storage Engine reads data from either the buffer or the disk according to the situation and returns it to the Query Processor (Relational Engine). This engine also sends the client data.

3) SQLOS API: It can be defined as an Application Layer between SQL Server and the operating system. This application layer is responsible for low - level operations such as memory management, thread - parallelism management, and I / O management.

Because Windows is a general operating system, SQL Server performs this resource allocation through scheduling, I / O completion, memory management, and resource management. It runs the operating system application interfaces (OS APIs) required by SQL Server in this middle tier, just like the .NET-CLR. This does not mean that SQLOS replaces Windows. DMVs that start with sys.dm_os_ can be used for SQLOS related data.

The following diagram outlines how a request to SQL Server is processed is very nice.


SQL Server Architecture
SQL Server client program
Open Data Services
Relational Data Engine
Parser
Optimizer
Procedure Cache
Query Executor
Data Storage Engine
Lock Manager
Access Methods Manager
Transaction Manager
Buffer Manager
Data Cache
Log Cache
Checkpoint Process
Lazy Writer Process
Data Files
Log Files
Log Writer Process
1
2
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4
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1	SQL Statements	The client application sends “batches” of SQL statements to SQL Server for execution.
2	Syntax Check	The Parser checks the syntax of the SQL statements.
3	Cache Lookup	The Parser checks the syntax of the SQL statements, and calls the SQL Manager to see if matching SQL is already in the Procedure Cache. If a match is found, the Optimizer is bypassed.
4	Parsing	If no matching SQL is found in the Procedure Cache, the Parser translates the batch into a Query Tree and passes it to the Optimizer.
5	Optimization	The Optimizer takes the Query Tree and produces an optimal Execution Plan based on data sizes, indexes, join techniques and CPU, I/O & memory estimates.
6	Execution	The Query Executor runs the Execution Plan, often interacting heavily with the Access Methods Manager and Transaction Manager.
7	Results	The Query Executor passes results back to ODS.
8	Results	ODS buffers the results and returns them to the client only when the buffer fills or the batch of SQL statements ends.
9	Row Operations	The Access Methods Manager locates and modifies data at the row and index level. It calls the Buffer Manager to retrieve and modify individual pages.
10	Page Retrieval	When a data or index page is required, the Buffer Manager checks the data cache. If the page is already there, disk reads are avoided. If not, it is read from disk.

11	Page Modification	Pages in the cache that are modified will eventually be written back to disk (usually by the Checkpoint process). They may be modified many times in the cache before this happens.
12	Checkpoints	The Checkpoint process minimizes the amount of work SQL Server has to do on startup by periodically flushing dirty pages to disk.
13	Free Pages	The Lazy Writer process maintains the list of buffer pages that are available for immediate re-use. If necessary, it will write dirty pages to disk to make them available.
14	Log Caching	When the Buffer Manager modifies a page, it gets the Log Manager to add the log record(s) to the Log Cache. Once the user commits their changes, the Log Manager places these pages into a queue to be written to disk by the Log Writer. The user process waits for the log writer to flush the log pages to disk.
15	Log Flushes	The Log Writer process writes pages from the log flush queue out to disk. Once the writes are complete, any user processes waiting on that log cache can continue.

Difference Between Web Server and Database Server

Web Server vs Database Server

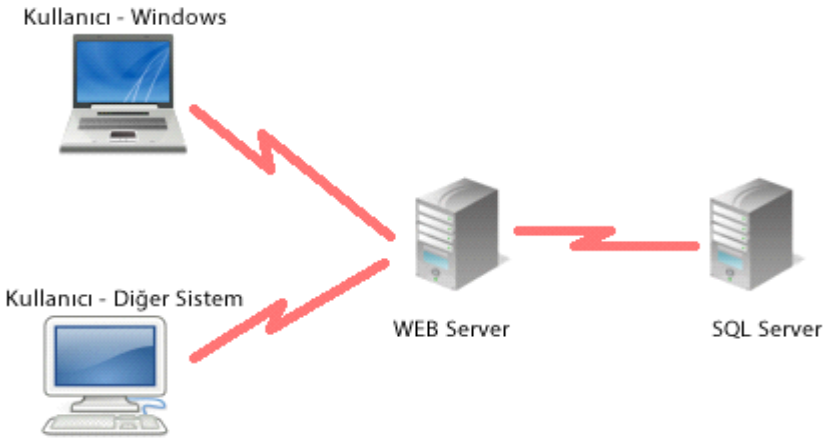
A Web Server and a Database Server is something that's been confused by a lot of people. This is because, as an overview, most people find them to serve similar purposes. In essence, both Database server and Web server provides services to facilitate the infrastructure underlying the internet. We will talk about these separately and identify the difference between them.

Web Server

A web server can be either a software unit or a hardware unit. We will talk about both of these counterparts together. In layman's terms, a web server is a place where you store the content of a website. When you type in www.xxxx.com in your web browser, the address gets translated to the IP address of the server where the files of the DB are stored. This storage facility is in essence the web server and facilitates serving dynamic HTML content to any client who is requesting it.

The history of the web servers run back to 1990, when Tim Berners Lee coded the first ever web browser and the web server. This was called CERN htttpd, and facilitated the ease of use of internet. The idea behind it was to create a mechanism to exchange data between a web server and a web browser in a convenient and consistent manner. Thus, the communication happens through HTTP (Hyper Text Transfer Protocol) calls. In late 1994s, Tim Barnes Lee constituted World Wide Web Consortium in order to regulate and standardize the development of web technologies including web servers.

With the recent developments, Web Server can serve dynamic content using server side scripting languages like PHP, ASP or JSP, as well. They serve a variety of clients including web browsers of the PCs, routers, printers, web cams etc. Another feature that can be seen in the web servers is the ability to acquire information from the clients using mechanisms such as forms or uploading. For instance, when you comment on this article, the web server acquires the content you used to comment and stores it.



Database Server

A database server is more of a software component than a hardware component. It can provide database services to other programs residing in the same computer or any other network. A database server works in the client-server architecture, and this is ensured by the Database Management System you use. Thus, a database server is always ready to offer information sought by its clients **[1]**.

There are some distinct advantages of using a database server like being able to store all the data in one location, the ability to manage the security measurements seamlessly, the added advantage of the database management services, the ability to access the database simultaneously etc. Most importantly, a database server ensures fast update and retrieval of your data, which is integral for the performance. Thus, a database server is inherently more efficient and effective than a simple file server used to store data.

CONCLUSION

As a result, the necessary information has been obtained from all these explanations. Then, in line with this information, we connected two computers through SQL Server and inquired about database related operations using C#.

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