Introduction to SQL Server

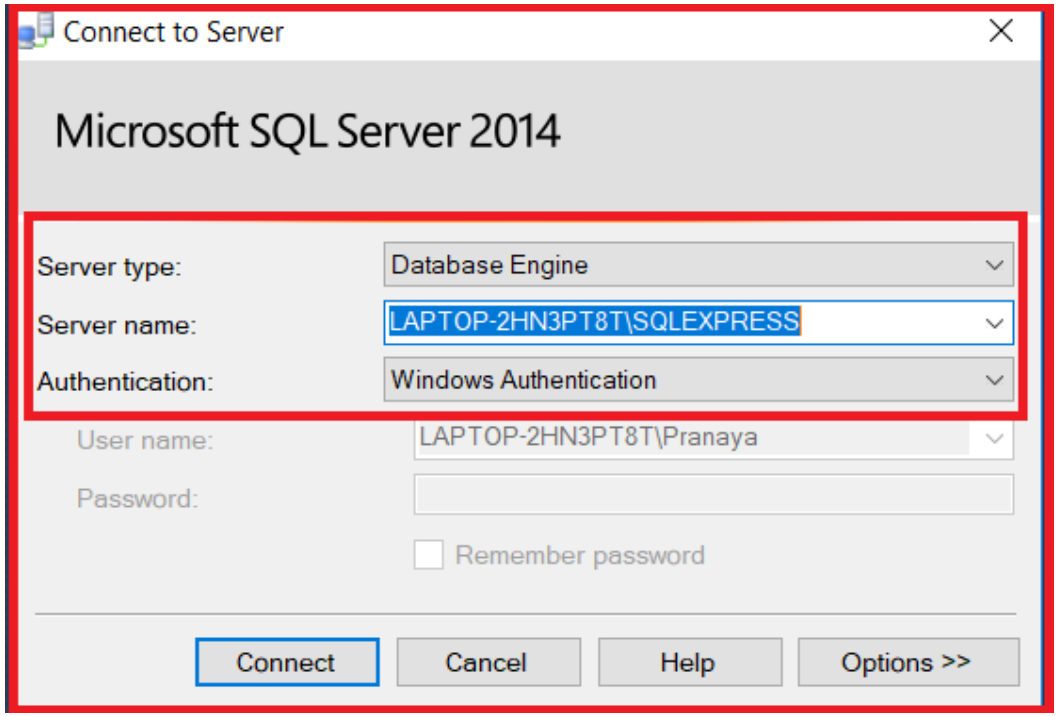
- SQL Server is software (A Relational Database Management System) developed by Microsoft. It is also called MS SQL Server. It is implemented from the specification of RDBMS.
- What is SQL Server
- The relational database management system(RDBMS) is a Microsoft software product mainly used to store and retrieve data for the same or other applications. We can run these applications on the same computer or a different one.

- Microsoft developed and marketed the SQL Server relational database management system(RDBMS) to primarily complete with the MySQL and Oracle databases. It is also called MS SQL Server, which is an ORDBMS, platform-dependent, and can work on GUI and command-based software.
- The key interface tool for SQL Server is SQL Server Management Studio(SSMS), which operates in both 32-bit and 64-bit environments.

Usage of SQL Server

- Its main purpose is to build and maintain databases.
- It is used to analyze the data using SQL Server Analysis Services(SSAS).
- It is used to generate reports using SQL Server Reporting Services(SSRS).
- It is used to perform ETL operations using SQL Server Integration Services(SSIS).

How to connect to the SQL Server using SQL Server Management Studio



- Step 1: Select Server Type
- As we are going to connect with the SQL Server Database, so here we need to select the Server Type as Database Engine.
- Along with Database Engine, the other Server Types options are available as SQL Server Analysis Services(SSAS), SQL Server Reporting Services (SSRS) and SQL Server Integration Services (SSIS).
- These there are called MSBI(Microsoft Business Intelligence)

Database Engine:

- The Database engine is the core service of SQL Server which will use for storing a large amount of data, accessing the data, manipulating the data and providing security to the information.
- In Database engine, the data will be stored in the form of a 2-D format(Tables).

Analysis Services(SSAS):

- The SSAS(SQL Server Analysis Service) is a tool that is used under the data warehousing/data mining environment for storing the information in the form of a 3-D format.

Reporting Services(SSRS):

- SQL Server Reporting Service(SSRS) is a tool that is used to generate various reports such as MS-word file format, Ms-Excel format, .pdf format, XML format, .tiff file format etc.

Integration Services(SSIS):

- The SQL Server integration Service (SSIS) is a tool that is used to convert one database tables into another database understandable format. For example, SQL Server database tables are converting into Oracle understandable table format.
- The SSAS, SSRS, SSIS tools are coming under the MSBI (Microsoft Business Intelligence) tool.

Step 2: Specify Server Name

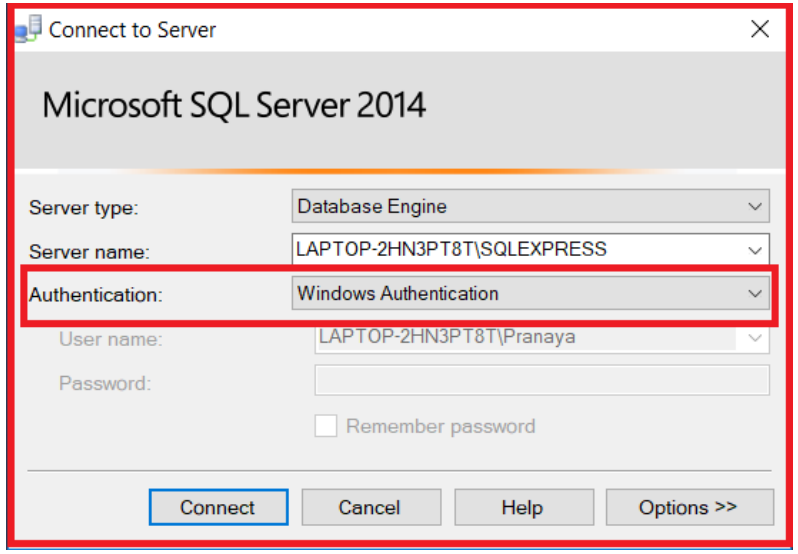
- The server name is nothing but the name of the SQL Server or IP address of SQL Server. One more thing that you need to remember is if the SQL Server is installed on your machine then you can specify the server name as a dot(.) or 127.0.0.1 or local.
- Server name=(local)

Step 3: Select Authentication

- In SQL Server there are two types of authentication i.e. Windows Authentication and SQL Server Authentication. But it will depend on how you installed the SQL Server. That means, at the time of installation, If you select the mixed-mode authentication then you will get both windows and SQL Server authentication to connect with the SQL server database or else you will only have windows authentication to connect with the database.

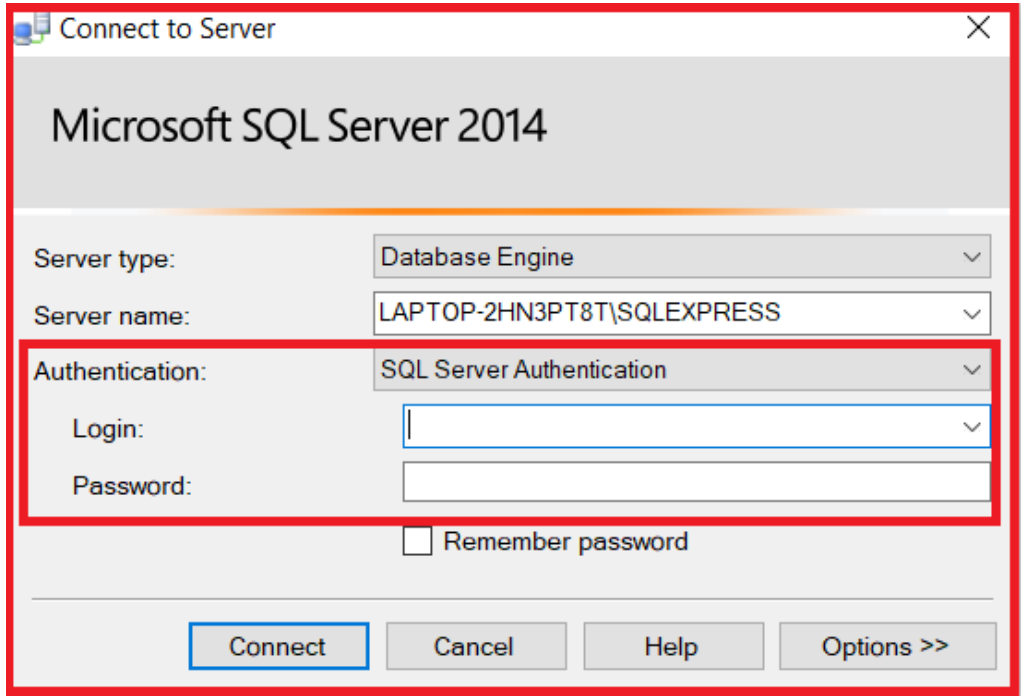
Windows Authentication:

- It is the default authentication mode of SQL Server.
- In windows authentication, we will work on user admin.
- With windows authentication mode there is no need to enter the user credentials i.e. user Id and password because User id and Password are generated by the Operating system by default.

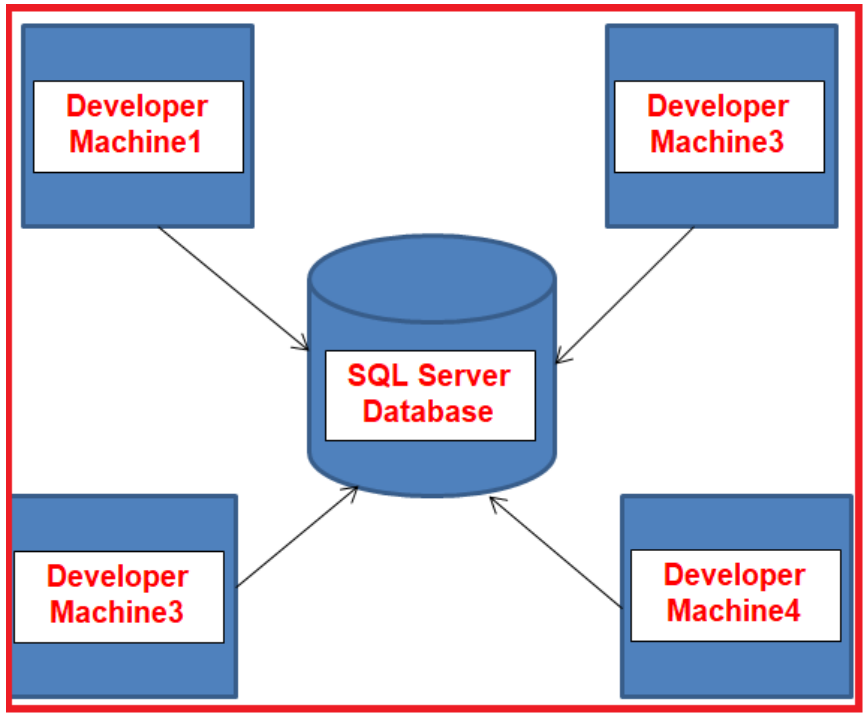


SQL Server Authentication:

- In SQL Server authentication we will work on the current user.
- When we will work with SQL Server authentication we should enter user id and Password (This user id and password are created by the user at the time of SQL Server Software installation).



- The SQL Server Management Studio is not the server, it is the client tool that can be used by a user to connect with server.
- The database server(SQL server) is generally on a dedicated machine, and the users are connecting to the server using SQL Server Management Studio from their machines .



Creating Altering and Deleting Database in SQL Server

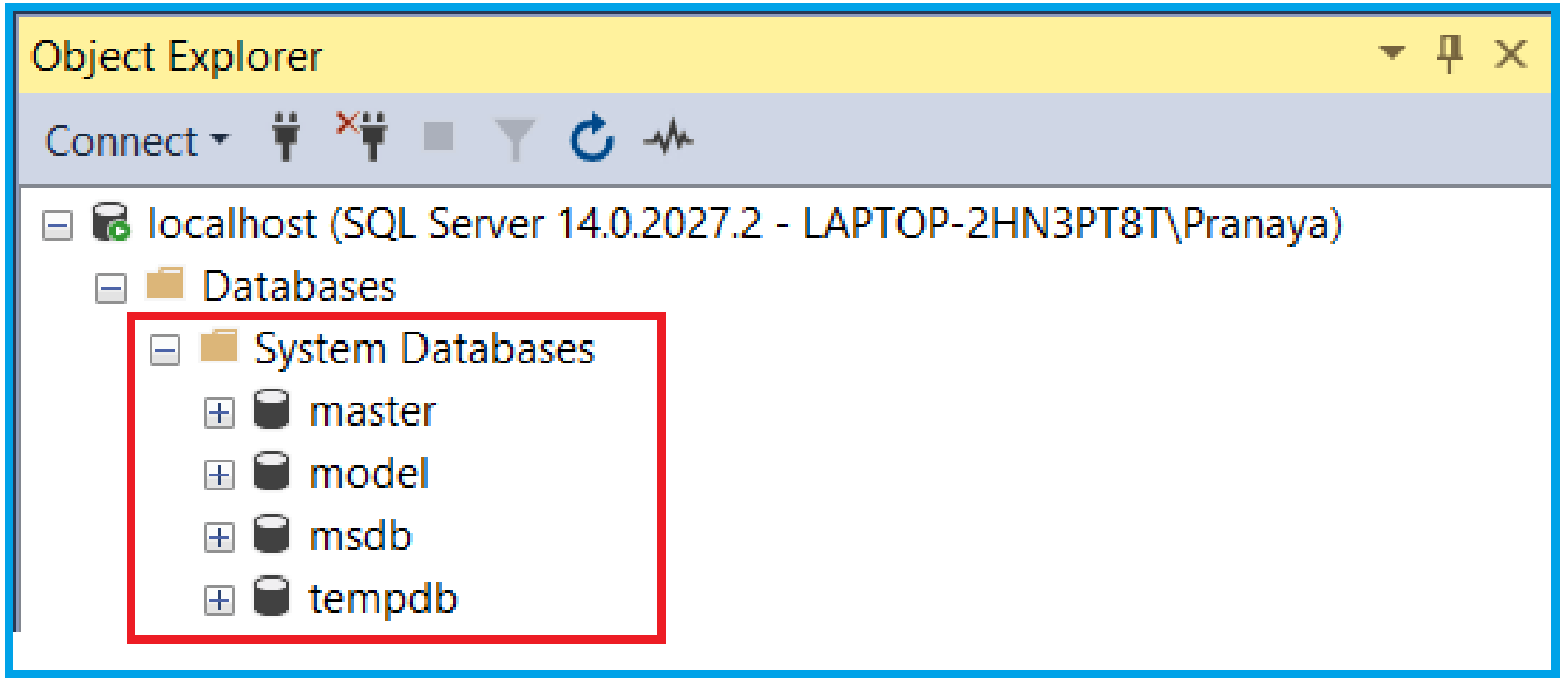
Different Types of Database in SQL Server.

- In SQL Server we are going to interact with 2 types of databases such as

1. System Database
2. User Database

System Databases in SQL Server:

- The databases which are created and managed by the SQL Server itself called System Databases.
- SQL Server has four system databases.


Object Explorer
Connect
localhost (SQL Server 14.0.2027.2 - LAPTOP-2HN3PT8T\Pranaya)
Databases
System Databases
master
model
msdb
tempdb

Types:

- Master Database : This database is used to store all system-level information such as system id, culture, Server id no, server version server culture ;etc.
- Model Database : The model database will act as a template for creating new databases under a server environment.
- Msdb(Microsoft Database): Microsoft Database will store jobs and alerts information i.e. backup file information.
- Tempdb database : It is a temporary database location that is allocated by the server when the user connected to the SQL server for storing temiporary table information.
- Once you disconnected from SQL server, then the temporary database location will be destroyed automatically. The above System databases are maintained and managed by the system by default.s

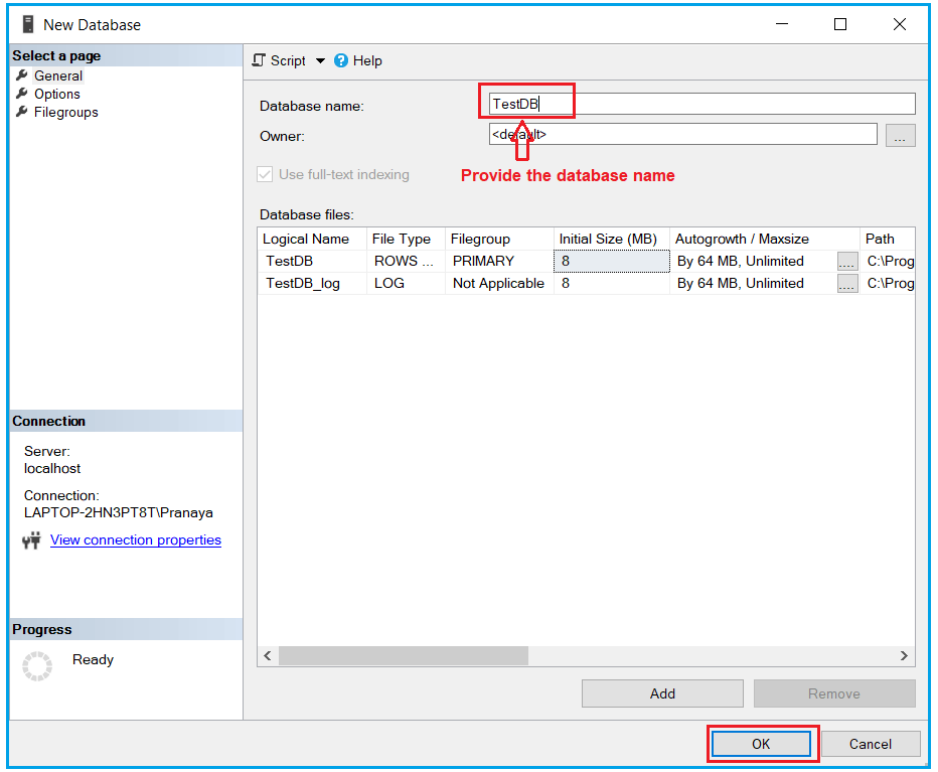
User Databases in SQL Server

- The databases which are created and managed by the user are called User Databases.
- These databases are used for storing business-related information such as employee details, Customer details, Student details, Product details, Salary details etc.
- In SQL Server, the user databases can be created, altered and dropped in two ways

1. Graphically using SQL Server Management Studio (SSMS) or
2. Using a Query

Creating SQL Server Database Graphically:

- Right click on the Databases folder in the Object Explorer
- Select New Database
- In the New Database dialog box, enter the Database name and click the OK Button



How to create SQL Server Database using Query

- The syntax for creating a database in SQL Server:

  Create database <database Name>

- Whether we create a database graphically using the designer window or using a query , the following 2 files get generated.
- .MDF file : Master Data File(contains actual data). This file will store all Tables and will be saved with an extension of .mdf(master data file).
- .LDF File: Transaction log file(used to recover the database). This file store transaction query information(insert ,update,delete,create etc.)

  and saved with an extension of .ldf.

How to Rename a database in SQL Server

- Once you create a database, then you can modify the name of the database using the Alter command as shown below.

  Syn: Alter database DatabaseName Modify Name=NewDatabaseName

- How to Delete or Drop a Database in SqL server
- In order to delete or drop a database in SQL Server, you need to use the following DROP command:
- Syn: Drop Database DatabaseName

- Whenever you drop a database in SQL Server, internally it deletes the LDF& MDF files.
- You cannot drop a database if it is currently in use & at that time you will get an error stating-cannot drop database “DatabaseName” because it is currently in use.
- So, if other users are connected to your database, then first you need to put the database in single-user mode and then drop the database.
- In order to put the database in single-user mode, you need to use the following command.
- Syn: Alter Database DatabaseName set SINGLE_USER with Rollback Immediate.
- With Rollback immediate option, it will rollback all incomplete transactions and closes the connection to the database.

What is SQL Server Data Type

- The SQL Server Data Types are the attribute that specifies what types of data entered by the user such as integer, character, decimal, date time etc.
- In SQL Server Database, each column of a table, all the local variables, and parameters must have a data type. The SQL Server supports the following data types:

1. Integer Data types
2. Decimal Data types
3. Money/currency data types
4. Date and Time data types

- Character data types
- Binary data types
- Special Data types

Integer data type in SQL Server:

- Integer data types are allowed only to hold integer types of values and this data type can be applied on Empid etc.
- These data types are classified into 4 types based on their range and memory size

Data Type	Range	Stored Memory
TinyInt	0-255	1byte
SmallInt	-32768 to 32767	2bytes
Int	$-2 * 10^{-8}$ to $2 * 10^{8}$	4 bytes
BigInt	$-9 * 10^{-8}$ to $9 * 10^{8}$	8 bytes

Decimal Data Types in SQL Server

- These data types are allowed decimal point values only. The decimal data type contains two types:
- Decimal(P, S)
- Numeric(P, S)
- But both are the same. Here P represents precision and S represents Scale and the default value of the Decimal data type is Decimal(18,0) and also for Numeric(18,0).

- Precision(P): The precision is nothing but the maximum number of digits that we can store both to left side and right side of the decimal point. Precision should have a value from 1 to 38. That is minimum value is 1 and the maximum value is 38. The default value of precision is 18.
- Scale(s): The scale is nothing but it just indicates the maximum number of decimal digits that we can store to the right of the decimal point. The scale must have a value from 0 through p. We can specify the scale only if the precision is specified.

Decimal Data type size in SQL Server

Precision	Stored memory
1-9	5bytes
10-12	9 bytes
20-28	13bytes
29-38	17bytes

SQL Server Money/currency Data type:

- These data types are used to accept currency format values into a table column. The money data type again classified into two types.

Data Type	Range	Stored memory
SmallMoney	-214,748,3648 to 214,748,3647	4 bytes
Money	-922, 337, 203, 685, 477, 5808 to …….5807	8 bytes

SQL Server Date and Time data types

- Date and Time data types are used to store a particular date and time information. These are applying on the date of joining, date of birth, hire date, order date columns, etc. Date and time data types again classified into 3 types, such as

1. **Date:** This data type will accept date format information only. The default format of the date data type is '**YYYY/MM/DD**'
2. **Time:** It allows time format information only. The default format of the time data type is '**hh:mm:ss.ms**'
3. **DateTime:** It allows date and time format information. The default format of DateTime data type is '**YYYY/MM/DD hh:mm: ss.ms**'.

Character Data Types in SQL

- Character data types are allowed characters and integer format values. These data types can be applied to employee names, student names etc..
- Character data types again classified into two types, those are Unicode data types and Non-Unicode data types.
- Non unicode data types: char(Size), varchar(size/max), Text
- Unicode data types: nchar(size), nvarchar(size), ntext