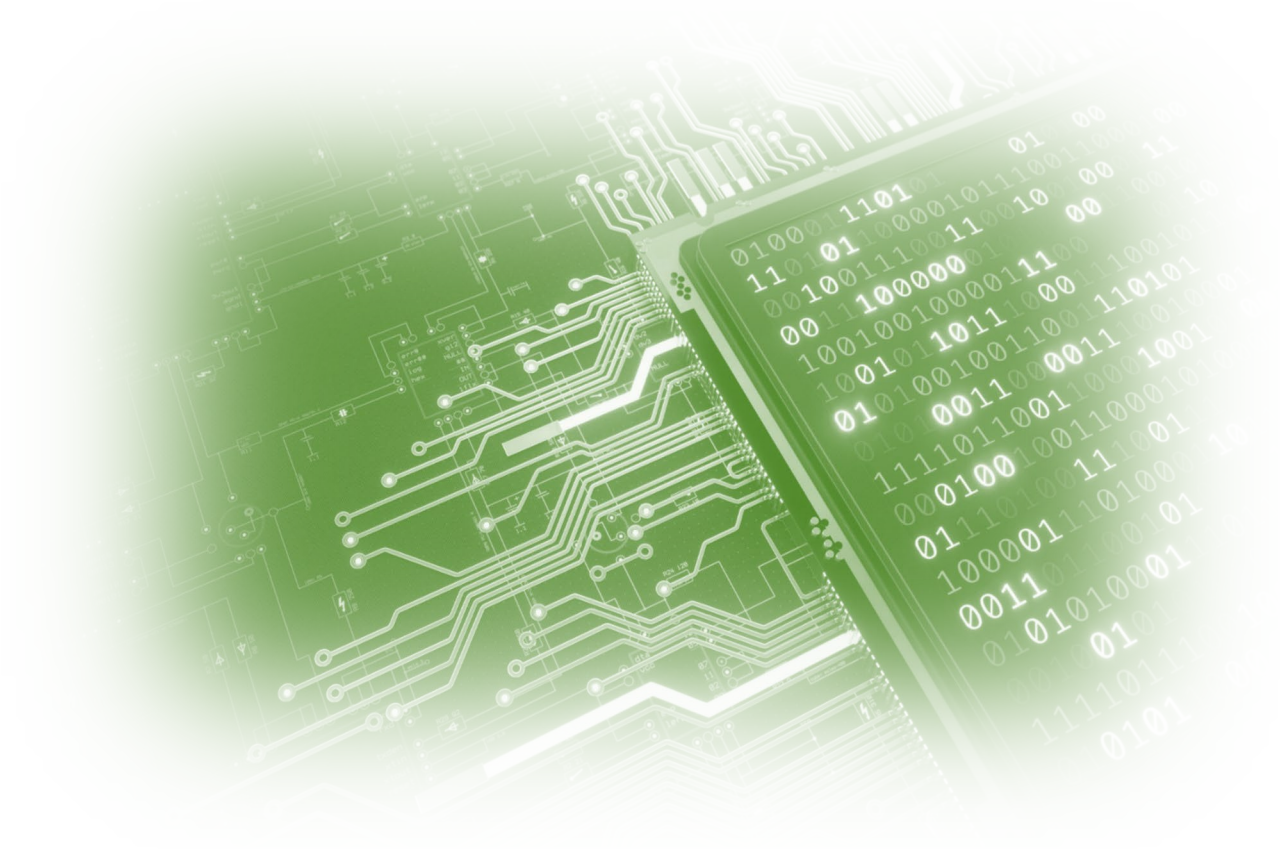
White Paper
MS-SQL Server Login, Role and User



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About Author

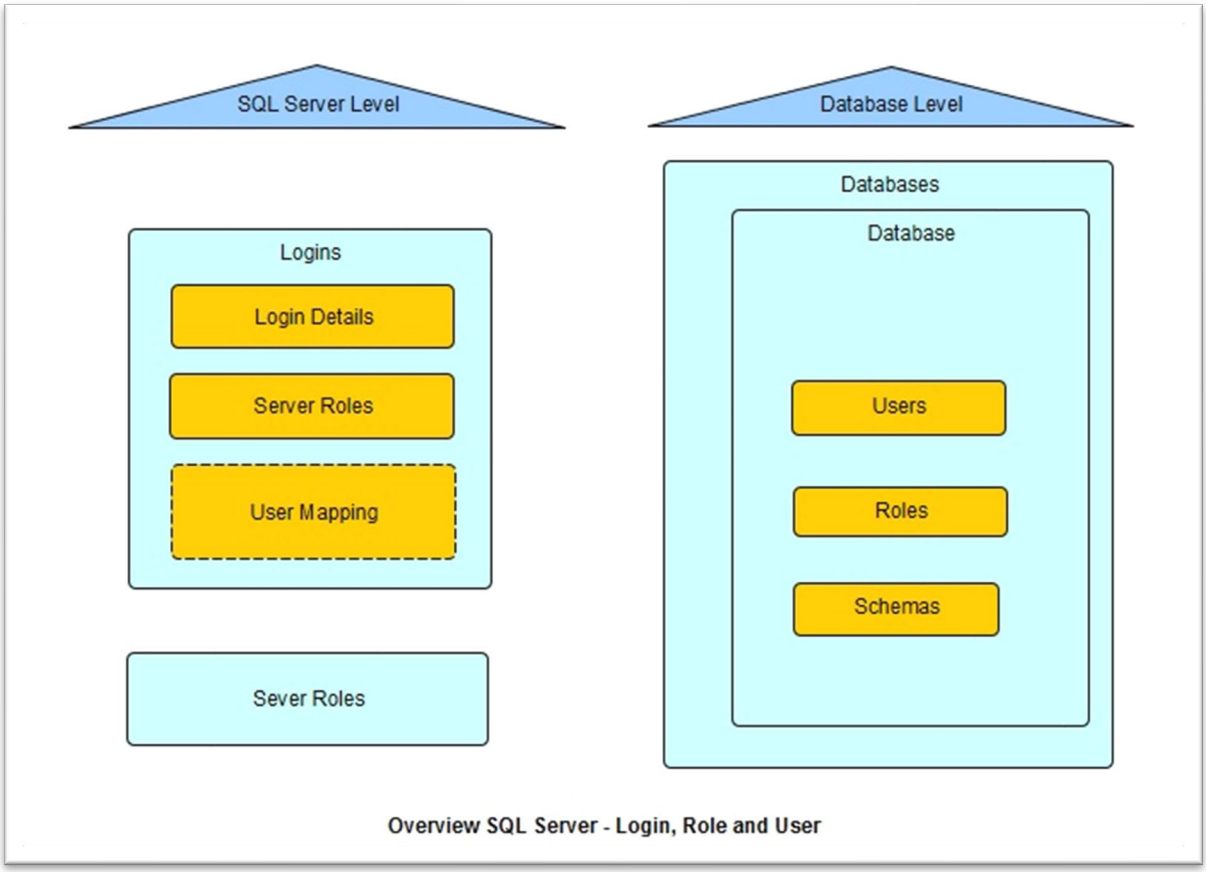
Thiruvarasamurthy G is a Software Architect, Full Stack Software Developer and Microsoft Certified Software Professional. He is passionate about technologies such as Cloud Computing, Software Design & Development, DevOps, Databases, BI Datawarehouse, Data Migrations, Application Securities & Ethical Hacking. He has experience with various MNC IT firms and runs a personal technical web blog www.thirufactory.com to share tech content.

Introduction

Microsoft SQL Server comes with a comprehensive security suite. Authentication and authorization are the robust securities achieved via the Login, Roles and Users. These concepts are pretty tricky to understand since they are tightly coupled. This whitepaper will illustrate the Login, Role and Users concepts with simple diagrams for basic understanding. When I was working as a developer, it was published.

Difference between SQL Server level and Database Level

Basically, these are mingled with two major areas SQL Server's Instance and Databases therefore it can be divided into two parts as **SQL Server level** and **Database level** refer the below diagram.



As I mentioned earlier majorly diagram has two parts. Each part has its corresponding components however both are working together with SQL Server. The concise definitions of the both components are below,

SQL Server Level	Databases Level
Login and Server Roles are the main parts and these are common to the entire SQL Server.	User, Roles and Schemas are the main parts and these are specific to a database. Each and every database has own sets.

SQL Server Level

1. Login:

Login is nothing but it is a user account which needs to enter the SQL Server system two type of authentication are supported those can be **Windows** or **SQL**.

2. Server Roles:

Server Roles are granted certain principle and permission to the Login users and which will reflect on Login user's owned databases. SQL Server is offering some built-in Server Roles that can be reused it's also called 'fixed' Server Roles.

Databases Level

1. Users:

Here we may have little confusion between the Login and Users. Both are completely different however mapping can be done. Users are only belonging to particular database.

2. Roles:

It is similar like as Server Roles but these roles only reflect on database also it manipulates on objects within the database. SQL Server is offering few built-in Database Roles that can be reused it's also called 'fixed' Database Roles.

3. Schema:

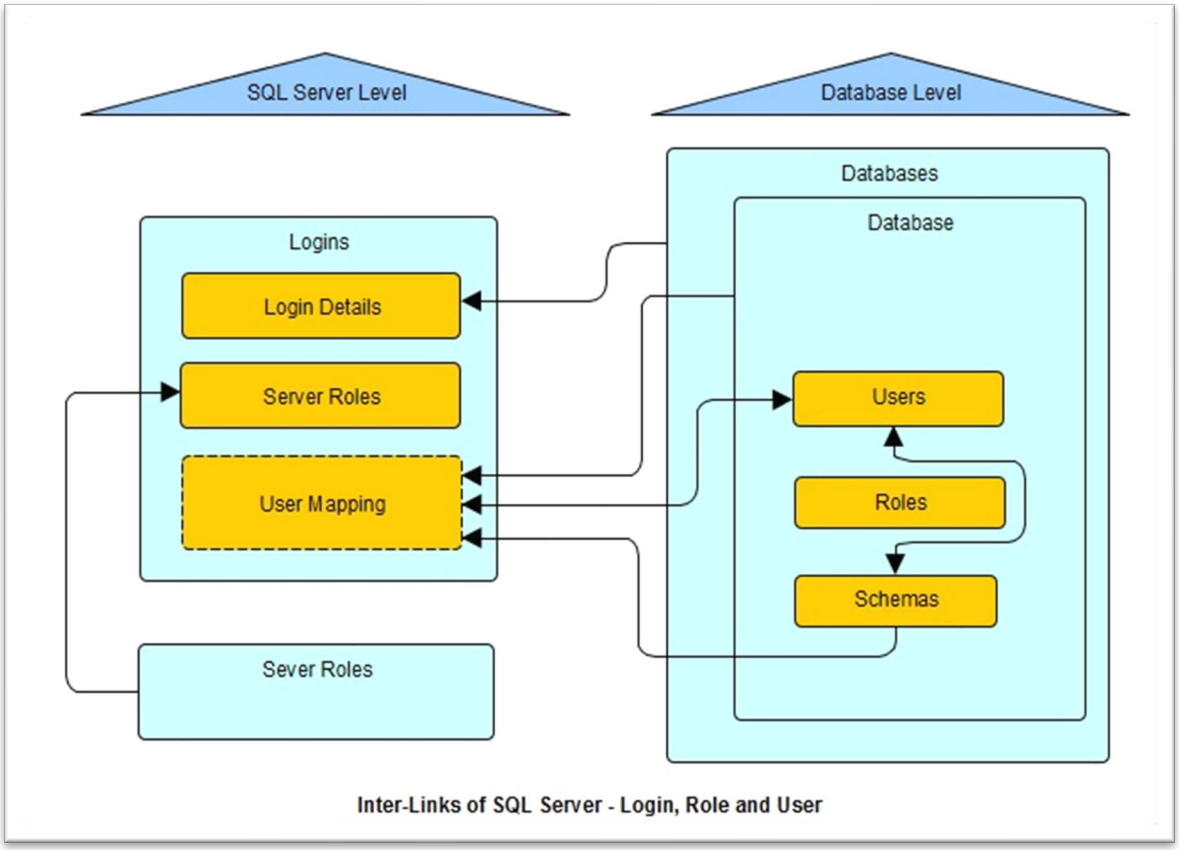
A schema is like a container for database objects such as tables, views, indexes, stored procedures, functions, etc. It is created inside the database and SQL Server allows creating multiple schemas for a database.

Generally, Roles will be assigned to the users according to their designations. DBA or SYS ADMIN will need full access control so who may own 'Server Roles' and Software Architecture or Developers may have 'Database Roles'.

As of now we have looked brief explanations of each. Next, going to look how those are working in inter-linking mode.

Inter connectivity between Login, Role and User

Let's assume a new SQL Server installation is done in a server, as well the new Logins and Server Roles and database are created on it. New Users, Roles, Schemas are created on the newly created databases. The biggest difference of both is at the storage location. Logins, Server Roles and Users, Roles, Schemas will be stored SQL Server's system and particular database respectively. Note while taking the database backup these three would come along with database backups.



Inter-Links of SQL Server - Login, Role and User

In the Login creation, we need to provide the information to below configuration sections,

- General
    - Authentication Type
    - Default Database
- Server Roles
- User Mapping
    - Databases
    - Roles
    - User
    - Schema

In General configuration, should choose authentication type SQL Server supports two types which are SQL and Windows and also should define a default database for the Login.

In Server Roles configuration, should choose the Server Roles by default public has marked If need we can choose more the one Server Roles.

In User Mapping configuration, system allows choosing the Database (pre created), Roles (pre created), Users, and Schemas however it is optional so we can skip it during the Login creation but should be done later.

The User Mapping configuration is most important which will act as a bridge between SQL Server Level and Database Level. During the User Mapping we can able to select the databases to the Login also system allows us to create new database User.

By default, SQL Server will use the same name to database User as what name is given to the Login. For example, if a Login is name 'Login1', the same name 'Login1' will be set to database User by default however it's changeable. Do not need to mess with same names both are different type of users.

Below are summarized points of combination of all the components,

- A SQL Server can have multiple Login.
- Login can have multiple Server Roles and multiple pre-created databases.
- New database Users, Roles, Schema can be created against pre-created databases during the Login creation.
- Databases can have multiple Schemas and Users.
- Users can have multiple Roles and Schemas.
- Login can have only one User and User can have only one Login.
- Schema can have only one User and User can have multiple Schemas.

Note: SQL Server will use default values if we are not provided any values on mandatory field and chances are there on above combination may be behaved differently according to Roles.

Conclusion

I would like to thank to my family, friends, supports for their solid encourages. Feel free to leave your comments or clarifications. If any correction is needed, I will do update on the subsequent version of white paper releases.

White Paper Details

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References

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