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Facultatea Calculatoare, Informatică și Microelectronică
Ingineria Software

REPORT

Laboratory work Nr.1

Instalating and confirguring SQL Server 2019

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The theoretical part

1. The advantages of using client-server technologies in database management

- Reduced network data flow
- Increased system efficiency
- Reduced number of mistakes
- Enhanced data sharing
- Centralized management
- Location independence of data and processing
- Sharing resources among diverse platforms
- Masked physical data access

2. Minimum hardware resources required to work with SQL Server 2019

Component	Requirement
Hard Disk	SQL Server requires a minimum of 6 GB of available hard-disk space. Disk space requirements will vary with the SQL Server components you install. For more information, see Hard Disk Space Requirements later in this article. For information on supported storage types for data files, see Storage Types for Data Files .
Monitor	SQL Server requires Super-VGA (800x600) or higher resolution monitor.
Internet	Internet functionality requires Internet access (fees may apply).
Memory *	Minimum: Express Editions: 512 MB All other editions: 1 GB Recommended: Express Editions: 1 GB All other editions: At least 4 GB and should be increased as database size increases to ensure optimal performance.
Processor Speed	Minimum: x64 Processor: 1.4 GHz Recommended: 2.0 GHz or faster
Processor Type	x64 Processor: AMD Opteron, AMD Athlon 64, Intel Xeon with Intel EM64T support, Intel Pentium IV with EM64T support

3. The logical components of the SQL Server system

- Databases
- Tables
- Database diagrams
- Indexes
- Views
- Schemes
- Synonyms
- Stored procedures
- Triggers
- Functions
- Data types
- Rules
- Sequences

4. Forms of authentication in SQL Server 2019

Windows authentication mode and mixed mode.

5. Server user roles in SQL Server 2019, utility, importance.

There are several types of roles in SQL Server. They serve to allow the management of user access control within the server. Thus, different users may have different rights.

SQL Server supports the following role groups:

- sysadmin - performs any action in SQL Server.
- setupadmin - manages linked servers and initiation procedures.
- serveradmin - sets the configuration options and can disconnect the server.
- securityadmin - manages logins and permissions to create databases, as well as reading error log files.
- processadmin - manages the processes that run in SQL Server.
- diskadmin - manages the files on the disk.
- dbcreator - creates and modifies the database.
- bulkadmin - the role of the fixed server can launch the BULK INSERT statement.
- public - each user of a database belongs to the public role. If not for a login the rights of access to an object have been implicitly defined, he inherits the rights of the public role on this object.

6. Schemas in SQL Server 2019, utility, importance.

A schema is a collection of database objects like tables, triggers, stored procedures, etc. A schema is connected with a user which is known as the schema owner. Database may have one or more schema.

The practical part

1. Install SQL Server 2019, following the procedures described in this laboratory.

Some steps from installation:

The screenshot shows the 'Features' window in the SQL Server 2019 Setup program. It lists various optional features that can be selected for installation. The 'Shared Features' section is expanded, showing a list of features with checkboxes. The 'Redistributable Features' section is also visible at the bottom.

Features:

- ☐ Python
- ☐ Java
- ☒ Full-Text and Semantic Extractions for Search
- ☒ Data Quality Services
- ☐ PolyBase Query Service for External Data
- ☐ Java connector for HDFS data sources
- ☒ Analysis Services

Shared Features

- ☐ Machine Learning Server (Standalone)
 - ☐ R
 - ☐ Python
- ☒ Data Quality Client
- ☒ Client Tools Connectivity
- ☒ Integration Services
 - ☒ Scale Out Master
 - ☒ Scale Out Worker
- ☒ Client Tools Backwards Compatibility
- ☒ Client Tools SDK
- ☒ Distributed Replay Controller
- ☒ Distributed Replay Client
- ☒ SQL Client Connectivity SDK
- ☒ Master Data Services

Redistributable Features

The screenshot shows the 'Instance Configuration' window in the SQL Server 2019 Setup program. It displays the configuration for the default instance, 'MSSQLSERVER'. The 'Instance ID' is set to 'MSSQLSERVER'. The 'SQL Server directory' and 'Analysis Services directory' are both set to 'C:\Program Files\Microsoft SQL Server\MSSQL15.MSSQLSERVER'. The 'Installed instances' table is empty.

Default instance

Named instance: MSSQLSERVER

Instance ID: MSSQLSERVER

SQL Server directory: C:\Program Files\Microsoft SQL Server\MSSQL15.MSSQLSERVER

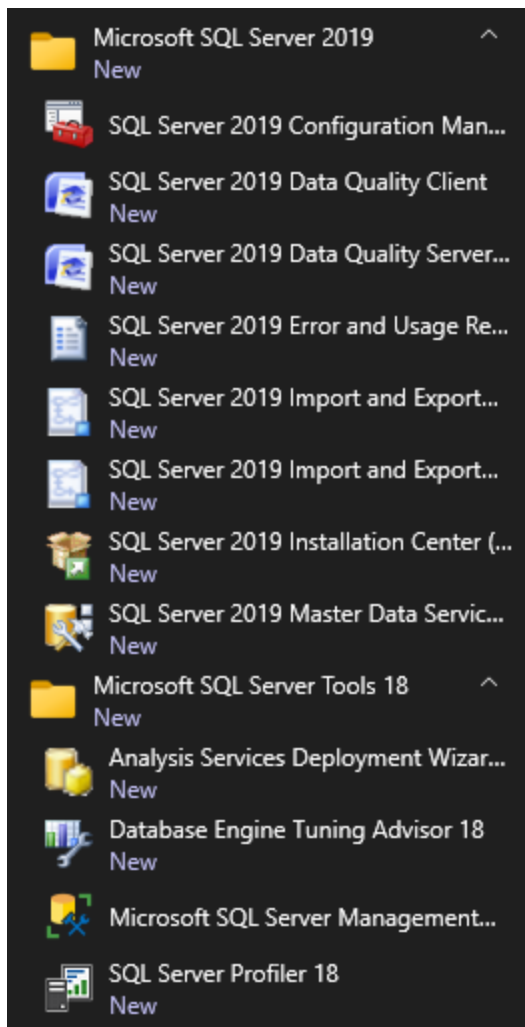
Analysis Services directory: C:\Program Files\Microsoft SQL Server\MSAS15.MSSQLSERVER

Installed instances:

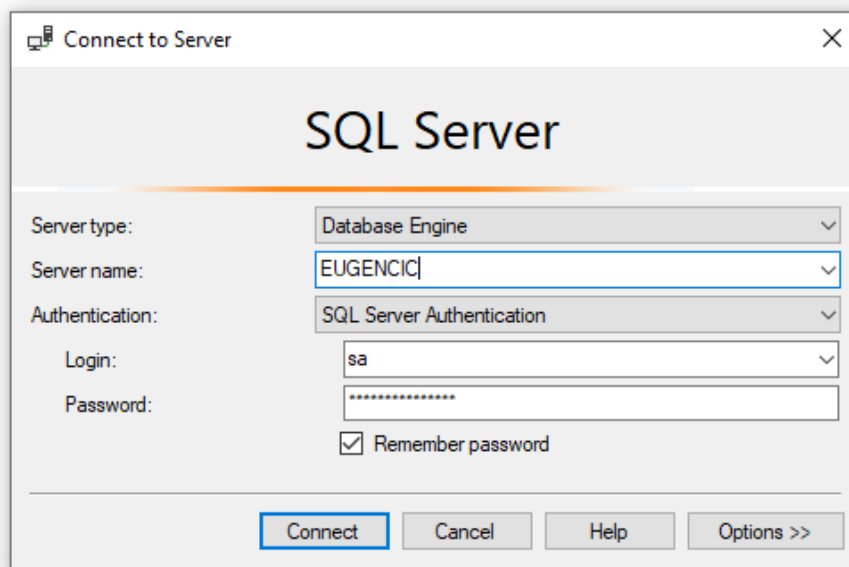
Instance Name	Instance ID	Features	Edition	Version
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< Back Next > Cancel

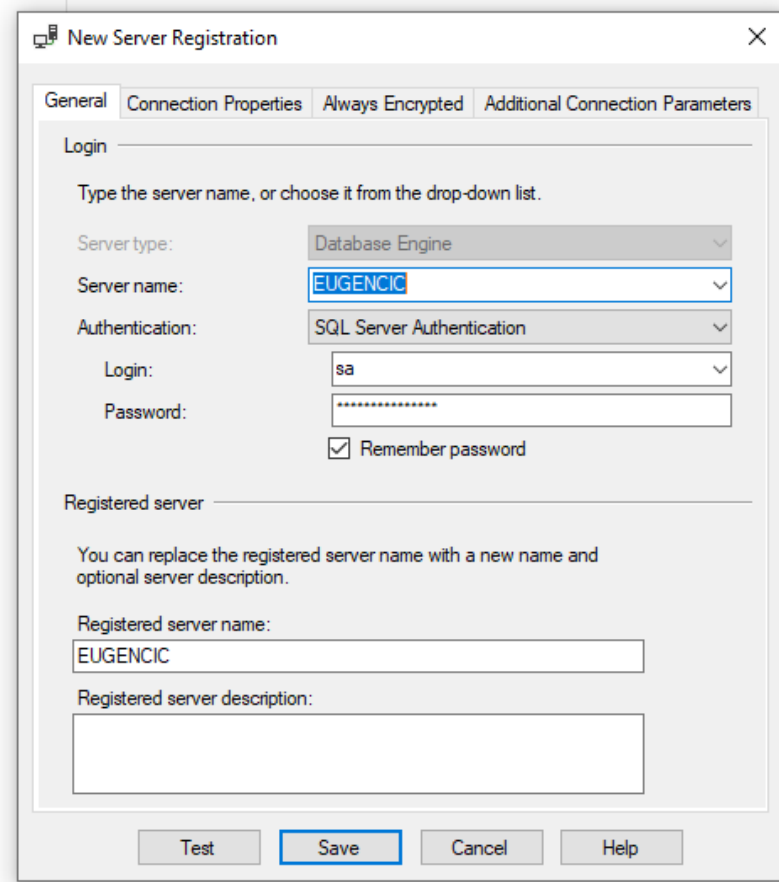
I forgot to take screenshots of every step, but the process was the same as in the book. The installation was successful.



Authentication:



2. Register the server on the available computer, choosing the type of SQL authentication.



The 'New Server Registration' dialog box is shown with the 'General' tab selected. The 'Login' section contains the following fields: 'Server type' set to 'Database Engine', 'Server name' set to 'EUGENCIC', 'Authentication' set to 'SQL Server Authentication', 'Login' set to 'sa', and 'Password' masked with asterisks. The 'Remember password' checkbox is checked. The 'Registered server' section has a 'Registered server name' field containing 'EUGENCIC' and an empty 'Registered server description' field. At the bottom are 'Test', 'Save', 'Cancel', and 'Help' buttons.

New Server Registration

General Connection Properties Always Encrypted Additional Connection Parameters

Login

Type the server name, or choose it from the drop-down list.

Server type: Database Engine

Server name: EUGENCIC

Authentication: SQL Server Authentication

Login: sa

Password: *****

☒ Remember password

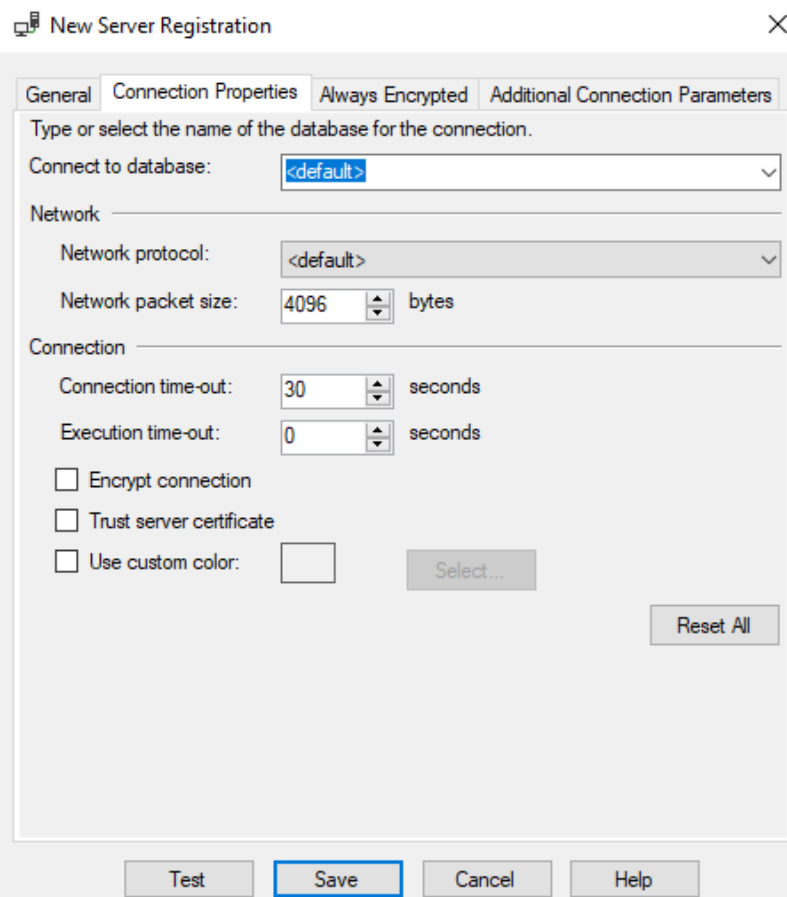
Registered server

You can replace the registered server name with a new name and optional server description.

Registered server name: EUGENCIC

Registered server description:

Test Save Cancel Help



The 'New Server Registration' dialog box is shown with the 'Connection Properties' tab selected. The 'Connect to database' dropdown is set to '<default>'. The 'Network' section has 'Network protocol' set to '<default>' and 'Network packet size' set to 4096 bytes. The 'Connection' section has 'Connection time-out' set to 30 seconds and 'Execution time-out' set to 0 seconds. There are checkboxes for 'Encrypt connection', 'Trust server certificate', and 'Use custom color' (with a color selection button). A 'Reset All' button is at the bottom right. At the bottom are 'Test', 'Save', 'Cancel', and 'Help' buttons.

New Server Registration

General Connection Properties Always Encrypted Additional Connection Parameters

Type or select the name of the database for the connection.

Connect to database: <default>

Network

Network protocol: <default>

Network packet size: 4096 bytes

Connection

Connection time-out: 30 seconds

Execution time-out: 0 seconds

☐ Encrypt connection

☐ Trust server certificate

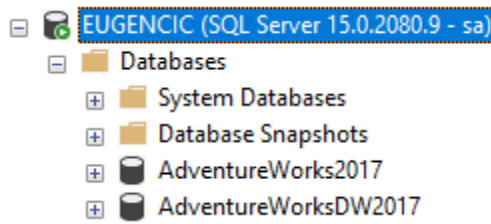
☐ Use custom color: Select...

Reset All

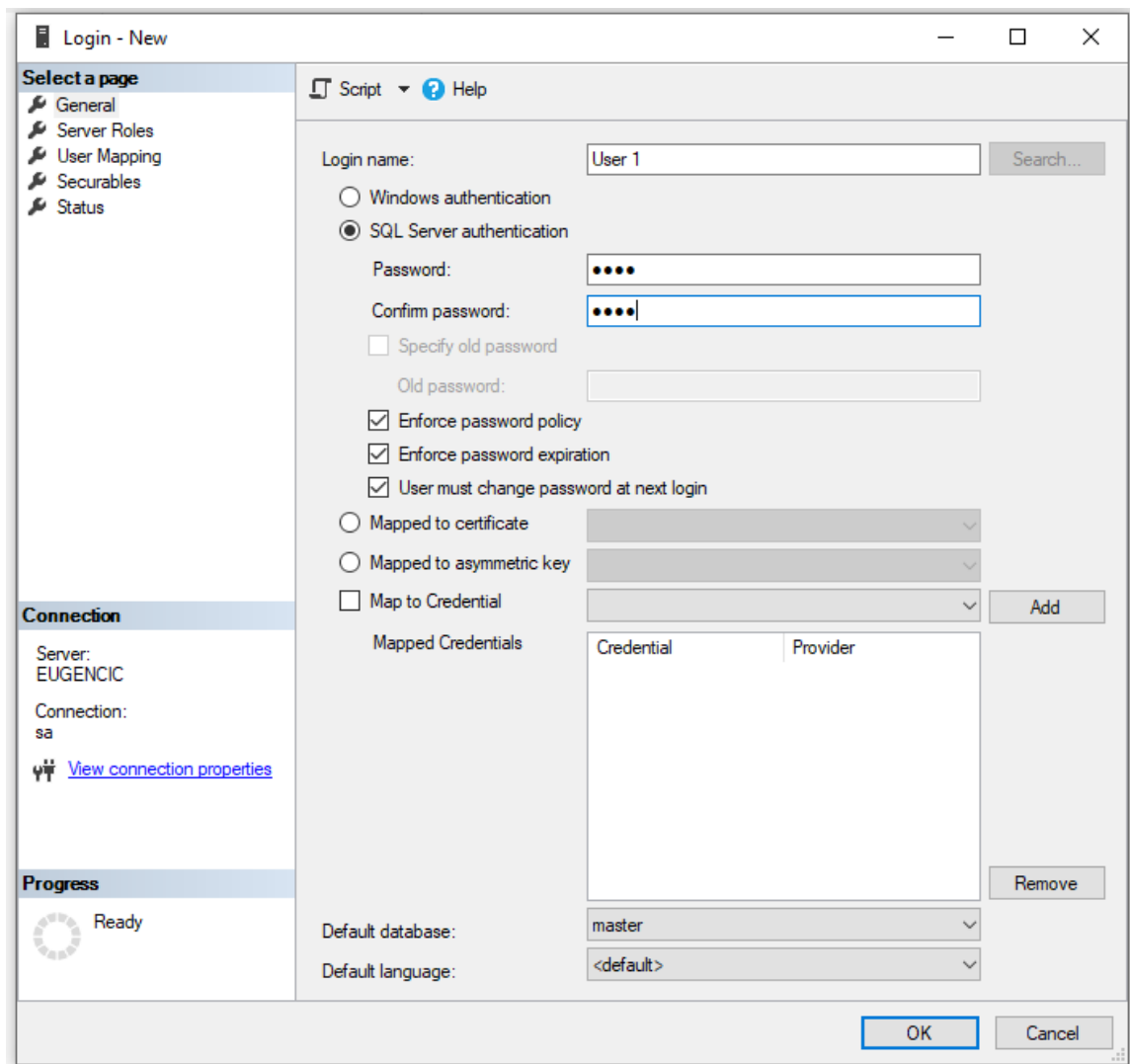
Test Save Cancel Help

3. Create three user logins that have SQL Authentication.

First of all, download and import the AdventureWorks database.



a).



Login - New

Select a page

- General
- Server Roles
- User Mapping
- Securables
- Status

Script ? Help

Users mapped to this login:

Map	Database	User	Default Schema
<input checked="" type="checkbox"/>	AdventureWorks2017	User 1	HumanResources
<input type="checkbox"/>	AdventureWorksDW2017		
<input type="checkbox"/>	master		
<input type="checkbox"/>	model		
<input type="checkbox"/>	msdb		
<input type="checkbox"/>	tempdb		

☐ Guest account enabled for: AdventureWorks2017

Database role membership for: AdventureWorks2017

- ☐ db_accessadmin
- ☐ db_backupoperator
- ☒ db_datareader
- ☒ db_datawriter
- ☐ db_ddladmin
- ☐ db_denydatareader
- ☐ db_denydatawriter
- ☐ db_owner
- ☐ db_securityadmin
- ☒ public

Connection

Server: EUGENCIC

Connection: sa

[View connection properties](#)

Progress

Ready

OK Cancel

b).

Login - New

Select a page

- General
- Server Roles
- User Mapping
- Securables
- Status

Script ? Help

Login name: User 2 Search...

☐ Windows authentication

☒ SQL Server authentication

Password:

Confirm password:

☐ Specify old password

Old password:

☒ Enforce password policy

☒ Enforce password expiration

☒ User must change password at next login

☐ Mapped to certificate

☐ Mapped to asymmetric key

☐ Map to Credential

Mapped Credentials

Credential	Provider
------------	----------

Add

Remove

Default database: master

Default language: <default>

OK Cancel

Login - New

Select a page

- General
- Server Roles
- User Mapping
- Securables
- Status

Connection

Server: EUGENCIC

Connection: sa

[View connection properties](#)

Progress

Ready

Script **Help**

Users mapped to this login:

Map	Database	User	Default Schema
<input checked="" type="checkbox"/>	AdventureWorks2017	User 2	Sales
<input type="checkbox"/>	AdventureWorksDW2017		
<input type="checkbox"/>	master		
<input type="checkbox"/>	model		
<input type="checkbox"/>	msdb		
<input type="checkbox"/>	tempdb		

☐ Guest account enabled for: AdventureWorks2017

Database role membership for: AdventureWorks2017

- ☐ db_accessadmin
- ☐ db_backupoperator
- ☒ db_datareader
- ☐ db_datawriter
- ☐ db_ddladmin
- ☐ db_denydatareader
- ☐ db_denydatawriter
- ☐ db_owner
- ☐ db_securityadmin
- ☒ public

OK **Cancel**

Login - New

Select a page

- General
- Server Roles
- User Mapping
- Securables
- Status

Connection

Server: EUGENCIC

Connection: sa

[View connection properties](#)

Progress

Ready

Script **Help**

Users mapped to this login:

Map	Database	User	Default Schema
<input checked="" type="checkbox"/>	AdventureWorks2017	User 2	Sales
<input checked="" type="checkbox"/>	AdventureWorksDW2017	User 2	db_owner
<input type="checkbox"/>	master		
<input type="checkbox"/>	model		
<input type="checkbox"/>	msdb		
<input type="checkbox"/>	tempdb		

☐ Guest account enabled for: AdventureWorksDW2017

Database role membership for: AdventureWorksDW2017

- ☐ db_accessadmin
- ☐ db_backupoperator
- ☐ db_datareader
- ☐ db_datawriter
- ☐ db_ddladmin
- ☐ db_denydatareader
- ☐ db_denydatawriter
- ☒ db_owner
- ☐ db_securityadmin
- ☒ public

OK **Cancel**

c).

Login - New

Select a page: General, Server Roles, User Mapping, Securables, Status

Script ? Help

Login name: User 3 Search...

☐ Windows authentication

☒ SQL Server authentication

Password:

Confirm password:

☐ Specify old password

Old password:

☒ Enforce password policy

☒ Enforce password expiration

☒ User must change password at next login

☐ Mapped to certificate

☐ Mapped to asymmetric key

☐ Map to Credential

Map to Credential: Add

Mapped Credentials

Credential	Provider
------------	----------

Remove

Default database: master

Default language: <default>

OK Cancel

Connection

Server: EUGENCIC

Connection: sa

[View connection properties](#)

Progress

Ready

Login - New

Select a page: General, Server Roles, User Mapping, Securables, Status

Script ? Help

Server role is used to grant server-wide security privileges to a user.

Server roles:

- ☐ bulkadmin
- ☒ dbcreator
- ☐ diskadmin
- ☐ processadmin
- ☒ public
- ☒ securityadmin
- ☐ serveradmin
- ☐ setupadmin
- ☐ sysadmin

OK Cancel

Connection

Server: EUGENCIC

Connection: sa

[View connection properties](#)

Progress

Ready