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BVMS - Migrating SQL database

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1 Document information	3
1.1 Version history	3
2 Introduction	4
2.1 Version	4
3 Preparing the SQL server	5
3.1 SQL server settings	5
3.2 Firewall settings	6
4 Moving data	10
4.1 Stop BVMS SQL server instance	10
4.2 Moving data	10
4.3 Attaching database	11
4.4 Set the database size	12
4.5 Confirming data migration	13
5 SQL Server security	14
5.1 Create user	14
5.2 Verify user	15
6 BVMS settings	17
6.1 Change SQL connection string	17
6.2 Verify logbook connectivity	18
7 Upgrading BVMS	19
8 Troubleshooting	20

1 Document information

Project	BVMS 10.0
Reference	n/a
Version	15
Last modified	 18 July 2019

1.1 Version history

Version	Date	Author	Comment
15	2019-07-18	Verhaeg Mario (BT-SC/PAS4-MKP)	

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2 Introduction

BVMS is using Microsoft SQL Server Express to store its logbook. Based on the information provided by Microsoft ([Compare SQL Server 2017 editions](#)), SQL Server Express is limited to a 10GB database size. This could be insufficient for larger installations or installations that require a very long logbook retention time. Additionally, some organisations have a dedicated SQL server environment which should be utilized by all applications.

The BVMS Logbook database can be moved to another SQL Server. This guide describes the steps that are necessary to migrate the database and describes how to confirm if the migration was successful.

Knowledge

This guide assumes the new database server is installed and up and running. Bosch strongly recommends that an experienced database administrator executes the migration. Experience with [Microsoft SQL Server Management Studio](#) is required. This guide does not include troubleshooting of the migration process (it is expected the database administrator is able to handle this) nor does it include any performance optimizations of the SQL server. This guide assumes the SQL server "sa" (Server Administrator) account is available for administrative purposes on the used SQL server.

Support

The migration process itself is not supported by the Bosch technical support teams. Once the database is migrated, the technical support teams will provide support. An experienced database administrator should be able to assist the technical support team in case the system experiences issues related to the logbook.

2.1 Version

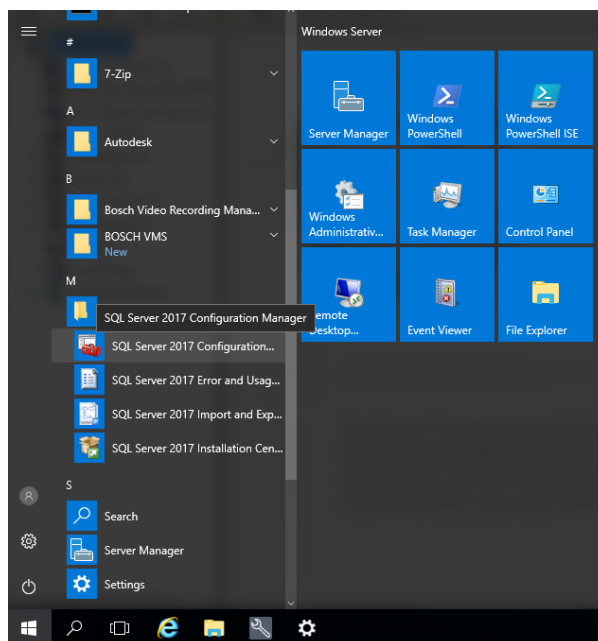
This guide is based on Microsoft Windows Server 2016 (fully updated on 2018-09-28) and Microsoft SQL Server 2017 (version 14.0.2002.14). The SQL Server should be installed in "[Mixed mode](#)" authentication (having an "sa" account) and this guide assumes an instance name "BVMS_External".

3 Preparing the SQL server

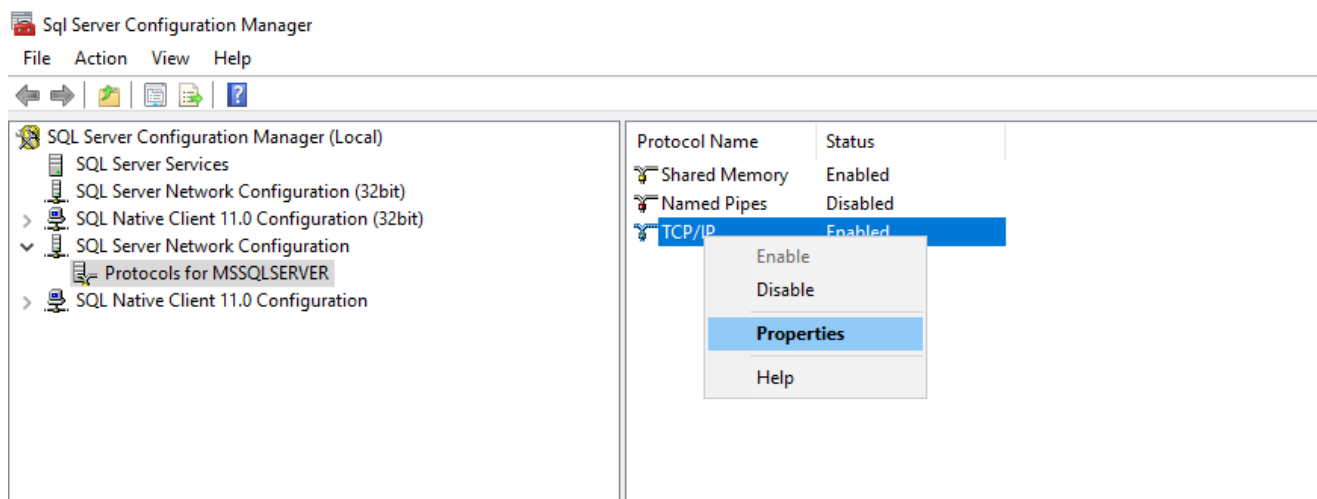
In the first step, the new SQL server is prepared for remote connections. This section assumes the SQL server has just been installed and the configuration is fresh. The instance name used in this guide is "MSSQLSERVER".

3.1 SQL server settings

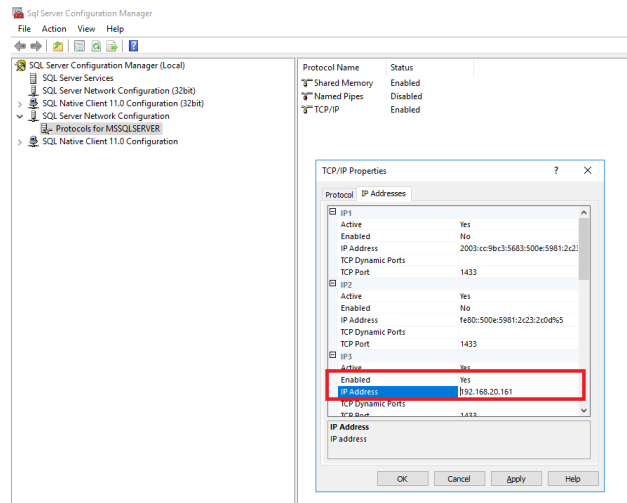
The SQL server can be configured using the SQL Server configuration manager, which can be started using the Windows start menu.



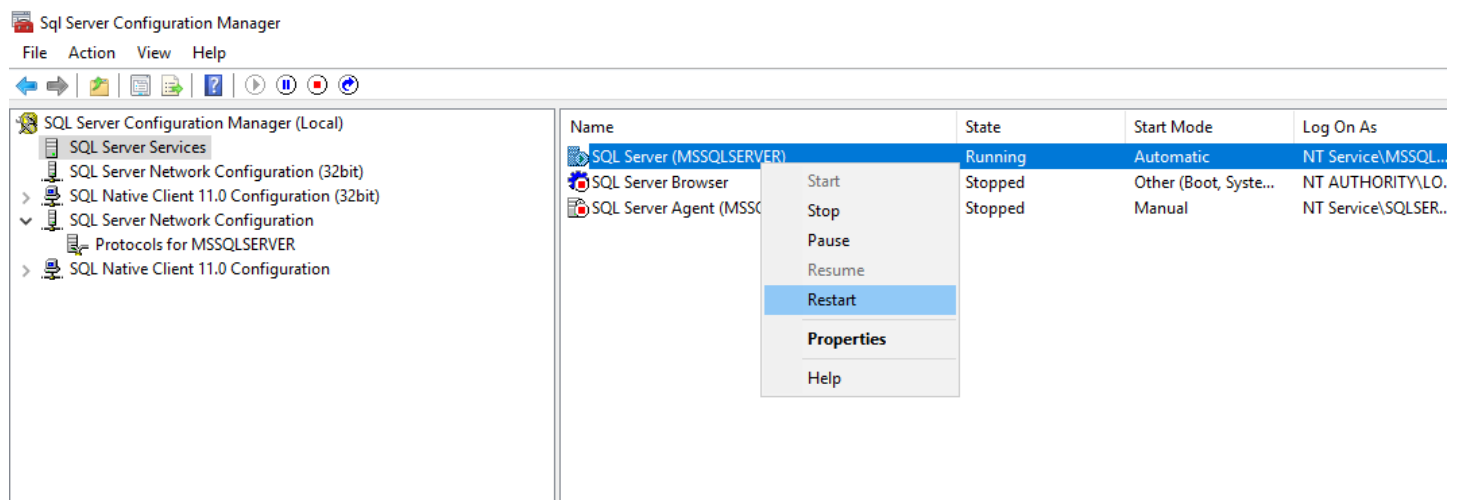
In this step, the TCP/IP protocol will be enabled for the network adapter which will be used to communicate with the BVMS management server. Browse to the *SQL Server Network Configuration, Protocols for MSSQLSERVER*. Open the properties window of the TCP/IP protocol.



Go to the IP Addresses tab in the properties window, and find the network adapter (search for the correct IP address) which should be used for communication with the BVMS management server. Enable the SQL Service on this adapter by changing the *Enabled* option to *Yes*.

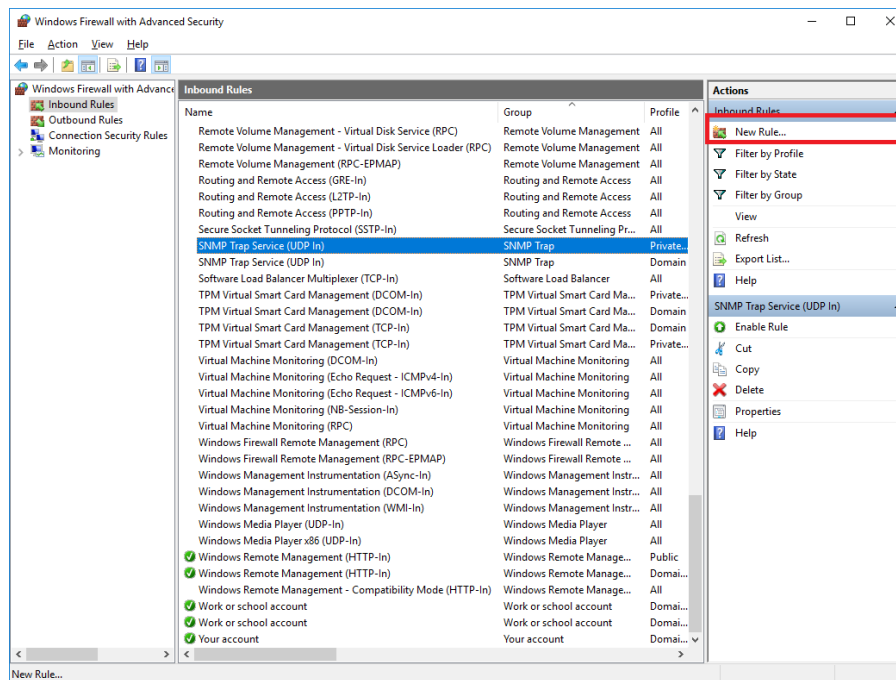


Restart the SQL Server (MSSQLSERVER) in order to apply the changes.

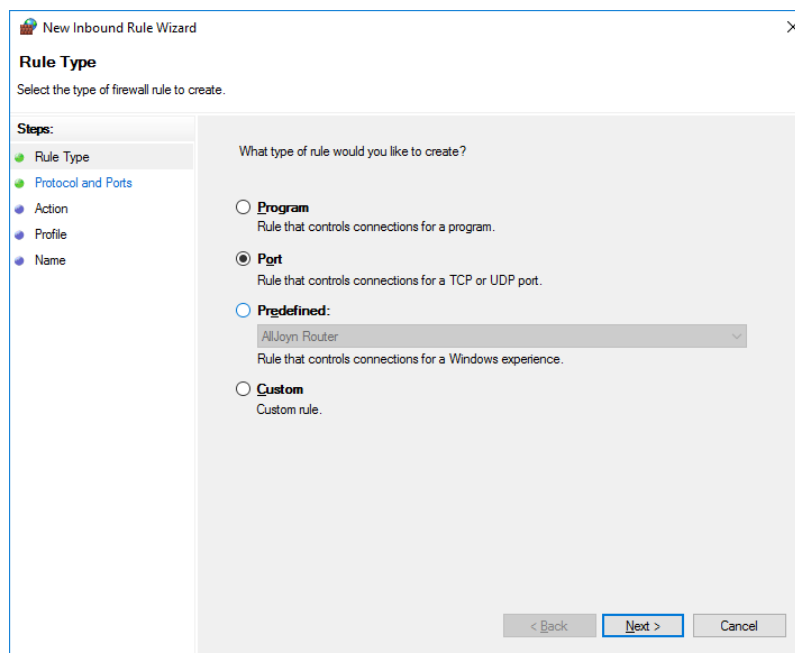


3.2 Firewall settings

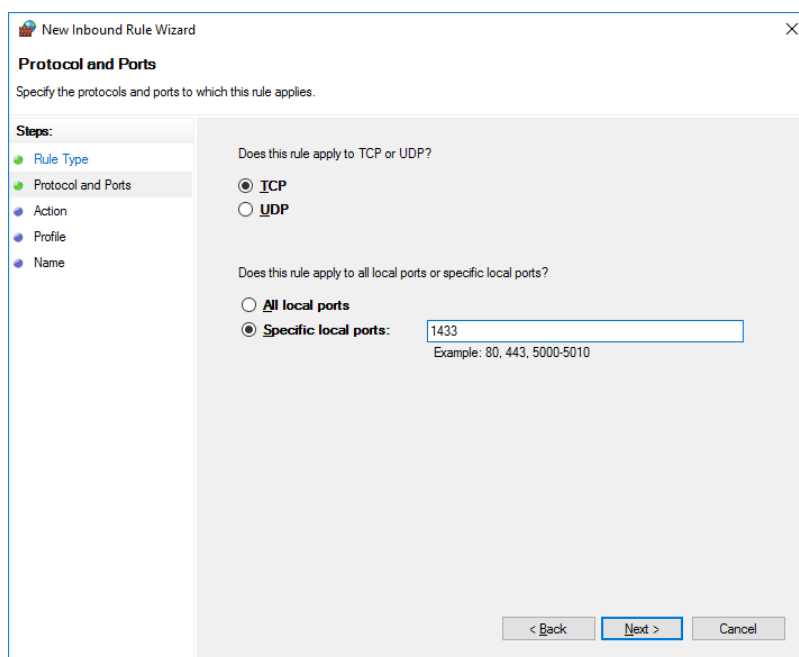
In order to allow the SQL Server to communicate with the BVMS management server, the firewall needs to be adjusted. Open the Windows Firewall with Advanced Security and create a new firewall rule, as shown in the image below.



Create a new inbound rule for ports.

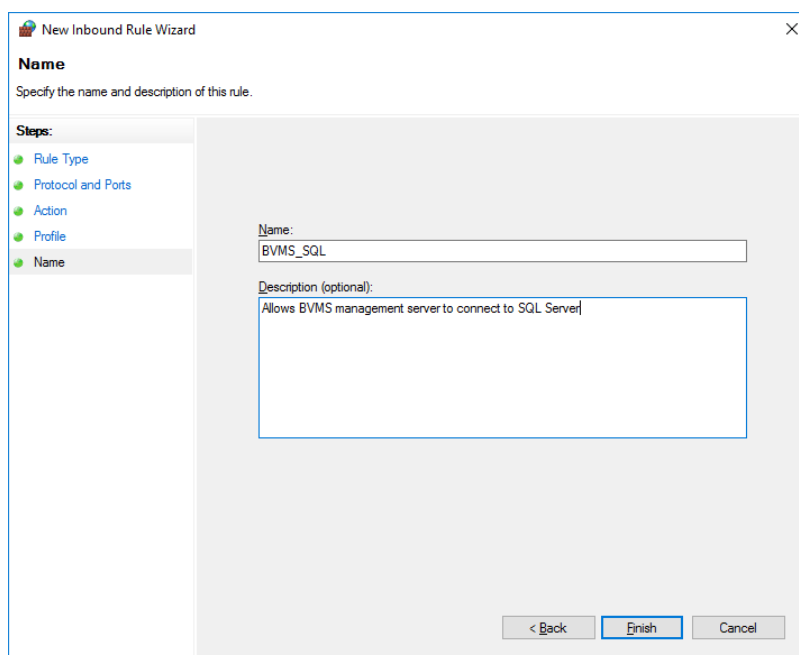


The SQL Server communicates based on TCP port 1433. Fill in the form as shown in the image below.



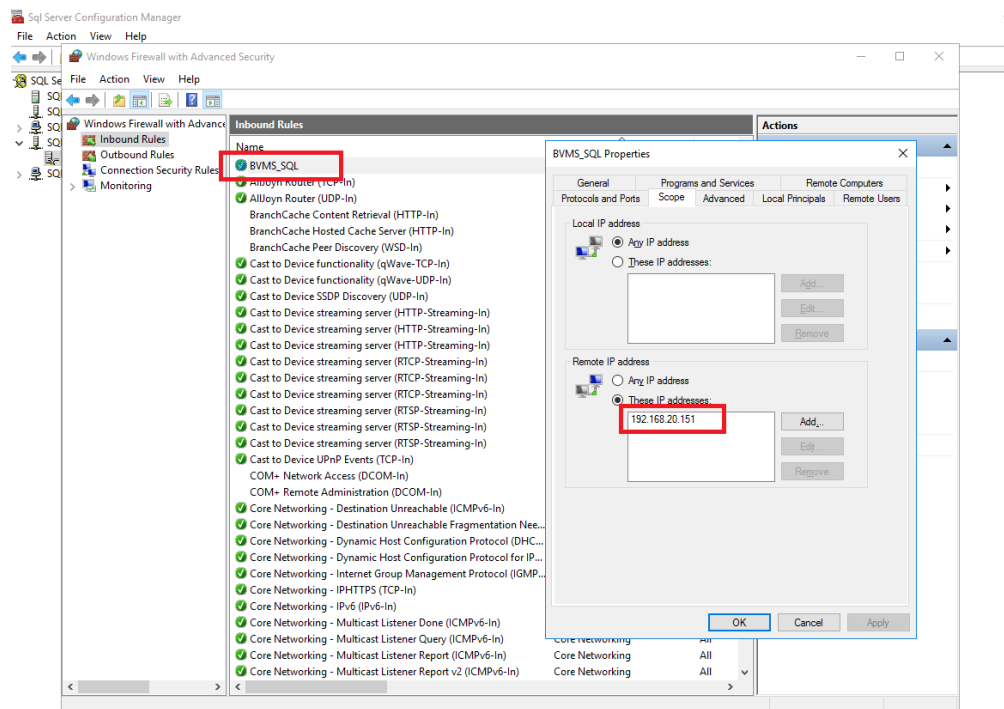
The screenshot shows the 'New Inbound Rule Wizard' window, specifically the 'Protocol and Ports' step. The left sidebar lists the steps: Rule Type, Protocol and Ports (selected), Action, Profile, and Name. The main area contains two questions. The first question is 'Does this rule apply to TCP or UDP?' with radio buttons for 'TCP' (selected) and 'UDP'. The second question is 'Does this rule apply to all local ports or specific local ports?' with radio buttons for 'All local ports' and 'Specific local ports' (selected). Below the 'Specific local ports' radio button is a text input field containing '1433' and an example text 'Example: 80, 443, 5000-5010'. At the bottom right are three buttons: '< Back', 'Next >', and 'Cancel'.

Move through the *action* (grant access) step and apply the rule for all firewall profiles (private, public, domain). Give the firewall rule an appropriate name.



The screenshot shows the 'New Inbound Rule Wizard' window, specifically the 'Name' step. The left sidebar lists the steps: Rule Type, Protocol and Ports, Action, Profile, and Name (selected). The main area contains two input fields. The first is 'Name:' with a text input field containing 'BVMS_SQL'. The second is 'Description (optional):' with a text area containing 'Allows BVMS management server to connect to SQL Server'. At the bottom right are three buttons: '< Back', 'Finish', and 'Cancel'.

In order to increase the security level, the rule can be adjusted in order to only allow communication between the SQL Server and the BVMS Management server. Open the properties dialogue of the firewall rule, go to the *Scope* tab, and add the *remote IP address* of the BVMS Management server (the example below shows 192.168.20.151 as the BVMS Management server IP address).



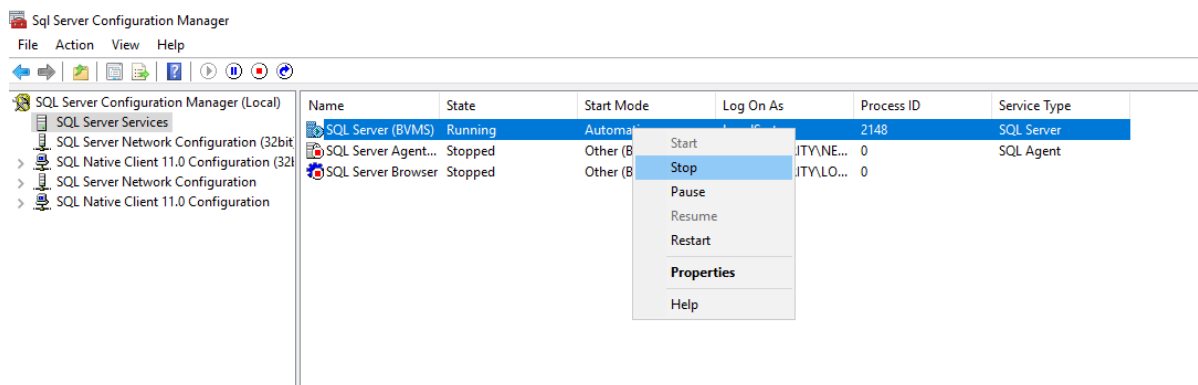
In order to test the rule, the [Microsoft SQL Server Management Studio](#) should be able to login to the SQL server from the BVMS Management server using the "sa" account.

4 Moving data

Now that the SQL server has been prepared, the logbook database will be moved from the BVMS Management server to the SQL Server.

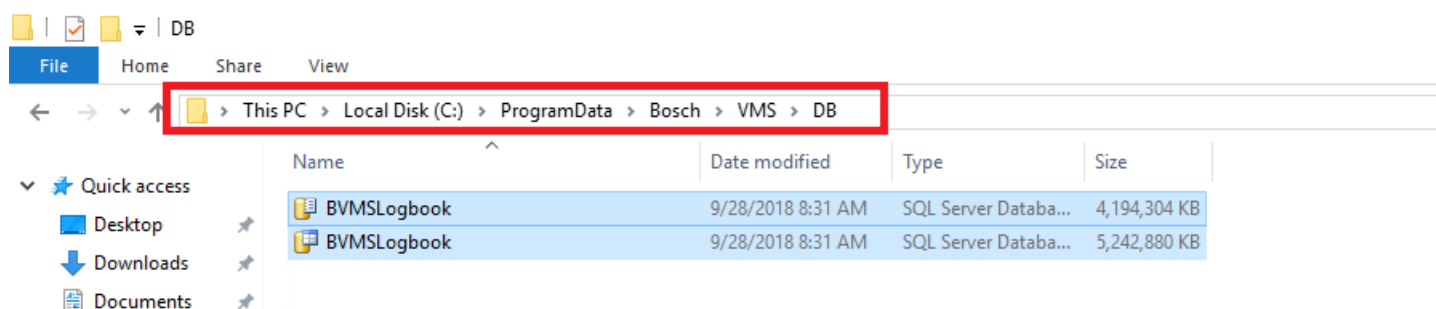
4.1 Stop BVMS SQL server instance

Open the SQL Server Configuration Manager on the BVMS Management server and Stop the SQL Server (BVMS) process.



4.2 Moving data

The logbook database is located in *C:\ProgramData\Bosch\VMS\DB* on the BVMS Management server. Copy the *BVMSLogbook.mdf* and *BVMSLogbook.ldf* (using a USB stick or using the network) to the SQL server.

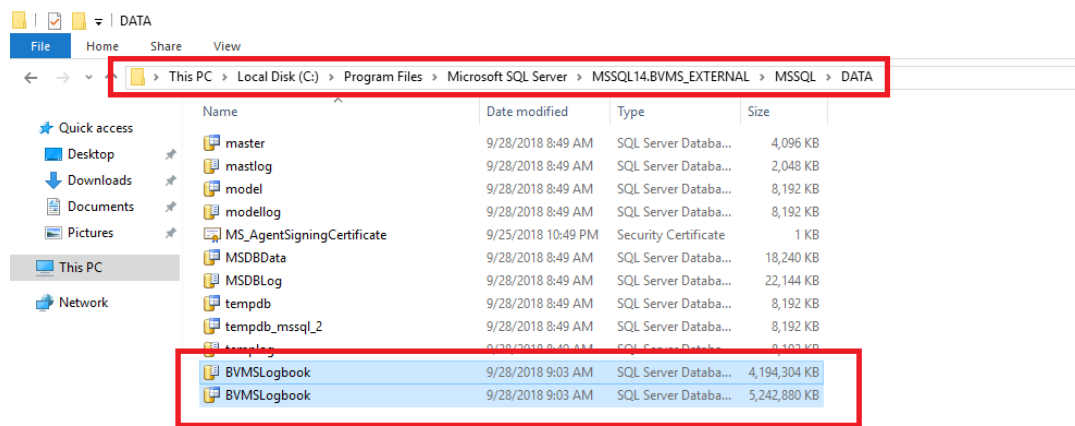


The files should be copied to the *C:\Program Files\Microsoft SQL Server\MSSQL.14.BVMS_External\MSSQL\DATA* folder.

Instance name

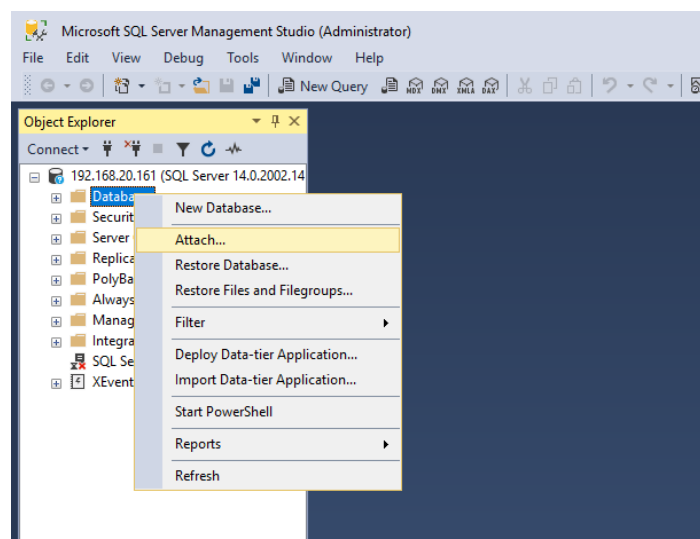
The folder name *MSSQL.14.BVMS_External* will depend on the instance name chosen during the SQL Server installation.

This folder location has the right permissions for the SQL Server to adjust these files. If another location is chosen, the database administrator needs to ensure the SQL server has the correct rights to change the files.

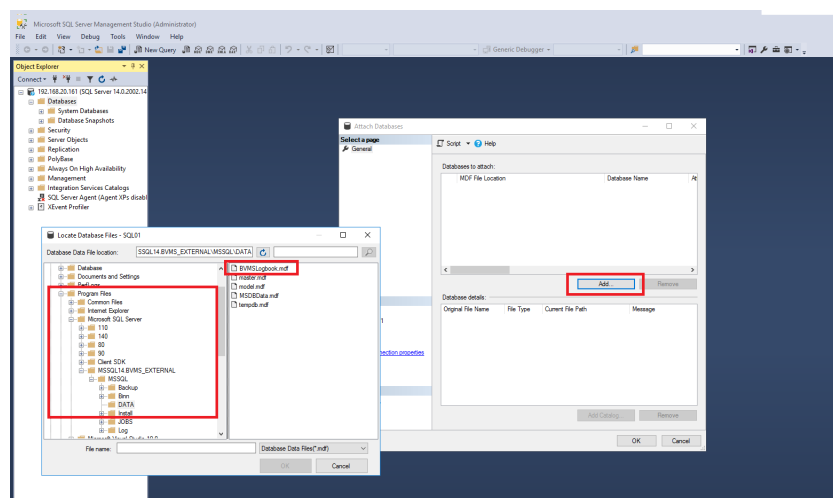


4.3 Attaching database

After the database files have been moved, they need to be attached to the SQL Server process. Login to the SQL Server using [Microsoft SQL Server Management Studio](#) on the BVMS Management server. Right click the Database folder and *Attach* a new database to the SQL Server.



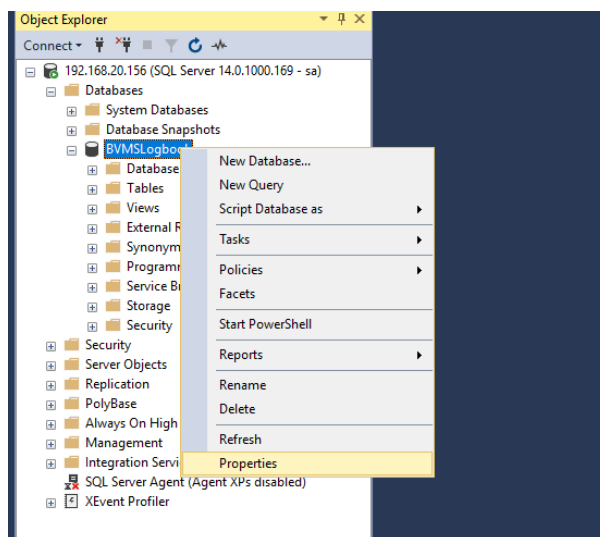
Browse to the `C:\Program Files\Microsoft SQL Server\MSSQL.14.BVMS_External\MSSQL\DATA` and select the BVMSLogbook database file.



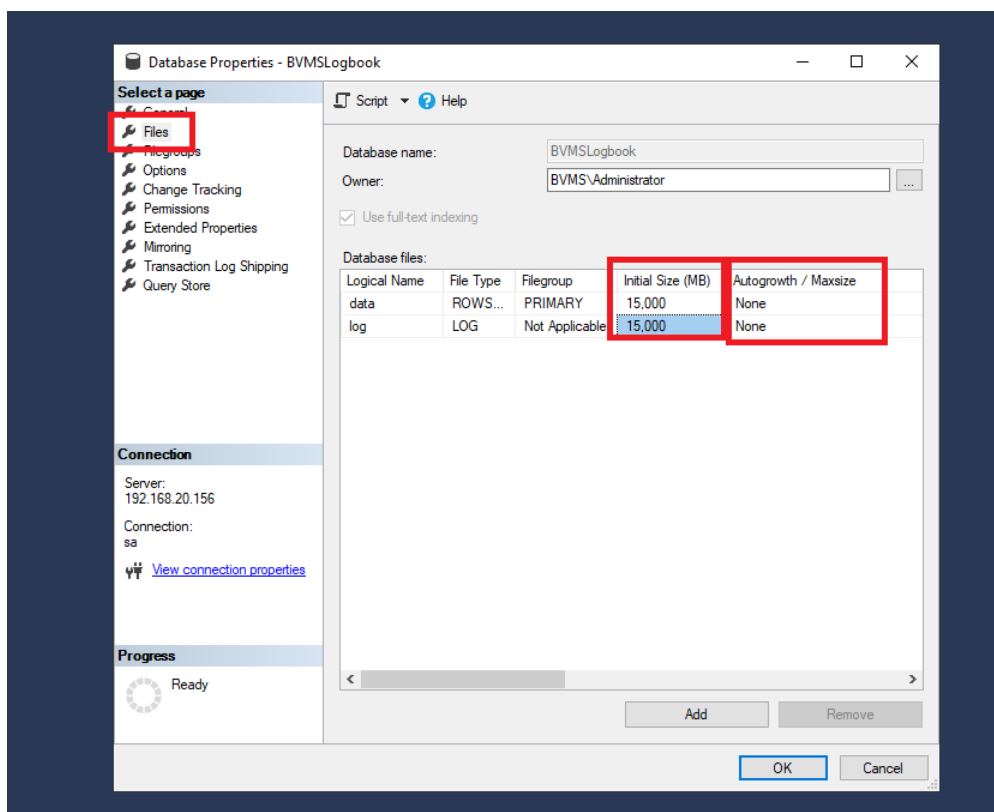
The database should be attached to the SQL Server and it should appear in the tree.

4.4 Set the database size

By default, the size of the BVMS logbook has been fixed to 4GB. To allow the logbook to grow, the size of the database needs to be changed. Right click the BVMSLogbook database in the SQL Server Management Studio and click properties.



Go to the Files page and change the Initial Size of the data and log files as required.



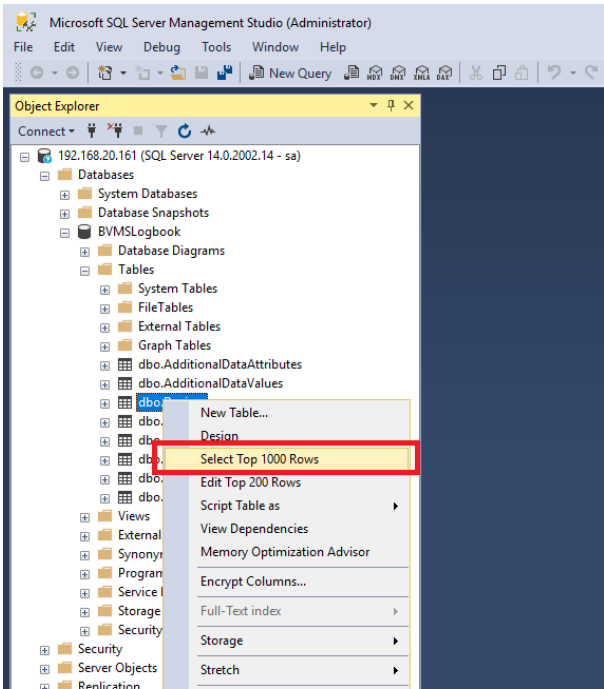
The standard BVMS Logbook is set-up with 4GB of data. The step above can also be used to increase the Logbook size, using SQL Server Express, up to 10GB (10240MB). SQL Server Management Studio might allow to increase the file size of a SQL Express database over 10GB, however, BVMS cannot add data once the limit has been reached. Configuring the database over 10GB might result in data loss.

Please note an increased database size might impact the performance of retrieving data, as SQL Server Express is limited to 1GB of memory usage. Further limitations of SQL Server Express are listed on the [Microsoft Support pages](#).

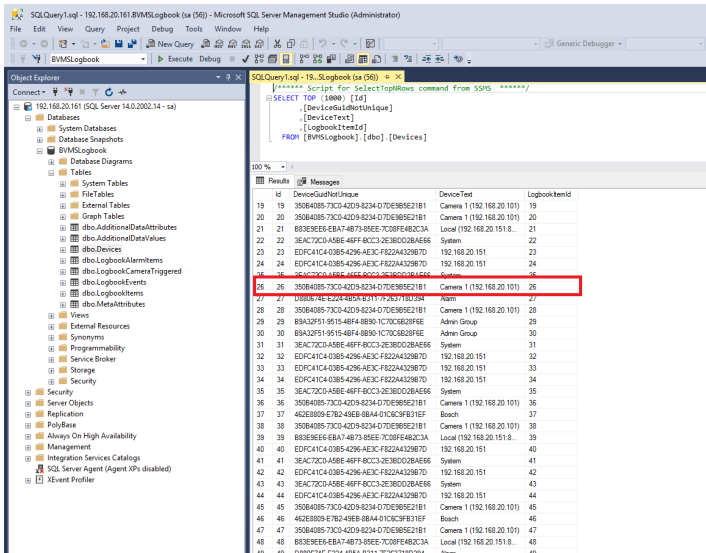
Autogrowth cannot be used for the BVMSLogbook database. More information on Autogrowth can be found on the [Microsoft Support pages](#).

4.5 Confirming data migration

In order to confirm the data migration, the content of the database can be checked by executing a SELECT query on the data. Expand the *BVMSLogbook* database, go into the *Tables* folder, right click on the *dbo.Devices* and click on "Select Top 1000 Rows".



The result should show devices recognized from the BVMS configuration, as shown below.

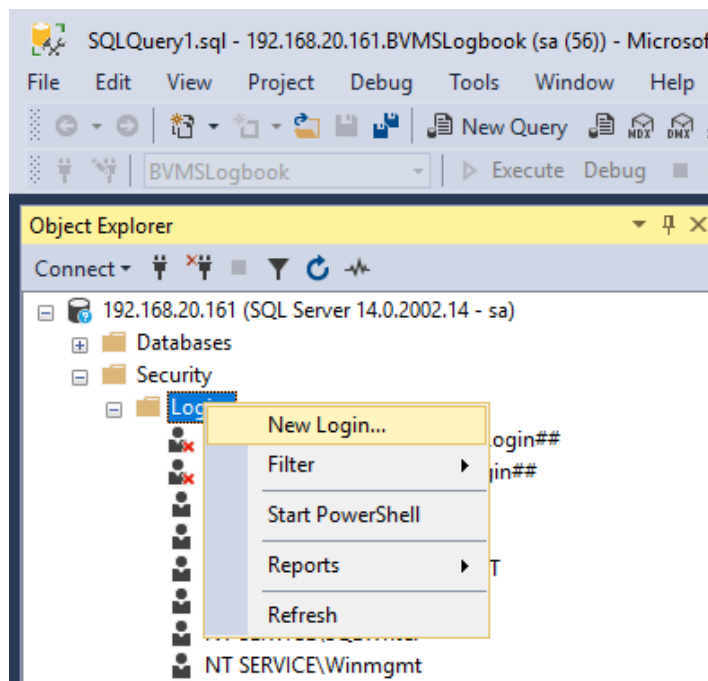


5 SQL Server security

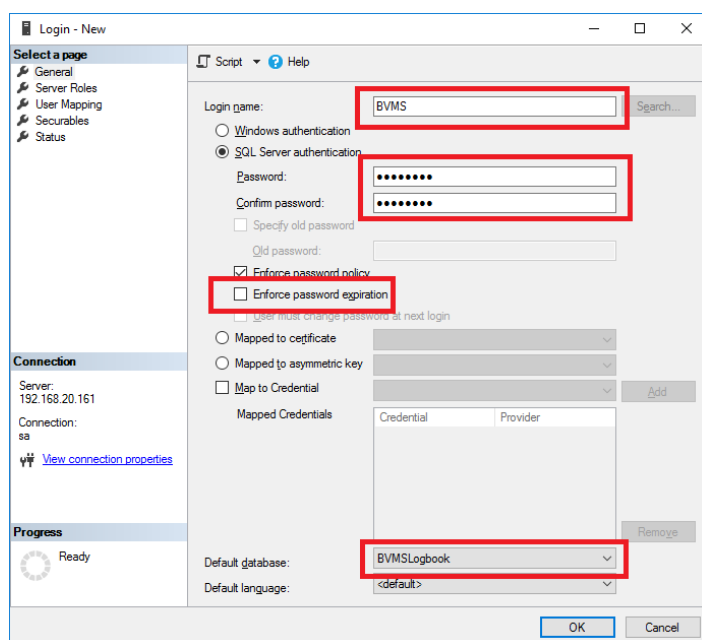
It is not recommended to use the "sa" account for BVMS to login to the SQL Server. In this section a separate SQL Server user account will be created.

5.1 Create user

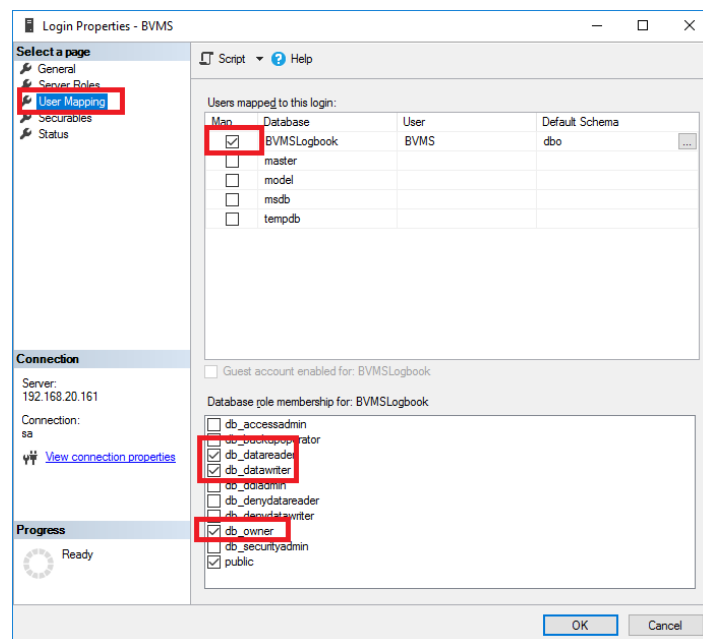
Browse to the Security - Login folder using the [Microsoft SQL Server Management Studio](#). Create a new login as shown in the image below.



Fill the form with an appropriate user-name and password, deselect *Enforce password expiration* (in order to prevent the BVMS Management server to lose access once the password has expired) and select the default database (BVMSLogbook).



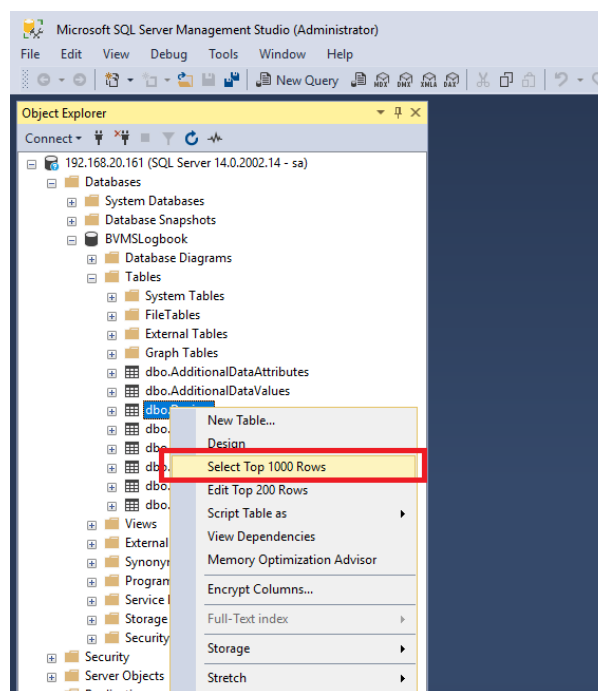
Go to the User Mapping tab, map the user to the BVMSLogbook database and enrol the user as *db_datareader*, *db_datawriter* and *db_owner* to the database.



Finish by clicking **OK**.

5.2 Verify user

Logout of the [Microsoft SQL Server Management Studio](#). Login using the newly created user and verify if the user has access to the database.



The result should show devices recognized from the BVMS configuration, as shown below.

SQLQueryLog - 192.168.20.161.BVMSLogbook (sa (56)) - Microsoft SQL Server Management Studio (Administrator)

File Edit View Query Project Debug Tools Window Help

Object Explorer

Connect 192.168.20.161 (SQL Server 14.0.2002.14 - sa)

Databases

System Databases

Database Snapshots

BVMSLogbook

Database Diagrams

Tables

System Tables

External Tables

Graph Tables

dbo.AdditionalDataAttributes

dbo.AdditionalDataValues

dbo.Devices

dbo.LogbookAlarmItems

dbo.LogbookCameraTriggered

dbo.LogbookEvents

dbo.LogbookItems

dbo.MetaAttributes

Views

External Resources

Synonyms

Programmability

Service Broker

Storage

Security

Server Objects

Replication

PolicyBase

Always On High Availability

Management

Integration Services Catalogs

SQL Server Agent (Agent XPs disabled)

XE-Event Profiler

SQLQueryLog - 192.168.20.161.BVMSLogbook (sa (56))

Script for selectOptimizes command from SPMS *****

```
SELECT TOP (1000) [Id]
, [DeviceGuidUnique]
, [DeviceTest]
, [LogbookItemId]
FROM [BVMSLogbook].[dbo].[Devices]
```

Results

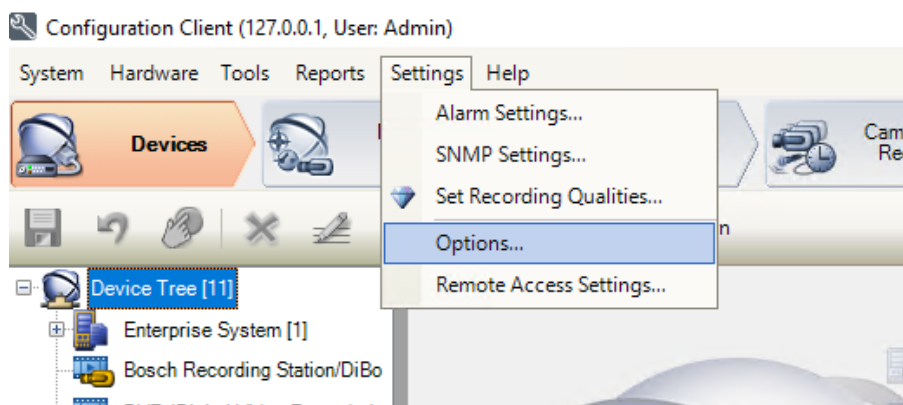
Id	DeviceGuidUnique	DeviceTest	LogbookItemId
19	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	19
20	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	20
21	8B3E3EE6-E8A7-4B73-85EE-7C0BF48DC3A	Local (192.168.20.151.8)	21
22	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	22
23	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	23
24	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	24
25	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	25
26	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	26
27	10B0A7E22484B5A9311F52677ED7384	Booth	27
28	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	28
29	89A32F51-9515-4B74-8890-1C70C4820F6E	Admin Group	29
30	89A32F51-9515-4B74-8890-1C70C4820F6E	Admin Group	30
31	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	31
32	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	32
33	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	33
34	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	34
35	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	35
36	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	36
37	462E3895-E762-49E8-8B4A-01C63F811EF	Booth	37
38	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	38
39	8B3E3EE6-E8A7-4B73-85EE-7C0BF48DC3A	Local (192.168.20.151.8)	39
40	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	40
41	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	41
42	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	42
43	3EAC72C3-A58E-48FF-8C33-2E38C02BAE66	System	43
44	EDFC41C4-0385-4286-AE3C-F822A432987D	192.168.20.151	44
45	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	45
46	462E3895-E762-49E8-8B4A-01C63F811EF	Booth	46
47	35084085-73C3-42D9-8234-07DE985E2181	Camera 1 (192.168.20.101)	47
48	8B3E3EE6-E8A7-4B73-85EE-7C0BF48DC3A	Local (192.168.20.151.8)	48

6 BVMS settings

Now that the database is configured and the access is tested, BVMS needs to be re-directed to the new location of the logbook database.

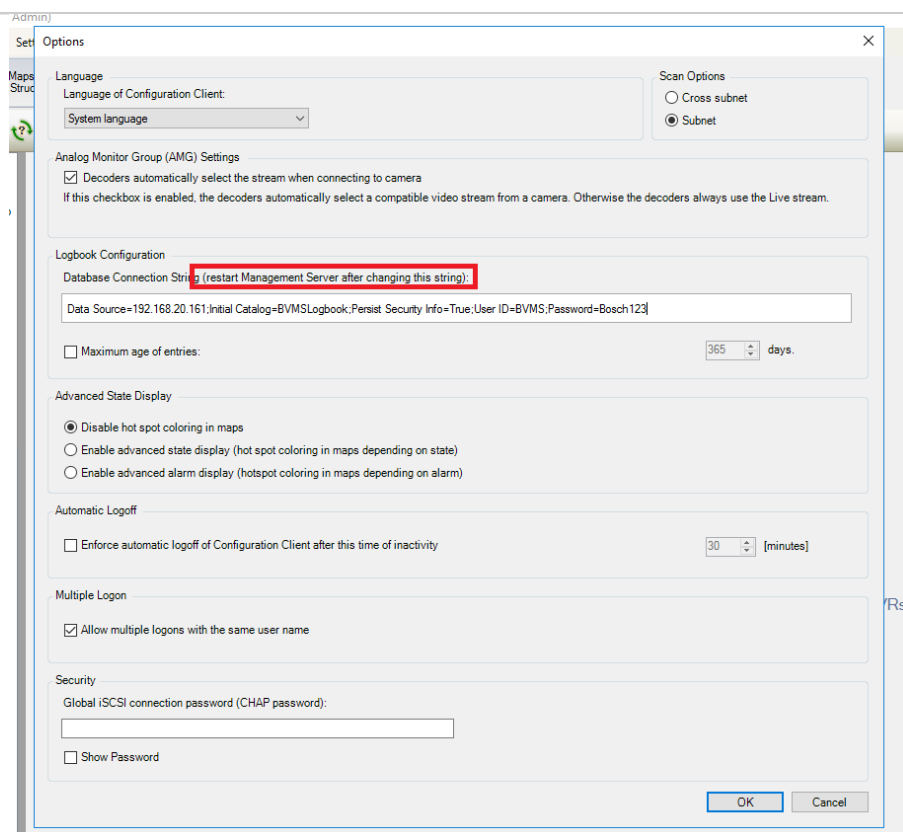
6.1 Change SQL connection string

The SQL Connection string can be configured in the Options dialogue.



Change the SQL Server connection string based on the format and example below.

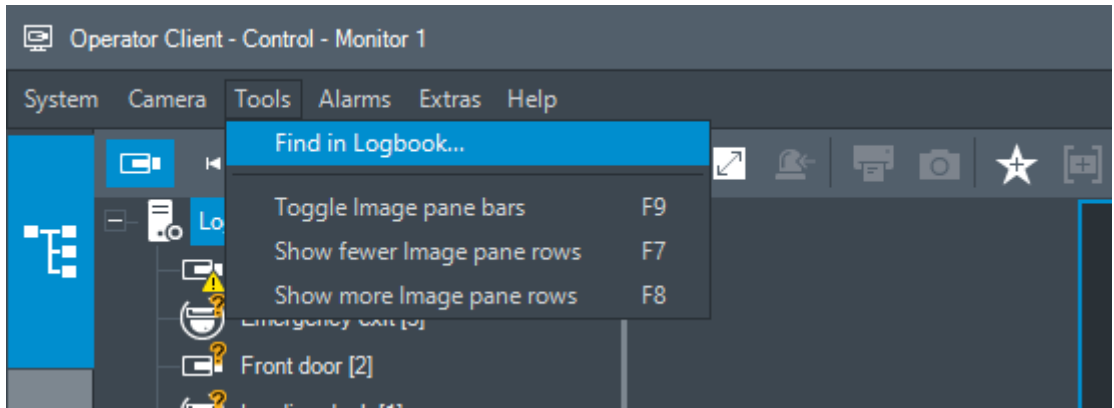
```
Data Source=YourDBServerAddress;Initial Catalog=DatabaseName;Persist Security Info=True;User ID=YourUserID;Password=YourPassword
Data Source=192.168.20.161;Initial Catalog=BVMSLogbook;Persist Security Info=True;User ID=BVMS;Password=Bosch123
```



Restart the BVMS Management server after the configuration has been saved and activated.

6.2 Verify logbook connectivity

The last step is to verify the logbook migration in the BVMS Operator Client. Open the logbook search window, as shown in the image below.



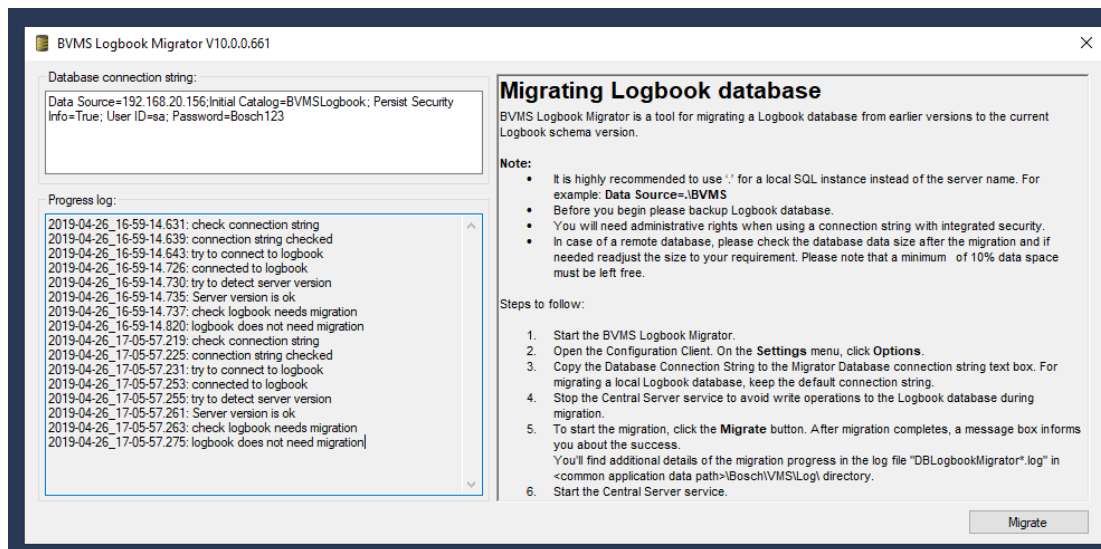
When the migration has succeeded, the logbook should contain a historical overview of events, dated from before the migration of the database.

Logbook Results: Default filter												
Back to Filter				Save Results								
Event Name	Event State Value	Event Time	Details	User name	Logging Time	Devices	Cameras Triggered	Alarm priority	Alarm state	Alarm Title	Record only	Force workflow
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Fr...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Fr...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.E...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.E...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Fr...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Fr...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Lo...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Lo...						
Camera Closed		9/28/2018 9:2		Admin/Admin Gr...	9/28/2018 9:2	Admin Group.Lo...						
Alarm Cleared		9/28/2018 9:2		Admin	9/28/2018 9:2	Alarm	20		Alarm Cleared	System Error	False	False
Alarm Accepted		9/28/2018 9:2		Admin	9/28/2018 9:2	Alarm	20		Alarm Accepted	System Error	False	False
Alarm Activated		9/28/2018 9:2			9/28/2018 9:2	Alarm	20		Alarm Active	System Error	False	False

7 Upgrading BVMS

Do not de-install SQL Server Express from the BVMS Management Server. This might cause the BVMS set-up to fail, when it used to upgrade the Management Server. The SQL Server Express services might be stopped during normal operations, but need to be started and running during the upgrade.

When a new BVMS release is created changed to the database schema might have been made. Normally, when using the embedded SQL Server, the database schema is automatically upgraded. As the database is moved to a different server, the set-up mechanism cannot realize an upgrade of the schema of the remote database. To allow system administrators to upgrade the database schema manually, the DbLogBookMigrator has been created. This tool can be found in the C:\Program Files\Bosch\VMs\bin directory (DBLogbookMigrator.exe). Start the tool, enter the SQL Server connection string (as entered in section 4.1) and start the migration process. The progress log will show an indication of the result.



8 Troubleshooting

If the migration has failed the BVMS Operator Client will report it is not able to access the database. This could have several root-causes. The connectivity between the SQL Server and BVMS Management server can be tested using general network troubleshooting tools, like ping (take care of the firewall configuration!). Additionally the firewall can be temporarily disabled to verify if it has been configured correctly. The [Microsoft SQL Server Management Studio](#) should be able to login from the BVMS Management server to the SQL Server. Last, the user account which has been created should have the correct roles on the database.