

# UHF\_Middleware

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## Documentation

5/15/2023  
Version 1.0R9

This document describes the UHF\_Middleware software supplied by GIGA-TMS Inc.

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# Introduction

**UHF\_Middleware** helps you to save UHF tags' information which read by TS100/UHF880 to Database (DB).

## System Requirements

**UHF\_Middleware** is a Windows-based program, following is the requirements:

UHF_Middleware Version	.NET Framework	OS
Before <b>V1.1R5</b>	4.0	Windows XP or later version.
After <b>V1.2R0*</b>	4.8	Windows 7 or later version.

\* After **UHF\_Middleware** V1.2R0, start to support PostgreSQL.

## Preparation

Firstly, setting up the device to send tags' information to TCP Server via Wi-Fi.

According to your device which is, refer to the corresponding chapter.

## TS100

Using **TS100 Utility** to configure TS100 as blow steps.

1. Open **TS100 Utility** program.
2. Plug in TS100 to your computer by USB.
3. Click [**Connect**] button to connect with TS100.
4. Select [**General**] tab and set up an Operating Mode.
5. Select [**Hardware**] tab / [**Wi-Fi Settings**] button to configure Wi-Fi settings to send tags' information to host via the internet.
6. Select [**Output**] tab:
  - 6.1. Set up [**Data Type**] to make TS100 sends different information to Middleware.

6.1.1. Select “Decoded Data” in general case.

6.1.2. Select “Raw Data” only when you need to retrieve “Remove Tag Event” and “EPC raw data”.



6.2. Set [TCP Server Address] that is the IP and port used for Middleware to listen.

*Tip: When you click [Start] button in the UHF\_Middleware, it shows which IPs & port are listening. (As below)*



6.3. Select [TCP Server (Wi-Fi)] to enable TS100 sends data to TCP Server.

7. Click [Update] button to save the modifications.

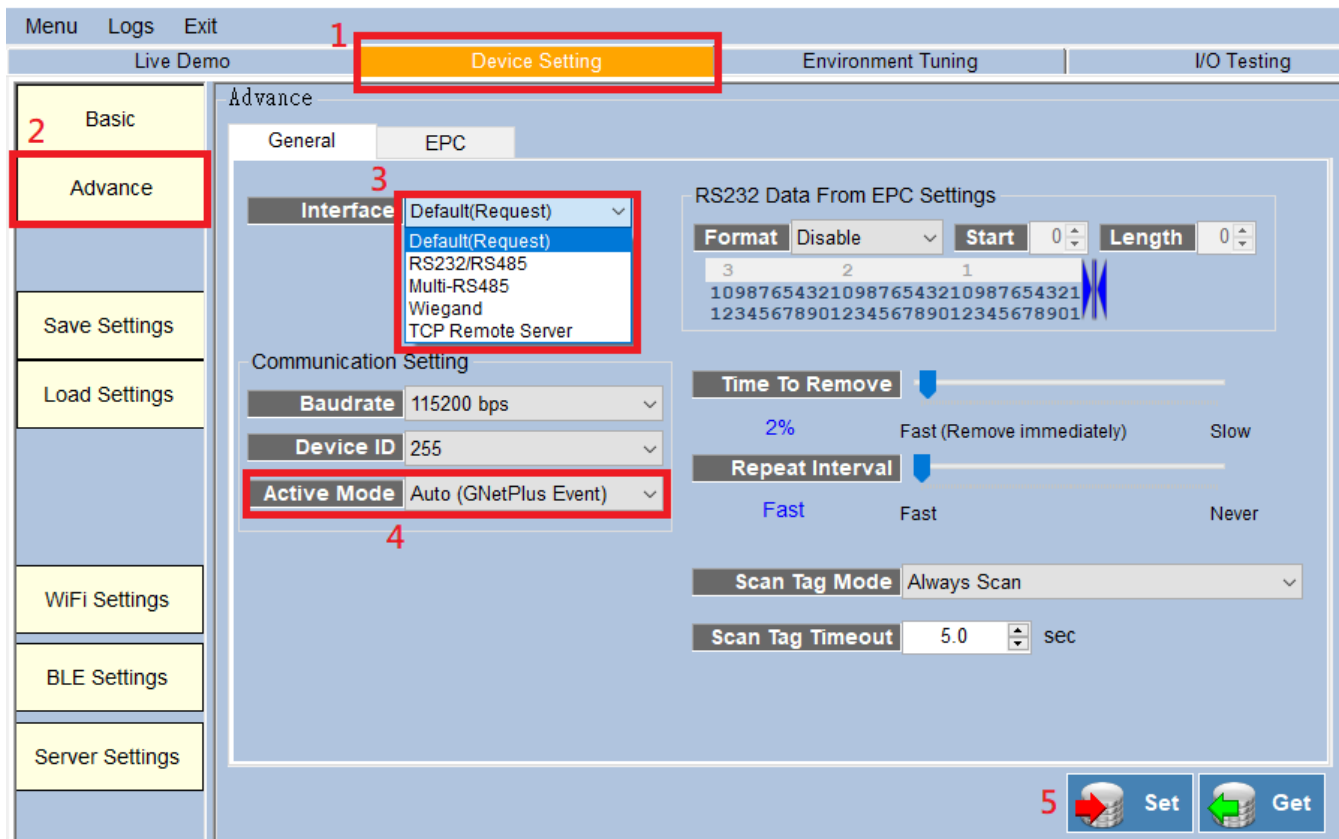
8. Close TS100 Utility.

Now, TS100 is ready to send tags’ information to TCP Server via Wi-Fi.

## UHF880

Using **UHF Reader Utility (G)** to configure UHF880 as blow steps.

1. Open **UHF Reader Utility (G)** program and connect with UHF880.
2. Configure output interface and packet format:
  - 2.1. Click [Device Setting] tab.
  - 2.2. Click [Advance] button.
  - 2.3. Configure interface to [Default(Request)] or [TCP Remote Server].
  - 2.4. Configure Active Mode to [Auto (GNetPlus Event)].
  - 2.5. Click [Set] button.

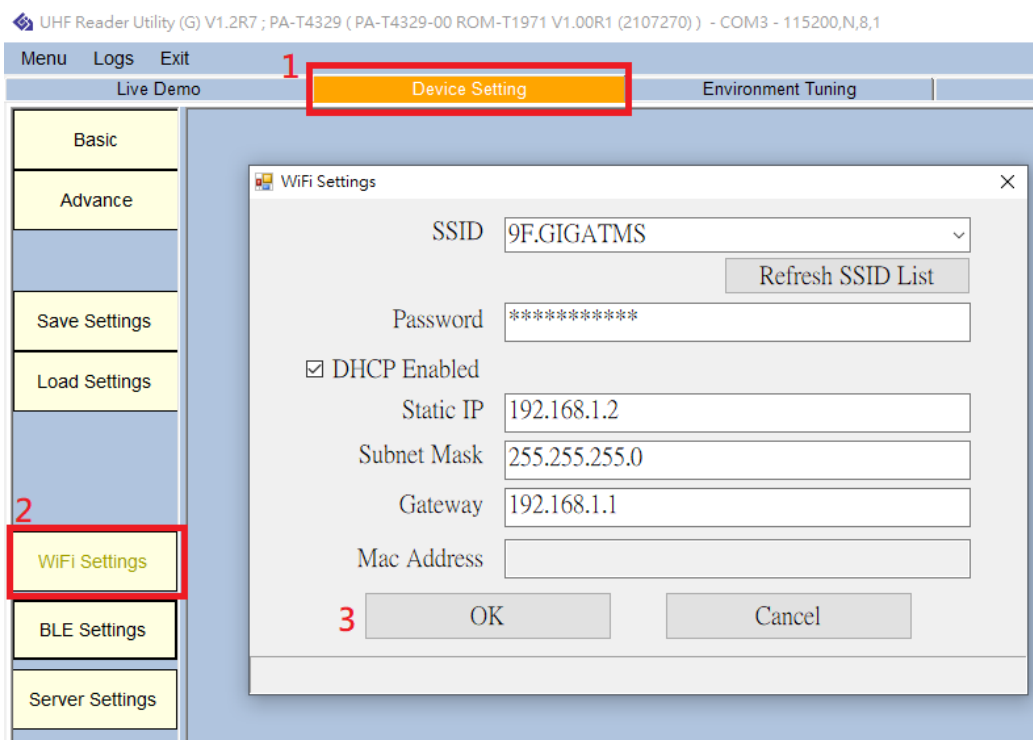


### 3. Configure Wi-Fi Settings:

3.1. Click **[Device Setting]** tab.

3.2. Click **[WiFi Settings]** button.

3.3. Configure Wi-Fi settings and click **[OK]** button.

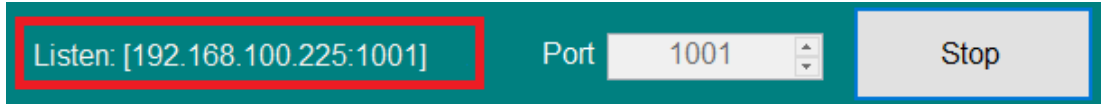


4. Configure TCP Server:

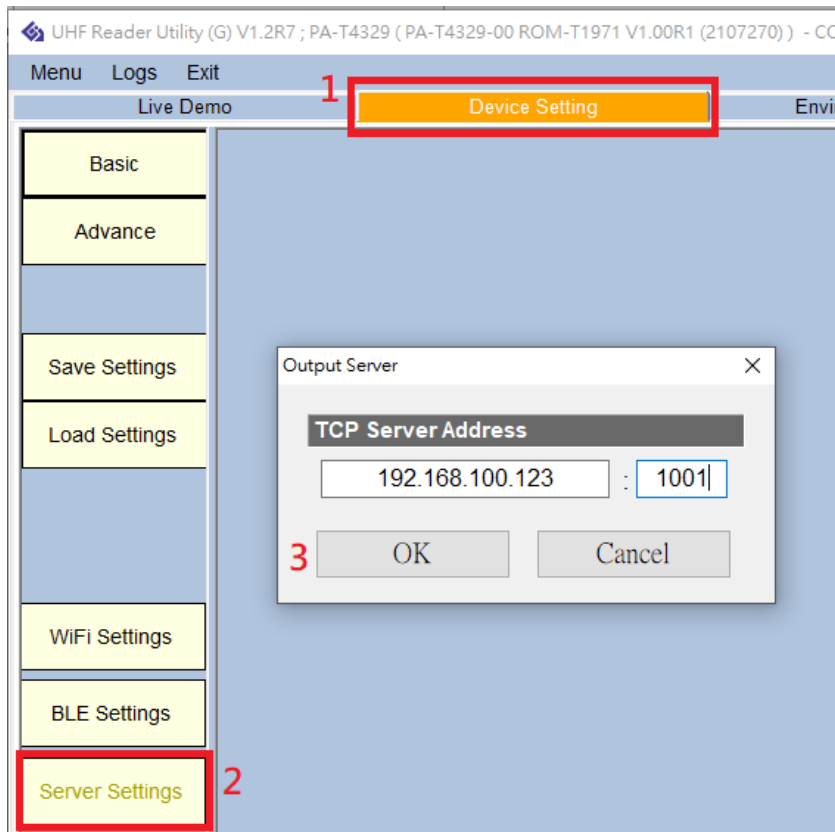
4.1. Click [Server Settings] button.

4.2. Set [TCP Server Address] that is the IP and port used for Middleware to listen.

*Tip: When you click [Start] button in the UHF\_Middleware, it shows which IPs & port are listening. (As below)*



4.3. Click [OK] button.

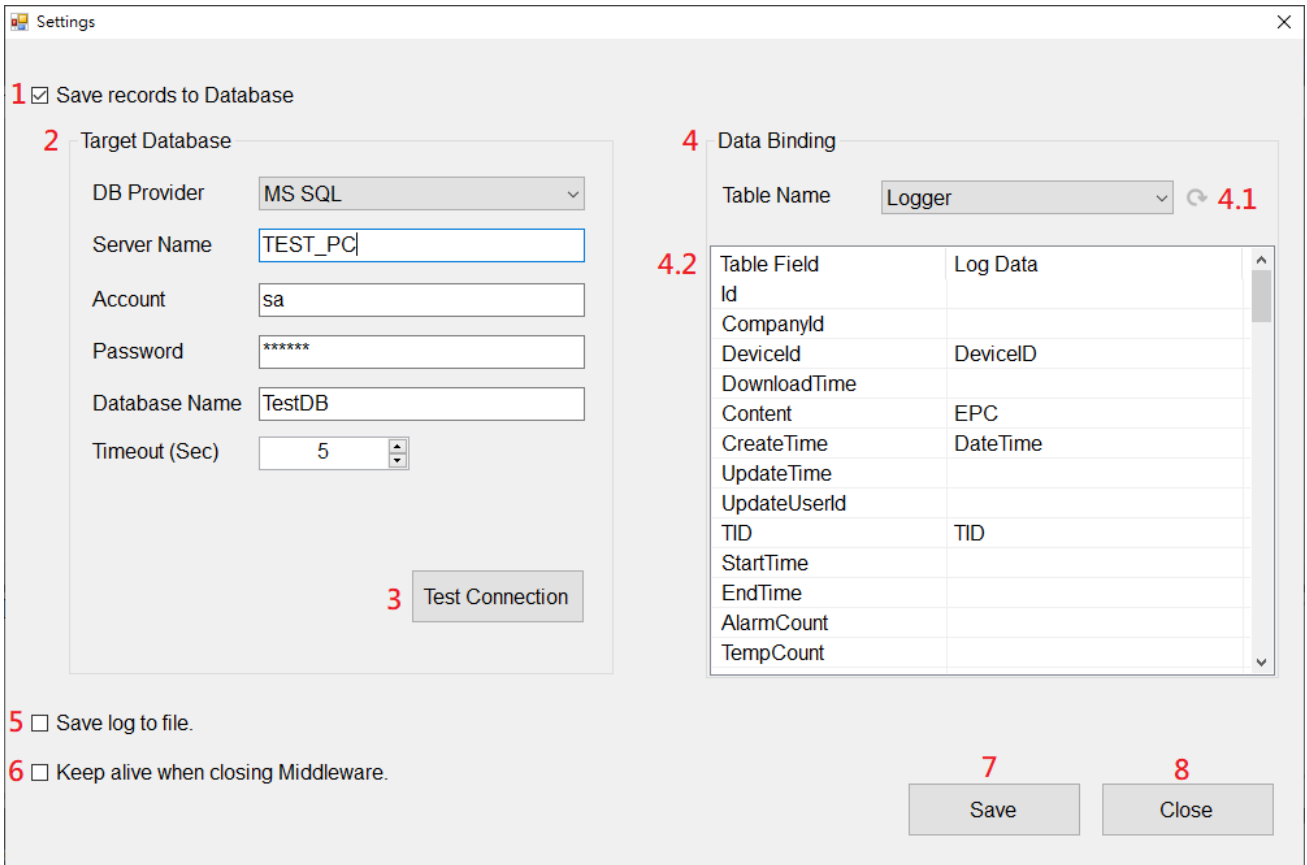


Now, UHF880 is ready to send tags' information to TCP Server via Wi-Fi.

Restart the UHF880 after closing **UHF Reader Utility (G)**, then UHF880 is running at Active Mode.







1. Select [**Save records to Database**] to save data to DB.
2. Fill up the [**Target Database**] form.
3. Click [**Test Connection**] button to make sure the settings are correct.
4. Binding data to the DB in the [**Data Binding**] block.
  - 4.1. Click [] button to update Table Name. And select the target table to store tag data.
  - 4.2. Mapping [**Table Fields**] with [**Log Data**]:
    - 4.2.1. Click empty fields under [**Log Data**] column. It shows a list in the field.
    - 4.2.2. Select a Log Data in the list to bind to the table field.

Table Field	Log Data
ID	
DateTime	
DeviceID	DeviceID
DeviceSerialNumber	
TagState	
EPC	

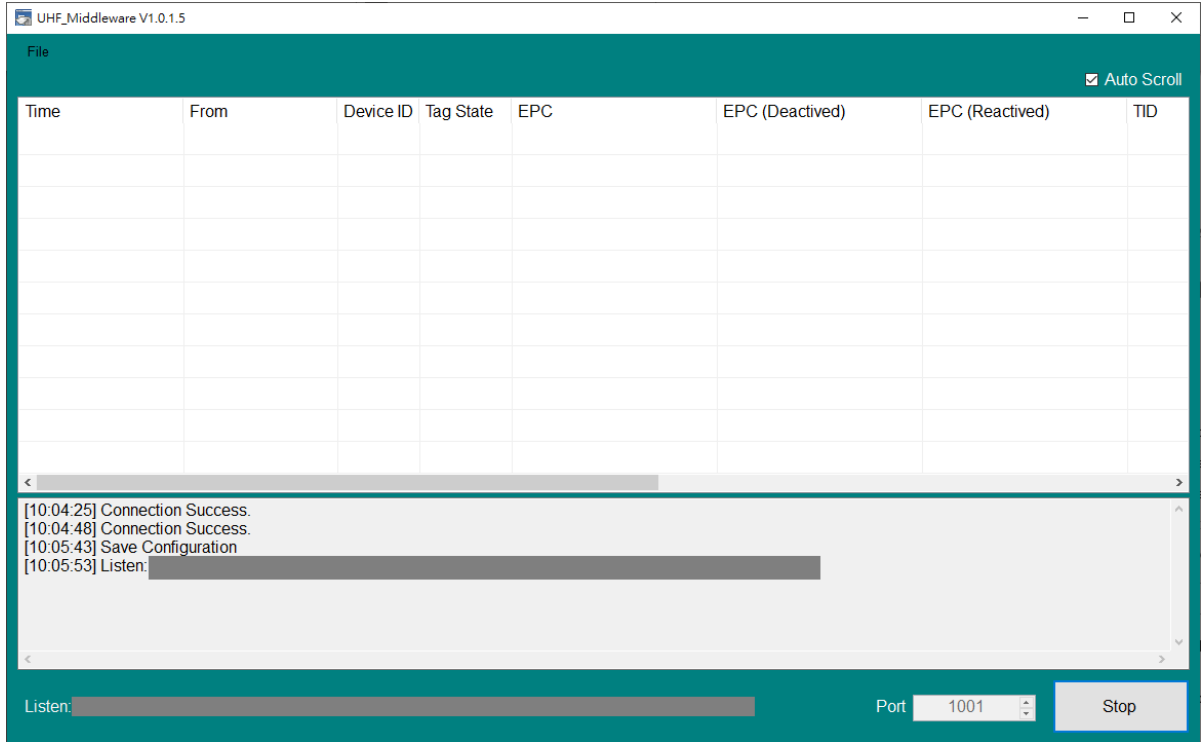
*Note: Refer to [Log Data Table](#) for more information.*

5. Select [**Save log to file**] will save logs to local files.
6. Select [**Keep alive when closing Middleware**] to make the middleware been running at the background after click [**X**] button.
7. Click [**Save**] button to save current settings to registry.

8. Click [**Close**] button to close the setting window.

## Start the service

1. Click [**Start**] button to start the process of receiving tag data. Then the background color changes to green. (Default listening Port Number is **1001**)



2. You could view the received tag data and log:

2.1. Select [**Auto Scroll**] to see the latest record in the below grid.

2.2. The receiving tag data shows in the grid.

Time	From	Device ID	Tag State	EPC	EPC (Deactivated)	EPC (Reactived)	TID
2023/05/15 10:12:26	192.168.100.225:...	FF	Present	3031323334353637383...			
2023/05/15 10:34:22	192.168.100.225:...	FF	Present	3031323334353637383...			
2023/05/15 10:36:11	192.168.100.225:...	FF	Present	3031323334353637383...			
2023/05/15 10:36:32	192.168.100.225:...	FF	Present	3031323334353637383...			

There are three types of background colors for records.

Background Color	Description
● Red	Got an error when saving data to DB.
● Turquoise	The record has saved to DB.
○ White	Not yet save to DB.

3. If you're going to modify settings, you should click [**Stop**] button to end the process of receiving tag data.

# Log Data Table

Name	Type	Description
DateTime	datetime	Time of data retrieved.
FromIPAddress	string	IP address and port of TS100.
DeviceID	string	device id of TS100.
DeviceSerialNumber	string	device serial number of TS100.
TagState	byte	Enable " <i>Remove Tag Event</i> " to retrieve tags removing state. 0: Present, 1: Disappeared
TID	string	TID of the tag.
EPC	string	EPC of the tag. (raw data) * Retrieve the data when <i>Data Type</i> is "Raw Data" or <i>Decoded Data</i> contains "EPC"
DeactivatedEPC	string	Deactivated EPC of the tag. * Retrieve the data when TS100 in " <i>Deactivated Mode</i> ".
ReactivatedEPC	string	Reactivated EPC of the tag. * Retrieve the data when TS100 in " <i>Reactivated Mode</i> ".
DecodedData	string	Decoded data of EPC. * Retrieve the data when <i>Data Type</i> is "Decoded Data".
TagSerialNumber	string	Serial number of UPC encoding. * Retrieve the data when 1. <i>Data Type</i> is "Decoded Data" 2. <i>Decoded Data</i> contains "EAN/UPC" or "EAN/UPC + EAS"
Ascii	string	EPC as ASCII. * Retrieve the data when 1. <i>Data Type</i> is "Decoded Data" 2. <i>Decoded Data</i> contains "ASCII (EPC)"

\* The gray rows in the table indicate that data packets may not exist. It depends on the settings of TS100 and tags' data.

# Appendix A - Sample SQL Schema

Using below sample schema to create a table for testing.

```
CREATE TABLE [dbo].[TagsInfo](
    [ID] [bigint] IDENTITY(1,1) NOT NULL,
    [DateTime] [datetime] NULL,
    [DeviceID] [varchar](10) NULL,
    [DeviceSerialNumber][varchar](20) NULL,
    [TagState] [tinyint] NULL,
    [EPC] [varchar](50) NULL,
    [DeactivatedEPC] [varchar](50) NULL,
    [ReactivatedEPC] [varchar](50) NULL,
    [TID] [varchar](50) NULL,
    [DataSource] [varchar](21) NULL,
    [DecodedData] [varchar](256) NULL,
    [TagSerialNumber] [varchar](10) NULL,
    CONSTRAINT [PK_TagsInfo] PRIMARY KEY CLUSTERED
(
    [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
    ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON) ON [PRIMARY]
) ON [PRIMARY]
```

In the UHF\_Middleware, set data binding as below.

# Appendix B - Install a database

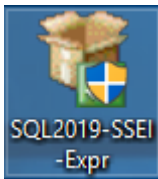
Following below steps to install a database for testing.

## Install SQL Server 2019 Express

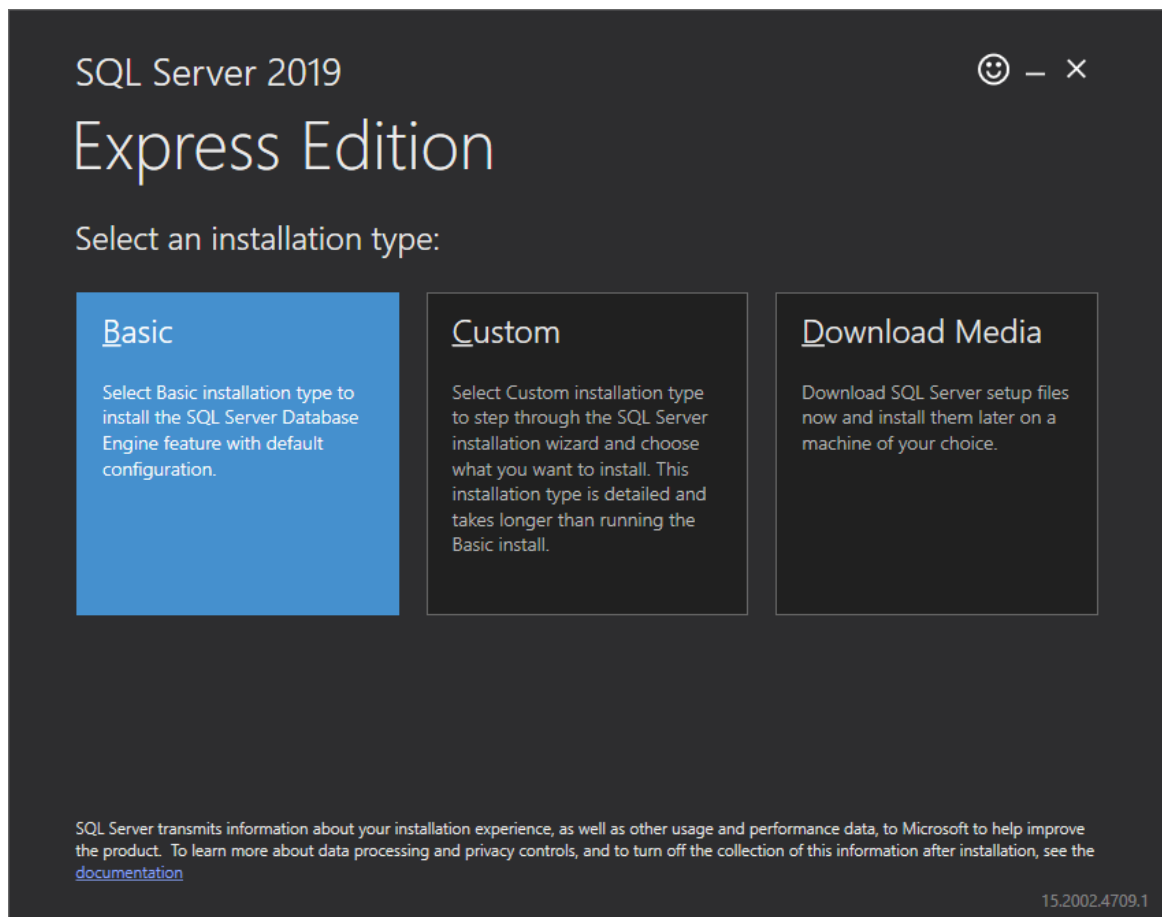
1. Download SQL Server 2019 Express.

<https://go.microsoft.com/fwlink/?linkid=866658>

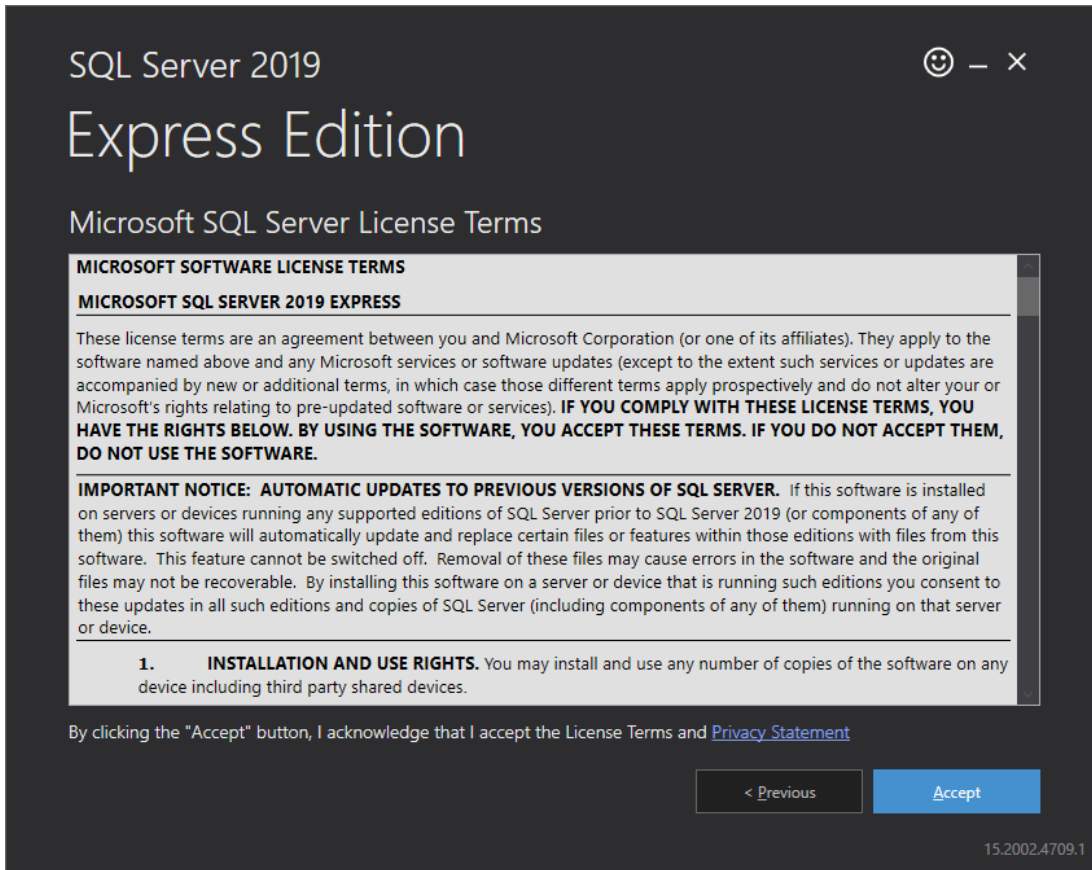
2. Execute the installer.



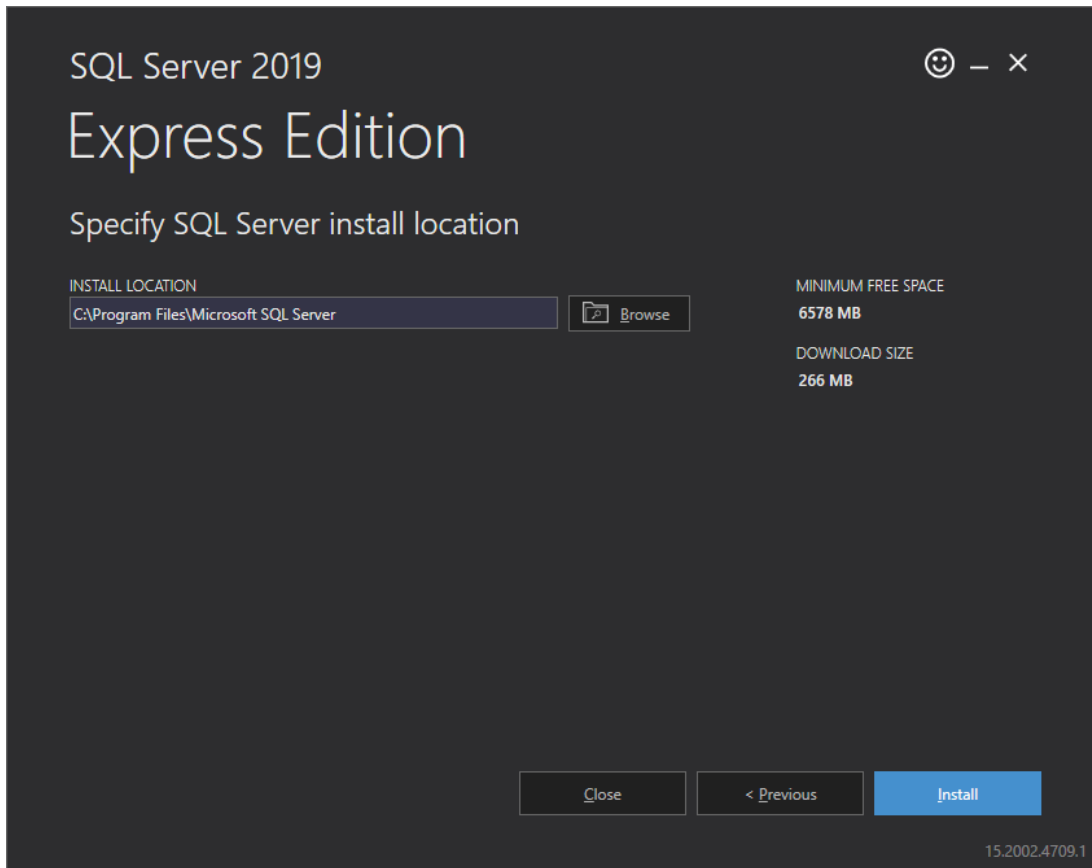
3. Select [Basic] option.



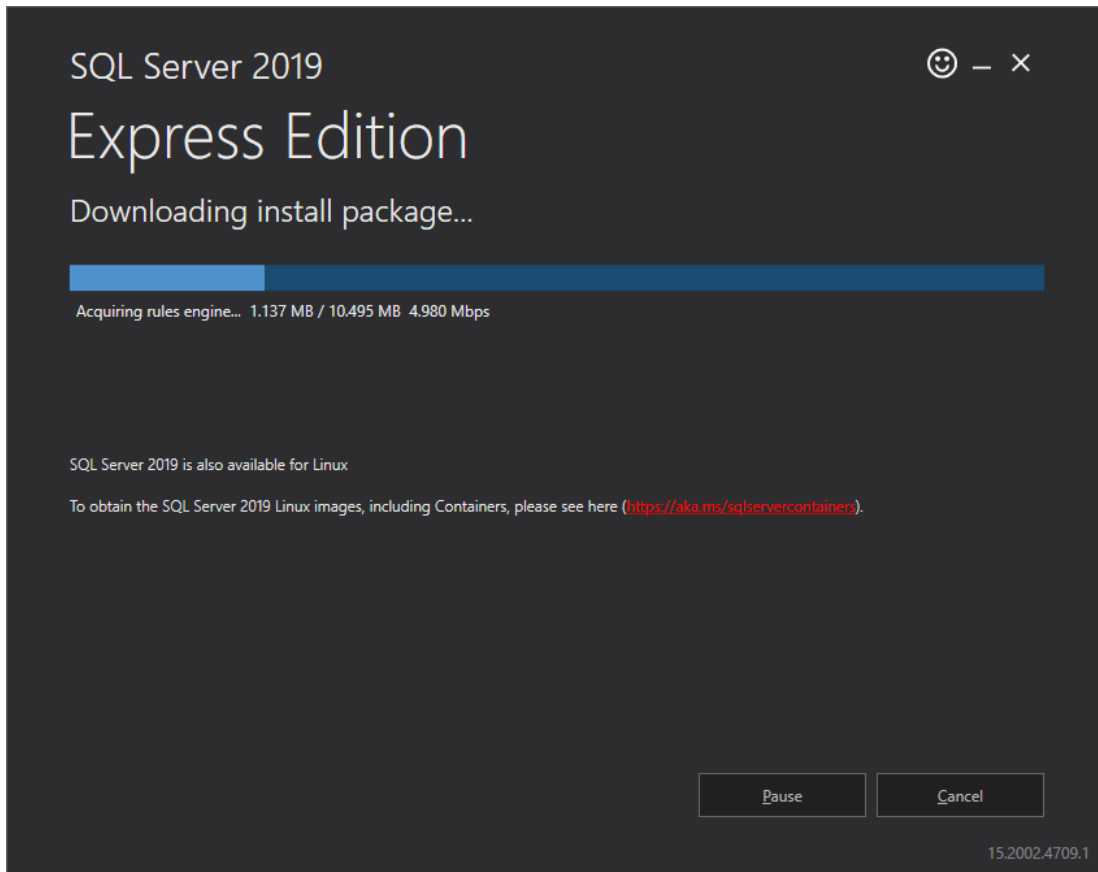
4. Click [**Accept**] button.



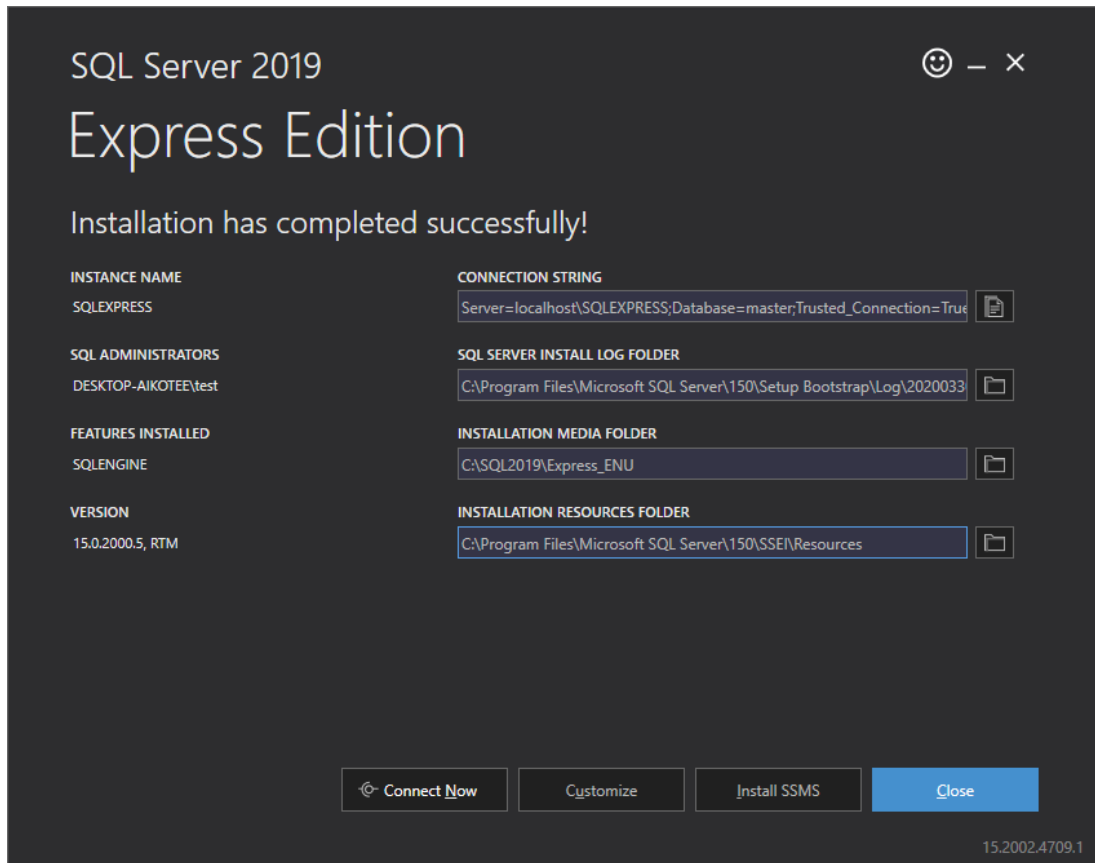
5. Click [**Install**] button.



6. Wait for installing.



7. Click [**Close**] button.



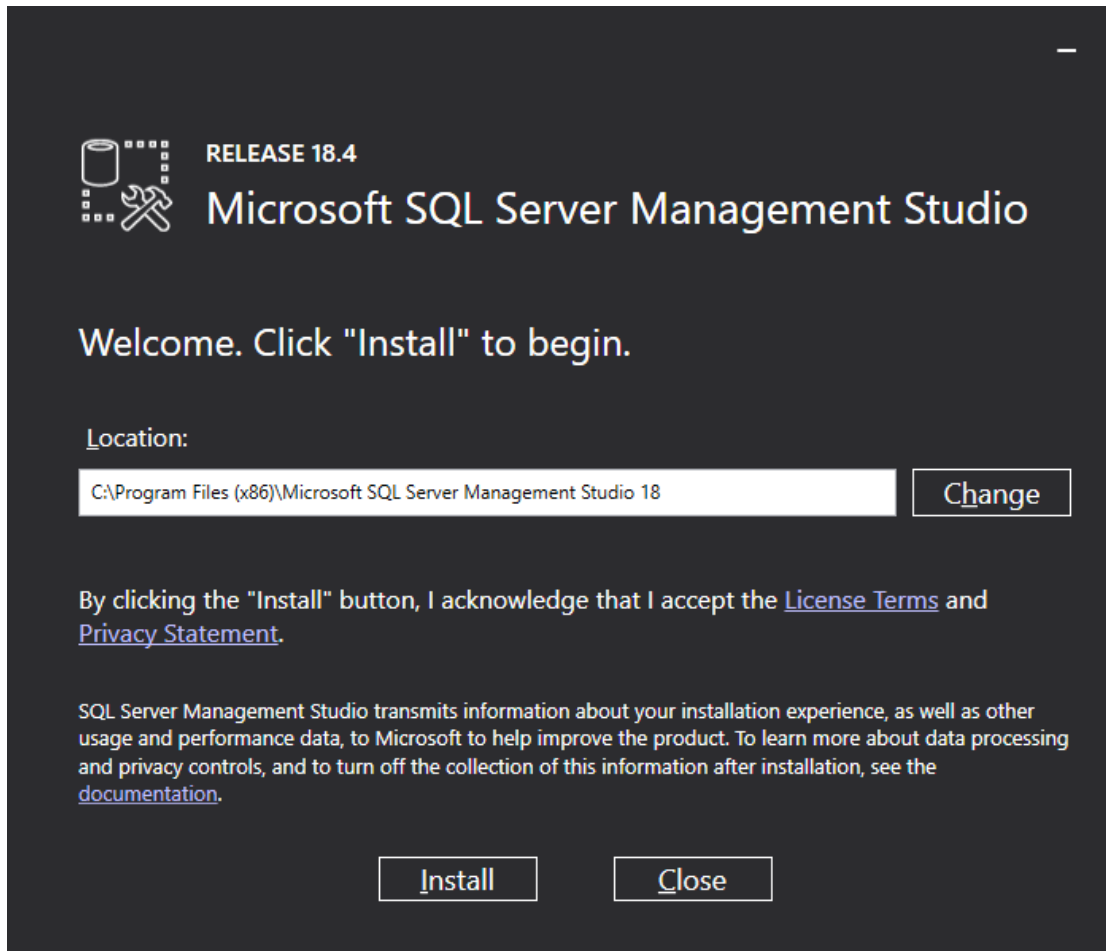


## Install SQL Server Management Studio (SSMS)

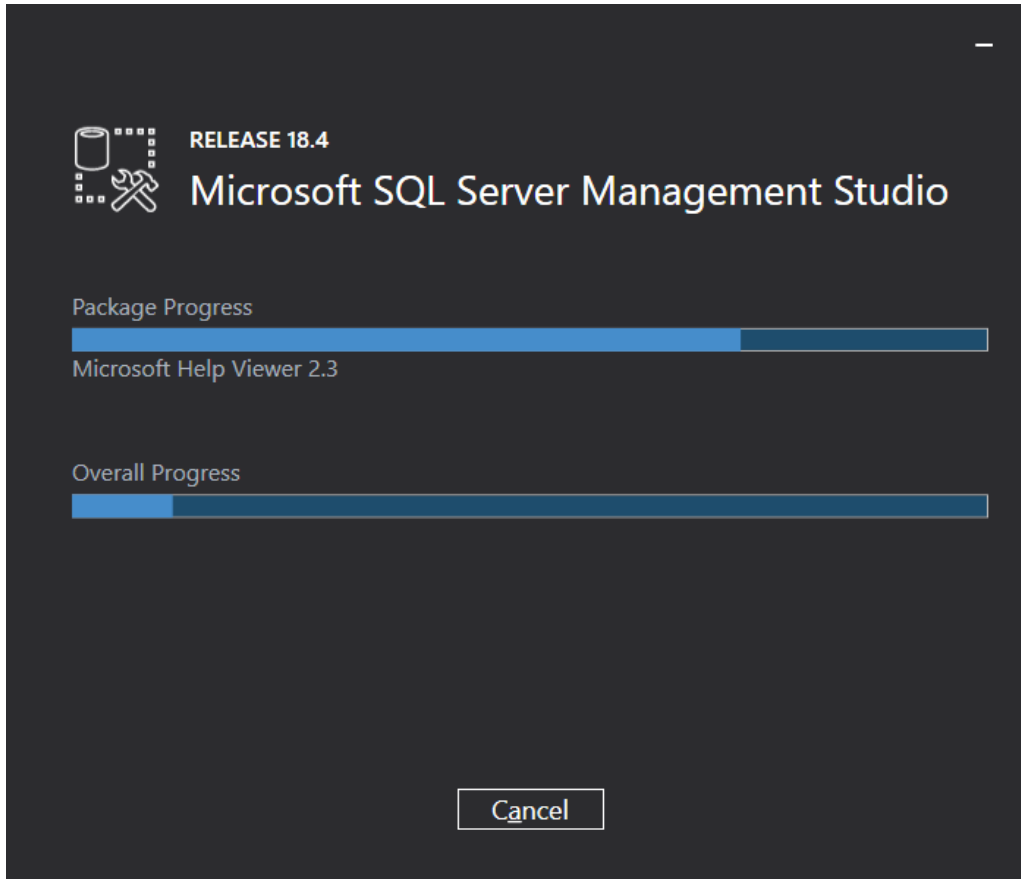
1. Download SQL Server Management Studio (SSMS)

<https://aka.ms/ssmsfullsetup>

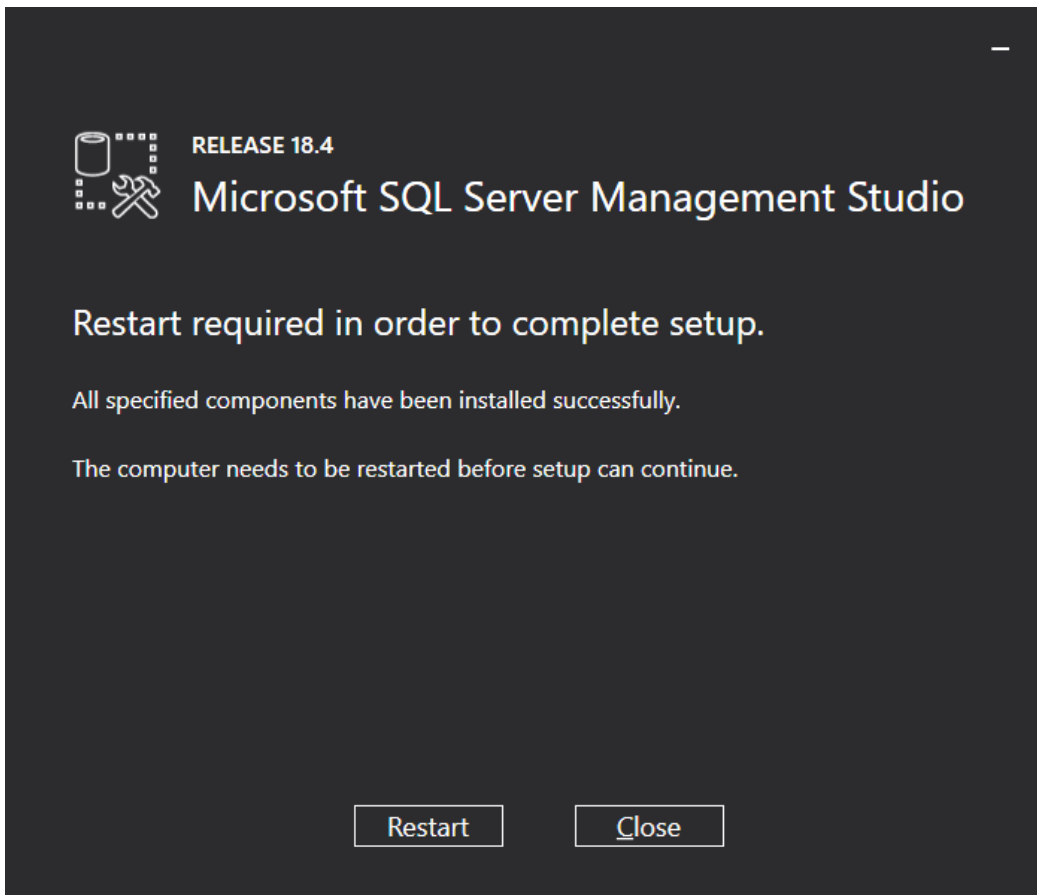
2. Execute the installer. Click [**Install**] button.



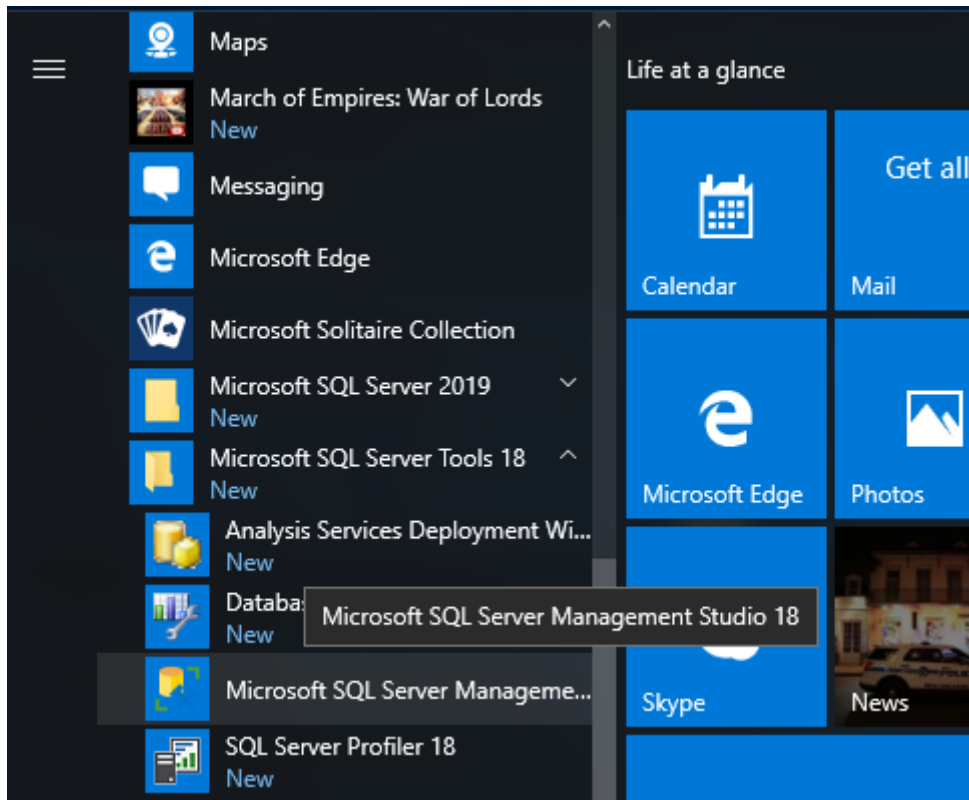
3. Wait for installing.



4. Click [**Restart**] button to restart your PC.



5. Execute SSMS.

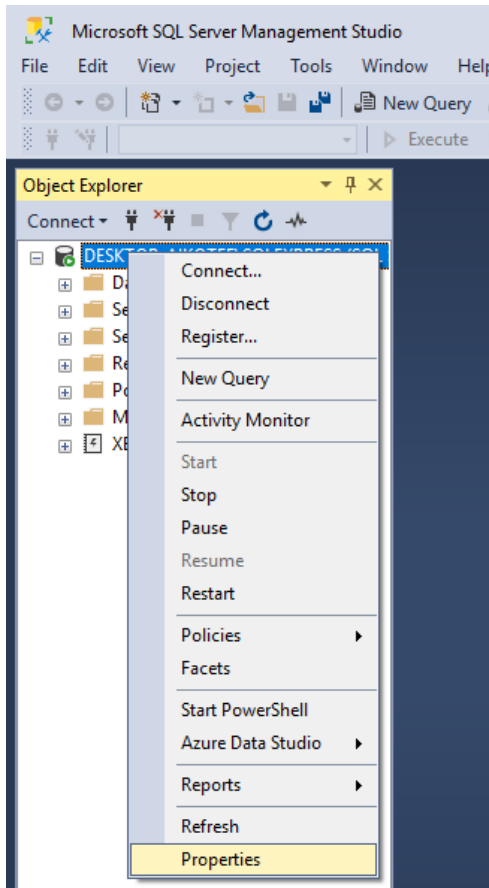


6. Click [**Connect**] button.

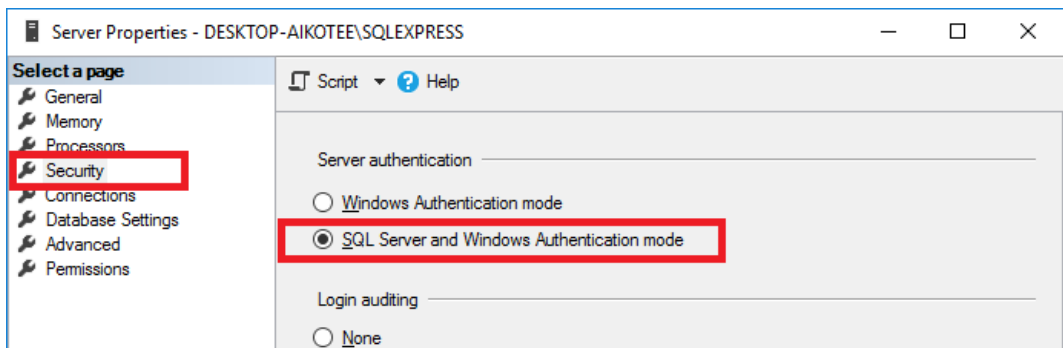
## Configure the Database

1. Change authentication mode with SSMS.

1.1 Right click on [**Object Explorer**] / Database Node. Click [**Properties**] on pop-up menu.



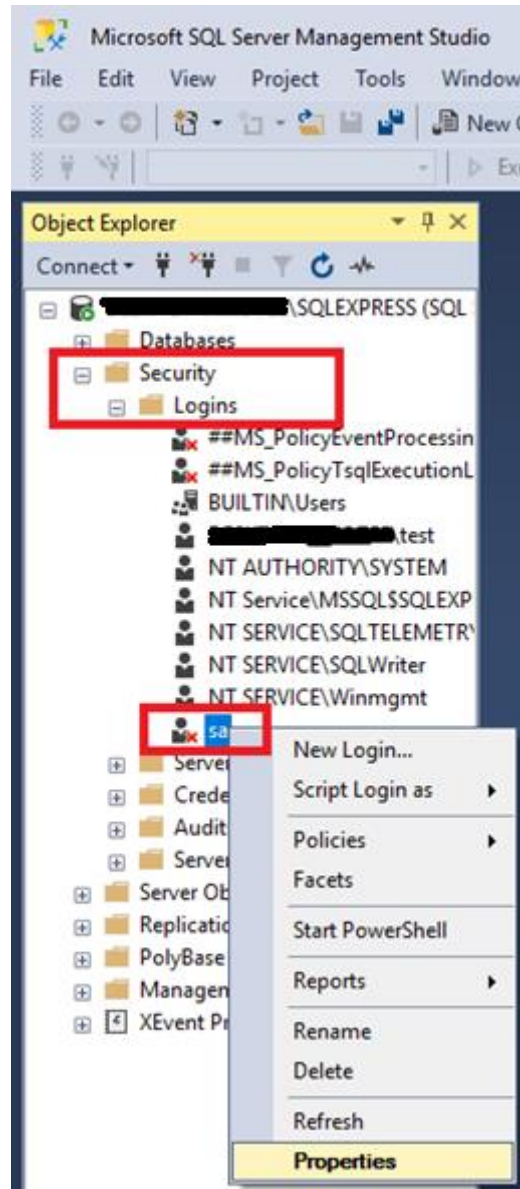
1.2. Select [Security] page and select [SQL Server and Windows Authentication mode]



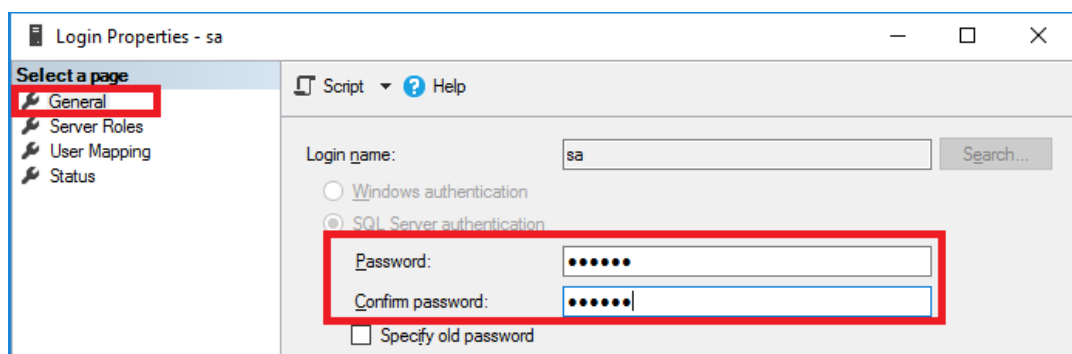
1.3. Click [OK] button.

2. Enable sa login

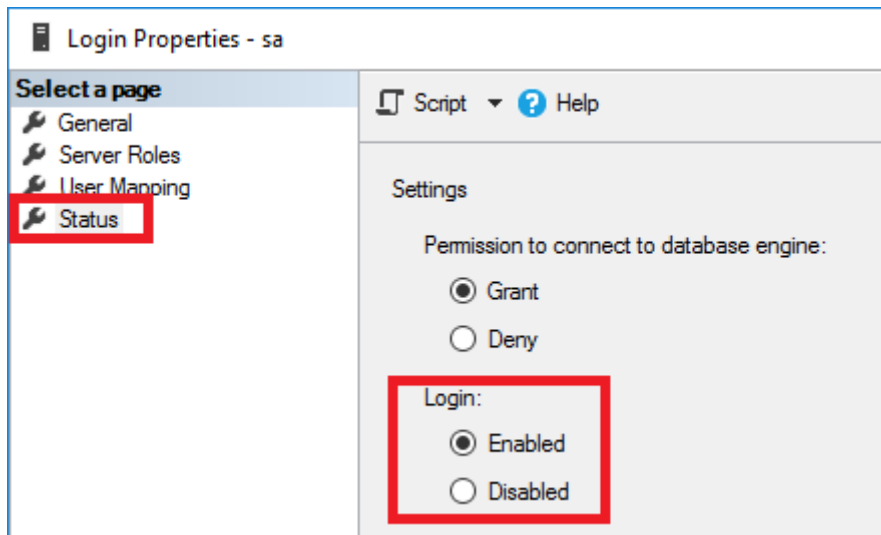
2.1. Expand [Object Explorer] / [Security] / [Logins], right click [sa], and click [Properties] on pop-up menu.



2.2. Set Password for the account sa in [General] page.



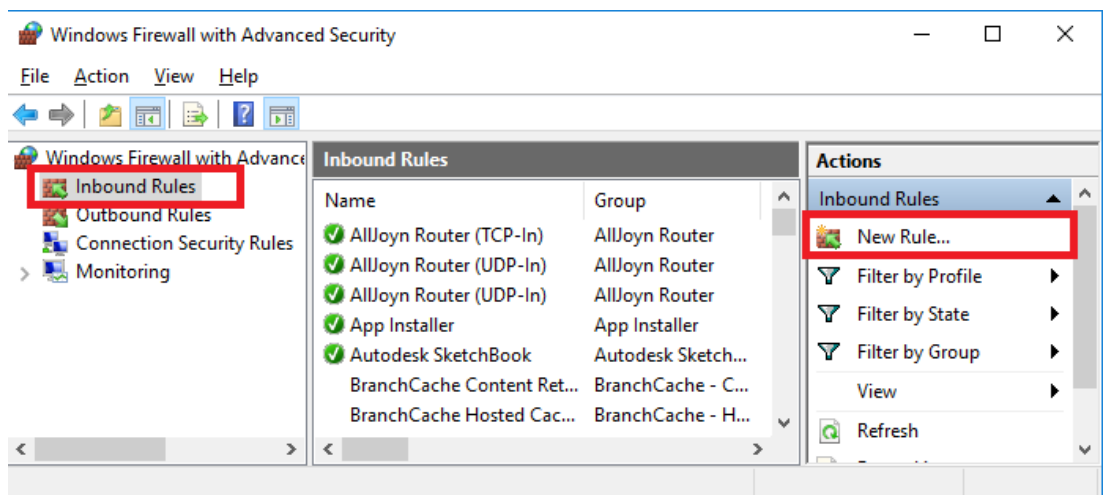
2.3. Set Login to [Enable] in [Status] page.



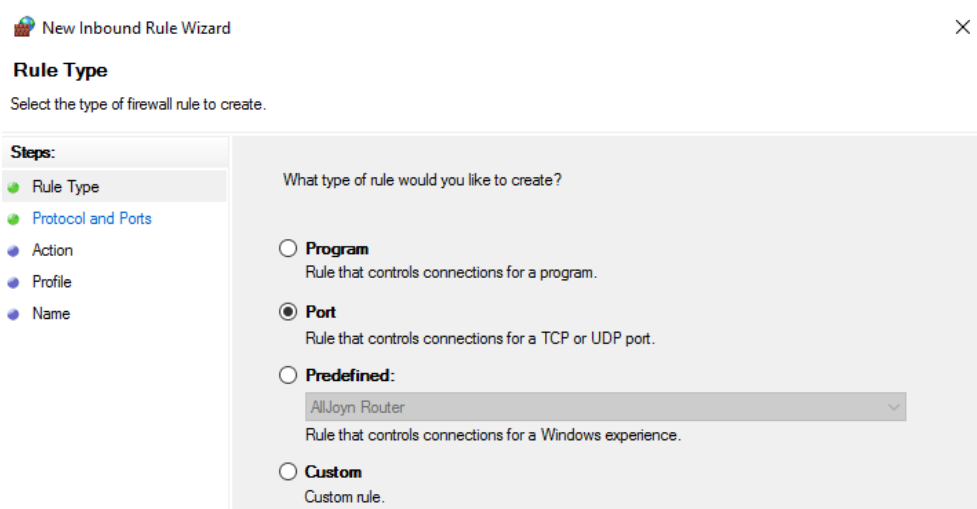
2.4. Click [OK] button.

3. Allow 1433 port through the firewall.

3.1. Execute [WF.msc]. Click [New Rule] in [Inbound Rules] page.



3.2. Select [Port] option. Then click [Next] button.



3.3. Select [**Specific local ports**] and enter **1433**. Then click [**Next**] button.

The screenshot shows a configuration wizard with a 'Steps' sidebar on the left containing: Rule Type, Protocol and Ports (highlighted), Action, Profile, and Name. The main panel is titled 'Does this rule apply to TCP or UDP?' and has two radio buttons:  TCP and  UDP. Below this, it asks 'Does this rule apply to all local ports or specific local ports?' with two radio buttons:  All local ports and  Specific local ports. A text box next to 'Specific local ports' contains '1433' and has an example below it: 'Example: 80, 443, 5000-5010'.

3.4. Click [**Next**] button.

The screenshot shows the 'Action' step in the wizard. The 'Steps' sidebar on the left includes: Rule Type, Protocol and Ports, Action (highlighted), Profile, and Name. The main panel asks 'What action should be taken when a connection matches the specified conditions?' and has three radio buttons:  Allow the connection,  Allow the connection if it is secure, and  Block the connection. Under 'Allow the connection', there is a description: 'This includes connections that are protected with IPsec as well as those are not.' Under 'Allow the connection if it is secure', there is a description: 'This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.' A 'Customize...' button is located below the second option.

3.5. Click [**Next**] button.

The screenshot shows the 'When does this rule apply?' step. The 'Steps' sidebar on the left includes: Rule Type, Protocol and Ports, Action, Profile, and Name (highlighted). The main panel asks 'When does this rule apply?' and has three checked checkboxes:  Domain (Applies when a computer is connected to its corporate domain.),  Private (Applies when a computer is connected to a private network location, such as a home or work place.), and  Public (Applies when a computer is connected to a public network location.).

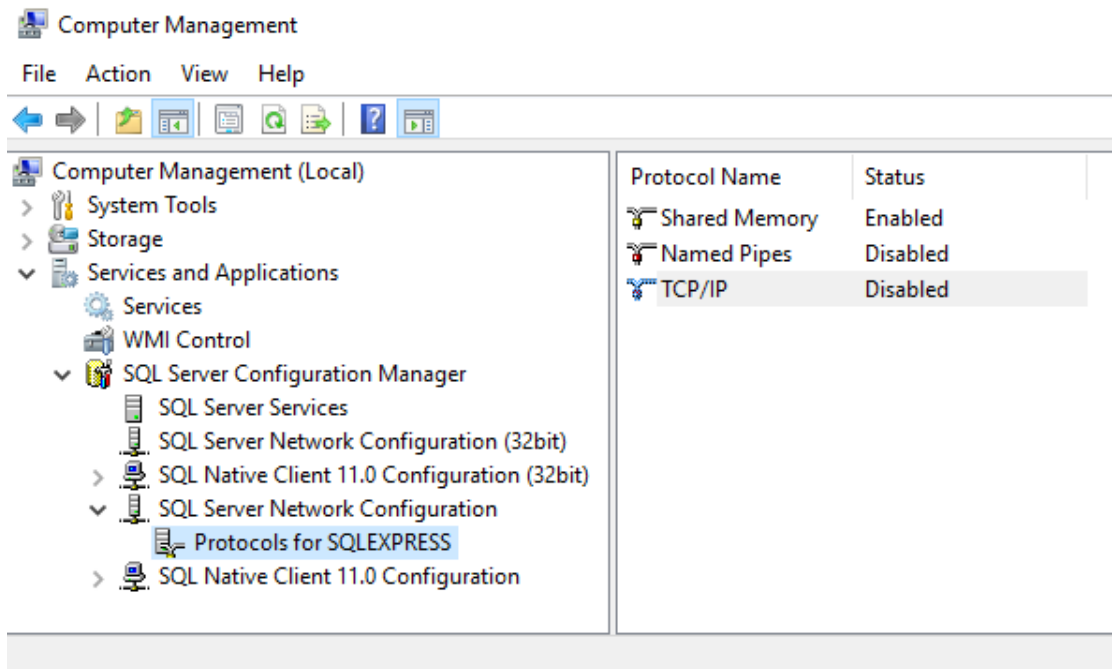
3.6. Enter the rule name. Then click [**Finish**] button.

The screenshot shows the 'Name' step in the wizard. The 'Steps' sidebar on the left includes: Rule Type, Protocol and Ports, Action, Profile, and Name (highlighted). The main panel has a 'Name:' label followed by a text box containing 'SQL Server Port'. Below it is a 'Description (optional):' label followed by a large empty text area.

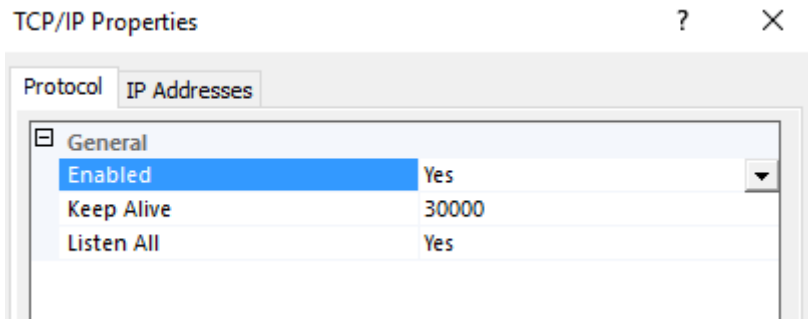
4. Enable SQL Server TCP/IP connection.

4.1. Open [Computer Management].

4.2. Select [Services and Applications] / [SQL Server Configuration Manager] /  
[SQL Server Network Configuration] / [Protocols for SQLEXPRESS]



4.3. Double click [TCP/IP] item. Set [Enabled] item to [Yes] in [Protocol] page.



4.4. In [IP Addresses] page:

4.4.1. Enter **1433** at [TCP Port]

4.4.2. Set [Enabled] to [Yes]

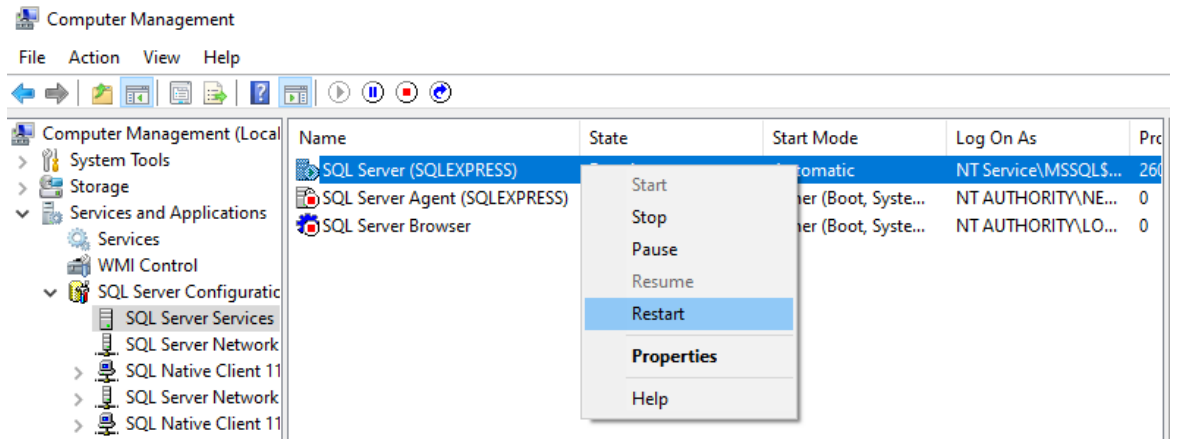
4.4.3. Clear [TCP Dynamic Ports] value

4.4. Then click [OK] button.

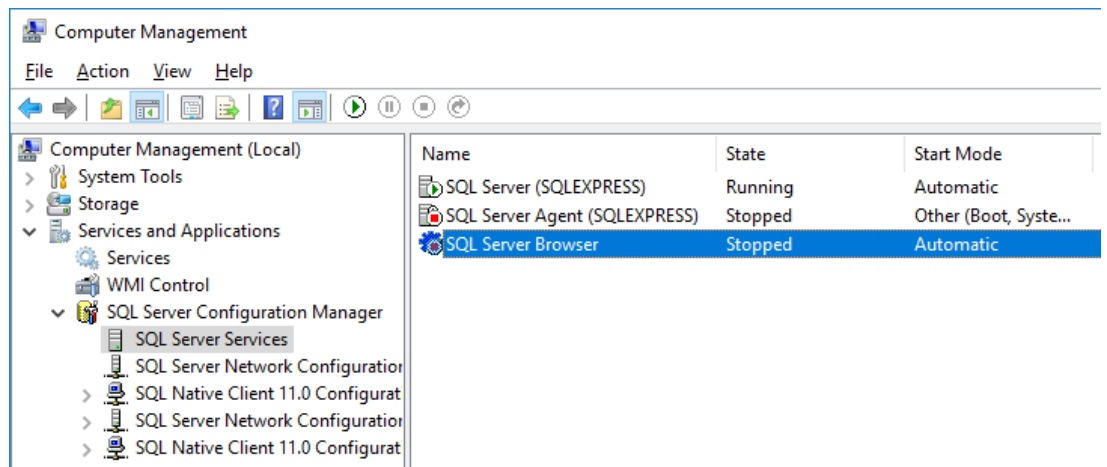
4.5. Select [SQL Server Services] item.

Right click [SQL Server (SQLEXPRESS)] and click [Restart] to apply new settings.

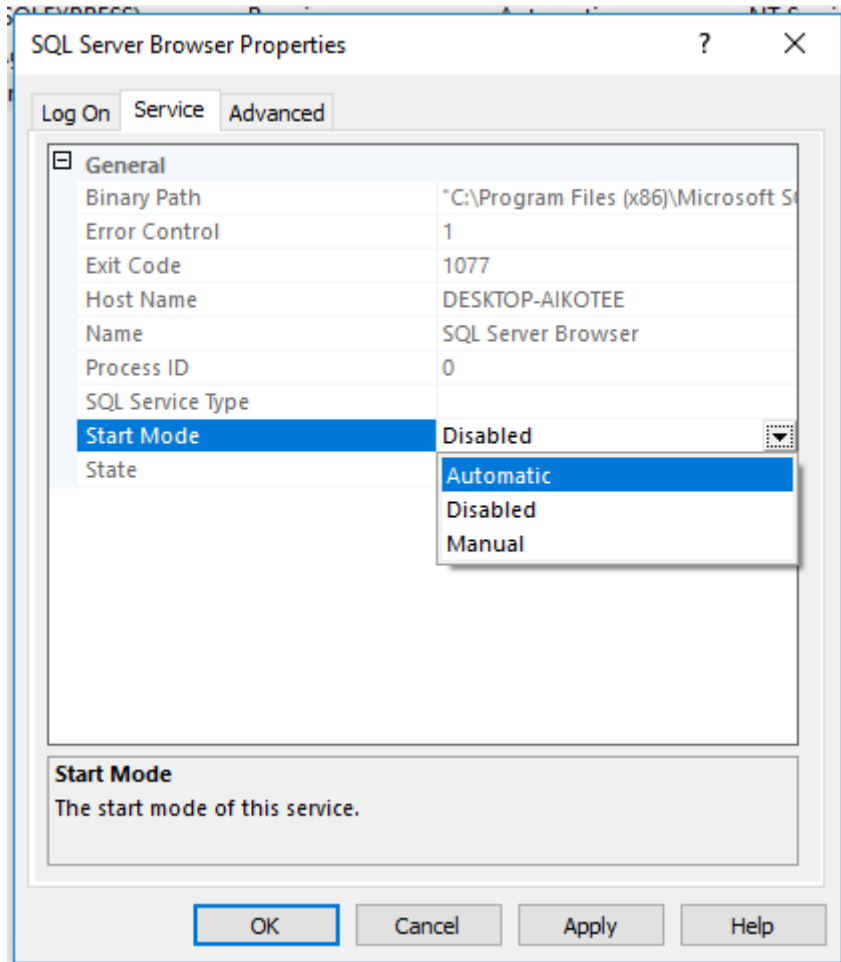




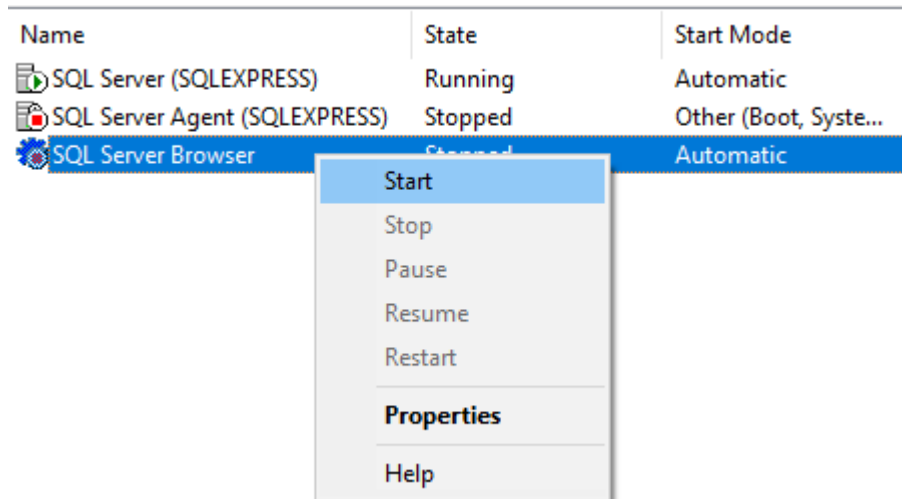
4.6. Double click [SQL Server Browser].



4.7. In [Service] page, change [Start Mode] to [Automatic]. Then click [OK] button.



4.8. Right click [SQL Server Browser] item and click [Start].



# Appendix C - Q & A

Q1. How to clear the tag data records and log message showing in the UI?

A1.

1. Right-click the list, in the drop-down menu, click to select **[Clear]**. (If there is any unsaved record, then they cannot be clear.)
2. Double-click the Log text box to clear log message.
3. The log message will also be automatically clear if the record count reach to 2000.

Q2. How to re-save the record to DB?

A2. Select one or more than one records, right-click the list view, in the drop-down menu, click **[Resend]**.

Time	From	Device ID	EPC	EPC (Deactivated)	EPC (Reactived)	TID	Decoded Type	Decoded String	Saved
2019/05/24 17:30:47	192.168.100.58:23163	FF	AAAA1234560000000000...			E28011002000575A240601AA	TagData		V
2019/05/24 17:30:47	192.168.100.58:23163	FF	AAAA1234560000000000...			E28011002000575A240601AA	TagData		V
2019/05/24 17:30:47	192.168.100.58:47264	FF	00007D0000000000000000...			E280110020003B1393EB015B	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E28011002000594E239601AA	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E28011002000594E239601AA	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF				E20034120137FB000C32762A141D01...	EAN_UPC	049886185089...	V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E280110020005101228801AA	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E280110020005101228801AA	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E280110020005B1A260501AA	TagData		V
2019/05/24 17:30:48	192.168.100.58:47264	FF	00007D0000000000000000...			E280110020005B1A260501AA	TagData		V
2019/05/24 17:30:49	192.168.100.58:47264	FF	00007D0000000000000000...			E28011002000568E23D101AA	TagData		V

Resend  
Clear

Q3. Why are the settings disabled?

A3. You should click **[Stop]** button to stop middleware firstly.

# Update History

## 15MAY2023 release

- Version 1.0R9
- Update Preparation - [UHF880](#) chapter.
- Update [Using UHF Middleware](#) chapter.

## 17NOV2021 release

- Version 1.0R8
- Update [System Requirements](#).
- Modify [Preparation](#) description.
- Add Preparation - [UHF880](#) chapter.

## 25MAR2020 release

- Version 1.0R7
- Update [Using UHF Middleware](#).

## 04DEC2019 release

- Version 1.0R6
- Update [Sample SQL Schema](#).

## 22NOV2019 release

- Version 1.0R5
- Update [Sample SQL Schema](#).
- Update [Log Data Table](#).

## 16AUG2019 release

- Version 1.0R4
- Update [Sample SQL Schema](#).
- Update the content according to UHF\_Middleware (V1.1R1).
- Add [Log Data Table](#).

## 2JUL2019 release

- Version 1.0R3
- Update [Sample SQL Schema](#)

## 11JUN2019 release

- Version 1.0R2
- Add [Sample SQL Schema](#)

3JUN2019 release

- Version 1.0R1