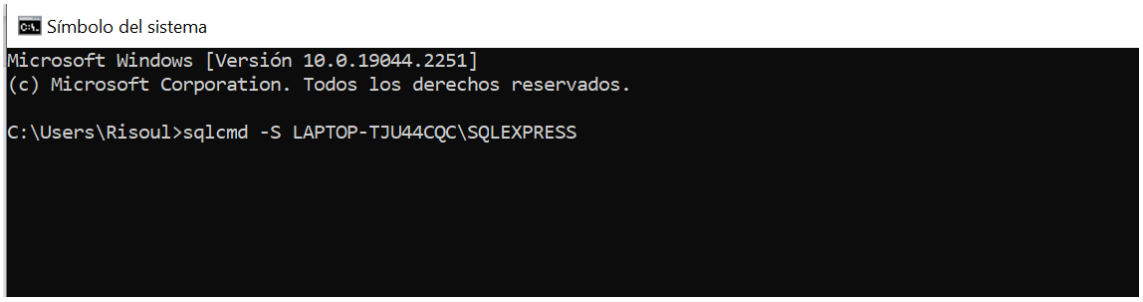
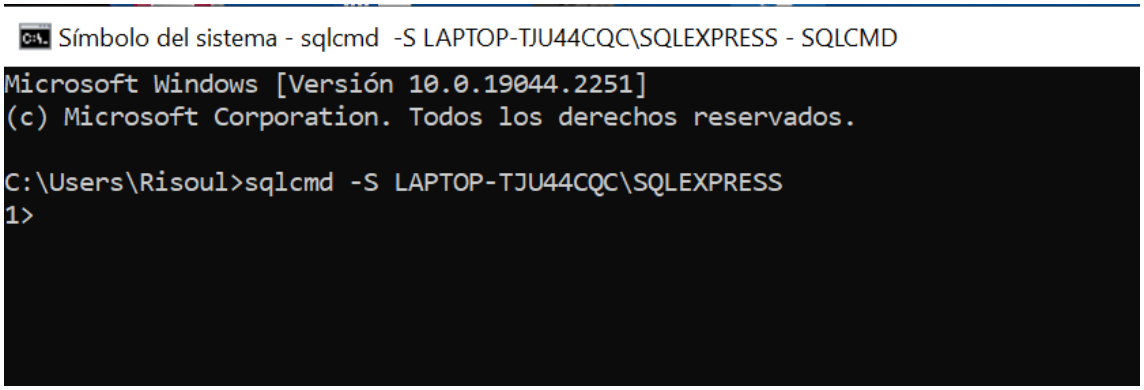
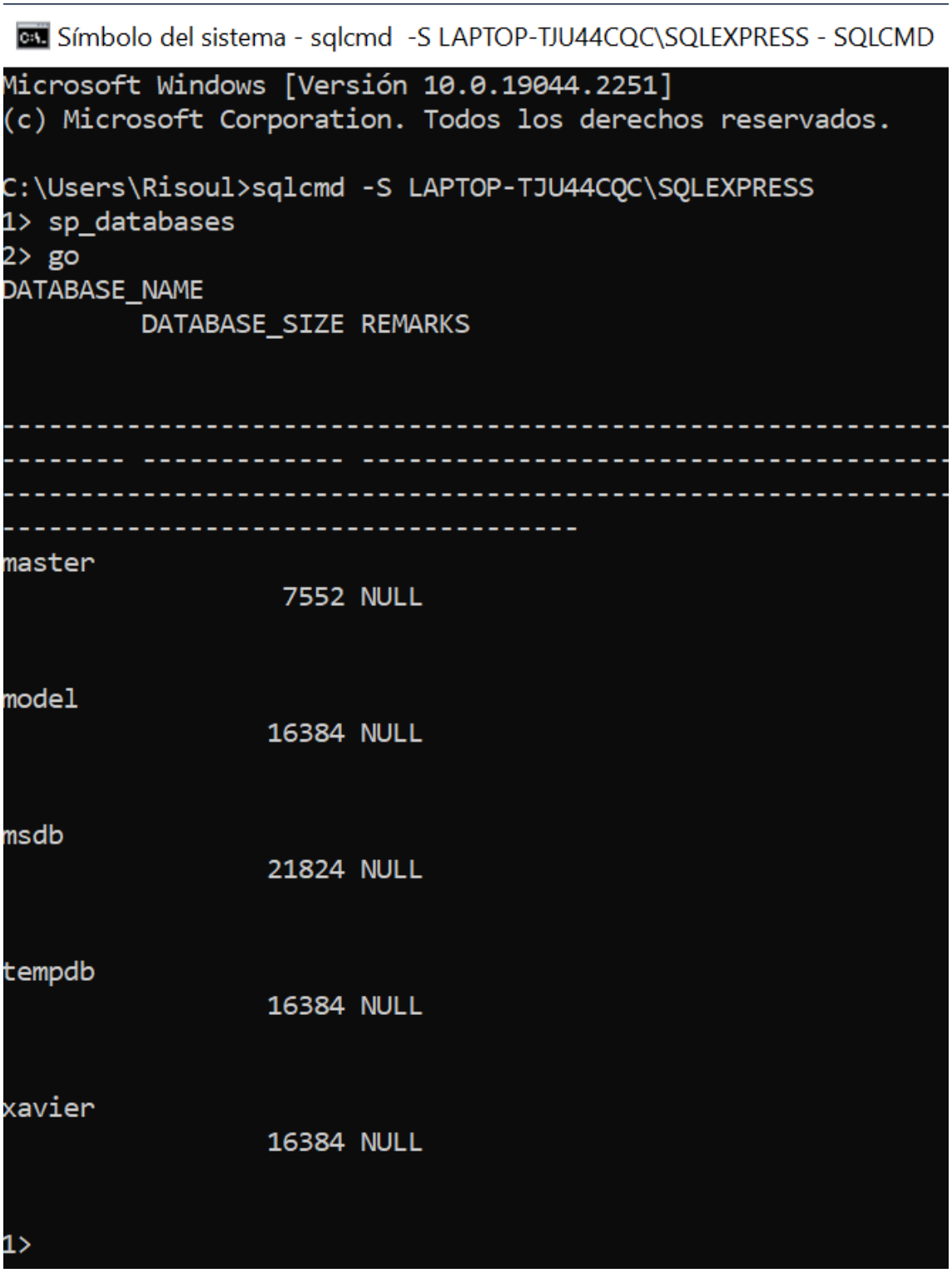
Readig from OPC UA and storing in a SQL database

First steps with SQL server

https://www.youtube.com/watch?v=H7Vj6lCZ9sk





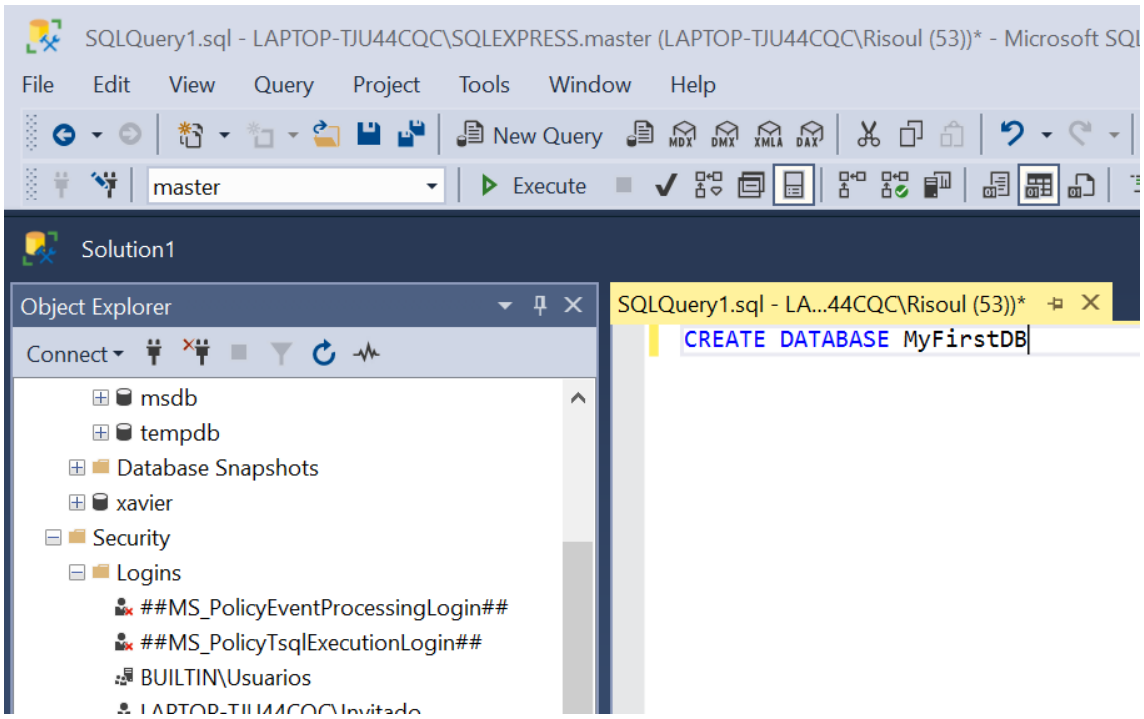


I have created a Database with MS SQL Management Studio called xavier

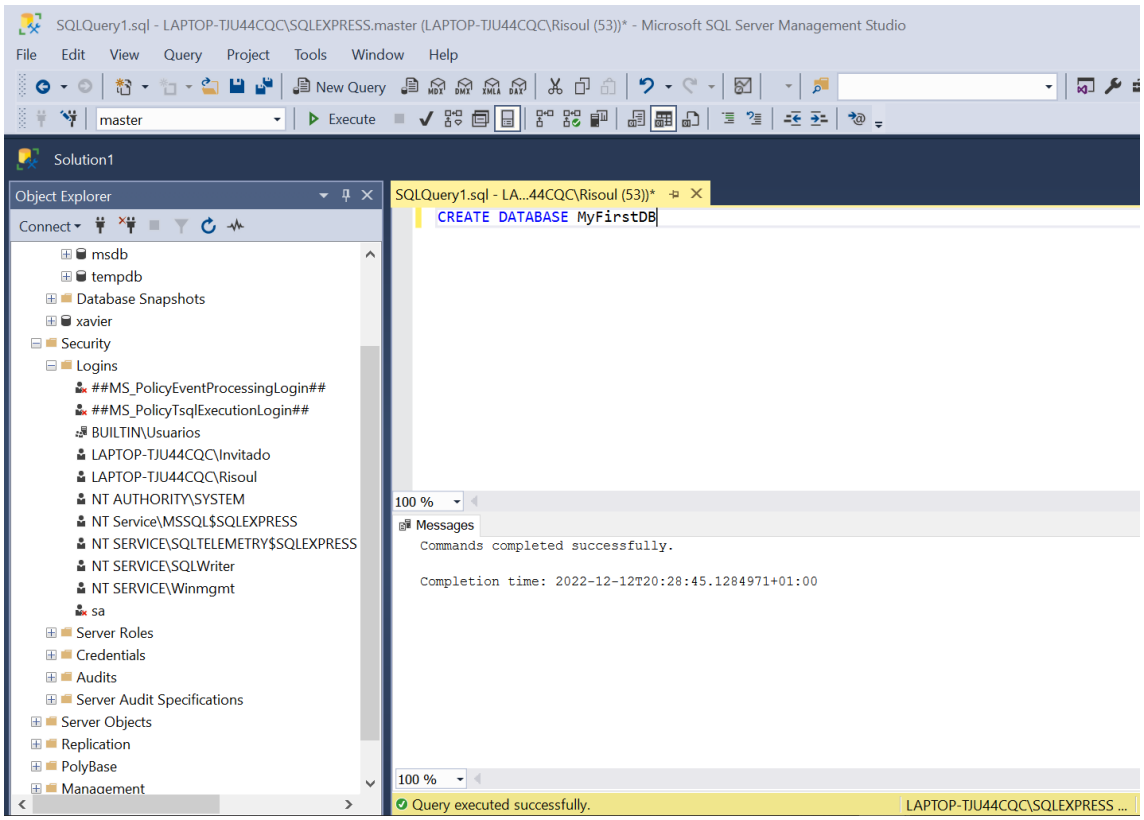
Creating a Database

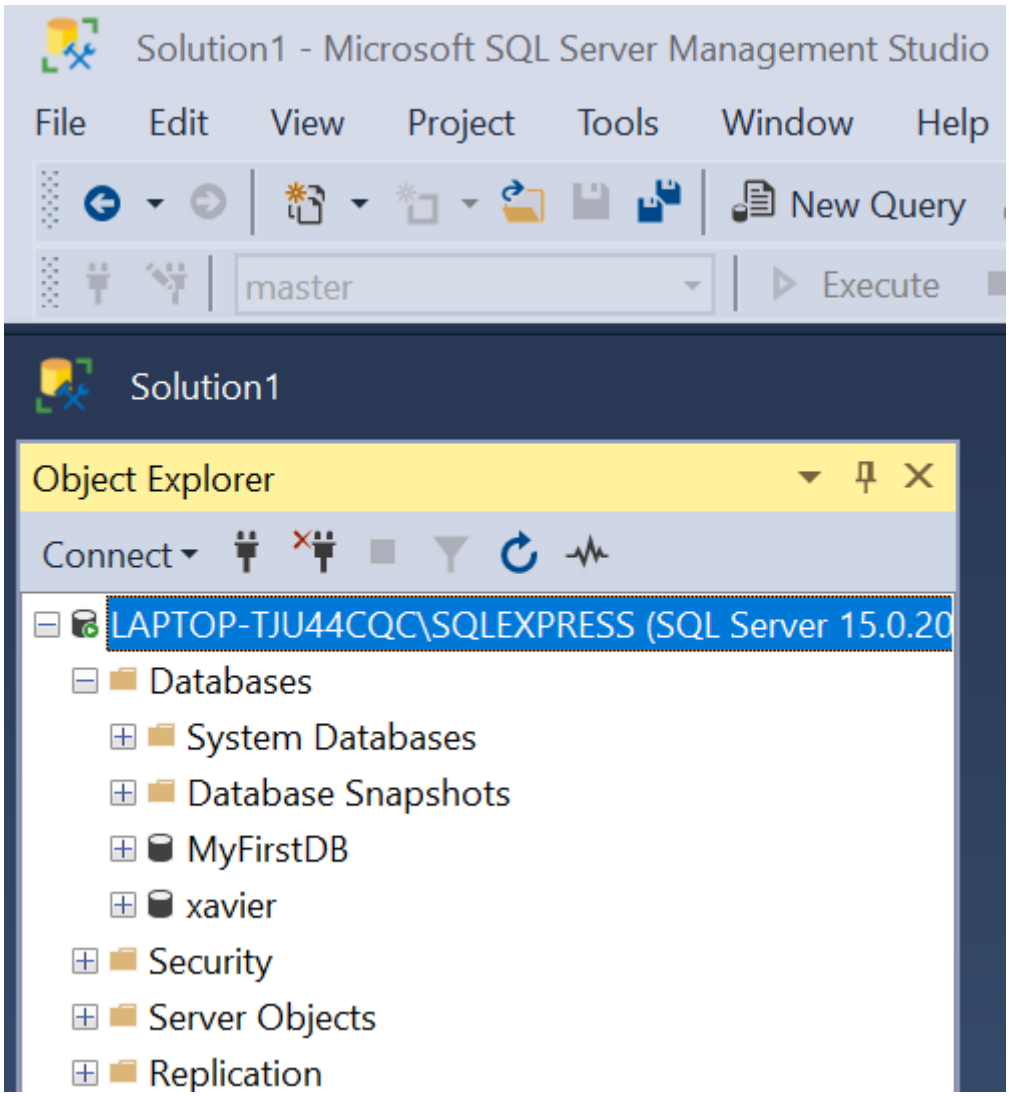
https://www.youtube.com/watch?v=qk08NTPDAdY

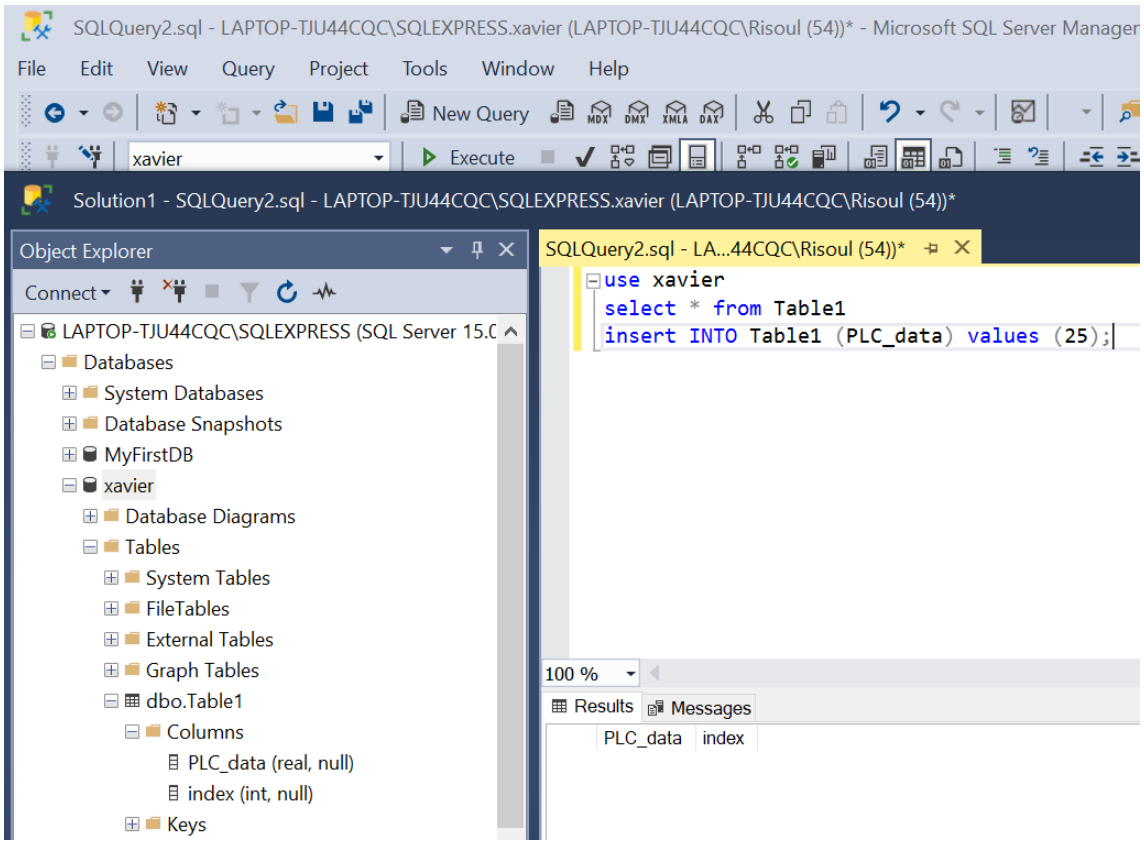
New Query

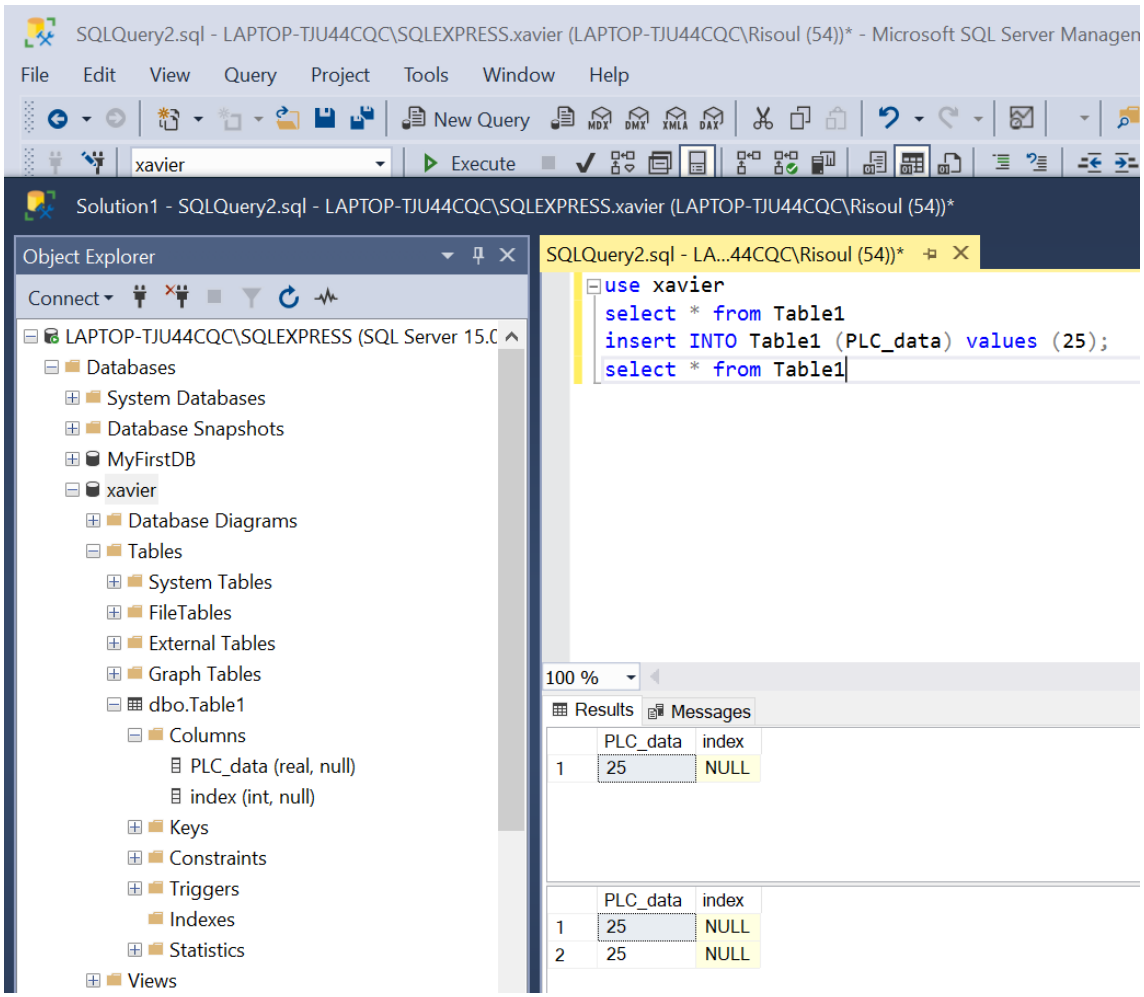

SQLQuery1.sql - LAPTOP-TJU44CQC\SQLEXPRESS.master (LAPTOP-TJU44CQC\Risoul (53))* - Microsoft SQL
File Edit View Query Project Tools Window Help
New Query
master
Execute
Solution1
Object Explorer
Connect
msdb
tempdb
Database Snapshots
xavier
Security
Logins
##MS_PolicyEventProcessingLogin##
##MS_PolicyTsqlExecutionLogin##
BUILTIN\Usuarios
SQLQuery1.sql - LA...44CQC\Risoul (53))*
CREATE DATABASE MyFirstDB

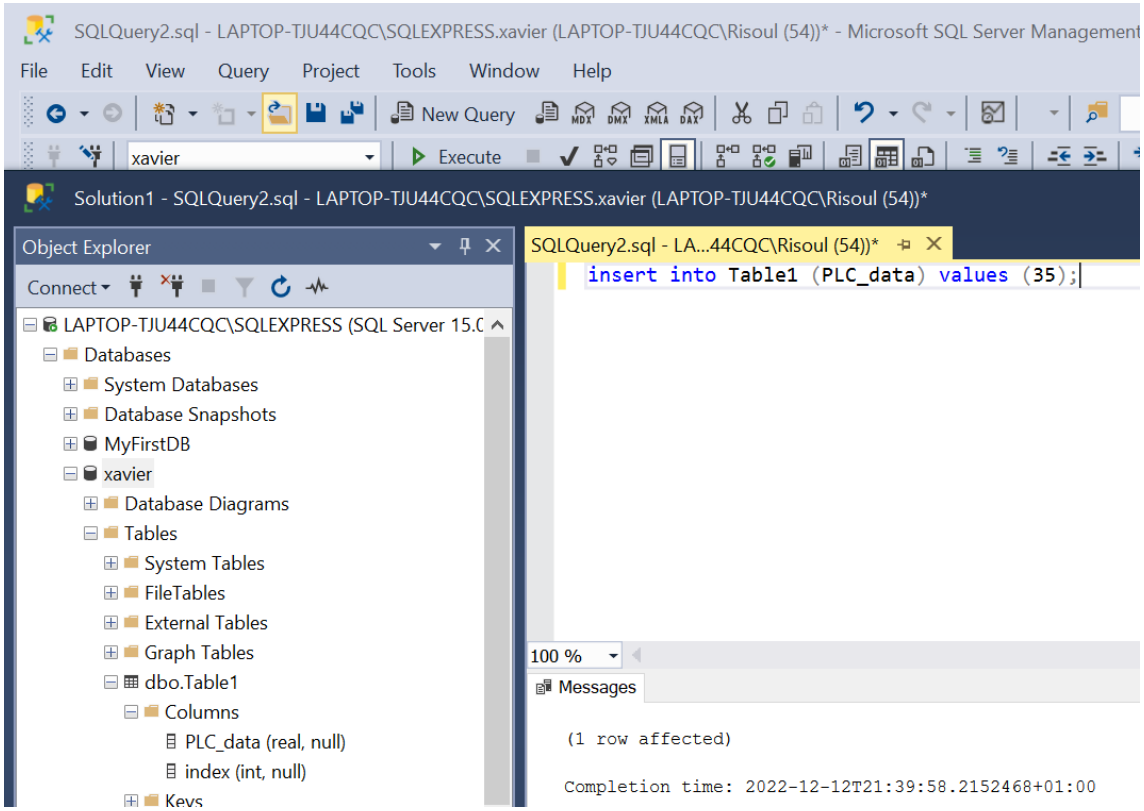
Execute

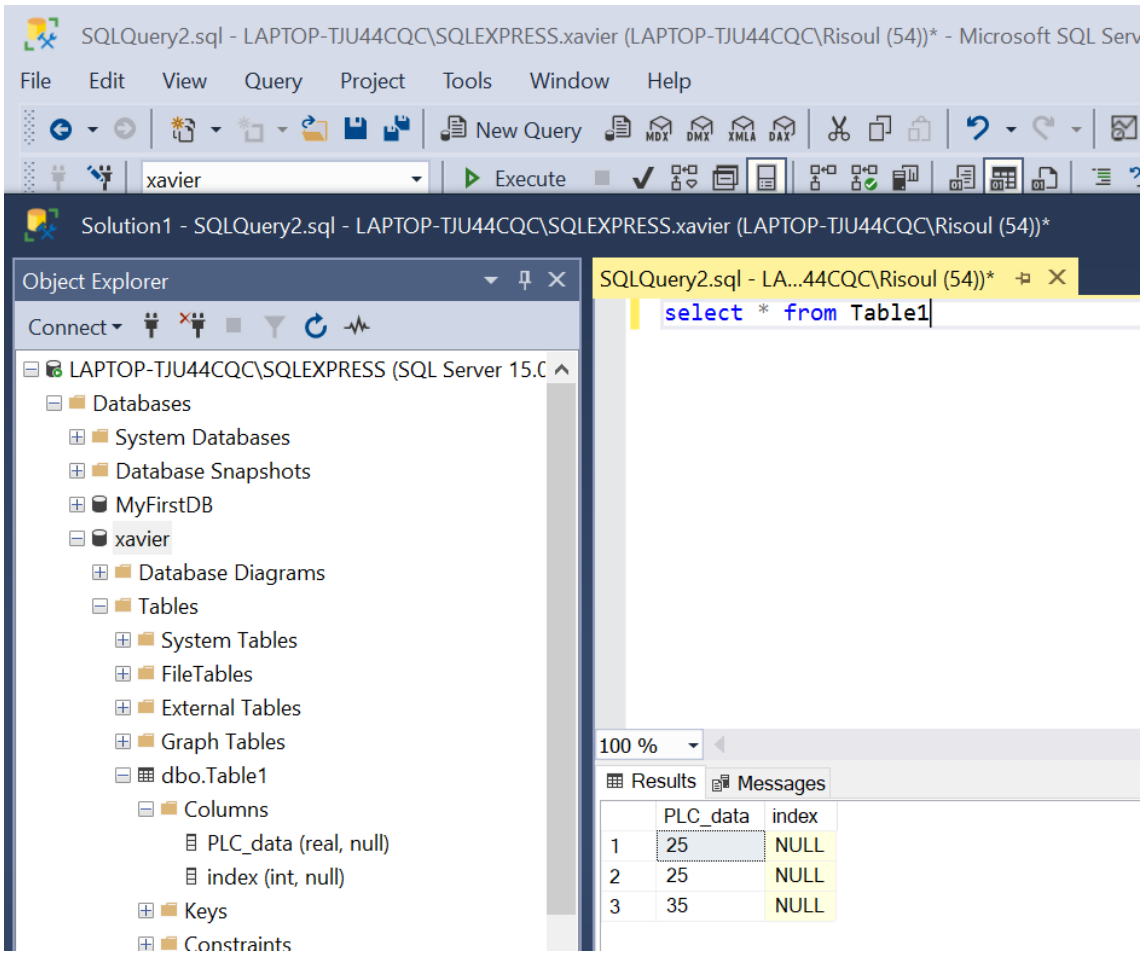

SQLQuery1.sql - LAPTOP-TJU44CQC\SQLEXPRESS.master (LAPTOP-TJU44CQC\Risoul (53))* - Microsoft SQL Server Management Studio
File Edit View Query Project Tools Window Help
New Query
master
Execute
Solution1
Object Explorer
Connect
msdb
tempdb
Database Snapshots
xavier
Security
Logins
##MS_PolicyEventProcessingLogin##
##MS_PolicyTsqlExecutionLogin##
BUILTIN\Usuarios
LAPTOP-TJU44CQC\Invitado
LAPTOP-TJU44CQC\Risoul
NT AUTHORITY\SYSTEM
NT Service\MSSQL$SQLEXPRESS
NT SERVICE\SQLTELEMETRY$SQLEXPRESS
NT SERVICE\SQLWriter
NT SERVICE\Winmgmt
sa
Server Roles
Credentials
Audits
Server Audit Specifications
Server Objects
Replication
PolyBase
Management
SQLQuery1.sql - LA...44CQC\Risoul (53))*
CREATE DATABASE MyFirstDB
100 %
Messages
Commands completed successfully.
Completion time: 2022-12-12T20:28:45.1284971+01:00
100 %
Query executed successfully.
LAPTOP-TJU44CQC\SQLEXPRESS ...


Solution1 - Microsoft SQL Server Management Studio
File
Edit
View
Project
Tools
Window
Help
New Query
master
Execute
Solution1
Object Explorer
Connect
LAPTOP-TJU44CQC\SQLEXPRESS (SQL Server 15.0.20
Databases
System Databases
Database Snapshots
MyFirstDB
xavier
Security
Server Objects
Replication

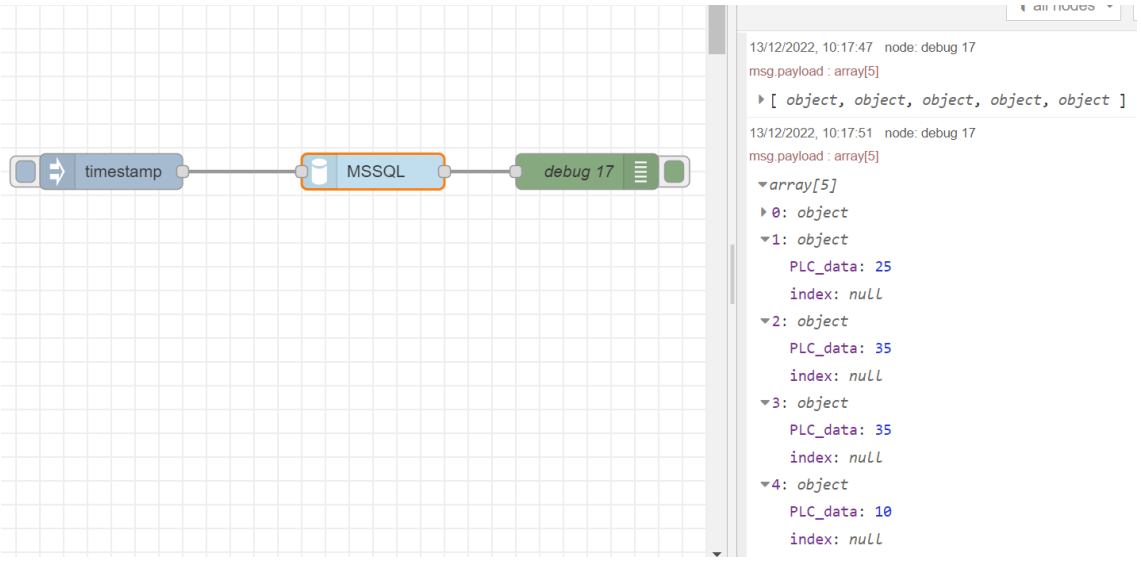

SQLQuery2.sql - LAPTOP-TJU44CQC\SQLEXPRESS.xavier (LAPTOP-TJU44CQC\Risoul (54))* - Microsoft SQL Server Manager
File Edit View Query Project Tools Window Help
New Query
xavier
Execute
Solution1 - SQLQuery2.sql - LAPTOP-TJU44CQC\SQLEXPRESS.xavier (LAPTOP-TJU44CQC\Risoul (54))*
Object Explorer
Connect
LAPTOP-TJU44CQC\SQLEXPRESS (SQL Server 15.0
Databases
System Databases
Database Snapshots
MyFirstDB
xavier
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.Table1
Columns
PLC_data (real, null)
index (int, null)
Keys
SQLQuery2.sql - LA...44CQC\Risoul (54))*
use xavier
select * from Table1
insert INTO Table1 (PLC_data) values (25);
100 %
Results
Messages
PLC_data
index

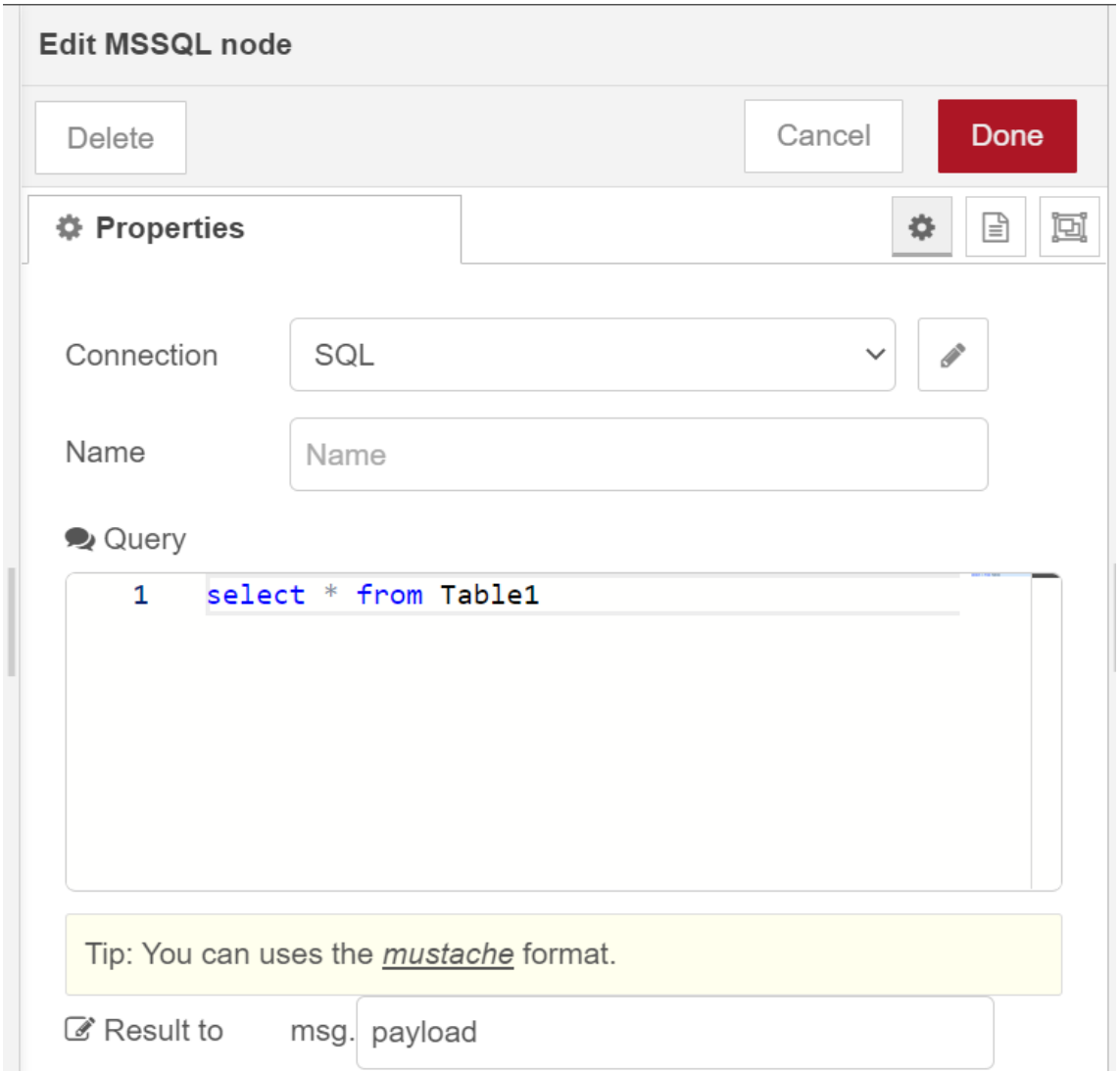

SQLQuery2.sql - LAPTOP-TJU44CQC\SQLEXPRESS.xavier (LAPTOP-TJU44CQC\Risoul (54))* - Microsoft SQL Server Manager
File Edit View Query Project Tools Window Help
New Query
xavier
Execute
Solution1 - SQLQuery2.sql - LAPTOP-TJU44CQC\SQLEXPRESS.xavier (LAPTOP-TJU44CQC\Risoul (54))*
Object Explorer
Connect
LAPTOP-TJU44CQC\SQLEXPRESS (SQL Server 15.0
Databases
System Databases
Database Snapshots
MyFirstDB
xavier
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.Table1
Columns
PLC_data (real, null)
index (int, null)
Keys
Constraints
Triggers
Indexes
Statistics
Views
SQLQuery2.sql - LA...44CQC\Risoul (54))*
use xavier
select * from Table1
insert INTO Table1 (PLC_data) values (25);
select * from Table1
100 %
Results
Messages
PLC_data
index
1
25
NULL
PLC_data
index
1
25
NULL
2
25
NULL

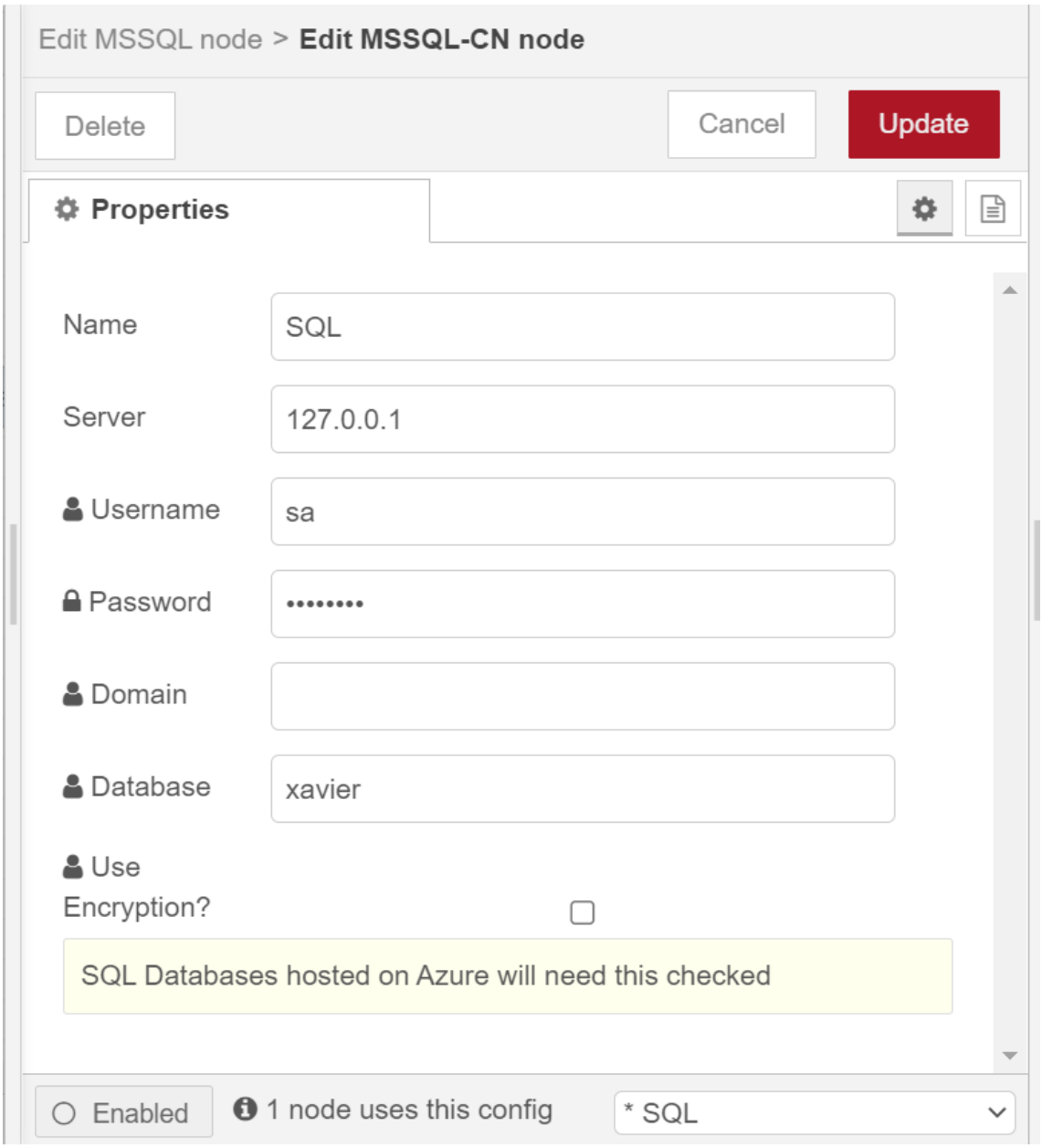




Now let's use Node-RED to interact with the database


timestamp
MSSQL
debug 17
13/12/2022, 10:17:47 node: debug 17
msg.payload : array[5]
[object, object, object, object, object]
13/12/2022, 10:17:51 node: debug 17
msg.payload : array[5]
array[5]
0: object
1: object
PLC_data: 25
index: null
2: object
PLC_data: 35
index: null
3: object
PLC_data: 35
index: null
4: object
PLC_data: 10
index: null

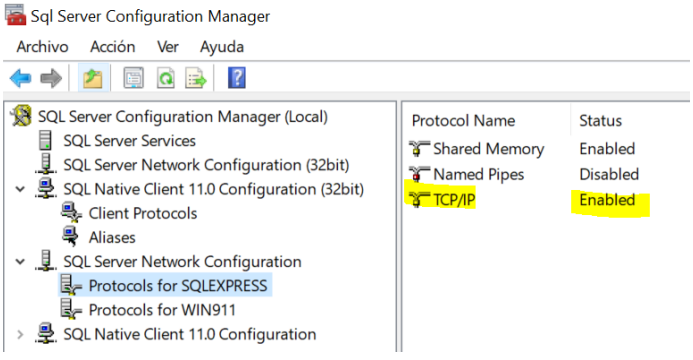

Edit MSSQL node
Delete
Cancel
Done
Properties
Connection
SQL
Name
Name
Query
1 select * from Table1
Tip: You can uses the mustache format.
Result to
msg.
payload



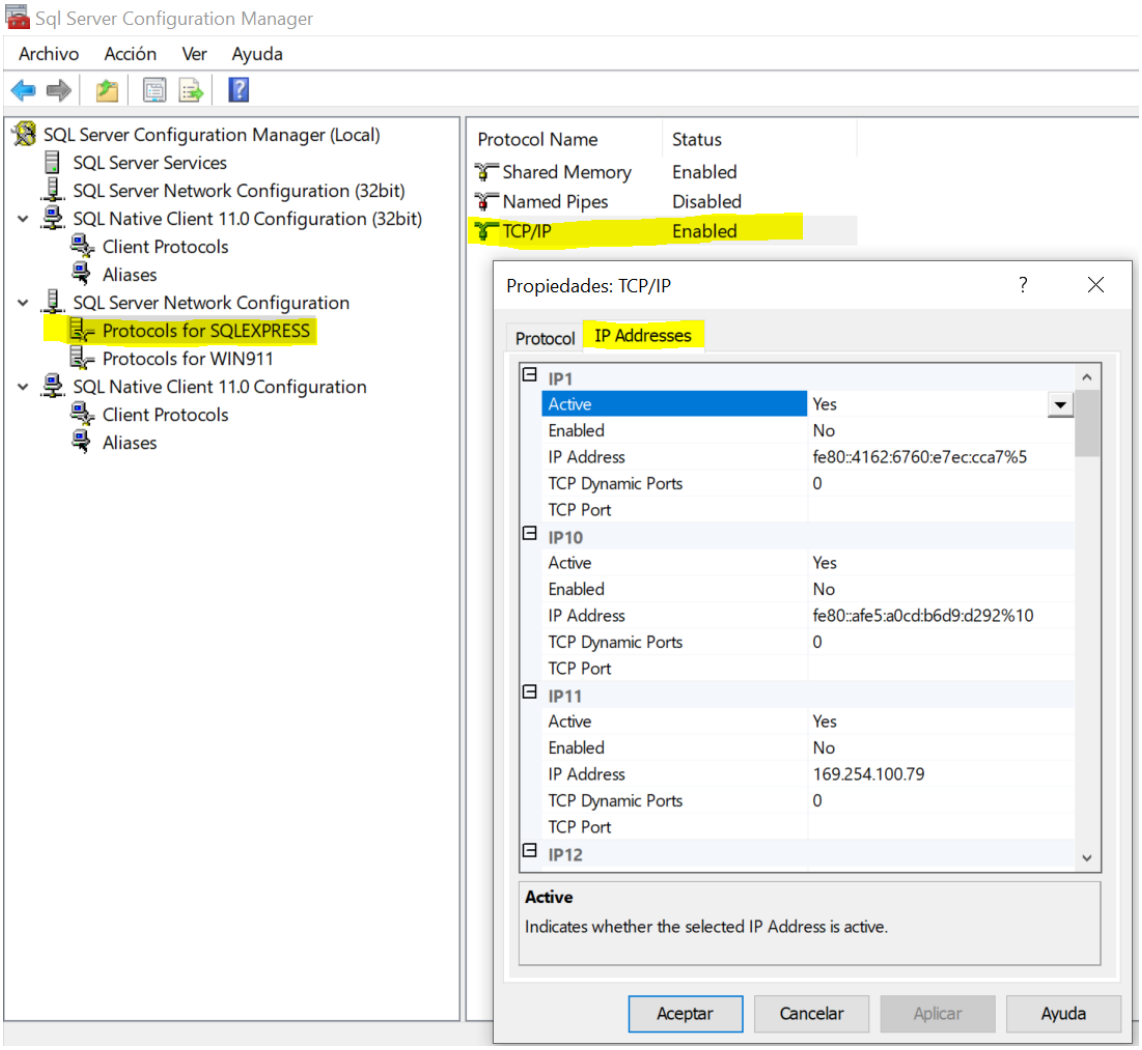
But before this will work, you have to make some adjustements in your SQL instance:

1-allow IP Access

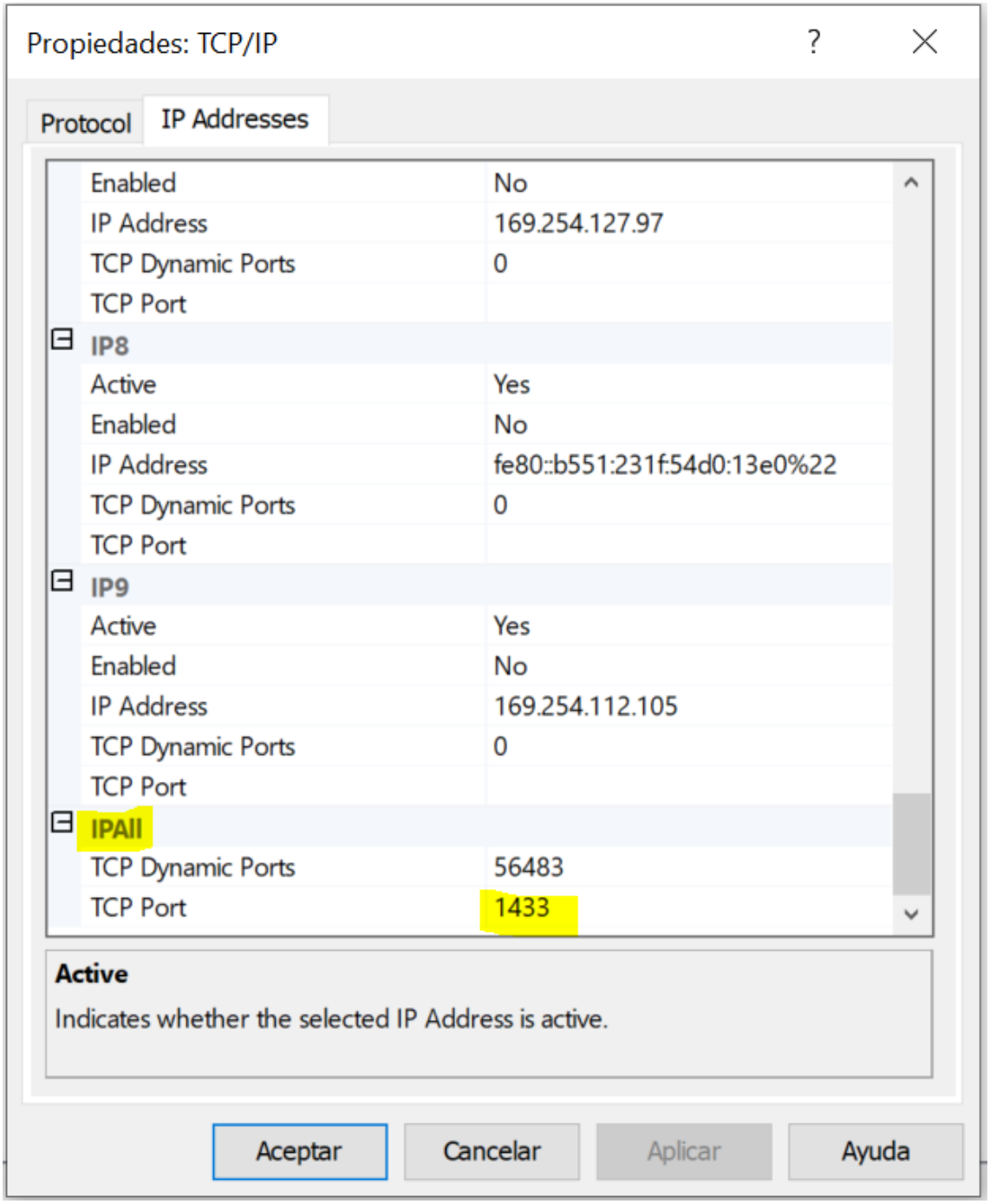
Open Sql Server Configuration Manager



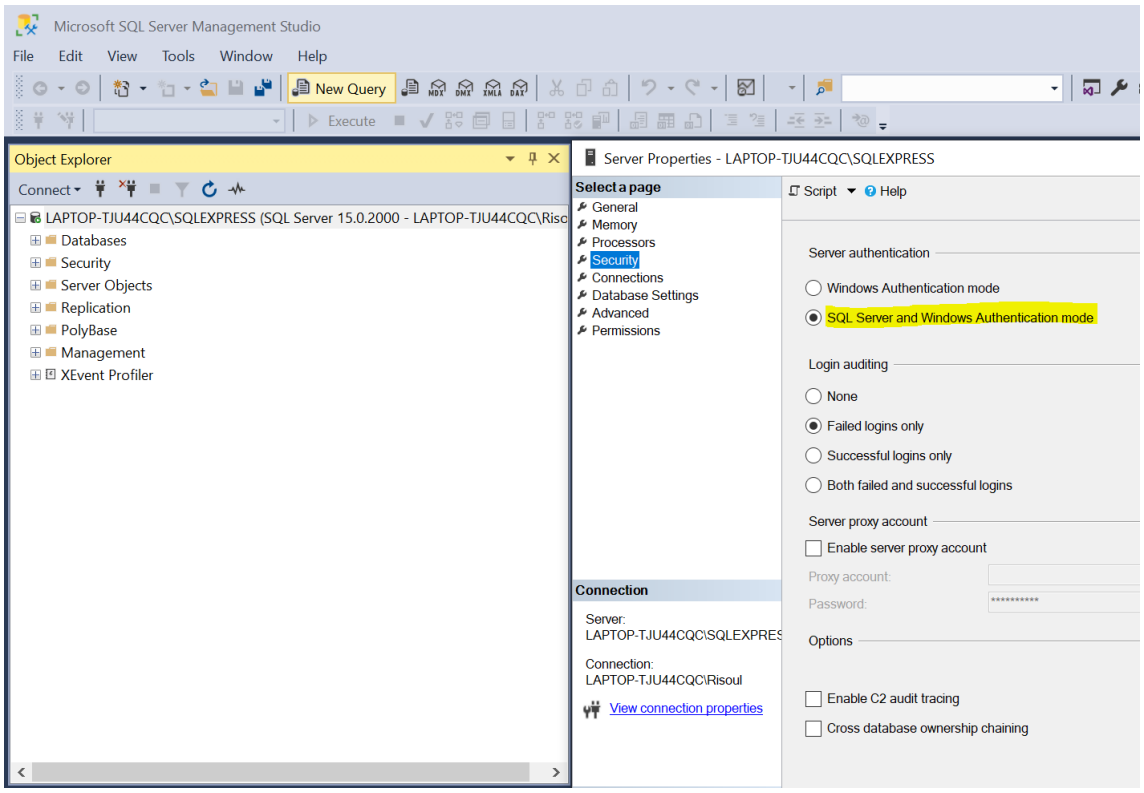
2- allow the IP address which will be logging to the database



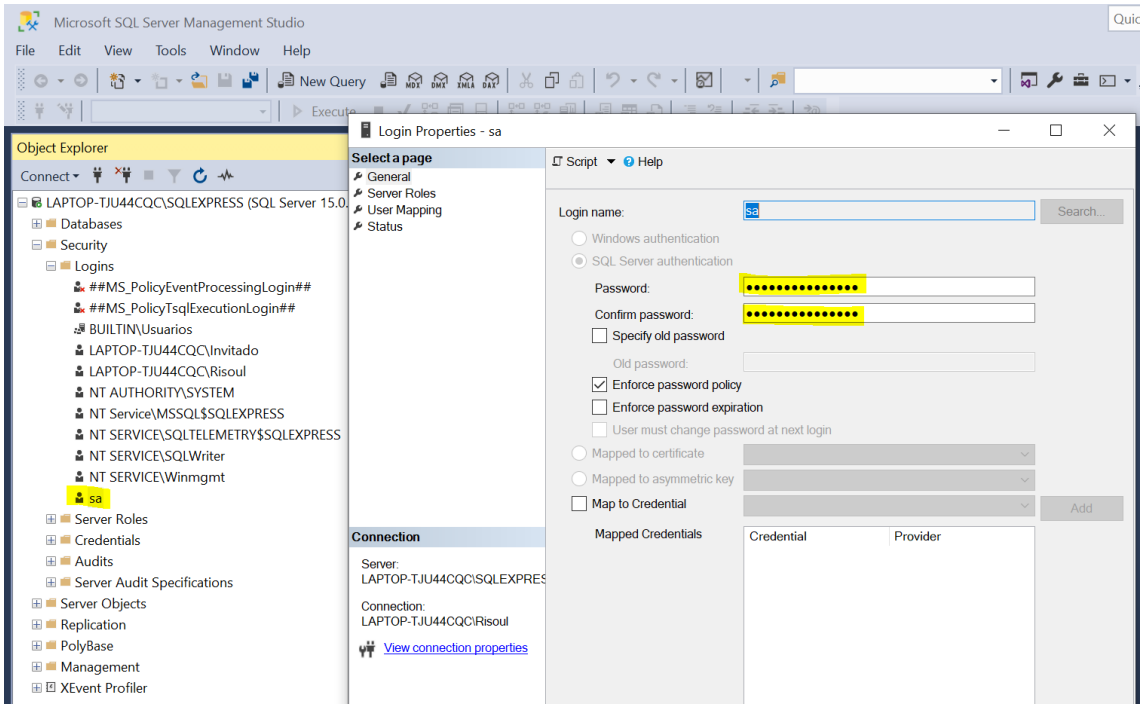
Let’s allow all IP addresses, normally the port used by SQLexpress is 1433



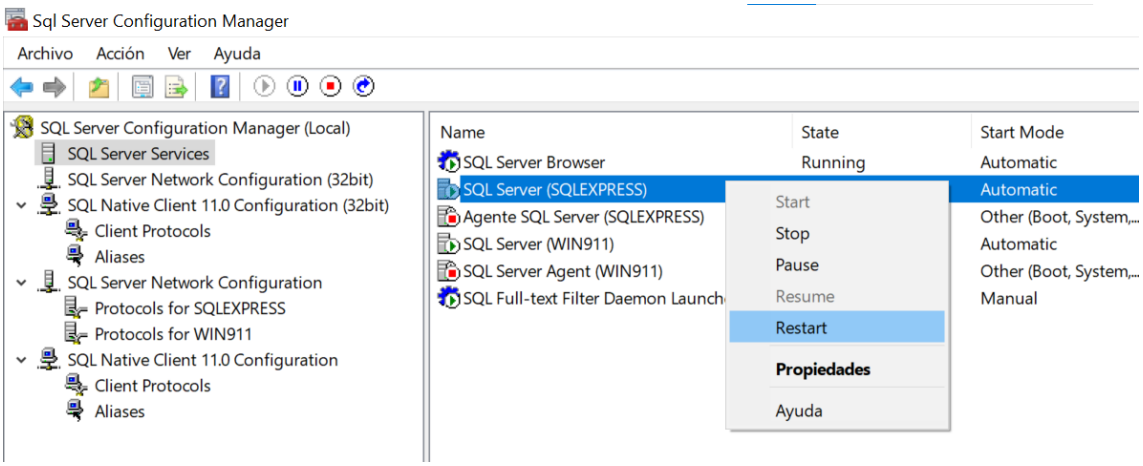
3-Allow SQL autentication (Node-RED does not work with Windows autentication)



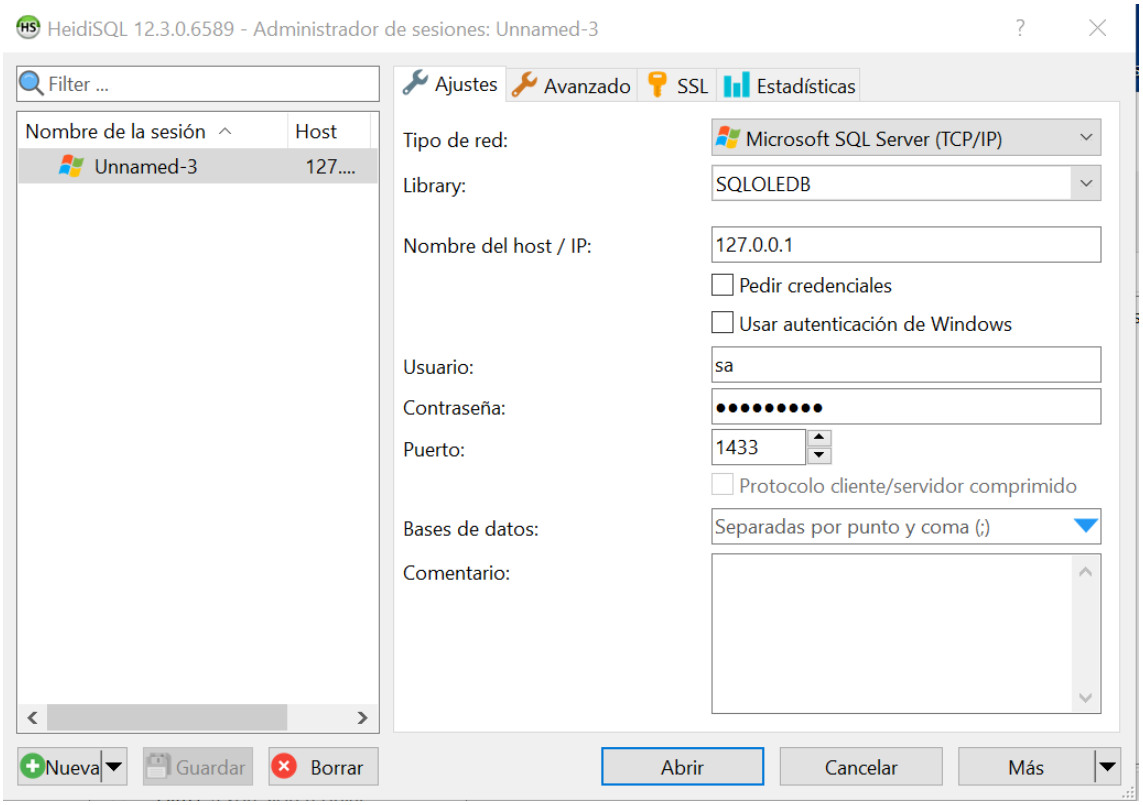
4-decide wich user you are going to use, create a password.



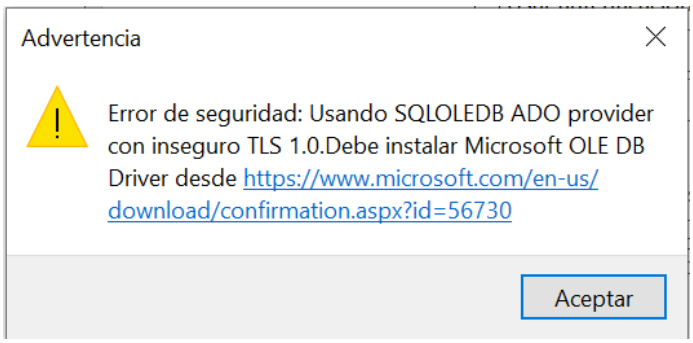
5-Restart database to apply changes

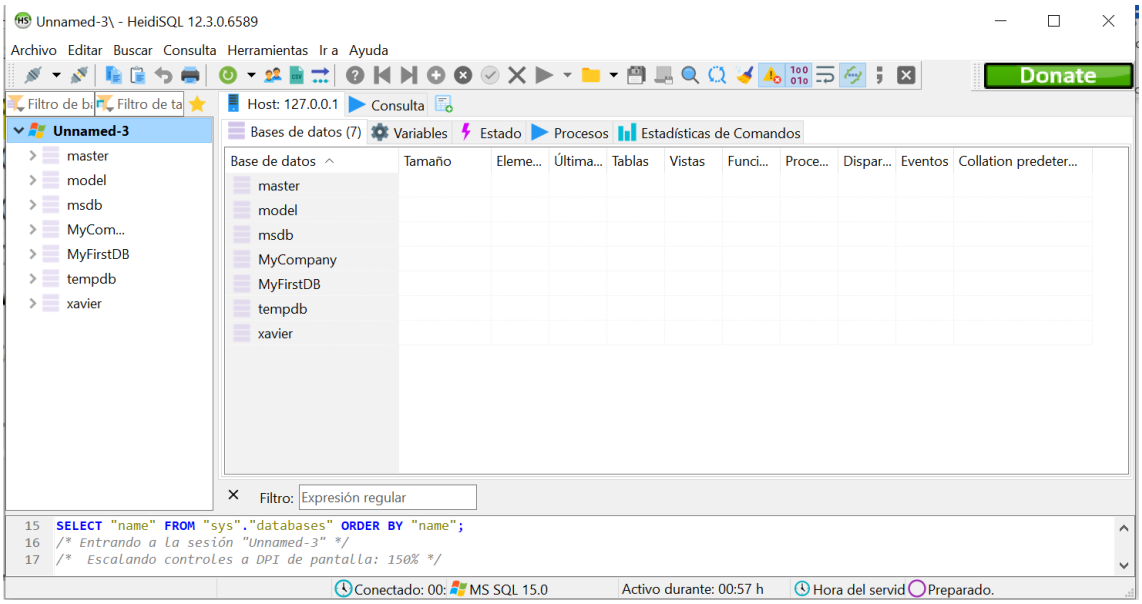


You can also use HeidiSQL to see the database

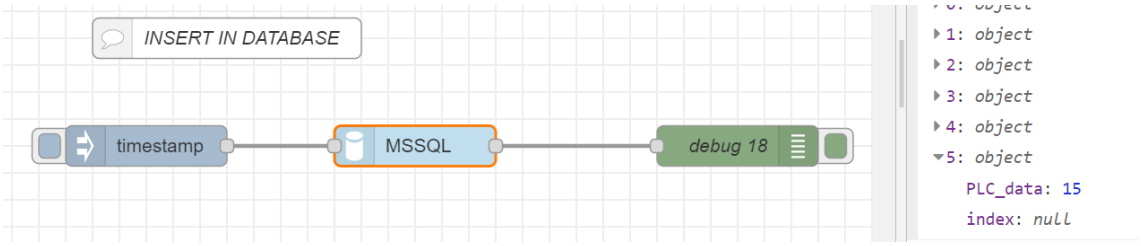


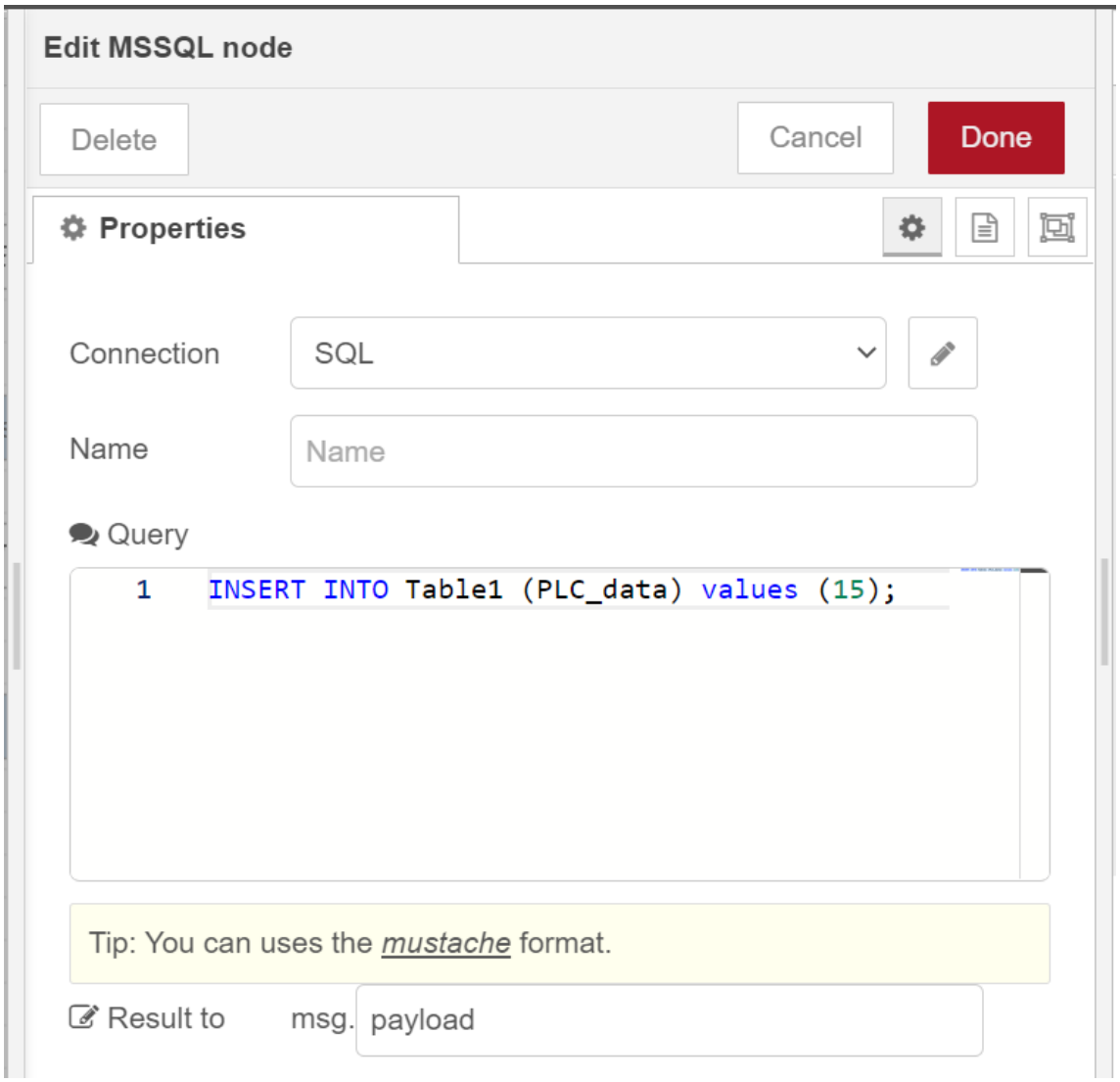
You will get this error but you can accept and you will connect to the database



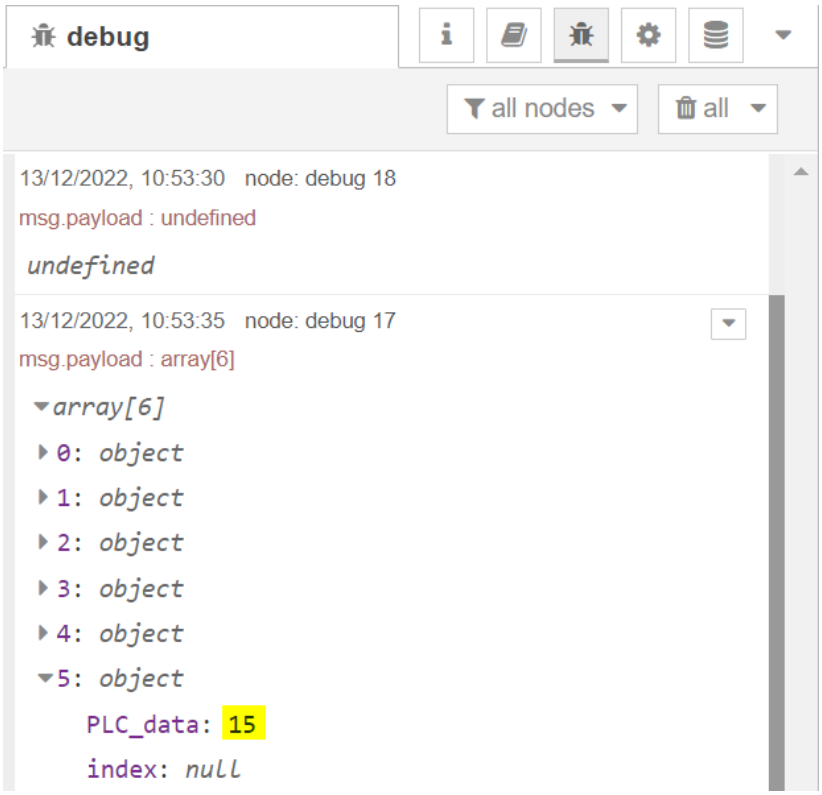


Now let's inject new records on the database

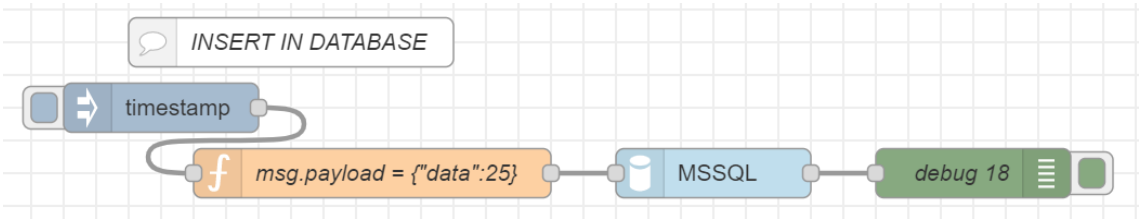


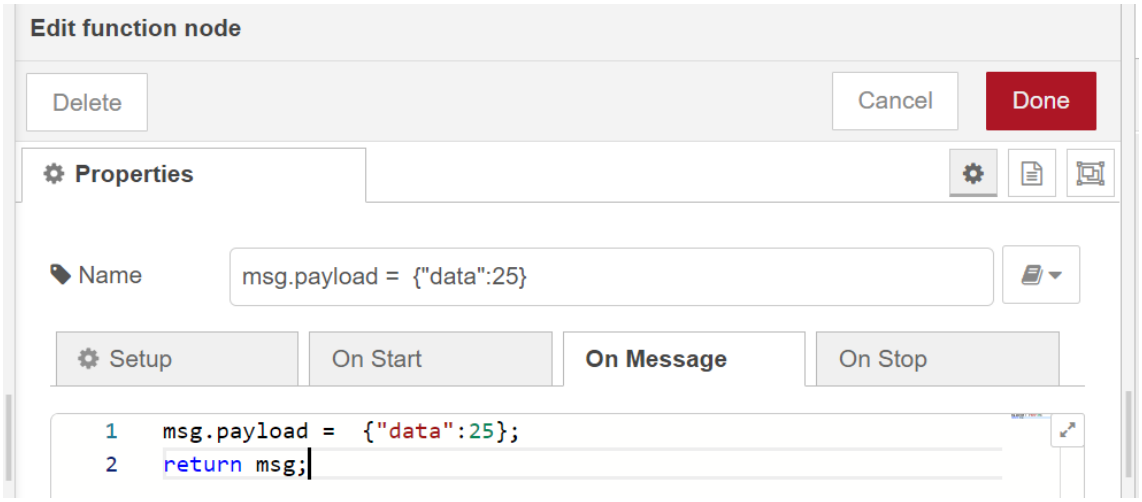


Let’s verify with the query

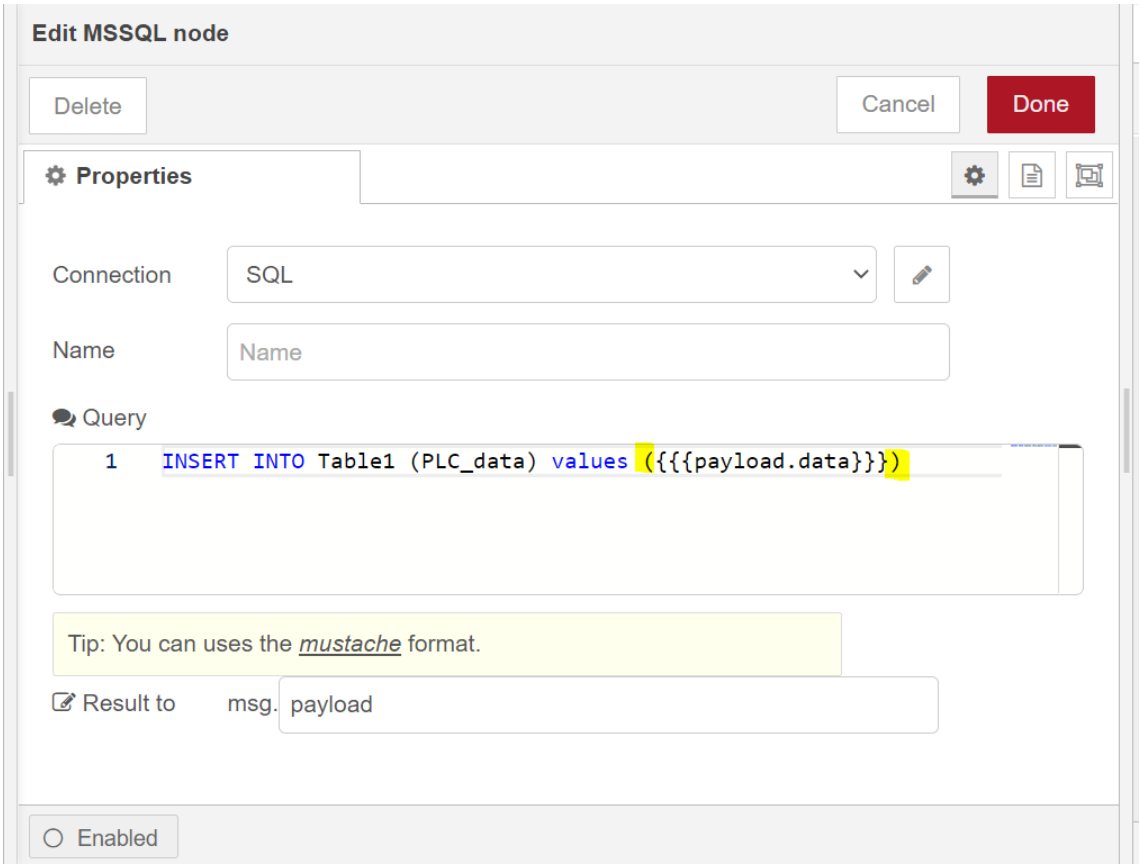


Now let's insert a variable value into the query

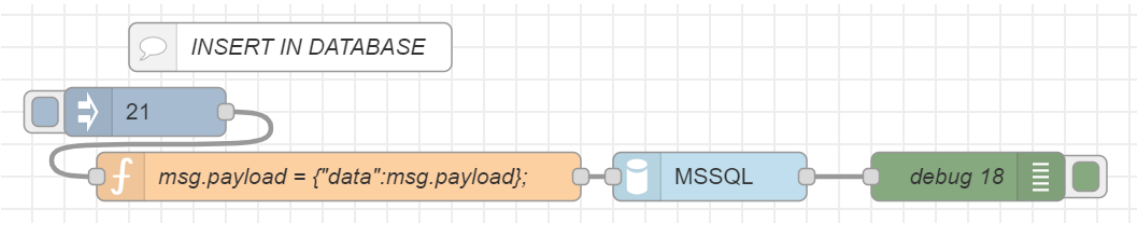




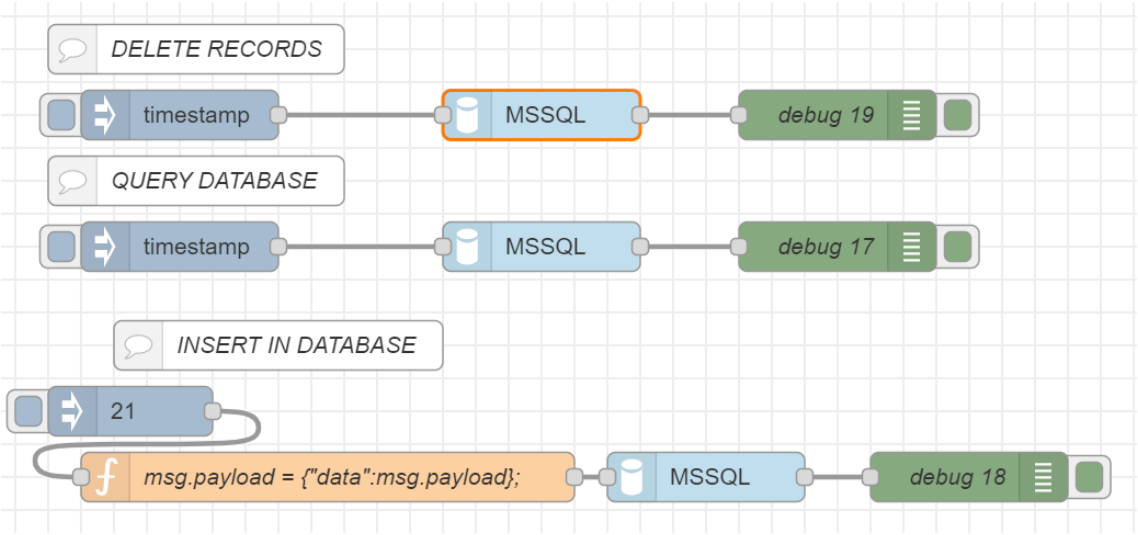
Do not forget the paréntesis

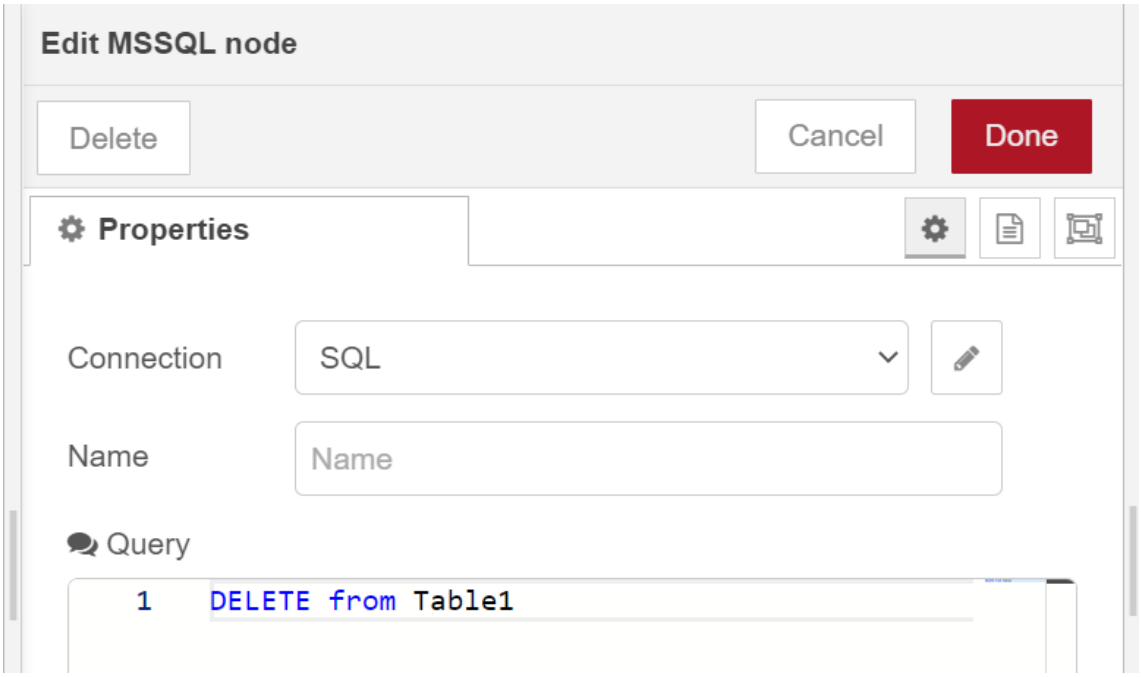


But we want a variable value

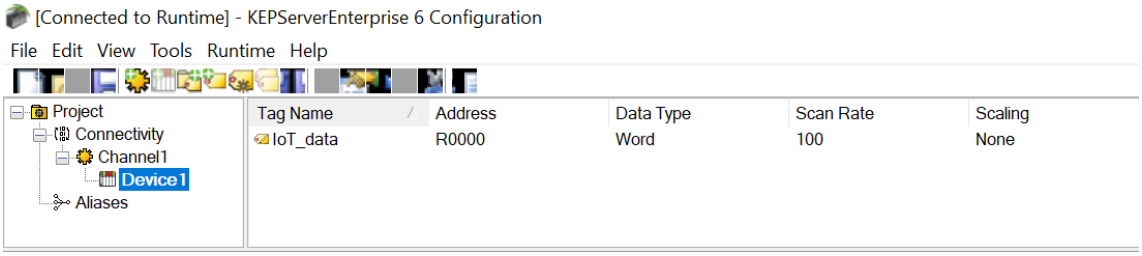


Since the database is growing we want to delete from time to time

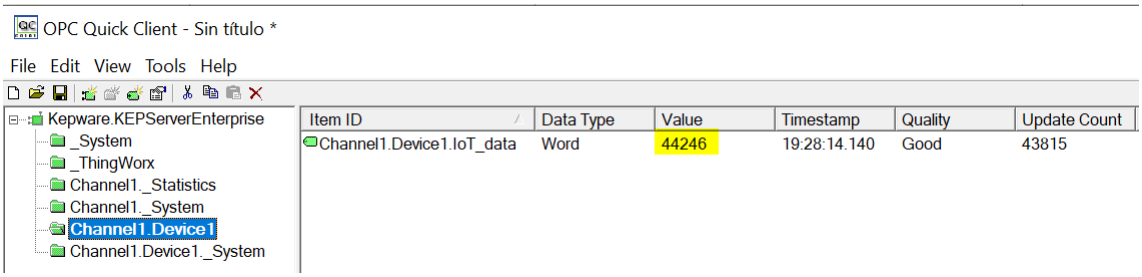




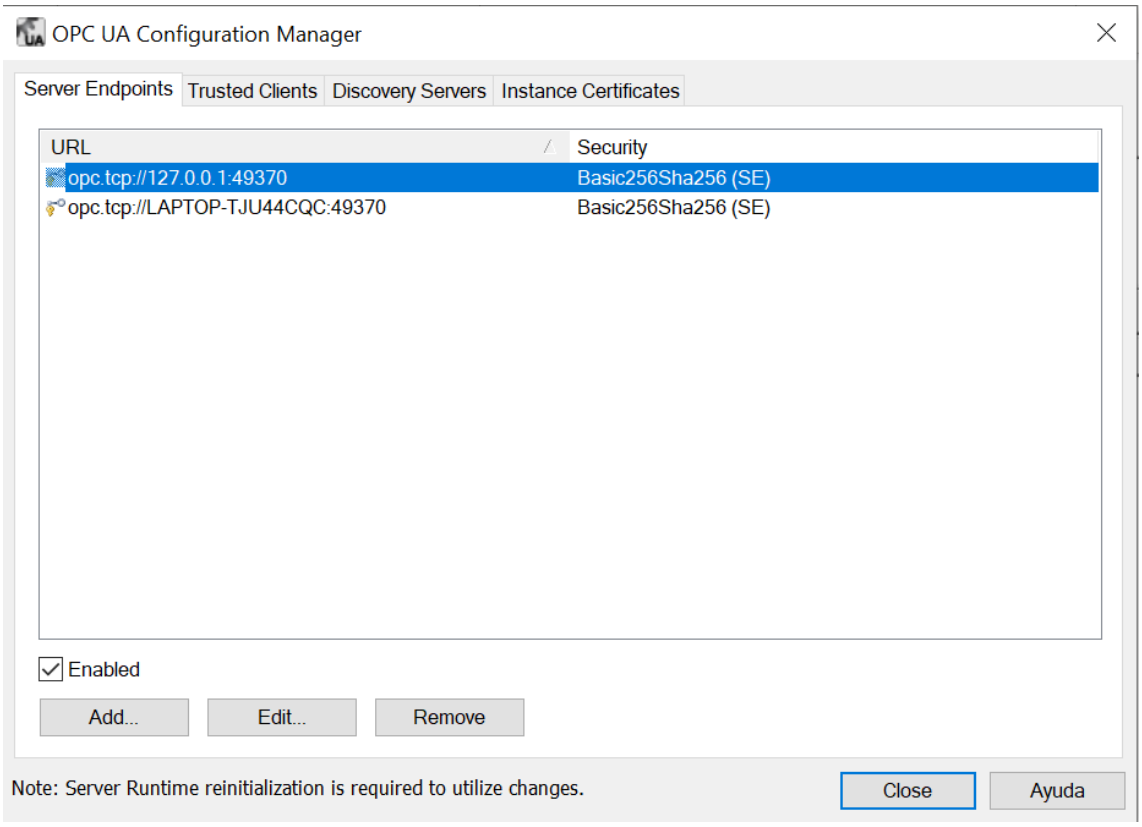
Now we will insert data from Kepserver Enterprise



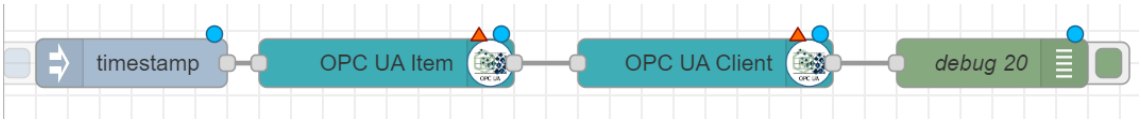
The data is changing

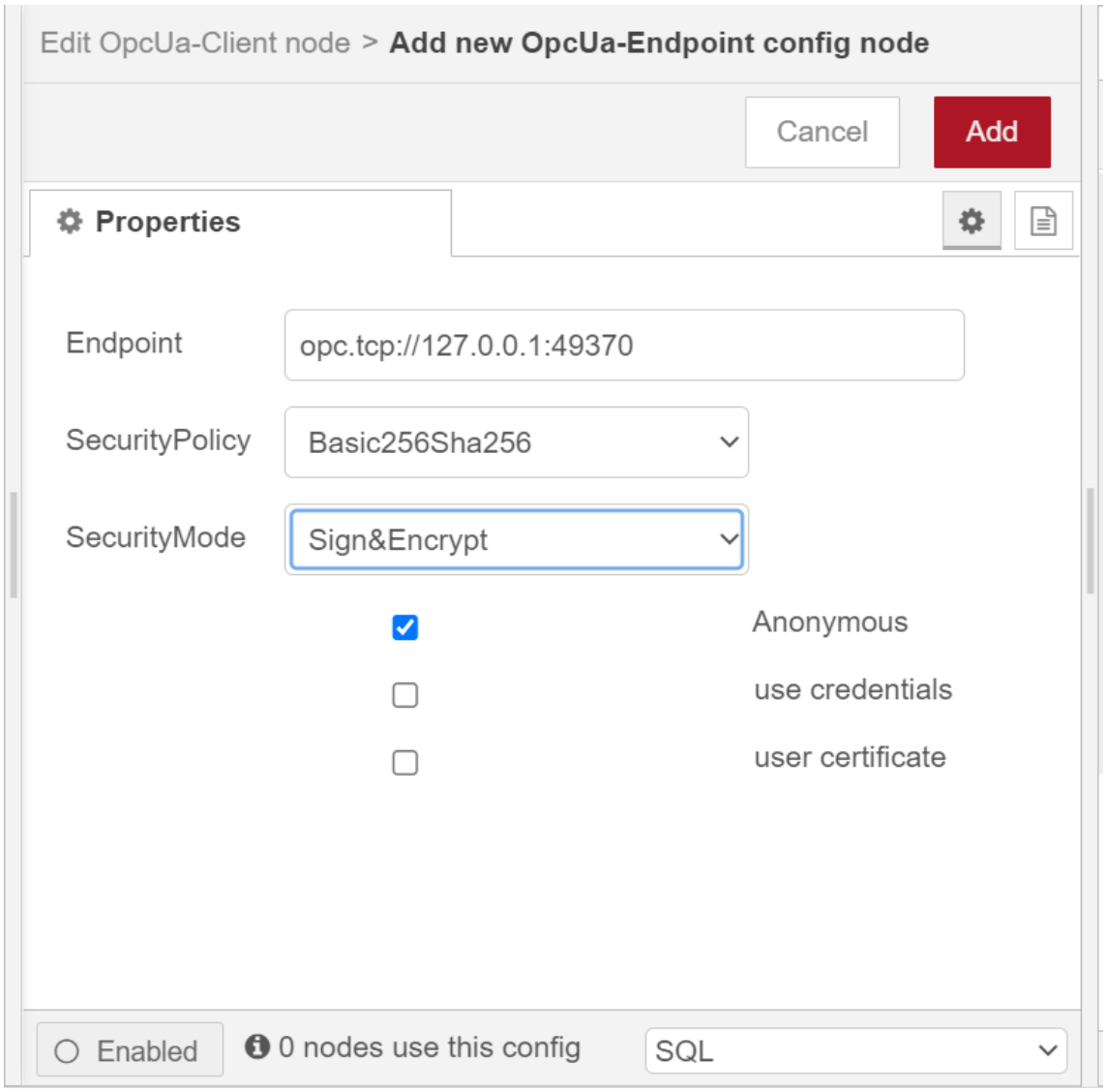


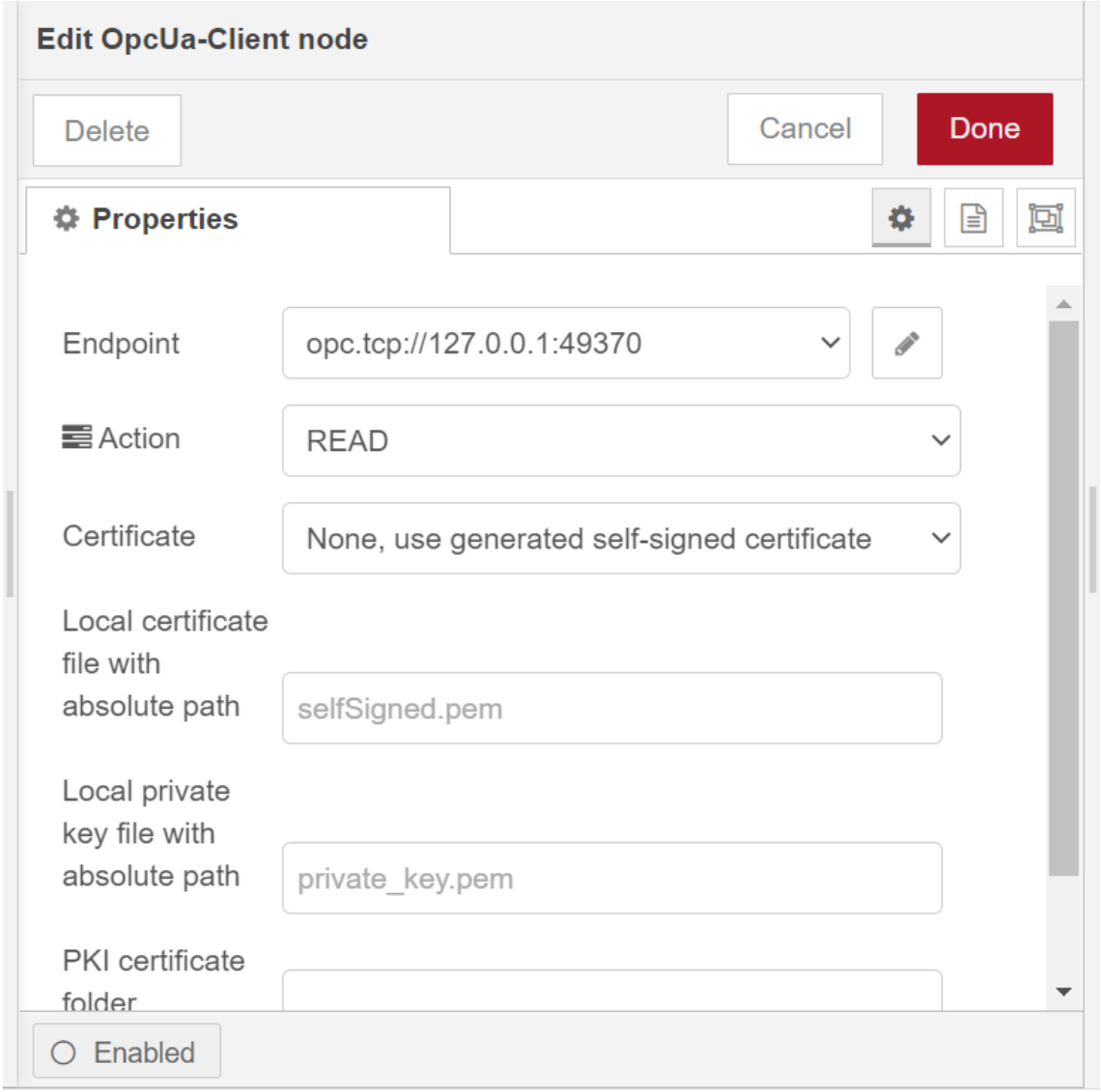
Let’s look at the port for OPC UA server

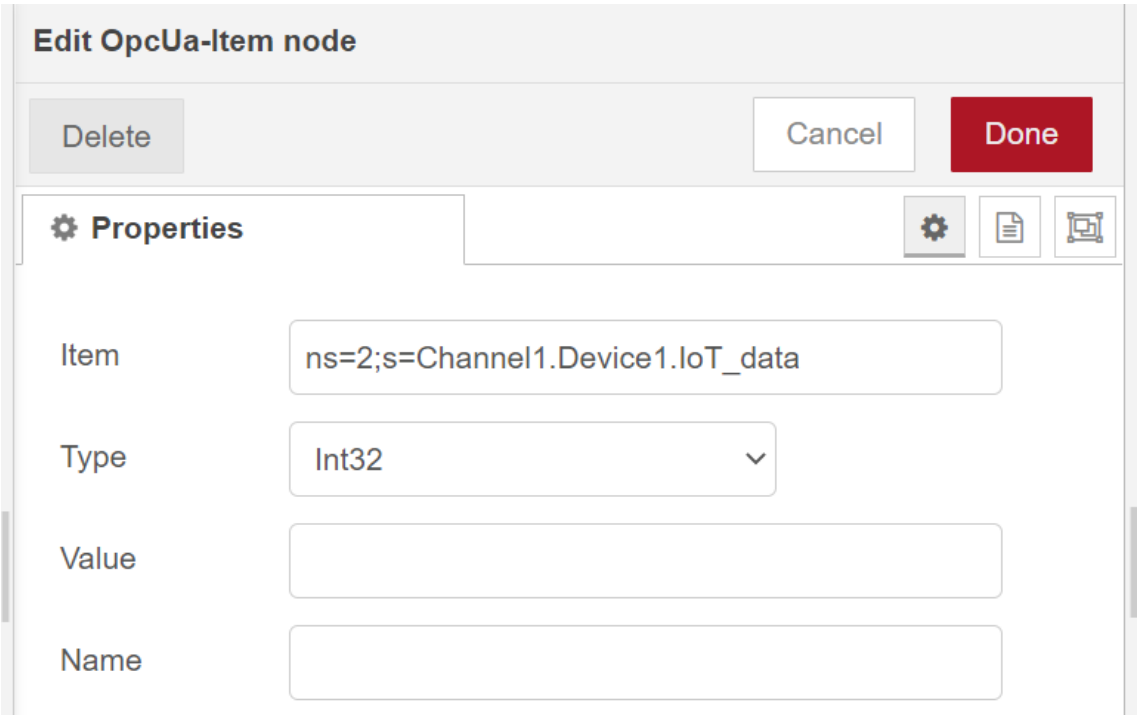


So let's setup the node-red OPC UA client

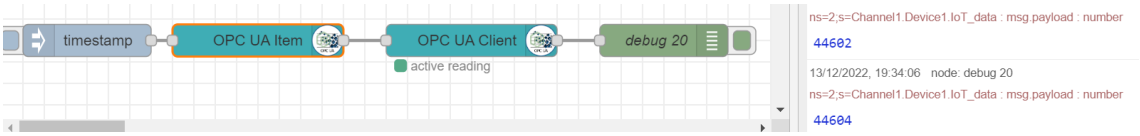



Edit OpcUa-Client node > Add new OpcUa-Endpoint config node
Cancel
Add
Properties
Endpoint
opc.tcp://127.0.0.1:49370
SecurityPolicy
Basic256Sha256
SecurityMode
Sign&Encrypt
Anonymous
use credentials
user certificate
Enabled
0 nodes use this config
SQL

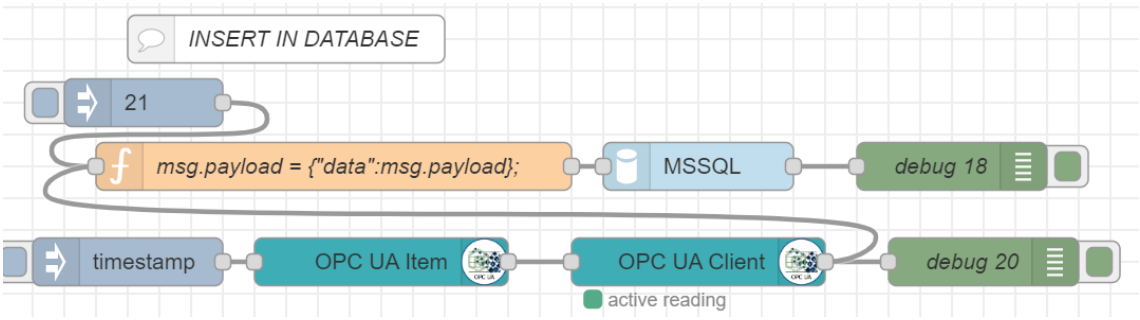

Edit OpcUa-Client node
Delete
Cancel
Done
Properties
Endpoint
opc.tcp://127.0.0.1:49370
Action
READ
Certificate
None, use generated self-signed certificate
Local certificate file with absolute path
selfSigned.pem
Local private key file with absolute path
private_key.pem
PKI certificate folder
Enabled



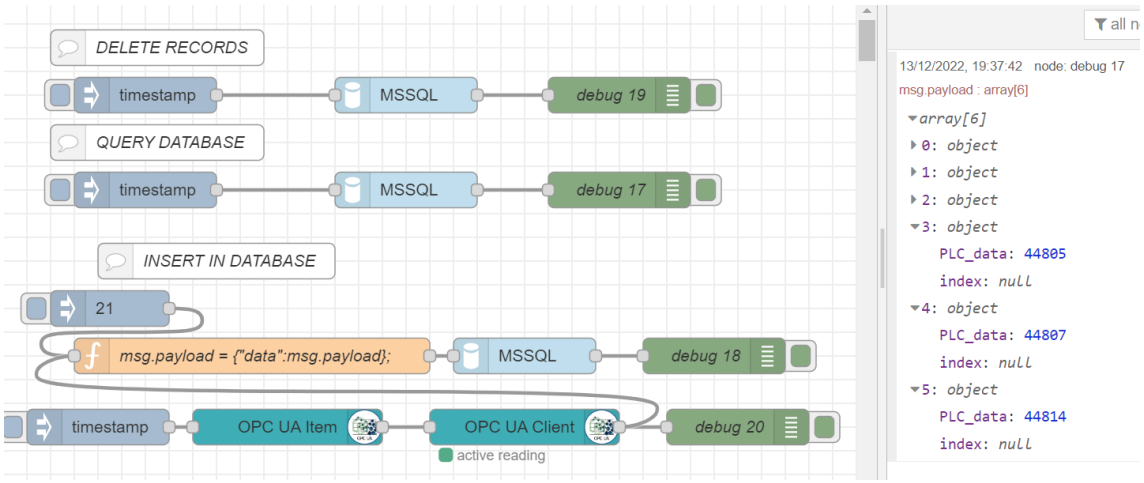
It Works, at least the OPC UA part!

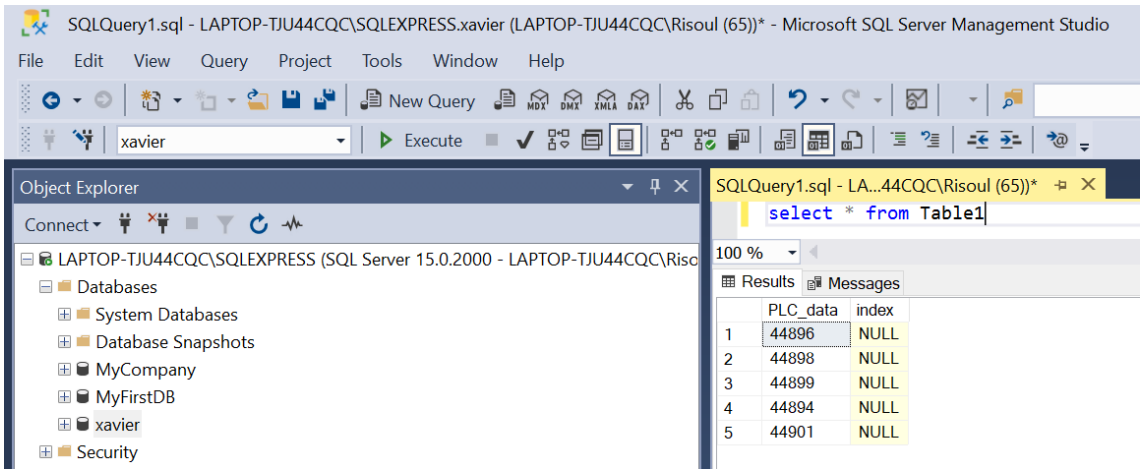


Now let's inject the data on the database

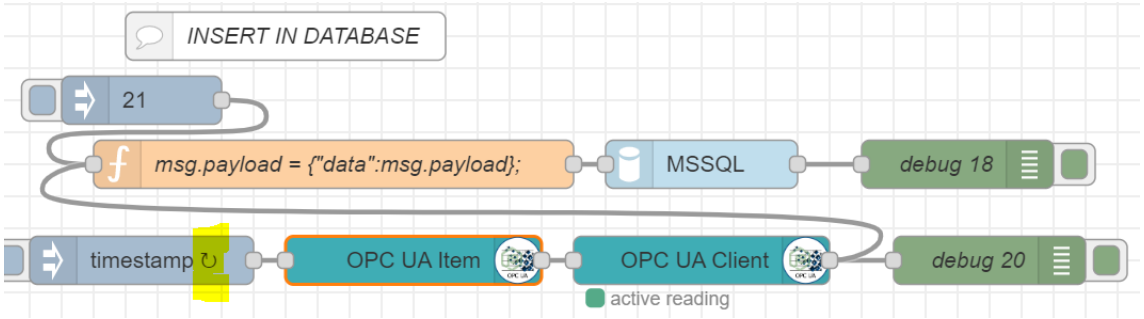


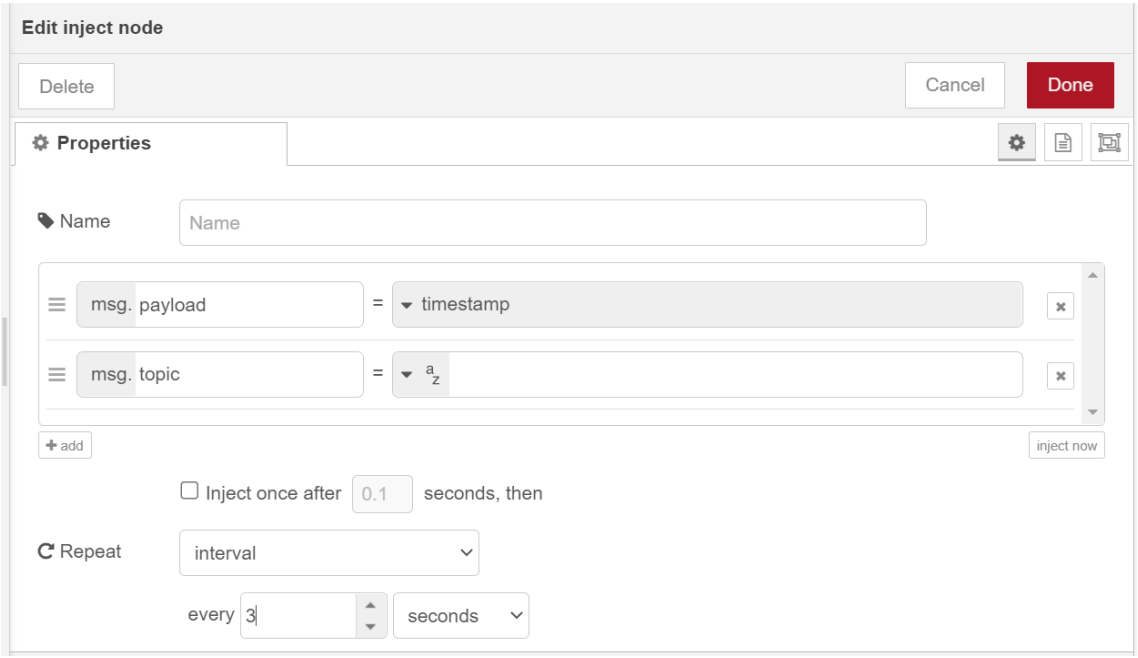
It is working! But only when I inject manually.



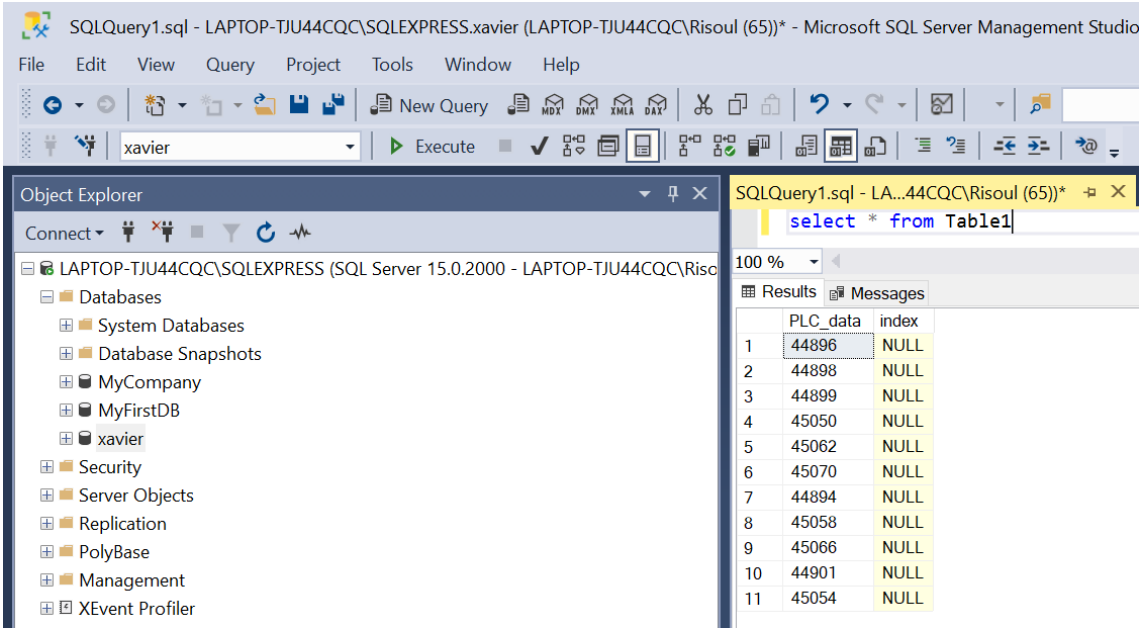


Let’s make a periodic writing on the database for instance each 3 seconds





Now the database is growing each 3 seconds



Let's stop the node!