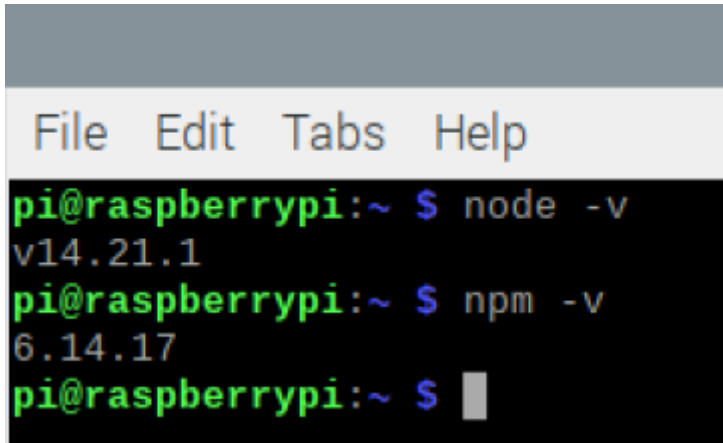


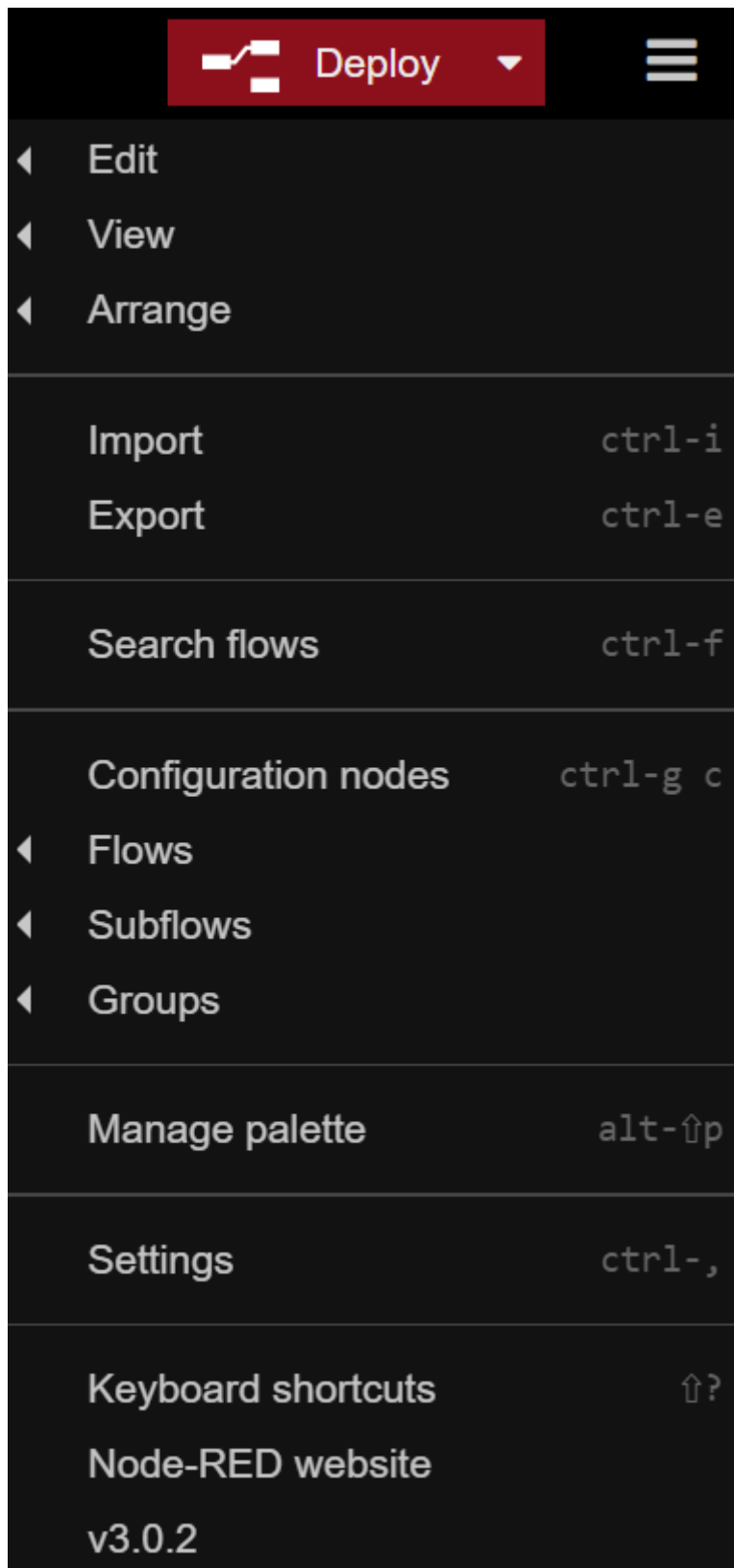
First steps with Node-RED OPC-UA server, and EtherNet/IP

The following versions have been used



```
File Edit Tabs Help
pi@raspberrypi:~ $ node -v
v14.21.1
pi@raspberrypi:~ $ npm -v
6.14.17
pi@raspberrypi:~ $
```

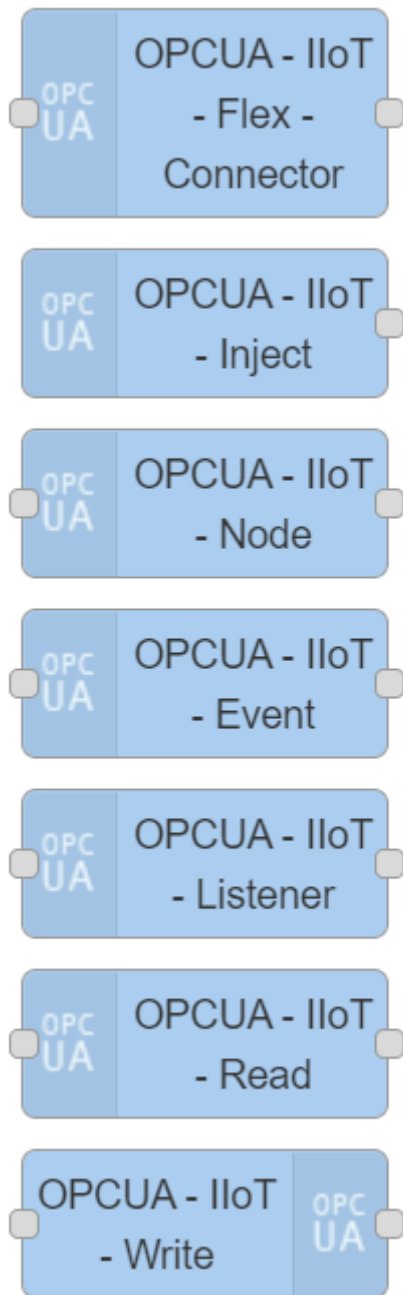
Node-RED v3.0.2



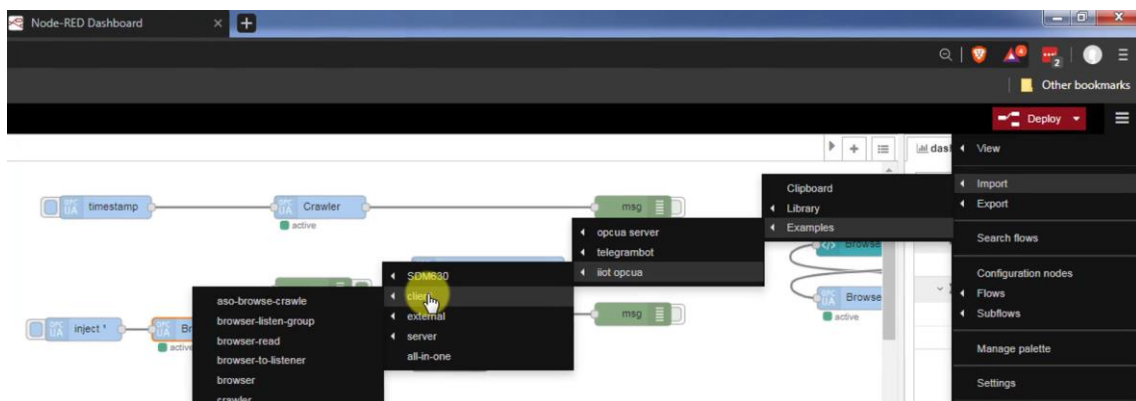
Let's install these nodes:

Nodered-contrib-iiot-opcua

node-red-contrib-cip-ethernet-ip



Next import following example on the working area: aso-browse-crawle



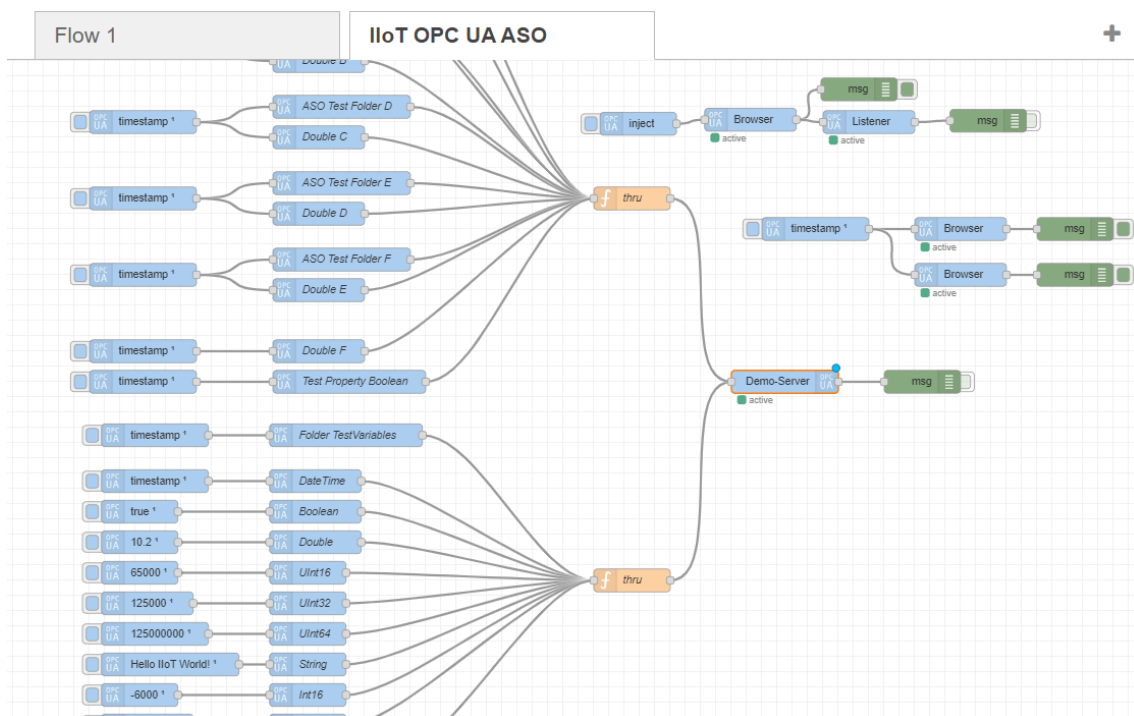
Or depending on the Node-red version you have you will find this way

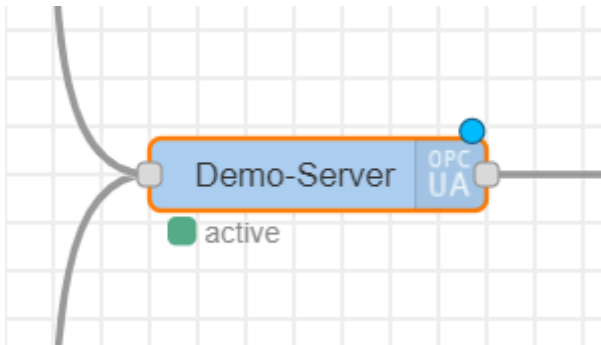
Import nodes

A screenshot of the Node-RED web interface. On the left, there is a sidebar with three tabs: 'Clipboard', 'Local', and 'Examples'. The 'Examples' tab is active. The main area displays a tree view of example flows. The 'Examples' folder is expanded, showing sub-folders like 'flows', 'node-red', 'node-red-contrib-buffer-parser', 'node-red-contrib-iiot-opcua', and 'client'. The 'client' folder is selected and highlighted in orange. Below it, a list of flows is shown: 'aso-browse-crawle', 'browser', 'browser-listen-group', 'browser-read', and 'browser-to-listener'. The 'browser' flow is highlighted in light gray.

Import to	current flow	new flow
-----------	--------------	----------

Cancel



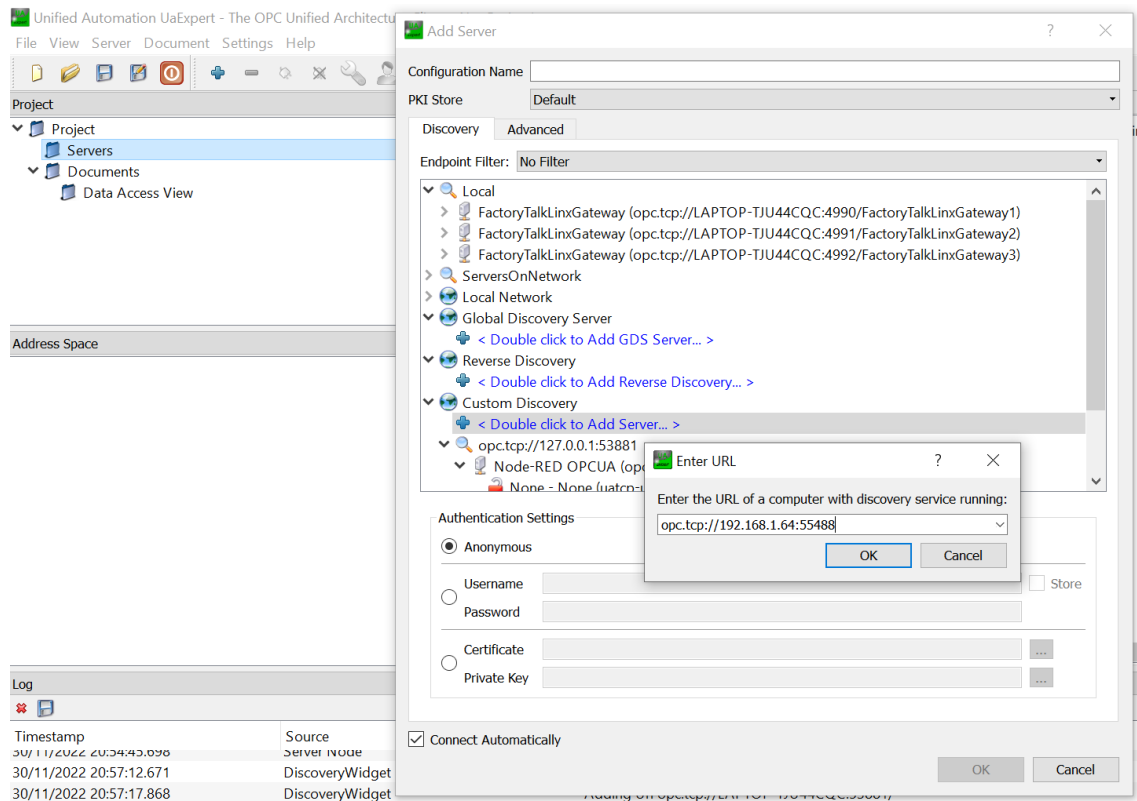


The server is active and listening on port 55488

A screenshot of the 'Edit OPCUA-IIoT-Server node' configuration window. The window has a title bar 'Edit OPCUA-IIoT-Server node' and buttons for 'Delete', 'Cancel', and 'Done'. Below the title bar is a 'Properties' section with tabs for 'Settings', 'Limits', 'Security', 'Users & Sets', and 'Discovery'. The 'Settings' tab is selected, showing fields for 'Port' (55488), 'Endpoint' (UA/NodeREDIIoTServer), 'Alternate Hostname' (empty), 'Delay On Close' (1000), and 'Name' (empty). At the bottom, there is a checkbox labeled 'Enabled' which is checked.

The OPC server is running on IP address 192.168.1.64. This is the wireless IP address got thru DHCP from router.

Let's open an OPC UA client. And add a new server.



Add Server

?

×

Configuration Name

PKI Store

Default

Discovery

Advanced

Endpoint Filter:

No Filter

< Double click to Add Reverse Discovery... >

Custom Discovery

< Double click to Add Server... >

opc.tcp://127.0.0.1:53881

opc.tcp://192.168.1.64:55488

Node-RED (opc.tcp://raspberrypi:55488/)

None - None (uatcp-uasc-uabinary)

Basic128Rsa15 - Sign (uatcp-uasc-uabinary)

Basic256 - Sign (uatcp-uasc-uabinary)

Basic256Sha256 - Sign (uatcp-uasc-uabinary)

Aes128_Sha256_RsaOaep - Sign (uatcp-uasc-uabinary)

Basic128Rsa15 - Sign & Encrypt (uatcp-uasc-uabinary)

Basic256 - Sign & Encrypt (uatcp-uasc-uabinary)

Basic256Sha256 - Sign & Encrypt (uatcp-uasc-uabinary)

Aes128_Sha256_RsaOaep - Sign & Encrypt (uatcp-uasc-uabinary)

Authentication Settings

Anonymous

Username

Store

Password

Certificate

...

Private Key

...

☒ Connect Automatically

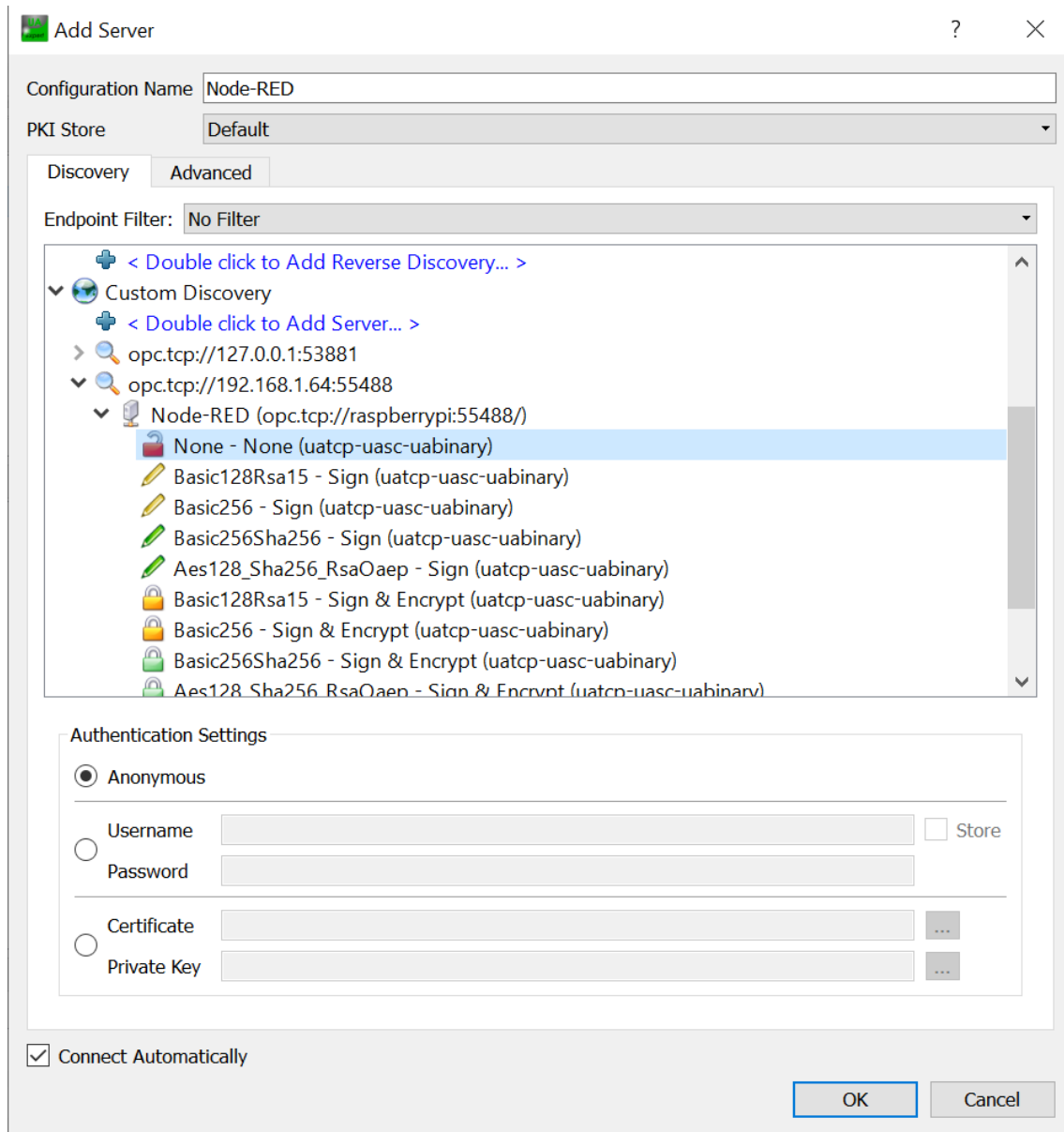
OK

Cancel

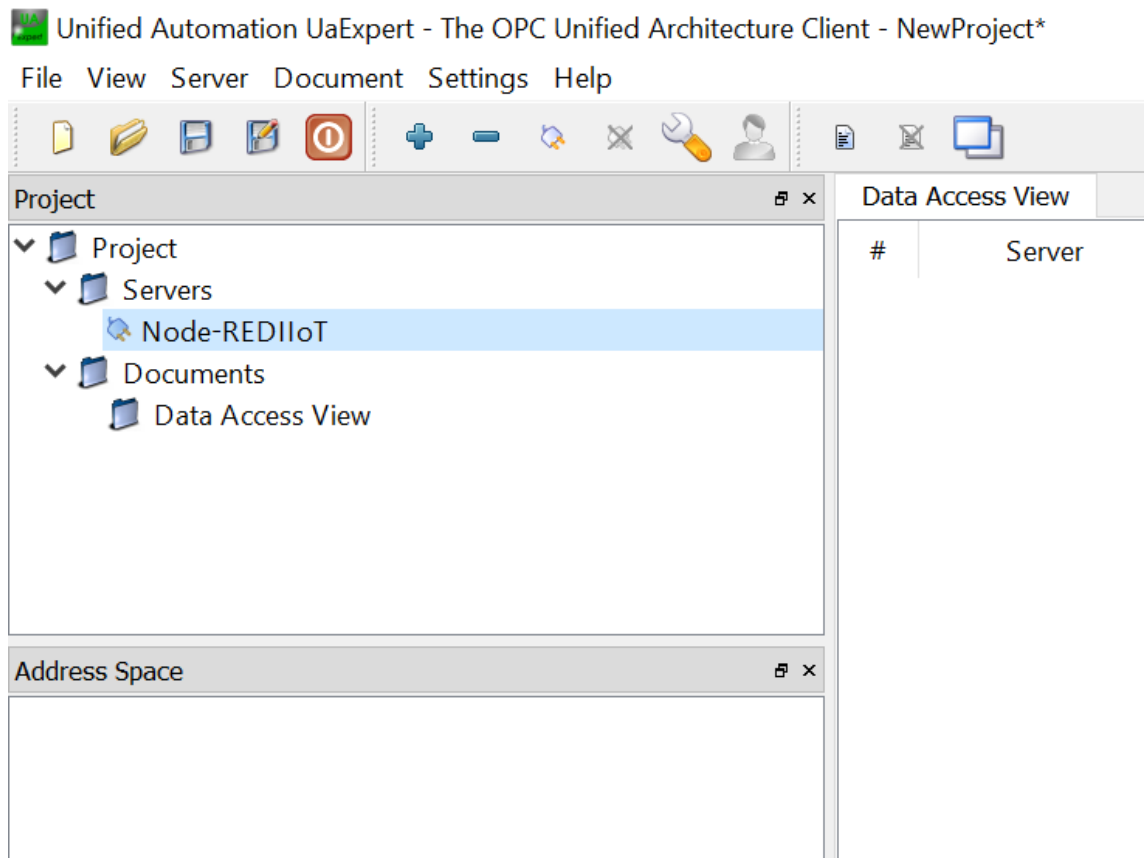
Xavier Florensa

Automation Specialist

Risoul Iberica



This way does not work



Since the url is not correct

Server Settings - Node-REDIIoT

Configuration

Configuration Name

PKI Store

Server Information

Endpoint Url

Reverse Connect ☐

Security Settings

Security Policy

Message Security Mode

Authentication Settings

☒ Anonymous

☐ Username ☐ Store

Password

☐ Certificate ...

Private Key ...

Session Settings

Session Name

OK Cancel

Let's do it this way instead

Add Server

Configuration Name: Node-RED

PKI Store: Default

Discovery | **Advanced**

Server Information

Endpoint Url:

Reverse Connect: ☐

Security Settings

Security Policy:

Message Security Mode:

Authentication Settings

☒ Anonymous

☐ Username: ☐ Store

☐ Password:

☐ Certificate: ...

☐ Private Key: ...

Session Settings

Session Name:

☒ Connect Automatically

OK Cancel

Server Settings - Node-RED

Configuration

Configuration Name

PKI Store

Server Information

Endpoint Url

Reverse Connect ☐

Security Settings

Security Policy

Message Security Mode

Authentication Settings

☒ Anonymous

☐ Username ☐ Store

Password

☐ Certificate ...

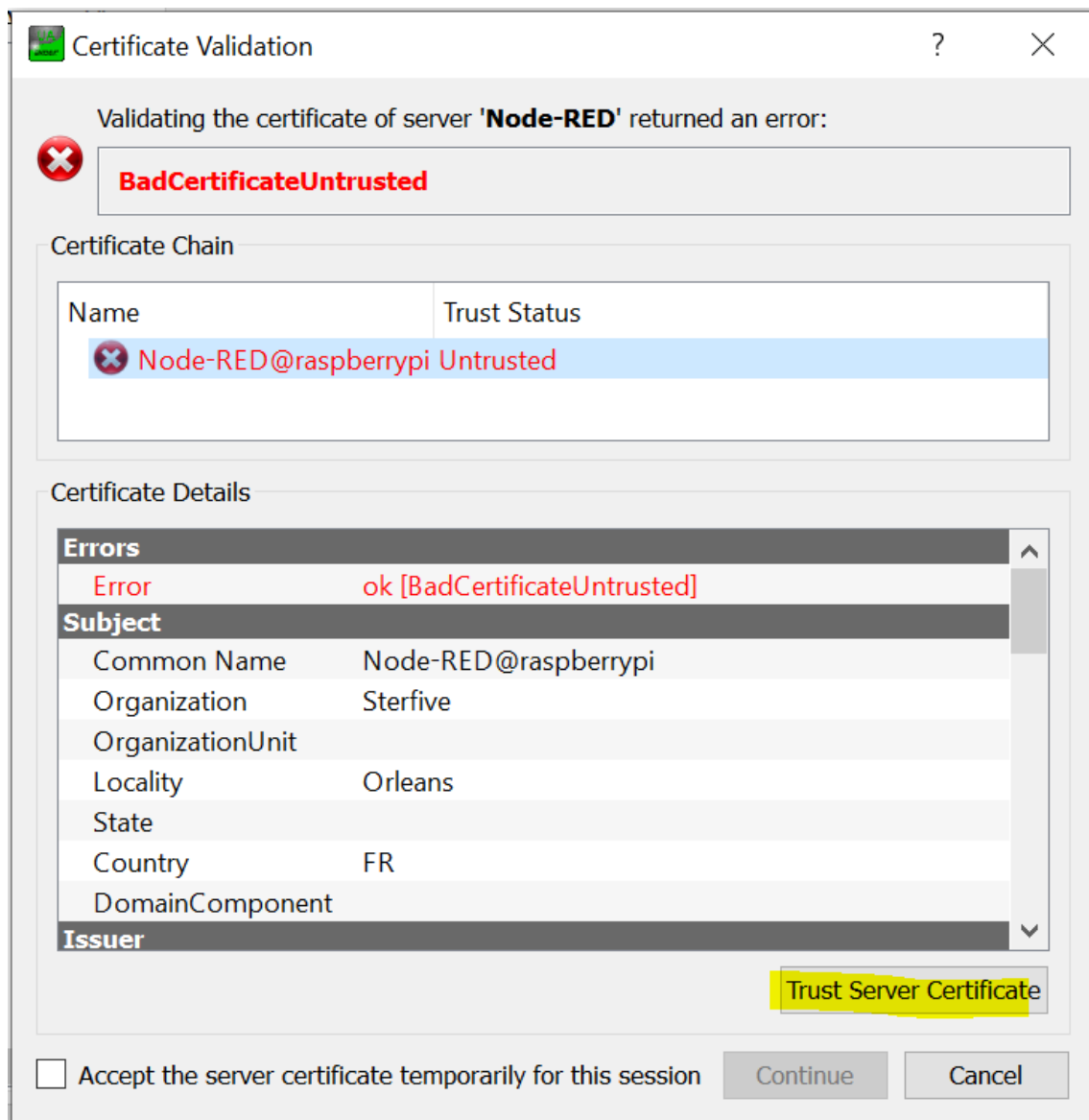
Private Key ...

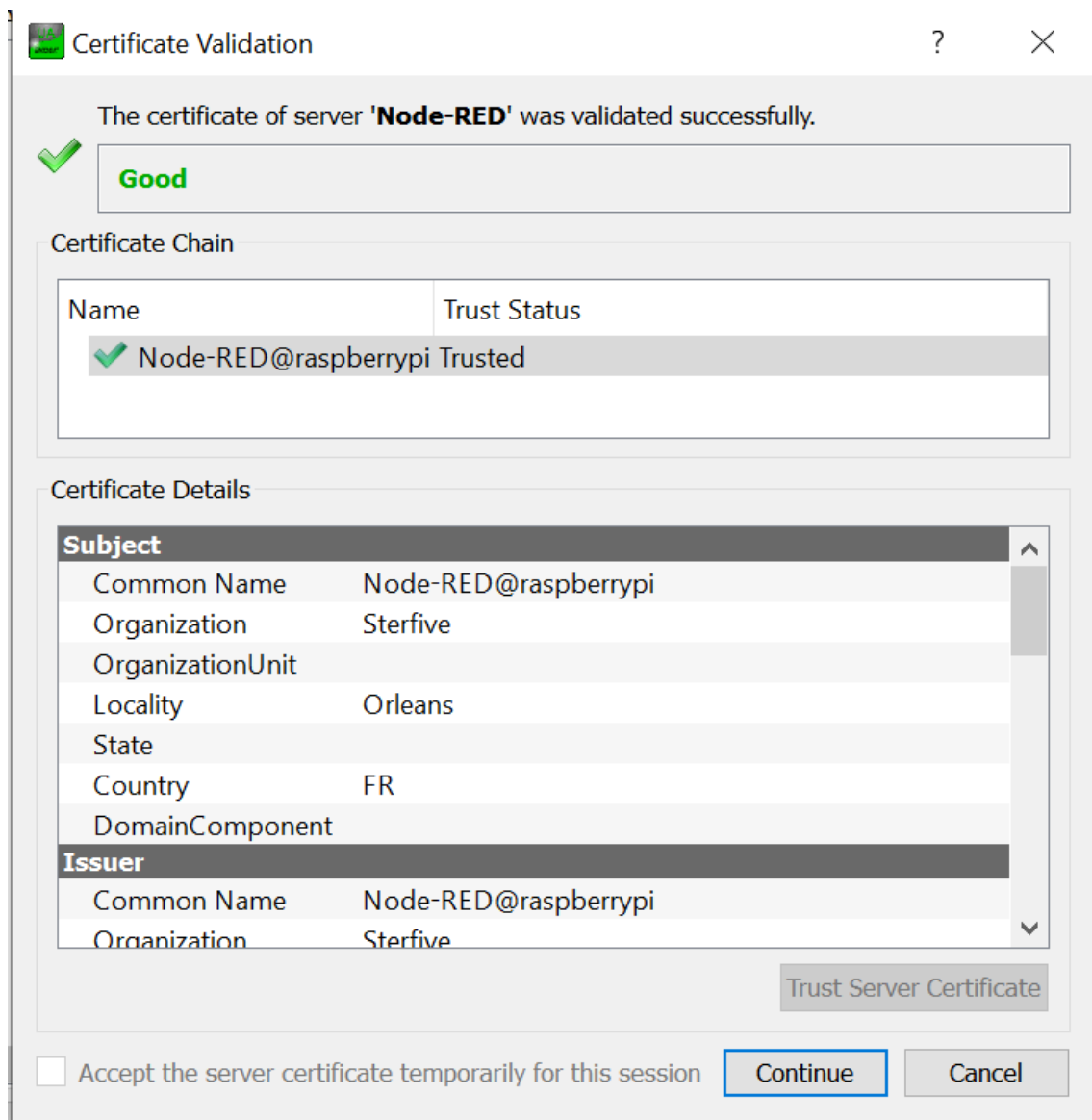
Session Settings

Session Name

OK Cancel

On first connection the client is rejected, let's trust it

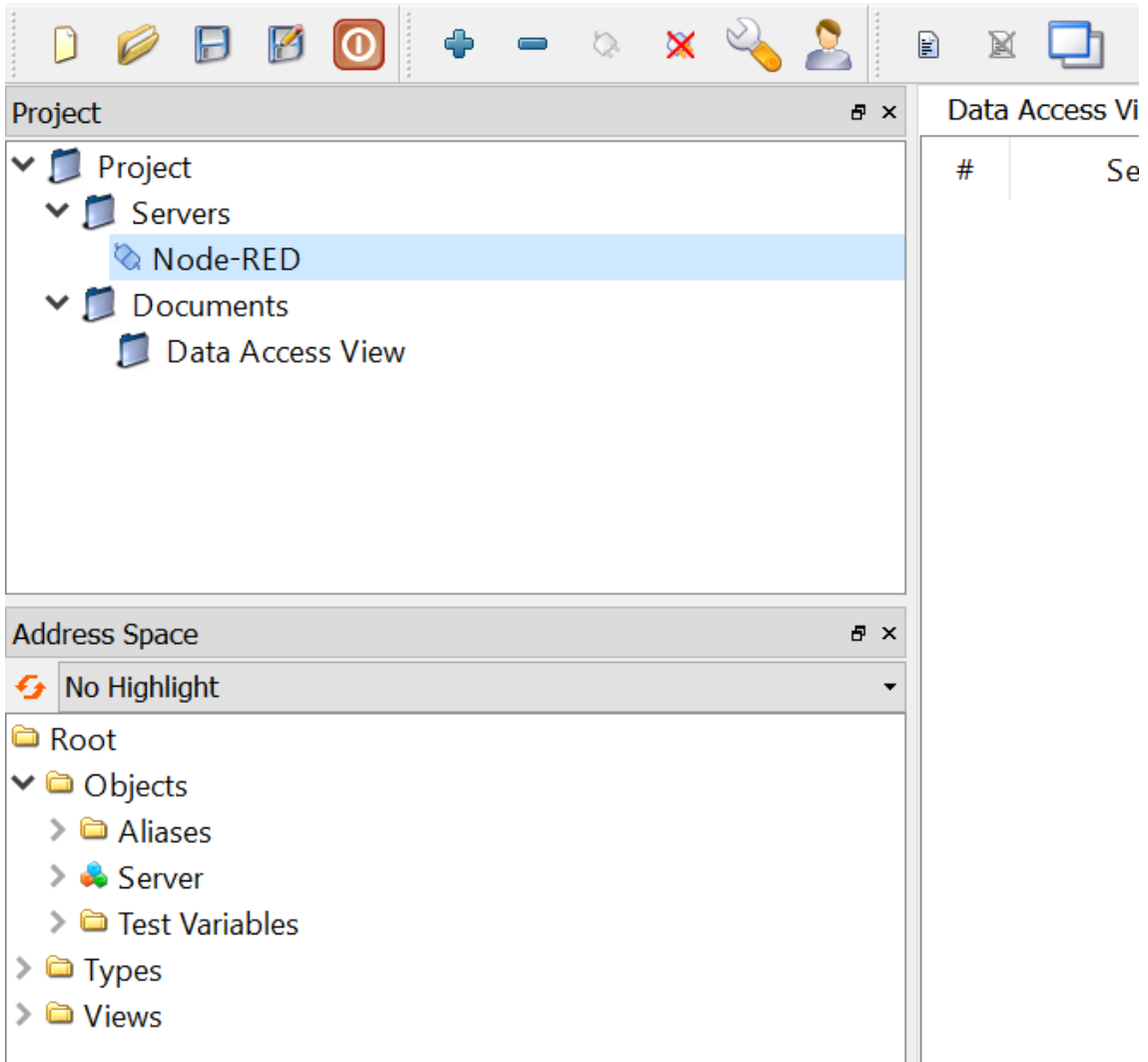




Now we can access the variables

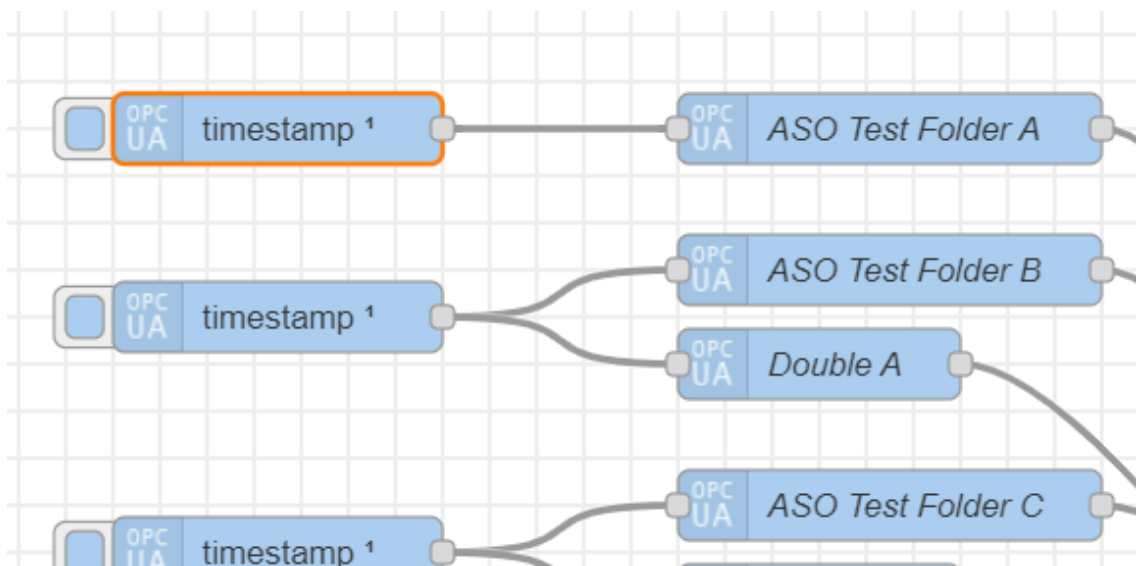
Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject

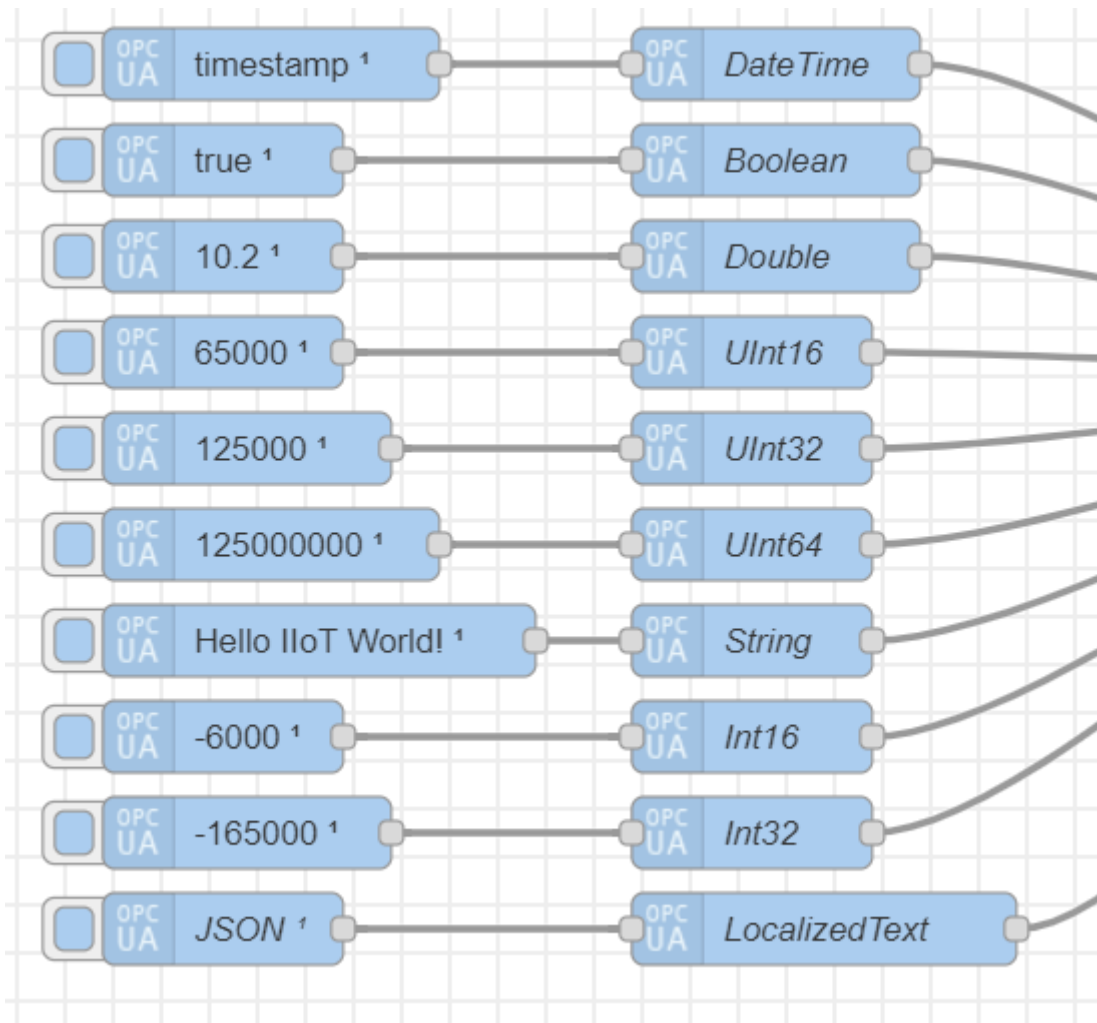
File View Server Document Settings Help



The screenshot displays the UaExpert application window. The top menu bar includes File, View, Server, Document, Settings, and Help. Below the menu is a toolbar with various icons for file operations and system functions. The main interface is divided into three panes. The left pane, titled 'Project', shows a hierarchical tree structure: 'Project' (expanded) contains 'Servers' (expanded) with 'Node-RED' selected, and 'Documents' (expanded) with 'Data Access View'. The bottom pane, titled 'Address Space', shows a tree structure: 'Root' (expanded) contains 'Objects' (expanded) with sub-items 'Aliases', 'Server', 'Test Variables', 'Types', and 'Views'. The right pane, titled 'Data Access Vi', is partially visible and shows a table with columns labeled '#' and 'Se'.

All the variables and folders are created at start





The variables are created but they do not change or update state.

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File View Server Document Settings Help

Project

- Project
 - Servers
 - Node-RED
 - Documents
 - Data Access View

Data Access View

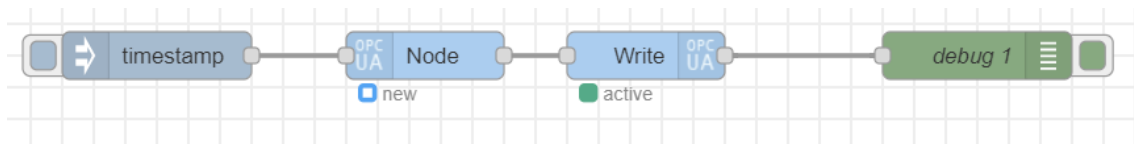
#	Server	Node Id	Display Name	Value	Datatype	r
1	Node-RED	NS1 String TestBoolean	Test Boolean	true	Boolean	2
2	Node-RED	NS1 String TestDateTime	Test DateTime	2022-11-30T22:19:33.470Z	DateTime	2
3	Node-RED	NS1 String TestDouble	Test Double	10.2	Double	2
4	Node-RED	NS1 String TestInt16	Test Int16	-6000	Int16	2
5	Node-RED	NS1 String TestInt32	Test Int32	-165000	Int32	2
6	Node-RED	NS1 String TestLocalizedText	Test LocalizedText	Double click to display value	Localized...	2
7	Node-RED	NS1 String TestString	Test String	Hello IIoT World!	String	2
8	Node-RED	NS1 String TestUInt16	Test UInt16	65000	UInt16	2
9	Node-RED	NS1 String TestUInt32	Test UInt32	125000	UInt32	2
10	Node-RED	NS1 String TestUInt64	Test UInt64	125000000	UInt64	2

Address Space

No Highlight

- Test Variables
 - Test Boolean
 - Test DateTime
 - Test Double
 - Test Int16
 - Test Int32
 - Test LocalizedText
 - Test String
 - Test UInt16
 - Test UInt32
 - Test UInt64
- Types
- Views

Let's change the value of the integer16 variable



Edit OPCUA-IloT-Node node

Properties

Type write ▾

Node-Id ns=1;s=TestInt16

Data Type Int16 🔍

Value 15

Topic

Name

☐ **Show Errors**

☐ Enabled

Edit OPCUA-IloT-Write node

Delete
Cancel
Done

Properties

Connector
LOCAL SERVER

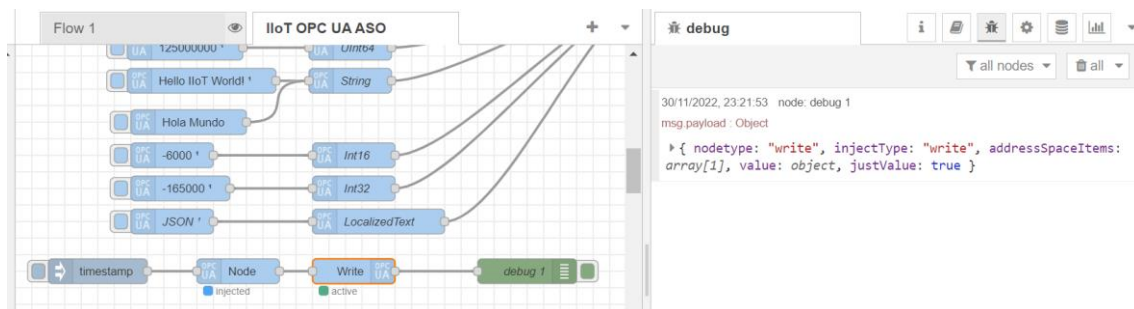
Name
Name

Send Just Values
☒

Show Activities
☐

Show Errors
☐

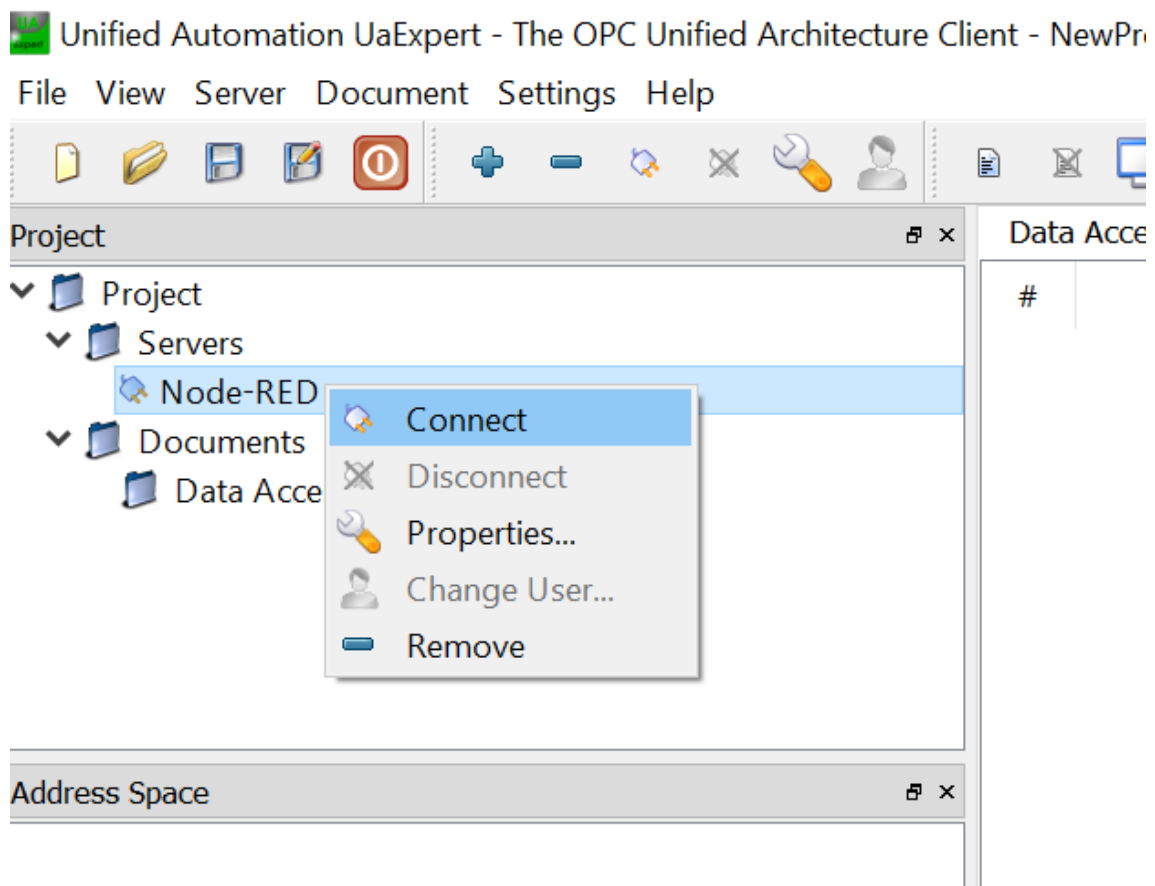
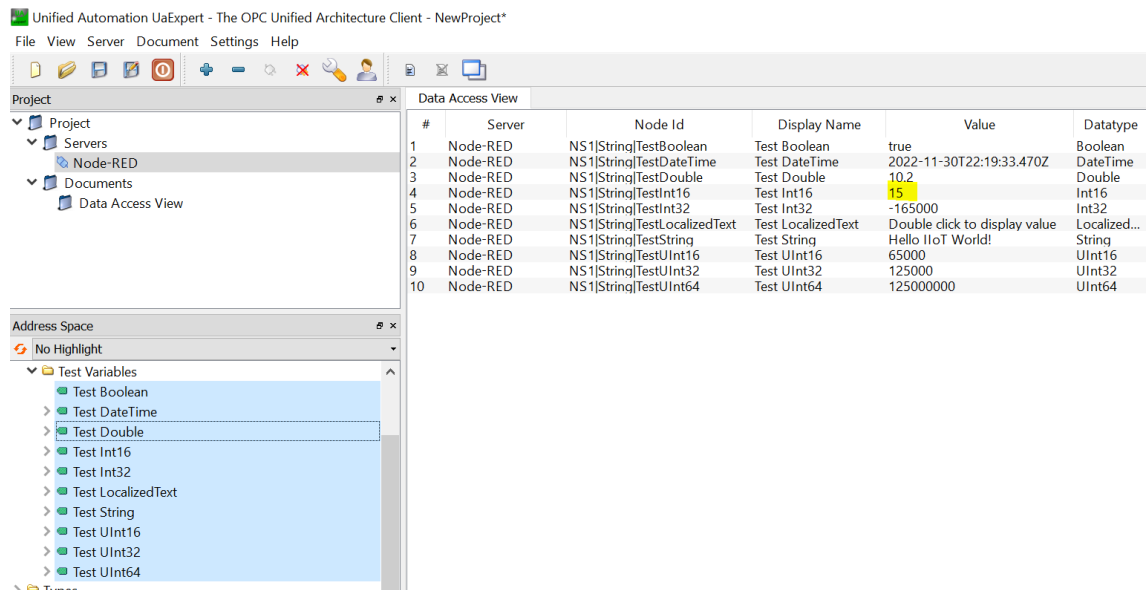
☐ Enabled



```

30/11/2022, 23:21:53 node: debug 1
msg.payload : Object
▼object
  nodetype: "write"
  injectType: "write"
  ▼addressSpaceItems: array[1]
    ▼0: object
      name: ""
      nodeId: "ns=1;s=TestInt16"
      datatypeName: "Int16"
  ▼value: object
    ▼statusCodes: array[1]
      ▼0: object
        value: 0
    justValue: true

```



Let's try to enter the value as a variable

Edit inject node

Delete
Cancel
Done

Properties

Name: Name

msg. payload = 0₉ 24

msg. topic = a_z

+ add

inject now

☐ Inject once after 0.1 seconds, then

Repeat: none

☐ Enabled

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File View Server Document Settings Help

#	Server	Node Id	Display Name	Value	Datatype	Access Time
1	Node-RED	NS1(String)TestBoolean	Test Boolean	true	Boolean	23:27:31
2	Node-RED	NS1(String)TestDateTime	Test DateTime	2022-11-30T22:26:53.014Z	DateTime	23:27:31
3	Node-RED	NS1(String)TestDouble	Test Double	10.2	Double	23:27:31
4	Node-RED	NS1(String)TestInt16	Test Int16	24	Int16	23:27:41
5	Node-RED	NS1(String)TestInt32	Test Int32	-165000	Int32	23:27:31
6	Node-RED	NS1(String)TestLocalizedText	Test LocalizedText	Double click to display value	LocalizedText	23:27:31
7	Node-RED	NS1(String)TestString	Test String	Hello IloT World!	String	23:27:31
8	Node-RED	NS1(String)TestUInt16	Test UInt16	65000	UInt16	23:27:31
9	Node-RED	NS1(String)TestUInt32	Test UInt32	125000	UInt32	23:27:31
10	Node-RED	NS1(String)TestUInt64	Test UInt64	125000000	UInt64	23:27:31

Address Space

- Test Variables
 - Test Boolean
 - Test DateTime
 - Test Double
 - Test Int16
 - Test Int32
 - Test LocalizedText
 - Test String
 - Test UInt16
 - Test UInt32
 - Test UInt64
- Types
- Views

Attributes

- Attribute: Value
- NodeId: ns=1
- NamespaceIndex: 1
- IdentifierType: String
- Identifier: TestStr
- NodeClass: Variable
- BrowseName: 1, "Test"
- DisplayName: "", "Test"
- Description: "", ""
- Value:

References

Reference	Target	DisplayName
HasType...	BaseDataVariableType	

Log

Edit OPCUA-IloT-Node node

Delete
Cancel
Done

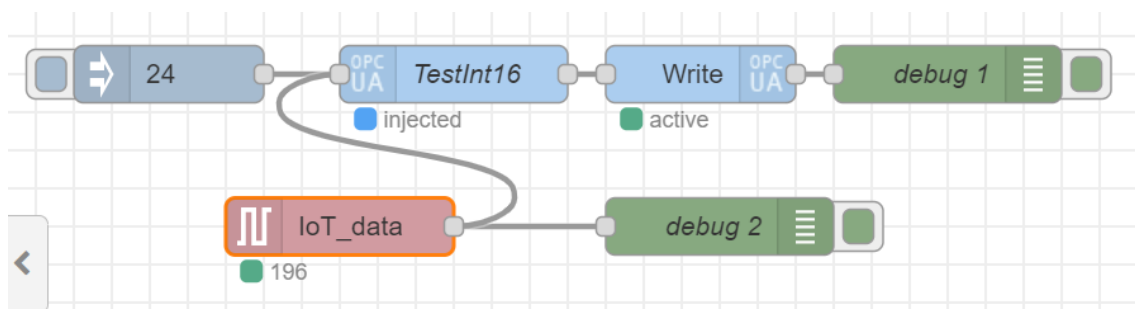
⚙️ Properties
⚙️
📄
🔍

Type
write
Node-Id
ns=1;s=TestInt16
Data Type
Int16
Value
|
Topic
Name

! Show Errors
☐

☐ Enabled

Now let's access the PLC data and inject to the OPC server



The PLC address is the IP address of your laptop if you are using FT Logix Echo

Edit eth-ip in node

Delete
Cancel
Done

Properties

⚙️
📄
🖨️

⚡ PLC
192.168.1.159:0
✎️

⚙️ Mode
Single tag
▼

🔗 Scope
<Global>
▼

🔗 Tag
IoT_data
▼

🏷️ Name
Name

Now we can see the value being updated

Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject*

File View Server Document Settings Help

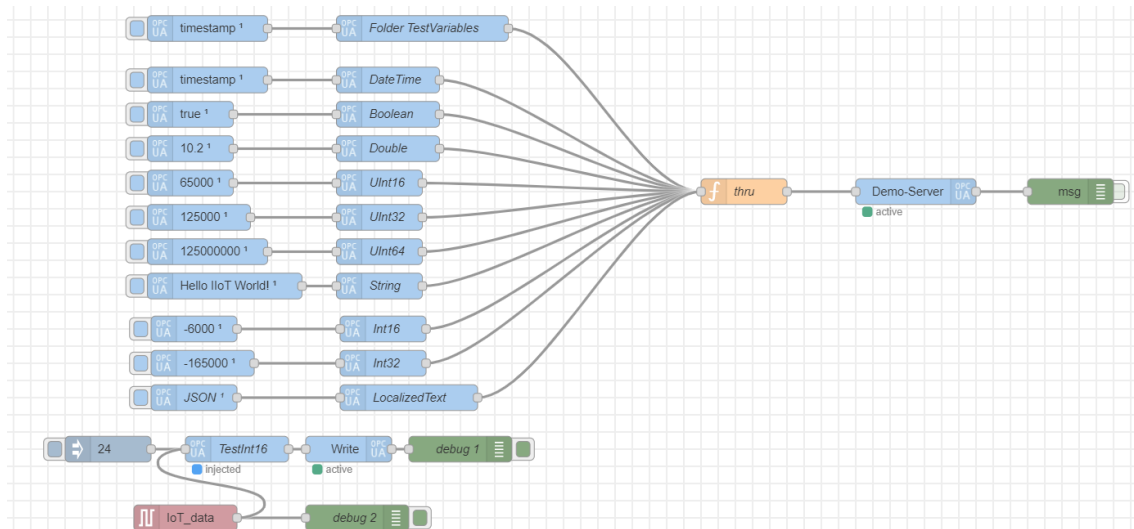
#	Server	Node Id	Display Name	Value	Datatype	rcv Timesta	ver Timesta	Statuscode
1	Node-RED	NS1 String TestBoolean	Test Boolean	true	Boolean	19:12:44....	19:12:57....	Good
2	Node-RED	NS1 String TestDateTime	Test DateTime	2022-12-01T18:07:09.731Z	DateTime	19:12:49....	19:12:57....	Good
3	Node-RED	NS1 String TestDouble	Test Double	10.2	Double	19:12:49....	19:12:57....	Good
4	Node-RED	NS1 String TestInt16	Test Int16	194	Int16	19:15:49....	19:15:49....	Good
5	Node-RED	NS1 String TestInt32	Test Int32	-165000	Int32	19:12:50....	19:12:57....	Good
6	Node-RED	NS1 String TestLocalizedText	Test LocalizedText	Double click to display value	Localized...	19:12:51....	19:12:57....	Good
7	Node-RED	NS1 String TestString	Test String	Hello IIoT World!	String	19:12:52....	19:12:57....	Good
8	Node-RED	NS1 String TestUInt16	Test UInt16	65000	UInt16	19:12:53....	19:12:57....	Good
9	Node-RED	NS1 String TestUInt32	Test UInt32	125000	UInt32	19:12:53....	19:12:57....	Good
10	Node-RED	NS1 String TestUInt64	Test UInt64	125000000	UInt64	19:12:54....	19:12:57....	Good

Address Space

No Highlight

> Aliases
> Server
> Test Variables
> Test Boolean
> Test DateTime
> Test Double
> Test Int16
> Test Int32
> Test LocalizedText
> Test String
> Test UInt16
> Test UInt32
> Test UInt64

Let's erase the unneeded nodes from example



You can find the code here

<https://github.com/xavierflorensa/EtherNet-IP-to-OPC-UA-server>