

<https://www.halvorsen.blog>



OPC UA Server Simulator

With Practical Examples using LabVIEW and MATLAB

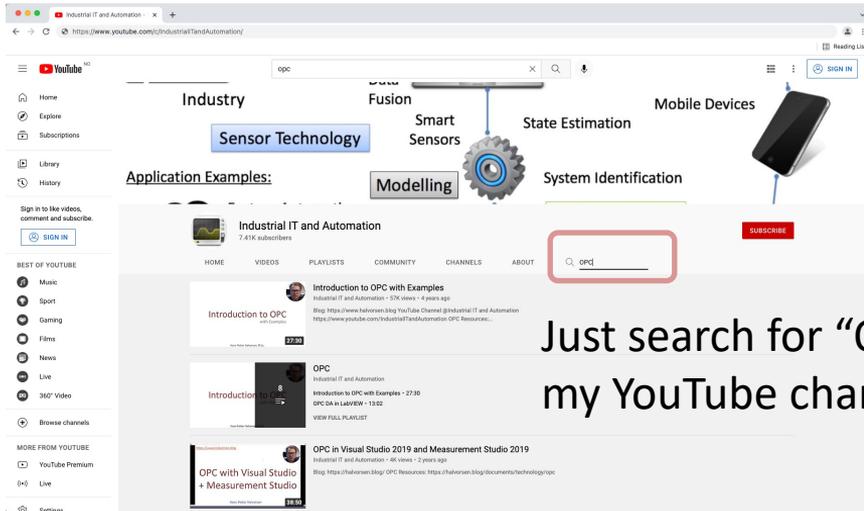
Hans-Petter Halvorsen

Contents

- [OPC UA](#) – A Short Introduction to OPC and OPC UA
- [OPC UA Server Simulator](#)
 - **Free OPC UA Server** (with limited features) from the company “Integration Objects” that supports Data Access and Historical Access of OPC UA
 - We will create different OPC UA Clients in different Programming Languages that communicates with the “OPC UA Server Simulator”
- [OPC UA Client](#) - **Free OPC UA Client** from the company “Integration Objects”
- [LabVIEW OPC UA Toolkit](#)
 - [LabVIEW OPC UA Examples communicating with the OPC UA Server Simulator](#)
- [MATLAB OPC Toolbox](#)
 - [MATLAB OPC UA Examples communicating with the OPC UA Server Simulator and LabVIEW OPC UA Server](#)

Other OPC Resources

- Blog: <https://www.halvorsen.blog>
- OPC Resources: <https://www.halvorsen.blog/documents/technology/opc/>
- YouTube: <https://www.youtube.com/IndustrialITandAutomation>



The screenshot shows the YouTube channel page for 'Industrial IT and Automation' (7.41K subscribers). The search bar at the top of the channel page contains the text 'opc', which is highlighted with a red box. Below the search bar, several video thumbnails are visible, including 'Introduction to OPC with Examples' and 'OPC in Visual Studio 2019 and Measurement Studio 2019'. A diagram at the top of the channel page shows 'Industry' connected to 'Fusion', 'Smart Sensors', 'State Estimation', and 'Mobile Devices', with 'Sensor Technology' and 'Modelling' also shown.

Just search for “OPC” within my YouTube channel



The screenshot shows the 'About' page of the blog 'The Technical Guy', a Blog about Technology by Hans-Peter Halvorsen. The page features a red header with the title 'The Technical Guy' and the subtitle 'a Blog about Technology'. Below the header, there is a section titled 'MATLAB for Students' with a 'Course Web Site' link. The text describes the course as a practical introduction to basic MATLAB programming and simulation, aimed at students learning MATLAB for technical computing and control applications. The course is based on Flipped Classroom and Problem-Based Learning (PBL) principles.

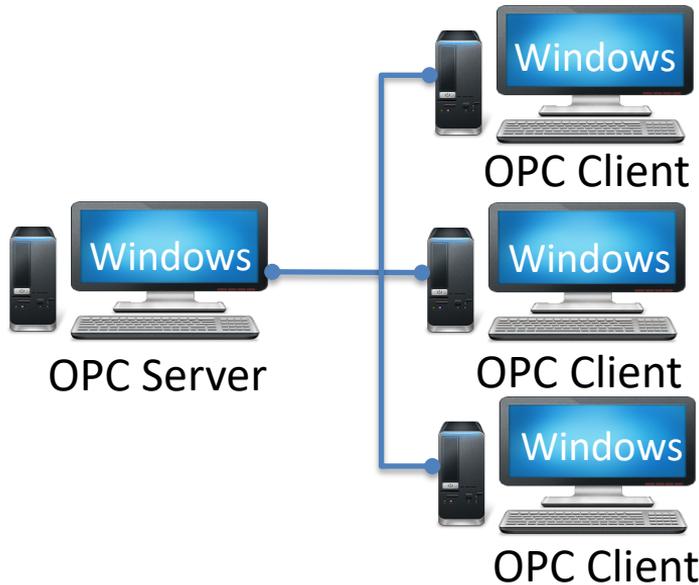


OPC UA

Classic OPC vs. OPC UA

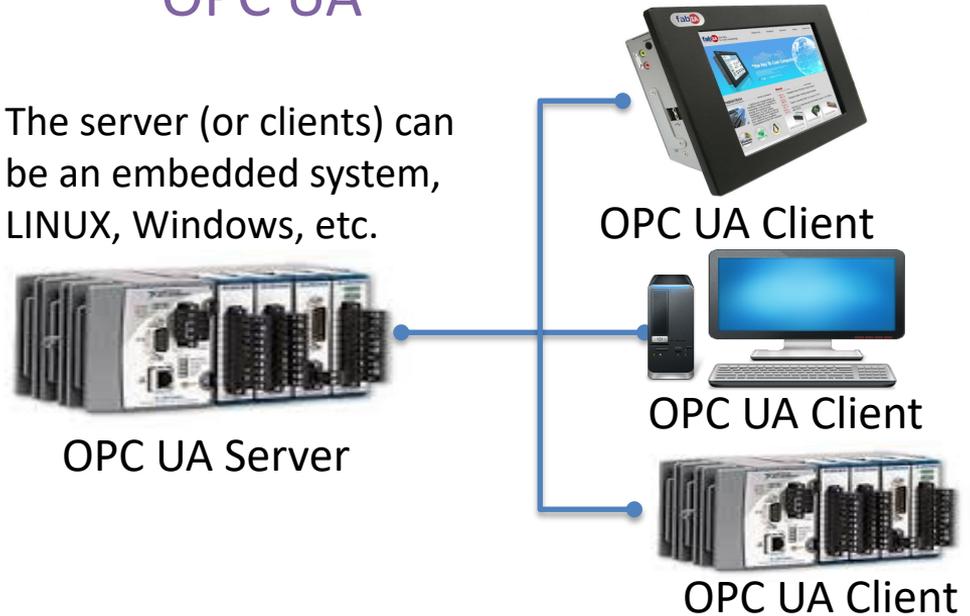


Classic OPC (DCOM)



OPC UA

The server (or clients) can be an embedded system, LINUX, Windows, etc.



Classic OPC requires a Microsoft Windows operating system to implement COM/DCOM server functionality. By utilizing SOA and Web Services, OPC UA is a platform-independent system that eliminates the previous dependency on a Windows operating system. By utilizing SOAP/XML over HTTP, OPC UA can deploy on a variety of embedded systems regardless of whether the system is a general purpose operating system, such as Windows, or a deterministic real-time operating system.

<http://www.ni.com/white-paper/13843/en/>

OPC Specifications

“Classic” OPC

OPC DA

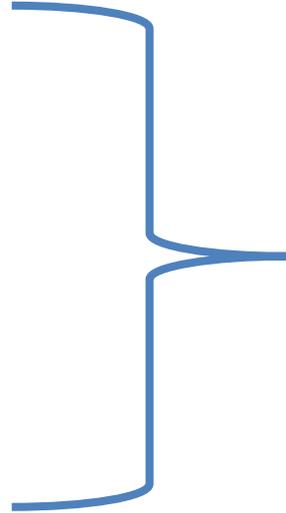
OPC HDA

OPC A&E

“Next Generation” OPC

OPC UA

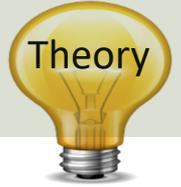
... (Many others)



OPC UA

- UA – Unified Architecture
- The Next Generation OPC
- Cross Platform. “Classic” OPC works only for Windows
- Based on Modern Software/Network Architecture (No DCOM problems!)
- It makes it easier to transmit and receive data in a modern data network/Internet

Next Generation OPC



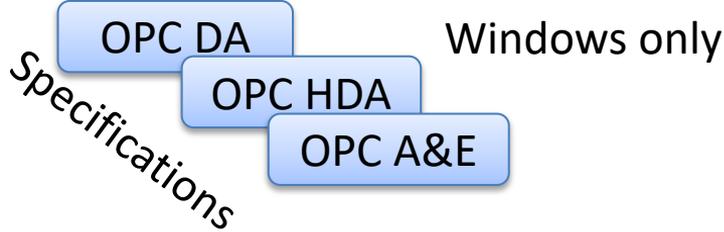
COM/DCOM

OPC Classic

Next Generation OPC

XML, HTTP, SOAP

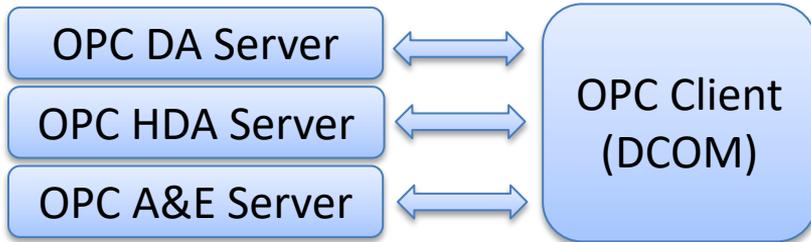
OPC UA



Cross-platform
Windows, Linux, Mac,
Embedded, VxWorks

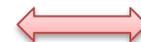
All specifications
collected in one (DA,
HDA, A&E)

Protocols: "UA Binary" or "UA XML"



Simpler!!

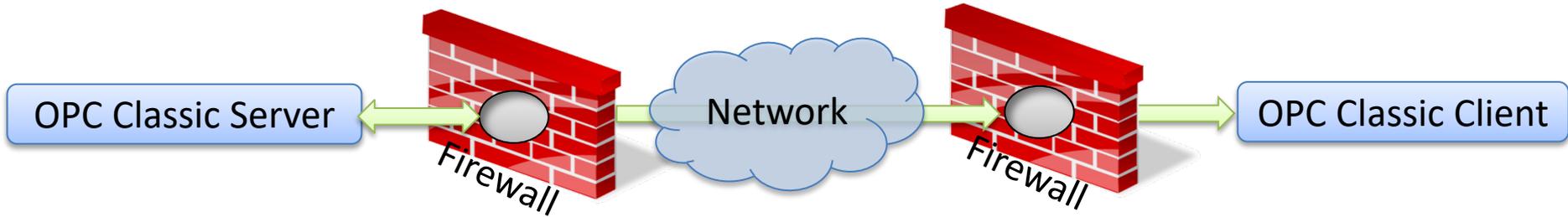
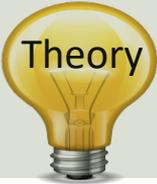
OPC UA Server



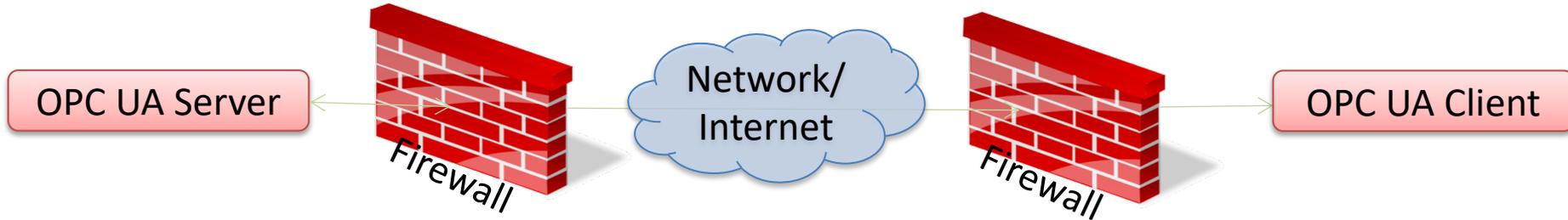
OPC UA Client

Next Generation OPC

Theory



To open DCOM through firewalls demanded a large hole in the firewall!
Impossible to route over Internet!



No hole in firewall (UA XML) or just a simple needle stick (UA Binary) is necessary
Easy to route over Internet!

<https://www.halvorsen.blog>



OPC UA Server Simulator

Free OPC UA Simulation Server from Integration Objects

Hans-Petter Halvorsen

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OPC UA Server Simulator

- This free OPC UA Server tool supports data access and historical access information models of OPC UA.
- Consequently, it provides simulated real-time and historical data.
- Moreover, users can configure their own tags and the data simulation via CSV files.
- OPC UA clients can monitor real-time data and explore history data from this simulator.
- <https://opcfoundation.org/products/view/opc-ua-server-simulator>

OPC UA Server Simulator



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Products » OPC UA Server Simulator

OPC UA Server Simulator



Member: Integration Objects

Product website: integrationobjects.com/sioth-opc/sioth-opc-unified...

Integration Objects' **OPC UA Server Simulator** is a free to use and distribute OPC Unified Architecture server utility. Indeed, you can use this OPC UA simulator to play the role of OPC UA servers and test your OPC UA Client applications.

This free OPC UA Server tool supports data access and historical access information models of OPC UA. Consequently, it provides simulated real-time and historical data. Moreover, users can configure their own tags and the data simulation via CSV files. OPC UA clients can monitor real-time data and explore history data from this simulator.

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OPC UA Server Simulator

[Download](#)
[User Guide](#)

Watch Demo Videos

Simulate real-time and historical data using OPC UA Server Simulator!

Integration Objects' **OPC UA Server Simulator** is a free to use and distribute OPC Unified Architecture server utility. Indeed, you can use this OPC UA simulator to play the role of OPC UA servers and test your OPC UA Client applications.

This free OPC UA Server tool supports data access and historical access information models of OPC UA. Consequently, it provides simulated real-time and historical data. Moreover, users can configure their own tags and the data simulation via CSV files. OPC UA clients can monitor real-time data and explore history data from this simulator.


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OPC UA Server Simulator

The screenshot shows the OPC UA Server Simulator application window. The title bar reads "OPC UA Server Simulator". The menu bar includes "File", "Settings", and "Help". A text field for "Server Endpoints URLs" contains the value "opc.tcp://xps15hph:62640/IntegrationObjects/ServerSimulator".

The "Sessions" tab is active, displaying a table with the following columns: SessionId, Name, User, and Last Contact. The table is currently empty.

The "Subscriptions" tab is also visible, displaying a table with the following columns: SubscriptionId, Publishing Interval, Item Count, and Seq No. This table is also empty.

The status bar at the bottom of the window displays the following information: **Status:** Running, **Current Time:** 11:01:11, **Sessions:** 0, **Subscriptions:** 0, **Items:** 0.

OPC UA Server Simulator

The OPC UA Server Simulator uses 2 CSV simulation files:

- “**AddressSpace.csv**” used to build the address space of the OPC UA Server.
- “**ValueSpace.csv**” used to simulate the data values of the OPC UA items.
- Those two files are located at the following path:
X:\Program Files (x86)\Integration Objects\Integration Objects' OPC UA Server Simulator\OPC UA Server Simulator\DATA

AutoSave Off AddressSpace.csv

File Home Insert Draw Page Layout Formulas Data Review View Add-Ins Help Load Save As Recent Telemetry

A1 Tag Name

	A	B	C	D	E	F	G	H	I
1	Tag Name	Data Type	AccessRights	Simulated					
2	Tag1	IO_Int16	RW	FALSE					
3	Tag2	IO_Int32	RW	FALSE					
4	Tag3	IO_Int64	RW	FALSE					
5	Tag4	IO_UInt16	RW	FALSE					
6	Tag5	IO_UInt32	RW	FALSE					
7	Tag6	IO_UInt64	RW	FALSE					
8	Tag7	IO_Double	RW	FALSE					
9	Tag8	IO_String	RW	FALSE					
10	Tag9	IO_Byte	RW	FALSE					
11	Tag10	IO_Boolean	RW	FALSE					
12	Tag11	IO_Int16	R	TRUE					
13	Tag12	IO_Int32	R	TRUE					
14	Tag13	IO_Int64	R	TRUE					
15	Tag14	IO_UInt16	R	TRUE					
16	Tag15	IO_UInt32	R	TRUE					
17	Tag16	IO_UInt64	R	TRUE					
18	Tag17	IO_Double	R	TRUE					
19	Tag18	IO_String	R	TRUE					
20	Tag19	IO_Byte	R	TRUE					
21	Tag20	IO_Boolean	R	TRUE					
22									

AddressSpace

Ready Accessibility: Unavailable 100%

AutoSave Off ValueSpace.csv

File Home Insert Draw Page Layout Formulas Data Review View Add-Ins Help Load Save As Recent Telemetry

A1 Tag11

	A	B	C	D	E	F	G	H	I
1	Tag11		Tag12		Tag13				
2	11 good		56 good		47 good				
3	12 good		32 good		14 good				
4	13 good		28 good		85 good				
5	14 good		14 good		125 good				
6	15 good		15 good		24 good				
7	16 good		57 good		69 good				
8	17 good		65 good		36 good				
9	18 good		18 good		18 good				
10	19 good		48 good		84 good				
11	20 good		36 good		64 good				
12									
13									
14									

ValueSpace

Ready Accessibility: Unavailable 100%



OPC UA Client

Free OPC UA Client from Integration Objects

Hans-Petter Halvorsen

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OPC UA Client

- OPC UA Client is a free client tool that supports the main OPC Unified Architecture information models.
- These models are Data Access, Alarms & Conditions, and Historical Data Access
- <https://integrationobjects.com/sioth-opc/sioth-opc-unified-architecture/opc-ua-client/>

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OPC UA Client

[Download](#)
[User Guide](#)
[Quick User Guide](#)

Download free OPC UA Client and start your OPC UA tests now!

OPC UA Client is a free client tool that supports the main OPC Unified Architecture information models. These models are Data Access, Alarms & Conditions, and Historical Data Access. In fact, it offers the capability to:

- ▶ Discover local and remote OPC UA servers
- ▶ Establish secure communication channels
- ▶ Browse the address space of any OPC UA compliant server
- ▶ Monitor real-time data and alarms & conditions
- ▶ Explore and update history data

Moreover, this OPC UA explorer allows you to generate its self-signed Application Instance Certificate in order to provide application level security and secure the connections with OPC UA servers.

▶ [View Tutorial Video of OPC UA Test Client & OPC UA Wrapper](#)



Home

New Open Save Save as **Connect** Disconnect Settings UA Settings Help About Define Remove Certificate Manager

File Session Configuration Help

Sessions

Sessions

Address Space

Forward

Message Type	Timestamp	Message
[Control]	2022-02-08 13:05:06	Disconnecting from session
[Control]	2022-02-08 13:03:09	Read operation of the variab
[Control]	2022-02-08 13:01:03	A session "Session0" with the

3 Messages

Connection Settings

Session Information

Session Name

Server Information

Endpoint Url

Transport Protocol

Opc.tcp
 Https

Message Encoding

Binary
 Xml

Security Mode

None
 Sign
 Sign_Encrypt

Security Policy

None
 Basic128RSA15
 Basic256
 Basic256Sha256

User Authentication Mode

Anonymous UserName Certificate

Certificate (.pfx)

Password

Subscription	Session	Attribute	Value

ne:Binary]]

ne:Binary]] was successfully created.

Home

New
 Open
 Save
 Save as
 Connect
 Disconnect
 Settings
 UA Settings
 Help
 About
 Define
 Remove
 Certificate Manager

File Session Configuration Help Default Configuration Certificate

Sessions

- Sessions
 - Session0

Data View History View Event View

Display Name	Node Id	Value	Data Type	Server Timestamp	Source Timestamp	Status Code	Subscription	Session
[Empty Data Table]								

Attribute	Value
NodeId	ns=2;s=Historical...
NodeClass	Object
BrowseName	2:Historicaldata
DisplayName	Historical Data
Description	
WriteMask	0
UserWriteMask	0
EventNotifier	Subscribe

Address Space

Forward

- Real Time Data
 - Tag1
 - Tag2
 - Tag3
 - Tag4
 - Tag5
 - Tag6
 - Tag7
 - Tag
 - Tag
 - Tag

References and Attributes

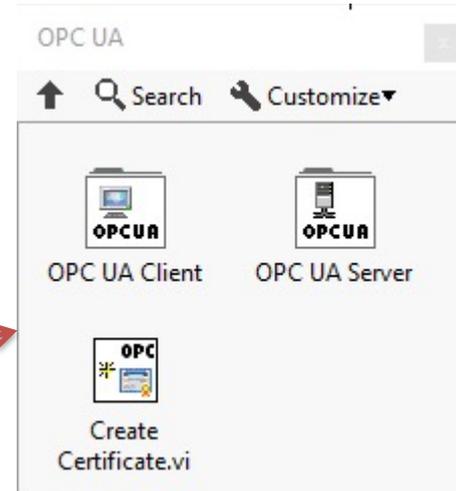
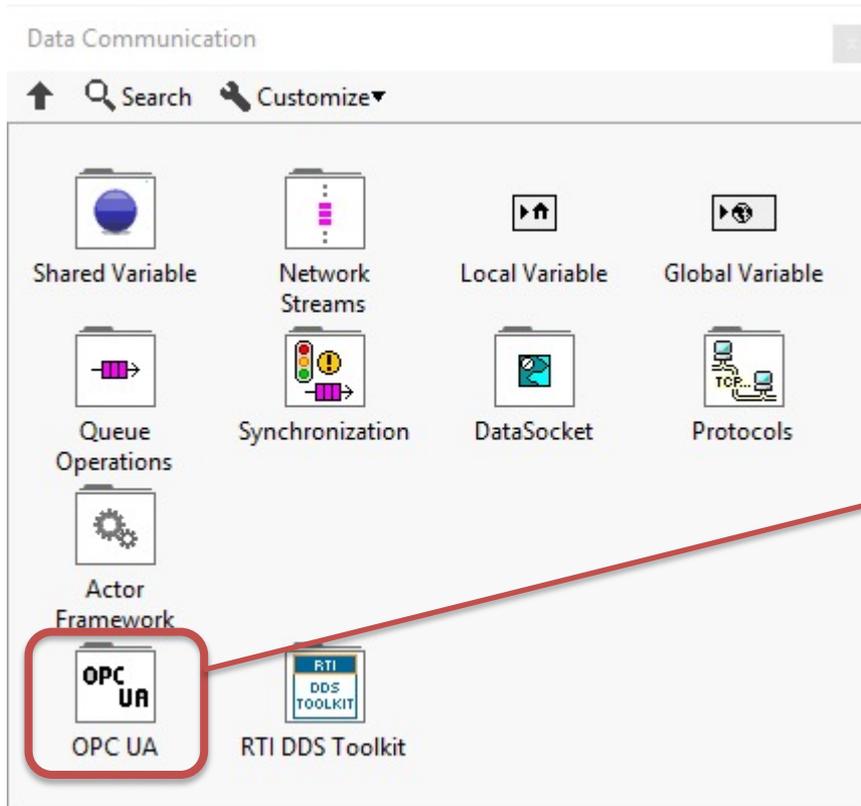
- Read
- Write
- History Update
- Monitor

Message Type	Timestamp	Message
[Control]	2022-02-08 13:03:09	Read operation of the variable [ns=2;s=Tag7] succeeded.
[Control]	2022-02-08 13:01:03	A session "Session0" with the Endpoint [opc.tcp://xps15hph:62640/IntegrationObjects/ServerSimulator - [None:None:Binary]] was successfully created.



LabVIEW OPC UA Toolkit

OPC UA Toolkit in LabVIEW



OPC UA Server Palette



Create.vi



Close.vi



Start.vi



Stop.vi

Add Trusted
Clients.viClear All Trusted
Clients.viRegister
Server.viUnregister
Server.vi

Add Folder.vi



Add Item.vi

Add Analog
Item.vi

Add Property.vi



Delete Node.vi



Read.vi



Write.vi

Alarms and
ConditionsHistorical
Access

OPC UA Client Palette

↑ Search

Customize



Connect.vi



Forward Browse.vi



Create Subscription.vi



Delete Subscriptions.vi



Disconnect.vi



Add Monitored Data Nodes.vi



Get Node Attribute.vi



Multiple Read.vi



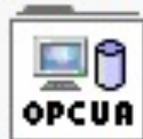
Multiple Write.vi



Delete Monitored ...



Alarms and Conditions



Historical Access



LabVIEW Examples



LabVIEW Example 1

Read Data from the OPC UA Server Simulator

Example 1 - Read

The screenshot displays the 'OPC UA Client-Read.vi Front Panel' interface. It features a menu bar (File, Edit, View, Project, Operate, Tools, Window, Help) and a toolbar with various icons. The main area is a grid with several input fields and a data display window.

Server endpoint URL:

Item Path:

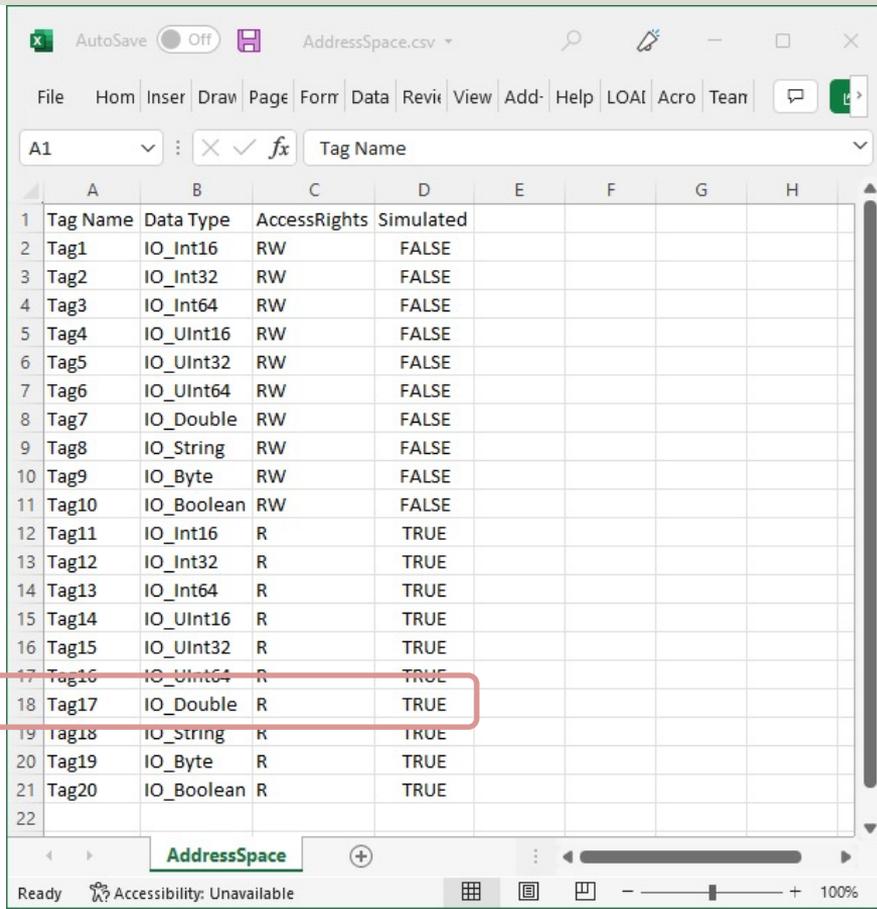
TagValue:

OPC Element:

node ID	<input type="text" value="ns=2;s=Factory.Temperature"/>
value	<input type="text" value="23"/>
timestamp	<input type="text" value="13:24:20.313
2022-02-08"/>
status	<input type="text" value="Good"/>

Stop 

Example 1 - Read



The screenshot shows an Excel spreadsheet titled "AddressSpace.csv". The spreadsheet contains a table with the following data:

Tag Name	Data Type	AccessRights	Simulated
Tag1	IO_Int16	RW	FALSE
Tag2	IO_Int32	RW	FALSE
Tag3	IO_Int64	RW	FALSE
Tag4	IO_UInt16	RW	FALSE
Tag5	IO_UInt32	RW	FALSE
Tag6	IO_UInt64	RW	FALSE
Tag7	IO_Double	RW	FALSE
Tag8	IO_String	RW	FALSE
Tag9	IO_Byte	RW	FALSE
Tag10	IO_Boolean	RW	FALSE
Tag11	IO_Int16	R	TRUE
Tag12	IO_Int32	R	TRUE
Tag13	IO_Int64	R	TRUE
Tag14	IO_UInt16	R	TRUE
Tag15	IO_UInt32	R	TRUE
Tag16	IO_UInt64	R	TRUE
Tag17	IO_Double	R	TRUE
Tag18	IO_String	R	TRUE
Tag19	IO_Byte	R	TRUE
Tag20	IO_Boolean	R	TRUE

The table is displayed in a grid with columns A through H and rows 1 through 22. The formula bar shows "Tag Name" and the active cell is A1. The status bar at the bottom indicates "Ready" and "Accessibility: Unavailable".

Example 1 - Read

OPC UA Server Simulator

File Settings Help

Server Endpoints URLs `opc.tcp://xps15hph:62640/IntegrationObjects/ServerSimulator`

Sessions

SessionId	Name	User	Last Contact
urn:XPS15HPH:Nati..	Anonymous	ns=3;i=1837697707	12:22:22

Subscriptions

SubscriptionId	Publishing Interval	Item Count	Seq No
----------------	---------------------	------------	--------

Status: Running Current Time: 12:22:23 Sessions: 1 Subscriptions: 0 Items: 0

OPC UA Client for OPC UA Server Simulator-Read.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
`opc.tcp://xps15hph:62640/IntegrationObjects/ServerSimulator`

Item Path
`ns=2;s=Tag17`

TagValue
`-4.17524E+12`

OPC Element

node ID
`ns=2;s=Tag17`

value
`-4.17524E+12`

timestamp
`12:22:38.032`
`2022-02-08`

status
`Good`

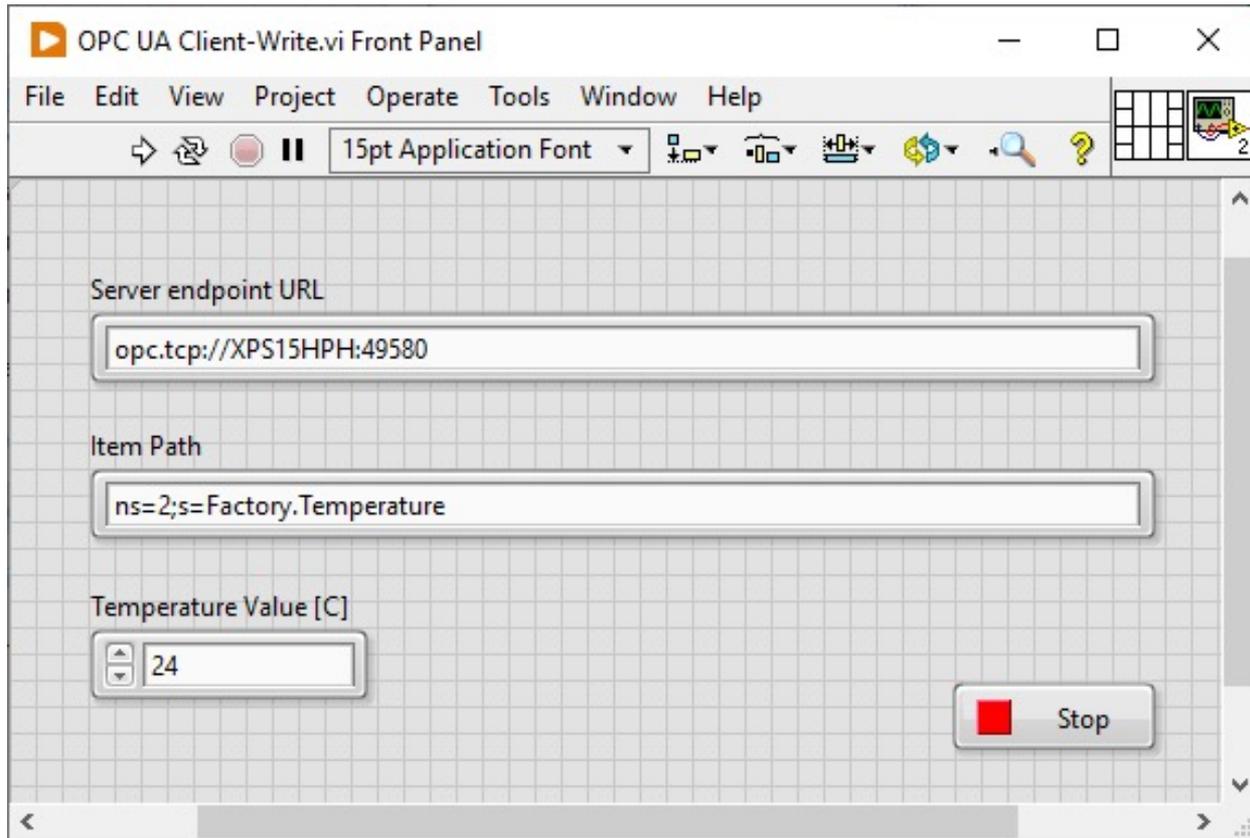
Stop



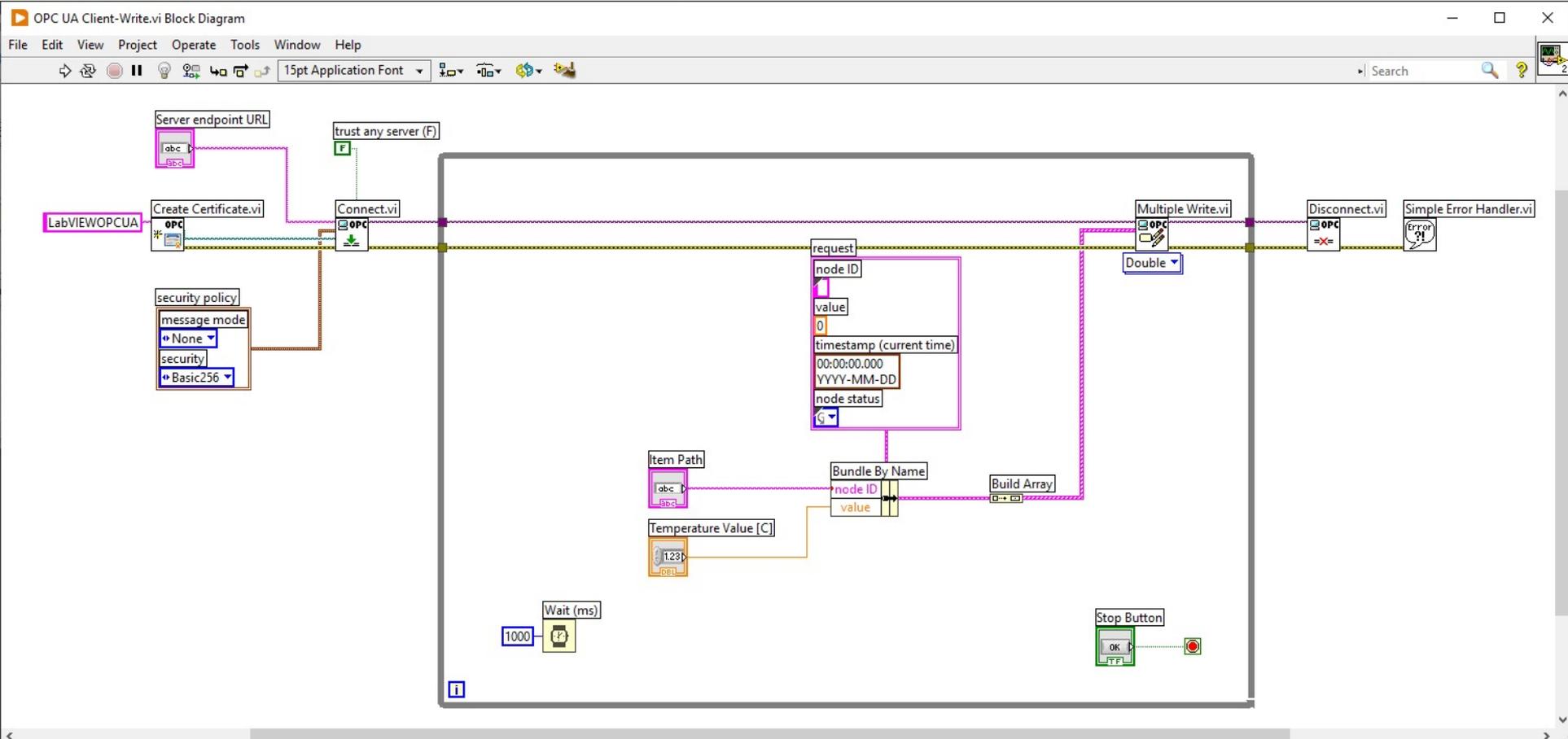
LabVIEW Example 2

Write Data to the OPC UA Server Simulator

Example 2 – Write



Example 2 – Write



OPC UA Client for OPC UA Server Simulator-Write.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL

Item Path

Temperature Value [C]

Stop

OPC UA Server Simulator

File Settings Help

Server Endpoints URLs

Sessions

SessionId	Name	User	Last Contact
urn:XPS15HPPH:Nati.. Anonymous		ns=3;i=1837697819	12:24:52
urn:XPS15HPPH:Nati.. Anonymous		ns=3;i=1837697763	12:24:52

Subscriptions

SubscriptionId	Publishing Interval	Item Count	Seq No
----------------	---------------------	------------	--------

Status: Running Current Time: 12:24:52 Sessions: 2 Subscriptions: 0 Items: 0

OPC UA Client for OPC UA Server Simulator-Read.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL

Item Path

TagValue

OPC Element

node ID

value

timestamp

status

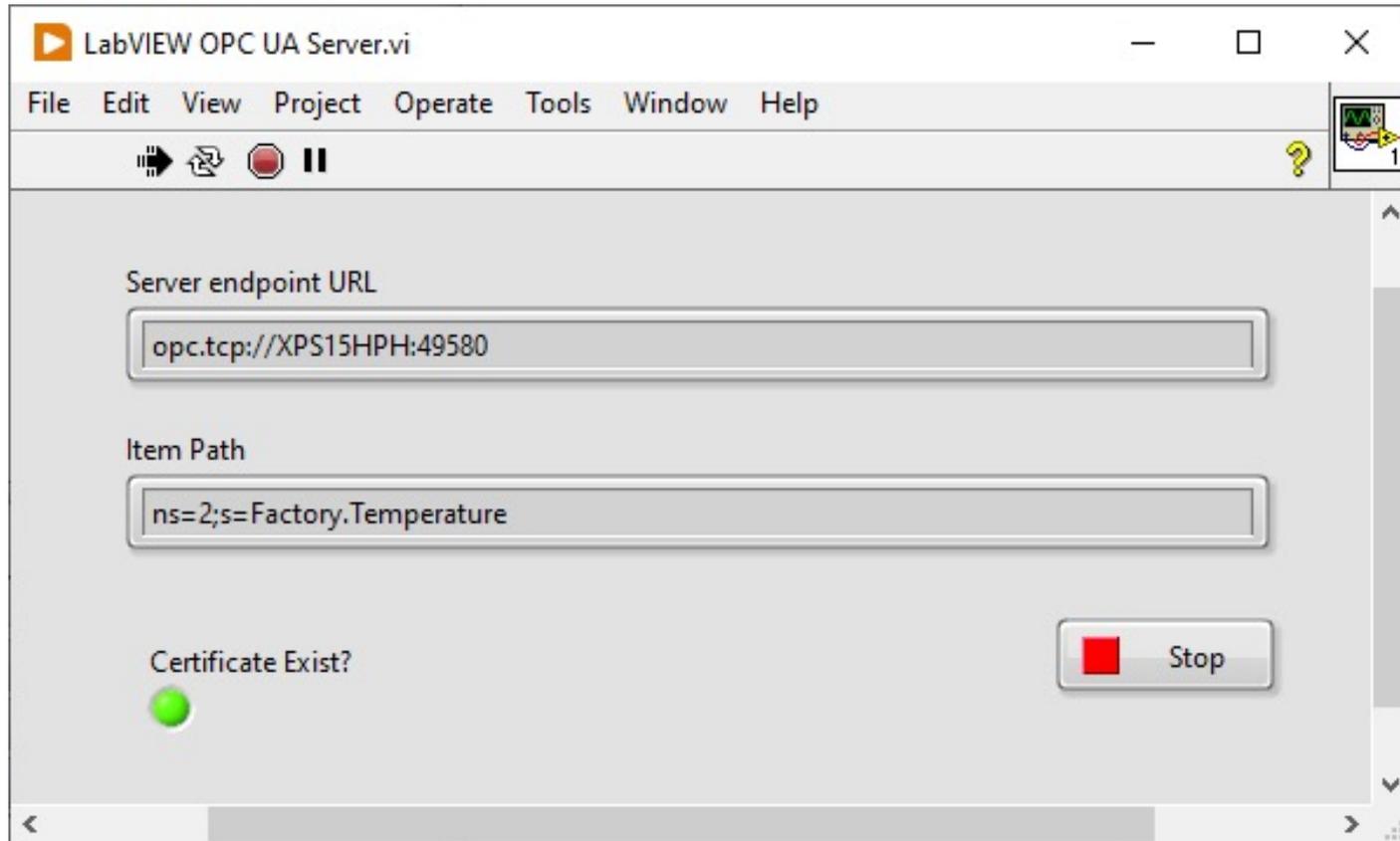
Stop



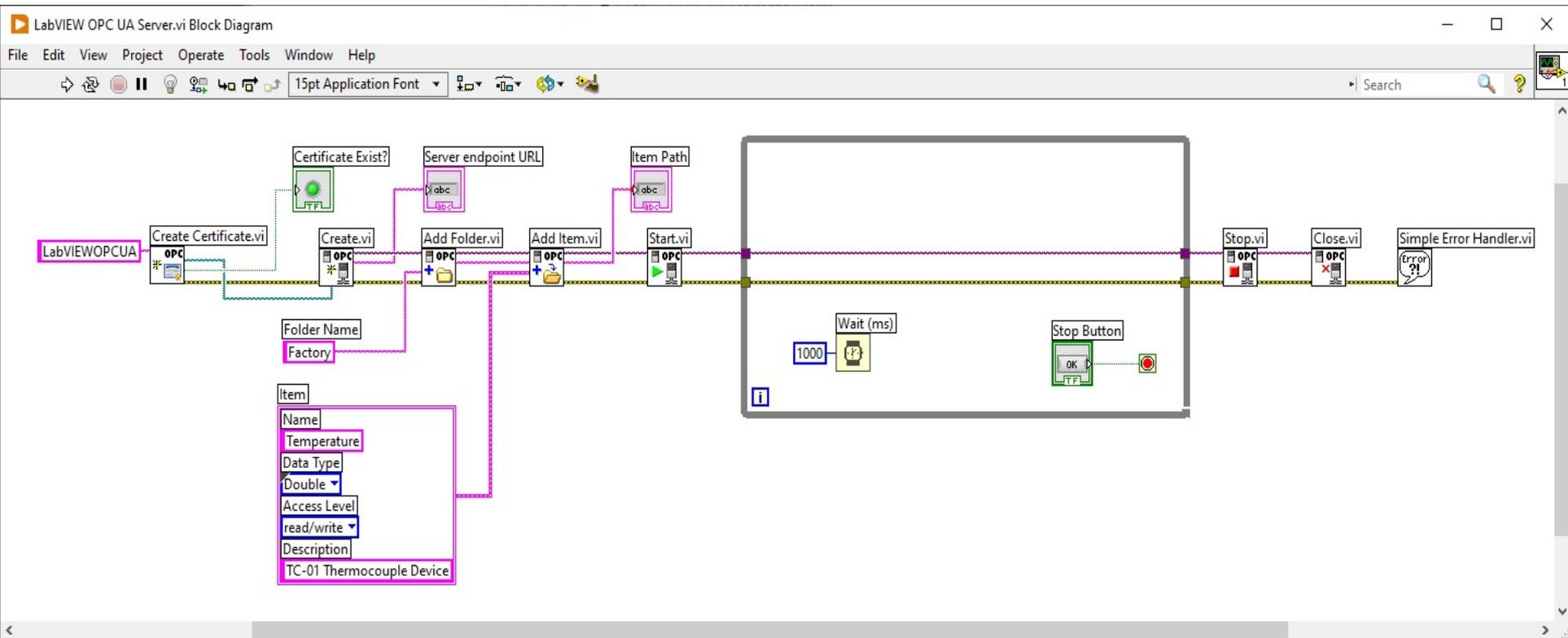
LabVIEW Example 3

Create and use a LabVIEW OPC UA Server

Ex3 – LabVIEW OPC UA Server



Ex3 – LabVIEW OPC UA Server



OPC UA Client-Write.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

Temperature Value [C]
22

OPC UA Client-Read.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

TagValue
22

LabVIEW OPC UA Server.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

Certificate Exist?


Stop

OPC Element

node ID
ns=2;s=Factory.Temperature

value
22

timestamp
13:15:27.816
2022-02-08

status
Good

Stop





LabVIEW Example 4

Use the free OPC UA Client from Integration Objects to
Read/Write Data from the LabVIEW OPC UA Server

Ex4 – LabVIEW OPC UA Server

The image shows the LabVIEW OPC UA Server interface with the 'Integration Objects' OPC UA Client window open. The client window displays the 'Connection Settings' dialog box, which is used to configure the connection to the server.

LabVIEW OPC UA Server.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

Certificate Exist?

Integration Objects' OPC UA Client

Home

New Open Save Save as Connect Disconnect Settings UA Settings Help About Define Remove Certificate Manager

File Session Configuration Help

Connection Settings

Session Information
Session Name: Session0

Server Information
Endpoint Url: opc.tcp://XPS15HPH:49580 Discover

Transport Protocol
 Opc.tcp
 Https

Message Encoding
 Binary
 Xml

Security Mode
 None
 Sign
 Sign_encrypt

Security Policy
 None
 Basic128RSA15
 Basic256
 Basic256Sha256

User Authentication Mode
 Anonymous
 UserName
 Certificate

Certificate (.pfx):
Password:

Apply Cancel

Source Timestamp Status Code Subscription Session Attribute Value

Source	Timestamp	Status Code	Subscription	Session	Attribute	Value

erSimulator - [None:None:Binary]]

erSimulator - [None:None:Binary]] was successfully created.

3 Messages

Message Type	Timestamp	Message
[Control]	2022-02-08 13:05:06	Disc
[Control]	2022-02-08 13:03:09	Read
[Control]	2022-02-08 13:01:03	A se

Ex4 – LabVIEW OPC UA Server

The screenshot displays the LabVIEW OPC UA Server interface. On the left, the 'Server endpoint URL' is set to `opc.tcp://XPS15HPH:49580` and the 'Item Path' is `ns=2;s=Factory.Temperature`. A green indicator shows 'Certificate Exist?'. The main window, titled 'Integration Objects' OPC UA Client, shows a tree view of the address space with 'Session0 | Root' expanded to show 'Views', 'Objects', 'Server', 'Factory', and 'Temperature'. A 'Read Variable Value' dialog box is open, displaying the following details:

Server Timestamp	2022-02-08 12:23:08
Source Timestamp	2022-02-08 12:15:27
Status Code	Good
Value	22
Value Type	Double

The bottom status bar shows a message log with the following entries:

Message Type	Timestamp	Message
[Control]	2022-02-08 13:23:08	Read operation of the variable [ns=2;s=Factory.Temperature] succeeded.
[Control]	2022-02-08 13:22:38	A session "Session0" with the Endpoint [opc.tcp://xps15hph:49580/ - [None:None:Binary]] was successfully created.
[Control]	2022-02-08 13:11:27	Disconnecting from session "Session0" [opc.tcp://xps15hph:49580/ - [None:None:Binary]]

LabVIEW OPC UA Server.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

OPC UA Client-Read.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

TagValue
23

OPC Element

node ID
ns=2;s=Factory.Temperature

value
23

timestamp
13:24:20.313
2022-02-08

status
Good

Stop

Integration Objects' OPC UA Client

Home

New Open Save Save as Connect Disconnect Settings UA Settings Help About Define Remove Certificate Manager

Sessions

Session0

Address Space

Forward

Session0 | Root

- Views
- Objects
- Server
- Factory
- Temperature
- Types

Data View

Display Name	Node Id	Value	Status Code	Subscription
		23.000000000000000		

Edit Numeric Value

OK Cancel

Message Type Timestamp Message

[Control] 2022-02-08 13:24:20 Write operation of the variable [ns=2;s=Factory.Temperature] succeeded.

[Control] 2022-02-08 13:23:58 Write operation of the variable [ns=2;s=Factory.Temperature] succeeded.

<https://www.halvorsen.blog>



MATLAB OPC Toolbox

Hans-Petter Halvorsen

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MATLAB OPC Toolbox

- MATLAB OPC Toolbox lets you connect to OPC Servers using the MATLAB Environment and Programming Language
- MATLAB OPC Toolbox supports OPC DA, OPC HDA and OPC UA
- <https://mathworks.com/products/opc.html>

MATLAB OPC UA

- <https://se.mathworks.com/help/opc/ug/access-data-from-opc-ua-servers.html>

MATLAB OPC UA - Functions

1. Locate Your OPC UA Server

```
serverList = opcuaserverinfo('localhost')
```

2. Create an OPC UA Client

```
uaClient = opcua('localhost', port)
```

3. Connect to the Server

```
connect(uaClient)
```

4. Browse OPC UA Server Namespace

```
serverNodes = browseNamespace(uaClient)
```

5. Read Current Values from the OPC UA Server

```
[val,ts,qual] = readValue(uaClient,serverNodes)
```

6. Disconnect

```
disconnect(uaClient)
```



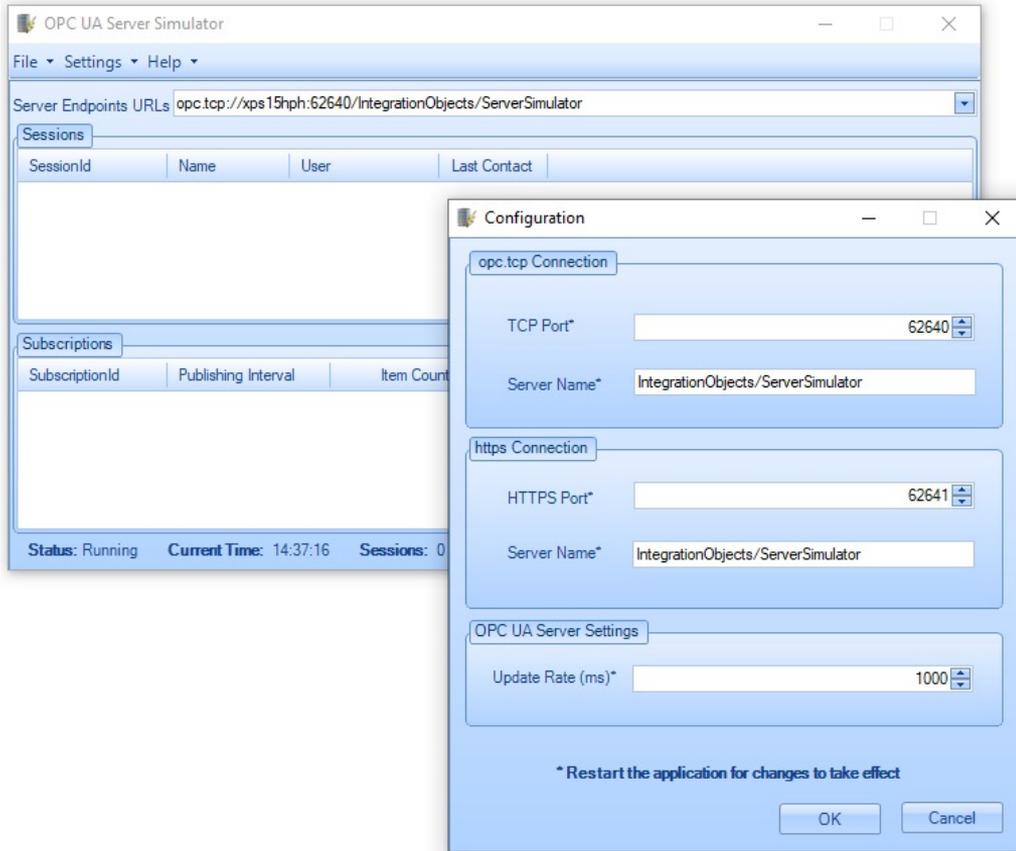
MATLAB Examples



MATLAB Example 1

OPC UA Server Simulator – Read Data

OPC UA Server Simulator



OPC UA Server Simulator

```
clear, clc
```

Read Data

```
uaClient = opcua('localhost', 62640)
```

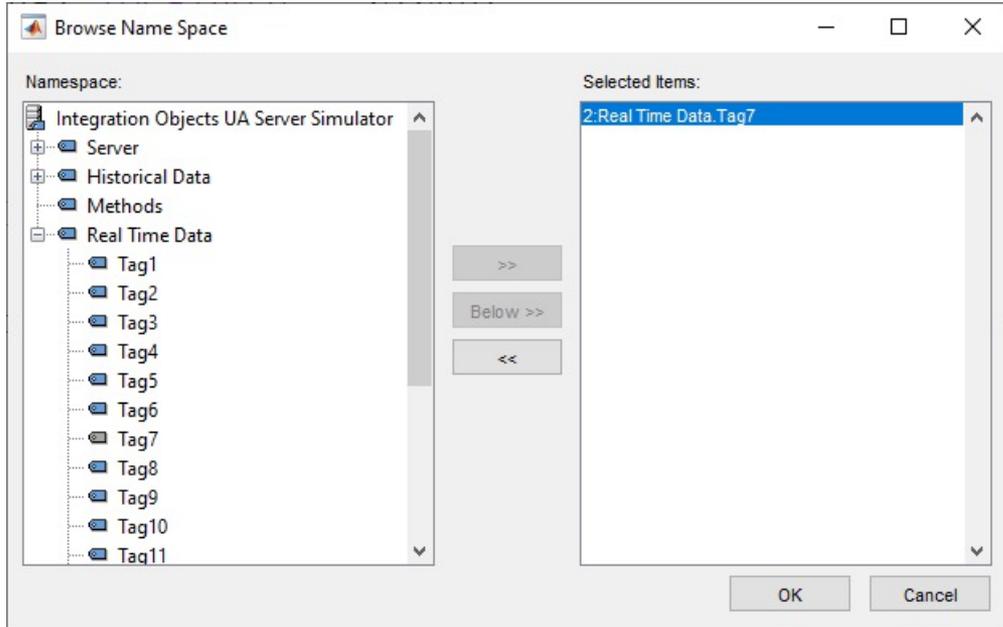
```
connect(uaClient)
```

```
serverNodes = browseNamespace(uaClient)
```

```
[val, ts, qual] = readValue(uaClient, serverNodes)
```

```
disconnect(uaClient);
```

OPC UA Server Simulator



Command Window

value =

1.3201e-37

timestamp =

datetime

08-Feb-2022 14:40:12

quality =

OPC UA Quality ID:

Good

fx >>

Alternative Code

Read Data

```
clear, clc
```

```
uaClient = opcua('localhost', 62640)
```

```
connect(uaClient)
```

```
topNodes = uaClient.Namespace
```

```
serverChildren = topNodes(4).Children
```

```
findNode = findNodeByName(topNodes, 'Tag7', '-once')
```

```
opcNode = opcuanode(2, 'Tag7', uaClient)
```

```
[value, timestamp, quality] = readValue(uaClient, opcNode)
```

```
disconnect(uaClient);
```

Here you don't need to select the Tag from the "Browse Name Space" window every time



MATLAB Example 2

OPC UA Server Simulator – Write Data

Hans-Petter Halvorsen

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MATLAB OPC UA - Functions

1. Locate Your OPC UA Server

```
serverList = opcuaserverinfo('localhost')
```

2. Create an OPC UA Client

```
uaClient = opcua('localhost', port)
```

3. Connect to the Server

```
connect(uaClient)
```

4. Browse OPC UA Server Namespace

```
serverNodes = browseNamespace(uaClient)
```

5. Write Current Values to the OPC UA Server

```
newValue = 22.5
```

```
writeValue(uaClient, serverNodes, newValue);
```

6. Disconnect

```
disconnect(uaClient)
```

OPC UA Server Simulator

```
clear, clc
```

```
uaClient = opcua('localhost', 62640)
```

```
connect(uaClient)
```

```
serverNodes = browseNamespace(uaClient)
```

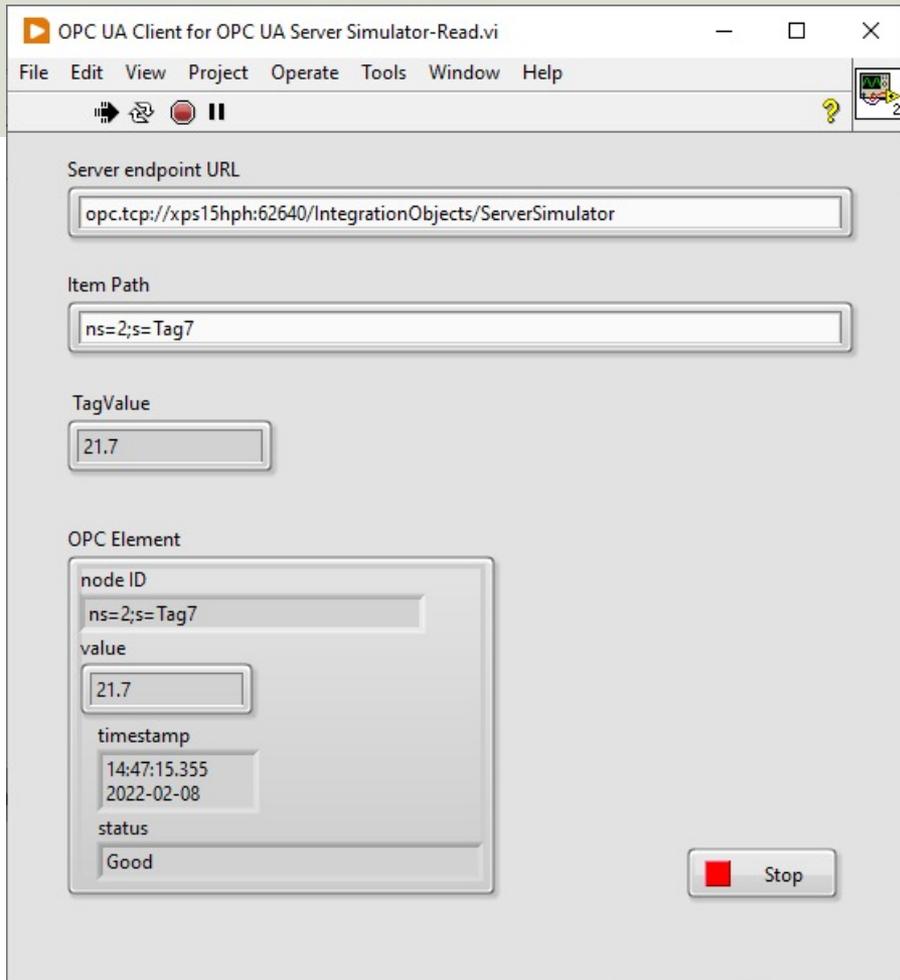
```
newValue = 21.7;
```

```
writeValue(uaClient, serverNodes, newValue);
```

```
[value, timestamp, quality] = readValue(uaClient, serverNodes)
```

```
disconnect(uaClient);
```

Write Data



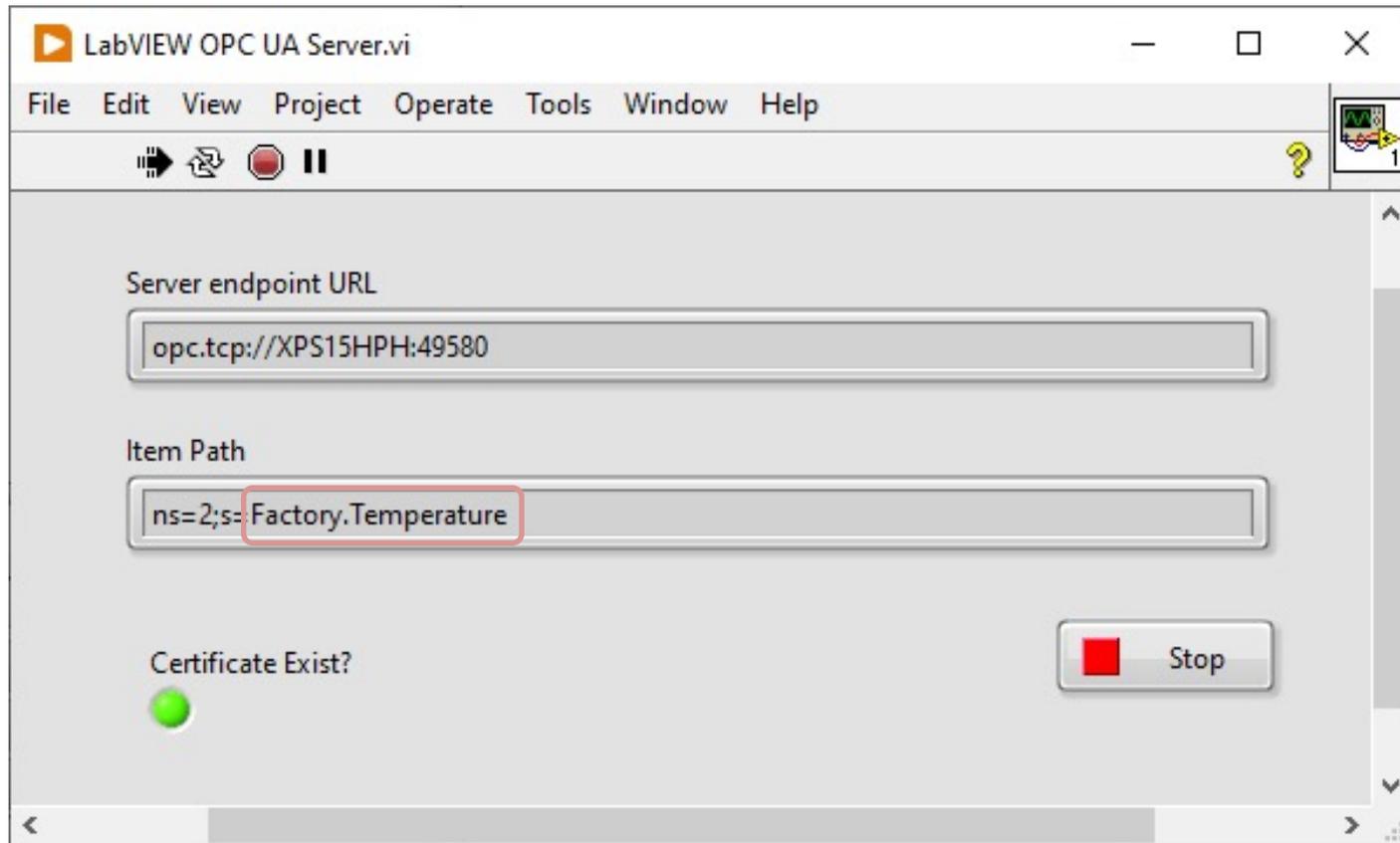
We can use, e.g., LabVIEW to verify that that data has been written to the Server



MATLAB Example 3

Write/Read Data from LabVIEW OPC UA Server

LabVIEW OPC UA Server



Read Data from LabVIEW OPC UA Server

```
clear, clc

uaClient = opcua('localhost', 49580)

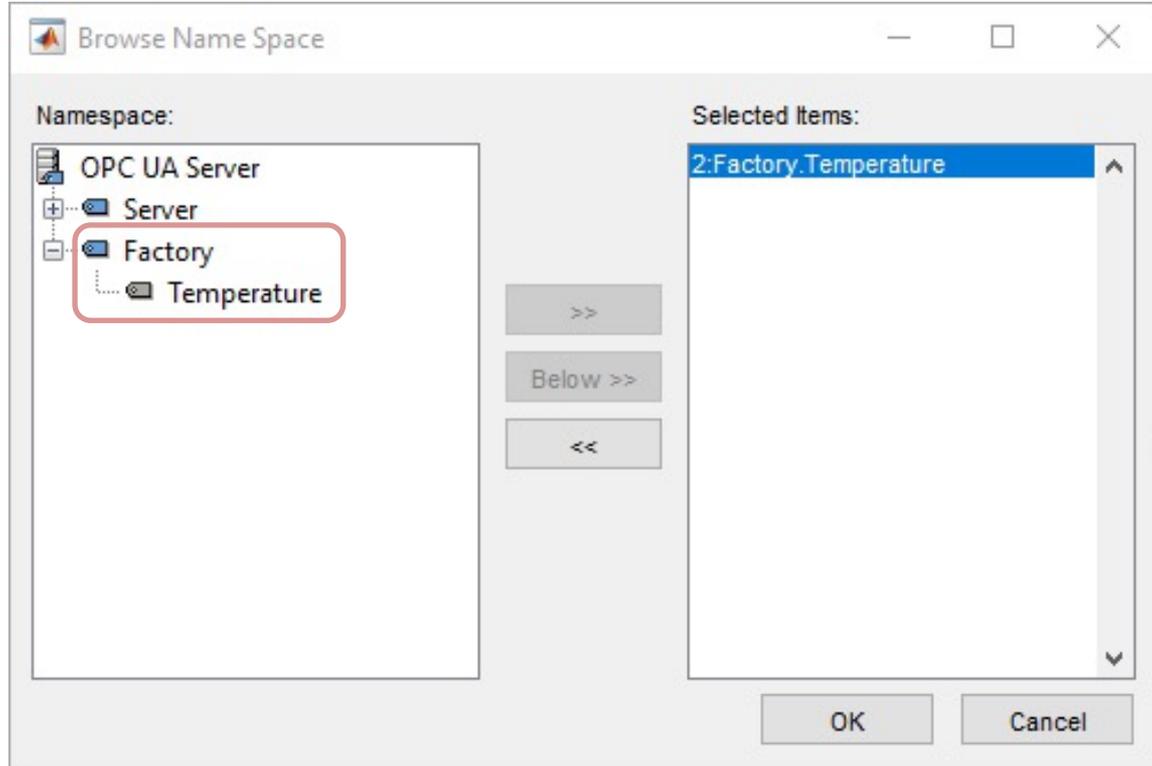
connect(uaClient)

serverNodes = browseNamespace(uaClient)

[value,timestamp,quality] = readValue(uaClient,serverNodes)

disconnect(uaClient);
```

LabVIEW OPC UA Server



```
Command Window

value =

    23

timestamp =

    datetime

    08-Feb-2022 15:00:58

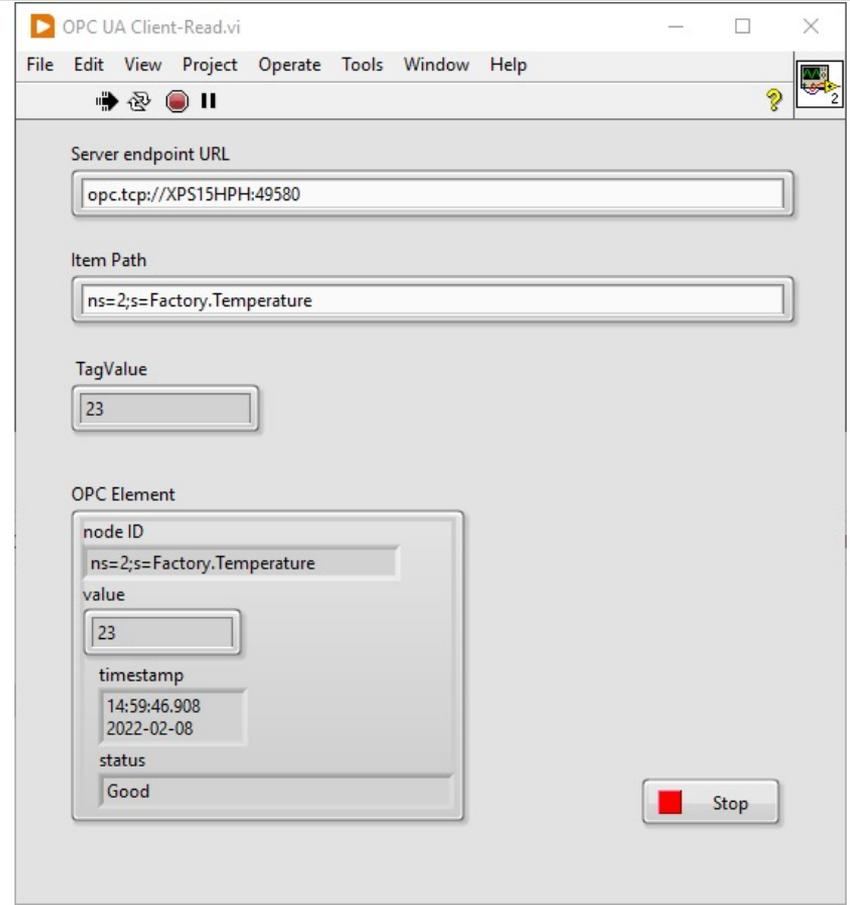
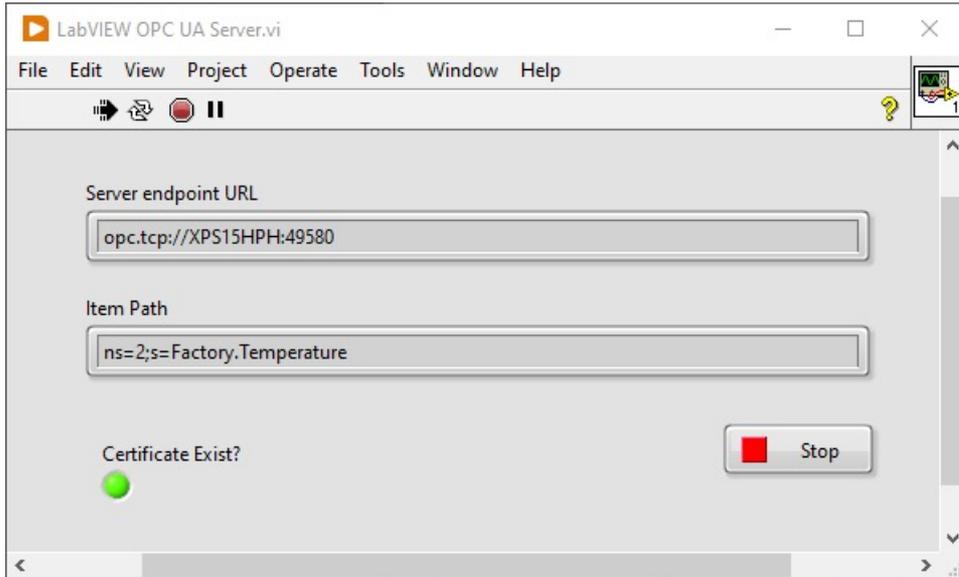
quality =

OPC UA Quality ID:

    Good

fx >>
```

LabVIEW OPC UA Server



Write Data to LabVIEW OPC UA Server

```
clear, clc

uaClient = opcua('localhost', 49580)

connect(uaClient)

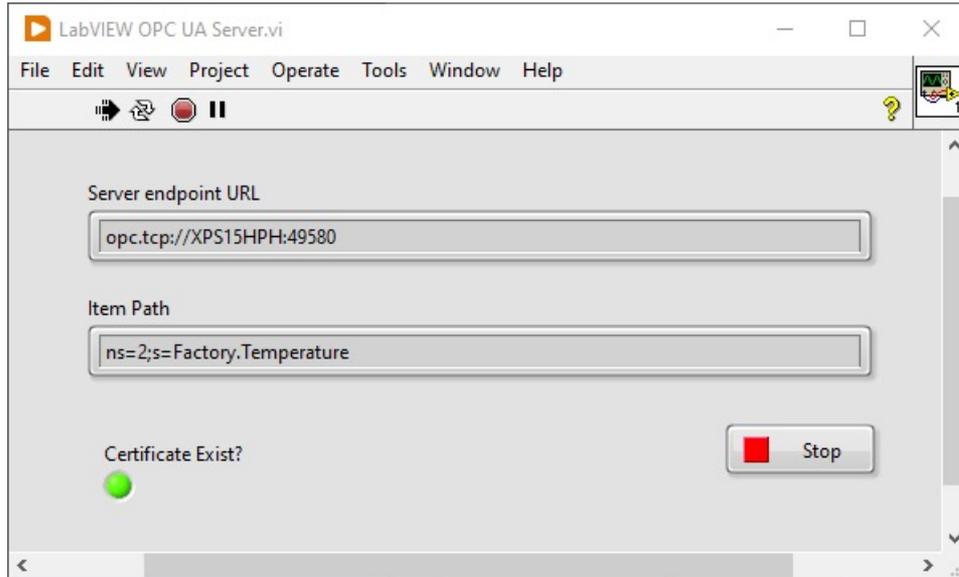
serverNodes = browseNamespace(uaClient)

newValue = 21.7;
writeValue(uaClient, serverNodes, newValue);

[value, timestamp, quality] = readValue(uaClient, serverNodes)

disconnect(uaClient);
```

LabVIEW OPC UA Server



LabVIEW OPC UA Server.vi

File Edit View Project Operate Tools Window Help

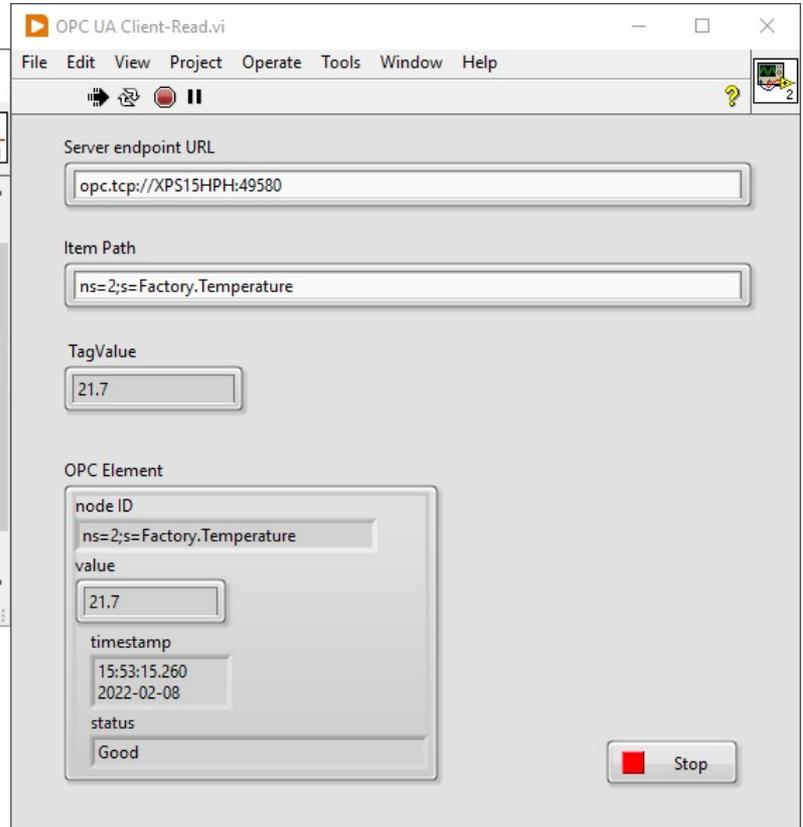
Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

Certificate Exist?

Stop

The screenshot shows the LabVIEW OPC UA Server interface. It features a menu bar with 'File', 'Edit', 'View', 'Project', 'Operate', 'Tools', 'Window', and 'Help'. Below the menu bar are control icons for running, pausing, and stopping the server. The main area contains three input fields: 'Server endpoint URL' with the value 'opc.tcp://XPS15HPH:49580', 'Item Path' with 'ns=2;s=Factory.Temperature', and a 'Certificate Exist?' checkbox which is checked. A red 'Stop' button is located at the bottom right.



OPC UA Client-Read.vi

File Edit View Project Operate Tools Window Help

Server endpoint URL
opc.tcp://XPS15HPH:49580

Item Path
ns=2;s=Factory.Temperature

TagValue
21.7

OPC Element

node ID
ns=2;s=Factory.Temperature

value
21.7

timestamp
15:53:15.260
2022-02-08

status
Good

Stop

The screenshot shows the OPC UA Client-Read interface. It has a similar menu bar and control icons. The 'Server endpoint URL' and 'Item Path' fields are identical to the server interface. The 'TagValue' field displays '21.7'. Below this is an 'OPC Element' section with a scrollable list containing 'node ID' (ns=2;s=Factory.Temperature), 'value' (21.7), 'timestamp' (15:53:15.260, 2022-02-08), and 'status' (Good). A red 'Stop' button is at the bottom right.

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