



# LabVIEW OPC DA

How Do we Communicate with an OPC Server using LabVIEW?

With Hands-on Examples

Hans-Petter Halvorsen, M.Sc.

# Software

You need the following Software:

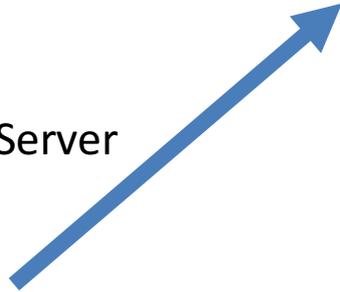
- **LabVIEW** (LabVIEW Professional Development System 32-Bit: English)
- **MatrikonOPC Simulation Server** (Free Download) – or you can use another OPC DA Server

All LabVIEW Software can be downloaded from: [www.ni.com/download](http://www.ni.com/download)

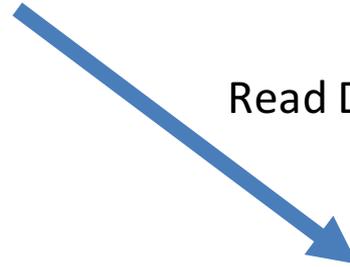


# MatrikonOPC

Write Data to OPC Server



Read Data from OPC Server



LabVIEW Application #1

In this Example LabVIEW Application #1 and LabVIEW Application #2 are on the same computer. Normally they are located on 2 different computers in a Network.



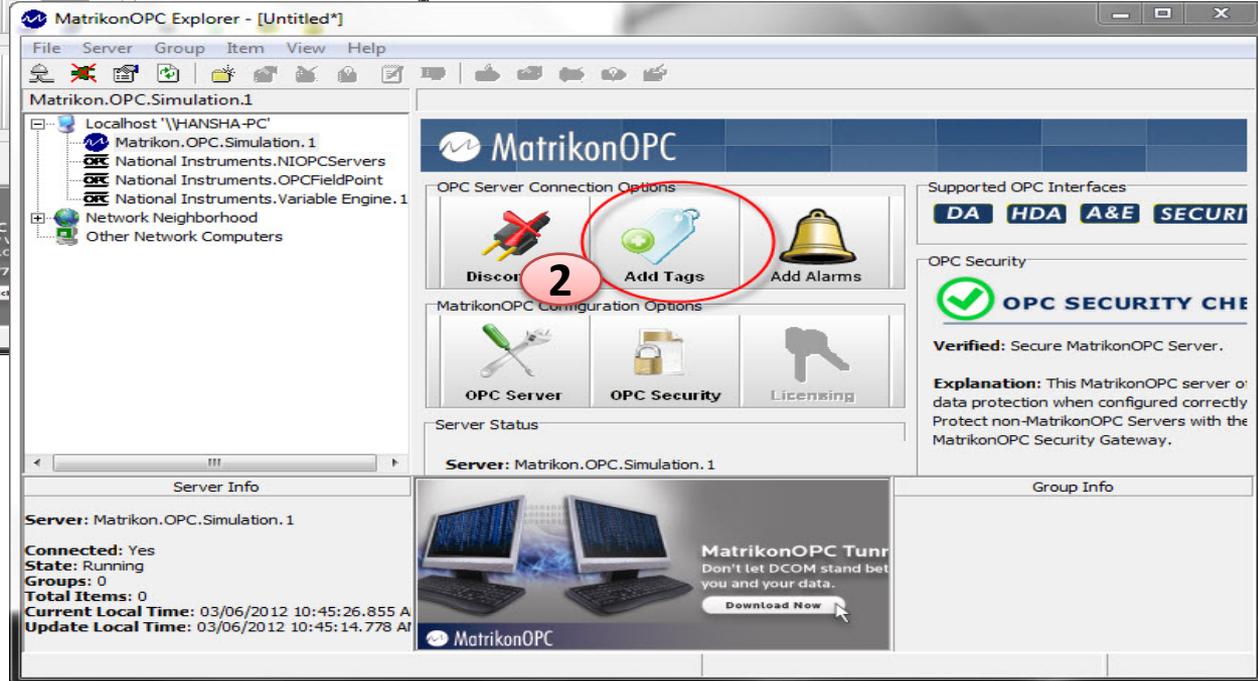
LabVIEW Application #2



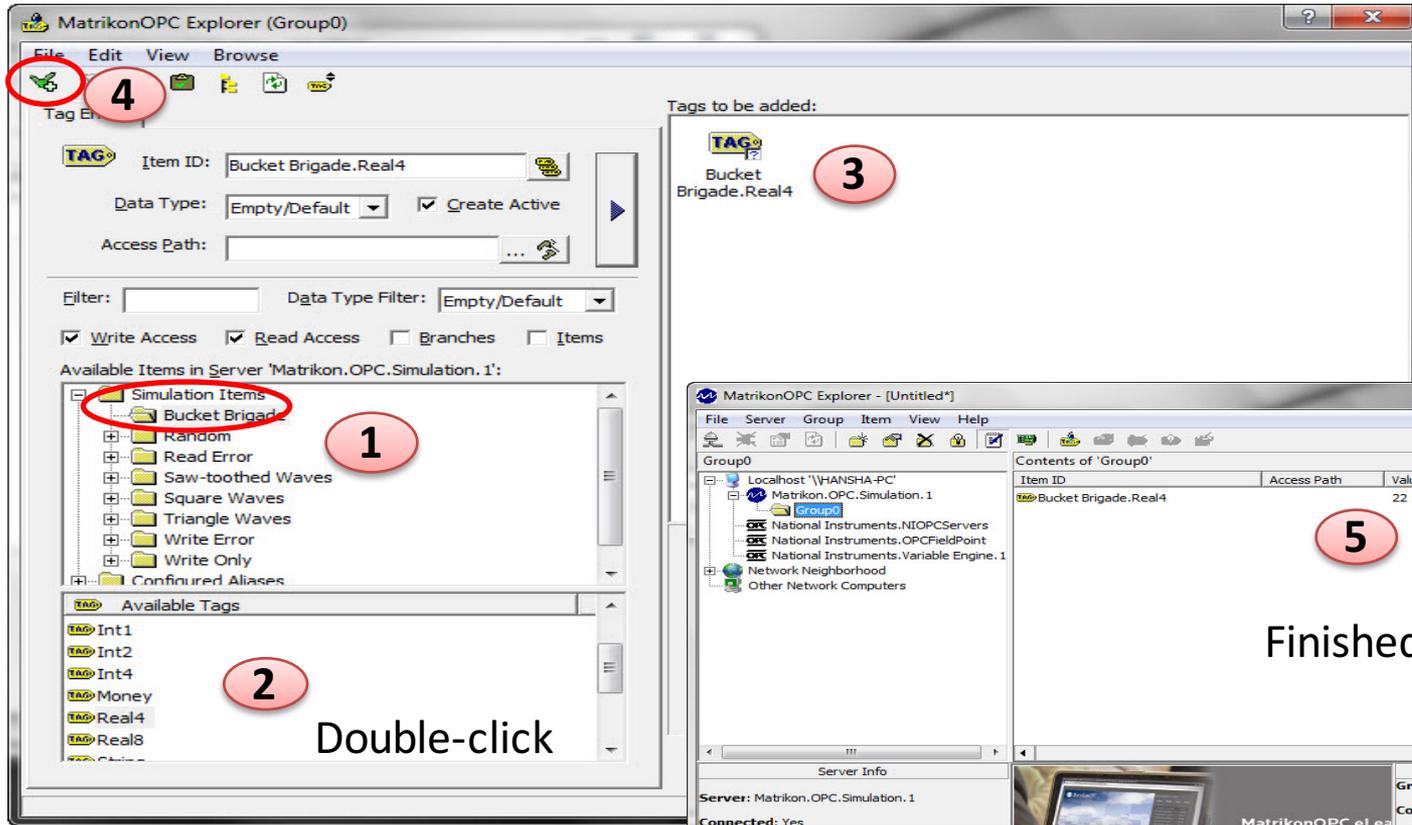
# Matrikon OPC Simulation server

Hans-Petter Halvorsen, M.Sc.

# Matrikon OPC Explorer – Connect to Server



# Matrikon OPC Explorer - Add Tags



The screenshot shows the Matrikon OPC Explorer interface with several steps highlighted by red circles and numbers:

- 1**: A red circle highlights the "Simulation Items" folder in the tree view.
- 2**: A red circle highlights the "Available Tags" list, with the text "Double-click" written below it.
- 3**: A red circle highlights the "Bucket Brigade.Real4" tag in the "Tags to be added:" list.
- 4**: A red circle highlights the "Add" button (a green plus sign) in the top toolbar.
- 5**: A red circle highlights the "Bucket Brigade.Real4" tag in the "Contents of 'Group0'" table.

The "Contents of 'Group0'" table is shown below:

Item ID	Access Path	Value	Quality
Bucket Brigade.Real4		22	Good, non-specific

The "Finished" text is displayed in the center of the bottom window.

Use the **BucketBrigade** Items – because they can be used for both reading and writing

# MatrikonOPC Explorer (OPC Client)

The screenshot displays the MatrikonOPC Explorer application window. The title bar reads "MatrikonOPC Explorer - [Untitled\*]". The menu bar includes "File", "Server", "Group", "Item", "View", and "Help". The toolbar contains various icons for file operations and server management.

The left pane shows a tree view of the OPC hierarchy. Under "Localhost '\\HANSHA-PC'", there is a folder "Matrikon.OPC.Simulation.1" which contains a sub-folder "Group0". Other servers listed include "National Instruments.NIOPCServers", "National Instruments.OPCFieldPoint", "National Instruments.Variable Engine.1", "Network Neighborhood", and "Other Network Computers".

The main pane displays the "Contents of 'Group0'" table:

Item ID	Access Path	Value	Quality
Bucket Brigade.Real4		22	Good, non-specific

The bottom-left pane shows "Server Info" for "Matrikon.OPC.Simulation.1":

- Server: Matrikon.OPC.Simulation.1
- Connected: Yes
- State: Running
- Groups: 1
- Total Items: 1
- Current Local Time: 03/06/2012 10:59:22.417 A
- Update Local Time: 03/06/2012 10:59:16.300 A

The bottom-right pane shows a table of OPC tags with a context menu open over the "Square Waves.Int4" tag:

Item ID	Access Path	Value	Quality
Random.Boolean		False	Good, non-specific
Square Waves.Int4		-8	Good, non-specific

The context menu for "Square Waves.Int4" includes the following options:

- Write Values
- Deactivate
- Delete (Del)
- Export Items
- Properties (Alt+Enter)

A small inset image in the bottom center shows a laptop displaying the MatrikonOPC Explorer interface.

The MatrikonOPC Explorer is useful for testing. You can use it for writing and reading OPC Tags



# OPC in LabVIEW

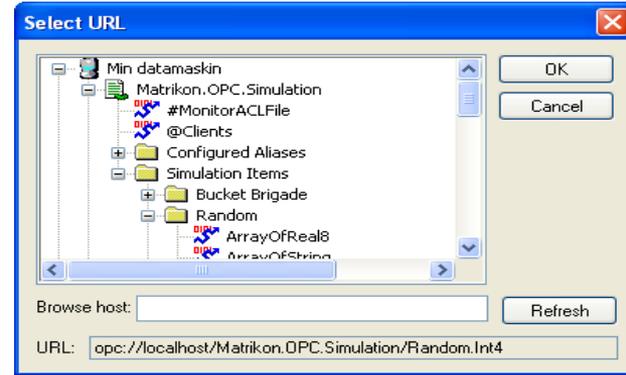
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# The OPC Functions in LabVIEW

You can use LabVIEW as an OPC client by connecting to an OPC server through a **DataSocket** connection.

The **DataSocket** palette in LabVIEW:

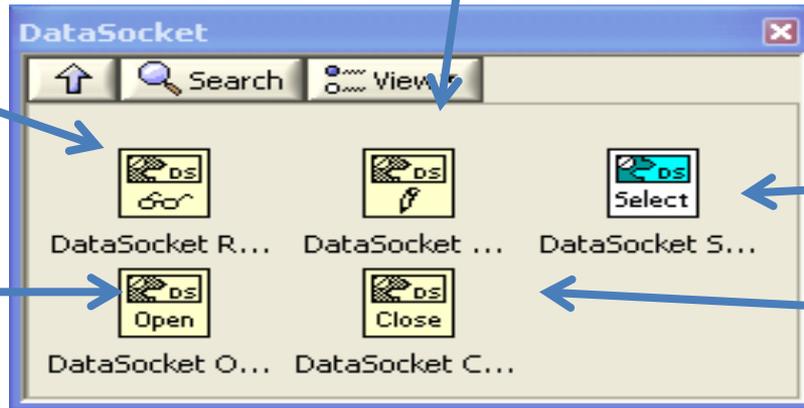
Write Data to OPC



Browse OPC Servers and OPC Items

Close Connection to OPC Server

Read Data from OPC



Open Connection to OPC Server



# OPC Write in LabVIEW

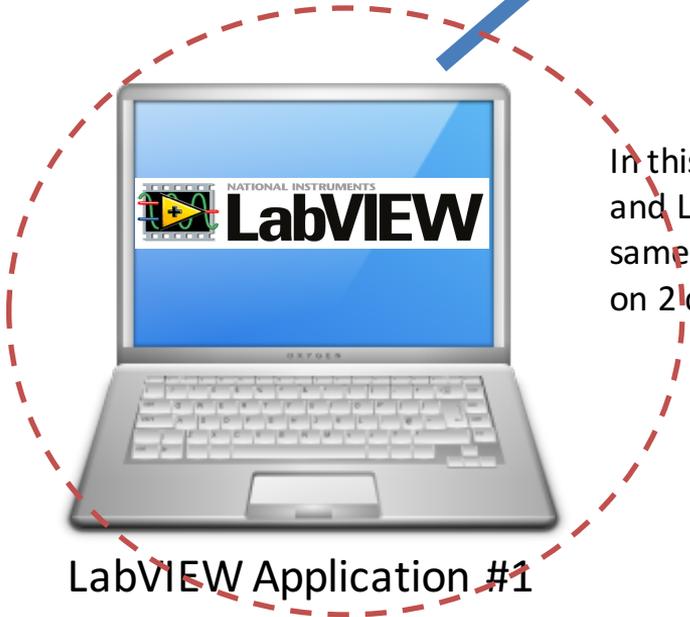
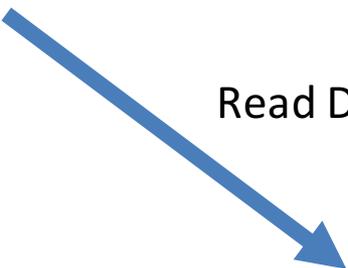
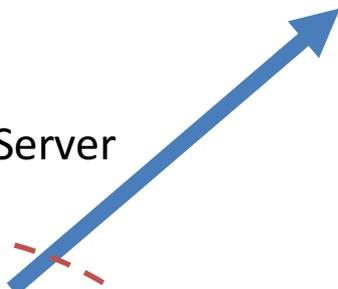
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# MatrikonOPC

Write Data to OPC Server

Read Data from OPC Server



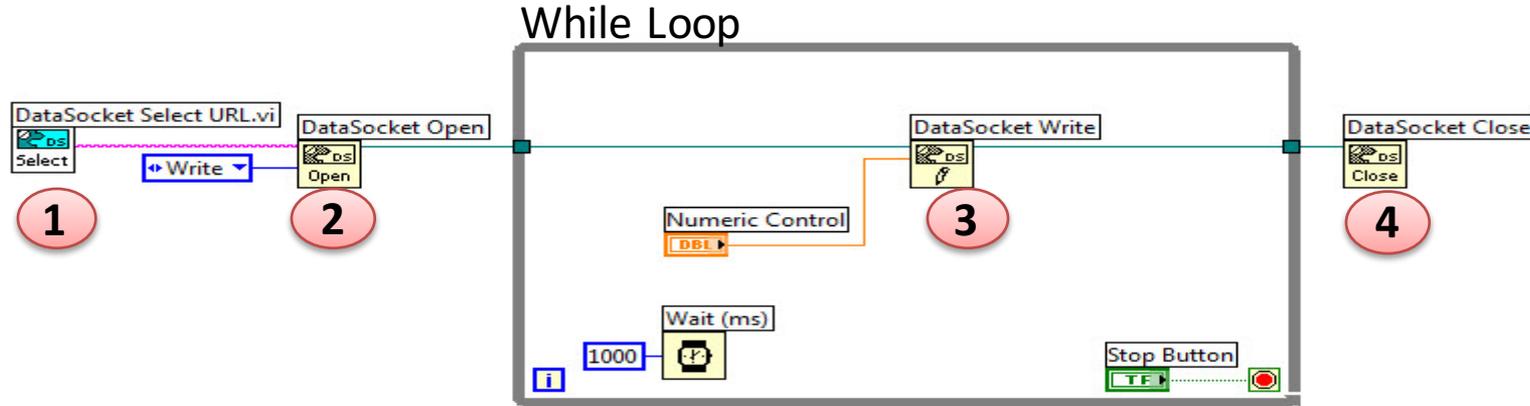
LabVIEW Application #1

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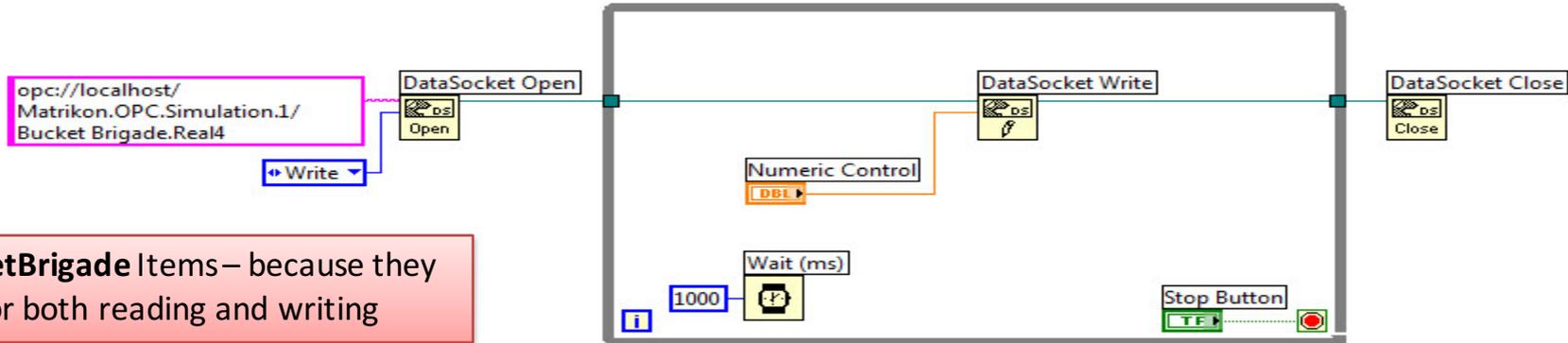


LabVIEW Application #2

# Write to OPC Server using LabVIEW



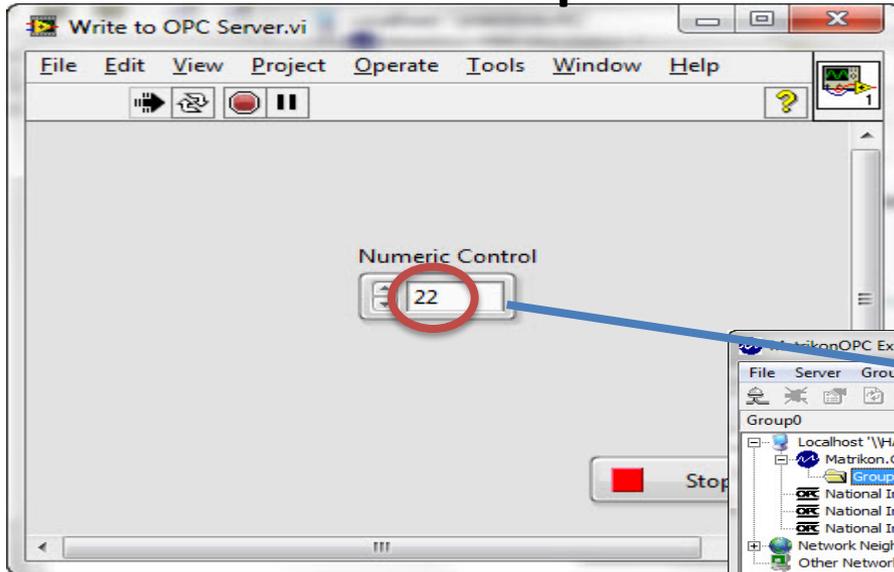
Or specify URL directly: While Loop



Use the **BucketBrigade** Items – because they can be used for both reading and writing

# Use OPC Explorer to Check Communication

Run the LabVIEW program and use the Matrikon OPC Explorer to check if the data is correctly written to the OPC server from LabVIEW



The Matrikon OPC Explorer window displays the following information:

- Server Info:**
  - Server: Matrikon.OPC.Simulation.1
  - Connected: Yes
  - State: Running
  - Groups: 1
  - Total Items: 1
  - Current Local Time: 03/06/2012 10:59:22.417 A
  - Update Local Time: 03/06/2012 10:59:16.300 A
- Contents of 'Group0':**

Item ID	Path	Value	Quality
Bucket Brigade.Real4		22	Good, non-specific
- Group Info:**
  - Group: Group0
  - Connected (Async I/O): Yes (2.0)
  - Active: Yes
  - Items: 1
  - Current Update Rate: 1000 ms
  - Percent Deadband: 0.00%
  - Data Change Rate: 0.01 Items/Sec

A red circle highlights the value '22' in the 'Value' column, and a blue arrow points from the LabVIEW Numeric Control to this value.

**DEMO**

Lets Create the Example from Scratch



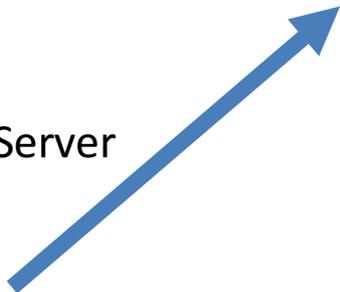
# OPC Read in LabVIEW

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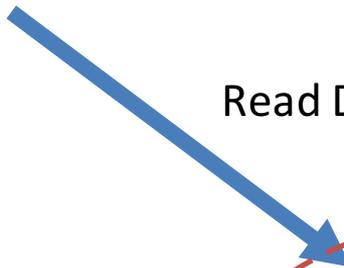


# MatrikonOPC

Write Data to OPC Server

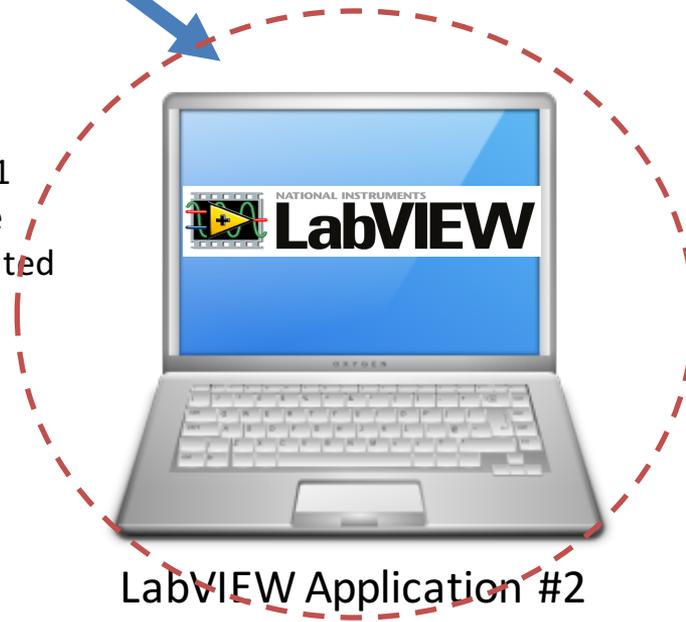


Read Data from OPC Server



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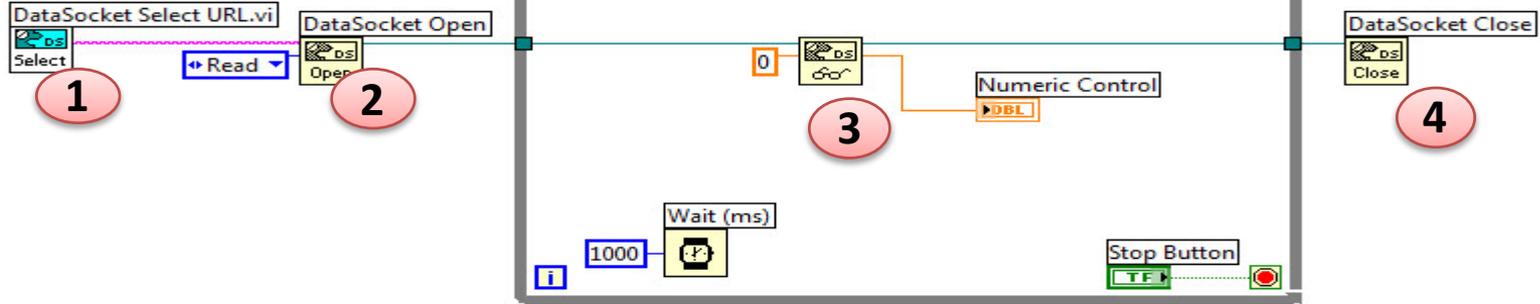


LabVIEW Application #2

# Read from OPC Server using LabVIEW

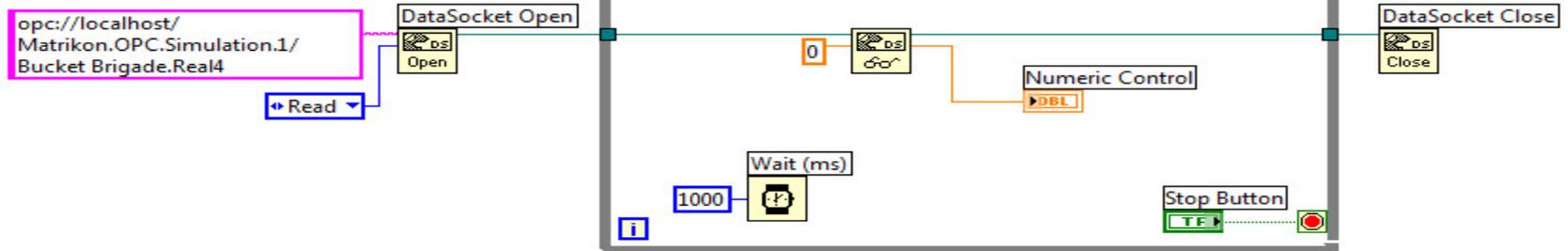


While Loop



Or specify URL directly:

While Loop



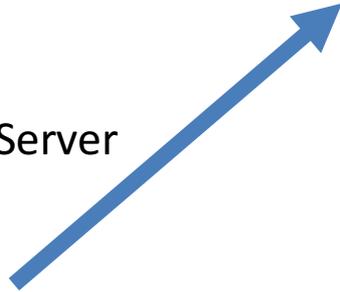
**DEMO**

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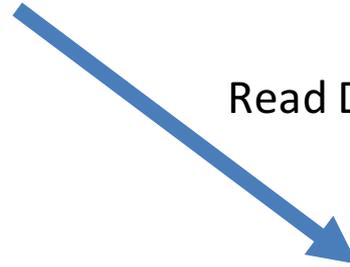


# MatrikonOPC

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Read Data from OPC Server



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LabVIEW Application #2

Hans-Petter Halvorsen, M.Sc.



University College of Southeast Norway

[www.usn.no](http://www.usn.no)

E-mail: [hans.p.halvorsen@hit.no](mailto:hans.p.halvorsen@hit.no)

Blog: <http://home.hit.no/~hansha/>

