ControlNet Router

SCADA / HMI Configuration

Technical Application Note

A-CNR

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aparian

1 PREFACE

1.1 PURPOSE OF THIS DOCUMENT

This document will assist the user to configure 3rd party SCADA/HMI driver applications using the Aparian ControlNet Router.

1.2 ADDITIONAL INFORMATION

The following resources contain additional information that can assist the user with the module installation and operation.

Resource	Link
Slate Installation	http://www.aparian.com/software/slate
ControlNet Router User Manual ControlNet Router Datasheet Example Code & UDTs	http://www.aparian.com/products/controlnetrouter
ControlNet	http://www.odva.org
ControlNet Cabling	ControlNet Coax Media Planning and Installation Guide https://literature.rockwellautomation.com/idc/groups/literature/documents/in/cnet-in002_-en-p.pdf

1.3 SUPPORT

Technical support will be provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Resource	Link
Contact us web link	www.aparian.com/contact-us
Support email	support@aparian.com

2 INTRODUCTION

The ControlNet Router provides intelligent data routing between EtherNet/IP and a ControlNet network.

When the ControlNet Router is operating in Bridge Mode, it will allow the user to add, configure, and parameterize ControlNet IO via the ControlNet Add-on Profile (AOP) in Logix. It also allows transparent routing functionality in HMI (Human Machine Interface) / SCADA (Supervisory Control and Data Acquisition) applications from EtherNet/IP, to ControlNet, via a ControlNet bridge to a Logix controller.

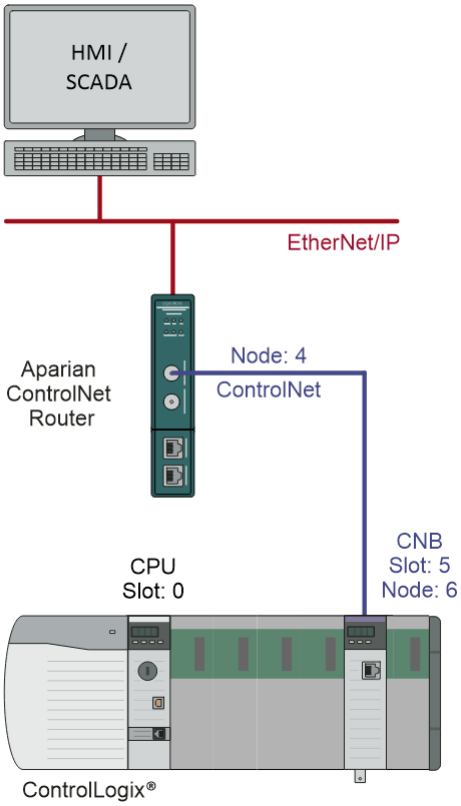

Figure 2.1 – HMI / SCADA application via a ControlNet Router

For 3rd party SCADA / HMI communication drivers that do not support the manual entry of a (free form) CIP path, the ControlNet Router provides a ***Virtual Gateway Routing (SCADA)*** option, where the ControlNet Router emulates an intermediate Logix chassis (Backplane + ControlNet bridge) by consuming (removing) a superfluous [Port + Address] segment in the routed CIP path, and adjusting the ControlNet port from 2 to 3.

For example, the routed path:

192.168.1.28, 1, 0, **2**, 6, 1, 0

will effectively be reduced to:

192.168.1.28, **3**, 6, 1, 0

NOTE: The ***Virtual Gateway Routing (SCADA)*** option is not required when using RSLinx / FTLinx OPC as the communication driver.

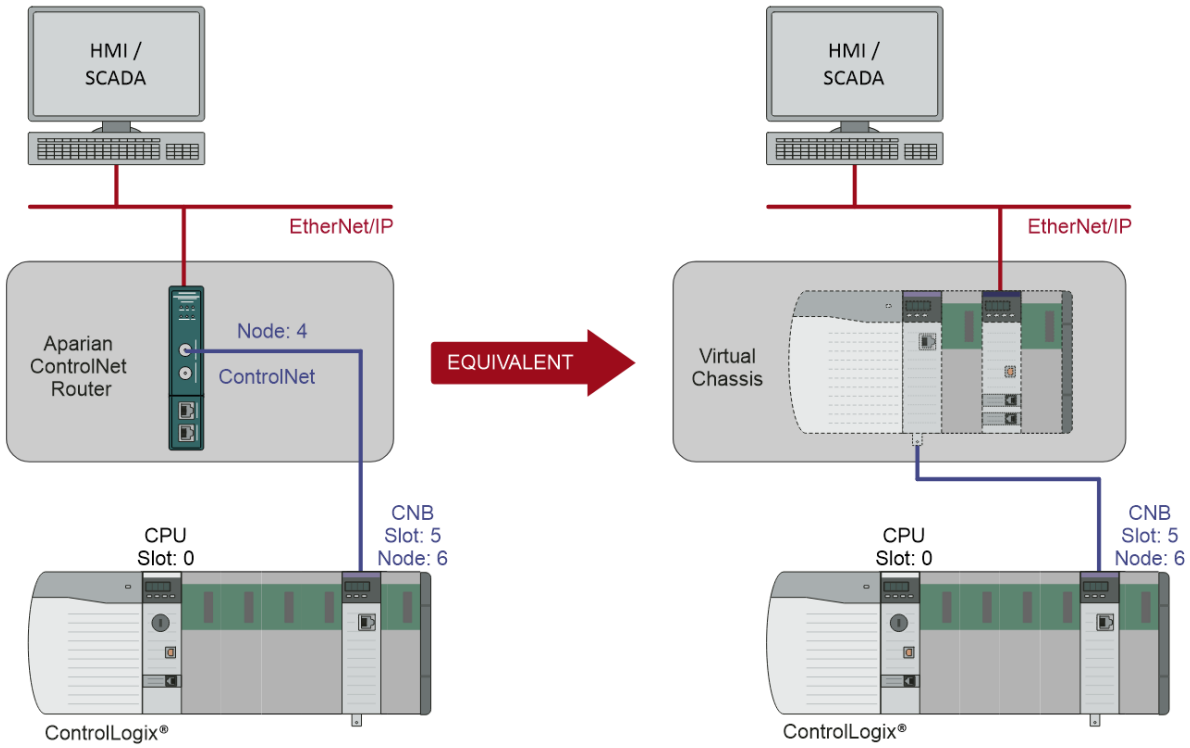

Figure 2.2 – HMI / SCADA Equivalent Path

3 CONFIGURATION

3.1 CONTROLNET ROUTER CONFIGURATION

The ControlNet Router should be configured as normal, with the ***ControlNet Mode*** set to ***Bridge***.

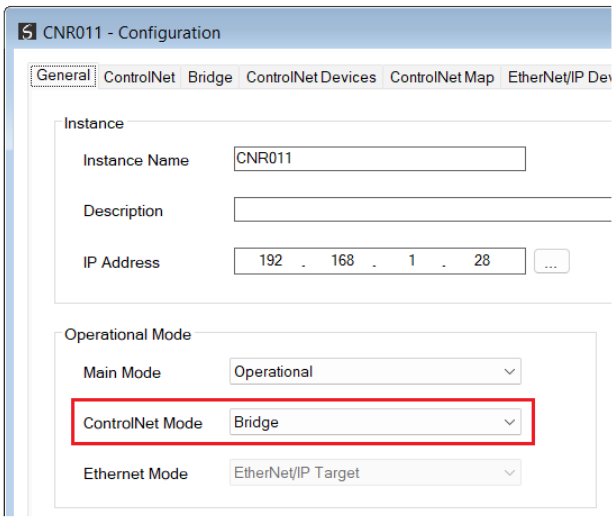

Figure 3.1 – ControlNet Router configuration – General tab

In the ControlNet tab, the ***Virtual Gateway Routing (SCADA)*** option must be enabled (checked).

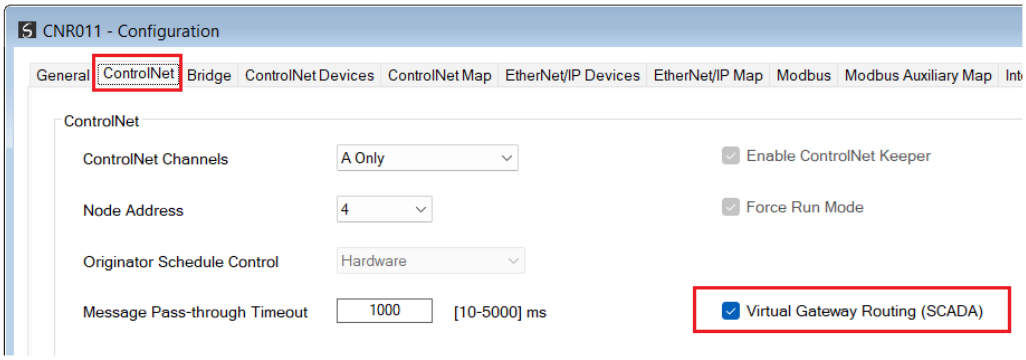

Figure 3.2 – ControlNet Router configuration – ControlNet tab

The configuration can now be accepted by clicking on the ***Ok*** button.

Then, ***Download*** the configuration to the ControlNet Router module.

3.2 AVEVA INTOUCH CONFIGURATION

AVEVA InTouch (formerly Wonderware InTouch) can be configured to communicate to a Logix controller via the ControlNet Router.

The configuration follows the Virtual Gateway Routing (SCADA) option where the ControlNet Router effectively emulates an equivalent Logix chassis as per the example below.

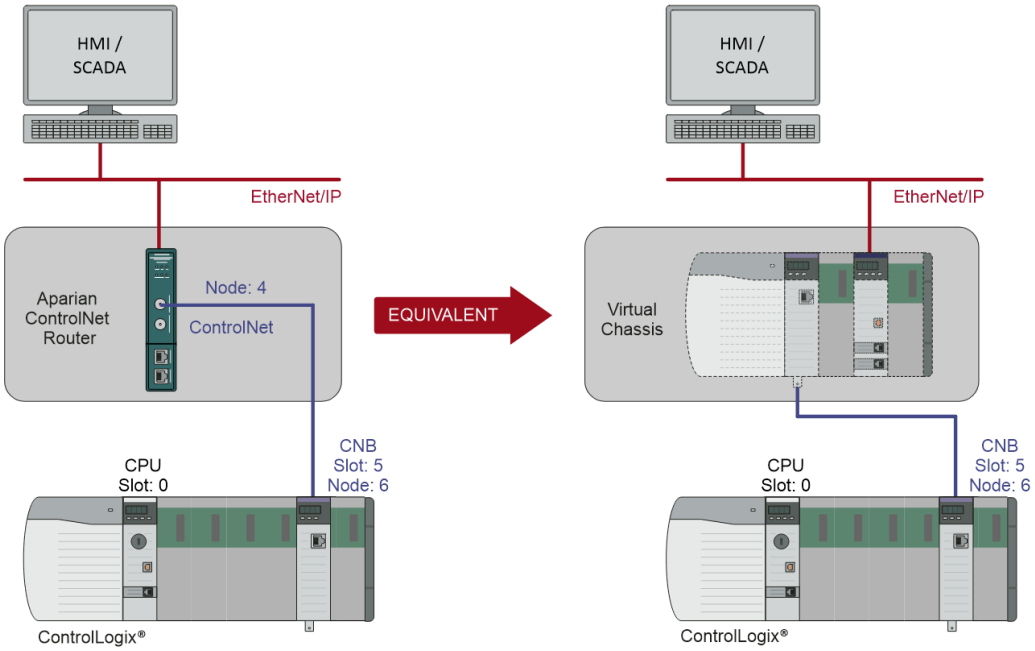

Figure 3.3 – HMI / SCADA Equivalent Path Example

The ABCIP driver must be configured using the AVEVA Operations Control Management Console.

3.2.1 OPERATIONS CONTROL MANAGEMENT CONSOLE

In the AVEVA Operations Control Management Console, expand the ***Supervisory Servers*** to reveal the Allen-Bradley – ***ABCIP*** driver.

If there is not an existing Server Instance of the driver, then this must be created by right-clicking on the ABCIP driver.

Under the PORT item, right-click and select the ***Add ENB_CLX Connection*** option.

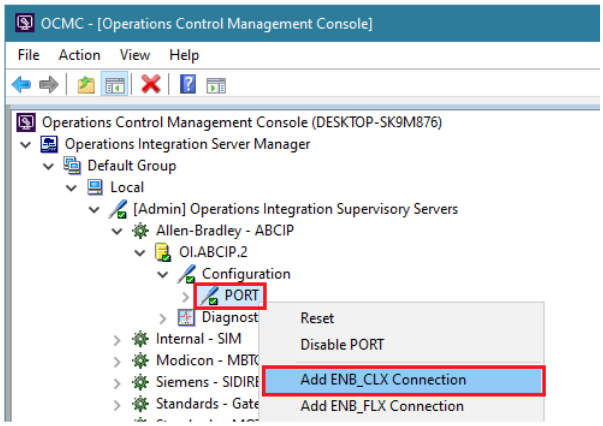

Figure 3.4 – ABCIP – Port – Add Connection

Rename the connection appropriately (e.g. “ACNR”) and set the ***Host Name*** to the ***IP Address*** of the ControlNet Router, e.g. 192.168.1.28. Save the settings (top right button).

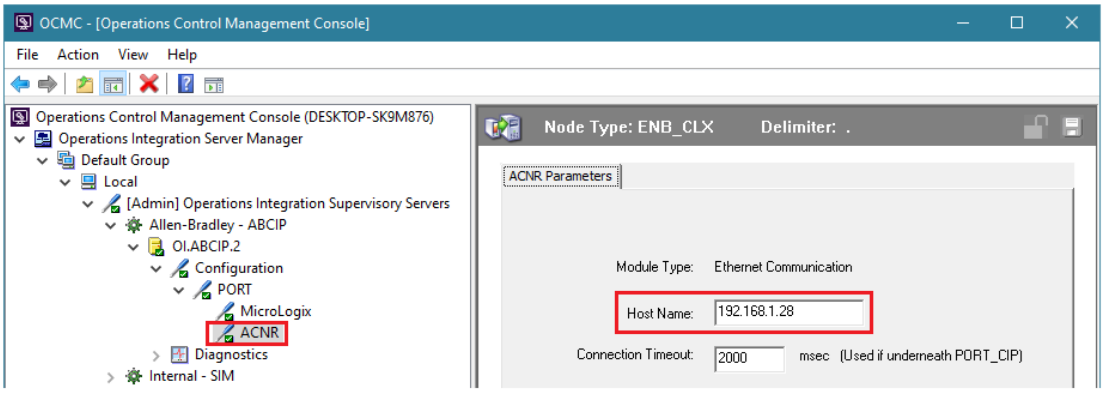

Figure 3.5 – ABCIP – ACNR Connection

Then right-click on the newly created “ACNR” and select the ***Add Backplane_CLX Connection*** option.

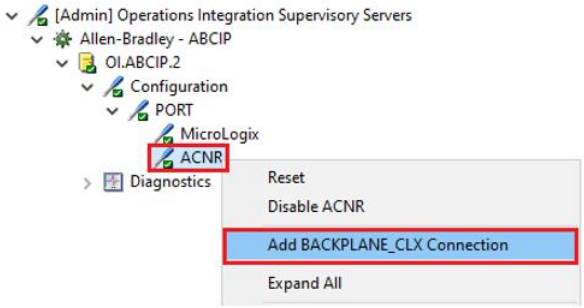

Figure 3.6 – ABCIP – Add Backplane

Rename the connection appropriately (e.g. “VirtualBackplane”).

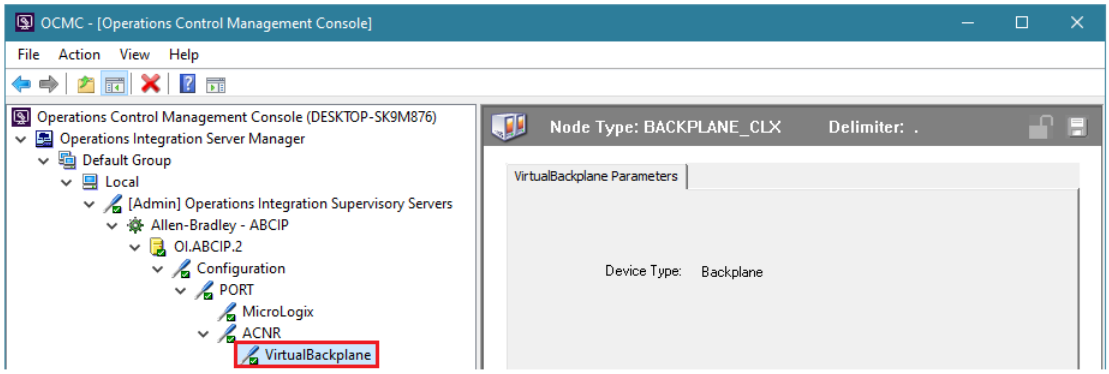

Figure 3.7 – ABCIP – Virtual Backplane

Then right-click on the newly created "VirtualBackplane" and select the ***Add CNB_CLX Connection*** option.

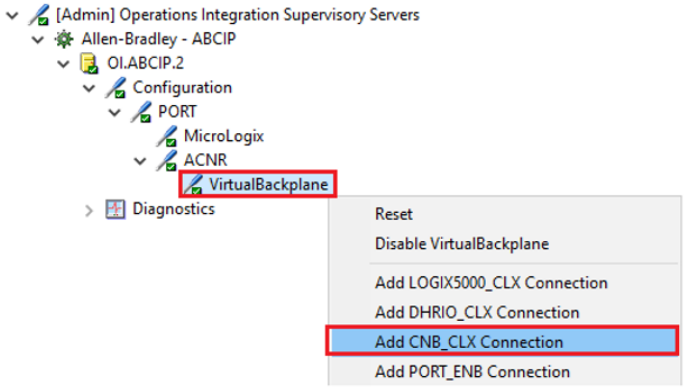

Figure 3.8 – ABCIP - Virtual Backplane – Add CNB

Rename the connection appropriately (e.g. "VirtualCNB") and set the ***Slot Number*** to 0. (Note that this Slot Number is not used in the routing path.). Save the settings (top right button).

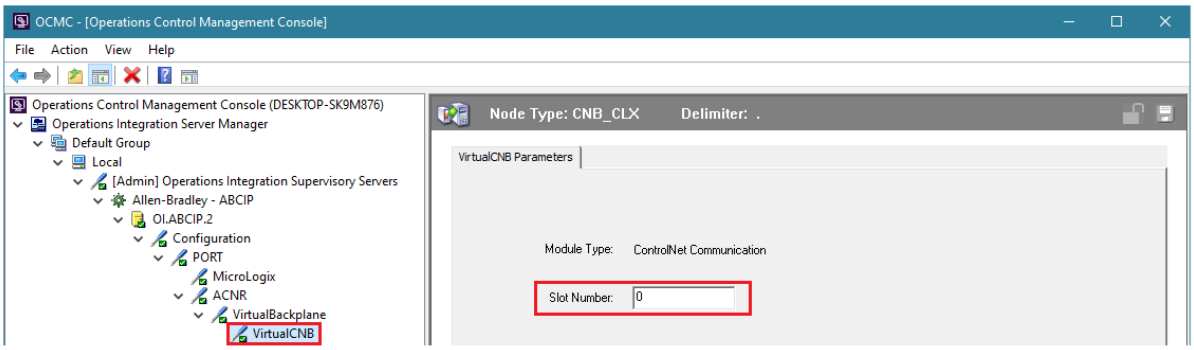

Figure 3.9 – ABCIP – Virtual CNB

Then right-click on the newly created “VirtualCNB” and select the ***Add PORT_CN Connection*** option.

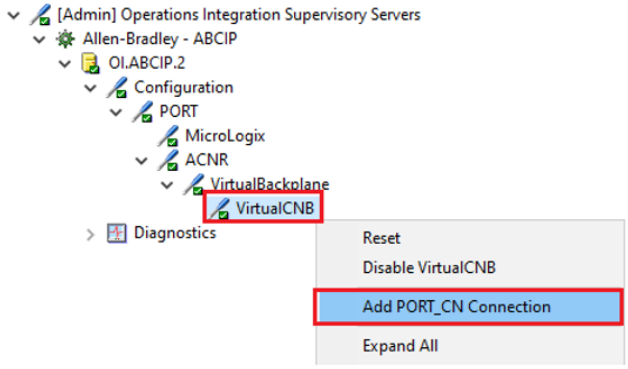

Figure 3.10 – ABCIP – Virtual CNB

Rename the connection appropriately (e.g. “ACNRPort”) and set the ***ControlNet Address*** to that configured in the ControlNet Router. The ***Channel Number*** should be set to ***Channel A***. Save the settings (top right button).

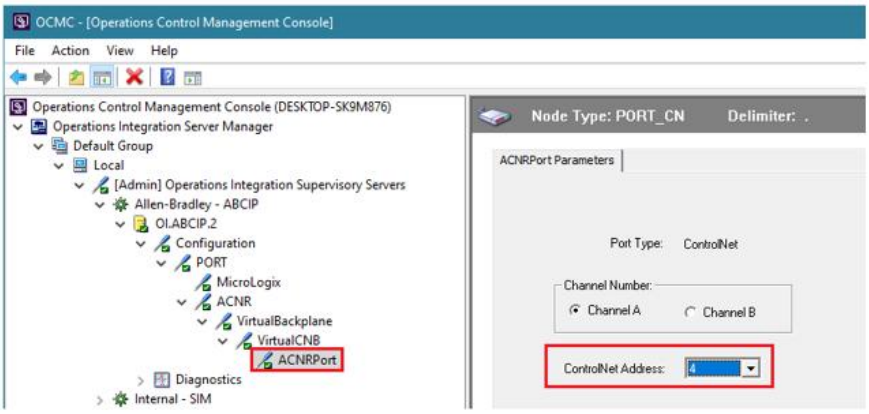

Figure 3.11 – ABCIP – ACNR Port

Then right-click on the newly created “ACNRPort” and select the ***Add CNB_PORT_CLX Connection*** option.

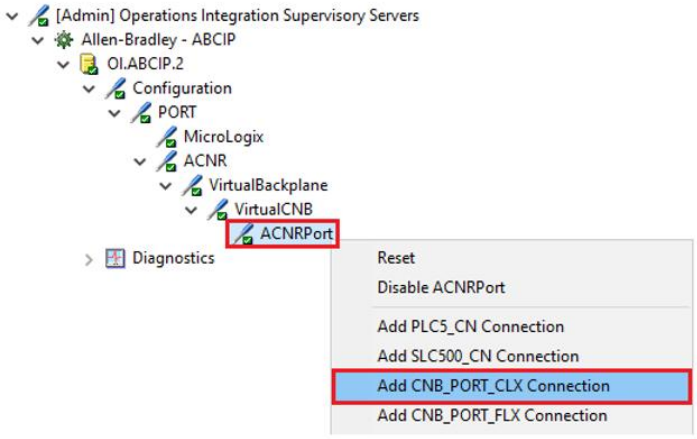

Figure 3.12 – ABCIP – ACNR Port – Add Connection

Rename the connection appropriately (e.g. “RemoteCNB”) and set the ***Slot Number*** and ***ControlNet Address*** to that of the physical 1756-CNB in the remote chassis. Save the settings (top right button).

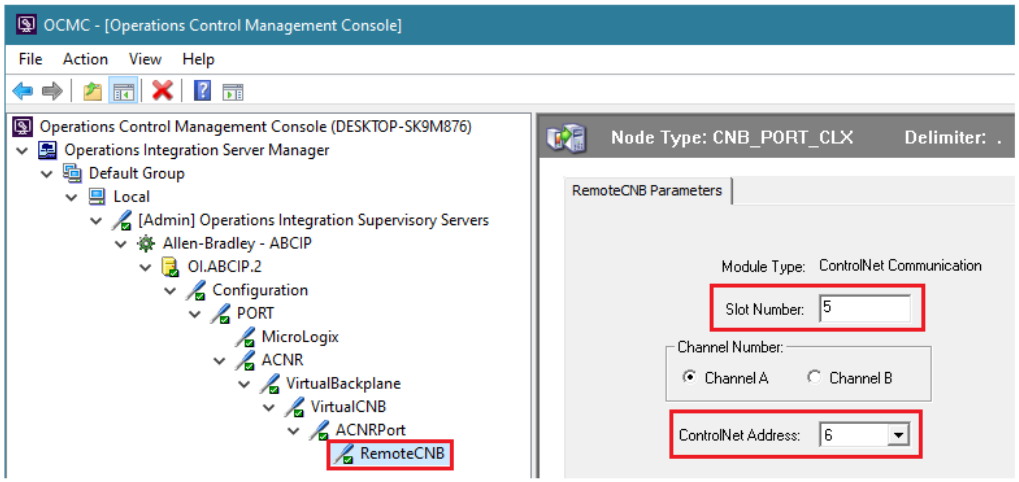

Figure 3.13 – ABCIP – Remote CNB

Then right-click on the newly created “RemoteCNB” and select the Add ***BACKPLANE_CLX Connection*** option.

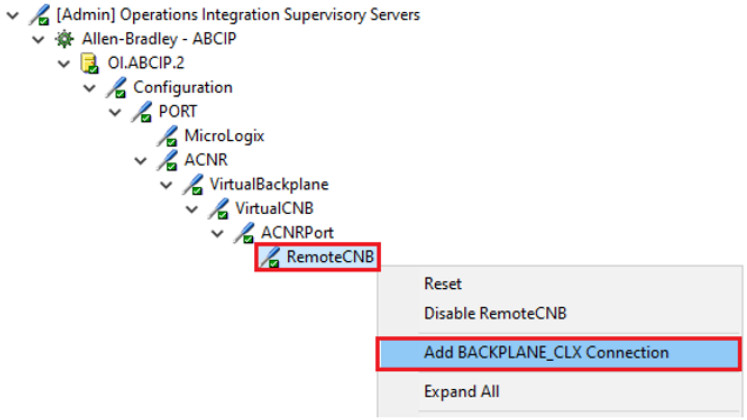

Figure 3.14 – ABCIP – RemoteCNB – Add Backplane

Rename the connection appropriately (e.g. “RemoteBackplane”).

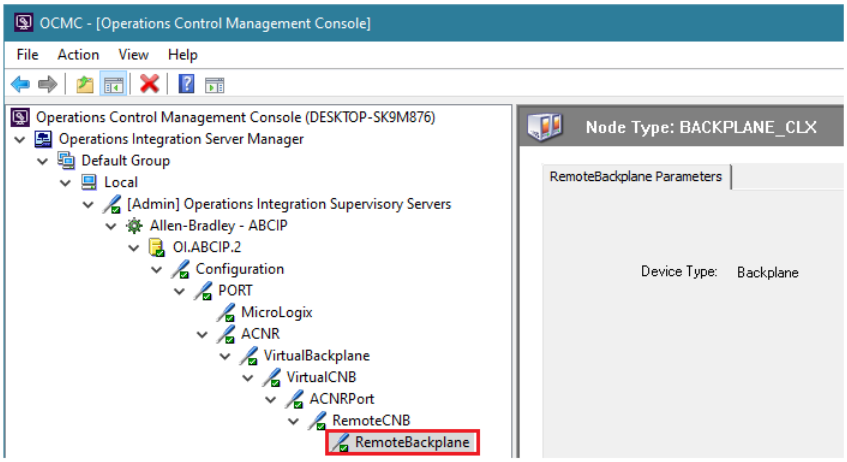

Figure 3.15 – ABCIP – Remote Backplane

Then right-click on the newly created “RemoteBackplane” and select the ***Add LOGIX5000_CLX Connection*** option.

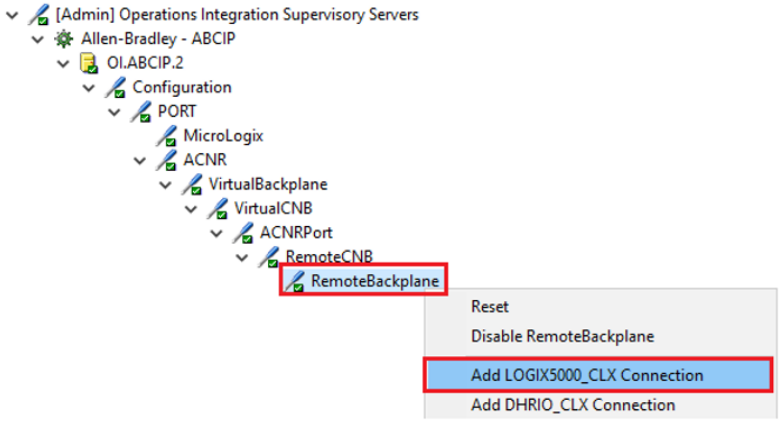

Figure 3.16 – ABCIP – Remote Backplane – Add Logix Controller

Rename the Logix controller appropriately (e.g. “WestCooling”) and set the ***Slot Number*** to that of the physical Logix controller in the remote chassis.
Save the settings (top right button).

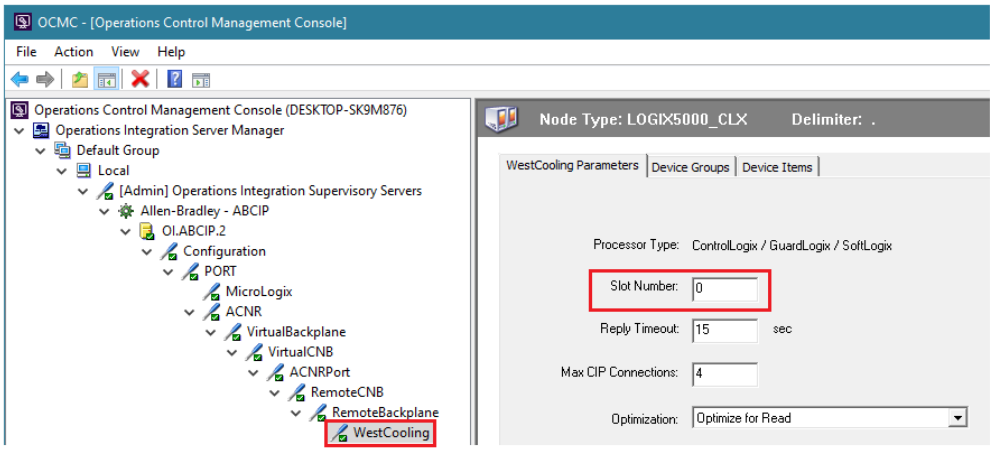

Figure 3.17 – ABCIP – Logix Controller

In the controller settings, select the second tab “Device Groups” and right-click on the data grid view, and select the ***Add*** option.

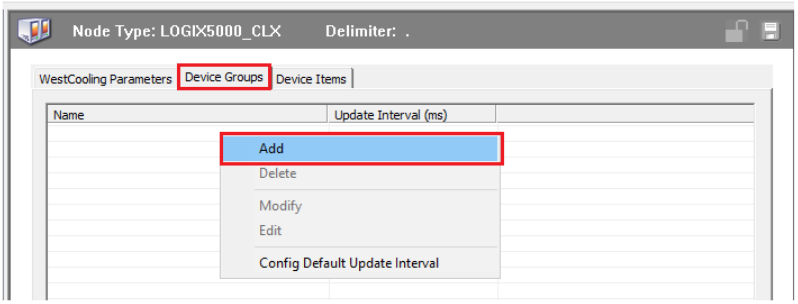

Figure 3.18 – ABCIP - Logix Controller - Device Groups - Add

Configure one or more Topics to be associated with this controller, as well as their required update intervals.

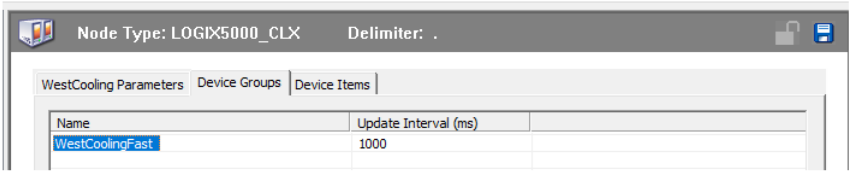

Figure 3.19 – ABCIP – Logix Controller - Device Groups

3.2.2 INTOUCH – WINDOWMAKER

In InTouch WindowMaker, you can now configure an ***Access Name*** to point to the previously configured ABCIP driver.

Enter an appropriate ***Access name***. If the server is local then the ***Node name*** can be left blank, otherwise it should be the name of the server running the ABCIP driver.

The ***Application name*** must be set to the name (between the two periods) of the ABCIP driver instance. In the example below, the instance name is "OI.ABCIP.2", so the Application name must be set to "ABCIP".

The ***Topic name*** must be set to the Topic name defined in the Logix controller's Device Groups, in the example below this is "WestCoolingFast".

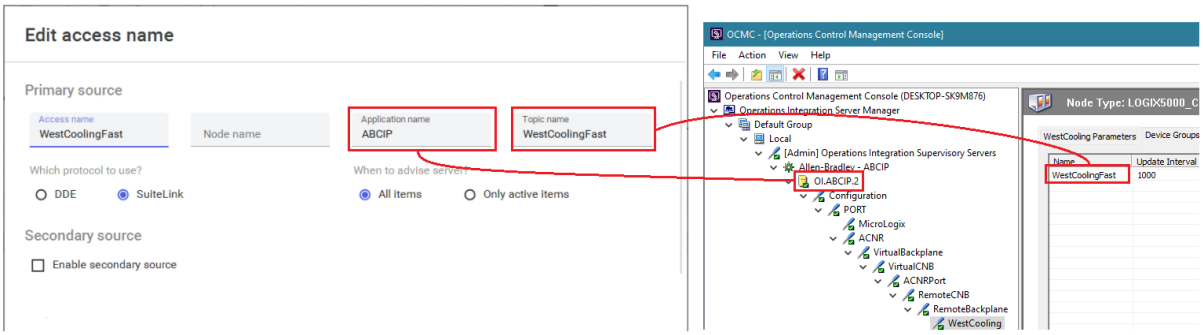

Figure 3.20 – InTouch Access Names

3.3 KEPWARE CONFIGURATION

The KEPware server can be configured to communicate to a Logix controller via the ControlNet Router.

The configuration follows the Virtual Gateway Routing (SCADA) option where the ControlNet Router effectively emulates an equivalent Logix chassis as per the example below.

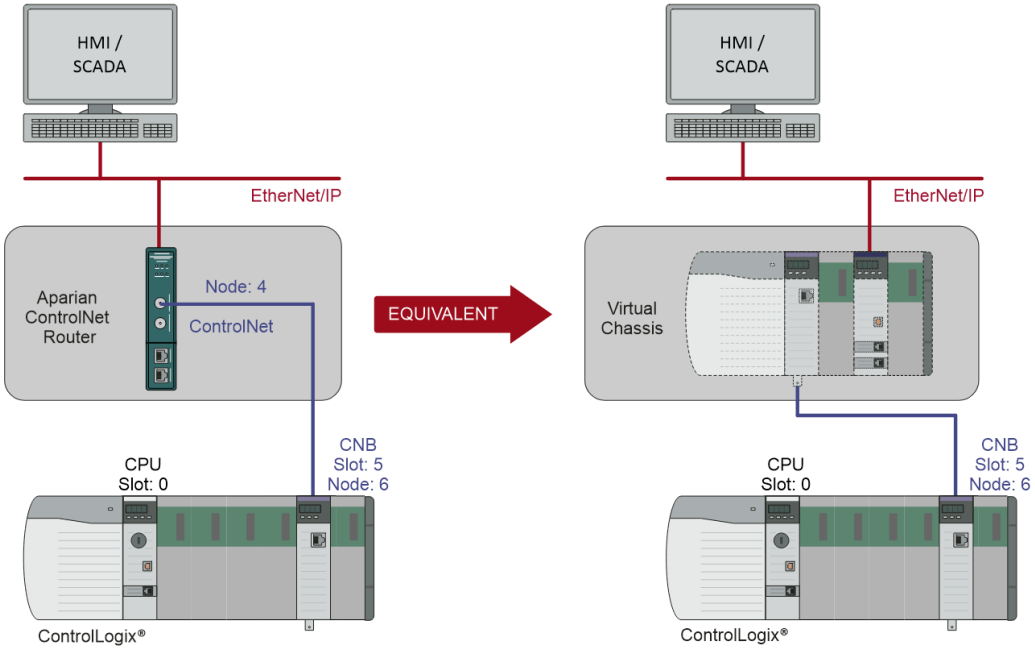

Figure 3.21 – HMI / SCADA Equivalent Path Example

To configure a path via the ControlNet Router, open the KEPServer Configuration, and under the ***Connectivity*** tree item, select the ***Click to add a channel*** option.

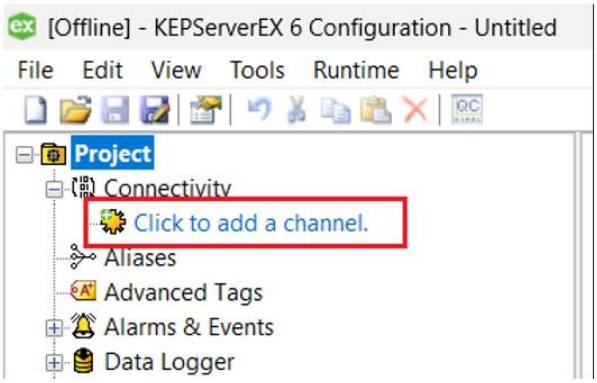

Figure 3.22 – KEPware – Add Channel

Select the ***Allen-Bradley ControlLogix Ethernet*** channel type.

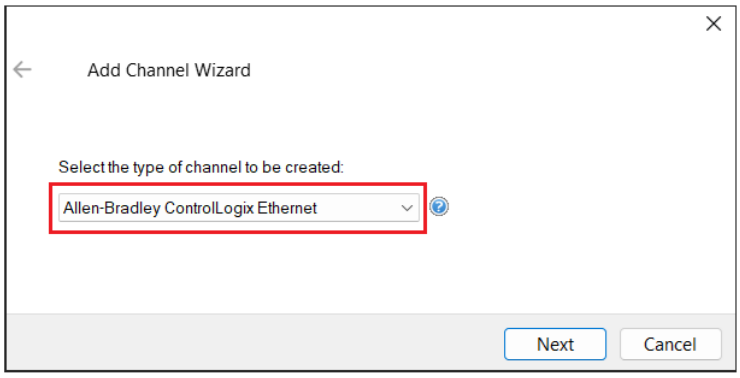

Figure 3.23 – KEPware – Channel Type

Select an appropriate name, example “A-CNR01”.

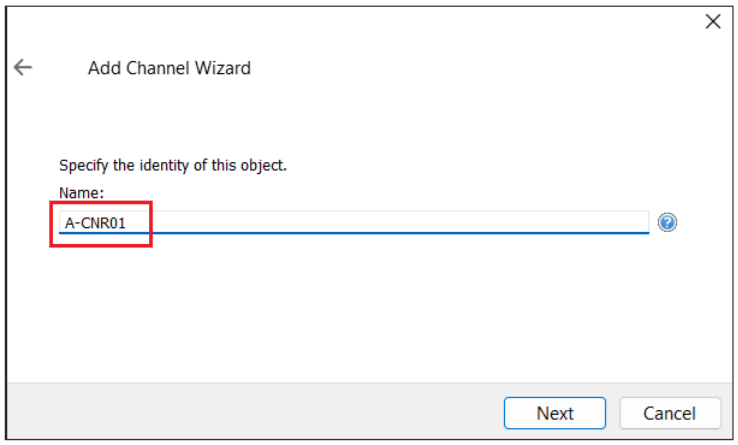

Figure 3.24 – KEPware – Channel Name

Under the newly created “A-CNR01” channel, add a device by clicking on the ***Click to add a device*** option.

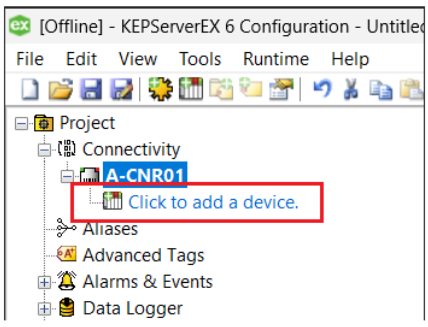

Figure 3.25 – KEPware – Add Devicre

Provide a suitable name for the device, example “L75”.

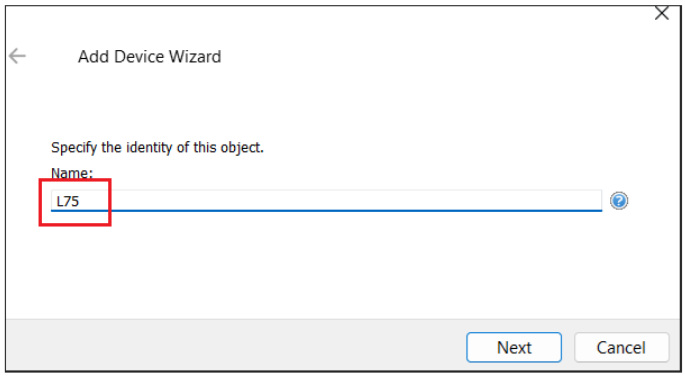

Figure 3.26 – KEPware – Device Name

Then select the ControlLogix 5500 for the Device ***Model***.

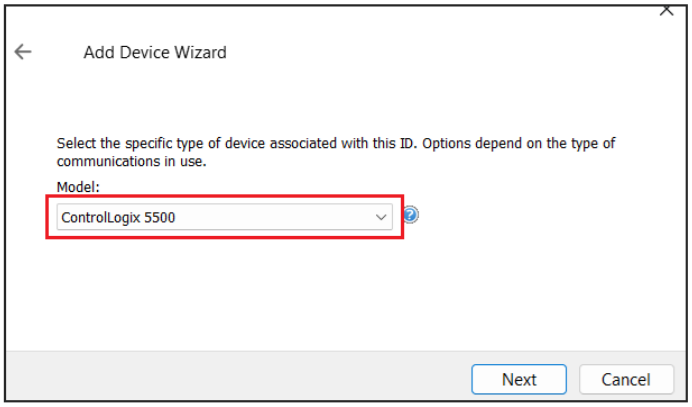

Figure 3.27 – KEPware – Device Model

Then enter the routing path, in the format:

<IPAddress>,1,[OptionalPath],<CPU Slot>

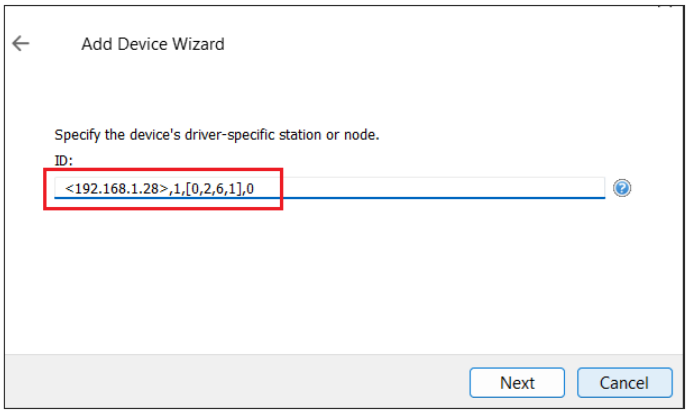

Figure 3.28 – KEPware – Device Path

In this example, we will enter the path as follows:

<192.168.1.28>,1,[0,2,6,1],0

Where:

192.168.1.28 is the IP Address of the ControlNet Router
1 specifies the (virtual) backplane (ACNR will remove)
0 specifies the (virtual) ControlNet bridge slot (ACNR will remove)
2 specifies the (virtual) ControlNet Port (ACNR will modify to 3)
6 specifies the ControlNet node of the physical remote ControlNet bridge
1 specifies the remote chassis backplane
0 specifies the slot of the Logix controller.

A tag can now be added under the newly created Logix controller by selecting the ***Click to add a static tag*** option.

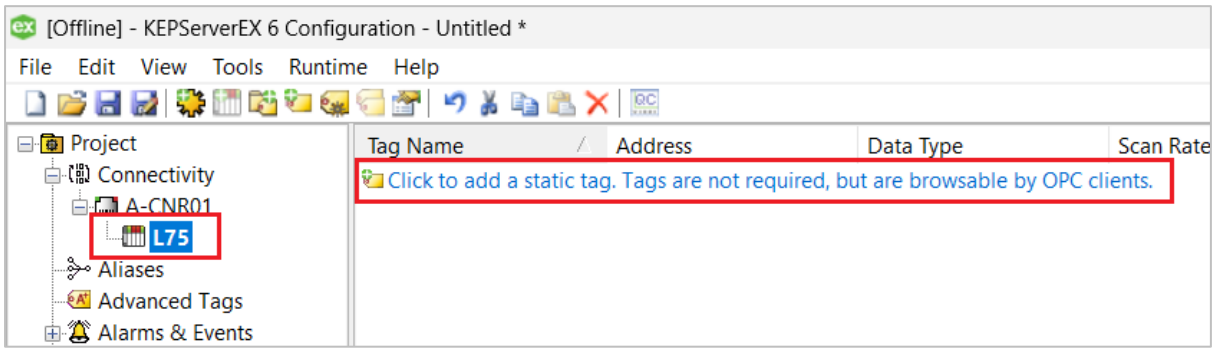

Figure 3.29 – KEPware – Add Tag

Specify a suitable tag ***Name*** and the corresponding Logix tag in the ***Address*** field.

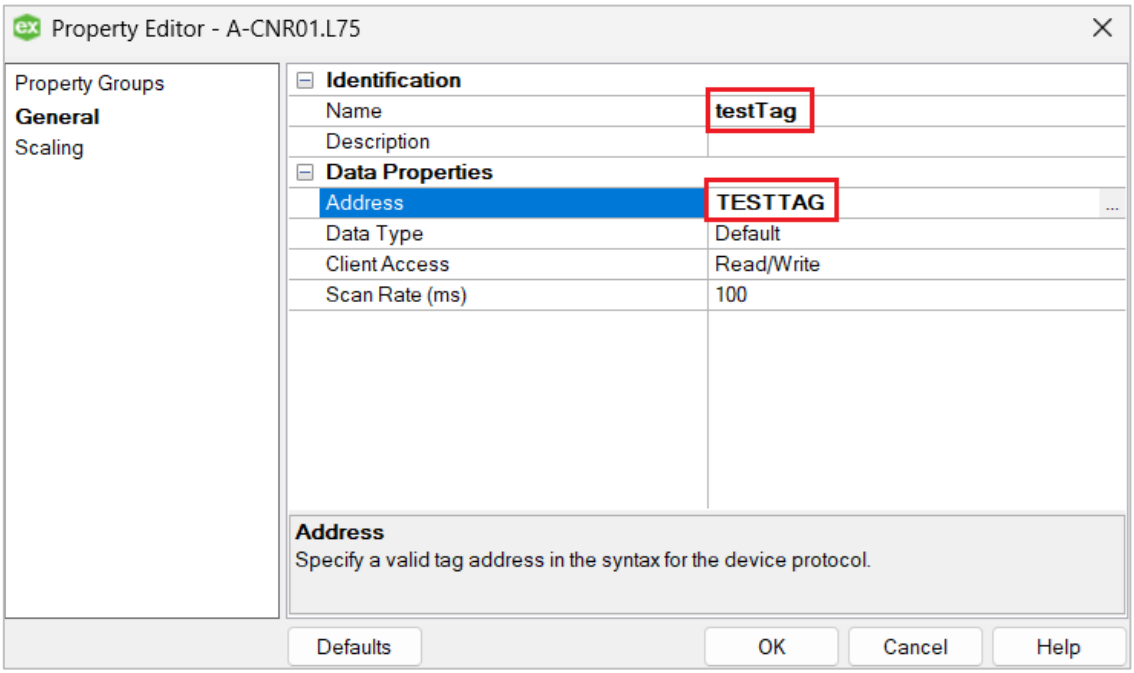

Figure 3.30 – KEPware – Configure Tag

To test the communication select the Test Client option.

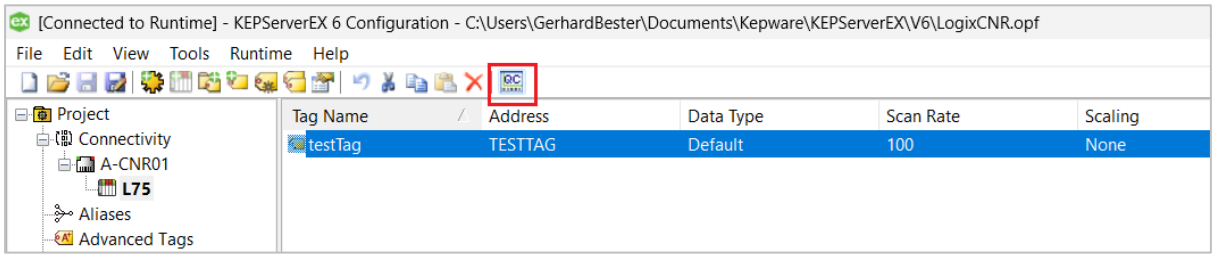

Figure 3.31 – KEPware – Open Test Client

Confirm the test tag is being read correctly.

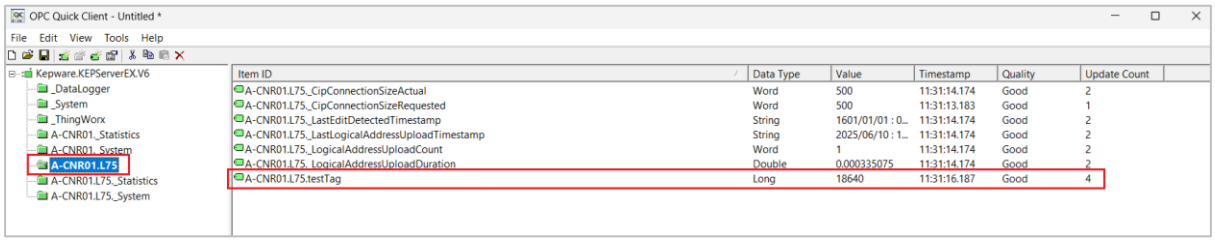

Figure 3.32 – KEPware – Test Client Tag Values

// End.