CTCopc

CONTROL TECHNOLOGY CORPORATION

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CHAPTER

1

Introduction

An introduction to CTCopc

CTCopc is a 32-bit Windows OPC server application that provides real-time client access to CTC automation controllers.

In 1994, several vendors formed what is now known as the OPC Foundation. This foundation defines standards that allow multiple vendors from various segments of the industrial marketplace to interoperate and share data.

In 1996, a specification was released that defines how data-oriented, server applications should interact with client application software. This specification, known as Data Access (OPC-DA) is now in its third major revision.

CTCopc conforms to the first two revisions, namely the1.0 and 2.0 OPC-DA standards.

By using OPC technology, users can avoid using custom, single-vendor application programming interfaces (API's) and drivers that are traditionally required for exchanging data between factory-floor devices and the enterprise.

CHAPTER

2

Installation

Installing CTCopc

CTCopc can be installed on any modern Windows-based operating system. Since OPC is rooted in Microsoft's COM (Component Object Model) technology, non-Windows operating systems, such as Linux, are not supported.

CTCopc uses the latest Microsoft technology, namely Microsoft .NET. Before installing or using CTCopc, core *.NET framework* components must be first installed on the target computer.

These framework components are:

- Microsoft .NET Framework Version 1.1 Runtime
- Microsoft Visual J# Version 1.1 Runtime

The installers for these runtime components are available on the CTCopc installation CD and **should be installed in the order listed above.**

If the CD is not available, these components can be downloaded via the Internet:

Microsoft .NET Framework 1.1

http://www.microsoft.com/downloads/details.aspx?FamilyID=262d25e3-f589-4842-8157-034d1e7cf3a3&displaylang=en

Microsoft Visual J# 1.1

http://www.microsoft.com/downloads/details.aspx?FamilyID=e3cf70a9-84ca-4fea-9e7d-7d674d2c7ca1&DisplayLang=en

Once these components are installed properly, then the CTCopc installer (CTCopc Installer.EXE) can be double-clicked and run. After the installation is complete, a desktop icon is created, as well as a shortcut located in the Start menu in the *CTC* folder (program group).

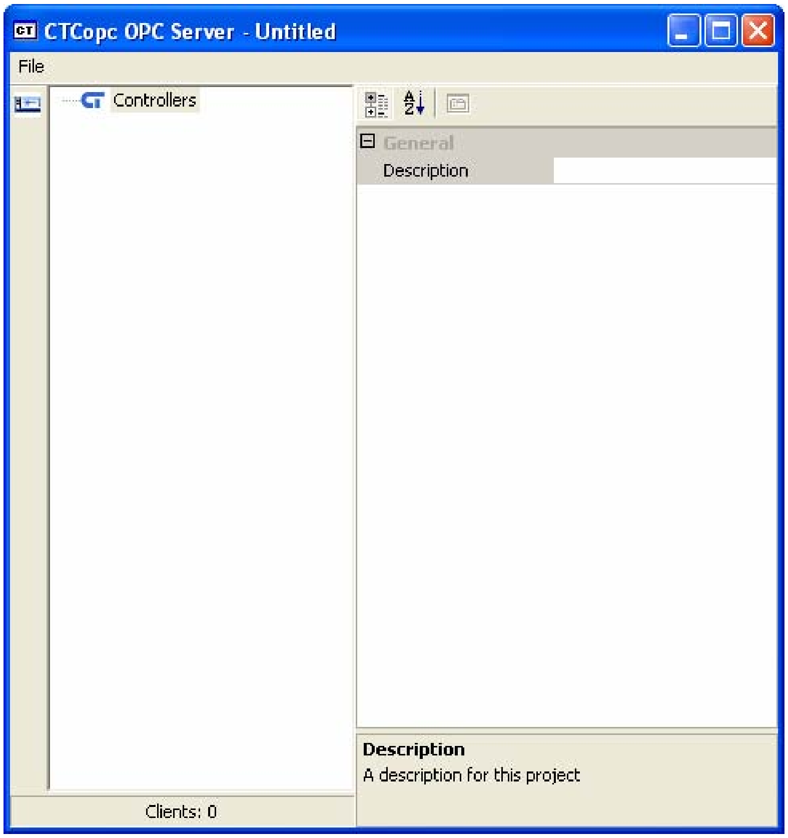
CHAPTER 3

CTCopc Projects

An introduction to creating and editing projects in CTCopc

Once CTCopc is properly installed, the application can be launched (from the desktop icon, or the shortcut within the START menu).

After launching, an empty project is created and the main application window is presented:



The CTCopc application window consists of two primary panes as well as a left-docked toolbar.

The left-most pane is the *tag-tree* and visually represents the hierarchical structure of the CTCopc project. A CTCopc project consists of a series of controllers and associated tags (data). Since OPC itself is also hierarchical, this model fits well to that architecture.

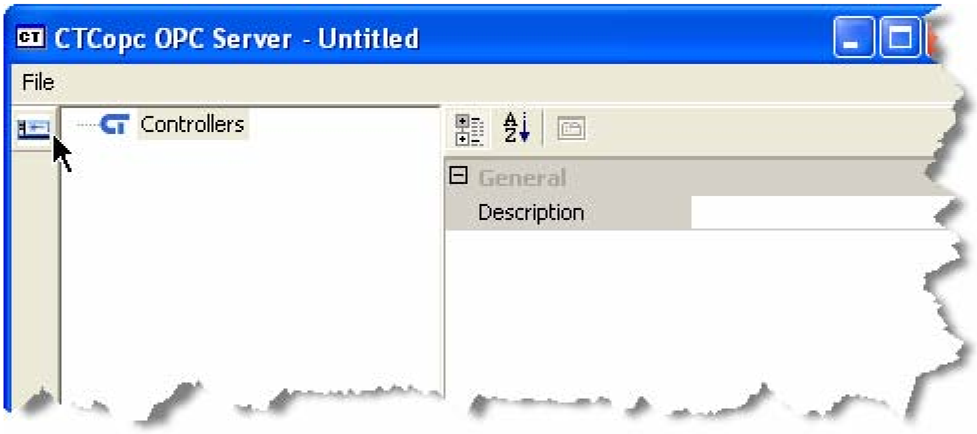
The right-most pane is called the *property editor* and allows the user to edit various parameters ("properties") for the selected node within the *tag-tree*.

The easiest way to understand the architecture of OPC and the CTCopc application is by a simple example.

SIMPLE CTCOPC EXAMPLE

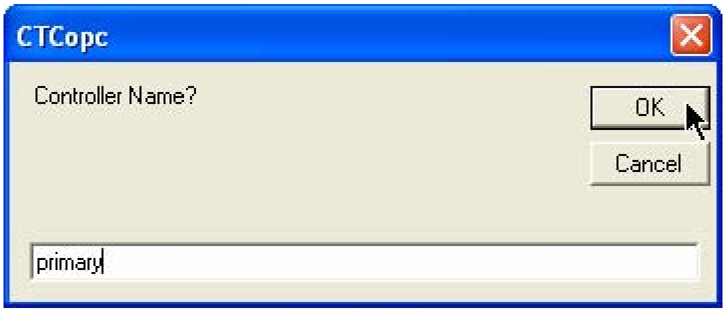
For this example, it is assumed that there are two controllers located on the network at IP addresses 192.168.44.71 and 192.168.44.73.

The first controller can be added to the (empty) CTCopc project by clicking the controller icon on the toolbar or by right-mouse clicking the **Controllers** node in the *tag-tree*.



A dialog box will appear prompting for the name for this controller. This name is published out to OPC clients as well, so it should be chosen carefully (although it can be renamed).

In this example, we will call the controller at 192.168.44.71 "primary".

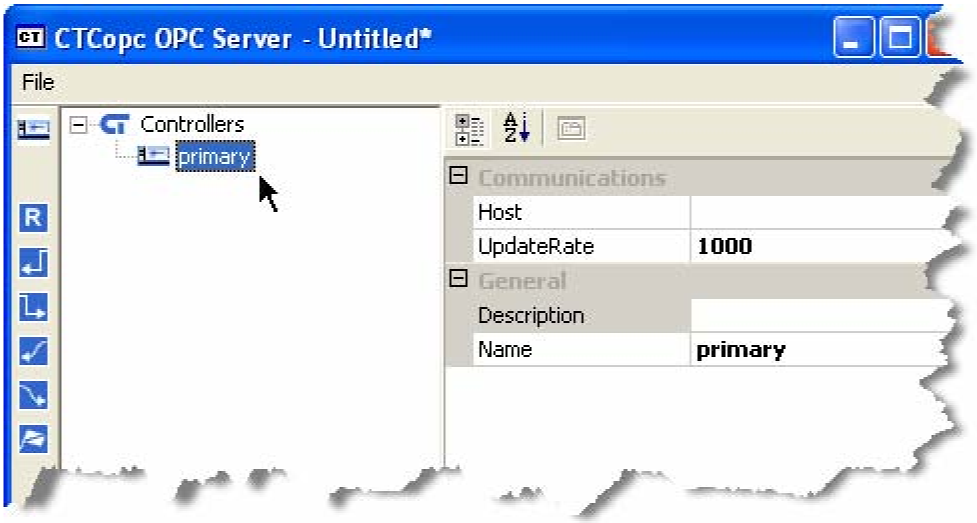


CTCopc

Controller Name?

primary

Once the name is entered and the **OK** button is pressed, the controller will appear in the *tag-tree*.



CTCopc OPC Server - Untitled*

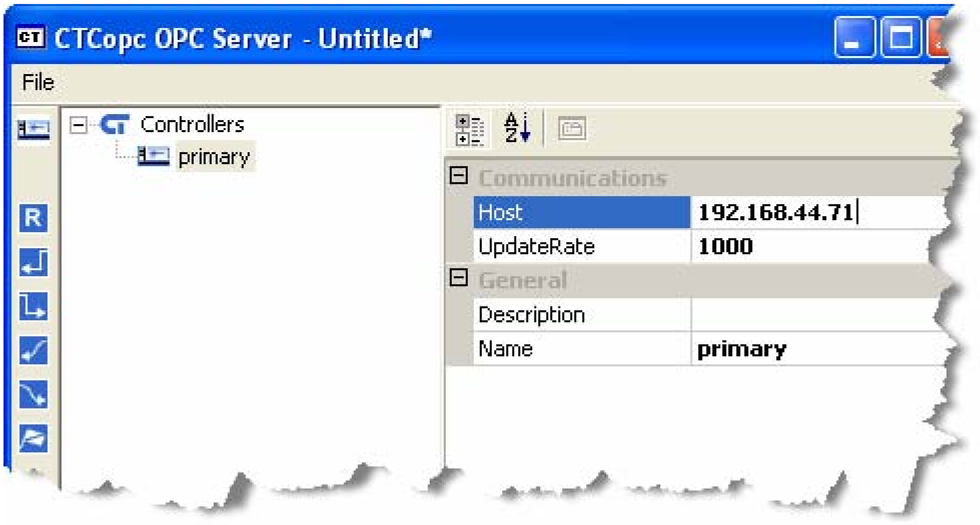
Communications	
Host	
UpdateRate	1000
General	
Description	
Name	primary

As you may have noticed, the right pane (the *property editor*) has filled in with a few default values for this node.

The *property editor* will change and update depending on which node is selected in the *tag-tree*. In this case, since a controller is selected the *property editor* shows only those properties relevant for this type of node.

The most import property that we need to edit is **Host.** This property defines the IP address (or *host name*) for the controller that the CTCopc application should communicate with. In our example, the **Host** parameter should be edited to be 192.168.44.71.

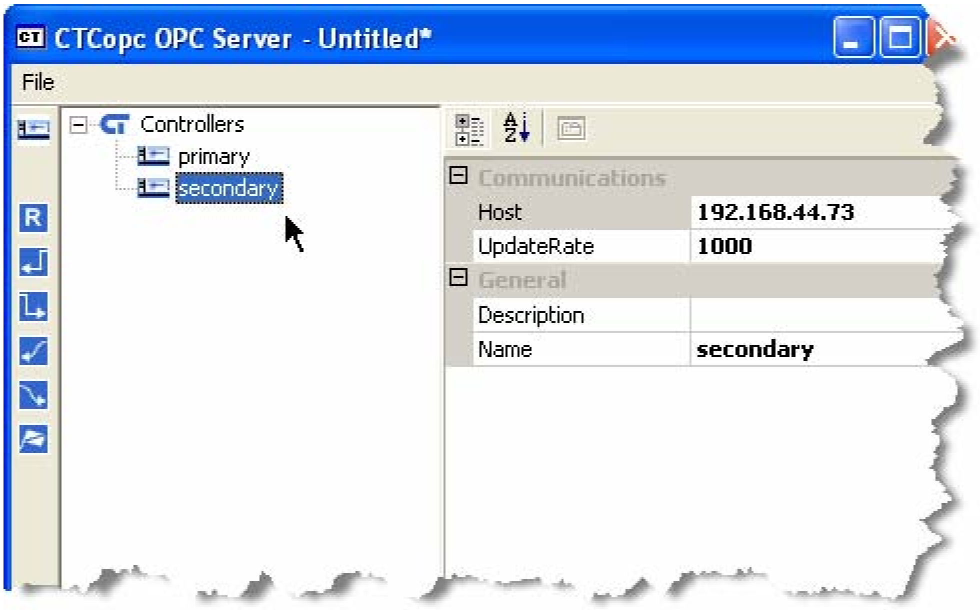
This is accomplished by clicking in the blank field next to **Host** and entering the address.



Host	192.168.44.71
UpdateRate	1000
Description	
Name	primary

The other properties for a controller will be discussed later in this document.

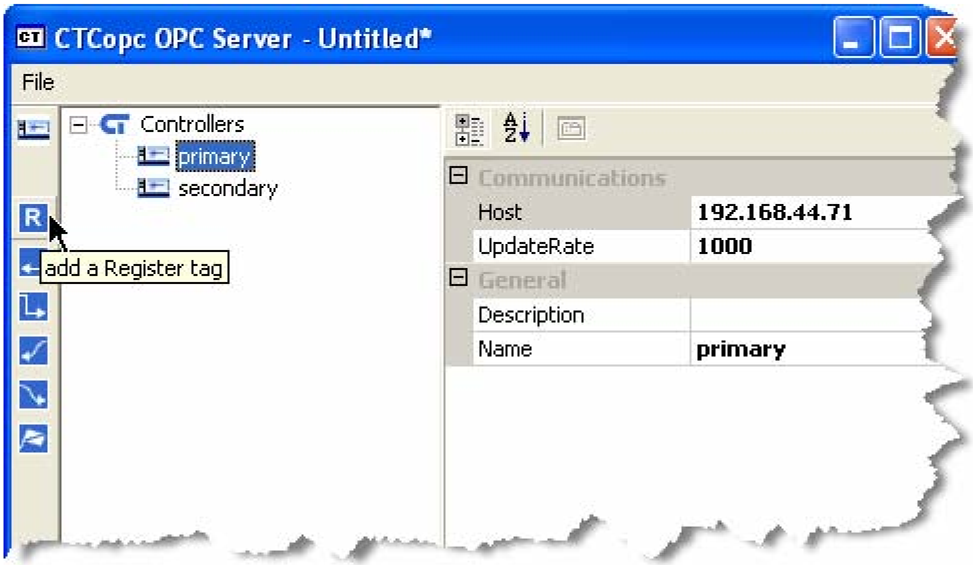
Adding the second controller is as simple as repeating the process described above, except that we will use the name "secondary" and the IP address 192.168.44.73.



Host	192.168.44.73
UpdateRate	1000
Description	
Name	secondary

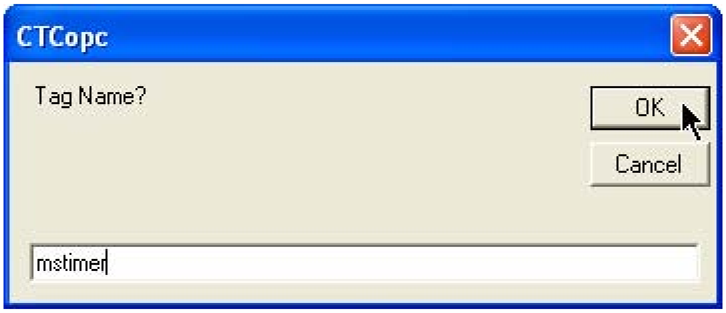
To add a tag to a controller, you click on it within the *tag-tree* and then click the appropriate icon in the toolbar for the type of tag you want to create.

For this example, we want to add the millisecond timer (register 13002) to each of the controllers, so we will be clicking on the icon that resembles the letter "R".



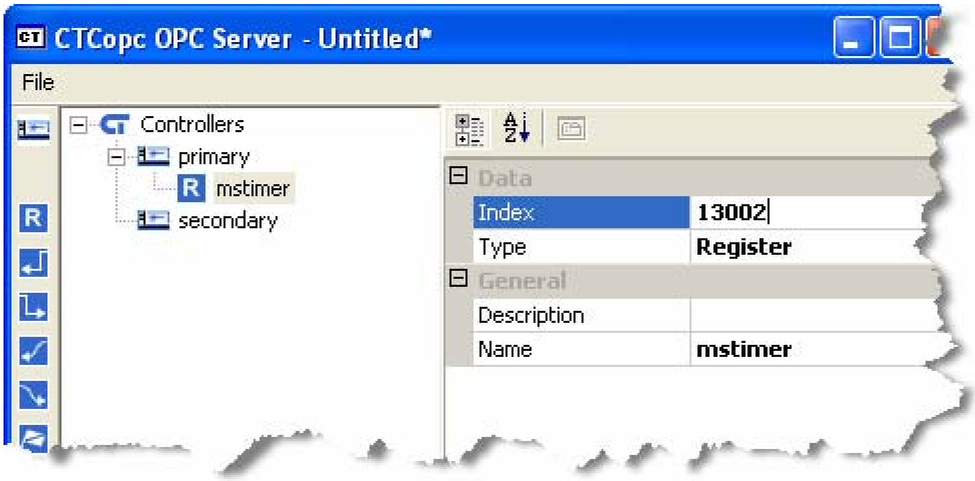
Host: 192.168.44.71
UpdateRate: 1000
Description:
Name: primary

A prompt will appear for the name of the tag. In this example, we will choose the name “mstimer” and then click the OK button.



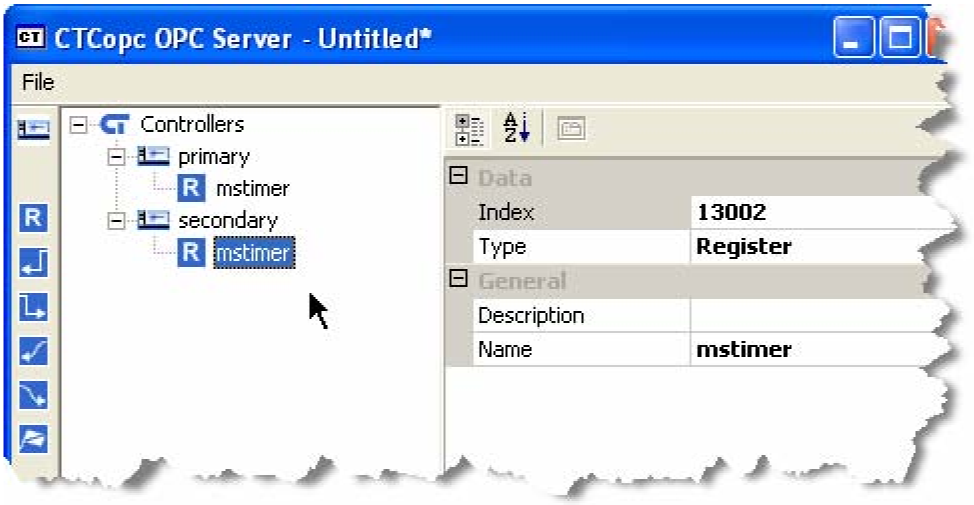
Tag Name?
mstimer

Before creating the register type tag for the “secondary” controller, we should edit the register number for this tag located in the **Index** property from its default value of 500 to a value of 13002.



Index: 13002
Type: Register
Description:
Name: mstimer

Next, we click on the “secondary” controller and repeat the process.

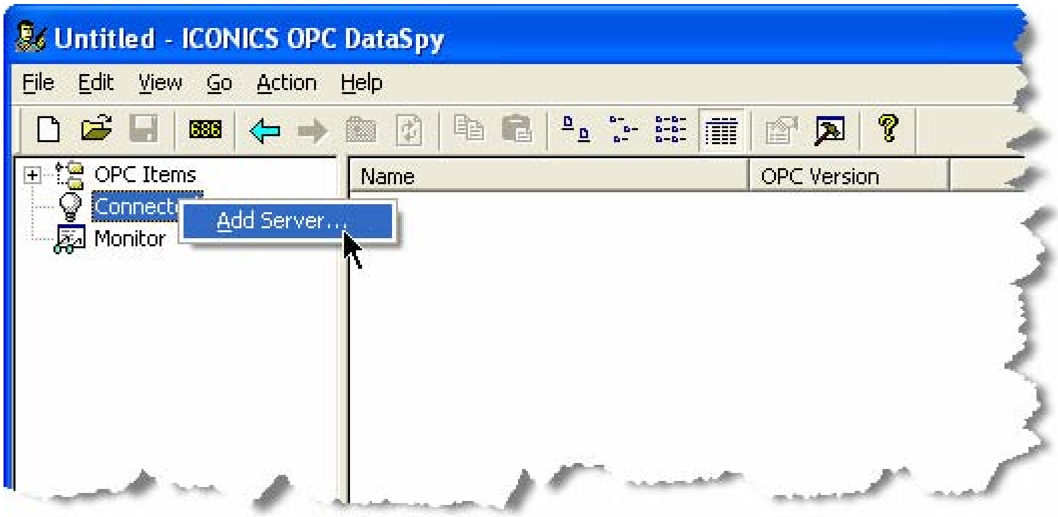


Index 13002
Type Register
Description
Name mstimer

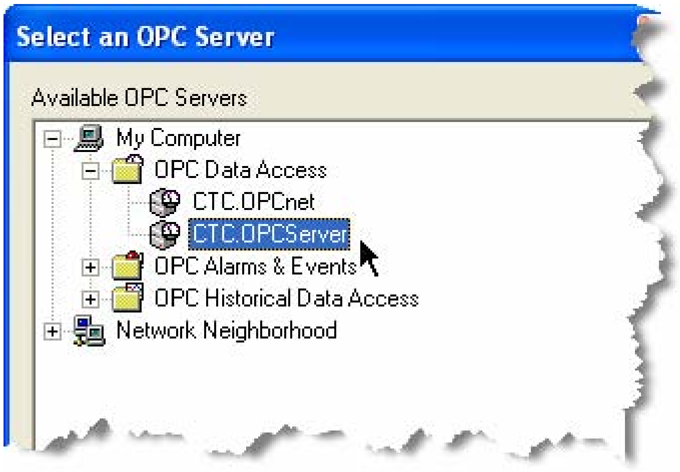
Next, we can launch an OPC client application to view these tags.

For this example, we will use a freely available test client from ICONICS called OPC DataSpy.

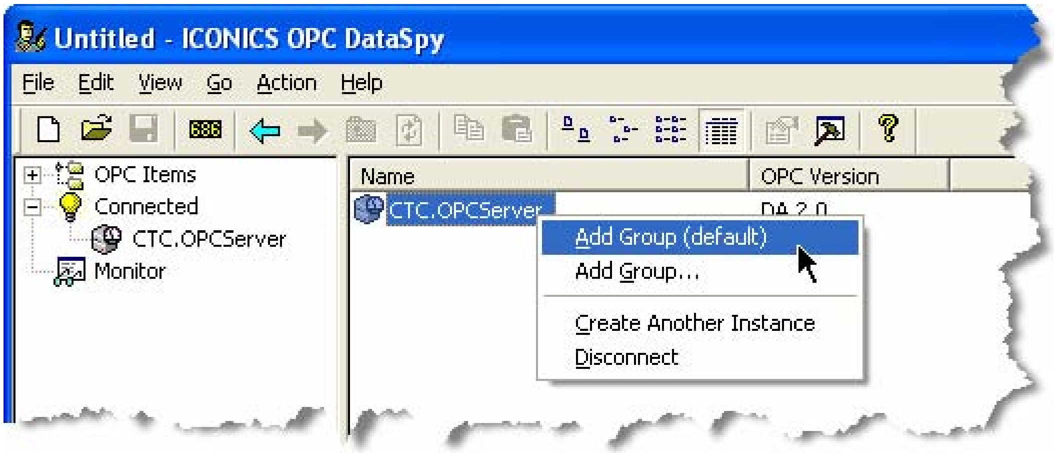
After launching DataSpy, we first need to create a connection (by right-mouse clicking on **Connected**) to the CTCopc OPC Server.



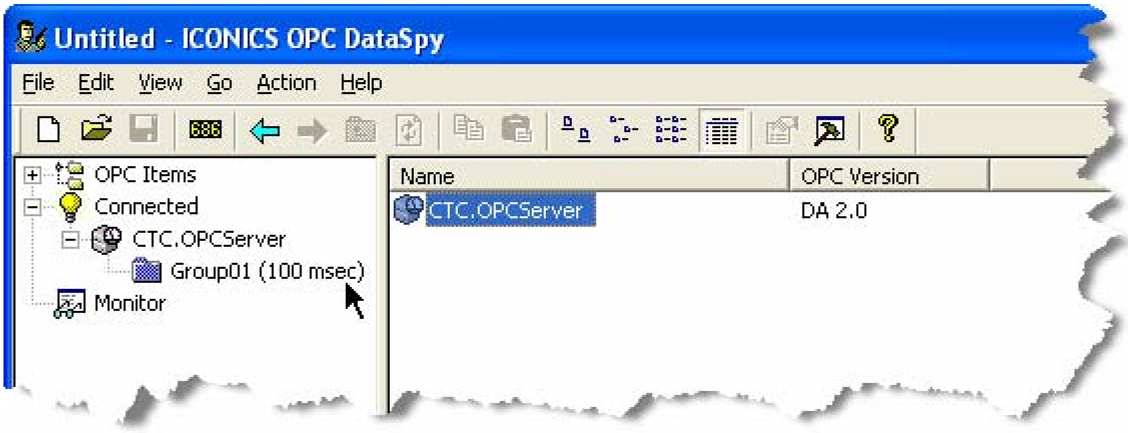
The name of the server as published to OPC clients is CTC.OPCServer. Choose this server from the dialog box and press OK.



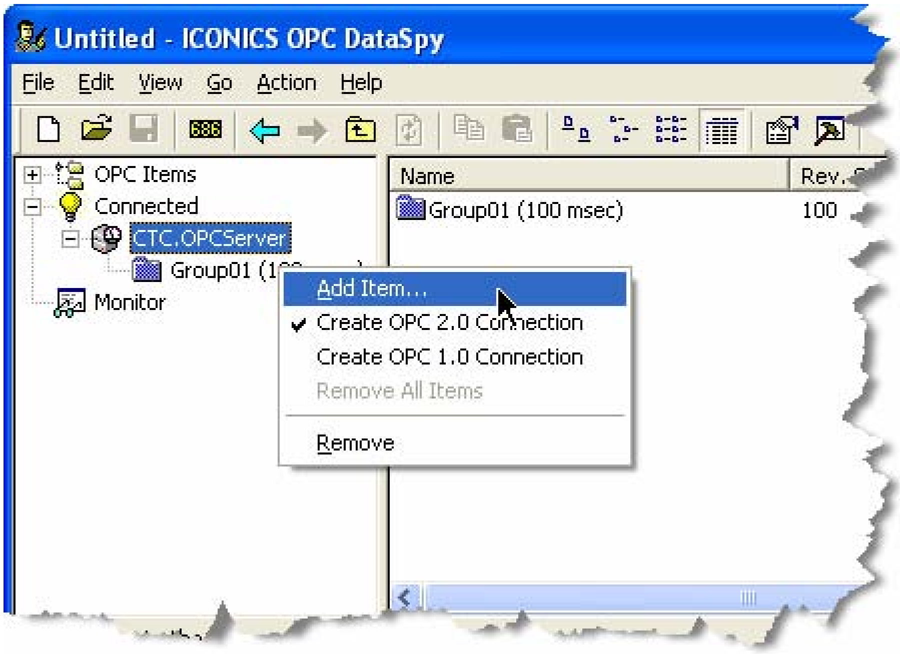
Next, add a default group to the server. OPC Groups are a part of the OPC specification and their purpose is as a container for published OPC tags.



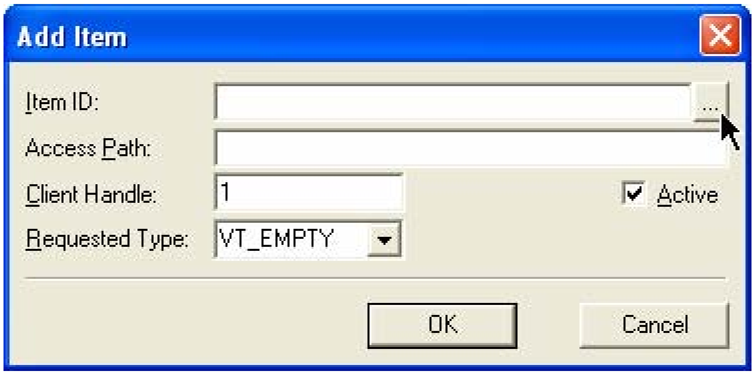
After adding a default group to the CTCopc OPC server, the DataSpy application window will show the new group (named **Group01**).



Next, we need to add a tag to this group that the CTCopc server is publishing. Right-mouse clicking on the default group (**Group01**) and click **Add Item**.


Untitled - ICONICS OPC DataSpy
File Edit View Go Action Help
OPC Items
Connected
CTC.OPCServer
Group01 (1…
Monitor
Name
Rev.
Group01 (100 msec)
100
Add Item...
✓ Create OPC 2.0 Connection
Create OPC 1.0 Connection
Remove All Items
Remove

A dialog box will appear to select the item to add. By clicking on the ellipsis icon (located in the upper right), we can select a published tag to add.



Item ID:

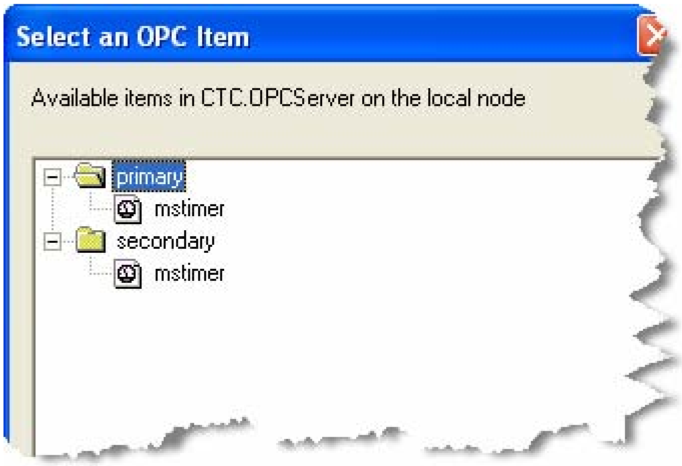
Access Path:

Client Handle: 1

☑ Active

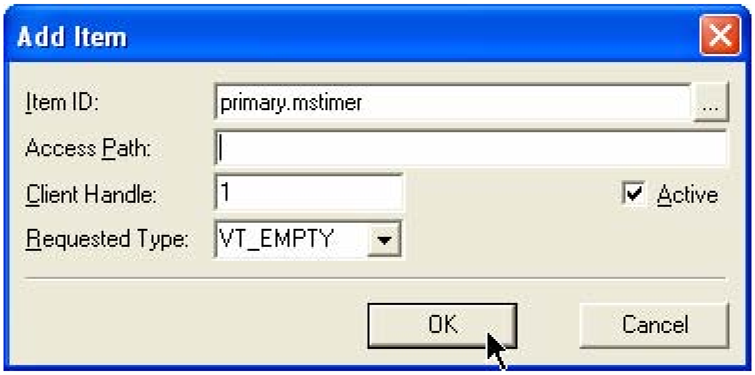
Requested Type: VT_EMPTY

As you can see, the two defined controllers along with their respective tags are available.



Available items in CTC.OPCServer on the local node

For this example, we'll select (by double-clicking) the **mstimer** tag from the first ("primary") controller and then adding it to DataSpy by clicking OK.



Item ID: primary.mstimer

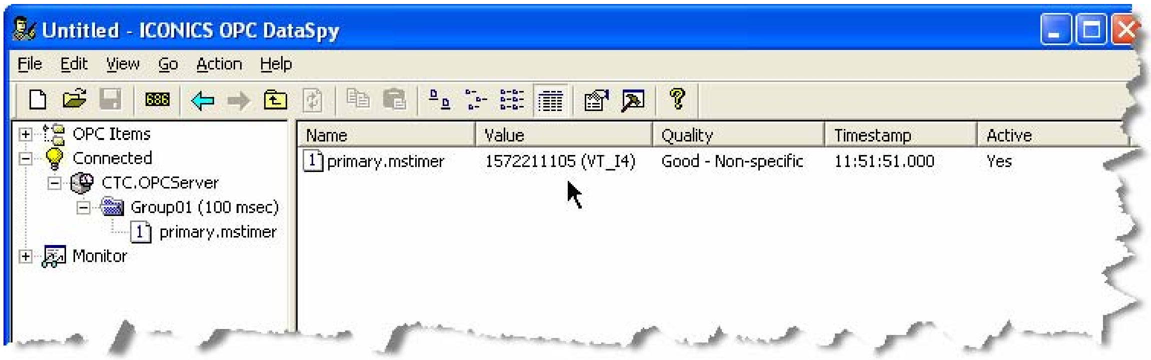
Access Path:

Client Handle: 1

☑ Active

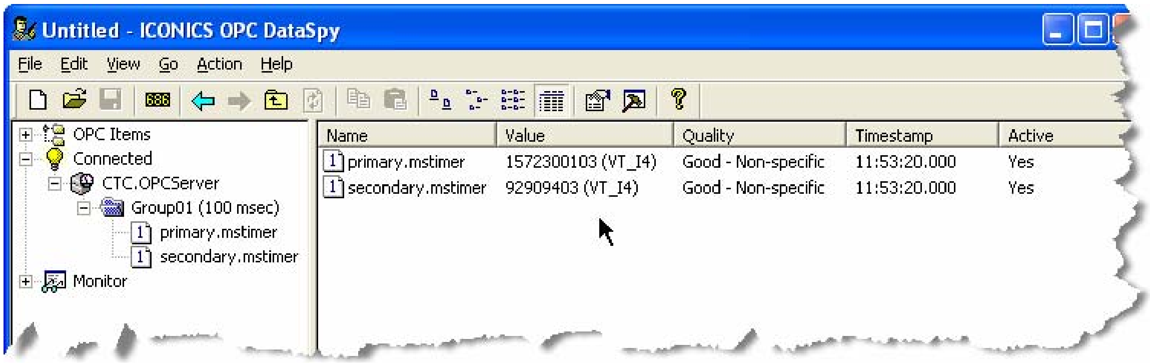
Requested Type: VT_EMPTY

The tag will appear as part of the **Group01** group, and the tag will update in the right pane.



Name	Value	Quality	Timestamp	Active
primary.mstimer	1572211105 (VT_I4)	Good - Non-specific	11:51:51.000	Yes

This step can be repeated for the second published tag (from the "secondary" controller) as well.



Name	Value	Quality	Timestamp	Active
primary.mstimer	1572300103 (VT_I4)	Good - Non-specific	11:53:20.000	Yes
secondary.mstimer	92909403 (VT_I4)	Good - Non-specific	11:53:20.000	Yes

Both tags will continue to update as long as the CTCopc server application is open.

CHAPTER 4

Properties

Each tree-tag node type has a specific set of properties that governs the tags behavior.

There are three fundamental *tag-tree* node types used in the CTCopc application. Each type of node has a specific set of properties associated with it.

This chapter describes each type and the properties available for the node.

ROOT NODE

The first type of *tag-tree* node is called the *root node* and is the uppermost node in the entire *tag-tree* hierarchy. It contains all other nodes defined in the project. It appears in the *tag-tree* as the CTC logo with the text, *Controllers*.

DESCRIPTION

The ***Description*** property for the *root node* is simply used to hold a summary description for the entire CTCopc project. It may be left blank since it is not exposed to OPC clients in any way.

CONTROLLER NODE

The second type of *tag-tree* node, the *controller node*, represents a physical CTC automation controller. The *controller node* contains all of the tags exposed to client OPC applications.

DESCRIPTION

The ***Description*** property for the *controller node* is used to hold a summary description for this controller. It may be left blank as it is not exposed to OPC clients.

NAME

The *Name* property holds the prefix used when *tag nodes* are published to OPC clients. All published tags within the CTCopc project hierarchy are published to clients as:

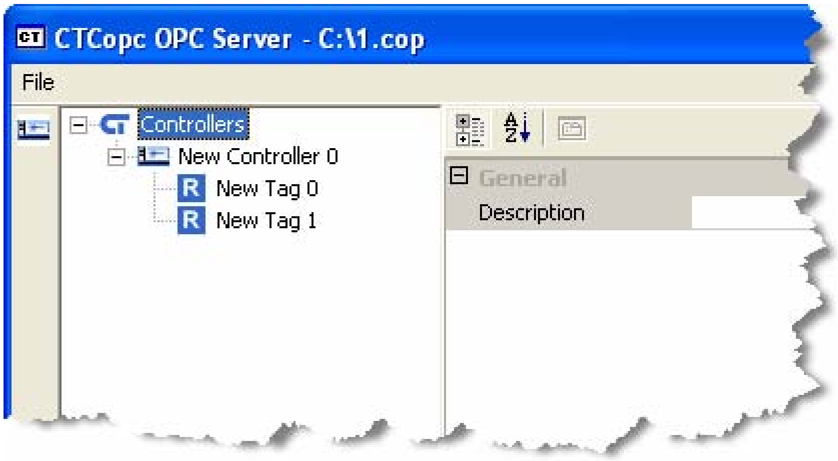
prefix.suffix

The *prefix* is the defined name of *parent controller node* and the *suffix* is the defined name of the *child tag node.*

In the following example, there would be two published OPC tags, namely:

New Controller 0.New Tag 0

New Controller 0.New Tag 1



HOST

The *Host* property defines the IP address that the CTCopc application uses to communicate with the physical CTC automation controller.

This field is entered as a dotted-quad (XX.XX.XX.XX).

UPDATERATE

The *UpdateRate* property defines how often each of the tags defined underneath this controller are updated. It is a numeric value defined in milliseconds.

The minimum allowed value is 100 milliseconds.

TAG NODE

The last type of *tag-tree* node, the *tag node*, represents a single entity residing in a physical controller.

DESCRIPTION

The ***Description*** property for the *tag node* is used to hold a summary description for this tag. It may be left blank as it is not exposed to OPC clients.

NAME

The ***Name*** property holds the suffix used this *tag node* is published to OPC clients. The *prefix* is the defined name of *parent controller node* and the *suffix* is the defined name of this *child tag node*.

INDEX

The ***Index*** property is used in conjunction with the ***Type*** property described below.

It is very important that the ***Index*** property is edited from its default value of 500.

TYPE

The ***Type*** property defines what entity within the controller should be exposed to OPC clients for this *tag node*. The ***Index*** property is used in conjunction with the ***Type*** property as follows.

Type	Index
Register	The register number to read (or write to) within the controller. For example, a value of 13002 represents the millisecond timer.
DigitalInput	The 1-based digital input number. For example, a value of 3 represents the third digital input connected to the controller.
DigitalOutput	The 1-based digital output number. For example, a value of 2 represents the second digital output connected to the controller.
AnalogInput	The 1-based analog input number. For example, a value of 4 represents the fourth analog input connected to the controller.
AnalogOutput	The 1-based analog output number. For example, a value of 1 represents the first analog output connected to the controller.
Flag	The 1-based flag number. For example, a value of 6 represents the sixth flag defined in the controller.

CHAPTER
5

Specifications

Specifications for CTCopc

Specifications are accurate at time of printing and are subject to change without notice.

OPC DA compatibility	Compatible to the OPC DA 1.0 and 2.0 specifications.
Total number of allowed controllers defined within a project	Up to 500, but dependent on the version purchased and authorized.
Total number of allowed tags defined per controller	Generally unlimited, but logically limited to about 1000.
Total number of allowed tags defined within a single project	Generally unlimited, but logically limited to about 10000.
OPC Variant type	All published tags are published as 4-byte (32 bit) integers using the OPC Variant type VT_I4.

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