

# OPC Device Driver Guide

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February 3, 2003

## 3. OPC Server Device Communications

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### 3.1 Introduction to OPC

The OPC Comport is associated with one OPC Server. If you have multiple OPC Servers, you must configure an OPC Comport to each Server. All OPC Devices on the same Comport are associated with one OPC Server.

OPC is an acronym for OLE for Process Control. It is an industry standard introduced by Microsoft based on DCOM. The WebAccess Device driver is an OLE Client. Hardware manufactures typically supply an OPC Server to provide access to real-time data. Most OPC Servers allow tags to be "browsed" and "imported". WebAccess provides an OPCTool.exe that allows tags to be "imported" after you have configured an OPC Comport and at least one OPC Device.

The OPC Server software is usually installed on the SCADA node (a **Local** OPC Server).

The OPC Server software can also be installed on another PC (a **Remote** OPC Server) that is not the SCADA Node. A TCP/IP network connection (usually a LAN or Intranet) is used to communicate to the "**remote**" OPC Server from the SCADA Node. The **remote** OPC Server must have either WebAccess Project Node software or OPC Service installed. WebAccess provides a set of pre-built communication "drivers" that enable engineers and technicians to easily establish communications to automation devices including PLCs, controllers, DCS, DDC systems, other software packages, recorders, RTUs, IO, smart transmitters and other automation hardware.

The steps, in summary, are:

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **WebAccess Configuration**.
4. Open or Create a **Project**.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is an **OPC type Comport**. Assign an **OPC Server** to this Comport.
7. Configure an **OPC Device** (determines the communications Protocol or Device Driver).
8. Start the OPCTool.exe on the Project Node.
9. Import Tags using the OPC Tool, Import/Add Tags and the Browse feature.

10. Optionally apply Tag name conversion rules before importing tags.
11. Edit Tags in Project Manager to assign **Alarms, Scaling, Engineering Units**, Description and other features.

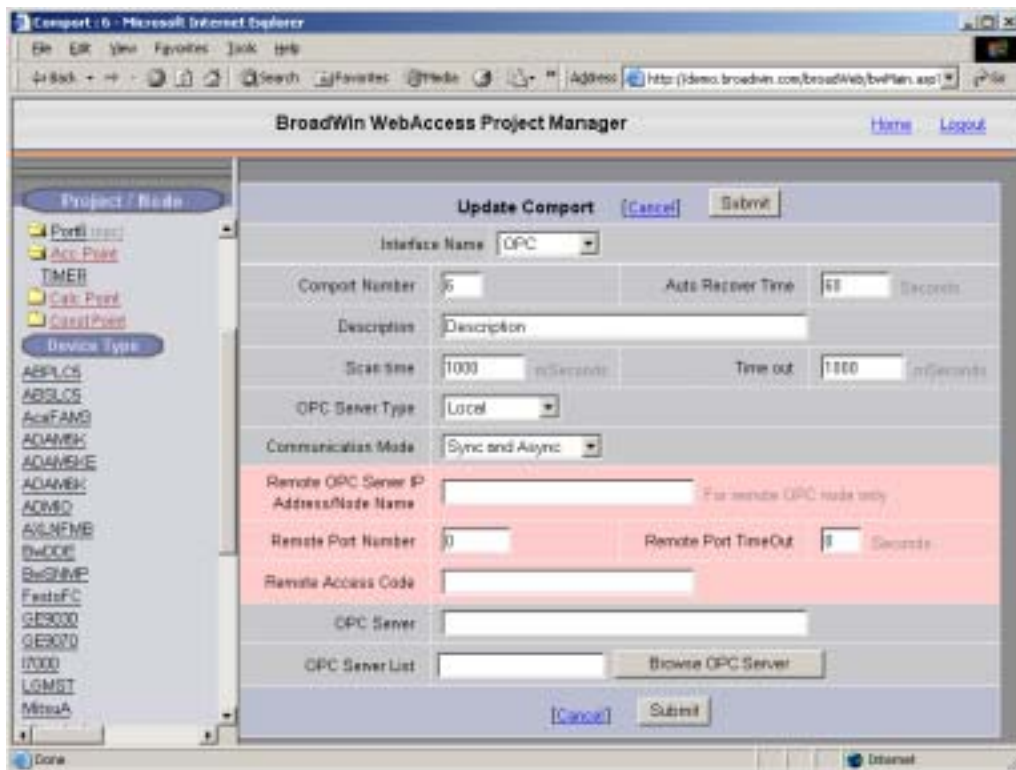
## 3.2 OPC Comport Properties

The OPC Comport is associated with one OPC Server. If you have multiple OPC Servers, you must configure an OPC Comport to each Server. All OPC Devices on the same Comport are associated with one OPC Server.

OPC is an acronym for OLE for Process Control. It is an industry standard introduced by Microsoft based on DCOM. The WebAccess Device driver is an OLE Client. Hardware manufactures typically supply an OPC Server to provide access to real-time data. Most OPC Servers allow tags to be "browsed" and "imported". WebAccess provides an OPCTool.exe that allows tags to be "imported" after you have configured an OPC Comport and at least one OPC Device.

The OPC Server software is usually installed on the SCADA node (a **Local** OPC Server).

The OPC Server software can also be installed on another PC (a **Remote** OPC Server) that is not the SCADA Node. A TCP/IP network connection (usually a LAN or Intranet) is used to communicate to the "**remote**" OPC Server from the SCADA Node. The **remote** OPC Server must have either WebAccess Project Node software or OPC Service installed.



### 3.2.1 Comport Number

In the OPC port properties, this is a Virtual number used for reference. It can be any number. The only consideration might be to avoid conflicts with another device driver (i.e. a Serial Comport) which requires the comport number to match that of the physical interface.

The connection from the OPC Server to the PLC or automation device may be a Serial Port, TCP/IP or proprietary network card. Hence, it is possible to have a Serial connection to the device, but use the OPC Port type in WebAccess. Allen-Bradley RS-LINX with the Data Highway protocol is an example.

If the OPC Server uses a Serial Comport, it is okay to use that same number as the OPC Comport number. This has the added advantage of reducing confusion.

### 3.2.2 Auto Recover Time

Auto Recover Time is the Time to wait before attempting to re-establish communications with the OPC Server. It is recommended to accept the default of 60 seconds. If communications to the OPC Server is unusually slow due to software, communications or network issues, you might consider increasing this value. If communications to the OPC Server fails frequently, you may want to decrease this number in order to have WebAccess try to re-establish communications sooner.

If communications to the Server Fails (i.e. exceeds Timeout for a remote OPC Server or drops in a Local Server) WebAccess will wait the Auto Recover Time before trying to re-establish communications. WebAccess will drop any "open handles" and re-establish new "software links" to the OPC Server. WebAccess will try to restart the OPC Server if the OPC Server is not running.

### 3.2.3 Description

User defined field for reference. This appears only in Project Manager.

### 3.2.4 OPC Server Type

This describes the physical location of the OPC Server software in relation to the SCADA Node. It is recommended to use either **Local** or **Remote** OPC Server choice. The In Process Server is a special type of Local OPC Server.

#### Local

**Local** OPC Server Type is OPC Server software installed on the SCADA Node. This is the most common choice. It is recommended to use a Local OPC Server. You will be able to import tags from the Local OPC Server if the SCADA Node software is installed on the SCADA Node. If **Local** is chosen, then the "**Browse OPC Server**" button will update the "**List of OPC Servers**" named at the bottom of the page with Local OPC Servers.

## InProcess

**InProcess** OPC Server Type is a special application of a Local OPC Server running in the same Process as the Client. There are many special requirements for an In Process Server (for example the Process must be registered, the DLL must be available to the Client, etc). It is recommended to use the Local OPC server if possible. Please refer to your OPC Server Guide for more information.

## Remote

**Remote** OPC Server Type is an OPC Server software running on a computer that is NOT this SCADA node. To configure a Remote OPC server will need to specify the address of the computer running the OPC Server Software in the Field labeled "**Remote OPC Server IP Address/Node Name**" and the TCP **Port** used by the OPC Server (if any).

If Remote is chosen, then the data fields in PINK are used to connect with the Remote OPC server.

If Remote is chosen, then the "**Browse OPC Sever**" button will update the "**List of OPC Servers**" named at the bottom of the page with Servers from the Remote Computer described in **Remote OPC Server IP Address/Node Name**.

The WebAccess OPC Service must be installed on the remote computer in order to import tags from the Remote OPC Server using OPCTool.exe.

### 3.2.5 Communication Mode

The communications mode (Asynchronous or Synchronous) is determined by the OPC Server. Most newer OPC Servers use Both Asynch and Synchronous modes, however many early OPC Servers use Synchronous polling only.

Synchronous Mode requires that the Client continuously poll the OPC Server for data.

Asynchronous Mode allows report by exception where the Client initially polls the Server when it starts, then the Server reports only when a value changes.

### 3.2.6 Remote OPC Server IP Address/Node Name

This is the address of the PC with the Remote OPC Server. Use this field if you are using a **Remote** OPC server. A Remote OPC Server is any OPC Software that is not installed on this SCADA Node.

This address can be a Network Node Name (Microsoft Network Name), a URL or an IP Address. A Remote Server is any PC other than the SCADA node you are configuring.

Unlike other OPC Clients, Web Access can use TCP/IP and IP addresses to access data from a Remote OPC Server. If the Remote OPC Server is not installed on a SCADA Node or Project Node, then the **WebAccess OPC Service** must be installed on the Remote OPC Server PC for tags to be imported and for real-time data to be exchanged. The Remote OPC Service can be installed from the WebAccess Installation CD-ROM.

### 3.2.7 Remote Port Number

This is the Primary TCP Port used by the Remote WebAccess SCADA Node or Remote WebAccess OPC Service. This is determined during installation of the WebAccess software on the Remote Node. (The default, 0 = Port 4592).

If the Remote OPC Server is not installed on a SCADA Node or Project Node, then the **WebAccess OPC Service** must be installed on the Remote OPC Server PC for tags to be imported and for real-time data to be exchanged. The Remote OPC Service can be installed from the WebAccess Installation CD-ROM.

### 3.2.8 Remote Port TimeOut

The OPC Remote Port Time Out is the time (in second) waited before re-sending a communications packet that did not have a reply. Specifies how long the software waits for a response to a data request, specifically, to wait for a reply from one packet.

For OPC Remote Port Timeout, 0 = default = 15 seconds.

If communications to the Server Fails (i.e. exceeds Time Out for a remote OPC Server after three retries) WebAccess will wait the Auto Recover Time before trying to re-establish communications. WebAccess will drop any "open handles" and re-establish new "software links" to the OPC Server. WebAccess will try to restart the OPC Server if the OPC Server is not running.

### 3.2.9 Remote Access Code

This is the Remote Access Code established during installation of the WebAccess software (SCADA Node, Project Node or OPC Service) on the OPC Server computer. The access code you enter here must match the Remote Access Code established during installation on the OPC Server. This prevents unauthorized users from accessing the OPC Server data using the WebAccess OPC Service.

### 3.2.10 OPC Server

This is the name of an OPC Server to be used. This can be either a **Remote** or **Local** OPC Server.

It is recommended to use the "**Browser OPC Server**" button and then select the name of the OPC Server you want to use from the OPC Server List. This ensures proper spelling and syntax.

To enter the OPC Server:

- 1) Select **Local** or **Remote** OPC Server Type. Local is an OPC Server installed on the SCADA node.
- 2) If using **Remote** OPC, enter
  - i. The **IP Address** or Computer name of the Remote OPC Server.
  - ii. The primary TCP **Port** of the remote OPC Service (0 = default).
  - iii. The **Remote Access Code** of the remote OPC Service.
- 3) Press the "**Browse OPC Server Names**" button.
- 4) Select the desired server from the OPC **Server List**. This will enter the OPC Server name in the OPC Server field.

You can also type the name of the OPC Server, if you know the registered name. It is recommended to use the "Browse OPC Server" button and select the OPC Server from the list to avoid spelling and syntax errors.

### OPC Server List

This is a list of local OPC Servers on the local Project/SCADA node. It is recommended to use this list to update the **OPC Server** field. This list is updated by pressing the Browse OPC Server Names button.

It is recommended to use the "Browse OPC Server" button in order to update this entry. This ensures proper spelling and syntax.

To update the OPC Server List:

- 1) Select **Local** or **Remote** OPC Server Type. Local is an OPC Server installed on the SCADA node.
- 2) If using **Remote** OPC, enter
  - i. The **IP Address** or Computer name of the Remote OPC Server.
  - ii. The primary TCP **Port** of the remote OPC Service (0 = default).
  - iii. The **Remote Access Code** of the remote OPC Service.
- 3) Press the "**Browse OPC Server Names**" button.
- 4) Select the desired server from the OPC **Server List**. This will enter the OPC Server name in the OPC Server field.

### Browse OPC Server Names

If **OPC Server Type** is **Local**, this updates the OPC Server List by browsing local OPC Servers on the **SCADA node**.

If **OPC Server Type** is **Remote**, this updates the OPC Server List by browsing remote OPC Servers specified in Remote OPC Server Address.

### 3.3 Device Properties - OPC Port

The Devices on an OPC Comport are "virtual" devices. You can use Device as an organizational tool (i.e. to represent process units, equipment, areas of a plant) or lump all the Tags into one Device.

The OPC Comport is associated with one OPC Server. If you have multiple OPC Servers, you must configure an OPC Comport to each Server. The OPC Device represents a "virtual" device. All OPC Devices on the same Comport are associated with one OPC Server.

OPC is an acronym for OLE for Process Control. The manufacture (or a 3<sup>rd</sup> party) supplies an OPC Server. The WebAccess driver is an OLE Client. The OPC Device is a connection to software and is often a "virtual device" which may include many physical devices in the field.

The OPC Server software usually is installed on the SCADA node. The OPC Server software can be installed on another PC; a TCP/IP network connection (usually a LAN or Intranet) is used to communicate to the "remote" OPC Server.

The connection from the SCADA node to the PLC or automation device may be a Serial Port, TCP/IP or proprietary network card. Hence, it is possible to have a Serial connection to the device, but use the OPC Port type in WebAccess. Allen-Bradley RS-LINX and the Data Highway protocol is an example.

For More information on OPC type Com Ports see [OPC Comport Properties](#).

Add your device to the OPC Port, by selecting the OPC Port you have configured, then select [Add Device](#).

To modify an existing Device, Select [Device Properties](#). The Device Properties Page for an OPC Type Device appears.



Delete Add Tag Add Block Browse OPC Items Tag Import Block Import	
Device Property [Cancel] Submit	
Device Name	PLC31
Description	OPC Device
Unit Number	0
Device Type	OpcBw

**Device Name** is any user-defined name. See [Error! Reference source not found.](#) for more information.

**Description** is a user defined. See [Error! Reference source not found.](#) for more information.

**Unit Number**, for most OPC interfaces, this is a "virtual number" and does not correspond to the actual Unit Number used in the protocol addressing. See [Error! Reference source not found.](#) for more information.

The **Device Type** lists available Device Drivers for an OPC type Comport (e.g. LANSTARII, RSLINX, KEPWARE). See [Error! Reference source not found.](#) for more information. If your device Type does not appear, you may have configured the wrong Com Port type. Not all OPC Servers follow the OPC standards in the same way. The OPCBW device type is tested with LANSTAR II and most KEPWARE OPC servers.

See the Device Driver Guide for you device type for detailed information.

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## 3.4 OPCTool - Import Tags

The WebAccess OPC Tool (OPCTool.exe) allows you to import tags from a Local or Remote OPC Server into WebAccess. The features of this tool include:

- Browse the "Tree" of OPC Items
- Browse the OPC Data points within each OPC Item
- Convert OPC Tag names (i.e. rename automatically)
  - Convert to Short Tag name
  - Convert by Renaming Rules
  - Convert to Sequential Tag numbers
- Append Prefix to OPC Tag Names
- Filter OPC Data Points by Data Type or Name
- Import only Selected Items
- Import All Items
- Import from Local OPC Server (Local to Project Node)
- Import from a Remote OPC Server (Remote to Project Node).
- Import to multiple Projects, Nodes, and Devices

The OPC Tool must be run on the Project Node. The OPC Server and the SCADA node can both be remote to the Project Node. But the OPC Tool works on a WebAccess Database directly (bwcfg.mdb) and, consequently, the OPCTool.exe must be run on the Project Node.

When using the **OPC Tool** a **Local** OPC Server is Local to the **Project Node**. A Remote OPC Server is remote to the Project Node. This is in contrast to the SCADA node. You may have configured your SCADA node to use a Local OPC Server, but when using the OPC Tool, that OPC Server might be remote (if the SCADA node and Project node are on separate nodes). The only time both the OPC Tool and SCADA node uses a Local OPC Server is if the SCADA Node and Project Node are the same PC.

Before using the OPC Tool to import, you must configure an OPC Comport, at least one OPC Device.

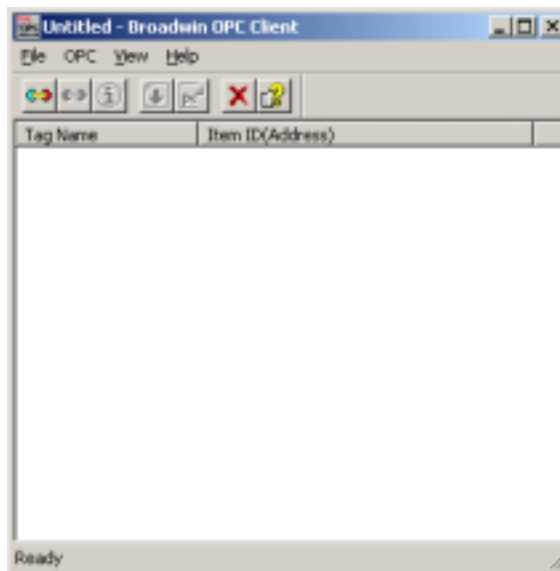
The OPC Tool will start the OPC Server if it is not running. However, it is recommended that you manually start the OPC Server and run through any procedure needed to connect to the automation devices (for example in the Kepware Modbus and Cimetrics BacNet OPC Servers both start with no

devices connected and require that you select a device or network to communicate).

### 3.4.1 Start the OPC Tool

The easiest way to run the OPC Tool is:

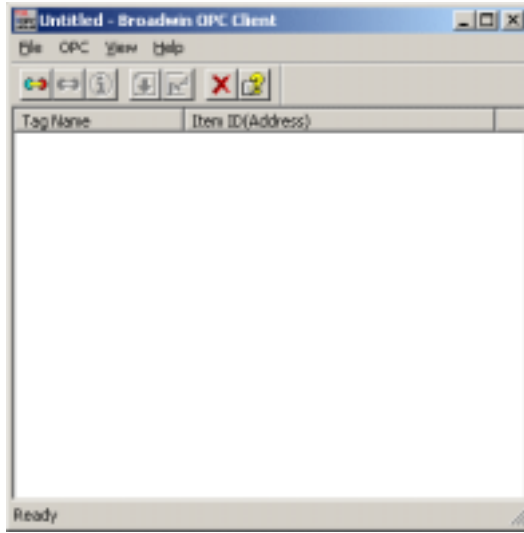
1. Go to the Project Node
2. Select START button from the Task Bar
3. Select **Run**
4. Enter **OPCTool**
5. Select **OK**.
6. The **OPC Tool Client** opens.  
It will be blank until you connect to a Server.




The OPC Tool is program located in the WebAccess Node directory (typically C:\WebAccess\Node\OPCTool.exe) on the Project Node. As an alternate to using the Start button and RUN, you can double click on the OPCTool.exe icon in Windows Explorer.

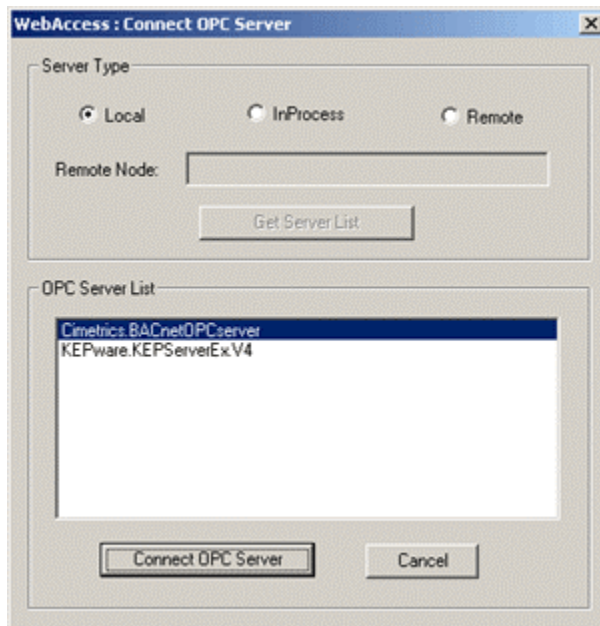
Before using the OPC Tool to import, you must configure an OPC Comport, at least one OPC Device. In case you forgot to configure an OPC Comport and Device in your WebAccess Database, you can do so without closing the OPC Tool.

### 3.4.2 Connect to OPC Server with OPC Tool



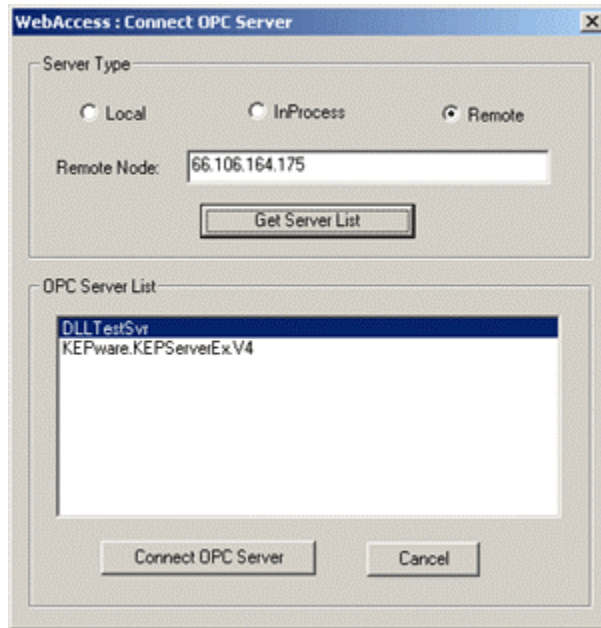
1. To connect the OPC Tool an OPC Server select either the connect icon  or from the menu bar select **OPC - > Connect OPC Server** from the OPC Tool Client.

2. The WebAccess Connect OPC Server Dialog box opens.



3. Under Server Type select either **Local** (i.e. this computer, the Project Node) or **Remote** (another computer).

3a. If you select **Local**, a list of all installed OPC Servers on this local computer appears. (i.e. the OPC Servers installed on the Project Node or Combined Project / SCADA node).



3b. If you select **Remote**:

3.b.1 Enter the **IP Address** or **Computer name** of the remote computer with the desired OPC Server.

3.b.2 Press the **Get Server** List button

3.b.3 A list of all OPC Servers on the Remote Computer appears.

4. Select the server from the **OPC Server List**

5. Select the **Connect OPC Server** button.

The OPC Tool will start the OPC Server if it is not running. However, it is recommended that you manually start the OPC Server and run through any procedure needed to connect to the automation devices (for example in the Kepware Modbus and Cimetrics BacNet OPC Servers both start with no devices connected and require that you select a device or network to communicate).

6. The OPC Tool Client appears with the toolbar icons enabled, including the following



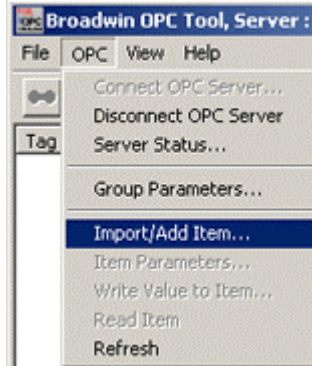
**Disconnect OPC Server** 

**OPC Status** 

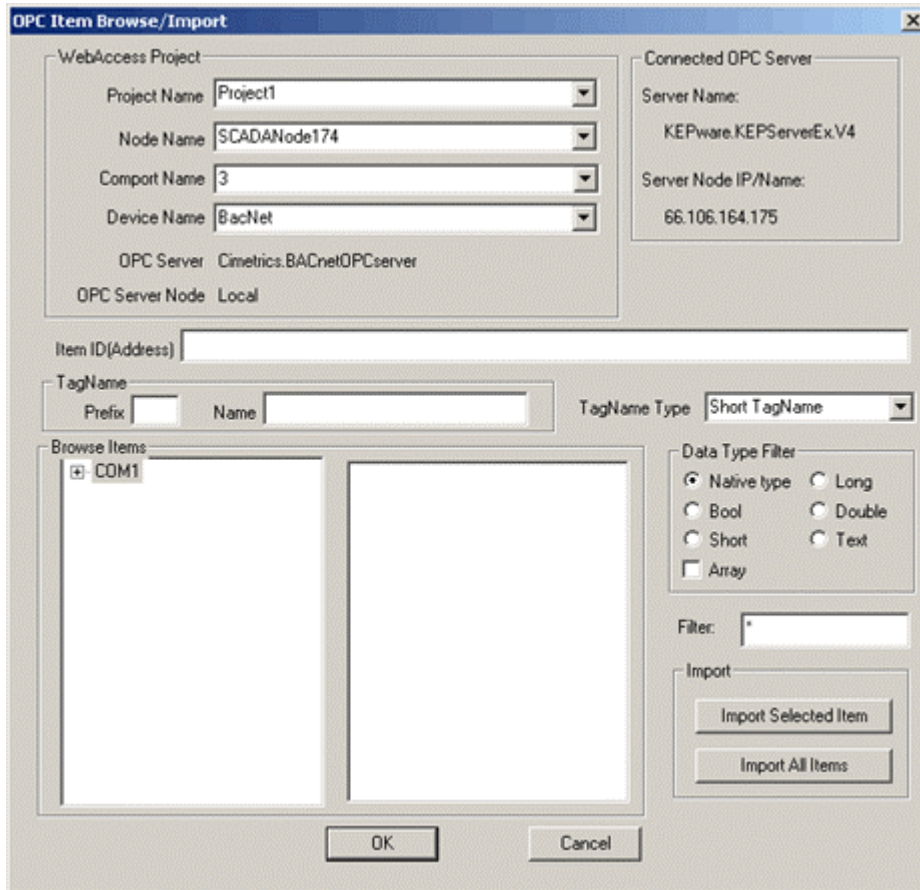
**Import / Add Item** 

7. Select the **Import/Add Item** icon 

Or from the menu bar select **OPC -> Import/Add Items**




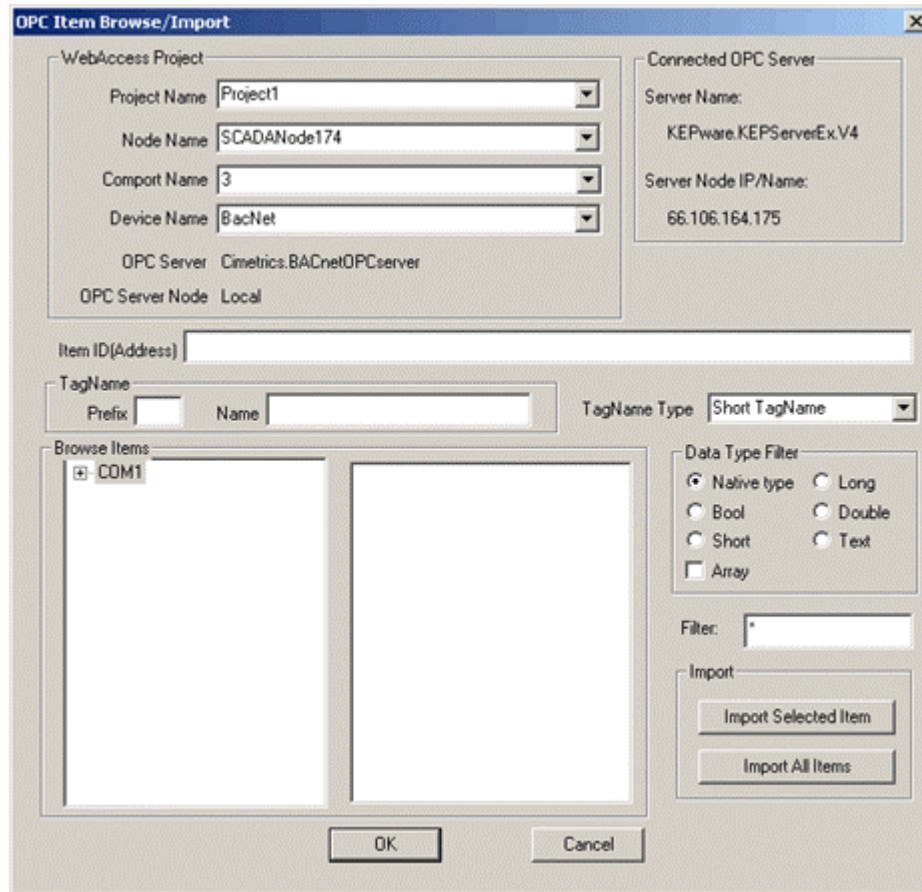
8. The **OPC Item Browse/Import** Dialog Panel appears.



### 3.4.3 OPC Item Import

To open the OPC Item /Browse import

1. [Start the OPC Tool](#)
2. [Connect to OPC Server](#)
3. Select Item / Browse icon 
4. The **OPC Item Browse / Import** Dialog Panel opens.



5. Select the desired **Project** from the pull down list (if you have more than one Project). The first project, listed alphabetically, is selected by default.
6. Select the SCADA node from the list (if you have multiple SCADA Nodes). This is the SCADA node that will collect data from the OPC Server. The SCADA node must have an OPC Comport configured to the OPC Server you are connected with now.
7. Select the Comport configured to this OPC Server.

The OPC Server and Server Type will change to reflect the configuration of the Comport. If the selected Comport is configured for an OPC Server, the OPC Server named and OPC Server Node type appears.

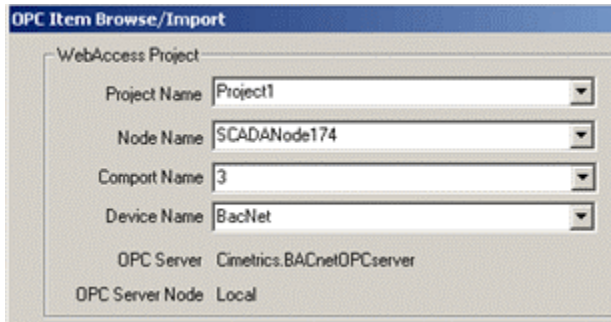


Figure - ComPort 3 configured for Cimetrics BACnet OPC Server

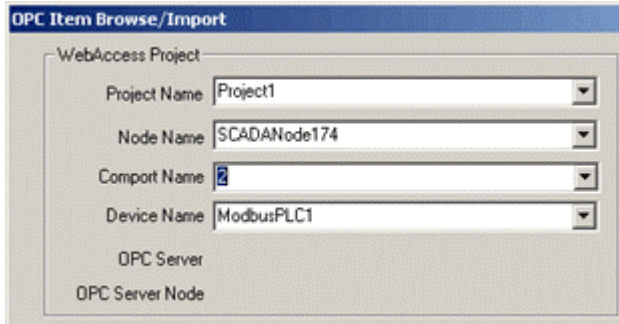
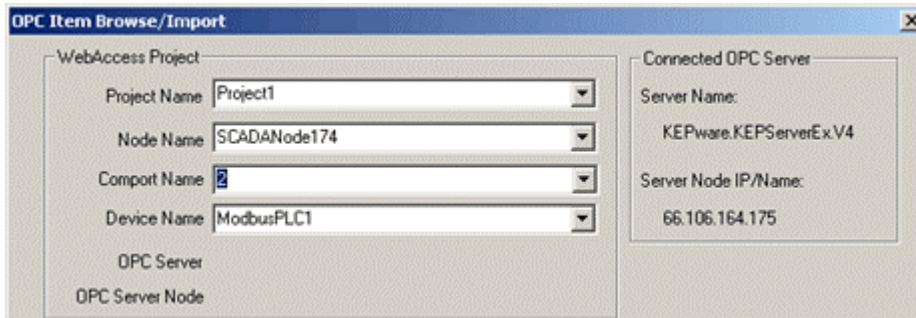
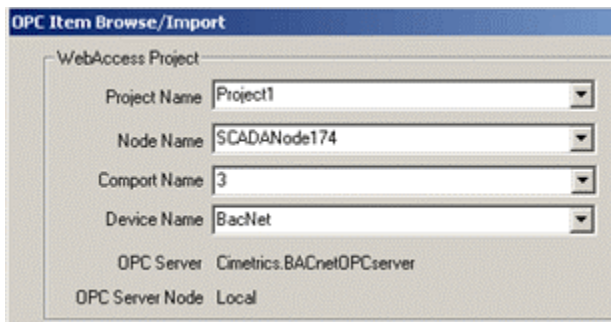


Figure - Comport 2 - no OPC Server configured

- 8. Confirm that the SCADA Node / Comport you have selected is configured for the OPC Server you have connected the OPC Tool.



The ComPort's OPC Server is listed in the **WebAccess Project** information area below the Comport and Device Name.



The Connect OPC Server area, at the Top Right, shows the OPC Server that the OPC Tool is currently connected to.



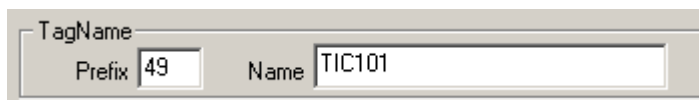
9. Select the Type of Tag Name Conversion (sic **Tag Name Type**). WebAccess Tag names are limited to 15 characters and the OPC Item names are often much longer.



- a. **Short TagName** will use the OPC **Data Point** name (the Panel on Right) as the Tag Name. If the same Data Point has already been selected from another item, WebAccess will append a sequential number to the tag name.
- b. **Convert TagName** will use both the **Item Name** and **Data Point** Name plus **conversion rules** create a Tag Name. The conversion rules are described in the [OPCTol.ini](#) file. The Convert Tag Name will give you the greatest control in creating tag names automatically. Please see section OPC TOOL INI file of Conversion Rules, section 3.4.3.1
- c. **Sequential TagName** will number the tag consecutively: Tag1, Tag2, etc. If you modify the TagName field (i.e. replace TAG), the tool will append a number to the name you enter and track the number of previous tag name roots.
- d. **ItemID** will use the OPC Item Name (from the Panel on Left) for any DataPoint selected (from Panel on Right). This is typically used when the same Data Point (e.g. present value) is selected for all Items and the Item Name is the desired Tag. **Sequential Numbering** of the Tag Name will occur if multiple Data Points are selected from the same Item (e.g. device\_1967\_\_analog\_I, device\_1967\_\_analog01, device\_1967\_\_analog02).

Underscores (\_) will replace Blanks (white spaces) in OPC Item and Data Point names.

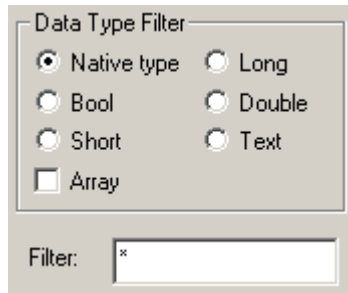
10. Add a **Prefix**, if desired. Prefix is limited to 2 characters max.



This prefix will be the leading characters of the WebAccess Tag Name. For example, Prefix "49" will yield 49TIC101, 49PIC202, 49YS333 etc.

The Prefix is commonly used to help users distinguish between multiple process units that have identical OPC naming conventions inside each process unit (for example 10 Air Handlers, all with identical control databases and OPC data point names).

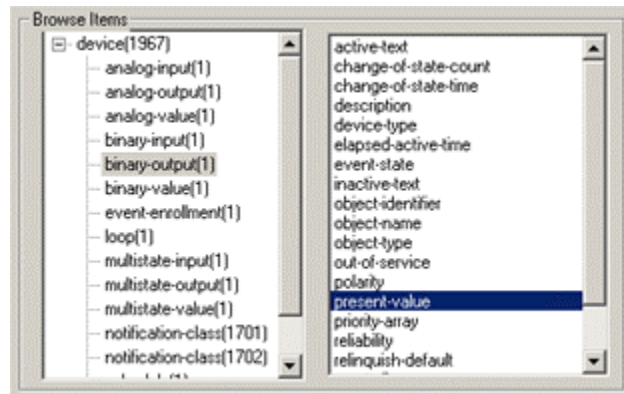
11. **Data Type Filter** - new users are recommended to select **Native Type** (the default) and use the wildcard (\*) for the Filter.



The Data Type Filter will limit the Data Points listed to only the Data Type selected (Boolean, Long Integer, etc).

11a. **Filter** is an OPC server specific filter string. Not all OPC Servers support Item Filter. This is entirely free format. Although the valid criteria are vendor specific, a typical filter is T\* where all tags beginning with "T" are displayed (e.g. TI100, TI101, TC102). The wildcard (\*) is recommended for new users.

12. Select an OPC **Item** (Panel on Left) under Browse Items.



13. Select a **Data Point** (Panel on Right) associated with the selected OPC Item. Notice that the List of Data Points (Right Panel) changes as you select different Browse Items (Left Panel).

Note that each Item in an OPC Server can have multiple data points associated with it.

14. The proposed TAGNAME appears in the TagName field (less any Prefix). Modify the Tagname if desired.

15. Item ID (Address) describes the addressing that will be used to read data from the OPC Server. It is recommended to accept this without modification.

16. Click the **Import Selected Items** button.

17. Select another OPC Item, and repeat steps 9 to 15 until all desired tags are imported.

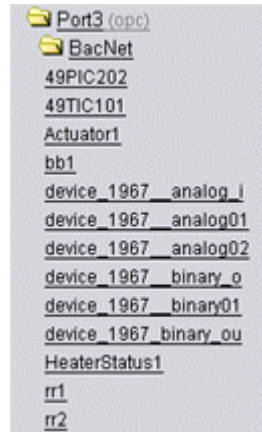
18. Select **OK** to confirm the Import of tags to WebAccess.

If you press Cancel, all tags imported since your first started the Add/Import Tags will be aborted.

19. The OPC Tool Client will list the Tag Names imported and the OPC Item addresses. The WebAccess Tag names are listed on the left (under Tag Name) and the OPC Items are listed on the right (under ItemID).

Tag Name	Item ID(Address)
rr1	device(1967).binary-output(1).description
rr2	device(1967).binary-output(1).device-type
bb1	device(1967).binary-output(1).inactive-text
device_1967__binary_o	device(1967).binary-output(1).present-value
device_1967__binary01	device(1967).binary-output(1).polarity
device_1967__analog_i	device(1967).analog-input(1).present-value
device_1967__analog01	device(1967).analog-input(1).object-name
device_1967__analog02	device(1967).analog-input(1).min-pres-value
49TIC101	device(1967).analog-input(1).present-value
49PIC202	device(1967).multistate-input(1).present-value
device_1967__binary_ou	device(1967).binary-output(1).present-value

20. You can have the WebAccess Project Configurator open while using the OPC Tool to import Tags.



By closing and opening the OPC Port Icon, in the Project Manager, you will refresh the tag list and see the Tags that you have imported. Once Imported, you can rename these tags, assign alarms, etc. You can also Delete imported tags and then re-import them allowing you to experiment with naming conversions, etc.

### 3.4.3.1 OPC TOOL INI file of Conversion Rules

The **Convert TagName** will convert OPC Item and Data Point names into WebAccess Tag names using conversion rules. The **Convert TagName** will use the **Item Name** appended to **Data Point** Name plus the **conversion rules** in the OPCTol.ini file.

Users can modify this file to create Name conversion rules

The OPCTol.ini is located on the Project Node, typically at  
C:\WebAccess\Node\OPCTol.ini

A sample of the Version 3.0 OPC Tool INI file for the Barrington OPC Server is listed below.

Each Section must be preceded by the official OPC Name in square brackets []. For example the Barrington OPC Server is named BarSys.OPCServer. The Section describing conversion rules for the Barrington OPC Server are in a section labeled [BarSys.OPCServer]

The rules are simple. Text String OPC = Text String in Tagname. For example, Digital Output.Channel=DO means convert the string "Digital Output.Channel" into a tag name with DO.

It may take an experimental or test database where you import OPC Items and DataPoints unchanged, then create rules to automatically shorten them.

```
[TAGNAME_TYPE]
//0: Leaf as TagName
//1: Custom Conversion
//2: Sequential
//3: TagName same as ItemID
BarSys.OPCServer=1
```

```
Matrikon.OPC.Simulation=1
ThinknDo.TnDOPC.1=0
RW.FASERVER.3=2
KEPware.KEPServerEx.V4=2
Cimetrics.BACnetOPCserver=1

[BarSys.OPCServer]
Digital Output.Channel=DO
Digital Input.Channel=DI
Analog Input=AI
Analog Output=AO
Channel=Ch
Communication=Comm
Extend_Service.Extend_Flag=ExHours
Flag_Schedule.Schedule=Z
Flag_Status.Flag=Occupancy
Sub_Schedule=SubSch
Start_Date=StrtD
Start_Time=Start
Stop_Date=StopD
Stop_Time=Stop
Holiday_Flag=HFlag
MF_Weekday_Flag=MF_WkFlag
Schedule_Serial=Sch_Serial
    Schedule_Name=Sch_Name
    Weekday_Flag=Wk_Flag
    Monday_Friday=Mon_Fri
    Weekday.Monday=Mon
    Weekday.Tuesday=Tue
    Weekday.Wednesday=Wed
    Weekday.Thursday=Thu
    Weekday.Friday=Fri
    Weekday.Saturday=Sat
    Weekday.Sunday=Sun
```