
Accessing OPC Servers over Network

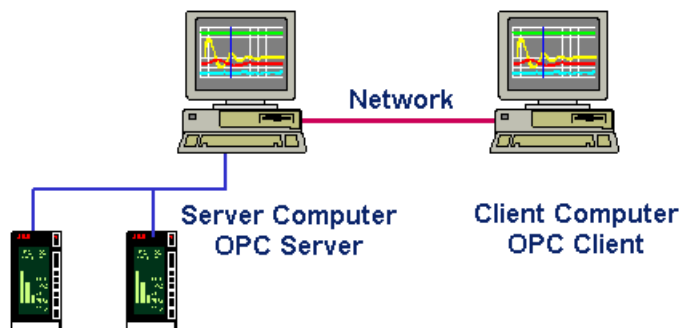
DCOM Setup for ABB OPC Servers

Description:

This tech-note covers the procedure for setting up DCOM (Distributed Component Object Model) that will enable ABB's Extended Modbus, ICN and Micro-DCI OPC Servers to be accessed over a network. This document is intended to help you in setting up DCOM to allow client applications to work with these servers. This document is not a complete guide for using DCOM. The settings in this document are provided as a working example only, which may not meet the security and process requirements for every installation. Microsoft's DCOM Web site provides detailed documentation on the configuration and use of DCOM.

Applies to:

This applies to MOD 30ML, Modcell, Micro-DCI products, Extended Modbus OPC Server, ICN OPC Server, Micro-DCI OPC Server, ViZapp and OPC client applications. All of the ABB OPC servers are DCOM enabled applications. This means that they can be installed in one computer (server) and can be accessed and launched from other computers (Clients) connected on the same Ethernet network. The OPC Servers use TCP/IP protocol for this purpose. This also enables them to be accessed over an intranet or the Internet if the security privileges are properly set. This technote has step-by-step instructions for setting up DCOM and accessing OPC Servers over a network.



Before you start:

The procedure below describes the use of DCOM with Windows NT, Windows 2000 and Windows XP operating systems. No attempt is made to describe DCOM for Windows 95, Windows 98 or Windows Me. On these systems, DCOM is not able to automatically launch a server as required on a remote computer. Refer to Microsoft documentation for further details related to Windows 95/98/Me applications.

DCOM setup requires Administrator level access to the PC. Make sure you are logged in as the Administrator or an account with Administrator rights on the Windows NT/2000/XP operating system. Once the DCOM setup is complete, Administrator level access is no longer required. You do not have to run your applications as an Administrator in order to use DCOM.

Step 1: The first step in this process is to make sure that the computers are on the network and can be accessed by each other. You can verify this by seeing them in the Windows Network Neighborhood or by searching for the computer from the Windows Search or by PINGing the computer by specifying the computer's IP address. Contact your system administrator for assistance.

We will assume a setup of 2 computers – one where the OPC Server is installed (we will refer to this as the **server computer**) and the other where an OPC client (ViZapp or other application software) is installed (we will refer to this as the **client computer**).

The User Name and Password for the two computers must have access (security rights) to the other computer. DCOM requires this access capability.

Step 2: The next step is to setup the users:

There could be 3 different scenarios in the network configuration:

1. The Server and the client computers are part of the same Windows NT/2000 domain. The domain controller manages the access rights of the domain. Domain User accounts and Domain Groups are used for granting permissions. If the computers are in different domains, then make sure that the domain Trusts relationships are properly setup – one Domain trusts users from the other domain and vice versa. Contact your system administrator for assistance with these issues.

Adding Users: If the server and the client computers are members of a domain, and users A and B are both accounts in that domain, then the permissions are already setup, You can go to the next step of configuring the DCOM. Otherwise, add the users in the domain controller. Contact your system administrator for further help. Alternatively you can add these two users as local

users in both the computers with the same user name and password.

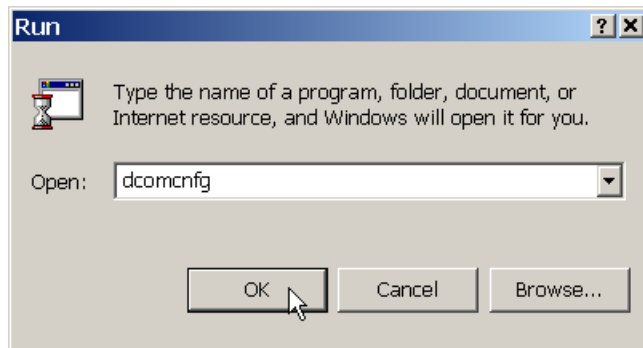
2. One of the computers is part of the domain and the other is part of a Windows workgroup, but they are connected on the network and can see each other.

Adding Users: Add the user from the computer that is part of the work group as a local user in the computer that is on the domain and vice versa.

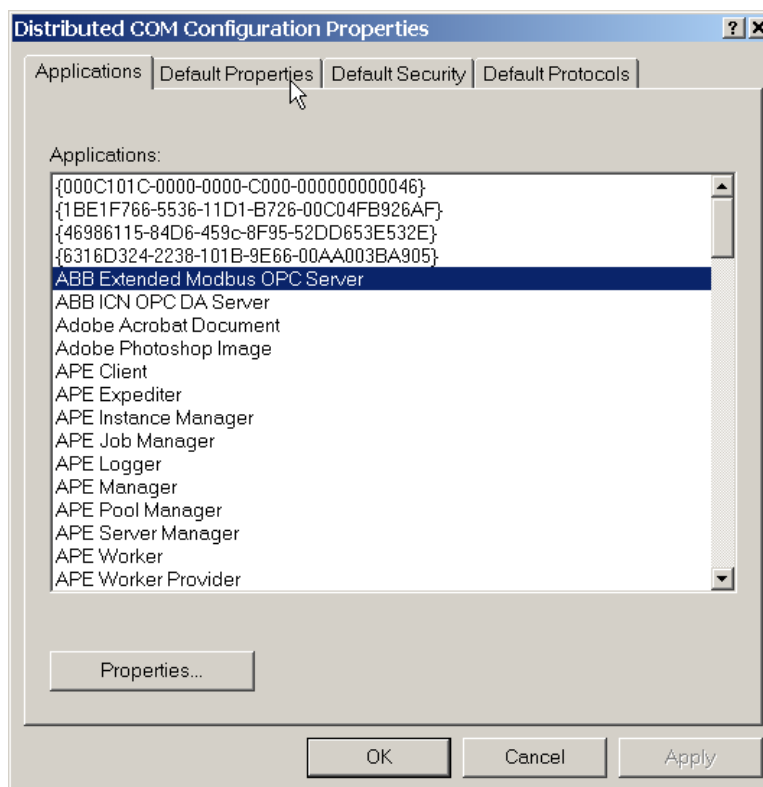
3. Both computers are part of a Workgroup.

Adding Users: Add the user from one computer as a local user in the other and vice versa.

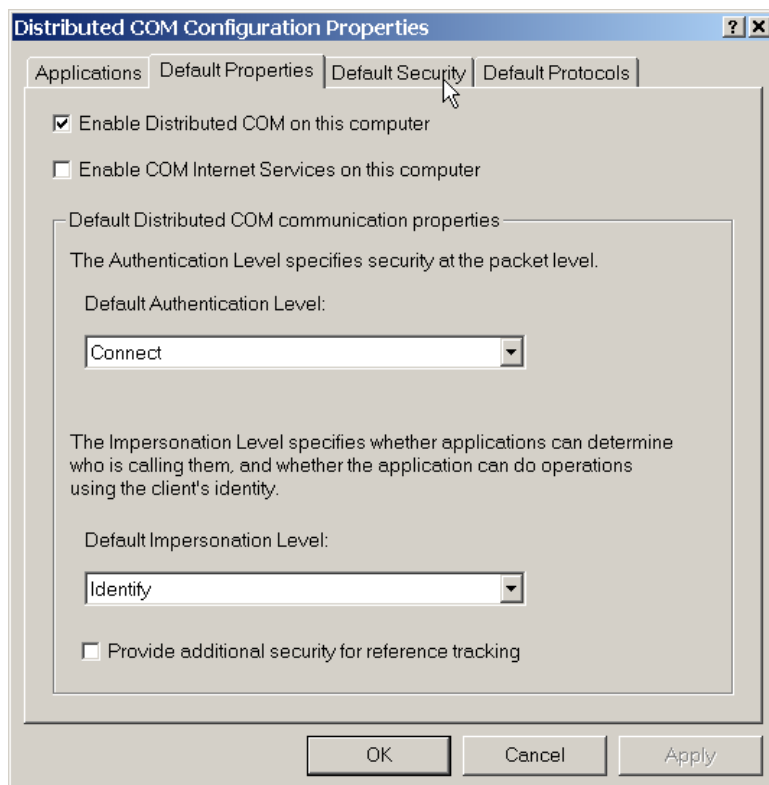
Step 3 – Setting up the OPC Server Computer: Start the DCOM Configuration Utility – DCOMConfig in the computer we designated as the server. Click on the Windows Start menu and select Run to start the Run dialog as shown below:



Type **dcomcnfg** in the Open field and then click on OK. The DCOM Configuration Utility will start as shown in the figure below:



Default Properties Tab: Click on the **Default Properties** tab. See the figure below:

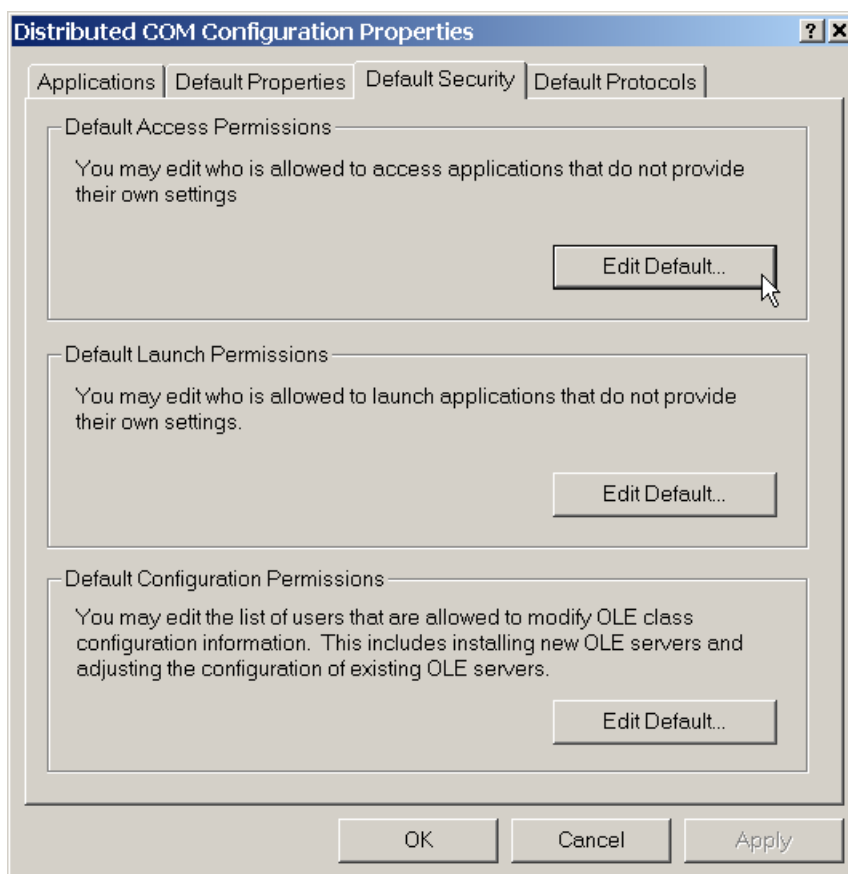


1. Make sure that the **Enable Distributed COM on this Computer** box is checked.
2. The Default Authentication Level should be **Connect**.
3. The **Default Impersonation Level** should be **Identify**.

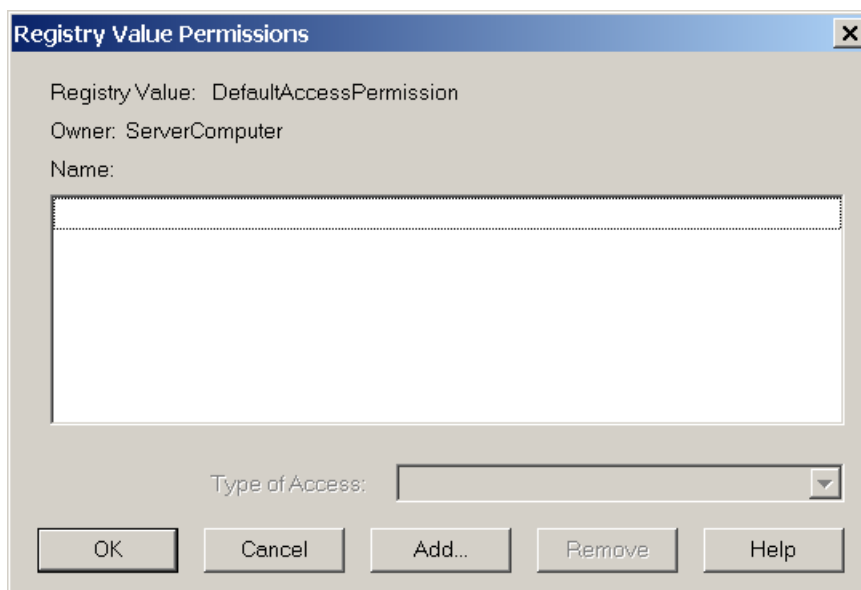
Default Security Tab: Click on the Default Security tab. See the next figure. This is where we will make the most setup changes. There are 3 settings from this tab:

1. Default Access Permissions: We will configure the users that will be allowed to access OPC servers on this computer.
2. Default Launch permissions: We will configure the users that will be allowed to launch OPC servers on this computer.
3. Default Configuration Permissions: We will configure the users that will be allowed to configure OPC servers on this machine

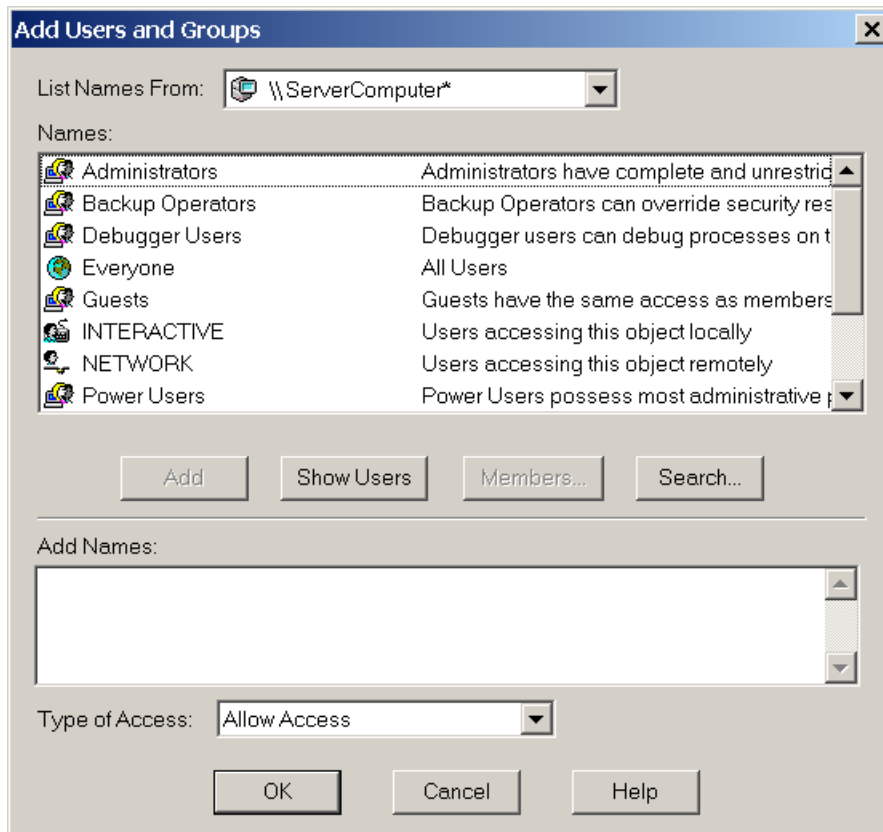
It is important that you understand the concept of users and groups to configure this portion of DCOM.



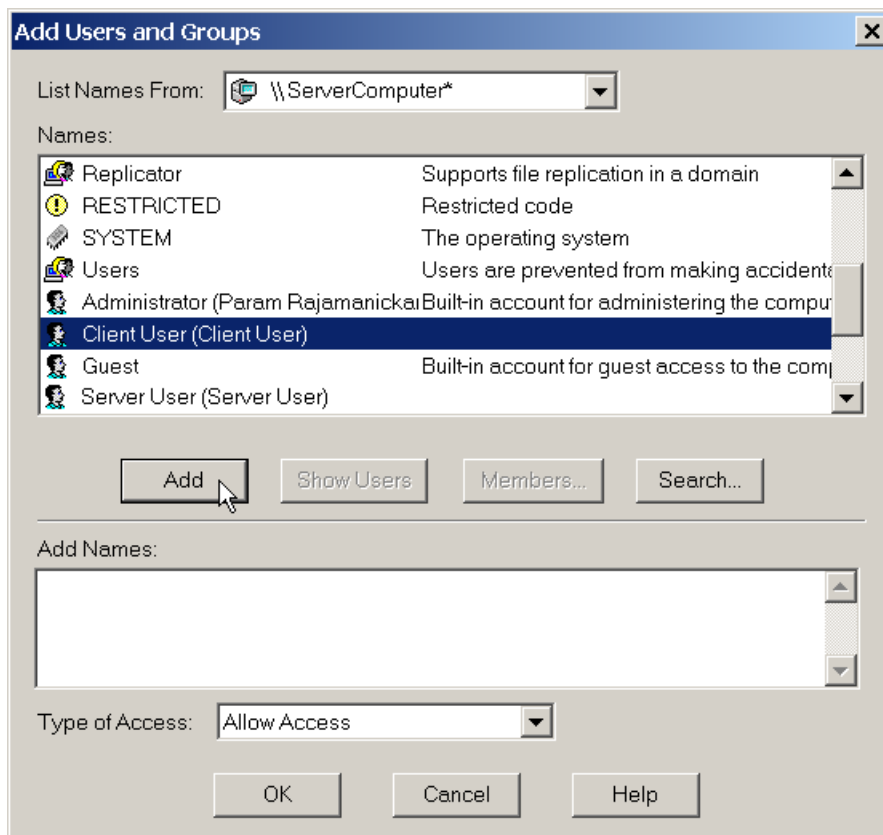
Click on the **Edit Default** button in the **Default Access Permissions** section. The **Registry Value Permissions** dialog box will be displayed as shown in the next figure:



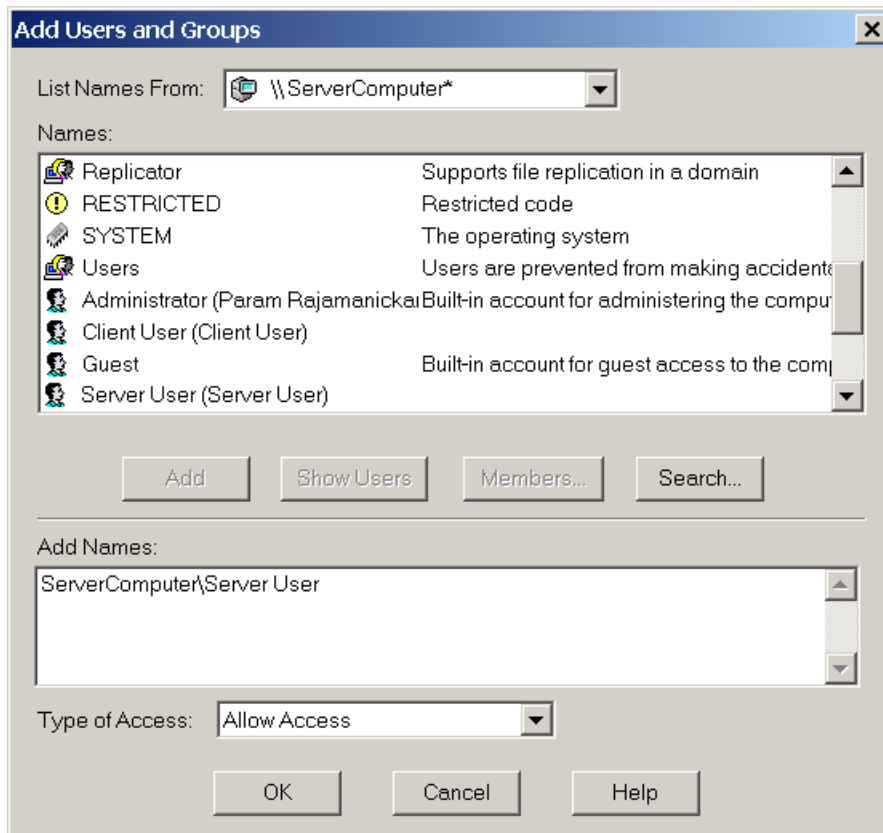
This dialog box will display the computer name (*ServerComputer* in this example) in the **Owner** field as shown. Click on the **Add** button to add the user from the client computer. The **Add Users and Groups** dialog box will be displayed as shown next. This dialog will display the user groups as shown.



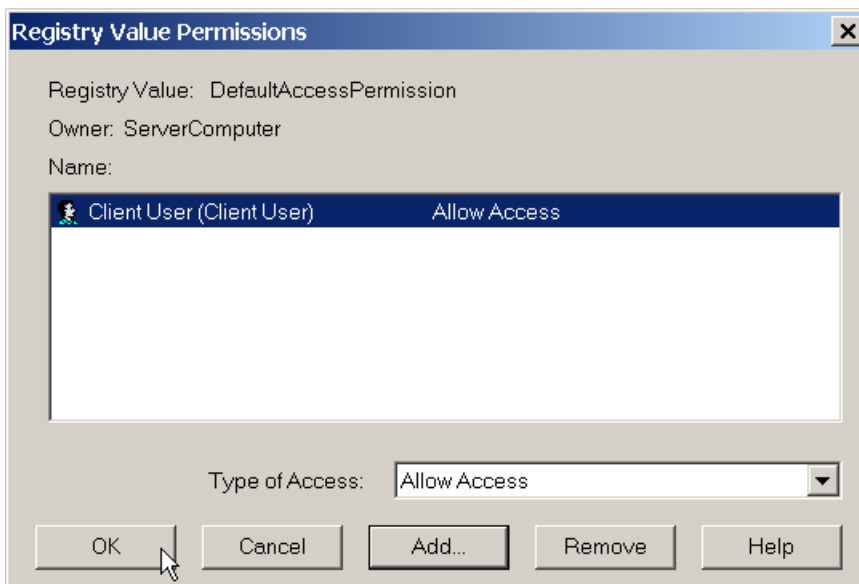
- Click on the **List Names from** field at the top and select the domain you want to add the user from. If the client user is not part of the domain, then you can select the local computer name from this field.
- Click on the **Show Users** button to show all the users from the domain/local computer as selected in the previous step.
- The **Add Users and Groups** dialog will redisplay with the user names as shown in the next figure:



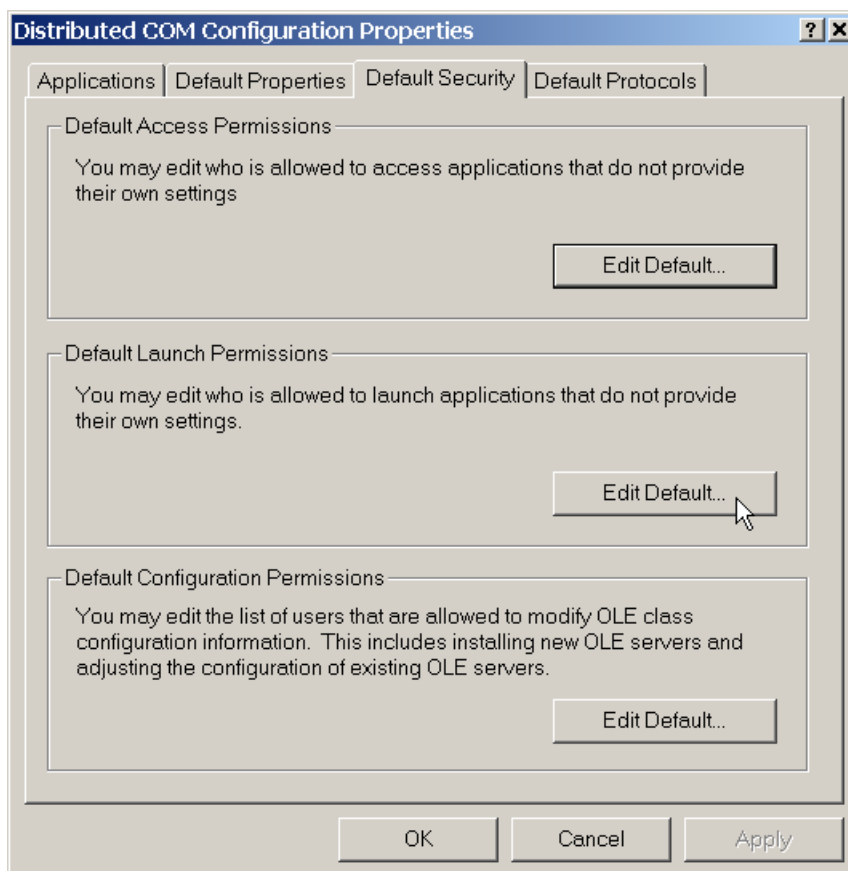
Select the client user from this list and then click on the Add button. You will see the added user in the Add Names box at the bottom as shown in the next figure.



Notice that the domain or the local computer name is also shown for the added user. Click on the OK button. The Registry Value Permissions dialog box will refresh with the added user as shown in the next figure.



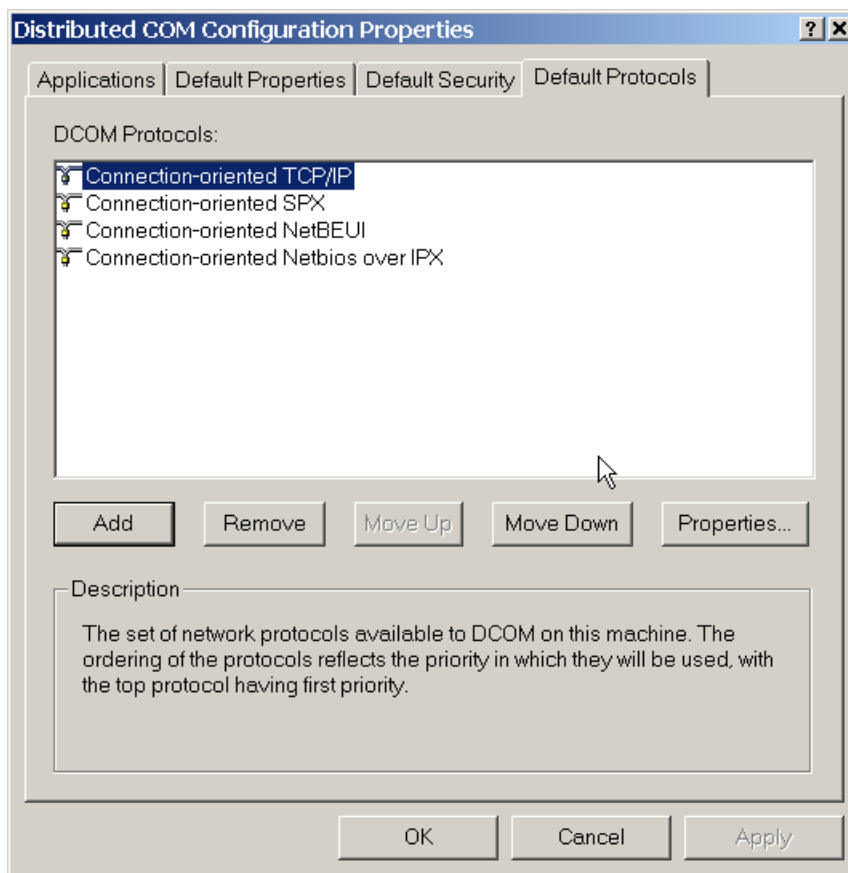
Click OK in this dialog box. The Default Security tab of the Distributed COM Configuration Properties dialog box will be redisplayed as shown below:



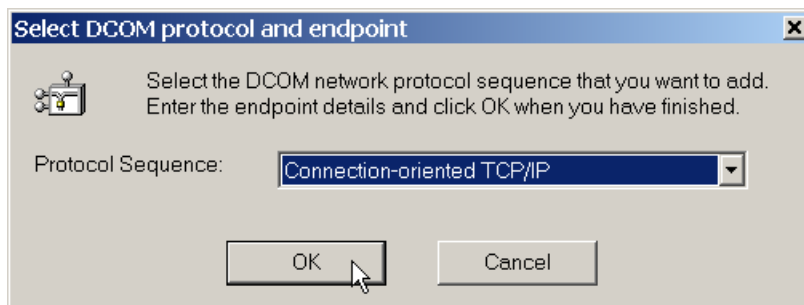
We have allowed default access permissions for the user. Next step is to allow default launch permissions for the same user. Click on the **Edit Default** button in the **Default Launch Permissions** section. Follow the procedure in the above section to allow the default launch permission for the same user.

We will skip the Default Configuration Permissions section, which does not apply to this application.

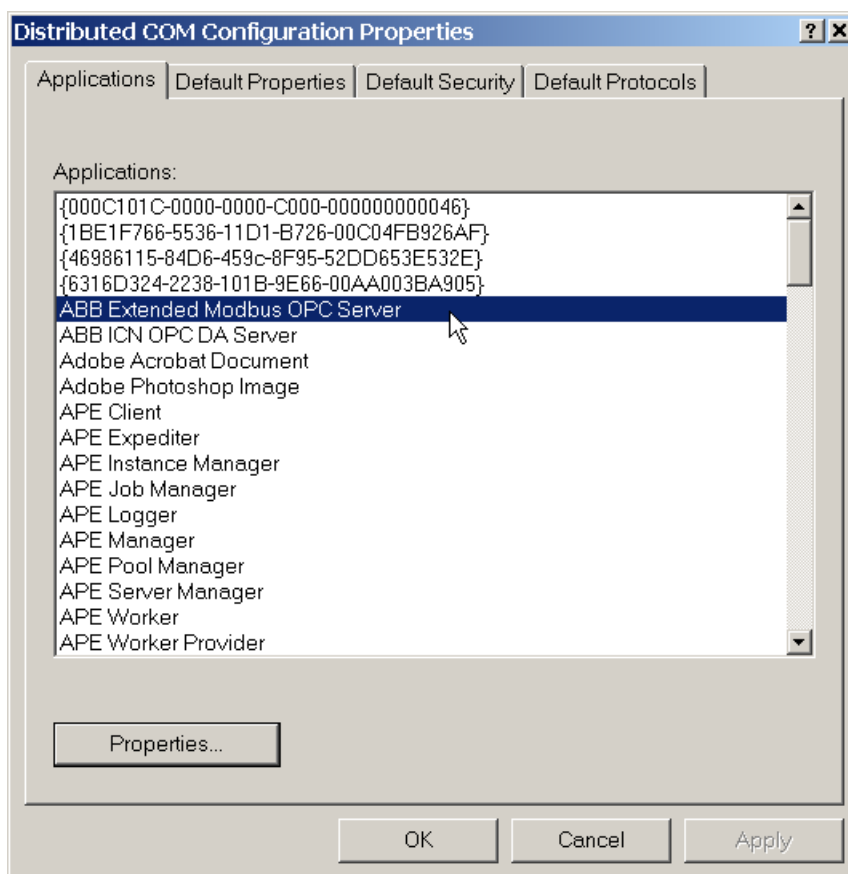
Default Protocols Tab: Click on the Default Protocols tab next. See the figure below: On this tab we will set Connection-Oriented TCP/IP as the protocol to be used by DCOM. Make sure that Connection-Oriented TCP/IP is listed at the top. You can remove the other protocols from this list. Note that this does not remove the protocols from the computer, but rather they will not be used for DCOM. The fewer the protocols in the list, the shorter your timeouts will be in DCOM waiting for a call or connection to fail.



If you do not see Connection-Oriented TCP/IP in the list, you can add it by clicking on the **Add** button and then by selecting it from the drop-down list from the resulting dialog box. See the figure below:

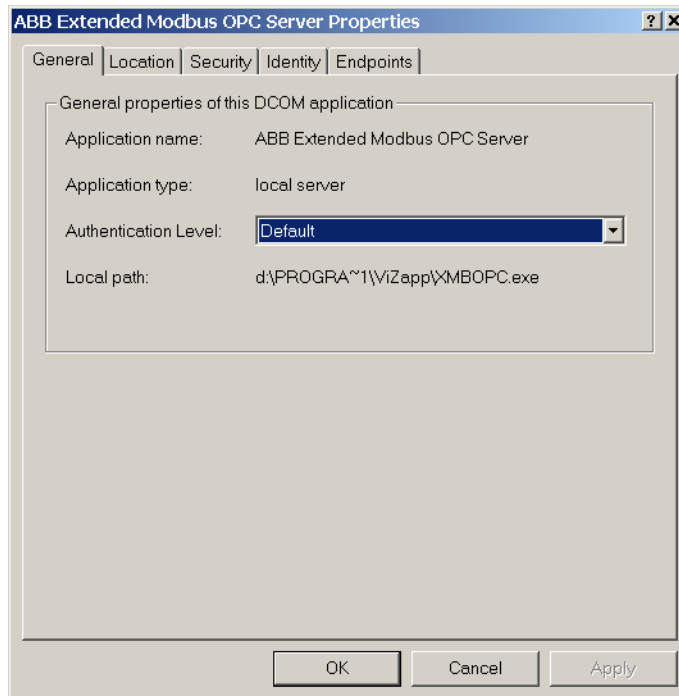


Applications Tab – ABB OPC Server Setup: Next we will configure access properties for the individual OPC Servers. Click on the Applications tab. Select the ABB Extended Modbus OPC Server from this list (the procedure is similar for the ABB ICN OPC DA Server and the ABB Micro-DCI OPC Server) and then double-click or click on the Properties button.

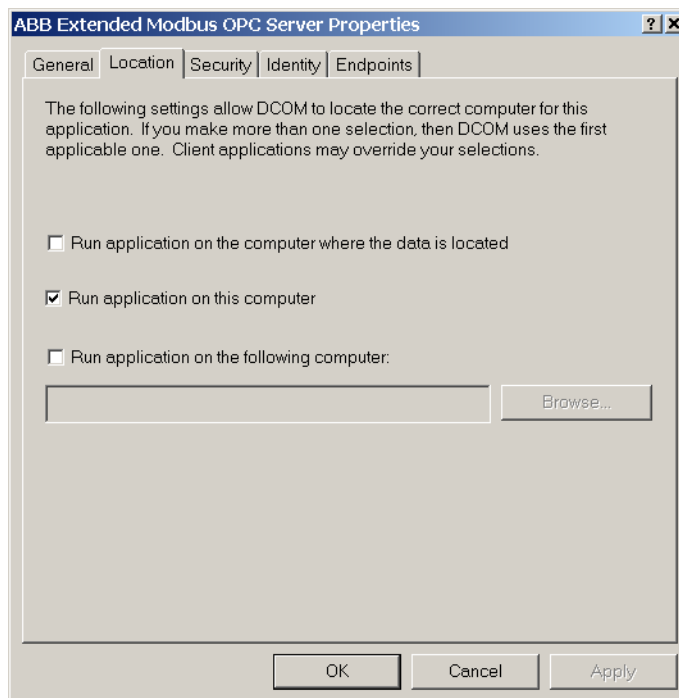


The ABB Extended Modbus OPC Server Properties dialog box will be displayed as shown in the next figure:

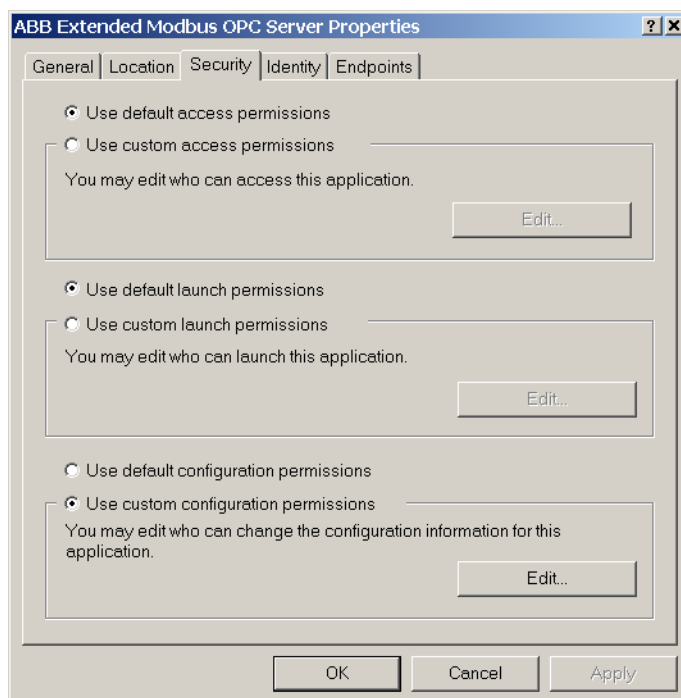
The General tab of this dialog box will be displayed by default. We will accept the default values on this tab. Make sure that the Authentication Level is **Default**.



Click on the Location tab. Make sure that only the Run Application on this Computer checkbox is checked as shown in the figure below:

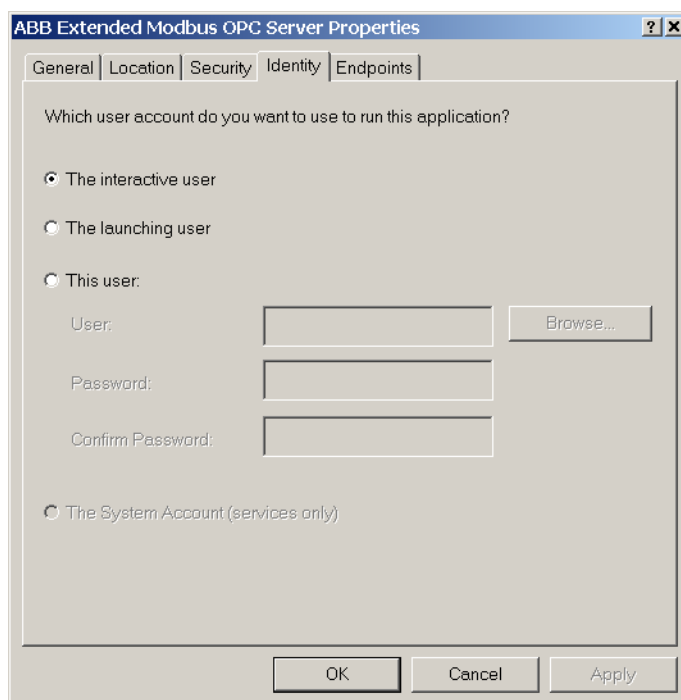


Click on the Security tab and make sure that the following settings are enabled:



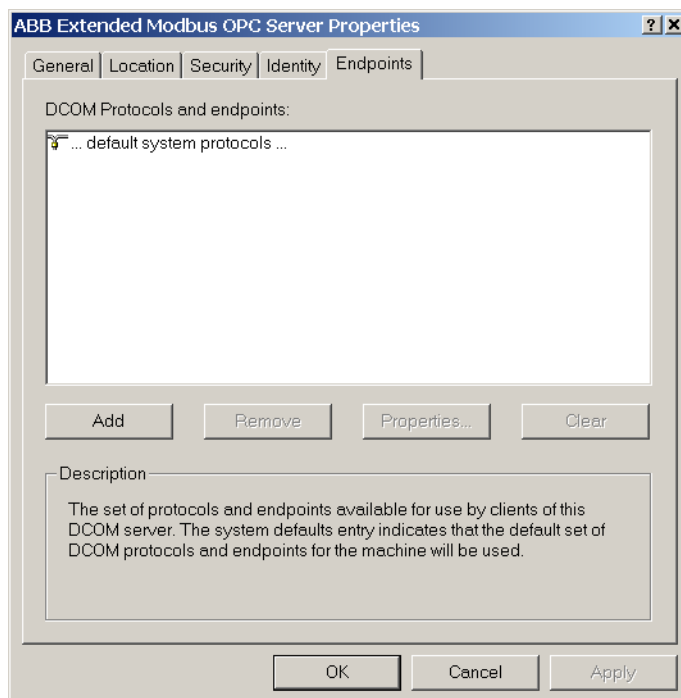
- Use default access permissions
- Use default launch permissions
- Use custom Configuration permissions

Click on the Identity tab and configure it as shown in the next figure:



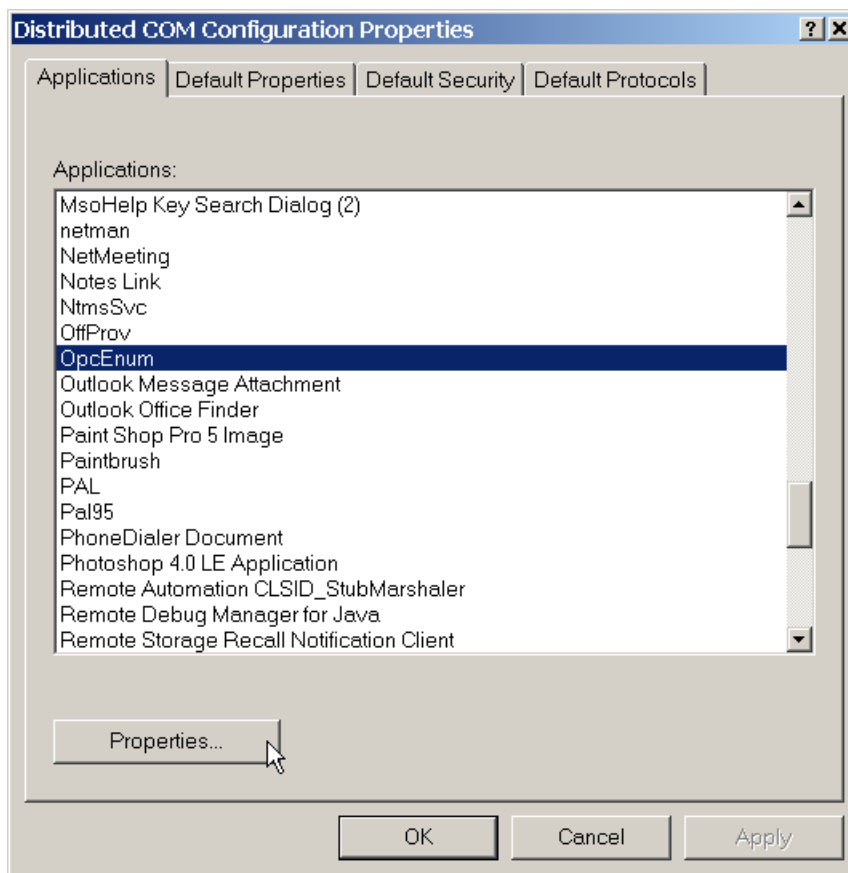
Make sure that The Interactive user is checked. This will be the most widely used setting provided there will be a user logged on in the Server Computer. The only time you will not use this setting is when you run the OPC Server as a Windows service with no user logged on.

There are no changes suggested in the next tab. Accept the defaults as shown in the next figure:

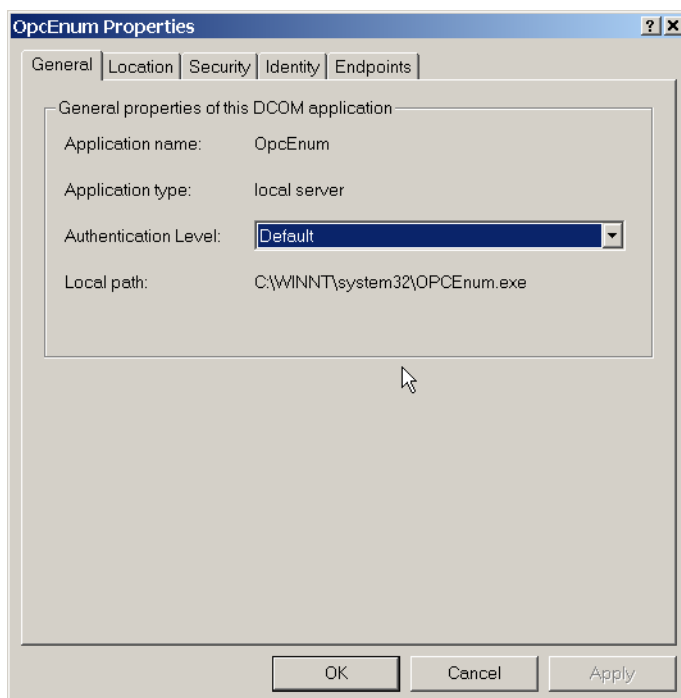


Applications Tab – ABB OPC Server Setup: This section covers the DCOM settings for the OPC server computer that are specific to the application OPCEnum that is installed by the ABB OPC Server installation software. You may skip this step depending on how your OPC client application works. If your OPC client allows your users to browse for OPC servers that are on the machine where your OPC servers are installed and then pick from a list, then you will need to complete this step.

See the next figure:



Select **OpcEnum** from the Application tab and double-click or click on the Properties button.



The OpcEnum Properties dialog box will be displayed as shown in the above figure. Configuration of this is similar to that of the section **Applications Tab – ABB OPC Server Setup** as explained above. Configure the tabs: **General, Location, Security, Identity** and **Endpoints** the same way you configured the OPC Server.

After the **OpcEnum** configuration is complete, click on the **OK** button on the **Distributed COM Configuration Properties** dialog.

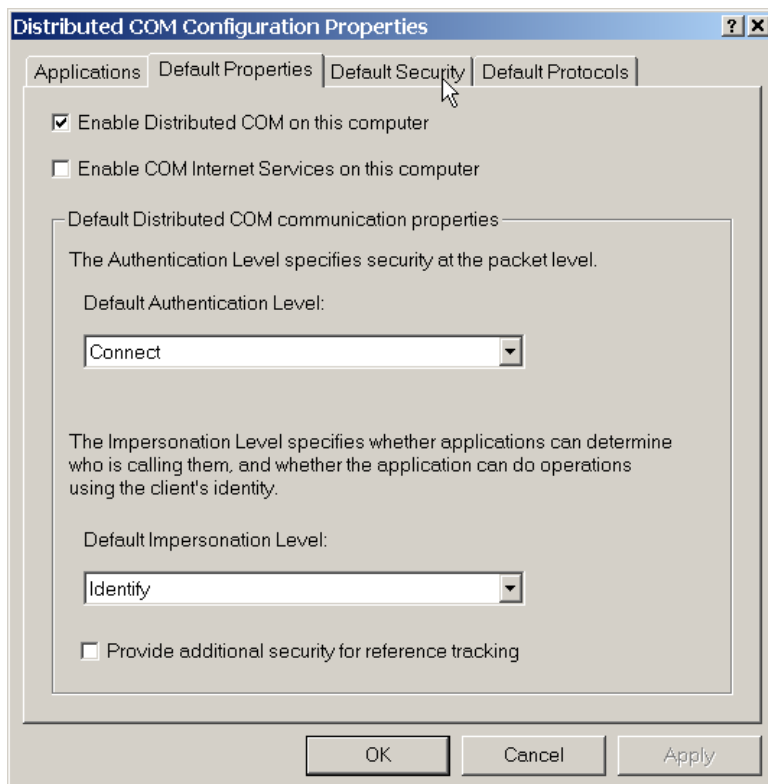
Step 4 – Setting up the OPC Client Computer:

This section provides settings for the computer on which your OPC Client application is running. Please note that depending on which OPC client you are running and how you intend to run your system, these settings may vary.

We will refer to some of the settings were done for the **ServerComputer** in this section. Make sure you have already completed the setup on the ServerComputer before configuring the settings in the **ClientComputer**.

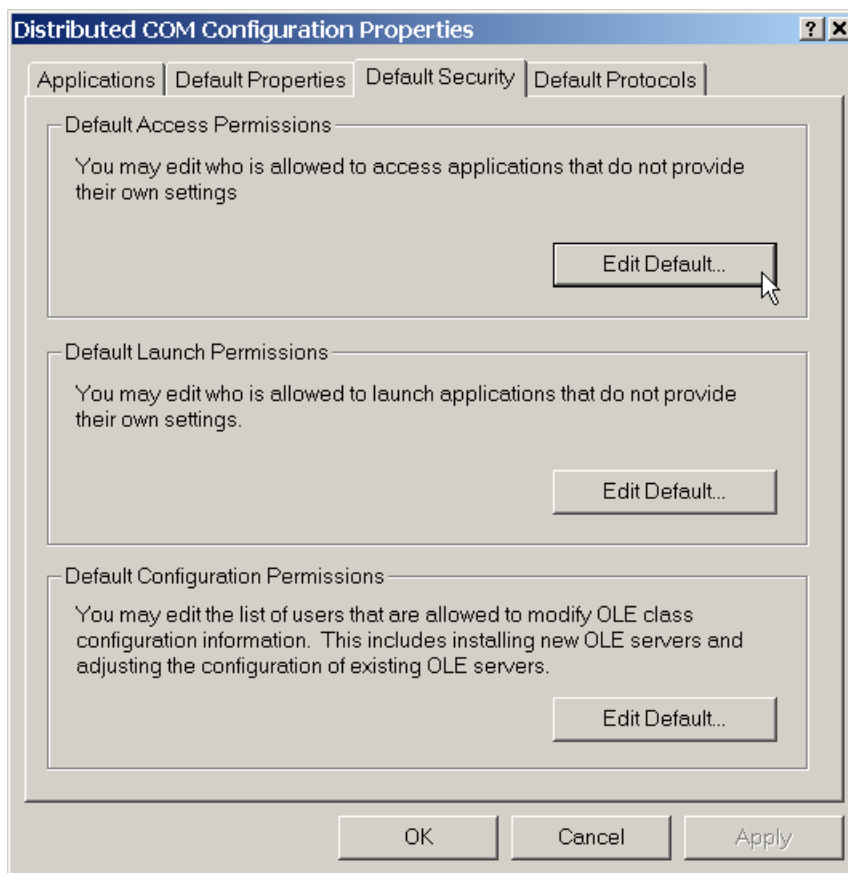
Start the DCOM Configuration Utility – DCOMConfig in the Client Computer.

Default Properties Tab: Click on the **Default Properties** tab. See the figure below:



1. Make sure that the **Enable Distributed COM on this Computer** box is **checked**.
2. The Default Authentication Level should be **Connect**.
3. The **Default Impersonation Level** should be **Identify**.

Default Security Tab: Click on the Default Security tab next. See the figure below. There is only one setting that we will address from this tab:



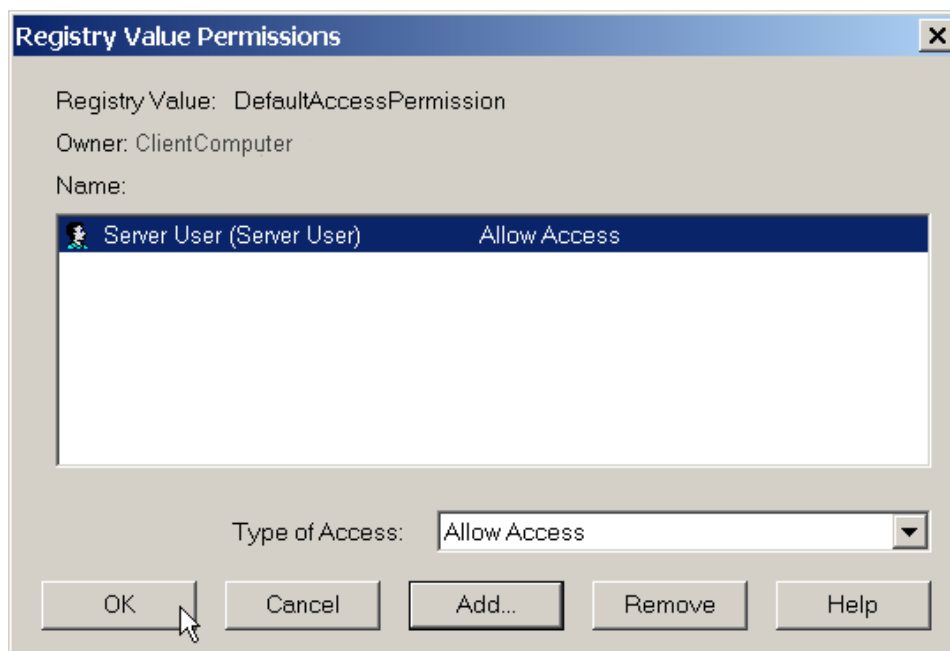
Default Access Permissions: We will configure the users that will be allowed to access the OPC client application from remote OPC servers.

It is on this dialog that you will set *user* (i.e. users that remote OPC servers are running under) that will have access to make call-backs to this machine when subscription/exception based reads are being done.

It is important that the User Name or a Group containing the User Name that the **OPC server** is running under be granted access here. Failure to grant access to the proper user or group will prevent the OPC client from receiving the call-backs on subscription/exception reads from the Server Computer.

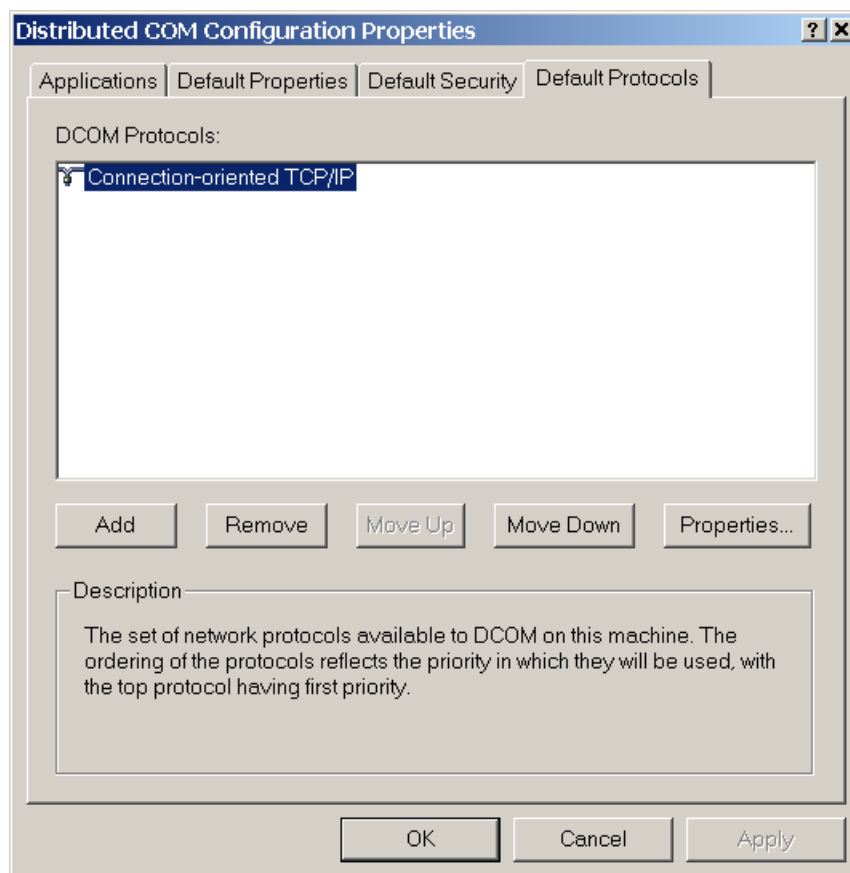
Click on the **Edit Default** button in the **Default Access Permissions** section of this tab. The **Registry Value Permissions** dialog box will be displayed next. Click on the Add button on this dialog and select the domain or the local computer and then show the users of the selected resource and then select the user (Server User in our example).

After you have added a user, the **Registry Value Permissions** dialog box will be redisplayed.



Click **OK** on this dialog.

Select the Default Protocol tab on the Distributed COM Configuration Properties dialog next.



Make sure that the **Connection Oriented TCP-IP** protocol is at the top of the list as shown in the figure above. You can remove the other protocols from this list. Note that this does not remove the protocols from the computer, but rather they will not be used for DCOM. The fewer the protocols in the list, the shorter your timeouts will be in DCOM waiting for a call or connect to fail.



If you make a change to any DCOM configuration or security related setting on the ClientComputer, you must restart the client application for the changes to take effect. Likewise, if you make such changes on the ServerComputer, you must restart the server application for the changes to take effect. You typically only need to reboot either or both computers in special instances where you are changing settings that globally affect all DCOM applications on the machine. For example, if you change the DCOM Default Authentication Level, you need to reboot the computer. The Default Authentication Level is a very broad change relative to your computer's use of DCOM.

This completes the setup on the ServerComputer and the ClientComputer.

Section 5: Accessing an ABB OPC Server from an OPC client application:

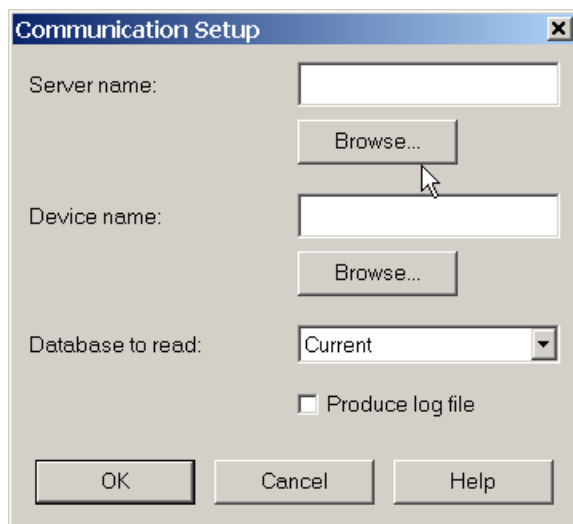
Example 1: Using ViZapp to access a MOD 30ML or Modcell controller connected to a computer on the network.

This setup includes a computer to which the controller is connected by Modbus. This computer is the Server Computer. We will use the Extended Modbus OPC Server in this example. You need to run the OPC Server properly configured. Make sure that you can communicate with the controller from the OPC Server running on this computer. The OPC Server loads the last saved file when you launch it. (In the case of the Extended Modbus OPC Server, make sure that a device is added in the **.mopc** file and in the case of the ICN OPC Server, a device is added to the **.icns** file to represent the controller you are trying to communicate.) DCOM setup on this computer should be done as explained in the Step 3 above.

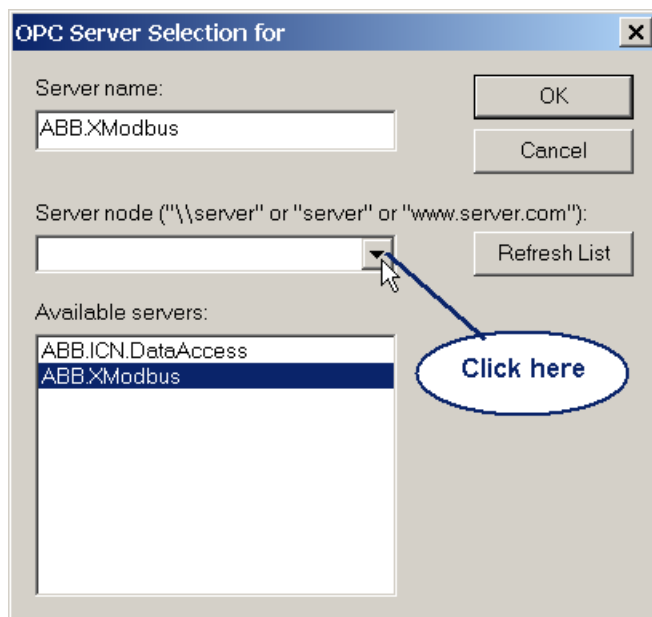
The setup also includes the client computer running ViZapp application and DCOM is configured as in Step 4.

We will try to read the version number of the controller connected to the ServerComputer from the ClientComputer.

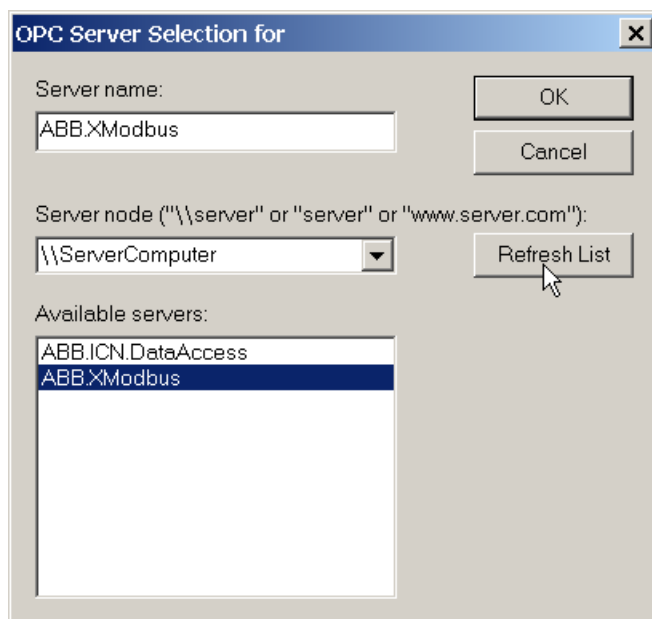
You need to login to the Client Computer (ClientUser is the user name in this example). Launch ViZapp in the ClientComputer. Open a ViZapp workspace, project and an instrument document. Select Instrument – Status from the menu bar at the top. The Communication Setup will display as shown in the next figure:



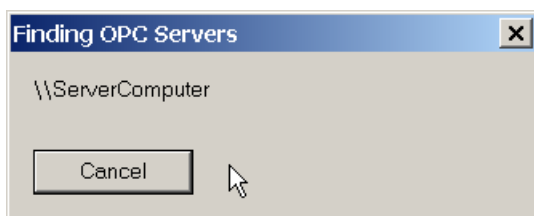
Click on the **Browse** button under the **Server name** field. The Communication Setup box will be displayed as shown below. The **Available Servers** list will display the OPC Servers that are installed in the local computer (ClientComputer). We need to connect to the ServerComputer and select the OPC Server from there.



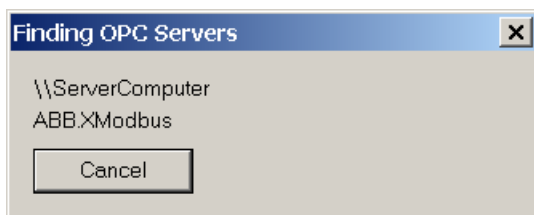
Click on the Drop-down arrow in the **Server node** field as shown in the above figure. This will show the computers on the network. Choose the ServerComputer from this menu. If the drop-down menu does not show ServerComputer, then you can type the computer name as shown in the next figure using the syntax **\\ServerComputer**.



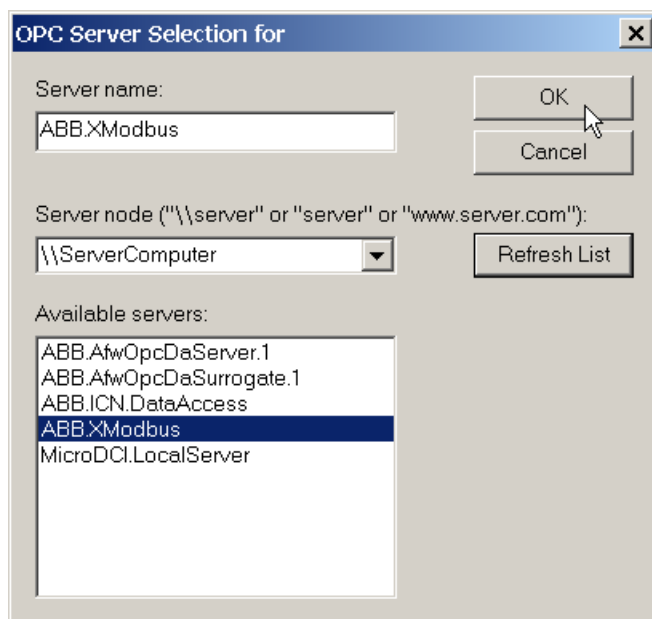
Click on the Refresh List button. This will search the ServerComputer for OPC Servers installed and registered in its system. If you do not see the message box, click on the **Refresh List** button again.



Subsequently the message box will display the names of the OPC Servers it finds in the ServerComputer. See figure below:

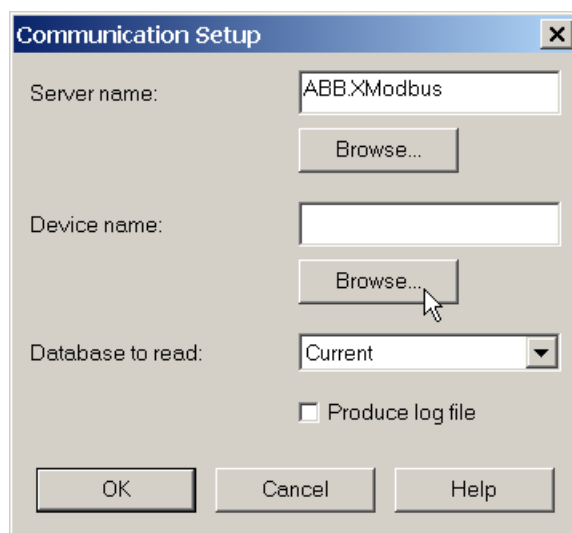


The OPC Server Selection dialog box will be redisplayed with all the OPC Servers that were found from the ServerComputer (as shown in the next figure):

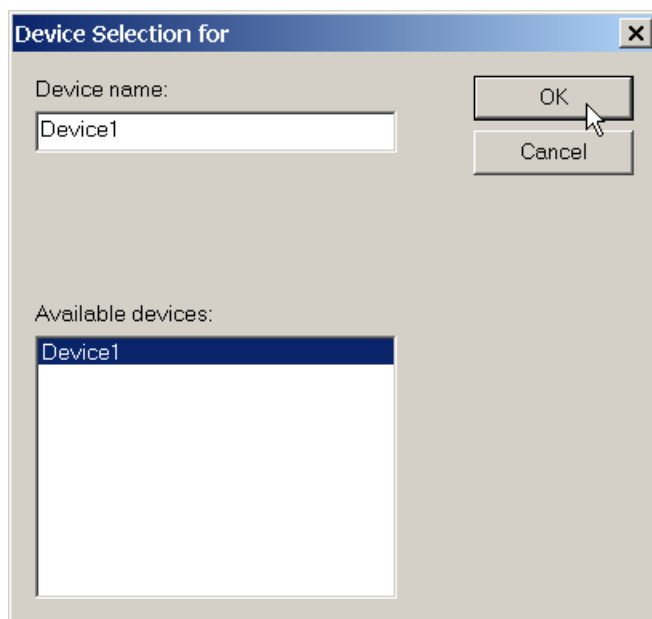


Select ABB.XModbus from the list and then click **OK**. The Communication Setup dialog box will be redisplayed with the Server name as shown below:

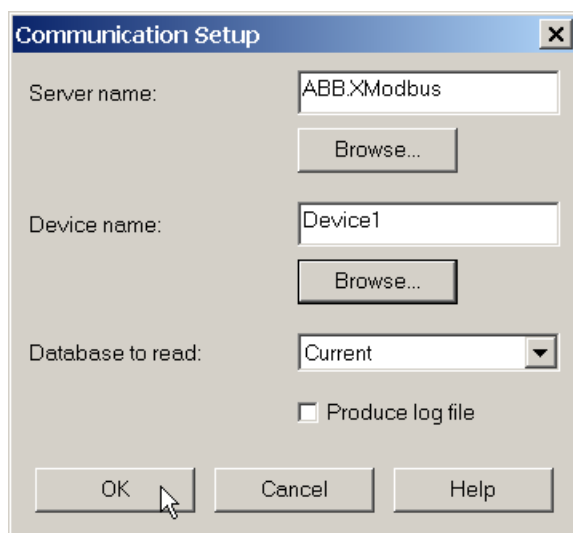
Click on the Browse button, in the Device name field, to browse for the device. This will launch the OPC Server in the ServerComputer (because we had granted Access and Launch Permissions for the user **Client User** in the ServerComputer in its DCOM configuration).



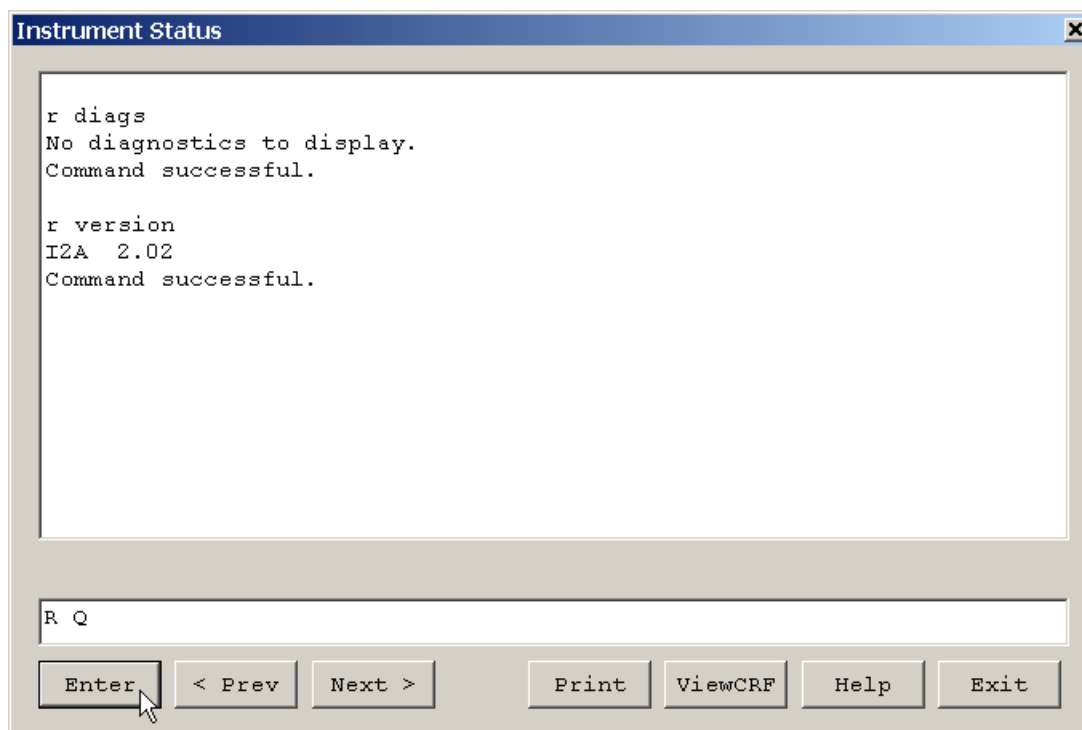
Next, the **Device Selection** dialog will be displayed (as shown below). Devices from the ServerComputer opened **.mopc** file will be displayed. The list may be different from the following figure depending on the **.mopc** file in the SeverComputer.



Select the device and then click **OK**. The Communication Setup will be redisplayed as shown below.



Click **OK** on this dialog box. The Instrument Status window will be displayed (as shown below). You can issue commands to the controller from this window. See the commands in the next figure.



You can use the same setup for downloading / uploading databases, entering ViZapp debug mode and other communication with the controller.

Example 2: Accessing the OPC Server from the ServerComputer using a third party OPC client running in the ClientComputer:

This is really simple if your OPC client allows your users to browse for OPC servers that are on the ServerComputer and then pick from a list. This is because the ABB OPC Servers use the **OpcEnum** to show up in third party browsing. You can select the OPC Server name, Device name and Tags by using the Tag Browser interface your OPC client supports.

If your OPC client does not support browsing, then you need to specify the node name, OPC Server name (ABB.Xmodbus or ABB.ICN.DataAccess or Micro-DCI.LocalServer), device name, group and tag names.

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