



## DCOM Configuration Tutorial

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### Software Toolbox Recommendations for Configuring DCOM

**New DCOM Configuration Videos Available!!!**

Having problems with "**Access Denied**" when trying to get your OPC Client/Server software communicating?

We have over 10 years of DCOM configuration and troubleshooting experience that we have tried to put within our DCOM tutorial.

#### Configuring DCOM

Windows 98, NT and 2000 DCOM Configuration	Windows XP, 2003, Vista, 2008 and Windows 7 - DCOM Configuration
<p><a href="#">Client side settings</a></p> <p><a href="#">Server side settings</a></p> <ul style="list-style-type: none"> <li>• <a href="#">General settings</a></li> <li>• <a href="#">OPC Server Specific</a></li> <li>• <a href="#">OPCEnum settings</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Introduction to DCOMCnfg</a></li> <li>1. <a href="#">Default DCOM options</a></li> <li>2. <a href="#">OPCEnum</a></li> <li>3. <a href="#">OPC Server PC only</a></li> <li>4. <a href="#">Local Security Policies</a></li> <li>• <a href="#">Workgroups vs. Domains</a></li> </ul>

#### Windows XP Service Pack 2

Important information available here:  
<http://www.softwaretoolbox.com/xpsp2>

#### Still having trouble and need more help?

- Software Toolbox customers are welcome to contact Technical Support for additional assistance.
- When contacting support please prepare a Microsoft Word document containing screenshots of ALL the DCOM configuration screens that you have modified in accordance with our recommendations.
- Send screenshots and help request to:  
[DcomExpert@softwaretoolbox.com](mailto:DcomExpert@softwaretoolbox.com)

#### Technical Explanations and Documentation

General Information	Technical Explanations
<ul style="list-style-type: none"> <li>• <a href="#">Introduction to DCOM</a></li> <li>• <a href="#">Preface and Best Practices</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">NT/2000 User Security Permissions/Considerations</a></li> <li>• <a href="#">Special considerations in</a></li> </ul>

<ul style="list-style-type: none"><li>• <a href="#">Introduction to DCOM Configuration Utility (DCOMCnfg.exe)</a></li></ul>	<a href="#">multiple domain settings</a>
<ul style="list-style-type: none"><li>• <b>Microsoft Reference Articles, for those who aren't afraid of lots of "under the hood, nuts and bolts" tech talk!</b><ul style="list-style-type: none"><li>○ <a href="#">DCOM Architecture</a></li><li>○ <a href="#">DCOM Technical Overview</a></li></ul></li></ul>	

### Comments and Feedback?

Input and client questions may be sent to:  
[DcomExpert@softwaretoolbox.com](mailto:DcomExpert@softwaretoolbox.com)

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## DCOM Tutorial Overview

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### DCOM Configuration Tutorial

This section is intended to provide general guidance on configuring DCOM settings for newer Operating Systems, which do differ slightly from Windows NT and 2000 Operating Systems.

This article will simply outline the steps to configure DCOM. If you would like to know and understand the reasons WHY some of these settings are so, then please read:

- [NT/2000 User Security Permissions/Considerations](#)
- [Special considerations in multiple domain settings.](#)

We will configure DCOM in 4 steps:

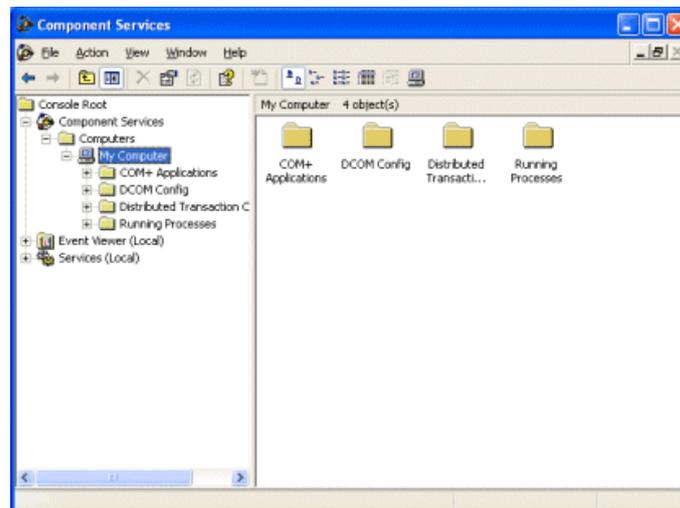
1. [Configuring the general/default settings](#)
2. [Configuring the settings for OPCENUM](#)
3. [Configuring the settings for your OPC Server](#)
4. [Configuring the Local Security Policies](#)

### Starting DCOM Configuration

The DCOM Configuration utility can be accessed either in the Windows Control Panel -> Administrative Tools, or the Windows START button. To start it manually:

1. Click on the Windows START button
2. Click on the RUN option
3. Type "DCOMCNFG" (without the quotes) and press ENTER. (case does not matter)

This will load the Windows "Component Services", which is shown below:



Next > [Configuring Default DCOM Settings](#)

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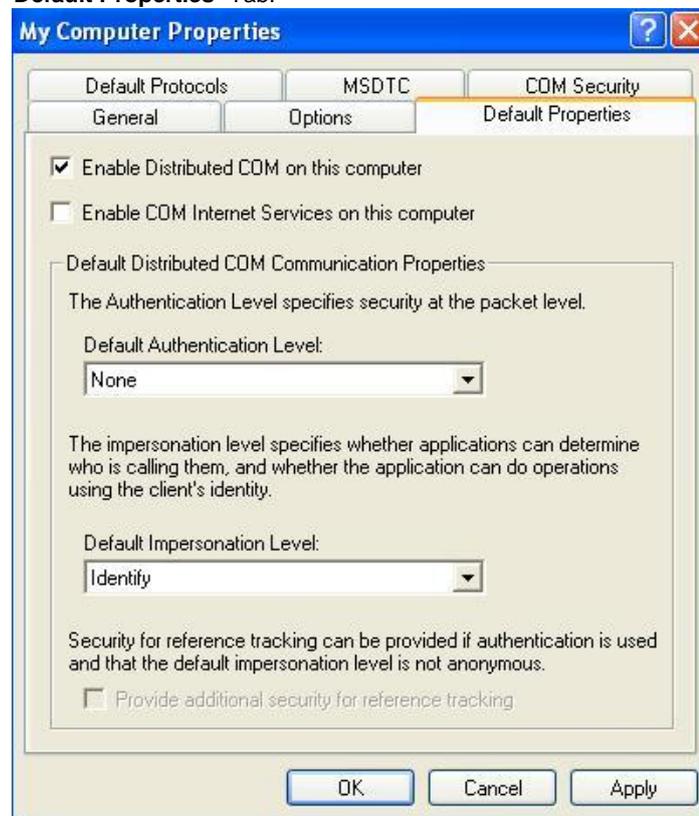
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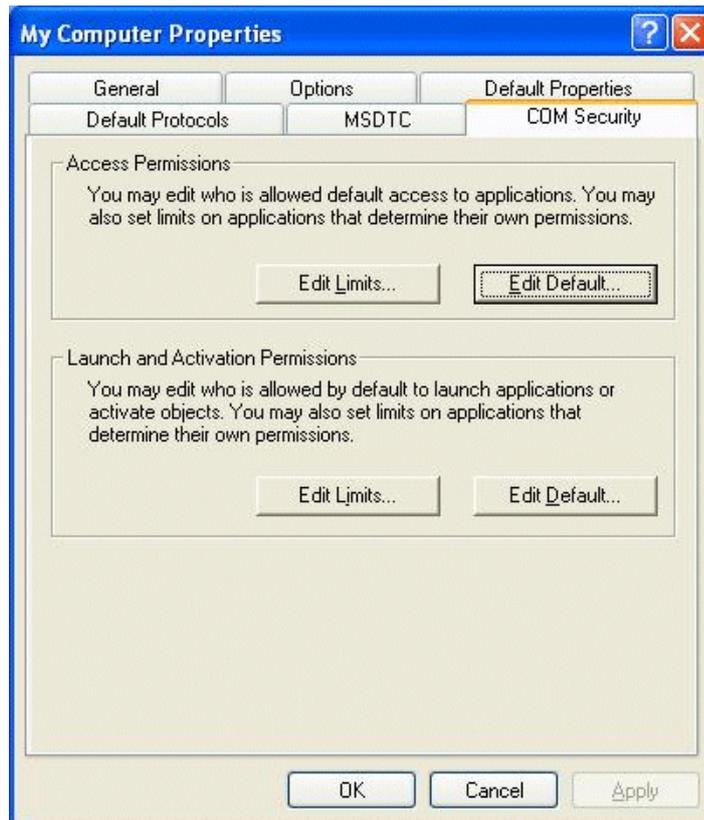
### Step 1 - Configuring Default DCOM Security Options

The following screen is opened by:

- Right-clicking on the "**My Computer**" node in the "Component Services" screen.
- Choosing "**Properties**" from the menu.
- Then click the "**Default Properties**" Tab.



- The options available in this screen should be configured as:
  - The Enable Distributed COM on this computer **MUST** be checked.
  - The Default Authentication Level should be set to None.
  - The Default Impersonation Level should be set to Identity
- The next step is to click on the "**COM Security**" tab, which is shown below:
  - As of XP SP2 there are four buttons in this screen. You **MUST** configure all four button:



- Click on the "Edit Default" button within the "Access Permissions " area and make sure that the following accounts exist with the "Allow Access" permissions:
  - Everyone
  - Interactive
  - System
  - Network
  - IWAM\_<computer-name> \*
  - IUSR\_<computer-name> \*
  - Guests
  - Anonymous
- Once that is complete, do the same with the "Edit Default" button in the " Launch Permissions" section and give the right "Allow Launch" to the same accounts as mentioned in the bullet-points above.
- Make the same settings under **both** "Edit Limits" buttons. If you do not set up these limits your DCOM will be limited based on these settings.
- Now click the OK button to save and close the window.

\* If you plan to use IIS (Internet Information Services) as an OPC Client, then its login context should be added to the list of trusted accounts as shown above.

Next > [Configuring OPCENUM](#)

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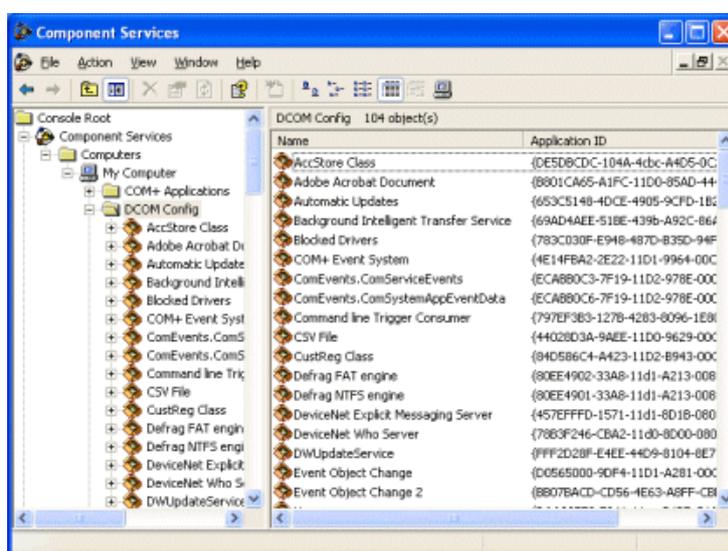


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### Step 2 - Configuring DCOM Security Options for OPCENUM

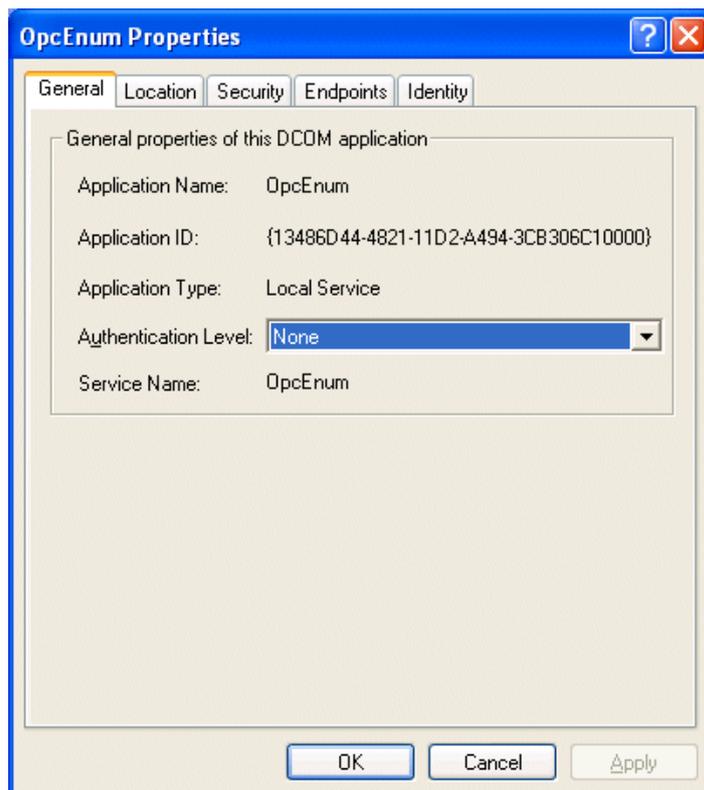
The next step is to locate OPCEnum in the list of COM components. Simply click on, or expand the "DCOM Config" section to show the objects available to configure:



Locate OPCEnum, and then open its properties by simply right-clicking on it, and choosing "Properties" from the menu.

#### General Tab

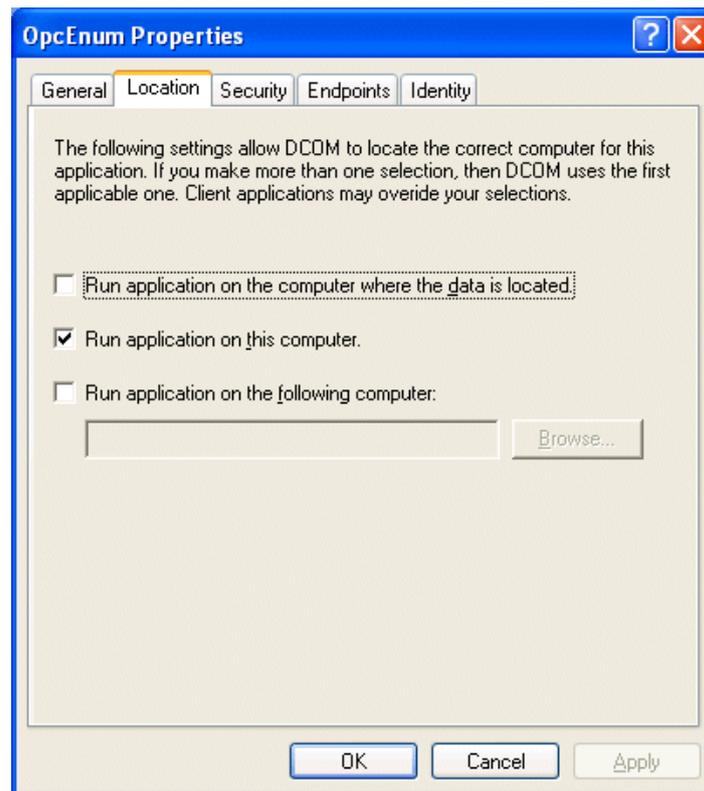
The General Tab has only one option, and that is the "Authentication level".



For each of use, you can select "None" as your option.

#### **Location Tab**

OPCEnum is a program that scans your registry for a list of OPC Servers on your computer.



OPCEnum needs to run on the computer where it resides.. therefore the option of choice here is to check "**Run application on this computer**".

#### **Security Tab**

There are 3 options in the Security tab that need to be set.

##### **Launch Permissions:**

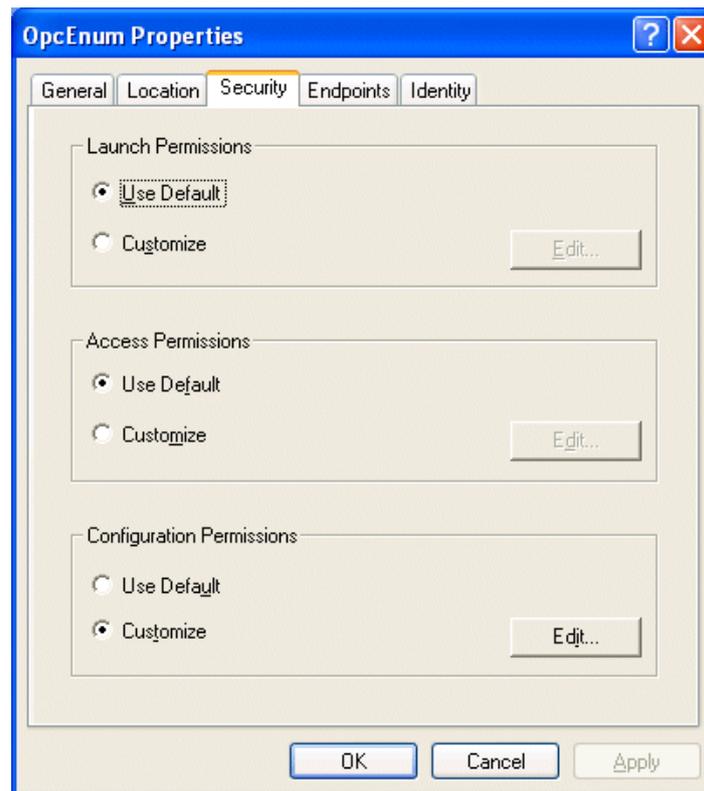
Select the option "Use Default".

##### **Access Permissions:**

Select the option "Use Default".

##### **Configuration Permissions:**

Select the option "**Customize** ", and then click the "**Edit**" button.



A window will open allowing to specify the accounts that do/don't have configuration permissions, simply add the same:

- *Network*
- *Interactive*
- *System*
- *Everyone*
- *Guests*
- *Anonymous*
- *IUSR\_<computer-name> \**
- *IWAM\_<computer-name> \**

Ensure that all of the accounts above receive "**Full Control**" rights.

\* If you are using IIS (Internet Information Services) as an OPC Client.

### Identity Tab

Use either the Interactive or System account.

Click OK to save and close the OPCENUM options window.

Next Step > [Configuring OPC Server](#)

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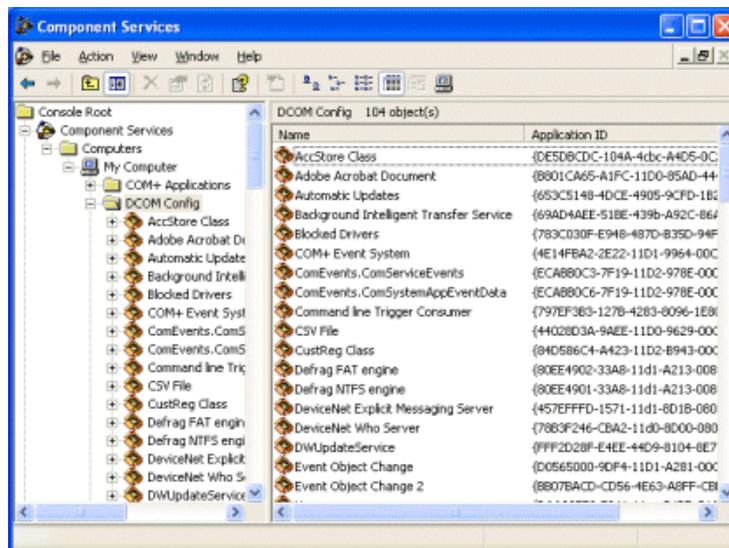
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### Step 4 - Configuring DCOM Security Options for the OPC Server

This step should only be followed if your computer has an OPC Server on it that you wish to allow OPC Clients to connect to.

At the "Component Services" window, click on or expand the "DCOM Config" node and locate your OPC Server from the list.



When you have found your OPC Server in this list, simply right-click on it and open its properties. Then follow the same steps as those listed for configuring OPCENUM.

Next Step > [Configuring Local Security Policies](#)

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## Configuring Local Security Policy Settings

### Overview

When making remote OPC connections there are some additional settings that should be checked. This is important when the two computers are not under the same domain when logged in.

Updates to newer operating systems have made changes to the local Policy settings and it is entirely possible that these updates have restricted systems that were otherwise once working.

This document assumes that all [DCOM security settings](#) are configured in accordance with our recommendations.

### Local Security Settings

The settings outlined in this document must be checked on both the OPC Server and OPC Client computer(s).

The Local Security Settings can be found:

START > Control Panel > Administrative Tools > Local Security Settings

The Local Security Settings window is shown below:



Expand the Local Policies folder and go the Security Options (shown in gray).

### DCOM Policies

Locate the following options:

- DCOM: Machine Access Restrictions in Security Descriptor Definition Language (SDDL) syntax
- DCOM: Machine Launch Restrictions in Security Descriptor Definition Language (SDDL) syntax

Both of these options should be set to "NOT DEFINED".

If either of these are defined, then you will need to work with an IT professional or network

administrator who has the necessary rights to be able to access and modify these policies.

## Network Access - Everyone Permissions

We need to let Everyone permissions also apply to anonymous users. Locate the following options:

- Network access: Let Everyone permissions apply to anonymous users

These settings default to "disabled". We recommend enabling these options by right-clicking on them and changing the setting as shown below:



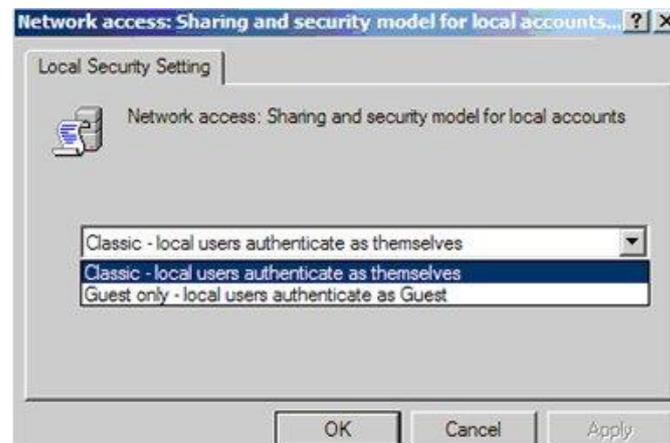
Click the OK button to save the setting and close the window.

## Network Access - Sharing and Security Model

We need to configure the sharing and security model for local accounts. Locate the following options:

- Network access: Sharing and security model for local accounts

This setting now has a default value of "Guest only" which can prevent OPC connections. Right click on this policy and open its Properties:



Change the setting to "Classic" as shown above, then click OK to save and close the window.

Next Step > [Workgroups vs. Domains](#)

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## Workgroup vs Domain

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### Important Concepts and Examples Regarding Workgroups and Windows Domains

When configuring an OPC client and server to run on separate PCs, it is very important that you know whether the computers are running in a workgroup or in a domain. If you don't know how your PC's are setup, you will need to ask someone with Administrative rights and experience to look and see for you.

After reading this you should have a clear understanding of the **user account requirements** for your usage scenario. Setting up those user accounts is a function of your Windows administration and you or your system administrator will need to setup the user accounts.

#### Workgroups

If you will be using BOTH the OPC Client PC and the OPC Server PC in the SAME WORKGROUP, you will need to have the **same user account** setup on BOTH PCs with the **same password**.

Ideally you'd run the OPC Server and the OPC Client using the same user account, but if you cannot do that, then you'll have to make sure **both accounts are on each PC**.

#### Workgroups example:

OPC Client runs as local account "OPCClientUser" on Computer #1

OPC Server runs as local account "OPCServerUser" on Computer #2

The accounts "OPCClientUser" and "OPCServerUser" will have to exist on **both** computers as local accounts. Account "OPCClientUser" must have the same password on both PCs. Account "OPCServerUser" must have the same password on both PCs. The passwords for the two accounts "OPCServerUser" and "OPCClientUser" do not have to match.

#### Domains

Ideally if you are using computers that are in a Windows Domain, both computers will be in the same domain. If they are not in the same domain, you must setup a "trust relationship" between the two domains, which is outside the scope of this documentation.

If you are using domains, it is recommended that you **use domain user accounts** instead of local user accounts to run the OPC Server and the OPC Client. Some people don't realize that if they log into their PC as "JoeSmith" that is different from "MyDomain\JoeSmith". When logging into the PC or choosing user accounts in DCOM setup, be VERY CLEAR whether you are picking a domain account or local user account. If you do choose to use local user accounts, you have to be consistent and do that everywhere in all your DCOM settings.

The big difference in domains is that the Domain Controller will determine whether a user account name + password combination are valid or not. For that reason when using domain user accounts you **will not** go set user names and passwords on each PC in the domain. You will setup the accounts ONE TIME on the Domain Controller and then reference those domain accounts in your DCOM setup.

#### Workgroup to Domain Connections

Connecting workgroups to domains either client to server or server to client can be much more difficult to accomplish. For that reason we strongly recommend you do not try to do this unless

your network and IT security setup constrains you.

The big thing to realize when trying to make workgroups interoperate with domains is that the workgroup has **no way to authenticate a domain user account!**

So to make workgroups and domains interoperate, you basically have to "fall back" to the workgroup to workgroup scenario and setup local user accounts on each PC. A couple of examples will help to illustrate this:

#### **Example: OPC Client in Workgroup, OPC Server in Domain**

Where this can get hard is if your OPC Server is setup to run as the interactive user, and the person logged in on the OPC server computer is using a domain account, and your OPC Client is in a workgroup, then the OPC Server will be running as a domain account user.

When subscription callbacks for data reads from the OPC server come back to the OPC client, the OPC Client PC will see the domain user account and say "I don't know you" and you won't get data.

The symptom of this will be that you can connect to the OPC Server, browse it, configure tags, but fail to get any data back from the OPC Server when it subscribes to tags.

The solution in this case would be to setup the OPC Server to run as a specific named local user on it's PC, instead of as the "interactive" user that is logged into the desktop which is a domain account. That specific named local user, if setup on the OPC Server PC in it's workgroup with the same password, would then be able to access the PC where the OPC Client is running.

Summary of requirements for this example to work:

- OPC Server must run as a local user account and that local user account must exist on the client and server PCs with the same username and password. This can be the same or a different local user account from the one used by the OPC Client.
  - The OPC Client must run as a local user account on the client PC and that same local user account must exist on the OPC Server PC with the same username and password
- **Example: The OPC Client in Domain, OPC Server in Workgroup**

The same concept applies if your OPC client is in a domain and the OPC Server is in a workgroup. The failure mode here though if you run the OPC Client under a domain account, is that the OPC Client won't connect to your OPC server PC, won't browse for servers, so you won't even be able to configure.

The requirements for this example to work are identical to the prior Workgroup/Domain example above.

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