Tech Note 761
OPC Connections at a Glance

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Topic#: 002540
Created: March 2011

Introduction

In the wonderful world of Device Integration, Microsoft OPC connectivity Standards are becoming more popular. Under the guideline of **OPC Foundation** compliancy rules, companies large and small are creating their own OPC products that broaden their applications by communicating with virtually any and every other proprietary communication and network protocols in the world.

However in reality, arbitrarily connecting an OPC Client to an OPC Server is not always as easy as it should be.

This *Tech Note* is a quick reference to assist Wonderware customers trying to take advantage of OPCs versatility. The *Tech Note* provides step-by-step instructions for checking and setting DCOM configurations required to assure the solid OPC connection between the Server and Client. This *Tech Note* also provides basic information regarding the Wonderware OPC products (server and client packages).

Note: This *Tech Note* is intended for basic OPC connectivity. In other words, "open to everyone" configurations. It is does not include any higher level of OPC security, policy implementation, or administrative management configurations. You can start with this wide-open OPC connection first to make sure your devices at two ends can indeed talk to each other, and assure that your network connections and routings are healthy. Later on you can always apply more strenuous security measures to customize your OPC connections.

Understanding OPC Connection Structure and Terminologies

OPC Connection = (OPC Server + OPC Client)

Just like any other communication protocol, an OPC connection is defined as a connection between an OPC *Server* and an OPC *Client*. Occasionally WW Support takes a report of an OPC connection failure between two OPC **Servers** talking to each other.

It is not possible to have two OPC **Servers** talking to each other, and it is not possible to have two OPC **Clients** talk to each other. If you have a good OPC connection at any time, there would have to be one OPC Server and one OPC Client. Once the OPC connection is made, the data flow can indeed go both directions. In other words, from the OPC Client side point of view, **read** is receiving data from the OPC Server, and **write** is sending data to the OPC Server.

It is also true that that one particular software product can be the OPC Server, and at the same time be a client of a different protocol. The opposite can also be true: Being an OPC Client and at the same time being the Server of another protocol.

Wonderware's FSGateway is a perfect example of this multi-functionality. You can configure it with an **OPC Client** object, and the FSGateway runs as an OPC Client and is interfacing with a Wonderware or 3rd party OPC Server. At the same time, FSGateway by default is a SuiteLink protocol **Server** for Wonderware SuiteLink clients such as InTouch® or Wonderware Historian.

OPC Foundation Data Access Specifications (OPC DA)

The OPC foundation currently has 3 sets of **D**ata **A**ccess specifications – **DA1, DA2, and DA3**.

Each set of rules provides guidance to the OPC vendors with compliance rules under Windows operating system and network environments.

Wonderware OPC products support Matrix:

Wonderware Product	OPC Specification
OPCLink	DA1 and DA2
FSGateway OPC Client	DA2
All Wonderware DAServers (such as DASABCIP, DASMBTCP, DASSiDirect….FSGateway etc.) and all OPC Servers	DA2
IAS OPC Client Proxy	DA2

Wonderware OPC products currently do not support DA3.

OPC InProc and Out-of-Proc Connections

There are 2 types of OPC Client-to-Server connections: InProc and Out-of-Proc.

- **InProc** Connection: A connection made by an OPC Client to an OPC Server via In Process memory allocation. An InProc connection between the OPC Server and OPC Client is single instance connection. Once the connection is established, another OPC Client connection is not allowed.

  To make an InProc connection, the OPC Server cannot run as service and cannot be already active. The OPC Client will be the sole requester to activating the OPC Server, and to connect to it. Once the connection is made, the OPC Server is not allowed to shutdown while the OPC Client is still connected to it.

  If you try to stop the OPC Server:

  • The OPC Client restarts the OPC Server.

  To terminate an OPC InProc Connection, you must stop the OPC Client.
  • The OPC Client issues the Disconnect action.
  • This releases the OPC Server to its **Inactive** state.

  You can then shut down the OPC Server.

- **Out-of-Proc Connection** (sometimes referred to as a **LOCAL** Connection): A connection made by an OPC Client to an OPC Server via Out-of-Process memory allocation. An Out-of-Proc connection with an OPC Server allows multiple OPC Client Connection instances at the same time.

OPC Synchronous and Asynchronous Calls

- A **Synchronous** call made by an OPC Client to an OPC Server means that the request for a data update must be confirmed by the OPC Server *after the data update is complete*. The next data update request then can proceed.

- An **Asynchronous** call made by an OPC Client to an OPC Server means that the request for a data update can be streamlined without getting an OPC Server confirmation of the previous update completion. In other words, the client can send another request before the server confirms the previous update is completed.

  All Wonderware OPC Client products (OPCLink, FSGarteway OPC Client, and Archestra OPC Client proxy DIObjects are Asynchronous based, and Wonderware OPC Client products support *only* Asynchronous calls. However, Wonderware OPC Server products support both

Synchronous and **Asynchronous** calls from any OPC Client.

OPC Server DCOM Settings

Whenever possible, Wonderware recommends installing any OPC Client on the same node where the OPC Server is installed. This is because that if the OPC Server and the OPC Client are remotely located to each other in different nodes of a network, the Distributed Communication security and authentication configuration and overhead are much more complicated.

For this *Tech Note*, we will discuss only the DCOM settings for the OPC Server/Client installed on the same node.

Note: A large percentage of Wonderware Tech Support Service Requests and calls for OPC connection problems have been resolved by making a simple, **local** DCOM setting adjustment to the OPC Server.

To change the OPC Server DCOM settings

1. From the Windows **Start** Menu, click **Run**.
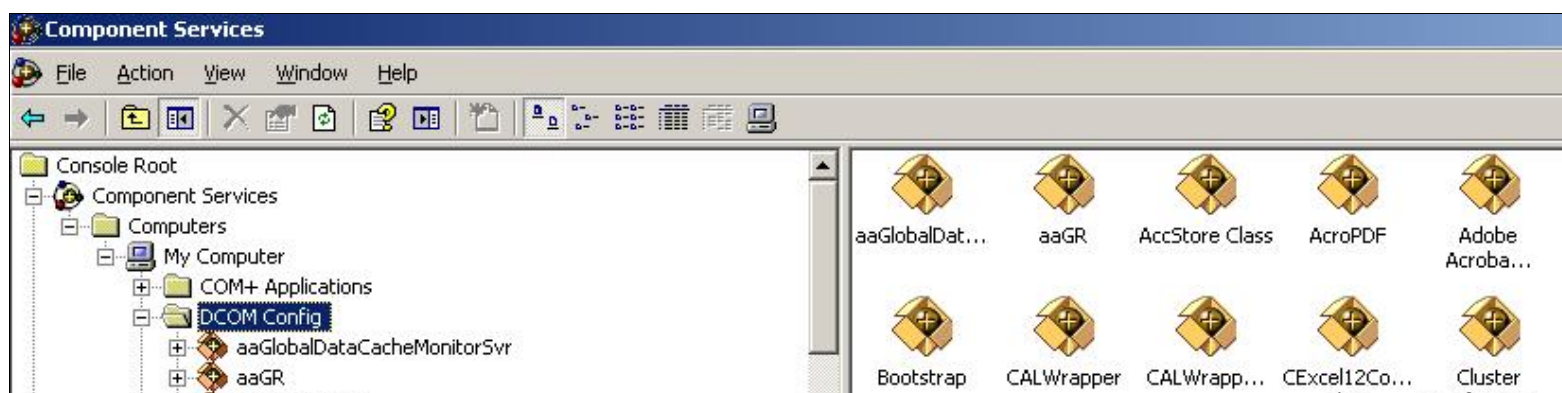
2. Type in `dcomcnfg` and click **OK** (Figure 1 below).
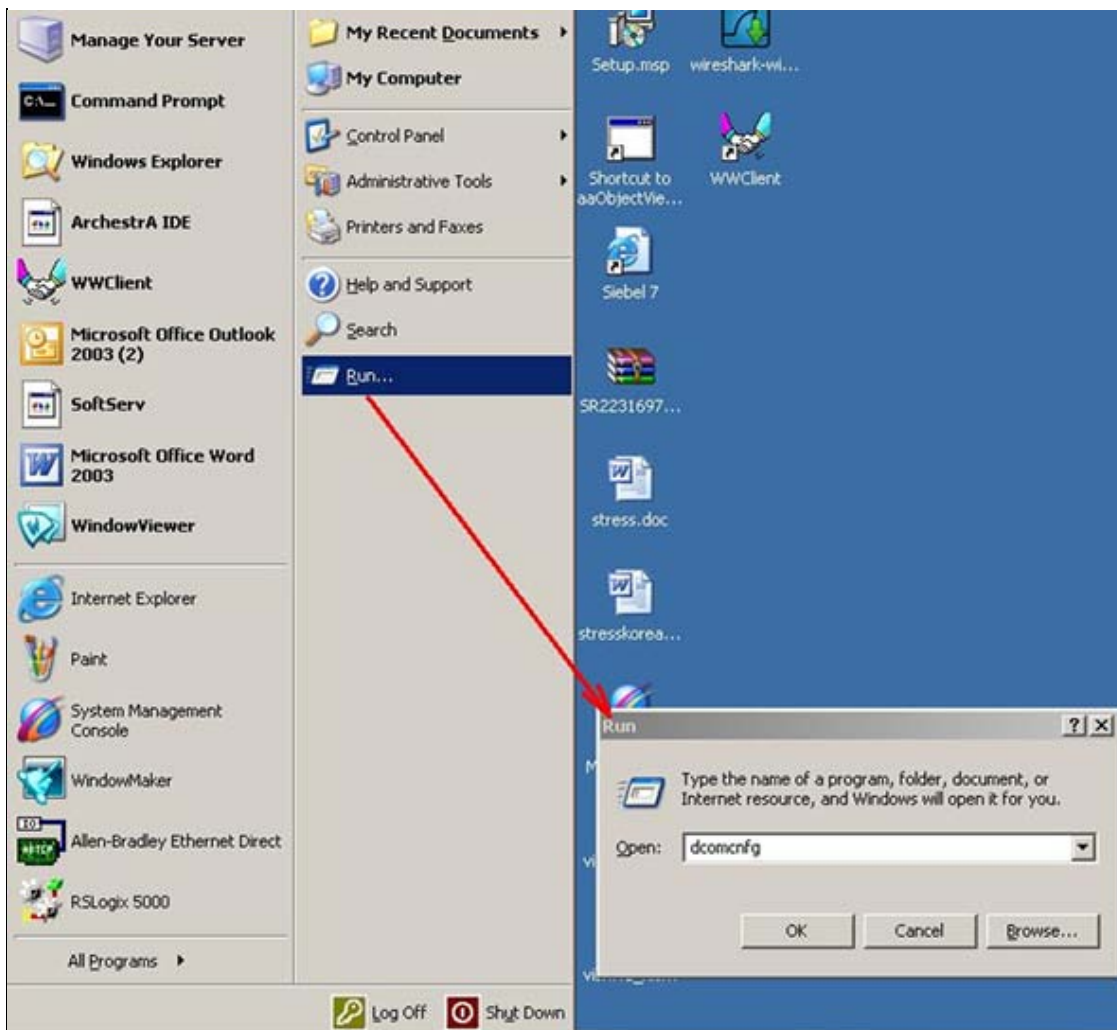
FIGURE 1: DCOMCNFG COMMAND PROMPT

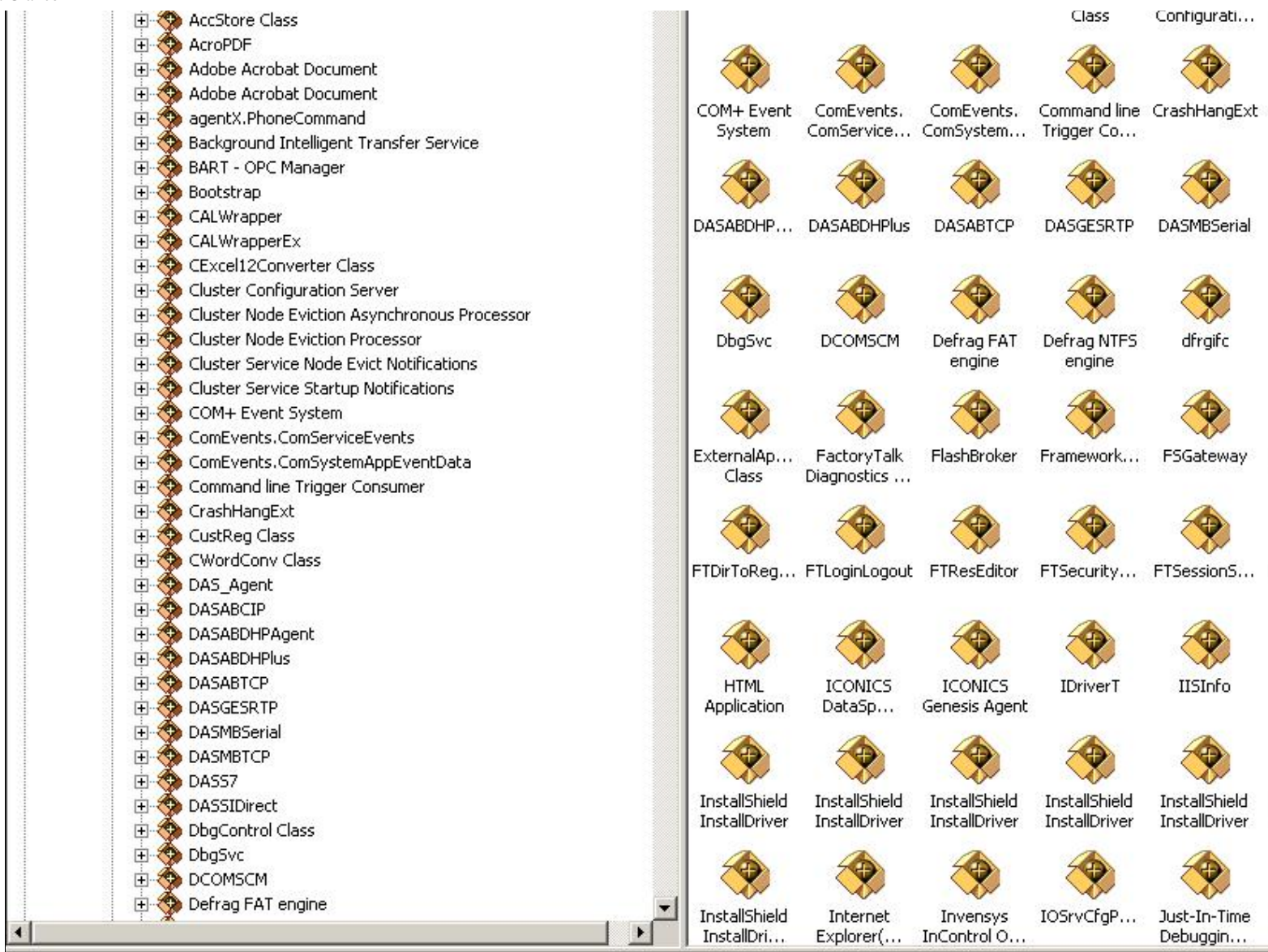The **Component Services** window opens (Figure 2 below).

3. Expand **Computers > My Computer > DCOM Config**.

4. Locate the OPC Server to which you are trying to connect.

Note: The name of the OPC Server in this DCOM list is NOT always the same name as the runtime application. If you are not sure which file is for the OPC Server that you are working with in this list, contact the OPC Server vendor or check the product help files in order to find out exactly what the OPC Server DCOM component is called.

This example uses the **IntraLogic** OPC Server.

5. Highlight the OPC Server, then right-click it and click **Properties** (Figure 3 below).
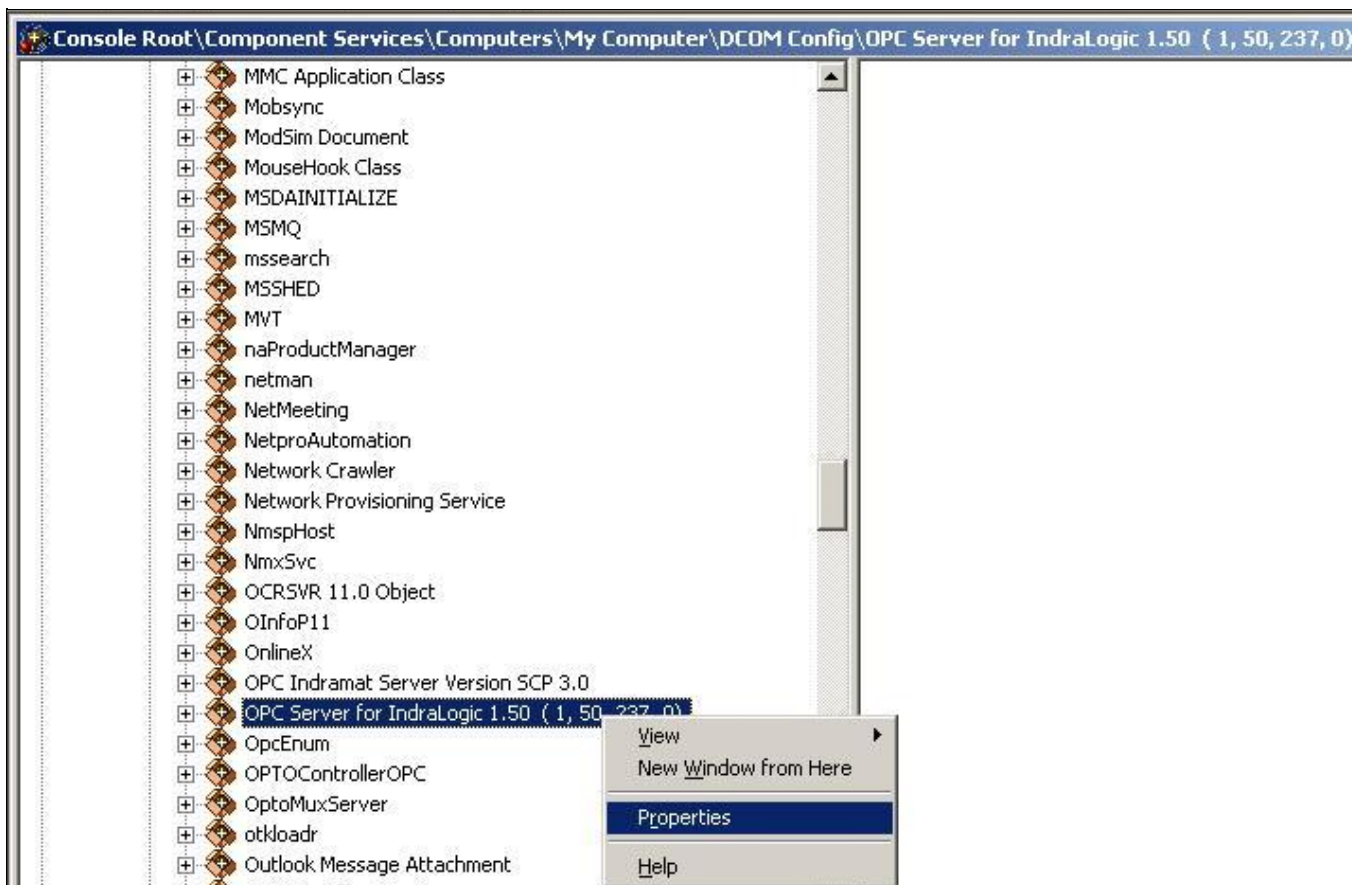
FIGURE 3: OPC SERVER PROPERTIES

There are usually 5 tabs in the property window.

6. Click the **General** tab and find the **Authentication Level** parameter. If it is set to **Default**, change it to **None** (Figures 4 and 5 below).
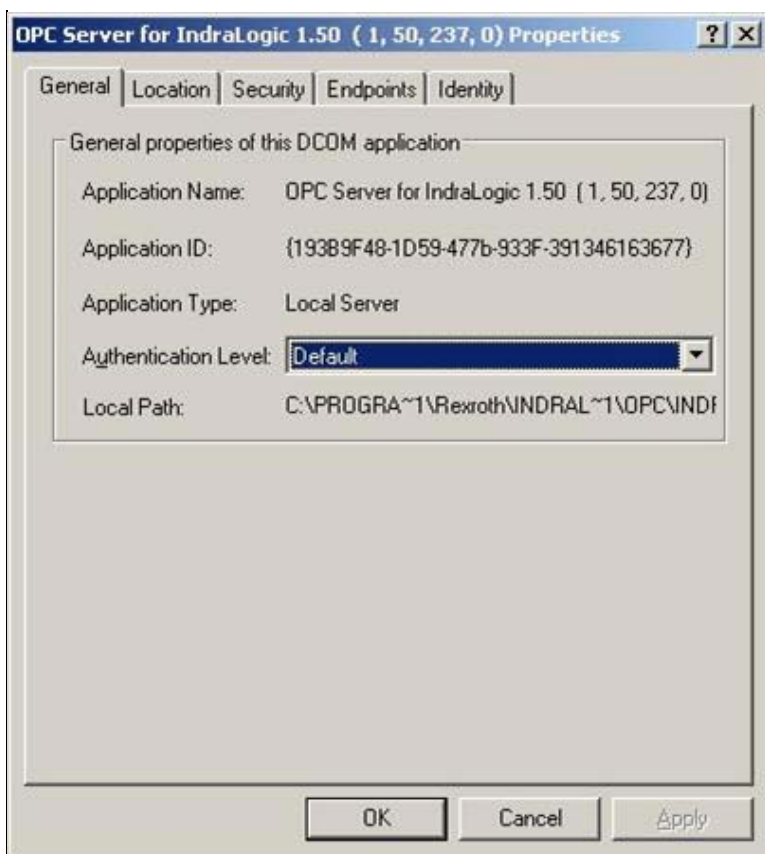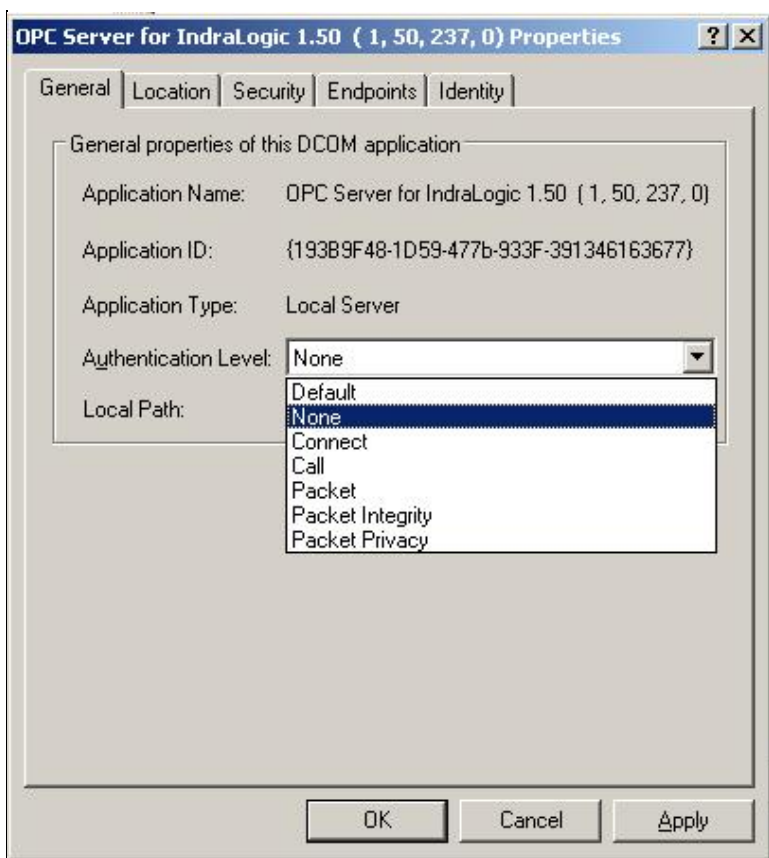
FIGURE 4: AUTHENTICATION LEVEL = DEFAULT
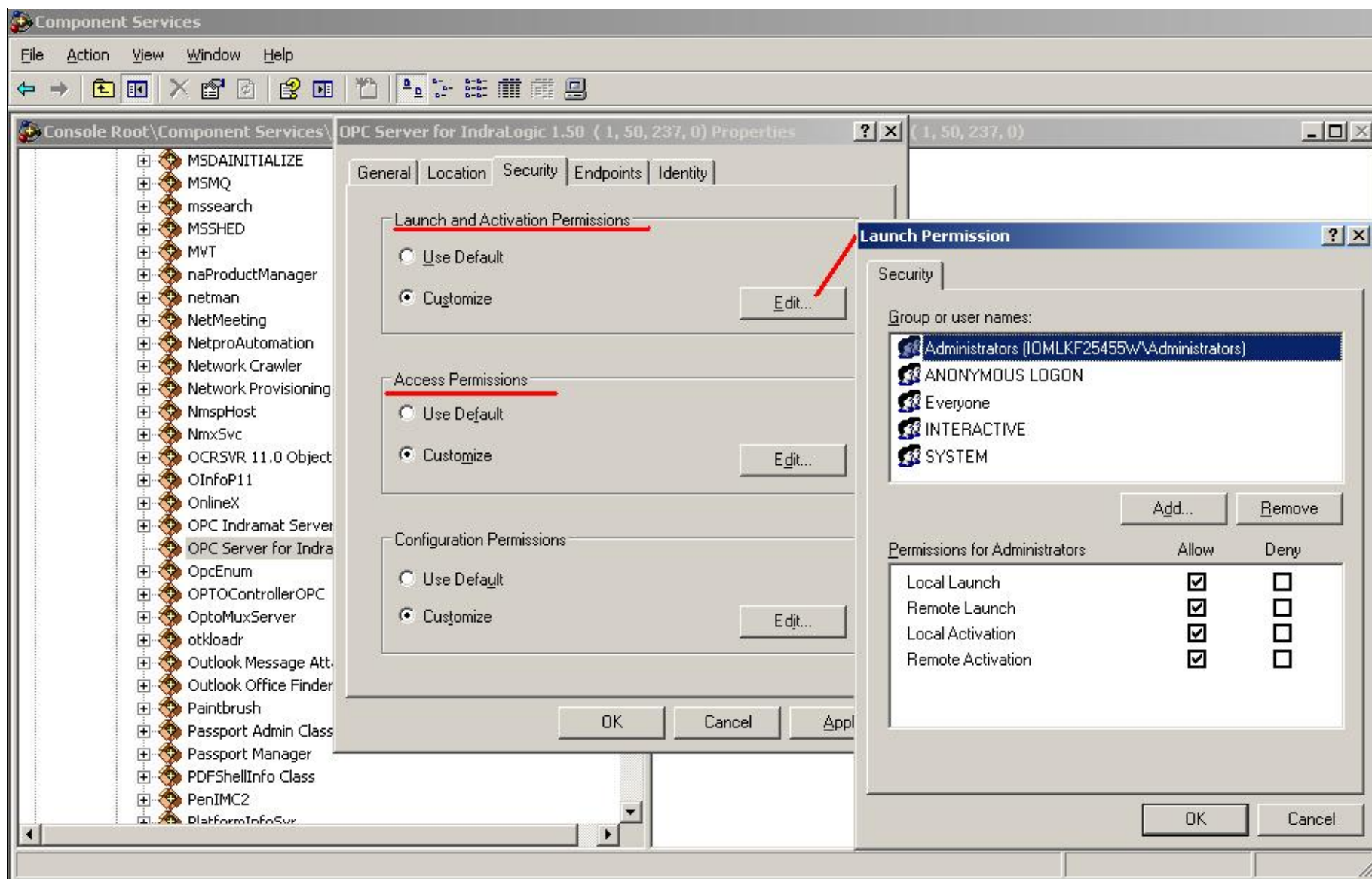
FIGURE 5: CHANGE AUTHENTICATION LEVEL TO NONE

7. Click the **Security** tab.

   You see 3 sections in this panel: **Launch and Activation Permissions**, **Access Permissions**, and **Configuration Permissions**.

   For the connection purpose, you only need to check the first 2 groups.

8. Click the **Customize** option in each group (Figure 6 below).

FIGURE 6: CUSTOMIZE ALL SECURITY SETTINGS

9. Cick **Edit** to open the **Launch Permission** window, and check if **Everyone** is already in the **Group or User names** list.

   If you don't see **Everyone** in the list, use the **Add** option to add Everyone, and assign Allow to all items in the Permissions list.

10. Repeat step 9 for **Access Permissions**.

11. Click the **Identity** tab.

   4 options are available: **The Interactive User**, **The Launching User**, **This User**, and **The System account (services only)**.
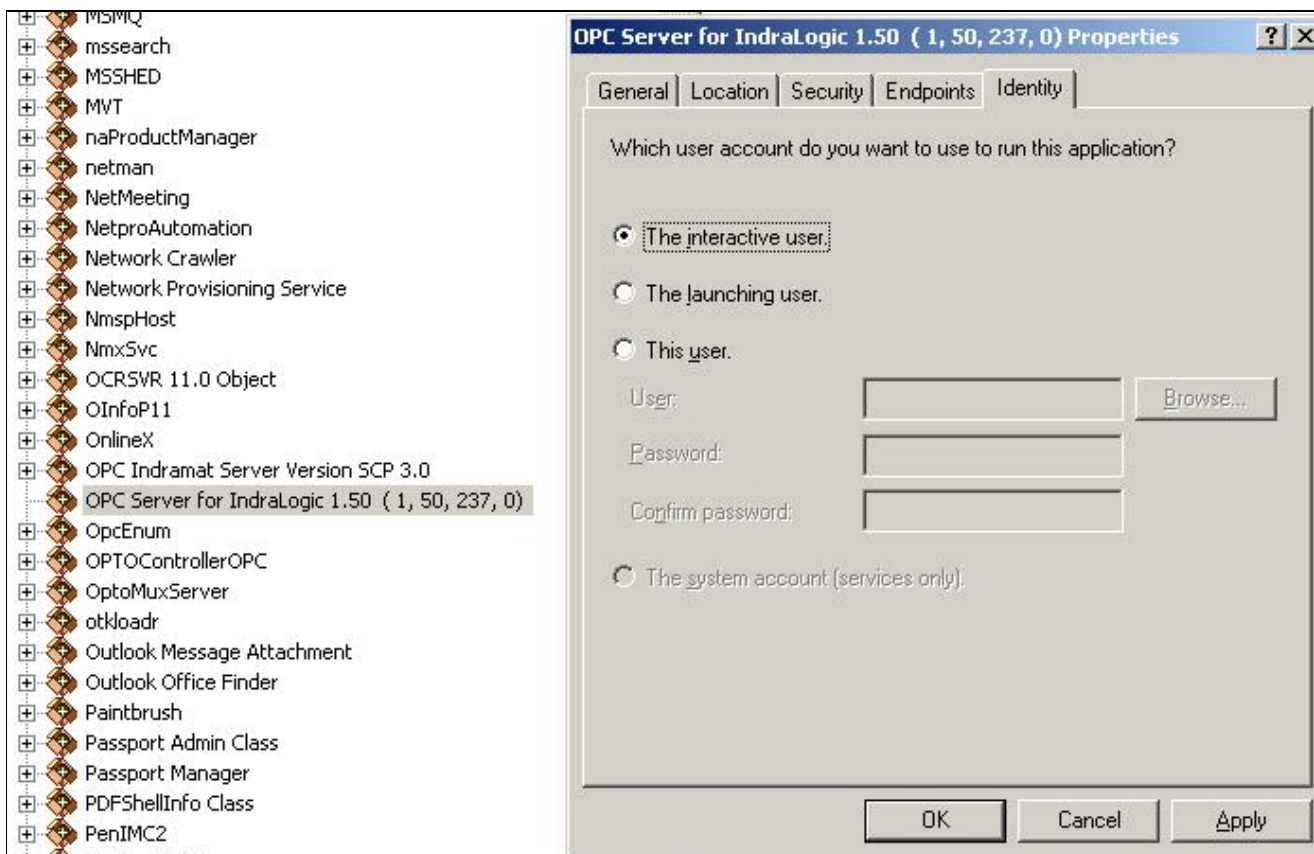
FIGURE 7: IDENTITY SETTINGS

One or more of these options can be disabled.

- **The interactive user** option gives you the most flexibility.

- **The launching user** and **This User** provide limited security policy privileges that come with the Users' accounts.

  If the OPC Server is running as a Service, you might only have **The system account** option.

Whenever possible, we recommend using the **Interactive User** option. For all other options, consult with your IT group for system and user group policies and specifics.

11. Save your changes, and then restart your OPC Server application or services. In most cases, now you should be able to receive your data update from the OPC Server.

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For technical support questions, send an e-mail to **support@wonderware.com**.

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