SPA OPC Server

User's Manual

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SPA OPC Server
Version 1.0

User's Manual

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ABOUT THIS BOOK

This user's manual describes the stand-alone SPA OPC Server and the central concepts related to it. You will find instructions on how to install the SPA OPC Server and how to take it into use. The basic operation procedures are also discussed.

Information in this user's manual is intended for application engineers who install and configure the SPA OPC Server.

As a prerequisite, you should have some previous knowledge of SPA devices.

This user's manual is divided into following sections:

Section 1 - Introduction

This section gives an overview of the SPA OPC Server and states the system requirements that need to be met when using the server.

Section 2 - Installation

This section provides you with instructions on how to install the SPA OPC Server software and other required software and hardware components.

Section 3 - Features

This section gives an overview of the features of the SPA OPC Server.

Section 4 - Engineering

In this section you will find an overview of engineering. You are given instructions on how to configure the SPA OPC Server related objects.

Use of warning, caution, information, and tip icons

This publication includes warning, caution, and information icons that point out safety related conditions or other important information. It also includes tip icons to point out useful information to the reader. The corresponding icons should be interpreted as follows:

An electrical warning icon indicates the presence of a hazard which could result in *electrical shock.*

A warning icon indicates the presence of a hazard which could result in *personal injury*.

A caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in *corruption of software or damage to equipment/property*.

An information icon alerts the reader to pertinent facts and conditions.

A tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Note: Although warning hazards are related to personal injury, and caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warning and caution notices.

Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ESC E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.

- The names of menus and menu items are boldfaced. For example, the **File** menu.
  - The following convention is used for menu operations: **MenuName** > **MenuItem** > **CascadedMenuItem**. For example: select **File** > **New** > **Type**.
  - The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be
  0 to 30.
  ```

  You may be told to enter the string MIF349 in a field. The string is shown as follows in the procedure:

  ```
  MIF349
  ```

- Variables are shown using lowercase letters:

  sequence name

- All the figures in this document have been taken using Windows XP.

Terminology

The following is a list of terms associated with the SPA OPC Server that you should be familiar with. The list contains terms that are unique to ABB or have a usage or definition that is different from the standard industry usage.

Term	Description
Data Access; DA	An OPC service for providing information about process data to OPC clients.
Device	A physical device that behaves as its own communication node in the network, e.g. protection relay.
OPC item	Representation of connections to data sources, i.e. object properties. An OPC item is identified by a string. Associated with each OPC item are Value, Quality and Time Stamp.

Term	Description
SPA	ABB proprietary communication protocol used in substation automation.
SPA device	Protection and/ or Control Product supporting the SPA protocol version 2.5 or earlier.

Abbreviations

The following is a list of abbreviations associated with the SPA OPC Server that you should be familiar with.

AE	Alarms and Events
DA	Data Access
DCOM	Distributed Component Object Model
OPC	Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry

Related documentation

The following is a listing of documentation related to the SPA OPC Server.

Category	Title	Document number
Technical description	SPA-Bus, Communication Protocol V2.5	1MRS750076-MTD

TABLE OF CONTENTS

Section 1 Introduction

1.1 Product overview

The SPA OPC Server provides methods for OPC Clients to exchange data with devices connected to the SPA bus. OPC Clients can access process data, alarms and events from SPA devices, such as protection and control relays that support the SPA protocol v. 2.5 or earlier.

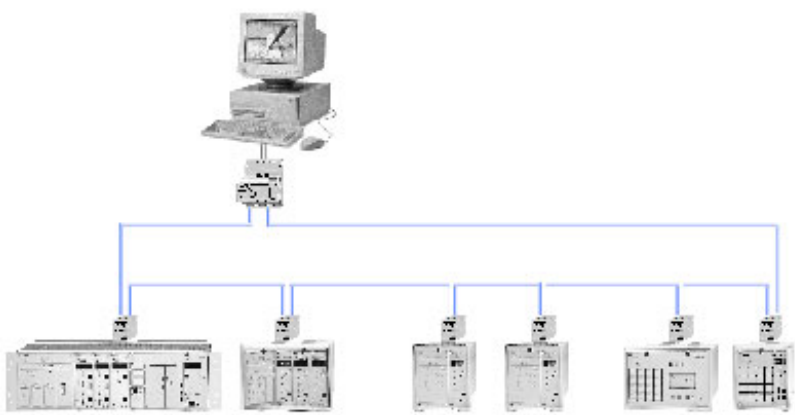

Figure 1-1: The SPA OPC Server system overview

The SPA OPC Server supports the OPC Data Access v.1.0/2.0 and OPC Alarm and Event interfaces. It can be run on the same computer with an OPC Client, see Figure 1-1, or on a separate communication server computer. If the SPA OPC server is running on a separate computer, the communication between the client and the server is based on Distributed Component Object Model (DCOM), see *DCOM configuration* on page 59.

1.2 Safety information

The purpose of safety information is to provide information on prevention of hazards.

1.3 Backup

All the project specific data is stored into the configuration file **opcs_net.ini**. Therefore it is usually enough to create a backup only for this file. Reinstalling the SPA OPC Server software will restore the rest of the required files.

There are some commercial software packages available for creating a complete image backup for the system, but none of these is delivered with the SPA OPC Server software. The backup image will then contain both the system and application specific files.

1.4 Fatal errors

A fatal error is an error that causes a breakdown or a locked situation in the program.

1.4.1 Handling

In case of a fatal error:

1. Write down the possible SPA OPC Server error messages.
2. If necessary, shut down the SPA OPC Server program in the Windows[TM1] Task Manager.
3. The data kept in the main memory at the moment of a fatal error is placed in the **drwtsn32.log** file. It is placed in a system folder, for example Winnt. Analyze and copy the data in this file.

Report the program breakdown together with the possible error messages and the information in the **drwtsn32.log** file to the SPA OPC Server supplier.

1. Windows is a trademark of Microsoft Corporation.

Section 2 Installation

This chapter provides information on the system requirements for the SPA OPC Server. It also describes the installation procedure of the SPA OPC Server.

2.1 System requirements

The SPA OPC Server runs on the Windows 2000 and Windows XP Operating System. A PC capable of running one of these operating systems and applications is usually sufficient also for the SPA OPC Server.

Other system requirements can be seen below.

- 20 MB free hard disk space, if Microsoft .NET Framework 1.1, which is required for running the SPA OPC Server Configuration Tool, has been installed already.
- 100 MB free hard disk space, includes installation of Microsoft .NET Framework 1.1. It is installed automatically, if it is not found.

The following issues affect the performance of the system, and should also be considered when choosing the hardware:

- The number of connected devices
- The number of signals per device
- The frequency of signal changes
- The number of OPC Clients connected to the server
- Whether the OPC Client is run on the same computer or on a separate one

2.2 Installation of the SPA OPC Server

To install the SPA OPC Server:

1. Start the installation program. The Setup dialog box is displayed. Click **Next** to continue the installation, or choose **Cancel** if you do not want to install, see Figure 2-1.

Figure 2-1: Setup dialog box

2. The License Agreement dialog box appears on the screen. Read the License Agreement and choose the “I accept the license agreement**”** radio button to accept the terms of it, and click **Next** to continue, see Figure 2-2.

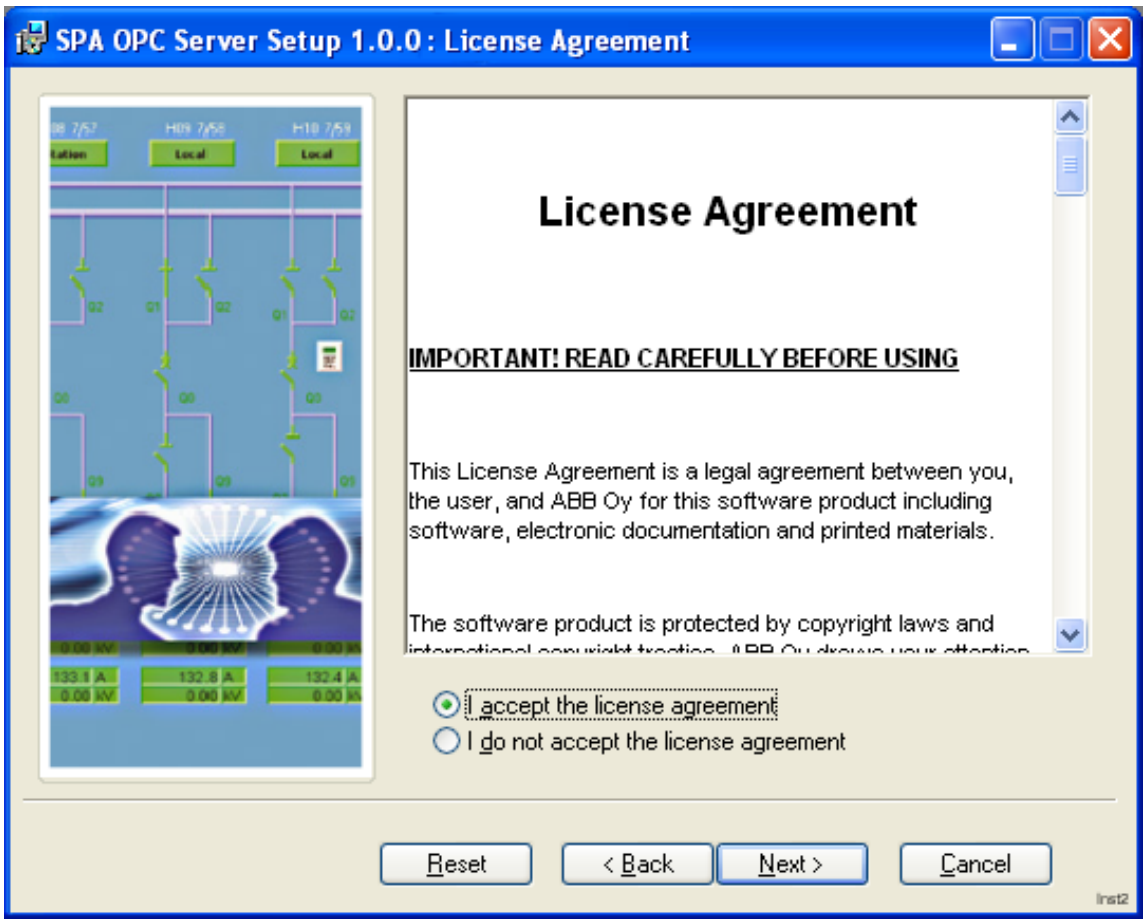

Figure 2-2: License Agreement dialog box

3. The Wise Installation Wizard dialog box appears on the screen. The files for the SPA OPC Server are automatically installed in a certain folder. Click **Next** to continue the installation. If you want to install the files in a different folder, choose **Browse**, see Figure 2-3.

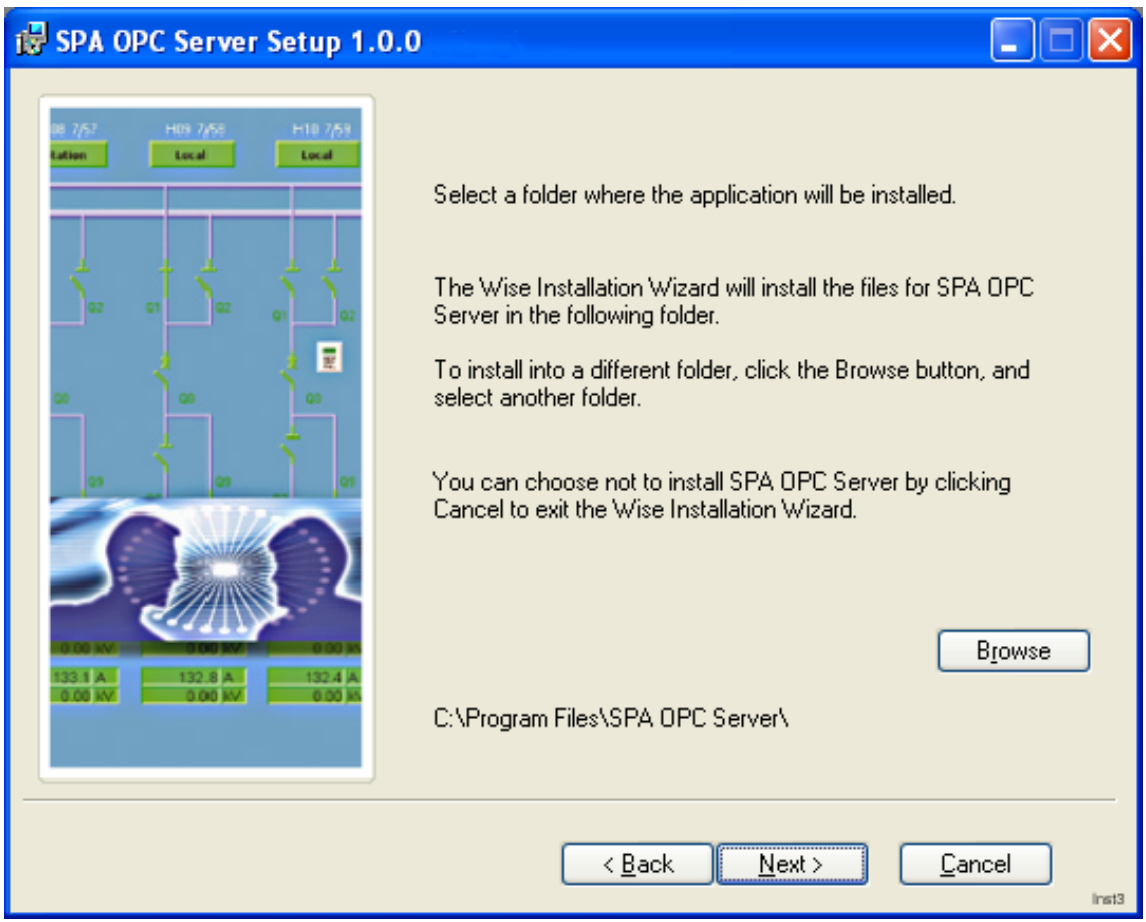

Figure 2-3: Wise Installation Wizard dialog box

license_agreement.tif

4. The application is now ready to start installing the SPA OPC Server. Click **Next** to continue or **Back** to reenter the installation information, see Figure 2-4.

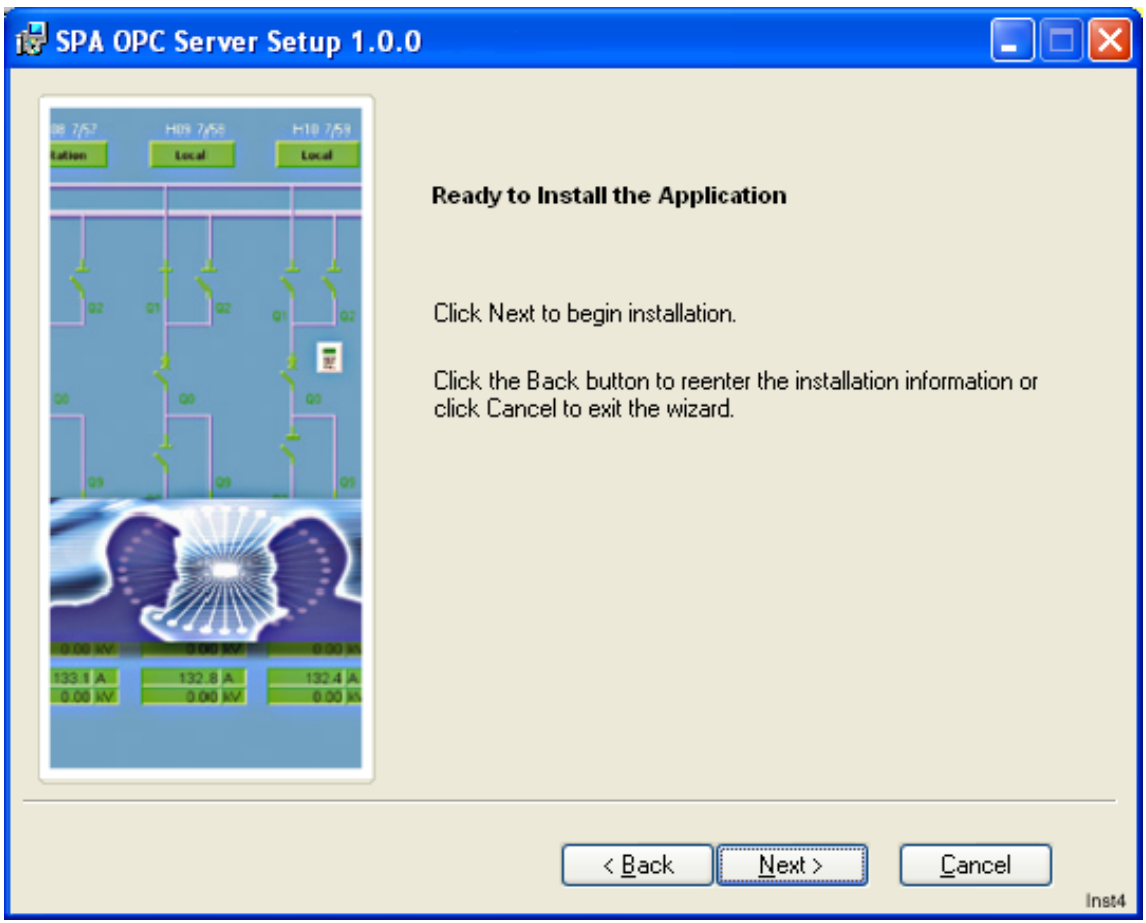

Figure 2-4: Starting the installation

5. You can now follow the progress of the installation. You can also cancel the installation at this point by selecting **Cancel**, see Figure 2-5.

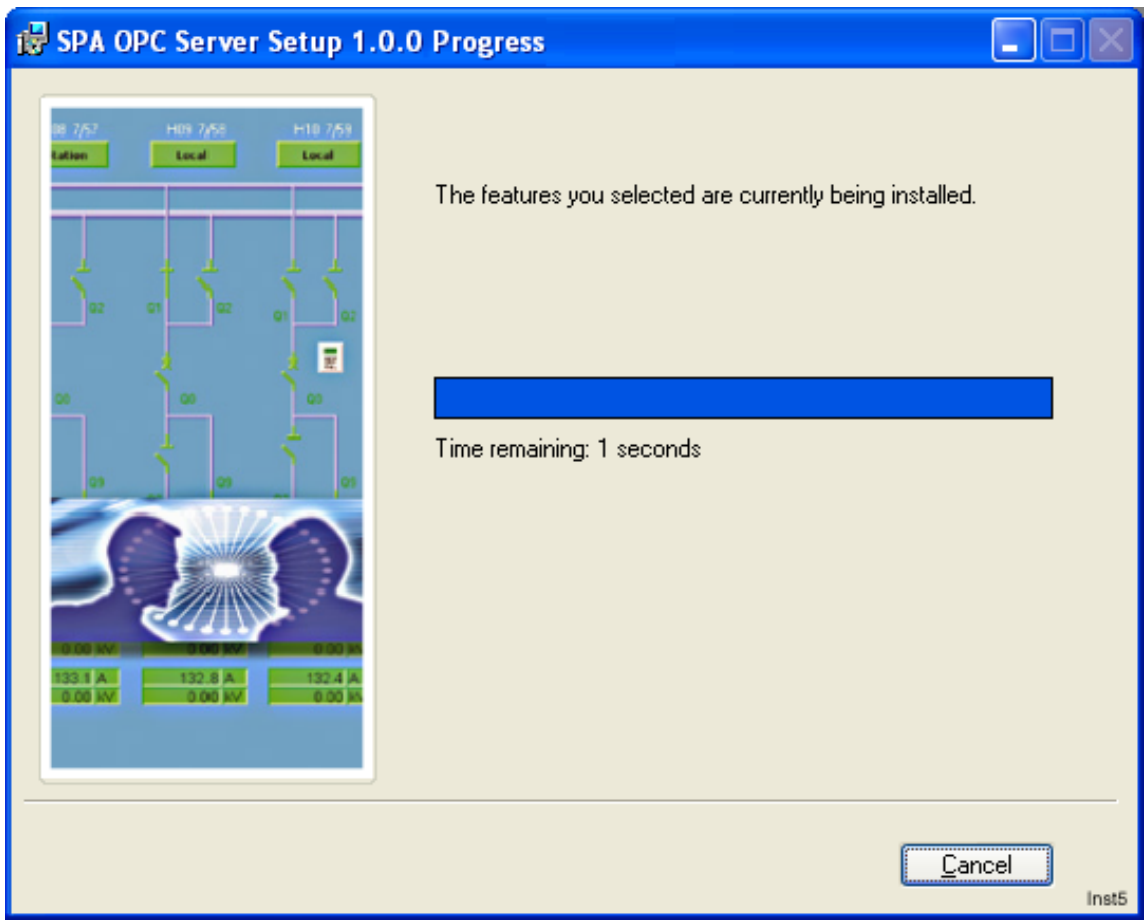

Figure 2-5: Progress of the installation

6. The License Installation dialog box is now displayed. The “Install a Demo license for SPA OPC Server” check box is selected automatically. Click **Install** to install a Demo license, see Figure 2-6.

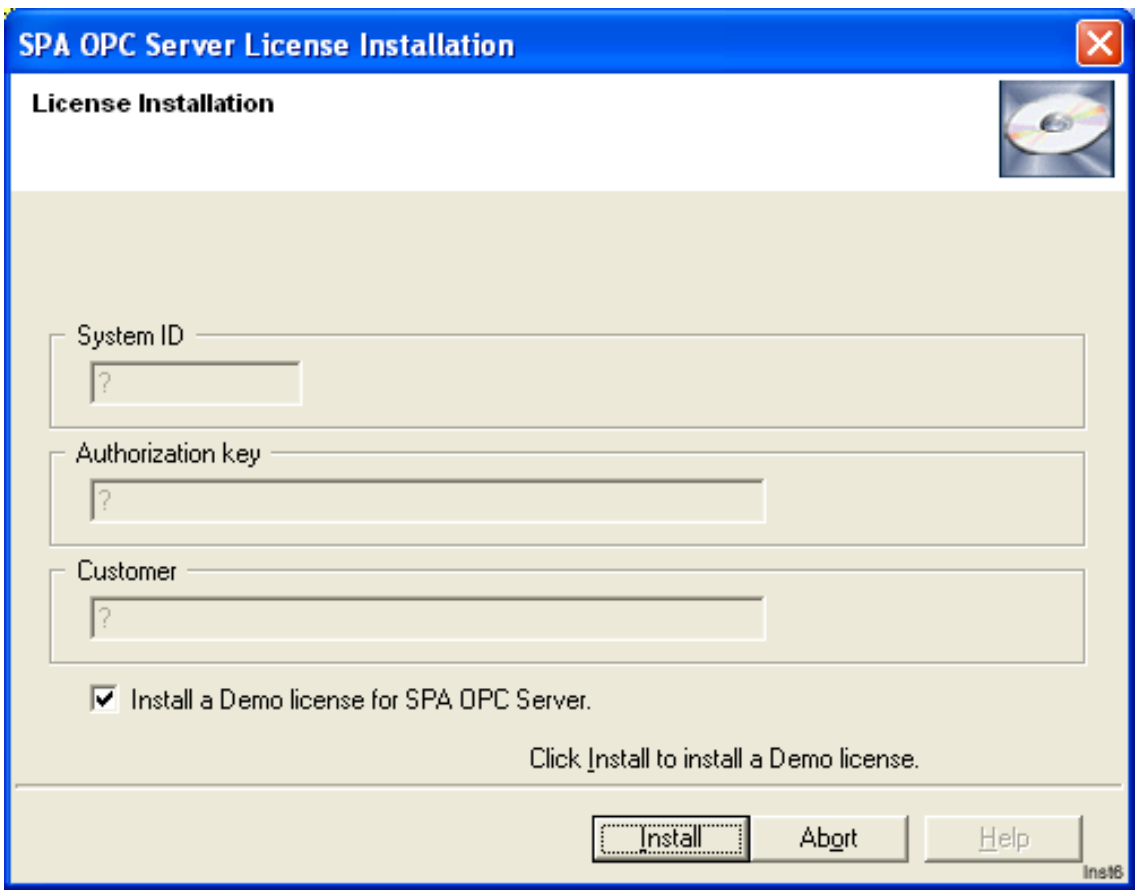

Figure 2-6: License Installation dialog box

7. The installation of the SPA OPC Server is now complete. Click **OK** to exit, see Figure 2-7.

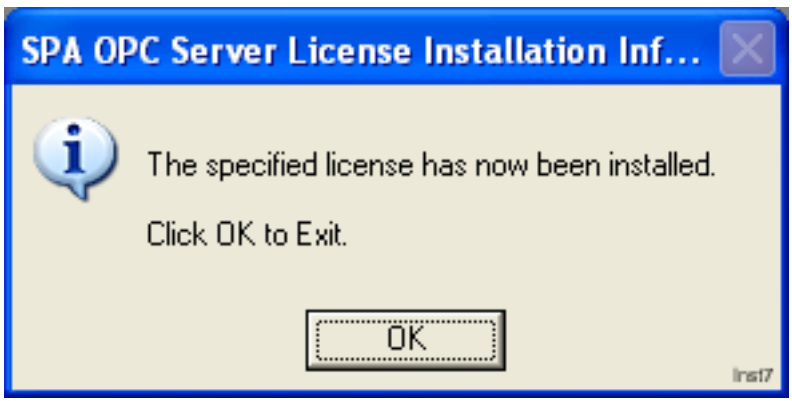

Figure 2-7: Installation complete dialog box

8. The SPA OPC Server has been successfully installed. Click **Finish** to exit the installation, see Figure 2-8.

Figure 2-8: Finishing the installation

Section 3 Features

The purpose of this section is to describe the basic features of the SPA OPC Server. This chapter also describes concepts like OPC Data Access Namespace, Attributes and OPC Alarms and Events Area Space.

The software component structure of the SPA OPC Server is shown in Figure 3-1.

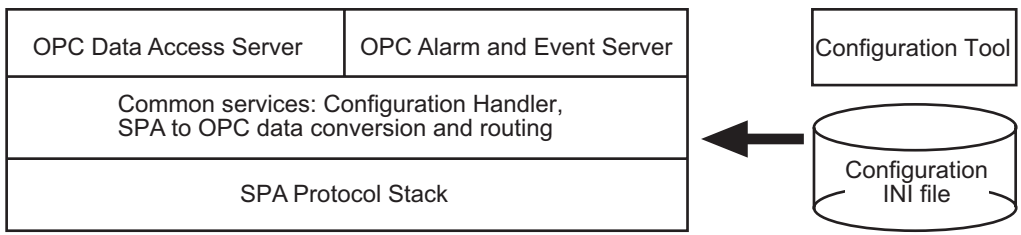

Figure 3-1: Software component structure of the SPA OPC Server

The SPA OPC Server supports the following features:

- OPC Data Access v. 1.0/2.0 and OPC Alarms and Events specifications
- System supervision:
  - SPA line communication
  - SPA device communication
- SPA communication
  - The SPA protocol v. 2.5 or earlier supports max. eight lines per server and max. 30 devices/modules per line.
- Supported SPA data types and functions:
  - Event based single and double indications, initial values requested when the server starts up

- Cyclically updated measurements
- Direct and secure commands
- Transparent SPA support for sending and receiving SPA messages directly from an OPC client
- Time synchronization
- Dial-up support for SPA devices connected through public telephone network

3.1 OPC Data Access Namespace

An example of the OPC Data Access Namespace is shown in Figure 3-2.
Table 3-1 describes all the components shown in Figure 3-2. Indentation is used to indicate the parent-child relationship between the nodes.

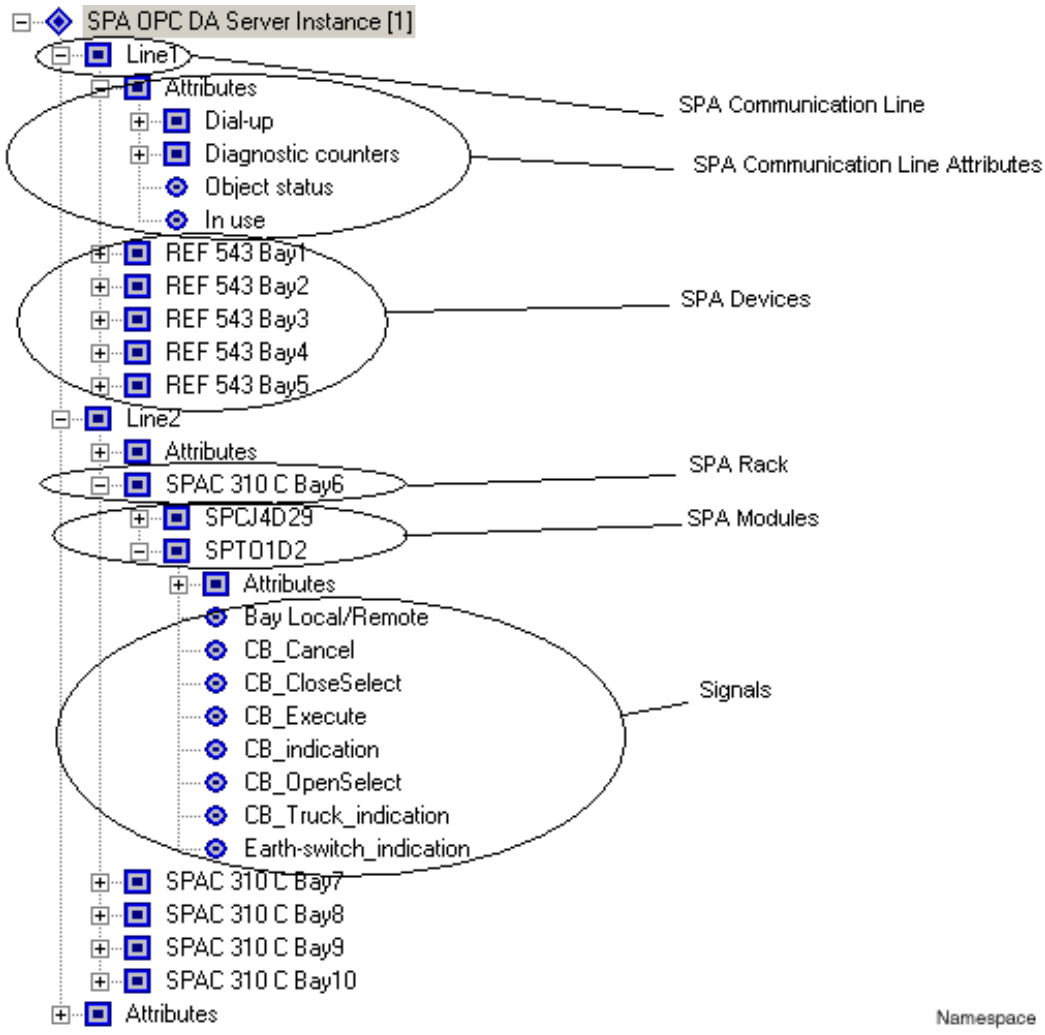

Figure 3-2: OPC Data Access Namespace

Table 3-1: Namespace legend

SPA OPC Server	An object representing the SPA OPC Server.
SPA Line	An object representing a physical communication line (=serial port). You can define up to 8 lines per OPC server.
SPA Device	An object representing a physical device. You should not have more than 30 devices/modules per line or more than 200 devices/modules per server.
SPA Rack	Collection of SPA Modules in one physical rack.
SPA Module	A SPA Device placed in a relay rack, for example, SPACOM modules. You should not have more than 30 modules/devices per line or more than 200 modules/devices per server.
SPA Signals	An OPC item tag/node representing a signal, usually a command or an indication. There are seven types of signals, see *Adding SPA Signal objects* on page 44. Signals describe the actual information that a device or module provides. To view the icons of all the signals, see Table 4-1.
Attributes	A predefined node that contains item tags for controlling or retrieving status information for the parent node. The parent node can be the server, a line or device.

3.2 Attributes

In addition to item tags for process data (indications and commands), the SPA OPC Server also provides some item tags for controlling the devices and retrieving status information from them. These item tags are called attributes.

There are three categories of attributes: server attributes, line attributes and device attributes. These attributes are described in sections 3.2.1, 3.2.2 and 3.2.3.

3.2.1 Server attributes

Server attributes display information on the protocol stack. The end user does not necessarily need any of these attributes.

Table 3-2: Server attributes

	Description
Protocol stack version	Version information of the SPA protocol stack software.

3.2.2 Line attributes

The line attribute section contains the following information:

Table 3-3: Line attributes

Dial-up	Description
Mode	Integer 0=direct connection (default), 1=dial-up connection
Dial	String A phone number to dial, writing the number string activates the dialing. Writing an empty string closes the connection (hang up).
Dial-up connection status	Integer 0=Idle 1=Connected 2=Busy 3=Not in dial-up mode 4=Configuration
Connection time limited	Integer 0=No time limit 1=Time limit used
Connection time limit	Integer The maximum connection time in seconds

Modem command	String Sends a string to the modem, e.g. AT command.
Diagnostic counters	**Description**
Transmitted messages	Incremented every time a message is transmitted to the SPA line by the SPA OPC Server.
Failed transmissions	Incremented every time a message transmission to the SPA line fails for some reason.
Timeout errors	Incremented every time a transaction based transmission does not receive a response within a configured timeout.
Received event messages	Incremented every time an event message is received to the SPA OPC server from the SPA line.
Received data messages	Incremented every time a data message is received to the SPA OPC server from the SPA line.
Received messages	Incremented every time a message is received to the SPA OPC Server from the SPA line.
Parity errors	Incremented every time a parity error is detected in a message received from the SPA line.
Overrun errors	Incremented every time an overrun error is detected in a message received from the SPA line.
Redundancy errors	Incremented every time a redundancy error is detected in a message received from the SPA line.
Framing errors	Incremented every time a framing error is detected in a message received from the SPA line.

Object status	Integer Communication status of the line, see *Status Codes* on page 57 for status codes values and explanations.
In use	Integer Controls whether the SPA OPC Server tries to communicate with the SPA devices configured to the line. When the SPA line is taken into use (In use set to value 1), the SPA OPC Server tries to establish communication with the devices configured to the line. When the SPA line is taken out of use (In use set to value 0), the SPA OPC Server suspends all communication on that line.

3.2.3 Device attributes

The device attribute section contains the following information:

Table 3-4: Device attributes

Diagnostic counters	Description
Process data messages received	Incremented every time a message containing process data is received from the device.
Event messages received	Incremented every time a message containing an event is received from the device.
Suspensions	Incremented every time the communication with the SPA device is broken and the device is considered suspended.
Reply timeouts	This counter is Incremented every time a command to the device is not responded within a configured time.
Event to data discrepancies	Incremented every time a discrepancy is detected between the process data received with data poll and the data received with an event. This can be due to a configuration error or an event overflow situation.

Object status	Integer Communication status of the device, see *Status Codes* on page 57 for status code values and explanation.
In use	Integer Controls whether the SPA OPC Server tries to communicate with the device. When the SPA device is taken into use (In use set to value 1), the SPA OPC Server tries to establish communication with the device. When a SPA device is taken out of use (In use set to value 0), the SPA OPC Server does not communicate with the device anymore.
Device connection status	Boolean The communication connection status of the device. If the device is communicating properly, the value is true. If the communication with the device is broken, the value is false.
Transparent SPA	String To write and read SPA parameters using transparent SPA messages. Transparent SPA enables a direct communication with the device using the SPA messages. The SPA command is written to “Transparent SPA” OPC item, and when the answer is received, it can be read from the same item.

3.3 OPC Alarms and Events Area Space

The area space resembles the OPC Data Access Namespace, but instead of signals there are alarm and event sources. The signals that generate events are event sources in the area space. Signals that do not generate events are not included in the area space.

The generated event type for a signal is always a condition event. The event categories used by the SPA OPC Server are listed in Table 3-5. They are described more precisely in sections 3.3.1 and 3.3.2.

Table 3-5: Event categories and event types

Event category	Event type
System Message	simple
Discrete	condition

The event definitions for the Discrete event categories must be defined in the configuration so that they can be used. The other event types do not need any configuration.

In each condition event notification the vendor specific attribute CV (current value) is included. This attribute holds the current value of the signal that generated the event.

3.3.1 System message events

The SPA OPC Server generates system message events for some notifications from the devices or lines. The notifications may be `device_started`, `device_suspended`, etc.

The source of such an event is the node name of the device or line from which the notification originates. The message is "Operation failed (status code number)". For information on status codes, see *Status Codes* on page 57.

System message events may also be generated to inform about internal problems in the SPA OPC Server, e.g. communication queues filling up.

3.3.2 Discrete (Indication) events

Discrete events describe a state change in a signal that can be a single or double indication, for example a signal that represents the position of a breaker. Discrete events have multiple sub-conditions depending on the signal type. Events for single indications have two sub-conditions, and events for double indications have four sub-conditions, see *Adding event definitions* on page 54.

Section 4 Engineering

4.1 About this section

This section guides you to the engineering tasks that are required before you can start using the SPA OPC Server.

To start the SPA OPC Server configuration tool, select **Start** > **Programs** > **SPA OPC Server** > **SPA OPC Server Configuration Tool**. The Figure 4-1 shows how the configuration tool looks like at this point.

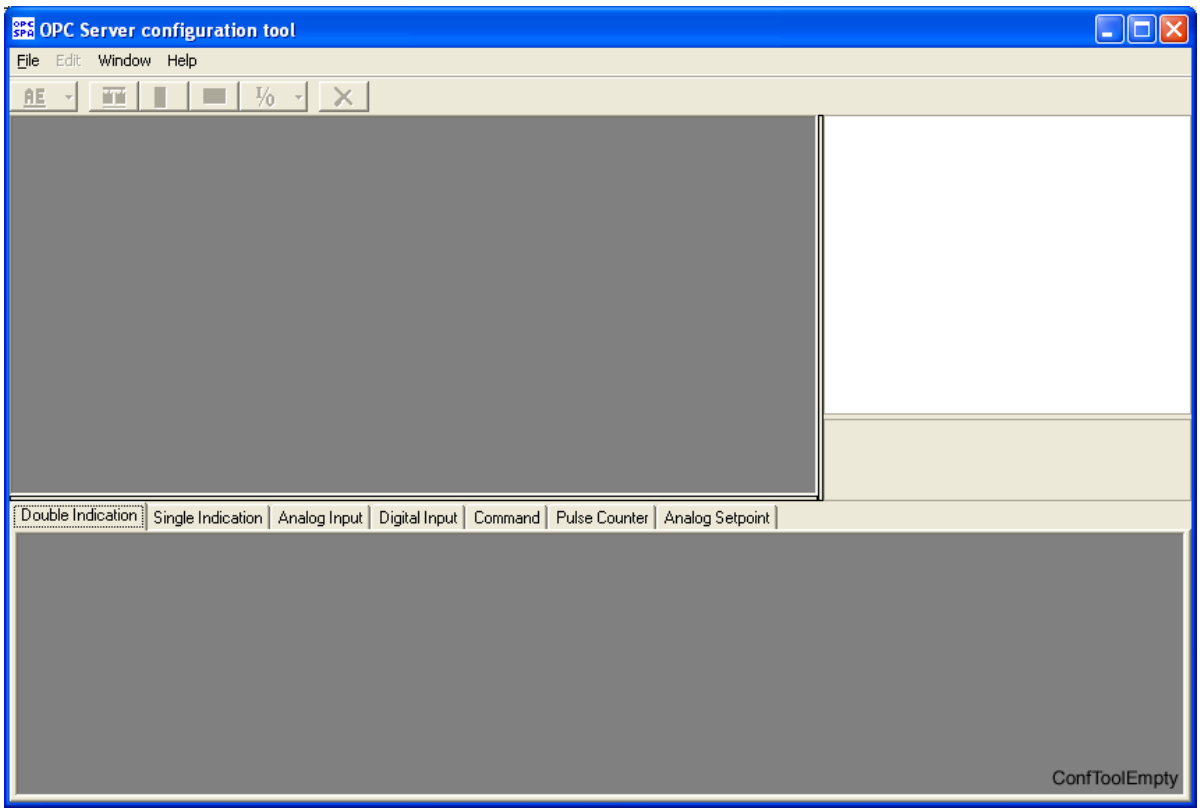

Figure 4-1: SPA OPC Server configuration tool

4.2 Overview of the engineering

Before you can start using the SPA OPC Server, you need to create and configure an object tree in the SPA OPC Server configuration tool to define the system structure. The possible objects are SPA OPC Server, Line, Device, Rack, Module and Signal, see Table 4-1.

The toolbar is placed on top of the screen. The icons for the selectable objects in the toolbar are colored, and the icons that cannot be selected remain grey.

On the right side of the screen you can view the configurable properties of a chosen object. When you choose a device or module object, a table representing the configured signals appears at the bottom of the screen.

The Figure 4-2 shows an example view of the SPA OPC Server configuration tool including the following parts:

1. Object tree
2. Toolbar
3. Property grid window displaying the object properties
4. Signal table

To view the SPA OPC Server User's Manual as a .pdf file, choose **Help > Manual**. To view the version of the SPA OPC Server Configuration Tool, choose **Help > About**.

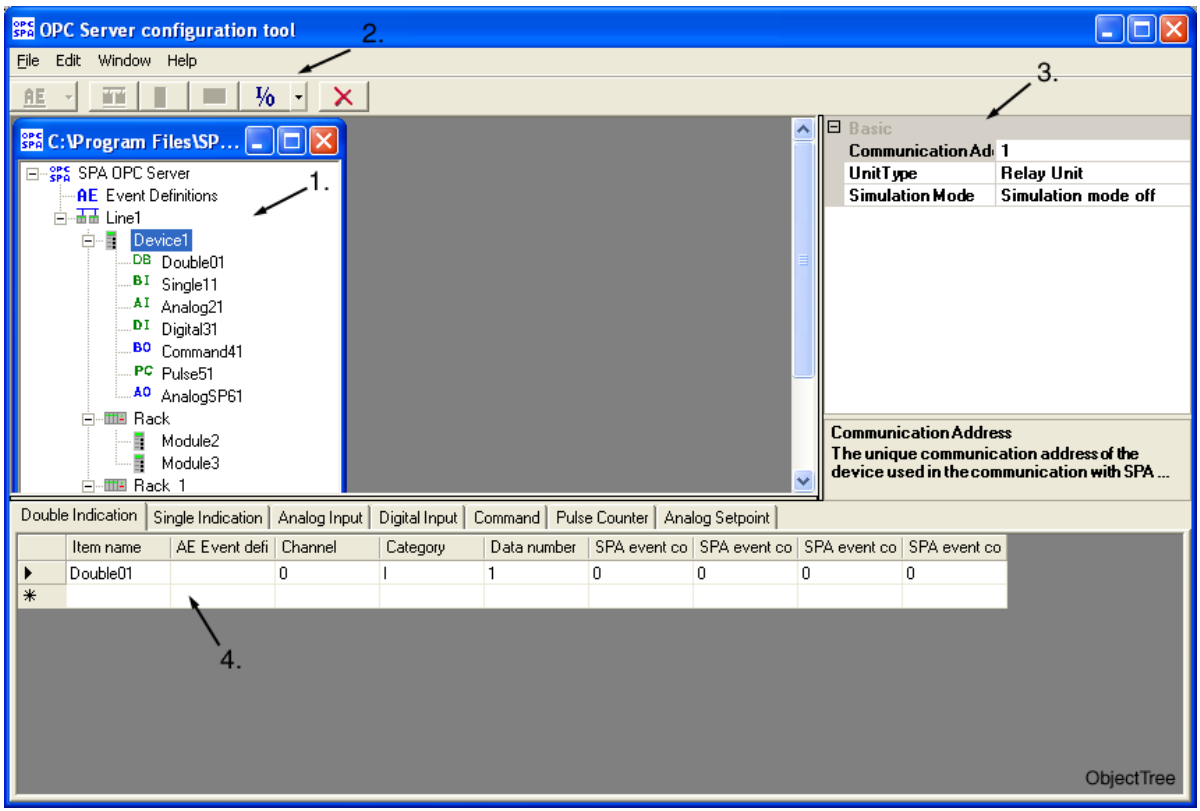

Figure 4-2: Example view of the SPA OPC Server configuration tool

When you start configuring, choose **File > New** or **File** > **Open.** By selecting **File > New** you can start with a clean slate. Choose **File** > **Open** to open an existing configuration in the **Tool** folder. By selecting **File** > **Open** you can also find an example configuration file **opcs_example.ini**, which is delivered with this installation package. It is also possible to open several configurations at the same time and copy SPA OPC Server objects from an existing configuration file to another configuration file.

Note that when you open the configuration tool for the first time, there is no existing active configuration. This means that the **OPCS_SPA_1** folder is empty at this point, see Figure 4-4.

The engineering work can be divided into three separate tasks:

1. creating an object tree,
2. configuring object properties, and
3. saving configuration data.

First, you need to create an object tree. This is done by adding objects to the object tree, see *Creating an object tree on page 43*. The Figure 4-3 shows an example of how the object tree may look like after the tree has been built. In the example tree you can see the SPA OPC Server object and its child objects like lines, devices, racks, modules and signals. Indentation is used to indicate the parent-child relationship between the objects.

Table 4-1 describes the objects shown in the example object tree (Figure 4-3).

Table 4-1: SPA OPC Server related objects

SPA OPC Server		An object representing the SPA OPC Server.
SPA Line		An object representing a physical communication line (=serial port). You can define up to 8 lines per OPC server.
SPA Device		An object representing a physical device. You should not have more than 30 devices/modules per line or more than 200 devices/modules per server.
SPA Rack		Collection of SPA Modules in one physical rack.
SPA Module		A SPA Device placed in a relay rack, for example, SPACOM modules. You should not have more than 30 modules/devices per line or more than 200 modules/devices per server.

SPA Signals		An OPC item tag/node representing a signal, usually a command or an indication. There are seven types of signals, see *Adding SPA Signal objects* on page 44. Signals describe the actual information that a device or module provides. The signals and their icons are the following:
		Double Indication A signal consisting of two bits (double binary). Bit values are presented as an integer value 00=0, 01=1, 10=2 and 11=3.
		Single Indication A signal presenting one bit information, values: 0 or 1.
		Analog Input A signal presenting floating point value information.
		Digital Input A signal presenting integer value information.
		Command Signal for controlling binary outputs.
		Pulse Counter A signal presenting long integer value information.
		Analog Setpoint A signal for controlling analog setpoints/outputs.

After you have added the required objects to the SPA OPC Server Configuration Tool, you need to configure them, see *Configuring objects* on page 46.

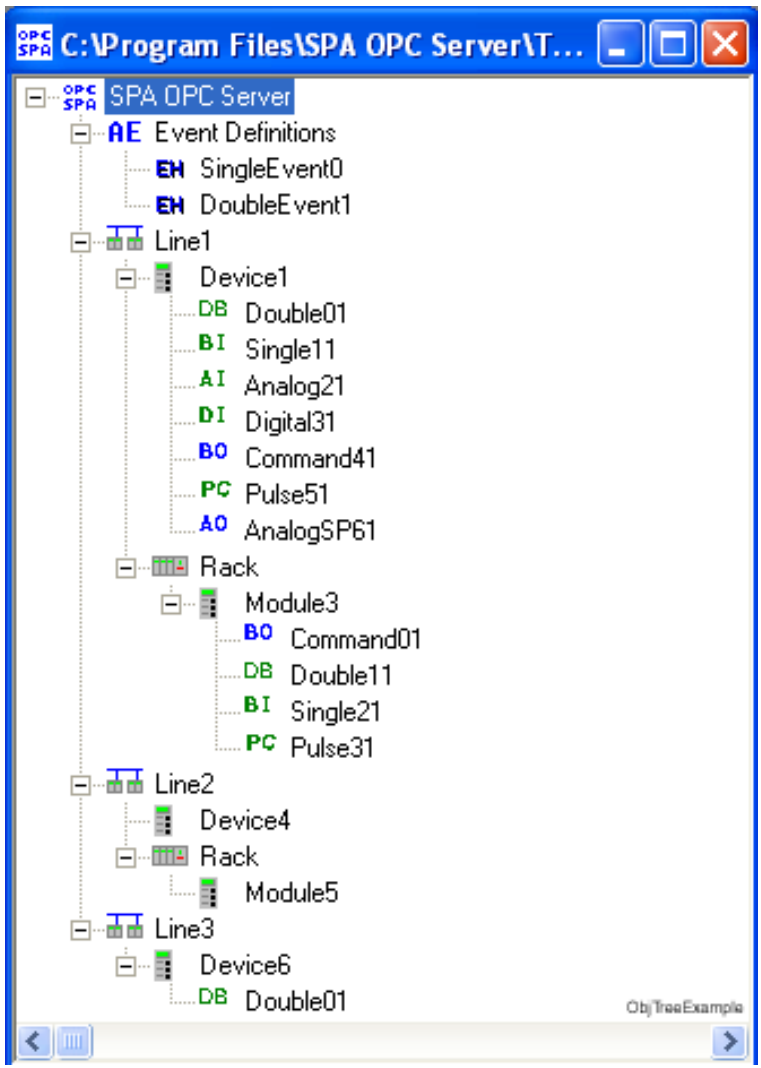

Figure 4-3: Example of an object tree

Finally, you must save the configuration data by selecting **File** > **Save as active configuration** or **File** > **Save as**.

The configuration that has been saved as active in the OPC Server refers to the **opcs_net.ini** file saved in the **OPCS_SPA_1** folder, see Figure 4-4 and Figure 4-5. When the SPA OPC Server is launched, it reads the configuration data and establishes communication with the SPA devices.

Selecting **File** > **Save as** saves the configuration in the **Tool** folder, see Figure 4-4. The files in the **Tool** folder can be named however, and any number of files can be saved in there.

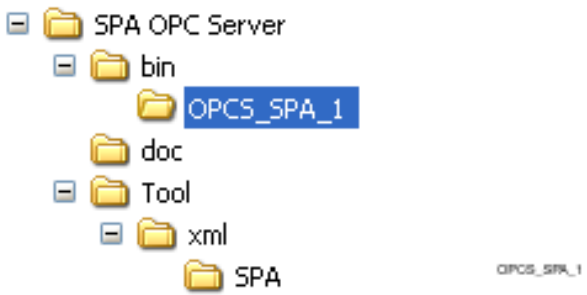

Figure 4-4: OPCS_SPA_1 folder

Figure 4-5: opcs_net.ini file

To open an active configuration, choose **File** > **Open active configuration**. This action opens the **opcs_net.ini** file in the **OPCS_SPA_1** folder.

4.3 Creating an object tree

The object tree is built in the SPA OPC Server Configuration Tool (see Figure 4-3). It is built by adding objects in a logical order to the SPA OPC Server Configuration Tool starting from the SPA OPC Server object.

There are basicly four ways to add an object to the object tree:

- You can right-click the object to which you want to add a child object.
- You can choose the appropriate icon in the toolbar.
- You can select **Edit** > **Add> Object name.**
- You can copy the object from an existing file.
- With signals, it is also possible to add an object in a signal table which appears below the object tree.

Add the objects in the following order. Note that the SPA OPC Server object exists already.

1. SPA Line object
2. SPA Device or SPA Rack objects
3. SPA Module objects (with relay object only)
4. SPA Signal objects (For all the possible signal types, see Table 4-1.)

4.3.1 SPA OPC Server object

To start creating the object tree

1. Select **File** > **New** in the SPA OPC Server Configuration Tool. The SPA OPC Server object is created automatically.

4.3.2 Adding SPA Line objects

To add a SPA Line object

1. Select a SPA OPC Server object.
2. There are four ways to add a SPA Line object to the object tree. You can either right-click the SPA OPC Server object and select **Add Line,** or you can choose the appropriate icon in the toolbar. You can also select **Edit** > **Add> Line** or copy an existing object.

3. Rename the Line object. Note that the names of the lines have to be unique.

4.3.3 Adding SPA Device or SPA Rack objects

To add a SPA Device or SPA Rack object

1. Select a Line object.
2. There are four ways to add a SPA Device or SPA Rack object to the object tree:

- You can right-click the Line object and select **Add Device** or **Add Rack.**
- You can choose the appropriate icon in the toolbar.
- You can select **Edit** > **Add> Device/Rack**
- You can copy an existing object.

3. Rename the Device or Rack object. Note that the names of the devices and racks within a line have to be unique.

4.3.4 Adding SPA Module objects

To add a SPA Module object

1. Select a Rack object.
2. There are four ways to add a SPA Module object to the object tree:

- You can right-click the Rack object and select **Add Module**.
- You can choose the appropriate icon in the toolbar.
- You can select **Edit** > **Add> Module.**
- You can copy an existing object.

3. Rename the Module object. Note that the names of the modules within a rack have to be unique.

4.3.5 Adding SPA Signal objects

To add a SPA Signal object

1. Select a Device or Module object.
2. There are five ways to add a SPA Signal object to the object tree:

- You can right-click the Device or Module object and select the Signal object you want to add, e.g. **Add Double Indication**.
- You can choose the appropriate icon in the toolbar.
- You can also select **Edit** > **Add> Signal object.**
- You can copy an existing object.
- You can add a Signal object in a signal table which appears below the object tree. You can click the **Item name** field on the right side of the star sign, see Figure 4-6.

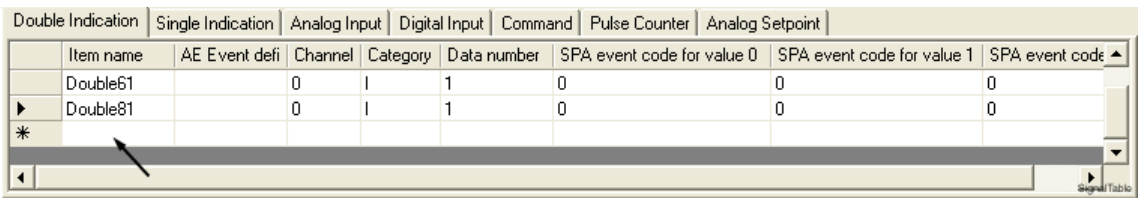

Figure 4-6: Signal table

3. Rename the Signal object. Note that the names of the signals within a device or module have to be unique.

4.3.6 Deleting and copying objects

To delete objects from the object tree, right-click the object you want to delete and choose **Delete**, or choose the appropriate icon in the toolbar. You can also select the object and click **Edit** > **Delete.**

To copy objects, right-click the object you want to copy and select **Copy**, then right-click the object you want to paste it to and select **Paste**. You can also copy objects by selecting **Edit** > **Copy** and **Edit** > **Paste**. It is also possible to drag and drop objects. Copying of objects is possible both within a file and from one file to another.

4.4 Configuring objects

After the objects have been added, you need to configure the object properties. Nearly every object has configurable properties. In addition to the property grid window, signal properties can be modified also in the signal table, see Figure 4-6.

The Figure 4-7 shows an example of the line object properties in the OPC Server configuration tool. See *SPA Line properties* on page 48 for further information on the line object properties.

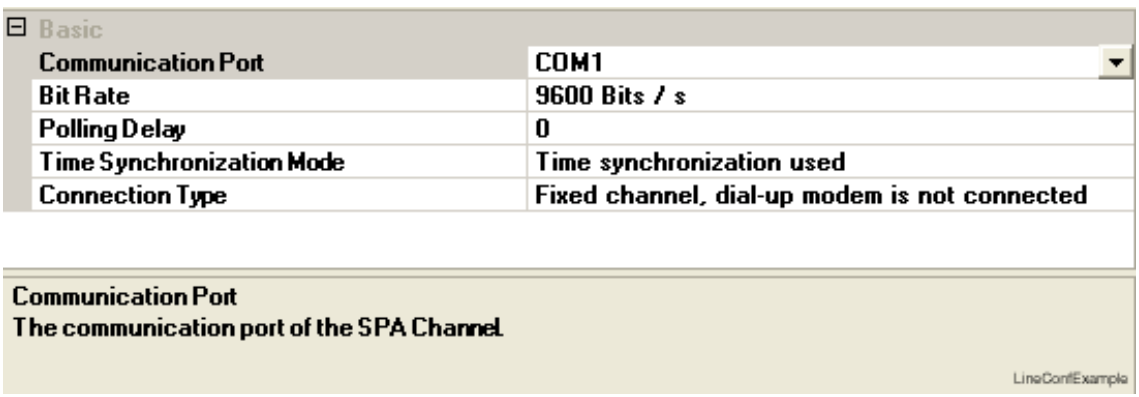

Figure 4-7: An example line configuration

4.4.1 SPA OPC Server properties

Table 4-2 lists the configurable SPA OPC Server properties, defaults, and descriptions.

Table 4-2: SPA OPC Server properties

Name	Default	Description
Use Reversed Double Positions	False	Specifies whether the ON and OFF values are reversed in double position indications or not. When this option is True OFF=2 and ON=1.
Enable OPC version 2.0 Optimizations	True	Enables faster and less memory consuming connections for the OPC v2 clients. NOTE! The OPC v1 clients are not fully supported when this option is enabled.

4.4.2 SPA Line properties

Table 4-3 lists the default values for the SPA Line properties that you can define.

Table 4-3: SPA Line properties

Name	Default values	Description
Basic attributes		
Communication Port	COM1...COM32 Default:COM1	The communication port of the SPA Line
Bit Rate	300 bits/s 600 bits/s 1200 bits/s 2400 bits/s 4800 bits/s 9600 bits/s 19200 bits/s Default: 9600 bits/s	Transmission rate used on the line
Polling Delay	20 ms	Defines the delay between polling telegrams in milliseconds, range 0-500.
Time Synchronization Mode	Time synchronization used Time synchronization not used Default: Time synchronization used	Synchronization mode for the line
Connection Type	Dial-up modem is connected Fixed channel, dial-up modem is not connected Default: Fixed channel, dial-up modem is not connected	States whether a dial-up modem is connected to the line or not. The dial-up modem must use the AT (Hayes) command set.

4.4.3 SPA Device and SPA Module properties

Table 4-4 lists the default values for the SPA Device and SPA Module properties that you can define.

Table 4-4: SPA Device/ Module properties

Name	Default values	Description
Basic		
Communication Address	1	The unique communication address of the device used in the communication with SPA OPC Server. The broadcast telegrams always use the address 900 and need not to be specified by this property, range 0-899.
Unit Type	Alarm Unit Relay Unit Default: Relay Unit	Defines the type of the connected device.
Simulation Mode	Simulation mode on Simulation mode off Default: Simulation mode off	Specifies whether the device is in simulation mode or not. It is possible to configure a device into simulation mode. This means that no data is exchanged with a real device via SPA, but all the process data is locally simulated and stored by the OPC Server. Commands (OPC item writes) will not be passed to the SPA Network.

4.4.4 SPA Signal properties

The following tables list the default values for the SPA Signal properties that you can define.

4.4.4.1 Double Indication

Table 4-5: Double Indication properties

Name	Default values	Description
Basic		

Channel	0	SPA Channel Number for indication, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for indication.
Data number	1	SPA Data Number for indication, range 0-999.
SPA event code for value 0	0	Event code for intermediate (00) position event, range 0-999.
SPA event code for value 1	0	Event code for Off/Open position event, range 0-999.
SPA event code for value 2	0	Event code for On/Close position event, range 0-999.
SPA event code for value 3	0	Event code for invalid (11) position event, range 0-999.
OPC Event		
AE Event definition	Default: None	Name of the event definition to be used with this object.

4.4.4.2 Single Indication

Table 4-6: Single Indication properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for indication, range 0-999.

Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for indication.
Data number	1	SPA Data Number for indication, range 0-999.
SPA event code for value 0	0	SPA Off Event Code, range 0-999.
SPA event code for value 1	0	SPA On Event Code, range 0-999.
OPC Event		
AE Event definition	Default: None	Name of the event definition to be used with this object.

4.4.4.3 Analog Input

Table 4-7: Analog Input properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for indication, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for indication.
Data number	1	SPA Data Number for indication, range 0-999.

4.4.4.4 Digital Input

Table 4-8: Digital Input properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for indication, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for indication.
Data number	1	SPA Data Number for indication, range 0-999.

4.4.4.5 Command

Table 4-9: Command properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for command, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for command.
Data number	1	SPA Data Number for command, range 0-999.

4.4.4.6 Pulse Counter

Table 4-10: Pulse Counter properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for pulse counter, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for pulse counter.
Data number	1	SPA Data Number for pulse counter, range 0-999.

4.4.4.7 Analog Setpoint

Table 4-11: Analog Setpoint properties

Name	Default values	Description
Basic		
Channel	0	SPA Channel Number for command, range 0-999.
Category	I = Input data O = Output data S = Setting V = Variable Default: I	SPA Data Category for command.
Data number	1	SPA Data Number for command, range 0-999.

4.5 Adding event definitions

It is possible to define events for single and double indications. They are added under AE Event Definitions in the same way as the other objects, see *Creating an object tree on page 43*. If you want to take a look at an example object tree, see *Example of an object tree* on page 41.

So that the OPC Alarm and Event Server can be used, events need to be defined, see *Features* on page 25. The OPC Alarm and Event Server is normally used for alarm and event lists, where the signal changes are displayed in text format.

1. Create a definition (e.g. breaker position) under AE Event Definitions. Once this has been done, several signals may share the same definition. (Continue creating other definitions in the same way.)
2. Attach the definition you created to a particular signal. This is done under the signal object by giving the name of the AE Event Definition object (e.g. breaker position) as a value of an AE Event Definition property.

In the tables below you can view examples of both single and double indications.

Table 4-12: Event definition properties for single indications

Name	Value or Value range/ Default	Description
Event for value 0		
0. Description	Value changed to 0	Description text of the event.
0. Severity	1	Severity of the event, range 0-999.
0. Sub Condition	Value 0	Sub condition name of the event.
0. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.
Event for value 1		
1. Description	Value changed to 1	Description text of the event.
1. Severity	2	Severity of the event, range 0-999.

Name	Value or Value range/ Default	Description
1. Sub Condition	Value 1	Sub condition name of the event.
1. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.

Table 4-13: Event definition properties for double indications

Name	Value or Value range/ Default	Description
Event for value 0		
0. Description	Value changed to 0	Description text of the event.
0. Severity	1	Severity of the event, range 0-999.
0. Sub Condition	Value 0	Sub condition name of the event.
0. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.
Event for value 1		
1. Description	Value changed to 1	Description text of the event.
1. Severity	2	Severity of the event, range 0-999.
1. Sub Condition	Value 1	Sub condition name of the event.
1. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.
Event for value 2		
2. Description	Value changed to 2	Description text of the event.

Name	Value or Value range/ Default	Description
2. Severity	3	Severity of the event, range 0-999.
2. Sub Condition	Value 2	Sub condition name of the event.
2. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.
Event for value 3		
3. Description	Value changed to 3	Description text of the event.
3. Severity	4	Severity of the event, range 0-999.
3. Sub Condition	Value 3	Sub condition name of the event.
3. Acknowledge Request	True False Default: False	Determines whether a user acknowledgement is required for the event or not.

Appendix A Status Codes

Status codes

13201	Data overflow error
13202	Received reply length exceeds the allowed maximum length
13212	Unexpected response
13223	Unexpected value type
13225	Only write allowed
13226	No acknowledge reply
13227	Data discrepancy detected between data and event poll
13228	No transparent SPA reply available
13229	Out of buffers error
13251	Device suspended
13252	Device taken out of use
13253	Device taken into use
13254	Out of memory error
13255	Timeout while waiting response
13258	General interrogation finished
17201	Timeout while waiting CTS signal
17202	CTS signal inactivated during transmission
17203	Redundancy error in response
17204	Timeout while waiting response
17205	CTS signal continuously inactive
17206	Dial-up connection inactive
17207	Dial-up connection hang-up

Appendix B DCOM configuration

By default, the OPC Server is installed and used as a local server, i.e. both the server and the client run on the same computer. The server can also be run as a remote server on another computer than the client. The remote server is accessed in the same way as the local server (except that the computer where the server runs must be selected in the OPC client; how this is done is client-specific), but some DCOM configuration must be performed before accessing the remote server. The DCOM configuration must be done on both the server and the client computer.

The server must be installed and registered on the server computer. It must also be registered on the client computer unless the client uses the OPC Server Browser (OPCENUM.EXE) provided by the OPC Foundation, or unless the client can browse the registry on the server computer. The registration is done automatically during the installation. Therefore it may be easiest to install the server also on the client computer, if the client requires local registry entries for the server.

DCOM uses security settings to protect the client and server from unauthorized access. The actual settings that are used depend on the security requirements, but the settings below should work in most cases. The settings can be changed with the program dcomcnfg. Administrator rights are required in order to use it.

You can launch the dcomcnfg program by choosing **Start** > **Run**. When prompted for the name of a program, type “dcomcnfg“ and click OK, see Figure 4-8.

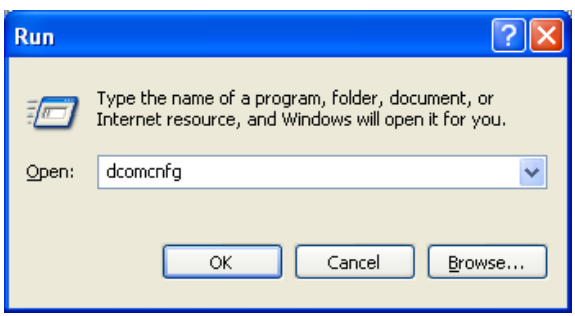

Figure 4-8: Launching the dcomcnfg

To find the OPC Server in the tree, choose the SPA OPC DA Server Instance [1] object, see Figure 4-9.

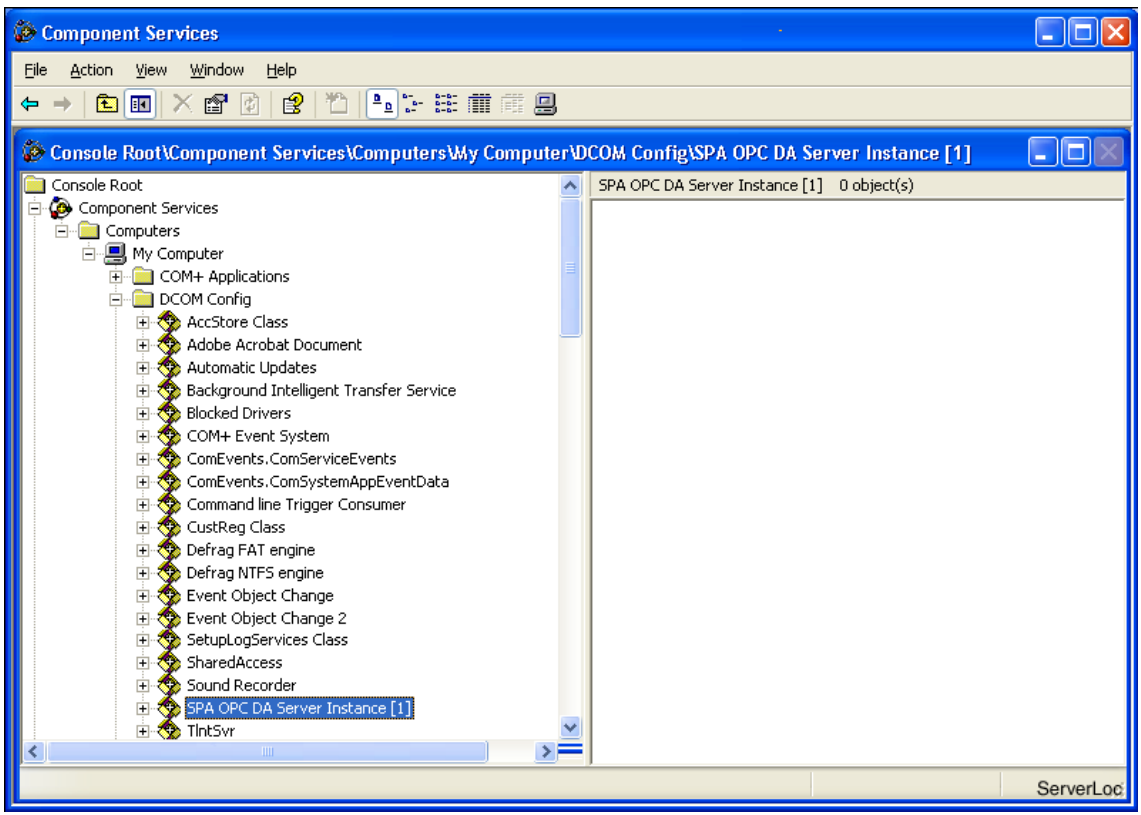

Figure 4-9: OPC Server location in the tree

Right-click the SPA OPC DA Server Instance [1] object and choose properties to find the DCOM properties of the OPC Server, see Figure 4-10.

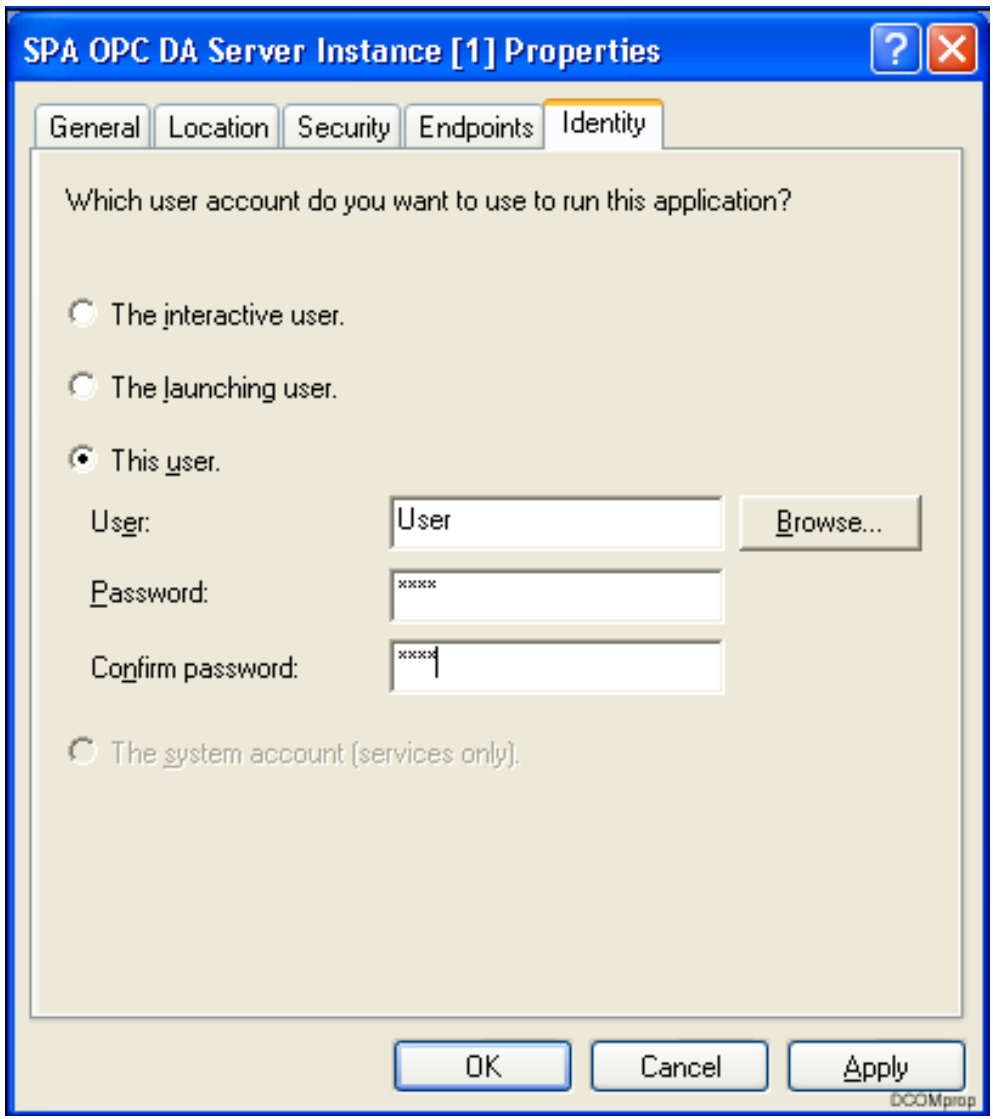

Figure 4-10: Example of DCOM properties

More information on DCOM is available in Microsoft Developer Network (MSDN).

Server computer

Default properties for the server computer are listed below:

- Make sure that DCOM is enabled
- Set default authentication level to "None"
- Set default impersonation level to "Impersonate"

Make sure that the Default Configuration Permissions include SYSTEM.

Specify custom security for OPCEnum (needed if remote OPC Server browsing is used in the OPC Client).

- Set custom access to NETWORK, SYSTEM, Everyone
- Set custom launch permissions to INTERACTIVE, SYSTEM, NETWORK, Everyone

Specify custom security for the OPC Server.

- Set custom access to NETWORK, SYSTEM, Everyone
- Set custom launch permissions to INTERACTIVE, SYSTEM, NETWORK, Everyone

Set the identification for the OPC Server to "Interactive User" or configure it to run on a specific user account (see Local DCOM configuration).

Client computer

Default properties for the client computer are listed below.

- Make sure that DCOM is enabled
- Set default authentication level to "None"
- Set default impersonation level to "Impersonate"

Before starting a remote SPA OPC Server, be sure that the SPA OPC Server computer and the OPC Client computer can access each other in the network. The "Remote Procedure Call" service should be started on the SPA OPC Server computer.

Local DCOM configuration

Sometimes it is necessary to configure DCOM even when the server and client run on the same computer. This is the case when two clients that are running in different user accounts must both access the same server. For example, an alarm and event client running as a service and an interactive data access client.

If the server is configured to run as the "Launching User", only the client that connects first will succeed to get a connection. This is due to how COM works. The solution is to configure the server to run either as the "Interactive User" or in a specific user account ("This user:").

If the server is configured to run in a specific user account, its user interface will not be visible when it is activated by the COM runtime. This is because it is not started in the interactive desktop. The only place where it is visible is the Task Manager.

The server should not be started manually, if it is configured in this way. In that case, the clients that are running in other user accounts will not be able to access it although it is correctly configured.

If the server is configured to run as the "Interactive User", it will be terminated when the interactive user logs off. This is not desirable, for example, if the client is an alarm service that is always running.

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