S7-200 SMART OPC Communication with SCADA

S7 - 200 SMART / Version 2.3 / WinCC 7.4

https://w3.siemens.co.in/automation/in/en/automation-systems/industrial-automation/s7-200-smart-plc/pages/default.aspx

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Table of contents

1 Introduction

1.1 Overview

The controller consists of S7-200 Smart PLC including the Ethernet communication port. Via Ethernet (TP: Twisted-Pair) the controller is connected to the PC (Personal Computer). OPC Server, which provides the data. The PC ACCESS is shipped with S7-200 Smart. OPC Server, displays the data from the OPC Server.

1.2 Components used

This application example has been created with the following hardware and software components:

Table 1-1

Component	Number	Article number	Note
CPU ST20	0	6ES7-288-1ST20-0AA0	
CPU ST30	0	6ES7-288-1ST30-0AA0	
CPU ST40	4	6ES7-288-1ST40-0AA0	
CPU ST60	0	6ES7-288-1ST60-0AA0	
S7 MICROWIN SMART V2.4	1	6ES7 288-SW01-0AA0	
WinCC 7.4	1		
S7-200 PC Access SMART V2.3	1		

This application example consists of the following components:

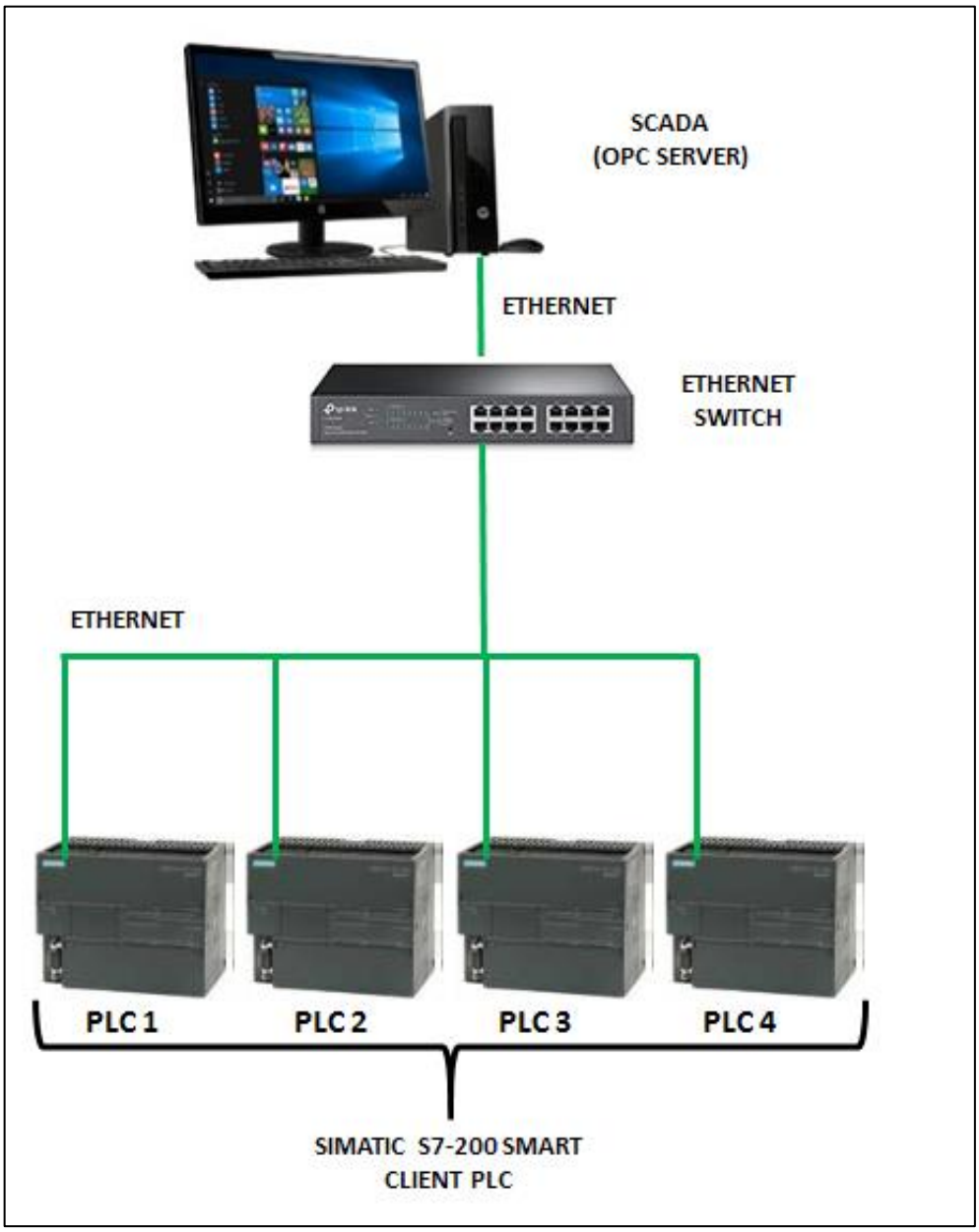
Table 1-2

Component	File name	Note

2 Engineering

2.1 Hardware setup:

The figure below shows a schematic overview of the most important components of the solution:



3 Engineering

3.1 Description of interface

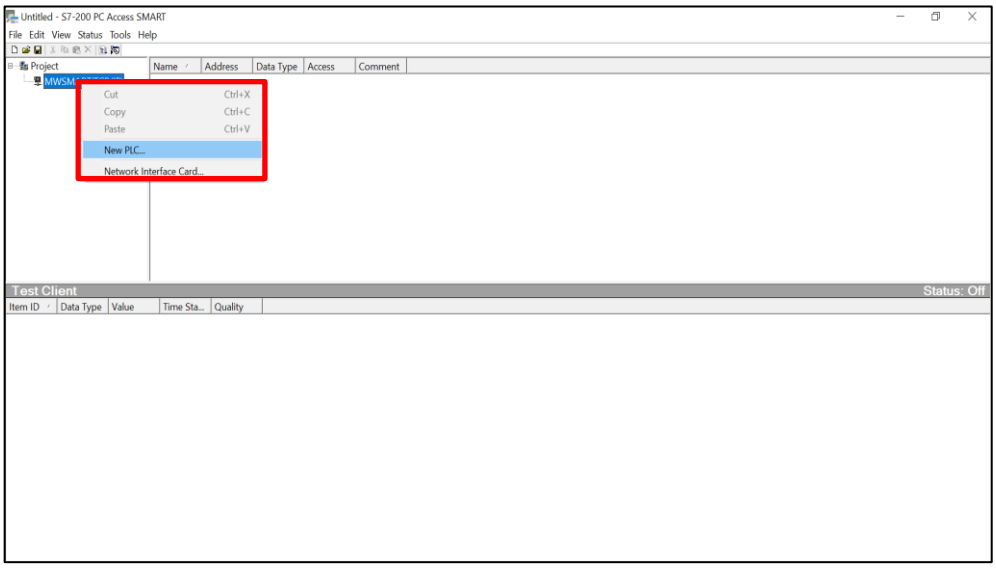
There is no driver for communication with the S7-200 SMART CPU in WinCC, so communication via Ethernet between WinCC and the S7-200 SMART CPU can only be done via OPC. As the Sever side of the OPC, the S7-200 SMART CPU only needs to set the IP address. The PC is used as the client side of the OPC to establish a PC Station with the S7-200 SMART.OPC Server under WinCC Explorer software to communicate with the S7-200 SMART. After the PC Station is set up, the implementation steps in WinCC are as follows:

3.2 Project integration

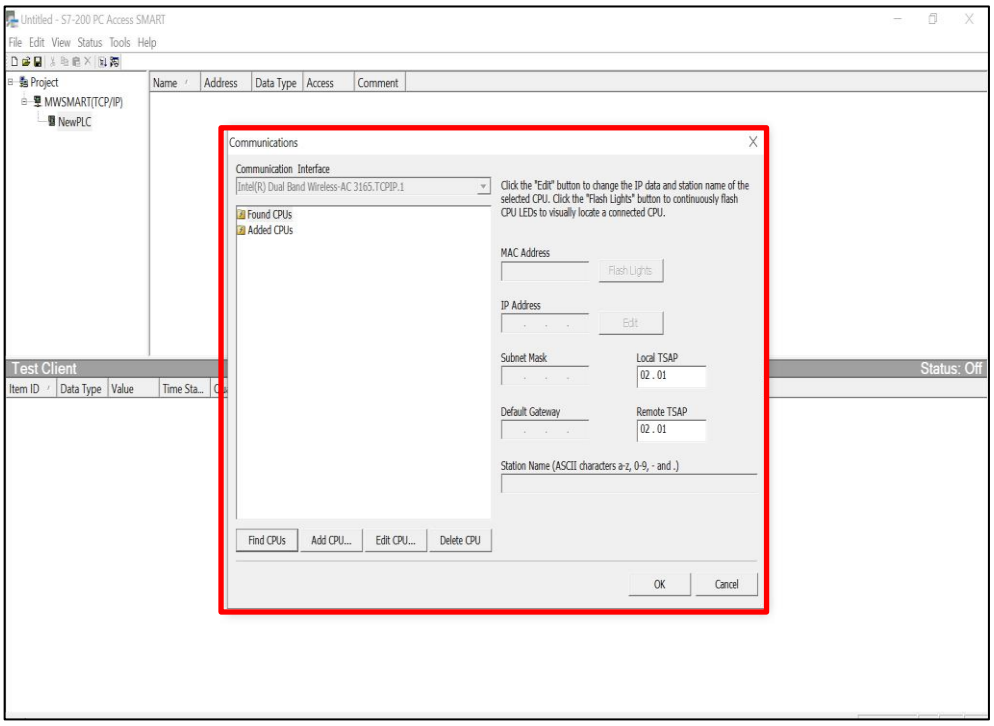
1. Establish all the Tags to be used in WinCC Explorer in PC ACCESS software.

First create all the Tags to be used in the PC ACCESS as mention below. The following settings have to be made in the software configuration to open S7-200 PC Access SMART S7-200 PC access smart that allows you to monitor all configured PLCs data.

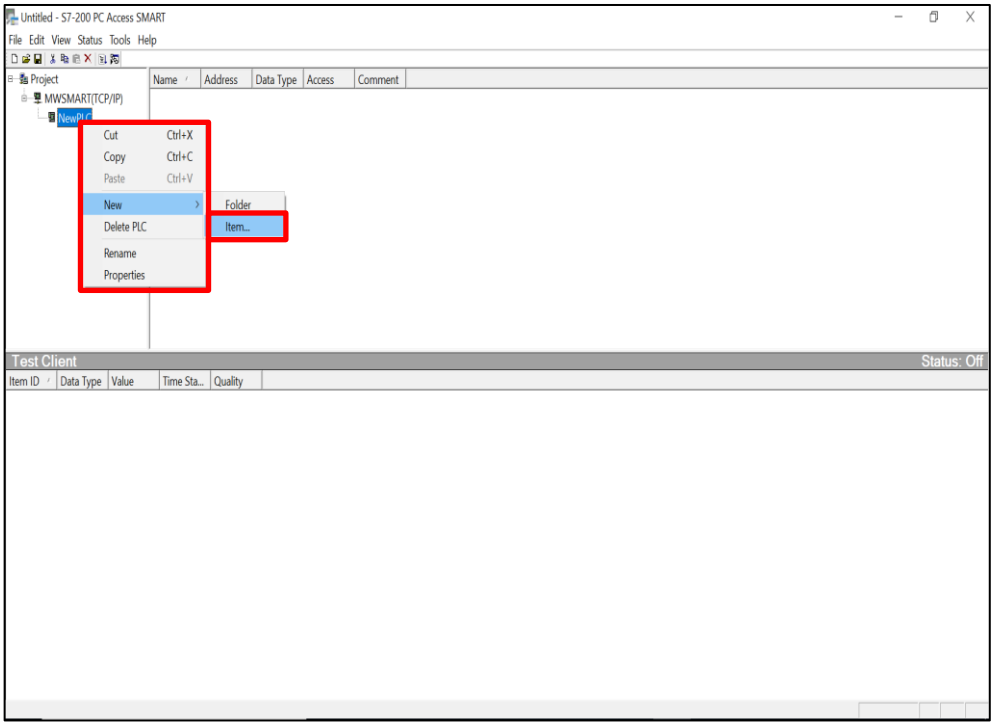
1. Double click on icon of S7-200 PC Access SMART.
2. After clicking icon, a window will appear in which you have to click on project tree.
3. In project tree, right click on MWSMART (TCP/IP) and select New PLC.



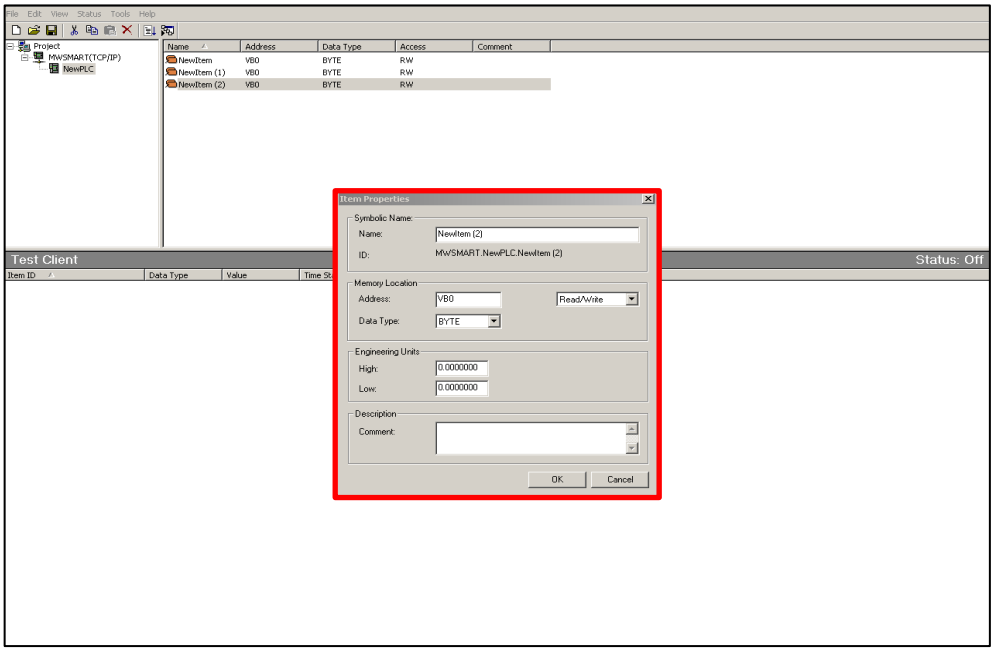
4. The Communication Interface window will open, and then click on Find CPUs.
5. Select the IP address of CPU for communication then click on “OK”.
6. Repeat the step 4 to step 6 for another PLC with different IP address.
7. Renaming of PLC can be done by right click on New PLC and select Rename option.
8. You can also change IP Address by Right click on New PLC, click on properties.
9. Then communications window will appear, click on find CPU.
10. As you select find CPU, it will show connected CPU to the PC.
11. Then click on “OK”.



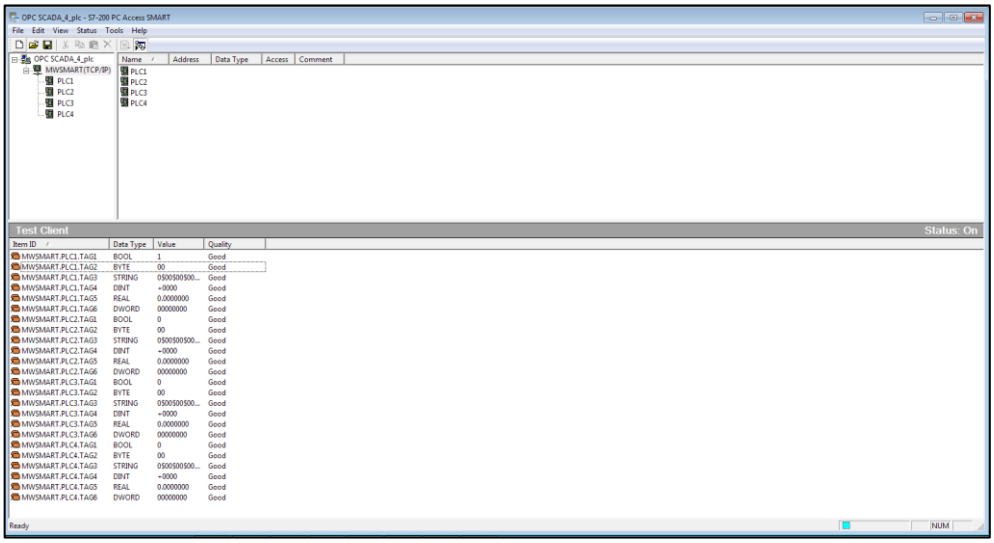
12. In project tree, right click on New PLC then select New→ Item.



13. Item properties window will be open.



14. In Item Properties, change Symbolic Name (Name) and Memory Location (Address) and select Data Type accordingly then click on OK.
15. Repeat the step13 to step15 for New Item (New Tag).
16. To monitor the added items Click on MWSMART (TCP/IP) then Click on' Add Current Items to Test Client" icon in tool bar the click on save file then Test Client Status.
17. If PLC is properly connected to PC then in Test client window, check the communication result it will show good quality otherwise it show bad quality.



18. If the communication quality is "bad", the communication is unsuccessful and you need to check if the software configuration and hardware connection are correct.
19. Minimize the S7-200 PC Access SMART window.

Note:

The tag need to be display in scada need to configure in PC Access.

OPC Communication supports all data types.

2. Opening of New Project & Adding a new driver in WinCC Explorer.

Double click on "WinCC Explorer". Open a new project in the WinCC software, right-click on "Tag Management" and select "Open" in the shortcut menu. In the "WinCC Configuration Studio" window that opens, right-click "Tag Management" and select "Add New Driver" in the shortcut menu to add the " **OPC** " driver. Figure 1. Shown.

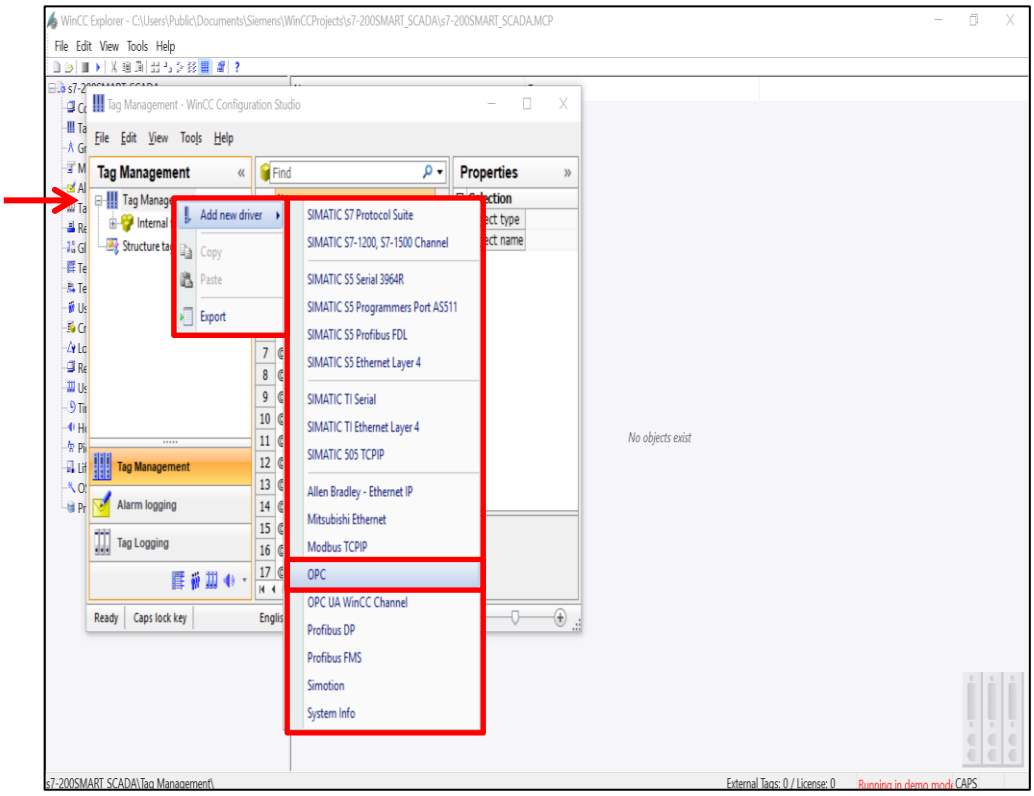


Figure 1. Adding a new drive "OPC"

3. Searching and adding tags defined in PC ACCESS in WinCC

First right click on "OPC Groups" and click on "System parameters" in the shortcut menu. In the pop-up "OPC Item Manager" window extend Local and select "S7200SMART.OPCServer" and click on the "Browse Server" button. In the "Filtering criteria" window that pops up, select "Next" to search. As shown in Figure2.

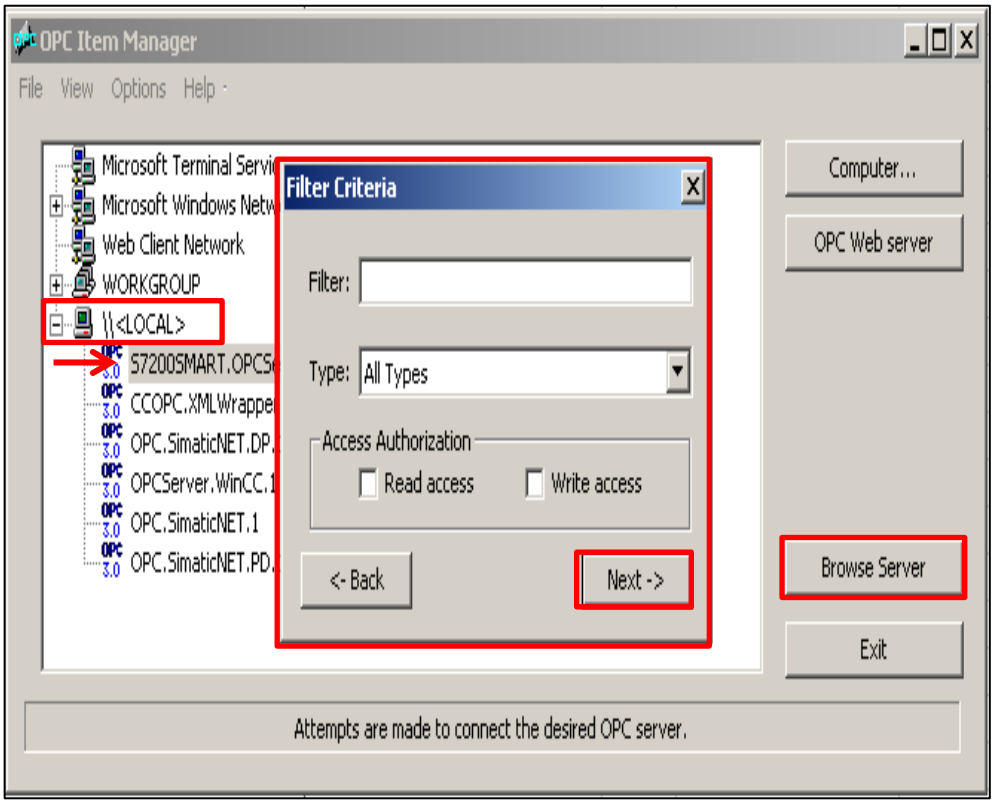


Figure 2. Select browse server

4. Create a new connection and add the required Tags

Select the desired Tag in the Tag list, click the "Add Item" button to add the required Tag, and you will automatically be asked to create a new connection and add the Tag to the connection, as shown in Figure 3 & 4. If you need to add more than one Tag, repeat the steps as described above.

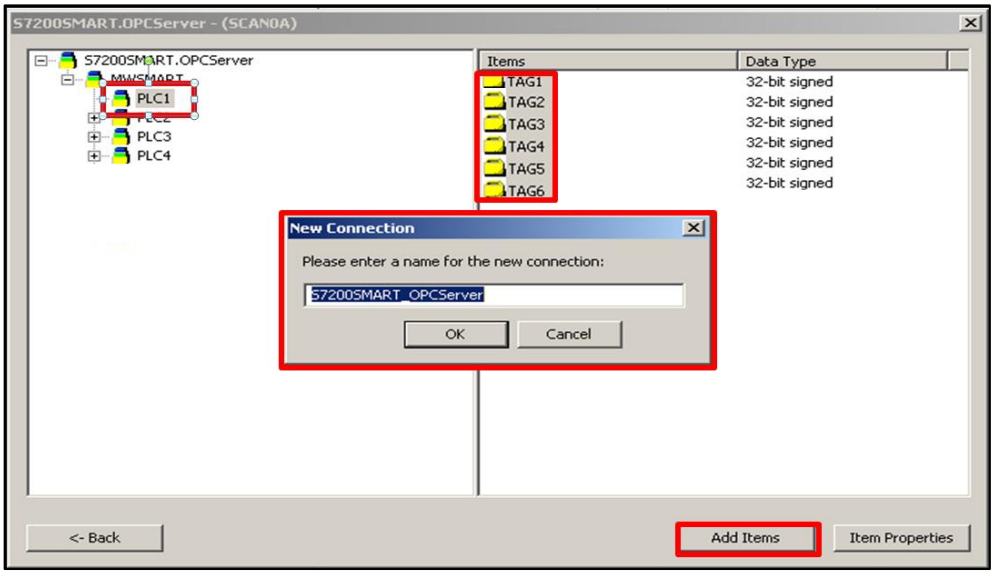


Figure 3. Establishing a new connection

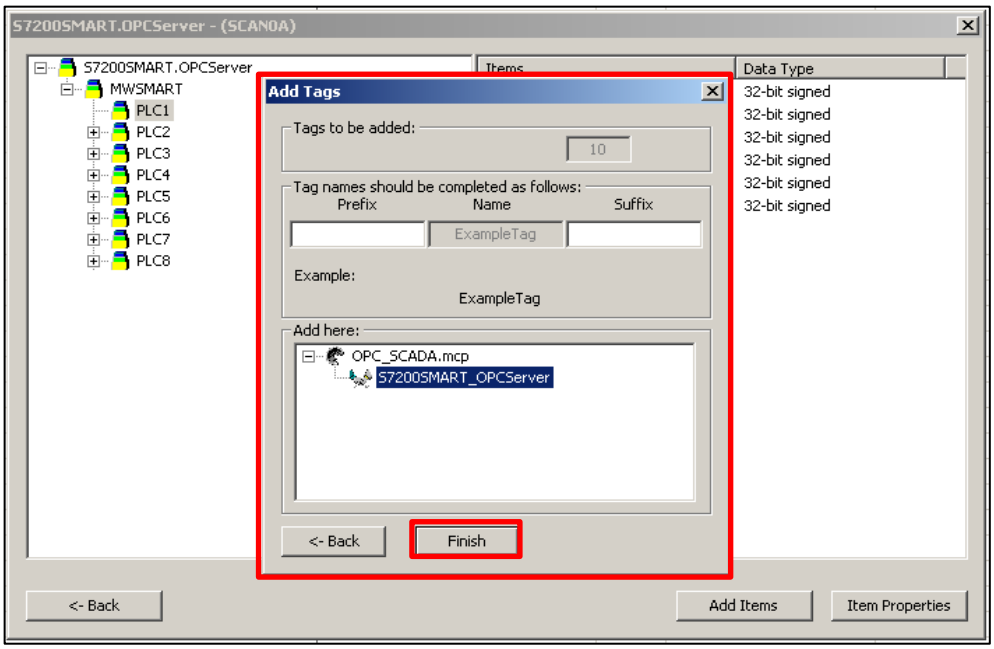


Figure 4. Adding Tags

Figure 3 & 4 Adding Tags and establishing the new connection. Once the Tags have been successfully added, the OPC connections and Tags that have been added are displayed in the tag management in WinCC, as shown in Figure5. Shown.Right click on S7200SMART_OPC Server, then select New Group. Rename New Group as per PLCs named in S7-200 PC Access SMART software. Once you rename, click on S7200SMART_OPC Server go to column number 6 (Group) then tagwise select PLC.

After tagwise select PLC minimize the Tag Managment window.

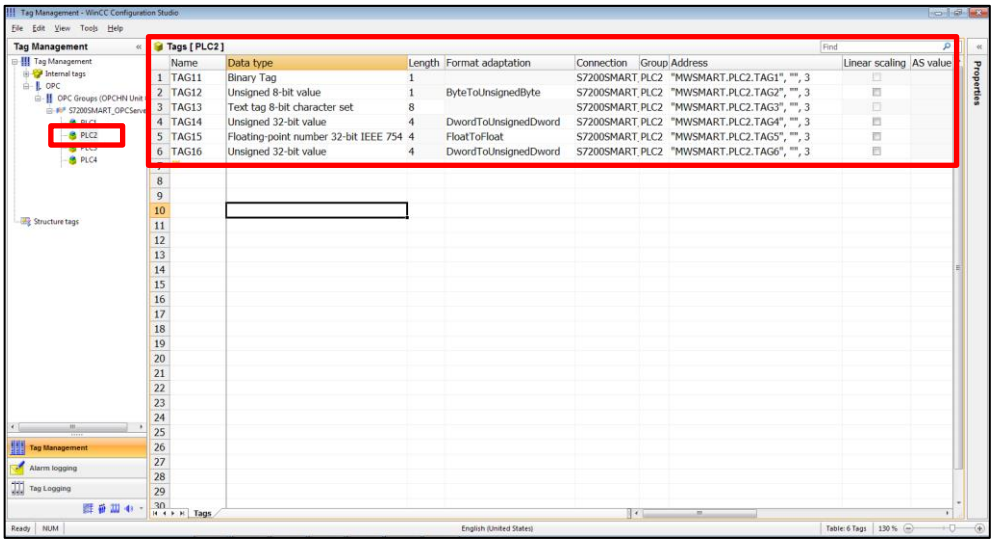


Figure 5. Successfully added Tags from PC ACCESS

5. WINCC creates & monitors the screen

In WinCC Explorer open Graphics Designer. WINCC creates the screen and monitors the New screen in the Tag WINCC, adds the “input/output field”, and selects the OPC Tag for it, as shown in Figure 6. Goto WINCC Explorer to Activate WINCC to test SCADA and S7-200 SMART OPC communication. To create new screen go to Graphics Designer, accordingly give tags and delay as shown in figure 6.

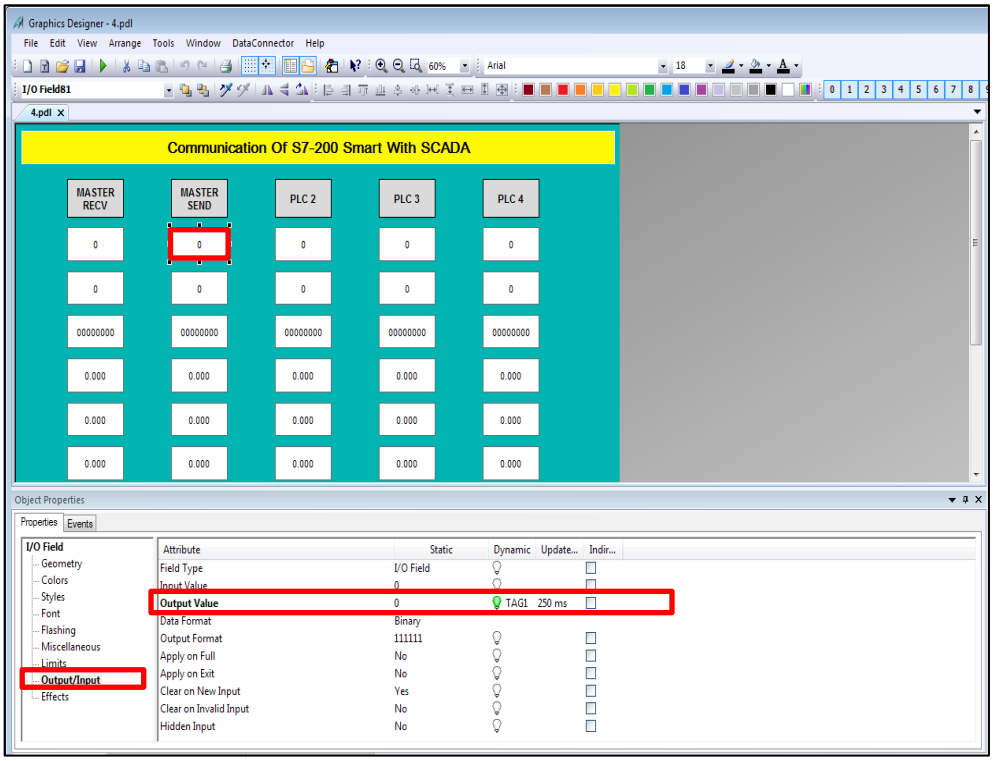


Figure 6. I/O Field , their tag and time delay

6. Script Design

In WinCC Explorer window, in project tree, right click on global script. In global script, select Open VBS Editor then in the pop-up Global Script VBS Window will appear then select Actions right click on Action → New → Action(Alt + F3) (which is in workplace). Start writing script. You have to save Script file according to project path.

Note: Script file will be save by .bac extension.

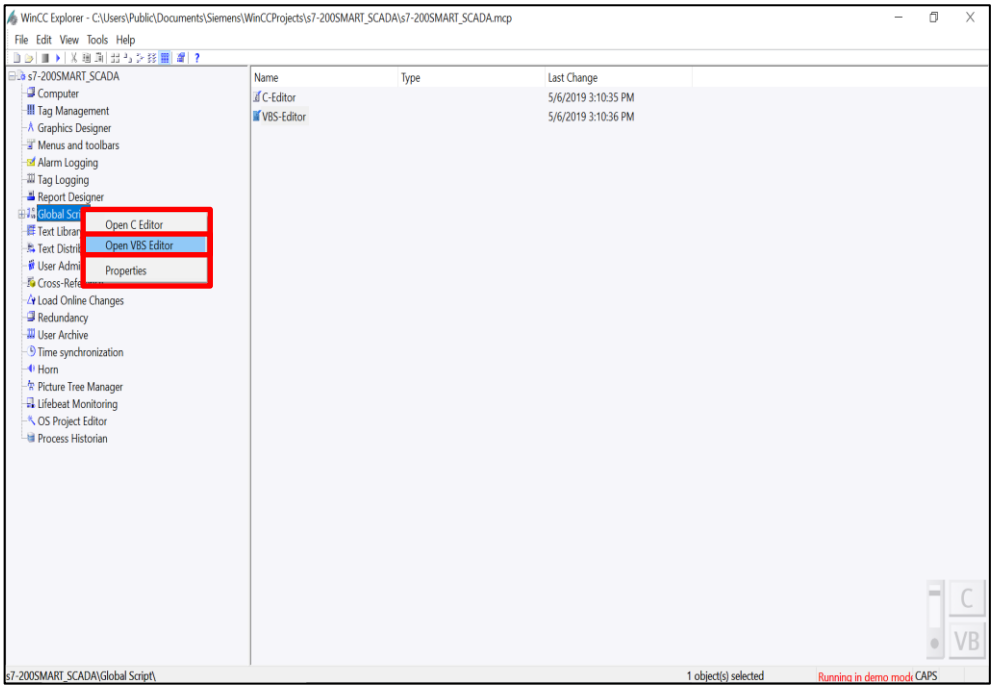


Figure 7. Global Script→Open VBS Script

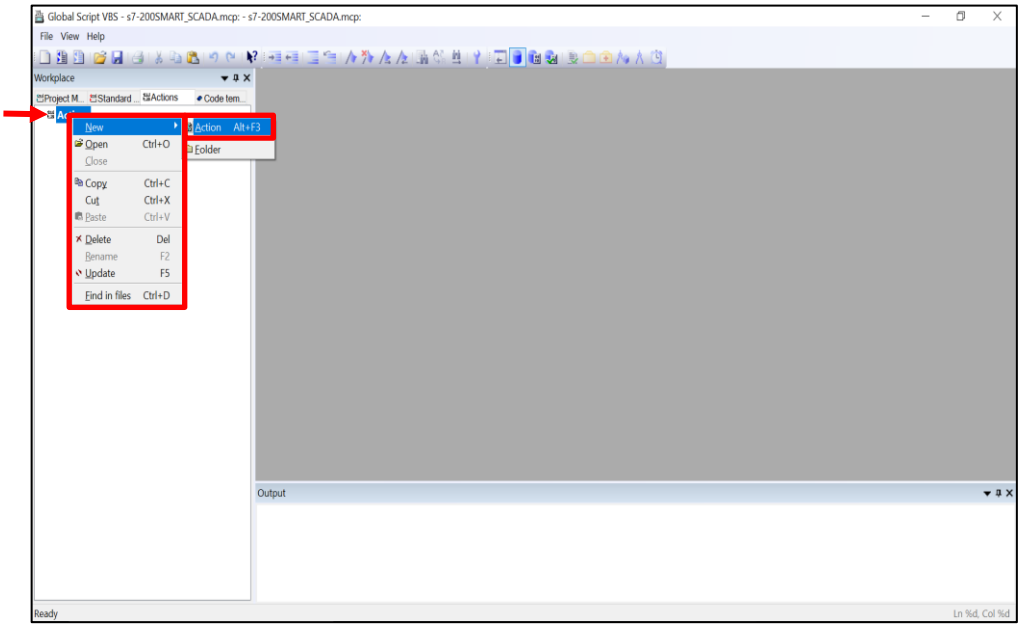


Figure 8. Script file generation

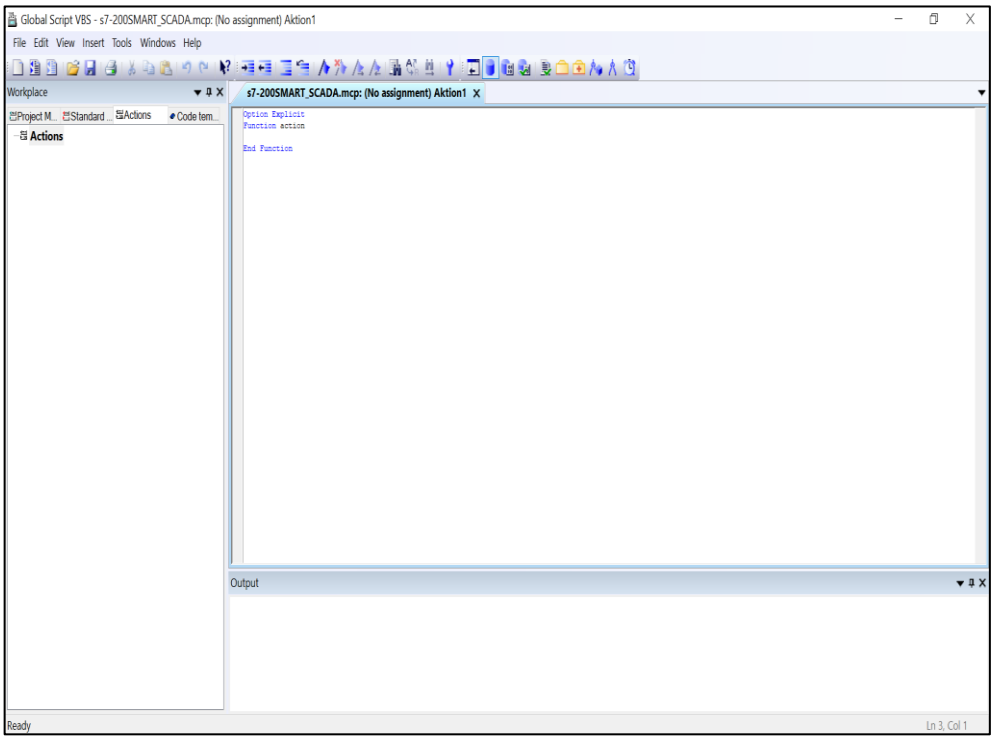


Figure 9. Script window

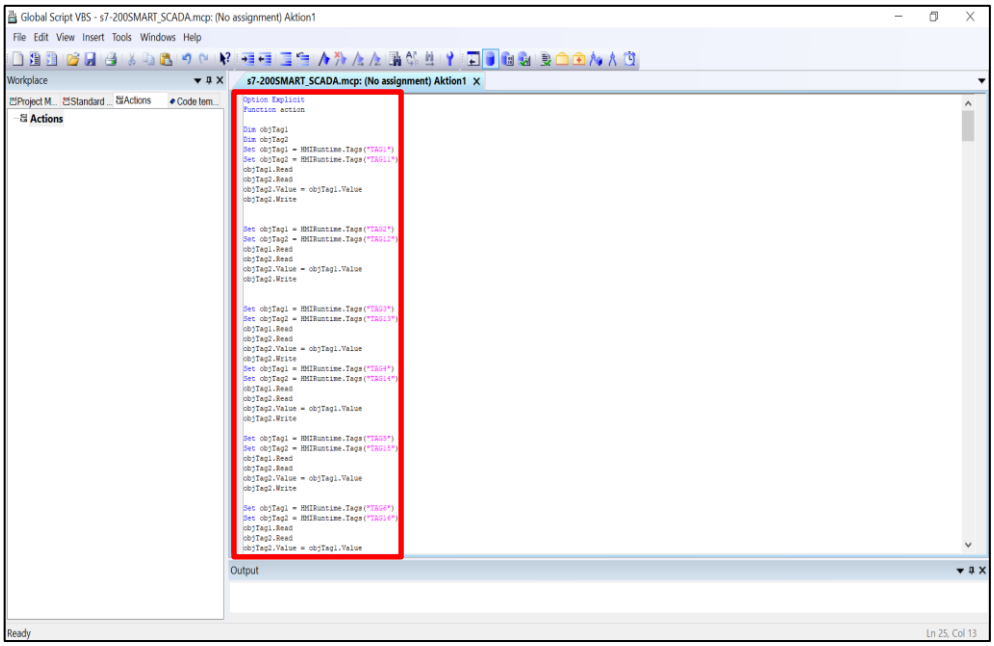


Figure 10. Script

7. Script File:

```
Option Explicit
Function action
Dim objTag1
Dim objTag2

Set objTag1 = HMIRuntime.Tags("TAG1")
Set objTag2 = HMIRuntime.Tags("TAG11")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG2")
Set objTag2 = HMIRuntime.Tags("TAG12")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG3")
Set objTag2 = HMIRuntime.Tags("TAG13")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG4")
Set objTag2 = HMIRuntime.Tags("TAG14")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG5")
Set objTag2 = HMIRuntime.Tags("TAG15")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG6")
Set objTag2 = HMIRuntime.Tags("TAG16")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag1.Write
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG1")
Set objTag2 = HMIRuntime.Tags("TAG21")
objTag1.Read
objTag2.Read
```

```
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG2")
Set objTag2 = HMIRuntime.Tags("TAG22")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG3")
Set objTag2 = HMIRuntime.Tags("TAG23")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG4")
Set objTag2 = HMIRuntime.Tags("TAG24")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG5")
Set objTag2 = HMIRuntime.Tags("TAG25")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG6")
Set objTag2 = HMIRuntime.Tags("TAG26")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG1")
Set objTag2 = HMIRuntime.Tags("TAG31")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG2")
Set objTag2 = HMIRuntime.Tags("TAG32")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG3")
Set objTag2 = HMIRuntime.Tags("TAG33")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write
```

```
Set objTag1 = HMIRuntime.Tags("TAG4")
Set objTag2 = HMIRuntime.Tags("TAG34")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG5")
Set objTag2 = HMIRuntime.Tags("TAG35")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG6")
Set objTag2 = HMIRuntime.Tags("TAG36")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG31")
Set objTag2 = HMIRuntime.Tags("TAG151")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG32")
Set objTag2 = HMIRuntime.Tags("TAG152")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG33")
Set objTag2 = HMIRuntime.Tags("TAG153")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG34")
Set objTag2 = HMIRuntime.Tags("TAG154")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG35")
Set objTag2 = HMIRuntime.Tags("TAG155")
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

Set objTag1 = HMIRuntime.Tags("TAG36")
Set objTag2 = HMIRuntime.Tags("TAG156")
```

```
objTag1.Read
objTag2.Read
objTag2.Value = objTag1.Value
objTag2.Write

End Function
```

3.3 Operation

Result: Communication result of WinCC Explorer and PC Access.

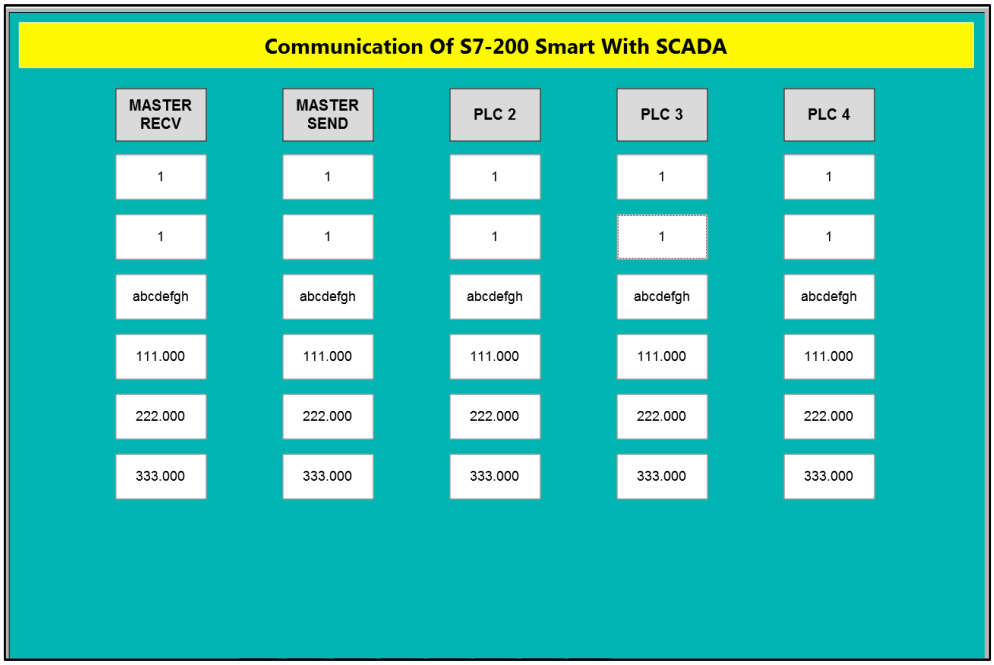


Figure1. Data transfer in WinCC Explorer.

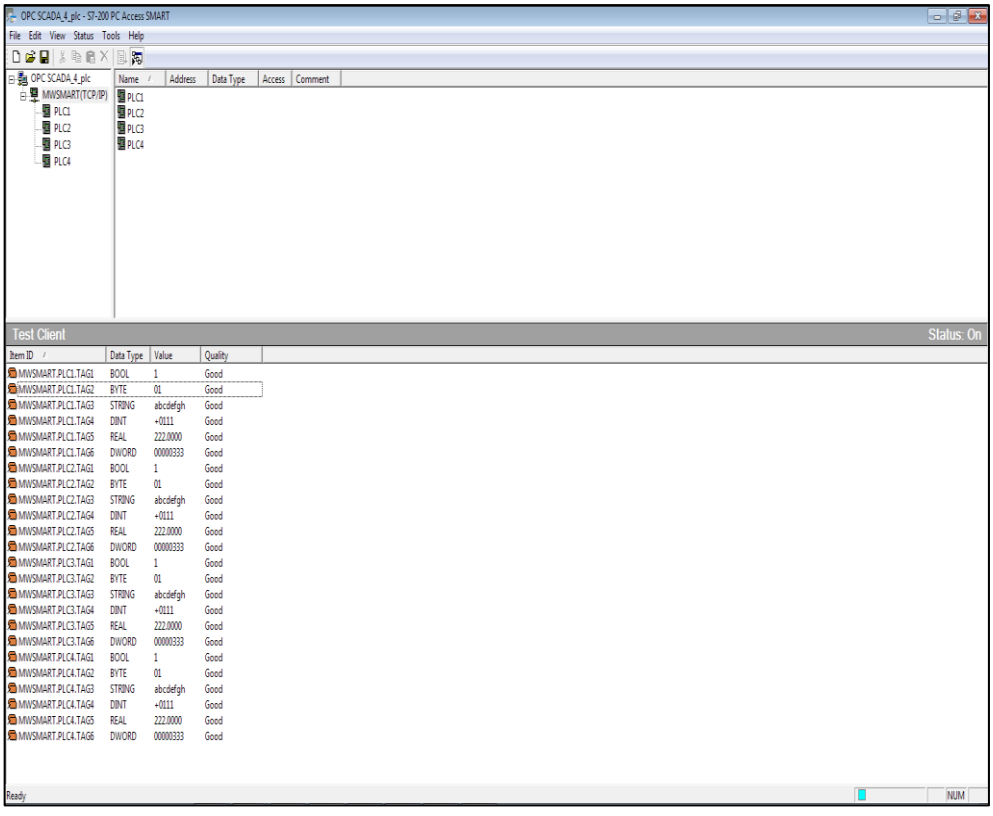


Figure2. Data transfer in PC Access.

4 Appendix

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Siemens Ltd
DI FA AS
Thane Belapur Road
Thane 400601, India

Application Center
SUP FA
Email: rginslpresales-fa.in@siemens.com

4.3 Links and literature

Table 4-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/Entry ID
\3\	

4.4 Change documentation

Table 4-2

Version	Date	Modifications
V1.0	MM/YYYY	First version