CODESYS connection with FLUIDSIM through OPC DA Server

1. Install **CODESYS** from the official site (you have to make an account)
2. Install **FluidSim** (search for an old version on internet, I am using the V3.6)
3. Go to the official site of **CODESYS** and search for **OPC DA SERVER DEMO**, add it to the **Cart** and Purchase it for 0 $. Then do it again. You will have now 2 Tickets of this software. Don't worry, they will expire in 30 days and nothing else will happen. Now download just one of them. Execute it and install it normally.
4. Open **CODESYS**, start a new Project, a standard project it's fine, Select **CODESYS control win v3** and **ST structure text code**.
5. After that, go to **Tools**, go to **License Manager**, it will open a new window, Select **Workstation**, next, **Soft Container**, next, now **select Install Licenses**, **Activate Licenses**:
    - Copy one of the 2 **Tickets**, paste it in the **ID Ticket**, select then **CmRuntime** as the **Container**
    - Now you installed the first license in the first container, do it again but with the 2nd Ticket and choose **Softlicenses** as the **Container**
6. Now that you have installed all the licenses, go back to your project, right-click **Application**, **add object**, **select Symbol Configuration**, now check the **2 top checkboxes** and **click Add**
7. Now you have the **Symbol Configuration Object**, what is it? Well, this is the file that will pass to FluidSim bytes of data, 1 byte is 8 bits, so we will store our variables in each bit (not all bits, but I'll explain later why). So now we have these bits and bytes etc..
8. Go to your device (**PLC_NAME Codesys control win v3**), open it, it will open the gateway connection to your device. Go to **Scan Network**, uncheck the bottom checkbox which will show you your personal computer as device. Double click it and it will ask you to connect to it with a **user** and a **password**, choose what you want but remember it (you can leave blank but it will warn you about security issues). After that, if you are still not connected:
    - Open windows search bar and **search Codesys systray**, open the 64 version and it will appear on your taskbar a cube with a 64 on it. Right-click it and **start Plc**
    - When the **systray** is started now you can retry, open again the gateway settings and you only need to select **your PC as device and click Enter**
9. Now your PLC is connected to the **localhost** of your PC, open the windows search bar and **search OPC Configurator**, open it, rename your PLC if you want, if you put a **user** and a **password**, put them in the blank text boxes of the OPC Configurator PLC, save it now.
10. Perfect you are almost there. Now open **FluidSim**, make a test:
    - Create a new file, drag and drop the PLC IN and OUT blocks. Go on the top and click Options, now **go to OPC/DDE connection**.. choose **OPC** and check the box of the **events**.
    - Now click on one of the two PLC blocks, browse for the server on top first, you should see **CoDeSyS OPC DA Server**, select it and click ok
    - Now browse for the Byte Variable of the ST Code, so click on the second browse, You will might see a popup with a retry button, click it until it is gone, the server is loading so it might take some time, now

open root, plc, and you should see **Application**, if you don't see it go to the **11th** point of the pdf. Otherwise skip to the **12th** point.

11. If you don't see the **Application** after PLC (or the name of your PLC), message me and we will figure it out together.
12. If you see **Application** you are good. Open it and you will see **PLC_PRG**, perfect, the connection is working.
13. Now all you have to do is design your **FluidSim** circuit and use my **FluidPy** programm. When you are done with the **FluidSim** circuit, you'll need to make the connections.
14. Open **Codesys**, open **FluidPy**, write your sequence, click finish and then copy as you see in the video, the **ST code** and paste it on **Codesys**. Now build the code, go to the **Symbol Configuration, build again, 0 errors** right? Wow incredible, now **check** the **PLC_PRG** checkbox and **build again**. **Now Login** to your device with the login icon on top of **Codesys**. Start it.
15. See the ***IN*** and ***OUT*** connections that you'll find on **FluidPy ST code**, follow them and make the connections on **FluidSim**. Now start the simulation and enjoy it. P.S. The **Start** will act like an **emergency button** too.