Lab on the platform Phnom Penh-ITC

http://www.gipsa-lab.grenoble-inp.fr/~jean-marc.thiriet/asean/asean.html

Asean-Factori 4.0 project

Phnom Penh, 15-26 August 2022

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Cf. Book p.

Outline

Software environment description

- **LAB-0 : Virtualisation environment**
  - Preparing the environment
  - tests

Software environment

The software environment is mainly composed of

- Control Expert for the PLC programmation
- Vijeo for the HMI programmation
- Wireshark for the network avalysis
- GICSTester if we use the GICS simulation card

Two main ways to organize the software environments

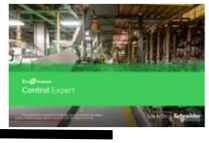
- By direct installation of the software on the physical machines
- By the use of virtualization which is a little bit more complex but with two interests
  - Working in a close to reality “Industry 4.0/”Digital twin” environment
  - Having the possibility to work for some time with a limited-time license

Virtualisation platform

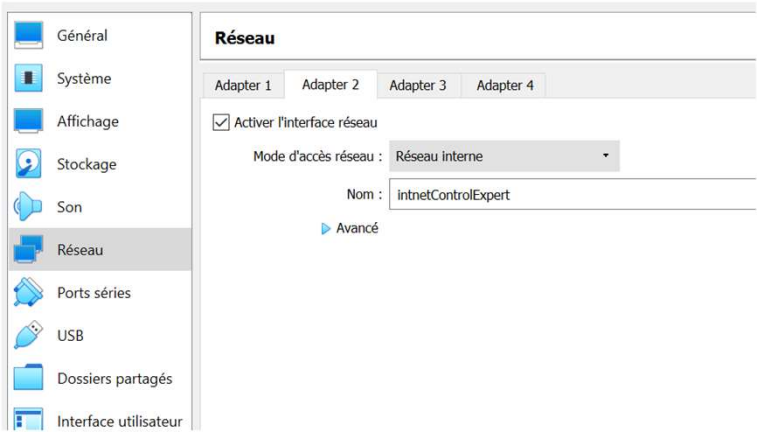
ControlExpert
192.168.0.200

PLC SIMULATOR
192.168.0.1

192.168.0.0/24

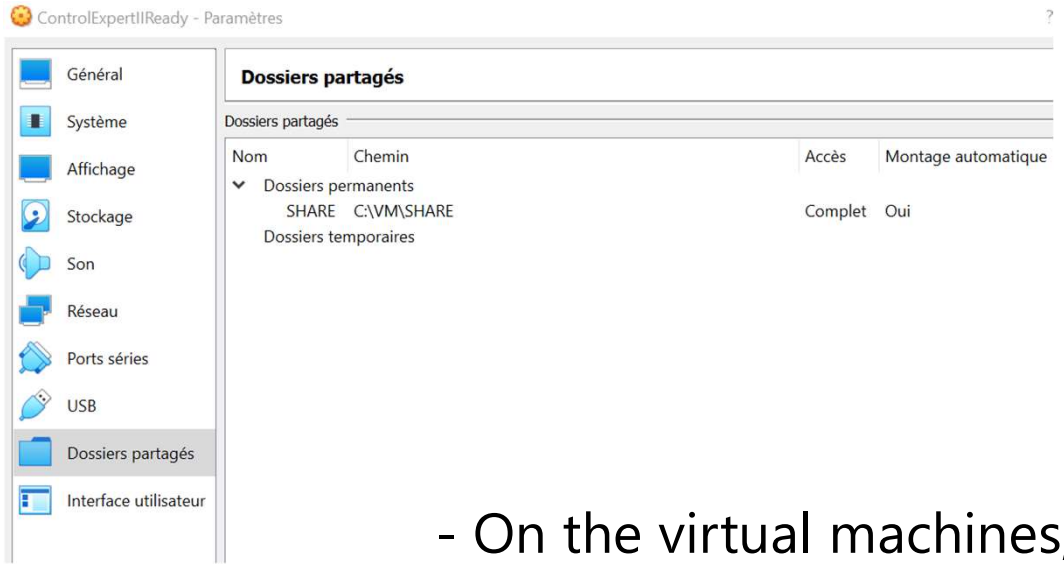


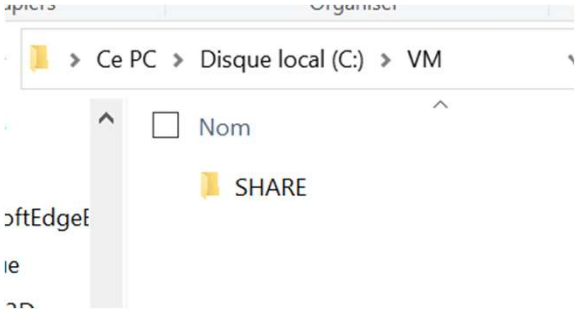
IntNetControlExpert
(VirtualBox Virtual Internal Network » linking both virtual machines:
- ControlExpertIIReady
- PLC*)*



The virtual network will link virtually both virtual machines within the physical machine
- 192.168.0.200 should be given to the « ControlExpertIIReady » virtual machine
- 192.168.0.1 should be given to the « PLC » virtual machine

Virtualisation platform

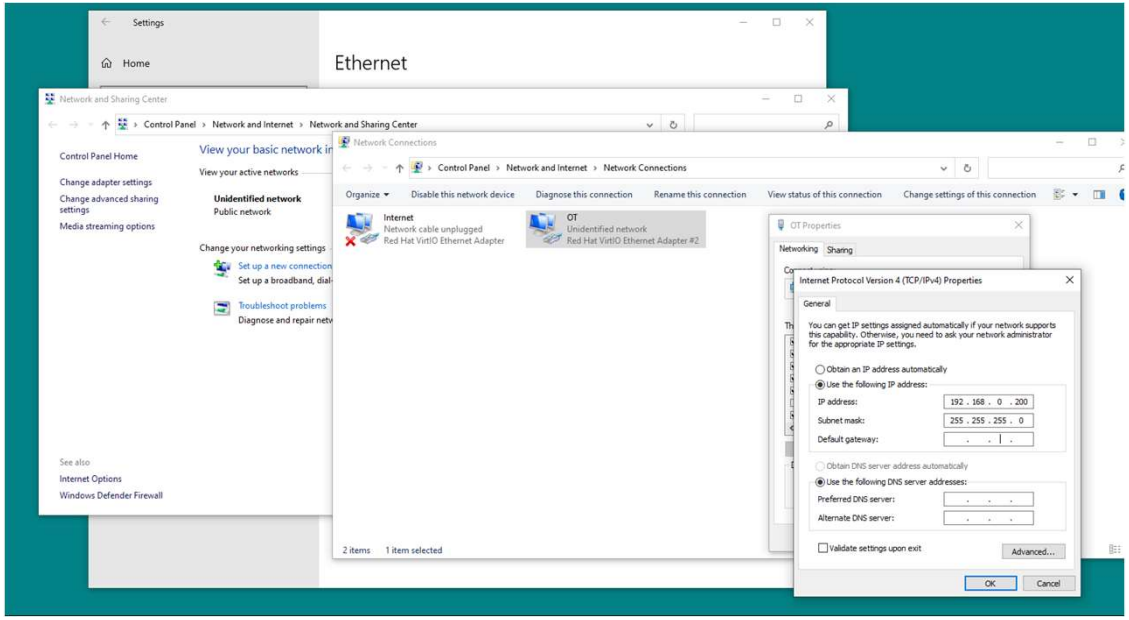




- On the virtual machines, a shared folder is configured
- It should be created also on the physical machine
- It is important because it is place to exchange space between the physical machine and the virtual one!

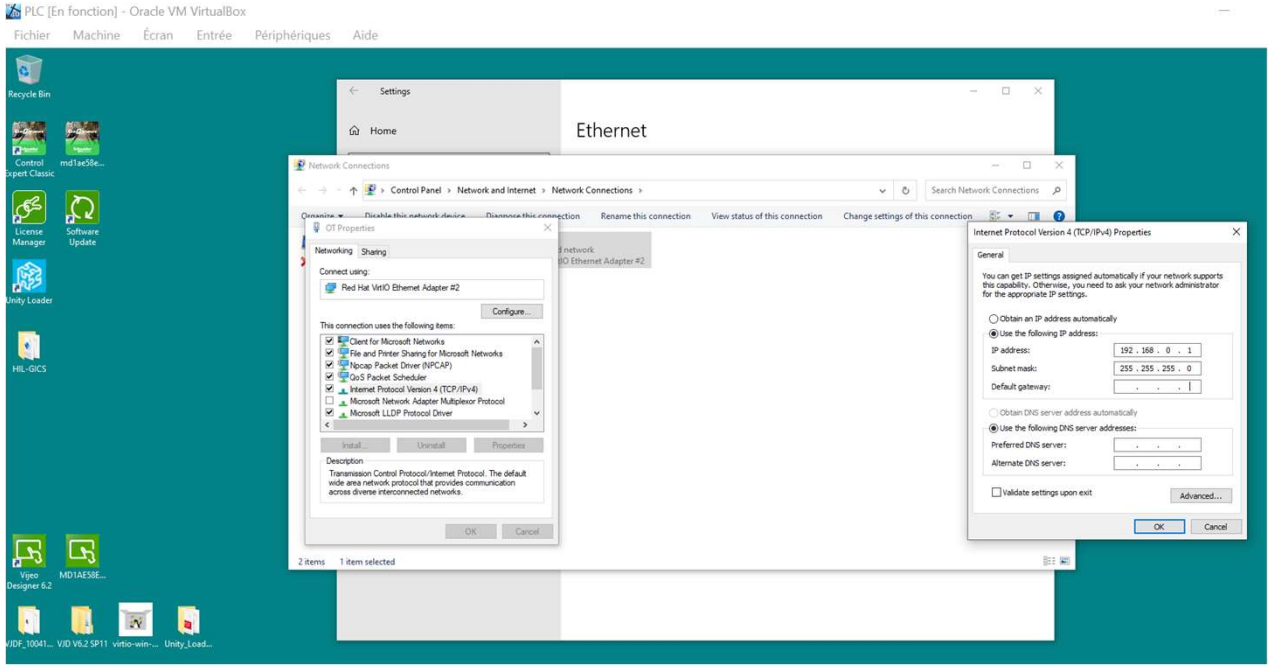
Virtualisation platform: launch of the machines

1. Launch of “ControlExpertIIReady”, the passwd is Toto123
2. Check the network configuration: 192.168.0.200



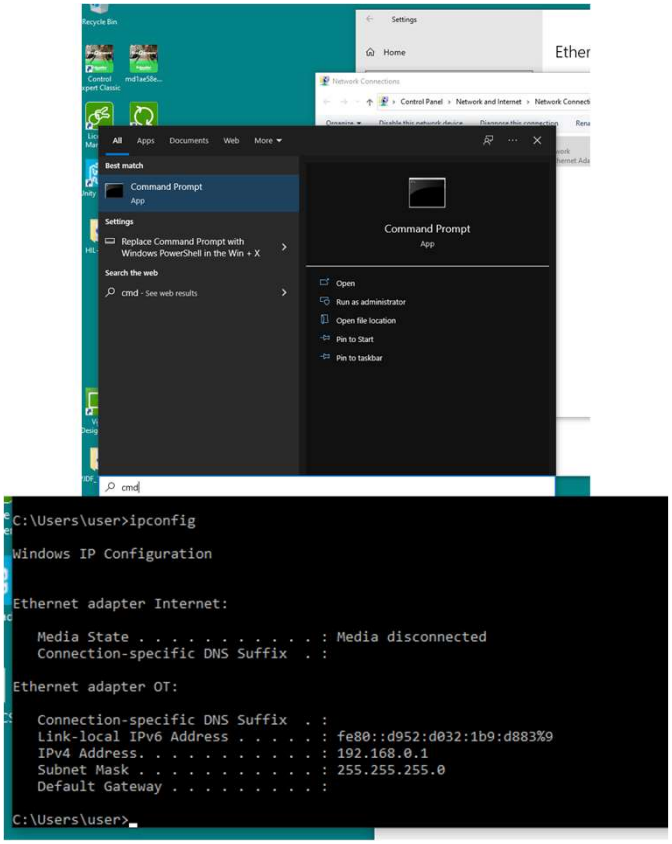
Virtualisation platform: launch of the machines

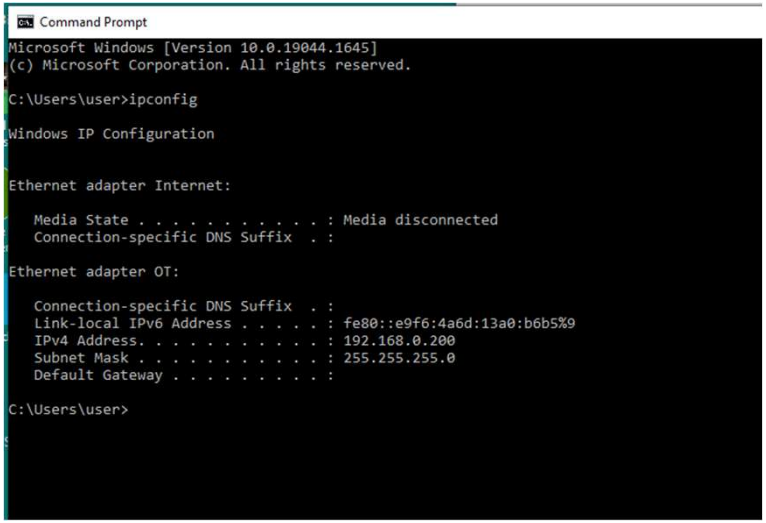
1. Launch of “PLC”, the passwd is also Toto123
2. Change the network configuration to 192.168.0.1



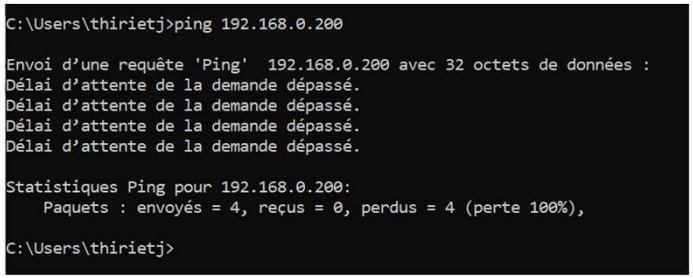
Check the connectivity

1. Launch the “command” window



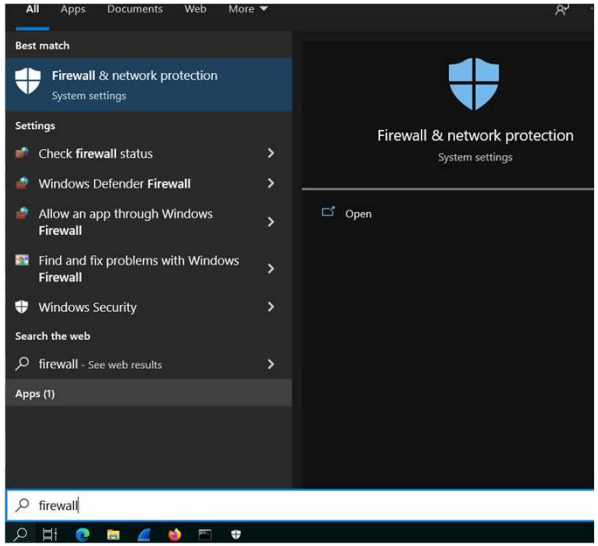


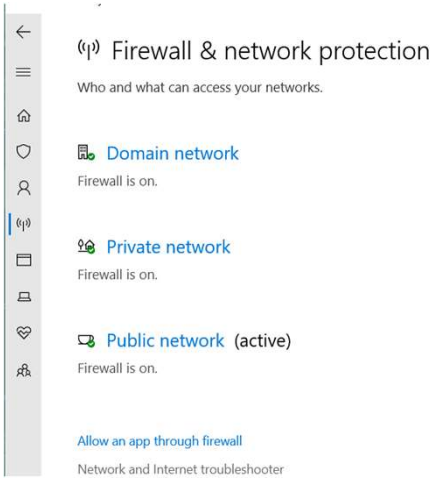
- Try to ping 192.168.0.200 from the 192.168.0.1
- Try to ping 192.168.0.1 from 192.168.0.200
- It doesn’t work yet!



Check the connectivity

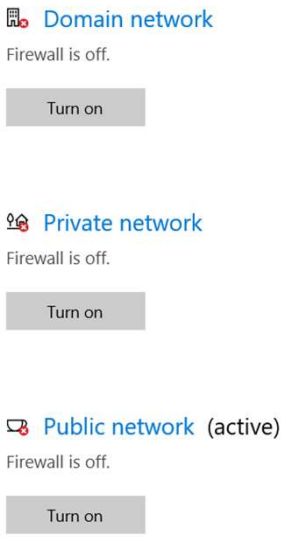
- To allow the “pings”, we need to remove the Windows software firewall on both virtual machines: “ControlExpertIIReady” and “PLC”
- You can for example search for “Firewall” in the “search” part of Windows
- You see all the firewalls are On. To avoid difficulties, it is good to switch off the 3 firewalls





Check the connectivity

- All the firewalls are now off
- The pings from 192.168.0.200 (ControlExpertIIReady) to 192.168.0.1 (PLC) are working
- The same from 0.1 to 0.200




```
C:\Users\user>ipconfig

Windows IP Configuration


Ethernet adapter Internet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Ethernet adapter OT:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::d952:d032:1b9:d883%9
   IPv4 Address. . . . . . . . . . . : 192.168.0.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

C:\Users\user>ping 192.168.0.200

Pinging 192.168.0.200 with 32 bytes of data:
Reply from 192.168.0.200: bytes=32 time<1ms TTL=128
Reply from 192.168.0.200: bytes=32 time=1ms TTL=128
Reply from 192.168.0.200: bytes=32 time=1ms TTL=128
Reply from 192.168.0.200: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.0.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\Users\user>ipconfig

Windows IP Configuration


Ethernet adapter Internet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Ethernet adapter OT:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::e9f6:4a6d:13a0:b6b5%9
   IPv4 Address. . . . . . . . . . . : 192.168.0.200
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

C:\Users\user>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1: bytes=32 time<1ms TTL=128
Reply from 192.168.0.1: bytes=32 time=1ms TTL=128
Reply from 192.168.0.1: bytes=32 time=1ms TTL=128
Reply from 192.168.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Virtualisation platform

LAB 0 : Prepare virtual Environment (1)

0) Configure Date and Time

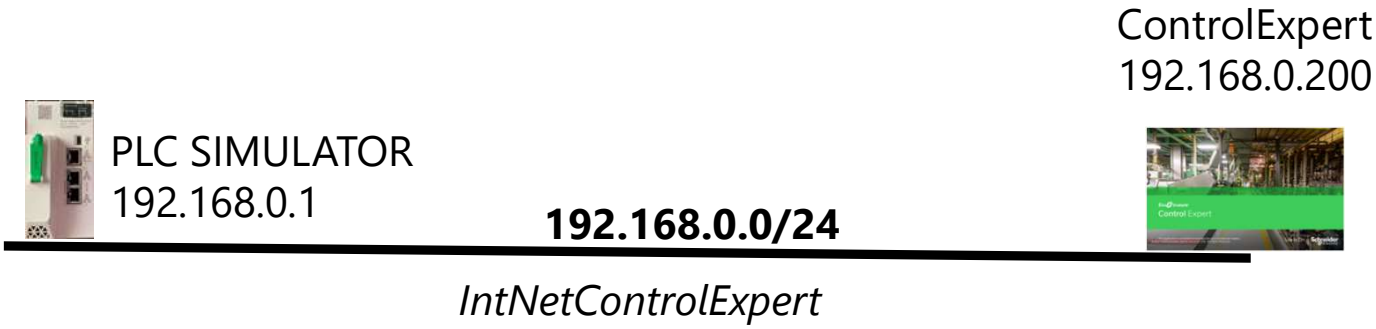
1) Install VirtualBox and Oracle Extensions
   (Ressources on www.virtualbox.org
   - Create C:\VM and C:\VM\SHARE
   - In virtualBox/Preferences set default folder to C:\VM

2) Get ControlExpertIIready
   - Import in VirtualBox
   - Take a snapshot (You can name it base)
   - Run the machine

Virtualisation platform

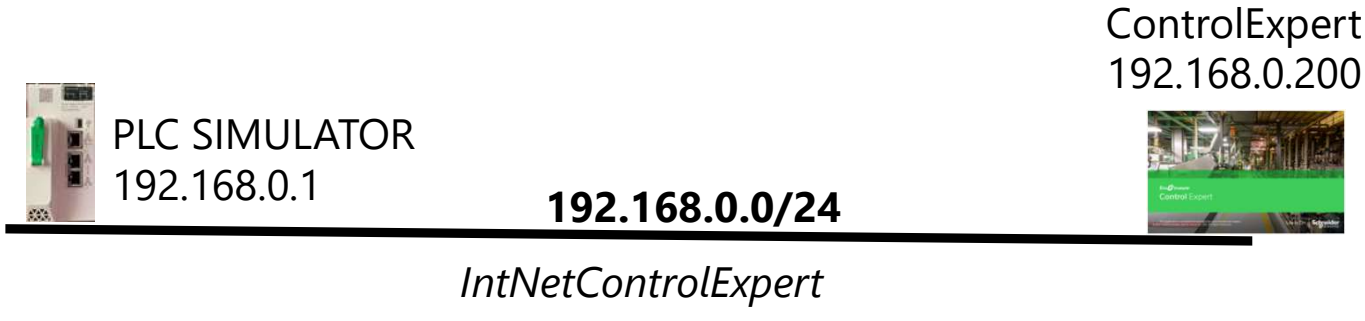
LAB 0 : Prepare virtual Environment (2)

3) Clone (Linked Clone) ControlExpertReady to PLC
   - Take a snapshot of the new VM
4) Run Both VM (password Toto123)



Virtualisation platform

LAB 0 : Prepare virtual Environment (3)



5) Check Connectivity

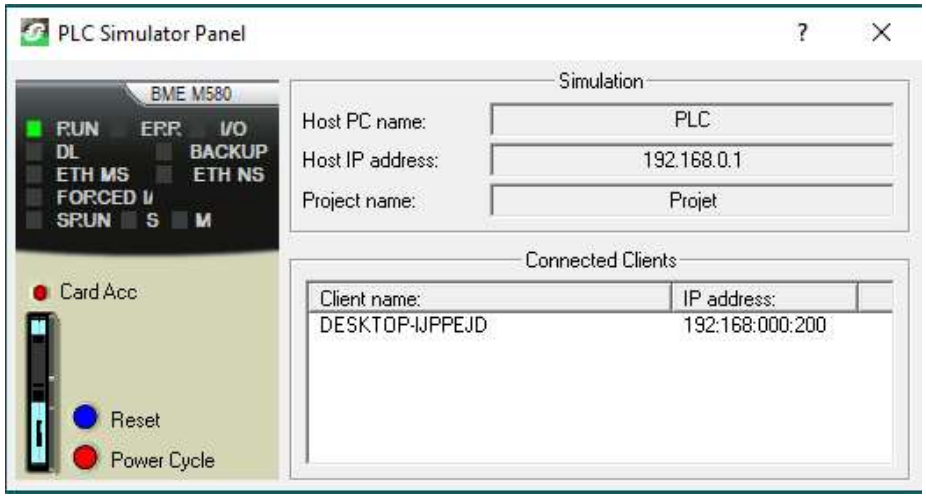
6) ON PLC : Run PLC simulator

On ControlExpert : Run ControlExpert

Virtualisation platform

LAB 0 : When transfert done :

On PLC



On ControlExpert