

Networking Labs

ECE

ING4 (SI)

2018/2019

**Network Configuration with
Packet Tracer**

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Session Requirements:

- ❖ Please install Cisco Packet tracer into your PC.
- ❖ At the end of the session do not forget to save your work into any available storage device (USB key for example).
- ❖ The different parts of this lab session are correlated. Execute the different steps sequentially.
- ❖ All the questions marked with **Q:** shall be answered and included in the report. Screen shots can be used in some cases.
- ❖ Each group (composed of 2 persons at most) shall submit a report.
- ❖ The report (**only PDF format is accepted**) shall be uploaded on the campus page before:
 - Monday 19/11/2018 midnight for group 5.
 - Thursday 22/11/2018 midnight for groups 1, 2 and 3.
- ❖ Late reports are not accepted. This is a hard deadline!

Part 1

Router configuration using virtual console and a virtual line interface.

Required Equipment:

- Generic router
 - 2 Generic PCs
 - Console cable (between serial port on PC and console port on router)
 - Ethernet cable
- Connect PC0 to Router0 with a serial cable (console) as shown in figure 1:

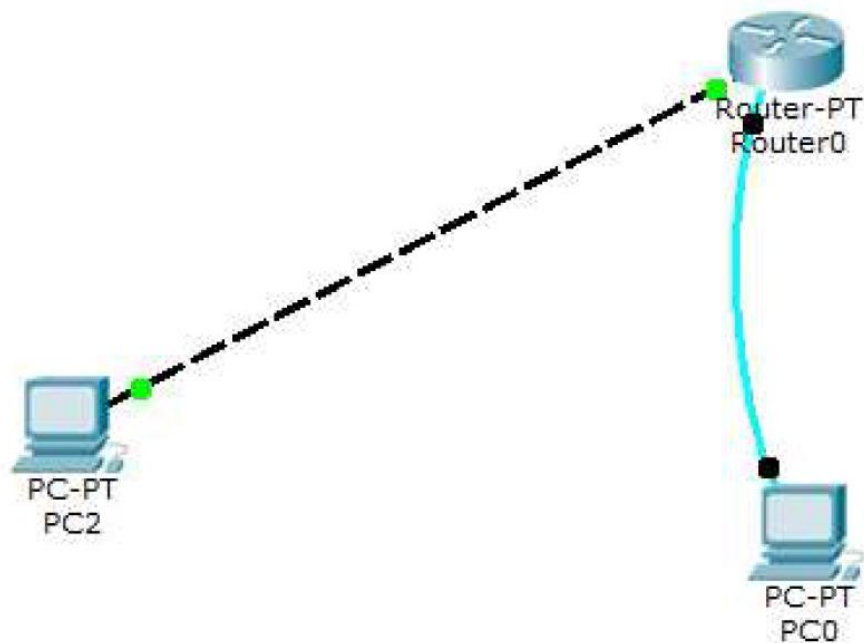


Figure 1

- From PC0 desktop, start a terminal session to the router (equivalent to using Putty for example).
- Skip the line by line wizard for configuring the router (select **NO**). You can also discover the configuration dialogue.
- Type ?

Q1.1: Is it possible to display the running configuration (using the command show) of the router in the current user EXEC mode?

- Enter the user privileged EXEC mode (command **enable**).
- Type ?

Q1.2: Comment

- Enter the global configuration mode by using the command (**configure terminal** or just **conf t**)
In this mode, you can configure the router (name, IP, description, interfaces, routes)

Q1.3: Change the name of the router. Call it R1 (copy screenshot)

- Go back to the privileged EXEC mode (type **exit**).
- Save the configuration to the NV RAM by copying the running configuration (in RAM) into the startup configuration. (Command: **copy running-config startup-config**).
Hint: you can use the tabulation key to get the full word by typing a part of it.
- Display the running configuration.

Q1.4: How many network interfaces are present on R1 and how many are assigned IP addresses?

- Exit the opened PC terminal.
- Click on the router and select the Command Line Interface CLI.

In the following, router configuration will be done directly from the CLI

- Enter the configuration of **line console 0**. (Just type it from the config mode).
- Set a password and activate it.
- **Reload** the router configuration after saving it.

Q1.5: Comment (provide necessary screenshots)

- Set a password to the virtual terminals (vty) and enable it
- Save the configuration and restart the router (**reload**).

Q1.6: Display the router configuration and copy your screen here after (the passwords of the console and the virtual lines shall be displayed).

- Add a second computer (PC2) and connect it to the router with an Ethernet cable through the first available Ethernet interface 'FastEthernet 0/0' as shown in figure 1.
- Configure PC2 with the following IP address: 192.168.0.2 /28. Set the default gateway to 192.168.0.1
- Configure the IP address of the router's interface (FastEthernet0/0) from the CLI.

Hints:

To enter into interface configuration; type in **interface interface_name**. For example:

interface FastEthernet 0/0

IP configuration example: **ip address 192.168.0.1 255.255.255.0**

To start/enable a router interface: **no shutdown**

- Do not forget to save the running configuration from time to time
- Ping the router from PC2.

Q1.7: Did it work? (Provide a screenshot)

- Now open a telnet session with router from a terminal on PC2.

Q1.8: Comment (which password should you enter to open the session?)

- Type in ?

Q1.9: Copy the results here (screen shot)

- Enter into the user privileged exec mode.

Q1.10: Do and provide the necessary configurations to make it work, otherwise provide the screenshot

Now you have learned how to configure the router from the CLI in 3 ways:

1. By using a serial connection (console)
2. By using a telnet session via the virtual line interfaces
3. Directly from the router (which actually is equivalent to the first method (from the console))

Part 2:

SUB-NETTING

Suppose that you need to configure 8 distinct subnetworks in the address space of 192.168.2.0/24

Q2.1: What is the subnet mask that you shall use?

Q2.2: Give the sub-network ids of these 8 subnets.

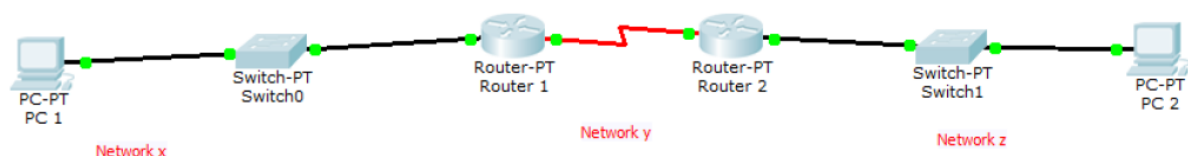


Figure 2

- Construct the network shown in figure 2 with the following materiel:
 - 2 generic routers
 - 2 generic PCs
 - 2 generic switches
 - 4 Ethernet cables
 - One WAN router-to-router cable (Serial DCE/DTE)
- Assign the second, third and fourth subnet ids to networks x, y and z respectively

- Configure PC1, PC2, Router 1 and Router 2 as follows:
 - The first available network address on each subnet is assigned to the router
 - If many routers are connected on a sub-network, the router with the smallest ID is assigned the first available address
 - Each time an address shall be assigned, the first available address is used.

Q2.3: Give the IP addresses of PC1, PC2, Router 1 and Router 2 (on all the enabled interfaces on the routers)

Q2.4: Ping Router 1 (use its IP on network x) from PC 1. Did you get a reply? (Provide a screenshot)

Q2.5: Ping Router 1 (use its IP on network y) from PC 1. Did you get a reply? (Provide a screenshot)

Q2.6: Ping Router 2 (use its IP on network z) from PC 1. Did you get a reply? Comment

The command **clock rate** is used to set configure rate on a DCE end.

STATIC ROUTING

Q2.7: Configure the routing tables of router 1 and router 2 so that PC 1 can communicate with PC2 and vice versa (explain).

N.B:

To add an entry in the routing table use the command:

ip route <Network address> <Subnet mask> <interface name>

Q2.8: Ping PC2 from PC 1. Do you get a reply? Comment

Part 3:

Network Extension

A new subnet is needed on the network shown in figure 2.

Q3.1: Assign the fifth subnet id to this new network (network t) and connect it to router 1 (to the first available Fast Ethernet interface). Give the network address of this new subnet.

A switch shall be used inside this network to break collision domains in the purpose of improving performance. Add two PCs on this network (PC3 and PC4).

Q3.2: Configure and provide the IPs of Router 1 as well as PC3 and PC4 on this new network.

Q3.3: Ping PC1 from PC 3. Comment

Q3.4: Update the routing tables wherever necessary so that all the PCs can reach each other (explain).

Q3.5: Ping PC2 from PC 4 (copy screenshot hereafter).