The University of Jordan, Comp. Eng. Dept.
Spring 2023: Networks lab: Experiment 8
Configuration of Basic and Real Devices (Problem Sheet)

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Problem 1: Basic Device Configuration (Packet Tracer)

In this activity (i.e., Exp_8_Problem_1.pka), you are requested to do the following configuration based on the Figure 1 and addressing table below (i.e., Table 1):

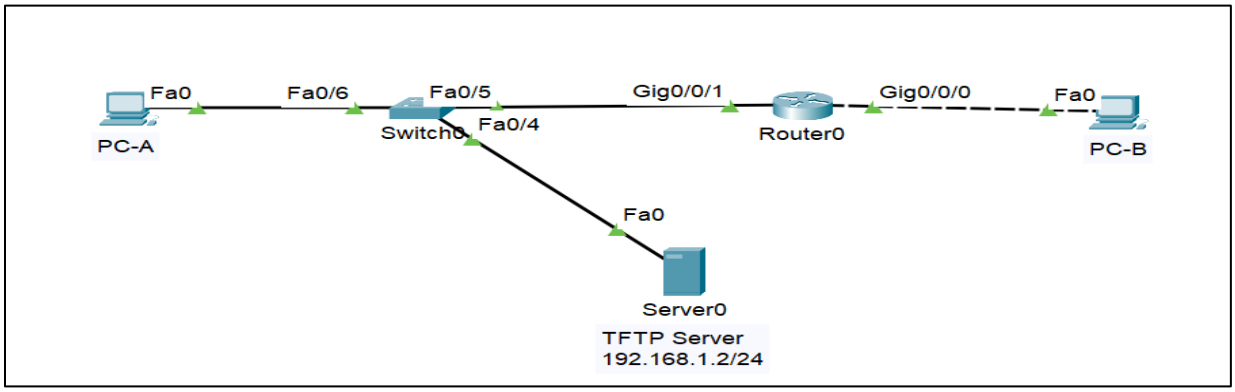

Figure 1: Network topology for problem 1

Table 1: Addressing Table for problem 1

Device	Interface	IPv4 address	Subnet mask	Default gateway
R1	G0/0/0	192.168.0.1	255.255.255.0	--
	G0/0/1	192.168.1.1	255.255.255.0	--
PC-A	Fa0	192.168.1.3	255.255.255.0	192.168.1.1
PC-B	Fa0	192.168.0.3	255.255.255.0	192.168.0.1
TFTP Server	Fa	192.168.1.2	255.255.255.0	192.168.1.1

Configure Devices and Verify Connectivity based on the following:

1. Configure the router's Giga Ethernet interfaces with the IP addresses specified in the addressing table above.
2. Configure PCs with the IP addresses specified in the addressing table above.
3. Verify end-to-end connectivity. From the command Prompt on PC-A, ping PC-B.
4. Specify the name for the router with: R1
5. Specify the name for the switch with: S1
6. Configure MOTD banner on R1 to be:" Unauthorized access is prohibited".
7. Specify an encrypted password for R1 as: **cisco**.
8. Specify a password to prevent unauthorized access to the console of R1 as: **class**.
9. Specify a password to prevent unauthorized telnet access to R1 as: **lab**.
10. Enter the command that encrypts plain text passwords.

11. **Configure SSH on R1:**
    a. Configure the domain name to be **ju.com**
    b. Secure keys are needed to encrypt the data. Generate the RSA keys using a 1024 key length.
    c. Create an **administrator** user with **pass123** as the secret password.
    d. Configure the VTY lines to check the local username database for login credentials.
12. Type this command to show the startup configuration file. `R1#sh start.` What do you observe?

Answer:

13. Save the running configuration into the NVRAM. Issue `R1# show startup-config` command to verify. What do you observe?

Answer:

14. Attempt to log in R1 using SSH from PC-A. Type **ssh –l administrator 192.168.1.1** ↵ then enter **pass123**
    Hint: The -l option is the letter "L", not the number 1. Upon successful login, enter privileged EXEC mode and save the configuration.
15. Use TFTP server to **save configuration files and IOS Images**.
16. Discuss all the previous points with the lab supervisor.

Problem 2: Basic Device Configuration (Real Devices)

In this problem, you are requested to bull up a router and cables from the devices' cabinet in the lab. Thereafter, do the following in sequence:

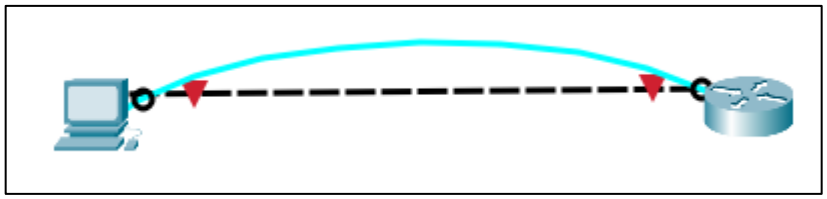

Figure 2: Network topology for problem 2

- Cable the network as shown in Figure 2 with crossover cable between Ethernet interfaces of the devices and console cable for configuration as illustrated in the handout.
- Establish a Console Session using **Putty**. Select appropriate serial port that your console cable is connected to (Device Manager→Ports (COM&LPT).
- You should see a response from the router on the screen (press enter several times). If you were asked "Continue with configuration dialog? [yes/no]: ", press no.
- Configure your router with the following taking into account that the words are case-sensitive:
    1. Set the device hostname to **Router1**
    2. Configure the MOTD banner to be **"Welcome to Computer Networks Lab"**.
    3. Set the secret password to **cisco**.
    4. Set the console access password to **networks**.
    5. Specify a password to prevent unauthorized telnet access as: **networkstelnet**.
    6. Configure the router Giga0/0 interface (20.0.0.1/8).

7. Configure the host computer (20.0.0.10/8) and the default gateway is the router interface. Follow these steps:
   Go to (Control Panel→Network and Internet→Network and Sharing Center→Change Adapter settings→Right-click on the Local Area Connection icon, and select Properties→Highlight the Internet Protocol(TCP/IPv4) field, and select Properties)

- After performing all the lab procedure, do the following:
  1. Verify Router1's configuration using this command: `Router1#show running-config` command, how large is the configuration file in bytes?

Answer:

  2. Verify host computer configuration with the `ipconfig` command from the command prompt of the host computer.
  3. Ping the router from the host computer (make sure the firewall is turned off), is it successful?

Answer:

  4. Attempt to log in Router1 using telnet from the PC command prompt window (to enable telenet on window: Control Panel→Programs and Features→turn windows features on or off→Telnet Client ✓). Type **telnet 20.0.0.1**. After the successful login, change the router name to **NetworksLabRouter**.
  5. Discuss all the previous points with the lab supervisor.

Problem 3: Enabling Routing Protocols on Real Devices

In this problem, you are requested to bull up routers and cables from the devices' cabinet in the lab. Thereafter, you are requested to cable the network as shown in Figure 3 with crossover cable between Ethernet interfaces of the devices and console cable for configuration as extensively illustrated in the handout.

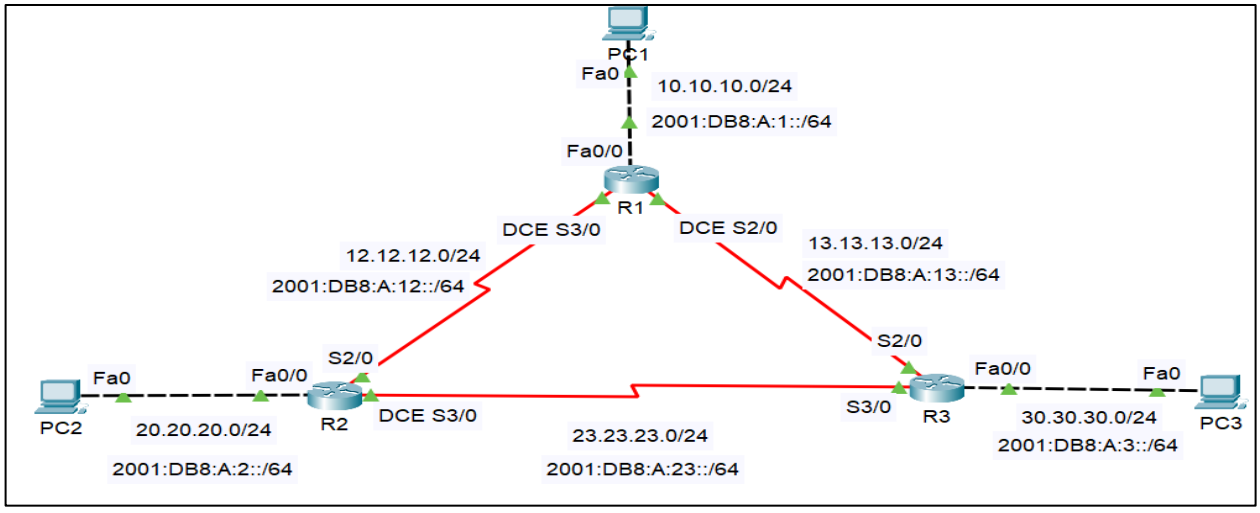

Figure 3: Network topology for problem 3

You must follow these steps in sequence:

1. Configure the PCs and routers interfaces with the correct IP addresses as displayed in Table2. You must be able to ping each PC with its default gateway.

2. For DCE interfaces, set the clock rate to 64000.
3. For IPv6 addressing, you should enable IPv6 on each router.
4. After that, you should enable the **RIP v2** routing protocol on each router with the correct network addresses to check the connectivity of your network and make sure that each device can reach another without any problems.
5. After that, you should enable the **OSPF** routing protocol on each router with the correct network address and wild mask to check the connectivity of your network and make sure that each device can reach another without any problems.
6. After that, you should enable the **EIGRP** routing protocol on each router with the correct network address and wild mask to check the connectivity of your network and make sure that each device can reach another without any problems.
7. The following are helpful commands to test the connectivity and check the configurations:
    a. **ping:** To test connectivity with neighboring devices.
    b. **telnet:** Log in remotely to a device for accessing configuration information.
    c. **show ip interface brief:** To display the up or down status and IP address of all interfaces.
    d. **show running:** To display the configuration that you did by yourself.
    e. **show ip route:** To display the routing table in a router to learn the directly connected neighbors, more remote devices (through learned routes), and the routing protocols.

Table 2: Addressing Table for problem 3

Device	Interface	Address		Subnet mask	Default gateway	Connected with
R1	Fa0/0	IPv4	10.10.10.1	255.255.255.0	--	PC1
		IPv6	2001:DB8:A:1::1/64	--	--	
	S2/0	IPv4	13.13.13.1	255.255.255.0	--	R3
		IPv6	2001:DB8:A:13::1/64	--	--	
	S3/0	IPv4	12.12.12.1	255.255.255.0	--	R2
		IPv6	2001:DB8:A:12::1/64		--	
	Link Local	IPv6	FE80::1	--	--	--
R2	Fa0/0	IPv4	20.20.20.2	255.255.255.0	--	PC2
		IPv6	2001:DB8:A:2::1/64	--	--	
	S2/0	IPv4	12.12.12.2	255.255.255.0		R1
		IPv6	2001:DB8:A:12::2/64			
	S3/0	IPv4	23.23.23.1	255.255.255.0	--	R3
		IPv6	2001:DB8:A:23::1/64	--	--	
	Link Local	IPv6	FE80::2	--	--	--
R3	Fa0/0	IPv4	30.30.30.3	255.255.255.0	--	PC3
		IPv6	2001:DB8:A:3::1/64	--	--	
	S2/0	IPv4	13.13.13.2	255.255.255.0	--	R1
		IPv6	2001:DB8:A:13::2	--	--	
	S3/0	IPv4	23.23.23.2	255.255.255.0	--	R2
		IPv6	2001:DB8:A:23::2/64	--	--	
	Link Local	IPv6	FE80::3	--	--	--
PC1	Fa0	IPv4	10.10.10.10	255.255.255.0	10.10.10.1	R1
		IPv6	2001:DB8:A:1::2/64	--	FE80::1	
PC2	Fa0	IPv4	20.20.20.20	255.255.255.0	20.20.20.2	R2
		IPv6	2001:DB8:A:2::2/64	--	FE80::2	
PC3	Fa0	IPv4	30.30.30.30	255.255.255.0	30.30.30.3	R3
		IPv6	2001:DB8:A:3::2/64	--	FE80::3	

The End: Good Luck!