- Lab 1 : Routing and switching
- Lecturer : Prof. Oumaima FADI
- T.A: Prof. Abdoulghaniyu HARAZEEM

Lab 1 – Routing and switching

Objective:

The goal of this lab is to set up a network between different machines and learn how to perform the necessary network configurations.

We will focus on the following:

- IP addressing configuration on a simple home network setup;
- P2P connection configuration
- Lan setup configuration
- Basic network configuration using packet tracer

Instructions:

1. The lab report must be submitted one week after the session in electronic format to Moodle platform
2. The lab must be done in class in groups of maximum 2 students.
3. Groups should remain the same for both reports and upcoming labs.

1. SIMPLE HOME NETWORK SETUP

Requirement

3 PCs, 2 Laptops, 1 Home Router

Selection of the End Devices

1. Select ‘End Devices’
2. Select and drag 3 ‘PCs’
3. Select and drag 2 ‘Laptops’
4. Select ‘Network Devices’, Select ‘Wireless Devices’, select, drag and drop ‘Home Router’

Connecting the Devices

Note: Cross-Over Cables are used for Connection between the same devices, while Straight-through Cables are used for connections between different devices

For LAN Connection

1. Select ‘Connection’
2. Select ‘Automatically choose connection type’

3. Using previous step, connect 2 PCs and 1 Laptop to the 'Home Router'

For Wireless Connection

4. Select the Laptop or PC
5. Power off the Laptop or PC
6. Remove the LAN Ethernet Card
7. Select 'WPC300N' to replace the ethernet card by drag and drop
8. Power on the Laptop or PC

2. PEER TO PEER (P2P) CONNECTION

Requirement:

2 PCs

Connecting the Devices

1. Select 'End Devices' select 2 PCs (Rename the PCs)
2. Select 'Connections', select 'Cross-Over Cables' to connect the 2 PCs, when prompt to choose 'FastEthernet0'

Configure the PCs

1. Select the PCs, choose 'Desktop', select 'IP Configuration' and input the following details for both PCs
   For PC 1
2. IPV4 Address: 192.168.1.1
3. Subnet Mask: 255.255.255.0
   For PC 2
4. IPV4 Address: 192.168.1.2
5. Subnet Mask: 255.255.255.0

Test the Connection (Run PING)

1. Select PC1, select 'Desktop', select 'Command Prompt'
2. Execute ping 192.168.1.2
3. To visualize the communication process in real time, select 'simulation', rerun the ping, then click the play button

3. LAN: CONNECTING MULTIPLE PCs

Requirements:

4 PCs, 1 Switch

Connecting the Devices

1. Select 'End Devices', select 4 PCs and rename them
2. Select 'Network Devices' select Switch

3. Add IP address to all the PCs by selecting PC > Desktop > IP Configuration

Test Connection

1. Use the command 'ipconfig' or 'ipconfig /all' to give all details of the PC configuration
2. Run the command ping 192.168.1.2 // depending on the IP address that was set
3. To see this in real time, select 'simulation', select 'Add Simple PDU (P)', drag to a PC and to the destination PC, then click on the play button to visualize

4. BASIC NETWORK CONFIGURATION USING CISCO PACKET TRACER

Requirements

4 PCs, 2 Switches, 1 Router

Selection of Devices (PCs)

1. Select 'End Devices'
2. Select PC
3. Drag and Drop 4 PCs

Selection of Devices (Switches)

1. Select 'Network Devices'
2. Select 'Switches'
3. Drag and Drop 2 Switches from selection

Selection of Devices (Router)

1. Select 'Network Devices'
2. Select 'Routers'
3. Drag and Drop 1 Router from selection

Connecting the Devices (PC to Switch)

1. Select 'Connections'
2. Select 'Cooper Straight-through' cable
3. Click on 'PC' select 'Fast Ethernet ()', drag to 'Switch', select 'FastEthernet 0/1'
4. Repeat the process for all 4 PCs

Connecting the Devices (Switch to Router)

1. Select 'Cooper Straight-through' cable
2. Click on the Switch, select 'GigabitEthernet0/1', drag to 'Router', select 'GigabitEthernet0'

Note: You will observe a red light indicating that there has been no connection established between the two. So, the device needs to be configured to change the red light to green.

Configuration of the Router Ports

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1. Click on the Router, select CLI Mode
2. Type ‘no’ on prompt then press ENTER
3. Type ‘enable’ then press ENTER
4. Type ‘configure terminal’ then press ENTER
   Configure Interface 1
5. Type ‘interface Gig0/0/0 then press ENTER
6. Type *ip address 192.168.1.1 255.255.255.0* press ENTER
7. Type ‘no shutdown’ press ENTER twice
8. Type exit to exit the interface mode and go back to the global configuration mode
   Configure Interface 2
9. Type interface Gig0/0/1 press ENTER
10. Type ip address 192.168.2.1 255.255.255.0 press ENTER
11. Type ‘no shutdown’ press ENTER
    Close the window, now check that the red light has changed to green implying connection has been established

Configuration of the PCs 1 and 2

1. Click ‘PC’ select ‘Desktop’, select ‘IP Configuration’ then input the following
2. IP Address: 192.168.1.10
   Subnet Mask: 255.255.255.0
   Default Gateway: 192.168.1.1
   Do same to PC2 but change IP address to 192.168.1.11

Configuration of the PCs 3 and 4

1. Click ‘PC’ select ‘Desktop’, select ‘IP Configuration’ then input the following
2. IP Address: 192.168.2.10
   Subnet Mask: 255.255.255.0
   Default Gateway: 192.168.2.1
   Do same to PC4 but change IP address to 192.168.2.11

Confirm the connection by sending PDU

1. From menu bar, Select ‘Add Simple PDU (P)’ drag to the PC and Router . Successful imply connection has been read
2. Drag from PC1 to PC3 to see if it can go across the network.

*Successful connection implies the connection has been established