

Al-Azhar UNIVERSITY

Faculty of Engineering

Computers and Systems Engineering Department

EXPERIMENT 1 – Simulating a Small Network

OBJECTIVES

- Explore the Packet Tracer (PT) interface
- Locate the key components used to place device symbols in the logical workplace
- Examine the devices that can be placed in the logical workplace and their symbols
- Place and connect devices
- Connecting devices in the logical workplace using auto connection
- Correctly identify cables for use in the network
- Physically cable a peer-to-peer
- Connect a Client-Server Network
- Configure DHCP, DNS, and HTTP services.
- Verify basic connectivity on each network

MATERIALS/EQUIPMENT NEEDED

1. Packet Tracer Simulation program

INTRODUCTION

Packet Tracer is a network simulator that allows you create a simulated network, configure the devices in the network, test the network, and examine the traffic in the network. The first step in creating a simulated network in Packet Tracer is to place the devices in the logical workplace and connect them together. Many network problems can be fixed at the Physical layer of a network. For this reason, it is important to have a clear understanding of which cables to use for your network connections. At the Physical layer (Layer 1) of the OSI model, end devices must be connected by media (cables). The type of media required depends on the type of device being connected. In the basic portion of this lab, straight-through or patch—cables will be used to connect workstations and switches. In addition, two or more devices communicate using assigned addresses. The Network layer (Layer 3) requires a unique address (also known as a logical address or IP Addresses), which allows the data to reach the appropriate destination device. Addressing for this lab will be applied to the workstations and will be used to enable communication between the devices.

EXPERIMENT 1 – Simulating a Small Network

PROCEDURE

Task 1: Create a Peer-to-Peer Network

Step 1: Obtain equipment and resources for the lab.

Equipment needed:

- 2 workstations
- 1 Ethernet cable

Step 2: Identify the Cables used in a Network

Before the devices can be cabled, you will need to identify the types of media you will be using. The cables used in this lab are straight-through and crossover.

Use a **straight-through cable** to connect the router's Ethernet port to a switch port or a workstation to a switch port. This is also an Ethernet cable. When you look at the plug you will notice that both ends of the cable are exactly the same in each pin position, as shown in figure 1.a.

Use a **crossover cable** to connect two workstations to each other through their NIC's (Network Interface Card) Ethernet port. When you look at the plug you will notice that the orange and green wires are in opposite positions on each end of the cable, as shown in figure 1.b.

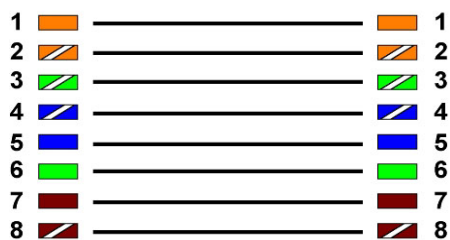


Figure: 1.a Straight-through cable

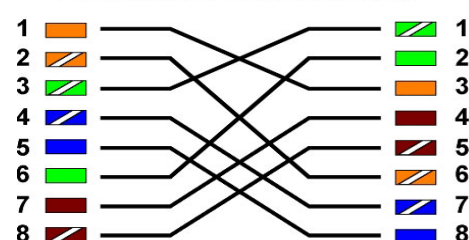


Figure: 1.b Crossover cable

EXPERIMENT 1 – Simulating a Small Network

Step 3: Cable the Peer-to-Peer Network.

Using the correct Ethernet cable, connect two workstations together. Connect one end of the cable to the NIC port on PC1 and the other end of the cable to PC2.



Which cable did you use?

Step 4: Apply a Layer 3 address to the workstations.

To complete this task, you will need to follow the step-by-step instructions below.

- Click the PC you want to assign an address to.
- Click the **Desktop** tab
- Click the **IP Configuration** tab
- In the **IP address** box, enter the IP address 192.168.1.2 for PC1. (Enter the IP address 192.168.1.3 for PC2.)
- Press the tab key and the Subnet mask is automatically entered. The subnet address should be 255.255.255.0. If this address is not automatically entered, enter this address manually
- Close the IP configuration window by clicking on the X

Step 5: Verify connectivity.

To test Connectivity follows the following instructions:

- Click **PC1**
- Click the **Desktop** tab
- Click the **Command Prompt** tab
- Type **ping 192.168.1.3** then press *enter*

EXPERIMENT 1 – Simulating a Small Network

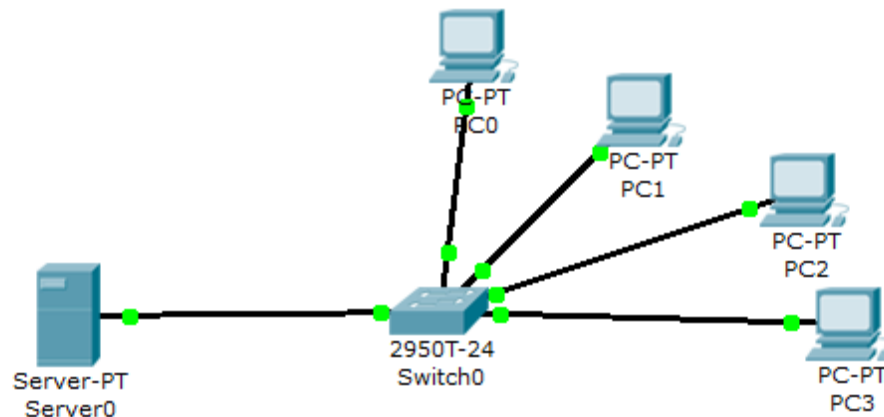
What is the output of the **ping** command?

If the ping command displays an error message or doesn't receive a reply from the other workstation, troubleshoot as necessary. Possible areas to troubleshoot include:

- Verifying the correct IP addresses on both workstations
- Ensuring that the correct type of cable is used between the workstations

What is the output of the **ping** command if you **unplug** the network cable and ping the other workstation?

Task 2: Client-Server Network



Step1: Cable the network

Use the following devices to connect the shown network

- 1 Server
- 4 Workstations
- 1 Switch
- 5 cables (Which Type of cables should be used?)

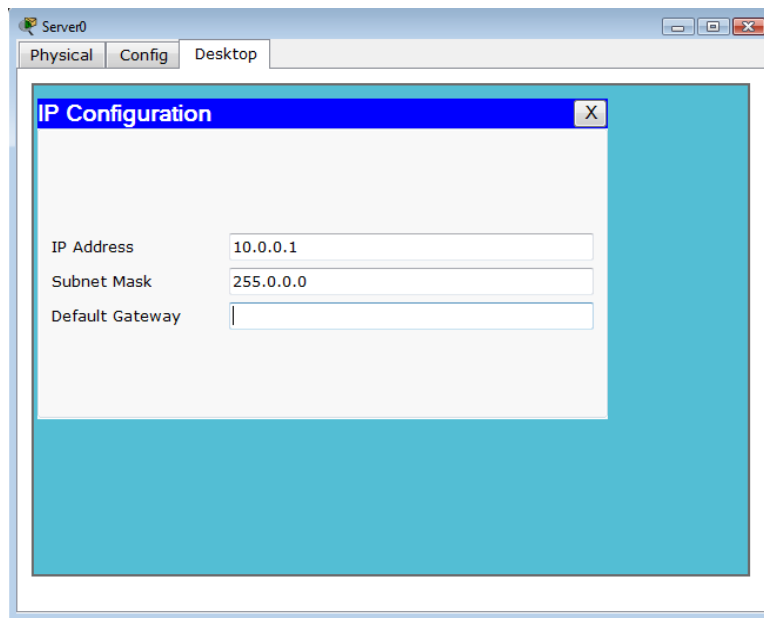
Step 2: Apply a Layer 3 address to the Server.

Configure the server IP. Use a proper IP and subnet mask

IP Address : 10.0.0.1

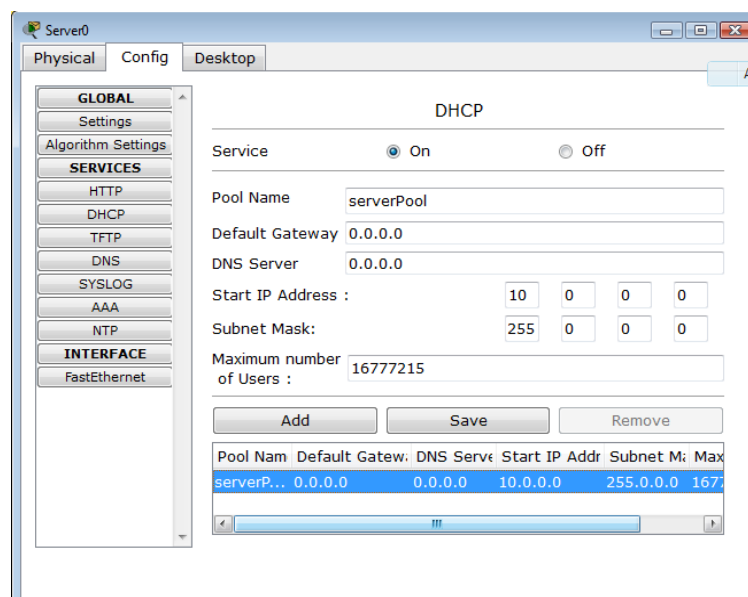
EXPERIMENT 1 – Simulating a Small Network

Subnet Mask : 255.0.0.0



Step 3: Enable DHCP service on the Server.

- Click the Server icon.
- Click the **Config** tab.
- Click the **DHCP** tab.
- Make sure that the service is **ON**
- Have a look on the **Start IP Address**, the **Subnet Mask**, and the **Maximum number of Users**.
How can you calculate the maximum number of users?

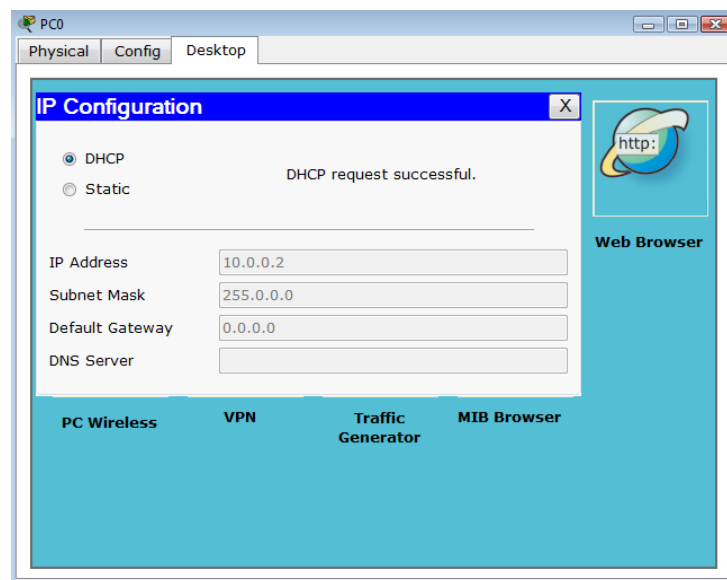


Step 4: Configure Workstations to get IP automatically.

For every workstation do the following

EXPERIMENT 1 – Simulating a Small Network

- Click the **workstation** icon
- Click the **Desktop** tab
- Click the **IP Configuration** tab
- Check **DHCP** radio button. What happens?



Step 5: Enable HTTP service on the Server.

- Click the Server icon.
- Click the **Config** tab.
- Click the **HTTP** tab.
- Make sure that the **HTTP** service is **ON**
- Examine the available pages. (index.html, helloworld.html, .ect)

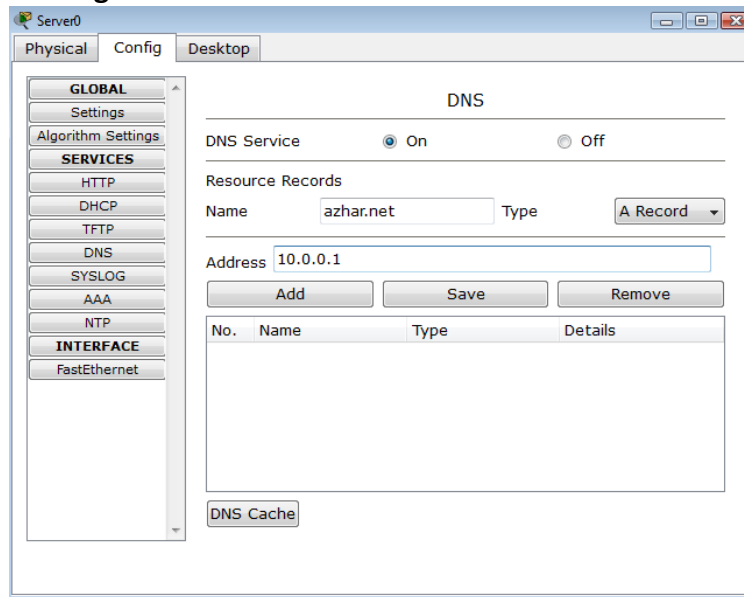
Step 6: Access web pages from workstations.

- Click **PC1**
- Click the **Desktop** tab
- Click the **Web Browser**.
- Type the server IP (What is the Server IP?) What Happens?

Step 7: Enable DNS service on the Server.

- Click the Server icon.
- Click the **Config** tab.
- Click the **DNS** tab.
- Make sure that the **DNS** service is **ON**
- Add a new record (**Name:** azhar.net **Address** 10.0.0.1) click **Add** button

EXPERIMENT 1 – Simulating a Small Network



Step 8: Access web pages from workstations using Name.

- Click **PC1**.
- Click the **Desktop** tab.
- Click the **Web Browser**.
- Type the server Name (azhar.net) what is the result?

EXPERIMENT 1 – Simulating a Small Network

POST-LAB

Post-Lab questions must be answered in each experiment's laboratory report.

Exercise 1:

Build a small network has three workstations and one switch. Use network address 192.168.1.0 to address the workstations. Use **ping** Command to verify the connectivity among the workstations.

Exercise 2:

Modify the **index.html** page on the server to show your Name, Faculty, and University. Use any workstation to check the new page