TNE20003 – Internet and Cybersecurity

# **Portfolio Task – Lab 1 Pass Task**

## Aims:

* To build and understand basic network infrastructure
* To build a simple network with Cisco Packet Tracer and observe the data flow within the network

## Preparation:

* View [“Topic 1 – Network Toplogies, Concepts and Protocol”](https://swinburne.instructure.com/courses/54168/pages/topic-1-network-topologies-concepts-and-protocols?module_item_id=3667743)
* Perform tasks instructed in the [Unit Canvas – Packet Tracer](https://swinburne.instructure.com/courses/54168/pages/packet-tracer?module_item_id=3679139).

## Due Date:

* All tasks in this lab are to be completed and demonstrated to your Lab instructor preferably during or at the end of the current lab, but if you do not complete the tasks you may demonstrate it at the beginning of your next lab class.

Task 1.

Build an Understanding of Network Infrastructure

In this task, you will

* record all the different devices attached to the network in your home.
* identify how each device connects to the network to send and receive information.
* create a diagram showing the topology of your network, and label each device with its function within the network.

# Instructions

1. Take a close look at the network you have at home.
2. Record the network and end-user devices that are connected on your local home network.

For example,

A table with text on it

Description automatically generated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Manufacturer** | **Device** | **Location** | **Connection** | **Media** |
| Apple | iPhone | Mobile | Wireless | WiFi & cell phone |
| Acer | Laptop Notebook | Room | Wireless | WiFi & cell phone |
| HP | Laptop Notebook | Room | Wireless | WiFi & cell phone |
| Arris CM8200 | Cable Modem | Living Area | Wired | Cable TV Coaxial cable and ethernet cable |
| Huawei | Wired Router | Living area | Wired | Ethernet cable |

1. Are there other electronic devices that are not connected to the local network to share information or resources? What would be the benefit of having these devices online?

Yes, there are a few other devices that are not connected to the network in the house where I am living such as the heater, refrigerator, dishwasher and microwave oven. There may be many benefits of having these devices online,

* Remote accessing the device through the internet.
* Firmware Updates
* Pre-Programmed Cooking

While we are using the devices through internet, it is better to consider the security of these devices as every device has its own vulnerabilities.

1. Which type of connectivity is used most frequently in your local network, wired or wireless? Explain why.

I’m frequently using wireless connectivity most of the time for use mobile phone, desktop and laptop but the router in my house is connected by wired connection. I prefer to use wireless connectivity as it has some benefits such as, easy to setup, convenient to use and scalability etc. However, it's important to note that while wireless connections offer numerous benefits, they also have some drawbacks. Wireless networks can be susceptible to interference, signal degradation, and security vulnerabilities if not properly secured. In situations where consistent and high-speed data transfer is essential, wired connections may still be preferred.

1. Draw a diagram of your local network. Label each device with a name and location.

Sample solution shown below

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Task 2.

**Build a simple network with Cisco Packet Tracer and observe the data flow within the network**

In this task, you will

* Create/model a simple Ethernet network using 2 PCs, 1 Server, and a Switch.
* Observe traffic behavior on the network.

## Create a logical network diagram with 2 PCs, a Server and a switch.

The bottom left hand corner of the Packet tracer screen displays the icons that represent device categories or groups, such as **Routers**, **Switches**, or **End Devices**.

Moving the cursor over the device categories will show the name of the category in the box. To select a device, first select the device category. When the device category is selected, the options within that category appear in the box next to the category listings. Select the device option that is required.

* + - 1. Select **End Devices** from the options in the bottom left-hand corner. Drag and drop 1 PC and 1 Server onto your design area.
      2. Select **Switch** from the options in the bottom left-hand corner. Add a 2960 switch to your prototype network by dragging it onto your design area.
      3. Select **Connections** from the bottom left-hand corner. Choose a copper straight-through cable type. Click the first PC (PC0) and assign the cable to the **FastEthernet0** connector. Click the switch (Switch0) and select **FastEthernet0/1** to connect to PC0.
      4. Select **Connections** from the bottom left-hand corner. Choose a copper straight-through cable type. Click the second PC (PC1) and assign the cable to the **FastEthernet0** connector. Click the switch (Switch0) and select **FastEthernet0/2** to connect to PC1.
      5. Select **Connections** from the bottom left-hand corner. Choose a copper straight-through cable type. Click the Server and assign the cable to the **FastEthernet0** connector. Click the switch (Switch0) and select **FastEthernet0/3** to connect to the Server.

There should be green dots at both ends of each cable connection after the network has converged. If not, double check the cable type selected.

# Configure Host names and IP Addresses on the PC and Server

* + - 1. Click **PC0**. Select the **Config tab**. Change the PC Display Name to **MyPC0**. Select **FastEthernet tab** on the left and add **192.168.1.1** as the IP address and **255.255.255.0** as the subnet mask. Close MyPC0 when done.
      2. Click **PC1**. Select the **Config tab**. Change the PC Display Name to **MyPC1**. Select **FastEthernet tab** on the left and add **192.168.1.2** as the IP address and **255.255.255.0** as the subnet mask. Close MyPC1 when done.
      3. Click **Server0**. Select the Config tab. Change the Server Display Name to **FileServer**. Select FastEthernet tab on the left and add **192.168.1.3** as the IP address and **255.255.255.0** as the subnet mask. Close FileServer when done.

You have just built a simple network.

# Observe the flow of data from MyPC0 to FileServer by creating network traffic

* + - 1. Switch to **Simulation Mode** in the bottom right-hand corner.
      2. Click **Edit Filter** in the **Edit List Filter** area. In the event list filter, *only select* **ARP** and **ICMP** filters under IPv4 tab, desect all other filters in the three tabs **IPV4, IPV6** and **Misc**.
      3. Select a **Simple PDU** by clicking the **closed envelope** in the upper toolbar.

With the envelop icon, click **MyPC0** to establish the source. Click **FileServer** to establish the destination.

# Note: Notice that two envelopes are now positioned beside MyPC. One envelop is ICMP, while the other is ARP. The Event List in the Simulation Panel will identify exactly which envelop represents ICMP and which represents ARP.

* + - 1. Select **Play** from the Play Controls in the Simulation Panel.

You can speed up the simulation using the Play Speed Slider. The Play Speed Slider is located below Play inside the Simulation Panel. Dragging the button to the right will speed up the simulation, while dragging is to the left will slow down the simulation.

* + - 1. Observe the path ICMP and ARP envelope.

Click **View Previous Event** to continue when the buffer is full.

* + - 1. Click **Reset Simulation** in the Simulation Panel.

Notice that the ARP envelop is no longer present. This has reset the simulation but has not cleared any configuration changes or dynamic table entries, such as ARP table entries. The ARP request is not necessary to complete the ping because MyPC0 already has the MAC address in the ARP table.

* + - 1. Exit the simulation mode by clicking **Realtime.**

*~~~~~ End of Lab ~~~~~*