Lab 06: Getting Started with Networking

Team Members:

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Background Information

In this activity, you will follow the instructions to build a basic network. Your team will build a network using the components in the provided activity kit. Once your network is built and configured, someone from the Instructional Team will bring a Raspberry Pi over to verify that your network is working properly. As usual, you will be rewarded with a bad meme if your network is working correctly.

Activity Kit Inventory

The kit that you have been provided includes the following items. 1 wired Ethernet switch

- 2 CAT6 Ethernet cables
- 1 Ethernet switch
- 1 USB-A Networking Adapter
- 1 USB-C Networking Adapter
- 1 large rechargeable USB battery
- 1 plastic toolbox

After you have completed the activity, make sure to return all components to the provided toolbox. Remove all cables from the devices and neatly coil any cables to allow everything to fit in the container without any stresses being placed on the equipment.

Directions: Creating the Network

Before starting this activity, you should identify among your team the two individuals whose laptops will become part of the network and who will keep their computer connected to the campus network. If your laptop is not part of the network, then your role is to act as a researcher to help your teammates figure out how to accomplish each of the steps below.

Step 1: Look at your laptops. Do they have networking ports? If they do not have networking ports, then plug in the provided networking adapters so that you have two laptops with available networking ports.

Step 2: Plug the one end of each of the two CAT6 Ethernet cables into the Ethernet switch. There should now be two cables plugged into the switch and each cable should have one end free.

Step 3: Plug the free end of each of the cables into the laptops' networking ports.

Step 4: Power up the Ethernet switch using the provided USB battery. The battery has a built in USB-C cable that will plug directly into the switch.

Step 5: Configure the laptops' to have static IP addresses.

Step 5a: Find the networking settings for your laptop

Step 5b: Turn off the wireless network adapter on your laptop.

Step 5c: Switch from DHCP to Manual IP for the wired network adapter and manually enter the following Information.

IP address:

Look at your toolbox for a number written in silver marker. That number will go where the *x* is in *10.0.x.y*.

Choose a number between 25 and 50. That number will go where the *y* is in *10.0.x.y*. Each laptop has a unique IP address, so make sure that you chose a different number for each laptop.

Subnet Mask:

If your computer asks for the Subnet Prefix Length use *16* (this is the CIDR notation for the subnet mask).

Otherwise, if your computer asks for the Subnet Mask use *255.255.0.0* (this is the dot-decimal notation for the subnet mask).

Gateway/Router: Windows will refer to a Gateway. MacOS will refer to a Router. There isn't one in this configuration, but you will not be able to save your setting without entering some information into this field. For this lab, we'll use *10.0.0.1*

DNS Server: You may be required to enter a DNS server before you can save your settings. If that is the case, then use 10.0.0.1. DNS will not work in this network because there is no DNS server running on the network.

Step 6: Test if it is working. Open a Terminal window (on Mac) or Command Prompt (on Windows) and use ping the other laptop's IP address. Some computer's firewall settings will block pings by default.

Step 7: Flag down your instructor so that you can test your network with the Raspberry Pi by opening a browser window and going to http://10.0.0.10

Step 8: Celebrate! □ □ □ □

Step 9: Undo everything that you did. This means:

Step 9a: Turn the laptops' wireless adapter back on. (Make sure that you can connect to eduroam!)

Step 9b: Ethernet cables have tabs on the connector that must be pressed to release the cable from the port. Don't YANK! Squeeze the tab and gently unplug the Ethernet cable from the laptop. If you used an USB networking adapter, unplug that from your laptop and put it in the toolbox.

Step 9c: Squeeze the tabs and gently unplug the Ethernet cables from the switch.

Step 9d: Loosely coil the Ethernet cable so that it fits back in the toolbox.

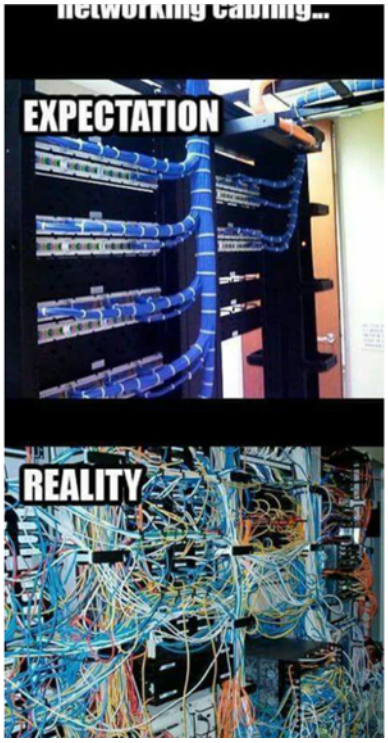
Step 9e: Unplug the USB battery from the switch.

Step 9f: Put the switch and the USB battery in the toolbox and close the lid securely.

Step 10: Answer the questions in the questions section.

Questions

1. Provide a screenshot or picture of the meme (from Step 7) to show you were successful.



2. What is the physical topology of the network you just created? Explain why.

The physical topology of the network that we created was a star topology. The computers were connected to a central device (switch).

3. What is the logical topology of the network you just created? Explain why.

The logical topology of the network that we created was also a star topology. The central device was a switch that transferred the data straight to the other device.

4. Describe the distributed systems architecture you demonstrated when you used your browser to access the website on the Raspberry Pi.

The distributed systems architecture used was peer-to-peer architecture. The browser we used connected to a server on Professor Heidenblad's computer.

5. What component(s) would we need to connect these networks together?

The components we would need to connect these networks together include a router which would allow us to connect the different networks together

6. Think about how this process was different from how you normally connect to the campus network using eduroam. What problems might need to be solved if connecting to the campus network had to be done similarly by manual configuration?

Connecting to a campus network using manual configuration would have several issues that would make connecting tedious. One such problem would be needing to know the IP address of the network, additionally everyone would need to have a unique ending for the network to work properly, which would be hard to organize for such a large student network because of communication problems. The amount of hardware would additionally be exponentially more than running a wireless service.