## Lab 6 –Setting up a Wireless LAN

Write down the name of the equipment used in this lab (fill this out once you have the information):

| | |
|---|---|
| Computer Name | |
| Wireless Router No | |
| Wireless Adapter No | |
| One or more wireless devices (yours) | |

In this lab, you will configure one wireless router/access point and install a USB wireless adapter to a host computer. You will also practice setting up connections between wireless devices and the access point.

When unpacking your equipment, please note how things are arranged inside the box as you will have to pack everything back up the same way at the end of the lab.

There are 3 parts to setting up the wireless network.

- First of all, we need to make sure we have all the software we need later on, so we will download all of the software while we still have an internet connection.
- Secondly, we need to **connect one computer to the router by cable first** to get the router's information and to setup the wireless information.
- Lastly, we will use devices with wireless adapter to connect to the wireless router.

### A. Download required software

1. Login to your computer (CSIS Student | password: STF@ll2016). We will be using Windows 7 for this lab.
2. Go to http://www.tp-link.com/en/download-center.html and download the latest **Driver** software for the wireless adapter TL-WDN3200 or Archer T2U (whichever you have). You will need this later.
3. Go to \\CSIS-T215-NAS01\CPSC1480\Lab6 and copy the **inSSIDer-installer.msi** installer to your desktop

## B. Setting up wireless network

Unpack the router and examine the interface. Look at the front, back, and bottom of the router to identify ports, switches, and other information.

This router comes with several switch ports and routing capabilities. It supports 802.11n transmission, which means that it is also backward compatible with the 802.11a, b, g standards.

Article on WLAN: https://www.lifewire.com/wireless-standards-802-11a-802-11b-g-n-and-802-11ac-816553

For two devices to communicate, they need to be in the same "channel" or frequency.

At home, you can verify your laptop's Wi-Fi adapter's information through Control Panel. It would mention which frequency or frequencies it supports.

1. Assemble your router and turn on the wireless switch.
2. Disconnect the host computer from the Ethernet port on the table. Connect it to one of the port no 1-4 at the back of your router (choose Work Network if asked) we will use it to configure the router.
3. To get to the router's web interface, open up a browser (**use Chrome**) and type the router's IP address into the address bar. (Try ipconfig it might help)
4. In order to minimize the interference to the existing Langara wireless networks (and our own lab's) and to comply with langara's IT policy, you MUST follow the following setup:
    a. Use **only the 5 GHz band** in this lab (disable the 2 GHz band)
    b. You must use the **specified channel and SSID** for your specific router (the information is listed on the label on the top right corner of your router)

***(Q.1). The SSID used:_____ Channel #_____***

    c. You must set the **Wi-Fi security** (minimum WPA2)

Notes:

- SSID (means Service Set Identifier) – a fancy terminology for a network name you would give to your device. In this case, your router.
- Channel # - is like a subset range. If you are taking public transit, it is like going/using zone 1, zone 2, or zone 3 "pass".
- WPA2 (Wi-Fi protected access 2)
    - Article on different Wifi security - http://www.howtogeek.com/167783/htg-explains-the-difference-between-wep-wpa-and-wpa2-wireless-encryption-and-why-it-matters/
    - Main difference or summary? Improvement on the security algorithm and encryption.

***(Q.2). Write down the password used:_____***

4. After you finish configuring the router, go to "status menu" and use the snipping tool to take a screen-shot of the finished/final configuration of your wireless information. Please make sure that the pasted image is readable.

   ***(Q.3). Include the screenshot of the "status menu" from the web management in your report.***

5. Remove the Ethernet cable that connects the router to the host computer.

## C. Connecting devices to wireless router

Pretend that the NIC card of your host computer is broken and you have purchased a new USB wireless adapter to get your computer back online. To use the wireless adapter, you will need to install the driver first (you have downloaded this previously).

1. Before we install the driver, locate the driver software you downloaded earlier and unzip/extract it.
2. Unpack the USB wireless adapter and plug it to the computer's USB port.
3. Go to device manager and check if you can see the newly installed adapter
4. Right click the new adapter > Properties > Upgrade Driver Software > select the folder where you have extracted the driver file
5. Now try to connect this computer to the wireless access point you created (identified by the SSID you set)

6. If you have trouble seeing the access point of your wireless router (SSID) from your laptop/smartphone, there is a possibility that your wireless NIC does not have dual band capability (doesn't work on 5 GHz band). In this case, go back to the router's web interface and enable the 2.4 GHz band. For the same reason of not interfering with Langara's wireless network, use the following setting: **2.4 GHz channel 6**, use the **same SSID** as your 5GHz access point **but add "2.4GHz"** at the end. Use the same WPA security setting.

***(Q.4). Can you surf the web from the host computer and the other wireless devices? (this is to test if you have internet connection)***

7. Access the router's web interface again from the host computer (this can be done wirelessly now). Go to the left-hand side menu and go through all the wireless settings.

***(Q.5). Fill out the following information for all the devices you managed to connect:***

| | *[device 1:]* | *[device 2:]* | *[device 3:]* | *[device 4:]* | *[device 5:]* |
|---|---|---|---|---|---|
| IPv4 address | | | | | |
| MAC address | | | | | |
| DNS server | | | | | |
| DHCP server | | | | | |
| Default gateway | | | | | |

The devices represent the computers used by your team members and other devices that you might be using to connect to your router.

***(Q.6). Which device give out IP addresses to the connected devices?***

## D. Wireless Analyzer

Make sure your computer is still connected to the wireless access point.

1. Run the **inSSIDer-installer.msi** installer on Windows 7 (uncheck "Yes, I am willing to participate")
2. Run the inSSIDer Home program , familiarize with the software, and locate your access point.

***(Q.7). Find your access point and record the following information:***

- ***a. MAC Address (is this the same as the one you previously recorded?)***
- ***b. Channel (verify that this the same as the one you assigned)***
- ***c. Signal***
- ***d. Co-Channel (what does this represent?)***
- ***e. Overlapping (what does this represent? Can you identify any overlapping channel?)***
- ***f. Security Type (are there any devices with "Open" security? What is your thought on this?)***

Notes:

- No frequency is perfect. "Adjacent channel congestion" is like being in a room where you could hear the sounds/voices of other people/strangers.
- Some applications or devices could be the cause of the network slow performance. Imagine a class where a student kept on asking what an IP address is for the past 7 weeks.

***(Q.8). Observe the 2.4 GHz and 5 GHz channels. Which one is more crowded?***

***(Q.9). Find out the SSID of another group (next to you or near-by).***

- ***a. What is your classmate's SSID?***
- b. ***Locate this SSID in the inSSIDer program. What is the signal value for this SSID?***
- c. ***Compare this signal to your signal. Which access point has a better signal strength?***

## E. End of the lab 6

You need to get the lab instructor to check your work.

After your work is inspected and marked, **reset the router to its factory default setting**. From the Web Management page, go to System Tools, Factory defaults, click the "Restore" button.

Logoff the Windows 7 computer after you have saved all your files on an external USB/cloud storage. **All changes made to the computer will be erased.**

Disassemble your wireless LAN and put the router and USB wireless adapter away properly (place everything back into the boxes in the same condition as when you first opened them). **Connect the network cables from the computers back to the port on the table.**

**Any missing/broken parts/ improper storage of your equipment may result in mark deduction.**

**Deliverables -** Submit a report named **Lab6.pdf or Lab6.docx** ***to D2L***