CS 410 Networks and Networking
October 5th, 2012 **Name:** _____

Lab 3

Introduction

In this lab, you will:

- Set up wired peer-to-peer networks using Windows 7 and Linux machines.
- Perform simple peer-to-peer operations such as file distribution, file sharing and chatting.
- Experiment with Java Multicasting

Due to limited eqiupment, please work in two groups. Everyone has to submit their own completed lab report. Coding can be done in groups or individually.

Windows 7: Two-Peer Network

For the first two sections, you will need two Windows 7 machines. Turn off your connectivity to the wireless internet connection.

1. Initiating the communication

- Connect two windows machines with a cross-over cable (converts output of one into input of the other). Some Windows machines can be connected to each other using the normal ethernet cable (if you are unable to see icon of the other computer in the Network tab, use ordinary ethernet card).
- On one of the computers, do the following:
- Go to **Start** menu and then right click **Computer** and select **Change Settings**. Set the name of your computer to **Peer1** and close.
- Click **Start** to open **Control Panel**. Now click **Network and Internet** followed by **Network and Sharing Center**. Select **Change Adapter Setting** in the side panel of this window.
- Now right click **Local Area Connection** and **Rename** this connection to MyPeer2Peer. Right click again to choose **Properties**.
- In the **Properties** box, select **Internet Protocol Version 4 (TCP/IPv4)** and press properties.
- Select **Use the following IP address**, and enter **192.168.1.1** in the IP address field. For subnet mask, enter **255.255.255.0**.
- Press OK and close the TCP/IPv4 Properties box.
- Make sure **Client for Microsoft Networks** and **File and Printer Sharing for Micrsoft Networks** are checked.
- Click **Close** button to close the **LAN Properties** window.
- Repeat the above steps for the other computer. Choose Computer Name to be **Peer2** and IP address **192.168.1.2**.
- Now open DOS windows on both computers by clicking Start button and then typing cmd in the search field.
- Type **ping 198.168.1.2** at the command prompt of computer with IP address **198.168.1.1**. You can also try pinging the computers using their names, i.e. Peer1 and Peer2.

(a) What did you observe after you typed ping? Are there any problems? How will you resolve them?

(b) Open **My Computer** on 198.168.1.1 and then select **Networks** , you should see an icon for the other computer. Drag and drop a file into that icon. What happened?

(c) What is essential for setting up a peer-to-peer network?

2. Sharing Files

In order to share files between two computers, you need a filesharing software your computers. Windows comes pre-installed with a File and Printer Sharing software which allows seamless sharing of the files. We will learn how to configure it for our network.

- Open **HomeGroup** by clicking the **Start** button, clicking **Control Panel**, typing homegroup in the search box, and then clicking **HomeGroup**.
- On the **Share with other home computers running Windows 7** page, click **Create a homegroup** button, and then follow the instructions. Call your homegroup **MyPeers**. Make sure you save the password.
- Repeat the above process on the other computer, except this time you will join the existing **MyPeers** homegroup.

(a) Figure out how you can change the level of access of your shared files and folders by going to HomeGroup Settings. (Hint: Type HomeGroup in the search box of Start Menu or navigate to **Networks** from **My Computer**). Describe what you did below

(b) How can you change your network configuration to use Dynamic Host Configuration Protocol (DHCP). What networking device do you need? (Hint: TCP/IPv4 properties window).

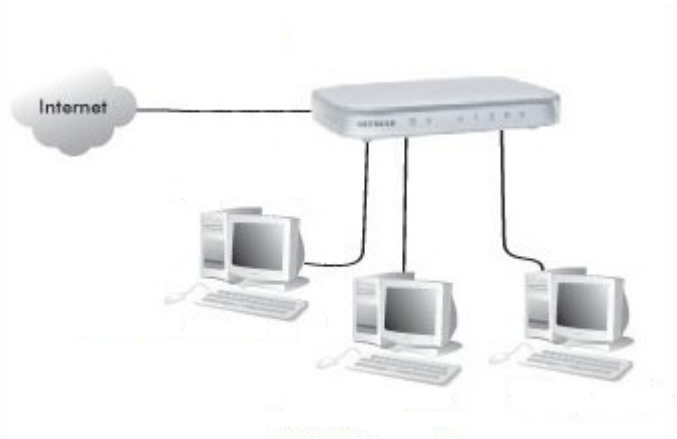
(c) What network properties are supposed to be same and different for computers in a peer-to-peer network if they are using DHCP?

II. Linux: Peer-to-Peer Network

For this part of the lab, you will need three ACLs, a router and four ethernet cables. You can use the machines in the ACL lab. Make sure they are disconnected from the internet. You will need root access on all three machines to do this lab. Make sure that the wifi is off on the router.

1. Setup: Making the Physical Connections

Set up your computers as shown in the diagram below:



Once the setup is complete, turn on the machines. Execute the following commands to start configuring your peer-to-peer network:

- First make sure network card is detected on all three boxes: **dmesg — grep eth0**
- Check the IP info: **ifconfig eth0**
- Now you can assign IP addresses to all three machines: **sudo ifconfig eth0 ip 255.255.255.0 up**. You can pick ip for each machine from the following range 192.168.1.105 to 192.168.1.107.
- Recheck the IP info: **ifconfig eth0**
- Check your default gateway: **route - n**
- You can make the router your default gateway: **sudo route add default gw 192.168.1.1 eth0**.
- Check whether your previous command was successful by executing the following command: **route -n**
- Your network is now set up and you are ready to communicate with the other machines: **ping box-ip**

(a) Record your observations and any problems.

2. Peer-to-Peer Multicast Chatting
In this part of the lab you will compile, run and test a peer-to-peer multicast chat system.

- Download MulticastChat.java from / bchaudhry/teaching/CS410/ directory.
- Compile to generate MulticastChat.class: **javac MulticastChat.java**
- Then launch the program several times to connect to the multicast group you just created: **java MulticastChat 255.255.255.0**
- Test the chat system by typing text into the input region of different frames to see whether they work as expected.

Answer the following questions:

a. Which statement in MulticastChat.java is for joining the multicast group?

b Which statement in MulticastChat.java is for receiving multicast messages?

c Which statement in MulticastChat.java for sending messages to the multicast group?

d What is the object name of DatagramPacket for storing outgoing packet to the multicast group?

e What is the object name of DatagramPacket for storing incoming packet from the multicast group?

3. Multicasting Sniffer

- Download MulticastSniffer.java from / bchaudhry/teaching/CS410/ directory.
- Complete, compile and run the following code about multicasting sniffer

Answer the following questions:

1. What are the missing 3 lines of code?

2. If you do not know the multicast address and port number for sniffing, how many possible numbers you need to try? Calculate a rough figure.

Multicasting (II. 2,3) questions have been adapted from http://www.stepwise.hk/npwiki/Tutorial/JavaMulticastChat

Scrap Paper