

Name _____

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CPADS HW Activity V

“Reach Out and Touch Someone!”

(Unfortunately) the days of isolated computing are long gone. Networking, through the Internet in particular, has become almost a necessity. It allows for things such as file and data sharing, distributed computing, multiplayer gaming, e-commerce, etc. Most PC's these days have onboard LAN and most laptops also have integrated wireless (which we'll explore later). To tap into this wonderful world of networking, we are going to perform some simple configuration to allow your networked machine to talk with another machine. Then, you will benchmark the 'real' world performance of the NIC (Network Interface Card).

1. Basic Configuration

- Determine the MAC address of your computer's onboard NIC. From the Windows 8.1 Start Screen, click the down arrow on the lower-left side of the screen. This will bring up a screen displaying a list of the applications installed on the machine. In the top right corner, click in the search dialog box and type “cmd” (without the quotes). Click on the command prompt program to run it. Once in the command prompt, you will see a prompt that looks like

```
C:\Users\student>
```

At the prompt, type the following command:

```
ipconfig /all
```

Write down the “Physical Address” (i.e. the MAC address) of your Ethernet Adapter below.

- Now, return to the Windows 8.1 Start Screen, click the down arrow the lower-left again, but this time search for the “Control Panel” application. Click on the application to load it.

In Control Panel, click → System and Security → System, be sure your computer's name is set to **CPADS-##** where ## is your PC's number.

- Set the workgroup to **CPADS** by clicking “Change Settings” and then “Change...” in the dialog box that pops up. After changing this you may need to reboot.
- Since we are not using a router with DHCP, we will need to set the IP information manually. Open the “Control Panel” again. Click on “Network and Internet”, then “Network and Sharing Center”, then “Change adapter settings” in the left column. If you don't see any Ethernet connections here, then you probably didn't install your LAN driver!

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Double click the Ethernet adapter to open the “Properties” window. Select “Internet Protocol Version 4 (TCP/IPv4)” and click “Properties”. Set the following information (where ## should be replaced by your computer's number) and close the dialog box.

- IP Address: 192.168.1.1##
- Subnet mask: 255.255.255.0
- Default gateway: 192.168.1.1

Click “Ok” to set the values, and then “Close” the “Properties” windows.

- Your computer is now setup to connect to the simple CPADS network. Inform your instructor that you’re ready and you will be provided with an Ethernet cable that you will use to complete the next few steps.
- Open a command prompt (All Programs → Accessories → Command Prompt) and type

```
ping 192.168.1.155
```

Note the following information.

Approximate round trip times in milli-seconds:

Minimum = _____ms, Maximum = _____ms, Average = _____ms

- Now try to ping Google by typing the following:

```
ping www.google.com
```

The ping command should return an error. In the space below, explain why the error occurred (consider what your computer is connected to).

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2. Throughput Measurement

We will now perform a very crude measurement of the network card's speed.

- Open the `Task Manager` with the `(Ctrl-Alt-Del)` shortcut. If you do not have a tabbed window, click the “More Details” button on the bottom left of the Task Manager window. Click on the “Performance” tab and select your Ethernet interface in the left column. Note the link speed at the top right corner of the graph.

Link Speed: _____ Kbps

The link speed gives the *theoretical* maximum transfer rate.

- Locate the `CPADS` shared directory on **ASUS-3D**. From your Windows 8.1 desktop, click on the File Explorer icon in the taskbar (i.e. the yellow folder looking thingy). In the left column, select “Network”. Windows 8.1 may indicate that you need to turn on “Network Discovery”. Click the yellow bar and “Turn on” network discovery. From here, you should be able to see the **ASUS-3D** computer. If you are not able to find the **ASUS-3D** computer, *check your workgroup setting*. Select **ASUS-3D** computer from the list and use the login information to connect to the machine:

Login: **cpads-guest**
Password: **cpads**

- Drag and drop the file from that directory onto your desktop. In the copy dialog window, click “More Details” to get more information about the speed of the copy (cancel the transfer before it completes).

Filename: _____

Speed: _____ Approximate Network Utilization %: _____

Compare the theoretical and actual throughputs. Why do you think they are drastically different, i.e. why does the network not achieve nearly what it is capable of?
(Hint: Consider where the data is coming from, i.e. are there any limitations on the *server*?)