

Unix/IP Preparation Course

July 19, 2009

Exercises: TCP/IP

1.) Configure a Network Interface

Your laptops have two “NICs” (Network Interface Cards). The first network interface is referred to as *eth0*. The second interface is *eth1*.

Eth1 is your wireless connection and may already be configured.

In a terminal type:

```
$ ifconfig eth0
```

We are going to use *ifconfig* to configure your laptop with a static IP address. To start we are going to pick a private address range from RFC 1918:

```
10.0.0.0          -   10.255.255.255  (10/8 prefix)
172.16.0.0       -   172.31.255.255  (172.16/12 prefix)
192.168.0.0      -   192.168.255.255 (192.168/16 prefix)
```

Let's use 192.168.1.0/24:

```
$ sudo ifconfig eth0 192.168.1.10/24
```

Or, you could have typed:

```
$ sudo ifconfig eth0 192.168.1.10 netmask 255.255.255.0
```

Remember to look at the course outline for references that can help you with this (see Session III):

<http://nsrc.org/workshops/2009/summer/unix-ip.html>

Do you have a gateway address for this address?

```
$ route
```

What was it?

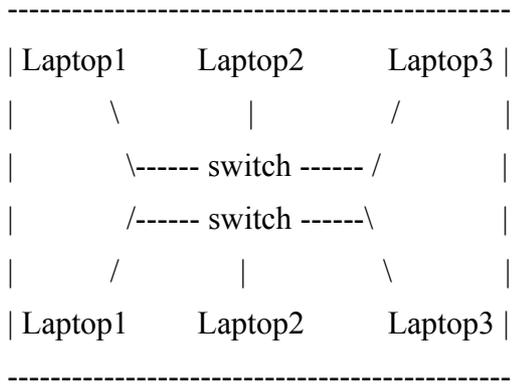
Try reconfiguring your *eth0* interface with another private address space such as 10.0.0.0. What gateway did you end up with? What was the *IP address* and the *netmask* that you chose?

2.) Ping Your Neighbor's Laptops

This exercise requires that you talk to your neighbors and coordinate with them.

GOAL: Connect your laptop and your two neighbor's laptops on the same side of the table on which you sit to a switch. Choose a private address range and assign each of your laptops a private address such that each of you can ping the other's machine using this address range.

TABLE LAYOUT



Example, you could choose an address range like:

192.168.10.0/24

Your separate IPs could be:

192.168.10.10

192.168.10.11

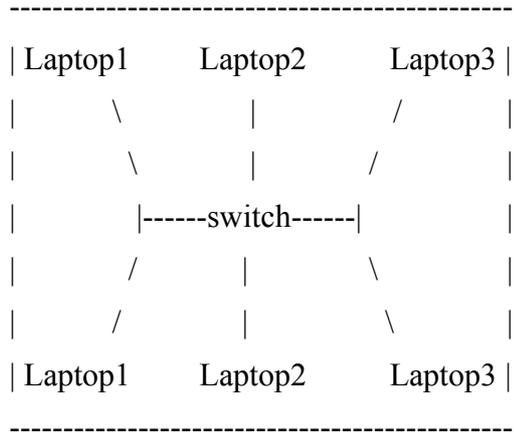
192.168.10.12

Do you need a gateway to ping each others machines?

3.) Ping Your Entire Table – Using *Separate* Networks

Now connect all six machines at your table to a single switch. Consult with your neighbors. Choose two *contiguous* address ranges and *supernet (aggregate)* them so that you can ping both your immediate neighbor's machines on your subnet, but, also, your other three neighbor's machines on a *different* subnet.

NEW TABLE LAYOUT



Example

Your side of the table is using:

10.254.4.0/24

With the addresses

10.254.4.10

10.254.4.11

10.254.4.12

The other side of the table might choose:

10.254.5.0/24

And use the addresses

10.254.5.101

10.254.5.102

10.254.5.103

Q.) How would you configure *eth0* on all 6 machines so that everyone can ping each other?

Q.) Will you need to specify a gateway address?

Challenge

Try doing this with a different set of IP address ranges than given in the example.

Hint

You can use the presentation if you wish.

Answers

On the next page....

Sample Answer

You need to remove a bit from your netmask...

So, for network 10.254.4.0 to see machines on network 10.254.5.0 you would configure *eth0* like this:

```
$ sudo ifconfig eth0 10.254.4.10/23
```

Alternately you can do:

```
$ sudo ifconfig eth0 10.254.4.10 netmask 255.255.254.0
```

Take a look at your wireless configuration:

```
$ ifconfig eth1
```

Here is a sample output:

```
eth1      Link encap:Ethernet  HWaddr 00:13:02:1f:f2:de
          inet addr:128.223.229.231  Bcast:128.223.239.255
          Mask:255.255.240.0
          inet6 addr: fe80::213:2ff:fe1f:f2de/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:6721947 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4252142 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4290068661 (4.2 GB)  TX bytes:868987668 (868.9 MB)
```

Note that the netmask is 255.255.240.0, or a “/20”. Why do you think this is the case? How many addresses can be aggregated on this network?