1.4 networks

Module 3: Internet

- Your computer needs 4 things to be able to get onto the internet:
- IP address, example 10.14.8.4
- Subnet mask, example 255.255.0.0
- Gateway/router, example 10.14.0.1
- Domain name server (DNS), example 10.9.250.13

Here's what each one does:

IP address:

All traffic on the internet or local area network (LAN) is in the form of packets of information, like mail envelopes with a letter inside. Each letter you mail has two important things: the address you want it to go to, and the message inside the envelope.

- TCP/IP is the format of these, which stands for Transmission control protocol and internet protocol.
- The TCP part is the message, and the IP part is the envelope, with an IP address on it.
- Check the IP address of your machine:
- From the GUI: open system preferences, network
- From the terminal: type ifconfig

Subnet mask:

- Imagine you want to stay in one of two large 254 room hotels. One has long hallways, and very few floors, the other has many floors, but short hallways.

- If you want to sleep, you don't want many people walking down the hall in front of your room. You want many floors with fewer rooms per floors.
- This is what subnet masking does on a network. Each of the four segments can hold 254 addresses.
- At home, you probably have a network that looks like this:
- IP: 192.168.1.49
- mask: 255.255.255.0
- router: 192.168.1.1
- dns: 192.168.1.1

This means that the last zero can hold up to 254 addresses (from 192.168.1.1 to 192.168.1.254)

- HPA has this sort of mask:
- 255.255.0.0
- which means that
- 10.14.0.0
- is the elab, which can have 254 x 254 addresses
- It makes for a quieter network, also providing some security as others cannot see you easily.

Router/gateway:

This is the gateway for all of your traffic, usually the access point at your home. The technical difference between these words is that a router routes traffic between two networks of the same type (like ethernet), while a gateway is between different types of networks (like a cable modem or DSL gateway)

Domain name server:

- This is the computer on your network or outside that translates names into numbers, like a digital phone book.
- Try this in terminal:

nslookup physics.hpa.edu

1. when you get the address, write it down
2. open a browser

3. go to physics.hpa.edu
4. now go to the numbers you wrote down.
5. Try this with another name, either on campus or off

Ping and traceroute:

- Imagine you want to find out if a machine is responding (you can block this by using "stealth mode")
- In terminal ping one of the IP addresses in your class
- ping an address out on the internet
- what is the difference?

now try this:

traceroute www.apple.com

- It should give you a trace of the path your connection took.
- Try this with other addresses on and off campus.

NSLOOKUP:

- Say you want to find out the name of something, or the IP address from the name.
- try this:
- nslookup
- (you will get a funny > sign)
- type:
- server 10.9.250.13
- type:
- physics.hpa.edu
- what do you get?
- where is this machine?
- Try again using 8.8.8.8 as the server

The best use of this is to find out what OTHER people might call a machine.

- We have several DNS servers at the elab, the main one is at 10.14.1.5
- Others to try:
- 4.4.4.4
- 8.8.8.8
- 10.14.1.2

- you can get out by typing
- exit
- or control-z (halt)
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