ECE 435 – Network Engineering Lecture 10

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Announcements

- HW#4 was posted. Due after break

- Short class today. Midterm on Wednesday. Yan Liu will proctor. Proctor has not taken this class so won't be able to answer detailed questions, sorry!

HW#3 Review

- dmesg — grep eth

```
[    1.771794] smsc95xx 1-1.1:1.0 eth0: register 'smsc95xx'
at usb-3f980000.usb-1.1,
smsc95xx USB 2.0 Ethernet, b8:27:eb:af:37:11
[    6.740795] smsc95xx 1-1.1:1.0 eth0: hardware isn't capable of remote wakeup
[    6.741127] IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready
[    8.304167] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
[    8.304971] smsc95xx 1-1.1:1.0 eth0: link up, 100Mbps, full-duplex, lpa 0x45E1
```

what's this remote wakeup stuff?

- ifconfig

```
eth0      Link encap:Ethernet  HWaddr b8:27:eb:af:37:11
```

```
inet addr:192.168.8.51  Bcast:192.168.0.255  Mask:255.255.255.0
inet6 addr: fe80::f3be:9e8d:fb2c:1ddf/64 Scope:Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:706206 errors:0 dropped:513058 overruns:0 frame:0
TX packets:262341 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:35221707 (33.5 MiB)  TX bytes:36933005 (35.2 MiB)
```

No collisions, no errors, but dropped on receive?
I am on a switch

- This was mostly C, with argc/argv. Meant to have it be more.
  What you are writing is essentially the "telnet" program.
  Main difference is you could escape out with control [
  The whole port80, "GET" and such we will discuss later

in the semester

- Raw Ethernet frame

```
16:05:34.982471 b8:27:eb:af:37:11 (oui Unknown) > 00:13:3b:10:66:7f
(oui Unknown), ethertype IPv4 (0x0800), length 70:
pi3.48549 > um-web-proxy1.um.maine.edu.http:
Flags [P.], seq 1:5, ack 1, win 229,
options [nop,nop,TS val 17055320 ecr 883456963], length 4
0x0000: 0013 3b10 667f b827 ebaf 3711 0800 4500 ..;.f....7...E.
00:13:3b:10:66:7f b8:27:eb:af:37:11  type=0x800
"speed dragon" (server) pi tcp/ip
0x0010: 0038 572a 4000 4006 69cc c0a8 0833 826f .8W*@.@.i....3.o
0x0020: 2e7f bda5 0050 cdc4 6a49 3c7b 6ca5 8018 .....P..jI<{l...
0x0030: 00e5 79f4 0000 0101 080a 0104 3e58 34a8 ..y.........>X4.
0x0040: 7bc3 4745 540a
checksum
{.GET.
```

How to read a hexdump.

- What is filling the rest? Turns out it's TCP/IP from above. We don't know that yet. TCP/IP minimum size+ethernet header is always at least 64 bytes so never need padding.

- Why did ethernet win over token ring? Mostly because cheaper and good enough

- Advantage of switch over a hub Point-to-point, no collisions. Downside? More expensive initially

- Wired over wireless? security faster downside: need to run wires everywhere, not mobile

Midterm Review

- Know about the OSI Layers we have covered (Physical, Data Link)

- Benefits/downsides of various media. Copper vs Fiber, Satellite vs Fiber

- Ethernet. Why did ethernet win over Token Ring? Be familiar with Ethernet at a high level

- Wireless ethernet. How to deal with Hidden terminal problem. (ACK, DCF, PCF)

- Bluetooth

- Bridges/VLANs