CS 485/ECE 440/CS 585 Fall 2017 Lab 3, part 1

Lab 3 part 1 is due by 11:59pm on Thursday, October 26th, 2017. Part 1 is worth 100 points, and part 2 will be worth 100 points, so in total Lab 3 is worth 200 lab points.

You'll submit a single packet capture (PCAP) as a an attachment in an email to crandall@cs.unm.edu. Failure to follow these instructions will result in a zero on the assignment. Send real email attachments, when you send "SharePoint" or Google Drive links or whatever, I won't click on those links. Only one group member (you'll work in groups of 2 for this assignment) needs to submit, but cc your partner and put both of your names in the body of the email.

You are expected to do your own work. From setting up the VMs to capturing the PCAP, for all phases of this project you should do your own work. Any instance of not doing your own work will be considered cheating. If you're not sure whether something will be considered cheating or not, ask me before you do it. You are encouraged to discuss the assignment with your classmates (especially your partner) at a any level of abstraction you like, so long as two things are true: 1) nobody else but you is typing on the keyboard or doing anything to configure your VMs; 2) you're not typing anything or making any changes that you don't understand. As long as those two things are true, feel free to explain to each other how the subnetting is working, compare quagga and ripd configurations, look at each other's network configurations, share ideas for troubleshooting, or anything to help each other get your networks operating correctly. Exchanging tools, source code that existed before the assignment was assigned, and general thoughts about approaches to specific problems is okay. As a reminder of the course policy, if you cheat on any assignment in this class including this assignment (cheating includes, but is not limited to, representing somebody else's work as your own or having someone else do the assignment for you) you will receive an F in the class. If you want to share source code written for the assignment with a classmate, you should get my permission first and share it with the whole class.

For Lab 3 part 1, you'll need to follow these overall steps, which are explained in more detail below:

1. Get quagga and ripd working on your middle router (mine is named chico) so that you and your partner can route packets to each others machines using dynamic RIPv2 routing.

2. Set up httperf on all your machines.

3. Capture HTTP traffic involving all 10 machines on your group network (*i.e.*, your five machines plus your partners five machines), as well as some RIPv2 traffic, in a PCAP.

For step 1, the first substep is to connect your middle routers together. Email Rudy to have a virtual connection made from a new eth3 on your machine to a new eth3 on your partner's machine, if you haven't done so already. Configure this using a /28 that comes from either you or your partner. DO NOT USE IP ADDRESSES THAT WEREN'T ASSIGNED TO YOU OR YOUR PARTNER. You should be able to ping each other's middle routers, but you won't be able to reach each other's networks until you configure quagga and ripd.

The next substep for step 1 is to configure quagga and ripd. For your four other machines (those that are not the middle router), you should add a route to 192.168.0.0/16 that sends traffic towards the middle router for routing. For the quagga and ripd configuration, we'll be sending out instrucions but you should also be trying to figure it out on your own. You'll want to tell quagga and ripd to advertise your middle router as being the gateway to 192.168.N.0/24 where N is your student number, and you'll

need to tell them that you have one peer (so far), which you'll probably identify by IP address and perhaps interface (whatever IP you assigned to eth3 of your partner's eth3, on your eth3). You should dynamically announce your respective /24s to each other, DO NOT USE ANY STATIC ROUTING TO REACH THE /24 OF YOUR PARTNER. Once dynamic routing is working properly, you should be able to ping or connect to SSH on any of your partner's machines (but not login since you shouldn't share passwords with each other), run httperf where one of your machines is a client and theirs is a server, *etc*. Note that you do not need quagga on your other four machines other than your middle router, so you can uninstall it on those four machines or just ignore it and not configure it in any way for those four machines.

Step 2 should already have been done in Lab 2, it's pretty much just “sudo apt-get install httperf”. But now you should read the manpage and be able to run simple experiments to test the bandwidth between and of your VMs and any of your partner's VMs.

To create a PCAP to prove that your network works and turn it in, *i.e.*, step 3, you should run tshark on eth3 of one of your interfaces (each pair of partners will create just one PCAP, and it doesn't matter which of you runs tshark). Make sure you capture traffic on eth3 of one of your middle routers, and make sure that there is httperf traffic in the PCAP involving every one of the 8 machines that are not your middle routers. You should have your outside machines (groucho and gummo for me) be the httperf servers and your inside machines (harpo and zeppo for me) be the httperf clients, and make sure your clients connect to your partner's servers and vice versa. Your single PCAP that you submit should also containt some RIPv2 traffic. To get your RIPv2 routers to talk to each other while you're running tshark, you may have to restart quagga/ripd and/or wait some amount of time.