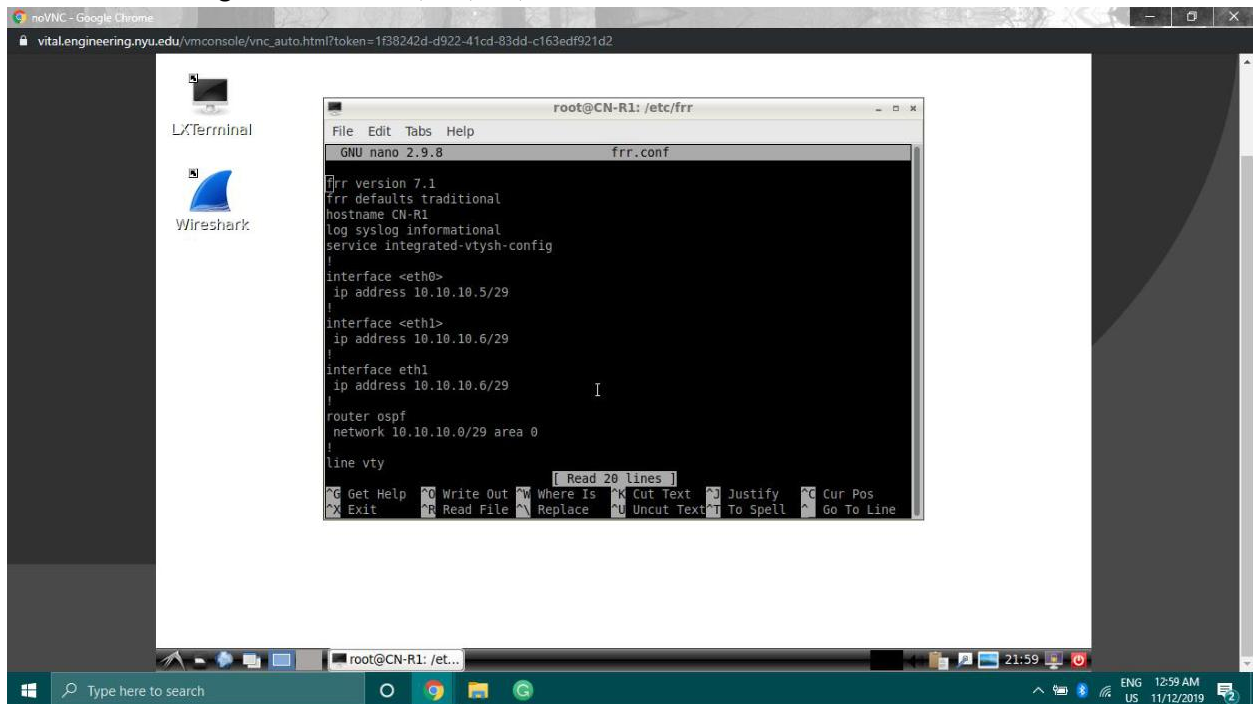


OSPF ASSIGNMENT

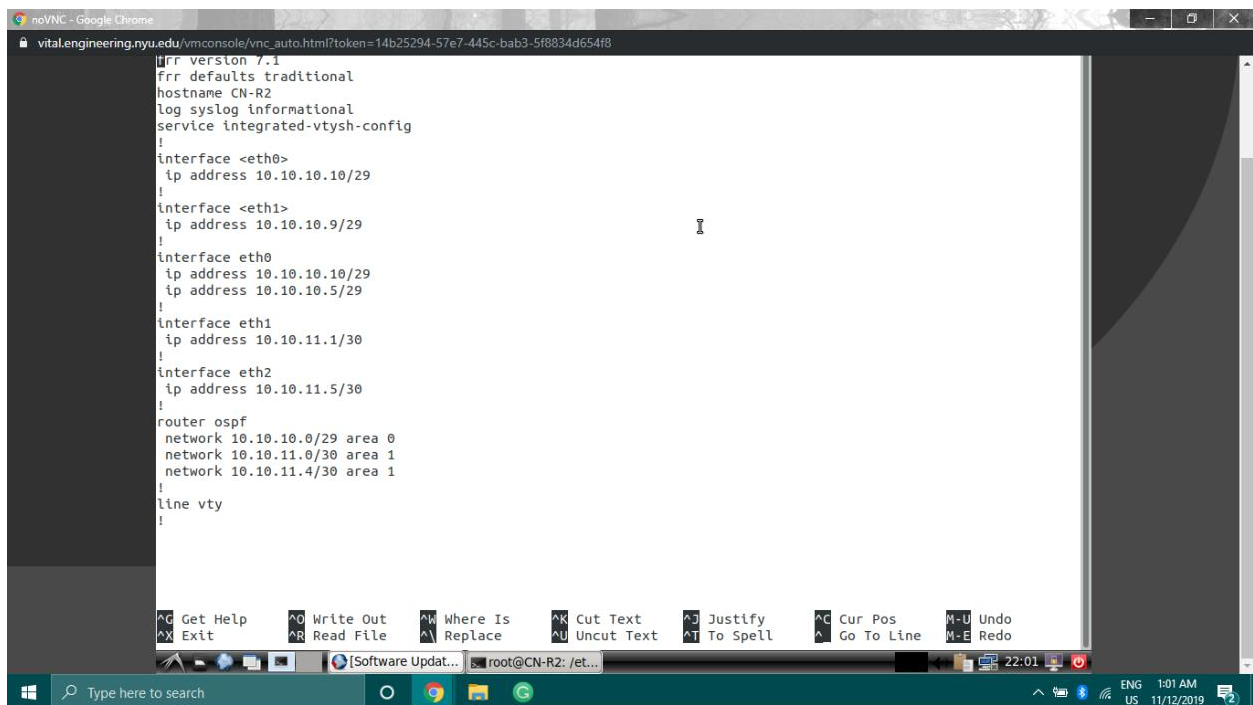
1. Screenshot configurations of R1, R2, R3, and R4



The screenshot shows a terminal window for R1 (CN-R1) running the nano text editor. The file being edited is frr.conf. The configuration includes setting the hostname to CN-R1, enabling syslog, and configuring OSPF on interfaces eth0, eth1, and eth1. The OSPF network is 10.10.0/29 area 0. The terminal also shows icons for LXTerminal and Wireshark on the desktop.

```
root@CN-R1: /etc/frr
GNU nano 2.9.8 frr.conf
frr version 7.1
frr defaults traditional
hostname CN-R1
log syslog informational
service integrated-vtysh-config
!
interface <eth0>
ip address 10.10.5/29
!
interface <eth1>
ip address 10.10.6/29
!
interface eth1
ip address 10.10.6/29
!
router ospf
network 10.10.0/29 area 0
!
line vty
!
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^U Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```

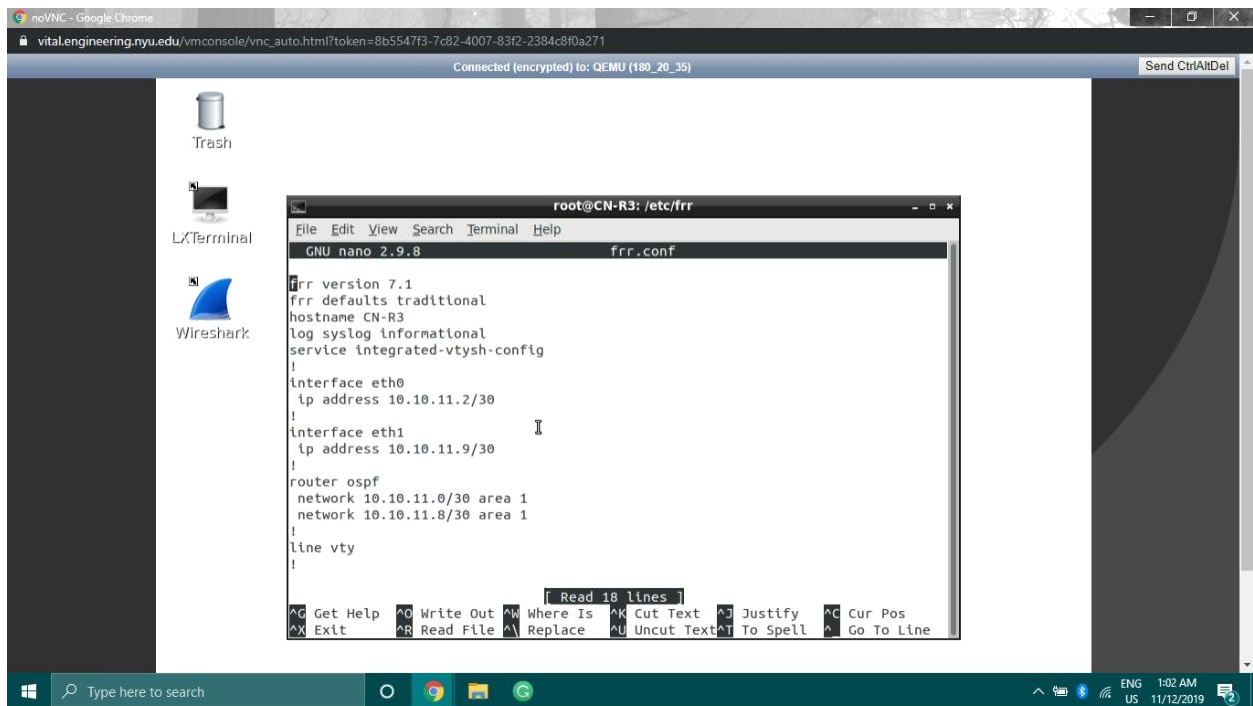
R1



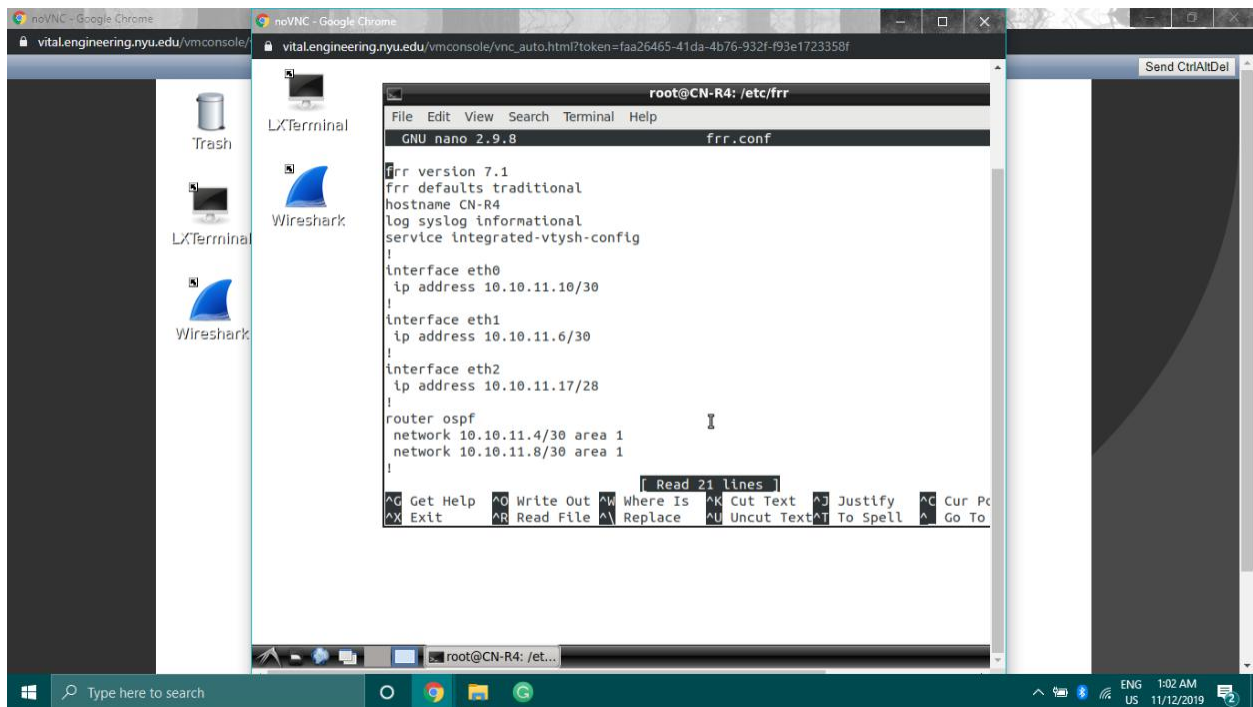
The screenshot shows a terminal window for R2 (CN-R2) running the nano text editor. The file being edited is frr.conf. The configuration includes setting the hostname to CN-R2, enabling syslog, and configuring OSPF on interfaces eth0, eth1, eth2, and eth2. The OSPF networks are 10.10.0/29 area 0, 10.10.11.0/30 area 1, and 10.10.11.4/30 area 1. The terminal also shows a software update notification on the desktop.

```
root@CN-R2: /etc/frr
frr version 7.1
frr defaults traditional
hostname CN-R2
log syslog informational
service integrated-vtysh-config
!
interface <eth0>
ip address 10.10.10/29
!
interface <eth1>
ip address 10.10.9/29
!
interface eth0
ip address 10.10.10/29
ip address 10.10.5/29
!
interface eth1
ip address 10.10.11.1/30
!
interface eth2
ip address 10.10.11.5/30
!
router ospf
network 10.10.0/29 area 0
network 10.10.11.0/30 area 1
network 10.10.11.4/30 area 1
!
line vty
!
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^U Replace ^U Uncut Text ^T To Spell ^_ Go To Line
^M-U Undo
^M-E Redo
```

R2

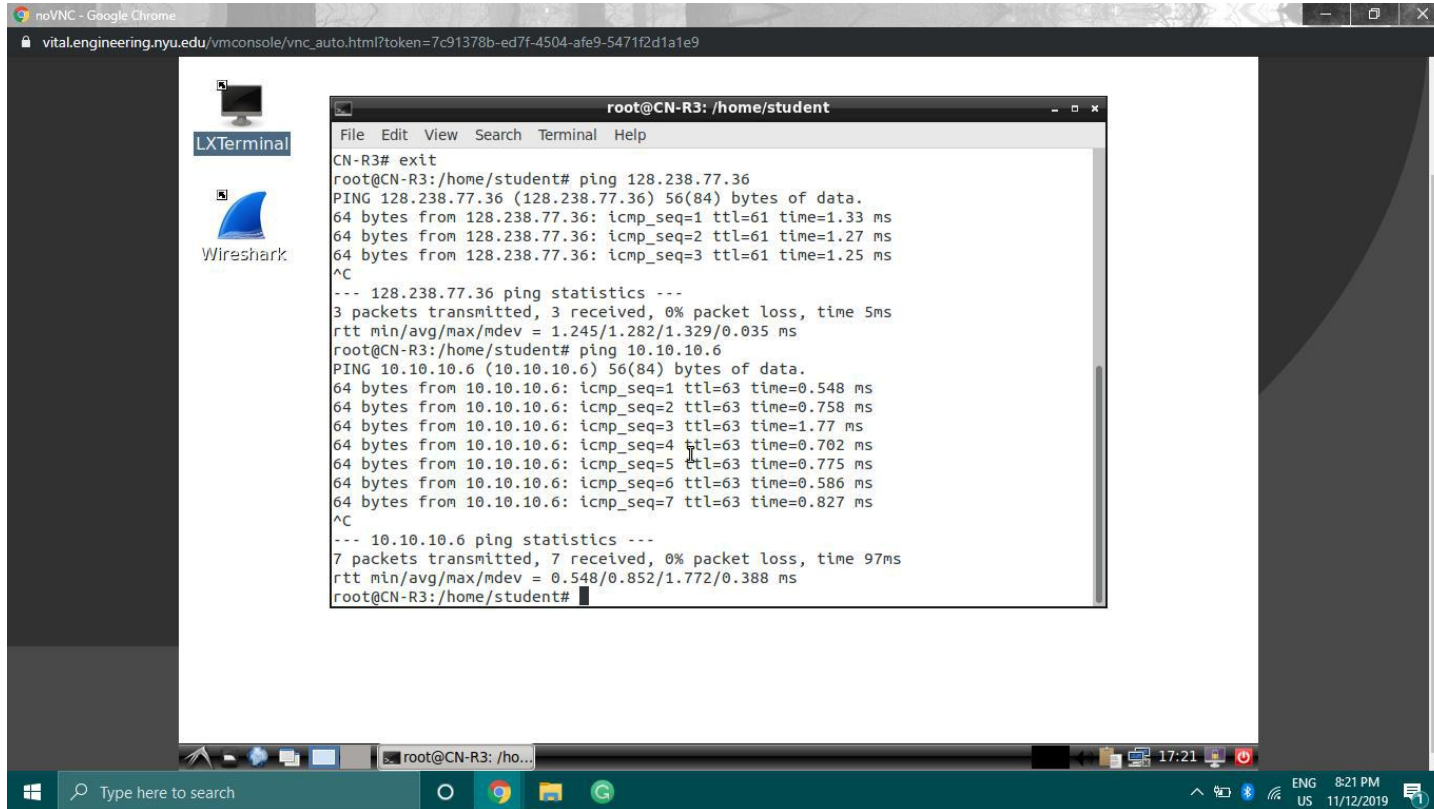


R3



R4

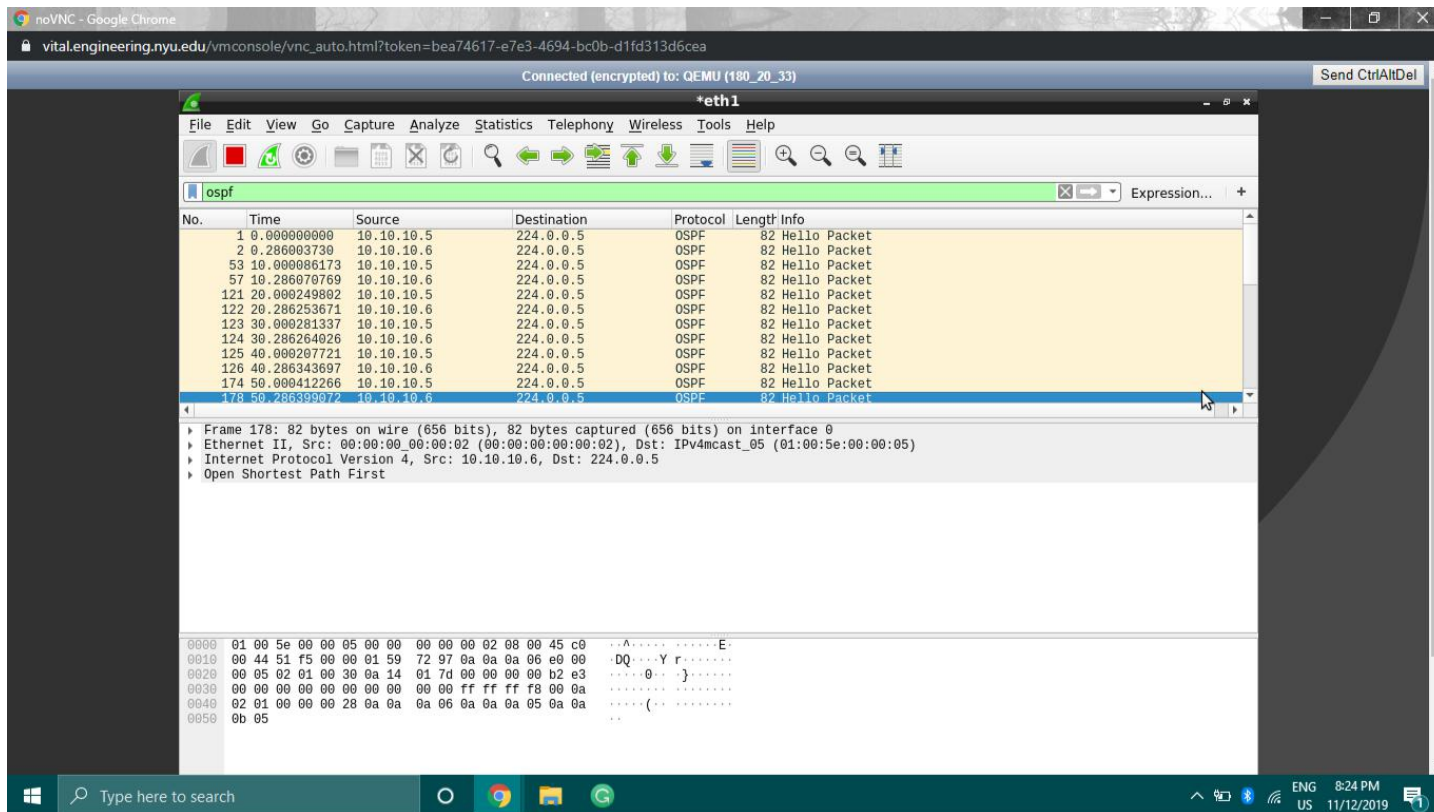
2. ICMP results from R3 to R1



The screenshot shows a VNC session titled "noVNC - Google Chrome" with the URL "vital.engineering.nyu.edu/vmconsole/vnc_auto.html?token=7c91378b-ed7f-4504-afe9-5471f2d1a1e9". The terminal window is titled "root@CN-R3: /home/student" and shows the following output:

```
root@CN-R3: /home/student# ping 128.238.77.36
PING 128.238.77.36 (128.238.77.36) 56(84) bytes of data.
64 bytes from 128.238.77.36: icmp_seq=1 ttl=61 time=1.33 ms
64 bytes from 128.238.77.36: icmp_seq=2 ttl=61 time=1.27 ms
64 bytes from 128.238.77.36: icmp_seq=3 ttl=61 time=1.25 ms
^C
--- 128.238.77.36 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 1.245/1.282/1.329/0.035 ms
root@CN-R3: /home/student# ping 10.10.10.6
PING 10.10.10.6 (10.10.10.6) 56(84) bytes of data.
64 bytes from 10.10.10.6: icmp_seq=1 ttl=63 time=0.548 ms
64 bytes from 10.10.10.6: icmp_seq=2 ttl=63 time=0.758 ms
64 bytes from 10.10.10.6: icmp_seq=3 ttl=63 time=1.77 ms
64 bytes from 10.10.10.6: icmp_seq=4 ttl=63 time=0.702 ms
64 bytes from 10.10.10.6: icmp_seq=5 ttl=63 time=0.775 ms
64 bytes from 10.10.10.6: icmp_seq=6 ttl=63 time=0.586 ms
64 bytes from 10.10.10.6: icmp_seq=7 ttl=63 time=0.827 ms
^C
--- 10.10.10.6 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 97ms
rtt min/avg/max/mdev = 0.548/0.852/1.772/0.388 ms
root@CN-R3: /home/student#
```

3. Wireshark screenshots on R1



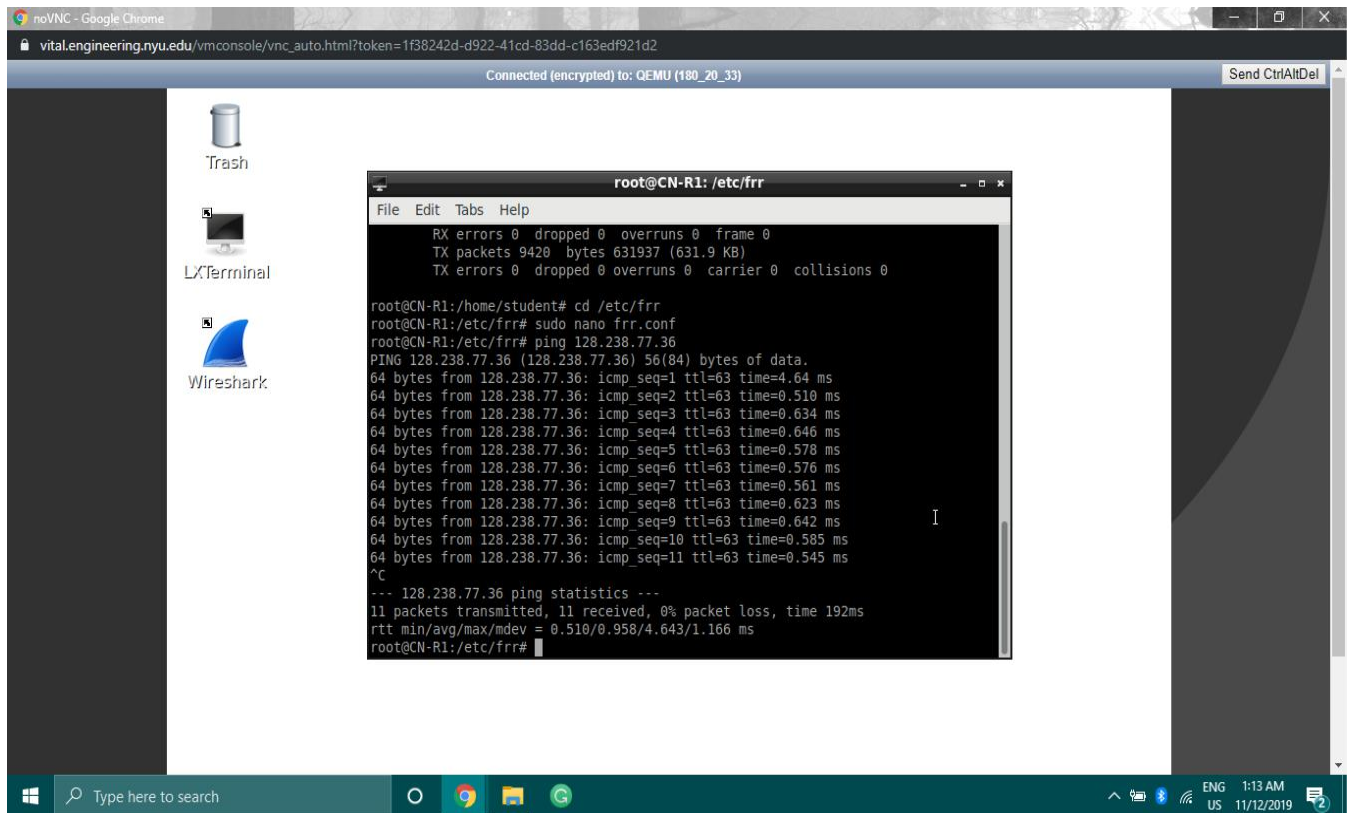
The screenshot shows a Wireshark capture on interface "eth1" (connected to QEMU 180_20_33). The capture filter is "ospf". The packet list shows several OSPF Hello packets from 10.10.10.5 to 224.0.0.5. The selected packet (No. 178) is an OSPF Hello packet. The packet details pane shows the following structure:

- Frame 178: 82 bytes on wire (656 bits), 82 bytes captured (656 bits) on interface 0
- Ethernet II, Src: 00:00:00:00:00:02 (00:00:00:00:00:02), Dst: IPv4mcast_05 (01:00:5e:00:00:05)
- Internet Protocol Version 4, Src: 10.10.10.6, Dst: 224.0.0.5
- Open Shortest Path First

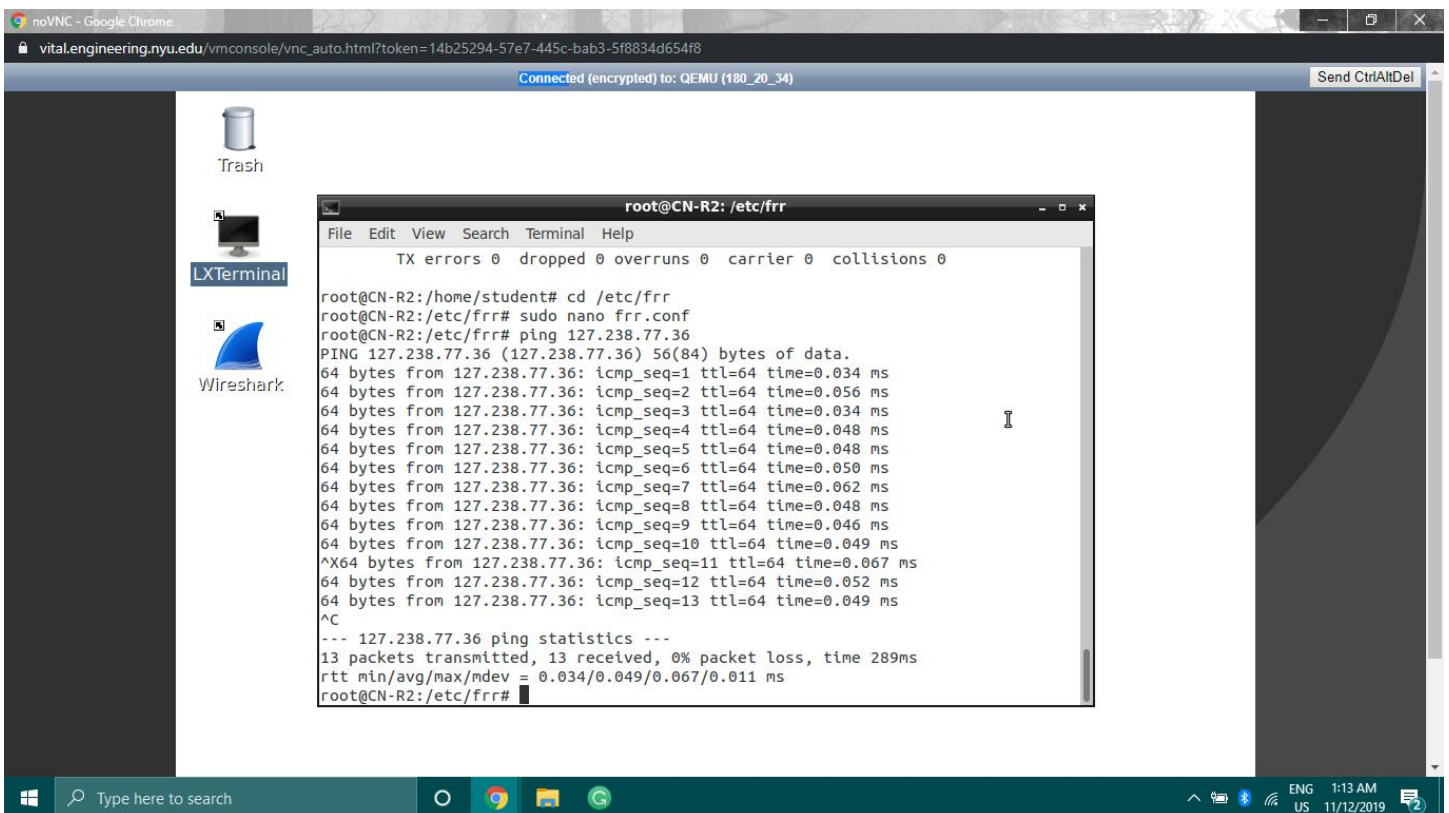
The packet bytes pane shows the raw data of the selected packet:

```
0000 01 00 5e 00 00 05 00 00 00 00 02 00 00 45 c0  ..A.....E..
0010 00 44 51 f5 00 00 01 59 72 97 0a 0a 0a e0 00  ..DQ...Yr.....
0020 00 05 02 01 00 00 0a 14 01 7d 00 00 00 02 e3  ....0...}.....
0030 00 00 00 00 00 00 00 00 00 00 ff ff ff f8 00 0a  ....(.....
0040 02 01 00 00 00 00 28 0a 0a 0a 06 0a 0a 05 0a 0a  ..
0050 0b 05
```

4. Screenshots depicting successful ping requests to the SFTP server (128.238.77.36) from R1, R2, R3, and R4



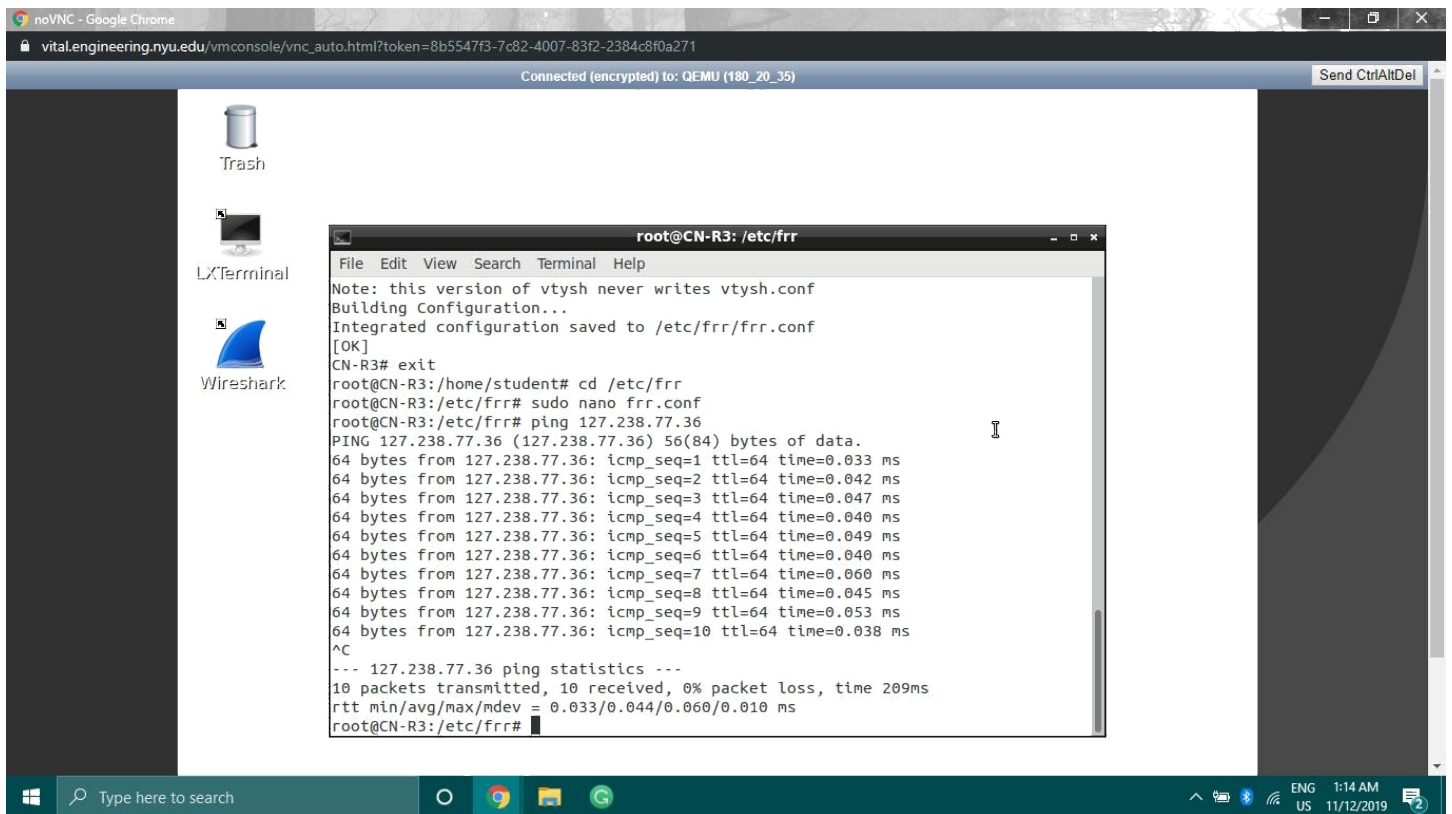
R1



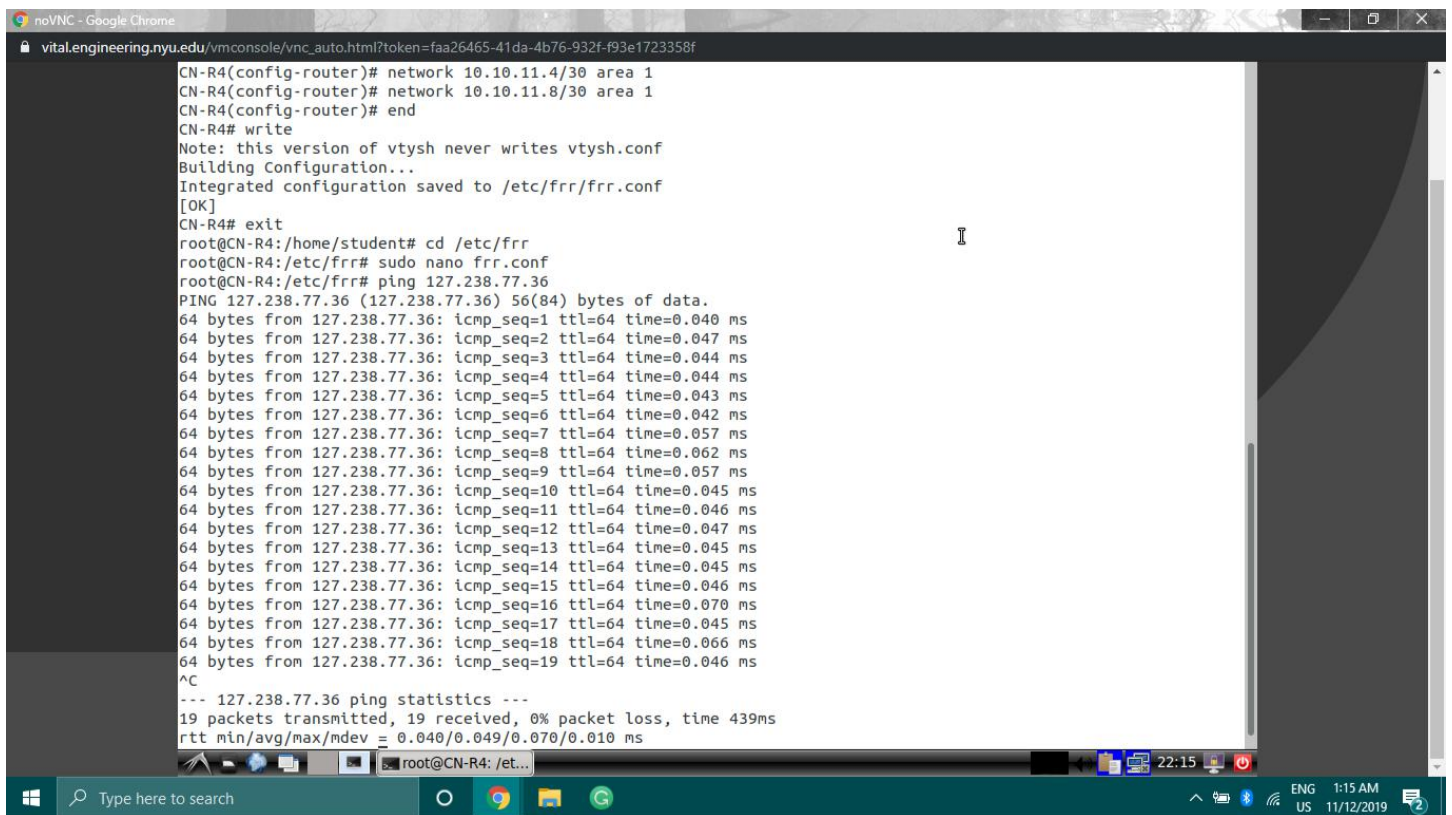
R2

This study source was downloaded by 100000756796733 from CourseHero.com on 02-27-2022 12:20:57 GMT -06:00

<https://www.coursehero.com/file/56774674/ospf-assgdoc/>



R3



R4

Part5: Questions

a) The OSPF hello packets have two timers to check if a neighbor is alive or not. The packets are sent periodically by the routers on all interfaces to form neighbor relationship with routers in the same area and maintain that relationship. These hello packets are multicast on address 224.0.0.5. The two timers are hello interval and router dead interval which are 10 seconds and 40 seconds respectively. Hello interval defines how we send hello packet and router dead interval tells us how long we should wait before declaring a neighbor dead.

b) Link State Update and Link state acknowledgement are messages that communicate to other routers through the multicast in OSPF domain. They are sent from internal routers to announce changes. They communicate with DR/BDR routers on multicast address 224.0.0.6. DR uses 224.0.0.5 multicast address to announce changes.

c) We don't see DB Descriptors and LS requests on R1 because of the fact that these packets are required when a router detects that portions of its topological database are out of date or at the time of initializing an adjacency. That did not happen during the process of lab.

So when there is a new router added to the connection or the neighbor's topological database are out of date we get all the OSPF packet types on R1