IP Interfaces: Part 1

Instructions

You applied to arin.net (American Registry for Internet Numbers) for a block of IP addresses and they very kindly assigned you a super-C address block of 10.10.10.0/23 to use to design your network. For this, you will select IP addresses from 10.10.10.0/24 to configure R1, R2, and Kali in Area 0 as shown in the network diagram.

Since R1, R2, and Kali are connected by the same hub, they are in the same broadcast and collision domain, and therefore have direct access to each other via Ethernet. You will create an IP subnet so that these machines can communicate with each other.

Before configuring your VMs, fill in the table and verify that you have assigned an appropriate subnet for all three VMs. The subnet should be large enough to accommodate Area 0, but **no larger than necessary**. If the subnet is larger than necessary, points will be deducted.

Part 0: Warm Up (not for credit)

a. What is the slash notation representation of 255.255.255.0?

b. What is the dot-decimal representation of /30?

c. What is the smallest subnet size that would accommodate 5 hosts?

d. Fill in the blank cells in the table below (R1 eth0 filled in by Vital system)

VM (interface)	**IP Address** (CIDR Notation)
R1 (eth1)	
R2 (eth0)	
Kali (eth0)	

Part 1: Configuring Network Interfaces

Open a terminal window (**Applications > System Tools > MATE Terminal**) and issue the following commands on both R1 (eth1) and R2 (eth0):

```
sudo su
vtysh
configure terminal
interface <interface name> // interface name can be eth0, eth1, or eth2
ip address x.x.x.w/29 // i.e. IP address and subnet mask (i.e. 192.0.2.130/30)
end
write
exit
```

You may use Linux's **ifconfig** command in order to verify that you have saved your network configuration (see man ifconfig).

Part 2: Configuring Kali

Kali must be configured using the Linux commands:

```
sudo su
nano /etc/network/interfaces (or nano/vi/vim)
```

Your configuration file should have the following entries:

```
auto eth0
iface eth0 inet static

     address x.x.x.w
     netmask A.A.A.B // convert your netmask to octet notation
     network x.x.x.y
     broadcast x.x.x.z
```

Once you have finished, reboot Kali.

Part 3: Questions

a) Why did we choose the /29 subnet mask for Area 0? (10 points)

b) The Linux **`arp`** (see man arp) command will print the current entries in the machine's address resolution protocol table. Now that you have configured Area 0, what entries are currently in R1, R2, and Kali? (10 points)

c) Now ***`ping`*** both R2 and Kali from R1. Note the changes on each machine's ARP tables. At this point, R2 should be aware of R1, but why doesn't R2 have a table entry for Kali? (10 points)

Submissions

[30 pts] Screenshot of the .conf file under /etc/frr/frr.conf from R1 and R2.
[10 pts] Screenshot of the /etc/network/interfaces file in Kali.
[20 pts] Screenshot showing that pinging works between R1, R2, and Kali.
[10 pts] Screenshot of the ARP tables on R1, R2, and Kali.
[30 pts] Answers to questions 3a-3c.