University College

IT Technology

Networking Assignment 11

Authors

Dainty Lyka Bihay Olsen
dlbo28887@edu.ucl.dk

Wednesday 16 December 2020

Table of Contents

1 Introduction

In this report, students will show their capability in explaining the fundamentals of a router and routing, static routes, and subnets. Students will also show 2 different networks each connected to a router, with established communication between the two subnets through the routers.

2 Audience

This document is meant for teachers and fellow students alike, with the intention of receiving peer review from these parties.

3 Inventory

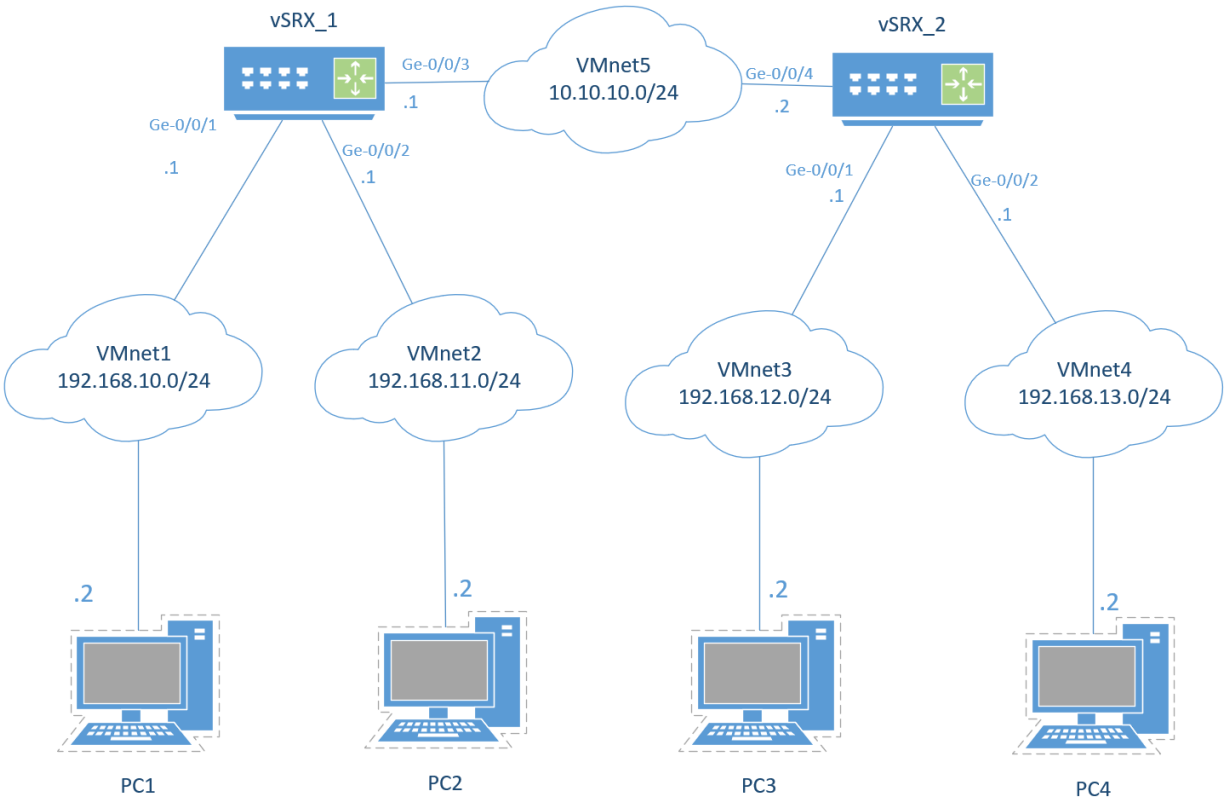
Software:

- VMWare Workstation Pro
  - Xubuntu
  - Juniper router
- Visio
- Putty

Hardware:

- Host machine

4 Network diagram



In the above diagram, we have two routers (vSRX_1 and vSRX_2) with 5 network connections: VMnet1, VMnet2, VMnet3, VMnet4, and VMnet5.
VMnet1 is connected to the Ge-0/0/1 interface of the router (vSRX_1). VMnet2 is connected to the Ge-0/0/2 interface of the router (vSRX_1).
The two routers are connected using Ge-0/0/3 of vSRX_1 router and Ge-0/0/4 interface of router vSRX_2 via VMnet5. The four networks, VMnet1, VMnet2, VMnet3, and VMnet4 each have their own subnet. These subnets have 1 virtual computer connected to PC1, PC2, PC3, and PC4. PC1 is connected to VMnet1 and PC2 is connected to VMnet2. PC3 and PC4 are connected to VMnet3 and VMnet4 respectively.

5 One screenshot and a description of how to configure the srxDC-1 and srxDC-2 routers in VMware. Only include things that are different from assignment 10.

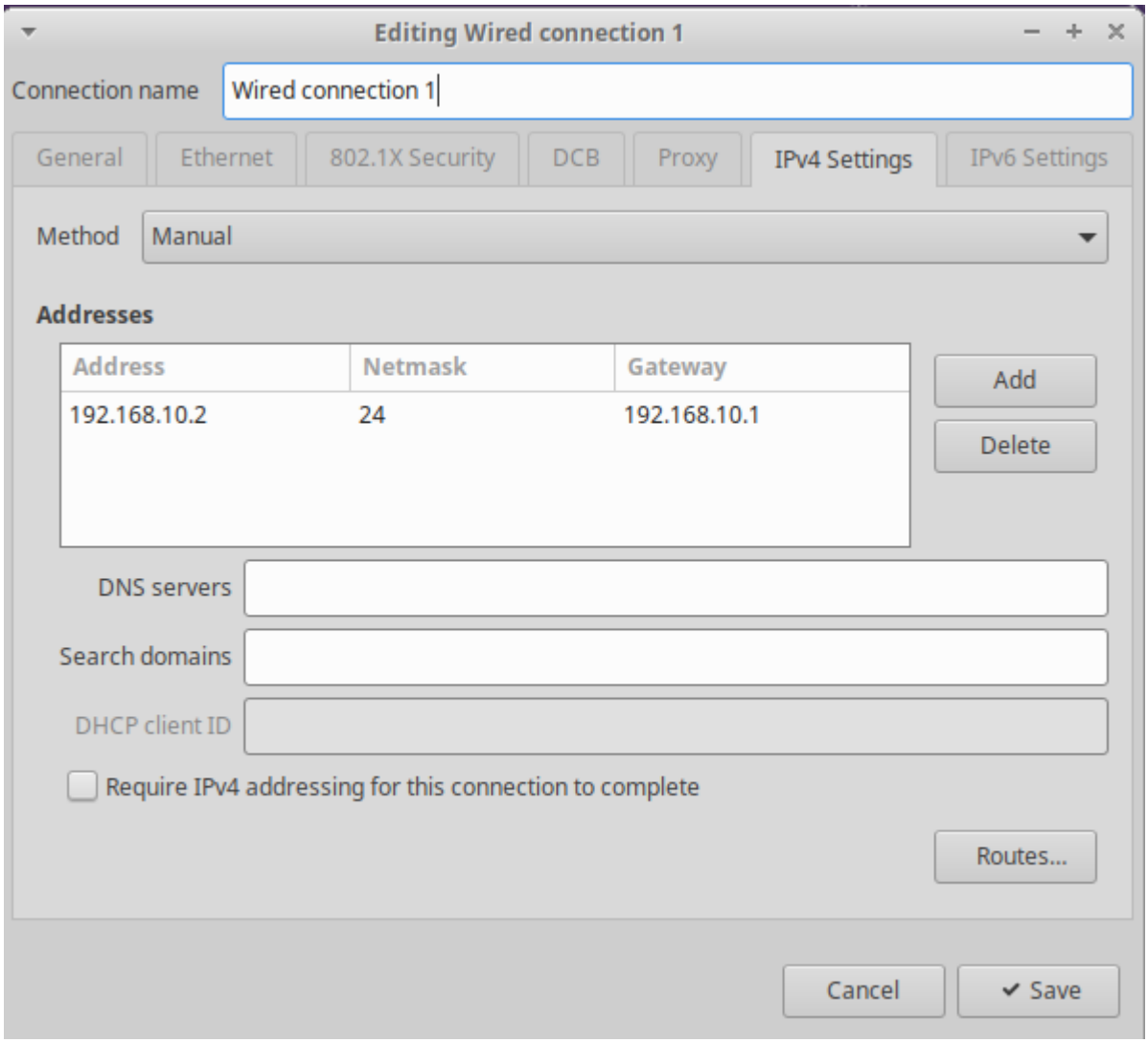
```
[edit]
root@vSRX_1# edit interfaces

[edit interfaces]
root@vSRX_1# show
ge-0/0/0 {
    unit 0;
}
ge-0/0/1 {
    unit 0 {
        family inet {
            address 192.168.10.1/24;
        }
    }
}
ge-0/0/2 {
    unit 0 {
        family inet {
            address 192.168.11.1/24;
        }
    }
}
ge-0/0/3 {
    unit 0 {
        family inet {
            address 10.10.10.1/24;
        }
    }
}
```

In the Putty terminal write: “edit interfaces” then write “show”. Now every interface will be shown, but Ge-0/0/3 interface is needed to connect the two routers via VMnet5 to Ge-0/0/3 of VSRX_1 router interface. This can be done by inserting this command : “set ge-0/0/3 unit 0 family inet address 10.10.10.1/24” (10.10.10.0/24 is the VMnet5). To test if the command is working, simply write “show” in the terminal. Before this is done, type “commit” in the terminal, and ge-0/0/3 is now added in the router.

The same thing should be done with vSRX_2.

6 One screenshot and description of how to Configure the PCs



The first thing to do is to add the right VMnet (network adaptor) for every PC, just like in assignment 10. As shown in the network diagram, PC1 should be connected to VMnet1, PC2 to VMnet2, PC3 to VMnet3 and PC4 to VMnet4. The only difference here is that instead of 2 PCs there are now 4. For every single PC, go to network settings and click on “IPv4 Settings” and under “Method” go choose “Manual” and go enter an IP, netmask, and a gateway. The information according to the PC’s can be found in the section “**Network diagram**”

7 One screenshot, a description and commands on how to configure the srxDC-1 and srxDC-2 routers with static routes between relevant subnets.

```
root@vSRX_1# run show route terse

inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination        P Prf   Metric 1   Metric 2  Next hop         AS path
* 10.10.10.0/24      D   0                       >ge-0/0/3.0
* 10.10.10.1/32      L   0                        Local
* 192.168.10.0/24    D   0                       >ge-0/0/1.0
* 192.168.10.1/32    L   0                        Local
* 192.168.11.0/24    D   0                       >ge-0/0/2.0
* 192.168.11.1/32    L   0                        Local
* 192.168.12.0/24    S   5                       >10.10.10.2
* 192.168.13.0/24    S   5                       >10.10.10.2
```

To configure the SRX1 and SRX2 routers with static routes between subnets, we first need to assign static IP addresses to both routers:

```
edit interfaces
```

This command will take you to the interface of the router we are configuring. For SRX1 we will be using this command:

```
set static route 192.168.12.0/24 next-hop 10.10.10.2

Set static route 192.168.13.0/24 next-hop 10.10.10.2
```

On the second router, SRX2, we will be doing the same thing:

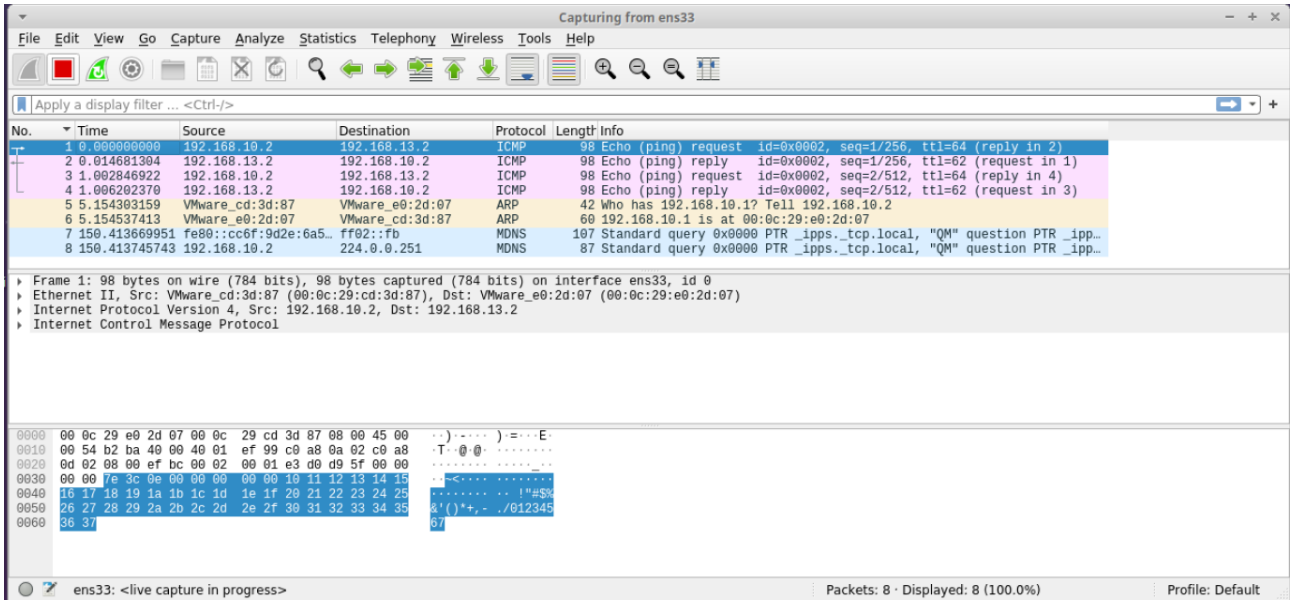
```
Set static route 192.168.10.0/24 next-hop 10.10.10.1

Set static route 192.168.11.0/24 next-hop 10.10.10.1
```

The command commit will be used to save the configuration settings:

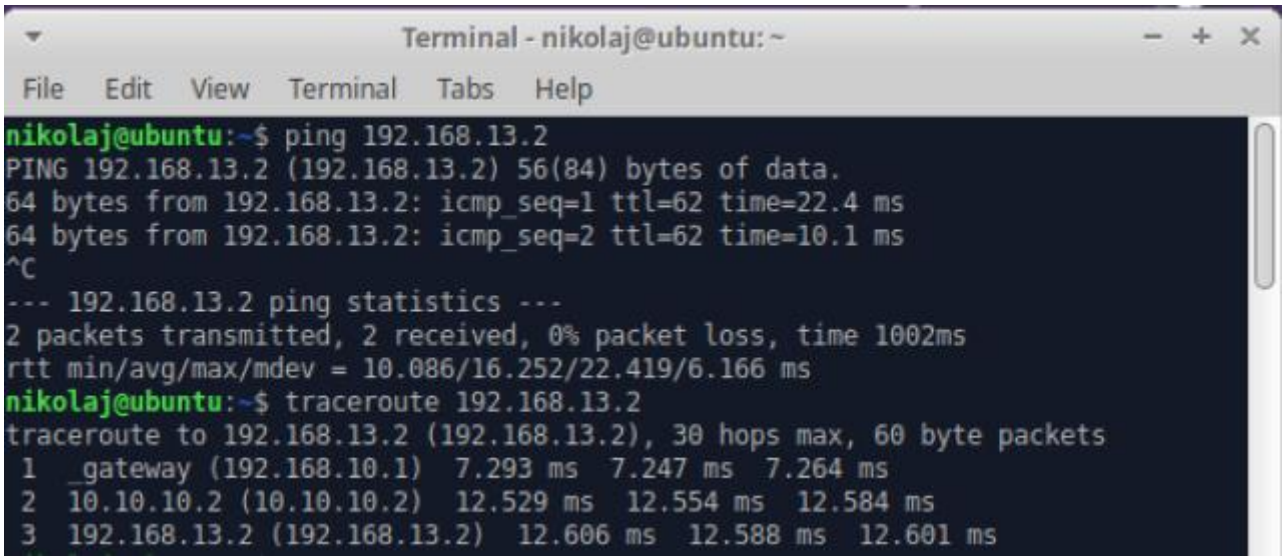
```
commit.
```

8 Use Wireshark and run the ping command and show one screenshot/description that proves that the routing between subnets is working. Possibly comment on layer2 and layer3 addresses. If relevant: Show how ping was used for troubleshooting.



In the screenshot, a ping command was used to check connection between the subnets. Four packets were sent in the ping request from the host, and four Echo reply messages were sent back to the host from the destination with the delay time(millisec). We also have ARP messages. In the above screenshot also shows both ip addresses which are layer 3 addresses and mac addresses which are layers 2 addresses.

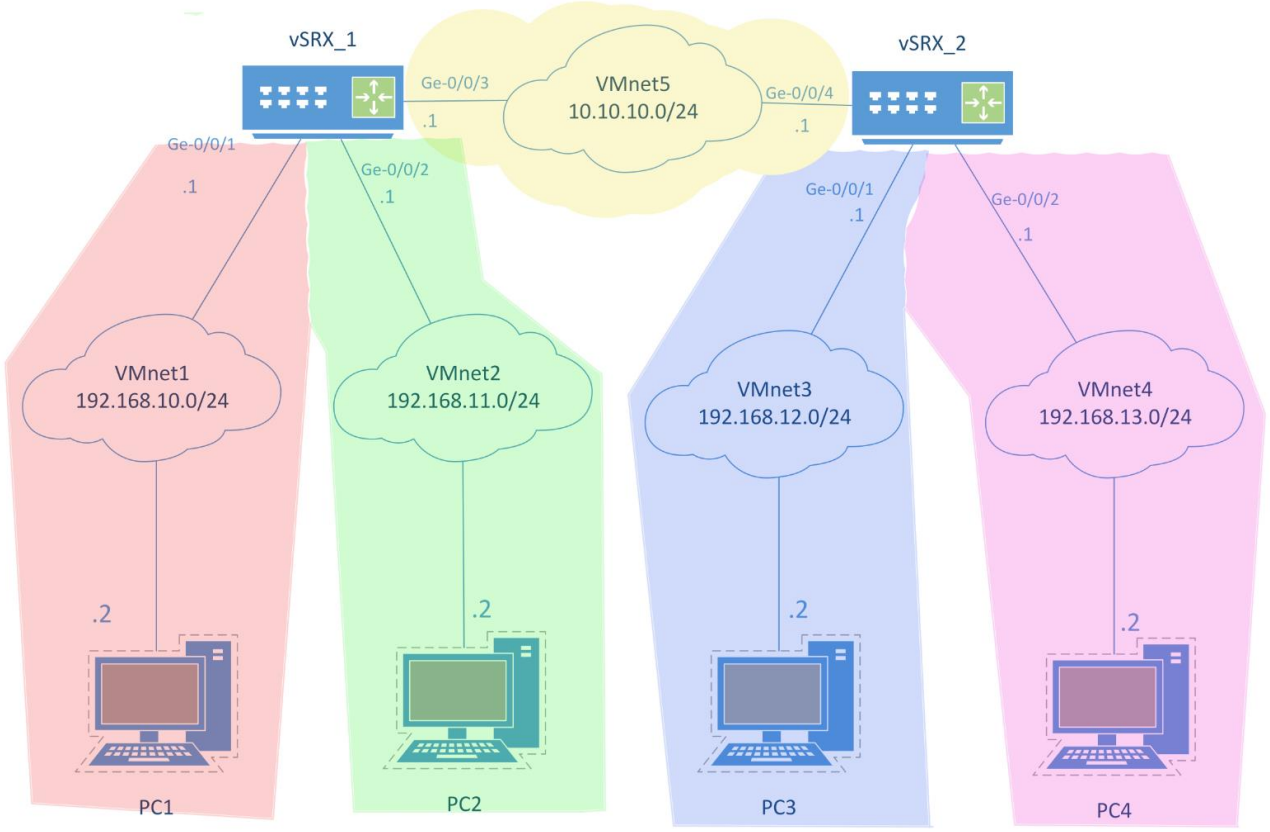
9 Run the traceroute command and show one screenshot/description that proves that the routing between subnets is working. If relevant, then show how traceroute was used for troubleshooting.



In the screenshot above, the traceroute command was run, and output the route to one of the other virtual machines in our network.
First jump is to router 1 (192.168.10.1), Second jump is to router 2 (10.10.10.2), and finally, the third jump is to our destination machine (192.168.13.2).

In the first column it shows the number of devices it takes to reach our destination, which is hop count. In the screenshot there are 3 counts. The next 3 columns show the round trip time. Last column shows the IP addresses of each router/device on the way.

10 Describe and show on a/the topology diagram how many Broadcast domains there are in the topology. Challenge: Show some proof of broadcast domains. Hint: Broadcast ping



In the screenshot above, we have five broadcast domains, vSRX1 has 2 interfaces and each interface is a broadcast domain and the interfaces are connected to VMnet1 and VMnet2 these switches are connected to PC1 and PC2 respectively.

vSRX2 has 2 interfaces and each interface is a broadcast domain and the interfaces are connected to VMnet3 and VMnet4 these switches are connected to PC3 and PC4 respectively.

The final broadcast domain is VMnet5 which connects to the 2 routers together ie. vSRX1 and vSRX2. Remember each port on a switch is a collision domain and the entire switch is a broadcast domain.