Group Assignment 1 - Group Lab Activity 1

TNE10006/TNE60006 Semester January, 2023

Assignment Weight:

5%

Assignment Points:

50

Submission Due Date:

By the start of Lab Session Week 5.

Reference Material:

- Lab SU-5a Configuring Per-Interface Inter-VLAN Routing
- Lab SU-5b – Configuring 802.1Q Trunk-Based Inter-VLAN Routing

Instructions:

1. Form a group of 3-4 people amongst the students present in the lab session
2. Your group discussion time will be in the last 20 minutes of the lab session in Collaborate Ultra, Breakout groups.
3. Discuss and answer the questions in Group Assignment 1 in your breakout group.
4. Organise for your group to meet again to complete all the questions.
5. Each group will submit one completed Group Assignment 1
6. Submit Group Assignment 1, in the Canvas shell, under the Group Lab Activity 1
7. Late penalties will apply for submission after the due date.

Group Assignment 1 Questions:

- Section 1: Lab SU-5a Configuring Per-Interface Inter-VLAN Routing (15 marks)
- Section 2: Lab SU-5b – Configuring 802.1Q Trunk-Based Inter-VLAN Routing (9 marks)
- Section 3: Reflection on Labs SU-5a and SU-5b (26 marks)

Group Assignment 1:

Group Members	
Name	**Student Id:**
Ton Tri Trung	**103808977**
Nguyen Dang Khanh Toan	**103487389**
Nguyen Ha Huy Hoang	**103487444**

Section 1: Lab SU-5a Connectivity Scenarios (15 marks)

Q1. After completing steps 1 – 3 in **Part 2 Configure Switches with VLANs and Trunking of Lab SU-5a**

a) Did S3 and S4 ping each other? Yes/No? If yes, explain why? If no, explain why not.
(1 mark)

Yes because these 2 switches are connected with a trunk link (not enough, how about ip also??).

b) Would S3 ping PC-A? Yes/No? If yes, explain why? If no, explain why not
(1 mark)

Yes because they are in the same network (192.168.10.0) and same vlan10

c) Would S3 ping PC-B? Yes/No? If yes, explain why? If no explain why not
(1 mark)

No because PC-B are not on the same subnet as S3 (PC-B: 192.168.20.0, S3: 192.168.10.0).

d) Would S4 ping PC-A? Yes/No? If yes, explain why? If no, explain why not
(1 mark)

Yes Because S4 can communicate with S3 and on the same subnet with PC-A. (192.168.10.0)

e) Would PC-A ping PC-B? Yes/No? If yes, explain why? If no explain why not
(1 mark)

No because PC-B and PC-A not on the same subnet (PC-B: 192.168.20.0, PC-A: 192.168.10.0).

Q2. After completing Step 3 in **Part 3: Basic Router Configuration of Lab SU-5a**

a) How many directly connected networks (C) were there in R1's routing table? If any, list them.
(2 marks)

```
Gateway of last resort is not set

     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0/1
L       192.168.10.1/32 is directly connected, GigabitEthernet0/0/1
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.20.1/32 is directly connected, GigabitEthernet0/0/0
```

There are 2 direct connected networks: 192.168.10.0 and 192.168.20.0

b) Would all devices now be able to ping each other? Give reasons for your answer.
(2 marks)

The router has the ability to forward packet to different network => act as the midman to connect every device in the network

c) When PC-A pings PC-B, would this traffic traverse R1? Yes/No? If yes, explain why. If no, explain why not.
(1 mark)

Yes because PC-A cannot directly connect to VLAN 20 is where PC-B connect to and PC-A is not on the same subnet with PC-B

d) When PC-A pings S3, would this traffic traverse R1? Yes/No? If yes, explain why. If no, explain why not.
(1 mark)

No because PC-A can directly communicate to S3 since they are on the same subnet

Q3. If you shutdown port Gi0/0/1 on R1:

a) How many directly connected (C) networks would there be in R1's routing table? If any, list them.
(2 marks)

```
Gateway of last resort is not set

     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.20.1/32 is directly connected, GigabitEthernet0/0/0

R1#
```

The network on g0/0/0 is available.

b) Would S3 and S4 still ping each other? Yes/No? If yes, explain why. If no, explain why not.
(1 mark)

Yes because they are on the same subnet (192.168.10.0) and have trunking configure on their connected port (because S4 have 2 VLANs on it)

c) Would PC-A and PC-B still ping each other? Yes/No? If yes, explain why. If no, explain why not.
(1 mark)

No because the router does not have connection to VLAN 10 => PC-A cannot connect to router.

Section 2: Lab SU-5b Connectivity Scenarios (9 marks)

Q1. After completing steps 1 – 4 in **Part 2 Configure Switches with VLANs and Trunking of lab SU-5b**

a) How many directly connected (C) networks are there in R1's routing table? If any, list them.
(2 marks)

```
Gateway of last resort is not set

     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0/1.99
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0/1.99
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0/1.10
L       192.168.10.1/32 is directly connected, GigabitEthernet0/0/1.10
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0/1.20
L       192.168.20.1/32 is directly connected, GigabitEthernet0/0/1.20
     209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.224/27 is directly connected, Loopback0
L       209.165.200.225/32 is directly connected, Loopback0
 --More--
```

G0/0/1.99 => vlan 99: 192.168.1.0/24

G0/0/1.10=> vlan 10: 192.168.10.0/24

G0/0/1/20 => vlan 20: 192.168.20.0/24

Lt0 => loopback : 209.165.200.224 /27

b) Would S3 ping PC-A? If yes, would this traffic traverse R1?
(1 mark)

Yes S3 can ping PC-A but it will through R1 since they are on different subnet in lab 5b

c) Would S3 ping PC-B? If yes, would this traffic traverse R1?
(1 mark)

Yes , the packet will travel through R1 because they are on different subnet

d) Would S4 ping PC-A? If yes, would this traffic traverse R1?
(1 mark)

Yes , the packet will travel through R1 because they are on different subnet

e) Would PC-A ping PC-B? If yes, would this traffic traverse R1?
(1 mark)

Yes , the packet will travel through R1 because they are on different subnet

f) What was the purpose of pinging S3 and S4 using the *source* option from R1?
(1 mark)

To prove that inter-VLAN routing is working properly by proving that every subinterfaces and interfaces of diffferent VLANs can access to switch S3 and S4 which are switches of different network.

Q2. If you shutdown port Gi0/0/1 on R1,

a) How many directly connected (C) networks would there be in R1's routing table? If any, list them.
(2 marks)

```
Gateway of last resort is not set

     209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.224/27 is directly connected, Loopback0
L       209.165.200.225/32 is directly connected, Loopback0

R1#
```

There will be only 1 left:

209.165.200.224/27

Section 3: Reflection on Labs SU-5a and SU-5b (26 marks)

In this section you will need to reflect on what you have learned and apply that knowledge

Q1. Answer the following questions regarding IP settings on layer 2 switches.

a) On a layer 2 switch, what is the purpose of creating an interface VLAN and allocating and IP address to it?
(2 marks)

Interface VLAN was configured to support the inter VLAN communication process. This will form a link with the router interface specifically for that VLAN so the router will

know the route to these VLAN. This also means that those VLAN will need an IP address so the router will know destination of the packet belong to which VLAN network.

b) On a layer 2 switch, what is the purpose of configuring a default gateway?
(2 marks)

To communicate to layer 3 devices (router) to communicate with other networks of in different subnet and VLAN.

c) Based on what you learned on labs SU-5a and SU-5b, which IP address should be configured as the default gateway IP on layer 2 switches?
(2 marks)

The ip address of interfaces and subinterfaces of the router that are on the same subnet with that switch.

Q2. Answer the following questions regarding inter-vlan routing configuration.

a) In labs SU-5a and SU-5b, you used two different approaches to configuring inter-vlan routing. Explain the difference(s) between the two.
(6 marks)

- In lab 5a, we configure the network into the traditional form (1 interface for 1 VLAN) but in lab 5b we configure the network in router-on-the-stick form (subinterface).

- The router in lab 5a will only need to forward the packet, lab 5b will need to check the existing subinterface to find the subinterface with the same network of the destination

b) When configuring a router-on-a-stick topology, the link between the switch and the router must carry traffic for multiple VLANs. How is this achieved on the router? How is this achieved on the switch?
(4 marks)

Router need to be divided into multiple sub interface with encapsulation. All the connected switches and router need to be connected to each other via trunk mode ports.

c) What are the benefits of using the “router-on-a-stick” topology for inter-vlan routing? (6 marks)

- Can connect multiple vlans to 1 port with sub interface, all vlan packets will be sent to router

- The router can use 1 physical interface to create more logical interfaces => 1 physical interface can be used => save cost, save router interfaces.

d) Are there any disadvantages to using “router-on-a-stick” inter-vlan routing as compared to the per-interface approach?
(2 marks)

- It has less redundancy since all vlan traffic now will need to pass through router, so if router has problem, all the network will be down.

- More complex to configure in comparison to per-interface approach.

- router-on-a-stick has problem with bandwidth contention.

e) Other than directly connected (C) networks, did you observe any other type of networks in R1’s routing table? If yes, specify what type of networks were there and what do they represent.
(2 marks)

There are L type networks beside C network connected to R1. This network type represents the IP address of the router interfaces that receive the packet from the same C network.