# 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:**

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| **Group Members** | |
| **Name** | **Student Id:** |
| **Ta Quang Tung** | **s104222196** |
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**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**

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

S3 and S4 can ping each other because they are connected to the same network portion and through a trunk's logical and physical connection.

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

S3 cannot ping PC-A because they are in different network portions and there is not any configuration for the default gateway of the router so the information from the S3 cannot find the final destination.

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

S3 can ping PC-B because they are connected to the same network portion and through a trunk's logical and physical connection

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

S4 can ping PC-A because they are connected to the same network portion and through a trunk's logical and physical connection

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

PC-A cannot ping PC-B because they are in different network portions and there is not any configuration for the default gateway of the router so the information from PC-A cannot find the final destination.

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

* + 1. How many directly connected networks (C) were there in R1’s routing table? If any, list them.   
       (2 marks)

There are 2 directly connected (C) networks in R1’s routing table which are

- 192.168.10.3/24

- 192.168.20.3/24

* + 1. Would all devices now be able to ping each other? Give reasons for your answer.   
       (2 marks)

All devices now will be able to ping each other as some still have the same network portions and also they are now connected to a router that has configured default gateway allowing inter-Vlan communication so the information ping from a device can find the final destination.

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

Because the router has been configured default gateway which enables inter-Vlan communication. Despite having different network portions, PC-A and PC-B can now ping each other through the router

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

As PC-A and S3 have the same network portions. When PC-A pings S3, a traffic traverse to R1 is not needed.

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

* + 1. How many directly connected (C) networks would there be in R1’s routing table? If any, list them.   
       (2 marks)

There is one directly connected network in R1’s routing table which is 192.168.20.0/24

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

S3 and S4 can still ping each other because they are in the same network portions and do not need to ping through the configured router.

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

As port gigabit ethernet 0/0/1 is disabled traffic cannot flow to VLAN 10.

**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**

* + 1. How many directly connected (C) networks are there in R1’s routing table? If any, list them.  
       (2 marks)

4 directly connected networks are present in R1’s routing table. They are:

* 192.168.1.0/24 attached to GigabitEthernet0/0/1.99 interface.
* 192.168.10.0/24 attached to GigabitEthernet0/0/1.10 interface.
* 192.168.20.0/24 attached to GigabitEthernet0/0/1.20 interface.
* 209.165.200.0/24 attached to Loopback0 interface.
  + 1. Would S3 ping PC-A? If yes, would this traffic traverse R1?  
       (1 mark)

Yes, S3 can ping PC-A. The traffic will go through R1 because S3 and PC-A are on different networks (192.168.1.0/24 vs. 192.168.10.0/24).

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

Yes, S3 can ping PC-B. The traffic will go through R1 because S3 and PC-B are on different networks (192.168.1.0/24 vs. 192.168.20.0/24).

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

Yes, S4 can ping PC-A. The traffic will go through R1 because S4 and PC-A are on different networks (192.168.1.0/24 vs. 192.168.10.0/24).

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

Yes, PC-A can ping PC-B. The traffic will go through R1 because PC-A and PC-B are on different networks (192.168.10.0/24 vs. 192.168.20.0/24).

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

This allows us to send pings from sub-interfaces on R1 to S3 and S4, providing a way to test if the networks associated with the sub-interfaces can communicate with S3 and S4. Successful pings indicate that inter-VLAN routing has been correctly set up and is running as expected.

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

* + 1. How many directly connected (C) networks would there be in R1’s routing table? If any, list them.   
       (2 marks)

Just one directly connected network would be present. It is 209.165.200.0/24 - the network associated with the Loopback0 interface, which is separated from port Gi0/0/1.

**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.

* + 1. On a layer 2 switch, what is the purpose of creating an interface VLAN and allocating and IP address to it?  
       (2 marks)
* Allocating the IP address to an interface VLAN of a switch can help us manage the switch remotely (eg: ping, ssh, telnet,…)
  + 1. On a layer 2 switch, what is the purpose of configuring a default gateway?   
       (2 marks)
* Configuring the default gateway of the layer 2 switch can help the switch forward the data out of the local network by sending the data to the default gateway IP address.
  + 1. 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 configured as the default gateway IP on layer 2 switches should be on the same network portion as the interface IP address of the layer 2 switches.

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

* + 1. 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 use the legacy inter-VLAN routing method; in lab 5b, we use the router-on-a-stick inter-VLAN routing method.
* The legacy inter-VLAN routing method required each router interface must be connected to the access port of the switch, which mean that each port can only carry the traffic from one VLAN.
* The router-on-a-stick inter-VLAN routing method only required one trunk port connected to the router interface, which mean that one port can carry the traffic from multiple VLAN.
  + 1. 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)
* On the router, this link is achieved by creating multiple sub-interfaces and assigning each VLAN to these sub-interfaces.
* On the switch, this link is achieved by making the port linking between the router and switch become the trunk port to carry multiple VLAN traffic
  + 1. What are the benefits of using the “router-on-a-stick” topology for inter-vlan routing?  
       (6 marks)
* The router-on-a-stick topology helps to reduce the number of wiring between the layer 2 switches to the router, which save a lot of money.
  + 1. Are there any disadvantages to using “router-on-a-stick” inter-vlan routing as compared to the per-interface approach?   
       (2 marks)
* The main drawback is bandwidth being shared with multiple VLANs so data transmission can be a little bit slower. Besides that, the setup for this method is more complex.
  + 1. 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)
* The type of the remaining network is the local network representing the IP address of the interface.