TNE10006

Networks and switching

Assignment 5A: Team lab activity worksheet 1

Reference Material:

* Lab 5A: Configuring per interface inter-VLAN routing
* Lab 5B: Configuring 802.1Q trunk-based inter-VLAN routing

Instructions:

1. Form a team in the Teaming up for Assignment 5 discussion in Week 4.
2. Complete the Week 5 lab individually.
3. Discuss and answer the questions in Assignment 5A: Team activity 1 within your team.
4. Organise for your team to meet again to complete all the questions.
5. Each team-member will submit a completed Assignment 5A: Team activity 1 through the Assignment 5A: Team lab activity 1 submission point.

Questions:

* Section 1: Lab 5A: Configuring per interface inter-VLAN routing (15 marks)
* Section 2: Lab 5B: Configuring 802.1Q trunk-based inter-VLAN routing (9 marks)
* Section 3: Reflection on Labs 5A and 5B(26 marks)

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Section 1: Lab 5A: Configuring per interface inter-VLAN routing (15 marks)

Q1. After completing steps 1–3 answer the following questions:

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

* Yes, because the interface Gig1/0/5 of S3 and S4 have been trunking so they can communicate each other’s.  
  b) Would S3 ping PC-A? Yes/No? If yes, explain why? If no, explain why not. (1 mark)
* Yes, because the interface Gig1/0/7 has been allocated access port to S3-vlan 10 (Student).

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

* Yes, because the communication will reach to the Router and then Router will forward the packet via the port Gig0/0/0 to the destination S4 and then S4 use the interface Gig1/0/24 to communicate with PC-B. Without Router S3 could not be able to communicate with the PC-B.

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

* Yes, Like the above answer. The S4 will send the frame via the interface Gig1/0/12 to the interface Gig0/0/0 of the Router and then the Router will use the interface Gig0/0/1 forward the packet via the interface Gig0/0/1 to the interface Gig1/0/11 to the S3. S3 will use the interface Gig1/0/7 communicate with the PC-A.

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

* Yes, Because S3 can communicate with the PC-B and PC-A can communicate with the S3. Finally, PC-A can communicate with the PC-B. Without Router they could not communicate each other’s.

Q2. After completing Step 3 in Part 3: basic router configuration, answer the following questions:

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

* By doing this we type the command: show Ip router. It will be displayed connected networks. In this case we have 2 connected networks.
* The Ip address 192.168.10.1/24 has connected to S3 – Vlan 10
* The Ip address 192.168.20.1/24 has connected to S4 – Vlan 20

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

* Yes, the router provides the means to connect all networks.

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)

* Yes. The router is required as able for PCs from different SWs to communicate. The router will forward the packet directly to the destination. In order to deliver a packet to a destination, a router needs to know Ip address and SM.

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

* No, PC-A use the interface Gig1/0/7 which has been allocated access port to S3-vlan10. It will not traverse to Router.

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)

* The network 192.168.10.0/24 will be disconnected and only one network as 192.168.20.0/24 is directly connected, GigabitEthernet0/0/0.

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

* Yes, they communicate over the trunk route.

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

* Yes, they are free now to communicate each other’s. Because they have Router to forward the packet to destination. Without Router is impossible.

Section 2: Lab 5B: Connectivity scenarios (9 marks)

Q1. After completing steps 1–4 in Part 2 configure switches with VLANs and trunking, answer the following questions:

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

* There are 4 networks directly connected with the Router like:
* Text

  Description automatically generated with medium confidence

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

* Yes, the traffic will traverse through R1.
* Text

  Description automatically generated

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

* Yes the traffic will traverse through R1.
* Text, letter

  Description automatically generated

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

Yes, the traffic will traverse through R1.

Text

Description automatically generated

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

* Yes, the traffic will traverse through R1.
* Graphical user interface

  Description automatically generated with low confidence

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

* The extended ping command helps R1 knows about the S3 and S4 networks (in other words, that it knows where to send packets destined for the S3, S4 networks, and it could be used to identify any routing problems in the path.

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

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

* There is only 1network directly connected with the Router like:
* Text

  Description automatically generated with medium confidence

Section 3: Reflection on Labs 5A and 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)

* To create a new IP local network on the switch.
* To permit IP packets to be forwarded by the switch.
* To enable remote access to the switch to manage it.
* To enable the switch to route packets between networks.

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

* The default gateway is the path to get off your network. if a host connected to a particular switch needs to send traffic to a host that is not in the same local subnet, the host will realize the destination is not in the same subnet and will send the traffic to the default gateway. The default gateway is a router connected to the switch.

1. Based on what you learned on labs 5A and 5B, which IP address should be configured as the default gateway IP on layer 2 switches? (2 marks)

* The default gateway is the first Layer 3 device (such as a router) on the same management VLAN network to which the switch connects.
* Another point as simple way to configure default gateway IP on layer 2 switches is we can use any usable Ip address of that range but should not be duplicated.

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

1. In labs 5A and 5B, you used two different approaches to configuring inter- VLAN routing. Explain the difference(s) between the two. (6 marks)

* [Legacy inter-VLAN routing](about:blank#legacy-inter-vlan-routing) and [Router-on-a-stick](about:blank#router-on-a-stick)
* Legacy vlan routing uses multiple router interfaces for connecting to a switch port in different VLANs. These interfaces are served as default gateways, which requires additional cabling when the network must be expanded. This will cost more expensive because more physical hardware required.
* With Router on a stick one physical interface port is used for routing the traffic between the network segments. Sub interfaces for each vlan are established on the one port on the router interface. This method is simple to implement and used for small to medium-sized networks. This will cost less than Legacy because not much required physical hardware but will slow down the traffic.

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 sub interface for each vlan on the port is stablished. Sub-interfaces to a Router are similar to what [Trunk ports](about:blank#trunk_port) are to a Switch – one link carrying traffic for multiple VLANs. Hence, each router Sub-interface must also add a [VLAN tag](about:blank#tagged-untagged) to all traffic leaving that interface.
* On the switches a trunk port is established to carry all the vlan traffic. You need to specify which vlan is allowed over the trunk route.

1. What are the benefits of using the ‘router-on-a-stick’ topology for inter-VLAN routing? (6 marks)

* The process of running a router on a stick is easy and very manageable.
* This method is used for running multiple VLANs over a single connection without the need of a layer 3 switch.
* It cuts down the flow of traffic and further assists in stopping sensitive traffic from flowing within the network.
* It also allows networks not to be tied to a specific physical location which increases the security of sensitive data that is managed or forward within a network.
* Can increase the number of networks without compromising physical space by decreasing the size of network.

1. Are there any disadvantages to using ‘router-on-a-stick’ inter-VLAN routing as compared to the per-interface approach? (2 marks)

* Better and modern alternative available with L3 switches that offer larger bandwidth as well as consistent functionality.
* Higher chances of bottlenecking since traffic goes over router twice.
* No backup available if the one router goes down.

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)

* Local network. Local routes are automatically created whenever an interface is configured with an IP address and activated