# Group Assignment 2 - Group Lab Activity 2

TNE10006/TNE60006 S2 2024

**Assignment Weight:**   
7.5%

**Assignment Points:**   
75

**Submission Due Date:**

Week 12 Lab Session

**Reference Material:**

* Sample Final Practical Assessment (available in Canvas Lab Sessions page, Week 11 tab)

**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 60 minutes of the lab session.
3. Organise for your group to meet again to complete all the questions.
4. Each group will submit one completed Group Assignment 2
5. Submit Group Assignment 2, in the Canvas shell, under the Group Lab Activity 2
6. Late penalties will apply for submission after the due date.

**Group Assignment 2 Sections:**

* Section 1: Sample Final Practical Assessment – Topology and Specs Analysis (15 marks)
* Section 2: Sample Final Practical Assessment – Configuration (35 marks)
* Section 3: Sample Final Practical Assessment – Validation and Troubleshooting (25 marks)

**Group Assignment 2 Members Information:**

|  |  |
| --- | --- |
| **Name** | **Student Id:** |
| **Truong Ngoc Gia Hieu** | **SWS01217** |
| **Duong Nguyen Dang** | **SWS01389** |
| **Pham Nguyen Minh Hoang** | **SWS01442S** |
| **Pham Dinh Duc AnhS** | **SWS01484** |

**Section 1: Sample Final Practical Assessment – Topology and Specs Analysis  
(15 marks)**

When tasked to build a network end to end, you should first take some time to analyse the topology diagram, addressing tables and other specifications to understand the basic network requirements.

Refer to the Sample Final Practical Assessment.

Q1. How many VLANs MUST be configured on the switches? (3 marks)

1. On Lisbon? Please specify VLAN(s) ID

* On Lisbon, there are three VLANs must be configured on two switches including VLAN 15 (Centralbank), VLAN 50 (Royalmint), and VLAN 150 (Management)

1. On Tokyo? Please specify VLAN(s) ID

* On Tokyo, there are three VLANs must be configured on both switches including VLAN 15 (Centralbank), VLAN 50 (Royalmint), and VLAN 150 (Management)

Q2. How many access ports MUST be configured on the switches? (3 marks)

1. On Lisbon? Please specify switchport to VLAN ID allocation.

* On Lisbon:

+ Gi1/0/7-10: Access ports, assigned to VLAN 15 (Centralbank).

+ Gi1/0/11-13: Access ports, assigned to VLAN 50 (Royalmint).

1. On Tokyo? Please specify switchport to VLAN ID allocation.

* According to the question, there is no access port for the Tokyo switch

Q3. How many 802.1q trunks MUST be configured on the switches? (3 marks)

1. On Lisbon? Please specify interface(s) ID.

* On Lisbon, there are two ports which 802.1q trunks must be configured on the switch including GigabitEthernet1/0/5 and GigabitEthernet1/0/6:

+ Gi1/0/5: Trunk port, allowing VLANs 15, 50, and 150.

+ Gi1/0/6: Trunk port, allowing VLANs 15, 50, and 150.

1. On Tokyo? Please specify interface(s) ID.

* On Tokyo, there are three ports which 802.1q trunks must be configured on the switch including GigabitEthernet1/0/5, GigabitEthernet1/0/6, and GigabitEthernet1/0/11

Q4. How many sub-interfaces MUST be configured on Nairobi? Please specify sub-interface(s) ID.   
(3 marks)

-> There are three sub-interfaces must be configured on Nairobi:

-> Sub-interface IDs:

* Gi0/0/1.15 (for VLAN 15)
* Gi0/0/1.50 (for VLAN 50)
* Gi0/0/1.150 (for VLAN 150)

Q5. How many interfaces VLAN MUST be configured on the switches? (2 marks)

1. On Lisbon? Please specify interface(s) ID.

* On Lisbon, there is one interface must be configure on the switch which is the VLAN 150 (Management)

1. On Tokyo? Please specify interface(s) ID.

* On Tokyo, there is one interface must be configure on the switch which is the VLAN 150 (Management)

Q6. Do we need to set a default-gateway on the switches? If YES, specify the default-gateway IP to be configured. (1 mark)

-> Yes, we need to set a default-gateway on the switches because a default gateway is necessary for the switches to communicate with devices outside their directly connected VLANs, especially for management.

-> The deafult gateway is 55.252.16.241

**Section 2: Sample Final Practical Assessment - Configuration   
(35 marks)**

After you have a good understanding of the network topology and basic network requirements, you can move on to configuring the devices following a systemic procedure.

Refer to the Sample Final Practical Assessment.

Q1. List the configuration commands required to complete **Task 1: Configure Device Names and MOTD**. For each command, specify the device(s) and operation mode.(2 marks)

Router Nairobi:

Router> ena

Router# config t

Router(config)# host Nairobi

Nairobi(config)# banner motd +studentID+

Switch Tokyo:

Switch> ena

Switch# config t

Switch(config)# host Tokyo

Tokyo(config)# banner motd +studentID+

Switch Lisbon:

Switch> ena

Switch# config t

Switch(config)# host Lisbon

Lisbon(config)# banner motd +studentID+

Q2. List the configuration commands required to complete **Task 2: Configure VLANs and VLAN membership**. For each command, specify the device(s) and operation mode. (6 marks)

- Tokyo Switch:

Tokyo(config)# vlan 15

Tokyo(config-vlan)# name Centralbank

Tokyo(config-vlan)# exit

Tokyo(config)# vlan 50

Tokyo(config-vlan)# name Royalmint

Tokyo(config-vlan)# exit

Tokyo(config)# vlan 150

Tokyo(config-vlan)# name Management

- Lisbon switch:

Lisbon(config)# vlan 15

Lisbon(config-vlan)# name Centralbank

Lisbon(config-vlan)# exit

Lisbon(config)# vlan 50

Lisbon(config-vlan)# name Royalmint

Lisbon(config-vlan)# exit

Lisbon(config)# vlan 150

Lisbon(config-vlan)# name Management

Lisbon(config)# interface range gi1/0/7 - 10

Lisbon(config-if-range)# switchport mode access

Lisbon(config-if-range)# switchport access vlan 15

Lisbon(config-if-range)# exit

Lisbon(config)# interface range gi1/0/11 - 13

Lisbon(config-if-range)# switchport mode access

Lisbon(config-if-range)# switchport access vlan 50

Lisbon(config-if-range)# exit

Q3. List the configuration commands required to complete **Task 3: Configure Router-on-a-Stick**. For each command, specify the device(s) and operation mode. (8 marks)

- VLAN 15: 213.17.144.254/25

- VLAN 50: 165.45.191.254/19

- VLAN 150: 55.252.16.254/28

Nairobi:

Nairobi(config)# int g0/0/1

Nairobi(config-if)# no shutdown

Nairobi(config)# int g0/0/1.15

Nairobi(config-subif)# encap dot1q 15

Nairobi(config-subif)# ip address 213.17.144.254 255.255.255.128

Nairobi(config)# int g0/0/1.50

Nairobi(config-subif)# encap dot1q 50

Nairobi(config-subif)# ip address 165.45.191.254 255.255.224.0

Nairobi(config)# int g0/0/1.150

Nairobi(config-subif)# encap dot1q 150

Nairobi(config-subif)# ip address 55.252.16.254 255.255.255.240

Nairobi(config-if)# int lo0

Q4. List the configuration commands required to complete **Task 4: Configure Switch Management**. For each command, specify the device(s) and operation mode. (6 marks)

Q5. List the configuration commands required to complete **Task 5: Fine-tune STP**. For each command, specify the device(s) and operation mode. (4 marks)

Tokyo:

Tokyo> en

Tokyo# conf t

Tokyo(config)# spanning-tree vlan 50 root primary

Lisbon:

Lisbon> en

Lisbon# conf t

Lisbon(config)# spanning-tree vlan 15 root primary

Lisbon(config)# spanning-tree portfast default

Q6. List the configuration commands required to complete **Task 6: Configure Port-Security.** For each command, specify the device(s) and operation mode. (4 marks)

Lisbon switch:

Lisbon> en

Lisbon# conf t

Lisbon(config)# int gi1/0/3

Lisbon(config-if)# switchport port-security violation protect

Lisbon(config-if)# switchport port-security maximum 2

Lisbon(config-if)# switchport port-security mac-address sticky

Q7. List the configuration commands required to complete **Task 7: Configure EtherChannel**. For each command, specify the device(s) and operation mode. (4 marks)

Tokyo:

Tokyo> ena

Tokyo# conf t

Tokyo(config)# int range gi1/0/5 – 6

Tokyo(config-if-range)# channel-group 1 mode active

Tokyo(config-if-range)# no shut

Lisbon:

Lisbon> en

Lisbon# conf t

Lisbon(config)# int range gi1/0/5 – 6

Lisbon(config-if-range)# channel-group 1 mode active

Lisbon(config-if-range)# no shut

All Switches:

Switch> en

Switch# conf t

Switch(config)# int port-channel 1

Switch(config-if)# switchport mode trunk

Switch(config-if)# switchport trunk native vlan 150

Q8. List the configuration commands required to complete **Task 8: Additional Settings.** For each command, specify the device(s) and operation mode. (1 mark)

Nairobi:

Nairobi> en

Nairobi# conf t

Nairobi(config)# int gi0/0/1

Nairobi(config-if)# description Physical Port

Nairobi(config)# int gi0/0/0

Nairobi(config-if)# description Unused

Have given description to other interfaces already in task 3-router on a stick

All Switches:

Switch> en

Switch# conf t

Switch(config)# line console 0

Switch(config-line)# logging synchronous

Switch(config)# line vty 0 15

Switch(config-line)# logging synchronous

**Section 3: Sample Final Practical Assessment - Validation and Troubleshooting   
(25 marks)**

Upon completing your configuration, you should validate all settings using troubleshooting commands, such as Cisco **show** commands. You should also run connectivity tests using ICMP tools, such as **ping**.

Refer to the Sample Final Practical Assessment.

Q1. Answer the following questions regarding validating and troubleshooting **VLANs and VLAN membership.**

* + 1. What command(s) can be used on **Tokyo** to validate VLANs and VLAN membership configuration? For each command, describe the expected output. (2 marks)

There are two main ways of showing and validating VLANs and VLAN membership:

+ Show vlan: This command will display information about all configured VLANs on the switch.

+ Show interfaces switchport: This command will display detailed information about all  
switch’s interfaces, including their VLAN membership and Native VLAN.

* + 1. What command(s) can be use on **Lisbon** to validate VLANs and VLAN membership configuration? For each command, describe the expected output. (2 marks)

As well as Tokyo one, there are two main ways of showing and validating VLANs and VLAN membership:

+ Show vlan: This command will display information about all configured VLANs on the switch.

+ Show interfaces switchport: This command will display detailed information about all switch’s interfaces, including their VLAN membership and Native VLAN.

* + 1. What command(s) can be use on **Lisbon** to validate that all unused ports have been disabled? For each command, describe the expected output. (2 marks)

Show interface status: this command will display the status of all interfaces, if the interface is connected meaning that it is in use, if it is unconnected meaning that it is not in use, and if it is disabled meaning that it is disabled.

Q2. Answer the following question regarding validating and troubleshooting **Router-on-a-Stick**

* + 1. What command(s) can be used on **Nairobi** to validate Router-on-a-Stick configuration? List at least 2. For each command, describe the expected output. (4 marks)

To verify Router-on-a-Stick on Nairobi, we can use the following:

+ Show interfaces: display detailed information about all router interfaces, including their status, description as well as information about sub-interfaces of the router, if our sub-interfaces are connected and trunking then it is working normally.

+ Show IP route: displays the router’s routing table, we can verify our configuration by looking at the routing entries for each VLAN network.

* + 1. What command(s) can be used on **Tokyo** to validate Router-on-a-Stick configuration? For each command, describe the expected output. (2 marks)

Show interfaces gi1/0/11 switchport: this command will display detailed information about gi1/0/11, if it is enabled and on trunking mode with the correct encapsulation, then it is working normally.

* + 1. Troubleshooting Scenario: The routing table on **Nairobi** is not displaying all the correct connected (C) routes and their exit interfaces.

What are the possible configuration issues? List at least 3 possible issues. (3 marks)

There are 3 possible issues:

+ Incorrect interface configuration: If the router interface is shut down or if it is not configured with a correct IP address and subnet mask, the router will not be able to add the connected routes to the routing table.

+ Incorrect VLAN configuration: If the VLAN configuration on the switch is incorrect, for example configuring the incorrect VLAN ID or encapsulation protocol for a sub-interface, the router may not be able to display the correct connected networks.

+ Bad mask or incorrect calculation of IP addresses: If there is a mistake in the calculation of subnet mask or IP allocation, the route table will not be able to display the correct routes.

Q3. Answer the following questions regarding validating and troubleshooting **Switch Management**

* + 1. What command(s) can be used on **Tokyo** to validate that the Management IP has been correctly configured? For each command, describe the expected output. (1 mark)

There are 2 ways:

+ Show ip int br: this command will show all the interfaces and active vlan with its IP addresses, so using this command will give us information of whether Management IP is correctly allocated.

+ Show running-config: this command will display the running configuration of all interfaces on a switch and we can see if Tokyo is allocated with the correct Management IP on its according VLAN.

* + 1. What command(s) can be used on **Tokyo** to test SSH access to **Lisbon**? (1 mark)

Tokyo# ssh -l cisco 55.252.16.240

* + 1. Troubleshooting Scenario: **Tokyo** and **Lisbon** can ping each other. **Tokyo** can ping all IP addresses configured on **Nairobi**. However, **Lisbon** can only ping the IP address configured on **Nairobi’s** Management sub-interface; it cannot ping any other router IP.

What is the most likely configuration issue? (2 marks)

The most likely configuration issue might be that Lisbon does not have the VLAN associated with Nairobi’s other sub-interfaces in VLAN 15 and 50.

Q4. Answer the following questions regarding validating and troubleshooting **STP, Port-Security and EtherChannel**

* + 1. Using the ***show spanning-tree*** command, how do we validate that **Tokyo** has been correctly configured as the root bridge for the Royalmint VLAN? (2 marks).

When we use show spanning-tree command and look at the information for VLAN 50, if the root ID and bridge ID of VLAN 50 have the MAC address of Tokyo or if it says that ‘This bridge is the root’ then we have correctly configured this option.

* + 1. What command can be used on **Lisbon** to validate the current Port-Security status of interface Gi1/0/7? (2 marks)

Lisbon#show port-security

* + 1. If the Port-Channel between **Tokyo** and **Lisbon** has been correctly configured and is fully operational; what should be the status flag(s) next to the Port-Channel interface on the ***show etherchannel summary*** output? (1 mark)

It should be (SU) meaning that the port channel is in Layer 2 and is currently in use.

* + 1. If the Port-Channel between **Tokyo** and **Lisbon** has been correctly configured and is fully operational; what should be the status flag(s) next to the member interfaces on the ***show etherchannel summary*** output? (1 mark)

It should be (P) meaning that the member interfaces are bundled in port-channel.