

## Group Assignment 2 - Group Lab Activity 2

TNE10006/TNE60006 S2 2023

**Assignment Weight:**

7.5%

**Assignment Points:**

75

**Submission Due Date:**

By the start of Week 12 Lab session.

**Reference Material:**

- Sample Final Practical Assessment (available in Canvas Lab Sessions page, Week 6a 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 in Collaborate Ultra, Breakout groups.
3. Discuss and answer the questions in Group Assignment 2 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 2
6. Submit Group Assignment 2, in the Canvas shell, under the Group Lab Activity 2
7. 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:**

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## 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)

- a) On Lisbon? Please specify VLAN(s) ID  
-> Three. They are VLAN15, VLAN50, VLAN150
- b) On Tokyo? Please specify VLAN(s) ID  
-> Three. They are VLAN15, VLAN50, VLAN150

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

- a) On Lisbon? Please specify switchport to VLAN ID allocation.
  - Gi1/0/1-3 belong to VLAN 15
  - Gi1/0/11-13 belong to VLAN 50
- b) On Tokyo? Please specify switchport to VLAN ID allocation.  
-> None

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

- a) On Lisbon? Please specify interface(s) ID.
  - Gi1/0/5, Gi1/0/6 MUST be configured Trunk
- b) On Tokyo? Please specify interface(s) ID.
  - Gi1/0/5, Gi1/0/6, Gi1/0/11 MUST be configured Trunk

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

-> Three. They are Gi0/0/1.15, Gi0/0/1.50, Gi0/0/1.150

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

- a) On Lisbon? Please specify interface(s) ID.  
-> VLAN150-Management Vlan

- b) On Tokyo? Please specify interface(s) ID.  
-> VLAN150-Management Vlan

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 both default gateway for 2 switches.
- For Switch Lisbon, the default gateway IP is: 55.252.16.254 255.255.255.224
- For SwitchTokyo, the default gateway IP is: 55.252.16.254 255.255.255.224

## 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)*

```
Router>en
```

```
Router#conf t
```

```
Router(config)#hostname Nairobi
```

```
Nairobi(config)#banner motd + *****
```

```
** Tran Quoc Toan Student ID 104196518 **
```

```
** This is Group Lab Activity 2 of TNE10006 **
```

```
***** +
```

```
Nairobi(config)exit
```

*(Switch 3)*

```
Switch>en
```

```
Switch#conf t
```

```
Switch(config)#hostname Tokyo
```

```
Tokyo(config)#banner motd + *****
```

```
** Tran Quoc Toan Student ID 104196518 **
```

```
** This is Group Lab Activity 2 of TNE10006 **
```

```
***** +
```

```
Tokyo(config)exit
```

*(Switch 4)*

```
Switch>en
```

```
Switch#conf t

Switch(config)#hostname Lisbon

Lisbon(config)#banner motd + *****

** Tran Quoc Toan Student ID 104196518 **

** This is Group Lab Activity 2 of TNE10006 **

***** +

Lisbon(config)#exit
```

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)

*(Switch 3 - Tokyo)*

```
Tokyo#conf t

Tokyo(config)#vlan 15

Tokyo(config-vlan)#name Centralbank

Tokyo(config-vlan)#vlan 50

Tokyo(config-vlan)#name Royalmint

Tokyo(config-vlan)#vlan 150

Tokyo(config-vlan)#name Management

Tokyo(config-vlan)#exit

Tokyo(config)#int vlan 15

Tokyo(config-if)#no shut

Tokyo(config-if)#int vlan 50

Tokyo(config-if)#no shut

Tokyo(config-if)#int vlan 150

Tokyo(config-if)#no shut

Tokyo(config-if)#end
```

*(Switch 4 - Lisbon)*

```
Lisbon#conf t
```

```
Lisbon(config)#vlan 15

Lisbon(config-vlan)#name Centralbank

Lisbon(config-vlan)#vlan 50

Lisbon(config-vlan)#name Royalmint

Lisbon(config-vlan)#vlan 150

Lisbon(config-vlan)#name Management

Lisbon(config-vlan)#exit

Lisbon(config)#int vlan 15

Lisbon(config-if)#no shut

Lisbon(config-if)#int vlan 50

Lisbon(config-if)#no shut

Lisbon(config-if)#int vlan 150

Lisbon(config-if)#no shut

Lisbon(config-if)#exit

Lisbon(config)#int range g1/0/1-24

Lisbon(config-if-range)#shutdown

Lisbon(config-if-range)#exit

Lisbon(config)#int range g1/1/1-4

Lisbon(config-if-range)#shutdown

Lisbon(config-if-range)#exit

Lisbon(config)#int range g1/0/1-3

Lisbon(config-if-range)#no shut

Lisbon(config-if-range)#description Centralbank VLAN

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

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

Lisbon(config-if-range)#exit

Lisbon(config)#int range g1/0/11-13
```

```
Lisbon(config-if-range)#no shut  
  
Lisbon(config-if-range)#description Royalmint VLAN  
  
Lisbon(config-if-range)#switchport mode access  
  
Lisbon(config-if-range)#switchport access vlan 50  
  
Lisbon(config-if-range)#end
```

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)

*(Router - Nairobi)*

```
Nairobi#conf t  
  
Nairobi(config)#int g0/0/1  
  
Nairobi(config-if)#no shut  
  
Nairobi(config-if)#exit  
  
Nairobi(config)#int lo0  
  
Nairobi(config-if)#description Loopback test interface  
  
Nairobi(config-if)#ip address 53.15.30.33 255.255.255.248  
  
Nairobi(config-if)#exit  
  
Nairobi(config)#int g0/0/1.15  
  
Nairobi(config-if)#description Connection to Centralbank VLAN  
  
Nairobi(config-if)#encapsulation dot1Q 15  
  
Nairobi(config-if)#ip address 213.17.144.254 255.255.255.128  
  
Nairobi(config-if)#exit  
  
Nairobi(config)#int g0/0/1.50  
  
Nairobi(config-if)#description Connection to Royalmint VLAN  
  
Nairobi(config-if)#encapsulation dot1Q 50  
  
Nairobi(config-if)#ip address 165.45.191.254 255.255.224.0  
  
Nairobi(config-if)#exit  
  
Nairobi(config)#int g0/0/1.150
```



```
Nairobi(config-if)#description Connection to Management VLAN

Nairobi(config-if)#encapsulation dot1Q 150

Nairobi(config-if)#ip address 55.252.16.254 255.255.255.240

Nairobi(config-if)#end
```

### *(Switch 3 - Tokyo)*

```
Tokyo#conf t

Tokyo(config)#int range g1/0/5-6

Tokyo(config-if-range)#no shut

Tokyo(config-if-range)#switchport mode trunk

Tokyo(config-if-range)#exit

Tokyo(config)#int g1/0/11

Tokyo(config-if)#no shut

Tokyo(config-if)#switchport mode trunk

Tokyo(config-if)#exit

Tokyo(config)#ip default-gateway 55.252.16.254

Tokyo(config)#end
```

### *(Switch 4 - Lisbon)*

```
Lisbon#conf t

Lisbon(config)#int range g1/0/5-6

Lisbon(config-if-range)#no shut

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

Lisbon(config-if-range)#exit

Lisbon(config)#ip default-gateway 55.252.16.254

Lisbon(config)#end
```

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)

*(Switch 3 – Tokyo)*

```
Tokyo#conf t
Tokyo(config)#int vlan 150
Tokyo(config-if)#ip address 55.252.16.253 255.255.255.240
Tokyo(config-if)#exit
```

*(Switch 4 – Lisbon)*

```
Lisbon#conf t
Lisbon(config)#int vlan 150
Lisbon(config-if)#ip address 55.252.16.252 255.255.255.240
Lisbon(config-if)#exit
Lisbon(config)#ip domain-name ccna.lab
Lisbon(config)#crypto key generate rsa general-key mod 1024
Lisbon(config)#username cisco privilege 15 secret cisco
Lisbon(config)#line vty 0 15
Lisbon(config-line)#transport input ssh
Lisbon(config-line)#login local
Lisbon(config-line)#end
```

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)

*(Switch 3 – Tokyo)*

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

```
Tokyo(config)#end

(Switch 4 - Lisbon)

Lisbon#conf t

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

Lisbon(config)#int range g1/0/1-3

Lisbon(config-if-range)#spanning-tree portfast

Lisbon(config)#int range g1/0/11-13

Lisbon(config-if-range)#spanning-tree portfast

Lisbon(config-if-range)#end
```

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)

```
(Switch 4 - Lisbon)

Lisbon#conf t

Lisbon(config)#int g1/0/3

Lisbon(config-if)#switchport port-security

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

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

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

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

```
(Switch 3 - Tokyo)

Tokyo#conf t

Tokyo(config)#int range g1/0/5-6

Tokyo(config-if-range)#no shut

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

Tokyo(config-if-range)#exit
```

```
Tokyo(config)#int port-channel 1

Tokyo(config-if)#switchport mode trunk

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

Tokyo(config-if)#end

(Switch 4 - Lisbon)

Lisbon#conf t

Lisbon(config)#int range g1/0/5-6

Lisbon(config-if-range)#no shut

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

Lisbon(config-if-range)#exit

Lisbon(config)#int port-channel 1

Lisbon(config-if)#switchport mode trunk

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

Lisbon(config-if)#end
```

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

```
(Router - Nairobi)

Nairobi#en

Nairobi#conf t

Nairobi(config)#int lo0

Nairobi(config-if)#description Loopback test interface

Nairobi(config-if)#exit

Nairobi(config)#int g0/0/1.15

Nairobi(config-if)#description Connection to Centralbank VLAN

Nairobi(config-if)#exit

Nairobi(config)#int g0/0/1.50
```

```
Nairobi(config-if)#description Connection to Royalmint VLAN

Nairobi(config-if)#exit

Nairobi(config)#int g0/0/1.150

Nairobi(config-if)#description Connection to Management VLAN

Nairobi(config-if)#end

(Switch 3 - Tokyo)

Tokyo#conf t

Tokyo(config)#line con 0

Tokyo(config-line)#logging synchronous

Tokyo(config-line)#end

(Switch 4 - Lisbon)

Lisbon#conf t

Lisbon(config)#line con 0

Lisbon(config-line)#logging synchronous

Lisbon(config-line)#end
```

## Section 2: 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**.

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

1. -> Tokyo# show ip interface brief
2. -> Tokyo# show vlan brief

1. Show all ip interfaces, including the VLANs configured on the switch. Should see VLAN15, 50, 150

2. Show all VLAN on device and the port associated with each one. Should see VLAN15, 50, 150

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

1. -> Lisbon# show ip interface brief
2. -> Lisbon# show vlan brief

1. Show all ip interfaces, including the VLANs configured on the switch. Should see VLAN15, 50, 150

2. Show all VLAN on device and the port associated with each one. Should see VLAN15, 50, 150 as well as all the ports associated with VLAN15 and 50

- c) 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)

-> Lisbon#show ip interface brief

Show all the interfaces that are in the Lisbon switch, ports from g1/0/1-24 and g1/1/1 - 4 should all be administratively down, except ports from g1/0/1 - 3 & g1/0/11 - 13.

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

- a) 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)
1. -> Nairobi# show interface trunk
  2. -> Nairobi# show ip interface brief
  3. -> Nairobi# show ip route
1. Show all the trunked ports configured on the router. Which should show g0/0/1.
  2. Show all the interfaces as well as sub interfaces of the router. Which should show all the ip interfaces and show g0/0/1 is up.
  3. This output shows connected routes for networks directly connected to the router's interfaces and static routes configured manually
- b) What command(s) can be used on **Tokyo** to validate Router-on-a-Stick configuration? For each command, describe the expected output. (2 marks)
1. -> Tokyo# show interface trunk
  2. -> Tokyo# show vlan brief
1. Show all the trunked ports configured on the router. Which should show g1/0/5 - g1/0/6 (Lisbon connection) and g1/0/11 (Nairobi connection).
  2. Show all VLAN on device and the port associated with each one. Should see VLAN15, 50, 150 and trunked ports should not appear.
- c) 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)
- > Configuration issue while configuring router-on-a-stick or subinterfaces issues.
  - > Trunk configuration issues.
  - > Missing VLAN configuration.

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

- a) 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)
1. -> show ip int br
  2. -> show running-config
1. This command will show all the interface and active vlan with its ip addresses, so this command will let us see whether Management IP is correctly allocated.

2. 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 VLAN.

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

-> Tokyo#ssh -l cisco 55.252.16.253

- c) 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 is Nairobi's routing table missing Lisbon's network or routing misconfiguration regarding Lisbon's network..

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

- a) 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 the show spanning-tree command, it will show all the information about the spanning tree on the switch, when we look at the information for Vlan50, if the root id and bridge id of Vlan 50 has the MAC address of tokyo. It will say This bridge is the root.

- b) What command can be used on **Lisbon** to validate the current Port-Security status of interface Gi1/0/3? (2 marks)

-> Lisbon# show port-security interface g1/0/3

- c) 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 used

- d) 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 .