Group Assignment 2 - Group Lab Activity 2

TNE10006/TNE60006 S1 2023

Assignment Weight:
7.5%

Assignment Points:
75

Submission Due Date:

By the start of Week 12 Lab session.

Reference Material:

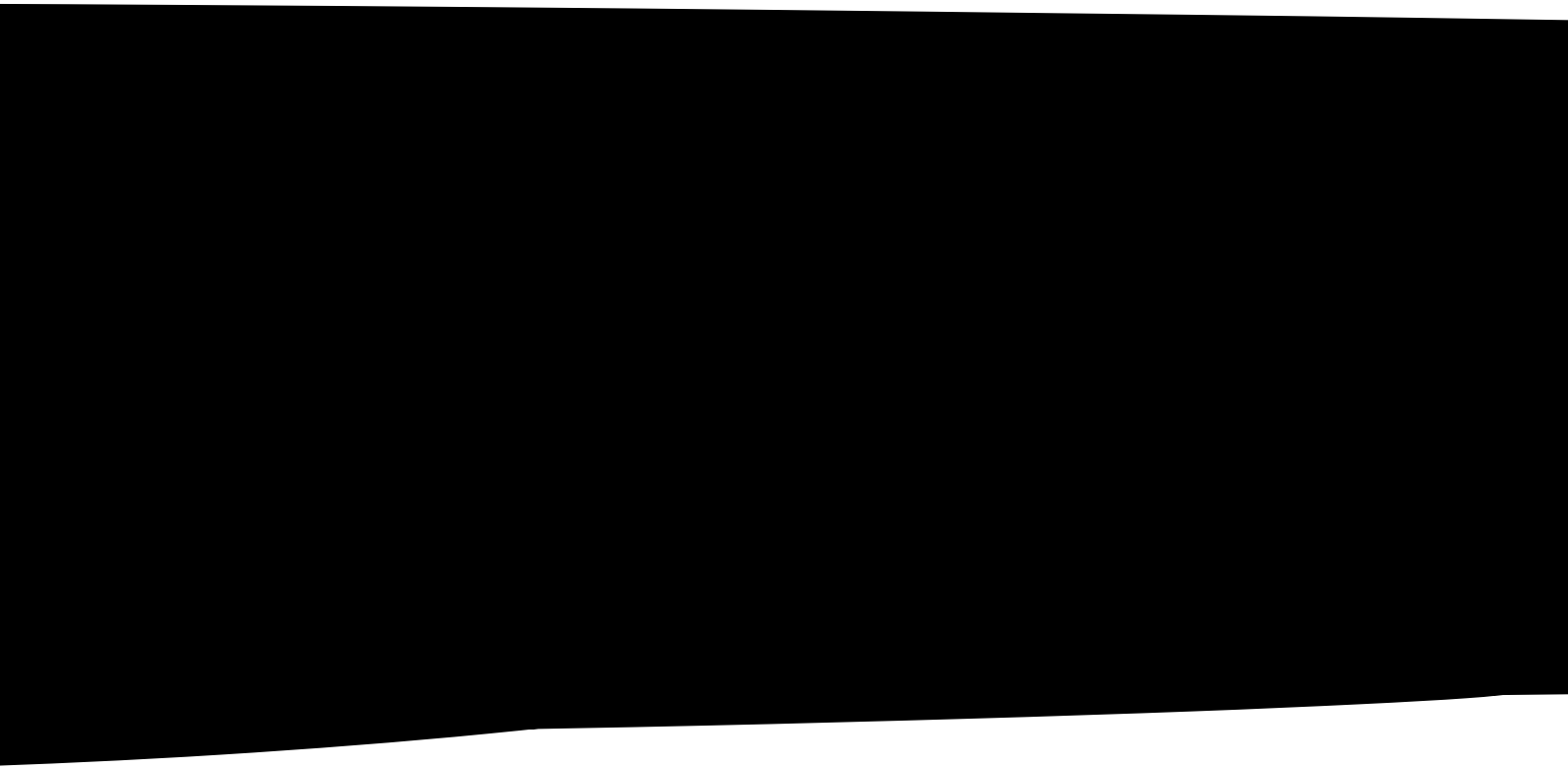
- Sample Final Practical Assessment (available in Canvas Lab Sessions page, Week 6a tab)

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 3 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 3
6. Submit Group Assignment 3, in the Canvas shell, under the Group Lab Activity 3
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)



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 (3):
   1. Vlan 15 – Centralbank
   2. Vlan 50 – Royalmint
   3. Vlan 150 – Management

b) On Tokyo? Please specify VLAN(s) ID
   Three (3):
   4. Vlan 15 – Centralbank
   5. Vlan 50 – Royalmint
   6. Vlan 150 – Management

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

a) On Lisbon? Please specify switchport to VLAN ID allocation.
   Six (6):
   Gi1/0/1-3 to Centralbank VLAN
   Gi1/0/11-13 to Royalmint VLAN

b) On Tokyo? Please specify switchport to VLAN ID allocation.
   Zero (0)

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

a) On Lisbon? Please specify interface(s) ID.
   Two (2):
   Gi1/0/5, Gi1/0/6

b) On Tokyo? Please specify interface(s) ID.
   Three (3):
   Gi1/0/5, Gi1/0/6, Gi1/0/11

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

Four (4):
Gi0/0/1.15, Gi0/0/1.50, Gi0/0/1.150, Loopback0

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

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

One (1):
Interface VLAN 150 (55.252.16.252 /28)

b) On Tokyo? Please specify interface(s) ID.
One (1):
Interface VLAN 150 (55.252.16.253 /28)

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. Both switches need a default gateway.
Default Gateway IP: **55.252.16.254**

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)

Devices: Nairobi (Router), Tokyo (Switch3), Lisbon (Switch4)

Mode(ALL): Interface configuration mode

Commands*: <DEVICE>(config)# hostname <DEVICE_NAME>

<DEVICE>(config)# banner motd +<STUDENTID>+

*Device name: Nairobi / Tokyo / Lisbon.

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)

// All VLANs must exist on Tokyo and Lisbon

Devices: Nairobi (Router), Tokyo (Switch3), Lisbon (Switch4)

Commands(Tokyo, Lisbon):

Mode: Global Configuration Mode

<DEVICE>(config)# vlan <VLAN ID>

<DEVICE>(config)# name <VLAN NAME>

*VLAN ID's: 15 / 50 / 150

*VLAN Names: Centralbank / Royalmint / Management

Commands(Lisbon):

Mode: Global Configuration Mode, Interface Configuration Mode

// Ports gi1/0/1-3 in Lisbon must be access ports for the Centralbank VLAN

Lisbon(config)# interface range gi1/0/1-3

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

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

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

// Ports gi1/0/11-13 in Lisbon must be access ports for the Royalmint VLAN

```
Lisbon(config-if-range)# interface range gi1/0/11-13
Lisbon(config)# description Royalmint VLAN
Lisbon(config-if-range)# switchport mode access
Lisbon(config-if-range)# switchport access vlan 50
```

// All unused switchports in Lisbon must be disabled

```
Lisbon(config-if-range)# interface range gi1/0/4, gi1/0/7-10,
gi1/0/14-24
Lisbon(config-if-range)# no shutdown
```

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)

// Nairobi must be the default gateway router for all VLANs
// The default gateway IP for all VLANs must be the last usable IP

Devices: Tokyo (Switch3), Lisbon (Switch4)

Mode: Global Configuration Mode

```
Switch(config)#ip default-gateway 55.252.16.254
```

// You must follow best practices for sub-interface ID configuration

Devices: Nairobi

Mode: Global Configuration Mode, Interface Configuration Mode, Subinterface Configuration Mode

```
Nairobi(config)# interface gi0/0/1
Nairobi(config-if)# no shutdown

Nairobi(config)# interface g0/0/1.15
Nairobi(config-subif)# encapsulation dot1q 15
Nairobi(config-subif)# ip address 213.17.144.254 255.255.255.128

Nairobi(config)# interface g0/0/1.50
Nairobi(config-subif)# encapsulation dot1q 50
```

```
Nairobi(config-subif)# ip address 165.45.191.254 255.255.224.0

Nairobi(config)# interface g0/0/1.150
Nairobi(config-subif)# encapsulation dot1q 150
Nairobi(config-subif)# ip address 55.252.16.254 255.255.255.240
```

// Configure Trunking Ports

Devices: Tokyo, Lisbon

Mode: Global Configuration Mode, Interface Configuration Mode

```
Tokyo(config)# interface range g1/0/5-6, g1/0/11
Tokyo(config-if)# switchport mode trunk

Lisbon(config)# interface range g1/0/5-6
Lisbon(config-if)# switchport mode trunk
```

// Configure Loopback0 on Nairobi with IP address 53.15.30.33/29

```
Nairobi(config)# interface lo0
Nairobi(config-if)# description Lookback0
Nairobi(config-if)# ip address 55.15.30.33 255.255.255.248
```

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)

// The management IP on Tokyo must be the second-last usable IP
// The management IP on Lisbon must be the third-last usable IP

Devices: Tokyo, Lisbon

Mode: Global configuration mode, Interface configuration mode

```
Tokyo(config)# interface vlan 150
Tokyo(config-if)# ip address 55.252.16.253 255.255.255.240

Lisbon(config)# interface vlan 150
```

```
Lisbon(config-if)# ip address 55.252.16.252 255.255.255.240
```

// Configure SSH access on Lisbon
// Domain name: ccna.lab
// User account details: Username: cisco, Password: cisco
Device: Lisbon
Mode: Global configuration mode, Line configuration mode

```
Lisbon(config)# ip domain-name ccna.lab
Lisbon(config)# username cisco privilege 15 secret cisco
Lisbon(config)# crypto key generate rsa general-keys modulus 1024
Lisbon(config)# line vty 0 15
Lisbon(config-line)# transport input ssh
Lisbon(config-line)# login local
```

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 must be the root bridge for the Royalmint VLAN

```
Mode: Global configuration mode
Tokyo(config)# spanning-tree vlan 50 root primary
```

// Lisbon must be the root bridge for the Centralbank VLAN

```
Mode: Global configuration mode
Lisbon(config)# spanning-tree vlan 15 root primary
```

// Access ports in Lisbon must be portfast ports by default

```
Mode: Global configuration mode, Interface configuration mode
Lisbon(config)# interface range g1/0/1-3, g1/0/11-13
Lisbon(config-if-range)# spanning-tree portfast
```

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)

// Gi1/0/3 in Lisbon must be configured with port-security
// Violation mode must be protect
// MAC address learning must be sticky
// Maximum allowed MAC addresses must be set to 2
Device: Lisbon

Mode: Global configuration mode, Interface configuration mode

```
Lisbon(config)# interface 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)

// The links between Tokyo and Lisbon must be bundled
// The native VLAN must be the Management VLAN
// Use LACP as the link aggregation protocol
Devices: Tokyo

Mode: Global configuration mode, Interface configuration mode

```
Tokyo(config)# interface range g1/0/5-6
Tokyo(config-if)# switchport trunk native vlan 150
Tokyo(config-if)# channel-group 1 mode active
```

Device: Lisbon

Mode: Global configuration mode, Interface configuration mode

```
Lisbon(config)# interface range g1/0/5-6
Lisbon(config-if)# switchport trunk native vlan 150
Lisbon(config-if)# channel-group 1 mode active
```

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

// Configure descriptions on all interfaces in Nairobi
Devices: Nairobi

Mode: Global configuration mode, Subinterface configuration Mode

```
Nairobi(config)# interface g0/0/1.15
Nairobi(config-subif)# description Centralbank

Nairobi(config)# interface g0/0/1.50
Nairobi(config-subif)# description Royalmint


Nairobi(config)# interface g0/0/1.150
Nairobi(config-subif)# description Management
```

```
Nairobi(config)# interface lo0
Nairobi(config-subif)# description Loopback0
```

// Configure synchronous logging in Lisbon and Tokyo

Devices: Tokyo, Lisbon

Mode: Global configuration mode, Line configuration Mode

```
Tokyo(config)# line console 0
Tokyo(config-line)# logging synchronous


Lisbon(config)# line console 0
Lisbon(config-line)# logging synchronous
```

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)

```
#show vlan brief
```

```
Expected output is:
```

This command will list all VLAN's (15 – Centralbank, 50 – Royalmint, 150 – Management) along with the ports that are currently in membership to each VLAN. For Tokyo, all switchports will belong to VLAN 1 by default.

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)

```
#show vlan brief
```

```
Expected output is:
```

This command will list all VLAN's (15 – Centralbank, 50 – Royalmint, 150 – Management) along with the ports that are currently in membership to each VLAN. For Lisbon, switchports g1/0/1-3 will belong to VLAN 15 and switchports g1/0/11-13 will belong to VLAN 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)

```
#show ip interface brief
```

This will show all ports except for g1/0/1-3, g1/0/5-6 and g1/0/11-13 being in the **down** state. Additionally, there will be an interface VLAN 150, which is in the **up** state, while VLAN 1 should be in the **down** state.

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)

`#show ip interface brief`

This will list all the sub-interfaces with their configured ip addresses. It will also indicate whether they are in the up state. This is important because ports on a Router are automatically in an administratively down state.

`#show ip route`

This will list all the interfaces currently configured with a Connected and Local variant of the ip addresses listed.

`#ping 'receiver' source 'sender'`

This will indicate whether traffic from one of the sub-interfaces can communicate with other sub-interfaces on Nairobi.

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)

#show interfaces trunk

Lists interface ports on Tokyo (gi1/0/5, gi1/0/6, gi1/0/11), encapsulation (802.1q), status (trunking), and native vlan (1)

#show ip route

Lists default gateway

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)

1. Incorrect Subnet mask configured
2. Invalid IP address (Network Address or Broadcast)
3. Incorrectly assigned subinterface

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)

`# show ip int brief`

This should show interface VLAN 150 with the IP Address configured as 55.252.16.253.

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

```
#ssh –l cisco 55.252.16.252
```

This should prompt the user to enter the password.

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)

router on a stick configured incorrectly

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)

If we look at the output for show spanning-tree, we can look at VLAN 50 and check that the bridge has been configured as a root. It will display the text "This bridge is the root". Additionally, none of the ports on Tokyo for VLAN 50 should be in root mode.

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

#show port-security

This will show a list of all currently configured port-security on Lisbon, with Gi1/0/3 being shown in this table.

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)

The letters SU - (SU)

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)

The letter P - (P)