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:
Do Duy Anh	104653686
Do Duy Hung	104182779
Huynh Anh Dung	105508428

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

3 VLANs

15 – CentralBank

50 – Royalmint

150 - Management

b) On Tokyo? Please specify VLAN(s) ID

3 VLANs

15 – CentralBank

50 – Royalmint

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.

Gigabitethernet 1/0/1 - Gigabitethernet 1/0/3 – Should be access ports to VLAN 15 Centralbank.

Gigabitethernet 1/0/11 - Gigabitethernet 1/0/13 – Should be access ports to VLAN 50 Royalmint

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

No ports in Tokyo should be allocated as access ports.

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

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

2 802.1q trunks should be configured on Lisbon. The interfaces that are trunked are Gigabitethernet 1/0/5 and Gigabitethernet 1/0/6.

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

3 802.1q trunks should be configured on Tokyo.

The interfaces that are trunked are Gigabitethernet 1/0/5, Gigabitethernet 1/0/6 and Gigabitethernet 1/0/11.

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

Gi0/0/1.15 – Centralbank VLAN Sub-interface

Gi0/0/1.50 – Royalmint VLAN Sub-interface

Gi0/0/1.150 – Management VLAN Sub-interface

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

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

One – VLAN 150 – Management VLAN

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

One – VLAN 150 – 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, the default-gateway IP is the last usable host of the management VLAN, which would be 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 (Nairobi)
      Router>ena
      Router#conf t
      Router(config)#hostname Nairobi
      Nairobi(config)#banner motd +Router Nairobi SWH02257+
      Nairobi(config)#
Switch (Tokyo)
      Switch>ena
      Switch#conf t
      Switch(config)#hostname Tokyo
      Tokyo(config)#banner motd +Switch Tokyo SWH02257+
      Tokyo(config)#
Switch (Lisbon)
      Switch>ena
```

```
Switch#conf t

Switch(config)#hostname Lisbon

Tokyo(config)#banner motd +Switch Lisbon SWH02257+

Tokyo(config)#
```

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(Lisbon)

Lisbon(config)#vlan 15

Lisbon(config-vlan)#name Centralbank

Lisbon(config-vlan)#exit

Lisbon#conf t

Lisbon(config)#int range gigabitEthernet 1/0/1 – 3

Lisbon(config-if-range)#no shutdown

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

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

Lisbon(config-if-range)#exit

Lisbon#conf t

Lisbon(config)#vlan 50

Lisbon(config-vlan)#name Royalmint

Lisbon(config-vlan)#exit

Lisbon#conf t

Lisbon(config)#int range gigabitEthernet 1/0/11 – 13

Lisbon(config-if-range)#no shutdown

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

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

Lisbon(config-if-range)#exit

Lisbon#conf t

Lisbon(config)#vlan 150

Lisbon(config-vlan)#name Management

Lisbon(config-vlan)#exit

Lisbon#conf t

Lisbon(config)#int range gigabitEthernet 1/0/4 - 10

Lisbon(config-if-range)#shutdown

Lisbon(config-if-range)# int range gigabitEthernet 1/0/14 – 24

Lisbon(config-if range)#shutdown

Lisbon(config-if-range)#int range gigabitEthernet 1/1/1 – 4

Lisbon(config-if-range)#shutdown

Switch(Tokyo)

Tokyo(config)#vlan 15

Tokyo(config-vlan)#name Centralbank

Tokyo(config-vlan)#exit

Tokyo#conf t

Tokyo(config)#vlan 50

Tokyo(config-vlan)#name Royalmint

Tokyo(config-vlan)#exit

Tokyo#conf t

Tokyo(config)#vlan 150

Tokyo(config-vlan)#name Management

Tokyo(config-vlan)#exit

Trunking ports

Switch(Tokyo)

Tokyo#conf t

Tokyo(config)#int range gigabitEthernet 1/0/5 – 6, 1/0/11

Tokyo(config-if-range)#no shutdown

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

Tokyo(config-if-range)#end

Switch(Lisbon)

Lisbon#conf t

Lisbon(config)#int range gigabitEthernet 1/0/5 -6

Lisbon(config-if-range)#no shutdown

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

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)

Creating sub-interfaces on the Nairobi Router

Nairobi#conf t

Nairobi(config)#int gigabitEthernet 0/0/1

Nairobi(config-if)#no shutdown

Nairobi(config-if)#int gigabitEthernet 0/0/1.15

Nairobi(config-subif)#description TO VLAN 15

Nairobi(config-subif)#ip address 213.17.144.254 255.255.255.128

Nairobi(config-subif)#exit

Nairobi(config)#interface gigabitEthernet 0/0/1.50

Nairobi(config-subif)#description TO VLAN 50

Nairobi(config-subif)#ip address 165.45.191.254 255.255.224.0

Nairobi(config-subif)#exit

Nairobi(config)#interface gigabitEthernet 0/0/1.150

Nairobi(config-subif)#description TO VLAN 150

Nairobi(config-subif)#ip address 55.252.16.254 255.255.255.240

Nairobi(config-subif)#exit

Nairobi(config)#interface lo0

Nairobi(config-if)#ip address 53.15.30.33 255.255.255.248

Nairobi(config-if)#exit

Configure default gateway on Switches

Lisbon(config)#ip default-gateway 55.252.16.254

Tokyo(config)#ip default-gateway 55.252.16.254

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(Tokyo)

Tokyo(config)#int vlan 150

Tokyo(config-vlan)#no shutdown

Tokyo(config-vlan)#ip address 55.252.16.253 255.255.255.240

Tokyo(config-vlan)#exit

Switch(Lisbon)

Lisbon(config)#int vlan 150

Lisbon(config-vlan)#no shutdown

Lisbon(config-vlan)#ip address 55.252.16.252 255.255.255.240

Configuring SSH on Lisbon Switch

Disabling Telnet access

Lisbon(config)#line vty 0 15

Lisbon(config-line)#transport input non

Lisbon(config-line)#no login

Switch(config-line)#end

Configuring FQDN

Lisbon(config)#ip domain name ccna.lab

Generating SSH certificate

Lisbon(config)#crypto key generate rsa general-keys modulus 1024

Configure local user account

Lisbon(config)#username cisco privilege 15 secret cisco

Enable SSH service

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(Tokyo)

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

Switch(Lisbon)

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)

Switch(Lisbon)

Lisbon(config)#int gigabitEthernet 1/0/3

Lisbon(config-if)#switchport port-security

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

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

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)

Switch(Tokyo)

Tokyo(config)#interface range gigabitEthernet 1/0/5 – 6

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

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

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

Tokyo(config-if-range)#no shutdown

Switch(Lisbon)

Lisbon(config)#interface range gigabitEthernet 1/0/5 – 6

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

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

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

Lisbon(config-if-range)#no shutdown

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(config)#no ip domain-lookup

Nairobi(config)#line console 0

Nairobi(config-line)#logging synchronous

Switch(Tokyo)

Tokyo(config)#no ip domain-lookup

Tokyo(config)#line console 0

Tokyo(config-line)#logging synchronous

Switch(Lisbon)

Lisbon(config)#no ip domain-lookup

Lisbon(config)#line console 0

Lisbon(config-line)#logging synchronou

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.**

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)

- Command: show vlan brief
- Expected output: the command will show all Vlans, as well as the ports that are presently assigned to each.

VLAN	Name	Status	Ports
1	default	active	all default ports of the switch
15	Centralbank		
50	Royalmint		
150	Management		
1002	fddi-default		
1003	token-ring-default		
1004	fddinet-default		
1005	trnet-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)

- Command: show vlan brief
- Expected Output: It appears to be a table, which has 4 column
    + "VLAN": id of the VLAN
    + "Name": name of the VLAN
    + "Status": status of the VLAN
    + "Ports": ports which were accessed to the VLAN

VLAN	Name	Status	Ports
1	default	active	all default ports except gi1/0/1-3 and gi1/0/11-13
15	Centralbank		gi1/0/1-3
50	Royalmint		gi1/0/11-13
150	Management		
1002	fddi-default		
1003	token-ring-default		
1004	fddinet-default		
1005	trnet-default		

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)

- Command: show ip interface brief
- Expected output: It appears to be a table, which has 6 attributes:
    + "Interface"
    + "IP-Address"
    + "OK?"
    + "Method",
    + "Status"
    + "Protocol"
- Ports gi1/0/1,gi1/0/2,gi1/0/4,gi1/0/7-24 and gi1/1/1-4 should be in "Status" is "administratively down" and "Protocol" is down

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)

Command	Expected Output
show interfaces trunk	Displaying a list of all trunk interfaces on the router, their encapsulation type (802.1q), status, the native VLAN, and all VLANs authorized to transit through the trunk port.
show ip interface brief	Displaying the interface name, IP address, method, status, and protocol information.
show ip route	The command displays the routing table of a router. The routing table is a table that stores information about the optimal routes to different networks. When a router receives a packet, it utilizes the routing table to identify the packet's next hop.

- Expect to see 4 C routes and 4 L routes
    + C routes: 213.17.144.128/25 exit interface gi0/0/1.15, 165.45.160.0/19 exit interface gi0/0/1.50, 55.252.16.240/28 exit interface gi0/0/1.150, 53.15.30.32/29 exit interface loopback0
    + L routes: 213.17.144.254/32 exit interface gi0/0/1.15, 165.45.191.254/32 exit interface gi0/0/1.50, 55.252.16.254/32 exit interface gi0/0/1.150, 53.15.30.33/32 exit interface loopback0

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)

Command	Expected Output
show vlan brief	Displaying all VLANs, their state, and the ports assigned to them, including the VLANs associated with the Router-on-a-Stick configuration.
show interfaces trunk	Displaying a list of all trunk interfaces on the router, their encapsulation type

	(802.1q), status, the native VLAN, and all VLANs authorized to transit through the trunk port.
show int trunk	Show the status of trunks on a switch. Trunks are ports that can handle traffic from several VLANs.

- Expected result:

  Tokyo#sh int trunk

  (gi1/0/5-6) and 11 trunking with on mode trunk, native vlan 150

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)

- Wrong configuration in IP address
- Wrong configuration in sub-interfaces, interfaces
- Wrong configuration in VLANs
- Wrong configuration in routing protocol

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)

- Command: show ip brief
- Expected output: IP address 55.252.16.253 in interface VLAN 150

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

- Command: ssh -i cisco 55.252.16.252
- This should prompt the user to enter their 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)

- The most likely configuration issue is that the default gateway was not correctly established on Lisbon.
- Lisbon can ping the IP address on Nairobi's Management sub-interface

  -> It is able to reach the router

- It cannot ping any other IP address on the router

  -> It does not know how to route traffic to those networks

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)

   Using the "show spanning-tree" command, we can check VLAN 50 to see if the bridge has been configured as the root. The message "This bridge is the root" indicates that the setup was successful. Furthermore, none of the Tokyo ports associated with VLAN 50 should be functioning in root mode.

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

   - Command: show port-security
   - This will reveal a list of all presently configured port-security on Lisbon, with Gi1/0/3 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)

   - SU should be the status flags, it stands for "standalone" or "in use"

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)

   - P should be the status flags, it stands for "in-port-channel"