STTJK3013

NETWORK CONNECTION AND SCALING (A242)

ASSIGNMENT 3

GROUP 7

PREPARED FOR :

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SUBMISSION REQUIREMENTS

• PDF report with:

1. **Network diagram**

o Configuration commands (with screenshots)

PART 1: VLAN and IP Addressing Configuration on MLS (Multilayer Switch)
Configure VLANs and interface range

MLS>enable
MLS# configure terminal
MLS(config)# ip routing
MLS(config)# vlan 10
MLS(config-vlan)# name CS_Lab
MLS(config-vlan)# exit

MLS(config)# vlan 20
MLS(config-vlan)# name IT_Lab
MLS(config-vlan)# exit

MLS(config)# vlan 30
MLS(config-vlan)# name Cyber_Lab
MLS(config-vlan)# exit

MLS(config)# vlan 40
MLS(config-vlan)# name Admin_Office
MLS(config-vlan)# exit

MLS(config)# vlan 50
MLS(config-vlan)# name Data_Center
MLS(config-vlan)# exit

Assign VLANs to ports
CS Department Labs-SW(config)# vlan 10

CS Department Labs-SW(config-vlan)# name CS_Lab
CS Department Labs-SW(config-vlan)#exit
CS Department Labs-SW(config)# interface range fa0/1 - 2
CS Department Labs-SW(config-if-range)# switchport mode access
CS Department Labs-SW(config-if-range)# switchport access vlan 10

IT Department Labs-SW(config)# vlan 20
IT Department Labs-SW(config-vlan)# name IT_Lab
IT Department Labs-SW(config-vlan)# exit
IT Department Labs-SW(config)# interface range fa0/1 - 2
IT Department Labs-SW(config-if-range)# switchport mode access
IT Department Labs-SW(config-if-range)# switchport access vlan 20

Cybersecurity Department-SW(config)# vlan 30
Cybersecurity Department-SW(config-vlan)# name Cyber_Lab
Cybersecurity Department-SW(config-vlan)# exit
Cybersecurity Department-SW(config)# interface range fa0/1 - 2
Cybersecurity Department-SW(config-if-range)# switchport mode access
Cybersecurity Department-SW(config-if-range)# switchport access vlan 30

Administrative Office-SW(config)# vlan 40
Administrative Office-SW(config-vlan)# name Admin_Office
Administrative Office-SW(config-vlan)# exit
Administrative Office-SW(config)# interface range fa0/1 - 2
Administrative Office-SW(config-if-range)# switchport mode access
Administrative Office-SW(config-if-range)# switchport access vlan 40

Data Center Segment-SW(config)# vlan 50
Data Center Segment-SW(config-vlan)# name Data_Center
Data Center Segment-SW(config-vlan)# exit
Data Center Segment-SW(config)# interface range fa0/1 - 2
Data Center Segment-SW(config-if-range)# switchport mode access
Data Center Segment-SW(config-if-range)# switchport access vlan 50

PART 2: Inter-VLAN Routing on MLS (using SVIs)
Enable routing
MLS(config)# ip routing

Create SVI interfaces for each VLAN
MLS(config)# interface vlan 10

```
MLS(config-if)# ip address 192.168.10.1 255.255.255.0
MLS(config-if)# no shutdown

MLS(config)# interface vlan 20
MLS(config-if)# ip address 192.168.20.1 255.255.255.0
MLS(config-if)# no shutdown

MLS(config)# interface vlan 30
MLS(config-if)# ip address 192.168.30.1 255.255.255.0
MLS(config-if)# no shutdown

MLS(config)# interface vlan 40
MLS(config-if)# ip address 192.168.40.1 255.255.255.0
MLS(config-if)# no shutdown

MLS(config)# interface vlan 50
MLS(config-if)# ip address 192.168.50.1 255.255.255.240
MLS(config-if)# no shutdown
```

Connect to Router (Internet Gateway) via VLAN 60 subnet

```
MLS(config)# interface FastEthernet0/0
MLS(config-if)# no switchport
MLS(config-if)# ip address 192.168.60.1 255.255.255.252
MLS(config-if)# no shutdown
```

Router OSPF

R1 (Internet Gateway Router)

```
R1(config)# router ospf 1
R1(config-router)# router-id 2.2.2.2
R1(config-router)# network 192.168.10.0 0.0.0.255 area 0
R1(config-router)# network 192.168.20.0 0.0.0.255 area 0
R1(config-router)# network 192.168.30.0 0.0.0.255 area 0
R1(config-router)# network 192.168.40.0 0.0.0.255 area 0
R1(config-router)# network 192.168.50.0 0.0.0.15 area 0
R1(config-router)# network 192.168.60.0 0.0.0.3 area 0
R1(config-router)# network 103.0.113.0 0.0.0.3 area 0
```

MLS (Multilayer Switch)

```
MLS(config)# router ospf 1
MLS(config-router)# router-id 1.1.1.1
```

MLS(config-router)# network 192.168.10.0 0.0.0.255 area 0
MLS(config-router)# network 192.168.20.0 0.0.0.255 area 0
MLS(config-router)# network 192.168.30.0 0.0.0.255 area 0
MLS(config-router)# network 192.168.40.0 0.0.0.255 area 0
MLS(config-router)# network 192.168.50.0 0.0.0.15 area 0
MLS(config-router)# network 192.168.60.0 0.0.0.3 area 0

Default route on MLS is set:
ip route 0.0.0.0 0.0.0.0 192.168.60.2

R2
R2(config)# router ospf 1
R2(config-router)#router-id 3.3.3.3
R2(config-router)# network 103.0.113.0 0.0.0.3 area 0
R2(config-router)# network 103.0.114.0 0.0.0.3 area 0

PART 3: Router (R1 – Internet Gateway) Configuration
Configure interface facing MLS (inside)
R1(config)# interface fastEthernet0/0
R1(config-if)# ip address 192.168.60.2 255.255.255.252
R1(config-if)# ip nat inside
R1(config-if)# no shutdown
R1(config-if)# exit

Configure interface facing ISP (outside)
R1(config)# interface fastEthernet0/1
R1(config-if)# ip address 103.0.113.1 255.255.255.252
R1(config-if)# ip nat outside
R1(config-if)# no shutdown
R1(config-if)# exit

NAT Overload Configuration
R1(config)# access-list 1 permit 192.168.10.0 0.0.0.255
R1(config)# access-list 1 permit 192.168.20.0 0.0.0.255
R1(config)# access-list 1 permit 192.168.30.0 0.0.0.255
R1(config)# access-list 1 permit 192.168.40.0 0.0.0.255
R1(config)# access-list 1 permit 192.168.50.0 0.0.0.15
R1(config)# access-list 1 permit 192.168.60.0 0.0.0.255

Apply NAT
R1(config)# ip nat inside source list 1 interface fastEthernet0/1 overload

PART 4: Static Routing
R1: Static route to internal networks
R1(config)# ip route 192.168.10.0 255.255.255.0 192.168.60.1
R1(config)# ip route 192.168.20.0 255.255.255.0 192.168.60.1
R1(config)# ip route 192.168.30.0 255.255.255.0 192.168.60.1
R1(config)# ip route 192.168.40.0 255.255.255.0 192.168.60.1
R1(config)# ip route 192.168.50.0 255.255.255.240 192.168.60.1
R1(config)# ip route 192.168.60.0 255.255.255.0 192.168.60.1

PART 5: R2 (ISP Router)
Configure interface toward R1
R2(config)# interface fa0/0
R2(config-if)# ip address 103.0.113.2 255.255.255.252
R2(config-if)# no shutdown
R2(config-if)# exit

Configure outside network for testing
R2(config)# interface fa0/1
R2(config-if)# ip address 103.0.114.1 255.255.255.0
R2(config-if)# no shutdown
R2(config-if)# exit

Route to college public IP
R2(config)# ip route 103.0.113.0 255.255.255.252 103.0.113.1

o Testing results and analysis (with screenshots)

PART 6: Test & Verification
On R1
R1# show ip nat translations
R1# show ip nat statistics
R1# show ip interface brief
R1# ping 103.0.114.10

On PC (CS Department Labs – VLAN 10)
ping 103.0.114.10

On PC (IT Department Labs – VLAN 20)
ping 103.0.114.10

On PC (Cybersecurity Department – VLAN 30)
ping 103.0.114.10

On PC (Administrative Office – VLAN 40)
ping 103.0.114.10

On Server (Data Center Segment – VLAN 50)
ping 103.0.114.10