Canterbury Institute of Management (CIM)

ASSESSMENT COVER SHEET

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Assessment Title	Assesment Task - *Week 10*		
Due Date & Time	08/12/2024		
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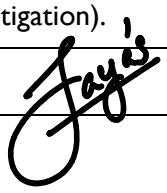
Signature:		Date:	07/12/24

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MBIS404 Networks and Communications

Assesment Task - *Week 10*

Ayesh Jayasekara - CIM12137

Broader Gateway Protocol Routing

In complex networks, manging routing configurations manually is not practical. Therefore, various autonomous routing protocols are introduced. The Broader Gateway Protocol (BGP) is one of those autonomous routing algorithms that can exchange information with connected systems to let those interfaces know what networks are connected to the router.

> **Border Gateway Protocol (BGP) refers to a gateway protocol that enables the internet to exchange routing information between autonomous systems (AS). As networks interact with each other, they need a way to communicate. This is accomplished through peering. BGP makes peering possible. Without it, networks would not be able to send and receive information with each other.**
>
> (Fortinet, 2024)

Below diagram shows example implementation of BGP routing protocol detailed in the next section of this document.

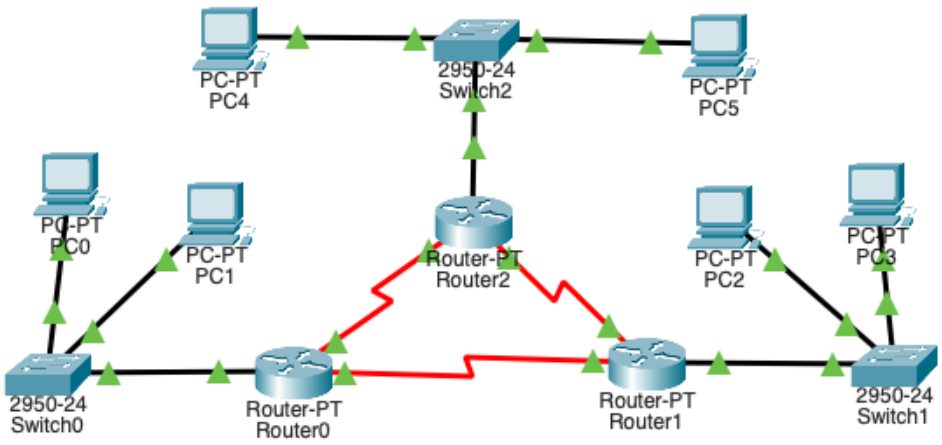

Figure 1: BGP Routing Configuration Overview

Setting Up Network

Following general steps were followed to create & test the network.

- Assign hosts static IP addressed from respective ranges
- Configuring 3 switches to use VLAN 10
- Configure each router with default gateway interface IP and P2P interface IPs
- Configure BGP and advertise connected networks and setup neighbors
- Test connectivity between hosts

Assigning Static IPs to Hosts

The three hosts were assigned IP addresses as follows.

1. PC0 - 1.1.1.2/24 (default gateway 1.1.1.1/24)
2. PC1 - 1.1.1.3/24 (default gateway 1.1.1.1/24)
3. PC2 - 3.3.3.2/24 (default gateway 3.3.3.1/24)
4. PC4 - 3.3.3.3/24 (default gateway 3.3.3.1/24)
5. PC5 - 2.2.2.2/24 (default gateway 2.2.2.1/24)
6. PC6 - 2.2.2.3/24 (default gateway 2.2.2.1/24)

Configure Switches

1. Create a VLAN
2. Assign port range to VLAN

Configuring - *Switches*

All switches share the same configuration as described below.

```
enable
conf t
# Create VLAN and name
vlan 10
name VLAN10
exit
# Assign access ports
interface range fa0/2-24
switchport mode access
switchport access vlan 10
# Mark interface for trunk traffic
interface fa0/1
switchport mode trunk
switchport access vlan 10
# Activate VLAN 10
interface vlan 10
no shutdown
exit
# Save configurations
exit
copy running-config startup-config


```

Listing 1: Configuring Switches Example

Configure Routers

1. Assign interface IP Addresses
2. Configure BGP Routing

Configuring - *Router 1*

```
enable
conf t
# Assign default gateway to VLAN encapsulated port
interface fa1/0.10
encapsulation dot1q 10
ip address 1.1.1.1 255.255.255.0
no shutdown
exit
# setup p2p interface 1
interface se2/0
ip address 10.1.1.1 255.255.255.0
no shutdown
```

```
exit
# setup p2p interface 2
interface se3/0
ip address 30.1.1.1 255.255.255.0
no shutdown
exit

# Configure BGP and identification
router bgp 100
# advertise networks connected to the router
network 10.1.1.0 mask 255.255.255.0
network 30.1.1.0 mask 255.255.255.0
network 1.1.1.0 mask 255.255.255.0
# define neighbouring BGP instances
neighbor 10.1.1.2 remote-as 200
neighbor 30.1.1.2 remote-as 300

exit
exit
copy running-config startup-config


```

Listing 2: Configuring Router 0

Configuring - *Router 2*

```
enable
conf t
# Assign default gateway to VLAN encapsulated port
interface fa1/0.10
encapsulation dot1q 10
ip address 2.2.2.1 255.255.255.0
no shutdown
exit
# setup p2p interface 1
interface se3/0
ip address 10.1.1.2 255.255.255.0
no shutdown
exit
# setup p2p interface 2
interface se2/0
ip address 20.1.1.1 255.255.255.0
no shutdown
exit

# Configure BGP and identification
```

```
router bgp 200
network 10.1.1.0 mask 255.255.255.0
network 20.1.1.0 mask 255.255.255.0
network 2.2.2.0 mask 255.255.255.0
# define neighbouring BGP instances
neighbor 10.1.1.1 remote-as 100
neighbor 20.1.1.2 remote-as 300

exit
exit
copy running-config startup-config



```

Listing 3: Configuring Router 1

Configuring - *Router 3*

```
        enable
conf t
# Assign default gateway to VLAN encapsulated port
interface fa1/0.10
encapsulation dot1q 10
ip address 3.3.3.1 255.255.255.0
no shutdown
exit
# setup p2p interface 1
interface se3/0
ip address 20.1.1.2 255.255.255.0
no shutdown
exit
# setup p2p interface 2
interface se2/0
ip address 30.1.1.2 255.255.255.0
no shutdown
exit

# Configure BGP and identification
router bgp 300
# advertise networks connected to the router
network 20.1.1.0 mask 255.255.255.0
network 30.1.1.0 mask 255.255.255.0
network 3.3.3.0 mask 255.255.255.0
# define neighbouring BGP instances
neighbor 20.1.1.1 remote-as 200
neighbor 30.1.1.1 remote-as 100

```

```
exit
exit
copy running-config startup-config


```

Listing 4: Configuring Router 3

Bibliography

Fortinet. (2024). What Is Border Gateway Protocol [https://www.fortinet.com/resources/cyberglossary/bgp-border-gateway-protocol (visited 2024-12-07)].