NETWORK SECURITY 1 PROJECT

PROJECT

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SITE A

DESCRIPTION:
Site A goal is to design and deploy a trustworthy network for a company using three layer 2 switches and two routers. The network requires a web server with a customized homepage, secure authentication, and EIGRP without auto-summary for routing updates between the access router and the edge router. For remote SSH connection to the access router and the edge router, a TACACS server is what I will use based on what I have been taught in this course.

REQUIREMENTS:

- A network design that is both secure and efficient
- Web server with personalized home page
- Secure authentication and encryption must be used for routing updates between the access router and edge router.
- EIGRP without auto summary
- Remote SSH login to access and edge routers must use TACACS server authentication.
- Three layer 2 switches connected to each other without causing network loops.
- A single IP address with a /28 CIDR will be used for the entire network.
- My subnet **10.150.136.0/28**
- The IP address between edge access and access router will be 10.150.136.48/28.

DESIGN

- **I will use 2 PT servers, 3-2960 layer 2 switches, 1- cisco 2911 Router, 1 Router PT router for this site.**
- I will use EIGRP for routing between the access router and edge router. Loopback addresses will be used for EIGRP updates.
- I will configure Vlan 1
- TACACS server will also be configured on this network to handle remote SSH login authentication for the access router and the edge router.
- I will configure a custom home page for my web server, I will activate the DNS service.
- STP will be configured on all switches to prevent network loops. SW2 will be configured as the root bridge, SW1 will have a root port on the interface connecting to SW2, and SW3 will have a root port on the interface connecting to SW1. All interfaces will be designated ports.
- I will connect the edge router in SITE A to SITE b using daisy chain manner which will also be connected to SITE C.
  IP ADDRESS ASSIGNMENT:
- SW1: 10.150.136.2/28
- SW2: 10.150.136.3/28
- SW3: 10.150.136.4/28
- **Access Router:**

- LAN: 10.150.136.1/28
- WAN: 10.150.136.49/28
- **Edge Router:**
- LAN: 10.150.136.50/28
- WAN: 10.150.136.160/28
- Tacacs server: 10.150.136.5/28
- Web server: 10.150.136.6/28

SCREENSHOT

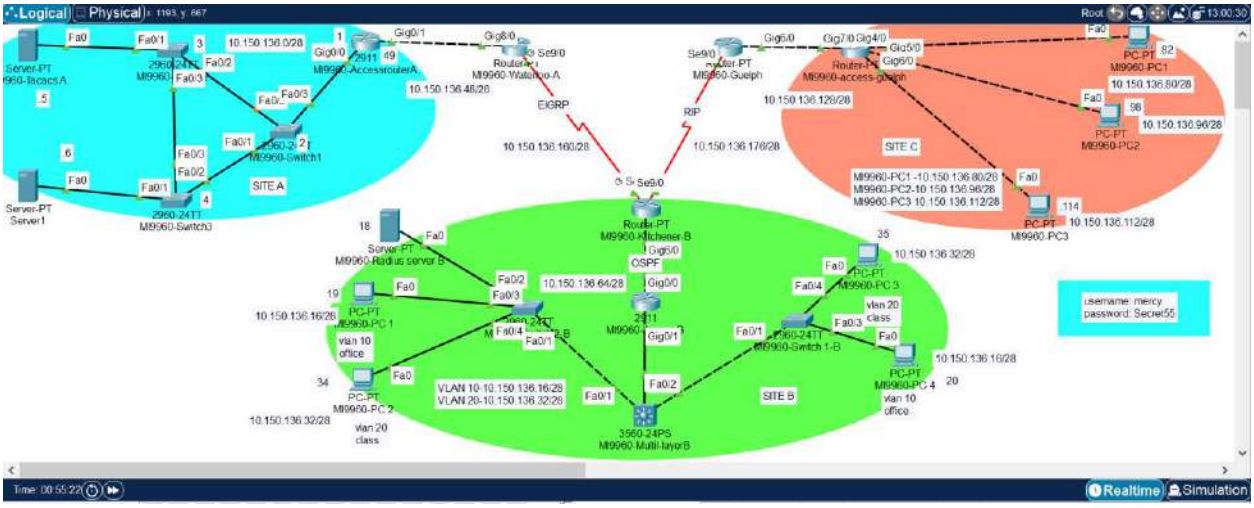


fig1 showing my topology showing different sites.

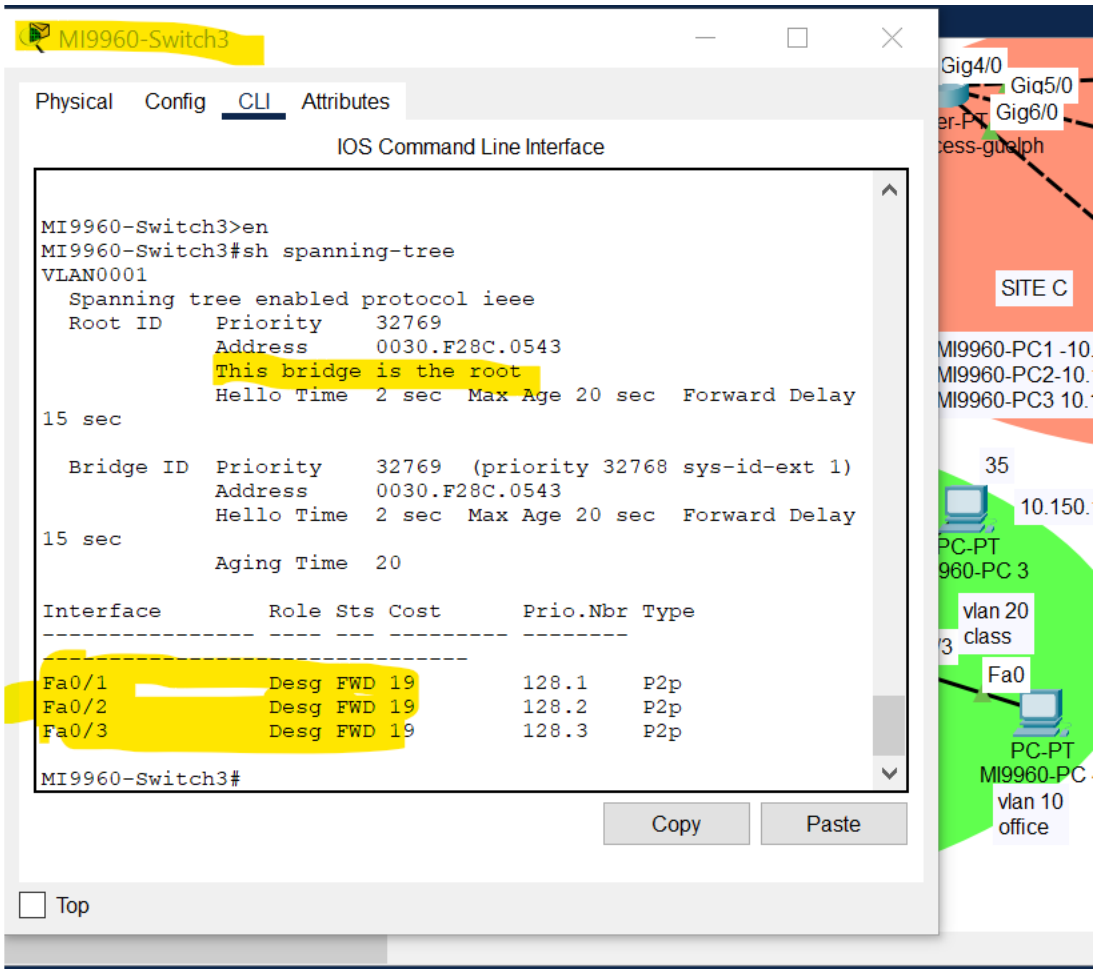


Fig 2 showing that this is the root bridge, designated ports, and ports costs on switch 3. The ports cost 19.

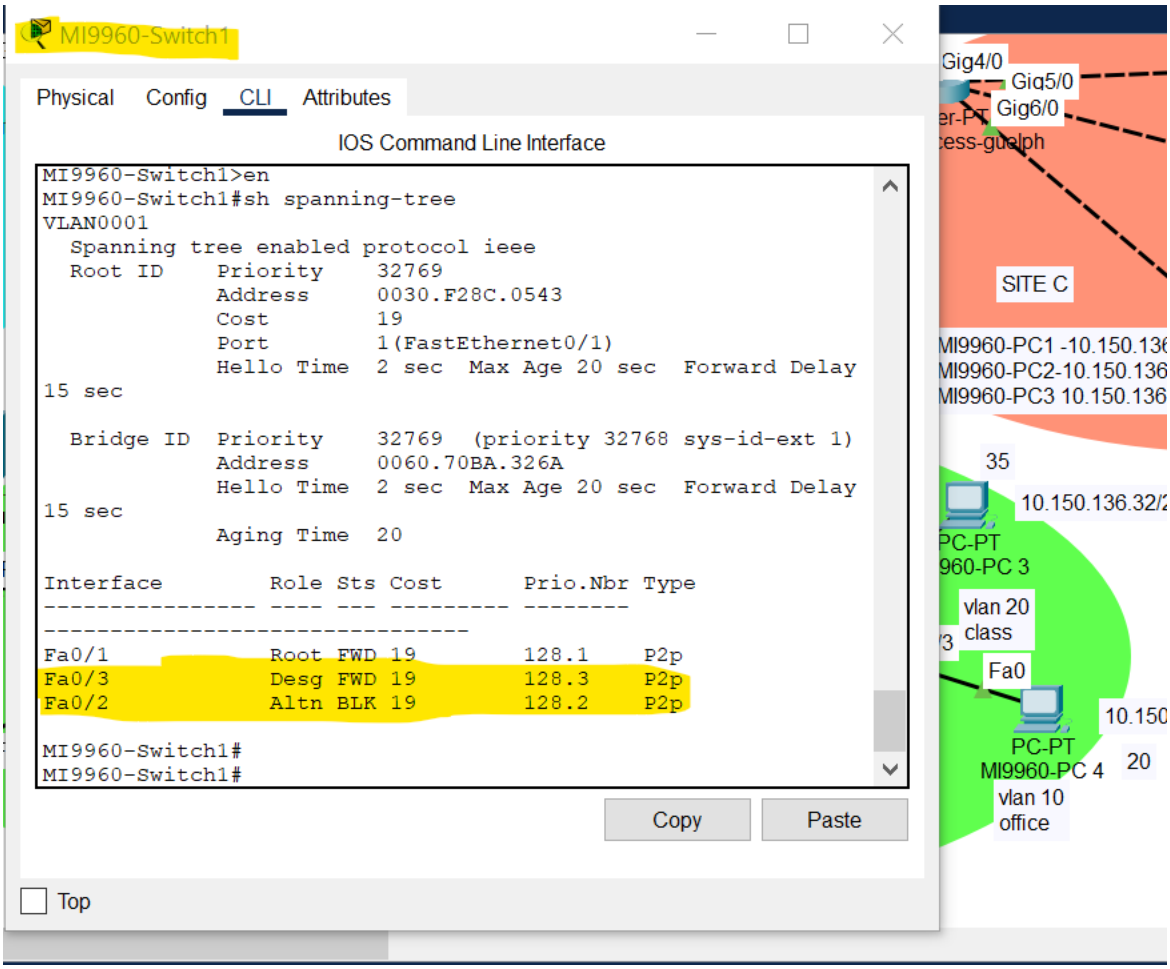


Fig 3 showing the blocking ports, designated ports and ports cost is 19 on Switch 1.

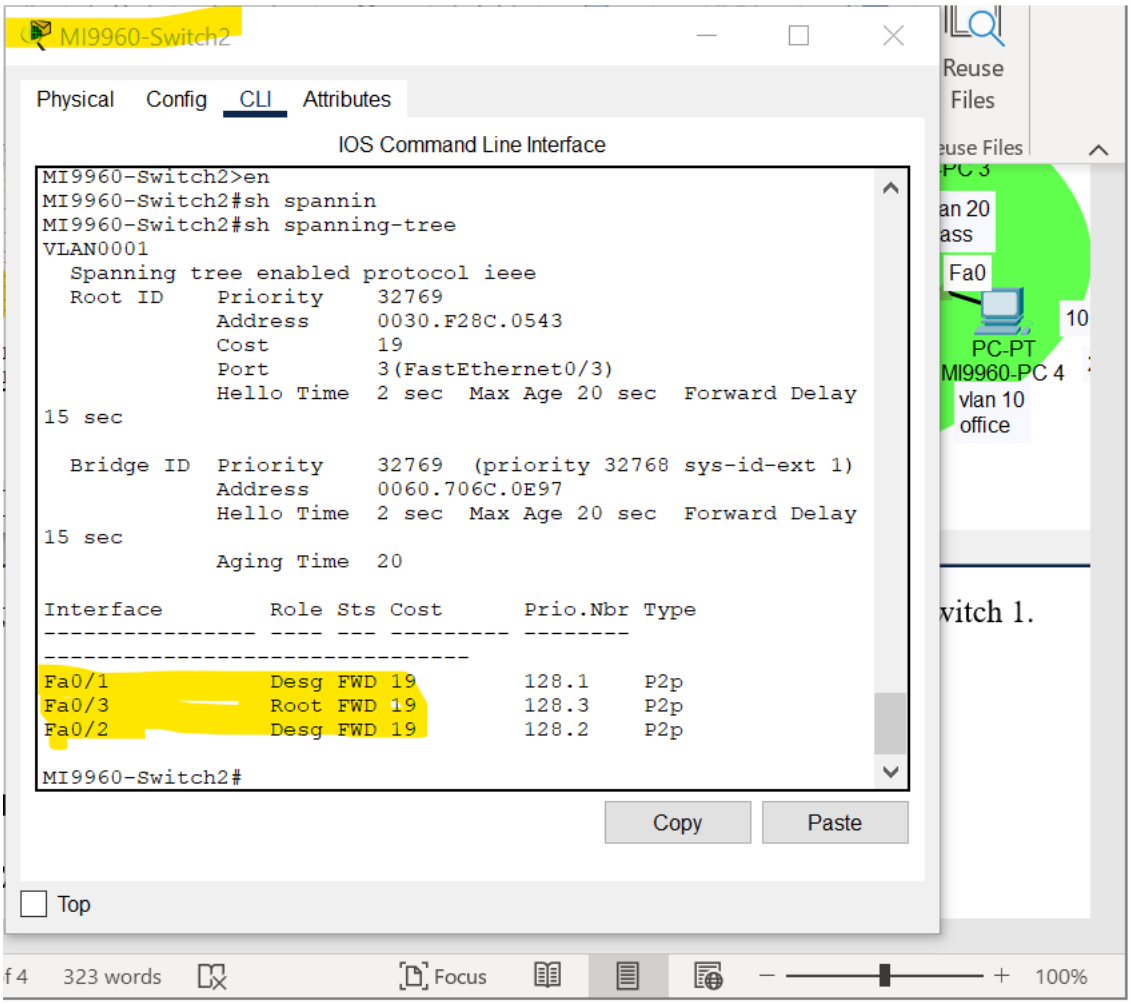


Fig 4 showing the designated ports and ports cost 19 on switch 2.

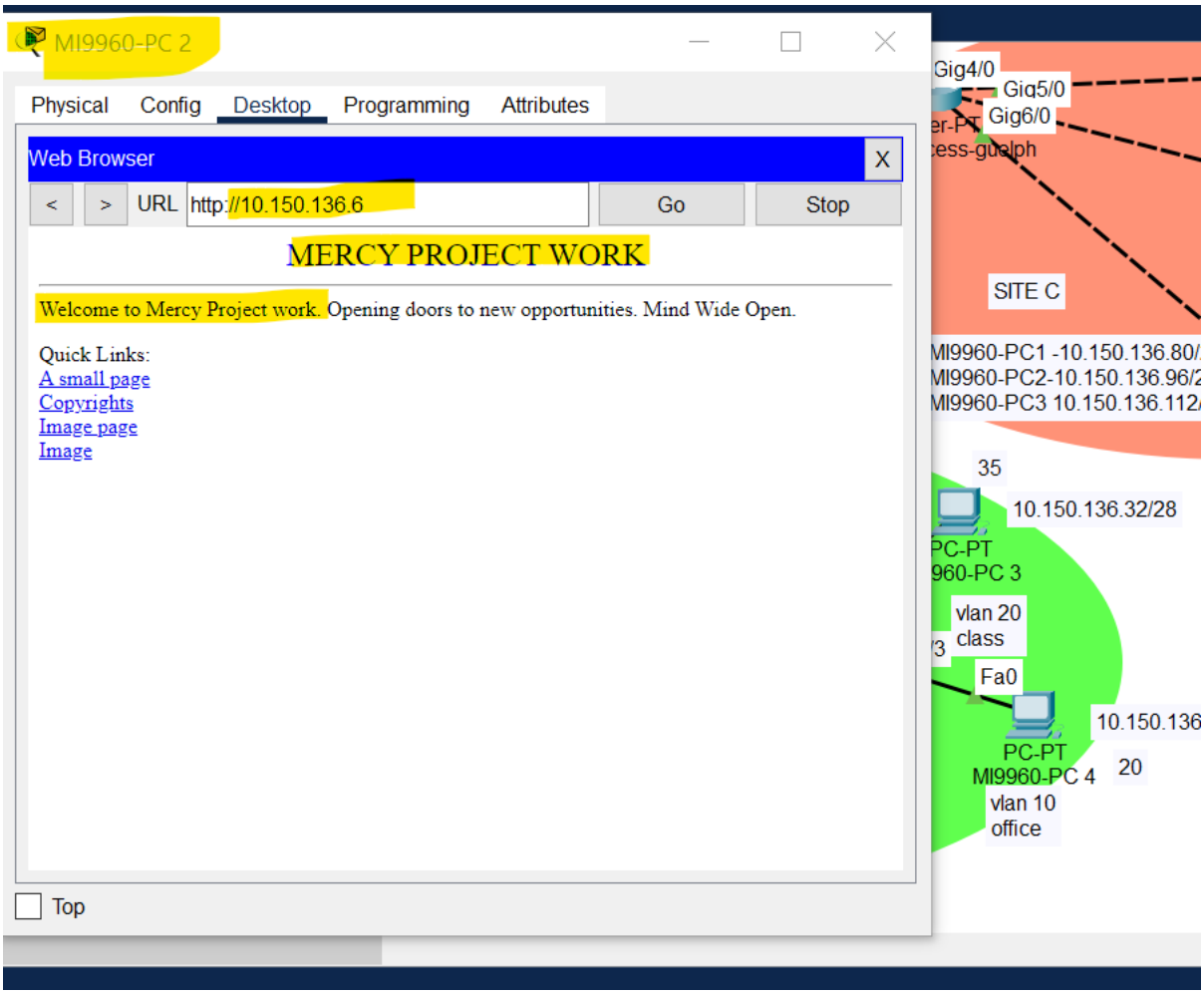


Fig 5 showing my customized home page.

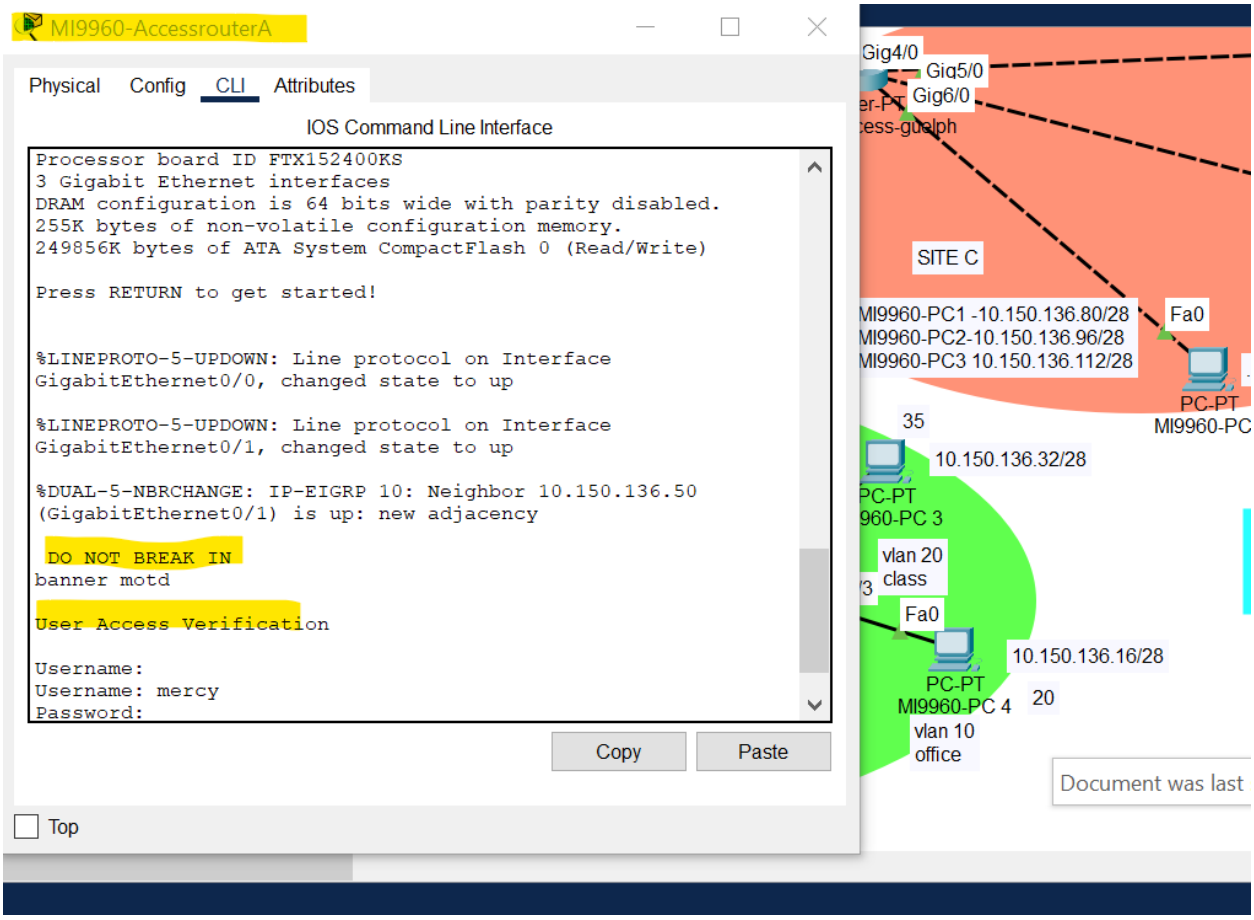


Fig 6 showing that I have configured banner of the day and I have enforced login.

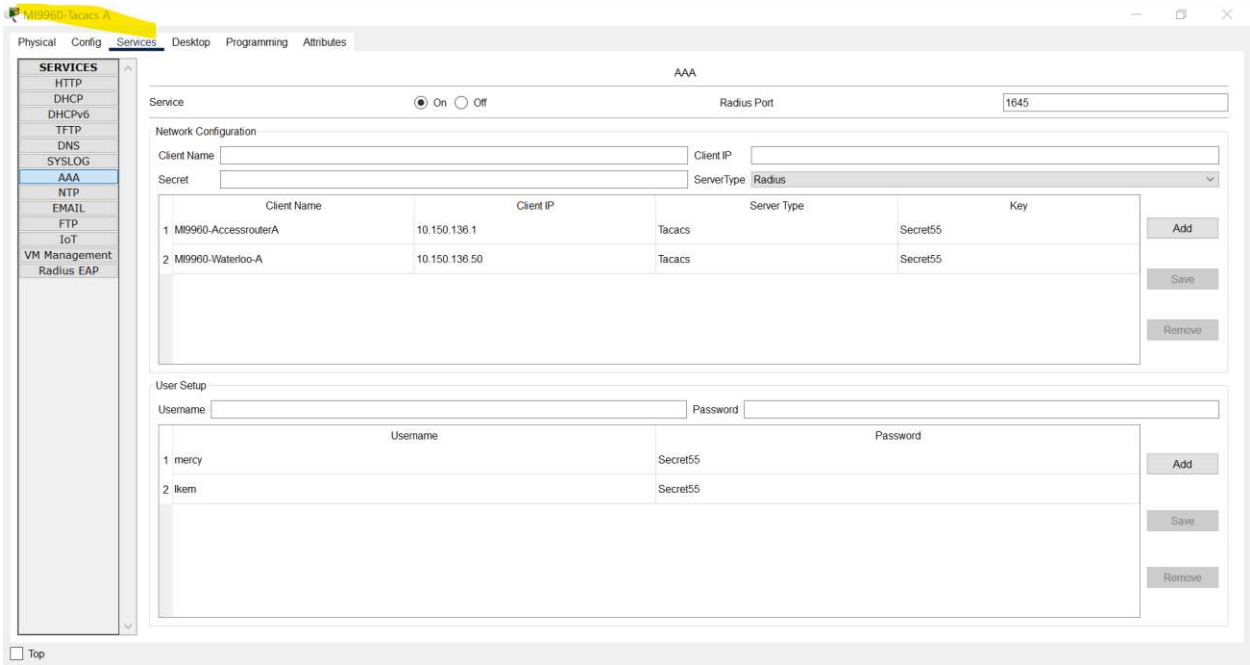


Fig 7 showing that I am using tacacs authentication for my access router and edge router.

Fig 8 showing the configuration I made on my waterloo access router.

Fig 9 showing the running configuration I made on access router.

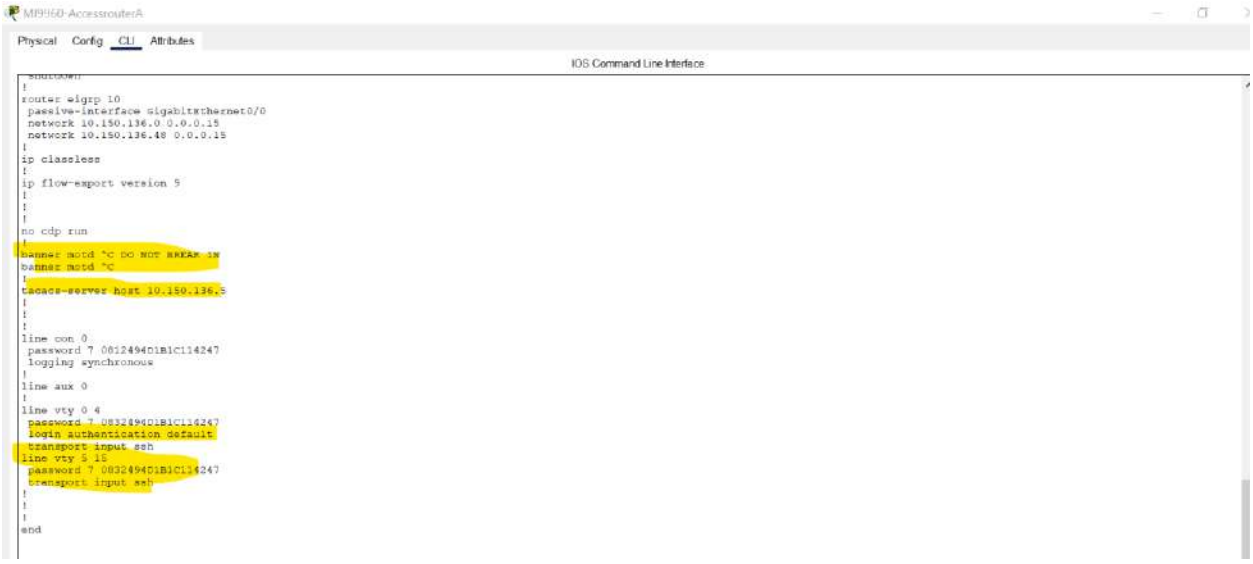


Fig 10 showing the configuration I made on the access router.

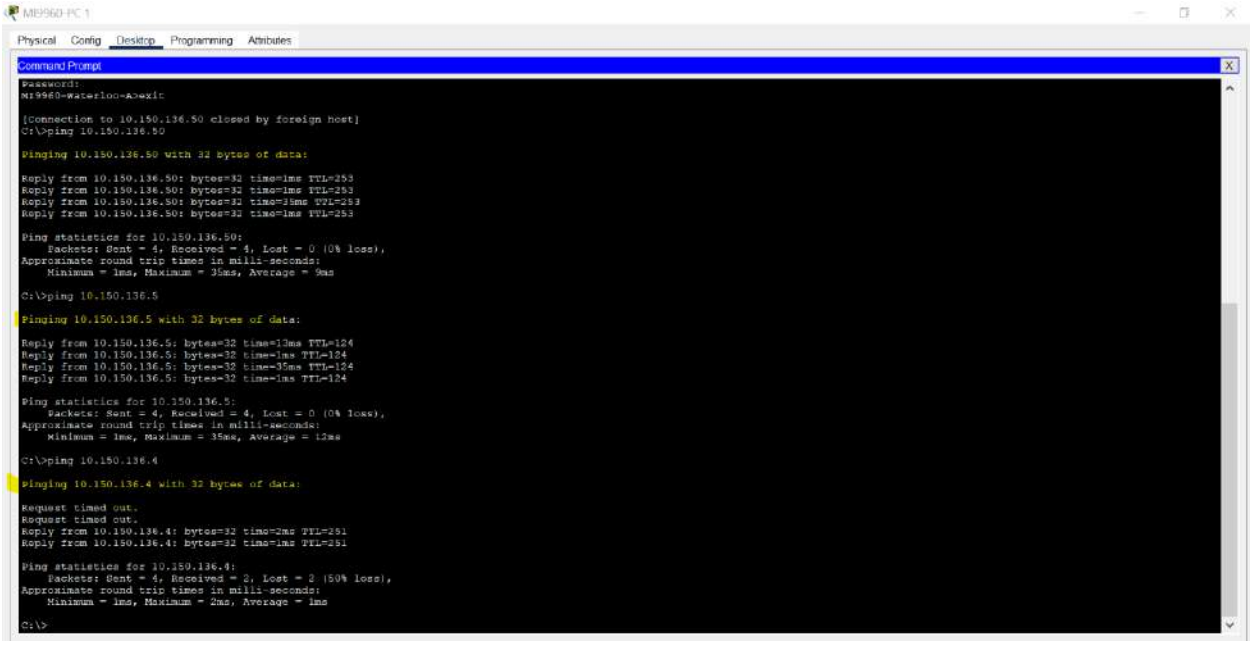


Fig 11 showing that the pc in site b can communicate with the router, switch and the server in site A.

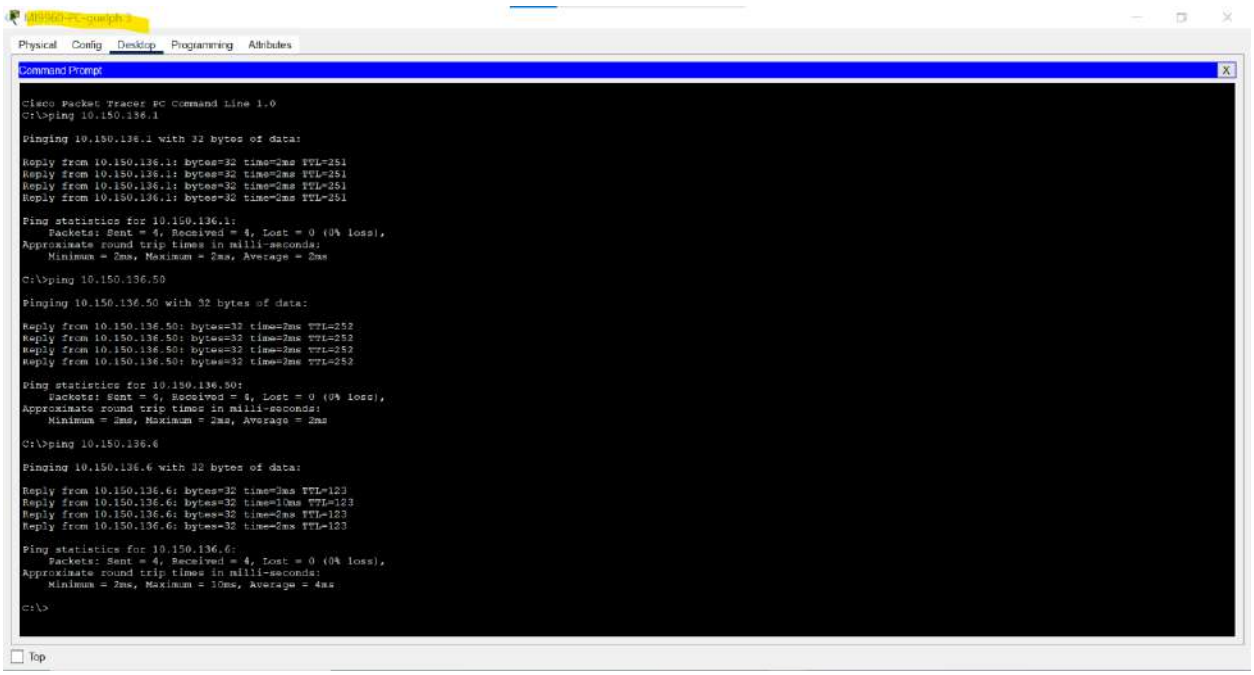


Fig 12 shows that site c can communicate with site A.

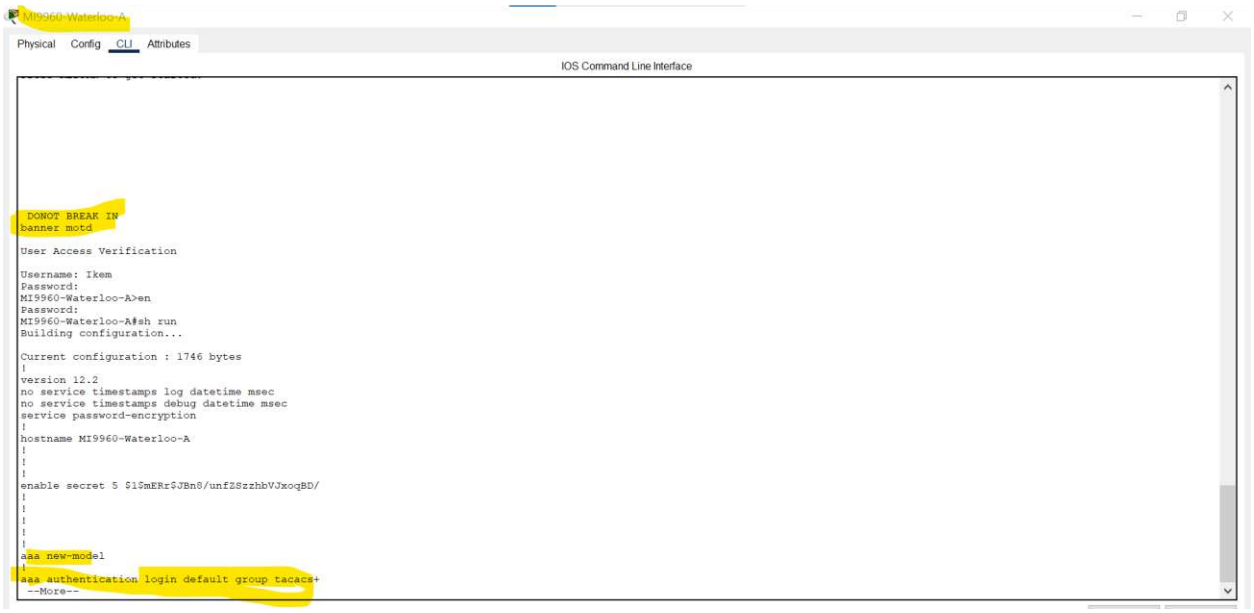


Fig 13 showing the configuration I made on the edge router.

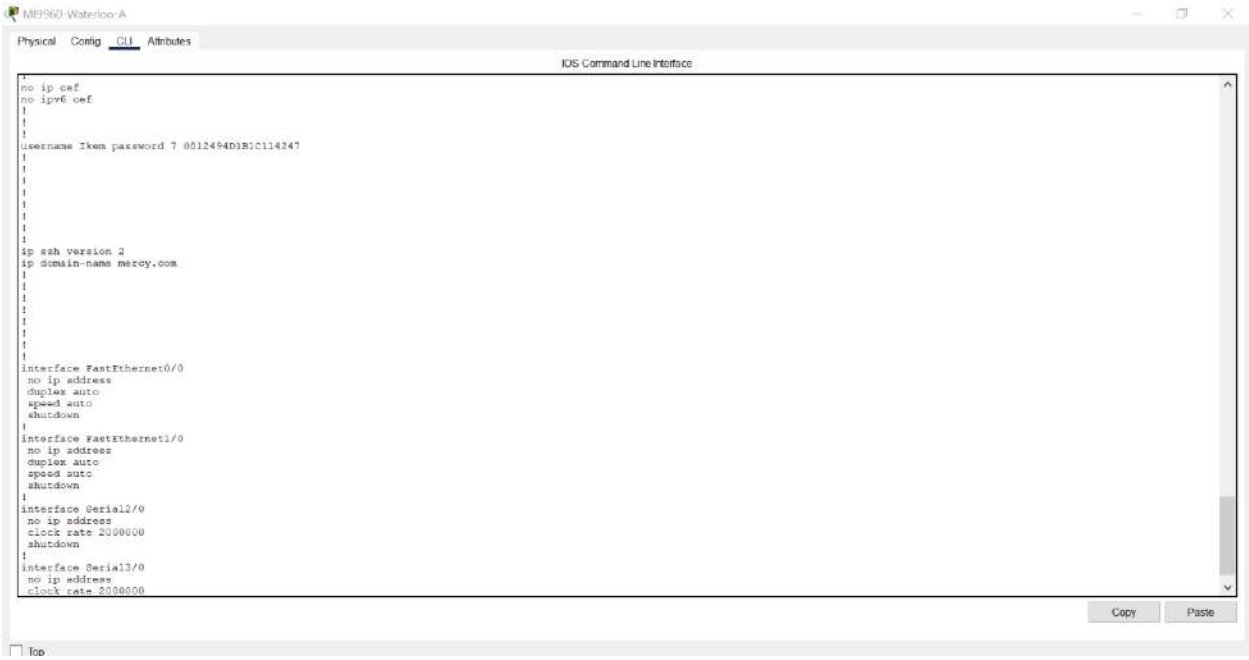


Fig 14 showing the configuration I made on the edge router.

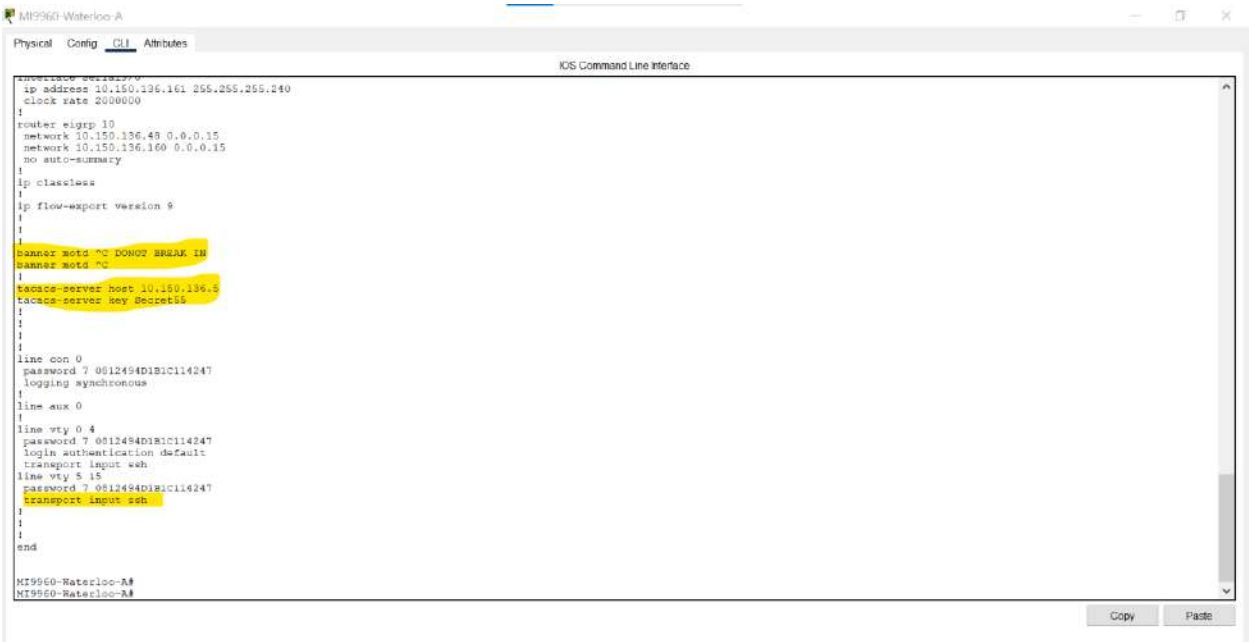


Fig 15 showing the configuration I made on the edge router.

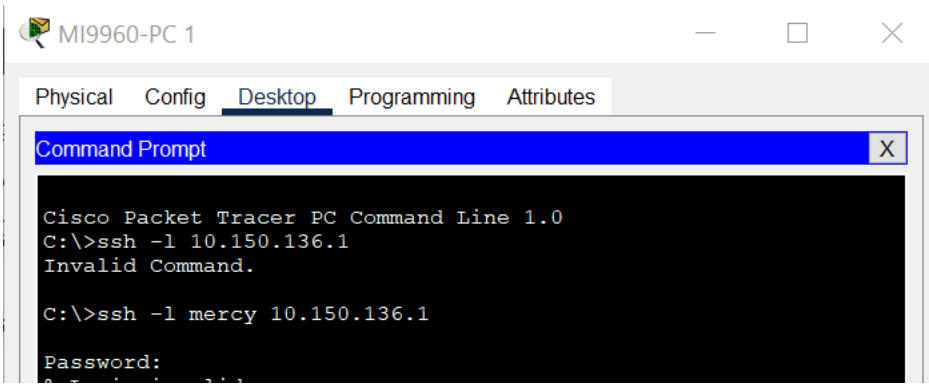


Fig 16 showing that I can ssh into the access router in site A using the pc in site b

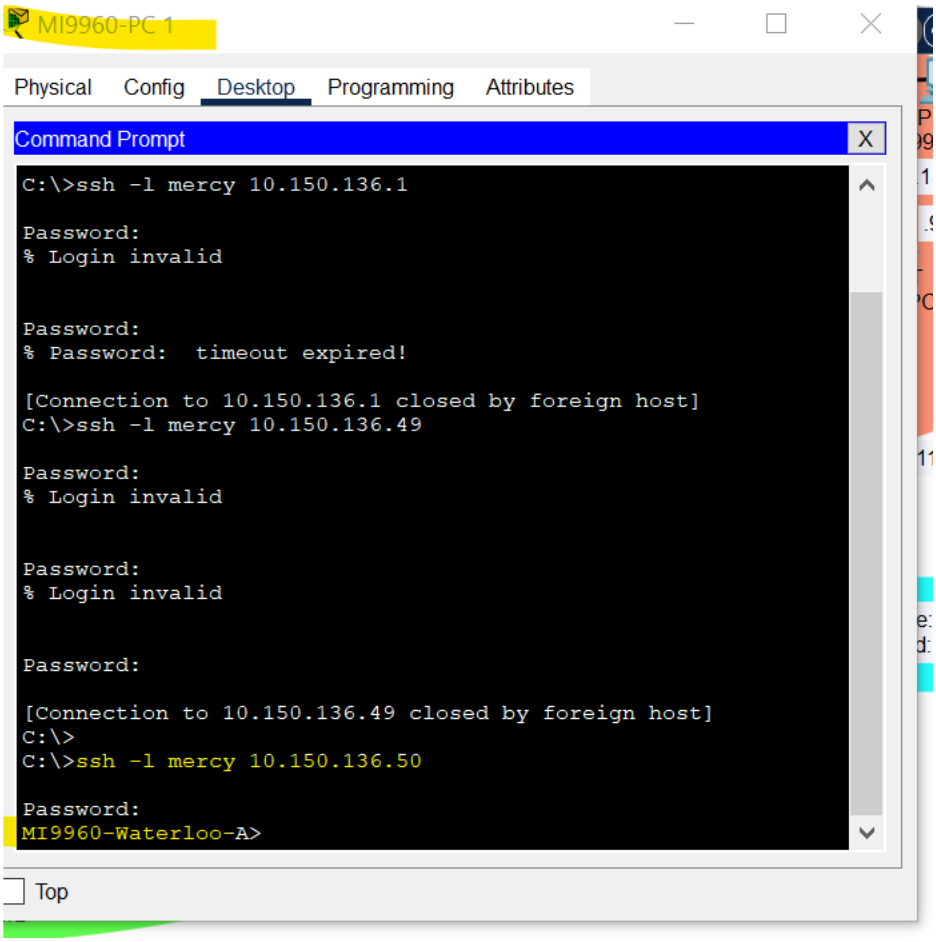


Fig 17 showing that I ssh into the edge router on site A using the pc in site b.

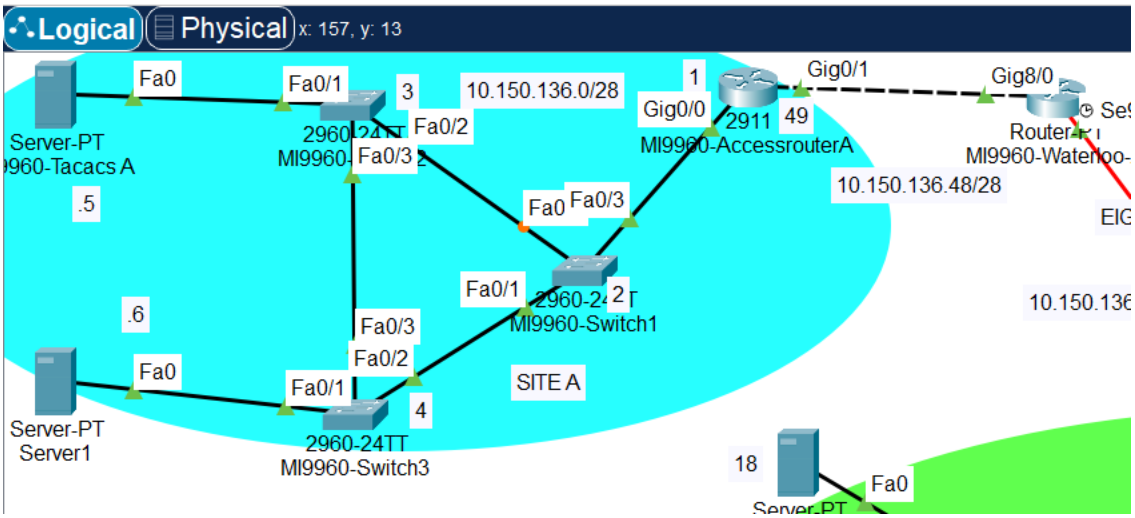


Fig 18 showing my Topology for site A.

SITE B

DESCRIPTION:
The goal for site B is to create a network that contains several switches, routers, and PCs that must be connected to provide secure remote access, inter-VLAN routing, and device connectivity.

REQUIREMENTS:
I will configure site B to do the following.

- I will configure the access router and edge router to authenticate using RADIUS server and remote using ssh.
- The radius server will be connected to one of the Vlans.
- Each of my switches in site b will have two identical vlans.
- Two pcs will be connected to each of the layer 2 switches, and they will be on separate vlans.
- I will connect the two-layer 2 switch to a layer 3 switch and configure VLAN Trunking and Inter VLAN routing.
- The computer connected to the switch must be able to communicate with each other.

DESIGN
To meet the requirements I mentioned above, I must make sure that my design will be implemented like this:

- My network will have several devices, including switches, routers, and computers. The network will have two VLANs, VLAN 10 and 20.

- The access router will be the default gateway for the switches and the PC.
- I will use OSPF authentication to route between my Access and Edge router. The Edge router will securely **redistribute** routing information between site A and site B.
- I will include the following devices.
- **Access router-** 1 2911 router
- **Edge router-** 1 router PT
- **Layer 3 switch -**1 3560-24PS
- **Two-layer 2 switch -**2960 Switches.
- **Radius server**
- **two pcs on both sides.**
- Access router will be connected to the edge router through serial link.
- The Edge router will be connected to layer 3 switch through a link and to the access router.
- I will connect the layer 3 switch to layer 2 switches through a trunk link.
- My radius server will be connected to one of my vlan (VLAN 10).
- My two PCs will be connected to the Vlans. (VLAN 10 and 20).

I will assign the following IP addresses to my devices.

- Access router-se9/0-10.150.136.162/28 gig6/0 10.150.136.66/28 se2/0 10.150.136.177/28
- Edge router- VLAN 10 (10.150.136.17/28) VLAN 20 (10.150.136.33/28)
- Layer 3 switch-VLAN 10 (10.150.136.21/28) VLAN 20 (10.150.136.37/28)
- MI9960-PC 1-10.150.136.19/28(VLAN 10)
- MI9960-PC 2-10.150.136.34/28(VLAN 20)
- MI9960-PC3-10.150.136.35/28(VLAN 20)
- MI9960-PC4-10.150.136.20/28(VLAN 10)
- Radius server-10.150.136.18/28(VLAN 10)

SCREENSHOT

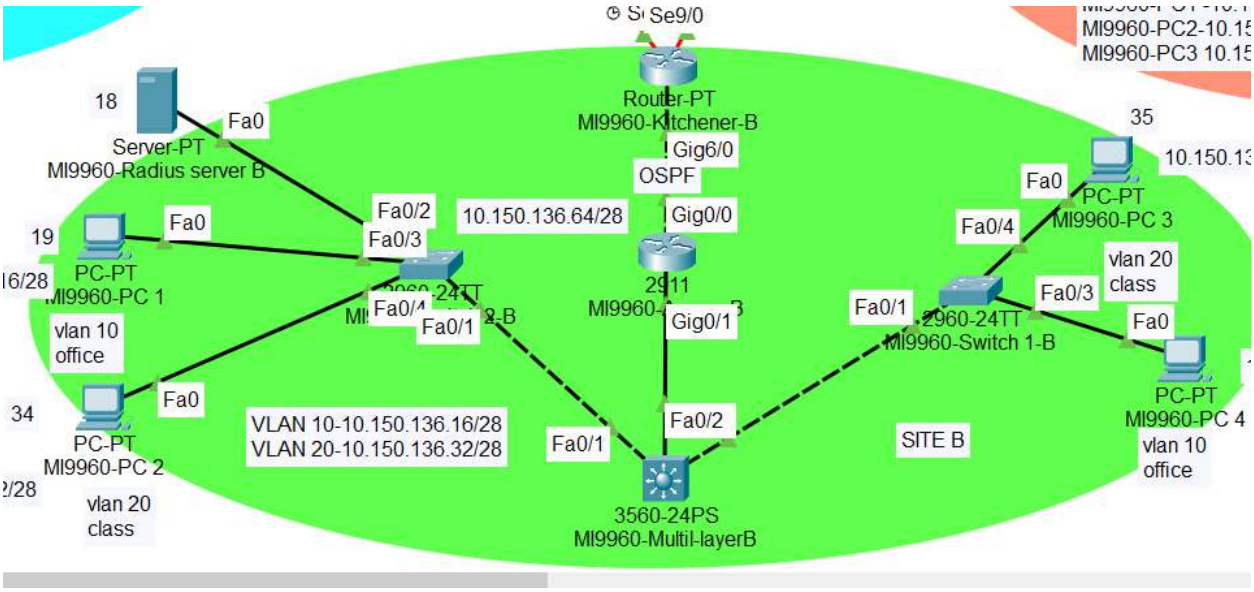


Fig 19 shows my Site B topology.

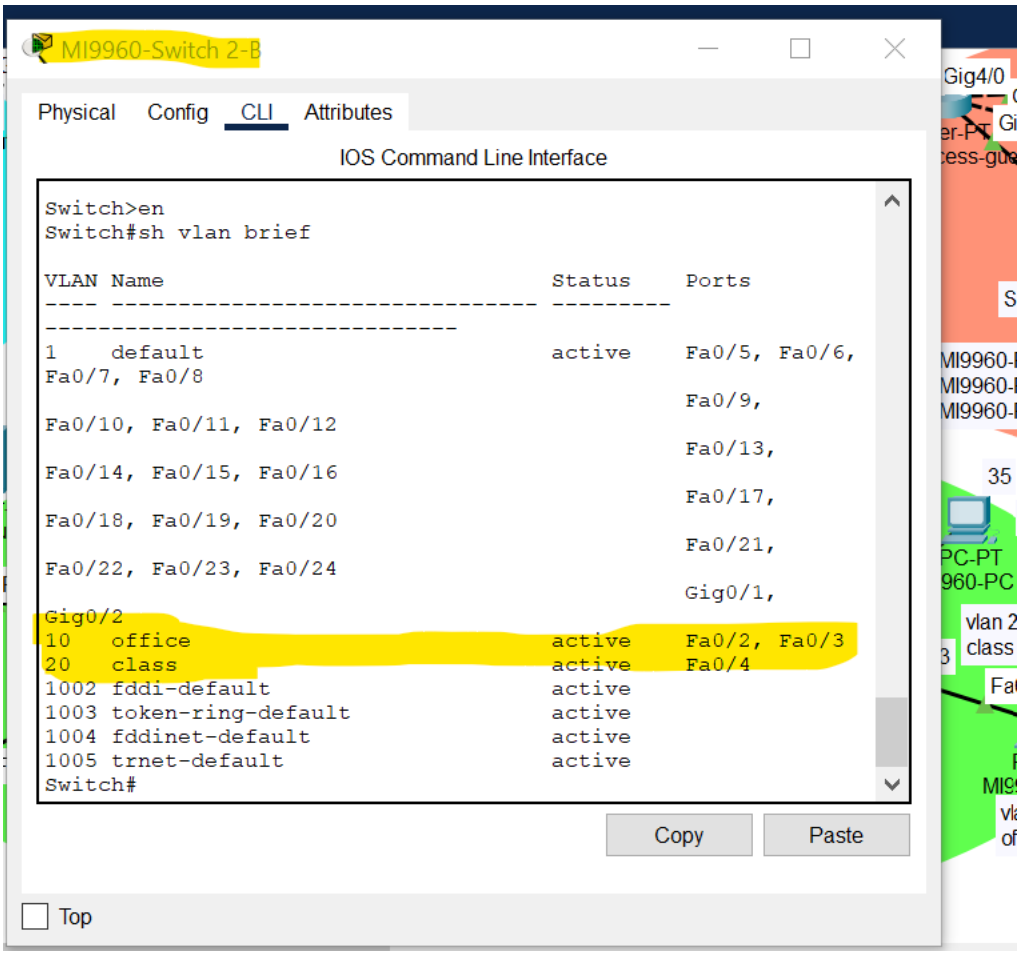


Fig 20 showing my vlan in switch 2 in site B.

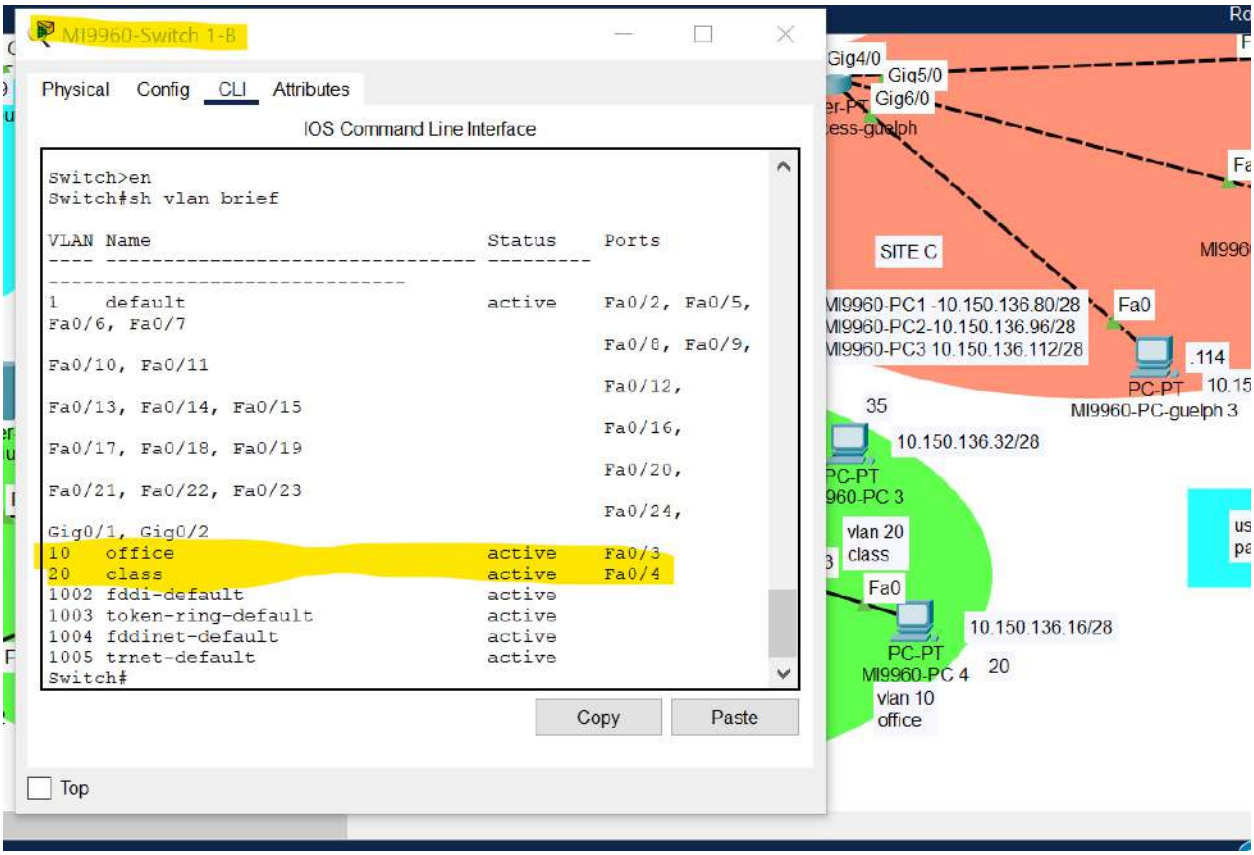


Fig 21 shows my vlan in switch 1 in site B.

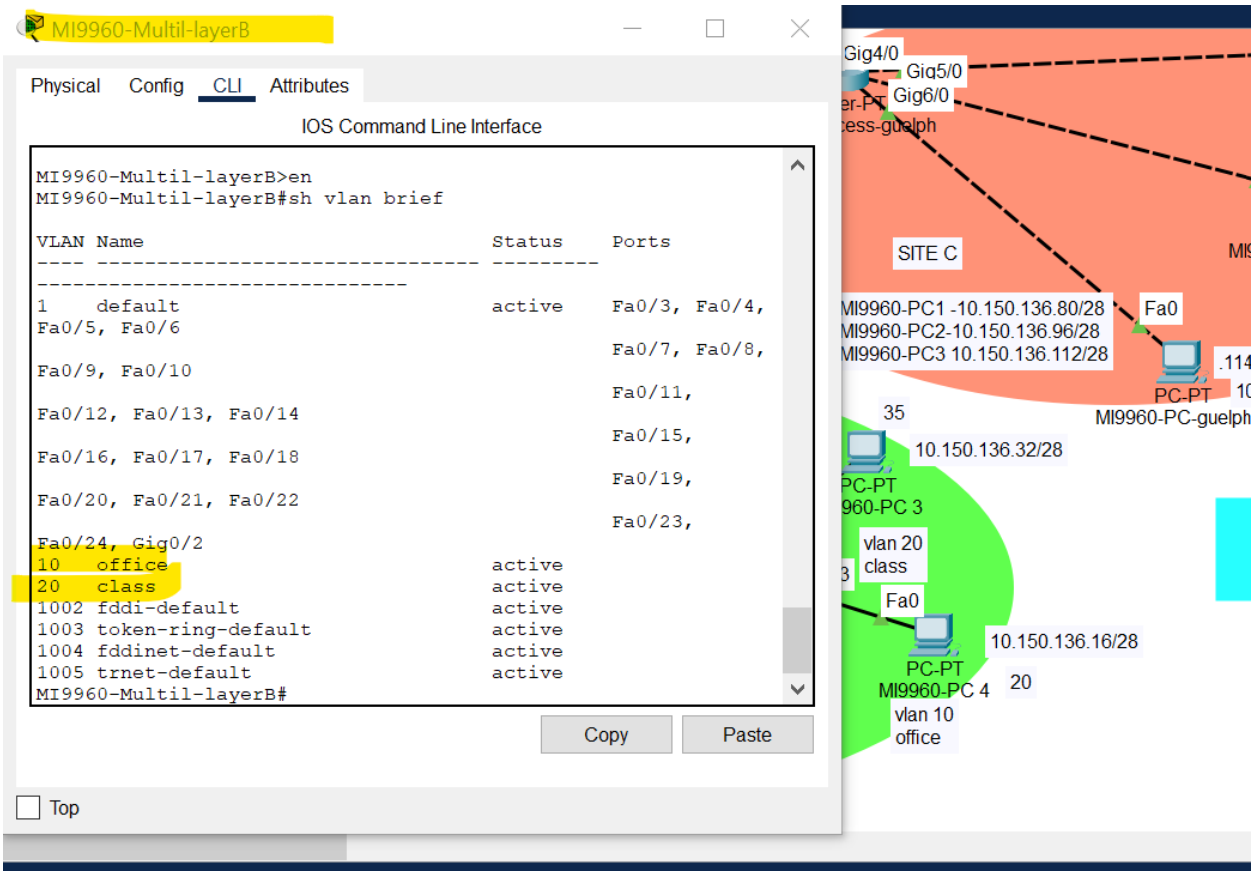


Fig 22 showing my vlan in my multilayer switch.

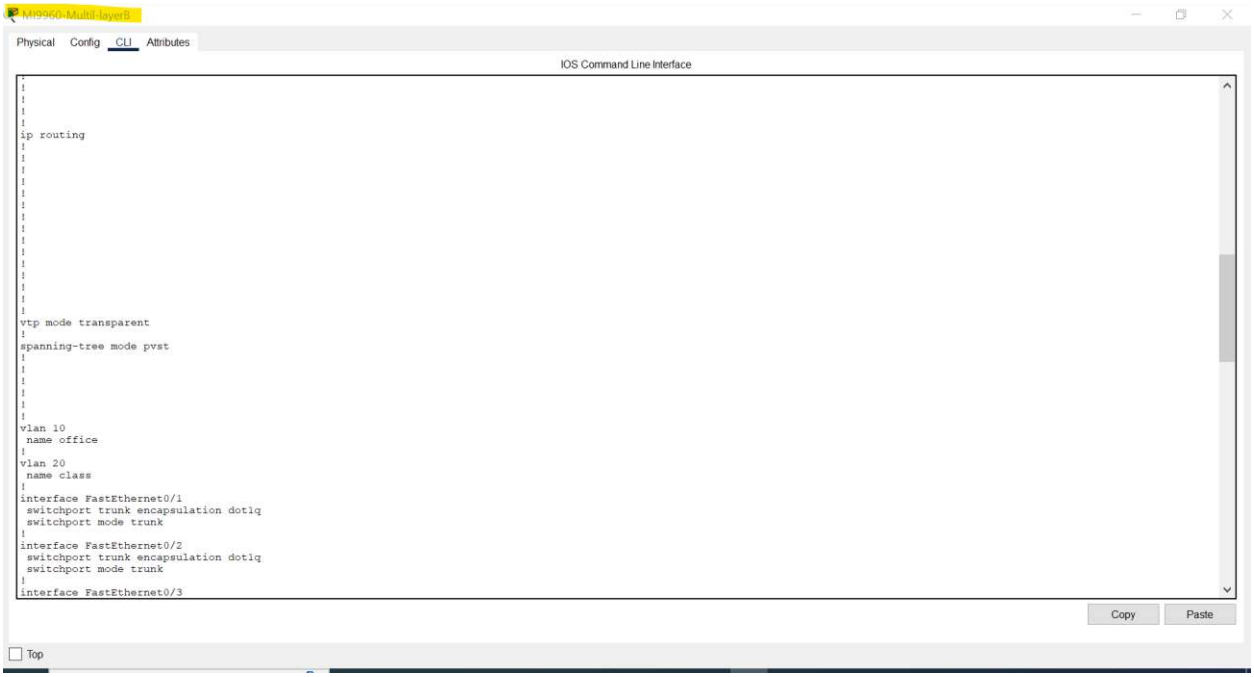


Fig 23 showing the configuration I made in my multilayer switch.

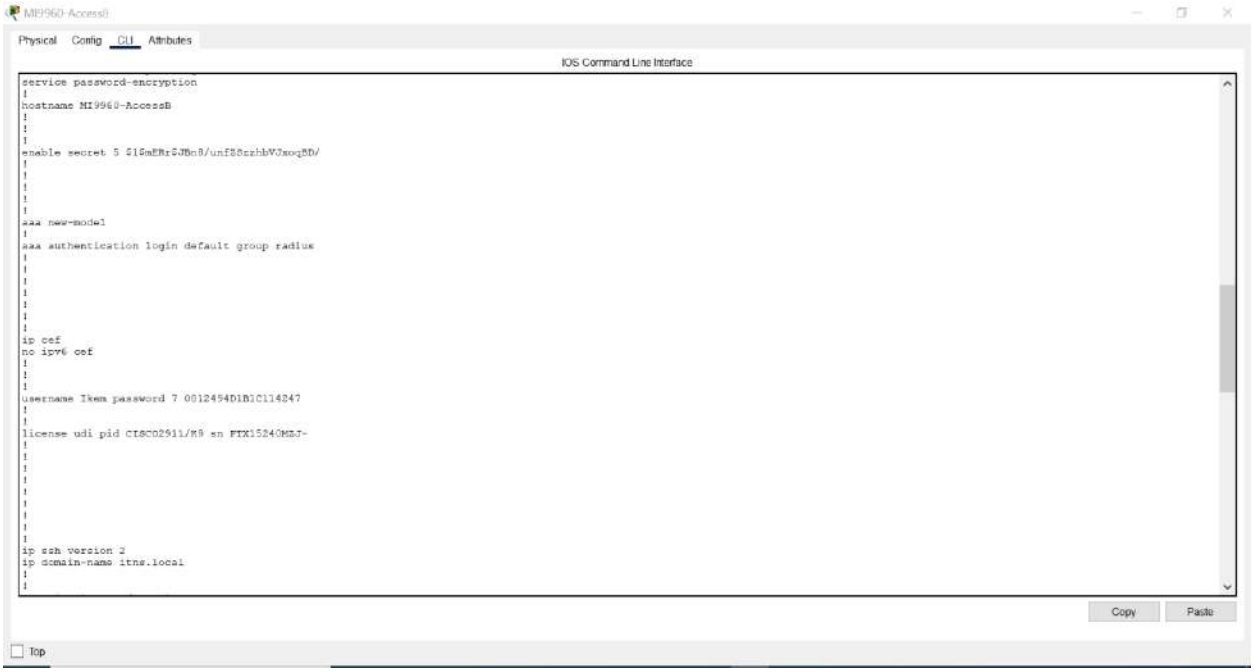


Fig 24 showing the configuration I did in MI9960 Access Router.

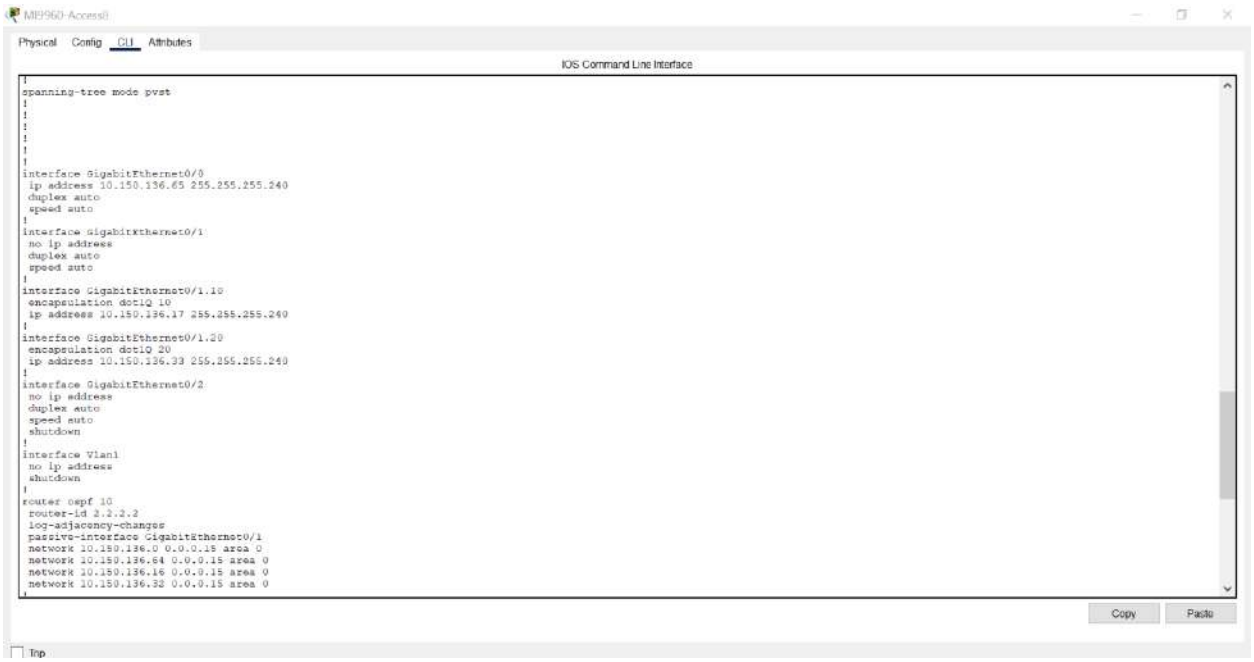


Fig 25 showing the configuration I did in MI9960 Access Router.

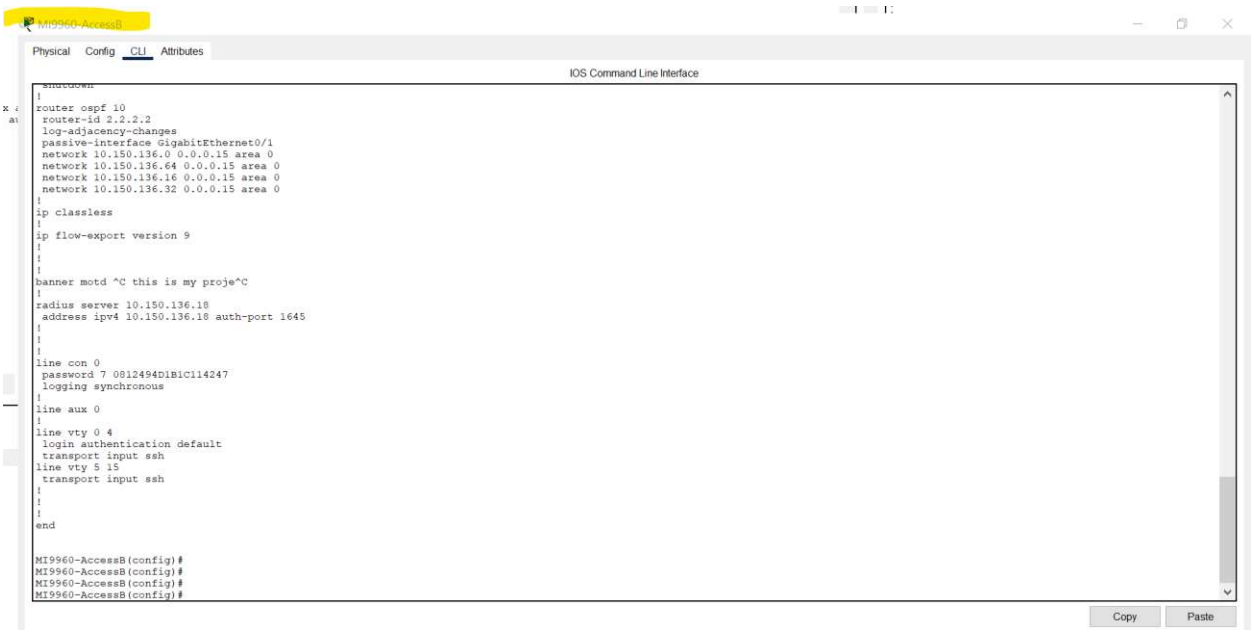


Fig 26 showing the configuration I did in MI9960 Access Router.

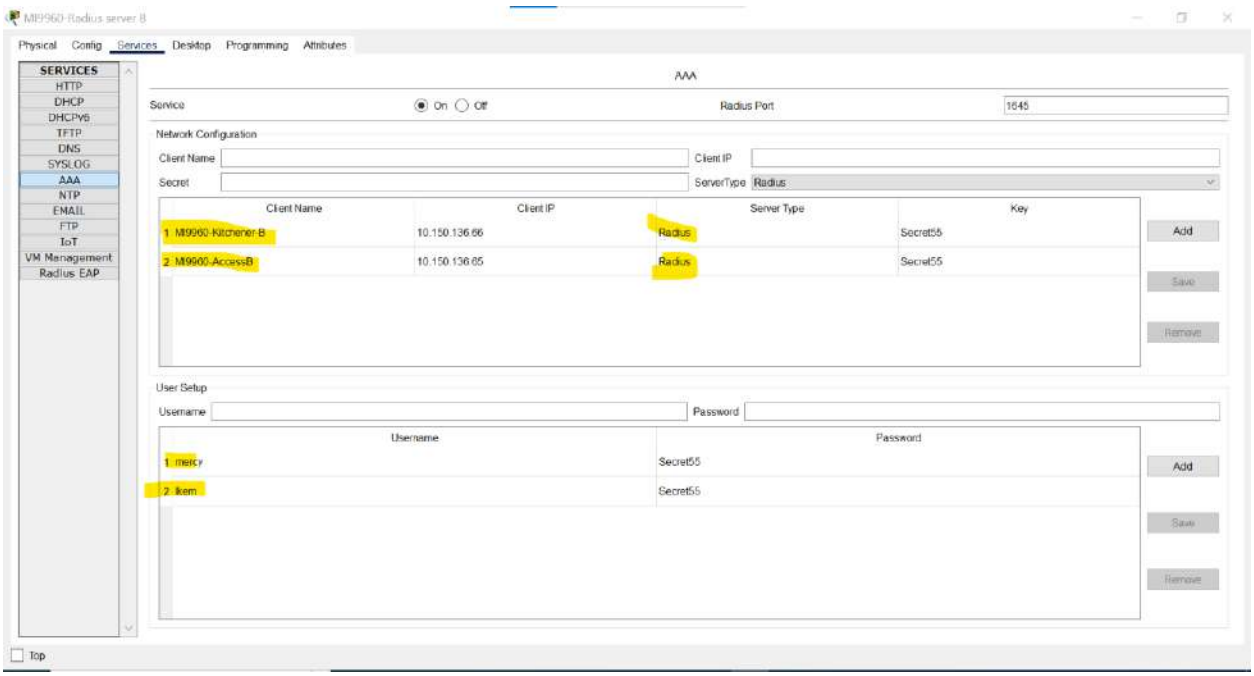
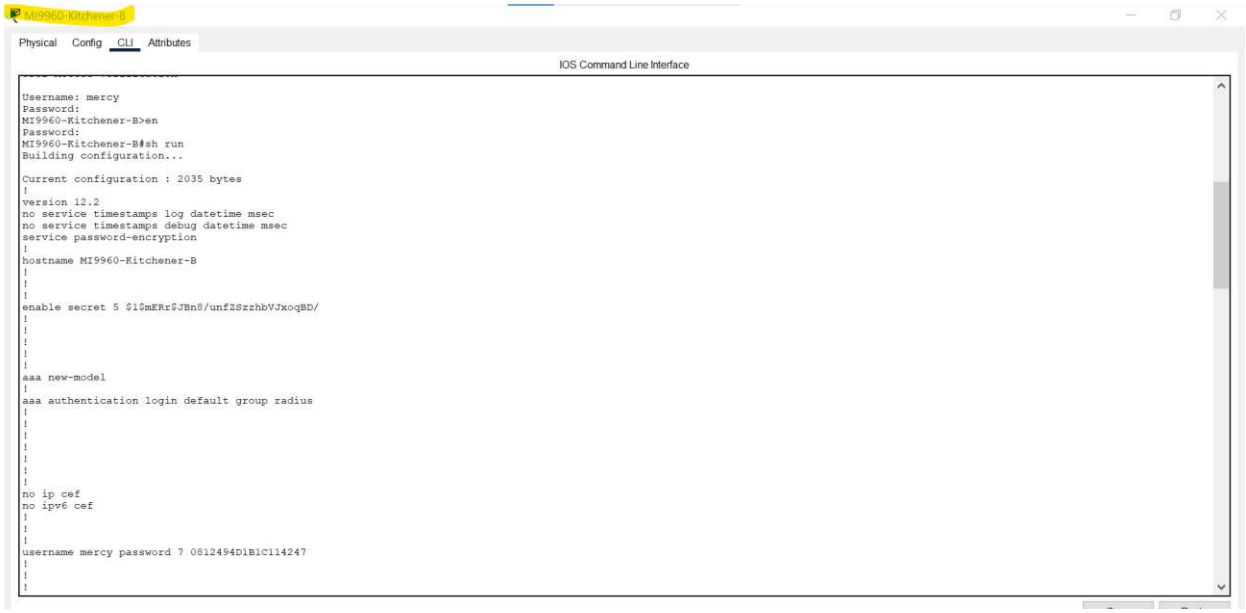


Fig 27 showing that I am using radius authentication for my access router and edge router.




```
Username: mercy
Password:
MI9960-Kitchener-B>en
Password:
MI9960-Kitchener-B#sh run
Building configuration...

Current configuration : 2035 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname MI9960-Kitchener-B
!
!
!
enable secret 5 $1$mERr$JBn8/unfZSzzhbVJxoqBD/
!
!
!
!
!
aaa new-model
!
aaa authentication login default group radius
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username mercy password 7 0812494D1B1C114247
!
!
!
```

Fig 28 showing the configuration I made in my edge router.


```
!
!
!
username mercy password 7 0812494D1B1C114247
!
!
!
!
!
!
!
!
ip ssh version 2
ip domain-name mercy.com
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 10.150.136.177 255.255.255.240
 clock rate 2000000
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
```

Fig 29 showing the configuration I made in my edge router.

Fig 30 shows that my edge router is the main point for my redistribution to take place.

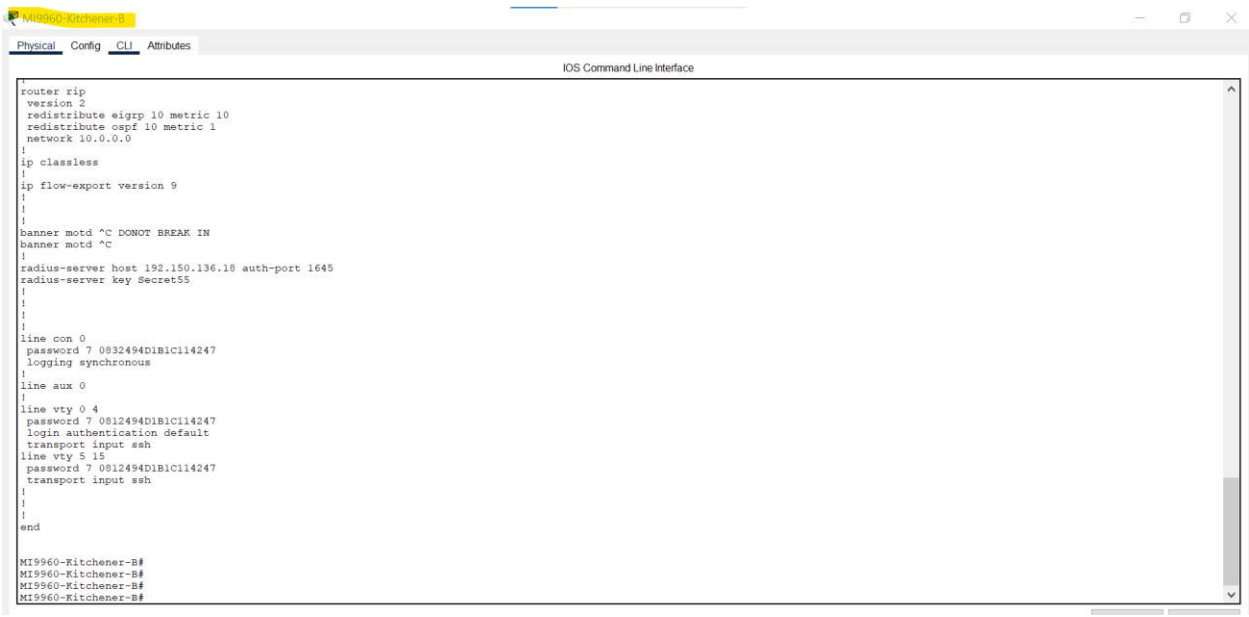


Fig 31 showing the configuration I made in my edge router.

SITE C

DESCRIPTION:
The aim for my site C is to design and implement a network infrastructure for a multi-site organization. I will include three different networks and subnets.

REQUIREMENTS:

- I will ensure that all my computers can communicate with each other.
- I will ensure that all devices in the network can be remotely managed using local authentication.
- I will configure RIP routing protocol between Access and edge router.
- I will configure **redistribution** of routing information between site A and site C.
- I will configure local authentication on my network devices.

DESIGN

- 1 router PT, 1 router PT, 3 PC-PT.
- My three computers will have their own subnets and they will be connected to the access router.
- The access router will be responsible for routing between the different networks. I will configure RIP routing protocol to communicate with the edge router.
- I will configure remote access using local authentication.
- I will use daisy chain connection for SITE C and SITE B.

IP Addressing

- MI9960-PC Guelph 1- 10.150.136.82/28
- MI9960-PC Guelph 2- 10.150.136.98/28
- MI9960-PC Guelph 3- 10.150.136.112/28
- MI9960-Access Guelph – gig4/0 10.150.136.81/28 gig5/0 10.150.136.97/28 gig6/0 10.150.136.113/28 gig7/0 10.150.136.130/28
- MI9960-Edge Guelph- gig6/0 10.150.136.129/28 se9/0 10.150.136.178/28

SCREENSHOT

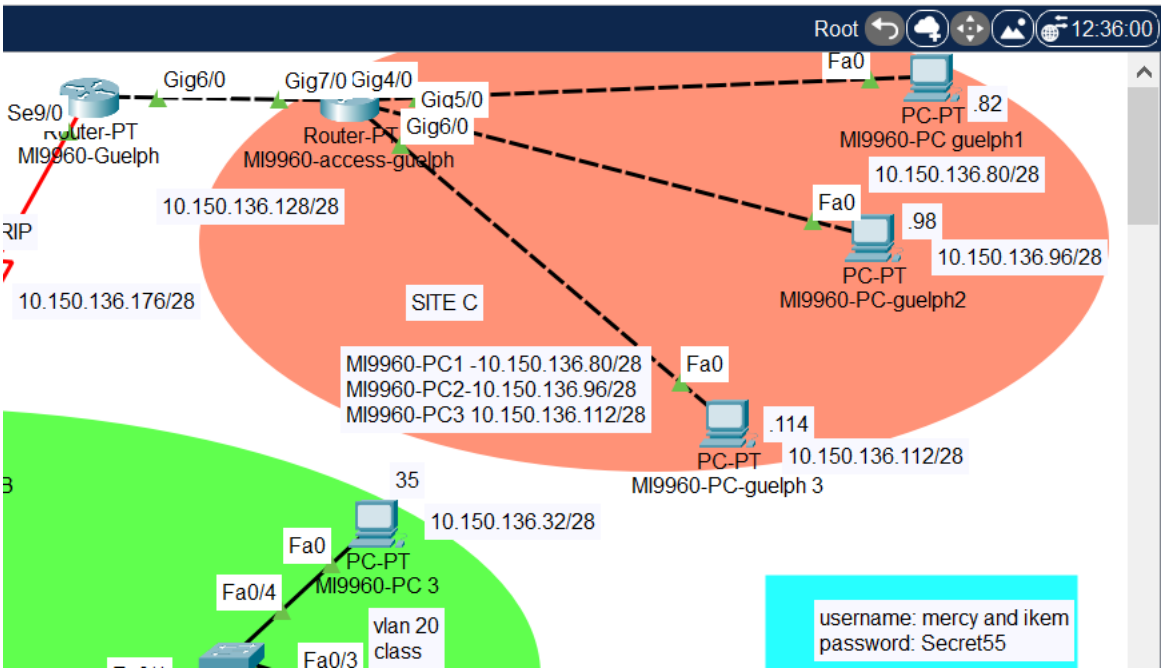


Fig 32 showing the topology for site C.

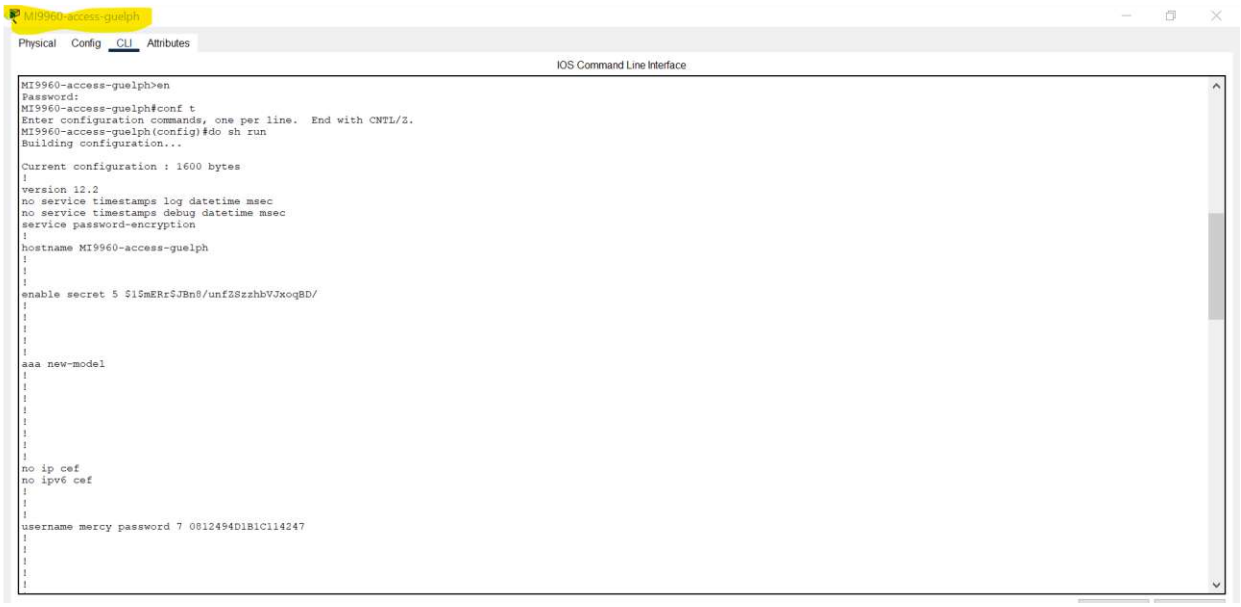


Fig 33 shows the configuration I made in my access router.

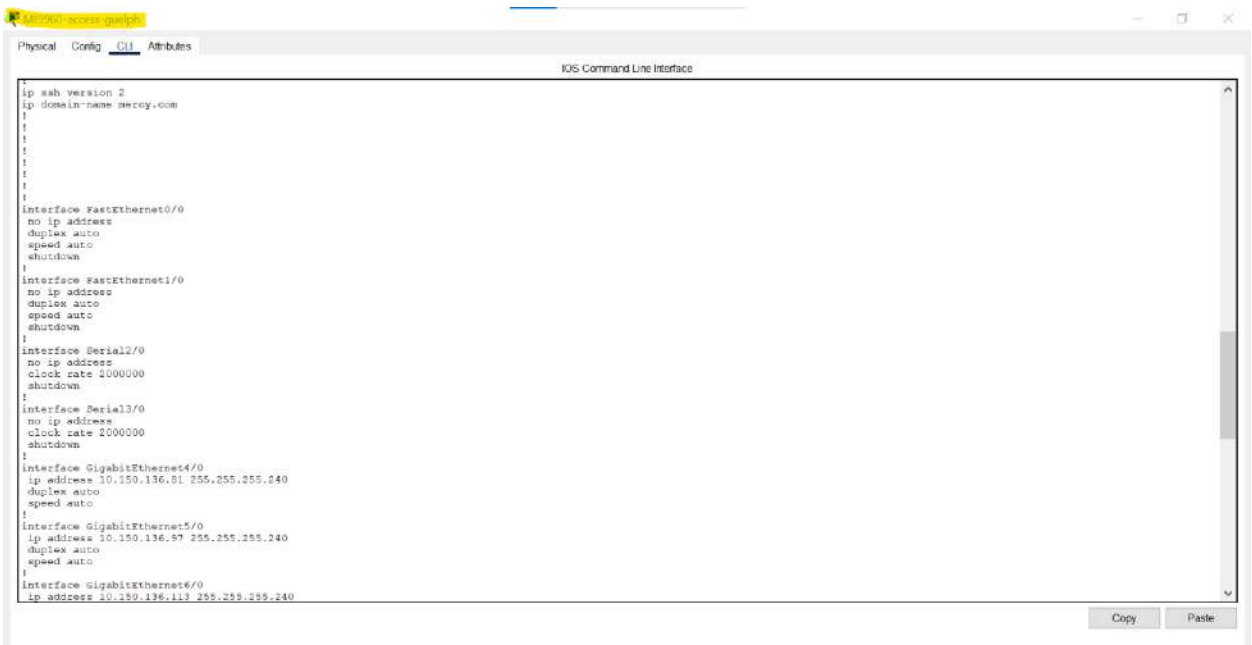


Fig 34 shows the configuration I made in my access router.

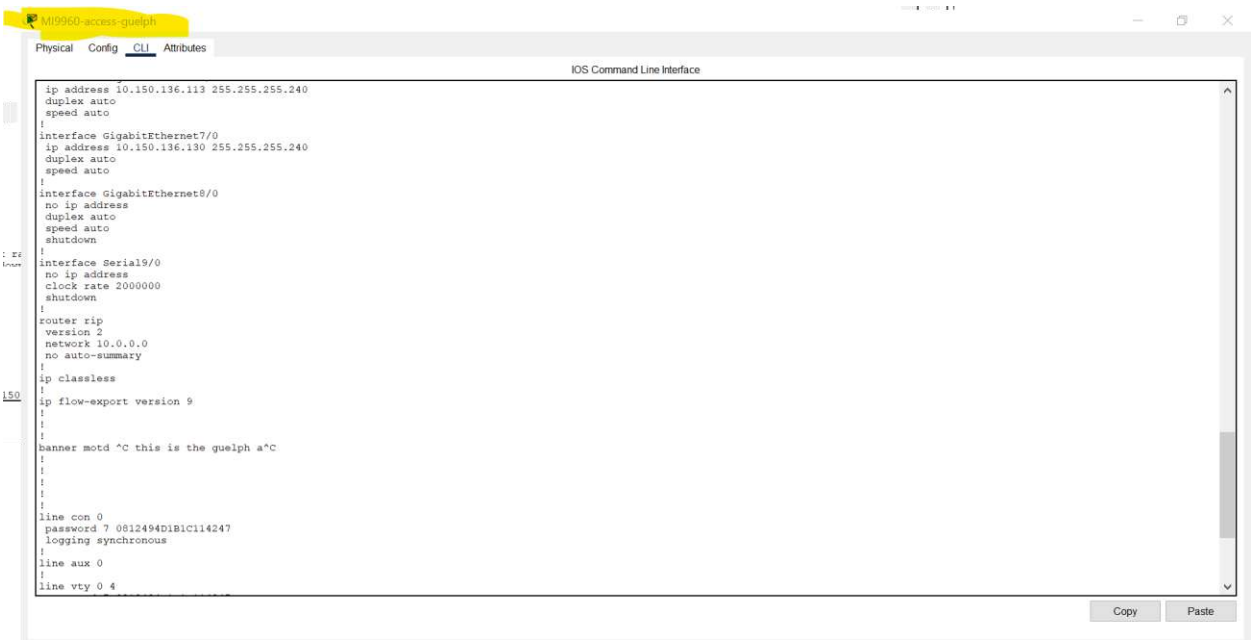


Fig 35 shows the configuration I made in my access router.

Fig 36 shows the configuration I made in my access router.

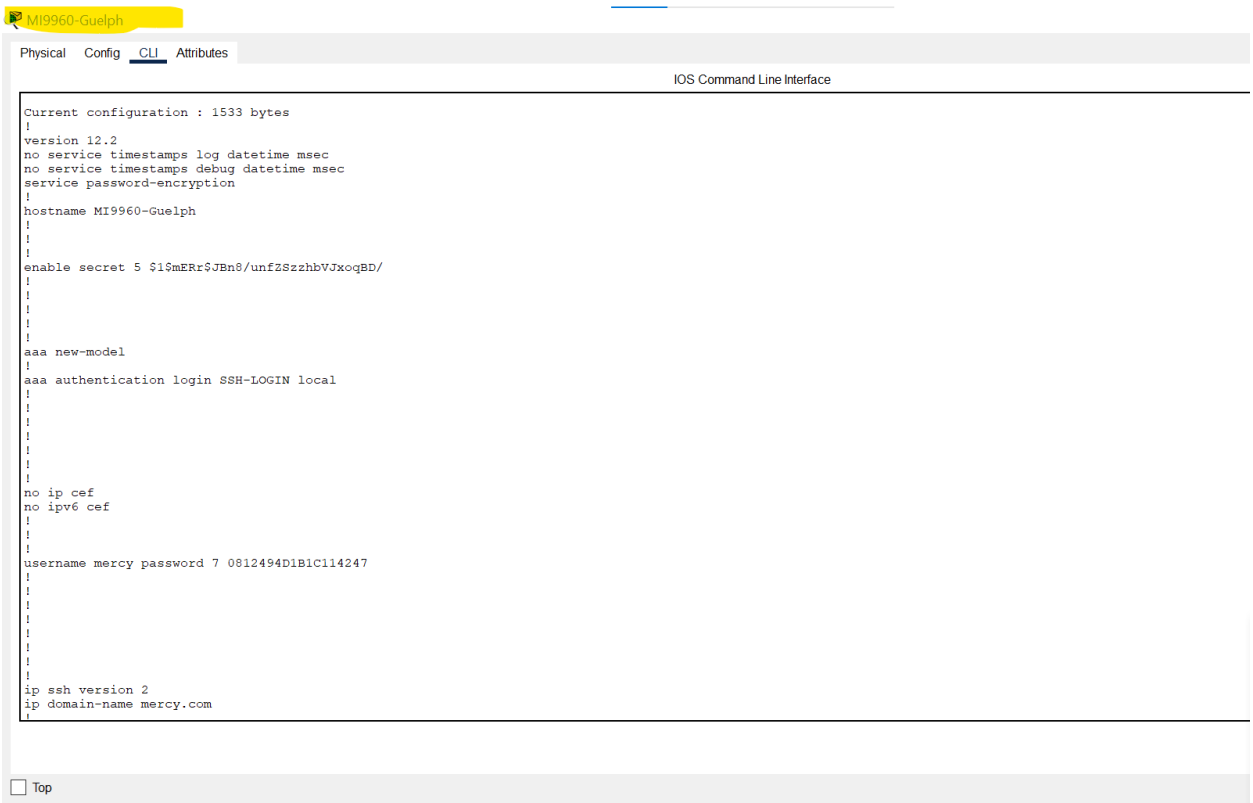


Fig 37 shows the configuration I made in my edge router.

MI9960-Guelph

Physical Config CLI Attributes

IOS Command Line Interface

```
!
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
interface GigabitEthernet6/0
 ip address 10.150.136.129 255.255.255.240
 duplex auto
 speed auto
!
interface GigabitEthernet7/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial9/0
 ip address 10.150.136.178 255.255.255.240
```

Fig 38 shows the configuration I made in my edge router.

MI9960-Guelph

Physical Config CLI Attributes

IOS Command Line Interface

```
 speed auto
 shutdown
!
interface Serial9/0
 ip address 10.150.136.178 255.255.255.240
!
router rip
 version 2
 network 10.0.0.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^C DONOT BREAK IN ^C
!
!
!
!
!
line con 0
 password 7 0812494D1B1C114247
 logging synchronous
 login authentication default
!
line aux 0
!
line vty 0 4
 password 7 0812494D1B1C114247
 login authentication SSH-LOGIN
 transport input ssh
line vty 5 15
 password 7 0812494D1B1C114247
 login authentication SSH-LOGIN
 transport input ssh
!
!
!
end
```

Top

Fig 39 shows the configuration I made in my edge router.

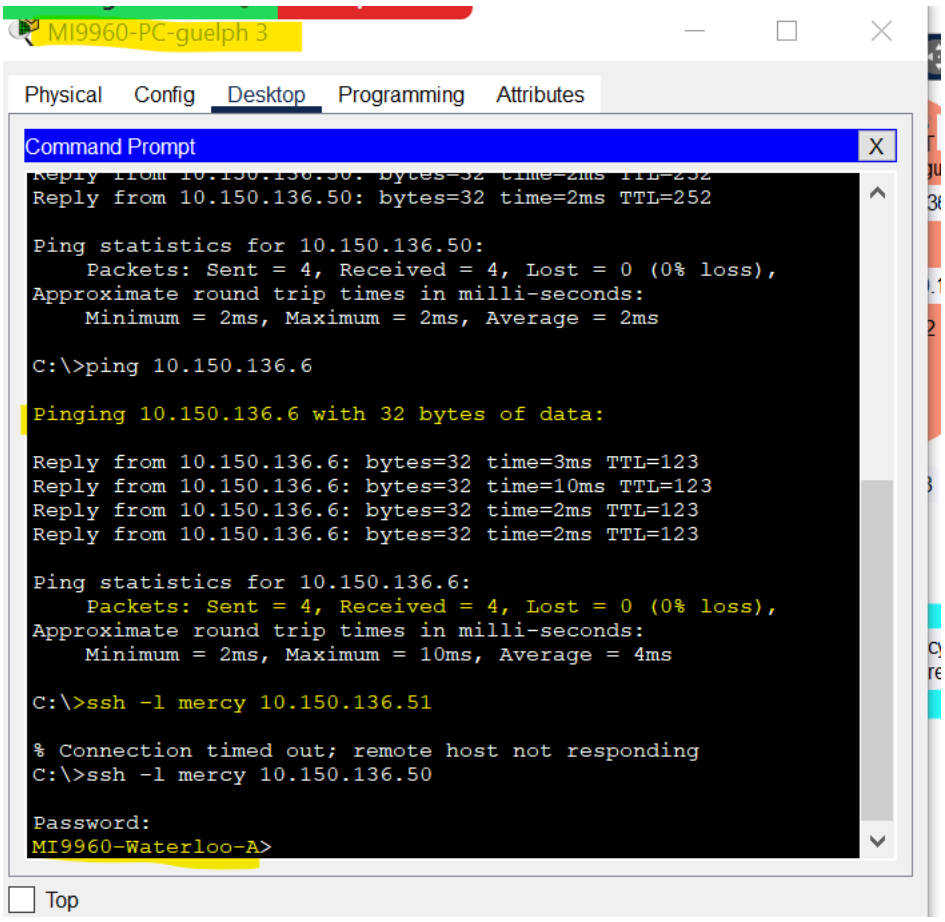


Fig 37 showing that I can ssh into the edge router in site A