**PROJECT**

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**COURSE CODE:** INFO8491-23W

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**DUE DATE:** 16th April,2023.

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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

Diagram

Description automatically generated

fig1 showing my topology showing different sites.

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text

Description automatically generated

Fig 5 showing my customized home page.

Graphical user interface, text, application

Description automatically generated

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

A screenshot of a computer

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, email

Description automatically generated

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

Text

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

Text

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

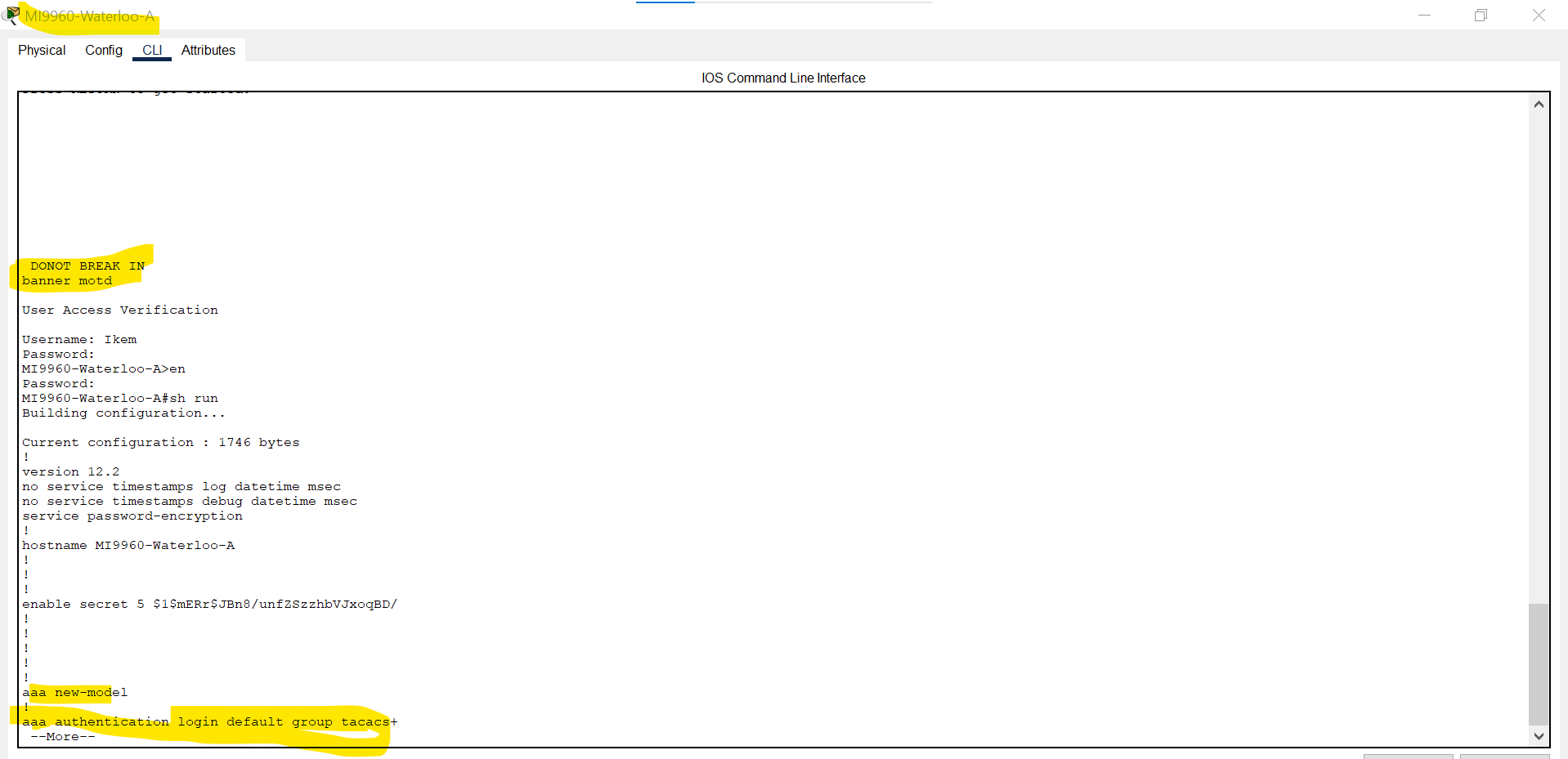


Fig 13 showing the configuration I made on the edge router.

Graphical user interface, text, application

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

Graphical user interface, text, application

Description automatically generated

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

Text

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

Text

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

Diagram

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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

Diagram

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Fig 19 shows my Site B topology.

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, application

Description automatically generated

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

Graphical user interface

Description automatically generated

Fig 22 showing my vlan in my multilayer switch.

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, application

Description automatically generated

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

Graphical user interface, application

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

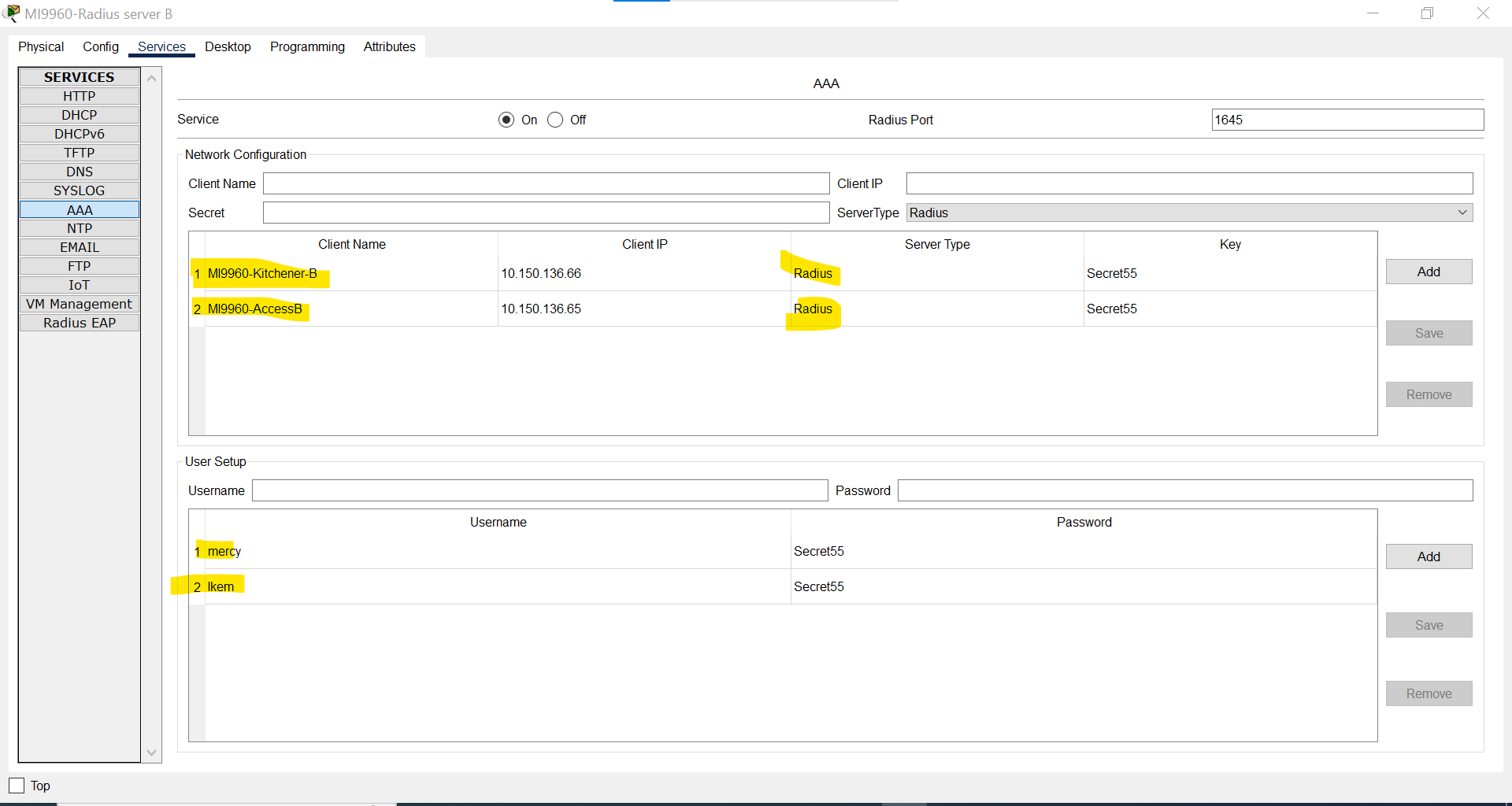


Fig 27 showing that I am using radius authentication for my access router and edge router.

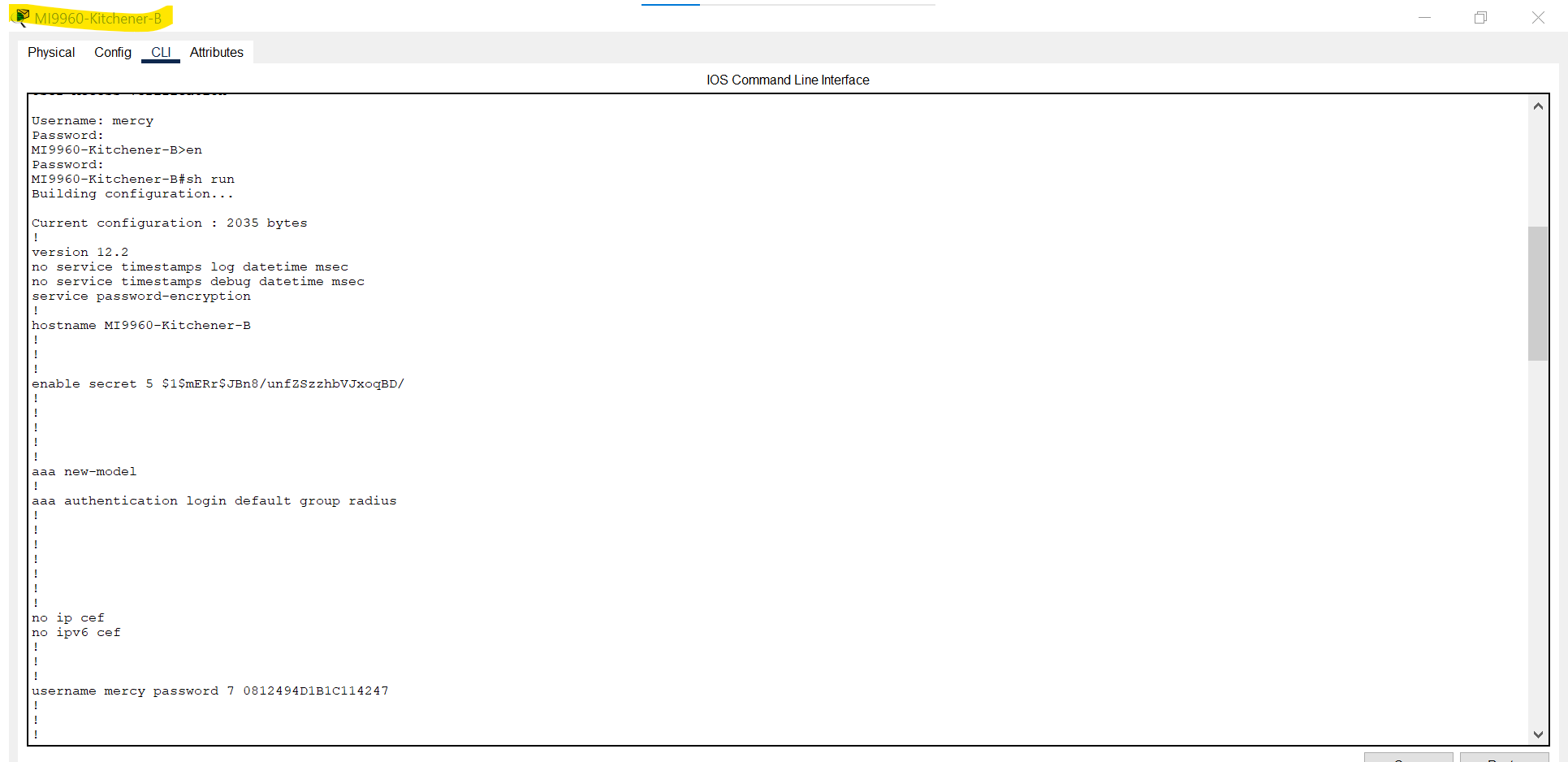


Fig 28 showing the configuration I made in my edge router.

Graphical user interface, text, application, email

Description automatically generated

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

Graphical user interface, application

Description automatically generated

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

Graphical user interface, application

Description automatically generated

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

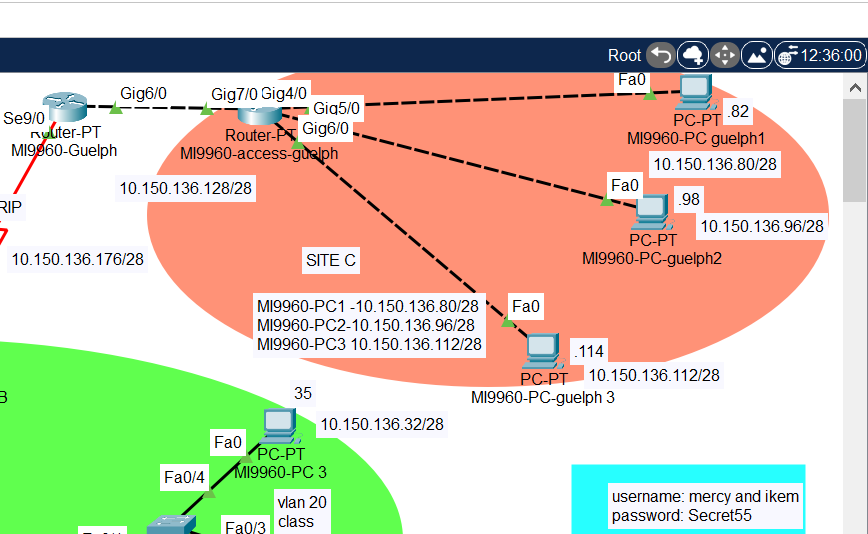


Fig 32 showing the topology for site C.

Graphical user interface, application, Teams

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, application, Teams

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, application, email

Description automatically generated

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

Graphical user interface, text, application

Description automatically generated

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

Graphical user interface, text, application, email

Description automatically generated

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

Text

Description automatically generated

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