ASSIGNMENT 1: VLANS AND SECURE SWITCH CONFIGURATION WRITEUP

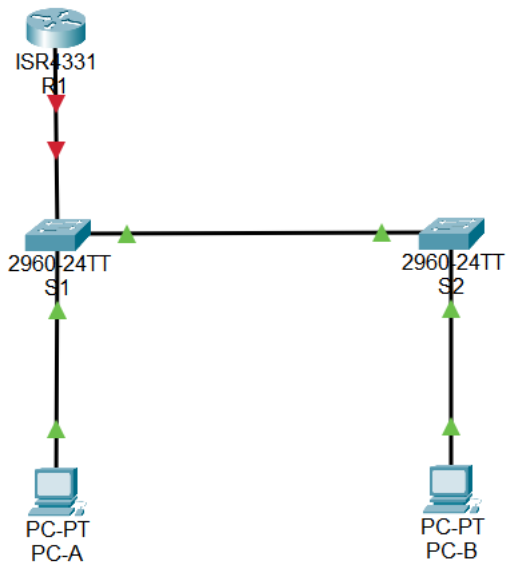
Introduction

In the rapidly evolving world of networking, efficient and secure configuration of network devices is of paramount importance. This assignment aims to provide the learner with skills in network device configuration and various aspects of network security. This assignment is divided into three main parts: Part 1 focuses on configuring the network devices and establishing a solid foundation for the network. Part 2 focuses on the configuration of Virtual LANs (VLANs) on the switches and Part 3 revolves around implementing switch security measures to safeguard the network against potential threats. This involves implementing 802.1Q trunking for efficient VLAN communication.

Part 1: Configure the Network Devices.

Step 1: Cable the network.

In this step cabling of the network with respect to the topology was done as shown below.



Step 2: Configure R1.

In this step, loaded the following configuration script on R1.

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain lookup
R1(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.9
R1(config)#ip dhcp excluded-address 192.168.10.201 192.168.10.202
R1(config)#
R1(config)#ip dhcp pool Students
R1(dhcp-config)#network 192.168.10.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.10.1
R1(dhcp-config)#domain-name secure.com
R1(dhcp-config)#
R1(dhcp-config)#interface Loopback0

R1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R1(config-if)#ip address 10.10.1.1 255.255.255.0
R1(config-if)#
R1(config-if)#interface GigabitEthernet0/0/1
R1(config-if)#description Link to S1 Port 5
R1(config-if)#ip dhcp relay information trusted
               ^
% Invalid input detected at '^' marker.

R1(config-if)#exit
R1(config)#ip dhcp relay information trusted
                                         ^
% Invalid input detected at '^' marker.

R1(config)#ip dhcp relay information trust-all
R1(config)#interface GigabitEthernet0/0/1
R1(config-if)#ip address 192.168.10.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#line con 0
R1(config-line)#logging synchronous
R1(config-line)#exec-timeout 0 0
R1(config-line)#
```

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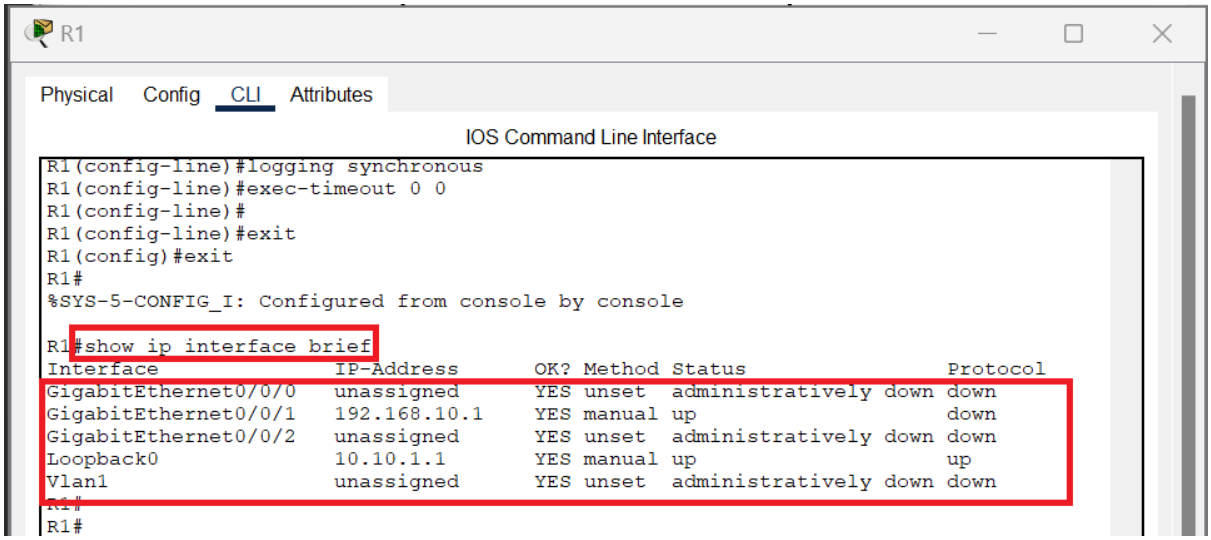
Top

To verify the running-configuration on R1 show ip interface brief command and confirmed the configuration.

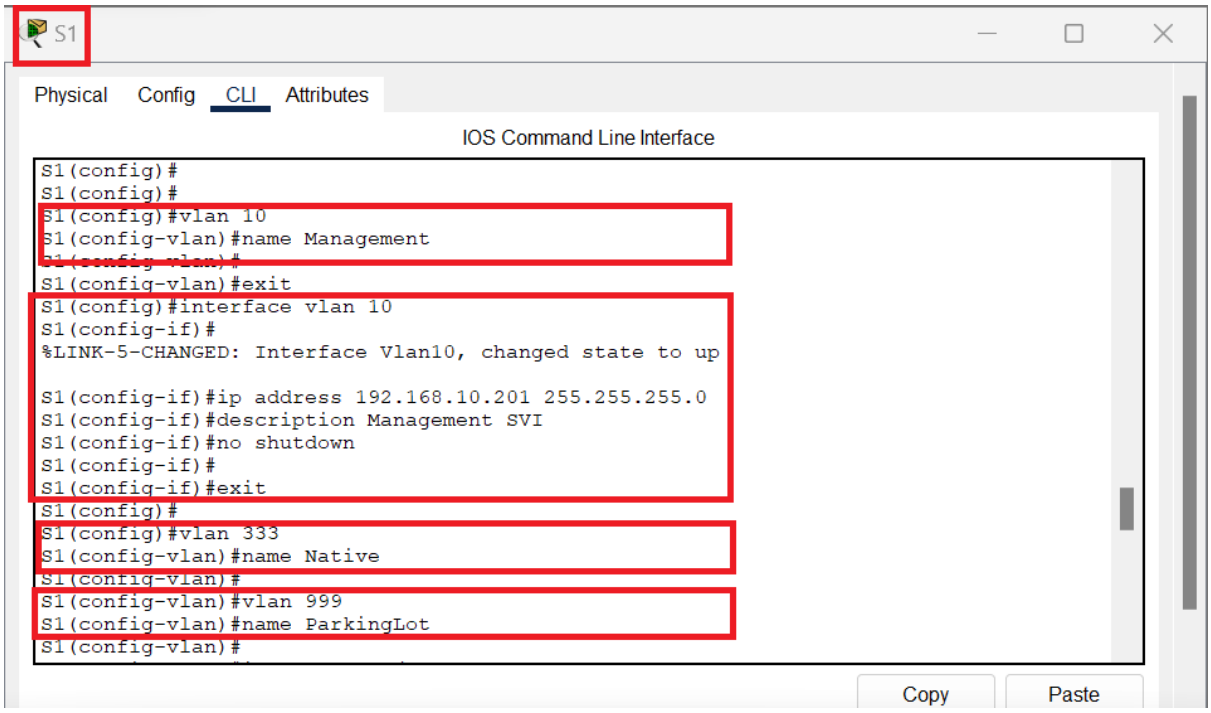


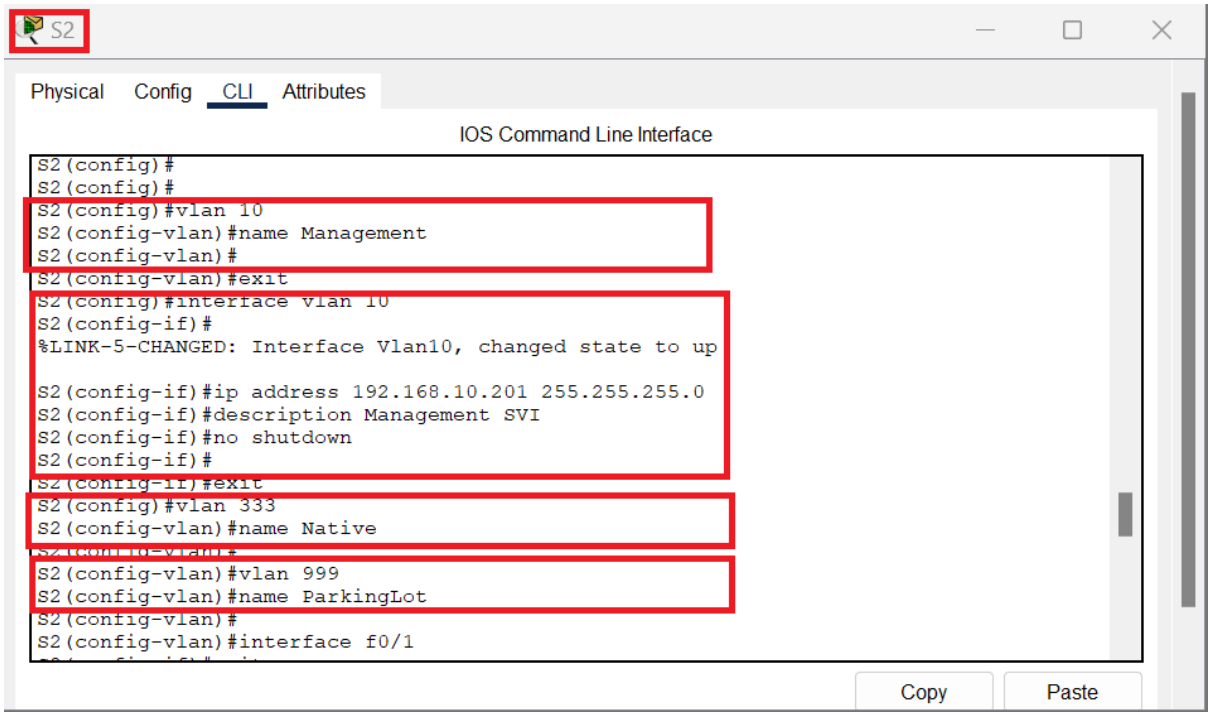
Step 3: Configure and verify basic switch settings.

In this step, configuration of the hostname for switches S1(hostname S1) and S2 (hostname S2) was done, preventing unwanted DNS lookups on both switches, configuring descriptions for the ports that are in use in S1 and S2 and setting of the default-gateway for the Management VLAN to 192.168.10.1 on both switches was done.

Part 2: Configure VLANs on Switches.

In this section details the process of configuring VLANs on Switches. Firstly, we configured VLAN 10 and named it VLAN Management, we then configured the SVI for VLAN 10, then configured VLAN 333 with its name Native and VLAN 999 with packing Lot for both S1 and S2, which can be shown the below pictures:



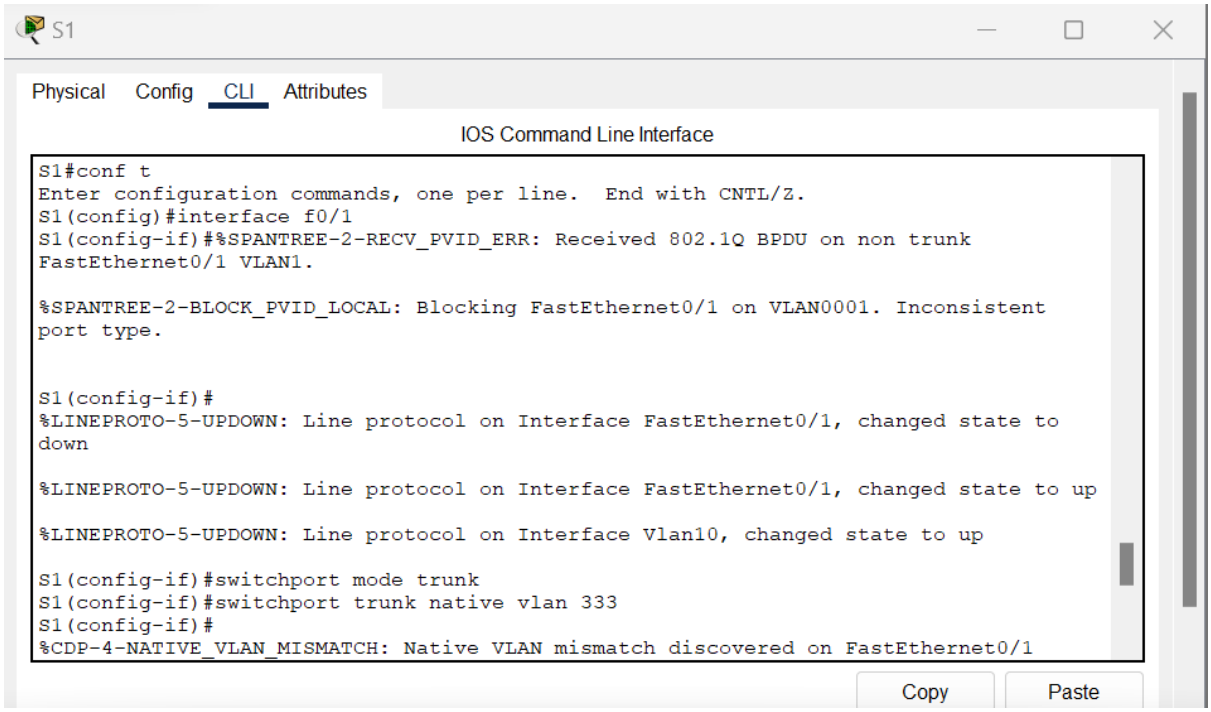


Part 3: Configure Switch Security.

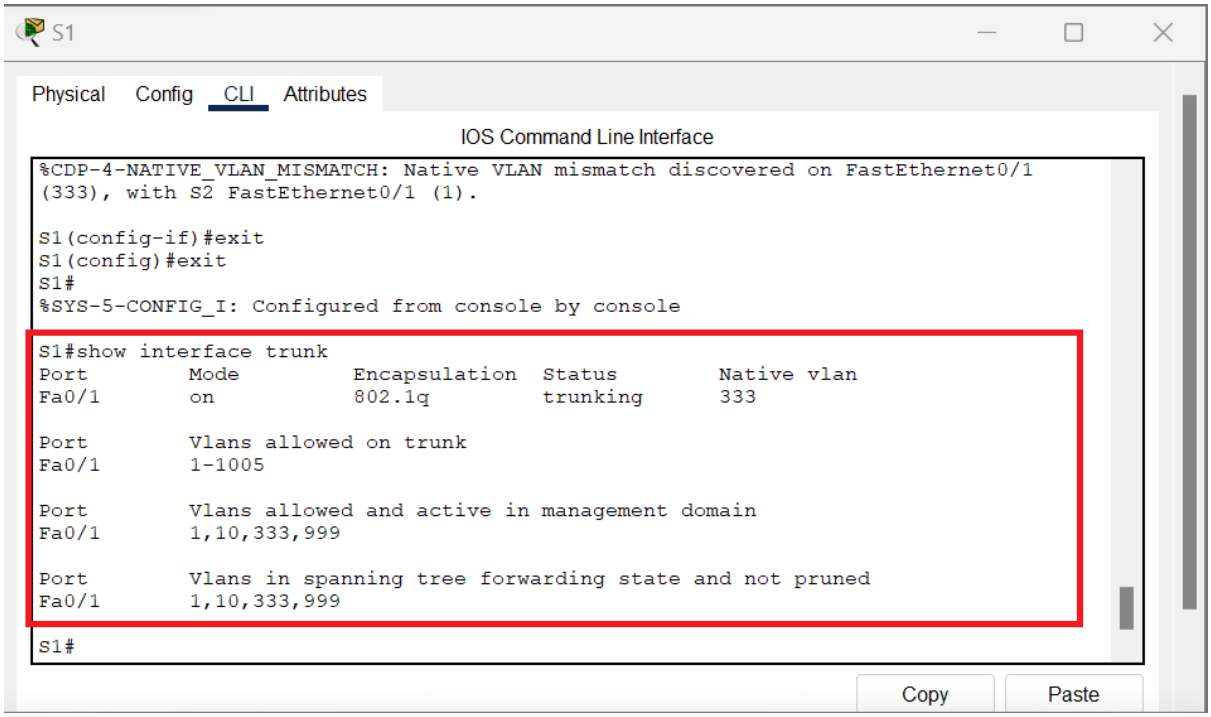
This section presents a step a step process of configuring switch security.

Step 1: Implement 802.1Q trunking.

In this step, configuring trunking on F0/1 to use VLAN 333 as the native VLAN on both switches was done as shown below:



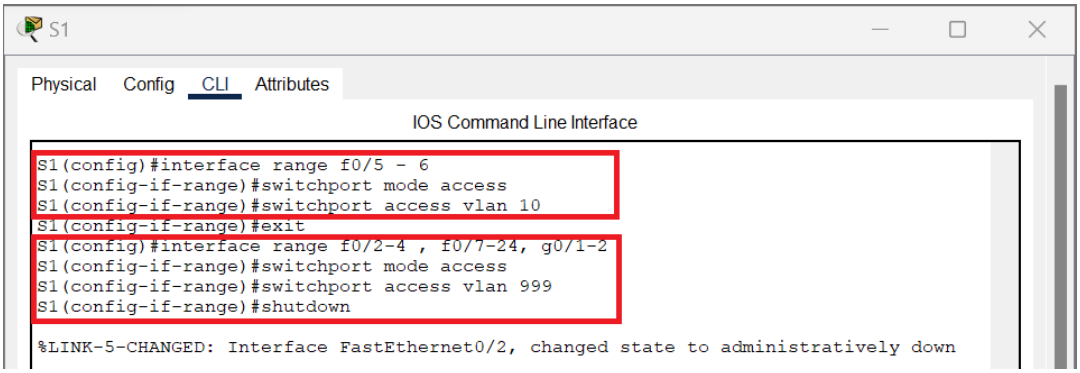
To verify that trunking is configured on both switches the show interface trunk is used.

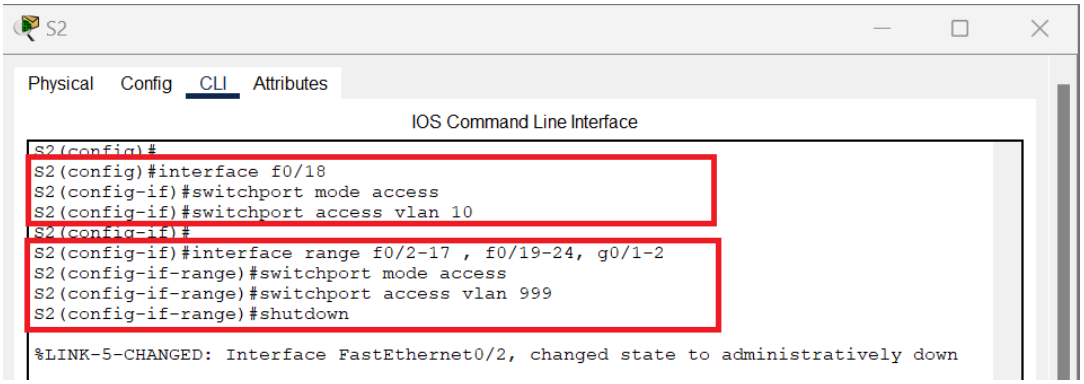


Then disable DTP negotiation on F0/1 on S1 and S2 and verification using show interface command.

Step 2: Configure access ports.

In this step, On S1, configured F0/5 and F0/6 as access ports that are associated with VLAN 10. And On S2, configure F0/18 as an access port that is associated with VLAN 10 and then we secure and disable unused switchports.

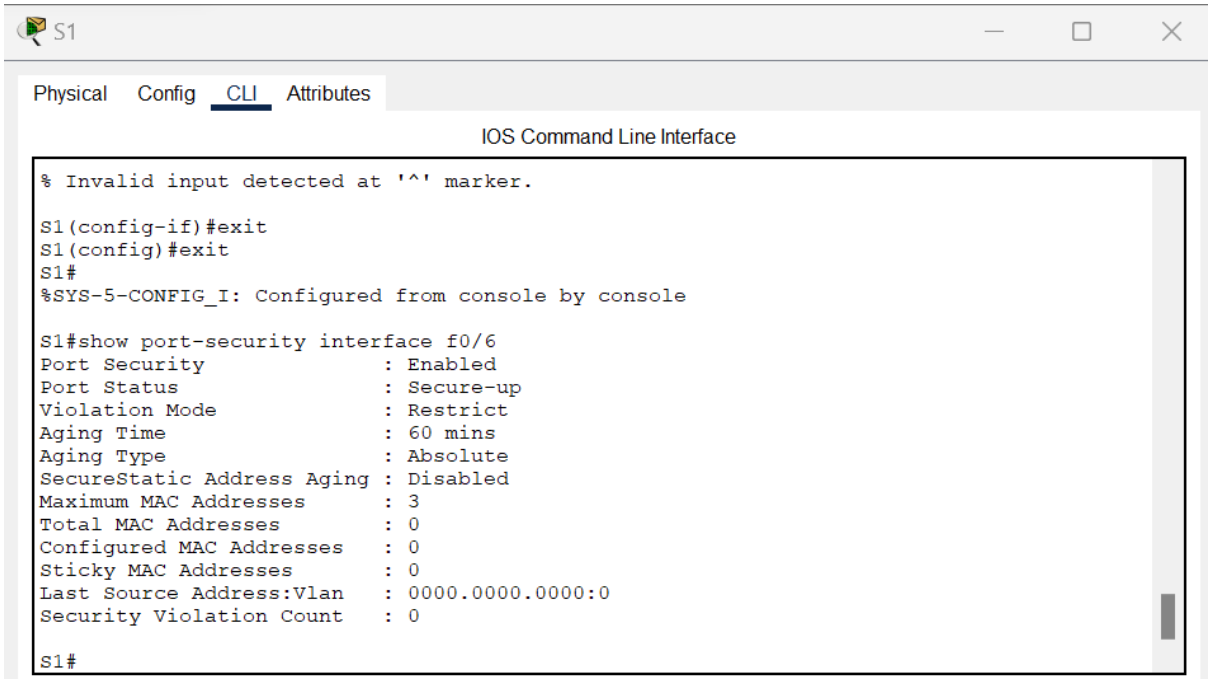




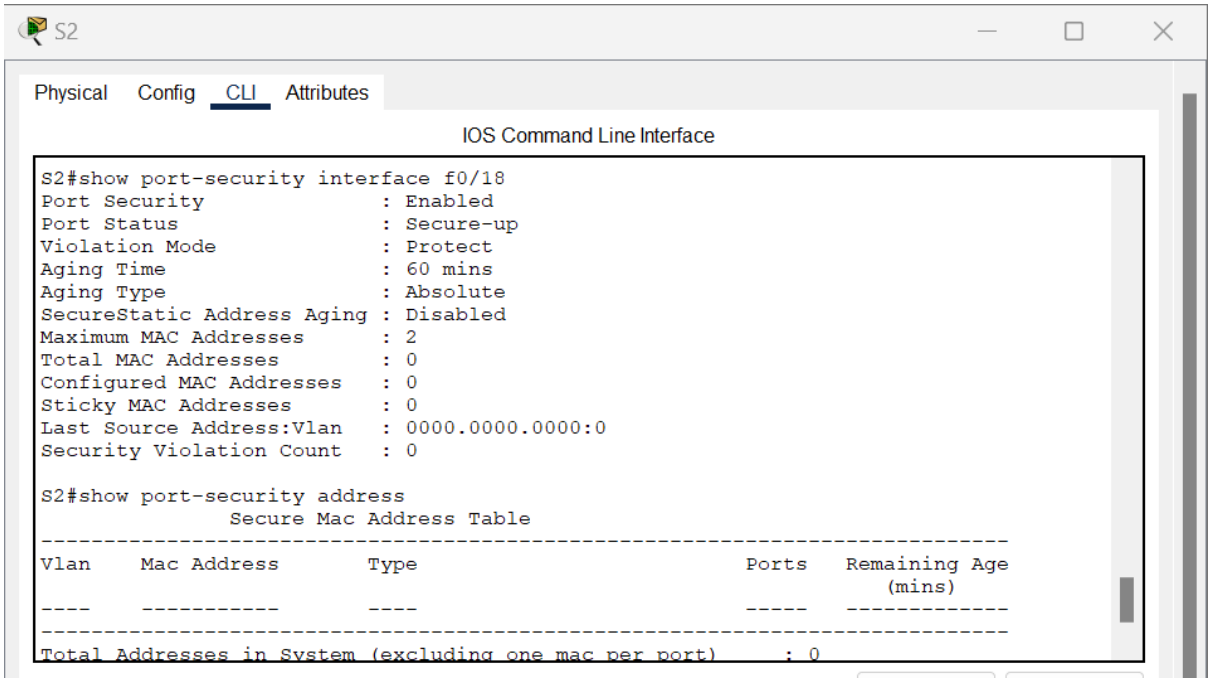
Step 4: Document and implement port security features.

In this step, one will also configure port security on the two access ports.

On S1, enable port security on F0/6 then issue the show port-security interface f0/6 command to display the default port security settings for interface F0/6.



On S2, enable port security for F0/18., then verify with show port-security interface f0/18 command.



Finally, to verify end to end connectivity one should ping from PC-B from PC-A or even the default gateway just as shown below:

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.11

Pinging 192.168.10.11 with 32 bytes of data:

Reply from 192.168.10.11: bytes=32 time=1ms TTL=128
Reply from 192.168.10.11: bytes=32 time=3ms TTL=128
Reply from 192.168.10.11: bytes=32 time<1ms TTL=128
Reply from 192.168.10.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Questions to answer

1. In reference to Port Security on S2, why is there no timer value for the remaining age in minutes when sticky learning was configured?

```
S2
Physical  Config  CLI  Attributes
IOS Command Line Interface
Configured MAC Addresses    : 0
Sticky MAC Addresses        : 1
Last Source Address:Vlan    : 0004.9ABC.1C7C:10
Security Violation Count    : 0

S2#show port-security address
                  Secure Mac Address Table
------------------------------------------------------------------------
Vlan  Mac Address Type              Ports       Remaining Age
                                                (mins)
----  -----------  ----             -----       -------------
10    0004.9ABC.1C7C   SecureSticky             FastEthernet0/18    -
```

This switch does not support the port security aging of sticky secure addresses.

2. In reference to Port Security on S2, if you load the running-config script on S2, why will PC-B on port 18 never get an IP address via DHCP?

Using the show running config. The Port security is set for only two MAC addresses and port 18 has two “sticky” MAC addresses bound to the port. Additionally, the violation is protected, which will never send a console/syslog message or increment the violation counter.

3. In reference to Port Security, what is the difference between the absolute aging type and inactivity aging type?

If the inactivity type is set, then the secure addresses on the port will be removed only if there is no data traffic from the secure source addresses for the specified time period. If the absolute type is set, then all secure addresses on this port age out exactly after the time specified ends.

Conclusion

In conclusion, this assignment has provided a comprehensive exploration of network configuration and security. By accomplishing the outlined objectives, I have gained experience in configuring network devices. The highlight of this assignment lies in Part 3, where I implemented a range of security measures to protect the network from potential threats. By configuring 802.1Q trunking, access ports, and implementing port security features, you have fortified the network's defenses against unauthorized access and devices. Additionally, the implementation of DHCP snooping security, PortFast, and BPDU guard further enhances network stability and mitigates potential vulnerabilities.