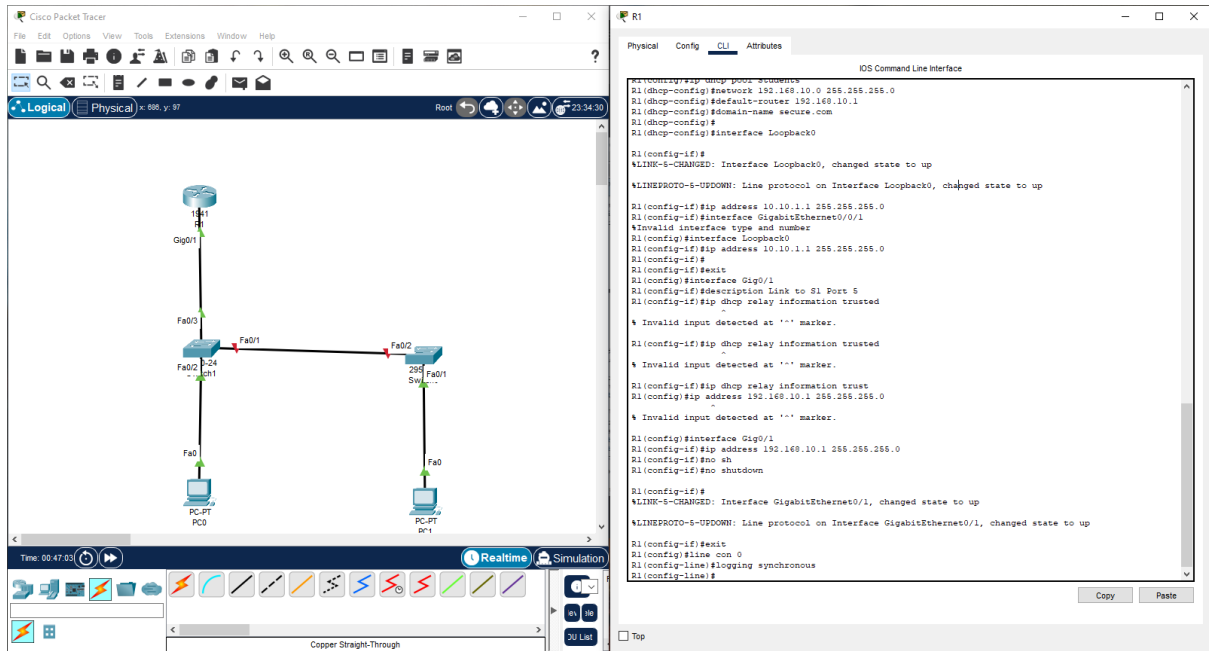
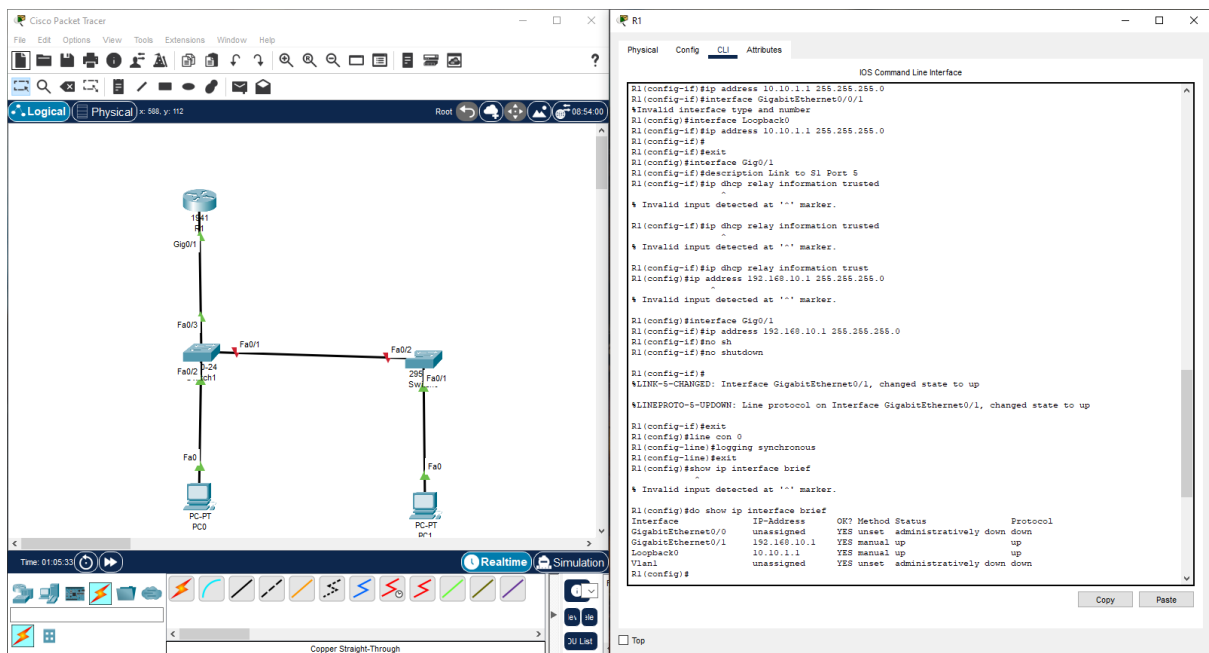


Step 2: Configure R1.



2. Verify the running-configuration on R1 using the following command:



The image displays two side-by-side screenshots of the Cisco IOS Command Line Interface (CLI) for a switch named S2. The left window shows the initial configuration steps, including enabling the switch, setting the hostname to S2, configuring IP addresses for interfaces fa0/1, fa0/5, and fa0/6, and setting up VLANs 10, 333, and 999. The right window shows the continuation of the configuration, including setting the default gateway to 192.168.10.1, configuring the VLAN 10 interface, and enabling the Line Protocol on the interfaces. Both windows show the 'Switch#enable' prompt and the 'Switch#config t' command.

```

Switch#enable
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#no ip domain-lookup
S2(config)#interface fa0/1
S2(config-if)#description Link to S2
S2(config-if)#interface fa0/5
S2(config-if)#description Link to R1
S2(config-if)#interface fa0/6
S2(config-if)#description Link to PC-A
S2(config-if)# ip default-gateway 192.168.10.1
S2(config)# ip default-gateway 192.168.10.1
S2(config)#vlan 10
S2(config-vlan)#name management
S2(config-vlan)#exit
S2(config)#interface vlan 10
S2(config-if)#
*LINK-6-CHANGED: Interface Vlan10, changed state to up
S2(config-if)# ip address 192.168.10.201 255.255.255.0
S2(config-if)#description management SVI
S2(config-if)#no shutdown
S2(config-if)#vlan 333
S2(config-vlan)#name Native
S2(config-vlan)#vlan 999
S2(config-vlan)#name ParkingLot
S2(config-vlan)#exit
S2(config)#interface fa0/1
S2(config-if)#switchport mode trunk

S2(config-if)#
*LINEPROTO-6-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
*LINEPROTO-6-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
*LINEPROTO-6-UPDOWN: Line protocol on Interface Vlan10, changed state to up

S2(config-if)#switchport trunk native vlan 333
S2(config-if)#SPANTRIE-2-RECV_PVID_ERR: Received BPDU with inconsistent peer Vlan id 1 on
FastEthernet0/1. VLAN333.
*SPANTRIE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/1 on VLAN0333. Inconsistent local Vlan.

*CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (333), with S2
FastEthernet0/1 (1).
  
```

The right window shows the continuation of the configuration, including setting the default gateway to 192.168.10.1, configuring the VLAN 10 interface, and enabling the Line Protocol on the interfaces. Both windows show the 'Switch#enable' prompt and the 'Switch#config t' command.

```

Switch#enable
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#no ip domain-lookup
S2(config)#interface fa0/1
S2(config-if)#description Link to S1
S2(config-if)#interface fa0/10
S2(config-if)#description Link to PC-B
S2(config-if)#exit
S2(config)# ip default-gateway 192.168.10.1
S2(config)#vlan 10
S2(config-vlan)#name management
S2(config-vlan)#exit
S2(config)#interface vlan 10
S2(config-if)#
*LINK-6-CHANGED: Interface Vlan10, changed state to up
S2(config-if)# ip address 192.168.10.202 255.255.255.0
S2(config-if)#description Management SVI
S2(config-if)#no shutdown
S2(config-if)#vlan 333
S2(config-vlan)#name Native
S2(config-vlan)#vlan 999
S2(config-vlan)#name ParkingLot
S2(config-vlan)#SPANTRIE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/1. VLAN1.
*SPANTRIE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/1 on VLAN0001. Inconsistent port type.

*LINEPROTO-6-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
*LINEPROTO-6-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
*LINEPROTO-6-UPDOWN: Line protocol on Interface Vlan10, changed state to up

S2(config-vlan)#exit
S2(config)#interface
*CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (1), with S1
FastEthernet0/Interface

* Invalid input detected at ... marker.

S2(config)#interface fa0/1
S2(config-if)#switchport mode trunk
S2(config-if)#switchport trunk native vlan 33
  
```

Part 3: Configure Switch Security.

Verify that trunking is configured on both switches.

The image displays two parallel Cisco IOS CLI windows. The left window shows the following commands and outputs:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up
S1(config-if)#switchport trunk native vlan 333
S1(config-if)#SPANTRREE-2-RECV_VPID_ERR: Received BPDU with inconsistent peer Vlan id 1 on FastEthernet0/1 VLAN333.
%SPANTRREE-2-BLOCK_VPID_LOCAL: Blocking FastEthernet0/1 on VLAN0333. Inconsistent local vlan.
%VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (333), with S2 FastEthernet0/1 (1).
%VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (333), with S2 FastEthernet0/1 (1).
%SPANTRREE-2-UNBLOCK_CONSIST_POST: Unblocking FastEthernet0/1 on VLAN0001. Port consistency restored.
%SPANTRREE-2-UNBLOCK_CONSIST_POST: Unblocking FastEthernet0/1 on VLAN0333. Port consistency restored.
```

The right window shows the following commands and outputs:

```
S1(config-if)#exit
S1(config)#exit
$SYS-5-CONFIG_I: Configured from console by console
S1#copy run
S1#copy running-config sta
S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S1#show interface trunk
Port      Mode      Encapsulation   Status        Native vlan
Fa0/1     on        802.1q           trunking      333
Port      Vlans allowed on trunk
Fa0/1     1-1005
Port      Vlans allowed and active in management domain
Fa0/1     1,10,333,999
Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     1,10,333,999
S1#
```

Step 2: Configure access ports.

Step 3: Secure and disable unused switchports.

Verify that unused ports are disabled and associated with VLAN 999 by issuing the show command.

```
S2
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S2(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/18, changed state to down
S2(config-if-range)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#copy run
S2#copy running-config
S2#copy running-config star
S2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S2#show interface status
Port      Name      Status      Vlan      Duplex  Speed  Type
Fa0/1     Link to S1 connected    trunk    auto     auto   10/100BaseTX
Fa0/2                                     disabled  999      auto     auto   10/100BaseTX
Fa0/3                                     disabled  999      auto     auto   10/100BaseTX
Fa0/4                                     disabled  999      auto     auto   10/100BaseTX
Fa0/5                                     disabled  999      auto     auto   10/100BaseTX
Fa0/6                                     disabled  999      auto     auto   10/100BaseTX
Fa0/7                                     disabled  999      auto     auto   10/100BaseTX
Fa0/8                                     disabled  999      auto     auto   10/100BaseTX
Fa0/9                                     disabled  999      auto     auto   10/100BaseTX
Fa0/10                                    disabled  999      auto     auto   10/100BaseTX
Fa0/11                                    disabled  999      auto     auto   10/100BaseTX
Fa0/12                                    disabled  999      auto     auto   10/100BaseTX
Fa0/13                                    disabled  999      auto     auto   10/100BaseTX
Fa0/14                                    disabled  999      auto     auto   10/100BaseTX
Fa0/15                                    disabled  999      auto     auto   10/100BaseTX
Fa0/16                                    disabled  999      auto     auto   10/100BaseTX
Fa0/17                                    disabled  999      auto     auto   10/100BaseTX
Fa0/18     Link to PC-B notconnect  10       auto     auto   10/100BaseTX
Fa0/19                                     disabled  999      auto     auto   10/100BaseTX
Fa0/20                                     disabled  999      auto     auto   10/100BaseTX
Fa0/21                                     disabled  999      auto     auto   10/100BaseTX
--More--

S1
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S1(config-if-range)#exit
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#copy run
S1#copy running-config star
S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S1#show interface status
Port      Name      Status      Vlan      Duplex  Speed  Type
Fa0/1     Link to S2 connected    trunk    auto     auto   10/100BaseTX
Fa0/2                                     disabled  999      auto     auto   10/100BaseTX
Fa0/3                                     disabled  999      auto     auto   10/100BaseTX
Fa0/4                                     disabled  999      auto     auto   10/100BaseTX
Fa0/5     Link to R1 connected    10       auto     auto   10/100BaseTX
Fa0/6     Link to PC-A connected    10       auto     auto   10/100BaseTX
Fa0/7                                     disabled  999      auto     auto   10/100BaseTX
Fa0/8                                     disabled  999      auto     auto   10/100BaseTX
Fa0/9                                     disabled  999      auto     auto   10/100BaseTX
Fa0/10                                    disabled  999      auto     auto   10/100BaseTX
Fa0/11                                    disabled  999      auto     auto   10/100BaseTX
Fa0/12                                    disabled  999      auto     auto   10/100BaseTX
Fa0/13                                    disabled  999      auto     auto   10/100BaseTX
Fa0/14                                    disabled  999      auto     auto   10/100BaseTX
Fa0/15                                    disabled  999      auto     auto   10/100BaseTX
Fa0/16                                    disabled  999      auto     auto   10/100BaseTX
Fa0/17                                    disabled  999      auto     auto   10/100BaseTX
Fa0/18                                    disabled  999      auto     auto   10/100BaseTX
Fa0/19                                    disabled  999      auto     auto   10/100BaseTX
Fa0/20                                    disabled  999      auto     auto   10/100BaseTX
Fa0/21                                    disabled  999      auto     auto   10/100BaseTX
--More--
```

Step 4: Document and implement port security features.

Verify port security on S1 F0/6.

Verify port security on S2 F0/18

```
S2
S2#config t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)#interface fa0/18
S2(config-if)#switchport port-security
S2(config-if)#switchport port-security mac-address sticky
S2(config-if)#exit
S2(config)#interface fa0/18
S2(config-if)# switchport port-security aging time 60
S2(config-if)#switchport port-security maximum 1
S2(config-if)#switchport port-security violation protect
S2(config-if)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#copy run
S2#copy running-config sta
S2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S2#show port-security interface fa0/18
Port Security          : Enabled
Port Status            : Secure-down
Violation Mode         : Protect
Aging Time             : 60 mins
Aging Type              : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses  : 1
Total MAC Addresses    : 0
Configured MAC Addresses : 0
Sticky MAC Addresses   : 0
Last Source Address:Vlan : 0000.0000.0000:0
Security Violation Count : 0

S2#config t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)# ip dhcp snooping
S2(config)# ip dhcp snooping vlan 10
S2(config)#interface fa0/1
S2(config-if)# ip dhcp snooping trust
S2(config-if)#exit
S2(config)#interface fa0/18
S2(config-if)#ip dhcp snooping limit rate 5
S2(config-if)#exit
S2(config)#exit
S2#

S1
% Invalid input detected at '' marker.
S1(config-if)#switchport port-security aging inactivity
% Invalid input detected at '' marker.
S1(config-if)#switchport port-security aging
% Invalid input detected at '' marker.
S1(config-if)#switchport port-security aging help
% Invalid input detected at '' marker.
S1(config-if)#switchport port-security aging -h
% Invalid input detected at '' marker.
S1(config-if)#help
% Invalid input detected at '' marker.
S1(config-if)#exit
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
cop
% Incomplete command.
S1#copy run
S1#copy running-config at
S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S1#show port-security interface fa0/6
Port Security          : Enabled
Port Status            : Secure-up
Violation Mode         : Restrict
Aging Time             : 60 mins
Aging Type              : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses  : 1
Total MAC Addresses    : 0
Configured MAC Addresses : 0
Sticky MAC Addresses   : 0
Last Source Address:Vlan : 0000.0000.0000:0
Security Violation Count : 0
```

Step 5: Implement DHCP snooping security.

Verify DHCP Snooping on S2.

From the command prompt on PC-B, release and then renew the IP address.

Verify the DHCP snooping binding using the show ip dhcp snooping binding command.

The screenshot displays two windows from Cisco Packet Tracer. The left window, titled 'PCB', shows the 'Command Prompt' for a Cisco Packet Tracer PC Command Line 1.0. The user has entered the following commands and received the corresponding output:

```
C:\>ipconfig /release

IP Address . . . . . : 0.0.0.0
Subnet Mask . . . . . : 0.0.0.0
Default Gateway . . . . : 0.0.0.0
DNS Server . . . . . : 0.0.0.0

C:\>ipconfig /renew

IP Address . . . . . : 0.0.0.0
Subnet Mask . . . . . : 0.0.0.0
Default Gateway . . . . : 0.0.0.0
DNS Server . . . . . : 0.0.0.0

C:\>ipconfig /renew

IP Address . . . . . : 192.168.10.11
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . : 192.168.10.1
DNS Server . . . . . : 0.0.0.0

C:\>
```

The right window, titled 'S2', shows the 'IOS Command Line Interface' for a switch. The user has entered the following commands and received the corresponding output:

```
S2(config)#exit
S2#
%SYS-6-CONFIG_I: Configured from console by console

S2#show port-security interface fa0/18
Port Security : Enabled
Port Status : Secure-up
Violation Mode : Protect
Aging Time : 60 mins
Aging Type : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses : 3
Total MAC Addresses : 1
Configured MAC Addresses : 0
Sticky MAC Addresses : 1
Last Source Address:Vlan : 0001.C902.4239:10
Security Violation Count : 0

S2#show port-security address
Secure Mac Address Table
-----
Vlan  Mac Address      Type      Ports  Remaining Age (mins)
----  -
10     0001.C902.4239    SecureSticky Fa0/18  -
Total Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 1024

S2#show ip dhcp snooping
Switch DHCP snooping is enabled
DHCP snooping is configured on following VLANs:
10
Insertion of option 82 is enabled
Option 82 on untrusted port is not allowed
Verification of hwaddr field is enabled
Interface      Trusted      Rate limit (pps)
-----
FastEthernet0/1  yes         unlimited
FastEthernet0/18 no           5

S2#show ip dhcp snooping binding
MacAddress      IpAddress      Lease(sec)  Type           VLAN  Interface
-----
00:01:C9:02:42:39 192.168.10.11  0           dhcp-snooping  10    FastEthernet0/18
Total number of bindings: 1

S2#
```

Step 6: Implement PortFast and BPDU guard.

The screenshot displays two windows from Cisco Packet Tracer. The left window shows the network topology in the 'Logical' tab. A central switch (S1) is connected to a router (R1) via its Fa0/5 interface and to two PCs (PC-PT PCA and PC-PT PCB) via its Fa0/18 and Fa0/19 interfaces. The router is connected to a cloud labeled '19 Giga0/1'. The PCs are connected to the switch via their Fa0 interfaces. The switch is also connected to a cloud labeled '2668'. The right window, titled 'S1', shows the 'IOS Command Line Interface' for a switch. The user has entered the following commands and received the corresponding output:

```
S1#
S1#enable
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#interface fa0/6
S1(config-if)#switchport port-security
S1(config-if)#switchport port-security maximum 3
S1(config-if)#switchport port-security violation restrict
S1(config-if)#switchport port-security aging time 60
S1(config-if)#switchport port-security aging type inactivity

% Invalid input detected at '^' marker.

S1(config-if)#do switchport port-security aging type inactivity
switchport port-security aging type inactivity

% Invalid input detected at '^' marker.

S1(config-if)#do show port-security interface fa0/6
Port Security : Enabled
Port Status : Secure-up
Violation Mode : Restrict
Aging Time : 60 mins
Aging Type : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses : 3
Total MAC Addresses : 1
Configured MAC Addresses : 0
Sticky MAC Addresses : 0
Last Source Address:Vlan : 0001.6376.5791:10
Security Violation Count : 0

S1(config-if)#
```

Step 7: Verify end-to-end connectivity.

