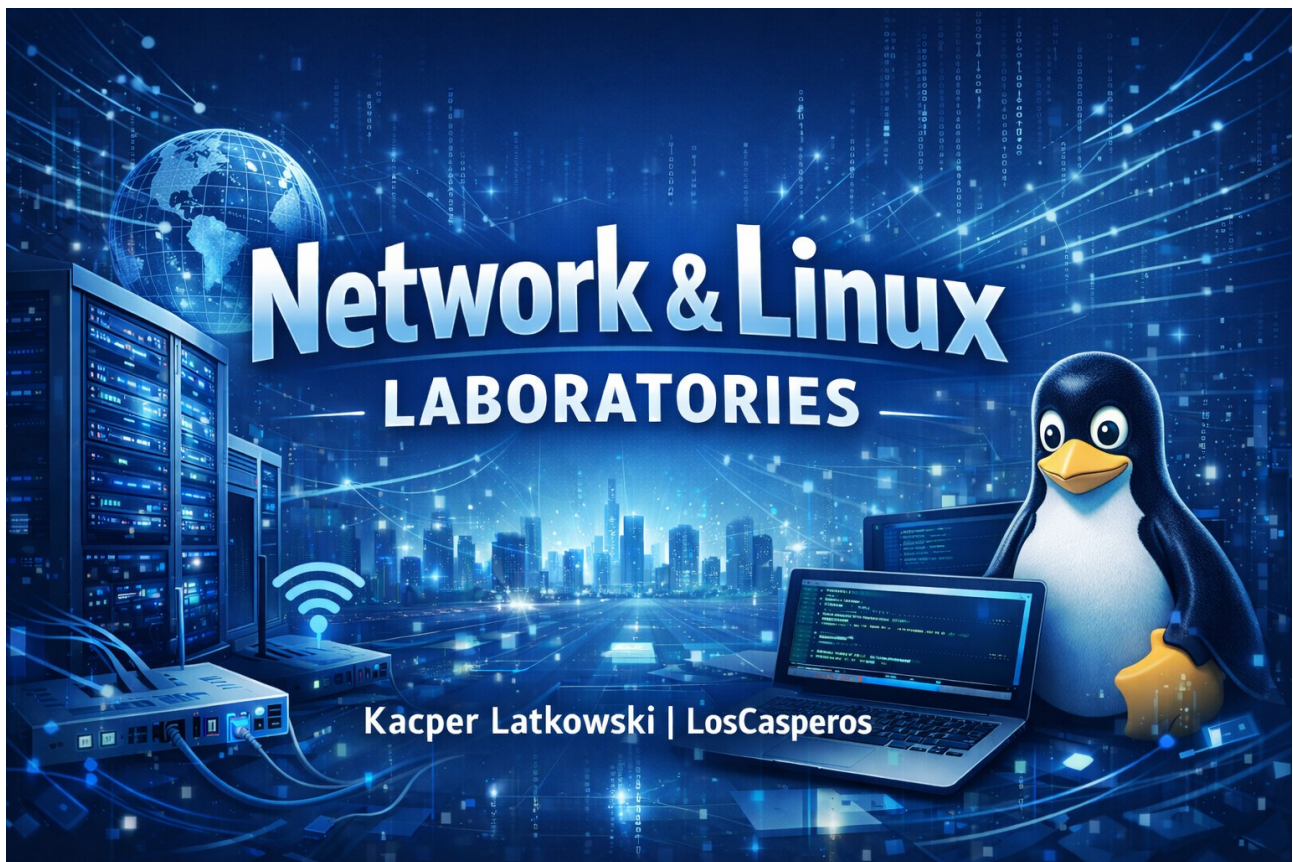


# Lab 1 VLAN and Inter-VLAN Routing with DHCP + Basic Hardening



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# 1. Lab Metadata

- **Lab Name:** Lab 1 VLAN and Inter-VLAN Routing with DHCP + Basic Hardening
- **Tools:** Cisco Packet Tracer
- **Devices:** 1x Router (R1), 1x Switch (S1), 6x PCs
- **Date:** 06.01.2026
- **Author:** Kacper Latkowski aka LosCasperos
- **Contact:** [kacperlatkowski@gmail.com](mailto:kacperlatkowski@gmail.com) / [LinkedIn](#) / mobile +48 725 140 666

# 2. Overview

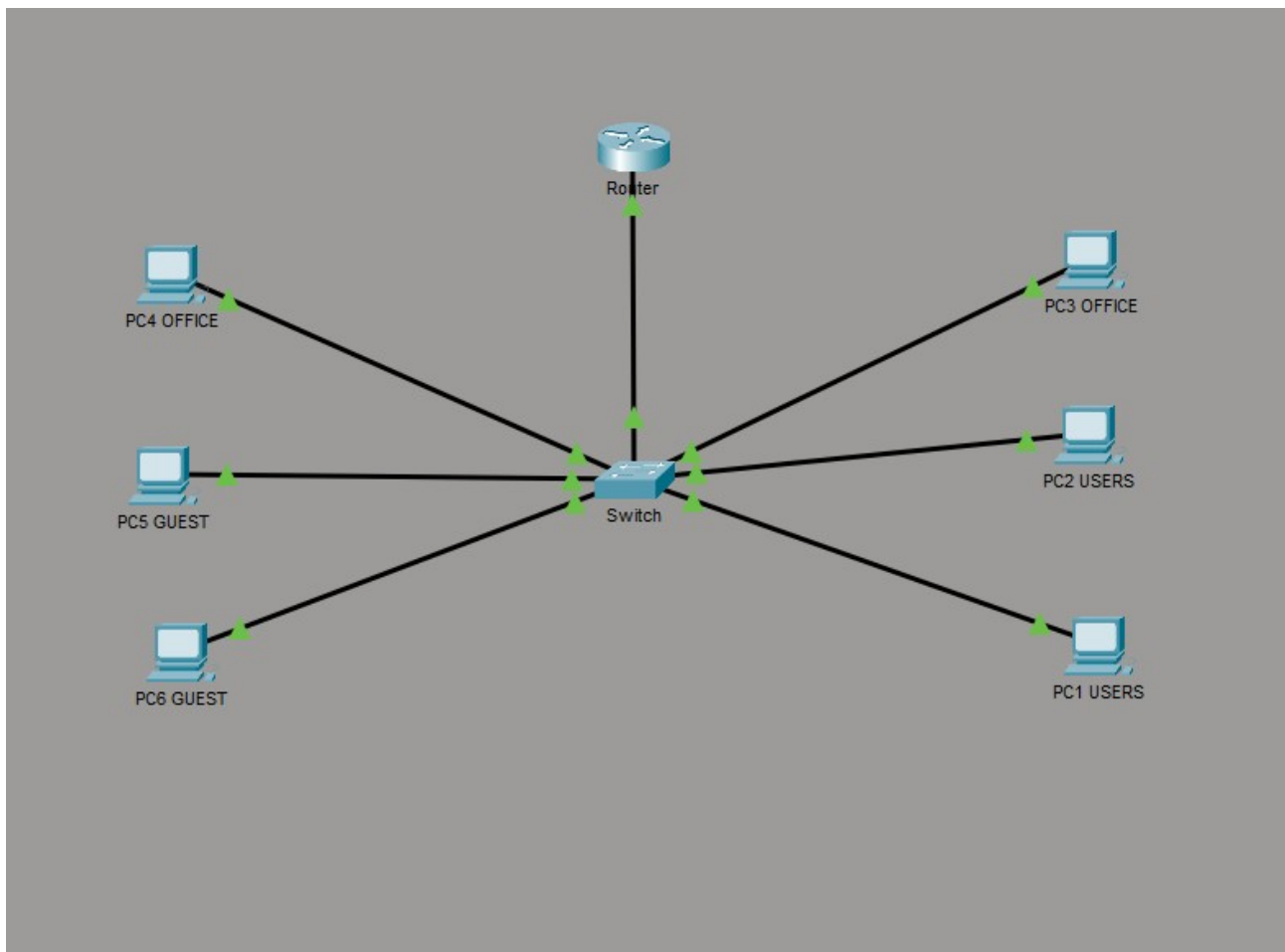
## 2.1. Objectives

- Create VLAN segmentation on a Layer 2 switch (VLAN 10 / 20 / 30).
- Configure a trunk link between the switch and router (802.1Q).
- Implement inter-VLAN routing using router-on-a-stick (router subinterfaces).
- Configure DHCP on the router with separate pools per VLAN.
- Apply basic Layer 2 and router hardening practices.
- Verify end-to-end connectivity (DHCP + inter-VLAN ping).

# 3. Network Topology

## 3.1. Topology Summary

- **R1 G0/0** is connected to **S1 G0/1** (802.1Q trunk).
- PCs are connected to S1 access ports:
  - VLAN 10: PC1 (F0/1), PC2 (F0/2)
  - VLAN 20: PC3 (F0/3), PC4 (F0/4)
  - VLAN 30: PC5 (F0/5), PC6 (F0/6)



01\_topology.png

## 4. IP Addressing Plan

VLAN	Name	Network	Default Gateway	DHCP Range
10	USERS	192.168.10.0/24	192.168.10.1	192.168.10.11-254
20	OFFICE	192.168.20.0/24	192.168.20.1	192.168.20.11-254
30	GUEST	192.168.30.0/24	192.168.30.1	192.168.30.11-254

### 4.1. DHCP Exclusions (Infrastructure Reservation)

The first 10 IP addresses in each VLAN were excluded from DHCP to reserve them for infrastructure devices and to avoid address conflicts.

## 5. Step-by-Step Implementation

### 5.1. Build the Topology (Packet Tracer)

#### Actions:

- Place devices: R1, S1, PC1-PC6.
- Connect devices using Copper Straight-Through cables:
  - R1 G0/0 to S1 G0/1
  - PC1 to S1 F0/1
  - PC2 to S1 F0/2
  - PC3 to S1 F0/3
  - PC4 to S1 F0/4
  - PC5 to S1 F0/5
  - PC6 to S1 F0/6

### 5.2. Switch S1 - Basic Setup

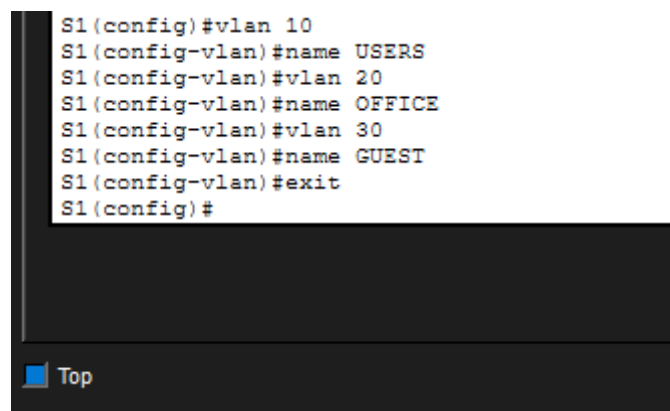
#### Configuration (S1 CLI)

The switch was configured with a hostname and DNS lookup was disabled to prevent unnecessary delays caused by mistyped commands.

### 5.3. Switch S1 - Create VLANs

VLANs 10, 20, and 30 were created on switch S1 and named according to their purpose

```
S1(config)#vlan 10
S1(config-vlan)#name USERS
S1(config-vlan)#vlan 20
S1(config-vlan)#name OFFICE
S1(config-vlan)#vlan 30
S1(config-vlan)#name GUEST
S1(config-vlan)#exit
S1(config)#
```



02\_vlan\_create.png

## 5.4. Switch S1 - Assign Access Ports to VLANs

Access ports were configured in access mode and assigned to the appropriate VLANs based on the connected end devices.

```
S1#
%SYS-5-CONFIG_I: Configured from console by console
show vlan brie
```

VLAN	Name	Status	Ports
1	default	active	Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24, Gig0/1, Gig0/2
10	USERS	active	Fa0/1, Fa0/2
20	OFFICE	active	Fa0/3, Fa0/4
30	GUEST	active	Fa0/5, Fa0/6
1002	fdi-default	active	
1003	token-ring-default	active	
1004	fdinet-default	active	
1005	trnet-default	active	

```
S1#
```

03\_show\_vlan\_brief.png

## 5.5. Switch S1 - Configure Trunk to Router

An IEEE 802.1Q trunk link was configured between switch S1 and router R1, allowing VLANs 10, 20, and 30.

```
S1#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Gig0/1	on	802.1q	trunking	1

```
Port      Mode      Encapsulation  Status      Native vlan
Gig0/1    on        802.1q         trunking    1

Port      Vlans allowed on trunk
Gig0/1    10,20,30

Port      Vlans allowed and active in management domain
Gig0/1    10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Gig0/1    10,20,30

S1#
```

04\_show\_interfaces\_trunk.png

## 5.6. Router R1 - Basic Setup and Enable Physical Interface

Basic router configuration was applied, including hostname assignment and enabling the physical interface connected to the switch.

```
--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain
R1(config)#no ip domain-lo
R1(config)#no ip domain-lookup
R1(config)#int gi 0/0
R1(config-if)#no shut
R1(config-if)#no shutdown

R1(config-if)#
%LINK-3-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
|
```

05\_router\_basic.png

## 5.7. Router R1 - Inter-VLAN Routing (Router-on-a-Stick)

Inter-VLAN routing was implemented using the router-on-a-stick method with 802.1Q subinterfaces for each VLAN.

```
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int
R1(config)#interface gi
R1(config)#interface gigabit
R1(config)#interface gigabitEthernet 0/0.10
R1(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/0.10, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up
enc
R1(config-subif)#encapsulation do
R1(config-subif)#encapsulation dot1Q 10
R1(config-subif)#ip add
R1(config-subif)#ip address 192.168.10.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int
R1(config)#interface gi
R1(config)#interface gigabitEthernet 0/0.20
R1(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/0.20, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up
enc
R1(config-subif)#encapsulation d
R1(config-subif)#encapsulation dot1Q 20
R1(config-subif)#ip add
R1(config-subif)#ip address 192.168.20.1 255.255.255.0
R1(config-subif)#exit
R1(config)#inte
R1(config)#interface gia
R1(config)#interface gi
R1(config)#interface gigabitEthernet 0/0.30
R1(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/0.30, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to up
enca
R1(config-subif)#encapsulation do
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip add
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#exit
R1(config)#
R1(config)#
R1(config)#do wr
Building configuration...
conf
```

06\_subinterfaces\_config.png



```
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console
show
R1#show ip i
R1#show ip interface b
R1#show ip interface brief
Interface                IP-Address      OK? Method Status          Protocol
GigabitEthernet0/0       unassigned      YES unset  up              up
GigabitEthernet0/0.10    192.168.10.1    YES manual  up              up
GigabitEthernet0/0.20    192.168.20.1    YES manual  up              up
GigabitEthernet0/0.30    192.168.30.1    YES manual  up              up
GigabitEthernet0/1       unassigned      YES unset  administratively down down
Vlan1                    unassigned      YES unset  administratively down down
R1#
```

07\_show\_ip\_int\_brief.png

## 5.8. Router R1 - DHCP Configuration

DHCP pools were configured on the router for each VLAN. The first ten IP addresses in each subnet were excluded to reserve them for infrastructure devices.

```
R1#
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp ex
R1(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.10
R1(config)#ip dhcp excluded-address 192.168.20.1 192.168.20.10
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.10
R1(config)#do wr
Building configuration...
[OK]
R1(config)#ip dhcp pool1 VLAN10_USERS
      ^
% Invalid input detected at '^' marker.

R1(config)#ip dhcp pool VLAN10_USERS
R1(dhcp-config)#net
R1(dhcp-config)#network 192.168.10.0 255.255.255.0
R1(dhcp-config)#defa
R1(dhcp-config)#default-router 192.168.10.1
R1(dhcp-config)#dns
R1(dhcp-config)#dns-server 8.8.8.8
R1(dhcp-config)#exit
R1(config)#ip dhcp pool VLAN20_OFFICE
R1(dhcp-config)#ne
R1(dhcp-config)#network 192.168.20.0 255.255.255.0
R1(dhcp-config)#defa
R1(dhcp-config)#default-router 192.168.20.1
R1(dhcp-config)#dns
R1(dhcp-config)#dns-server 8.8.8.8
R1(dhcp-config)#exit
R1(config)#ip dhcp pool VLAN30 GUEST
```

08\_dhcp\_config.png



```

R1#
#SYS-5-CONFIG_I: Configured from console by console

R1#
R1#
R1#show ip dhcp pool

Pool VLAN10_USERS :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)         : 0 / 0
  Total addresses                   : 254
  Leased addresses                  : 0
  Excluded addresses               : 3
  Pending event                    : none

  1 subnet is currently in the pool
  Current index      IP address range      Leased/Excluded/Total
  192.168.10.1       192.168.10.1 - 192.168.10.254  0 / 3 / 254

Pool VLAN20_OFFICE :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)         : 0 / 0
  Total addresses                   : 254
  Leased addresses                  : 0
  Excluded addresses               : 3
  Pending event                    : none

  1 subnet is currently in the pool
  Current index      IP address range      Leased/Excluded/Total
  192.168.20.1       192.168.20.1 - 192.168.20.254  0 / 3 / 254

Pool VLAN30_GUEST :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)         : 0 / 0
  Total addresses                   : 254
  Leased addresses                  : 0
  Excluded addresses               : 3
  Pending event                    : none

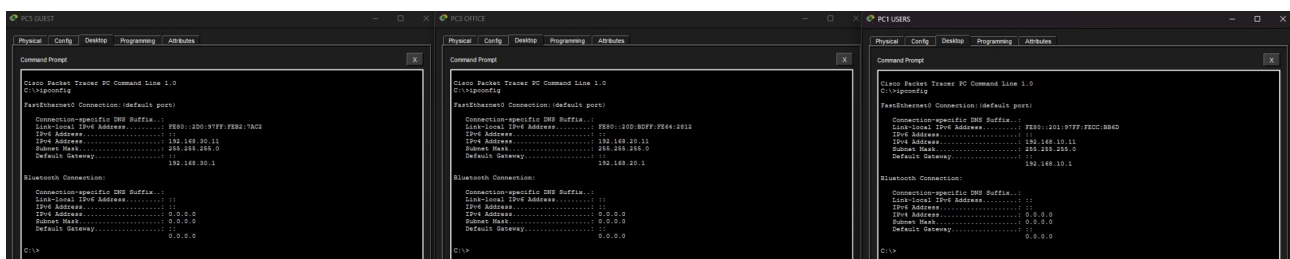
  1 subnet is currently in the pool
  Current index      IP address range      Leased/Excluded/Total
  192.168.30.1       192.168.30.1 - 192.168.30.254  0 / 3 / 254
R1#

```

09\_show\_ip\_dhcp\_pool.png

## 5.9. End Devices - DHCP Configuration

End devices were configured to obtain IP addressing information dynamically via DHCP.

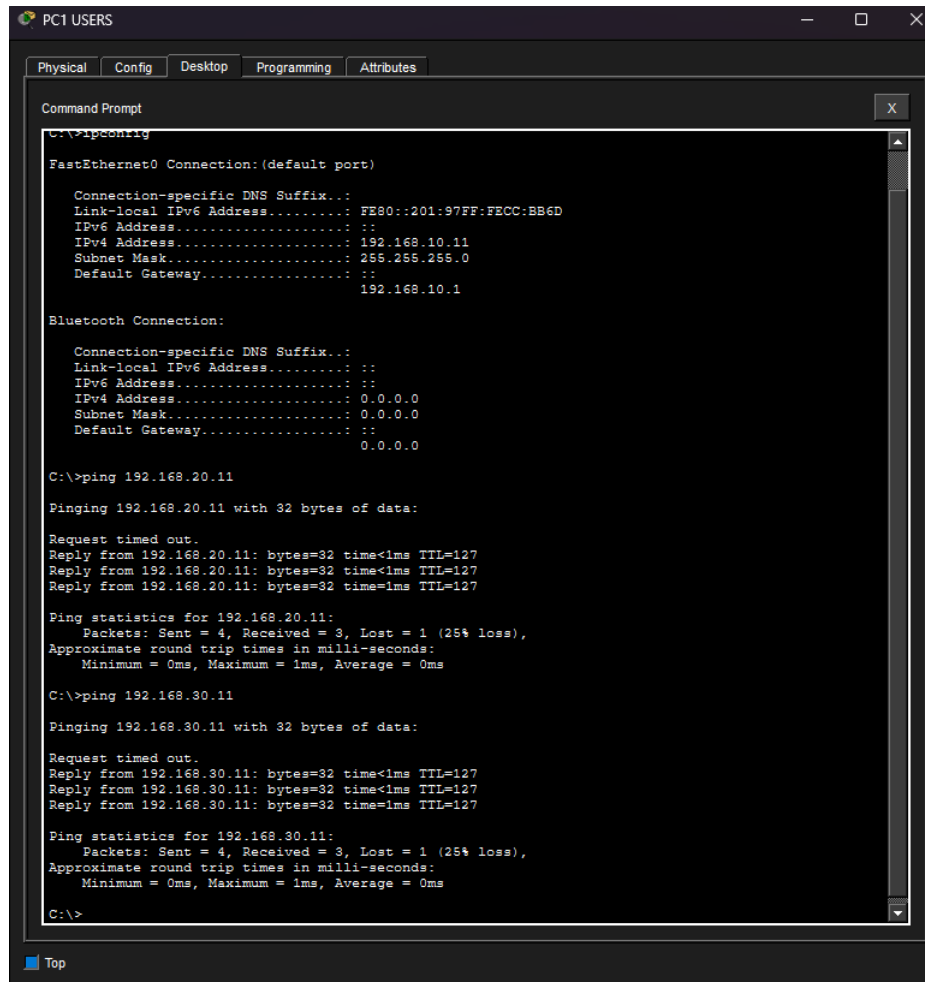


10\_pc1\_ipconfig.png

## 6. Verification & Testing

### 6.1. Inter-VLAN Connectivity Test

Inter-VLAN connectivity was verified using ICMP echo requests between hosts.



The screenshot shows a Windows Command Prompt window titled "PC1 USERS". The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Config" tab is active, showing the configuration for "FastEthernet0 Connection: (default port)". The configuration includes:

- Connection-specific DNS Suffix...
- Link-local IPv6 Address..... FE80::201:97FF:FECC:BB6D
- IPv6 Address..... ::
- IPv4 Address..... 192.168.10.11
- Subnet Mask..... 255.255.255.0
- Default Gateway..... 192.168.10.1

Below the configuration, the "Bluetooth Connection:" section is shown with similar fields, but all values are 0.0.0.0.

The Command Prompt shows the following commands and output:

```
C:\>ipconfig

FastEthernet0 Connection: (default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::201:97FF:FECC:BB6D
IPv6 Address.....: ::
IPv4 Address.....: 192.168.10.11
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.10.1

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: 0.0.0.0

C:\>ping 192.168.20.11

Pinging 192.168.20.11 with 32 bytes of data:

Request timed out.
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.30.11

Pinging 192.168.30.11 with 32 bytes of data:

Request timed out.
Reply from 192.168.30.11: bytes=32 time<1ms TTL=127
Reply from 192.168.30.11: bytes=32 time<1ms TTL=127
Reply from 192.168.30.11: bytes=32 time<1ms TTL=127

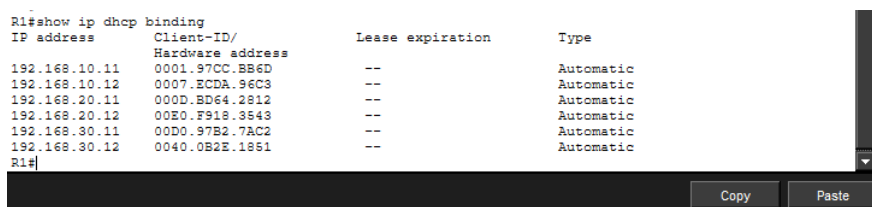
Ping statistics for 192.168.30.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

11\_ping\_intervlan.png

### 6.2. DHCP Lease Verification

DHCP lease assignments were verified on the router.



The screenshot shows a router command prompt with the command "R1#show ip dhcp binding" and its output. The output is a table with four columns: IP address, Client-ID/Hardware address, Lease expiration, and Type.

IP address	Client-ID/Hardware address	Lease expiration	Type
192.168.10.11	0001.97CC.BB6D	--	Automatic
192.168.10.12	0007.ECDA.96C9	--	Automatic
192.168.20.11	000D.BD64.2812	--	Automatic
192.168.20.12	00E0.F918.3543	--	Automatic
192.168.30.11	00D0.97B2.7AC2	--	Automatic
192.168.30.12	0040.0B2E.1851	--	Automatic

The command prompt shows "R1#" at the bottom.

19\_show\_dhcp\_binding.png

## 7. Security Hardening

### 7.1. Switch S1 - Port Descriptions (Documentation Hygiene)

Interface descriptions were added to improve configuration readability and network documentation.

```
S1>en
S1#show ru
S1#show running-config | include description
description VLAN10_USERS_PC
description VLAN10_USERS_PC
description VLAN20_OFFICE_PC
description VLAN20_OFFICE_PC
description VLAN30_GUEST_PC
description VLAN30_GUEST_PC
description TRUNK_TO_R1
S1#
```

12\_port\_descriptions.png

### 7.2. Switch S1 - Unused Ports and Parking VLAN

Unused switch ports were administratively shut down and assigned to a parking VLAN to reduce the attack surface.

```
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#show interfaces status
Port      Name                Status      Vlan    Duplex  Speed Type
Fa0/1     VLAN10_USERS_PC     connected   10      a-full  a-100  10/100BaseTX
Fa0/2     VLAN10_USERS_PC     connected   10      a-full  a-100  10/100BaseTX
Fa0/3     VLAN20_OFFICE_PC     connected   20      a-full  a-100  10/100BaseTX
Fa0/4     VLAN20_OFFICE_PC     connected   20      a-full  a-100  10/100BaseTX
Fa0/5     VLAN30_GUEST_PC      connected   30      a-full  a-100  10/100BaseTX
Fa0/6     VLAN30_GUEST_PC      connected   30      a-full  a-100  10/100BaseTX
Fa0/7     UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/8     UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/9     UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/10    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/11    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/12    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/13    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/14    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/15    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/16    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/17    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/18    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/19    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/20    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/21    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/22    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/23    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Fa0/24    UNUSED_PORT_SHUTDOWN disabled     999      auto    auto   10/100BaseTX
Gig0/1    TRUNK_TO_R1         connected   trunk   a-full  a-100  10/100/1000BaseTX
Gig0/2                                notconnect  1       auto    auto   10/100/1000BaseTX

S1#
```

13\_show\_int\_status\_unused.png

```
S1#show vlan brief

VLAN Name                Status    Ports
-----
1    default                active    Gi0/2
10   USERS                   active    Fa0/1, Fa0/2
20   OFFICE                  active    Fa0/3, Fa0/4
30   GUEST                   active    Fa0/5, Fa0/6
999  PARKING_LOT              active    Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                           Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                           Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                           Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                           Fa0/23, Fa0/24
1002 fddi-default           active
1003 token-ring-default     active
1004 fddinet-default         active
1005 trnet-default           active

S1#
```

14\_vlan999\_parking.png

## 7.3. Switch S1 - Port Security

Port security was enabled on access ports using sticky MAC addresses, allowing a single device per port. Violation Mode set to Restrict.

```
S1#show port-security

Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
      (Count)      (Count)      (Count)
-----
Fa0/1      1          0          0          Restrict
Fa0/2      1          0          0          Restrict
Fa0/3      1          0          0          Restrict
Fa0/4      1          0          0          Restrict
Fa0/5      1          0          0          Restrict
Fa0/6      1          0          0          Restrict

S1#
```

15\_show\_port\_security.png

```
S1#show port-security interface f0/1

Port Security          : Enabled
Port Status            : Secure-up
Violation Mode         : Restrict
Aging Time             : 0 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

S1#
```

16\_ps\_int\_f01.png

## 7.4. Switch S1 — Disable DTP on Trunk

Dynamic Trunking Protocol (DTP) was disabled on the trunk interface to prevent unauthorized trunk negotiations.

```
S1#show interfaces trunk
Port      Mode      Encapsulation  Status        Native vlan
Gig0/1    on        802.1q         trunking      1

Port      Vlans allowed on trunk
Gig0/1    10,20,30

Port      Vlans allowed and active in management domain
Gig0/1    10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Gig0/1    10,20,30

S1#
```

17\_trunk\_after\_hardening.png

## 7.5. Router R1 — Basic Hardening

Basic router hardening was applied, including password encryption and a login warning banner.

```
R1#
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#enable secret cisco123
R1(config)#ser
R1(config)#service pass
R1(config)#service password-encryption
R1(config)#banner motd # UNAUTHORIZED ACCESS PROHIBITED #
R1(config)#
```

18\_router\_hardening.png

## 7.6. Post-Hardening Verification

Network functionality was re-verified after hardening to ensure that security measures did not impact connectivity.

```
C:\>ping 192.168.20.11

Pinging 192.168.20.11 with 32 bytes of data:

Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.30.11

Pinging 192.168.30.11 with 32 bytes of data:

Reply from 192.168.30.11: bytes=32 time<1ms TTL=127
Reply from 192.168.30.11: bytes=32 time<1ms TTL=127
Reply from 192.168.30.11: bytes=32 time=3ms TTL=127
Reply from 192.168.30.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.30.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>
```

20\_ping\_after\_hardening.png

## 8. Appendix A - Screenshot Checklist

- 01\_topology.png
- 02\_vlan\_create.png
- 03\_show\_vlan\_brief.png
- 04\_show\_interfaces\_trunk.png
- 05\_router\_basic.png
- 06\_subinterfaces\_config.png
- 07\_show\_ip\_int\_brief.png
- 08\_dhcp\_config.png
- 09\_show\_ip\_dhcp\_pool.png
- 10\_pc1\_ipconfig.png
- 11\_ping\_intervlan.png
- 12\_port\_descriptions.png
- 13\_show\_int\_status\_unused.png
- 14\_vlan999\_parking.png
- 15\_show\_port\_security.png
- 16\_ps\_int\_f01.png
- 17\_trunk\_after\_hardening.png
- 18\_router\_hardening.png
- 19\_show\_dhcp\_binding.png
- 20\_ping\_after\_hardening.png

## 9. Appendix B – Device Configuration

### 9.1. Switch S1 — Running Configuration

S1#show running-config

Building configuration...

Current configuration : 4630 bytes

```
!  
version 15.0  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname S1  
!  
!  
!  
no ip domain-lookup  
!  
!  
!  
spanning-tree mode pvst  
spanning-tree extend system-id  
!  
interface FastEthernet0/1  
description VLAN10_USERS_PC  
switchport access vlan 10  
switchport mode access  
switchport port-security  
switchport port-security mac-address sticky  
switchport port-security violation restrict  
switchport port-security mac-address sticky 0001.97CC.BB6D  
spanning-tree portfast  
!  
interface FastEthernet0/2  
description VLAN10_USERS_PC  
switchport access vlan 10  
switchport mode access  
switchport port-security  
switchport port-security mac-address sticky
```



```
switchport port-security violation restrict
switchport port-security mac-address sticky 0007.ECDA.96C3
spanning-tree portfast
!
interface FastEthernet0/3
description VLAN20_OFFICE_PC
switchport access vlan 20
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security violation restrict
switchport port-security mac-address sticky 000D.BD64.2812
spanning-tree portfast
!
interface FastEthernet0/4
description VLAN20_OFFICE_PC
switchport access vlan 20
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security violation restrict
switchport port-security mac-address sticky 00E0.F918.3543
spanning-tree portfast
!
interface FastEthernet0/5
description VLAN30_GUEST_PC
switchport access vlan 30
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security violation restrict
switchport port-security mac-address sticky 00D0.97B2.7AC2
spanning-tree portfast
!
interface FastEthernet0/6
description VLAN30_GUEST_PC
switchport access vlan 30
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security violation restrict
switchport port-security mac-address sticky 0040.0B2E.1851
```

```
spanning-tree portfast
!
interface FastEthernet0/7
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/8
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/9
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/10
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/11
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/12
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/13
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
```

```
shutdown
!
interface FastEthernet0/14
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/15
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/16
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/17
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/18
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/19
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/20
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
```

```
shutdown
!
interface FastEthernet0/21
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/22
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/23
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface FastEthernet0/24
description UNUSED_PORT_SHUTDOWN
switchport access vlan 999
switchport mode access
shutdown
!
interface GigabitEthernet0/1
description TRUNK_TO_R1
switchport trunk allowed vlan 10,20,30
switchport mode trunk
switchport nonegotiate
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
```

```
!  
line vty 0 4  
login  
line vty 5 15  
login  
!  
!  
!  
!  
end
```

## 9.2. Router R1 — Running Configuration

R1#show run

Building configuration...

Current configuration : 1492 bytes

```
!  
version 15.1  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
service password-encryption  
!  
hostname R1  
!  
!  
!  
enable secret 5 $1$mERr$5.a6P4JqbNiMX01usIfka/  
!  
!  
ip dhcp excluded-address 192.168.10.1 192.168.10.10  
ip dhcp excluded-address 192.168.20.1 192.168.20.10  
ip dhcp excluded-address 192.168.30.1 192.168.30.10  
!  
ip dhcp pool VLAN10_USERS  
network 192.168.10.0 255.255.255.0  
default-router 192.168.10.1  
dns-server 8.8.8.8  
ip dhcp pool VLAN20_OFFICE  
network 192.168.20.0 255.255.255.0  
default-router 192.168.20.1
```

```
dns-server 8.8.8.8
ip dhcp pool VLAN30_GUEST
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1
dns-server 8.8.8.8
!
!
!
ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO1941/K9 sn FTX1524JO4X-
!
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0.10
```

```
encapsulation dot1Q 10
ip address 192.168.10.1 255.255.255.0
!
interface GigabitEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.1 255.255.255.0
!
interface GigabitEthernet0/0.30
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Vlan1
no ip address
shutdown
!
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^C UNAUTHORIZED ACCESS PROHIBITED ^C
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```