

UOB-2526303

V. GURUNIVASAN



BSc (Hons) Computer Networks

Advanced Networking - CIS005-3

Assignment 1 – Individual Report

Course Instructor: Mr Vibhavi Attigala

Student Name: V. Gurunivasan

Student ID: 2526303

ABSTRACT

The project is about designing and implementing a network solution which is suitable for Crescent Studios, an animation and production company for movies. The main challenge here was to provide an infrastructure that supports bandwidth-intensive applications, such as 4K video editing, CGI editing and 3D rendering, while also enforcing tight security between departments.

I have applied the concept of a segmented network architecture through the application of VLANs to logically separate the two major groups: Technical and Operations. To manage the traffic flow, I applied well-configured Access Control Lists. This ensures animators have unrestricted access, which they need for collaboration, while other departments operate in controlled environments. The network also sports a secure wireless setup with six strategically placed access points, each using WPA2 encryption. Testing shows that the system meets all operational requirements by supporting high-speed data transfer for creative work and preventing unauthorized cross-departmental access effectively.

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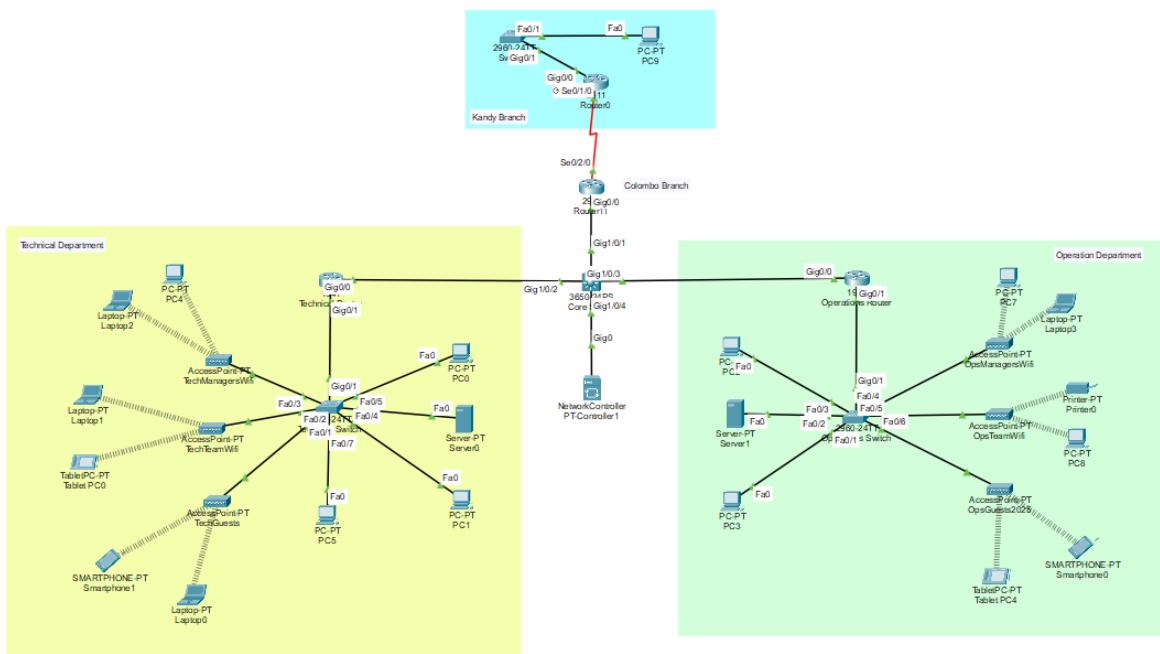
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01. INTRODUCTION AND NETWORK DESIGN

1.1 Introduction

This report describes a proposed network design for Crescent Studios, a mid-sized creative company specializing in CGI, animation, video editing, and client operations. The organization consists of 2 branches (Kandy and Colombo) and two major departments on 2 floors on one branch (Technical and Operations) with different performance and security requirements for each. Due to increased workloads, collaborative projects, and client meetings, it's important that Crescent Studios be fitted with a modern, secure, and scalable network infrastructure design. The objective of this proposed network is to provide a high-performance office environment with advanced VLAN segmentation, inter-VLAN routing, secure switching technologies, and structured IP addressing. Primary considerations in the design include security, wireless connectivity, and easy expansion.

1.2 Network Design and Architecture



1.3 IP Addressing Scheme

Host / VLAN	Subnet	Network Address	Broadcast Address	1st Usable	Last Usable	Subnet Mask
Tech Managers - VLAN 10	192.168.1.0/24	192.168.1.0	192.168.1.255	192.168.1.1	192.168.1.254	255.255.255.0
Tech Team -VLAN 20	192.168.2.0/24	192.168.2.0	192.168.2.255	192.168.2.1	192.168.2.254	255.255.255.0
Tech Guests - VLAN 30	192.168.3.0/24	192.168.3.0	192.168.3.255	192.168.3.1	192.168.3.254	255.255.255.0
Operation Managers -VLAN 40	192.168.4.0/24	192.168.4.0	192.168.4.255	192.168.4.1	192.168.4.254	255.255.255.0
Operation Team - VLAN 50	192.168.5.0/24	192.168.5.0	192.168.5.255	192.168.5.1	192.168.5.254	255.255.255.0
Operation Guests - VLAN 60	192.168.6.0/24	192.168.6.0	192.168.6.255	192.168.6.1	192.168.6.254	255.255.255.0
Infrastructure-VLAN 99	192.168.99.0/24	192.168.99.0	192.168.99.255	192.168.99.1	192.168.99.254	255.255.255.0

Table 1_Colombo Office VLAN Subnets and IP Addressing Scheme

Link	Subnet	Network Address	Broadcast Address	1st Usable	Last Usable	Branch / Details
Main Router <-> Branch Router	10.0.0.0/30	10.0.0.0	10.0.0.3	10.0.0.1	10.0.0.2	Main Branch to Kandy Branch
Core Router	10.0.0.1/30	10.0.0.1	10.0.0.3	10.0.0.1	10.0.0.1	Main Router Interface
Branch Router	10.0.0.2/30	10.0.0.2	10.0.0.3	10.0.0.2	10.0.0.2	Kandy Branch Router Interface

Table 2_Connection Between Colombo Branch (Main Router) and Kandy Branch (Branch Router)

Host / LAN	Subnet	Network Address	Broadcast Address	1st Usable	Last Usable	Branch
Branch Router LAN	192.168.200.0/24	192.168.200.0	192.168.200.255	192.168.200.1	192.168.200.254	Kandy Branch

Table 3_Branch Office Scheme_Kandy Branch

```

MainBranchRouter

Physical Config CLI Attributes

IOS Command Line Interface

Router# 
Router# 
Router# 
Router# 
Router#sh ip ro
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C     10.0.0.0/30 is directly connected, Serial0/2/0
L     10.0.0.1/32 is directly connected, Serial0/2/0
S     192.168.1.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.6
S     192.168.2.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.6
S     192.168.3.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.6
S     192.168.4.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.10
S     192.168.5.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.10
S     192.168.6.0/24 [1/0] via 192.168.100.1
      [1/0] via 192.168.100.10
      192.168.99.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.99.0/24 is directly connected, GigabitEthernet0/0
L     192.168.99.1/32 is directly connected, GigabitEthernet0/0
D     192.168.100.0/24 [90/3072] via 192.168.99.2, 01:57:46, GigabitEthernet0/0
D     192.168.200.0/24 [90/2170112] via 10.0.0.2, 01:58:13, Serial0/2/0

Router# 
Router# 
Router# 
Router# 
Router# 
Router#

```

Top

Figure 1_MainRouterRouting_ColomboBranch

```

BranchOfficeRouter

Physical Config CLI Attributes

IOS Command Line Interface

Router>
Router>en
Router>sh ip ro
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C     10.0.0.0/30 is directly connected, Serial0/1/0
L     10.0.0.2/32 is directly connected, Serial0/1/0
D     192.168.1.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.2.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.3.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.4.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.5.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.6.0/24 [90/2172928] via 10.0.0.1, 01:50:12, Serial0/1/0
D     192.168.99.0/24 [90/2170112] via 10.0.0.1, 01:50:39, Serial0/1/0
D     192.168.100.0/24 [90/2170368] via 10.0.0.1, 01:50:12, Serial0/1/0
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.200.0/24 is directly connected, GigabitEthernet0/0
L     192.168.200.1/32 is directly connected, GigabitEthernet0/0

Router# 
Router# 
Router#

```

Top

Figure 2_Routing On Kandy Branch

02. METHODOLOGY AND RESULTS

2.1 VLAN Configurations

The screenshot shows a software interface for managing network configurations, specifically for a 'Core Switch'. The main window has tabs for 'Physical', 'Config' (which is selected), 'CLI', and 'Attributes'. On the left, there's a sidebar with sections like 'GLOBAL', 'ROUTING', 'SWITCHING', 'VLAN Database' (which is also selected), and 'INTERFACE' with a list of 16 Gigabit Ethernet ports.

In the central area, under 'VLAN Configuration', the 'VLAN Number' is set to 99 and the 'VLAN Name' is Infrastructure. Below this are two buttons: 'Add' and 'Remove'. A table lists existing VLANs with their numbers and names:

VLAN No	VLAN Name
1	default
10	Tech-Managers
20	Tech-Team
30	Tech-Guests
40	Ops-Managers
50	Ops-Team
60	Ops-Guests
99	Infrastructure
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

At the bottom, there's a section titled 'Equivalent IOS Commands' containing the following configuration script:

```
Switch#config terminal
Switch(config)# vlan 50
Switch(config-vlan)# name Ops-Team
Switch(config-vlan)#vlan 50
Switch(config-vlan)# name Ops-Guests
Switch(config-vlan)#vlan 50
Switch(config-vlan)# name Ops-Team
Switch(config-vlan)#vlan 60
Switch(config-vlan)# name Ops-Guests
Switch(config-vlan)#vlan 99
Switch(config-vlan)# name Infrastructure
Switch(config-vlan)#

```

A 'Top' button is located at the bottom left of the interface.

Figure 3_VLAN Configurations

2.2 Trunk Port Configurations

```
Switch>
Switch>en
Switch#
Switch#show interfaces trunk
Port      Mode       Encapsulation  Status        Native vlan
Gig1/0/1  on         802.1q          trunking    99

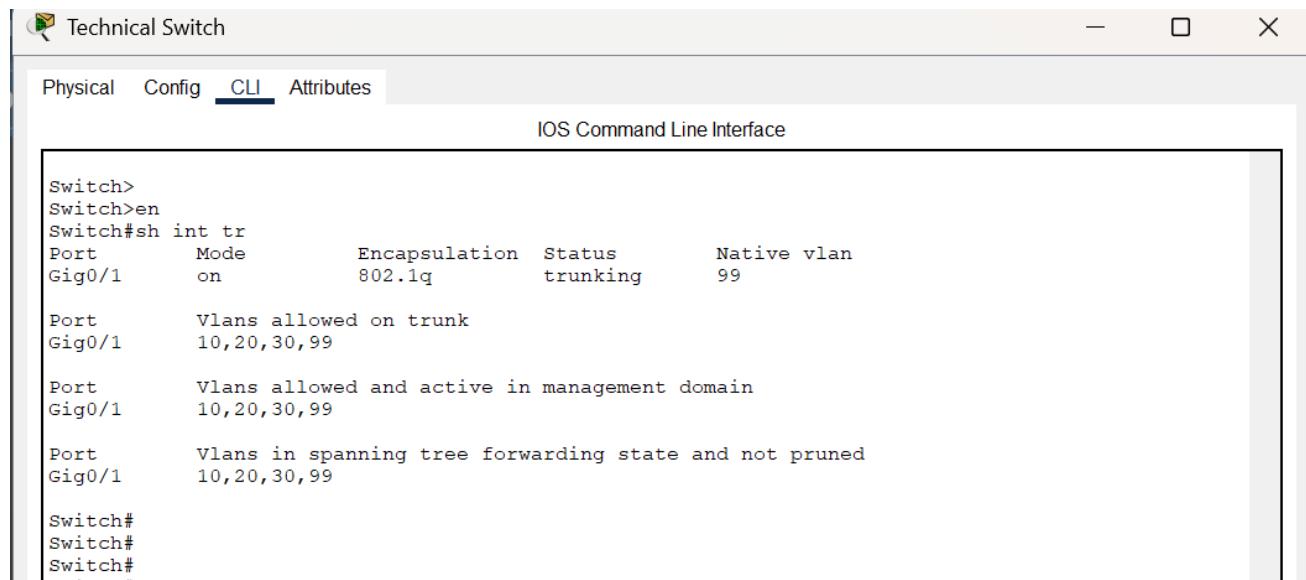
Port      Vlans allowed on trunk
Gig1/0/1  10,20,30,40,50,60,99

Port      Vlans allowed and active in management domain
Gig1/0/1  10,20,30,40,50,60,99

Port      Vlans in spanning tree forwarding state and not pruned
Gig1/0/1  10,20,30,40,50,60,99

Switch#
```

Figure 4_ Trunk Configuration On Multilayer Switch



Technical Switch

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch>
Switch>en
Switch#sh int tr
Port      Mode       Encapsulation  Status        Native vlan
Gig0/1   on         802.1q          trunking    99

Port      Vlans allowed on trunk
Gig0/1   10,20,30,99

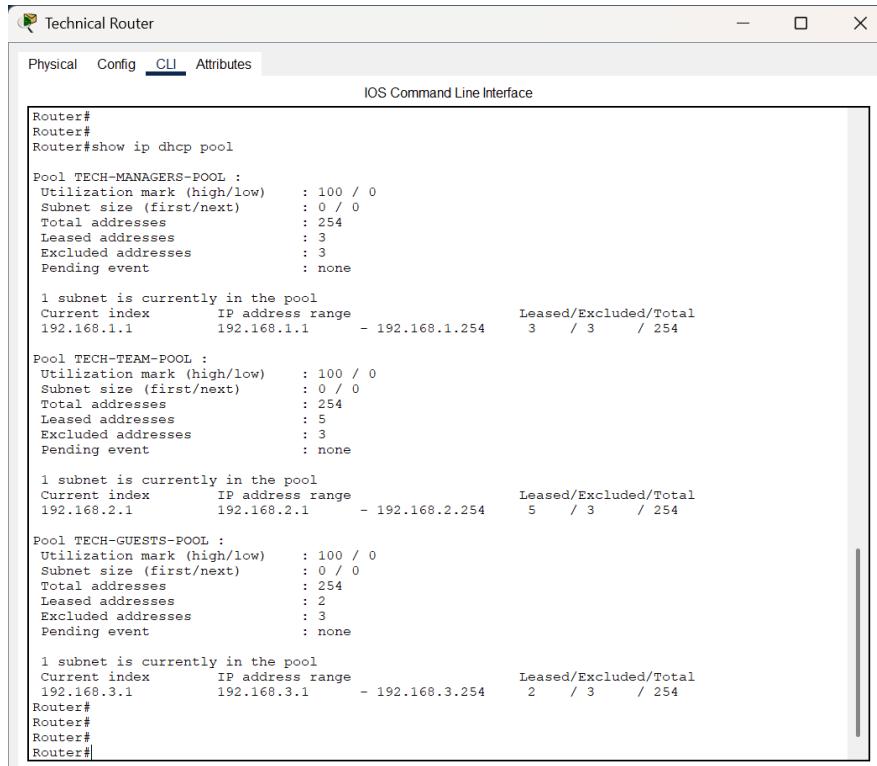
Port      Vlans allowed and active in management domain
Gig0/1   10,20,30,99

Port      Vlans in spanning tree forwarding state and not pruned
Gig0/1   10,20,30,99

Switch#
Switch#
Switch#
```

Figure 5_ Trunk Configuration on Technical Department Switch

2.3 DHCP Configurations



The screenshot shows the CLI interface of a Cisco router named 'Technical Router'. The 'CLI' tab is selected. The command entered is 'Router# show ip dhcp pool'. The output displays three DHCP pools: TECH-MANAGERS-POOL, TECH-TEAM-POOL, and TECH-GUESTS-POOL. Each pool has utilization marks, subnet sizes, total addresses, leased addresses, excluded addresses, and pending events. Subnet ranges and lease counts are also provided.

```
Router#
Router#
Router#show ip dhcp pool

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

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.1.1 192.168.1.1 - 192.168.1.254 3 / 3 / 254

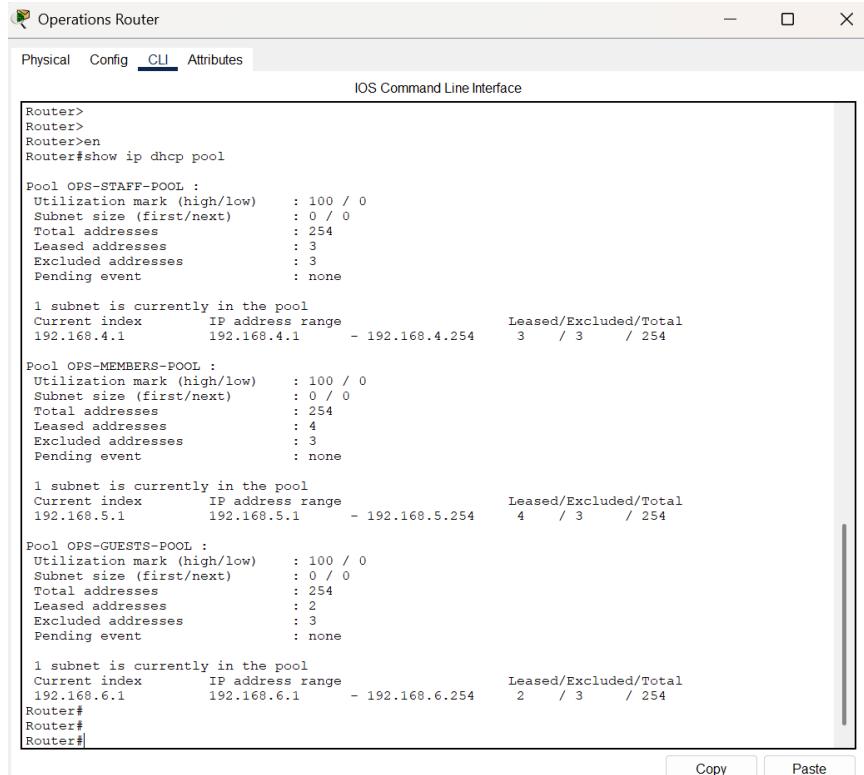
Pool TECH-TEAM-POOL :
 Utilization mark (high/low) : 100 / 0
 Subnet size (first/next) : 0 / 0
 Total addresses : 254
 Leased addresses : 5
 Excluded addresses : 3
 Pending event : none

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.2.1 192.168.2.1 - 192.168.2.254 5 / 3 / 254

Pool TECH-GUESTS-POOL :
 Utilization mark (high/low) : 100 / 0
 Subnet size (first/next) : 0 / 0
 Total addresses : 254
 Leased addresses : 2
 Excluded addresses : 3
 Pending event : none

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.3.1 192.168.3.1 - 192.168.3.254 2 / 3 / 254
Router#
Router#
Router#
Router#
```

Figure 6_DHCP Configuration on Technical Department Router



The screenshot shows the CLI interface of a Cisco router named 'Operations Router'. The 'CLI' tab is selected. The command entered is 'Router# show ip dhcp pool'. The output displays three DHCP pools: OPS-STAFF-POOL, OPS-MEMBERS-POOL, and OPS-GUESTS-POOL. Each pool has utilization marks, subnet sizes, total addresses, leased addresses, excluded addresses, and pending events. Subnet ranges and lease counts are also provided.

```
Router>
Router>
Router>en
Router#show ip dhcp pool

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

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.4.1 192.168.4.1 - 192.168.4.254 3 / 3 / 254

Pool OPS-MEMBERS-POOL :
 Utilization mark (high/low) : 100 / 0
 Subnet size (first/next) : 0 / 0
 Total addresses : 254
 Leased addresses : 4
 Excluded addresses : 3
 Pending event : none

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.5.1 192.168.5.1 - 192.168.5.254 4 / 3 / 254

Pool OPS-GUESTS-POOL :
 Utilization mark (high/low) : 100 / 0
 Subnet size (first/next) : 0 / 0
 Total addresses : 254
 Leased addresses : 2
 Excluded addresses : 3
 Pending event : none

1 subnet is currently in the pool
 Current index IP address range Leased/Excluded/Total
 192.168.6.1 192.168.6.1 - 192.168.6.254 2 / 3 / 254
Router#
Router#
Router#
```

Figure 7_DHCP Configuration on Operations Department Router

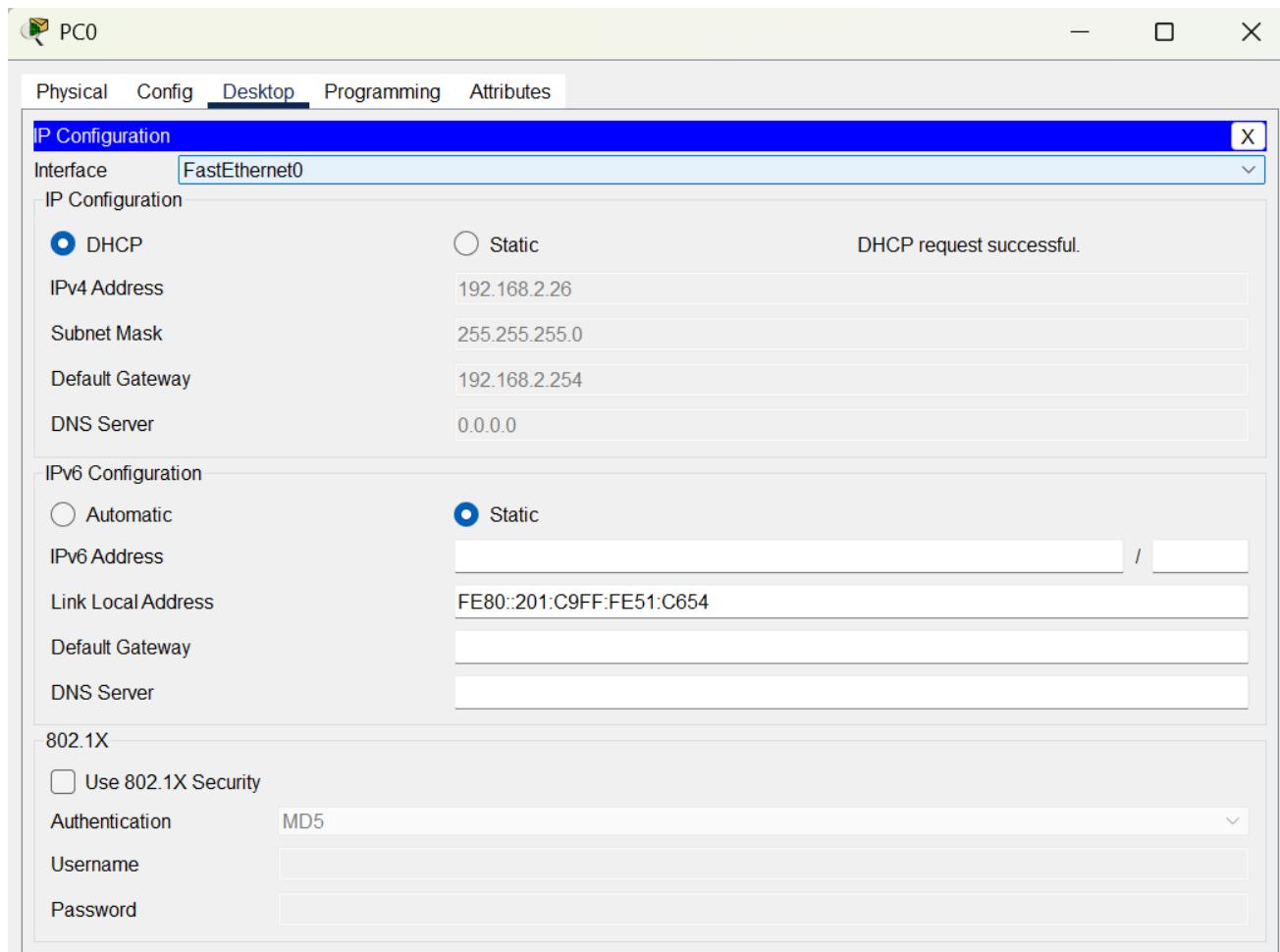


Figure 8_ DHCP Successful

2.4 Wireless Access Points Implementation

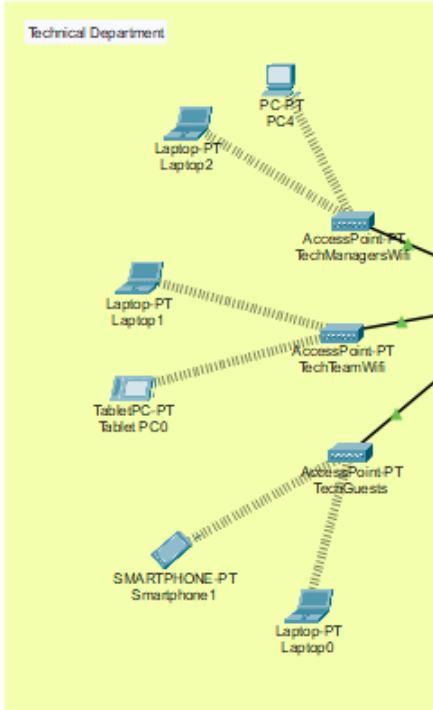


Figure 9_Technical Department APs for each type of user

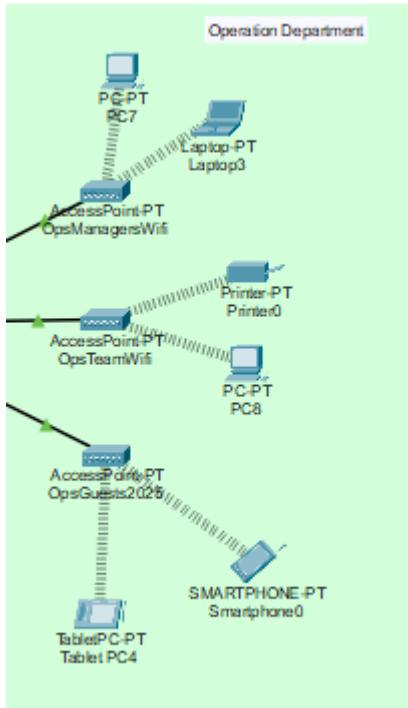


Figure 10_AP on Operations Department for each user

TechTeamWifi

Physical Config Attributes

GLOBAL		Port 1			
Settings		Port Status	<input checked="" type="checkbox"/> On		
INTERFACE		SSID	TechTeam2025		
Port 0		2.4 GHz Channel	6		
Port 1		Coverage Range (meters)	140.00		
		Authentication			
		<input type="radio"/> Disabled	<input type="radio"/> WEP	WEP Key	
		<input type="radio"/> WPA-PSK	<input checked="" type="radio"/> WPA2-PSK	PSK Pass Phrase	TechTeam2025
				User ID	
				Password	
				Encryption Type	AES

TechManagersWifi

Physical Config Attributes

GLOBAL		Port 1			
Settings		Port Status	<input checked="" type="checkbox"/> On		
INTERFACE		SSID	ManagersWifi2025		
Port 0		2.4 GHz Channel	6		
Port 1		Coverage Range (meters)	140.00		
		Authentication			
		<input type="radio"/> Disabled	<input type="radio"/> WEP	WEP Key	
		<input type="radio"/> WPA-PSK	<input checked="" type="radio"/> WPA2-PSK	PSK Pass Phrase	ManagersWifi2025
				User ID	
				Password	
				Encryption Type	AES

TechGuests

Physical Config Attributes

GLOBAL		Port 1			
Settings		Port Status	<input checked="" type="checkbox"/> On		
INTERFACE		SSID	Guests12025		
Port 0		2.4 GHz Channel	6		
Port 1		Coverage Range (meters)	140.00		
		Authentication			
		<input type="radio"/> Disabled	<input type="radio"/> WEP	WEP Key	
		<input type="radio"/> WPA-PSK	<input checked="" type="radio"/> WPA2-PSK	PSK Pass Phrase	Guests2025
				User ID	
				Password	
				Encryption Type	AES

Figure 11_Setting Up SSIDs and WPA2-PSK for the Technical Department

2.5 Network Controller Setup

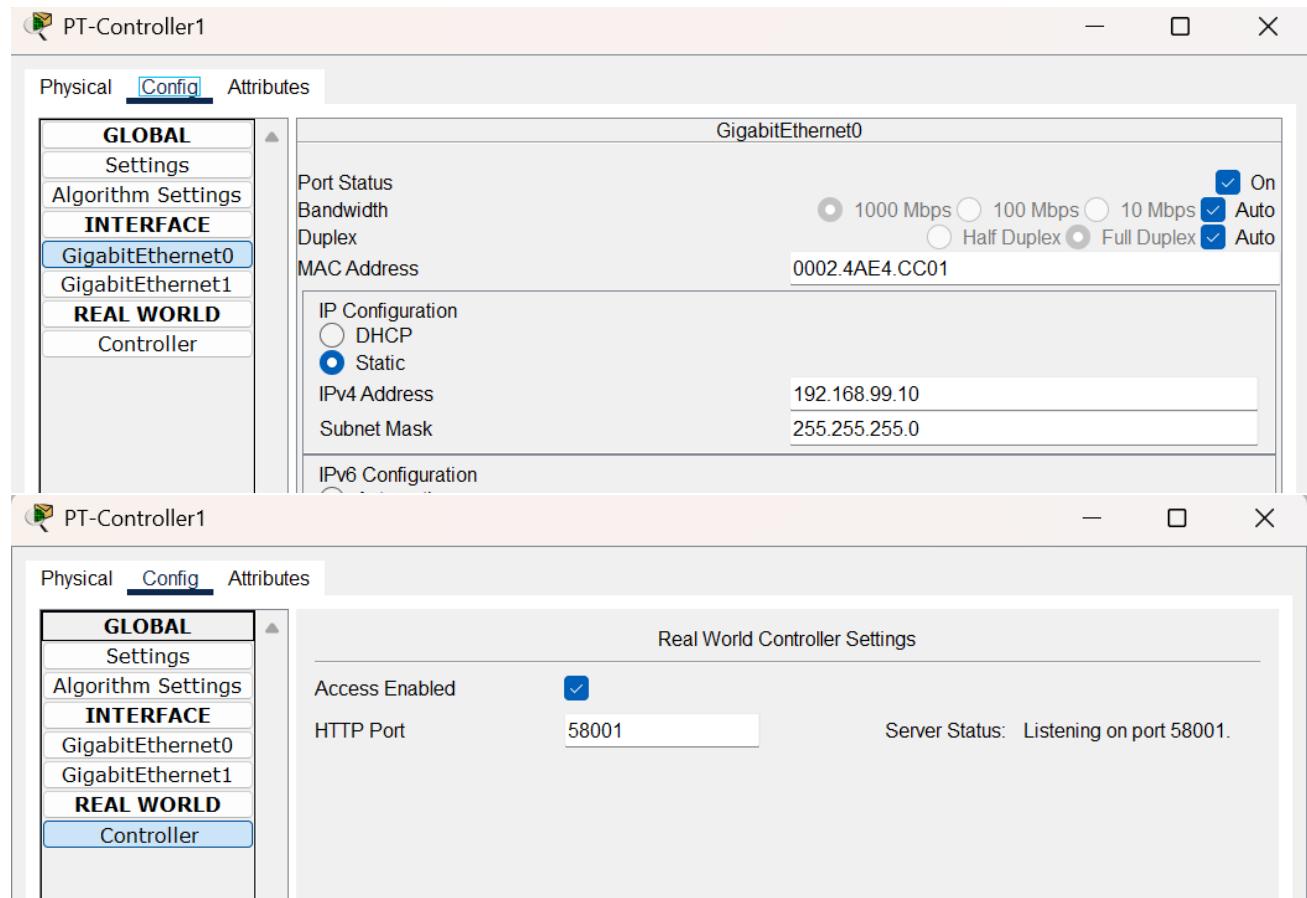


Figure 12_Setting Up the Network Controller

PC0

Physical Config Desktop Programming Attributes

Web Browser URL http://192.168.99.10 Go Stop Manager

cisco Network Controller

DISCOVERY

Discoveries

Status	Name
✓ Complete	ML Switch
✓ Complete	Core Router
✓ Complete	Tech Router
In Progress	internal_health_check
✓ Complete	internal_health_check

Core Router

Condition: Complete ✓ Status: inactive Type: CDP ID: 2

Discovery Details

CDP Level	Retry Count	TimeOut	IP Range
16	3	5	192.168.99.1

CLI Credentials

ID	Username	Description
8505e598-2806-498b-9a81-4498bead0b0e	Manager	The Manager Of The Company

Discovered Devices

Hostname	Type	IP	Reachability Status
		0.0.0.0	Unreachable
Router	Router	10.0.0.1	Reachable
Router	Router	10.0.0.2	Reachable
PC1	Pc	192.168.1.21	Reachable
Laptop2	Laptop	192.168.1.22	Reachable
PC4	Pc	192.168.1.23	Reachable
Router	Router	192.168.1.24	Reachable
Router	Router	192.168.10.1	Unreachable
Router	Router	192.168.100.10	Reachable
Switch	MultiLayerSwitch	192.168.100.5	Unreachable
Router	Router	192.168.100.6	Reachable
Switch	MultiLayerSwitch	192.168.100.9	Unreachable

PC0

Physical Config Desktop Programming Attributes

Web Browser URL http://192.168.99.10 Go Stop Manager

cisco Network Controller

ASSURANCE HOSTS TOPOLOGY PATH TRACE

Assurance

Routers

Healthy Percentage: 0% Healthy Ratio: 0:0

Managed Unmanaged

Switches

Healthy Percentage: 0% Healthy Ratio: 0:0

Managed Unmanaged

Hosts

Healthy Percentage: 90% Healthy Ratio: 18:20

Reachable Unreachable

Network Health

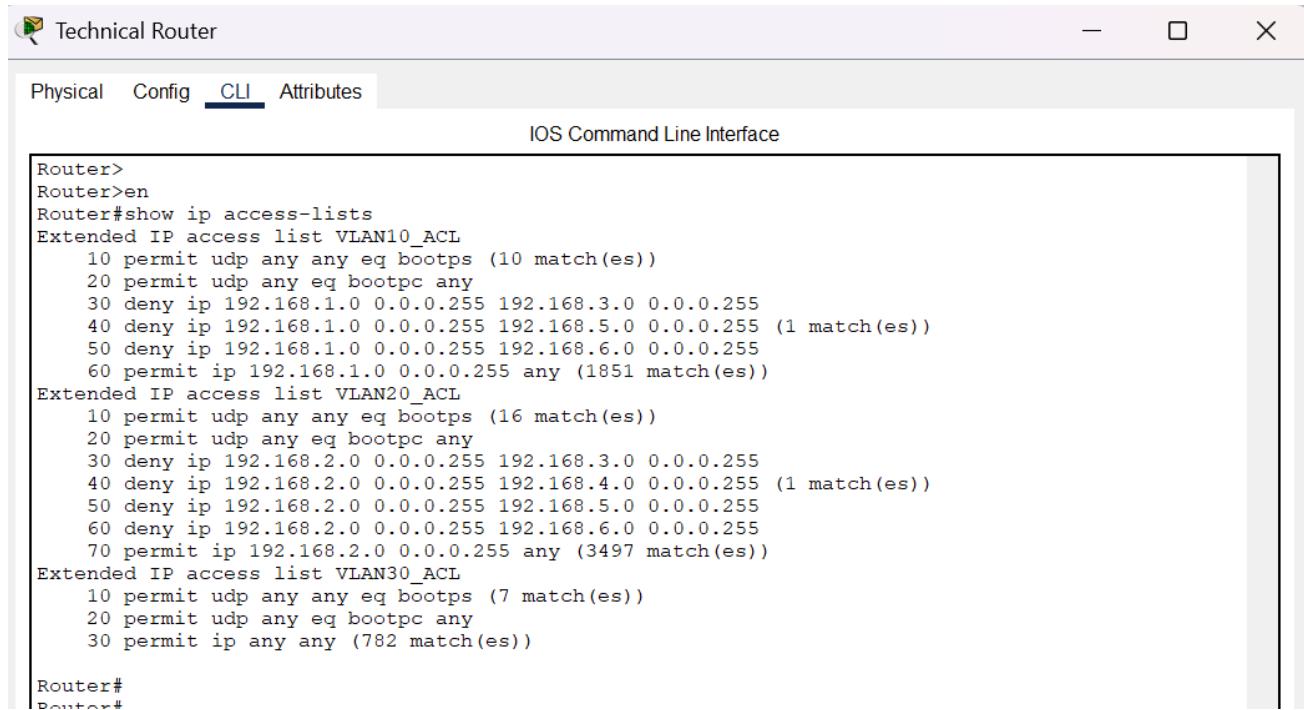
Routers 0 Health Level 0%

Switches 0 Health Level 0%

Hosts 20 Health Level 90%

Figure 13_Network Controller Discoveries

2.6 ACL Configuration

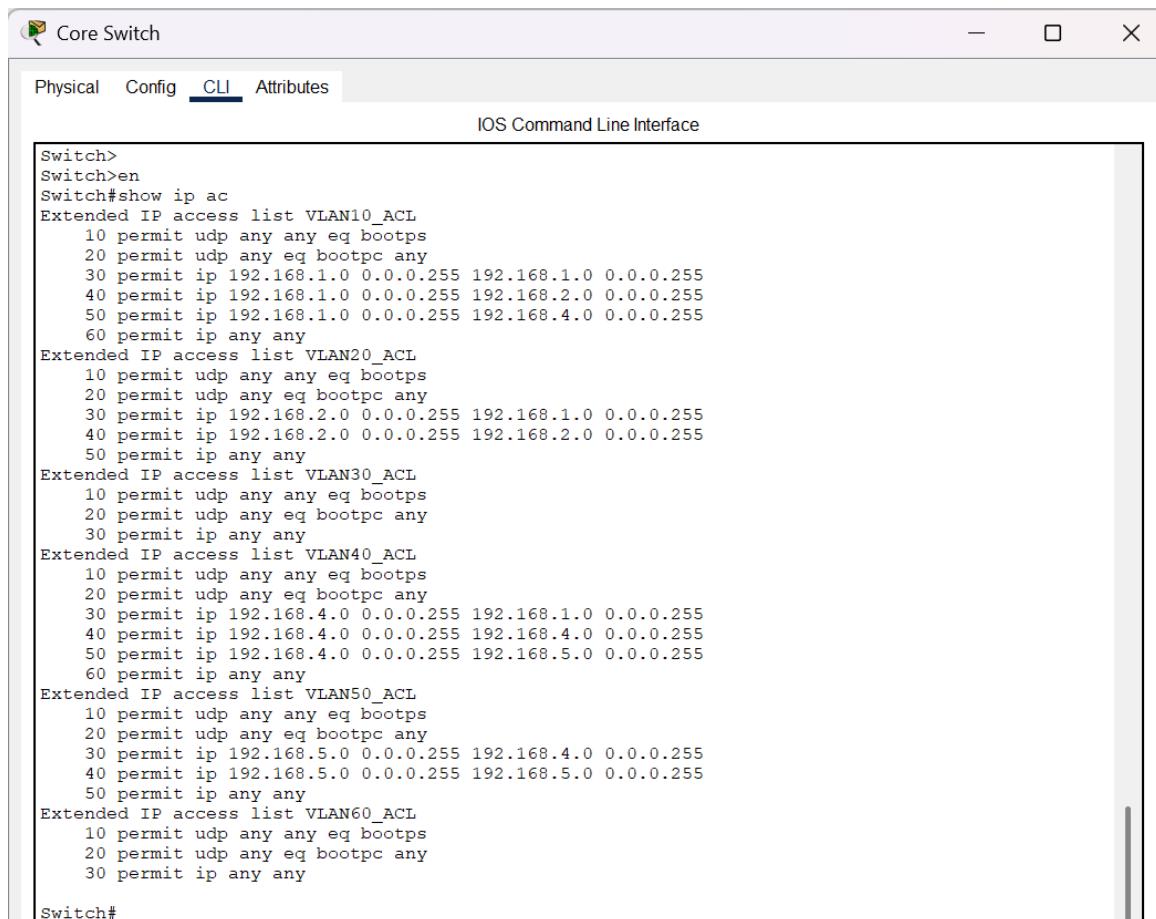


The screenshot shows the 'Technical Router' configuration interface with the 'CLI' tab selected. The title bar says 'Technical Router'. Below it is a menu bar with 'Physical', 'Config', 'CLI', and 'Attributes'. The main area is titled 'IOS Command Line Interface'. The CLI output displays the configuration of three Extended IP access lists (VLAN10_ACL, VLAN20_ACL, and VLAN30_ACL) on the router.

```
Router>
Router>en
Router#show ip access-lists
Extended IP access list VLAN10_ACL
 10 permit udp any any eq bootps (10 match(es))
 20 permit udp any any eq bootpc any
 30 deny ip 192.168.1.0 0.0.0.255 192.168.3.0 0.0.0.255
 40 deny ip 192.168.1.0 0.0.0.255 192.168.5.0 0.0.0.255 (1 match(es))
 50 deny ip 192.168.1.0 0.0.0.255 192.168.6.0 0.0.0.255
 60 permit ip 192.168.1.0 0.0.0.255 any (1851 match(es))
Extended IP access list VLAN20_ACL
 10 permit udp any any eq bootps (16 match(es))
 20 permit udp any any eq bootpc any
 30 deny ip 192.168.2.0 0.0.0.255 192.168.3.0 0.0.0.255
 40 deny ip 192.168.2.0 0.0.0.255 192.168.4.0 0.0.0.255 (1 match(es))
 50 deny ip 192.168.2.0 0.0.0.255 192.168.5.0 0.0.0.255
 60 deny ip 192.168.2.0 0.0.0.255 192.168.6.0 0.0.0.255
 70 permit ip 192.168.2.0 0.0.0.255 any (3497 match(es))
Extended IP access list VLAN30_ACL
 10 permit udp any any eq bootps (7 match(es))
 20 permit udp any any eq bootpc any
 30 permit ip any any (782 match(es))

Router#
Router#
```

Figure 14_ ACL Configuration on Technical Router



The screenshot shows the 'Core Switch' configuration interface with the 'CLI' tab selected. The title bar says 'Core Switch'. Below it is a menu bar with 'Physical', 'Config', 'CLI', and 'Attributes'. The main area is titled 'IOS Command Line Interface'. The CLI output displays the configuration of six Extended IP access lists (VLAN10_ACL through VLAN60_ACL) on the switch.

```
Switch>
Switch>en
Switch#show ip ac
Extended IP access list VLAN10_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip 192.168.1.0 0.0.0.255 192.168.1.0 0.0.0.255
 40 permit ip 192.168.1.0 0.0.0.255 192.168.2.0 0.0.0.255
 50 permit ip 192.168.1.0 0.0.0.255 192.168.4.0 0.0.0.255
 60 permit ip any any
Extended IP access list VLAN20_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip 192.168.2.0 0.0.0.255 192.168.1.0 0.0.0.255
 40 permit ip 192.168.2.0 0.0.0.255 192.168.2.0 0.0.0.255
 50 permit ip any any
Extended IP access list VLAN30_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip any any
Extended IP access list VLAN40_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip 192.168.4.0 0.0.0.255 192.168.1.0 0.0.0.255
 40 permit ip 192.168.4.0 0.0.0.255 192.168.4.0 0.0.0.255
 50 permit ip 192.168.4.0 0.0.0.255 192.168.5.0 0.0.0.255
 60 permit ip any any
Extended IP access list VLAN50_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip 192.168.5.0 0.0.0.255 192.168.4.0 0.0.0.255
 40 permit ip 192.168.5.0 0.0.0.255 192.168.5.0 0.0.0.255
 50 permit ip any any
Extended IP access list VLAN60_ACL
 10 permit udp any any eq bootps
 20 permit udp any any eq bootpc any
 30 permit ip any any

Switch#
Switch#
```

Figure 15_ ACL Configuration on Core Switch

Operations Router

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router>
Router>en
Router#show ip ac
Extended IP access list VLAN40_ACL
  10 permit udp any any eq bootps (9 match(es))
  20 permit udp any eq bootpc any
  30 deny ip 192.168.4.0 0.0.0.255 192.168.2.0 0.0.0.255
  40 deny ip 192.168.4.0 0.0.0.255 192.168.3.0 0.0.0.255
  50 deny ip 192.168.4.0 0.0.0.255 192.168.6.0 0.0.0.255
  60 permit ip 192.168.4.0 0.0.0.255 any (1324 match(es))
Extended IP access list VLAN50_ACL
  10 permit udp any any eq bootps (12 match(es))
  20 permit udp any eq bootpc any
  30 deny ip 192.168.5.0 0.0.0.255 192.168.1.0 0.0.0.255
  40 deny ip 192.168.5.0 0.0.0.255 192.168.2.0 0.0.0.255
  50 deny ip 192.168.5.0 0.0.0.255 192.168.3.0 0.0.0.255
  60 deny ip 192.168.5.0 0.0.0.255 192.168.6.0 0.0.0.255
  70 permit ip 192.168.5.0 0.0.0.255 any (2382 match(es))
Extended IP access list VLAN60_ACL
  10 permit udp any any eq bootps (6 match(es))
  20 permit udp any eq bootpc any
  30 permit ip any any (1321 match(es))

Router#
Router#
Router#

```

Figure 16_ ACL on Operation Router

2.7 EIGRP Configurations

MainBranchRouter

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router>
Router>en
Router#show ip eigrp top
IP-EIGRP Topology Table for AS 100/ID(192.168.99.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 10.0.0.0/30, 1 successors, FD is 2169856
      via Connected, Serial0/2/0
P 192.168.1.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.2.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.3.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.4.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.5.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.6.0/24, 1 successors, FD is 28672
      via 192.168.99.2 (28672/28416), GigabitEthernet0/0
P 192.168.99.0/24, 1 successors, FD is 2816
      via Connected, GigabitEthernet0/0
P 192.168.100.0/24, 1 successors, FD is 3072
      via 192.168.99.2 (3072/2816), GigabitEthernet0/0
P 192.168.200.0/24, 1 successors, FD is 2170112
      via 10.0.0.2 (2170112/2816), Serial0/2/0

Router#
Router#
Router#

```

Figure 17_ EIGRP Topology Taken From the Main Branch Router

2.8 Connectivity Testing and Results

VLAN / ACL	ALLOWED COMMUNICATION	DENIED COMMUNICATION	REASON / JUSTIFICATION
VLAN 10 – TECH MANAGERS	VLAN 10, VLAN 20, VLAN 40	VLAN 30, VLAN 50, VLAN 60	Allow full access to team members and Ops management. Block guests and non-related Ops VLANs to maintain internal security.
VLAN 20 – TECH MEMBERS	VLAN 10, VLAN 20	VLAN 30, VLAN 40, VLAN 50, VLAN 60	Allow collaboration within Tech department. Restrict access to other departments and guests.
VLAN 30 – TECH GUESTS / CLIENTS	Internet only	VLAN 10, VLAN 20, VLAN 40, VLAN 50, VLAN 60	Limit guest access to Internet. Prevent internal resource access.
VLAN 40 – OPERATIONS MANAGERS	VLAN 40, VLAN 50, VLAN 10	VLAN 20, VLAN 30, VLAN 60	Allow Ops staff and management to collaborate internally and with Tech managers. Restrict unrelated Tech members and guests.
VLAN 50 – OPERATION MEMBERS (HR/FINANCE)	VLAN 40, VLAN 50	VLAN 10, VLAN 20, VLAN 30, VLAN 60	Allow internal Ops collaboration. Restrict Tech VLANs and guest access.
VLAN 60 – OPERATION GUESTS / CLIENTS	Internet only	VLAN 10, VLAN 20, VLAN 30, VLAN 40, VLAN 50	Limit external clients to Internet. No access to internal systems.
VLAN 99 – INFRASTRUCTURE	All VLANs (10–60)	N/A	Full access for management and IT infrastructure to monitor and maintain all departments.

Table 4 _Allowed and Denied Communications Between the Networks and Justification

PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.2.26
Pinging 192.168.2.26 with 32 bytes of data:
Reply from 192.168.2.26: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.2.26:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.4.24
Pinging 192.168.4.24 with 32 bytes of data:
Reply from 192.168.4.24: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.4.24:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.5.22
Pinging 192.168.5.22 with 32 bytes of data:
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 192.168.5.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.3.22
Pinging 192.168.3.22 with 32 bytes of data:
Reply from 192.168.1.254: Destination host unreachable.
```

Top

Figure 18_ Ping tests from a device in VLAN 10

PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.25
Pinging 192.168.1.25 with 32 bytes of data:
Reply from 192.168.1.25: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.1.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.3.22
Pinging 192.168.3.22 with 32 bytes of data:
Reply from 192.168.2.254: Destination host unreachable.

Ping statistics for 192.168.3.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

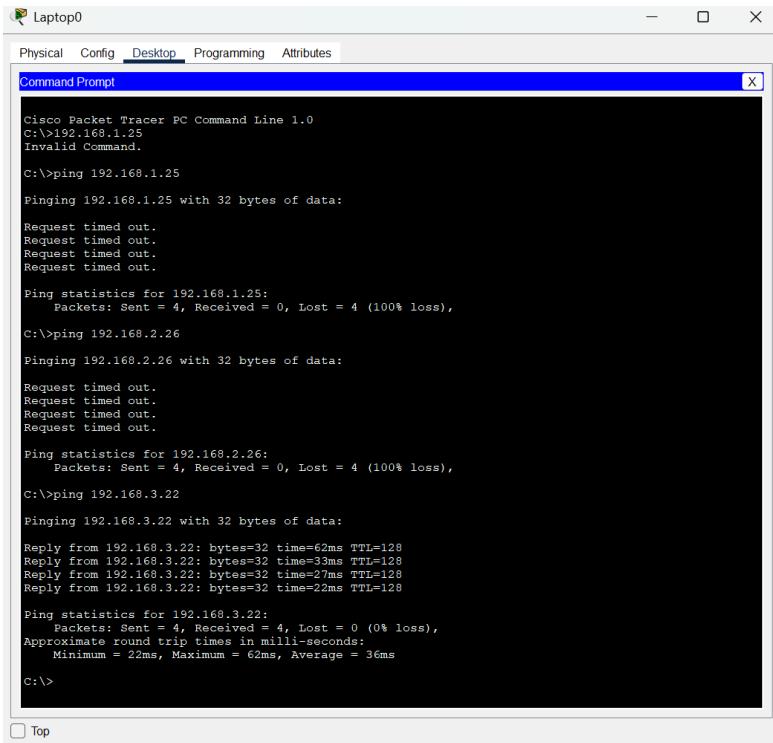
C:\>ping 192.168.4.22
Pinging 192.168.4.22 with 32 bytes of data:
Reply from 192.168.2.254: Destination host unreachable.

Ping statistics for 192.168.4.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.5.22
Pinging 192.168.5.22 with 32 bytes of data:
Reply from 192.168.2.254: Destination host unreachable.
Reply from 192.168.2.254: Destination host unreachable.
```

Top

Figure 19_ Ping test from a device in VLAN 20



```

Cisco Packet Tracer PC Command Line 1.0
C:>\192.168.1.25
Invalid Command.

C:>ping 192.168.1.25
Pinging 192.168.1.25 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.25:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:>ping 192.168.2.26
Pinging 192.168.2.26 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.26:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:>ping 192.168.3.22
Pinging 192.168.3.22 with 32 bytes of data:
Reply from 192.168.3.22: bytes=32 time=62ms TTL=128
Reply from 192.168.3.22: bytes=32 time=33ms TTL=128
Reply from 192.168.3.22: bytes=32 time=27ms TTL=128
Reply from 192.168.3.22: bytes=32 time=22ms TTL=128

Ping statistics for 192.168.3.22:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 62ms, Average = 36ms
C:>

```

Figure 20_Ping Test from a Device in VLAN 30



```

MainBranchRouter
Physical Config CLI Attributes
IOS Command Line Interface

Router#ping 10.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/10/20 ms
Router#
Router#
Router#

```

Figure 21_Testing Connectivity from Router in Colombo Branch to Router in Kandy Branch

03. DISCUSSION AND CONCLUSIONS

3.1 The Network Design

The network design used in Crescent Studios was used to address the challenges in media production environments. In contrast to typical office networks, an animation studio needs high performance for huge file transfers, along with strict security for the valuable intellectual property. A clear boundary is maintained among the three layers (core, distribution, and access) to prevent traffic from impacting administrative operations while ensuring defined security zones between creative and business data. This approach ensures that 4K video editing sessions remain smooth even at peak network usage while simultaneously protecting unreleased content through structured segmentation.

3.2 VLAN Segmentation Strategy

The reason why there were 6 VLANs is because it was necessary to not disrupt the workflow of the company. Technical teams of animators and visual effects artists need shared access to rendering clusters and network-attached storage, so they must be grouped across VLANs 10 through 20. At the same time, full isolation of guest networks in VLANs 30 and 60 protects production assets during client reviews and visits. This level of granularity shows how creative organizations in the modern world balance collaboration needs with security requirements.

3.3 IP Addressing Reasoning

The decision to use multiple Class C networks is based on operational efficiency rather than the theoretical optimization of address space. In real IT support environments, this greatly reduces resolution time when troubleshooting network issues because a device's IP address immediately identifies the department and function. This practice is quite common in medium enterprises where operational simplicity weighs stronger than perfect address utilization.

3.4 How Does Packet Tracer Limitations Affect Wireless Implementation?

This wireless design shows large gaps in simulation capabilities compared to real-world deployment. Packet Tracer is unable to represent multi-SSID enterprise access points, which forces us to use different devices for each wireless network. What this means is that our wireless design will show conceptual separation but not reflect the efficiency of the hardware or the advanced features found in actual studio deployments.

3.5 Why Use Serial Connections Between the Branches?

While selecting the serial connections for the branch offices, this shows that there are, in fact, specific real-world scenarios where leased lines make more sense. Even though SD-WAN and MPLS are modern alternatives, serial links-such as T1/E1 circuits-offer bandwidth immune to congestion over the public internet, which is important for transferring high-bandwidth media files between studio locations. Physical isolation from the public networks inherently provides security benefits, and for organizations with predictable inter-site traffic patterns, a leased line often proves more cost-effective than the equivalent managed services. This represents a solution that shows network design must consider the specific business needs rather than automatically choosing the newest technology.

3.6 What Alternative Technologies Were Considered but Rejected?

Several other design approaches were reviewed and discarded in arriving at the final design. OSPF was initially considered instead of EIGRP but proved to have slower convergence times critical for large file transfers. A single network subnetting approach was considered and then discarded in favour of multiple Class C networks for ease of operational management. Cloud-only wireless controllers were considered but more traditional on-premises management was selected for reliability of media transfer scenarios.

3.7 How does this design address operational challenges?

The network architecture explicitly targets weak points of an animation studio, such as bottlenecks in large file transfers, needs for collaborative workflow, and protection of intellectual property. Branch connectivity enables remote collaboration across locations. The security framework protects unreleased content yet permits necessary communication across departments. Each element addresses real operational challenges faced by media production companies rather than just generic best practices for networking.

04. REFERENCES

Cisco Systems (2023) EIGRP Configuration Guide, Cisco IOS Release 15M&T. Available at: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_eigrp/configuration/15-mt/ire-15-mt-book.html (Accessed: 20 November 2025).

Cisco Systems (2023) VLAN Configuration Guide, Cisco IOS XE Release 3SE. Available at: https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9500/software/release/16-9/configuration_guide/vlan/b_169_vlan_9500_cg.html (Accessed: 5 November 2025).

Tanenbaum, A. and Wetherall, D. J. (2021) Computer Networks. 6th edition. Pearson.

Wi-Fi Alliance (2023) WPA2 Security for Wireless Networks. Available at: <https://www.wi-fi.org/discover-wi-fi/security> (Accessed: 15 November 2025).

Cisco Systems (2023) DHCP Configuration Guide, Cisco IOS Release 15M&T. Available at: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipaddr_dhcp/configuration/15-mt/dhcp-15-mt-book.html (Accessed: 10 November 2025).

05. APPENDICES

The image shows two windows of the Cisco IOS Command Line Interface (CLI) for a device named "MainBranchRouter". Both windows have tabs for "Physical", "Config", and "Attributes", with "Config" being the active tab.

Top Window (Initial Configuration):

```
!
!
!
spanning-tree mode pvst
!
!
!
interface GigabitEthernet0/0
 ip address 192.168.99.1 255.255.255.0
 ip nat inside
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/2
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/0
 no ip address
 ip nat outside
!
interface GigabitEthernet0/1/0
 no ip address
!
interface Serial0/2/0
 ip address 10.0.0.1 255.255.255.252
!
interface Serial0/2/1
 no ip address
 clock rate 2000000
!
interface Vlan1
 no ip address
```

Bottom Window (Detailed Configuration):

```
clock rate 2000000
!
interface Vlan1
 no ip address
!
router eigrp 100
 network 192.168.100.0 0.0.0.3
 network 10.0.0.0 0.0.0.3
 network 192.168.99.0
!
ip nat inside source list 1 interface GigabitEthernet0/0/0 overload
ip classless
ip route 192.168.1.0 255.255.255.0 192.168.100.1
ip route 192.168.2.0 255.255.255.0 192.168.100.1
ip route 192.168.3.0 255.255.255.0 192.168.100.1
ip route 192.168.4.0 255.255.255.0 192.168.100.1
ip route 192.168.5.0 255.255.255.0 192.168.100.1
ip route 192.168.6.0 255.255.255.0 192.168.100.1
ip route 192.168.99.0 255.255.255.0 192.168.100.1
ip route 192.168.1.1 255.255.255.1 192.168.100.6
ip route 192.168.2.1 255.255.255.1 192.168.100.6
ip route 192.168.3.1 255.255.255.1 192.168.100.6
ip route 192.168.4.1 255.255.255.1 192.168.100.10
ip route 192.168.5.0 255.255.255.0 192.168.100.10
ip route 192.168.6.0 255.255.255.0 192.168.100.10
!
ip flow-export version 9
!
access-list 1 permit 192.168.1.0 0.0.0.255
access-list 1 permit 192.168.2.0 0.0.0.255
access-list 1 permit 192.168.3.0 0.0.0.255
access-list 1 permit 192.168.4.0 0.0.0.255
access-list 1 permit 192.168.5.0 0.0.0.255
access-list 1 permit 192.168.6.0 0.0.0.255
access-list 1 permit 192.168.100.0 0.0.0.3
access-list 1 permit 192.168.100.4 0.0.0.3
access-list 1 permit 192.168.100.8 0.0.0.3
!
```

Figure 22_Colombo Main Router Running Config

Core Switch

Physical Config CLI Attributes

IOS Command Line Interface

```

!
! spanning-tree mode pvst
!
!
!
!
!
interface GigabitEthernet1/0/1
switchport trunk native vlan 99
switchport trunk allowed vlan 10,20,30,40,50,60,99
switchport mode trunk
!
interface GigabitEthernet1/0/2
no ip address
ip address 192.168.100.5 255.255.255.252
ip access-group INTERNET_FILTER in
duplex auto
speed auto
!
interface GigabitEthernet1/0/3
no switchport
ip address 192.168.100.9 255.255.255.252
ip access-group INTERNET_FILTER in
duplex auto
speed auto
!
interface GigabitEthernet1/0/4
switchport access vlan 99
switchport mode access
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
--More--

```

Top

Core Switch

Physical Config CLI Attributes

IOS Command Line Interface

```

interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
interface GigabitEthernet1/0/13
!
interface GigabitEthernet1/0/14
interface GigabitEthernet1/0/15
!
interface GigabitEthernet1/0/16
interface GigabitEthernet1/0/17
!
interface GigabitEthernet1/0/18
!
interface GigabitEthernet1/0/19
interface GigabitEthernet1/0/20
!
interface GigabitEthernet1/0/21
interface GigabitEthernet1/0/22
!
interface GigabitEthernet1/0/23
interface GigabitEthernet1/0/24
!
interface GigabitEthernet1/1/1
interface GigabitEthernet1/1/2
!
--More--

```

Top

Core Switch

Physical Config CLI Attributes

IOS Command Line Interface

```

Physical Config CLI Attributes
IOS Command Line Interface
ip classless
ip route 0.0.0.0 0.0.0.0 192.168.100.2
ip route 192.168.1.0 255.255.255.0 192.168.100.6
ip route 192.168.1.1 255.255.255.0 192.168.100.4
ip route 192.168.1.2 255.255.255.0 192.168.100.6
ip route 192.168.4.0 255.255.255.0 192.168.100.10
ip route 192.168.5.0 255.255.255.0 192.168.100.10
ip route 192.168.6.0 255.255.255.0 192.168.100.10
ip flow-export version 9
!
ip access-list extended VLAN10_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.1.0 0.0.0.255 192.168.1.0 0.0.0.255
permit ip 192.168.1.1 0.0.0.255 192.168.2.0 0.0.0.255
permit ip 192.168.1.2 0.0.0.255 192.168.4.0 0.0.0.255
permit ip any any
ip access-list extended VLAN30_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.2.0 0.0.0.255 192.168.1.0 0.0.0.255
permit ip 192.168.2.1 0.0.0.255 192.168.2.0 0.0.0.255
ip access-list extended VLAN30_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.3.0 0.0.0.255 192.168.4.0 0.0.0.255
permit ip 192.168.4.0 0.0.0.255 192.168.5.0 0.0.0.255
permit ip any any
ip access-list extended VLAN50_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.5.0 0.0.0.255 192.168.4.0 0.0.0.255
permit ip 192.168.5.1 0.0.0.255 192.168.5.0 0.0.0.255
permit ip any any
--More--

```

Top

Core Switch

Physical Config CLI Attributes

IOS Command Line Interface

```

permit udp any any eq bootps
permit udp any eq bootptc any
permit ip any any
ip access-list extended VLAN40_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.4.0 0.0.0.255 192.168.1.0 0.0.0.255
permit ip 192.168.4.1 0.0.0.255 192.168.4.0 0.0.0.255
permit ip 192.168.4.2 0.0.0.255 192.168.5.0 0.0.0.255
permit ip any any
ip access-list extended VLAN50_ACL
permit udp any any eq bootps
permit udp any eq bootptc any
permit ip 192.168.5.0 0.0.0.255 192.168.4.0 0.0.0.255
permit ip 192.168.5.1 0.0.0.255 192.168.5.0 0.0.0.255
permit ip any any
line con 0
line aux 0
line vty 0 4
login
!
!
end

Switch#
Switch#
Switch#
Switch#

```

Top

Figure 23 Multilayer Switch Running Configurations

Technical Router

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router#show run
Building configuration...
Current configuration : 2911 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
ip dhcp excluded-address 192.168.1.1 192.168.1.20
ip dhcp excluded-address 192.168.2.1 192.168.2.20
ip dhcp excluded-address 192.168.3.1 192.168.3.20
!
ip dhcp pool TECH-MANAGERS-POOL
network 192.168.1.0 255.255.255.0
default-router 192.168.1.254
ip dhcp pool TECH-TEAM-POOL
network 192.168.2.0 255.255.255.0
default-router 192.168.2.254
ip dhcp pool TECH-GUESTS-POOL
network 192.168.3.0 255.255.255.0
default-router 192.168.3.254
!
!
ip cef
no ipv6 cef
!
!
license udi pid CISCO1941/K9 sn FTX152481AW-
!
!
!
--More--

```

Top

Technical Router

Physical Config **CLI** Attributes

IOS Command Line Interface

```

spanning-tree mode pvst
!
!
!
!
interface GigabitEthernet0/0
ip address 192.168.100.6 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
ip access-group TECH_VLANS_IN in
duplex auto
speed auto
!
interface GigabitEthernet0/1.10
encapsulation dot1Q 10
ip address 192.168.1.254 255.255.255.0
ip access-group VLAN0_ACL in
!
interface GigabitEthernet0/1.20
encapsulation dot1Q 20
ip address 192.168.2.254 255.255.255.0
ip access-group VLAN20_ACL in
!
interface GigabitEthernet0/1.30
encapsulation dot1Q 30
ip address 192.168.3.254 255.255.255.0
ip access-group VLAN30_ACL in

```

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Technical Router

Physical Config **CLI** Attributes

IOS Command Line Interface

```

!
interface Vlan1
no ip address
shutdown
!
interface Vlan10
mac-address 00d0.d347.7001
no ip address
!
interface Vlan20
mac-address 00d0.d347.7002
no ip address
!
interface Vlan30
mac-address 00d0.d347.7003
no ip address
!
router cigrp 100
network 192.168.100.4 0.0.0.3
network 192.168.1.0
network 192.168.2.0
network 192.168.3.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 192.168.100.5
ip route 192.168.1.0 255.255.255.0 192.168.100.10
ip route 192.168.2.0 255.255.255.0 192.168.100.10
ip route 192.168.3.0 255.255.255.0 192.168.100.10
ip route 192.168.99.0 255.255.255.0 192.168.100.10
!
ip flow-export version 9
!
ip access-list extended VLAN10_ACL
permit udp any any eq bootps
permit udp any any eq bootpc
deny ip 192.168.1.0 0.0.0.255 192.168.3.0 0.0.0.255
deny ip 192.168.1.0 0.0.0.255 192.168.5.0 0.0.0.255
deny ip 192.168.6.0 0.0.0.255 192.168.100.10
permit ip 192.168.1.0 0.0.0.255 any
ip access-list extended VLAN20_ACL
permit udp any any eq bootps
permit udp any any eq bootpc
permit ip any any
!
!
line con 0
line aux 0
!
line vty 0 4
login
!
--More--

```

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Figure 24_Technical Department Router Running Configurations

```

Operations Router - CLI
Physical Config CLI Attributes
IOS Command Line Interface
!
hostname Router
!
!
ip dhcp excluded-address 192.168.4.1 192.168.4.20
ip dhcp excluded-address 192.168.5.1 192.168.5.20
ip dhcp excluded-address 192.168.6.1 192.168.6.20
!
ip dhcp pool OPS-STAFF-POOL
network 192.168.4.0 255.255.255.0
default-router 192.168.4.254
ip dhcp pool OPS-GUESTS-POOL
network 192.168.6.0 255.255.255.0
default-router 192.168.6.254
!
!
ip cef
no ipv6 cef
!
!
license udi pid CISCO1941/K9 sn FTX15244WP9-
!
!
!
!
!
!
spanning-tree mode pvst
!--More--|

```



```

Operations Router - CLI
Physical Config CLI Attributes
IOS Command Line Interface
!
spanning-tree mode pvst
!
!
!
interface GigabitEthernet0/0
ip address 192.168.100.10 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
ip access-group OPS_VLAN40_ACL in
duplex auto
speed auto
!
interface GigabitEthernet0/1.40
encapsulation dot1q 40
ip address 192.168.4.154 255.255.255.0
ip access-group VLAN40_ACL in
!
interface GigabitEthernet0/1.50
encapsulation dot1q 50
ip address 192.168.5.254 255.255.255.0
ip access-group VLAN50_ACL in
!
interface GigabitEthernet0/1.60
encapsulation dot1q 60
ip address 192.168.6.254 255.255.255.0
ip access-group VLAN60_ACL in
!
interface Vlan1
no ip address
shutdown
!
interface Vlan40
mac-address 000b.bedaa010
no ip address
!
!--More--|

```


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```

Operations Router - CLI
Physical Config CLI Attributes
IOS Command Line Interface
!
interface Vlan1
no ip address
shutdown
!
interface Vlan40
mac-address 000b.bedaa010
no ip address
!
interface Vlan50
mac-address 000b.bedaa0102
no ip address
!
interface Vlan60
mac-address 000b.bedaa0103
no ip address
!
router eigrp 100
network 192.168.100.0 0.0.0.3
network 192.168.4.0
network 192.168.5.0
network 192.168.6.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 192.168.100.9
ip route 192.168.1.0 255.255.255.0 192.168.100.6
ip route 192.168.2.0 255.255.255.0 192.168.100.6
ip route 192.168.3.0 255.255.255.0 192.168.100.6
ip route 192.168.99.0 255.255.255.0 192.168.100.6
!
ip flow-export version 9
!
ip access-list extended VLAN40_ACL
permit udp any any eq bootps
permit udp any eq bootpc any
deny ip 192.168.4.0 0.0.0.255 192.168.2.0 0.0.0.255
deny ip 192.168.4.0 0.0.0.255 192.168.3.0 0.0.0.255
deny ip 192.168.4.0 0.0.0.255 192.168.6.0 0.0.0.255
permit ip 192.168.4.0 0.0.0.255 any
ip access-list extended VLAN50_ACL
permit udp any any eq bootps
permit udp any eq bootpc any
permit udp any eq bootpc any
permit udp any eq bootpc any
!--More--|

```


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```

Operations Router - CLI
Physical Config CLI Attributes
IOS Command Line Interface
!
access-list extended VLAN40_ACL
permit udp any any eq bootps
permit udp any eq bootpc any
deny ip 192.168.4.0 0.0.0.255 192.168.2.0 0.0.0.255
deny ip 192.168.4.0 0.0.0.255 192.168.3.0 0.0.0.255
deny ip 192.168.4.0 0.0.0.255 192.168.6.0 0.0.0.255
permit ip 192.168.4.0 0.0.0.255 any
ip access-list extended VLAN50_ACL
permit udp any any eq bootps
permit udp any eq bootpc any
permit ip any any
!
!
line con 0
line aux 0
line vty 0 4
login
!
end
Router# Router# Router# Router# Router# Router#

```


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Figure 25_Operations Department Router Running Configuration

BranchOfficeRouter

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router#show run
Building configuration...
Current configuration : 1077 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
ip dhcp pool BRANCH_POOL
 network 192.168.200.0 255.255.255.0
 default-router 192.168.200.1
!
!
no ip cef
no ipv6 cef
!
!
license udi pid CISCO2911/K9 sn FTX1524P3SD-
!
!
!
!
!
!
spanning-tree mode pvst
!--More--|
```

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BranchOfficeRouter

Physical Config **CLI** Attributes

IOS Command Line Interface

```
!
interface GigabitEthernet0/0
 ip address 192.168.200.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/0/0
 ip address 192.168.10.1 255.255.255.0
!
interface Serial0/1/0
 ip address 10.0.0.2 255.255.255.252
 clock rate 64000
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
router eigrp 100
 network 10.0.0.0 0.0.0.3
 network 192.168.200.0
!
ip classless
!
ip flow-export version 9
!
!--More--|
```

Copy Paste

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Figure 26_Kandy Branch Office Core Router Running Configurations