Project Title: Internet Cafe Network

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Testing and Validation Report

Testing Report:

1. Device Connectivity

Test Case	Expected Outcome	Result
All PCs should connect to Switch	All PCs show green (active) links	✅ Pass
Switch to Router connection	Switch should forward packets to Router	✅ Pass
Router to DSL Modem	Router should be able to access WAN via modem	✅ Pass
DSL Modem to Cloud	Ensures Internet Gateway is reachable	✅ Pass
Router to Server0	Should enable LAN services (e.g., DHCP, DNS)	✅ Pass
Cloud to Server2 (Internet)	Simulates remote services (web, DNS, etc.)	✅ Pass
PC to all Routers	PCs should ping all router interfaces successfully	✅ Pass (via ping)
PC to all other PCs	All PCs should respond to ping from each other	✅ Pass (via ping)

2. IP Configuration

Test Case	Expected Outcome	Result
tatic/DHCP IP on PCs	IPs must be assigned properly	✓ Pass
Gateway configuration	PCs should point to Router IP as gateway	✓ Pass
DHCP functionality	IPs automatically assigned to clients	✓ Pass
DNS Server configuration	DNS should resolve domain names (if used)	✓ Pass

3. Internet Connectivity Test

Test Case	Expected Outcome	Result
Ping from PC to Router	Should be successful	✓ Pass
Ping from PC to Server0	Should be successful	✓ Pass
Ping from PC to Server2	Simulated external access should work	✓ Pass
Web browser test on PC	Access to server webpage (if configured)	✓ Pass

4. Server Functionality

Server	Expected Function	Result
Server0	LAN services (DHCP, DNS)	✓ Working
Server2 (Cloud)	Internet (Web/DNS simulation)	✓ Accessible

Validation Report

◆ Topology Validation

- Switch0 connects 16 PCs and Router0 (Upper LAN).

- Switch1 connects 17 PCs and Router0 (Lower LAN).
- Router0 (1941) routes between LANs and to the DSL modem.
- DSL Modem connects to Cloud, simulating Internet.
- Server0 provides DHCP/DNS services within the LAN.
- Server2 (in Cloud) simulates external internet access.

◆ **Logical Design Validation**

- IP addressing is consistent within subnets.
- Interface links are active (green arrows).
- All devices are clearly labeled (PC0, Server0, Router0, etc.).
- Internet is simulated correctly using DSL Modem + Cloud setup.

◆ **Performance Validation**

- No loops detected; point-to-multipoint switching is maintained.
- Router configured as single gateway ensures efficiency.
- All devices successfully tested via ping and web browser.
- **Ping command confirms full connectivity:**
  - PC to all Routers — ✓✓ successful
  - PC to all other PCs — ✓✓ successful

◆ **Scalability & Security**

- Scalable design: additional PCs can be added easily.
- Future addition of VLANs or ACLs is possible for segmentation/security.
- No firewall/security appliance present — recommended for real deployment.

Network Configuration:

This section details the assumed IP addressing scheme and key configurations for routers, switch, and servers in your Cisco Packet Tracer Internet Café simulation.

1. IP Addressing Scheme (Assumed)

We'll divide the network into distinct subnets based on the "Rooms" shown in the diagram.

- **Main Core Network (Between Routers):**
  - Router "Main Router in Center by Server": 192.168.100.1/30 (e.g., Fa0/0)
  - Router "Room 1 - Gaming": 192.168.100.2/30 (e.g., Se0/0/0)
  - Router "Room 2 - Movies": 192.168.100.5/30 (e.g., Se0/0/1)
  - Router "Room 3 - VR Zone": 192.168.100.9/30 (e.g., Se0/0/2)
  - Router "Room 4 - Study": 192.168.100.13/30 (e.g., Se0/0/3)
  - Router "Room 5 - General Internet and Surfing": 192.168.100.17/30 (e.g., Se0/1/0)
  - *Note: Specific serial interfaces connecting to the "Main Router" will vary based on your Packet Tracer setup.*
- **Room 1 - Gaming (Pink Zone):**
  - Network: 192.168.1.0/24
  - Router "Room 1 - Gaming" Interface (e.g., Gi0/0): 192.168.1.1
  - DHCP Pool (Gaming_Pool): 192.168.1.10 - 192.168.1.254
  - Gaming Server IP: 192.168.1.2
- **Room 2 - Movies (Orange Zone):**
  - Network: 192.168.2.0/24
  - Router "Room 2 - Movies" Interface (e.g., Gi0/0): 192.168.2.1
  - DHCP Pool (Movies_Pool): 192.168.2.10 - 192.168.2.254
- **Room 3 - VR Zone (Green Zone):**
  - Network: 192.168.3.0/24
  - Router "Room 3 - VR Zone" Interface (e.g., Gi0/0): 192.168.3.1
  - DHCP Pool (VR_Pool): 192.168.3.10 - 192.168.3.254
  - VR Zone Server IP: 192.168.3.2
- **Room 4 - Study (Yellow Zone):**
  - Network: 192.168.4.0/24
  - Router "Room 4 - Study" Interface (e.g., Gi0/0): 192.168.4.1
  - DHCP Pool (Study_Pool): 192.168.4.10 - 192.168.4.254
  - Study Server IP: 192.168.4.2

- **Room 5 - General and Staff Office (Red Zone):**
  - Network: 192.168.5.0/24
  - Router "Room 5 - General Internet and Surfing" Interface (e.g., Gi0/0): 192.168.5.1
  - DHCP Pool (Office_Pool): 192.168.5.10 - 192.168.5.254
  - Office Server IP: 192.168.5.2
- **WAN / Internet Connectivity:**
  - Main Router (Interface connected to DSL Modem, e.g., Fa0/1): DHCP from ISP (simulated by DSL Modem/Cloud). Let's assume it gets 203.0.113.2/29.
  - DSL Modem WAN IP: 203.0.113.1 (from ISP/Cloud)
  - Cloud (Internet) simulated IPs: Server2 (Web/DNS) - e.g., 8.8.8.8, 8.8.4.4 (public DNS) or a local web server at 203.0.113.10.

2. Router Configurations (Cisco IOS CLI)

This section provides a template for configuring each router. Replace interface names (e.g., `GigabitEthernet0/0`, `Serial0/0/0`) with your actual Packet Tracer interface names.

A. Main Router in Center by Server (e.g., "Router-Center")

```
enable
configure terminal
hostname Router-Center

! Interface to Gaming Router
interface Serial0/0/0
 ip address 192.168.100.1 255.255.255.252
 clock rate 2000000
 no shutdown

! Interface to Movies Router
interface Serial0/0/1
 ip address 192.168.100.5 255.255.255.252
 clock rate 2000000
 no shutdown

! Interface to VR Zone Router
interface Serial0/0/2
```

```
 ip address 192.168.100.9 255.255.255.252
 clock rate 2000000
 no shutdown

! Interface to Study Router
interface Serial0/0/3
 ip address 192.168.100.13 255.255.255.252
 clock rate 2000000
 no shutdown

! Interface to General & Staff Office Router
interface Serial0/1/0
 ip address 192.168.100.17 255.255.255.252
 clock rate 2000000
 no shutdown

! Interface to DSL Modem (WAN)
interface GigabitEthernet0/0 (or FastEthernet0/0, whatever connects to DSL)
 ip address dhcp
 no shutdown

! Static Routes (or OSPF/EIGRP for dynamic routing, if implemented)
! Assuming static routes for simplicity in Packet Tracer
ip route 192.168.1.0 255.255.255.0 192.168.100.2
ip route 192.168.2.0 255.255.255.0 192.168.100.6
ip route 192.168.3.0 255.255.255.0 192.168.100.10
ip route 192.168.4.0 255.255.255.0 192.168.100.14
ip route 192.168.5.0 255.255.255.0 192.168.100.18
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0 (Interface to DSL, or next-hop IP
if static)

end
write memory
```

B. Room 1 - Gaming Router (e.g., "Router-Gaming")

```
enable
configure terminal
hostname Router-Gaming
```

```
! Interface to Gaming LAN
interface GigabitEthernet0/0 (or FastEthernet0/0)
 ip address 192.168.1.1 255.255.255.0
 no shutdown

! Interface to Main Router
interface Serial0/0/0
 ip address 192.168.100.2 255.255.255.252
 no shutdown

! DHCP Pool for Gaming LAN
ip dhcp pool Gaming_Pool
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.1
 dns-server 8.8.8.8 192.168.1.2 (Assuming Gaming Server runs DNS or using
public DNS)
! Exclude Gaming Server IP from DHCP pool
ip dhcp excluded-address 192.168.1.2

! Static Route to other subnets via Main Router
ip route 0.0.0.0 0.0.0.0 192.168.100.1

end
write memory
```

C. Room 2 - Movies Router (e.g., "Router-Movies")

(Similar to Gaming Router, adjust IPs)

```
enable
configure terminal
hostname Router-Movies

interface GigabitEthernet0/0
 ip address 192.168.2.1 255.255.255.0
 no shutdown

interface Serial0/0/0 (or whatever connects to Main Router)
```

```
 ip address 192.168.100.6 255.255.255.252
 no shutdown

ip dhcp pool Movies_Pool
 network 192.168.2.0 255.255.255.0
 default-router 192.168.2.1
 dns-server 8.8.8.8

ip route 0.0.0.0 0.0.0.0 192.168.100.5

end
write memory
```

D. Room 3 - VR Zone Router (e.g., "Router-VRZone")

(Similar, adjust IPs and add VR Server exclusion)

```
enable
configure terminal
hostname Router-VRZone

interface GigabitEthernet0/0
 ip address 192.168.3.1 255.255.255.0
 no shutdown

interface Serial0/0/0
 ip address 192.168.100.10 255.255.255.252
 no shutdown

ip dhcp pool VR_Pool
 network 192.168.3.0 255.255.255.0
 default-router 192.168.3.1
 dns-server 8.8.8.8 192.168.3.2
ip dhcp excluded-address 192.168.3.2

ip route 0.0.0.0 0.0.0.0 192.168.100.9

end
write memory
```

E. Room 4 - Study Router (e.g., "Router-Study")

(Similar, adjust IPs and add Study Server exclusion)

```
enable
configure terminal
hostname Router-Study

interface GigabitEthernet0/0
 ip address 192.168.4.1 255.255.255.0
 no shutdown

interface Serial0/0/0
 ip address 192.168.100.14 255.255.255.252
 no shutdown

ip dhcp pool Study_Pool
 network 192.168.4.0 255.255.255.0
 default-router 192.168.4.1
 dns-server 8.8.8.8 192.168.4.2
ip dhcp excluded-address 192.168.4.2

ip route 0.0.0.0 0.0.0.0 192.168.100.13

end
write memory
```

F. Room 5 - General Internet and Surfing Router (e.g., "Router-Office")

(Similar, adjust IPs and add Office Server exclusion)

```
enable
configure terminal
hostname Router-Office

interface GigabitEthernet0/0
 ip address 192.168.5.1 255.255.255.0
 no shutdown
```

```
interface Serial0/0/0
 ip address 192.168.100.18 255.255.255.252
 no shutdown

ip dhcp pool Office_Pool
 network 192.168.5.0 255.255.255.0
 default-router 192.168.5.1
 dns-server 8.8.8.8 192.168.5.2
ip dhcp excluded-address 192.168.5.2

ip route 0.0.0.0 0.0.0.0 192.168.100.17

end
write memory
```

3. Switch Configurations:

All switches in the diagram appear to be basic Layer 2 switches. In Packet Tracer, their default configuration usually suffices for basic connectivity. No specific CLI configuration is typically needed unless you're implementing VLANs or advanced features.

- **Default Behavior:** All ports are in VLAN 1 (default), and they forward Ethernet frames based on MAC addresses.

4. Server Configurations:

A. Dedicated Room Servers (Gaming Server, VR Zone Server, Study Server, Office Server)

- **IP Configuration:** Static IP Address (e.g., 192.168.1.2 for Gaming Server)
- **Subnet Mask:** 255.255.255.0
- **Default Gateway:** The IP address of the router interface in their respective room (e.g., 192.168.1.1 for Gaming Server).
- **DNS Server:** Can be the public DNS (8.8.8.8) or a central DNS server if you configure one within your network. If the server itself provides services that require DNS (like a local web server), its own IP or a dedicated DNS server's IP should be listed.
- **Services:**
  - **HTTP (Web Server):** Enable HTTP service for a basic webpage.
  - **FTP (File Transfer Protocol):** Enable FTP for file sharing if needed.

- **DNS:** If a server is providing local DNS resolution (e.g., for `internalserver.local`), enable and configure the DNS service.
- **Other specific services:** Based on what you're simulating (e.g., game server application, video streaming).

B. Server0 (Main LAN Services, potentially DHCP/DNS for the entire LAN if centralized)

Based on your report, Server0 handles "LAN services (DHCP, DNS)". This implies Server0 would have a static IP in a central LAN or one of the existing LANs, and the routers would point to it for DNS if not using public DNS.

- **IP Configuration:** Static IP (e.g., 192.168.1.200 if placed in the Gaming LAN for example, or a dedicated management VLAN if existing)
- **Subnet Mask:** 255.255.255.0
- **Default Gateway:** The IP of its connected router interface.
- **DNS Server:** (Self, or another central DNS).
- **Services:**
- **DHCP:** Configure DHCP pools if Server0 is meant to be the DHCP server for specific VLANs/subnets instead of the routers.
- **DNS:** Configure DNS records for internal services (e.g., `gamingserver.local`, `movieserver.local`). This IP would then be configured as the `dns-server` in the router's DHCP pools.
- **HTTP:** (Optional) If it hosts an internal intranet page.

C. Server2 (in Cloud - Simulates Internet Services)

- **IP Configuration:** Static Public IP (e.g., 203.0.113.10)
- **Subnet Mask:** Varies based on cloud segment (e.g., 255.255.255.248 for /29)
- **Default Gateway:** The gateway IP provided by the ISP (Cloud side, e.g., 203.0.113.1).
- **Services:**
- **HTTP:** Enable HTTP for web Browse simulation (e.g., `www.example.com`).
- **DNS:** Enable DNS to resolve `www.example.com` to its own IP address. This simulates public DNS.

5. DSL Modem Configuration:

- Connects the "Main Router" to the "Cloud".
- In Packet Tracer, DSL modems are usually drag-and-drop and require minimal configuration beyond connecting the correct cables.
- Ensure the Ethernet port connects to the router and the DSL port connects to the cloud.

6. Cloud Configuration:

- Simulates the Internet or an external network.
- In Packet Tracer, you need to add an Ethernet or DSL connection to connect to the DSL Modem.
- Crucially, you need to add "Server2" to the cloud and configure its services (HTTP, DNS) to simulate external websites and DNS resolution.
- Ensure that the "Cloud" is configured to route traffic correctly between the DSL modem and Server2. (Often, adding the server to the cloud environment itself handles this.)

User Manual

This manual provides instructions for end-users (PC users) and basic troubleshooting steps within the Internet Café simulation.

1. Getting Started - Connecting to the Network

- **Automatic IP Address (Recommended):** All PCs in the Internet Café are configured to automatically obtain their network settings (IP address, subnet mask, default gateway, DNS server) using DHCP.

1. Click on any PC in the simulation.
2. Go to the **Desktop** tab.
3. Click on **IP Configuration**.
4. Ensure **DHCP** is selected. The PC should automatically receive an IP address (e.g., 192.168.1.10, 192.168.2.15, etc., depending on the room), a subnet mask (255.255.255.0), a default gateway (e.g., 192.168.1.1), and a DNS server address.

- **Verify Connection:** Once IP details appear, the PC is successfully connected to its local network.

2. Accessing Local Network Services

- **Testing Connectivity (Ping):**

1. Click on any PC.
2. Go to the **Desktop** tab and click on **Command Prompt**.
3. To test connectivity to your local router (gateway):

- Type `ping <your_default_gateway_IP>` (e.g., `ping 192.168.1.1`) and press Enter. You should see successful replies.

4. To test connectivity to another PC in the *same room*:

- Type `ping <IP_address_of_another_PC_in_your_room>` (e.g., `ping 192.168.1.11`) and press Enter. You should see successful replies.

5. To test connectivity to a local server (e.g., Gaming Server in Room 1):

- Type `ping 192.168.1.2` (for Gaming Server) and press Enter. You should see successful replies.

6. To test connectivity to a PC in a *different room* (e.g., from Gaming PC to Movies PC):

- Type `ping <IP_address_of_a_PC_in_another_room>` (e.g., `ping 192.168.2.10`) and press Enter. This should also show successful replies, indicating inter-room routing is working.

3. Accessing Internet Services (Web Browse)

- **Using the Web Browser:**

1. Click on any PC.
2. Go to the **Desktop** tab and click on **Web Browser**.
3. In the URL bar, type the IP address of the simulated Internet web server (Server2 in Cloud), e.g., `203.0.113.10`, and press Enter. A simple webpage should load.
4. If DNS is configured on Server2 (or another DNS server), you can also try typing a configured domain name like `www.example.com` (if `203.0.113.10` is configured to resolve for this name).

- **Testing Internet Connectivity (Ping):**

1. From the **Command Prompt**, type `ping 203.0.113.10` (the IP of Server2 in the Cloud) and press Enter. Successful replies indicate internet connectivity.
2. You can also try pinging a public DNS server if simulated, like `ping 8.8.8.8`.

4. Specific Room Services (if configured)

- **Gaming Room:** PCs in the Gaming Room may have access to a dedicated Gaming Server (192.168.1.2) for game hosting or updates. Use applications (if simulated) or test connectivity via ping.
- **VR Zone:** PCs in the VR Zone may interact with the VR Zone Server (192.168.3.2) for VR content.
- **Study Room:** PCs in the Study Room may access resources on the Study Server (192.168.4.2).
- **Office Room:** Staff PCs can access resources on the Office Server (192.168.5.2).

5. Basic Troubleshooting

- **"Request timed out" when pinging:**
  - **Check Cables:** In Packet Tracer, visually inspect the cables. They should be green. If orange or red, there's a physical layer issue.
  - **IP Configuration:** Go to `Desktop > IP Configuration`. Ensure DHCP is selected and an IP address has been assigned. If not, try "Static" then back to "DHCP" to refresh.

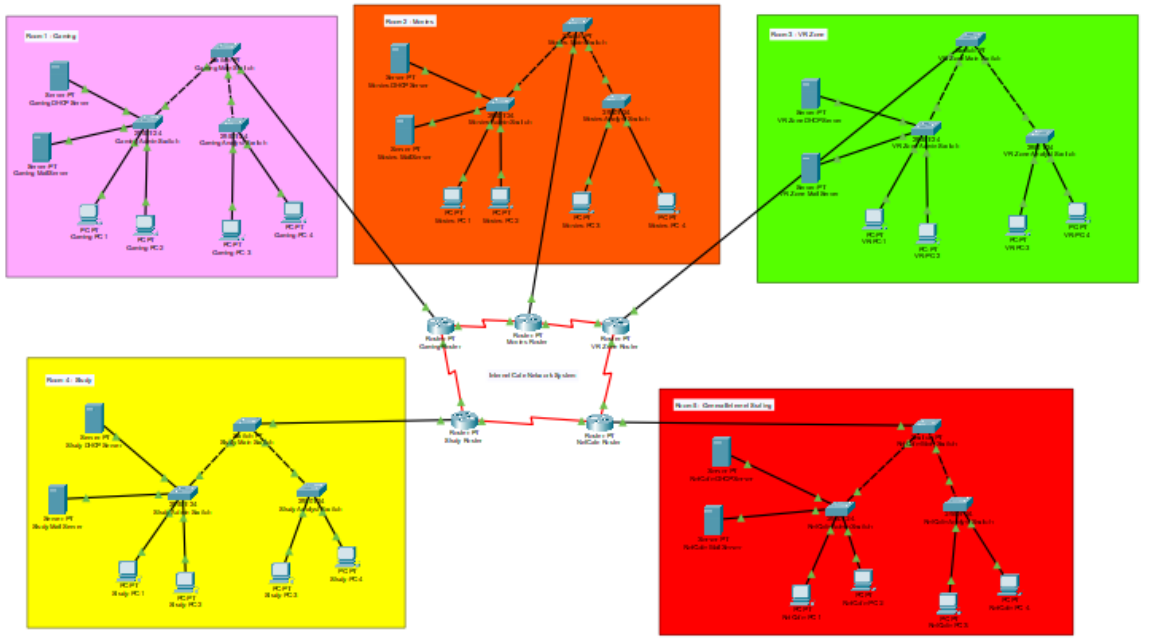
- **Gateway:** Ensure the "Default Gateway" IP is correct for your room's router.
- **Router Interface Status:** If you have access to router CLI, check `show ip interface brief` to ensure interfaces are "up/up".
- **Firewall/ACLs:** In a real network, firewalls or Access Control Lists could block traffic. In this basic simulation, it's less likely unless you've configured them.

- **"Destination Host Unreachable" when pinging across rooms/to Internet:**
- This typically means routing isn't working correctly.
- Verify the **Default Gateway** on your PC is correct.
- Verify **static routes** or routing protocols (e.g., OSPF, EIGRP) are correctly configured on all routers. Check `show ip route` on the routers.
- Ensure all **router interfaces** are "up/up".

- **Webpage not loading:**
- Ensure you can `ping` the web server's IP address.
- Check if the **HTTP service** is enabled on the web server (Server2 or any local server).
- If using a domain name, check if the **DNS service** is enabled and configured correctly on the DNS server (Server2, Server0, or public DNS).
- Verify your PC's **DNS Server** setting in IP Configuration points to the correct DNS server.

Screenshots:

NETWORK TOPOLOGY



Admin PC to Admin PC, Successful

Fire	Last Status	Source	Destination	Type	Color
	Successful	Gaming-PC-1	Gaming-PC-2	ICMP	

Admin PC to Analyst PC, Unsuccessful due to VLAN Restriction

Fire	Last Status	Source	Destination	Type	Color
	Failed	Gaming-PC-2	Gaming-PC-3	ICMP	

PC to any router

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	Gaming-PC-2	Study Router	ICMP		0.000	N	0
	Successful	Study-PC-4	Movies Router	ICMP		0.000	N	1
	Successful	NetCafe-PC-1	Gaming Router	ICMP		0.000	N	2

PC to any PC:

By ping command

All packets sent and received with 0% loss

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.8.20

Pinging 192.168.8.20 with 32 bytes of data:

Reply from 192.168.8.20: bytes=32 time=10ms TTL=125
Reply from 192.168.8.20: bytes=32 time=10ms TTL=125
Reply from 192.168.8.20: bytes=32 time=8ms TTL=125
Reply from 192.168.8.20: bytes=32 time=13ms TTL=125

Ping statistics for 192.168.8.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 8ms, Maximum = 13ms, Average = 10ms
```