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1.0 introduction

This project was completed as part of the ITT300 Computer Networking course, where we were tasked with designing and building a functioning network simulation using Cisco Packet Tracer. The main goal was to create a network setup that included two subnets, Subnet A and Subnet B and to configure key services like DHCP, DNS, and a web server. The idea was to give us hands-on experience with how devices in a network communicate and how these services work together in a real environment.

We started by dividing the IP address space into two subnets using basic subnetting, which allowed us to separate network traffic and manage devices more efficiently. A single router was used to connect both subnets so that they could communicate with each other. For the servers, we used one machine to handle both DNS and DHCP, and another as a web server that hosted a welcome page. The page included the UiTM logo, a welcome message, and the names and student IDs of all group members. With DHCP set up, devices in both subnets were able to automatically receive their IP addresses, along with the correct gateway and DNS settings.

During the project, we faced a few challenges, like DHCP not working at first, or DNS failing to resolve the domain name, but we managed to troubleshoot and solve these problems as a team. We learned how to properly configure each device, how to test connectivity using ping and the browser, and how important each part of a network is to the overall system. Overall, this project helped us better understand the concepts we’ve learned in class by applying them in a more practical, real-world-like setup.

2.0 Network Design Overview

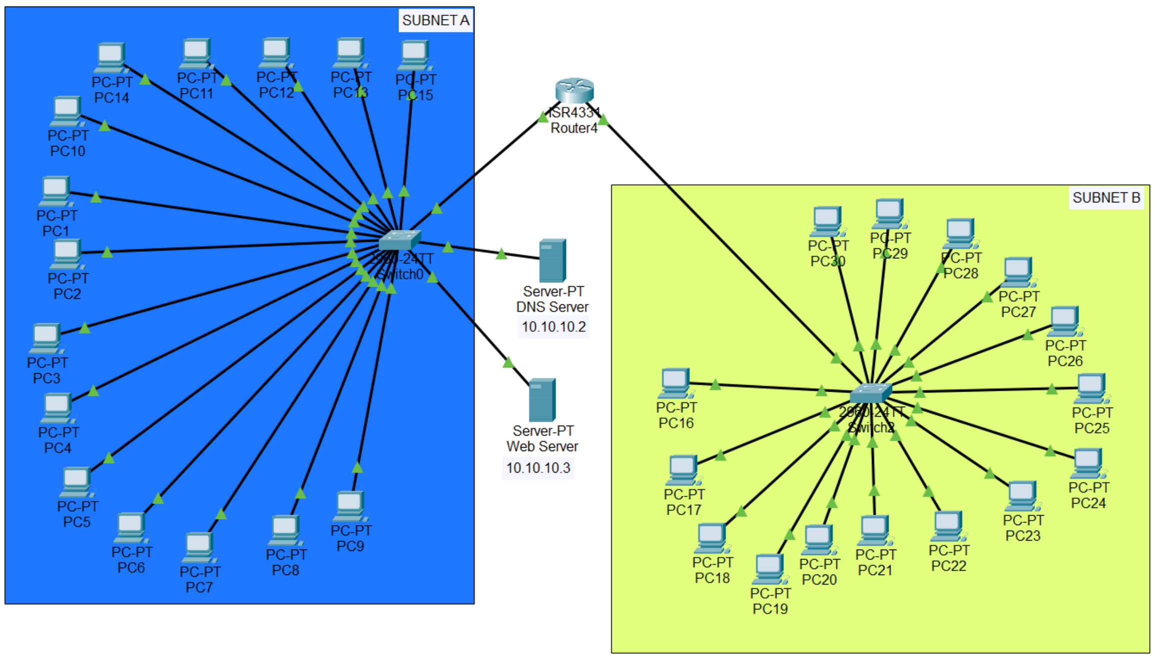


Figure 1: STAR topology network design

We have chosen the STAR topology for our LANs. Each PC and server is directly connected to a central switch, Switch A for SUBNET A and Switch B for SUBNET B. Both switches are connected to a central router that enables communication between the two subnets. Several factors influenced our decision to use this topology :

Centralized Management : In a star topology, all devices are connected to a central switch. This design simplifies network management and allows for easier monitoring, configuration, troubleshooting, maintenance, and upgrades. By having each LAN under its own switch, we can isolate and manage SUBNET A and SUBNET B effectively.

Scalability : The star topology is scalable, allowing us to easily add new PCs or servers by simply connecting them to the appropriate switch. This supports future network expansion with minimal reconfiguration, especially if more users or services are added in either subnet.

Reliability : Each PC or server has its own dedicated connection to the switch. If one device or cable fails, it does not affect the rest of the network. This ensures continuous operation of the remaining devices, making the network more fault-tolerant and reliable.

Performance : The star topology provides better performance since each device has a dedicated connection to the switch. This prevents bandwidth sharing across devices and reduces network congestion. As a result, data transmission is faster and more efficient within both subnets.

3.0 Device Configuration Summary

3.1 Router Configuration

Interfaces configured :

- GigabitEthernet0/0/0 - IP: 10.10.10.1, Subnet Mask: 255.255.255.128
- GigabitEthernet0/0/1 - IP: 10.10.10.129, Subnet Mask: 255.255.255.128

```
Router(config)#interface gig0/0/0
Router(config-if)#ip address 10.10.10.1 255.255.255.128
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface gig0/0/1
Router(config-if)#ip address 10.10.10.129 255.255.255.128
Router(config-if)#no shutdown
Router(config-if)#exit
```

Figure 2 : CLI command for router for correct configuration

3.2 DHCP and HTTP Server Configuration

1. DHCP/DNS server

Static IP Address :

- IPv4 : 10.10.10.2
- Subnet Mask : 255.255.255.128
- Default Gateway : 10.10.10.1
- DNS server: 10.10.10.2

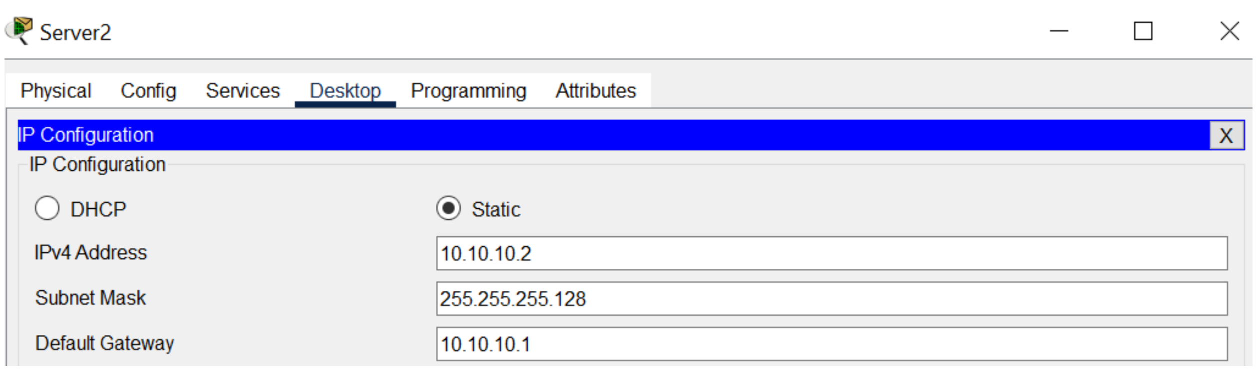


Figure 3 : Static IP configuration for DHCP/DNS server

DHCP Pools Created :

- Subnet A: serverPool

  Starting IP : 10.10.10.3

  Max Users : 30

  Gateway : 10.10.10.1

  Subnet Mask : 255.255.255.128

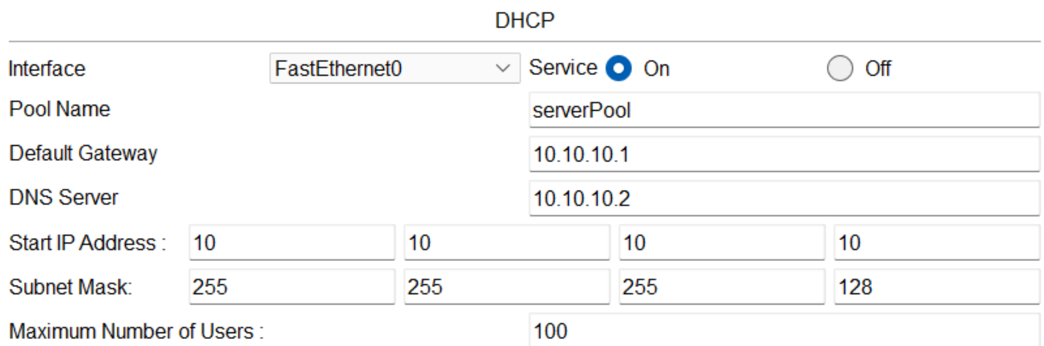


Figure 4 : DHCP server for subnet A

- Subnet B : subnetB

  Starting IP : 10.10.10.130

  Max Users : 30

  Gateway : 10.10.10.129

  Subnet Mask : 255.255.255.128

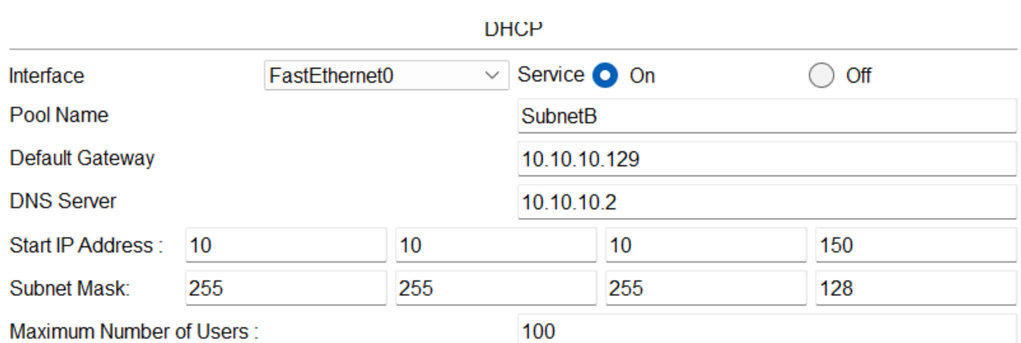


Figure 5 : DHCP server for subnet B

2. <u>HTTP(Application) server</u>

Static IP Address :

- IPv4 : 10.10.10.3
- Subnet Mask : 255.255.255.128
- Default Gateway : 10.10.10.1
- DNS server: 10.10.10.2

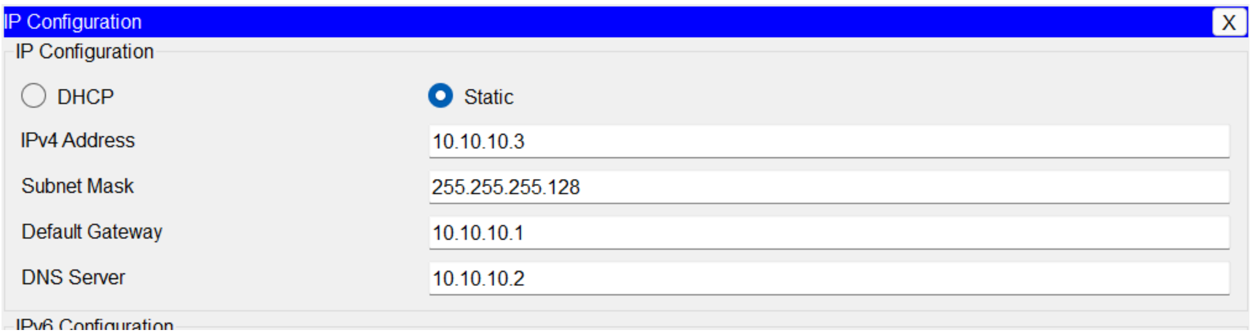
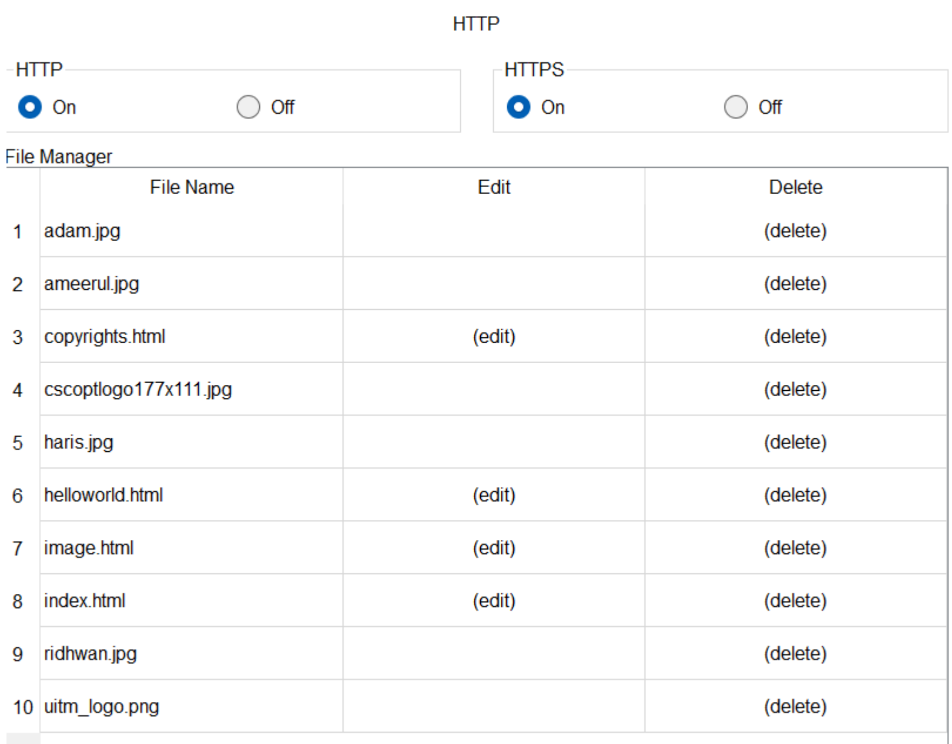


Figure 6 : IP configuration for application server



	File Name	Edit	Delete
1	adam.jpg		(delete)
2	ameerul.jpg		(delete)
3	copyrights.html	(edit)	(delete)
4	cscoptlogo177x111.jpg		(delete)
5	haris.jpg		(delete)
6	helloworld.html	(edit)	(delete)
7	image.html	(edit)	(delete)
8	index.html	(edit)	(delete)
9	ridhwan.jpg		(delete)
10	uitm_logo.png		(delete)

Figure 7 : HTTP server contents

3.3 Switch A Configuration

Ports Used :

- Fa0/2 - Fa0/17 : For PCs and server
- Fa0/1 : Connected to Router

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range fa0/1 - 17
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#no shutdown
Switch(config-if-range)#exit
```

Figure 8 : interface range configuration using CLI command in switch0

3.4 Switch B Configuration

Ports Used :

- Fa0/2 - Fa0/16 : For PCs
- Fa0/1 : Connected to Router

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range fa0/1 - 16
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#no shutdown
Switch(config-if-range)#exit
```

Figure 9 : interface range configuration using CLI command in switch2

3.5 PCs Configuration

Total PCs : 30

Configuration Method : DHCP (Automatically assigned)

Table 1 : All PC configuration

Device	IP Address	Subnet Mask	Default Gateway
PC1	10.10.10.4	255.255.255.128	N/A
PC2	10.10.10.17	255.255.255.128	N/A
PC3	10.10.10.11	255.255.255.128	N/A
PC4	10.10.10.5	255.255.255.128	N/A
PC5	10.10.10.29	255.255.255.128	N/A
PC6	10.10.10.7	255.255.255.128	N/A
PC7	10.10.10.10	255.255.255.128	N/A
PC8	10.10.10.31	255.255.255.128	N/A
PC9	10.10.10.8	255.255.255.128	N/A
PC10	10.10.10.6	255.255.255.128	N/A
PC11	10.10.10.14	255.255.255.128	N/A
PC12	10.10.10.15	255.255.255.128	N/A
PC13	10.10.10.9	255.255.255.128	N/A
PC14	10.10.10.12	255.255.255.128	N/A
PC15	10.10.10.26	255.255.255.128	N/A
PC16	10.10.10.145	255.255.255.128	10.10.10.129
PC17	10.10.10.137	255.255.255.128	10.10.10.129
PC18	10.10.10.133	255.255.255.128	10.10.10.129
PC19	10.10.10.140	255.255.255.128	10.10.10.129
PC20	10.10.10.130	255.255.255.128	10.10.10.129
PC21	10.10.10.131	255.255.255.128	10.10.10.129

PC22	10.10.10.143	255.255.255.128	10.10.10.129
PC23	10.10.10.144	255.255.255.128	10.10.10.129
PC24	10.10.10.139	255.255.255.128	10.10.10.129
PC25	10.10.10.135	255.255.255.128	10.10.10.129
PC26	10.10.10.141	255.255.255.128	10.10.10.129
PC27	10.10.10.132	255.255.255.128	10.10.10.129
PC28	10.10.10.136	255.255.255.128	10.10.10.129
PC29	10.10.10.138	255.255.255.128	10.10.10.129
PC30	10.10.10.142	255.255.255.128	10.10.10.129

4.0 Testing & Verification

4.1 Envelope Test

In Subnet A, a successful envelope test from the DNS/DHCP Server to all 15 PCs confirms that:

1. Switch0 is working properly
    - All connected FastEthernet ports are active (`up`) and transmitting data.
2. Router interface G0/0/0 is configured correctly
    - IP: `10.10.10.1`, Subnet: `255.255.255.128`
    - It serves as the default gateway for Subnet A.
3. DHCP Server is assigning IPs successfully
    - Each PC from `PC1` to `PC15` has automatically received a valid IP address via DHCP, within the range `10.10.10.4 – 10.10.10.126`.
4. DNS Server can reach all devices
    - The DNS part of the server is reachable and can respond to name queries if needed.
5. Physical and logical connections are correct
    - Copper straight-through cables connect:
    - Server → Switch0
    - Switch0 → Router (G0/0/0)
6. All PCs in Subnet A can communicate with each other and the server
    - This means Layer 1–3 of the OSI model (Physical, Data Link, and Network Layers) are functioning properly.

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.001	DNS Server	Switch0	ICMP
	0.001	--	DNS Server	ICMP
	0.002	DNS Server	Switch0	ICMP
	0.002	Switch0	PC15	ICMP
	0.002	--	DNS Server	ICMP
	0.003	DNS Server	Switch0	ICMP
	0.003	Switch0	PC13	ICMP
	0.003	PC15	Switch0	ICMP
	0.003	--	DNS Server	ICMP
	0.004	DNS Server	Switch0	ICMP
	0.004	Switch0	PC12	ICMP
	0.004	PC13	Switch0	ICMP
	0.004	Switch0	DNS Server	ICMP
	0.004	--	DNS Server	ICMP
	0.005	DNS Server	Switch0	ICMP
	0.005	Switch0	PC11	ICMP
	0.005	PC12	Switch0	ICMP
	0.005	Switch0	DNS Server	ICMP
	0.005	--	DNS Server	ICMP
	0.006	DNS Server	Switch0	ICMP
	0.006	Switch0	PC14	ICMP
	0.006	PC11	Switch0	ICMP
	0.006	Switch0	DNS Server	ICMP
	0.006	--	DNS Server	ICMP
	0.007	DNS Server	Switch0	ICMP
	0.007	Switch0	PC10	ICMP
	0.007	PC14	Switch0	ICMP
	0.007	Switch0	DNS Server	ICMP
	0.007	--	DNS Server	ICMP
	0.008	DNS Server	Switch0	ICMP
	0.008	Switch0	PC1	ICMP
	0.008	PC10	Switch0	ICMP
	0.008	Switch0	DNS Server	ICMP
	0.008	--	DNS Server	ICMP
	0.009	DNS Server	Switch0	ICMP
	0.009	Switch0	PC2	ICMP
	0.009	PC1	Switch0	ICMP
	0.009	Switch0	DNS Server	ICMP
	0.009	--	DNS Server	ICMP
	0.010	DNS Server	Switch0	ICMP
	0.010	Switch0	PC3	ICMP
	0.010	PC2	Switch0	ICMP
	0.010	Switch0	DNS Server	ICMP
	0.011	Switch0	PC4	ICMP
	0.011	PC3	Switch0	ICMP
	0.011	Switch0	DNS Server	ICMP
	0.012	PC4	Switch0	ICMP
	0.012	Switch0	DNS Server	ICMP
	0.013	Switch0	DNS Server	ICMP

0.001	DNS Server	Switch0	ICMP
0.001	--	DNS Server	ICMP
0.002	DNS Server	Switch0	ICMP
0.002	Switch0	PC5	ICMP
0.002	--	DNS Server	ICMP
0.003	DNS Server	Switch0	ICMP
0.003	Switch0	PC6	ICMP
0.003	PC5	Switch0	ICMP
0.003	--	DNS Server	ICMP
0.004	DNS Server	Switch0	ICMP
0.004	Switch0	PC7	ICMP
0.004	PC6	Switch0	ICMP
0.004	Switch0	DNS Server	ICMP
0.004	--	DNS Server	ICMP
0.005	DNS Server	Switch0	ICMP
0.005	Switch0	PC8	ICMP
0.005	PC7	Switch0	ICMP
0.005	Switch0	DNS Server	ICMP
0.006	Switch0	PC9	ICMP
0.006	PC8	Switch0	ICMP
0.006	Switch0	DNS Server	ICMP
0.007	PC9	Switch0	ICMP
0.007	Switch0	DNS Server	ICMP
0.008	Switch0	DNS Server	ICMP

Figure 10 : Envelope test from PC1 to PC 15

Subnet B consists of 15 PCs connected to Switch1, which is then connected to the router's GigabitEthernet0/0/1 interface. The DHCP server located in Subnet A successfully assigns IP addresses to all PCs in Subnet B via DHCP relay using the `ip helper-address` command configured on the router.

Connectivity between the DNS/DHCP server and all PCs in Subnet B was tested using ICMP (ping) packets. All devices responded correctly, confirming that:

- The router is correctly forwarding DHCP and DNS requests between subnets.
- Switch1 is operational and all ports are functioning.
- The PCs in Subnet B are properly receiving IP configurations (IP address, subnet mask, gateway, and DNS).
- Communication between Subnet A and Subnet B is fully established and functional.

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	DNS Server	ICMP
	0.001	DNS Server	Switch0	ICMP
	0.001	--	DNS Server	ICMP
	0.002	DNS Server	Switch0	ICMP
	0.002	Switch0	Router4	ICMP
	0.002	--	DNS Server	ICMP
	0.003	DNS Server	Switch0	ICMP
	0.003	Switch0	Router4	ICMP
	0.003	Router4	Switch2	ICMP
	0.003	--	DNS Server	ICMP
	0.004	DNS Server	Switch0	ICMP
	0.004	Switch0	Router4	ICMP
	0.004	Router4	Switch2	ICMP
	0.004	Switch2	PC30	ICMP
	0.004	--	DNS Server	ICMP
	0.005	DNS Server	Switch0	ICMP
	0.005	Switch0	Router4	ICMP
	0.005	Router4	Switch2	ICMP
	0.005	Switch2	PC29	ICMP
	0.005	PC30	Switch2	ICMP
	0.005	--	DNS Server	ICMP
	0.006	DNS Server	Switch0	ICMP
	0.006	Switch0	Router4	ICMP
	0.006	Router4	Switch2	ICMP
	0.006	Switch2	PC28	ICMP
	0.006	PC29	Switch2	ICMP
	0.006	Switch2	Router4	ICMP
	0.006	--	DNS Server	ICMP
	0.007	DNS Server	Switch0	ICMP
	0.007	Switch0	Router4	ICMP
	0.007	Router4	Switch2	ICMP
	0.007	Switch2	PC27	ICMP
	0.007	PC28	Switch2	ICMP
	0.007	Switch2	Router4	ICMP
	0.007	Router4	Switch0	ICMP
	0.007	--	DNS Server	ICMP
	0.008	DNS Server	Switch0	ICMP
	0.008	Switch0	Router4	ICMP
	0.008	Router4	Switch2	ICMP
	0.008	Switch2	PC26	ICMP

0.008	PC27	Switch2	ICMP
0.008	Switch2	Router4	ICMP
0.008	Router4	Switch0	ICMP
0.008	Switch0	DNS Server	ICMP
0.008	--	DNS Server	ICMP
0.009	DNS Server	Switch0	ICMP
0.009	Switch0	Router4	ICMP
0.009	Router4	Switch2	ICMP
0.009	Switch2	PC25	ICMP
0.009	PC26	Switch2	ICMP
0.009	Switch2	Router4	ICMP
0.009	Router4	Switch0	ICMP
0.009	Switch0	DNS Server	ICMP
0.009	--	DNS Server	ICMP
0.010	DNS Server	Switch0	ICMP
0.010	Switch0	Router4	ICMP
0.010	Router4	Switch2	ICMP
0.010	Switch2	PC24	ICMP
0.010	PC25	Switch2	ICMP
0.010	Switch2	Router4	ICMP
0.010	Router4	Switch0	ICMP
0.010	Switch0	DNS Server	ICMP
0.011	Switch0	Router4	ICMP
0.011	Router4	Switch2	ICMP
0.011	Switch2	PC23	ICMP
0.011	PC24	Switch2	ICMP
0.011	Switch2	Router4	ICMP
0.011	Router4	Switch0	ICMP
0.011	Switch0	DNS Server	ICMP
0.012	Router4	Switch2	ICMP
0.012	Switch2	PC22	ICMP
0.012	PC23	Switch2	ICMP
0.012	Switch2	Router4	ICMP
0.012	Router4	Switch0	ICMP
0.012	Switch0	DNS Server	ICMP
0.013	Switch2	PC21	ICMP
0.013	PC22	Switch2	ICMP
0.013	Switch2	Router4	ICMP
0.013	Router4	Switch0	ICMP

0.013	Switch0	DNS Server	ICMP
0.014	PC21	Switch2	ICMP
0.014	Switch2	Router4	ICMP
0.014	Router4	Switch0	ICMP
0.014	Switch0	DNS Server	ICMP
0.015	Switch2	Router4	ICMP
0.015	Router4	Switch0	ICMP
0.015	Switch0	DNS Server	ICMP
0.016	Router4	Switch0	ICMP
0.016	Switch0	DNS Server	ICMP
0.017	Switch0	DNS Server	ICMP

Figure 11 : Envelope test from PC16 to PC30

4.2 Ping Command Test

A ping command was executed from the DNS/DHCP server in Subnet A to one of the PC to test connectivity.

The ping output showed successful replies, confirming that:

- The PC received a valid IP address from the DHCP server.
- The switch (Switch0) is forwarding traffic correctly.
- There is no port or communication issue between the server and the PC.
- DNS/DHCP server and the PCs are on the same subnet (10.10.10.0/25), so no routing is needed for this communication.

Even though only one ping command was shown, the envelope animation previously provided shows that all PCs in Subnet A successfully exchanged ICMP (ping) packets with the DNS server verifying full connectivity.

This confirms Subnet A is working properly.

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>

ping 10.10.10.4

Pinging 10.10.10.4 with 32 bytes of data:

Reply from 10.10.10.4: bytes=32 time=4ms TTL=128
Reply from 10.10.10.4: bytes=32 time=4ms TTL=128
Reply from 10.10.10.4: bytes=32 time=4ms TTL=128
Reply from 10.10.10.4: bytes=32 time=4ms TTL=128

Ping statistics for 10.10.10.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms
```

Figure 12 : Pinging a PC from DNS/DHCP server

In Subnet B (`10.10.10.128/25`), devices ranging from PC16 to PC30 were tested using the ping (ICMP) command. These devices fall within the IP address range:

- IP Range: 10.10.10.129 – 10.10.10.254
- Subnet Mask: 255.255.255.128
- Default Gateway: 10.10.10.129
- Connected Switch: Switch1
- Router Port: G0/0/1

What the Test Confirms:

- All 15 PCs in Subnet B successfully communicated using ping.
- The DHCP service (hosted in Subnet A) worked across subnets — likely with `ip helper-address` configured.
- There is no port issue; all Switch1 ports are active and functional.
- All routing and switch connections are correct and stable.
- ICMP envelopes were received and replied successfully — confirming end-to-end connectivity.

```
C:\>ping 10.10.10.164

Pinging 10.10.10.164 with 32 bytes of data:

Reply from 10.10.10.164: bytes=32 time=5ms TTL=128
Reply from 10.10.10.164: bytes=32 time<1ms TTL=128
Reply from 10.10.10.164: bytes=32 time=3ms TTL=128
Reply from 10.10.10.164: bytes=32 time=8ms TTL=128

Ping statistics for 10.10.10.164:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 8ms, Average = 4ms
```

Figure 13 : Pinging PC30 from PC1

A successful ping from PC1 to PC30 proves that inter-subnet communication is fully working. This confirms proper IP addressing, routing, DHCP relay, and switch operation are all critical components of a working multi-subnet LAN network.

```
C:\>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time<1ms TTL=127
Reply from 10.10.10.3: bytes=32 time<1ms TTL=127
Reply from 10.10.10.3: bytes=32 time<1ms TTL=127
Reply from 10.10.10.3: bytes=32 time<1ms TTL=127

Ping statistics for 10.10.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping itt300.uitm.edu.my

Pinging 10.10.10.3 with 32 bytes of data:

Reply from 10.10.10.3: bytes=32 time=1ms TTL=127
Reply from 10.10.10.3: bytes=32 time<1ms TTL=127
Reply from 10.10.10.3: bytes=32 time<1ms TTL=127
Reply from 10.10.10.3: bytes=32 time=16ms TTL=127

Ping statistics for 10.10.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 16ms, Average = 4ms
```

Figure 14 : Pinging itt300.uitm.edu.my and application server(10.10.10.3)

4.3 Web Access Test

A successful web access test was performed from PC1 in Subnet A to the URL `itt300.uitm.edu.my`. This confirms that:

- DNS resolution is working – the PC can resolve domain names using the DNS server.
- Internet or simulated server access is functioning.
- Network routing and gateway configuration are correct.
- No port restrictions or access blocks are preventing outbound HTTP traffic.

This verifies that Subnet A has full connectivity from Layer 1 to Layer 7 (Application Layer).

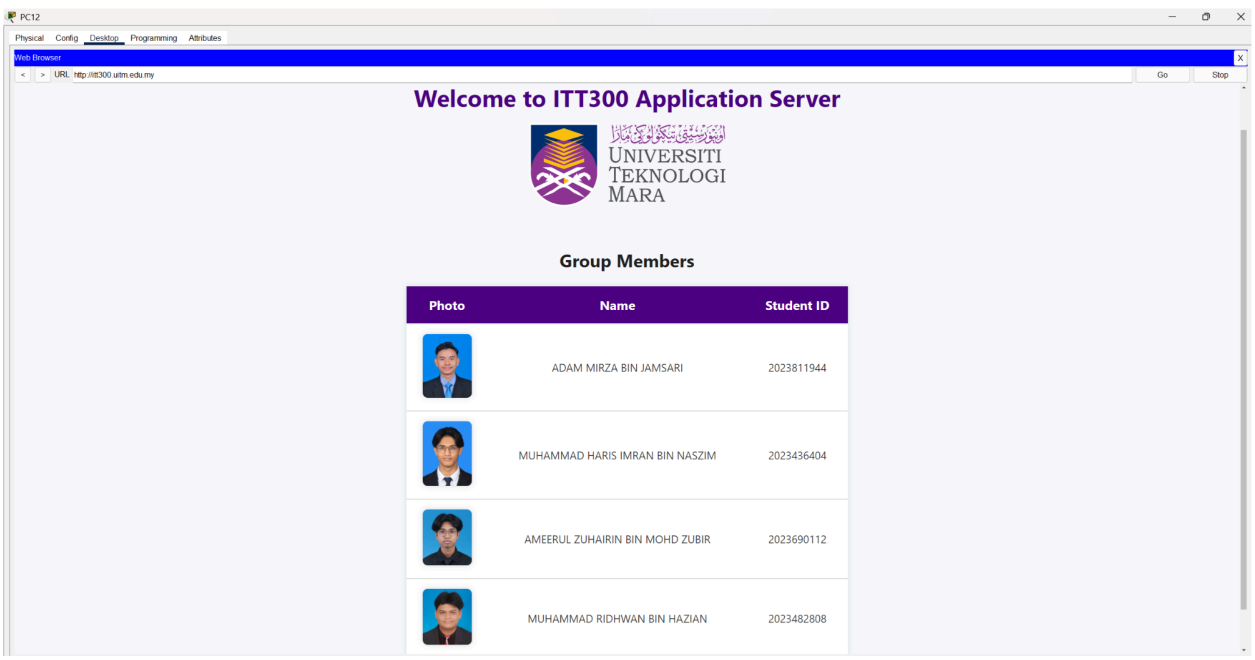


Figure 15 : Testing url itt300.uitm.edu.my in a PC(PC1) on subnet A

A successful web access test was performed from PC30 in Subnet B to the domain `itt300.uitm.edu.my`. This confirms that:

- DHCP relay is functioning – PC30 received correct IP, subnet mask, gateway, and DNS.
- DNS resolution is successful – domain names can be translated to IP addresses.
- Routing between Subnet B and the DNS/DHCP server in Subnet A is working properly.
- Switch1 and Router interface G0/0/1 are operational with no port issues.
- HTTP communication (Layer 7) is successful from Subnet B to external services or simulated web servers.

This validates full network connectivity and service availability for Subnet B.

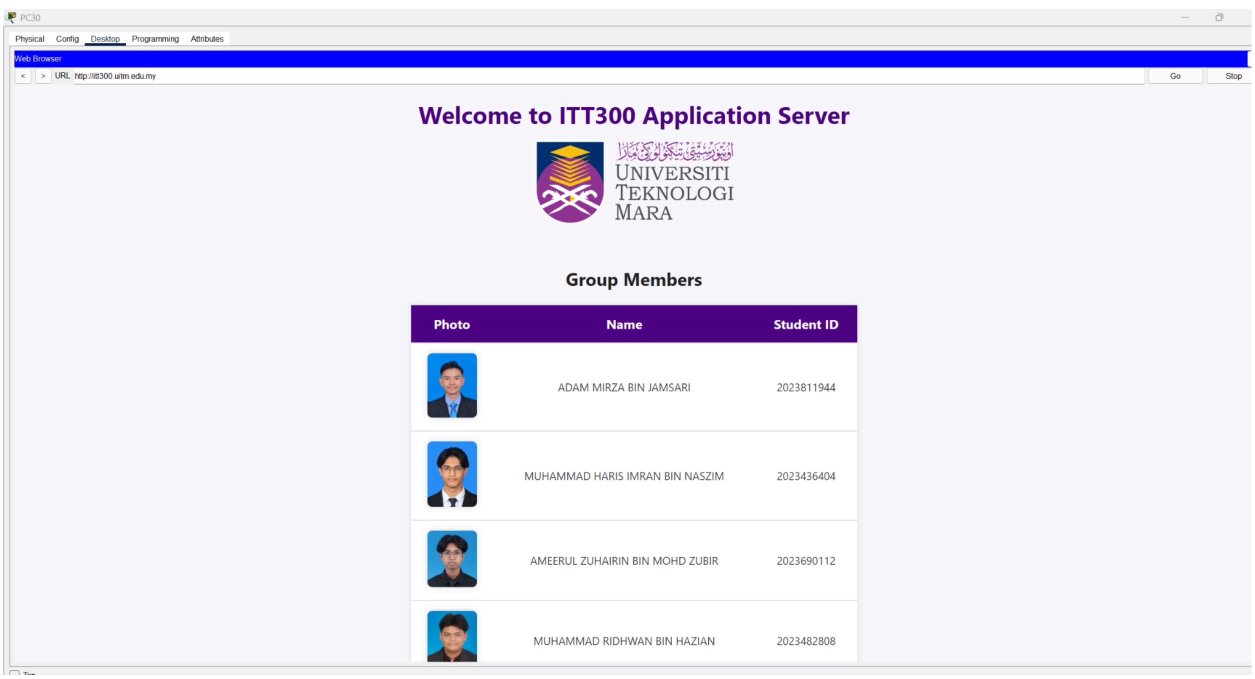


Figure 16 : Testing url itt300.uitm.edu.my in a PC(PC30) on subnet B

The `ipconfig /all` command was run on PC1, and the following lease information was verified:

- IP Address: 10.10.10.21
- Subnet Mask: 255.255.255.128
- Default Gateway: 10.10.10.1
- DNS Server: 10.10.10.2

All values were correctly assigned via DHCP from the server located in Subnet A.
This confirms that PC1 received a valid and consistent DHCP lease, ensuring proper network connectivity in Subnet A.

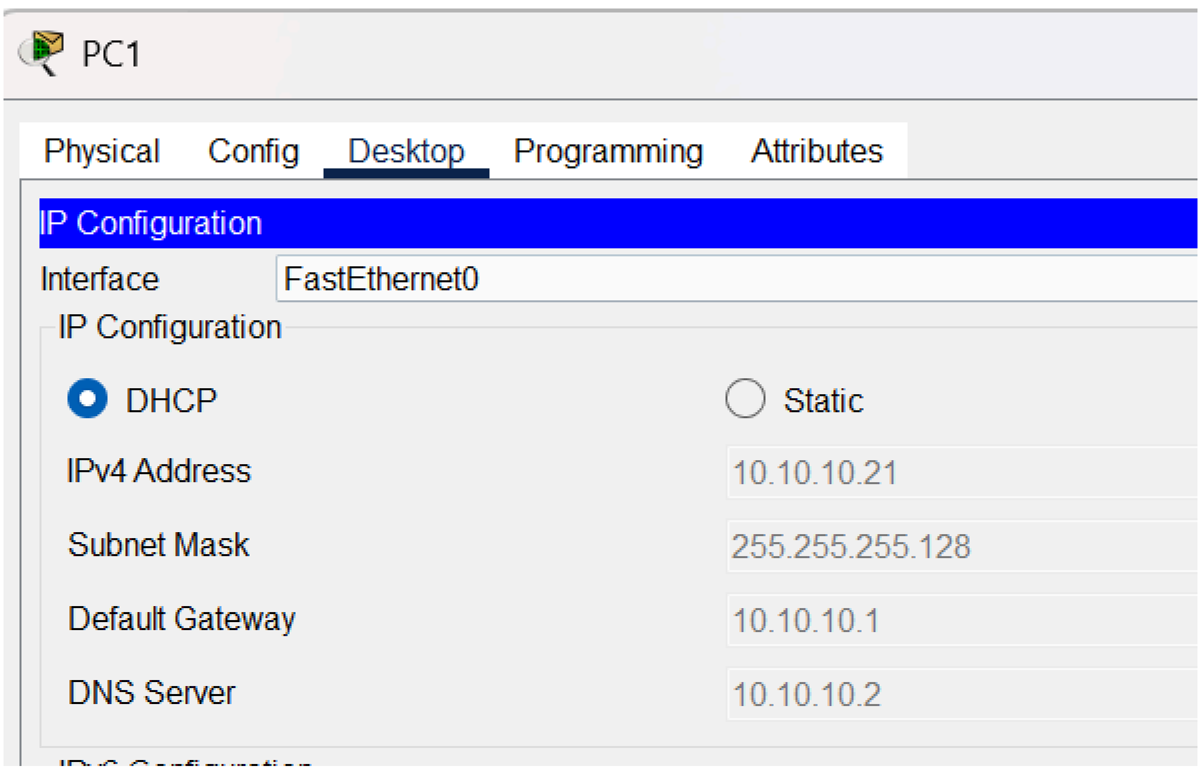


Figure 17 : Example of IP Configuration using DHCP of a PC(PC1)

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address................: 0060.5CCA.36DB
   Link-local IPv6 Address.........: FE80::260:5CFF:FECA:36DB
   IPv6 Address....................: ::
   IPv4 Address....................: 10.10.10.21
   Subnet Mask.....................: 255.255.255.128
   Default Gateway.................: ::
                                     10.10.10.1
   DHCP Servers....................: 10.10.10.2
   DHCPv6 IAID.....................:
   DHCPv6 Client DUID..............: 00-01-00-01-E7-BD-43-70-00-60-5C-CA-36-DB
   DNS Servers.....................: ::
                                     10.10.10.2

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Physical Address................: 0060.472A.7134
   Link-local IPv6 Address.........: ::
 --More--
```

Figure 18 : Pinging using ipconfig /all

5.0 Challenges Faced & Solutions

Table 2 : Challenges and solutions

No.	Challenge	What Happened	Solution
1	PCs received APIPA addresses instead of valid IPs	When we set the PCs to use DHCP, some of them couldn't get an IP address and instead got the default 169.254.x.x APIPA address. This happened especially in Subnet B.	We realized the DHCP pool didn't cover Subnet B properly. We added a second DHCP pool with the correct range, gateway, and DNS settings. After that, the PCs in Subnet B received valid IPs automatically.
2	DNS name wasn't working (itt300.uitm.edu.my)	Even though the web server was working with its IP address, trying to access the domain name didn't work at all.	We checked the DNS configuration and saw that the domain name wasn't added. We added an entry linking `itt300.uitm.edu.my` to the IP of the web server (10.10.10.3), and it worked right after.
3	Subnet B couldn't access the web page	PCs in Subnet B weren't able to open the website in the browser, even though Subnet A could.	We found out that the PCs in Subnet B didn't receive a DNS address or default gateway properly. After updating the DHCP pool and confirming the router interface IPs, web access worked on both subnets.
4	Some servers didn't respond to pings	At first, some of the servers couldn't be reached. Pings were failing even though they had static IPs.	We checked the IP settings and noticed a mismatch in subnet masks. We also made sure each server was actually connected to the correct switch port. After that, pings were successful.
5	UiTM logo didn't appear on the website	The index page loaded, but the image wasn't showing. It just had a broken image icon.	We realized the image file either wasn't uploaded or was named incorrectly. Once we renamed it to `uitm_logo.png` and re-uploaded it to the HTTP server folder, it worked fine.

6	Wrong DNS or gateway values from DHCP	Some PCs were getting the wrong default gateway or DNS address, which broke network access.	The problem was that only Subnet A was covered in the original DHCP pool. We created a new pool just for Subnet B and entered the correct gateway and DNS info. This fixed the issue.
7	Subnet B couldn't get IP addresses from the DHCP server	PCs in Subnet B couldn't get IP via DHCP. They got APIPA (169.254.x.x) because the server was only in Subnet A, and routers don't forward broadcasts by default.	We added `ip helper-address 10.10.10.2` on the router interface for Subnet B. This forwards DHCP requests to the server. DHCP then worked across both subnets.
8	Switch showed "no functional ports"	When trying to send envelopes from the DNS server to PCs, an error said "Switch has no functional ports."	We checked the switch interfaces using `show ip interface brief`. Some ports were down, and one of the cables was not properly connected. We moved the cable to an available port in the "up/up" state.
9	Envelope simulation not working	Sending simulation envelopes from server to switch/PCs failed.	We confirmed that all physical cables were properly connected, used copper straight-through cables, and ensured ports were up. We also verified subnet, IP addressing, and that the server was configured.
10	Router gave invalid command errors	When entering DHCP configuration commands on the router, errors showed (e.g., `% Invalid input detected`).	The router was still in user mode (`Router>`). We entered `enable`, then `configure terminal` to access global config mode. After that, the commands worked as expected.
11	Wrong cable type used	At first, some connections didn't establish because of wrong cable selection (e.g., crossover vs. straight-through).	We reviewed cable types and replaced incorrect ones. Copper straight-through cables were used between PCs, switches, servers, and router connections as needed.

12	FastEthernet port down	Some ports (e.g., Fa0/19–24) showed status `down/down`.	We avoided using those ports and connected all devices to ports with `up/up` status. We also ensured the device at the other end was powered on and configured properly.

6.0 Conclusion

This ITT300 project gave us real hands-on experience in building and managing a network using Cisco Packet Tracer. We created a two-subnet LAN with a star topology and configured key services like DHCP, DNS, and an HTTP web server. The goal was to simulate a real-world network where devices could automatically receive IP addresses, connect to a shared web server, and communicate seamlessly between subnets, just like in an office or campus environment.

One of the most valuable lessons we learned was how to properly divide an IP address space using subnetting. We assigned static IPs to our servers and used the ip helper-address command on the router to ensure that PCs in both subnets could receive IPs from the same DHCP server. It was very rewarding to see everything work together after carefully setting up each component.

Of course, we faced some challenges, like Subnet B devices not receiving IP addresses, DNS not resolving properly, and even some early mistakes with cabling. But instead of giving up, we worked through each issue step by step. We checked configurations, made adjustments, and ensured all connections were correctly set. Through collaboration and logical problem-solving, we were able to fix everything using the tools provided in Packet Tracer.

To test the network, we used ping, the simulation envelope tool, and browser access to the HTTP server. These tests confirmed that all PCs received valid IP addresses, could resolve domain names via DNS, and could communicate across both subnets. This showed us that our network was functioning correctly from the physical layer all the way up to the application layer.

Overall, this project didn’t just help us meet our technical goals, it helped us understand how real networks work. We gained experience setting up and troubleshooting services, learned how devices interact, and discovered how important proper testing really is. On top of that, it improved our teamwork and communication skills that are just as essential as technical knowledge in any IT career. This experience will definitely benefit us in our future studies and professional work in networking and beyond.

References

Eugene Blanchard. (2020, May 4). *Cisco Packet Tracer - Creating easter eggs in assignments* [Video]. YouTube. https://www.youtube.com/watch?v=_ucsKcKjz9k

Swati Tripathi. (2021, May 23). *Http / Web server configuration in cisco packet tracer* [Video]. YouTube. https://www.youtube.com/watch?v=vyzvdbnOTXY

Configuring IP Helper-Address to issue IP address from DHCP Server. (2025, May 2). https://community.cisco.com/t5/networking-knowledge-base/configuring-ip-helper-address-to-issue-ip-address-from-dhcp/ta-p/4680974

IP DHCP Pool - Connected Dots online. (n.d.). https://www.connecteddots.online/resources/cisco-reference/ip-dhcp-pool

DHCP - Configuring the Cisco IOS DHCP Server [Support]. (2006, February 27). Cisco. https://www.cisco.com/en/US/docs/ios/12_4t/ip_addr/configuration/guide/htdhcpsv.html