

1. Problem Statement

You are hired as a network engineer for Tech Solutions, a midsized enterprise with a 5-floor office building. Each floor is equipped with a different number of computers, like **floor 1 has 10000, floor 2 has 3789, floor 3 has 222, floor 4 has 61, and floor 5 has 543**. Configure the **DHCP server on floor 1**, the **Email server should be connected on floor 3**, the **HTTP server should be connected on floor 2**, and the **FTP and DNS servers of the company are on floor 5**. The organization requires a well-structured network to ensure efficient communication and scalability.

Network Design Requirements:

1. Topology Selection: Design a Star topology for the first 4 floors and a Mesh topology for the remaining floors, considering performance and fault tolerance. (**Just connect 7 computers on each floor** instead of the given requirement, as we are not able to do this in Cisco Packet Tracer.)

2. IP Addressing Scheme: The company has decided to use **Class A private IPv4 addresses for the first 3 floors** and **Class A public for the remaining floors**, following a **classless addressing scheme that is VLSM**. Allocate IP addresses properly for each floor, ensuring uniqueness.

3. Routing Strategy for Inter-Floor Communication & Connectivity: Recommend a routing approach that is **Dynamic** for inter-floor communication.

- Design how the floors will be connected for seamless inter department communication.
- Suggest the appropriate network devices (e.g., switches, routers, access points) and their placement.
- If using dynamic routing, use RIP routing protocol.
- If using static routing, define the static routes for efficient data flow.
- The minimum number of routers to be used should be 4 and the maximum 5.
- Specify the number of default gateways along with IP addresses.
- Specify each SUBNETWORK with proper Subnetwork address, host IP range, and broadcast address.

Report Writing: Write the project report, which includes all the above things along with the labeled network scenario, and also mention the innovation done by you in the project. Then upload the project on GitHub as well as check the engagement level of the project uploaded on GitHub.

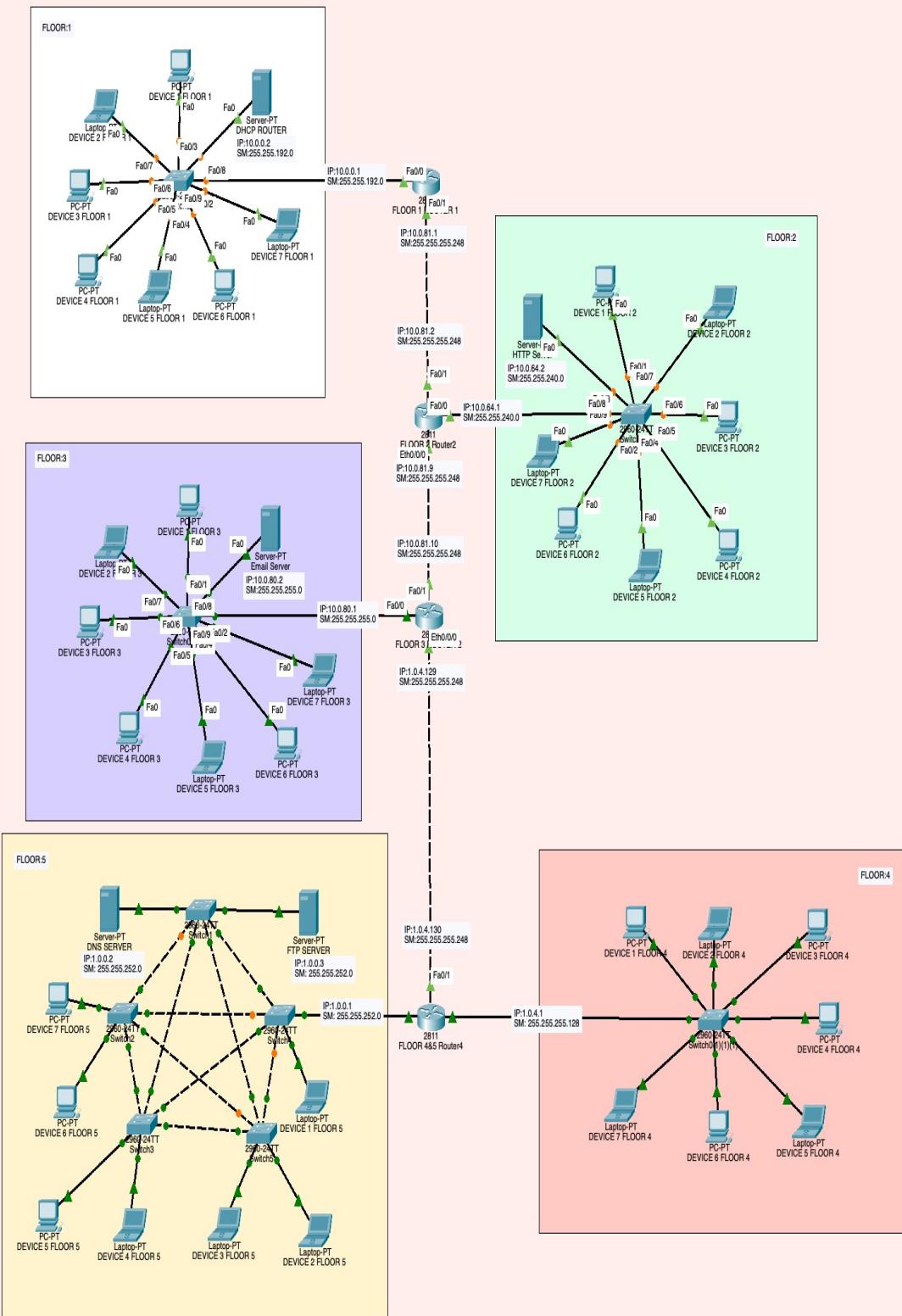
2.Requirements

Given Requirements:

S.no.	Floors	No.of hosts needed	Servers	Topology	Classes	Private/public
1.	FLOOR-1	10,000	DHCP Server	Star topology	CLASS-A	private
2.	FLOOR-2	3,789	HTTP Server	Star topology	CLASS-A	private
3.	FLOOR-3	222	Email Server	Star topology	CLASS-A	private
4.	FLOOR-4	61	-	Star topology	CLASS-A	public
5.	FLOOR-5	543	DNS & FTP	Mesh topology	CLASS-A	public

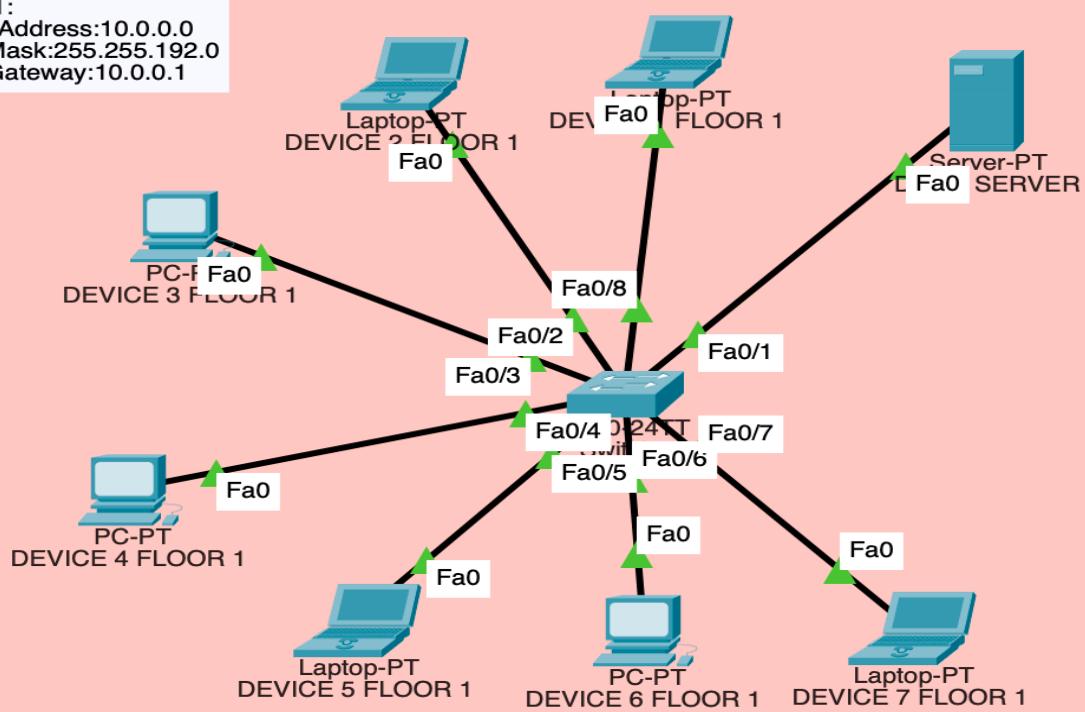
Classless routing to be used using VLSM(Variable Length Subnet Mask).

3. Overall Physical Scenario



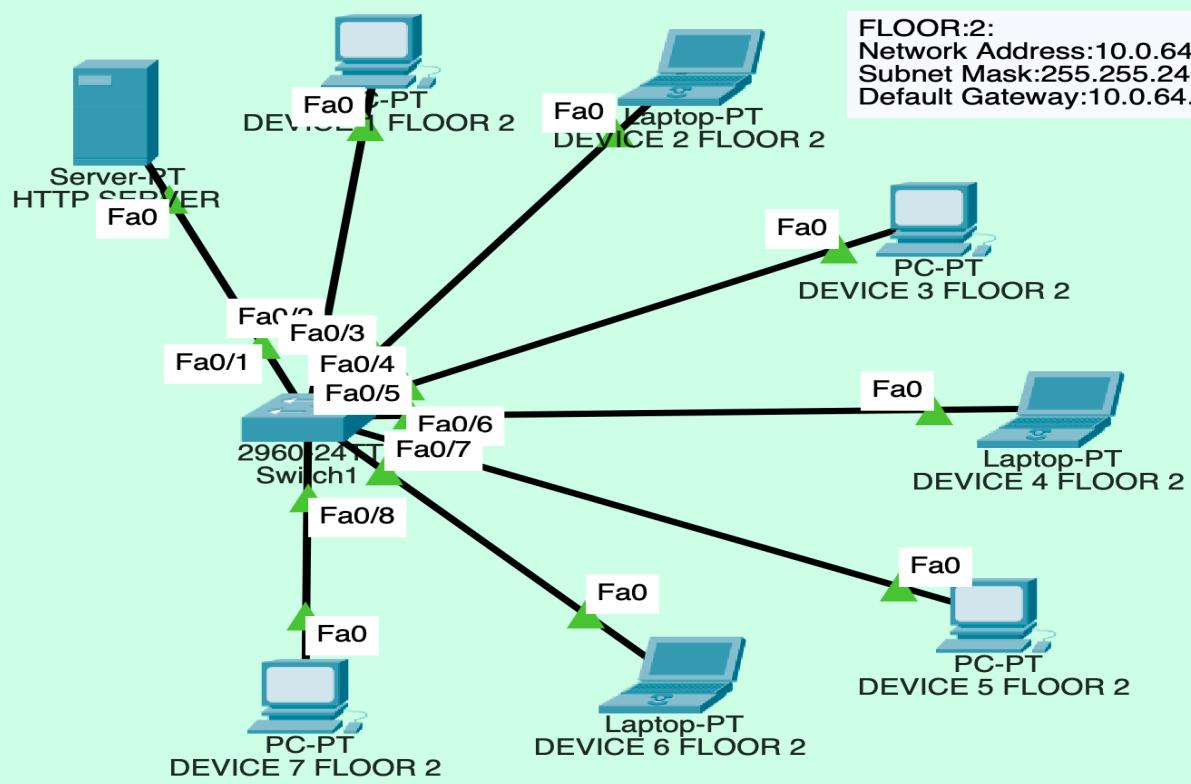
FLOOR-1:

FLOOR:1:
Network Address:10.0.0.0
Subnet Mask:255.255.192.0
Default Gateway:10.0.0.1



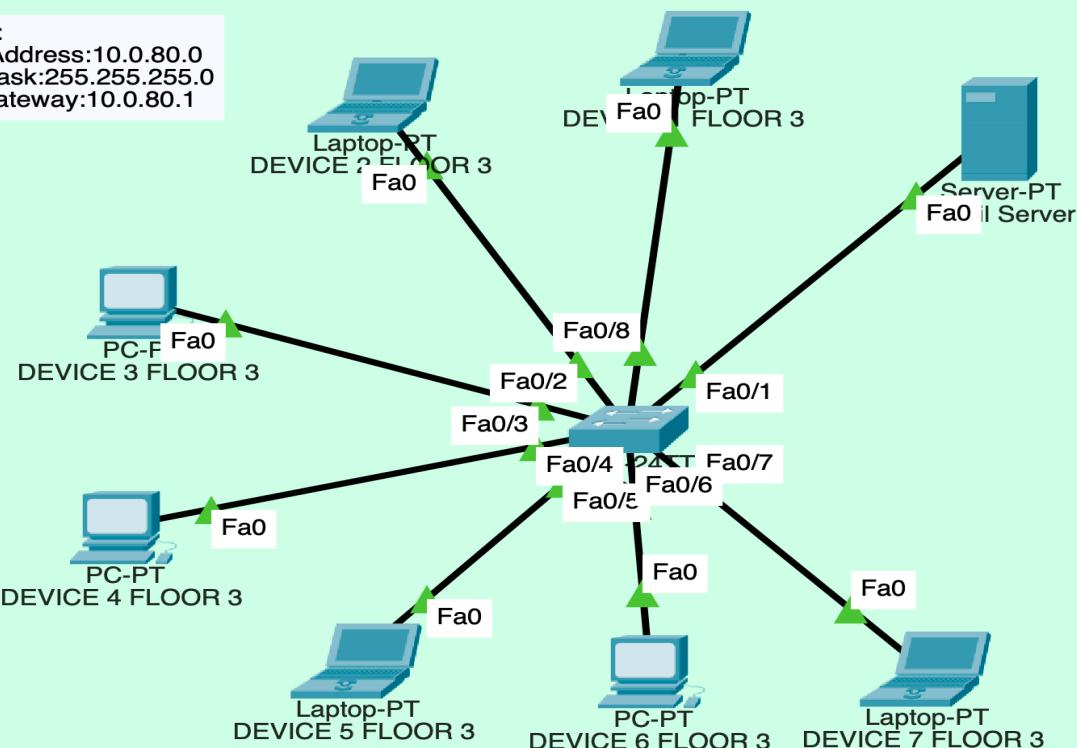
FLOOR-2:

FLOOR:2:
Network Address:10.0.64.0
Subnet Mask:255.255.240.0
Default Gateway:10.0.64.1



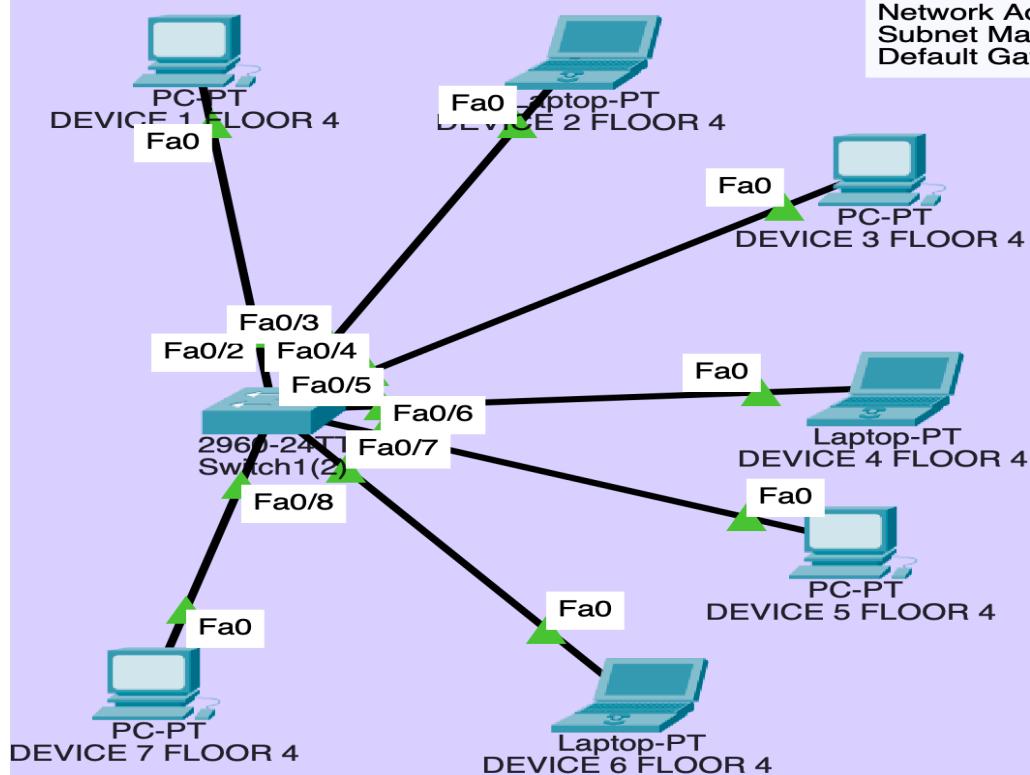
FLOOR-3:

FLOOR:3:
Network Address:10.0.80.0
Subnet Mask:255.255.255.0
Default Gateway:10.0.80.1

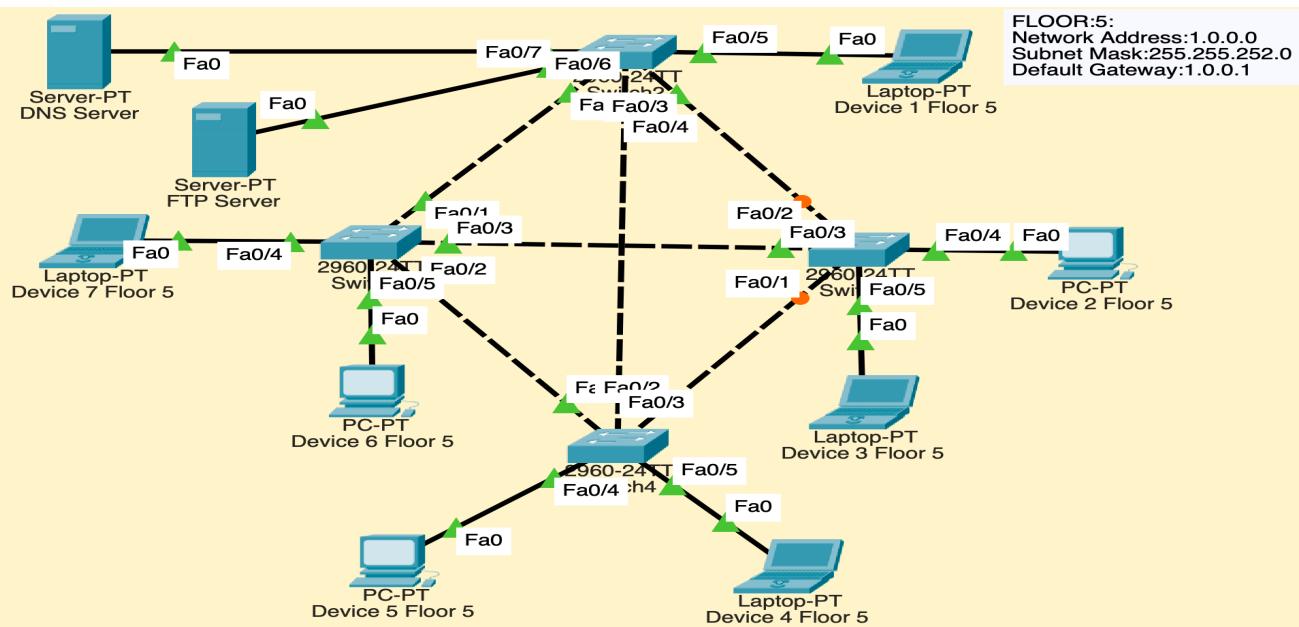


FLOOR-4:

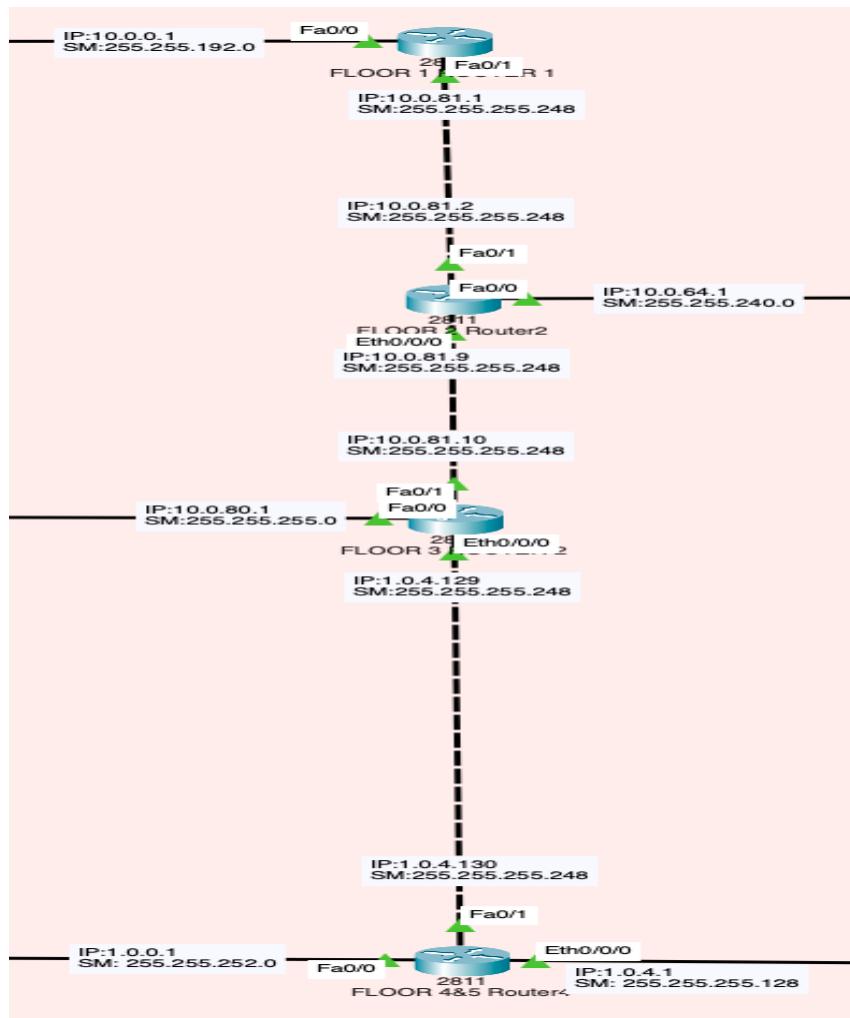
FLOOR:4:
Network Address:1.0.4.0
Subnet Mask:255.255.255.192
Default Gateway:1.0.4.1



FLOOR-5:



Routers:



4.Calculations

We know the ranges of class-A routing:

CLASS-A PRIVATE	10.0.0.0 to 10.255.255.255
CLASS-A PUBLIC	1.0.0.0 to 9.255.255.255
	11.0.0.0 to 126.255.255.25

Subnet:1:Floor:1:

No.of hosts needed = 10,000

Class-A Private = 10.0.0.0

Default Subnet Mask = 255.0.0.0

Step:1:Calculating Host bits:

$$2^{\text{host bits}} = \text{No.of hosts needed}$$

$$2^{\text{host bits}} = 10,000 \sim 16,382$$

Host bits = 14

Step:2:Calculating Network Bits:

Network Bits = 32-Host bits

$$\text{Network Bits} = 32 - 14 = 18$$

Network Bits = 18

Step:3:Subnet mask:

In Binary notation form:

11111111 . 11111111 . 11000000 . 00000000

In Decimal notation form:

255.255.192.0

Subnet Mask : 255.255.192.0

Step:4:Range of IP addressing:

Network Address : 10.0.0.0

Range : 10.0.0.1 - 10.0.63.254

Broadcast address : 10.0.63.255

No. of unused hosts = 16,382-10,000 = 6,382

Subnet:2:Floor:2:

No.of hosts needed = 3,789

Class-A Private = 10.0.64.0

Default Subnet Mask = 255.0.0.0

Step:1:Calculating Host bits:

$$2^{\text{host bits}} = \text{No.of hosts needed}$$

$$2^{\text{host bits}} = 3,789 \sim 4,096$$

Host bits = 12

Step:2:Calculating Network Bits:

Network Bits = 32-Host bits

$$\text{Network Bits} = 32 - 12 = 20$$

Network Bits = 20

Step:3:Subnet mask:

In Binary notation form:

11111111 . 11111111 . 11110000 . 00000000

In Decimal notation form:

255.255.240.0

Subnet Mask : 255.255.240.0

Step:4:Range of IP addressing:

Network Address : 10.0.64.0

Range : 10.0.64.1 - 10.0.79.254

Broadcast address : 10.0.64.255

No. of unused hosts = 4,094-3,789 = 305

Subnet:3:Floor:3:

No.of hosts needed = 222

Class-A Private = 10.0.80.0

Default Subnet Mask = 255.0.0.0

Step:1:Calculating Host bits:

$$2^{\text{host bits}} = \text{No.of hosts needed}$$

$$2^{\text{host bits}} = 222 \sim 256$$

Host bits = 8

Step:2:Calculating Network Bits:

$$\text{Network Bits} = 32 - \text{Host bits}$$

$$\text{Network Bits} = 32 - 8 = 24$$

Network Bits = 24

Step:3:Subnet mask:

In Binary notation form:

11111111 . 11111111 . 11111111 . 00000000

In Decimal notation form:

255.255.255.0

Subnet Mask : 255.255.255.0

Step:4:Range of IP addressing:

Network Address : 10.0.80.0

Range : 10.0.80.1 - 10.0.80.254

Broadcast address : 10.0.80.255

No. of unused hosts = 254-222 = 32

Subnet:4:Floor:4:

No.of hosts needed = 61

Class-A Private = 1.0.4.0

Default Subnet Mask = 255.0.0.0

Step:1:Calculating Host bits:

$$2^{\text{host bits}} = \text{No.of hosts needed}$$

$$2^{\text{host bits}} = 61 \sim 64$$

Host bits = 6

Step:2:Calculating Network Bits:

Network Bits = 32-Host bits

Network Bits = 32-6 = 26

Network Bits = 26

Step:3:Subnet mask:

In Binary notation form:

11111111 . 11111111 . 11111111 . 11000000

In Decimal notation form:

255.255.255.192

Subnet Mask : 255.255.255.192

Step:4:Range of IP addressing:

Network Address : 1.0.4.0

Range : 1.0.4.1 - 1.0.4.62

Broadcast address : 1.0.4.63

No. of unused hosts = 62-61 = 1

Subnet:5:Floor:5:

No.of hosts needed = 543

Class-A Private = 1.0.0.0

Default Subnet Mask = 255.0.0.0

Step:1:Calculating Host bits:

$$2^{\text{host bits}} = \text{No.of hosts needed}$$

$$2^{\text{host bits}} = 543 \sim 1024$$

Host bits = 10

Step:2:Calculating Network Bits:

Network Bits = 32-Host bits

Network Bits = 32-10 = 22

Network Bits = 22

Step:3:Subnet mask:

In Binary notation form:

11111111 . 11111111 . 11111100 . 00000000

In Decimal notation form:

255.255.252.0

Subnet Mask : 255.255.252.0

Step:4:Range of IP addressing:

Network Address : 1.0.0.0

Range : 1.0.0.1 - 1.0.3.254

Broadcast address : 1.0.2.255

No. of unused hosts = 1022-543 = 479

Table of IP Address ranges and Subnet mask:

FLOOR	Host Needed	Host Available	Network Address	Subnet Mask	Range
FLOOR-1	10000	16382	10.0.0.0	255.255.192.0	10.0.0.1 to 10.0.63.254
FLOOR-2	3789	4094	10.0.64.0	255.255.240.0	10.0.64.1 to 10.0.79.254
FLOOR-3	222	254	10.0.80.0	255.255.255.0	10.0.80.1 to 10.0.80.254
FLOOR-4	61	62	1.0.4.0	255.255.255.192	1.0.4.1 to 1.0.4.62
FLOOR-5	543	1022	1.0.0.0	255.255.252.0	1.0.0.1 to 1.0.3.254
FLOOR-1 TO FLOOR-2	3	6	10.0.81.0	255.255.255.248	10.0.81.1 to 10.0.81.6
FLOOR-2 TO FLOOR-3	3	6	10.0.81.8	255.255.255.248	10.0.81.9 to 10.0.81.14
FLOOR-3 TO FLOOR-4 & 5	3	6	1.0.4.128	255.255.255.248	1.0.4.129 to 1.0.4.130

5.IP ADDRESSING

- IP Addressing is done with DHCP(Dynamic Host Configuration Protocol) Server which is placed in the first floor of the building.
- DHCP automatically assigns IP addresses to devices on all the network as it is pre-configured with ranges and subnet masks.
- Pre-configuration steps includes :
 - Pool Name,
 - Default Gateway,
 - DNS Server Address,
 - Start IP addressing,
 - Subnet Mask,
 - Maximum number of users.
- Open DHCP server > Go to Services > Choose DHCP
- Used command ***ip helper-address <DHCP Server address>*** to provide DHCP to all the floors through routers.
- The below picture and table shows DHCP IP addressing pool table:

Pool Name	Default Gateway	DNS Server	Start IP address	Subnet Mask	Max user	TFTP Server	WLC Address
Floor-1	10.0.0.1	1.0.0.2	10.0.0.3	255.255.192.0	16,382	-	-
Floor-2	10.0.64.1	1.0.0.2	10.0.64.3	255.255.240.0	4,093	-	-
Floor-3	10.0.80.1	1.0.0.2	10.0.80.3	255.255.255.0	253	-	-
Floor-4	1.0.4.1	1.0.0.2	1.0.4.2	255.255.255.192	63	-	-
Floor-5	1.0.0.1	1.0.0.2	1.0.0.4	255.255.252.0	1020	-	

DHCP ROUTER

Physical Config Services **Desktop** Programming Attributes

SERVICES									
HTTP									
DHCP									
DHCPv6									
TFTP									
DNS									
SYSLOG									
AAA									
NTP									
EMAIL									
FTP									
IoT									
VM Management									
Radius EAP									

DHCP

Interface Service On Off

Pool Name

Default Gateway

DNS Server

Start IP Address :

Subnet Mask:

Maximum Number of Users :

TFTP Server:

WLC Address:

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
floor 4	1.0.4.1	1.0.0.2	1.0.4.2	255.255...	126	0.0.0.0	0.0.0.0
floor 5	1.0.0.1	1.0.0.2	1.0.0.4	255.255...	1...	0.0.0.0	0.0.0.0
Floor 3	10.0.80.1	1.0.0.2	10.0.80.3	255.255...	253	0.0.0.0	0.0.0.0
Floor 2	10.0.64.1	1.0.0.2	10.0.64.3	255.255...	4...	0.0.0.0	0.0.0.0
serverPool	10.0.0.1	1.0.0.2	10.0.0.3	255.255...	1...	0.0.0.0	0.0.0.0

- **DHCP Addresses of devices:**
Includes some pictures of DHCP Routing address:

The image displays six network configuration windows arranged in a grid, each showing the IP Configuration for a specific device and floor.

- DEVICE 1 FLOOR 1:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.0.3, Subnet Mask 255.255.192.0, Default Gateway 10.0.0.1, DNS Server 1.0.0.2.
- DEVICE 1 FLOOR 2:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.64.3, Subnet Mask 255.255.240.0, Default Gateway 10.0.64.1, DNS Server 1.0.0.2.
- DEVICE 2 FLOOR 3:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.80.4, Subnet Mask 255.255.255.0, Default Gateway 0.0.0.0, DNS Server 0.0.0.0.
- DEVICE 4 FLOOR 1:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.0.6, Subnet Mask 255.255.192.0, Default Gateway 10.0.0.1, DNS Server 1.0.0.2.
- DEVICE 4 FLOOR 2:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.64.6, Subnet Mask 255.255.240.0, Default Gateway 10.0.64.1, DNS Server 1.0.0.2.
- DEVICE 5 FLOOR 2:** IP Configuration for FastEthernet0. DHCP is selected, and the message "DHCP request successful." is displayed. Settings: IPv4 Address 10.0.64.7, Subnet Mask 255.255.240.0, Default Gateway 10.0.64.1, DNS Server 1.0.0.2.

6.Routing

- For routing I used dynamic routing using RIP(Routing Information Protocol) version 2.
- Syntax:

Router>enable

Router>configure terminal

Router# Router RIP

Router# version 2

Router# network <network_address>

Router# exit

- Totally I used 4 routers which include total of **8 networks**.The images of the routing shown below.

- **Router:1:**

The screenshot shows the Cisco IOS CLI interface for 'FLOOR 1 ROUTER 1'. The title bar includes the router's name and the current mode ('CLI'). Below the title bar is a menu bar with tabs: Physical, Config, CLI (which is selected), and Attributes. The main area is labeled 'IOS Command Line Interface' and contains the following text:

```
Router con0 is now available

Press RETURN to get started.

Router>
Router>
Router>
Router>enable
Router>show ip route
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

R    1.0.0.0/8 [120/2] via 10.0.81.2, 00:00:02, FastEthernet0/1
      10.0.0.0/8 is variably subnetted, 7 subnets, 5 masks
      C    10.0.0.0/18 is directly connected, FastEthernet0/0
      L    10.0.0.1/32 is directly connected, FastEthernet0/0
      R    10.0.64.0/20 [120/1] via 10.0.81.2, 00:00:02, FastEthernet0/1
      R    10.0.80.0/24 [120/2] via 10.0.81.2, 00:00:02, FastEthernet0/1
      C    10.0.81.0/29 is directly connected, FastEthernet0/1
      L    10.0.81.1/32 is directly connected, FastEthernet0/1
      R    10.0.81.8/29 [120/1] via 10.0.81.2, 00:00:02, FastEthernet0/1

Router#
```

- Router:2:

FLOOR 2 Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

-- Comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wrl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory
Processor board ID JAD05190MTZ (4292891495)
4 Ethernet interface(s)
2 FastEthernet interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0/0, changed state to up

Router>
Router>enable
Router#show ip route
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

R    1.0.0.0/8 [120/1] via 10.0.81.10, 00:00:17, Ethernet0/0/0
     10.0.0.0/8 is variably subnetted, 8 subnets, 5 masks
R    10.0.0.0/18 [120/1] via 10.0.81.1, 00:00:10, FastEthernet0/1
C    10.0.0.0/20 [120/1] is directly connected, Ethernet0/0/0
L    10.0.64.1/32 is directly connected, FastEthernet0/0
R    10.0.80.0/24 [120/1] via 10.0.81.10, 00:00:17, Ethernet0/0/0
C    10.0.81.0/32 is directly connected, FastEthernet0/1
L    10.0.81.2/32 is directly connected, FastEthernet0/0
C    10.0.81.8/29 is directly connected, Ethernet0/0/0
L    10.0.81.9/32 is directly connected, Ethernet0/0/0

Router#

```

- Router:3:

FLOOR 3 ROUTER 2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wrl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
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Press RETURN to get started!

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%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router>
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
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      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
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      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

1.0.0.0/8 is variably subnetted, 4 subnets, 4 masks
R    1.0.0.0/22 [120/1] via 1.0.4.130, 00:00:07, Ethernet0/0/0
R    1.0.4.0/25 [120/1] via 1.0.4.130, 00:00:07, Ethernet0/0/0
C    1.0.4.128/29 is directly connected, Ethernet0/0/0
L    1.0.4.129/32 is directly connected, Ethernet0/0/0
10.0.0.0/8 is variably subnetted, 7 subnets, 5 masks
R    10.0.0.0/18 [120/2] via 10.0.81.9, 00:00:01, FastEthernet0/1
R    10.0.64.0/20 [120/1] via 10.0.81.9, 00:00:01, FastEthernet0/0
C    10.0.80.0/24 is directly connected, FastEthernet0/0
L    10.0.80.1/32 is directly connected, FastEthernet0/0
R    10.0.81.0/29 [120/1] via 10.0.81.9, 00:00:01, FastEthernet0/1
C    10.0.81.8/29 is directly connected, FastEthernet0/0/1

Router#

```

- Router:4:

FLOOR 4&5 Router4

Physical Config **CLI** Attributes

IOS Command Line Interface

Compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

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2 FastEthernet interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router>
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
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      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

  1.0.0.0/8 is variably subnetted, 6 subnets, 4 masks
C    1.0.0.0/22 is directly connected, FastEthernet0/0
L    1.0.0.1/32 is directly connected, FastEthernet0/0
C    1.0.4.0/25 is directly connected, Ethernet0/0/0
L    1.0.4.1/32 is directly connected, Ethernet0/0/0
C    1.0.4.128/29 is directly connected, FastEthernet0/1
L    1.0.4.130/32 is directly connected, FastEthernet0/1
R    10.0.0.0/8 [120/1] via 1.0.4.129, 00:00:01, FastEthernet0/1

Router#
```

7.Communication between PC's

From floor:1 to floor 2 :

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.64.6

Pinging 10.0.64.6 with 32 bytes of data:

Request timed out.
Reply from 10.0.64.6: bytes=32 time<1ms TTL=126
Reply from 10.0.64.6: bytes=32 time<1ms TTL=126
Reply from 10.0.64.6: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.64.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>tracert 10.0.64.6

Tracing route to 10.0.64.6 over a maximum of 30 hops:

  1    0 ms        0 ms        0 ms      10.0.0.1
  2    0 ms        0 ms        0 ms      10.0.81.2
  3    0 ms        0 ms        0 ms      10.0.64.6

Trace complete.
```

From floor:2 to floor 5:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 1.0.0.8

Pinging 1.0.0.8 with 32 bytes of data:

Request timed out.
Reply from 1.0.0.8: bytes=32 time<1ms TTL=125
Reply from 1.0.0.8: bytes=32 time<1ms TTL=125
Reply from 1.0.0.8: bytes=32 time=1ms TTL=125

Ping statistics for 1.0.0.8:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>tracert 1.0.0.8

Tracing route to 1.0.0.8 over a maximum of 30 hops:

  1    0 ms        0 ms        0 ms      10.0.64.1
  2    0 ms        0 ms        0 ms      10.0.81.10
  3    0 ms        0 ms        0 ms      1.0.4.130
  4   11 ms        0 ms        0 ms      1.0.0.8

Trace complete.
```

From floor:5 to floor 3

```
C:\>ping 10.0.80.6

Pinging 10.0.80.6 with 32 bytes of data:

Request timed out.
Reply from 10.0.80.6: bytes=32 time=1ms TTL=126
Reply from 10.0.80.6: bytes=32 time<1ms TTL=126
Reply from 10.0.80.6: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.80.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>tracert 10.0.80.6

Tracing route to 10.0.80.6 over a maximum of 30 hops:

  1  0 ms      20 ms      0 ms      1.0.0.1
  2  0 ms      0 ms      1 ms      1.0.4.129
  3  0 ms      11 ms      1 ms      10.0.80.6

Trace complete.
```

From floor:4 to floor 1:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time=2ms TTL=124
Reply from 10.0.0.4: bytes=32 time<1ms TTL=124
Reply from 10.0.0.4: bytes=32 time=1ms TTL=124
Reply from 10.0.0.4: bytes=32 time=2ms TTL=124

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 1ms

C:\>tracert 10.0.0.4

Tracing route to 10.0.0.4 over a maximum of 30 hops:

  1  0 ms      0 ms      0 ms      1.0.4.1
  2  18 ms      41 ms      9 ms      1.0.4.129
  3  1 ms      1 ms      49 ms      10.0.81.9
  4  0 ms      0 ms      0 ms      10.0.81.1
  5  0 ms      0 ms      0 ms      10.0.0.4

Trace complete.
```

From floor:1 to floor 5:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 1.0.0.9

Pinging 1.0.0.9 with 32 bytes of data:

Request timed out.
Reply from 1.0.0.9: bytes=32 time<1ms TTL=124
Reply from 1.0.0.9: bytes=32 time<1ms TTL=124
Reply from 1.0.0.9: bytes=32 time<1ms TTL=124

Ping statistics for 1.0.0.9:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>tracert 1.0.0.9

Tracing route to 1.0.0.9 over a maximum of 30 hops:

  1  7 ms        0 ms        0 ms      10.0.0.1
  2  0 ms        0 ms        0 ms      10.0.81.2
  3  0 ms        0 ms        1 ms      10.0.81.10
  4  0 ms        0 ms        0 ms     1.0.4.130
  5  0 ms        0 ms        0 ms     1.0.0.9

Trace complete.
```

From floor:3 to floor 4:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 1.0.4.6

Pinging 1.0.4.6 with 32 bytes of data:

Reply from 1.0.4.6: bytes=32 time=2ms TTL=126
Reply from 1.0.4.6: bytes=32 time=1ms TTL=126
Reply from 1.0.4.6: bytes=32 time=1ms TTL=126
Reply from 1.0.4.6: bytes=32 time<1ms TTL=126

Ping statistics for 1.0.4.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 1ms

C:\>tracert 1.0.4.6

Tracing route to 1.0.4.6 over a maximum of 30 hops:

  1  0 ms        0 ms        0 ms      10.0.80.1
  2  0 ms        0 ms        0 ms     1.0.4.130
  3  0 ms        0 ms        0 ms     1.0.4.6

Trace complete.
```

8.HTTP AND DNS SERVER

The screenshot shows a software interface titled "DNS SERVER" with a tab navigation bar at the top: Physical, Config, Services, Desktop, Programming, and Attributes. The "Services" tab is selected. On the left, a vertical sidebar lists various services: HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, FTP, IoT, VM Management, and Radius EAP. The main panel is titled "DNS" and contains the following fields:

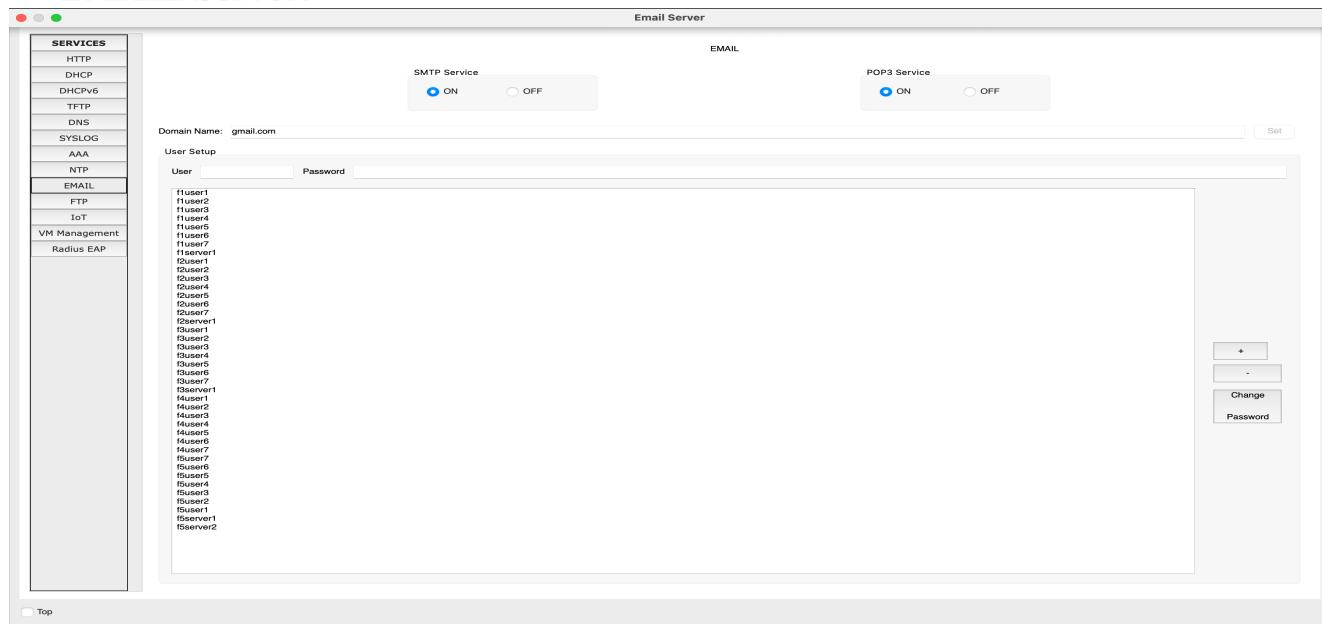
- "DNS Service" with an "On" radio button (selected) and an "Off" radio button.
- "Resource Records" section with fields for "Name" (containing "motivate.com") and "Address" (containing "10.0.64.2"). A dropdown menu next to "Type" indicates "A Record".
- Buttons for "Add", "Save", and "Remove".
- A table listing the current resource records:

No.	Name	Type	Detail
0	motivate.com	A Record	10.0.64.2

DNS Cache

9.EMAIL SERVER

- **EMAIL Server:**



- **Email ID's for all in the range:**

- **Floor:1:**

Username	Password	Id
f1user1	f1user1	f1user1@gmail.com
f1user2	f1user2	f1user2@gmail.com
f1user3	f1user3	f1user3@gmail.com
f1user4	f1user4	f1user4@gmail.com
f1user5	f1user5	f1user5@gmail.com
f1user6	f1user6	f1user6@gmail.com
f1user7	f1user7	f1user7@gmail.com
.	.	.
.	.	.
.	.	.
f1user16381	f1user16381	f1user16381@gmail.com

- **Floor:2:**

Username	Password	Id
f2user1	f2user1	f2user1@gmail.com
f2user2	f2user2	f2user2@gmail.com
f2user3	f2user3	f2user3@gmail.com
f2user4	f2user4	f2user4@gmail.com
f2user5	f2user5	f2user5@gmail.com
f2user6	f2user6	f2user6@gmail.com
f2user7	f2user7	f2user7@gmail.com
.	.	.
.	.	.
.	.	.
f2user4093	f2user4093	f2user4093@gmail.com

- **Floor:3:**

Username	Password	Id
f3user1	f3user1	f3user1@gmail.com
f3user2	f3user2	f3user2@gmail.com
f3user3	f3user3	f3user3@gmail.com
f3user4	f3user4	f3user4@gmail.com
f3user5	f3user5	f3user5@gmail.com
f3user6	f3user6	f3user6@gmail.com
f3user7	f3user7	f3user7@gmail.com
.	.	.
.	.	.

.	.	.
f3user253	f3user253	f3user253@gmail.com

- **Floor:4:**

Username	Password	Id
f4user1	f4user1	f4user1@gmail.com
f4user2	f4user2	f4user2@gmail.com
f4user3	f4user3	f4user3@gmail.com
f4user4	f4user4	f4user4@gmail.com
f4user5	f4user5	f4user5@gmail.com
f4user6	f4user6	f4user6@gmail.com
f4user7	f4user7	f4user7@gmail.com
.	.	.
.	.	.
.	.	.
f4user61	f4user61	f4user61@gmail.com

- **Floor:5:**

Username	Password	Id
f5user1	f5user1	f5user1@gmail.com
f5user2	f5user2	f5user2@gmail.com
f5user3	f5user3	f5user3@gmail.com
f5user4	f5user4	f5user4@gmail.com
f5user5	f5user5	f5user5@gmail.com
f5user6	f5user6	f5user6@gmail.com

f5user7	f5user7	f5user7@gmail.com
.	.	.
.	.	.
f5user1021	f5user1021	f5user1021@gmail.com

- Some images of Email configure in devices:

Floor:1

DEVICE 1 FLOOR 1

Physical Config Desktop Programming Attributes

Configure Mail X

User Information

Your Name: f1user1

Email Address: f1user1@gmail.com

Server Information

Incoming Mail Server: 10.0.80.2

Outgoing Mail Server: 10.0.80.2

Logon Information

User Name: f1user1

Password:

Save Remove Clear Reset

Floor:2

DEVICE 1 FLOOR 2

Physical Config Desktop Programming Attributes

Configure Mail

X

User Information

Your Name: f2user1

Email Address f2user1@gmail.com

Server Information

Incoming Mail Server 10.0.80.2

Outgoing Mail Server 10.0.80.2

Logon Information

User Name: f2user1

Password:

Save

Remove

Clear

Reset

Floor:3

DEVICE 3 FLOOR 3

Physical Config Desktop Programming Attributes

Configure Mail

X

User Information

Your Name: f3user3

Email Address f3user3@gmail.com

Server Information

Incoming Mail Server 10.0.80.2

Outgoing Mail Server 10.0.80.2

Logon Information

User Name: f3user3

Password:

Save

Remove

Clear

Reset

Floor:4

DEVICE 2 FLOOR 4

Physical Config **Desktop** Programming Attributes

Configure Mail

X

User Information

Your Name: f4user2

Email Address: f4user2@gmail.com

Server Information

Incoming Mail Server: 10.0.80.2

Outgoing Mail Server: 10.0.80.2

Logon Information

User Name: f4user2

Password:

Save Remove Clear Reset

Floor:5

DEVICE 4 FLOOR 5

Physical Config **Desktop** Programming Attributes

Configure Mail

X

User Information

Your Name: f5user4

Email Address: f5user4@gmail.com

Server Information

Incoming Mail Server: 10.0.80.2

Outgoing Mail Server: 10.0.80.2

Logon Information

User Name: f5user4

Password:

Save Remove Clear Reset

Composing a mail:

DEVICE 2 FLOOR 1

Physical Config Desktop **Desktop** Programming Attributes

Compose Mail X

To: f2user4@gmail.com
Subject: Deployment of Version 3.2.1 of Project Tracker Tool

Send

Dear Team,

We are pleased to announce that Version 3.2.1 of the Project Tracker Tool has been successfully deployed and is now live across all departments. This update includes:

- Improved dashboard performance
- Bug fixes from previous versions
- Enhanced reporting features
- UI/UX improvements for better user experience

*Sent mail success

DEVICE 2 FLOOR 1

Physical Config Desktop **Desktop** Programming Attributes

MAIL BROWSER X

Mails

Compose Reply Receive Delete Configure Mail

From	Subject	Received

Sending mail to f2user4@gmail.com , with subject : Deployment of Version 3.2.1 of Project Tracker Too .. Mail Server: 10.0.80.2 Send Success.

Cancel Send/Receive

*Received mail on f2user4:

DEVICE 4 FLOOR 2

Physical Config Desktop Programming Attributes

MAIL BROWSER X

Mails

Compose Reply Receive Delete Configure Mail

	From	Subject	Received
1	f1user2@gmail.com	Deployment of Version 3.2.1 of Project Tracker Tool	Thu Apr 24 2025 17:36:48

Deployment of Version 3.2.1 of Project Tracker Tool
f1user2@gmail.com
Sent : Thu Apr 24 2025 17:36:48

Dear Team,

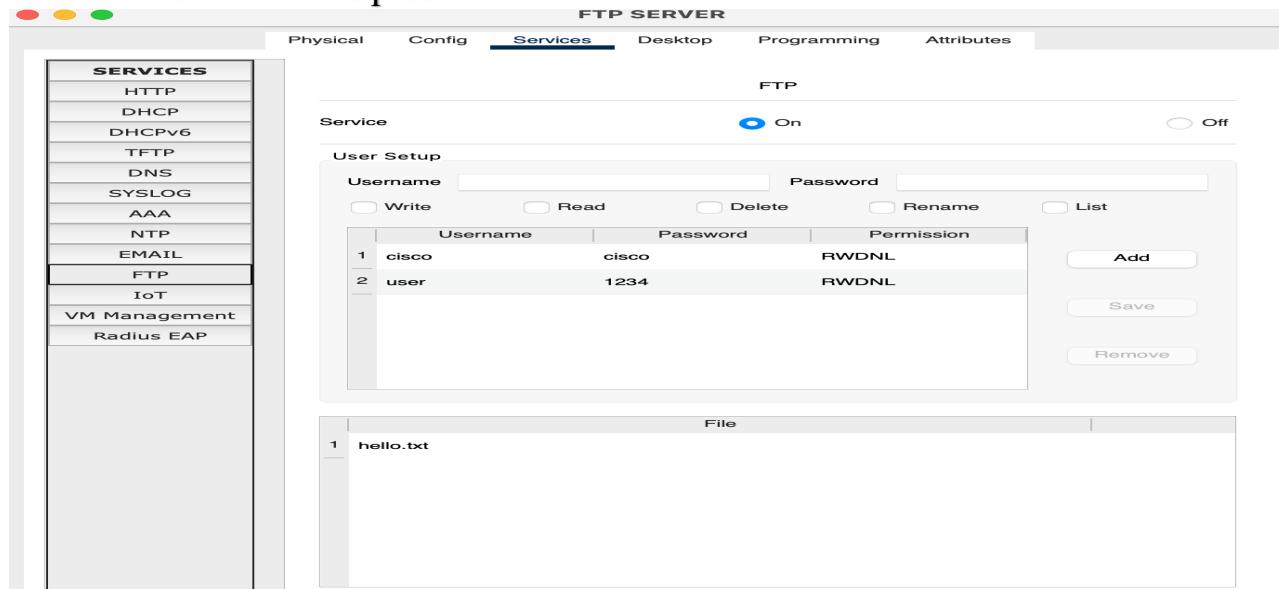
We are pleased to announce that Version 3.2.1 of the Project Tracker Tool has been successfully deployed and is now live across all departments. This update includes:
Improved dashboard performance
Bug fixes from previous versions
Enhanced reporting features
UI/UX improvements for better user experience

Receiving mail from POP3 Server 10.0.80.2
Receive Mail Success.

Cancel Send/Receive

9. FTP SERVER

- Server username and password:



- Opened server in a device and used some commands:

```
Cisco Packet Tracer PC Command Line 1.0
1>ftp://1.0.0.3
Trying to connect...1.0.0.3
Connected to 1.0.0.3
220- Welcome to PT Ptp server
Username:user
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>dir
Listing /ftp directory from 1.0.0.3:
0 : hello.txt
28

Reading file hello.txt from 1.0.0.3:
File transfer in progress...
[Transfer complete - 28 bytes]
28 bytes copied in 0.001 secs (28000 bytes/sec)
ftp>delete hello.txt
Deleting file hello.txt from 1.0.0.3: ftp>
[Deleted file hello.txt successfully ]
ftp>put positive.txt
Writing file positive.txt to 1.0.0.3:
File transfer in progress...
[Transfer complete - 629 bytes]
629 bytes copied in 0.022 secs (28590 bytes/sec)
ftp>
```



FTP SERVER

Physical Config Services Desktop Programming Attributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

FTP

Service

On

Off

User Setup

Username

Password

Write

Read

Delete

Rename

List

	Username	Password	Permission
1	cisco	cisco	RWDNL
2	user	1234	RWDNL

Add

Save

Remove

File

1 positive.txt

10.GITHUB LINK

Github Link: <https://github.com/Dakshin2k05/VLSM-routing-with-5-Server-in-5-floor>

Scan the QR for Github repository

