LOVELY PROFESSIONAL UNIVERSITY

Subject: CSE307 (INTERNETWORKING ESSENTIALS)

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Submitted To:

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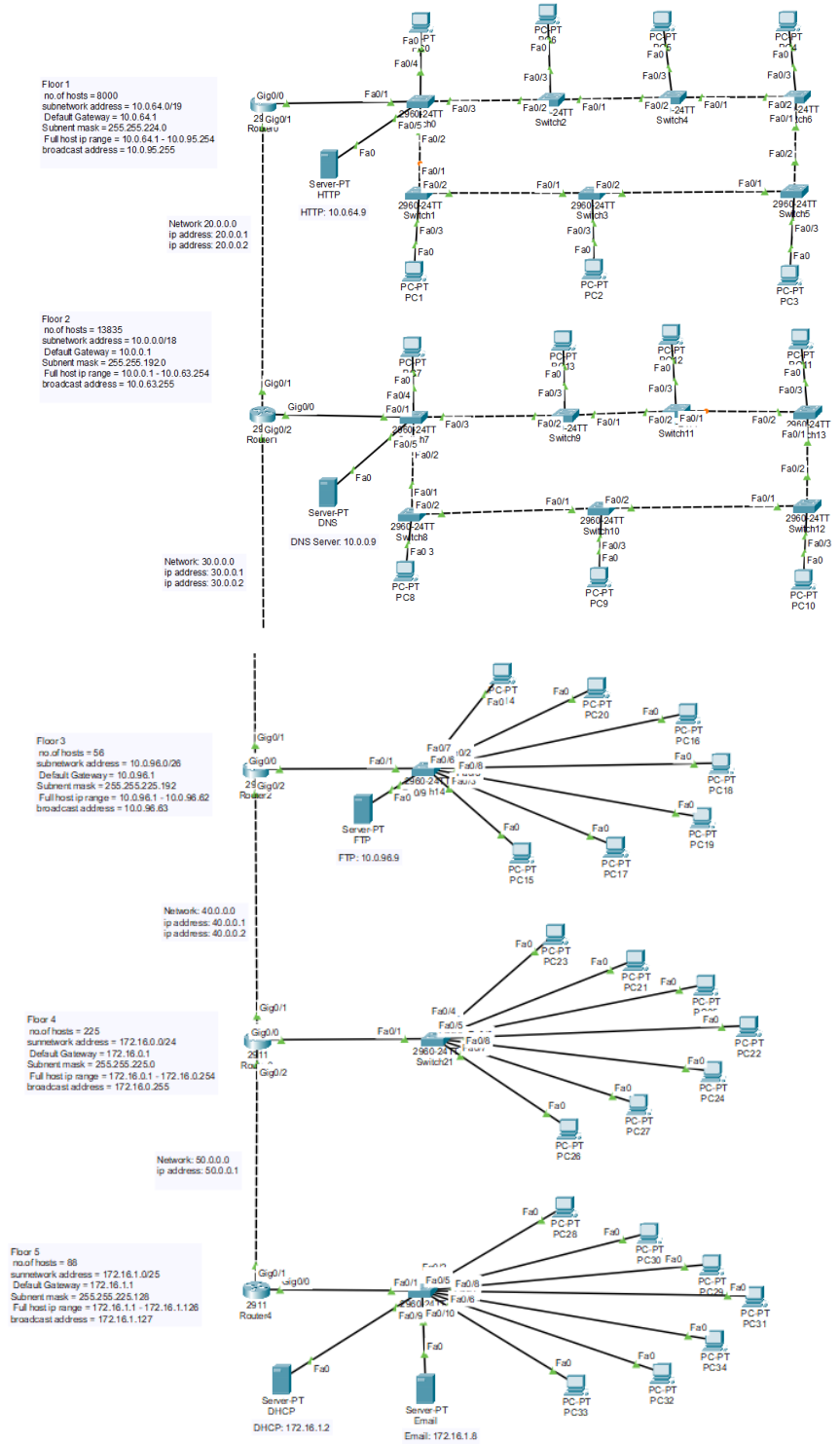
GITHUB LINK:

https://github.com/KOTHAPU7/Internet-Networking

Network Design Requirements:

You are hired as a network engineer for AL Infotech, a midsized enterprise with a 5-floor office building. Each floor is equipped with a different number of computers, like floor 1 has 8000, floor 2 has 13835, floor 3 has 56, floor 4 has 225, and floor 5 has 88. Configure the HTTP server on floor 1, the FTP server should be connected on floor 3, the DNS server should be connected on floor 2, and the DHCP and Email 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 Ring topology for the first 2 floors and a Star 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 B 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 interdepartment 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 SUBENTWORK 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.

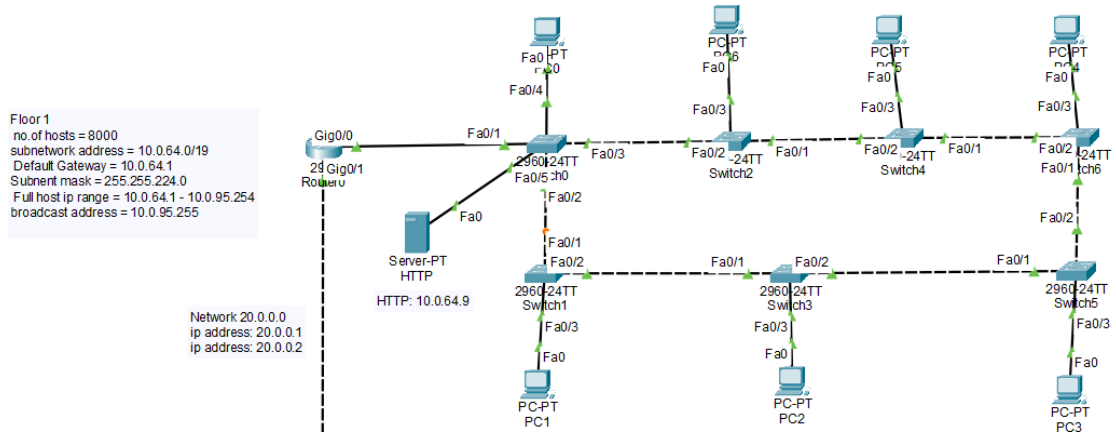
Overview :



Physical Scenario

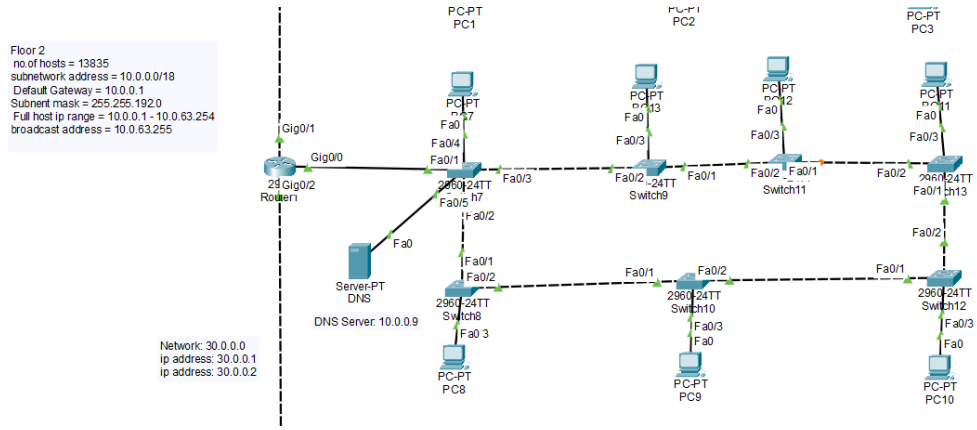
FLOOR 1

RING TOPOLOGY



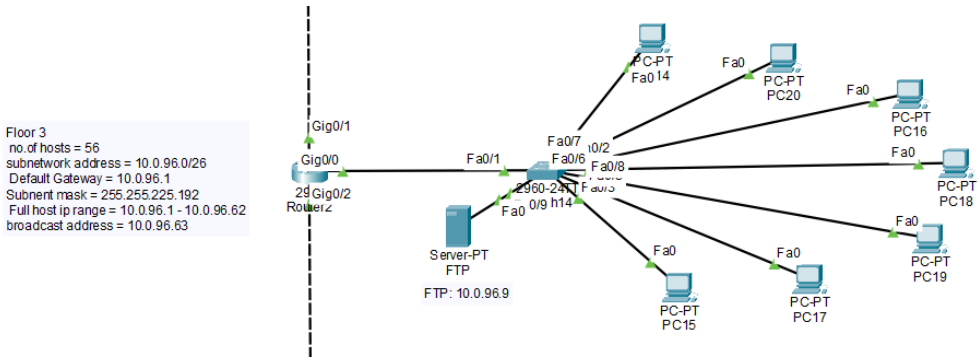
FLOOR 2

RING TOPOLOGY



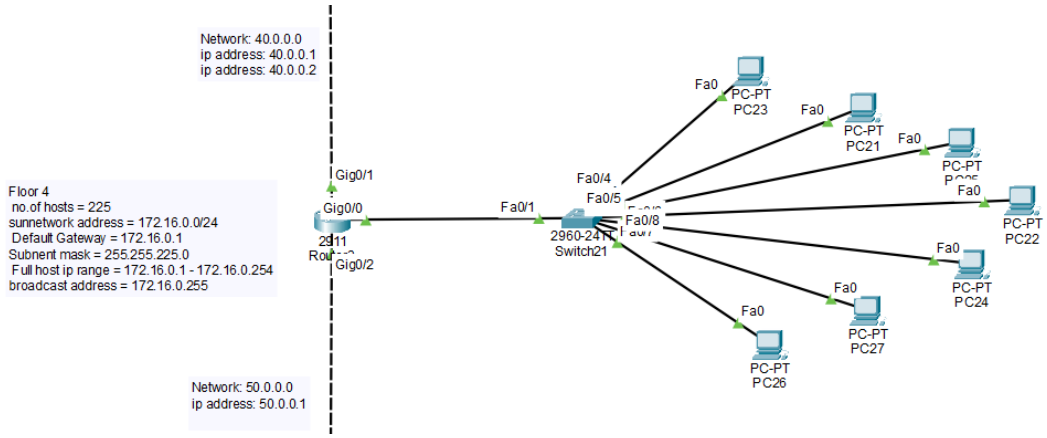
FLOOR 3

STAR TOPOLOGY



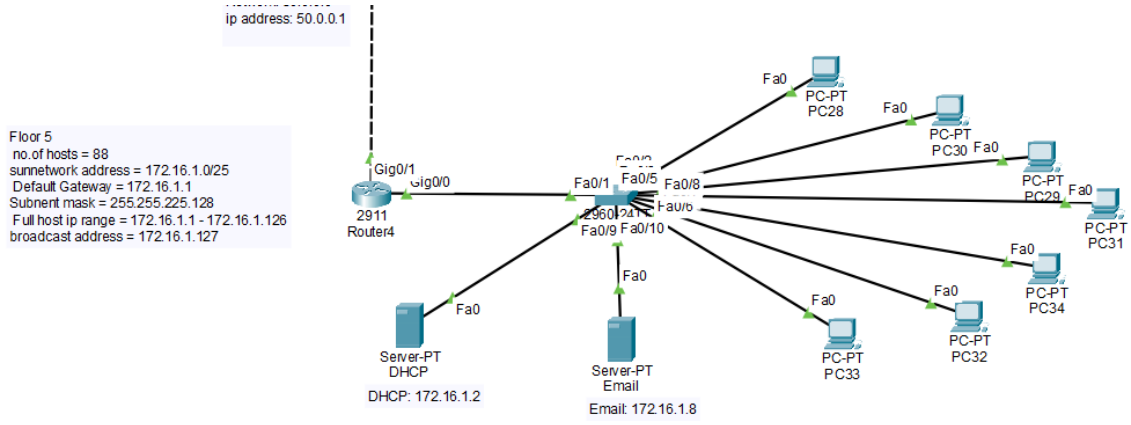
FLOOR4

STAR TOPOLOGY

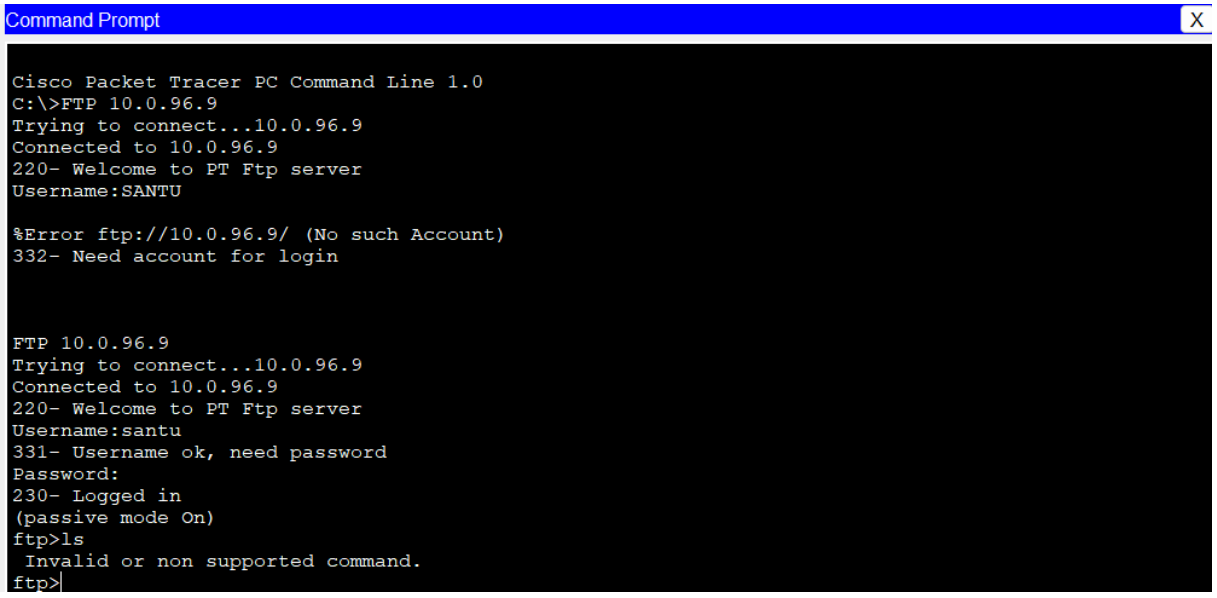


FLOOR 5

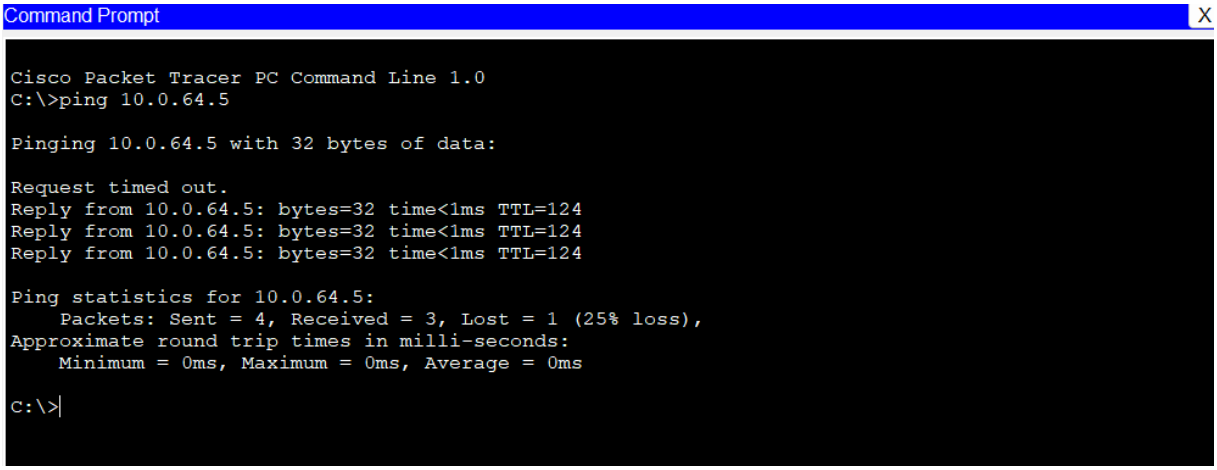
STAR TOPOLOGY



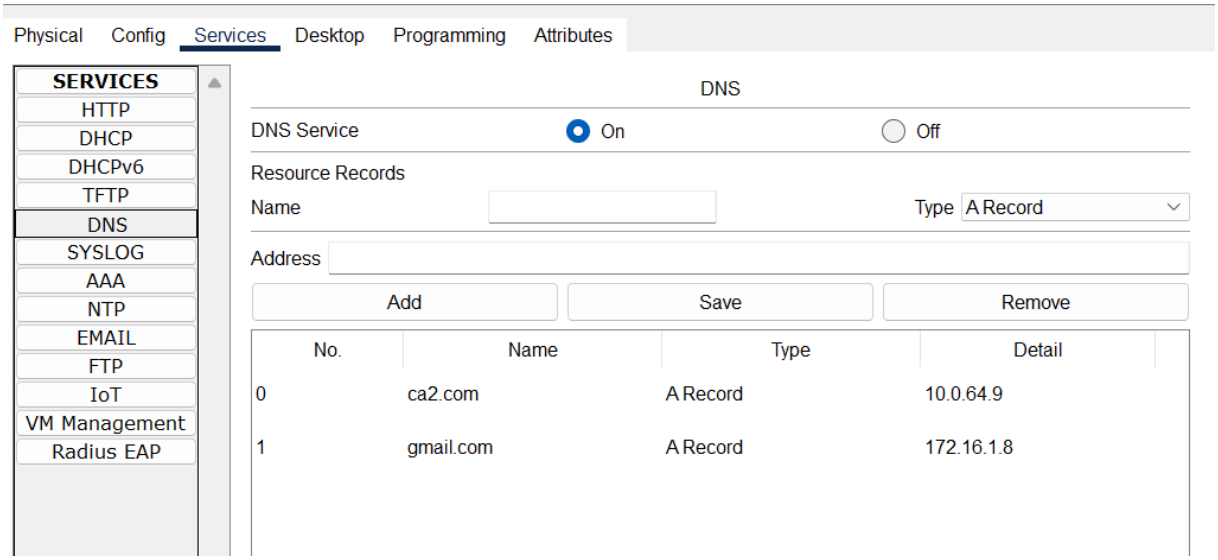
FTP SERVER:



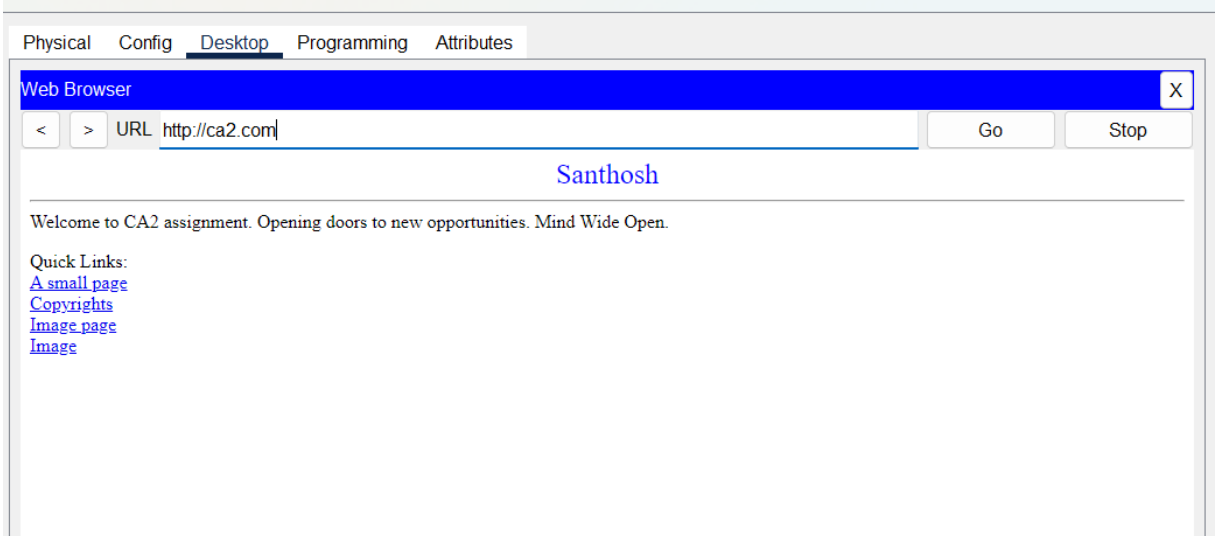
PING FROM PC TO PC AND ROUTER TO PC :



DNS SERVER:



HTTP SERVER:



VLSM (Variable length subnet masking):

Floor 1

NO. of hosts = 8000

subnetwork address = 10.0.64.0/19

Default Gateway = 10.0.64.1

Subnet mask = 255.255.224.0

Full host Ip range = 10.0.64.1 - 10.0.95.254

broadcast address = 10.0.95.255

Floor 2

No .of hosts = 13835

subnetwork address = 10.0.0.0/18

Default Gateway = 10.0.0.1

Subnet mask = 255.255.192.0

Full host Ip range = 10.0.0.1 - 10.0.63.254

broadcast address = 10.0.63.255

Floor 3

NO .of hosts = 56

subnetwork address = 10.0.96.0/26

Default Gateway = 10.0.96.1

Subnet mask = 255.255.225.192

Full host Ip range = 10.0.96.1 - 10.0.96.62

broadcast address = 10.0.96.63

Floor 4

NO. of hosts = 225

subnetwork address = 172.16.0.0/24

Default Gateway = 172.16.0.1

Subnet mask = 255.255.225.0

Full host Ip range = 172.16.0.1 - 172.16.0.254

broadcast address = 172.16.0.255

Floor 5

NO. of hosts = 88

subnetwork address = 172.16.1.0/25

Default Gateway = 172.16.1.1

Subnet mask = 255.255.225.128

Full host Ip range = 172.16.1.1 - 172.16.1.126

broadcast address = 172.16.1.127