A Project Report on

College Network Scenario

Submitted in partial fulfillment of the requirements
of the SDP project

Network SDP
in

Information Technology
by

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CERTIFICATE

This is to certify that Network SDP Mini Project entitled ***"Food Company Network Scenario"*** Submitted by "Prerna Mumbaikar(Roll No 120A3029) Shivani Lalwani (Roll No 121A3024) Arya Angane(Roll 120A3008) for the partial fulfillment of the requirement for SDP Project in ***SE Information Technology 2022-23.***

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Signature

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Arya Angane

Abbreviations

MSE	**M**obility **S**ervice **E**ngine
UCS	**U**nified **C**omputing **S**ystem
RFP	**R**equest **F**or **P**roposal
IP	**I**nternet **P**rotocol
RIP	**R**outing **I**nformation **P**rotocol
RPP	**R**outing **P**rotocol **P**lan
OS	**O**perating **S**ystem
OSI	**O**pen **S**ystems **I**nterconnection
FTP	**F**ile **T**ransfer **P**rotocol
DNS	**D**omain **N**ame **S**ystem
LAN	**L**ocal **A**rea **N**etwork
VLAN	**V**irtual **L**ocal **A**rea **N**etwork

CONTENT

Introduction

This Food Company Network Scenario is about designing a topology of a network that is a LAN (Local Area Network) for a Food production company in which various computers of different departments are set up so that they can interact and communicate with each other by interchanging data. To design a networking scenario for a Food company which connect various departments to each other's, it puts forward communication among different departments. CNS is used to design a systematic and well-planned topology, satisfying all the necessities of the Food production company.

Objectives

The main objective of the proposed network is to update the existing network and also enhance its capabilities and increase the flexibility of the network which will eventually help in increasing efficiency of production for the company.

1. Enhanced Operational Efficiency: One of the primary objectives of a food company computer network design is to improve operational efficiency. This can be achieved by streamlining communication and collaboration among different departments and facilitating the sharing of information and resources. An efficient network design ensures that employees can access the necessary data and applications quickly, leading to improved productivity and streamlined business processes.
2. Scalability and Flexibility: Another objective is to design a network that can easily accommodate future growth and changes within the organization. The network should be scalable, allowing for the addition of new devices, users, and locations without significant disruptions. Additionally, it should be flexible enough to adapt to evolving business needs, such as the introduction of new technologies or changes in operational requirements.
3. Cost-effectiveness: Optimizing costs is a crucial objective for any business, including food companies. The network design should aim to achieve a balance between performance and cost-effectiveness. This involves selecting the appropriate network equipment, considering factors such as reliability, scalability, and energy efficiency. By designing an efficient and cost-effective network, the company can allocate resources more effectively and maximize return on investment.

EXISTING SYSTEMS

Existing food company networks vary in size and complexity depending on the specific company and its IT infrastructure requirements. Here are some common elements and components found in food company networks:

Local Area Network (LAN): Food companies typically have a LAN that connects computers, servers, printers, and other devices within a single location, such as a production facility or office. LANs facilitate local communication, resource sharing, and access to shared applications and databases.

Wide Area Network (WAN): Food companies with multiple locations or branches often have a WAN to connect these sites and enable centralized management and communication. WANs utilize technologies such as leased lines, virtual private networks (VPNs), or dedicated connections to facilitate secure and reliable data transmission between locations.

Servers: Food companies utilize servers to host and manage critical applications, databases, and file storage. These servers may include enterprise resource planning (ERP) systems, inventory management software, customer relationship management (CRM) systems, and other specialized applications specific to the food industry.

NETWORK DEVICES USED

Routers :

A router is a critical component of a computer network that connects multiple networks together, directing data packets between them. It serves as a gateway, facilitating the transfer of data between devices within the network and enabling communication with external networks, such as the internet.

Switches :

A network switch is a networking device that connects multiple devices within a local area network (LAN), allowing them to communicate with each other efficiently. It operates at the data link layer (Layer 2) of the OSI model and uses the MAC (Media Access Control) addresses of devices to forward data packets.

Server :

Servers are a fundamental component of computer networks, including those in food companies. They are powerful computers designed to host and provide centralized services, applications, and resources to network users. Here are some key aspects of servers in the context of food company networks:

IP ADDRESSING SCHEME

DEPARTMENTS/BUILDING	NETWORK ID
1.OFFICE BUILDING(IT/SALES/ACCOUNTS/HR)	**192.168.10.0**
2.FACTORY BUILDING (PRODUCTION CONTROL/QUALITY CONTROL)	**192.168.11.0**
3.DATA CENTER (SERVER ROOMS)	**20.0.0.0**

ROUTING PROTOCOL USED

RIP (Routing Information Protocol) is a dynamic routing protocol used in computer networks to facilitate the exchange of routing information between routers. It is a distance-vector routing protocol, which means that it determines the best path to a destination based on the distance metric (typically hop count) and shares this information with neighboring routers.

Here are some key features and aspects of RIP routing protocol:

Hop Count: RIP calculates the best path to a destination network based on the number of router hops. Each router counts as one hop, and RIP uses a maximum hop count of 15 to prevent routing loops. If a route exceeds the maximum hop count, it is considered unreachable.

Routing Updates: RIP routers periodically send routing updates to their neighboring routers, sharing information about the networks they are aware of and the associated hop counts. By exchanging these updates, routers build and maintain a routing table that contains the network destinations and the corresponding next-hop routers.

Split Horizon: RIP incorporates the split horizon mechanism, which prevents routing loops by not advertising routes back to the router from which the information was received. This helps maintain routing stability and avoids routing loops that can occur when information circulates indefinitely between routers.

IMPLEMENTATION :

```
Router(config)#do sh 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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, GigabitEthernet0/0/1
L       10.0.0.1/32 is directly connected, GigabitEthernet0/0/1
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0/0
```

NETWORK FEATURES

DHCP :

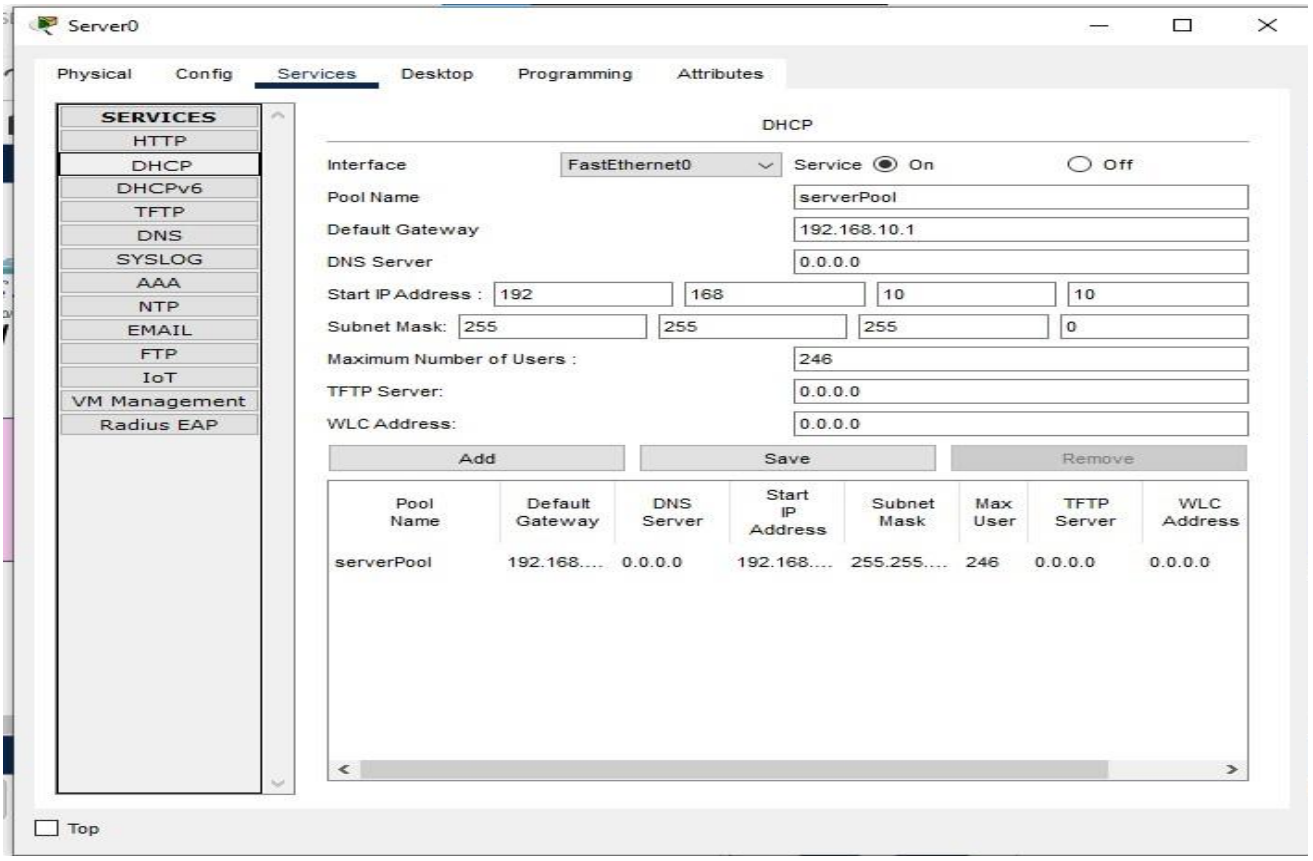
(Dynamic Host Configuration Protocol) is a network protocol used to automatically assign IP addresses and other network configuration parameters to devices within a network. It simplifies the process of IP address management by dynamically allocating and renewing IP addresses as devices connect to and disconnect from the network.

Here are some key features and aspects of DHCP :

IP Address Allocation: DHCP enables the automatic assignment of IP addresses to devices on a network. When a device (known as a DHCP client) connects to the network, it sends a request to a DHCP server, which then dynamically assigns an available IP address from a predefined range called a DHCP pool. This eliminates the need for manual IP address configuration on each device.

Dynamic IP Address Management: DHCP allows for dynamic IP address allocation, meaning that IP addresses are not permanently assigned to devices. Instead, IP addresses are leased to devices for a specific period, known as the lease duration. When the lease expires, the device can request a renewal from the DHCP server, which may assign the same IP address or a different one from the available pool.

IMPLEMENTATION :



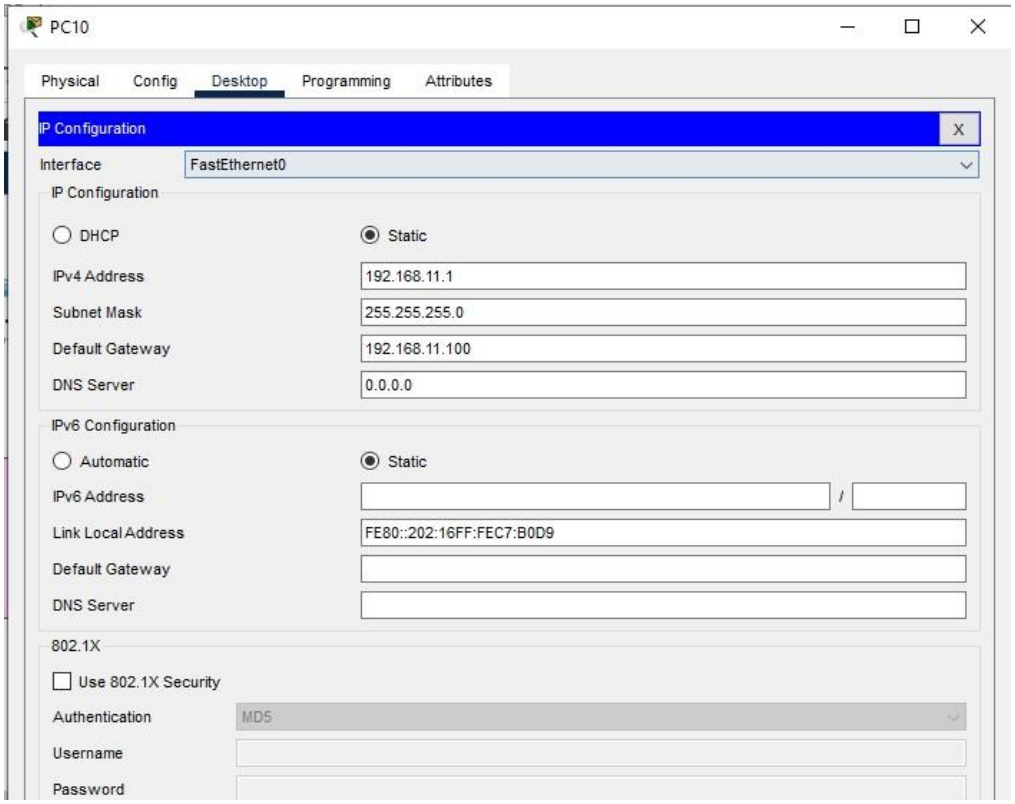
PAT :

(Port Address Translation) is a technique used in computer networks to translate multiple private IP addresses to a single public IP address by utilizing different port numbers. It is a variation of Network Address Translation (NAT) that allows multiple devices on a local network to share a single public IP address for internet connectivity.

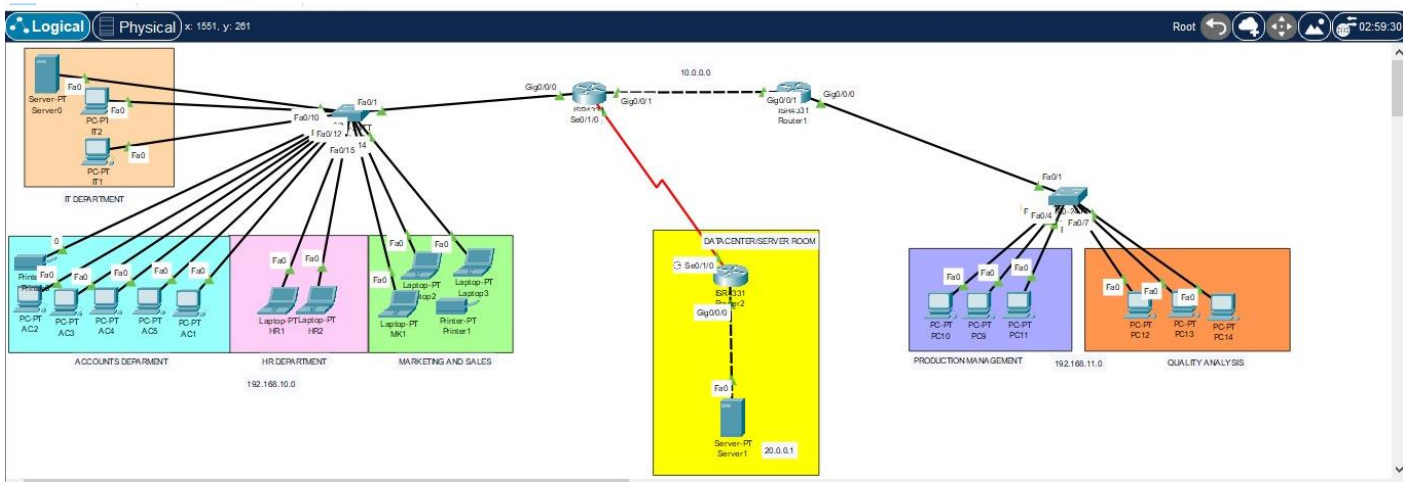
Here are some key features and aspects of PAT:
IP Address Conservation: PAT helps conserve public IP addresses by allowing multiple devices on a private network to share a single public IP address. This is particularly useful when there are more devices in the private network than available public IP addresses.

Port Number Mapping: PAT maps each private IP address to a unique port number on the public IP address. When a device from the private network sends data to the internet, the source IP address is replaced with the public IP address, and the source port number is replaced with a unique port number allocated by the PAT device.

IP ADDRESS IMPLEMENTATION :



NETWORK DESIGN



Summary

The outcome of the proposed system will be a fail-safe backbone network infrastructure which meets the requirements for readily available access to information and security of the private network, and also ensures optimized productivity when telecommunication services are accessed. The installed equipment allowed to organize high-speed wired and wireless Internet access throughout the whole complex of food enterprise buildings as well as providing transfer of all types of data throughout the single optimized network.

References

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