Air University Aerospace & Aviation Campus Kamra

Department of Computer Sciences

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Course: Computer Networks

Simple Company Networking

Network Architecture:

Main Router:

Network Address: 192.168.1.0

Gigabit Ethernet 0/0:

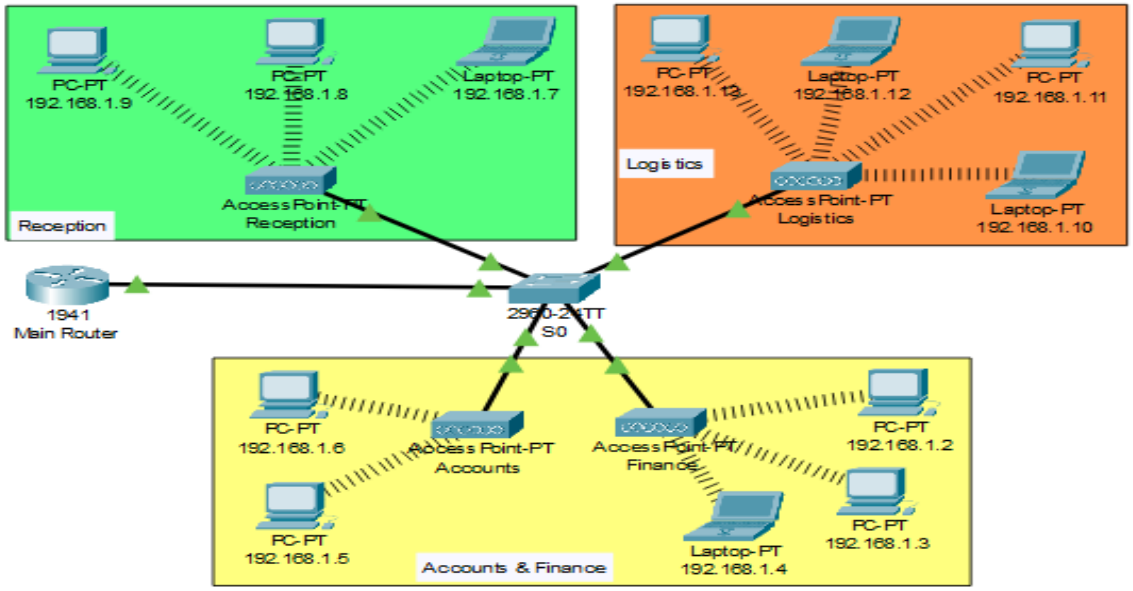
IP Address: 192.168.1.0

Subnet Mask: 255.255.255.0

Serial 0/1/0:

IP Address: 11.0.0.2

Subnet Mask: 255.255.255.0



Reception:

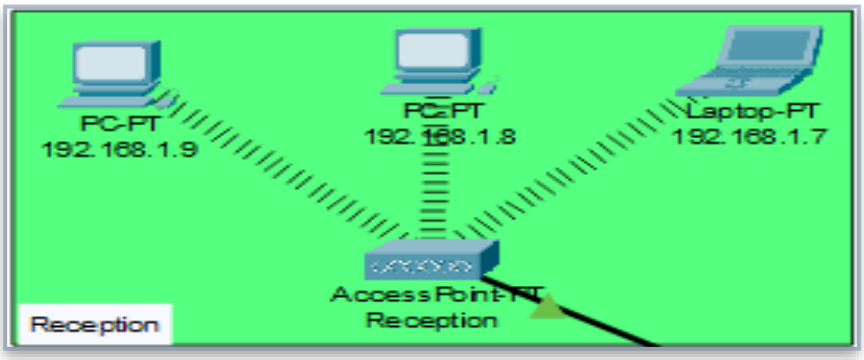
IP Addresses:

Laptop- 192.168.1.7

PC- 192.168.1.8

PC- 192.168.1.9

Subnet Mask- 255.255.255.0



Logistics:

IP Addresses:

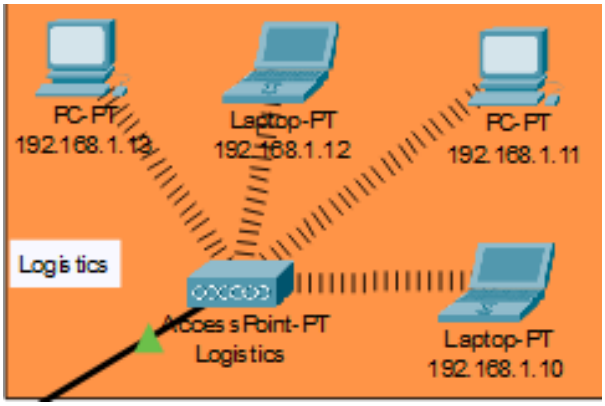
Laptop- 192.168.1.10

Laptop- 192.168.1.12

PC- 192.168.1.11

PC- 192.168.1.13

Subnet Mask- 255.255.255.0



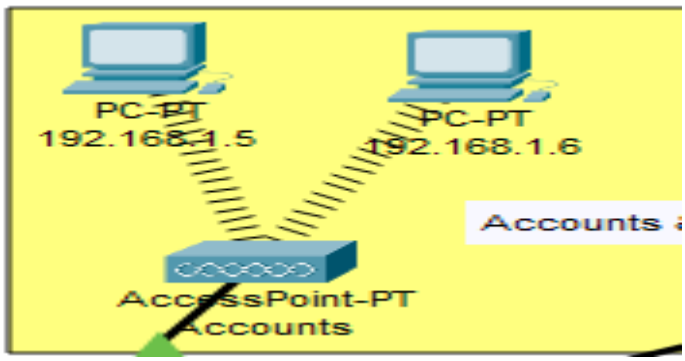
Accounts:

IP Addresses:

PC- 192.168.1.5

PC- 192.168.1.6

Subnet Mask- 255.255.255.0



Finance:

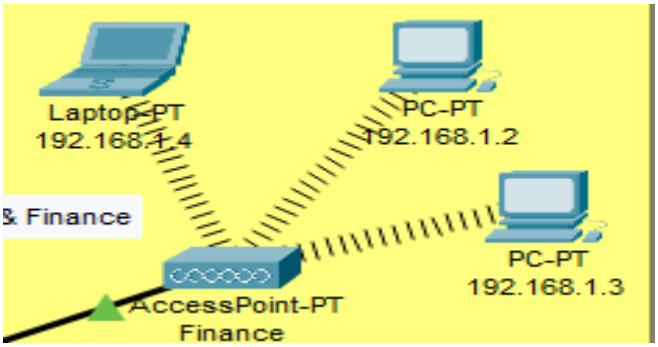
IP Addresses:

PC- 192.168.1.2

PC- 192.168.1.3

Laptop- 192.168.1.4

Subnet Mask- 255.255.255.0



Wireless Access Points:

SSID	Password
1) Reception	1234567890
2) Logistics	1234567890
3) Accounts	1234567890
4) Finance	1234567890

Securing the network:

Password is used in accessing the router.

Main Router:

Console Password: abdul123@

SSH (Secret Password): admin

Routing Analysis:

- Analyze the advantages and disadvantages of using static routing.

Advantages of Static Routing:

1) **Simplicity:**
   Static routing is straightforward and easy to configure. It's a simple and direct way to specify how traffic should flow.
2) **Predictability:**
   Since routes are manually configured, network administrators have full control and predictability over the routing table. This can simplify troubleshooting.
3) **Resource Efficiency:**
   Static routes use fewer network resources compared to dynamic routing protocols as they don't involve continuous communication or exchange of routing information.
4) **Security:**
   Static routes can enhance security by reducing the attack surface. There is no risk of malicious routing information being injected into the network.

Disadvantages of Static Routing:

1) **Scalability:**
   Static routing becomes cumbersome in large networks, as each route must be configured manually. It's not practical for environments that frequently change.
2) **Maintenance Overhead:**
   Ongoing maintenance becomes challenging, especially in dynamic environments where network changes are frequent. Any modification requires manual updates to the routing table.
3) **Lack of Adaptability:**
   Static routes do not adapt to changes in the network. If a link or router fails, manual intervention is needed to update routes.

Static Routing vs. Dynamic Routing Protocols:

- Compare and contrast static routing with dynamic routing protocols.

  Static Routing Protocols:

  - **Configuration:** Routes are manually configured by the network administrator.
  - **Scalability:** Less scalable in large and dynamic networks.
  - **Adaptability:** Lacks adaptability to network changes.
  - **Overhead:** Lower overhead as it doesn't involve continuous updates.

  Dynamic Routing Protocols:

  - **Configuration:** Routes are dynamically learned and updated by routers using routing protocols.
  - **Scalability**: More scalable, suitable for larger and dynamic networks.
  - **Adaptability**: Adapts to network changes automatically.
  - **Overhead**: Higher overhead due to continuous exchange of routing information.

- Explain the concept and use of a default route. Include an example scenario.

Concept and Use of Default Route:

A default route, often represented as 0.0.0.0/0, is a route that matches all packets and is used when there is no specific match in the routing table. It acts as a catch-all for traffic that doesn't match any other route.

Example Scenario:

Imagine a network with multiple internal subnets and a single connection to the internet. Instead of manually specifying a route for every possible destination on the internet, a default route can be used.

ip route 0.0.0.0 0.0.0.0 <next-hop or exit interface>

In this example, all traffic not matching a specific internal route will follow the default route, directing it to the next-hop or exit interface that leads to the internet. This simplifies the routing table and is especially useful in scenarios where a concise route is sufficient for outbound traffic.