Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Laboratory Report

CSE 4412: Data Communication and Networking Lab

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Title: Router Configuration and using static routing to connect multiple LANs in CISCO Packet Tracer.

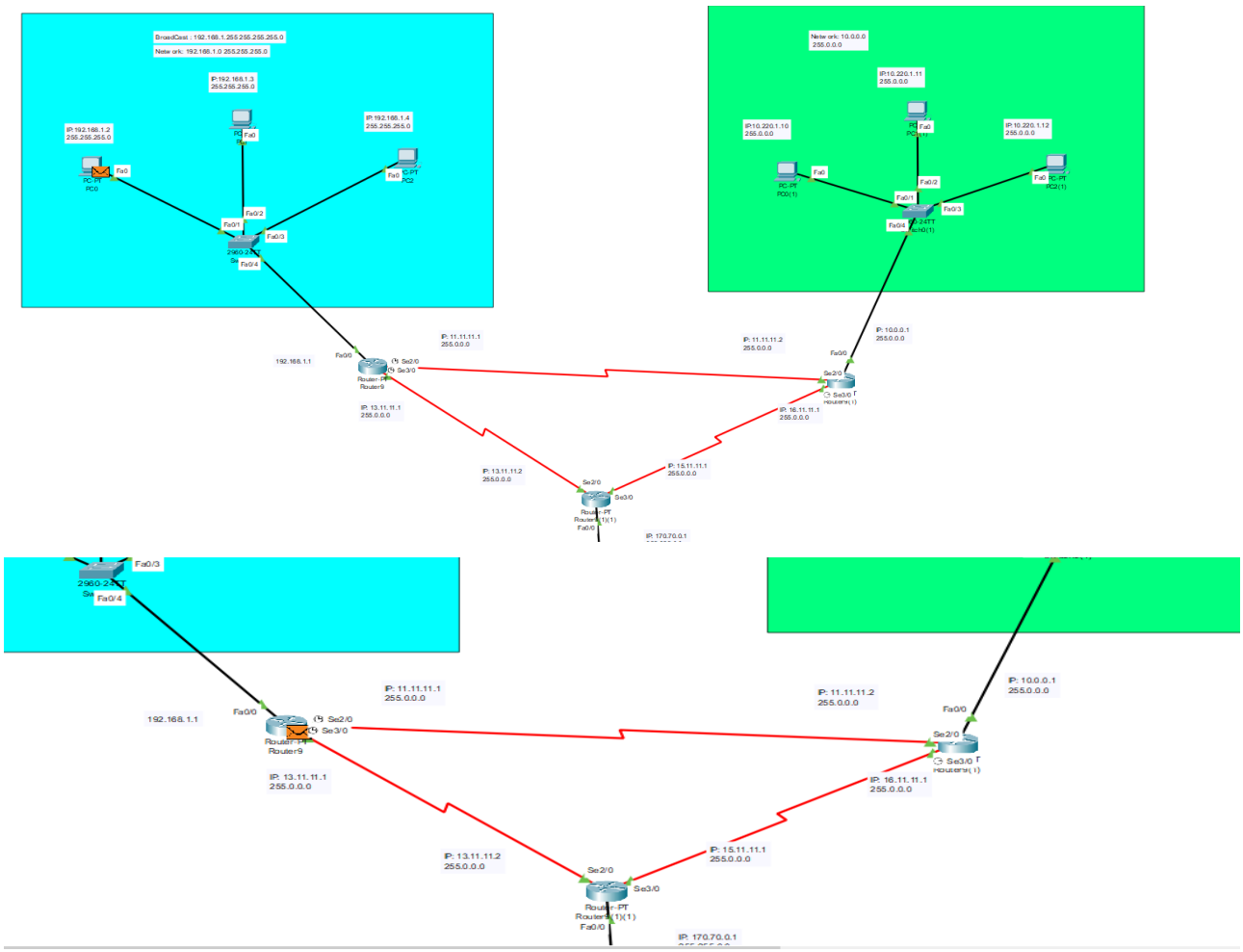
Objective:

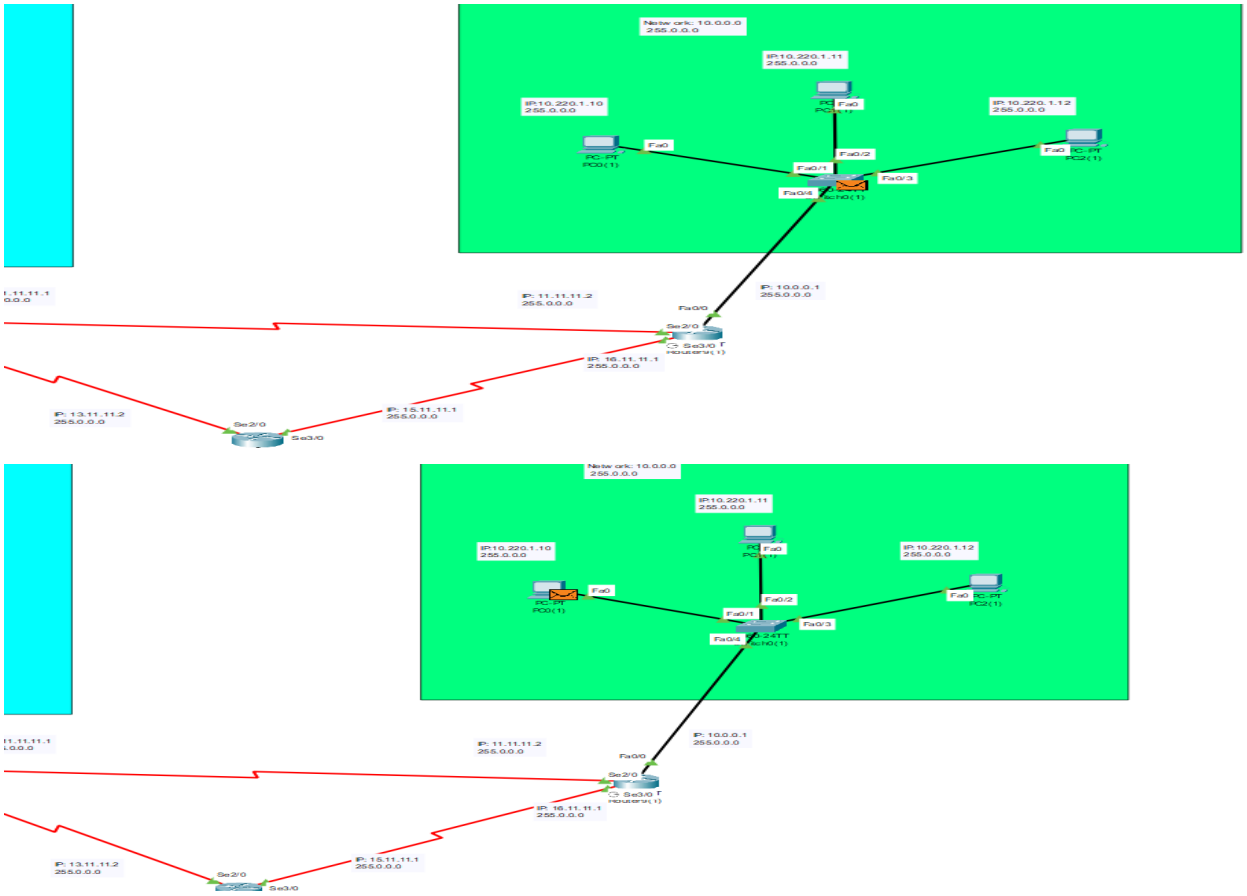
1. Understand Default Gateway
2. Difference between Switch and Router.
3. Router to Router Wiring [Using DCE and DTE Cables]
4. Static Routing Configuration
5. Default Route

Devices/ software Used:

1. Cisco Packet Tracer

Diagram of the experiment:





Theory:

Default Gateway: (If it is not set what may happen?)
Default gateway is a network address that will connect one local network to another when it is set. It serves as the first hop for a packet that is destined for another network. If the default gateway is not set, a packet will be dropped before reaching the connected router.

Difference between Switch and Router:
Both are network devices that act as connecting devices for the network. However, a switch is responsible for communication within a local network where a router sets up communication between multiple networks including the internet.

Router-to-Router Wiring [Using DCE and DTE Cables]:
We use DCE and DTE cables for router-to-router wiring. Connections between routers are done using serial cables which can be of DCE and DTE type. To add serial ports to a router in cisco packet tracer, we might need to add NM-2T serial port to router. To set up the connection, the serial interface on one router is set as DCE while on the other router

we have to set the serial interface as DTE. We also have to set the clock rate for the DCE interface.

Static Route:
Static route is a defined path that a packet will take to reach one network from another without using a routing algorithm. If a network administrator wants to make sure that a packet takes a specific route to reach another network, the static route is defined.

Default Route:
If no matching route is found for forwarding a packet, a packet will use the default route to reach the destination defined by the default route.

Configuration of Routers:

The port we use to connect one router to a network or another router is called an interface. In order to configure routers given in the assignment, we need to take the following steps:

1. Set the default gateway of networks as the IP address of the router. The connected interfaces here are FastEthernet 0/0. So, the Ip address of FastEthernet 0/0 is set to the address corresponding to the default gateway.
2. Go to each router to configure based on the commands. For Router9, set IP address of serial 2/0 to 11.11.11.1, and serial 3/0 to 13.11.11.1. For Router9(1), set IP address of serial 2/0 to 11.11.11.2, and serial 3/0 to 15.11.11.2. For Router9(1){1), set IP address of serial 2/0 to 13.11.11.2, and serial 3/0 to 15.11.11.1. (We need to make sure that connected serial ports belong to the same network).
3. Now, write no shutdown on each router to start the routers.
4. Then, to set static route, we need to set path for each router to reach one network from other. To do this, we need to write using this format: *IP route network address subnet mask serial port of router corresponding to that network address*.
    a. For router 9, write *ip route 10.0.0.0 255.0.0.0 11.11.11.2* for route to 10.0.0.0 network and write *ip route 170.70.0.0 255.255.0.0 13.11.11.2* for route to 170.70.0.0 network.
    b. For router 9 (1), write *ip route 192.168.0.0 255.255.255.0 11.11.11.1* for route to 192.168.0.0 network and write *ip route 170.70.0.0 255.255.0.0 15.11.11.1* for route to 170.70.0.0 network.
    c. For router 9 (1)(1), write *ip route 192.168.0.0 255.255.255.0 13.11.11.1* for route to 192.168.0.0 network and write *ip route 10.0.0.0 255.0.0.0 15.11.11.2* for route to 10.0.0.0 network.
5. To save the configuration write copy running-config startup-config on privilege mode.

Observation:

According to the diagrams of the experiment given, a packet is sent from 192.168.1.2 to 10.220.1.10 PC. Before MAC address is known, the packet gets dropped. After MAC address of destination device is known the packet is resent and we can observe that the packet reaches the switch first then it reaches the Router 9. With the help of the path defined in static route, it is sent to Router9(1). Then the packet is sent to the switch of the network 10.0.0.0. Afterwards, the packet reaches its destination PC.

Challenges:

- Firstly, we need to make sure that connecting ports belong to the same network. Otherwise, packet will be dropped.
- Secondly, if the packet is dropped at first even when configuration seems to be correct, it is not because of any issues rather it is because MAC address for destination is not yet set on the ARP table.