



Department of Computer Science and Engineering
Islamic University of Technology (IUT)
A subsidiary organ of OIC

Laboratory Report

CSE 4412 : Data Communication and Networking Lab

Name: A Z Hasnain Kabir

Student ID: 200042102

Section: 1B

Semester: Summer

Academic Year: 2021-2022

Date of Submission: 7-3-2023

Title: Configuration of RIP in a network topology.

Objective:

1. Understand distance vector routing
2. Understand RIP
3. Understand the necessity of dynamic routing

Devices/ software Used:

1. Cisco Packet Tracer

Theory:

Distance Vector (DV) Routing

Distance Vector Routing (DVR) is a routing algorithm to determine the best path for data packets to travel from one node to another. Each node has a table of the distances to all other nodes and updates its table periodically based on the information provided by neighboring nodes. Routing information protocol (RIP) is one type of implementation of Distance Vector Routing.

Count to Infinity problem in DV routing

When a node in the network becomes unreachable, other nodes receive incorrect information about the state of the network. Since every node has a routing table which gets periodically updated, an unreachable node will send incorrect information indicating that the distance to the node has increased. However, if there is a cycle present in the network, neighboring nodes may continue to forward packets to nodes that are unreachable and consequently cause the distance to the unreachable nodes to keep increasing. This is count to infinity problem.

Two node Loop problem in DV routing

When two nodes in a network loses the link between them temporarily, each node will update its routing table with the increased distance to the other node. Afterwards, when the

nodes come back online, each node will have increased distance in routing table and packets will continue to be routed through other paths.

Split Horizon (one solution to instability)

Split Horizon is a mechanism used to prevent loops in Routing information protocol algorithm. The general idea here is to never send routing information back to the same direction from which the information was received. Through this, packets are prevented from being forwarded in between two nodes in a loop. As a result, packets are forwarded only along shortest path between nodes.

Poison Reverse

As the name suggests, position reverse is an event where roles of transmitter and receiver gets switched or reversed in wireless communication. It is necessary in certain types of wireless communication systems where devices may have to take different roles based on network topology.

Routing Information Protocol (RIP)

RIP is in simple terms, an algorithm to define shortest path for data packets to travel from one network to another network. It operates through the exchange of information between neighboring routers. Each of the routers has a table of known routes and keeps updating that table periodically based on the routing information received from other routers. Those tables contain information about distance to every destination network along with the next hop router along the path to that network. There are two versions of RIP namely, RIP version 1 and RIP version 2. RIP Version 2 will be used in this lab task.

Diagram of the experiment:

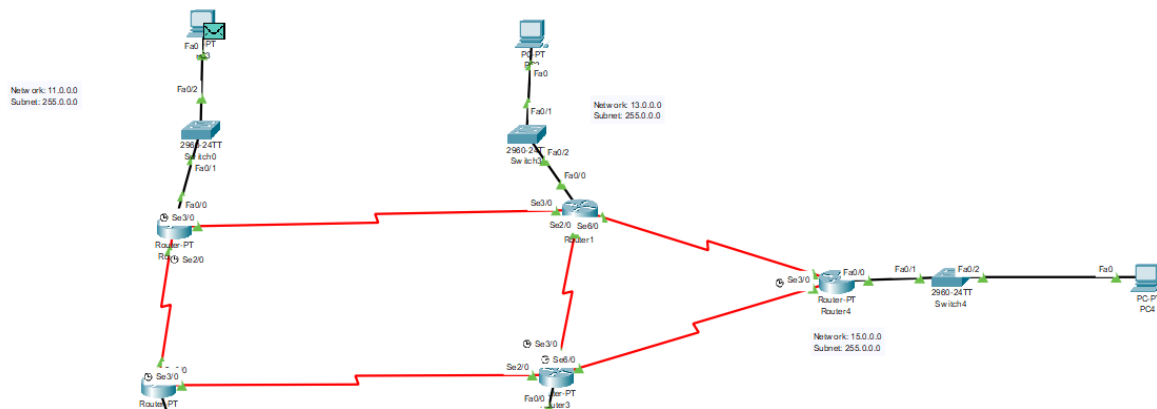


Fig: Start of sending packet to 14.0.0.1

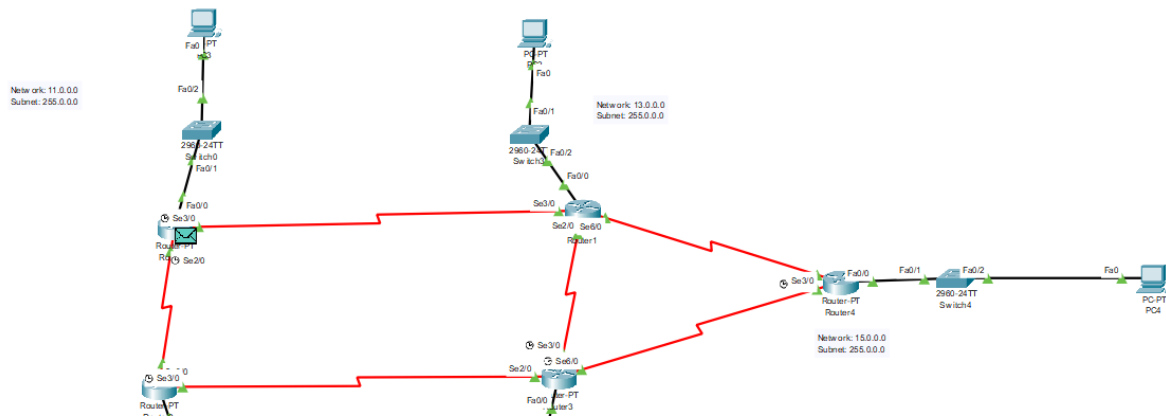


Fig: Packet reaching router through default gateway

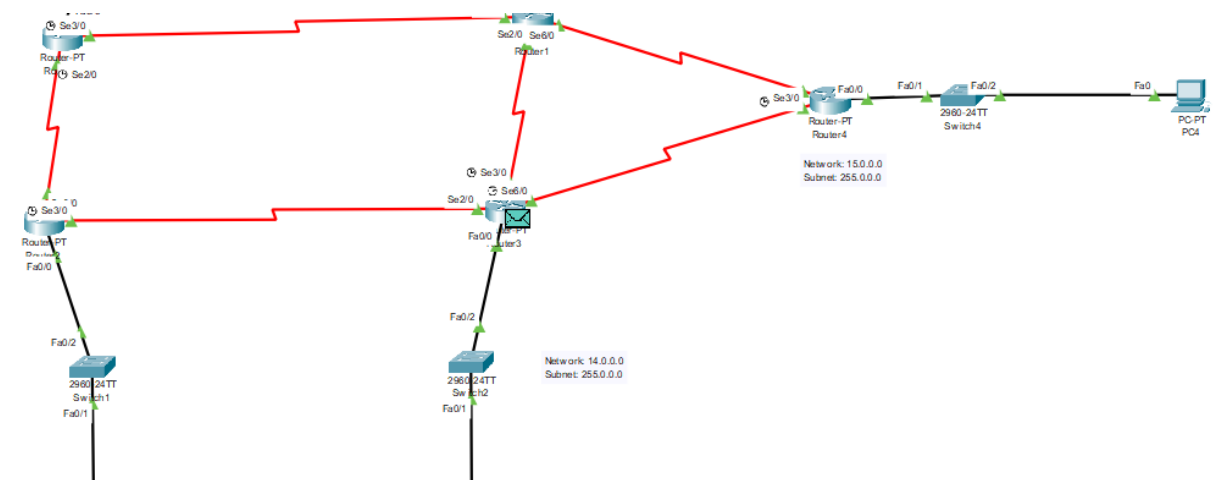


Fig: Packet finding route through RIP

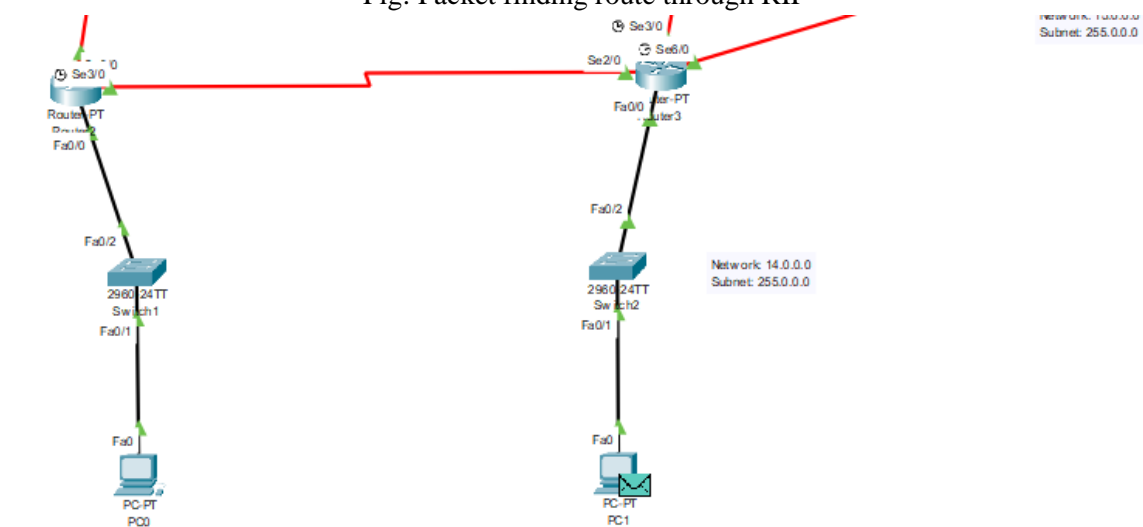


Fig: Packet reaching destination IP address

Configuration of Routers:

At first, it is my job to configure each PC. With that being said, we need to set IP address of each PC to the corresponding network address. We also need to set the default gateway of each PC which will also be set as the FastEthernet IP address of router corresponding to that PC. This connects every PC to its network router. Then we configure each serial port of every router according to procedure of lab 5. Once every serial port is configured, we start the configuration of RIP.

Commands for configuring RIP

Router#configure terminal

Router(config)#router rip

Router(config-router)# version 2

Router(config-router)# network <network-address>

Using these commands we set RIP table of each router. We add network address of every network as well as address of each serial port of all routers.

Observation:

After setting up the RIP routing algorithm if Serial port Se3/0 of Router 4 is switched off then what are the changes occurred in Routing information of the routers.

Router4 and Router3 are connected through serial port 3 of Router 4 and serial port 6 of Router

3. If the Serial3/0 of Router 4 is switched off, then the packet sent from PC1 goes to PC4 through router3 then Router1 then Router4 path through Serial2/0 of Router 4.

Challenges:

I needed to press fast forward many times for tables to be set in each router otherwise packets were not being sent to destination. It was pretty hard to identify serial ports of connecting routers accurately. I had to move routers from one place to another in order to check.