SRM INSTITUTE OF SCIENCE & TECHNOLOGY
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DELHI-NCR CAMPUS, GHAZIABAD (U.P.)

COMPUTER COMMUNICATIONS LAB

(Subject Code: 18CSS202J)

B.TECH. (CoMpUTEr sCiENCE ANd ENGiNEEriNG) - i

ii YEAr / iV sEMEsTEr

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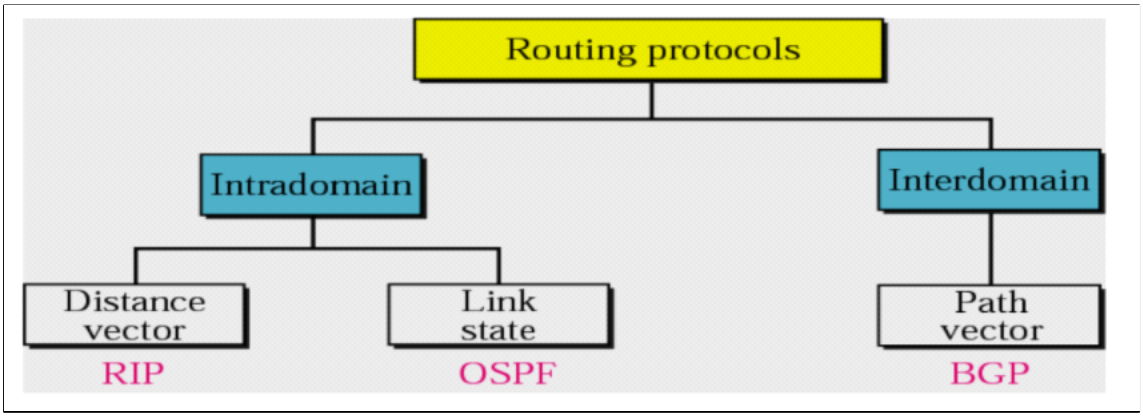
Experiment-5 Create a network for data transfer through Routing Information Protocol (RIP).

Theory:



DISTANCE VECTOR ROUTING

- In this type of routing a router can normally be represented by a node and a network by a link connecting two nodes
- This method sees an AS, with all routers and networks, as a graph, a set of nodes and lines (edges) connecting the nodes.
- The graph theory used an algorithm called **Bellman-Ford** (also called Ford-Fulkerson) for a while to find the shortest path between nodes in a graph given the distance between nodes

LINK STATE ROUTING

Link state routing has a different philosophy from that of distance vector routing. In link state routing, if each node in the domain has the entire topology of the domain— the list of nodes and links, how they are connected including the type, cost (metric), and the condition of the links (up or down)—the node can use the **Dijkstra algorithm** to build a routing table.

RIP:

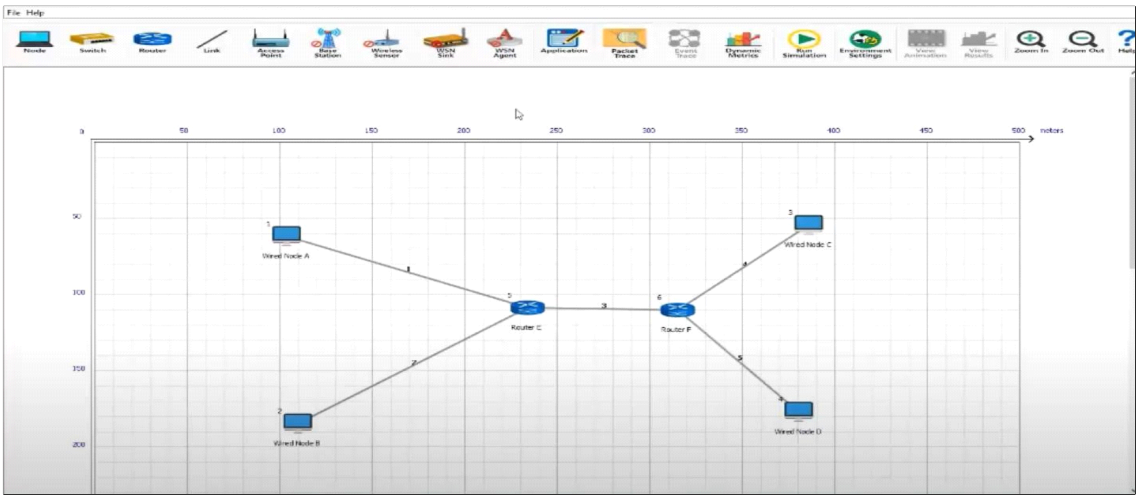
RIP is intended to allow hosts and gateways to exchange information for computing routes through an IP-based network. RIP is a distance vector protocol which is based on Bellman Ford algorithm. This algorithm has been used for routing computation in the network. Distance vector algorithms are based on the exchange of only a small amount of information using RIP messages.

Each entity (router or host) that participates in the routing protocol is assumed to keep information about all of the destinations within the system. Generally, information about all entities connected to one network is summarized by a single entry, which describes the route to all destinations on that

network. This summarization is possible because as far as IP is concerned, routing within a network is invisible. Each entry in this routing database includes the next router to which datagram's destined for the entity should be sent. In addition, it includes a "metric" measuring the total distance to the entity. Distance is a somewhat generalized concept, which may cover the time delay in getting messages to the entity, the dollar cost of sending messages to it, etc. Distance vector algorithms get their name from the fact that it is possible to compute optimal routes when the only information exchanged is the list of these distances. Furthermore, information is only exchanged among entities that are adjacent, that is, entities that share a common network. **Procedure**

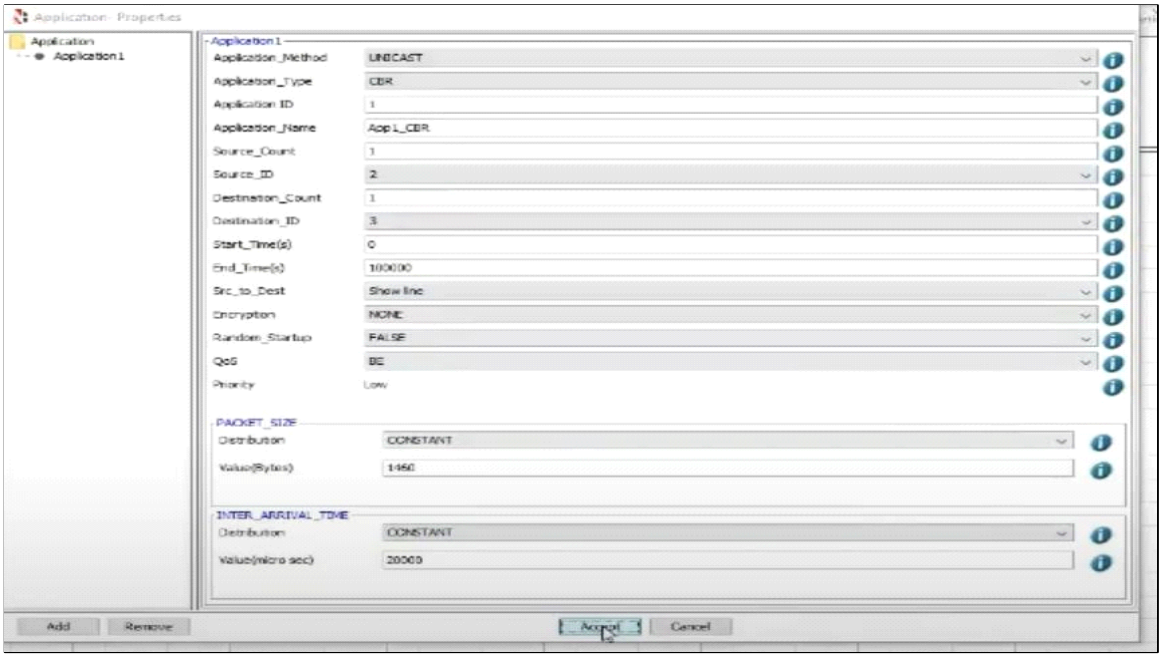
Sample 1:

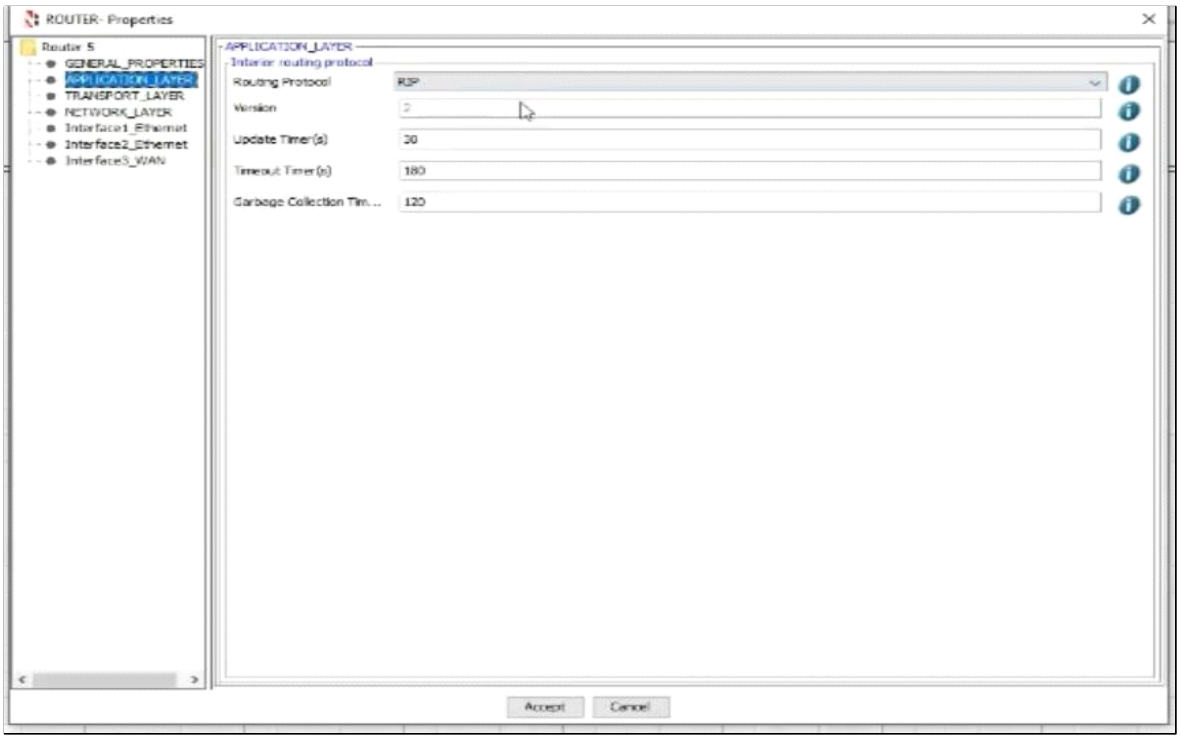
Step 1: Go to, New Internetworks
Step2: Click & drop Routers, Switches and Nodes onto the Simulation Environment and link them as shown:



Step 3:

These properties can be set only after devices are linked to each other as shown above.





Node Properties: In Wired Node J, go to Transport Layer and set TCP as Disable

Switch Properties: Accept default properties for Switch.

Link Properties:

SimulationTime-100Sec. After Simulation is performed, save the experiment.

Application Properties: Click and drop Application icon and set properties as in Sample 1. **Simulation Time- 100 Sec**

Output and Inference:

RIP

In Distance vector routing, each router periodically shares its knowledge about the entire network with its neighbors. The three keys for understanding the algorithm:

1. **Knowledge about the whole network**

Router sends all of its collected knowledge about the network to its neighbors

2. **Routing only to neighbors**

Each router periodically sends its knowledge about the network only to those routers to which it has direct links. It sends whatever knowledge it has about the whole network through all of its ports. This information is received and kept by each neighboring router and used to update that router's own information about the network.

3. **Information sharing at regular intervals**

For example, every 30 seconds, each router sends its information about the whole network to its neighbors.

This sharing occurs whether or not the network has changed since the last time information was exchanged

In NetSim the Routing table Formation has 3 stages

Initial Table: This table will show the direct connections made by each Router.

Intermediate Table: The Intermediate table will have the updates of the

Network in every 30 seconds

Final Table: This table is formed when there is no update in the Network.

The data should be forwarded using Routing Table with the shortest distance.

The RIP table in NetSim

- After running Sample1, click IP Forwarding table in Simulation Analysis screen. Then click the respective router to view the Routing table.

- We have shown the routing table for Router A and G which take part in routing the packets from source to destination.
- The destination node has the IP address 11.9.1.2 and belongs to the network 11.9.0.0 • From the IP Forwarding table of Router A, it is evident that all packets destined to the network 11.9.0.0 are forwarded to the Router G with interface IP

11.7.1.1

- From the IP Forwarding table of Router G it is evident that all packets destined to the network 11.9.0.0 are forwarded to the Router F with interface IP

11.8.1.1

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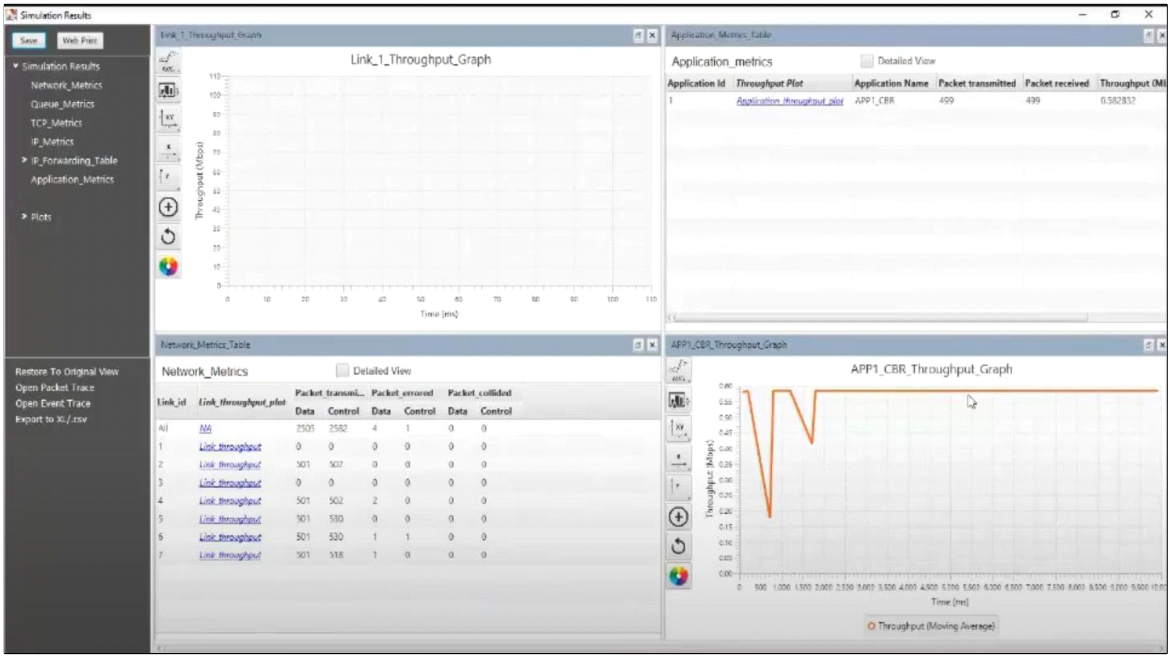
- Shortest Path from Wired Node H to Wired Node I in RIP (Use Packet

Animation to view) is **Wired Node J->L2 Switch H->Router A->Router G>Router F->L2 Switch I->Wired Node K.** RIP chooses the lower path (number of hops is less) to forward packets from source to destination since it is based on hop count.

Simulation Results:-



Result: Network created and the data transferred through Routing Information Protocol (RIP) .