Neighbor Node Discovery using OSPF Algorithm

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Abstract— the nodes in the network act as router. The router forwards data packets from one node to another. A router is connected to at least two networks, commonly two LANs or WANs. Routers are located at gateways, the places where two or more networks connect. When a data packet comes in one of the lines, the router reads the address information in the packet to determine its ultimate destination. Routers perform the “traffic directing” functions on the internet. A data packet is typically forwarded from one router to another through the networks until it reaches its destination node. The packet sending from one node to another is based on the shortest path. The link cost determines the shortest path between nodes. Packet capturing (or packet sniffing) is the process of collecting all packets of data that pass through a given network interface. Capturing network packets in our applications is a powerful capability which lets us write network monitoring, packet analyzer and security tools.

Key words: Routing, C#.NET, OSPF, Route Discovery, Network Topology

I. INTRODUCTION

The nodes in the network acts as routers, which transmits data packets from one neighbouring node to another. We focus on monitoring network performance, packet tracker, route cost, and packet loss detection. In this project we are designing the network model which is used to find the shortest path among the nodes and maintain the routing table. The source node sends the packets to destination node by finding the shortest path among them. During packets transmission, every intermediate node in the discovery route creates routing table to store the information regarding neighbor node and the destination node information. The routing table information updated for every packet transmission during the message transmission. Neighbour node discovery problem is nothing but detecting the mobile nodes within one node’s communication range. The location information of nodes over time has to be updated accordingly. Also multiple numbers of nodes should not be allowed to access the same destination at the same time there by avoiding packet loss and errors.

The routing protocols for ad hoc wireless network should be capable to handle a very large number of hosts with limited resources, such as bandwidth and energy. The main challenge for the routing protocol is that they must also deal with host mobility, meaning that hosts can appear and disappear in various locations. Thus, all hosts of the ad hoc network act as routers and must participate in the route discovery and maintenance of the routers to the other hosts. To monitor the network performance which include packet capture, packet loss, bandwidth detection, and analysis of various protocol which are used in the network. The nodes are connected with each other via link and they transfer the packets from node to node using the different bandwidth of the link.

II. RELATED WORK

In Reactive Routing Protocol Reactive routing protocol is an on-demand routing protocol for mobile ad-hoc networks, which uses routing tables to store routing information. The protocol comprises of three main functions like route discovery, route establishment and route maintenance. Reactive routing protocols, such as the AODV nodes have four types of message to communicate between each other. These are Route Request, Route Reply, Route Error and Hello messages with a key feature that doesn’t require any distribution routing information and then, keep the routing information about the failure links. Reactive routing protocol, consists of three steps to find the optimal path. Initially, calculate the shortest path to the source node and created reverse route table. Then, filtered these paths to obtain optimal path for communication in the mobile adhoc network by calculating distance to the destination node. Then in the third step, a comparative analysis conducted in between three different protocols in terms of packet delivery ratio, routing overhead, throughput and average end to end delay, by using NS2 simulator.

A. Open Shortest Path First:

Open Shortest Path First is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing algorithm which is currently in development process. It gathers link state information from available routers and constructs a topology map of the network. OSPF detects changes in the topology, such as link failures. It computes the shortest path tree for each route using a method based on Dijkstra’s algorithm, a shortest path first algorithm. The OSPF routing policies for constructing a route table are governed by link cost factors (external metrics) associated with each routing interface. Cost factors may be the distance of a router (round-trip time), data throughput of a link, or link availability and reliability, expressed as simple unless numbers. This provides a dynamic process of traffic load balancing between routers of equal cost. As a link state routing protocol, OSPF establishes and maintains neighbor relationships for exchanging routing updates with other routers. The neighbor relationship table is called an adjacency database. An OSPF router forms neighbor relationship only with the routers directly connected to it.

III. PROPOSED ALGORITHM

A. Design Considerations:

- Make network topology
- Select Source Node
- Select Destination Node
- The shortest path from source node to destination node will be displayed
- Forward Packet from source to destination node

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It shows the simulation and displayed the packet information in textbox.

B. Description of the Proposed Algorithm:
Aim of the proposed algorithm is to make network topology and send the packets. It calculates the time required to send the packet from source to destination.

IV. RESEARCH METHODOLOGY
1) Step 1: Find the possible routes.
2) Step 2: From source node to destination node find the shortest path.
3) Step 3: Check condition for each route till no route is available to transmit the packet.
   If route is available then forward the packet
   Else
   Message will displayed “No Path Exists”
4) Step 4: Check condition for node failure
   If node is fail
   Find the another route
   Else
   Forward the packet
5) Step 5: End

V. EXPERIMENTAL RESULT
The experimental results show the small network topology with 5 nodes as shown in fig1. The proposed algorithm is implemented in C#.NET. First select the source node and destination node as shown in fig2 and fig3. Our experimental result shows the shortest path as shown in fig4.

VI. CONCLUSION
The C#.Net performs the simulation and results showed that the proposed algorithm forward the packet from source node to destination node via using shortest path algorithm. The shortest path is based on the bandwidth of the link. Those link have maximum bandwidth that link will be considered as route. I have used very small network of 5 nodes, as
number of nodes increases the complexity will increase. Increase the number of nodes and analyze the performance. This project work may be extended for wireless sensor network to find the optimal path from source to destination. As the application is developed using C#.Net so that it can be easily deploy to the other computers. This project can be constructed in WPF (windows presentation foundation). WPF provides the interactive GUI.

REFERENCES


