



# QUALITY COMPARISON OF MULTIPLE ROUTING PROTOCOLS OVER WIRELESS AD HOC NETWORK

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*Abstract* : The complete use of hop by hop adaptive link state optimal routing scheme is to expertise as unique routing scheme which is highly known as a perfect routing technique. The back dated work mostly improved the wireless sensor routing techniques but among all there is no effective research on the quality of service techniques within wireless sensor network as well as for the multiple destination routing including the less to less traffic network. The improvement on routing techniques within quality of service and multiple destination packet routing going to be survey in this paper. The complete use of this node to node approach as per different researchers is to be noticed within this. The use of wireless sensor network is mostly used in the computer network i.e. destination detection and tracking of the network in the ad hoc compatibility network. The industrial process monitoring as well as environmental monitoring and the tactical systems are also included in this research. Among all this the incomplete power source also makes issues in the wireless sensor network that's why the energy efficient system is to be widely needed within that system. This is the most important factor of the wireless sensor network of the nodes. In MAC as well as the TCP/IP network layer model the energy conservation plays most important role within the different layers and it is the most effective part of this system. The network traffic is also the most important issue within the wireless sensor network. The packet sending and the receiving of the delivery acknowledgement is the cause of node traffic. That's why there is a need to manage the network traffic load within the network traffic system. We have to find out the shortest path by considering the bandwidth, network delay, hop count, path cost, load within nodes, energy efficiency, reliability and the communication time.

**Index Terms** - Wireless Ad hoc Network, Link State Routing, Energy Efficiency, Load Balancing, Traffic aware routing

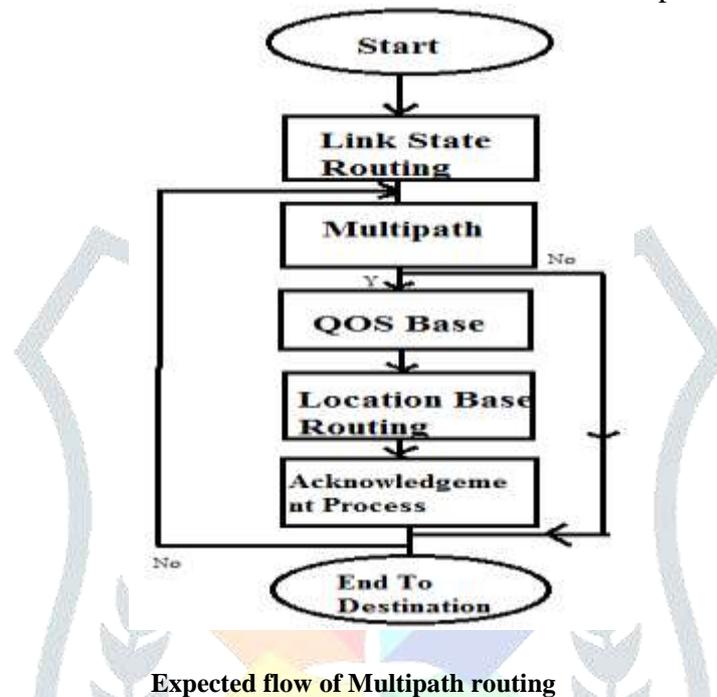
## I. INTRODUCTION

In current world there is a need of high speed application to run on multiple platforms which need to be more flexible and feasible in nature. Mainly in the wireless Ad hoc network there is a mixture of multiple variety protocols and standards where as there are many more limitations within hardware and the software. As per this the packet routing plays most important role in the technique point of view that's why there is a need to focus on the optimality with the quality of service as per transmission. Also we want to focus on the multipath destination routing techniques with the less traffic consumption. To find out the most efficient route with less traffic as well as the energy efficient routing by using the packet switching methodology is mainly the optimal routing. The packet sending cost is minimizes by using this techniques. This research particularly starts since 1970 including ARPANET, which is next of the internet. Since today we discover

multiple routing techniques but as per today's world the requirement of high speed routing technique is quite more that's why by using this comparison we want to find out the optimal routing technique to achieve cost effective route, less traffic and energy efficient routing within hop by hop wireless adhoc network by using multiple routing techniques.

## II. ROUTING PROTOCOL

Multipath routing is a favourable routing scheme to fit in with these requirements by using multiple pairs of routes in between the source and the destination. Multipath routing is the routing technique of using multiple substitute paths through a network, which can sanction a variety of benefits such as increased bandwidth, or improved security. The multiple paths computed might be overlapped, edge disjointed or node disjointed with each other. Substantial research will be done on multipath routing techniques.



### A) ADAPTIVE LINK STATE OPTIMAL ROUTING

In this paper the link state routing algorithm including forwarding packets to hop by hop manner is mentioned which is mainly used to reduce the traffic of the network. In this system the adaptive algorithm does not require the network demand matrix. The main motto of this paper is to reduce the tradeoff between optimality and the routing and balance the load as well as network management and optimal routing. This system carried out multiple challenges most of them were overcome by the authors. Within this the some of terms we are discuss here such as

**Hop-by-hop:-** In this each node from the router get the information about the about each and every node.

**Adaptive:-** Through this algorithm there is no need of network demand traffic. The link weights counts and calculates automatically as well as the change in network is also updated automatically. The change in topology and the traffic situation counted as its own.

**Link State:-** In this system the node get link information without matrix and select the route as its own automatically, Which will takes too much less time to selection of route. It will select root effectively without consuming much more time.

**Optimal:-** This system is mainly used to reduce the delay over the network that's why the cost also minimizes as its own. It will select the route most effectively which is important to manage it by traffic engineering

This system is better as compare to OSPF, Gallager's algorithm, Projected gradient and PEFT system.

### B) OPTIMAL AND SUBOPTIMAL ROUTING

In this paper the most popular random dynamic wideband Ad hoc network is considered. The Orthogonal frequency division multiple access is used for signal transfer and the single antenna is used

here. The routing matrix maximization which is depending on its neighbor node is the main task in this system. The weight of nearest neighbor is encounter first and then remaining nodes also as nearest neighbor will consider. As per its probability the final route is to be considered and finalized it. Some of the routing techniques are as follows

**Statically Optimal Routing:-** In this the wide band region is considered and this is manage through the optimal routing function[2]. It is quite important because it is mainly used here for maximization of the wideband region. The routing functions are used to achieve the optimal routing.

**Narrow Knowledge Statically Optimal Routing:-** This system is mainly used to reduction of the complexity computation. Evaluation of the routing matrix within node and probe transmitter is only using the distance within this so this system is known as narrow knowledge. The identical distribution is there for every node as per matrix.

**Narrow Knowledge Bound Optimal Routing:-** This system also used to reduce the complexity within suboptimal route scheme[2]. The distance is the main key of this system and this distance is considered as without any expectation and previous consideration. It is not too easy to reduce the complexity but the lookup table made this possible.

From all this schemes the every routing terms are to be considered decentral manner. The computational complexity is reduced using the lookup table. The performance of nearest neighbor is almost attached to the narrow knowledge routing performance.

### C) ENERGY EFFICIENT LOAD BALANCED CLUSTERING

An efficient technique for scalability and time period of wireless ad hoc network is clustering. This paper is mainly focus on energy efficiency and load balancing cluster algorithm. This clustering algorithm is mean heap base algorithm. The execution time is less in this system within network period. This system is used in the high speed broadband wireless technology as well as low power radio frequency. It is a combination of more number of mini sensor nodes. It is deployed manually within that coverage area. It tracks the location via Global positioning system. The design of this system is highly manage the low power consumption model.

This system solves the both problems within wireless ad hoc network these are energy efficiency and load balancing. The range of communication totally depends between less energy consume gateway and the sensor node. The restricted node and open node are the both sensor node used in it. The restricted node is one of the node which allows to communicate with only one gateway whereas the open node is one of node which allows to communicate with multiple gateways. Within the multiple iterations the every iteration assigns the sensor node as a cluster head that's why the load is distributed over that multiple cluster heads which balance the load and manage the energy consumption. Because the energy consumption is mainly depends on the distance between the one and another next nodes. That's why this system leads to make energy efficiency and load balancing achievement.

### D) THROUGHPUT OPTIMAL ROUTING

The movement and shifting of network traffic towards different nodes within network which forms the path diversity and it achieve the maximum throughput. The shifting of traffic is to be done using routers for specific nodes but remaining others cannot diverted or shifted and distributed i.e. all nodes are not distributed in this overlay network. The dynamic routing can be achieved in this system. This overall network can be work as a queue. Maximum nodes are quite stable but few of these need to be check. Stable nodes are normally restricted and others are unrestricted. This overlay system is simply work on the unrestricted nodes of the network. The shortest path routing is used to find out the route within the network. Maximum the single way path is used in this but for fast forwarding of the data the multipath routing is much needed. For extending the throughput multipath routing is must because the multiple paths are used to travel the data.

Within Ad hoc network the network formulations change time to time that's why the dynamic adaption of route is necessary in this system. This can be choose or change the route as its own in online mode. This paper mainly works on dynamic routing. When the route is going to choose dynamically then it is going to choose from subset of nodes otherwise the fixed single route path is to be choose.

From all this the path discovery through online mode i.e. overlay network is the router and the other nodes who choose the single route is said to be forwarders.

### **E) ADAPTIVE ENERGY AWARE CLUSTER BASED ROUTING:-**

Now a day because of less installation cost and much more availability of applications the growth of adhoc network is exceed very fast. The main issue within this is high energy consumption. Most of the systems discover recently but these are unbalanced within the network and nor sure to reduce the energy consumption. In this paper the cluster based protocol work on the less energy consumption and better performance of the data delivery. This protocol is somehow different from other systems because it forms the balanced cluster which is mainly based on the node distribution within the network. The random formation of cluster is not done in this. Then it is work on the network traffic balancing i.e. load balancing concept within the network which is going to improve the data delivery performance. For balancing the load and to manage the energy efficiency the cluster head is chosen dynamically as per network condition.

Within wireless adhoc network the small numbered and low powered devices are used to sending and receiving as well as to manage the overall communication and the processing of the data. All the nodes are fixed randomly and tried to connect with each other dynamically till the overall network exist. At that time the energy drain is also happen within that system. For distributed environment the common routing scheme is not efficient for the sensor nodes. That's why for energy reduction and load management the cluster approach is within centralize or distributed manner is mainly preferred. The cluster information and the data transmission are the two approaches used in this. There are multiple clusters and among the multiple nodes within that cluster the one sensor node considered as the cluster head i.e. main sensor node. Sometimes the route discovery is quite hard because of non-optimized routing techniques. The route change is happen drastically, long route selection may happen, sometimes because of breaking of route causes retransmission these are some of major issues. In this paper the network time improvisation and the performance of packet delivery including less overhead is done using the adaptive energy aware clustering.

In step one the overall sensor field is distributed within different clusters which are balance in nature then as per its weight the cluster head is formed for reduction of overhead and energy consumption. In second step the shortest paths are discover within multi path routing. Then data transmission can be done. From all this research this system is used to reduce the overhead and the energy wastage.

### **F) HOP BY HOP TRAFFIC AWARE ROUTING:-**

The most challenging fact in wireless ad hoc network is traffic congestion but the control on traffic without affecting on energy consumption. Because of network congestion the packet loss, throughput issue as well as energy waste is happen. To overcome with these issues the traffic aware routing with distributed manner is used in this paper which leads to adjust the capacity of data transmission for multi hop wireless ad hoc network. This is properly distribute the traffic in proper manner and the traffic load will make normalize also provide the proper balance within the proper paths and the trafficful routes. The retransmission of the packets is saved with this system. Within limited bandwidth network the wireless ad hoc network is used now a day that's why the congestion of network and traffic issue usually happens that's why this system is used to overcome this issue. The traffic is evenly distributed in this system within all nodes. The overall nodes utilizes in this system. This system is known as gradient base routing system[6]. It takes the routing decision at its own. Through this overall system the traffic network transmission is manage, end to end delay of packet is reduced, packet delivery is done and energy consumption also reduced.

### **G) METHOD AT LINK LAYER:-**

At data link layer IEEE 802.11 protocol used in this system. Normally for poor performance within network the multi hop ad hoc network is used for throughput and the overall performance. This paper actually works on the fewer throughputs and the unfairness in the network within the MAC layer and the data link layer. The wireless ad hoc network leads to self-organization, better flexibility as well as the proper and easy deployment. The round robin queue management technique is used to manage the multi hop wireless ad hoc network which is going to solve the unfairness issue and less throughput. This method has no need to make any changes in MAC layer. That's why also there is no need to do any changes in the hardware. The scheduling method i.e. round robin scheme is used here to solve the unfairness issue within MAC layer and also from data link layer. The data flow can

be keep stable and balanced in this system. We require changes only in data link layer not in any hardware or anything else.

#### **H) SPRAY AND HOP DISTANCE ROUTING:-**

In some of areas the high speed network as well as infrastructure is not possible also not available such as rural areas that's why there is a need of store and forward type of network for large data with delay management and disruption tolerance mechanism within networking. This scenario is used to connect the multiple adjacent islands with each other. Some of islands are connected through physical way but for messaging and other data transfer the virtual connectivity is must. That's why through this routing scheme the virtual connectivity will be done. It is also a hop to hop connectivity and the store and forward mechanism is used in this using hop to hop. Mainly it is distance base routing[8] used for avoidance of wrong destination transmission of message. The high speed network and infrastructure carry very high cost as well as the deployment cost is also very high that's why this is not possible everywhere. So the store carry and forward methodology within connectivity with multiple islands are possible with low cost and less resources.

#### **I) SERVER LINK ROUTER STATE ROUTING:-**

In these days the packet forwarding delay by selecting the path is also the one of issue in networking. So, to select the best route and improve the performance is also the challenging fact for the internet service providers. Solving the downloading delay issue, traffic within routes, find out the best route and minimizes the delay are the main focus of this paper. The route matrix can be maintained in this system. The bellman ford algorithm is used here for finding out the shortest path. This is the loop free technique of finding route. Two major things will happen in this system that is finding the neighbour node and maintain the matrix of node for adding, updating, deleting as well as validating the node. The route table can be managed in route finding method.

The server link router is compatible to both internet service provider and the content provider. It provides the loop free route and find out the best path.

#### **J) LOAD BALANCING PROTOCOL:-**

In multiple types of ad hoc network the wireless sensor network is the one of most emerging type of sensor network. It is also useful in scientific, logistic and military areas. It can provide the much more benefits for consumer point of view and also provide high flexibility. If we consider the size of sensor then the lookout towards energy consumption and battery backup have much more limitations that's why here the focus is on quality of service. The improvement within quality of service is to be done through the clustering algorithmic methodology. The LEACH and SEP are the clustering protocols used in this research.

The wireless sensor network is the most successful and long lasting among all network communication within industry oriented and scientific oriented. Wireless connectivity is the most necessary thing in this world. The major things which are applicable towards this popularity are very easy to deploy, information security and low installation cost. Also it contains lot of restrictions but still these are needed to be managed. The overall performance is managed through the clustering methodology. Here also as per distance of sensor nodes within cluster the cluster head selection is must. Then the cluster head will be responsible to handle the energy efficiency and the node to node communication. The LEACH protocol can be divided its network into zones and clusters will be form. It can be managed the use of bandwidth, network life should be gained and energy consumption is reduced. SEP is the protocol which is mainly used to selection of cluster head as per energy available within that network. The selection of cluster head is choosing here according to the energy availability and efficiency of the node. From all this the multiple protocols are used to increase the lifeline of the network, energy efficiency, stability of network and selection of cluster.

### **III. CONCLUSION**

The wireless ad hoc network is the most effective network within all other type of network for overall control and connectivity. Some of the critical applications such as war zone, disaster area or industrial

area, it is the most popular network method for data transmission. In this network the routing protocol and the routing method plays most important role and also selection of protocol and method is also a challenging task. Here multiple types of protocols and methods compared here. But as per observation the hop by hop adaptive link state optimal routing protocol (HALO) can be the best solution for overall improved performance as compared to others. From all this concluded that the quality of service totally depend on the selection of protocol and method within wireless ad-hoc network.

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