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# An Assessment On Routing Protocols Algorithms In Manet

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## Abstract

Today, people have large access to the Internet through mobile and Wi-Fi networks. On-demand video streaming has been the Internet's most dominant technology. The provision of Internet services through MANETs attracts both researchers and consumers, in particular video transmission. Ad hoc design and infrastructure-free distribution features make the MANETs more complex to provide video streaming on demand. The research tries to propose an efficient multi path routing protocol with replication.

**Keywords:** MANET, Multi path Routing, Video streaming

**1. Introduction:** Wireless networks date back to 1888 where the transmission by electromagnetic waves was experienced thanks to the physicist named Rudolf Hertz who were the foundations for this type of technology, in 1971 a radio communication system was implemented that achieved the transmission of packets was considered the first WLAN network in Hawaii[1].

This was the beginning of the emergence of WLANs, and the creation of devices that were not compatible with each other, since manufacturers created their devices under their standards, which led years later to the creation of a control body for the compatibility called WI-FI ALIANCE and the use of standards to regulate the use of this technology.

A MANET network is implemented by a set of wireless mobile nodes, each node communicates with routing protocols by forwarding data to its neighboring nodes, which are connected through links without using a physical structure as long as it is in its range. Coverage, that is, they are complex distributed systems that comprise nodes that can self-organize freely, are flexible and simply deplorable[2].

These types of networks are derived from ad-hoc technology specified for mobile use, providing wireless communication, they do not contain a centralized control in their operation, they are flexible and easy to implement.

In this research about MANET networks, concepts, operation of their applicable protocols and simulation will be included, in order to know the processes that are carried out according to their metrics to obtain the best route, which is established for the transmission of data, since they influence its performance according to its application in the social field, such as commercial or military applications. Ad hoc wireless networks are shown in fig 1.



**Figure1: Ad-hoc Wireless Networks**

**2. Literature Review:** In this literature review we will try to cover the routing algorithms which are important from our research point of view. They are located in the network layer, they are responsible for making the decision by which the incoming packet will be transported. They work differently depending on the sub net [3] , if it works with data grams the result is changing, the process must be carried out every time a data packet arrives, due to changes in the route. If you work with virtual circuits, the process is carried out if the circuit is established and the packets are transmitted through the previously established route [29]. The most used algorithms are: Link State, Source Routing and Distance Vector.

**2.1 Distance Vector Algorithm:** It is based on each node knowing the distance it has throughout the network, each node is updating on some cost change and informs its adjacent nodes how to get there and its cost, to update its routing able according to the information received from the other nodes. Thus, the algorithm performs its management based on the least cost route, example DSDV protocol, AODV.

**2.2 Link State Algorithm:** It is used to recognize the closest route from the starting point to the destination, and is not based on the number of hops (Cisco,CCN3, 2018).It performs

the diffusion of the distance and the delay of the nodes in the network, for the updating of the routing table, the best route will be the one with the lowest cost, such as OLSR[3].

**2.3 Source Routing:** Its operation is simple, it allows the sending node to specify to the packet the route to be taken for its transmission. This is called that it already has a previously established path from the sending, used in the DSR protocol [4].

Within MANET networks, the protocols are divided into three groups that are applicable in this technology, which are proactive, reactive and hybrid, each one has its own characteristics for decision-making [5].

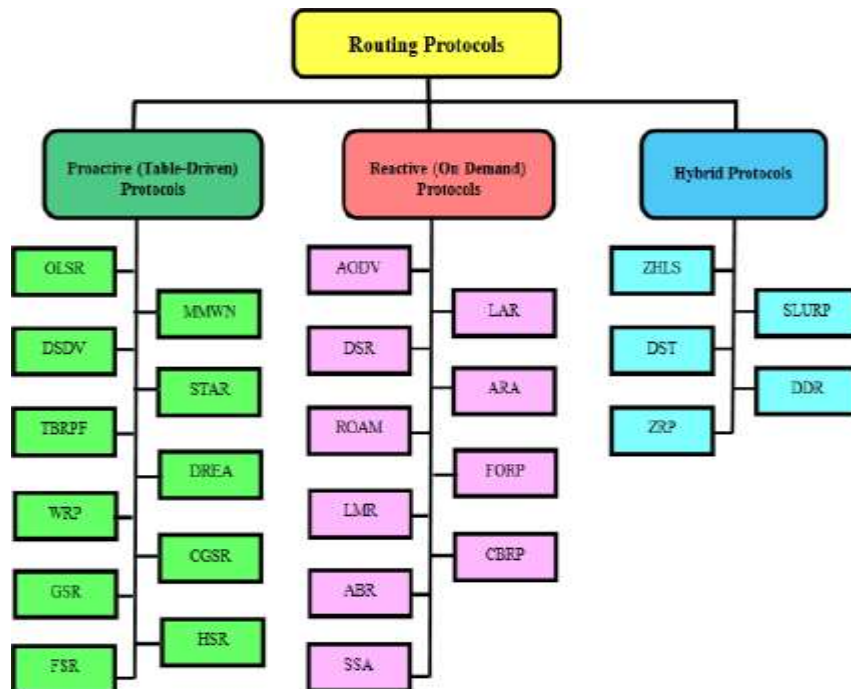
**3. Applicable Routing protocols in MANET networks:** The protocols that work with MANET technology are divided into the following groups of proactive, reactive and hybrid, of which four protocols are the most used in the group of proactive OLSR and DSDV, and in the group of Reagents, AODV and DSR, which are those that have reached an RFC level, for studies and which we are going to analyze in this research work. Figure 2 MANET routing Classification Algorithm.

**3.1 Proactive protocols:** Its operation is based on updating the routing tables provided by the nodes, this protocol presents the characteristic of the link state algorithm, thus maintaining a correlation between nodes in the search for routes.

The characteristics of the protocols are the following, it does not need a fixed route, they are not dependent, it lacks good bandwidth, its routing table makes it easy to obtain information from the nodes and the routes to establish the session.

The main disadvantage of these protocols is constant updating with the maintenance messages of the routes, which causes a large amount of information that is stored in the nodes [6].

**3.2 Reactive Protocols:** This protocol works under the concepts of requests, when a node needs to transmit data, what the protocol does is a broadcast to the entire network to discover the route. As soon as the required route



**Figure2: MANET Routing Protocols Classification**

is found, it is no longer accessible. The process is considered individually for each node, each time it is required to transmit, the search process begins depending on whether there is no previous route defined or that the transmission is active, its category is divided into three protocols observed.

The main advantage of the protocol is to establish the destinations and consequently not to overload the routing tables with information. The disadvantage of this protocol is the latency that it causes each time the discovery of a route begins.

**3.3 DSDV (Destination Sequence Distance Vector) Protocol:** The DSDV protocol proposed in 1994, its operation is created under the distributive algorithm proposed by Bellman-Ford, in comparison with the link state protocol, the performance it provides is more stable and efficient, It requires less storage space.[7]

This protocol is a derivation of the distance vector algorithm, it is based on the sending of information between nodes. They are usually used in environments with few nodes. Each node sends the known routes according to its routing to its adjacent nodes to reveal the distance of the other nodes in the network. The maintenance of the route is dynamic, the updates of the nodes are transitory in order to keep the routing table updated, since new nodes can be implemented in the MANET network[8].

**3.4 OLSR protocol(Optimized Link State Routing Protocol) :** It is created under the parameters of the link state algorithm, what this protocol performs is a flood in the

network, but with specific nodes for it to send control packets, the function of the chosen nodes is to transmit in a bidirectional way for the network coverage.

In terms of a protocol, optimized connection state routing (OLSR) describes a modified link state protocol. OLSOLS is well known for its interesting function of using multi-point relay (MPR). For reducing connection state sizes and reducing processing overhead, use OLS. When a network topology shifts, nodes use its assigned set of neighbors to measure its MPRs. Neighbors in this neighborhood are called a multipoint relay (MPR). select one-hop neighbors MPR by continuously broadcasting the HELLO message When one node chooses to participate in a replication process, each of its neighbors selects one of the others to participate.

### **3.5 DSR (Dynamic Source Routing) protocol:**

It is a unicast protocol that is based on the source routing algorithm. [9] refer that each data packet contains complete routing information to reach its broadcast. The nodes perform the function of conserving the route cache to be sent through route requests to the other nodes, carrying out the process until reaching the destination.

DSR is an on-demand routing protocol Because of the root routing theorem, the problem was solved. The path root node knows the entire route from start to finish DSR also operates under the theory of route identification and repair. A route exploration process is initiated. The DSR's RREQ source and destination addresses comprise the origins of the RREQ packet. All routes go to neighboring nodes are in use is denoted by ROUTEQ. The intermediate node has its own address in the RREQ packet when getting the RREQ An RREQ will be produced to the source node if this specified. The source route is fetched from the RREQ and inserted in the store packet at the destination.

**3.6 Zone Routing Protocol:** In ZRP [10], the network is divided into zones, and the nodes of each zone are considered as a domain. The zone's radius is derived from its length and length is defined according to the number of hops. Nodes that are within a defined area of a designated geographic boundary use constructive routing, whereas those that are not use reactive boundary-based routing. This illustrates the fact that a node that is inside a region knows all other nodes and routes and dependencies on them. When the destination node is not inside a zone, the routing table decides if it has packets to send to it. It's necessary to create a path in order to find a route. Use these figurines to show the network path in ZRP Process.[11]

**4. Problem Definition:** Mobile Ad hoc Networks require an efficient routing strategy, which is capable of handling limited resources as well as simultaneously being able to adapt to dynamic network conditions like network size, topology and traffic density.

The Shortest path or path with the least hop count has been the most widely known way for finding the best path from source node to destination node. However, such a path may not always be the best path in terms of Quality of Service (QoS) metrics defined for the sending and receiving application.

Also, the basic design of MANETs is not fully capable to provide support to multimedia services and also due to uncertainties associated with MANETs (unreliable wireless channel, node mobility, decentralized architecture etc.), providing QoS guarantees to MANET applications is quite an arduous task.

The objective of this Dissertation was to deal with a critical QoS aspect of MANET i.e. Delay and hence, propose a delay aware routing protocol that discovers routes for a source destination pair with the delay constraints provided by the applications. This has been presented through simulation.

The delay constraint provided by the application that wishes to transmit its traffic are used to find suitable routes that can send the application traffic from source to destination node within the specified delay bound.

**Problem Statement:** The characteristics that wireless networks offer us, with the infeasibility of communication in places that are difficult to access, have been an important advance for the development of telecommunications today and network protocols were implemented for an adequate each for routes for the data that reach the predestination.

MANET networks are versatile as they are a union of wireless nodes that can be added as well as eliminated without being dependent and can be implemented without prior infrastructure, but they need network protocols for data transmission which are created by algorithms to its handling.

By working with different protocols, they have variants in the way of operating; The algorithms with which MANET works are three, dynamic routing source, distance vector and link state, which at the time of being implemented have a different performance in different situations and each of them obtains the packet transfer route in a different.

Considering this, the need arises to make a comparison of the different protocols and their characteristics and application for a better application of the technology in different fields in which these networks can be applied, since most do not know how the protocols operate in the search for route and it is not applied by the networks according to the they do not know these parameters.

The MANET networks used today in different areas since they are useful for their ease of implementation, but important aspects such as the performance of the protocols in

different circumstances according to their metrics and how they find and maintain the path found for it are not considered Sending packages.

Since the protocols consider different aspects for route selection, they cover other characteristics such as higher energy use, high node processing, propagation, higher delays and packet losses, so knowledge of these parameters must be known according to the needs that are going to have. Faced with the problems set out, it is essential to carry out research on the protocols used by MANET to improve knowledge and better use of this technology.

**5. Objectives:** Carry out a comparative analysis of different protocols used in MANET networks by means of a simulation to verify their performance in the transport of packets and give a report on the results obtained. The specific objectives are-

- Describe the protocols that MANET uses as concepts and applications.
- Carry out a comparative analysis of the data obtained in the simulation.
- Simulate the performance of MANET on NS2.
- Provide a report with the advantages and disadvantages of each protocol according to the simulated application.

**6. Conclusion:** The evolution of technology in recent time has been an essential advance for communications, wireless technology has opened new areas to be exploited and contribute to the development of telecommunications, today the lack of knowledge in the use of tools that are provided has caused poor implementation due to ignorance in the areas that should be applied.

In this research about MANET networks, concepts, operation of their applicable protocols and simulation will be included, in order to know the processes that are carried out according to their metrics to obtain the best route, which is established for the transmission of data, since they influence its performance according to its application in the social field, such as commercial or military applications.

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