Survey for MANET Environment Based on Proactive and Reactive Routing Protocols

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Abstract— MANET (Mobile Ad-hoc Networks) have act out a new extension in field of wireless networks. It permits any number of nodes to connect with each other . It's not require fixed infrastructure as the mobile nodes are tremendously mobile. And network topology in MANET is dynamic i.e. changes accordingly to the environment. These are much easier to radiate, enact and organize i.e. these are self configurable.These kinds of networks are currently one of the most decisive and hot research areas due to the wide range of applications (such as emergency, military, salvage operations, local area networks, personal area network, hospitals, and many more).The spreading interest in mobile ad-hoc network has resulted in many routing protocol proposals. In this paper we will review the unicasting routing protocols proposed and designed for MANET. Routing protocols used in MANET have to aspect many challenges due to dynamically changing topologies, route discovery, device discovery, bandwidth constrained, less transmission power and asymmetric links. Due to node mobility and instability and again and again changing topologies, routing became one of the major issues in MANET.

Index Terms— MANET, Routing Protocol, Proactive, Reactive.

1 INTRODUCTION

THERE has been a phenomenal increase in the demand of quality-of-service (QoS) in wireless networks over the years due to rapid growth in the number of wireless and mobile devices. Such devices are in use to access Internet and QoS aware applications such as video conferencing, voice-over IP, interactive video-on-demand and many other multimedia applications.

Ad-hoc network is a collection of Nodes forming a temporary network without any additional infrastructure and no centralized control. Mobile nodes act as transmitter, receiver or as a router. Ad-hoc networks are self-organizing, self-configuring network. Networks structure is changed dynamically because of member's mobility. These nodes may be routers and/or hosts. The mobile nodes communicate directly with each other and without the aid of access points, and therefore have no fixed infrastructure. These networks can be established anywhere and anytime. It allows communication without any physical infrastructure for highly dynamic topology with multi hop. Application of the Ad-hoc networks in Military networks, disaster relief networks and wireless sensor networks.

2 USES OF MANETS

Mobile ad hoc networks can be used in many applications, ranging from sensors for environment, vehicular ad hoc communications, road safety, health, home, peer-to-peer messaging, disaster rescue operations, air/land/navy defense, weapons, robots, etc. See the application section in wireless ad hoc networks.

In the past, wireless ad hoc paradigms were implemented only in military applications [11]. However, advances in mobile computing and wireless devices, and the growth of support for ubiquitous computing, have led to exponential growth in the application and deployment of MANETs. With the rapid proliferation of wireless technologies such as Bluetooth, Hyperlan, WiMax, and the IEEE 802.11 series, MANETs have found myriad applications ranging from disaster relief, battlefield operations, and industrial and commercial purposes to information sharing and personal networking. Several industrial and commercial MANET applications have been proposed [14], some of them are: A wireless sensor network is one of the most significant applications of MANETs, which have been widely used for domestic and environmental applications.

3 WORK OF A MANET

Abstract A mobile ad-hoc network is comprised of mobile hosts that can communicate with each other using wireless links. A MANET is a system of wireless mobile nodes that dynamically self organize in arbitrary and temporary network topologies.As discussed earlier, MANETs do not rely on a static infrastructure including base stations and routers. The nodes have unconstrained mobility, and they can organize themselves arbitrarily, creating a dynamic topology that can change rapidly and unpredictably.

4 MANET ROUTING PROTOCAL

Routing is the process in which a route from a source to a destination node is identified and is achieved either by computing all routes before and pre-storing them or computing them when needed. Routing is used to decide path of packet transmission from one place to another place. The routing protocol is the key factor for ad-hoc network as it decides directly the performance of the whole networks. In multihop wireless environment, an efficient Ad-hoc routing protocols play a very important role to ensure that every transmitted data packets reaches its final destination mobile node. Routing protocols for ad-hoc networks are required to support distributed operation means ability to work independently and dynamic network topology.

Routing protocols of Mobile Ad-hoc networks are classified in two ways: Proactive routing and Reactive routing algorithms.

4.1 Proactive Routing

Proactive Routing is Table Driven routing scheme. It is adaptive routing in which route always available on request. Route is determined by using routing table. The family of distance vector protocols is an example of proactive routing. They maintain consistency up to date routing information from each node to every other node in the network.These protocols are:

- DSDV (Destination Sequence Distance Vector Routing)
- OLSR (Optimized Link State Routing)

4.2 Reactive Routing

Reactive routing is source initiated on-demand routing protocols. In which route determine procedure only on demand. Thus, when a route is needed some sort of global search procedure is initiated. The family of classical flooding algorithms belongs to the reactive group.These protocols are:

- AODV (Ad hoc On Demand Distance Vector Routing)
- DSR (Dynamic Source Routing)

AODV

The Ad hoc On Demand Distance Vector Routing (AODV) protocol builds routes between nodes only if they are requested by source nodes. AODV is therefore considered an on-demand algorithm and does not create any extra traffic for communication along links. The routes are maintained as long as they are required by the sources. They also form trees to connect multicast group members. AODV makes use of sequence numbers to ensure route freshness. They are self-starting and loop-free besides scaling to numerous mobile nodes.

In AODV, networks are silent until connections are established. Network nodes that need connections broadcast a request for connection. The remaining AODV nodes forward the message and record the node that requested a connection. Thus, they create a series of temporary routes back to the requesting node.

When a route to a new destination is needed, the node uses a broadcast RREQ to find a route to destination. A route can be determined when the request reaches either the destination itself or an intermediate node with a fresh route to the destination. The route is made available by unicasting a RREP back to the source of RREQ. Each node maintains its own broadcast id, sequence number. The broadcast ID is incremented for every RREQ packet. Since each node receiving the request keeps track of a route back to the source of the request, the RREP reply can be unicast back from the destination to the source, or from any intermediate node that is able to satisfy the request back to the source.

DSR

Dynamic Source Routing (DSR) is a routing protocol for wireless mesh networks. It is similar to AODV in that it forms a route on-demand when a transmitting node requests one. However, it uses source routing instead of relying on the routing table at each intermediate device. Dynamic Source Routing (DSR) is a widely used reactive (on-demand) routing protocol which is designed particularly for the mobile ad-hoc networks. DSR permits the network to run without any existing network infrastructure and thus the network becomes as a self-organized and self-configured network. This protocol maintains an on-demand approach and hence extinguishes the periodic table-update messages needed in the table-driven approach [31]. Consequently, it is able to prevent the control packets from consuming much bandwidth. Like other on-demand routing protocols, DSR does not provide the transmission of any periodic hello packet (beacon), which is essential for informing its presence to other nodes. Instead, during the route construction phase, it establishes the route by flooding a Route Request packet in the network. Each Route Request packet holds a sequence number which is generated by all the nodes through which the packet is flooded. By using this sequence number, loop formation and multiple transmission of the same Route Request is possible to be evaded.

DSDV

The Destination-Sequenced Distance-Vector Routing protocol (DSDV) described in is a table-driven algorithm based on the classical Bellman-Ford routing mechanism [3, 10]. The improvements made to the Bellman-Ford algorithm include freedom from loops in routing tables. Every mobile node in the network maintains a routing table in which all of the possible destinations within the network and the number of hops to each destination are recorded. Each entry is marked with a sequence number assigned by the destination node. The sequence numbers enable the mobile nodes to distinguish stale routes from new ones, thereby avoiding the formation of routing loops. Routing table updates are periodically transmitted throughout the network in order to maintain table consistency.

OLSR

The Optimized Link State Routing Protocol (OLSR) is an IP routing protocol optimized for mobile ad hoc networks, which can also be used on other wireless ad hoc networks. The Optimized Link State Routing (OLSR) is operated as a proactive (table-driven) routing protocol i.e. frequently exchanges topology information with other nodes of the network [44]. This protocol is basically an optimization of traditional link state protocol developed for mobile ad-hoc network. The responsibilities of OLSR protocol are to minimize the required number of control packets transmission and also to shorten the size of control packets. On top of that, OLSR trims down the control traffic overhead in the network with the help of Multipoint Relays (MPRs) [45]. The MPR concept is the key idea behind OLSR protocol which is basically a node's one-hop neighbors in the network.

5 Conclusion

We have implemented our work i.e. Creation of MANET Scenario for NS-2 and then to create Different routing protocols with the use of Various performance matrices Like Packet Delivery Ratio, End to End delay and Overall Throughput. In our case firstly we have created scenario file for IEEE 802.11 standard which has to be used along with our TCL Script than we have created a TCL script consist of various routing protocols in our case these are AODV, DSDV, DSR, OLSR and MAODV than a particular MANET scenario or topology in our case it consist of 10nodes, 40 nodes, 92 nodes and 128 nodes with 30sec simulation time.

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