A STUDY OF ROUTING PROTOCOLS PERFORMANCE IN MANET'S

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ABSTRACT:

Mobile ad hoc networks (MANETs) are Dynamic infrastructure less and multiple-hop networks. Routing is the process of movement of information from source to destination within the infrastructure less network. In this work it presents the literature survey and comparison of various routing protocols based on the energy consumption of wireless ad hoc networks, relative performance analysis and analyzing the behavior and performance of opportunistic proactive routing protocols under highly dynamic Mobile ad hoc Networks.

Keywords: Ad hoc network, Routing protocol, MANET's

I. INTRODUCTION

MANET is a highly flexible network where nodes can freely move with no fixed infrastructure network and join in to the network whenever there is a need of updating the network. So that it is a vulnerable to attacks by malicious users. In MANETs, the nodes communicate with each other without any existing infrastructure using Routing Protocols. The major benefits of MANET's are Infrastureless network, Dynamic frequency reuse, rapid deployment, robustness and flexibility support for mobility. The mobility of the hopes is random and nodes organize themselves in arbitrarily topology. MANET's has various applications, such as Military applications Collaborative and Distributed Computing, emergency operations, Conference events, and battlefield communication between moving vehicles and/or soldiers. The nature of MANET's needs address issues and challenges for designing the network. This flexibility of self-configuring and self-administration makes it beneficial for various applications in military operations, wireless mesh networks, wireless sensor networks etc. The wireless nature of mobile Ad hoc network needs address issues such as Mobility of nodes , Network Size , Power Constraints and Data / information fusion. This paper presents Six Sections. Section II with related work of routing Protocols, Section III shows the design challenges and issues in MANET's. Section IV gives the performance metrics in MANET. Section V presents the comparison of basic routing protocols and Section VI presents concludes and future enhancement.

II. RELATED WORK

Exhaustive literature survey is carried on various routing protocols in MANET. Based on routing information update mechanism routing protocols are categorized in to Proactive , Reactive and Hybrid Routing protocols ,Efficient routing methodologies have been proposed satisfying different requirements in MANET's.

The authors in [3] have been analyzed Dynamic Source Routing (DSR) and Destination-Sequenced Distance Vector Routing (DSDV) protocols. The authors are also discussed the performance analysis on varying the values of the periodic update interval.

The authors in [4] has been discussed the two mobile ad-hoc routing protocols DSDV and AODV are proactive and Reactive routing protocols respectively.

In [3], authors presented the performance of DSDV protocol for four different mobility models called Random Waypoint, Reference Point Group Mobility, Gauss Markov & Manhattan Mobility Model with varying network load & speed and proved that DSDV protocol with RPGM mobility model has optimized results with varying load and speed of network.

The authors in [4] present different routing protocols proposed in literature and also provides a comparison between them. They can be categorized broadly as proactive and reactive and hybrid protocols. A comparative study of Reactive, Proactive and Hybrid routing protocols is given. They have analyzed various issues in routing.

The design issues and challenges due to various unique characteristics of MANET were studied and analyzed in [1]. Further, various to be considered for designing and selection of a routing protocol in ad-hoc network with stressing on changing topology due to mobility of the nodes is discussed. Findings of literature survey, motivates to design efficient routing protocol with different design issues, characteristics and QoS requirements [1].

III. CHARACTERISTICS ISSUES AND CHALLENGES

This section has been shows about characteristics, issues and challenges based on MANET's.

The main characteristics of MANET's that grounds routing protocols to overcome various issues and challenges that are listed as follows.

a. Infrastructure less and no central administration
b. Deals with individual nodes
c. Handling dynamic topology
d. Wireless links
e. No centralized control and No access point (AP's) required
f. Support Multiple hop routing
g. limited battery backup

The following are the major design issues and challenges in designing a routing protocols are as follows..

a. Mobility
b. Bandwidth Constraints
c. Unpredictable topology change
d. Hidden and Exposed Terminals
e. Resource Constraints
f. Unreliability of wireless medium

In Ad hoc networks basic routing protocols are dynamic source routing protocol (DSR), destination sequenced distance vector (DSDV) , Ad hoc On Demand Distance Vector (AODV) and Zone Routing Protocol (ZRP) are analyzed based on performance metrics.

IV. PERFORMANCE METRICES

The various performances metrics are to be considered for the analysis of various Routing Protocols are as follows. They are

I. Packet Delivery Ratio (PDR) : It is defined as the ratio of number of packet sent from source node to destination node

$$P_{dr} = \frac{\text{Total packets received}}{\text{Total Packets Send}}$$

Where P_{dr} is the Packet Delivery Ratio

II.   Packet Dropped: The count of packets that are not received by the destination

$$P_d = Pts - Prc \times E \times N$$

Where, Pd : Packet dropping rate

Pts : total packet sent
Prc : total packet received
E : dissipated energy
N : No of Nodes

III.   End To End Delay: The delay experienced by a packet from the time it was sent by a source till the time it was received at the destination

$$D = 1/N \sum_{i=1}^{s} (P_{ri} - P_{si})$$

Where,

D: end- to-end delay
N: number of nodes
Pr_i: packet i received time
Ps_i : packet i sent time
Pr_i: unique packet id

IV. Routing Over head: The number of control packets produced per mobile node. Control packets include route requests, replies and error messages.

V. Route duration: The average route length given in terms of the number of hops that the all the packets require to reach the destination from the source.

V. COMPARISON OF BASIC ROUTING PROTOCOLS

Table 1 shows the comparison of routing protocols in Ad-hoc networks Based on Network Simulator under NS-2 Environment.

Various routing protocols are to be considered for comparison are DSR, AODV, DSDV,ZRP routing protocols. These routing protocols can be broadly classified into proactive, reactive and Hybrid routing protocols. Various performance metrics supported by these routing are listed.

Parameter	DSR	AODV	DSDV	ZRP
Routing	Reactive	Reactive	Proactive	Hybrid
Routing Overhead	High	High	Low	Low
Throughput	High	High	Low	Low
Loop Free	Yes	Yes	Yes	Yes
Routing Updation	Non Periodic	Non Periodic	Periodic	Periodic
End to End Delay	High	High	Low	Low

Table 1. Comparison of various routing protocols

VI. CONCLUSION & FUTURE ENHANCEMENT

Routing protocols are an important research area in MANET. Efficient design of routing protocol are to be designed based on various issues analyzed to be considered for getting efficient routing with less power consumption , less resources and error free network. The study provides the basic routing protocols of MANET'S and the comparative study among these proactive and reactive routing protocols and highlights their applicability to meet the requirement of different applications.

VII. REFERENCES

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