

A Review on Congestion Control over Mobile Ad-Hoc Network

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Abstract— Mobile Ad-Hoc network is a type of Ad-Hoc network that can change locations and configure itself on the fly. MANETs uses self-configurable connections to connect various nodes. There are a number of issues and challenges in a mobile Ad-Hoc network. Congestion Control is an advanced area in research and new development in mobile Ad-Hoc network. Congestion occurs when resources are limited and demand is more. Different types of techniques have been proposed to overcome the congestion in the mobile Ad-Hoc network. Congestion control mechanism tries to control congestion either before congestion occur or after congestion takes actually place in the network. In this paper, we studied different approaches for congestion control in MANETs.

Keywords— MANET, Congestion, Congestion Control,

I. INTRODUCTION

The Mobile Ad-Hoc network is actually an amount of Mobile nodes creating an Ad-Hoc network with no centralized constructions. These networks introduced a brand new art involving network business which enables it to become suitable for an environment wherever both this structure is actually dropped or even wherever set up a good structure isn't very affordable. The widely used IEEE 802. 11 "WI-FI" projects are actually able to offer Ad-Hoc network services in the reduced amount, whenever simply no admittance point can be found. On the other hand, in this case, these nodes are on a mail and obtain facts yet usually do not course everything along the network. Mobile Ad-Hoc Networks can easily run within a standalone style or even might be linked to a larger network such as the World Wide Web.

In Ad-Hoc networks, it is vital to use, efficient routing protocols that provide high quality communication. To maintain transportability, size and weight of the device this network has lots of resources constrain. The nodes have limited battery power, bandwidth and buffer space, etc. So it is required to distribute the traffic between the different mobile hosts. A routing protocol in MANET needs to fairly send out the routing tasks to among the mobile host. An unbalanced traffic/load distribution may cause performance degradation of the network. Due to this unbalancing nature, few nodes in the

network are hugely rich in routing duties which causes the large queue size, high packet delay, high packet loss ratio and high power consumption.

AD - HOC NETWORKS

[1] Defines computer networks as a system for communication among the computers. These networks may be permanent (cabled) or temporary. Ad-Hoc networks are a new paradigm of wireless communication for mobile hosts. Wireless networks having 802.11 run in one of two modes- Ad-Hoc or infrastructure mode. The IEEE standard defines the Ad-Hoc mode as the infrastructure mode as Basic Service Set (BSS) and Independent Basic Service Set (IBSS).

In infrastructure mode, each client sends all of its communications to a central base station, or access point (AP). The access point acts as a bridge and forwards the packet communication onto the appropriate network- either the wireless network, or the wired network.

Each client in Ad-Hoc network communicates directly with the other clients within the network. Ad-Hoc mode is designed such that only the clients within transmission range (within the same cell) of each other can communicate.

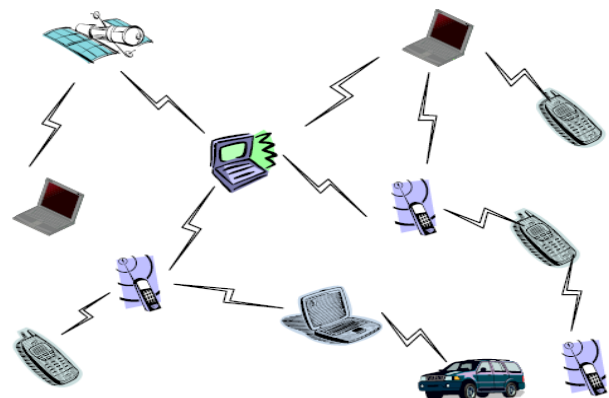


Figure 1: An example of ad hoc network

MANET contains mobile owners built with Wi-Fi communication units. The leading qualities connected with MANET are usually, the item function without a Central Manager, Quickly Deployable, Multi-Hop Radio Station Communication, Frequently breaking URLs due to mobile nature of Nodes, Concern sources (bandwidth, calculating electric power, and battery lifetime, for example.) and just because all the nodes are mobile so topology can be extremely vibrant. So, the major issues connected with standard routing protocol in MANET are; it must be thoroughly sent out the packets, adaptive in order to typical topology alters, simple working out & upkeep, optimal and never-ending loop free course, optimal by using sources, the item present, QoS and wreck needs to be lower.

A. Classification of routing protocols in MANET

The Routing protocols in MANET are usually categorized determined by routing strategy and system composition. According to the routing strategy this routing protocol might be grouped since Table-driven and source initiated, although based on the system composition they are categorized since toned redirecting, hierarchical redirecting and geographic position served redirecting Good routing strategy this routing protocol might be categorized in two ways:

- *Proactive (Table Driven) Routing Protocol*

Each and every node in the network retains routing information to every other node in the network. Route information is generally retained in the routing tables and is periodically updated as the changes in network topology. DSDV along with WRP are the examples of proactive protocols.

- *Reactive (On-Demand) Routing Protocol*

This particular protocol, don't maintain routing details or even routing exercise on the network nodes if you find not any connection. In case a node wishes to post any packet to a different node subsequently this kind of process looks for the option in an on-demand way and also establishes the connection to send and also get the packet. DSR [1], AODV [2] will be the degrees of reactive protocols.

- *Hybrid Routing Protocol*

This can be a combination of very best popular features of preceding two protocols. Node inside of selected long distance through the node concerned, or even just a certain geographical region, tends to be said to be in routing zone. For routing inside the zone, hands-on method along with intended for routing past the area, a hands-on direction-finding standard protocol is employed.

Effective load balancing is a difficult job throughout Mobile Ad-Hoc Networks (MANET) because of the dynamic and also unpredictable actions and also topology changes. This particular document presents a different strategy determined by multipath direction-finding backbones for improved load balancing in MANETs. Nodes in MANETs significantly change with one another when it comes to transmission and

also running capabilities. Inside the recommended strategy, multiple routing backbones are generally recognized by origin to help location applying second time beginner's nodes that have much better transmission and also running capabilities to help indulge in the mobile routing backbones and also successfully attend the routing process.

Multipath QoS Mobile Routing Backbones (MP-QMRB) regarding superior load balancing within MANETs. This proposed approach to employ multiple Mobile Routing Backbones (MRB) in between a pair of sources along with intermediate nodes utilizing second time beginner's nodes that happen to be full of sources similar to bandwidth, processing power, residual energy and so on. This protocol makes sure that the particular obtainable bandwidth inside the network is actually applied successfully through disbursing traffic visitors consistently which in turn makes sure far better load balancing with congestion control [1]. Ad-Hoc on- demand Multipath Distance Vector (AOMDV) chooses the way with a lower hop count and discard routes with higher hop count. The new scheme CRAODV (A New Approach for Congestion Control in Mobile Ad-hoc Network) is usually utilized practically in most on-demand routing protocols.

Here we tend to use the AOMDV protocol to finds node-disjoint or link-disjoint routes between source and destination. Link breakdown could occur as a result of node quality, node failures, congestion in traffic, packet collisions, and so on. For locating node-disjoint routes, every node doesn't in real time reject duplicate RREQs. A node-disjoint path is obtained by every RREQs, coming back from totally different neighbor of the supply as a result of nodes cannot broadcast duplicate RREQs. Any 2 RREQs incoming at AN intermediate node through a unique neighbor of the supply couldn't have traversed a similar node to urge multiple link-disjoint routes, the destination send RREP to duplicate RREQs despite their 1st hop. For guaranteeing link dis-joint within the 1st hop of the RREP, the destination solely replies to RREQs incoming through distinctive neighbors. The RREPs follow the reverse methods, that square measure node-disjoint and therefore link-disjoint once the primary hop. Every RREP intersects at AN intermediate node and additionally takes a unique reverse path to the supply to confirm link dis-joint [2].

B. Need for load balancing in MANET

An important part of the best possible network is the load balancing. For instance, job completion becomes tedious, if higher load is given to the nodes with less processing capabilities and which do not have any means to share the load [3].

There is a possibility associated with a load imbalance on account of that the computing/processing power of the systems usually is non-uniform (i. e., several nodes may be idle and few is going to be overloaded). A node which has high finalizing power finishes a unique work quickly and is estimated to obtain less or no load whatsoever quite often. So, inside the presence associated with under-loaded nodes, you need for over-loaded nodes are usually undesirable [4].

Multipath routing can balance the load better compared to single way routing in Ad-Hoc networks, the spot that the first not bothered shortest paths are employed for redirecting. This is achievable only for the networks having endless choice of nodes (i. e, a significant fraction in the total variety of nodes in the network) involving any source-destination set of two nodes. It will be infeasible to build such a method; it will be economical intended for discovering and also maintaining a lot of paths. Load balance just isn't improved by using multiple quickest path routes rather than a solitary path. And so, for a much better load well-balanced network dispersed multi-path insert splitting strategies must be carefully created [5].

III. LITERATURE REVIEW

- A. Soundararajan et al in his titled "Adaptive Multipath Routing for Load Balancing in Mobile Ad-Hoc Networks" [3], it proposes over-crowding controlled adaptive multi-path course-plotting protocol to obtain load balancing and get away from congestion in MANETs. This algorithm with regard to finding multi-path channels computes fail-safe many paths, which provide the many intermediate nodes within the primary way with many routes to destinations. The fail-safe many paths are the nodes having least load and much more battery electrical power and recurring energy. When the normal load of the node along the route increases outside of a limit, it blows the traffic over disjoint multi-path routes to reduce the traffic load using a congested link.
- B. Amjad Ali et al., "Node Centric Load Balancing Routing Protocol for Mobile Ad-Hoc Networks" [6], suggested that many nodes steer clear of the congestion inside greedy fashion. This protocol uses the choice route to your destination in order to avoid new routes forming through congested node. Each node finds the present status, connected with interface queue size, where by node takes 60 as maximum queue size. Queue size 50 is known as an over - crowding threshold. When a node notices which the congestion threshold have been reached, it automatically starts discard new RREQ packets so that it cannot allow any new routes passing through that.
- C. Sivakumar et al "A QoS routing protocol for mobile Ad-Hoc networks based on the load distribution" [7], have projected a new distributed load based routing algorithm created for many different traffic classes to establish the very best routing routes. This tactic calculates the cost metric while using link loads. Here multimedia systems, traffic is recognized as higher priority traffic and its routing is carried out over the lightly packed links such that the links for the lighter loads are selected choice of links having heavier loads. Also the resources tend to be shared one of many high and low (normal traffic) main concern traffic. The lightly loaded path is used by standard traffic in having less multimedia traffic.
- D. Bin et al. in this titled "A novel adaptive load balancing, routing algorithm in Ad-Hoc networks" [8], have proposed any novel adaptive load balancing routing algorithm in Ad-Hoc networks depends on a gossiping process. This algorithm merges gossips based routing and load balancing system efficiently. It adjusts the forwarding probability in the routing announcements adaptively as per the fill status along with distribution in the nodes inside phase involving route discovery.
- E. Raj bhupinder Kaur et al in his titled "Load Balancing of Ant Based Algorithm in MANET" [9], the objective would be made use of the ant based algorithm with regard to load balancing by establishing a threshold value of every routing table through an average number of requests accepted by every node. According to this limit value, they could control the amount of units that has been sent. Should the threshold importance is a lesser amount of; it means the common number regarding requests compared to that node can be low. They simply sent out the ants with regard to updating their routing table. If the average number regarding requests can be high, then any data packet is going to be sent based on the pheromone table of these particular nodes. They do the job presents a whole new dynamic in addition to adaptive routing algorithm with regard to MANETs inspired by the ant colony paradigm.
- F. Eman S. Alwadiyeh et al [11], in his titled, "Interference-Aware Multipath Routing Protocols for Mobile Ad-Hoc Networks", proposes two on - demand multipath routing protocol intended for MANETs. First protocol is usually Efficient, Stable, Disjoint Multipath routing protocol (ESDMR) and also another are usually Efficient, Disjoint Multipath routing protocol (EDMR), the principle goal of the proposed routing protocols would be to reduce the actual influence of interference between the selected node-disjoint multipath plans, by choosing node-disjoint routes with all the minimal interference between these. In inclusion, both of the proposed methodologies used a whole new proposed process that aims to relieve the command packets cost, while the idea enables the actual destination node of collecting the mandatory information. Simulation outcomes show how the proposed routing protocols have a higher delivery rate and also higher throughput weighed against the kinds in Split Multipath Routing protocol (SMR).
- G. M. Jehan et al in his titled "Scalable TCP: Better Throughput in TCP Congestion Control Algorithms on MANETs" [12], in the modern mobile communication world the congestion control algorithms' role is very important to data transmission between mobile devices. It offers better along with reliable connection capabilities in all kinds of

networking area. The wireless networking technology along with the new set of requirements throughout communication devices needs a few extensions on the original layout of TCP intended for oncoming technology progress. This operates aims to analyze some TCP congestion control algorithms along with their effectiveness on Mobile Ad-Hoc Networks (MANET). Far more specifically, most of us describe effectiveness behavior of BIC, Vegas and Scalable TCP congestion control algorithms.

- H. Shruti Sangwan et al [13] have proposed an NEW approach to get fair routing in mobile Ad-Hoc networks (MANETs) using adaptive and efficient load balancing schemes. It explains different load balancing mechanisms that control congestion. Their proposed mechanism for efficient optimization facilitate in deciding best route in the Ad-Hoc networks. The work has mainly focused on improving the performance in terms of the processing time of the loads, nodes stability, throughput and lifetime of the network.
- I. Xuyang Wang et al [14] proposed a cross layer hop by hop congestion control scheme to enhance the Transmission Control Protocol performance in multi-hop wireless networks that coordinates the congestion response across the network and transport layer protocols. The proposed mechanism attempts to determine the actual reason of a packet loss and then coordinates the appropriate congestion control reaction among the MAC network, and transport protocols. The congestion control efforts are invoke at all intermediate and source node along the upstream paths directed from the wireless link experiencing the congestion induced packet drop.

IV. CONCLUSION AND FUTURE WORK

Mobile Ad-Hoc network is a type of Ad-Hoc network that can change locations and configure itself on the fly. MANETs uses self-configurable connections to connect various nodes. There are a number of issues and challenges in a mobile Ad-Hoc network. Congestion Control is an advanced area in research and new development in mobile Ad-Hoc network. Congestion occurs when resources are limited and demand is more. Different types of techniques have been proposed to overcome the congestion in the mobile Ad-Hoc network. Congestion control mechanism tries to control congestion either before congestion occur or after congestion takes actually place in the network. In this paper we have presented the survey on different work done by the authors to overcome the problem of congestion control in the Mobile Ad-Hoc Network.

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