A REVIEW OF
MANET CONGESTION PROBLEM

Shiwali Latiyar

Assistant Professor, CSE, LNCTS, Bhopal M.P. India

Dr. Bhawana Pillai

Associate Professor, CSE, LNCTS, Bhopal M.P. India

Abstract: Mobile ad hoc networks (MANETs) are designed to overcome the limitations of wired backbone networks and infrastructure-based wireless networks. Each configuration has its own probability of existence according to the configurations. In the ad hoc environment, data transfer performs less as a link in the network, mainly due to the movement of muscles, which is the main cause of failures in MANETs. There are many method algorithms, but all algorithms have congestion problems that reduce the overall performance of the network. In an ad hoc network, nodes are autonomous; they can roam freely and may not cooperate properly in network operations to protect their resources. Nodes are called selfish or mischievous nodes, and their behavior is called selfish or mischievous nodes. The protocol has a good interface like TCP, which is very sensitive to packet loss. This article provides a review of management tools for MANETs.

Keywords: Ad hoc Network, Congestion avoidance, Congestion control, Reliability, Routing Protocol.

Introduction Mobile Ad hoc Networks (MANETs) are designed to overcome the inherent limitations of mobile phone connections and infrastructure-based wireless networks. Mobile Ad-Hoc Network is an independent group of mobile users that provide access to networks in situations where a temporary network connection is required and in areas where a prefix infrastructure is not possible due to the current location. or should be sent without interference requiring the use of connection equipment for military use > Use it yourself, so this equipment can also be used as a router. In MANET, every device can be easily moved, so the network topology is not fixed and continuous communication in MANET is weaker compared to normal networks. All network operations such as messaging and topology discovery must be performed by the nodes themselves. It is one of the most important problems of MANET. Each device constantly stores the necessary information for the smooth flow of traffic. Private wireless networks provide unique and versatile advantages for some environments and some applications due to some unique features such as:

- An existing fixed location or a base station - Not required in MANET
- This type of network works without the limitation of hard frozen topology. Adding new nodes and removing existing nodes only requires the interaction of other nodes and does not involve other organizations.

1.1 Routing Concepts in MANET

All network operations such as messaging and calling topology must be done by the nodes themselves. Therefore, routing functions must be implemented in mobile nodes to send data from source to source. Each device continues to hold the necessary information to optimize traffic flow. Because hosts are mobile, network topology can change rapidly over time. In a particular network configuration this topology is unpredictable. Therefore, in order to provide communication between nodes in the network, routing protocols must be used to find the path between the nodes. The goal of an autonomous network routing protocol is to determine a path between a pair of nodes so that messages can be sent efficiently and reach the correct destination in a limited time. Various routing protocols have been developed for this purpose. Since the number of nodes in a MANET is limited and some nodes cannot communicate directly with each other, the communication method of an ad hoc network is based on multiple sequences between one or more media. Mobile devices can be available in different types. There are differences between these devices and this change affects the communication and the design of the communication. A routing protocol suitable for use in private networks must meet the following characteristics:

- To increase reliability, the MANET protocol must be provided.
- Mobile devices use batteries for power, so they can have very low power, so the protocol needs to be efficient.
- The routing protocol must also ensure quality of service.
- Confidentiality must be ensured by the routing protocol since the data sent on the private network contains many headers indicating that the packet must be authenticated.

1.2 MANET Congestion Issue

Mobile Ad Hoc Networks (MANET) facilitates the exchange of information among disconnected networks or mobile users. In MANET, each mobile device acts as a router and collaborates with others to successfully transmit data. However, MANET faces challenges such as high transmission error rates, transmission contention, and congestion. When intermediate nodes are unable to deliver all data packets at the same rate, they create a queue to temporarily store some packets until they can be transmitted. Unlike wired networks, addressing congestion in ad-hoc networks is more complex due to limited resources like wireless bandwidth, power constraints, and node mobility. MANET congestion is a significant problem as there is no central access point or controller. Congestion occurs when multiple users demand more network resources (bandwidth, buffers, and queues) than the network can handle. As the offered load increases, network throughput initially increases linearly, but eventually reaches a point where further load causes response times to increase and packets to be dropped. In mobile ad hoc networks, factors such as limited resources and node mobility can contribute to packet drop.

- Packets may be lost due to transmission errors such as wireless connection. media are used to convey the possibility of interference There are more on the channel. This type of packet loss is not possible was removed or reduced to improve the protocol.
- MANET experiences high packet loss when nodes switch locations during communication. When the node is moved may not be available for a long time at that time more packages are doomed to disappear.
- Rate Packet access speed exceeds the capacity of the outgoing connection less resources, e.g. less battery power, slower equal distance etc.
- If the package is not available it will be posted online, but I The waiting time on the line exceeds the limit that the packet can reach Tied by knots.

There is a close relationship between car types. The network is full and buffered on the network router. Live network environment, every connection capacity is complete and everything resource requests may exceed availability Capacity. In such cases the connection becomes overloaded and when this happens full. This song can go on for a while longer (permanent) or short-term (temporary). Short term the pack was fully charged and exploded instantly. For a while the answer to the question is possible by giving more Buffer space on the router to allow packets on the connection The waits briefly before being sent to the next line. Two Here are common methods to solve the blockage problem:

1. 2. 1 Prevention is a way to deal with network congestion kicks in before the channel gets too busy. For this the main purpose of is to control and communicate their status. There are neighbor nodes in the network so there is no more traffic than me knots of any size can work and comes in the queue, so it won't be a problem. Church affects network performance. So some are needed issue management methods are required to protect the network. Congestion avoidance is common in MANET is more complex than wired network due to its uniqueness Features. Below are some of the most important QoS features provisioning and maintenance issue in MANET.

A. Fixed route discovery not possible in Mannetti is better to choose a network to avoid a large network. Safe route. For this purpose, the process will be analyzed under a single heading.is the best bug free full version with high quality transfer The distribution rate is optional. Requires head knowledge will always remain available but due to power outages Such a selection is not possible in the MANET environment.

B. Broadband storage is not possible in MANET Saving bandwidth is a way to prevent a network from crashing multiplicity by which the node reserves its bandwidth for the future communications via peer-to-peer communication Theis delivered in two to three hops. Evidence is also needed people exchange messages with each other while sharing the network Amongheads. In the MANET environment, a node can move at any time even from the location registered in the node communication continues. Online storage means: Additional for sending and posting. Then Reservation of lines is not possible in MANET.

C. Lack of Service Level Agreement (SLA) In MANET, each participating node acts as a host and a server. Routers. No node is responsible for a specific activity study. Because all channels in the network work together for delivery service, no clear definition of service level agreement (SLA). Infrastructure network services are enabled while you are inside users on the network are served by one or more services Providers. It is therefore not possible to compare the behavior of the heads required to avoid speeding.

D. Secure network not supported Because MANETs have free bandwidth and capacity. Due to interference, noise and multipath fading, channels are not reliable. There is also a line at the inter section cannot be compared exactly because there are many differences depends on mobility of nodes and other wireless devices pollution etc.

E. Routes in MANETs Routing in MANETs are complex due to the complex interactions that occur. often. When all the links on the road are broken, he must find something Still links exist or have been replaced with newly found links. This redirection function consumes less radio resources and battery power will also be affected if the operation is slow Quality of Service Practices and Network Disruption functions. Therefore, the production process needs to deal with this type of the hardest problems to solve.

1. 2. 2 Control of Congestion

Another method can be used to solve the blockage problem, in which case the control operations are performed from now on There is congestion on Channel. How to monitor meetings normally? people are working to develop the network as a whole. Based on network load conditions, control density is done by checking the data transfer rate of each channel resources help prevent violence It will lead to and more usage in the future lines. The main purpose of problem management reduces latency and buffer overflow depending on network density makes the network more efficient. Like density is directly related to the packet loss issue, i.e. It is recommended to use the same method online the pack drop will be smaller, he said. But look Reducing size in MANET is difficult in comparison [8] in cable due to some unique features MANET] is due to some unique features of MANET as follows:

A. There is no central point or base station control as in the MANET. all channels. Any device can be moved for free MANET, so the network topology is not correct. So no predicts whether a node is active at a given time publications will participate or not participate in all distributions. Title can be moved at any time to identify the process and open the source's data transmission may be interrupted at any time. If no way can be found average data sending level is starting to drop package after some time.

B. **Multi-Hop Route Concept** Every node in MANET can receive and transmit data other articles. But the ability to send nodes is limited Distribution of ; so only packet can provide data this node falls into its distribution. If there are two nodes are not included in the transfer wants to connect with many thoughts to choose the way in MANET. The route is then determined by the metric protocol , the sender starts sending data to the underlying node distributed series. Each of these nodes is called a range is the best way to send data to other networks This process is repeated until the data reaches its destination. This is possible The probably has some heads dealing with heavy traffic as well Compare with other nodes in the network as they change The distance of the is similar in many respects multi-node deployments; thus increasing packet access speed This node may therefore have exceeded its transmission capacity This node is starting to drop packets.

C. **Heterogeneous Environment** In a MANET**,** any device can participate as long as it can transmit information. These interactive devices are of different types different storage capacity and accessories. Distributed The speed of each device may remain different. Added to MANET new device is very easy if it is deployed other node becomes part of this network. This is possible, it is possible for a new device to arrive and start transferring its data is on a route already defined by other nodes. All equipment participants in communication are of different types and possibilities is always available, making it time consuming Communication does not last very long [6]. In this type of package format was predicted by its predecessor. Sometimes nodes become the middle layer of many nodes. A. This node can host events across its many neighbors sending data simultaneously, hence overload The package size reaches this middle range. if I am Node's data rate has been high since sent Rate is starting to drop packages.

D. **High neighborhood density** The number of neighbors of each node can also be a factor distrust towards nodes in MANET because if a node can not to provide information directly to the recipient using the interface nodes to send data packets as all nodes arrive Under the transfer of the connection called. In MANET, more adjacent nodes means more connections for each node connections between neighbors and their neighbors. Will be reasons for high packet access to a particular node is why most of each node's neighbors are variable is the reason for the heavy load compared to the master node Capacity. In such a case node i starts to go down Package.

E. **Existence of packet dropping nodes** The reliability of the node will be reduced due to its presence power unit. Participating devices in MANET devices are sometimes limited to protocol options and selection options within the protocol. is the power package that acts as the mid-range. A. Packet Dropper node is actually a selfish concept that is not at the fore front packets of data are being sent to the next node, but instead they just drop Team Savings Package [4]. Availability of power packs is a big problem in MANET and that's not the only reasons lows down a lot but also creates a heavy load channel because the sender can be involved in sending the packet If no decision is received from f no acknowledgement is received from the receiver.

F. Due to lack of physical protection, It is not possible to maintain the level of diversity in MANET threat node may move as location is not fixed in all directions in the network. Muscles can be affected by all kinds of things aspect rather than direct physical protection such as firewall and Port cannot be used. It means protecting yourself needs to be equipped to counter the attack directly or indirectly. But due to lack of physical protection like on the mainnet There are many opportunities for nodes to distrust each other and start drop pack

1. 3 Main activities and summary Church Inspection Program

The key performance indicators evaluated are:

A. **Routing Load:** Cargo is on its way to the street where you live communication link due to transmission of designated routes(RREQ, RREP, RERR etc.) packages. Road package included identical data were sent by the node. This package uses some of these is part of the existing communications link protocol. These additional packets do not provide message content.

B. Normalized Routing Load: It is the average number of messages spread by: is the number of data packets of each node in the network successfully reached its destination. price low For NRL, means better protocol performance.

C. **Package Delivery Rate (PDR)**:PDR is the measure of the number of successful page sgot all the clues for all the information injected into the network in the specified format from all sources Season. PDR is a number between 0 and 1. It's normal It represented percent. If no packets were delivered = PTS No packets received = PTR Then PDR (%) = (PTR/PTS) * 100

D. Throughput: The throughput metric is used to measures how well the network can constantly provide data to the sink. Throughput is the number of packet arriving at the receiver per unit time Let T is the unit time in which measure in milliseconds. N is the number of packets which has been received in T. Then throughput=N/T milliseconds

2. HOW TO CONTROL CONGESTION

2.1 Dynamic congestion detection and avoidance

T. Senthilkumaran and V. Sankaranarayanan et al.methods for early detection and prevention channel against congestion. His work is based on this to calculate the length of the first average line. For this aims to calculate average line length per node Level. Network features such as congestion and route outages should be detected and fixed using a reliable method. Open solves the problem of traffic congestion, there are many innovations benchmarking techniques recommended for traffic analysis variables. The knot is determined by evaluating the average line ratio. could see there was a chance there were too many to send warning messages to neighbors. If neighbors are welcome warning message when searching for an alternative route with no route to the destination. If there are other ways then precedes the node initiating a new communication via the other node Method. This method used to measure the density of the experiment enables reliable communication in MANET to check the density of a private line. They asked DCDR uses a method to detect random paths. hence packet loss rate is decreased, and by which end-to-end delay is reduced so throughput is improved.

2.2 Detection and removal of lost packets Professor Reeta Bourasi and Sandeep Sahu2 and colleagues proposed a new technology that uses reliable results to detect lost packets in the network. In MANET, low resources such as low battery and low packet loss are all nodes that cannot effectively cooperate in the network because they do not send messages. In order to save resources . These nodes are called selfish or mischievous nodes, and these nodes also cause congestion. Dumping data packets not only affects the network connection, but also affects many network resources. To solve this problem, MAC layer authentication technique is used to identify the packet. To remove nodes from the network, their reliability is evaluated during packet transmission. In this study, the trust area is increased according to the confirmation received by the receiver and each sender decides to send the packet from the node with more confidence. By including the reliability field in the packet header, packet rotation can be defined because if the nodes do not forward the packet to the next hop, drop the packet, and do not receive the packet from the next hop, the reliability field value will never increase. Therefore, according to the node's belief, packet dropping nodes can be detected and isolated from the network, which not only improves performance but also increases network connectivity.

2.3 Ensuring reliability of terminal nodes
Majid Ahmad & Durgesh Kumar Mishra et al. Terminal pair reliability is defined as the efficiency of communication between two (selected) terminals in the network; therefore the reliability of the terminal depends on the participating terminals and the connecting link. As the number of nodes increases, the time complexity of the reliability calculation process increases exponentially, making it computationally infeasible to calculate the reliability of large-scale mobile networks. Calculating the reliability of large cell numbers. The proposed method calculates the reliability of mobile ad hoc networks by identifying key links in the network. This method uses significant nodes as a computational theory, so this method should be able to reduce the expected computational complexity in a practical way.

2.4 By handling the problem of non-passing by Robin Choudhary & Niraj Singhal et al. Compared to mobile networks that use fixed media for data transmission, only limited bandwidth is available in mobile ad hoc networks, hence there is more time for errors to occur, which hinders further data transmission. Therefore, it is necessary to utilize the limited resources to get as good results as possible with minimum amount during transmission. Mobile nodes have limited transmission capacity and need multi-hop relays to carry some overhead on TCP congestion control mechanism, so the congestion control mechanism of traditional networks is not used in ad hoc networks. The aim of congestion control in this paper is to limit the delay and buffer overflow problems that cause network congestion. The extent of packet loss is one of the main reasons for high latency and low throughput. It is used for communication between locations and addresses in MANETs. This process relies entirely on receipt confirmation and delivery confirmation for each package received. Most current systems do not distinguish between associations with other types of crime. This article determines whether the link is displayed or not. Link failure and network fragmentation, mostly caused by failures such as mobility and battery consumption, have a negative impact on MANETs. To solve this problem, a new method is proposed that uses rate changes and angle changes in the common packet to identify and control congestion before packet loss in MANETs.

2.6 Human density near a certain height reduces connectivity
Zhao Xibin, You Zhiyang, Wan Haiwan et al. They said that the performance of the node is also affected by the number of neighbors of the node. The performance impacts of node mobility and reliability on real MANET platforms are proposed and analyzed. They proved that the capacity of wireless networks is limited and as the number of users increases, the access to each user in the wireless network will decrease to zero. Since the transmission capacity of the wireless network will affect the access, it will also affect the terminal reliability of MANET. Congestion means too many packets arriving on the network, resulting in too many packets being lost. A node can communicate with its neighbors. Since they are in multi-node communication, there is always the possibility that many neighboring nodes are sending packets to the same node at the same time, so the multiplicity of packets arriving at the nodes will cause the packets to decrease. . Therefore, congestion is related to the node speed in certain areas, which will affect the reliability of the terminal by reducing

the reliability of intermediate nodes. For each node, the more neighbors there are, the greater the connection between the node and its neighbors, which may lead to lack of trust in the node, so to reduce the congestion problem, this article focuses on relationship identification. Between numbers and reliability of nodes.

2.5 Using optimized reliable private optional distance vector (ORAODV) scheme Srinivas Sethi and Siba K. Udgata et al [16] proposed optimized and reliable private optional distance vector (ORAODV) scheme that provides fast. Dynamic connection conditions, low performance and low network utilization in ad-hoc networks. The application process (ORAODV) aims to ensure the most convenient and reliable transmission of packets. The new Extended Ring Call Interception (Interception-ERS) concept is used to block broadcasts across the network. Block-ERS does not start the route search process from scratch every time it needs to be redone. Replay may be initiated by an agent of the base's appropriate representation as a relay or name. Packet retransmission in ORAODV provides good performance in terms of Packet Delivery Rate (PDR), Normalized Route Load (NRL) and delay for different network densities such as number of nodes and multiple routes arriving.

REFERENCES

[1] Ms. Ritu Jain, Mrs.Bhawana Pillai "A Survey on Congestion Problem of MANET" International Journal of Computer Science and Information Technologies (IJCSIT), Vol. 6 (2) , 2015, 947-951

[2] T. Senthilkumaran, V. Sankaranarayanan "Dynamic Congestion Detection and Control Routing in Ad Hoc Networks" Journal of King Saud University – Computer and Information Sciences, pp-25–34, May 2012.

[3] K.Dinesh Kumar, I.Ramya & M.Roberts "Queue Management In Mobile Adhoc Networks(Manets)" IEEE/ACM International Conference on Cyber, Physical and Social ComputingGreenCom CPSCom pp.943-946,2010.

[4] Dr.S.S.Dhenakaran, A.Parvathavarthini "An Overview of Routing Protocols in Mobile Ad-Hoc Network" International Journal of Advanced Research in Computer Science and Software Engineering(IJARCSSE) Volume 3, Issue 2,pp.251-259, February 2013.

[5] Reeta Bourasi , Prof Sandeep Sahu, " Detection and Removal of Packet Dropper Nodes for Congestion Control over the MANET", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering(IJIREEICE) Vol. 1, Issue 2, pp.55-63,May 2013.

[6] Li Yuanzhou, Hu Weihua "Optimization Strategy for Mobile Ad Hoc Network Based on AODV Routing Protocol" 978-1-4244-3709- 2/10 IEEE 2010

[7] T. Senthilkumaran, V. Sankaranarayanan "Early Congestion Detection and Adaptive Routing in MANET" Egyptian Informatics JournalVol.1,, pp-165-175,Oct, 2011.

[8] Shawqi Kharbash ,Wenye Wang " Computing Two-Terminal Reliability in Mobile Ad hoc Network"in Wireless Communication And Networking Conference of IEEE,Vol.1,pp.2831- 2836,March2007

[9] Gaurav Sharma, Akhilesh K. Bhardwaj" Congestion Control in Ad hoc Network" International Journal of Advanced Research in Computer Science and Software Engineering(IJARCSSE)Volume 3, Issue 6,pp.283-286 June 2013.

[10] Majid Ahmad Durgesh Kumar Mishra "A Reliability Calculations Model for Large-Scale MANET" International Journal of Computer Applications Volume 59– No.9, pp. 17-21, December 2012.

[11] Robin Choudhary, Niraj Singhal, "A Novel Approach for Congestion Control in MANET" International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 5, pp. 55-61, November 2012.

[12] Ramratan Ahirwal , Ganesh Lokhande and Yogendra Kumar Jain "TCP Congestion Control through Bandwidth Estimation Mechanism in MANET" International Journal of Applied Information Systems

[13] Shakeel Ahmad, Adli Mustafa, Bashir Ahmad,, Arjamand Bano ,Al Sammarraie Hosam" Comparative Study Of Congestion Control Techniques In High Speed Networks" International Journal of Computer Science and Information Security(IJCSIS),Vol.6, Issue No. 2,pp.222-231, 2009.

[14] G.Vijaya Lakshmi, Dr. C.Shoba Bindhu, "Congestion Control Avoidance in Ad hoc Network using Queuing Model" International Journal of Computer Science & Application (IJCTA) , pp. 750-760, July-August 2011

[15] Shitalkumar A Jain "A Study on Congestion Aware Multipath Routing Protocols in MANET" Multidisciplinary Journal of Research in Engineering and Technology(MJRET), Volume 1, Issue 1,pp.119- 128 ,April 2014.

[16] Xibin Zhao, Zhiyang You, and Hai Wan "A Novel Two-Terminal Reliability Analysis for MANET" Research Article Hindawi Publishing Corporation Journal of Applied Mathematics Volume 2013, Article ID 216186.

[17] Siba K. Udgata, Srinivas Sethi "Optimized and Reliable AODV for MANET" International Journal of Computer Applications Volume 3 – No.10, pp. 22-26, July 2010.

[18] S. Subburam, P. Sheik Abdul Khader " Predictive congestion control mechanism for MANET" Indian Journal of Computer Science and Engineering (IJCSE) Vol. 3,Issue No.5,pp.640-651,Nov 2012

[19] S.A.Jain, S.R.Kokate, Pranita Thakur, Shubhangi Takalkar " A Study of Congestion Aware Adaptive Routing Protocols in MANET" International Journal of Scientific and Research Publications, Volume 2, Issue 4, pp.1-5,April 2012.

[20] Durgesh Wadbude, Vineet Richariya " An Efficient Secure AODV Routing Protocol in MANET" International Journal of Engineering and Innovative Technology (IJEIT)Volume 1, Issue 4,pp.274-279, April 2012.

[21] J.Premalatha, P.Balasubramanie "Enhancing Quality of Service in MANETS by Effective Routing" ICWCS IEEE 2010