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Decide a Finest Path in Mobile Ad Hoc Network

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Abstract: ***Mobile ad hoc network; a network of unorganized nodes with the capability of change the path of data transmission dynamically. Some protocols are works as guideline for set a communication model for data transmission between various ends of network like DSDV, TORA, and AODV etc. The optimal goal is as primarily decide select the shortest path or if not available select next one best suit. In this paper we will go to describe a special case haw to send a large data file through various paths or multiple transmission send in the name of response supplied at the single end user.***

Keywords: DSDV, TORA, AODV, MANET, source quench, promiscuous

1. Introduction

A mobile ad hoc network (MANET) is a continuously self-configuring, infrastructure-less network of mobile devices connected without wires. Ad hoc is Latin and means "for this purpose". Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet. They may contain one or multiple and different transceivers between nodes .This results in a highly – dynamic, autonomous topology.

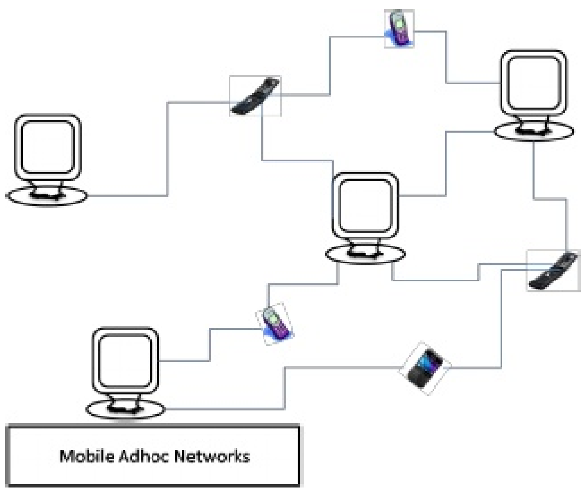
MANETs are a kind of Wireless ad hoc network that usually has a routable networking environment on top of a Link Layer ad hoc network. MANETs consist of a peer-to-peer, self-forming, self-healing network in contrast to a mesh network has a central controller (to determine, optimize, and distribute the routing table). MANETs circa 2000-2015 typically communicate at radio frequencies (30 MHz - 5 GHz).

Multi-hop relays date back to at least 500 BC. The growth of laptops and 802.11/Wi-Fi wireless networking have made MANETs a popular research topic since the mid-1990s. Many academic papers evaluate protocols and their abilities, assuming varying degrees of mobility within a bounded space, usually with all nodes within a few hops of each other. Different protocols are then evaluated based on measures such as the packet drop rate, the overhead introduced by the routing protocol, end-to-end packet delays, network throughput, ability to scale, etc.

In MANET routing protocols can be classified in to two categories:

(1) Pro active protocols
(2) Reactive protocols

Pro active protocols: these protocols are also called as table driven routing protocols which contains up to date information or maintain routing information of all nodes in the network and add new routs with the existing routes.



In this routing protocols route is always ready to any destination when needed. The major drawback of table driven routing protocols is maintain conversions .When over hand off flooding route advertisements.

Reactive protocols: these protocols contain routs when they are needed. That's why the nodes using reactive protocols and these do not need the update the routing table as frequently and no need to maintain the route for nodes over the network. When reactive routing protocols use by a nodes it require a route to a new destination, it firstly send a route. Packets are transmitted between stations of the network by using routing tables which are stored at each station of the network. Each routing table at each station, list all available destinations and the number of hops to each request and must be wait until the route is not found . Reactive routing protocols have main disadvantage through which more time is required for searching a route to new destination so there is no need to maintain table or all possible routes over network previously.

In MANET node position is dynamic, so topologies changes very frequently. The range of transmission of nodes very bounded, so nodes which are far away from one to another cannot communicate to each other. So many researchers proposed many protocols for achieving the efficient way of routing over cast decades. Then new routes are searching by every protocol using new techniques, when host move from one location to another location. The many important issues in MANET are energy consumption because mobile nodes have restricted battery power.

2. MANET Routing Protocols

AODV stands for Ad-hoc on demand distance vector routing protocol. The AODV routing protocols uses on demand approach for searching routes that why a route is generated then it is needed by source node for sending data packets. In AODV, the source node and intermediate node store the information about the next hop corresponding to each flow of packet transmission .The AODV capable of both unicast & multicast routing. It is a self loop starting, loop free protocols the AODV protocols uses the serial numbers which are created by the receiver for each route entry to ignore routing loop. The greatest sequence no. of routes is preferred in choosing routes from source to destination. The standard ns-3 distribution contains the AODV protocols, but they are increasing some problems due to its implementation. AODV protocol has taken large amount of time consumption for finding route over network from source to destination node and the AODV protocols create route only when there is urgent need for transferring the information from source to destination the main advantages is that no extra traffic is created for communication along existing links.

By using AODV approach: - In to this approach network in silent until a connection is needed. In it unused entries in the routing table are recycled after a time. When we need a shortest path from source node to destination node, at that time AODV approach is used because that shortest path is needed at less period of time. At any instant position, when a route is instantly required; only AODV approach is used. Because AODV is the only one protocol who can provide any instant path when a source node needed. That's why the AODV protocol is best suitably used when their needed an instant path for the transmission of data packet from source node to destination node. By using TORA approach: - This TORA approach is highly adaptive distributed routing approach.

Destination-Sequenced Distance-Vector Routing (DSDV) is a table-driven routing scheme for ad hoc mobile networks based on the Bellman–Ford algorithm. It was developed by C. Perkins and P.Bhagwat in 1994. The main contribution of the algorithm was to solve the routing loop problem. Each entry in the routing table contains a sequence number, the sequence numbers are generally even if a link is present; else, an odd number is used. The number is generated by the destination, and the emitter needs to send out the next update with this number. Routing information is distributed between nodes by sending full dumps infrequently and smaller incremental updates more frequently

3. Data Monitoring and Mining

MANETS can be used for facilitating the collection of sensor data for data mining for a variety of applications such as air pollution monitoring and different types of architectures can be used for such applications. It should be noted that a key characteristic of such applications is that nearby sensor nodes monitoring an environmental feature typically register similar values. This kind of data redundancy due to the spatial correlation between sensor observations inspires the techniques for in-network data aggregation and mining. By measuring the spatial correlation between data sampled by different sensors, a wide class of specialized algorithms can be developed to develop more efficient spatial data mining algorithms as well as more efficient routing strategies. Also researchers have developed performance models for MANET by applying queuing theory.

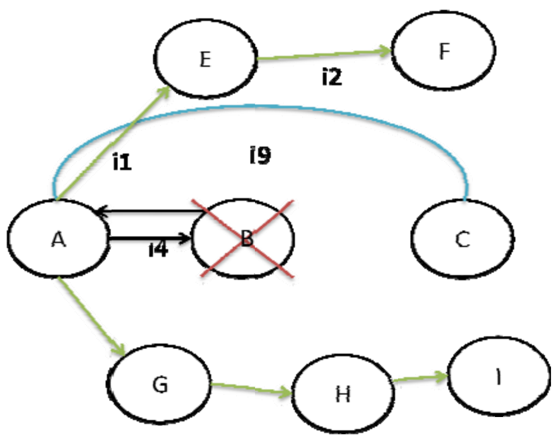
Security

A lot of research has been done in the past but the most significant contributions have been the PGP (Pretty Good Privacy) and trust based security. None of the protocols have made a decent tradeoff between security and performance. In an attempt to enhance security in MANETs many researchers have suggested and implemented new improvements to the protocols and some of them have suggested new protocols.

Attack Classifications

These attacks on MANETs challenge the mobile infrastructure in which nodes can join and leave easily with dynamics requests without a static path of routing. Schematics of various attacks as described by Al-Shakib Khan on individual layer are as under:

- Application Layer: Malicious code, Repudiation
- Transport Layer: Session hijacking, Flooding
- Network Layer: Sybil, Flooding, Black Hole, Grey Hole. Worm Hole, Link Spoofing, Link Withholding, Location disclosure etc.
- Data Link/MAC: Malicious Behavior, Selfish Behavior, Active, Passive, Internal External
- Physical: Interference, Traffic Jamming, Eavesdropping
- BY using DSDV approach: -We have to deliver the same message or data file at the several destination ends. Here we select the source end and collect the various end points where the data to be broadcasted.



DSDV functioning

- This approach is freeform as the distribution of direction message or guide line from one to multiple end points immediately.
- By following DSDV we can avoid the problem of resending same thickness of data where the destination end must be contain the autonomous property regarding the service to be delivered at the destination end. For e.g. Fire siren means that the left the building or this place

TORA: The Temporally Ordered Routing Algorithm (TORA) is an algorithm for routing data across Wireless Mesh Networks or Mobile ad hoc networks. It was developed by Vincent Park and Scott Corson at the University of Maryland and the Naval Research Laboratory. Park has patented his work, and it was licensed by Nova Engineering, who is marketing a wireless router product based on Parks algorithm. The TORA attempts to achieve a high degree of scalability using a "flat", non-hierarchical routing algorithm. In its operation the algorithm attempts to suppress, to the greatest extent possible, the generation of far-reaching control message propagation. In order to achieve this, the TORA does not use a shortest path solution, an approach which is unusual for routing algorithms of this type. TORA builds and maintains a Directed Acyclic Graph (DAG) rooted at a destination. No two nodes may have the same height. Information may flow from nodes with higher heights to nodes with lower heights. Information can therefore be thought of as a fluid that may only flow downhill. By maintaining a set of totally ordered heights at all times, TORA achieves loop-free multipath routing, as information cannot 'flow uphill' and so cross back on itself. The key design concepts of TORA are localization of control messages to a very small set of nodes near the occurrence of a topological change. To accomplish this, nodes need to maintain the routing information about adjacent (one hop) nodes. The protocol performs three basic functions:

- Route creation
- Route maintenance
- Route erasure

During the route creation and maintenance phases, nodes use a height metric to establish a directed acyclic graph (DAG) rooted at destination. Thereafter links are assigned based on the relative height metric of neighboring nodes. During the times of mobility the DAG is broken and the route maintenance unit comes into picture to reestablish a DAG routed at the destination. Timing is an important factor for TORA because the height metric is dependent on the logical time of the link failure. TORA's route erasure phase is essentially involving flooding a broadcast clear packet (CLR) throughout the network to erase invalid routes.

Route creation: A node which requires a link to a destination because it has no downstream neighbors for it sends a QRY (query) packet and sets its (formerly unset) route-required flag. A QRY packet contains the destination id of the node a route is sought to. The reply to a query is called an update UPD packet. It contains the height quintuple of the neighbor node answering to a query and the destination field which tells for which destination the update was meant for. A node receiving a QRY packet does one of the following:

- If its route required flag is set, this means that it doesn't have to forward the QRY, because it has it already issued a QRY for the destination, but better discard it to prevent message overhead.
- If the node has no downstream links and the route-required flag was not set, it sets its route-required flag and rebroadcasts the QRY message.

A node receiving an update packet updates the height value of its neighbor in the table and takes one of the following actions:

- If the reflection bit of the neighbors height is not set and its route required flag is set it sets its height for the destination to that of its neighbors but increments d by one. It then deletes the RR flag and sends an UPD message to the neighbors, so they may route through it.
- If the neighbor route is not valid (which is indicated by the reflection bit) or the RR flag was unset, the node only updates the entry of the neighbor node in its table.

Route maintenance: Route maintenance in TORA has five different cases according to the flowchart below:

Example

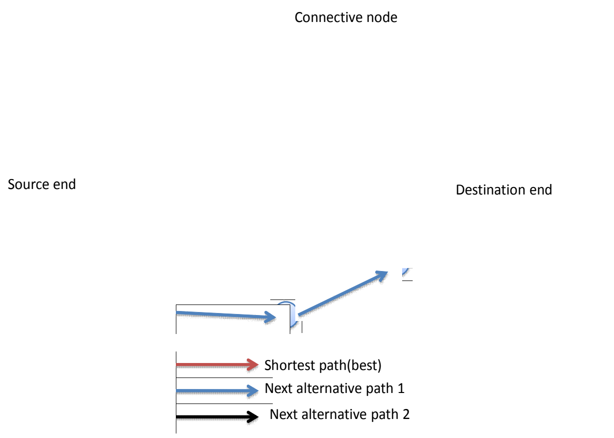
i. B still has a downstream link to the destination so no action is needed
ii. Partition detection and route erasure
iii. He links D-F and E-F reverse. Node D propagates the reference level.
iv. Node E now "reflects" the reference level. The reference heights of the neighbors are equal with the reflection bit not set. E sets the reflection bit to indicate the reflection and sets its offset to 0. Node C just propagates the new reference level.
v. Node A now propagates the reference level.

Route Erasure

When a node has detected a partition it sets its height and the heights of all its neighbors for the destination in its table to NULL and it issues a CLR (Clear) packet. The CLR packet consists of the reflected reference level and the destination id.

If a node receives a CLR packet and the reference level matches its own reference level it sets all heights of the neighbors and its own for the destination to NULL and broadcasts the CLR packet. If the reference level doesn't match its own it just sets the heights of the neighbors its table matching the reflected reference level to NULL and updates their link status.

By using TORA approach:-TORA approach is used when there is large amount of data packet and that will be transmitted from source to destination node, but the problem is route is too busy or data file is large (it’s hard to carry the complete file over a dedicated route). So that the data file is divide into several small size data packets;



These data packets are assigned a unique index order that can be transmitted over the various path and rearrange at the destination end as per sequence allotted to the data packets to avoid the loss of data consistency.

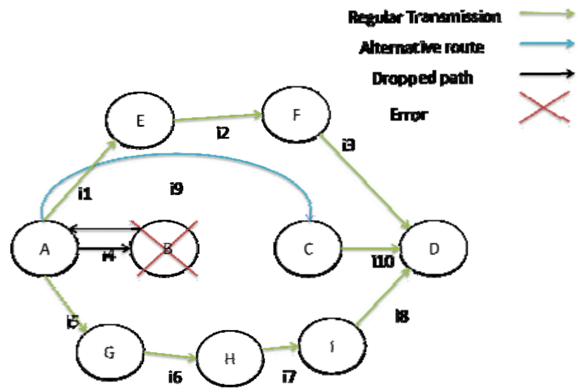
4. Proposal Work

we are highly emphasis on the transmission of data from one point to another point; in this paper we are going to describe some special case that are might be helpful to a better approach to select whether a path is select or not.

Case 1. Transmission of a large data file: Here we are consider a large file which contains a bulk amount of data that is to transmitted at the single end (destination point). A new approach is to be selected for the transmission of data in the various phases as given below:

- Decompose the data records in to benefited parts.
- Assign the index to the each port of data record.
- Select the best paths from source to destination end.
- Collect the all the data stream at the destination end.
- Merge the data records as per the sequence allotted the data segments/ data packets.
- Collect and retrieve the information.

Into this is sent from one end to another end in parts, the parts are in small size as compare to complete data record at a time. This is might be take less time to keep a track continue for the large data transmission. The risk of path loss and data loss is reduced with great rate; the feature of rearrangement of data at the destination end helps to keep the consistency of data record. Exploiting multi-path transmission under a proposed adaptive link weight algorithm. Data transmission through multiple paths improves the connection probability by reducing the wavelength hold time on a link. Further it reduces traffic load on bottleneck links by distributing traffic over multiple paths in the network. The proposed approach uses multiple edge disjoint paths to mitigate the congestion problem through load balancing and improves the reliability. We study the effectiveness of the proposed algorithm using network simulation and estimate the call blocking probability for the given resources through a single and multi-path transmission to establish the superiority of the latter approach.



PATH SELECTION PROCEDURE FROM ONE END TO ANOTHER

Algorithm applied for the route deciding approach:

Step 1: Assign to every node a tentative distance value: set it to zero for our initial node and to infinity for all other nodes.
Step 2: Mark all nodes unvisited. Set the initial node as current. Create a set of the unvisited nodes called the unvisited set consisting of all the nodes.
Step 3: For the current node, consider all of its unvisited neighbors and calculate their tentative distances. Compare the newly calculated tentative distance to the current assigned value and assign the smaller one. For example, if the current node A is marked with a distance of 6, and the edge connecting it with a neighbor B has length 2, then the distance to B(through A) will be 6 + 2 = 8. If B was previously marked with a distance greater than 8 then change it to 8. Otherwise, keep the current value.
Step 4: When we are done considering all of the neighbors of the current node, mark the current node as visited and remove it from the unvisited set. A visited node will never be checked again.
Step 5: If the destination node has been marked visited (when planning a route between two specific nodes) or if the smallest tentative distance among the nodes in the unvisited set is infinity (when planning a complete traversal; occurs when there is no connection between the initial node and remaining unvisited nodes), then stop. The algorithm has finished.
Step 6: Select the unvisited node that is marked with the smallest tentative distance, and set it as the new "current node" then go back to step 3.

The diagrams show that how the data is to be transmitted through various paths at the same end. As the simultaneous transmission of data is done the transmission time is must be reduced with the considerable amount; once the given direction is selected then the transmission is very within instance.

5. Conclusion

This approach helps to provide transmission of data through the singular path as well as multipath. By using this path, we can transmit single file to multiple data end & singular file transmission to the single end through multiple path .this approach helps to provide parallel transmission as well as sequential transmission which is the feature of shortest and finest and alternative path decided by merge of AODV, DSDV, TORA protocols. This is a guide about a way through which indication are provided complex feature of all advance protocols.

References

[1] Jenn-Wei Lin and Yi-Ting Chen, " Local replacement for route recovery on a collaborative mobile ad hoc network", WIRELESS COMMUNICATIONS AND MOBILE COMPUTING, 2011; 11:1341–1357.
[2] David B. Johnson David A. Maltz Josh Broch, " DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks".
[3] Dr.S.S.Dhenakaran and A. Parvathavarthini2, "An Overview of Routing Protocols in Mobile Ad Hoc Network", Available: http://www.ijarcsse.com/docs/papers/Volume_3/2_February2013/V3I2-0201.pdf
[4] David B. Johnson, " Routing in Ad Hoc Networks of Mobile Hosts", In Proceedings of the IEEE Workshop on Mobile Computing Systems and Applications, pages 158–163.IEEE Computer Society, December 1994.
[5] David B. Johnson and David A. Maltz, "Dynamic Source Routing in Ad Hoc Wireless Networks", In Mobile Computing, edited by Tomasz Imielinski and Hank Korth, chapter 5, pages 153–181. Kluwer Academic Publishers, 1996.
[6] Josh Broch, David B. Johnson, and David A. Maltz, "The Dynamic Source Routing Protocol for Mobile Ad Hoc Networks", Internet-Draft, draft-ietf-manet-dsr-03.txt, October 1999. Work in progress. Earlier revisions published June 1999,December1998,andMarch1998
[7] Tamer Demir, " Simulation of Adhoc networks with DSR protocol".
[8] "Reactive Routing Protocols for Adhoc wireless networks", Available: www2.ece.ohio-state.edu/~ji/Seminars/ReactiveRoutingProtocols.ppt
[9] M. Frodigh, P. Johansson, and P. Larsson. "Wireless ad hoc networking: the art of networking without a network," Ericsson Review, No.4, 2000, pp. 248-263.
[10] "THE HANDBOOK OF AD HOC WIRELESS NETWORKS" Edited by Mohammad Ilyas Florida Atlantic University Boca Raton, Florida
[11] Wenjia Li and Anupam Joshi, Department of Computer Science and Electrical Engineering University of Maryland, Baltimore County "Security Issues in Mobile Ad Hoc Networks- A Survey"
[12] K.P. Manikandan, Dr. R .Satyaprasad, Dr. Rajasekhararao. "Analysis and Diminution of Security Attacks on Mobile Ad hoc Network".IJCA Special Issue on "Mobile Ad-hoc Networks "MANETs, 2010
[13] Kisung Kim and Sehun Kim, "A Sinkhole Detection Method based on Incremental Learning in Wireless Ad Hoc Networks".
[14] Ad hoc network specific attacks held by Adam Burg.
[15] Akanksha Saini, Harish Kumar, "Effect of Black Hole Attack on AODV Routing Protocol in MANET".
[16] Sevil ¸ Sen, John A. Clark, and Juan E. Tapiador, "Security Threats in Mobile Ad Hoc Net
[17] Robinpreet Kaur & Mritunjay Kumar Rai, Department of Electronics and Engineering, Lovely Professional University, Phagwara, Punjab, India "A Novel Review on Routing Protocols in MANETs" under Undergraduate Academic Research Journal (UARJ), ISSN : 2278 – 1129, Volume-1, Issue-1, 2012
[18] Lu Han, October 8, 2004 "Wireless Ad-hoc Networks" Priti et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.5, May- 2014, pg. 365-370 © 2014, IJCSMC All Rights Reserved 370 works".