ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 1, January 2018

Secure and Efficient Technique for Network Enhancement using Hash Value and Confidence in MANET

[1] Poonam Yadav, [2] Dr. Shivnath Ghosh
[1] Dept. of CSE, Maharana Pratap College of Technology Gwalior
Associate Professor, Computer Science & Engineering Maharana Pratap College of Technology Gwalior

Abstract: **- In the current years, the wireless network can be infrastructure or infrastructure less in which there is no centralized structure. Mobile Ad Hoc Network (MANET) is the set of nodes where they can communicate to each different wirelessly. They act as a router and forward data at the receiver through the intermediate nodes. It is vulnerable to many attacks due to wireless nature and there are many techniques to eliminate these attacks from the network. In this paper, we send the data through the secure path for which multiple paths are formed. For multiple paths, there are many protocols used and then we calculate the confidence value and reputation value to detect the malicious nodes in the path. Finally, we get the secure path for the data transmission towards the destination. In this way, the performance of the network is improved and the security is also enhanced.**

Keywords:**—Wireless Network, Infrastructure, Routing Protocol, Trust, Confidence value and Security.**

I. INTRODUCTION

The wireless network may be divided into two sorts: Infrastructure less or Infrastructure. In Infrastructure wireless networks, while communicating the mobility node can move, the base stations (BS) are fixed and as the node goes out of the range of a BS later it goes into the range of other BS. The fig.1 is an instance of Infrastructure wireless network.

Fig.1 Infrastructure wirelessly network

In Infrastructure less network, while communicating the mobile node can move, there are no fixed base stations (BS) and each the nodes can act as routers in the network. The mobility nodes in the Ad Hoc network dynamically establish routing among themselves to form their self-network.

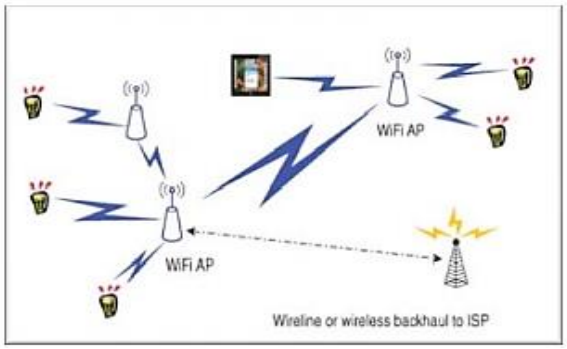

Fig.2 Ad hoc wireless networks

MANET is a group of wirelessly mobility nodes forming a short/temporary-lived network without any fixed infrastructure where each nodes are self-organize to move about arbitrarily and where each nodes configure themselves. All node acts as host and router. The network topology may also modify quickly in MANET. The challenges in MANET are as follows [1]:

1) Speed
2) Network overhead
3) Dynamic network topology
4) Unicast routing
5) Scalability
6) Multicast routing

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7) QoS
8) Secure routing

II. THE COMPARISON OF THE VARIOUS KINDS OF ROUTING PROTOCOL

Parameters	Proactive Protocol	Reactive Protocol	Hybrid Protocol
Routing Scheme	Table driven	On demand	Combination of both
Traffic Overhead	Highest	Lowest	Medium
Mobility	Periodical updates	Route maintenance	Combination of both
Routing Overhead	Highest	Lowest	Medium
Power Capacity	Highest	Medium	Medium
Unicast	Yes	No	Yes
Multicast	No	Yes	Yes
QOS	Yes	Yes	Yes

III. BENEFITS AND WEEKNESS OF SEVERAL ROUTING PROTOCOLS

Protocols	Advantages	Disadvantages
DSDV (Proactive)	DSDV was one of the early defined algorithms.	Need lowest bandwidth and highest battery power for regular up to date of routing tables when the network is idle. DSDV isn't appropriate for highest dynamic or largest scale networks.
WRP (Proactive)	WRP has the similar benefit as that of DSDV. It has quicker convergence and fewer table up to date	The complexity of maintenance of various tables demands a biggest memory and bigger processing power from nodes in the wirelessly ad hoc network. At highest mobility, the control overhead included in updating table entries is almost the similar as that of DSDV and hence isn't appropriate for a highest dynamic and for a very largest ad hoc wirelessly network as it suffers from limited scalability.
GSR (Proactive)	Good bandwidth utilization decreases the size of distance vector table because the routing is performed only CH.	Additional time is spent in choosing of CH and gateways if the mobility node utilizes CDMA/TDMA then it can take certain time to get permission to transmit packets changes in the CH, may outcome in multiple path breaks.
OLSR (Proactive)	Less average end to end delay. Its implementation is user friendly. It does not require that link is reliable for control messages.	Maintains routing table for all routes. Overhead from control messages increases with increased number of mobile hosts. It takes considerable time to find broken links.
ABR (Reactive)	Circumvents packet duplicates. No route reforms.	Operation complexity. Communiqué complexity.
DSR (Reactive)	A route is recognized only when it's needed. Decreasing load. Loop-free routing.	Route overheads. Highest delay. The route maintenance mechanism is bad.
AODV (Reactive)	Adaptability to dynamic networks. Decrease overhead. Lesser setup delay.	Periodic up to date. Inconsistent routes.

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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TORA (Reactive)	Multiple paths created. Communiqué bandwidth and overhead utilization is minimized.	Routing overheads. Based on synchronized clocks amongst nodes.
ZRP (Hybrid)	It decreases the control traffic produced through periodic flooding. It decreases the bandwidth wastage and overhead.	Memory necessity is larger. Big overlapping of routing zones.
ZHLS (Hybrid)	Non overlapping zones. The zone-phase topological data is distributed to each node. Decreases the traffic and evades single point of failure.	Further traffic produced through the maintenance and creation of the zone level topology.
CEDAR (Hybrid)	Decreases the traffic overhead.	The route establishment and computation is relied on central nodes. Core node's movement affects the activity of the protocol[2]

IV. TRUST

Trust is initiated in the protocols to give security in MANET. Trust is a value which is computed on the basis of nodes action when necessary. Trust is initiated to exclude from quite a group of attacks like DoS, wormhole, black hole, selfish attacks etc. Trust can also be carried out in quite a various methods comparable to reputation, subjective good judgment from opinion of needs etc as there are no particular definition of trust. Trust has subsequent properties.

- Function of Uncertainty: Trust is dependent upon the uncertainty of nodes motion. It gives the probability of action performed by way of a node.
- Context Dependence: In a number of specific context trust associations are applicable.
- Quantitative value: Trust can also be assigned any form of numeric values discrete or continuous.
- Asymmetric Relationship: Trust relationship is uneven in nature. If node A trusts B and node B trusts C that does not mean that A trusts C [3].

V. LITERATURE SURVEY

Anjana Tiwari et al. [2017] In this paper, it focuses on AODV routing protocol that is a mostly utilized routing protocol in MANET. Energy consumption is a main issue in Ad hoc network which speciously builds attention today. AODV routing protocol doesn't consider energy of nodes in route discovery phase. If less energy of node occurs in between the path, it causes packet dropping. It leads to link-failure problem. After that system reinitiate RREQ message from sender node again. Therefore, it causes more energy consumption. To overcome this issue, we proposed a new technique based on existing AODV routing protocol without disconnection of route after link failure problem. This scheme does not cause link failure problem and avoid rebroadcast message again from source node. This gives a significant improvement in node energy. The outcome illustrations with proposed technique will enhance the energy of network. The comparison results between proposed AODV and existing AODV routing protocols are shown in term of various QoS parameters such as throughput, energy spent, end to end delay and PDR. This simulation work is analyzed using NS-2 simulation tool (NS- 2.35) under Ubuntu 14.04 LTS as operating system [4]. Sambhu Dahal et al.[2016] In this paper, an Enhanced Multicast Routing Protocol (EMRP) has been defined for MANET. It's depending on MAODV. The defined EMRP is operated in two phase: (i) Multicast Tree Maintenance (ii) Route Discovery and Multicast Tree Formation. EMRP chooses the path depend on hop count and node lifetime to the receiver node. A mechanism is utilized to decrease the route discovery during link break. A node utilizes two hop neighbor information to repair the link. The proposed protocol is compared with an existing one. From the results of simulation, it is seen that the planned EMRP has advanced throughput [5]. A. Rama Rao, et al. [2016] In this paper, they proposed the design of backup path concern for QoS routing protocol. In this protocol, the possible malfunctions of network and node are recognized and a backup routing is initiated. For discovery of failures, a path evaluation function is determined depending on the metrics energy drain rate and obstruction, congestion status is calculated. The principal path fulfilling the QoS parameters node's static resource capability, dynamic resource accessibility, neighborhood quality, and link quality is recognized. If failure is detected, back up routes are established and transmission is redirected on these back up routes. Simulation outcomes demonstrate that the defined protocol has reduced recovery delay and improved throughput [6]. V. Naga Gopi Raju et al. [2016] In this paper, MANET are dynamically configurable and

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International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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organized network, with no any existing infrastructure. It's an integration of many wirelessly nodes. To communicate between the nodes proficiently, the path is built by a routing protocol proficiently amongst the nodes within a network. The routing algorithm should dynamically discover the path which successfully preserves the path with smallest overhead and bandwidth. Our work proposes a novel Passive Source Routing protocol that has an extremely little communication overhead. The define work improves light-weight passive source routing protocol for MANETs, to improve the PSR; they utilize Dynamic find algorithms namely DSRW, DSF and Knowledge Based - DS to find out the route. In such technique, each node of the wirelessly network comprises a neighbor table. Such table includes every node with its details of nearest with distance among them. Therefore, every node has a full topology of the wirelessly network that is helpful to find out the route. Periodic data exchange is utilized to update such table. The solution of routing is studied in MANET and performance is evaluated utilizing NS-2 simulator with various network parameters [7]. Amit Barve, et al. [2016] In this paper, Routing algorithms in MANET like AODV and DSR utilize flooding as the mechanism for discovery of routes in the network. In flooding, all node forwards flood packets to its nearby so as to ensure that the packets arrive the intended receiver. Forwarding of redundant flood packets create additional overhead in bandwidth of network. However, only a subset of nodes needs to forward the packet to make it reach its destination. Clustering has been recognized as a well-organized method to diminish flooding overhead in MANETs. Active Clustering algorithms employ explicit control packets to generate and preserve clusters whereas passive clustering piggybacks the control details in the departing data packets thus significantly reducing control overhead. The define algorithm integrates Passive Clustering with DSR routing protocol. Route Discovery stages of DSR floods the RREQ packets within the whole network. However, the define algorithm creates the clusters in the network in the initial phase of Route Discovery process and once the clusters are formed only a subset of nodes will promote the RREQ (Route Request) packets. This method decreases the overhead on bandwidth through curtailing the flooding of packets and thus growing the PDR. The outcomes demonstrate that optimized DSR algorithm improves the PDR value by smallest of 20% and diminishes the RREQ flooding by a smallest of 30% [8].

V. Sameswari et al. [2016] In this paper, the MANET plays a significant role in networking research environment for sharing information from one to others. MANET is a mobile, which is formed by radio waves without any desirable base stations. The main issue of DSDV is routing overhead continuously, because it maintains the up-to-date information during data transmission. The key drawback of DSR Protocol is route creation delay during route building and end-to-end delay during transmission. To solve the above issue, this paper defines an inventive approach called Hybrid of Destination Sequenced and Dynamic Source routing protocol (HDS2) in MANET. The novel method of HDS2 improves the PDR & throughput and reduces end-to-end delay & route creation delay. The define method has been tested and implemented in NS2 simulator and finally it is compared with existing DSDV routing protocol [9]. Safaa LAQTIB, et al.[2016] In this paper, they have study the performance of many mobility models specifically: Random Waypoint, Random Direction, Random walk and Gauss Markov Mobility Models having changeable amount of nodes. The empirical outcomes recommend that OLSR protocol using Random Waypoint mobility model has better results for different quantity of nodes [10].

VI. PROPOSED WORK

The Message Digest 5 algorithm is an extensively utilized for creating the hash function of 128-bit hash value. Still MD5 was chiefly designed for achieving integrity by generating hash value of message that to be utilized as a cryptographic hash function. It has been recognized to suffer from widespread vulnerabilities for which there are other techniques available. For the validation of data integrity, there can be used a checksum for the corruption against unintended users. MSR (MULTIPLE SOURCE ROUTING) can recover the presentation by giving applications the freedom to use multiple paths within the identical path service. In the proposed work, there is lots of technique used to develop the network performance.

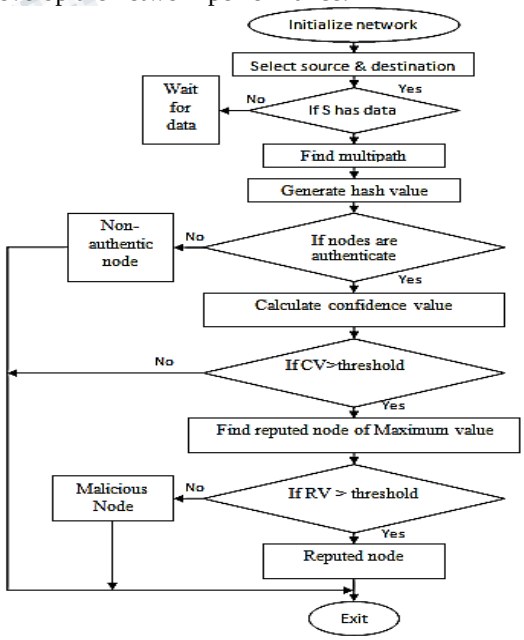

Fig.3 Flowchart of Proposed Algorithm

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VII. RESULT ANALYSIS

For the implementation of the proposed work, we used NS2 for the simulation and the above mentioned approach are applied to show the work.

NAM:
Network animator is a Tool command language/Tool Kit based simulation tool for screening network simulation traces and real world packet traces. It maintains outline of topology, animation of packet level, and a range of data examination tools.
Trace file:
The file written by an application to keep details of coverage or the whole network details and in NS2, it is known as Trace File. Trace files log every packet, every event that happened in the simulation and are utilized for examination.

We have described the parameters table with their values to show the default values for the simulation:

Table 1: Parameter Table with their Values

Parameters	Values
Simulation Used	NS2
Network Size	1526m x 135m
Number of Nodes	50
Simulation Time	50s
Antenna Used	Omni directional Antenna
Packet Size	1500 bytes
MAC Protocol	IEEE 802.11

There are three tables which show throughput graph, PDR Graph and Packet drop Graph at different time period.

Table 2: Throughput

Time (in ms)	Base paper	Propose paper
10	13225.9	96256
20	14547.7	101540
30	15023.3	107705
40	15298	110627
50	15375.9	110809

Table 3: Packet Delivery Ratio

Time (in ms)	Base paper	Propose paper
10	13225.9	96256
20	14547.7	101540
30	15023.3	107705
40	15298	110627
50	15375.9	110809

Table 4: Packet Drop

Time (in ms)	Base paper	Propose paper
10	4232	2505
20	8537	4533
30	13113	6969
40	17542	9034
50	21720	11520

VIII. CONCLUSION

In this paper, multipath routing protocol utilized which is MSR of MANET. Confidence value calculated in this paper which show that the node is trusted and data transmission is secure. Reputation value is also taken into consideration to get the history of interaction with other nodes to evaluate the attacker node in the network. Since MSR utilize source routing, central nodes do nothing but forwarding the packet as specified through the route in its header. In multipath routing, path independence is a significant property; a more independent path offers more aggregate physical resources among a group of nodes.

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