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Identification of node behavior for Mobile Ad-hoc Network

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Abstract

In present scenario, in ad-hoc network, the behavior of nodes are not very stable. They do not work properly and satisfactory. They are not cooperative and acting selfishly. They show their selfishness to share their resources like bandwidth to save life of battery, they are not hasitate to block thepackets sent by others for forwarding and transmit their own packets. Due to higher Mobility of the different nodes makes the situation even more complicated. Multiple routing protocols especially for these conditions have been developed during the last few years, to find optimized routes from a source to some destination. But it is still difficult to know the actual shortest path without attackers or bad nodes. Ad-hoc network suffer from the lot of issues i.e. congestion, Throughput, delay, security, network overhead. Packet delivery ratio is the issues of ongoing research. Cause of node failure may be either natural failure of node links or it may be due to act of an attacker or bad node which may degrade performance of network slowly or drastically, which also need to identify or determined. In this paper, we identify the good and bad nodes. A simulation has been performed to achieve better performance of modified AODV. Good result has been obtained in terms of Throughout, Packet Delivery Ratio.

Keywords

AODV,DSR,TORA,MANET

1. Introduction

In AODV (Ad-hoc on demand Distance Vector Routing) [1], the network [2] is silent until a connection is needed. At point of time when a node needs to establish a connection broadcasts [3] a request Root Request Packet (RREQ) [4] for connection. Other nodes of AODV forward this message, and record the node that they heard it from, creating an explosion of temporary routes back to the needy node. When a node receives such a message and already has a route to the desired node, it sends a message backwards through a temporary route to the requesting node. The needy node then begins using the route that has the least number of hops through other nodes. Unused entries in the routing tables are recycled after a time. When a link fails, a routing error is passed back to a transmitting node and the process.

2. Literature Review

This Research has been contributed in [11] Mobile ad hoc network has group of wireless node they are communication without a centralized mechanism in the network. There are various issues in mobile ad hoc network in one of them is energy. If the network is divided in divided into more than two and one of the nodes has consumed all the energy still not participated in the network. In the area of energy storage and increase network life time huge work has to be contributed. One improvement is to apply energy mean value algorithm which considerate node energy-aware. The outcome of the algorithm does have a positive result in ns2. The further research issue is to develop an optimal model through applying various parameters in different environments.

This Research has been contributed in [12]. In on demand distance vector routing in MANET establish is single path for the communication. This paper introduces novel on-demand multipath routing protocol for MANET which combines the metrics of delay , hop count and disjointness , each intermediate node deliberately selects multipath candidates while contributing to suppression of unnecessary routing packets. Due to the extension of the RREQ / RREP packet provide more efficient multipath routes. The outcome of this research has higher packet delivery ratio and lower routing packets. Further research issue is to the improvement of the metric definition should be considered. This Research has been contributed in [13]. Ad hoc network are characterized by multi-hop wireless connectivity and frequently changing network topology which have made there infrastructure less. In this research compares of the AODV, DSR and TORA routing protocols with respect to a modified path optimality that we call as a

weighted path optimality and analyses various factors average end-end delay and jitter etc.

This Research has been contributed in [14] An Ad hoc network is the collection of mobile nodes communicating without a centralized infrastructure. MANET generally uses a wireless radio communication channel. So they are open to various types of attack. In this research they presented a Distribution Intrusion Detection System to protect against some attack like DoS attacks, Sequence No. Modification. Here IDS agent is used to detect the intruders without using any of the cryptographic algorithm. The outcome of this research performance of AODV is Improved in the presence of attack. Future direction of the research is looking for the solution of other kinds of attack.

This Research has been contributed in [15]. In MANET routers have recreated many times due to the mobility of the nodes. If a node in a mobile ad hoc network aware of the mobility of the neighbor nodes then highly mobile node is to avoid to become a part of routes, this will greatly reduce new path discovery towards the destination. A node in the network is aware to its neighbor by the help of inquiries and reply to inquiries .These inquiries are based on the hellow message. The outcome of this research is greatly reducing the new path discoveries and it increases the network throughput and performance.

3. Proposed Work

AODV: Enhance local Repair AODV is Motivated by the issues identified [6] in local Repair AODV which use to broadcast locally to repair the route. In ELRAODV route repair by unicast mechanism instead of broadcast. As shown in figure when a red node down then instead of discarding the whole route or to find a new route [7] from the source , Node 1 start repairing the same route to node 2 by finding the alternative of the broken node. As shown in the figure Node 1 sends a unicast request to node 2 by LRREQ packet & Node 2 replies by RREP Packet.

Extended Enhance AODV [9] is modified version of ELRAODV. If the route is not repaired by ELRAODV then it sends the route error message towards the source with the help of RRER Packet to report the route failure or link failure.

In our proposed research instead of sending RRER [7] packet it sends PRRER (priority route error packet) which is the extension of RRER packet to set the priority of the packet. If some packets waiting in the queue to forward the packet instead of forwarding these packet our packet is forward first. As shown in the figure if the route is not repaired by alternative green node or multiple link failure occurs then it sends PRREQ packets to the source.

The expected outcome of this research is that congestion and routing overhead in the network will decrease. As we know source doesn't stop sending the data packet until gets if route error packet (PRRES). If it gets this packet as soon as possible it stop sending data packets as packet as soon as possible which reduced network overhead and congestion in the network.

4. Result Analysis

Results of simulation have been analyzed on the bases of following parameters.

4.1 Throughput: It is defined as packet transmitted per unit of time. In our work the Throughput [8] increases due to (a) Fast recovery of failure path or fast reconstruction of alternate path (instead of again broadcasting the RREQ packet) by taking the information of next to next node. (b) Secondly, using prioritized [10] control packet (PRREQ) to inform for choosing alternate path farstly due to early confirmation of small queue length and choosing alternate path [11].

Table 1: Throughputs

S.No	No of Nodes	Throughput	
		AODV	MAODV
1	5	89.38	90.18
2	10	144.57	143.88
3	15	118.04	119.83
4	20	146.73	143.99

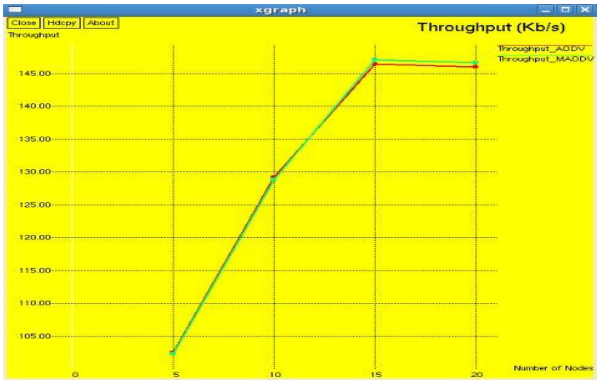

Fig 1: Throughputs

4.2 PDR (Packet Delivery ratio) : It is the ratio of number of packet received to the number of packet transmitted. Ideally it's value should be 1.

Table 2: PDR

S.No	No of Nodes	PDR	
		AODV	MAODV
1	5	0.61	0.62
2	10	0.96	0.97
3	15	0.78	0.81
4	20	0.97	0.98

Fig 2: PDR

4.3 Network overhead: Number of control packets exchange before and after the packet transmissions. In our case we are exchanging extra control packets PRREQ.

Table 3: Networks Overhead

S.No	No of Nodes	Network Overhead	
		AODV	MAODV
1	5	0.028	0.031
2	10	0.044	0.049
3	15	0.058	0.068
4	20	0.079	0.073

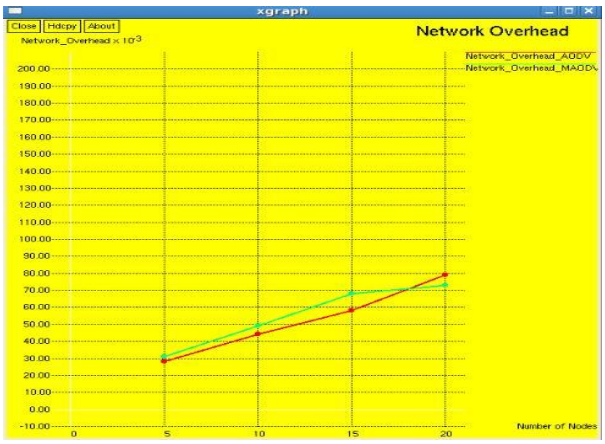

Fig 3: Networks Overhead

4.4. Avg. End- to- End Delay: It is the time to reach packets [12] to the destinations, after node failure because of priority control packet (PRRER) transmitted, the end to end delay affects and decreases as compared to AODV.

Table 4: Avg. End-To-End Delays

S.No	No of Nodes	End-to-End Delay (In ms)	
		AODV	MAODV
1	5	119.74	123.36
2	10	14.36	11.85
3	15	191.76	170.13
4	20	21.98	45.79

Fig 4: End-To-End Delays

5. Conclusion and future research direction

In this paper we have done simulation of AODV with our modifications and got good results of the parameters i.e. Throughput, Packet delivery Ratio [13] and marginally good performance in Network overhead with some degradation in Avg. End-to-End delay. Congestion [14] has been refuses due to our concept. Bad nodes in the Network also have been identified and can be removed or other nodes can be aware to avoid rejecting them from their shortest path. Nodes those who are not informing to other nodes regarding channel congestion can be declared as bad nodes. If more or two consecutive nodes are out of order then it will be very difficult to store address of multiple nodes at each node to identify information about other failure nodes. In that case either table driven routing protocol will be preferred or more node information must be stored in the current nodes.

References

[1] G.S. Tomar, "Modified Routing Algorithm for AODV in Constrained Conditions", Second Asia International Conference on Modelling & Simulation, june 2008 , pp 219-225.

[2] Alexander Klein, "Performance Comparison and Evaluation of AODV,OLSR, and SBR in Mobile Ad-Hoc Networks",IEEE ISWPC 2008, jan 2008 ,pp 571-575.

[3] Chia-Ching Ooi1 and N. Fisal2 "Implementation of GEOCAST-Enhanced AODVbis Routing Protocol in Manet" IEEE , 2004 , pp 660-663.

[4] Leiyu.an Li and Chunxiao Chigan "Token Routing: A Power Efficient Method for Securing AODV Routing Protocol" IEEE , 2006 , pp 29-35.

[5] Hong-Peng Wang, Lin Cui " An Enhanced AODV for Mobile Ad-hoc Network" , Proceedings of the Seventh International Conference on Machine Learning and Cybernetics, Kunming, 12-15 July 2008.

[6] Khushboo Agarwal, Dr. Lalit Kumar Awasthi "Enhanced AODV Routing Protocol for Ad hoc Networks" , ICON IEEE , 2008 , pp 1-5.

[7] Pei Tingrui, Zeng Wenli, Zhang Zhaoxiao, Peng Tao "An Improved Hierarchical AODV Routing Protocol for Hybrid Wireless Mesh Network" , IEEE International Conference on Networks Security, Wireless Communications and Trusted Computing , 2009 , pp 588-594.

[8] Sandeep Suman and Balkrishan "Enhanced AODV for Wireless Networks", IEEE 2nd International Advance Computing Conference , 2010, pp 246-250.

[9] Che-Aron, Z., Al-Khateeb, W. F. M. and Anwar F , "The Enhanced Fault-Tolerant AODV Routing Protocol for Wireless Sensor Network" IEEE Second International Conference on Computer Research and Development, 2010 , 105-109 .

[10] Muhammad Mehran Ajmal, "Efficient Routing in Wireless Mesh Network by Enhanced AODV , IEEE , 2010 , pp 1-7.

[11] Baozhu Li, Yue Liu and Guoxin Chu. "Optimized AODV Routing Protocol for Vehicular Ad hoc Networks", IEEE, 2010, pp 1-4.

[12] M.Usha , S.Jayabharathi, R.S.D.Wahida Banu "RE-AODV: An Enhanced Routing Algorithm for QoS Support in Wireless Ad-Hoc Sensor Networks". IEEE-International Conference on Recent Trends in Information Technology, ICRTIT 2011, June 3-5, 2011, pp 567-570.

[13] Ben Ding, Zehua Chen, Yan Wang, Hui Yu. "An Improved AODV Routing Protocol for VANETs" IEEE, 2011,pp 1-5.

[14] HuaYANG and Zhi-yuan LI , Simulation and Anlysis of a Modified AODV RoutingProtocols" IEEE International Conference on Computer Science and Network Technology , December 24-26, 2011 , pp 1440-1444.

[15] Hua YANG and Zhi-yuan LI , "A Stablity Routing Protocols base on Reverse AODV", International Conference on Computer Science and Network Technology , December 24-26, 2011 , pp 2419-2425.

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