© 2016 IJSRSET | Volume 2 | Issue 2 | Print ISSN : 2395-1990 | Online ISSN : 2394-4099
Themed Section: Engineering and Technology

DSR and DSDV Analysis under Hidden Node Environment

Ruchi Garg, Sumit Kumar, Deepika Sharma, Yogita Wadhwa
ECE Department, M.M. University Sadopur, Ambala, Haryana, India

ABSTRACT

In Mobile Ad hoc networks (MANETs) because of mobile nodes, the topology of network is different all the times. So every node of these type of networks participate in routing and join in discovery and upkeeping of routes to other nodes in the network .Also intermediate nodes acting as routers affects the communication between nodes that are far apart. The aim of MANET routing protocol is to maintain virtual backbone created by these routers, in spite of the dynamic configuration of the networks. Simulation model with MAC and physical layer models is used to conclude the interaction between different layers and their performance implications, considering the effects of hidden nodes .The paper demonstrates that different protocol mechanisms used by Dynamic Source Routing (DSR) and Destination Sequenced Distance Vector Routing DSDV leads to different performance behavior . DSR and DSDV are compared depending on packet delivery ratio by varying the arrangements of nodes under hidden node environment.

Keywords : DSDV, DSR, Hidden nodes, Interference, IEEE 802.11, MANET, MAC, NS2, RTS/CTS, Protocol

I. INTRODUCTION

In ad hoc systems, synchronous transmission of the packets in a system over the common medium might bring about an exceptionally poor performance [5]. In the event that a protocol needs to transmit a packet starting with a node then onto the next node effectively then there ought to be no disturbance of some other packets with this packet all through the transmission [10]. The obstruction brought about by other nodes can be stayed away from up to certain degree with the accessible strategies for RTS/CTS handshake and physical carrier sensing methods [11]. The force required for interfering with a packet is much lower than the force required by a packet for its successful transmission [12], [13]. Those nodes which fall in the interference range of a recipient are called hidden nodes. The physical channel detecting keeps the interference up to a significant level however it is not exceptionally successful constantly, because the carrier sensing is done at the sender's end and has no knowledge about the circumstance at the recipient's end [9], [14].

This paper examines the performance of ad hoc networks under hidden node environment. For the simulation, to realize the wireless communication between the several nodes, testbed is using IEEE 802.11 for physical layer; logical link layer and MAC layer [7].

II. METHODS AND MATERIAL

DSR and DSDV COMPARISON

At the point when a node utilizing an on-demand protocol wishes a route to another destination, it will need to hold up until this type of route can be found [15]. This element, however helpful for datagram movement, brings about considerable signalling traffic and power utilization. Since both data transmission and battery power are rare assets in portable PCs, this turns into a genuine confinement.

DSR:

The key characteristic of DSR [1] is the utilization of source routing. Dynamic DSR doesn't use periodic advertisement, so it is a reactive protocol. It figures the paths when vital and after that looks after them [8]. In Source routing the sender of a packet decides the whole grouping of nodes across which the packet needs to pass through; the sender expressly records this route in the packet’s header, distinguishing every sending hop by the

location of the following node to which to send the packet on its path to the destination host.

DSDV:

Destination-Sequenced Distance Vector Routing (DSDV) [2] is a table-driven routing plan for ad hoc mobile networks in light of the Bellman-Ford algorithm. It was created by C. Perkins and P. Bhagwat in 1994. Contains A sequence number is associated with every entry in the routing table [6]. The number is created by the destination, and the emitter needs to convey the next update with this number. Routing information is circulated between nodes by transmitting full dumps occasionally and smaller incremental updates all the more much of the time.

The packet delivery is low in DSDV because of the way that, it utilizes stale routes as a part of instance of broken connections. In DSDV the presence of stale route does not infer that there is no justifiable route to the destination. The packets can be sent through different neighbors who might have routes to the destination.

Simulation Environment

This paper utilizes NS2 simulator [4] to examine the behavior of DSDV and DSR protocols under different circumstances. The version 2.31 of NS2 is utilized. The basic parameters are organized underneath in table I.
Certain assumptions have been made, for the test environment:-

1. Transmission power of all nodes is same.
2. All nodes uses a single wireless transceiver.
3. Omni-directional wireless antennas are used by all nodes.
4. All nodes share a common channel.

TABLE 1: SIMULATION PARAMETERS

Type of Antenna	Omni Directional
Routing Protocol Topology	DSDV/ DSR
Used	Mesh
IEEE standard	IEEE 802.11
Propagation Model	Two Ray Ground
Test Area	800 x 800 m
Type of Traffic	CBR (UDP)
Size of Packet	512 bytes
Interference Range	550 m
Range of Transmission	250 m

III. RESULTS AND DISCUSSION

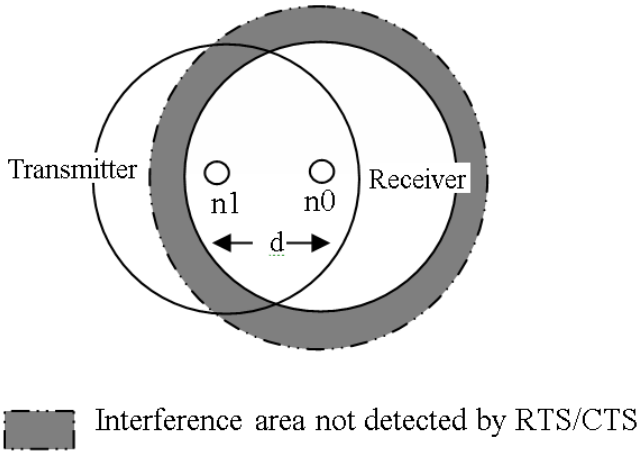

Figure 1. Arrangement of Nodes

Various tests have been directed with NS2 for understanding the conduct of the protocols under hidden node environment and to comprehend the feasible reasons. In the 1st experiment, as shown in Fig.1, sender (n1) is mobile while receiver (n0) is fixed in a grasp of interference because of some nodes which are hidden. In this course of action when the distance'd' in the middle of receiver and transmitter surpasses more than 0.56 of Rtx (where R_{tx} is transmission scope of transmitter), the viability of RTS/CTS falls pointedly [3] in IEEE 802.11. A simulation has been performing for the Fig.1.

The outcomes of simulation are shown in Fig.2 which demonstrates that the failure because of the separation and because of the hidden nodes is significant for both the protocols.

Fig.2 demonstrates that DSDV is ineffectively influenced in the hidden node environment than the DSR. The poor execution of DSDV is because of the stale routes available in the cache and it is exceptionally reliant on these routes. If every one of the routes are useless at exactly that point DSDV seeks the new route. As DSDV is table driven protocol, each node keeps up a table that carry the following hop to achieve all destinations. To stay up with the latest they are exchanged between neighboring nodes at standard intervals or when a critical topology changes are watched. Throughput diminishes comparatively in DSDV as it needs to publicize intermittent upgrades and occasion driven updates. To keep up the routing tables DSDV will surge the system with routing packets rather

than successful conveyance of information packets which causes a poor impact on throughput.

In the meantime DSR never makes the system occupied with its "HELLO" packets and the accessible bandwidth is more viably accessible for data communication than DSDV.

Another experiment is performed to recognize further, the degradation of protocols' performance due to hidden nodes.. Presently two sets of a transmitter and a receiver exists as shown in Fig.3.

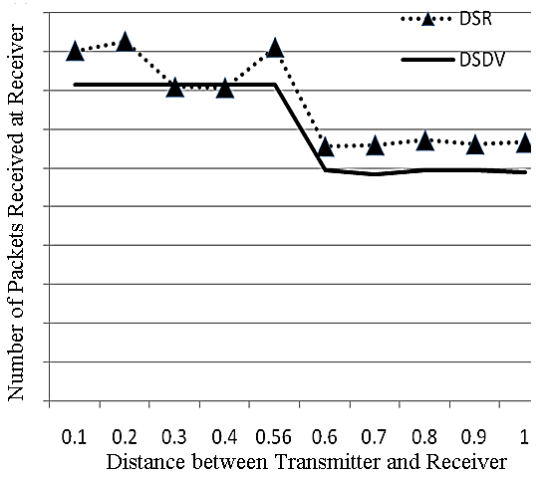

Figure 2. Throughput vs. distance between n0 and n1.

In the Fig.3, for n1 node n0 is a sender and for n2 node n3 is a sender. By this arrangement, n3 is a hidden node for n1; likewise n0 is a hidden node for n2. During the simulation, separation'd' between the two pairs is going to change. A very surprising behaviour is noticed as shown in the Fig.4. It shows the throughput at n1 due to n0 with the changing distance'd'. As per the expectations, as the distance'd' will go to increase, the acceptance of packets at node n1 due to node n0 must not fall or it must increase even.

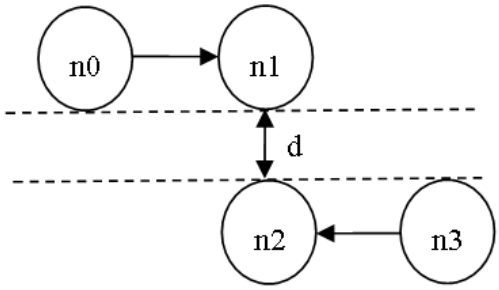

Figure 3. Two pairs of transmitters and receivers

But according to Fig. 4 as shown below, the curve falls after a particular distance and then after a certain period it further accomplishes a striking height. This is contributed by the greater interference range and inadequacy of RTS/CTS for determining the hidden nodes issues.At the point, when node n3 is out of the transmission scope of the node n1, it can't effectively get the CTS packet of node n1. Although, even now it in the interference range of the node n1, transmission from the node n3 will interfere any packet reception at the node n1. Only when node n2 and node n3 are both out of interference range of node n1, the two connections are fully apart from each other. Since the pairs are moving apart from each other they will leave impac of each other by any how so the quantity of packets received at node n1 accomplishes a striking strength.

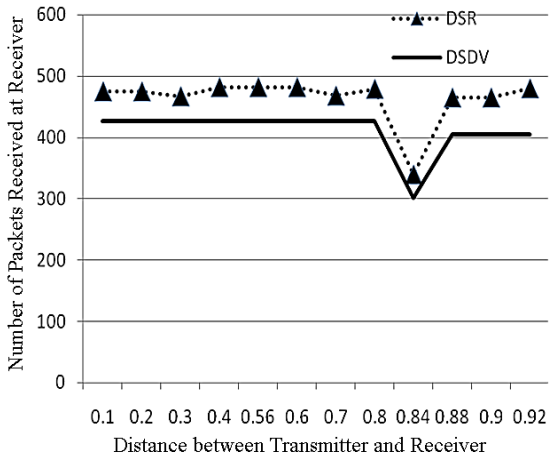

Figure 4. Throughput vs. distance between n1 and n2

As discussed above, DSR is beaconless protocol and shows better results than DSDV.

IV. CONCLUSION

In practice, wireless networks are often presented to the hidden node issue. As wireless networks multiply, it is therefore vital to examine precisely the effect of hidden nodes on the behavior of network. In this manner various tests have been performed and studied for DSDV and DSR protocols. A general problem noticed is a performance degradation and unpredicted behavior due to inter-flow co-channel interferences. Performance of the protocols also relies on the configuration of the nodes involve in communication. To take care of the issue of interference, RTS/CTS is one method however the outcomes are agreeable inside of specific conditions

as it were. Another observation from the simulation is that both the protocols are ineffectively influenced by hidden nodes. Still DSR outperforms DSDV in more unpleasant circumstances. The poor execution of DSDV is basically credited in view of the association of overhead in upgrading every one of the nodes with the latest routing information .Since DSDV utilizes the table driven methodology of keeping up routing information, it is not as versatile to the route changes that happens because of frequent changes in topology. In contrast the methodology utilized by the DSR to construct the routing information as and when they are created make it more adaptive and result in better performance

V. REFERENCES

[1] David B. Johnson, David A. Maltz, Josh Broch, "DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks",in Asia-Pacific Coference on Communications, 2006 APCC'-06, pp. 1-5, August 2006.

[2] Perkins, Charles E. and Bhagwat Pravin. "Highly Dynamic Destination-Sequenced Distance-Vector Routing (DSDV) for Mobile Computers", in ACM SIGCOMM Computer Communication Review, Volume24, Issue 4, pp. 234 – 244, October 1994.

[3] Kaixin Xu Gerla, M. Sang Bae, "How effective is the IEEE 802.11 RTS/CTS handshake in ad hoc networks", In Global Telecommunications Conference, 2002. GLOBECOM '02. IEEE, pp. 72-76 vol.1, 17-21 Nov. 2002.

[4] NS-2 Simulator, http://www.isi.edu/nsnam/ns/tutorial/index.html.

[5] Pirzada, A.A. Wishart, R. Portmann, M. , "Congestion Aware Routing in Hybrid Wireless Mesh Networks", In 15th IEEE International Conference on Networks, 2007. ICON 2007., pp. 513-518, 19-21 Nov. 2007.

[6] Abdul hadi A. Rahman and Zuriati A. Zukarnain, " Performance Comparison of AODV, DSDV and I-DSDV Routing Protocols in mobile Ad Hoc Networks", European Journal of Scientific Research, pp.566-576, Vol.31 No.4 (2009).

[7] Shugong Xu and Tarek Saadawi, "Does the IEEE 802.11 MAC Protocol Work Well in Multihop Wireless Ad Hoc Networks?", IEEE Communications Magazine, pp. 130-137, June 2001.

[8] Martínez-Alfaro, Horacio, "DSR performance improvement in ad-hoc networks using a behavior-based architecture", Systems, Man and Cybernetics, 2003. IEEE International Conference, pp. 3032- 3037 vol.3.

[9] Md. Anisur Rahman, Md. Shohidul Islam, Alex Talevski, "Performance Measurement of Various Routing Protocols in Ad-hoc Network", Proceedings of the International MultiConference of Engineers and Computer Scientists 2009 Vol I IMECS 2009, March 18 - 20, 2009, Hong Kong

[10] A.B NATARAJU,H.D MAHESHAPPA , "Implementa tion and Performance Analysis of DCWAMAC Protocol for Multihop Wireless Networks", International Journal of Science and Applied Information Technology (IJSAIT) , Vol. 4 , No.3, Pages : 54-59 2015

[11] Divya Bandral , Reena Aggarwal ,"Comparative Analysis of Proactive, Reactive and Hybrid Routing Protocols for Improving Quality of Service in Mobile Ad-Hoc Networks" , International Journal of Engineering Trends and Technology (IJETT) – Volume 30 Number 4 - December 2015.

[12] Rajni Sobti," A Study on Challenges and Issues on MANET", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering- Vol. 4, Issue 9, September 2015.

[13] T. K. Araghi, M. Zamani, A. BT Abdul Mnaf, "Performance Analysis in Reactive Routing Protocols in Wireless Mobile Ad Hoc networks Using DSR, AODV and AOMDV", International Conference on Informatics and Creative Multimedia ,IEEE, pp 81-84,2013.

[14] R. Desai, B. P. Patil, "Analysis of Routing Protocols for Ad Hoc Networks", International Conference on Circuits, System, Communication and Information Technology Applications (CSCITA) IEEE , pp 111-115, 2014.

[15] B. S. Gouda, D. Patro, R. K. Shial, "Scenario-Based Performance Evaluation of Proactive Reactive and Hybrid Routing Protocol in Manets Using Raydom Waypoint Model", International Conference on Information Technology,IEEE,pp 47-52, 2014.