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Congestion Free Mechanism (Cfm) Using Mobile Adhoc Network

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Abstract: In mobile computing broadcasting and searching a data plays a virtual role and satisfying the customer needs without delay, by resolving the network issues (accuracy in data , time , Qos) of data exchange in Mobile Adhoc network (MANET).Random search of data by radio- frequency leads to congestion and data loss. In this continuous search of data without time interval cause congestion/collusion /data repetition in network data loss and Mobility environment creates the distance, data loss and congestion in network. To improve the quality of data in time and to overcome mobile network issue using our new technique congestion - free mechanism in MAC –layer, which follow the carrier sense Multiple Access (CSMA) congestion avoidance technique to improve the data transmission our CFM will be helpful. Number of re-requesting (routing path) is reduced so, time – delay is reduced between nodes. Our CFM is simulated and the performance will be discussed analytically.

Keywords: Mobile Adhoc Network (MANET), congestion, Mac layer, Routing, congestion-avoidance

1. INTRODUCTION

Mobile ad hoc networks (MANETs) are the most creative architectures whichareself-organized by the collection of mobile nodes when transmitting the data packets hop by hop method [1] with best Qos constructed network. Un-centralized structure is maintained in MANET.The multi hop network continuously changes the place, which results in route changes and protocol finds the best shortest route to carry the packets to destination loss of packet in broadcasting [2].

When a node transmits the data to destination with the help of intermediate routing leads to packet loss and time delay by the multi – hop broadcasting [2]. By constant boundaries of the network increase the data delivery rate, scalability of network helps to improve the Qos. On-demand routing process also leads to time delay [2] each hop to hop request makes routing path long and delay in reaching destination. To control data traffic when all node started to move from one place to destination, more number of request and broadcasting makes congestion and data loss, in mac- layer channel allocation [6]can control the data traffic using "underdog" scheme of predetermination resource .A constant network traffic pattern also shows the high rate of data delivery in which a fixed set of nodes update the routing table [5]. In practice, however, continuous data collection in network often exhibits dynamically changing traffic
patterns over time due to congestion in broadcasting.Congestion can occur due to intermediate node re-transmission broadcasting [9] with packet loss, to reduce loss agent based

transmissionis deployed.

Why congestion -free Mechanism in MAC-Layer?

Nodes communication depends on routing and broadcasting to carry the data packets of destination node, in this shortest routing and avoiding the intermediate node re-broadcasting avoidance reduce congestion .From the figure 1. Source N_1 find the routing as N_2, N_3 and to reach N_4 destination, N_6 is broadcasting and again re-broadcasting makes congestion and data loss, N_{6c} is rejected in shortest path finding, mobility is not constant.Number of nodes increases routing selection and broadcasting makes congestion and affects the quality of routing.

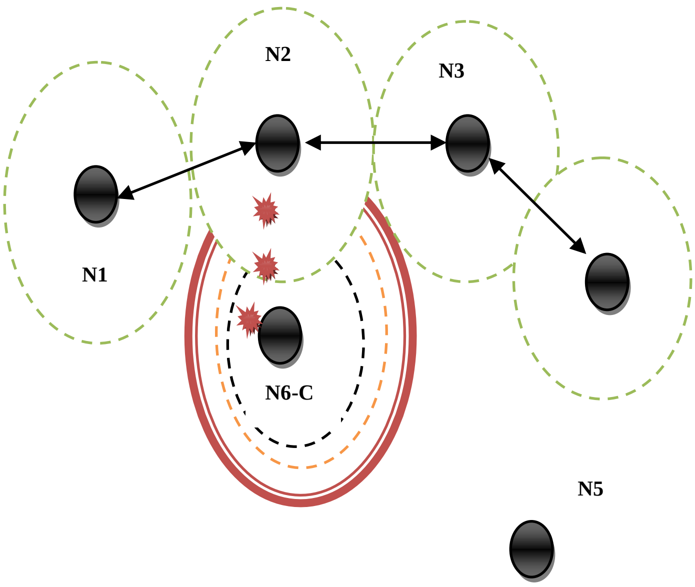

Figure 1: Neighbor Coverage

2. CONGESTION FREE-MECHANISM

2.1 Right Routing

Congestion controlcan be reduced by routing path selectionin network, in routing shortest route improves the packet delivery rate in shorttime,intermediatenode selection of prior request or coverage of radio broadcasting signal within the range of 300 m/sec.AODV protocol helps in congestion free transmission of data. Mobility of nodes changes the node location,neighbor, routing list; the nature of mobility creates the congestion in identification of node address which affects the selection of nodes in routing path.From the figure1 N1 chooses shortest channel, by determining the duration of data transmission so that the period from the last sensing time of the channel to the completion time of data transmission is shorter than the detection delay limit. Furthermore, the sender node is required to transmit data packets with the power lower than the maximum allowable transmission power. With this feature, it is expected that the proposed system can properly protect a on the reserved channel which the sender and the receiver have failed to detect.

2.2 Mac-Mechanism

The channels are assumed in the random network, which makes the node-link failure in routing and in selection of intermediate nodes, continuously shortest route is updated in routing table re-broadcasting causes the conflicts in time delay. In collusion-free scenarios, the contention period of time is used to send the payload to destination; we build a channel –aware state in network to improve the delivery rate.

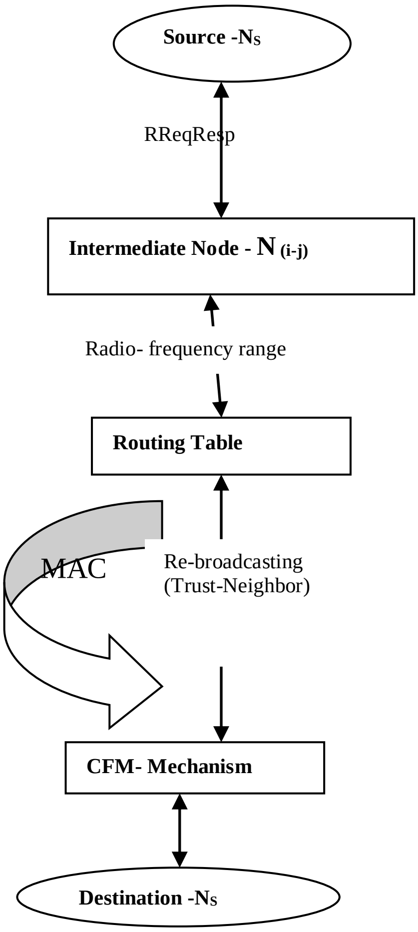

Fig.2 Block Diagram

The process of the data transmission in network, always select the ad- hoc best routing of AODV protocol, from the block diagram a source node search an intermediatenode by sending the RREQand RESP message from the radio-frequency range in broadcasting, random mobility of node will update the routing table continuouslycarrier-sense multiple accessfinds its own behavior to better channel states will show higher contention probabilities. The mac-channel considers only the channels which are empty at both of the sender and the receiver, for data transmission. In addition, the sender/receiver nodes try to protect which is a newly activated after the last sensing of the reserved

2.3 Congestion Free-Mechanism

Alert the features a dynamic and unpredictable routingpath, which consists of a number of dynamically determinedintermediate relay nodes. The data delivery time detection depends on the mobility strategies of both sender and receiver. Node mobility is choosing their directions uniformly at random between [0,2π].If broadcasting repeat it more congestion and request loss will drop the packets.

1. Broadcasting Coverage: The area coverage of a mobile network at time t, p(t), is the probability that a given point x= πR2 is covered by one or more radio signal at time t.

2. Time delay area coverage: The area coverage of a node in the network during time delay area coverage [b,t) with s < t, p(b,t), is the probability that given a point x = πR2, there exists u = [b,t) such that x is covered by at least one node at time u.

3 Coverage Detection time: Suppose congestion node time x(t) and that x(0) is re-broadcasting at time t = 0. The detection time of the congestion is the smallest t > 0 such that x(t) is covered by at least broadcasting time t.

Consider a network model of (λ, r) at time t = 0, with nodes moving according to the random mobility model.

1) At any time instant t, the probability of area being covered is

$P(t) = 1-e-\lambda\pi r2$, $\forall t \geq 0$ ------ (1)

2) The re-brocasting of area that has been covered at least once during time interval [s,t) is

$P(b,t) = 1-e-\lambda E(\alpha(s,t))$ -------- (2)

where E(α(b,t)) is the expected area covered by a node during time interval [b,t). When all nodes move in straight lines, we have

$P(b,t) = 1-e-\lambda(\pi r2+2r\,\bar{}\,vs(t-b))$ --------- (3)

where ,vs is the average sensor speed.

3) The radio frequency of the time at a point is covered by

$Pt = 1-e-\lambda\pi r2$ ---------- (4)

The faster node movement will cover the region of data transmission. Thereforenode mobility can be improving lack of nodes activation in network over an interval of time. Routing nodes and their locations at any given time, but need to cover a region within a given time interval.

$Sv = \lambda\pi r2+\log(1-P0) / 2\lambda rt0$, for $P0 \geq 1-e^{\lambda\pi r2}$

Note that the broadcasting area coverage depends on the response of intermediate node and destination routing path, Probability of the area (P0) covered within a time interval of length t0. At specific time of coverage congestion free message and intermediate node is identified by the re-broadcasting technique; coverage of all nodes also makes packet loss with congestion.

Table 1: Simulation Parameters

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The node mobility satisfies the

1) Broadcasting radius of a node (HELLO-request) is greater than the sensing range routing path broadcasting frequency;
2) Broadcasting distance between the source and destination node is less than 2r, then the distance between them along the routing link is less than πr.

Parameter	**Value**
Simulator	Ns2 - 2.34
Number of nodes	25, 50 .75,100
Simulation Time	15 min
Packet Interval	0.01 sec
Simulation Landscape	1000 x 1000
Background Data Traffic	CBR
Packet Size	1000 bytes
Queue Length	50
Transmission Range	100 Kbytes
Node Transmission range	300 m
Antenna Type	Omni directional
Mobility Models	Random-waypoint (0-30 m/s)
Radio Frequency	150-350 MHz
Routing Protocol	AODV , CFM
MAC Protocol	IEEE 802.11

When these broadcasting rules satisfies, the sensing of over-lappingof signal can be reduced, which stop the congestion in finding the routing path in network .The congestion free mechanism, rate of packet efficiency is thus maximized.The forwarding nodes will continue to forward the packet to other nodes until the routing path length reaches a predefined TTL, whereeach packet of node may have multiple copies in the transmission process and the overhearing message which creates congestion in network. The data packet transmission is repeated until the congestion free message clear the routing path , as long as the sender has data packets designated for the receiver. If the transmission of all packets is completed before the time of the channel and thechannel has been reserved only by this sender/receiver pair, the sender releases the channel and informs other nodes of this channel release by transmitting.

The standard of node locations is important issue in mobile networks, and it becomes particularly challenging in the presenceof harming the over-all quality of system. In these cases, we need solutions that let nodes

1) correctly establish their location in spite of congestion-free of false location information,and
2) Verify the positions of their neighbors, so as to detectadversarial nodes announcing false locations.

Secure neighbor discovery deals with the identification of nodes with which a communication link can be established or that are within a given distance.Neighbor discovery is only a step toward the solution simply put, an adversarial node could be securely discovered as neighbor and be indeed a neighbor (within some location range), but it could still make congestion about its position within the same range.

To our knowledge, our congestion free mechanism is the first to provide a fully distributed, lightweight solution to the problem that does not require any infrastructure or a priori trusted neighbors and is robust to several different overhead message, including coordinated packets by colluding adversaries. Our solution is suitable for both low and high mobile environments and it only assumes RF communication. Indeed, non-RF communication, It is unfeasible in mobile networks, where non-line-of-sight conditions are frequent and device-todevice distances can be in the order of tens or hundreds of meters. An un-knowledgeable adversary has no possibility of success against our congestion free mechanism. An independent knowledgeable adversary can move at most two links between source and destination. Colluding knowledgeable adversaries can announce timing information that reciprocally validate their distances, and pose a more dangerous overflow to the system.

However, we prove that an overwhelming presence of congestion in the verifier neighborhood is required for the avoidance to be successful.

3. SIMULATION SETUP

To estimate the performance of congestion free data transfer in network. Our proposed CFM is compared with the routing protocol in NS2 simulator, more number of nodes can be analysed in simulation, finding the shortest route and trusting the node whose is not re- broadcasting will help to reach destination. Because of the infrastructure-less architecture of MANET, our congestion-aware response system is distributed, which means each node in this system makes its own response decisions based on the alert CFM and its own individual benefits. Therefore, some nodes in MANET may isolate the congestion node, but others may still keep in cooperation with due to high dependency routing list.

Simulation parameter:

Mac protocol improve the quality of data packet in communication IEEE 802.11 is a common protocol which reduce time-delay by broadcasting with packet interval 0.01 seconds, random mobility speed ranges from 30 meter/second ,broadcasting range of 250 meter ,the routing request of each node will search in omni-directional.A packet in ALERT of congestion includes the source and destination range rather than their positions to provide anonymity routing protection to the source and the destination.

During the simulation, the source node route broadcasts a Route REQuest (RREQ) message to all the neighbors within its communication rangeof 250 m/sec and continuously routeis updated in routing table. Upon receiving this RREQ message, each neighbor address a message and broadcast this new message to their neighbors. If any node receives the same RREQ message more than once it can be identified as congestion node , it ignores it. If a node drops the request message re-broadcasting makes congestion, which generally indicates a broken link in flat routing protocols like AODV, a Route ERRor (RERR) message is sent to the source node. When the RREQ message arrives to its final destination node, the destination node initiates a Route REPly (RREP) message and sends this message back to the source node by reversing the route in the RREQ message and according to message count , the routing path and time delay may occur.

In terms of computational complexity and memory overload Delay the response / request in transmission in un-stability Network. A radio-frequency system is a typical research scenariowhere auctions can be applied. Radio-frequency can be used in both single-hop and multi-hop wireless mobile networks. The right to use when the node does not have data packets to transmit as well as the channels waiting for urgent sensing. This sensing is applied to the idle channels with the urgency level of 0, 1, or 2.

It is seen that determining the sensing priority of a channel with only the elapsed time means sensing the channels according to a round-robin fashion. Since the mac-channels with the higher priority need to be sensed more often than ones with the lower urgency, we use the sensing urgency as the weight for the elapsed time.Intermediate node opportunistic sensing occurs, if the node has thepackets to transmit or receive, it drops the packets immediately theopportunistic sensing and transmits/receives data packets.Also, the node stops promptly the opportunistic sensing ona channel if other neighbor node starts data transmissionover the channel. In other words, the opportunistic sensing and location coverage on a channel can be interrupted by data transmission/ reception on the channel, whereas the urgent sensing is not suspended on sensing. The suspended sensing is resumed after the transmission/reception of all data packets iscompleted. When selecting the channel for opportunisticsensing, the node should give preference to the idle channels for which the sensing has been suspended. Thus,if there are such one or more channels, the node selects thechannel having the shortest remaining sensing time. Whenthere is no idle channel for which the sensing has beensuspended, the node chooses the channel with the highestopportunistic sensing priority among the idle channels.

4. PERFORMANCE EVALUATIONS

1. PDR (Packet Delivery Ratio): It is the ratio of the datapackets delivered to the destinations. The best of PDR shows how congestion free mechanism improves the delivery rate in network. The performance explains the congestion free mechanism shows the data delivery rate in high when compared to the normal routing of AODV protocol.

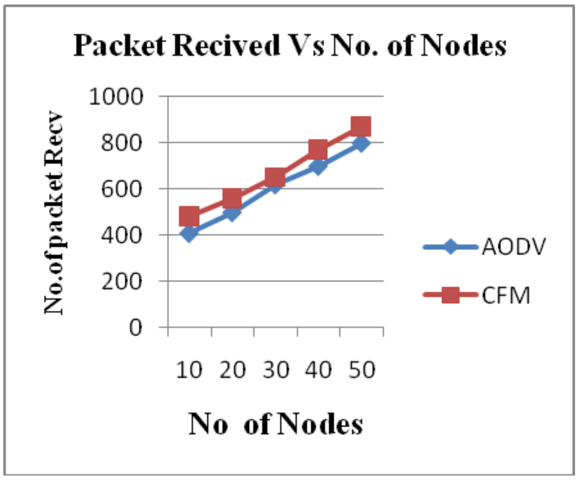

Fig.2 Packet delivery ratio

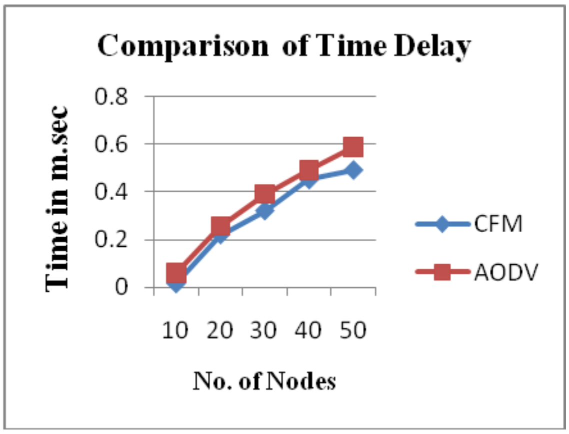

Fig 3.End to End Delay

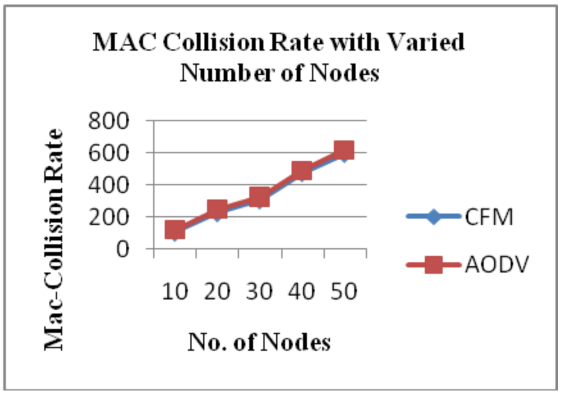

Fig 4: Mac Collision Rate

2. Routing Overhead: Routing overload is the ratio of total number of the routing packets to the received data packets. It is the ratio of total number of data packets received to the total duration of simulation time. Like, we start the packet starting time at 1 and ending time 15 so total duration of simulation is14 (15-1). The total number of received packets is estimated with in the simulation time. Only congestion free message and ALERT of right routing decides the free of congestion avoidance in routing .

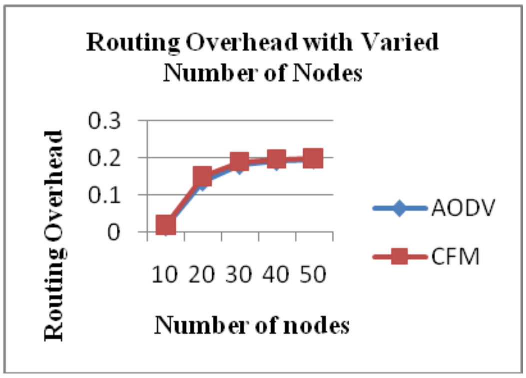

Fig 5: Routing Overhead

3. End to End Delay: It is the average time taken to receive data from the source to destination node, the packet delivery ratio will increase only if the delay performances is good.

5. CONCLUSION

From the simulation setup the mobility of nodes changes the performance of environment; our mechanism of (congestion free broadcasting mechanism) improves the quality service and the data delivery in dense network. Randomly identifing the congestion node in routinghelps to increase the data delivery rate, over hearing the re-broadcasting message conflicts overhead delay.Our response congestion free mechanism againstAd-hoc routing protocol with dense scenarios and experiments thus demonstrate the effectiveness and scalability of our risk-aware approach.Experiment results show that ALERT can offer high priorityprotection . It can also achieve comparable routing efficiency to the high mobility of random network Congestion free is not completely bullet-proof to protect network performance. Future work enhancement is direct transmission of data to the sender by minimizing the routing path and CFM theoretical and simulation results in large network.

5. REFERENCES

[1] S. Sesay, Z. Yang, and J. He, “A survey on mobile Ad hoc wireless network,” Information Technology Journal, vol. 3, no. 2, pp. 168–175, 2004.Griffin Jr. A. C, “Cotton Ginners' Handbook”, Agricultural Handbook No. 503. Washington, D.C.: USDA,1997.
[2] C. Liu and J. Kaiser, “A survey of mobile Ad hoc network routing protocols,” University of Ulm Tech. Report Series, no. 2003-08, Oct. 2005.
[3] M. Abolhasan, T. Wysocki, and E. Dutkiewicz, “A review of routing protocols for mobile ad hoc networks,” Ad Hoc Networks, vol. 2, no. 1, pp. 1–22, 2004.
[4] E. M. Royer and C. K. Toh, “A review of current routing protocols for Ad hoc mobile wireless Networks,” IEEE Personal Communications, vol. 6, no. 2, pp. 46–55, Apr. 1999.
[5] X. Wu, H. R. Sadjadpour, and J. J. Garcia-Luna-Aceves, “Routing Overhead as A Function of Node Mobility: Modeling Framework and Implications on Proactive Routing,” Proc. of IEEE MASS’07, pp. 1-9, 2007.
[6] S. Y. Ni, Y. C. Tseng, Y. S. Chen, and J. P. Sheu. “The Broadcast Storm Problem in a Mobile Ad hoc Network,” Proc. of ACM/IEEE MobiCom’99, pp. 151-162, 1999.
[7] Mohammed, M. Ould-Khaoua, L.M. Mackenzie, C. Perkins, and J. D. Abdulai, “Probabilistic Counter-Based Route Discovery for Mobile Ad Hoc Networks,” Proc. of IWCMC’09, pp. 1335-1339, 2009.
[8] Williams and T. Camp, “Comparison of Broadcasting Techniques for Mobile Ad Hoc Networks,” Proc. ACM MobiHoc’02, pp. 194- 205, 2002.
[9] Q. Zhang and D. Agrawal. Dynamic probabilistic broadcasting in manets. Journal of Parallel Distributed Computing, 65:220– 233, 2005
[10] B. Williams, T. Camp, Comparison of broadcasting techniques for mobile ad hoc networks.Proc. ACM Symposium on Mobile Ad Hoc Networking & Computing (MOBIHOC 2002), pp.194–205, 2002
[11] C.E. Perkins, E.M. Royer, Ad hoc on-demand distance vector routing, in: Proceedings of IEEE Workshop on Mobile Computing Systems and Applications, February 1999, pp. 90–100.
[12] Ns2Reference from http://networksimulation.wordpress.com/
[13] C.E. Perkins, E.M. Royer, S.R. Das, Quality of service for ad hoc on-demand distance vector routing (work in progress), IETF Internet Draft, draft-ietf-manet-aodvqos00.txt, July 2000.
[14] Adam Chlipala, Jonathan Hui and Gilman Tolle, \Deluge: Data Dissemination in Multi-

Hop Sensor Networks," UC Berkeley CS294-1 Project Report, December 2003
[15] C.R. Lin, J. Liu, QoSrouting in ad hoc wireless networks, IEEE Journal on Selected Areas in Communications 17 (8) (1999) 1426–1438.