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Bandwidth Aware Routing For Improving Quality of Service in AODV

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ABSTRACT: Quality of Service (QoS) for Mobile Adhoc Network (MANET) is one of the spearheading research regions where in assortment of directing conventions is presented. Be that as it may, those steering conventions are not bolstering numerous courses by appointing need as per their coveted information rates. In this paper, Priority Aware Adhoc on Demand Distance Vector (PA-AODV) convention is proposed keeping in mind the end goal to improve the QoS for MANET. The system parameter, for example, throughput, bundle conveyance proportion and end to end defer is assessed for the proposed PA-AODV convention. Keeping in mind the end goal to guarantee the QoS, five distinct streams are considered, where in, the need has been appointed by its Bandwidth. From the reproduction, it is watched that the proposed PA-AODV convention performs superior to the current one.

KEYWORDS: Quality of Service, QoS, PA-AODV, MANET, Priority Aware Adhoc on Demand Distance Vector.

I. INTRODUCTION

Mobile Adhoc Network (MANET) is self-starting dynamic network, comprising of mobile nodes, where each and every participating nodes are voluntarily transmitting the packets from source to destination using wireless transmission. In MANET, all the nodes are assumed to be dynamic with more or less relative speed in arbitrary direction. Hence, it is highly difficult to ensure the long term guaranteed path from one node to other node.

MANET have very enterprising use in emergency scenarios like military operations, monitoring animal habitats and disaster relief operation where there is a need for communication network immediately following some major event or some temporary requirement like conference or seminar at new place where there is no earlier network infrastructure exist and need alternative solution. The emergence of real time applications and the widespread utilization of wireless and mobile devices have generated the need to provide quality of service support in wireless and mobile networking environments. It is very important to determine the QoS of the network which is depending upon the network.

In MANET, there are several parameters which influence enhancing the QoS of the network such as throughput, end to end delay, packet delivery ratio, jitter etc. The aforementioned parameters are improved by altering the algorithm, protocol, and mechanisms. Typically, QoS refers to the ability of a network to provide improved service to selected network traffic over various underlying technologies. QoS routing requires not only finding a route from a source to a destination, but also, a route that satisfies the end to end QoS requirement. QoS is more difficult to guarantee in Adhoc networks than in most other type of networks, because the wireless bandwidth is shared among adjacent nodes and the network topology changes owing to the movement of nodes.

Hence, in order to provide QoS in MANET, the extensive collaboration between nodes is essential to establish the route and to secure the resources. QoS provisioning improves the end to end performance in heavily loaded networks through QoS aware routing, admission control, resource reservation, traffic analysis, and scheduling. One of the most crucial components of a system for QoS provisioning is to estimate the state of the networks resources and

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thereby decide which application data can be processed. In MANET, there is no reliable mechanism to provide QoS; therefore, research in this field has received much attention from last decade.

However, no solution has been standardized for estimation of bandwidth which becomes necessary for guaranteed QoS. The estimation of available resources still represents one of the main issues for QoS enhancement. Hence, the bandwidth estimation must be accurate enough to assure the admission of right connections. Hence, bandwidth estimation must be accurate enough to assure the admission of right flows (connection) between the nodes. In this paper, priority aware AODV is proposed to enhance the QoS by estimating the available bandwidth in IEEE 802.11 based MANET. Five connections are considered and their priority is assigned according to its data rates. The QoS parameters throughput, packet delivery ration, end to end delay are estimated with respect to the simulation time and total number of nodes in the network with and without mobility.

II. EXISTING APPROACHES – A SUMMARY

In MANET, estimation of available bandwidth is a primary component for QoS. The available bandwidth refers to amount of bandwidth available to the node to send packets to the network. The available bandwidth is employed for analyzing the network performance and optimizing end-to-end transport performance which is used to improve the QoS of multimedia services and video over a network as such applications require large bandwidth. Typically the bandwidth estimation is classified into four different categories: (a) Active probing techniques (b) Passive techniques, (c) Techniques only for wireless networks, and (d) Other bandwidth estimation techniques.

In the literature, there have been several passive techniques reported to estimate the available bandwidth which in turn improve the QoS. The passive technique is the calculation based technique where the available bandwidth is estimated using the measured channel usage without any impact on the existing flows. The available bandwidth is enhanced as it is calculated by minimizing the unnecessary signaling and stopping the sessions that cannot meet the QoS requirement. The condense aware admission control protocol provides an efficient, scalable admission control protocol for MANET to ensure the end to end connections with QoS requirements. The above mentioned mechanism offers a better QoS guarantee by limiting the number of flows (connections) in the network. The adaptive admission control is estimated end to end with the available bandwidth based on cross layer QoS routing. It is also considered the intra flow contention problem .proposed the mechanism to calculate the available bandwidth in the particular link to support QoS in IEEE 802.11 based networks.

They have considered synchronization between transmitter and receiver in order to identify the bandwidth in a decided link. The bandwidth estimation is carried out by an agent based mechanism. The optimum available bandwidth is calculated using static and mobile agent for connectionless and connection oriented network. By using channel monitoring, collision estimation and back off duration prediction, the available bandwidth is calculated. The available bandwidth is estimated by combining listen available bandwidth and hello available bandwidth method. In a similar way, the available bandwidth is estimated according to the channel conditions like busy time (listen method) and hello method. Here, the bandwidth estimation is done by switching the channel conditions according to the channel state . The available bandwidth is calculated by collecting/exchanging the information during the communication among neighbor nodes without any impact on the other existing flows.

III. PROPOSED SYSTEM

AODV is selected as the baseline routing protocol to incorporate the priority aware mechanism because it is an on-demand protocol without global periodic routing advertisement. With small routing overheads and destination sequence number, AODV consumes less overall network bandwidth, scalable to large networks, loop free and reliable. It can quickly respond to link breakage, and repair routes with minor errors.

A. AODV Protocol

Ad hoc on demand distance vector protocol is one of the reactive protocols. It makes route on demand basis which primarily aims to reduce the routing load. AODV is distance vector type routing where it does not involve nodes to maintain routes from source to destination. Different route messages such as route request, route reply and route

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errors are utilized to identify and maintain the links. AODV uses a destination sequence number for each route which is created by destination node for any request to the nodes and then a route with maximum sequence number is identified and selected to maintain the link.

In order to find a new route, the source node sends route request message to other neighbor nodes which are presented in the network till destination is reached or to find the active route. Then route reply is send back to the source node once the route is identified. The nodes on active route communicate with each other by passing hello messages periodically to its immediate neighbor. If a node does not receive a reply then it deletes the node from its list and sends route error to all the members in the route.

B. Priority Aware-AODV

Typically, AODV is having its own priority mechanism. When congestion occurs in the network, the low priority packets travel faster than the higher priority packets, hence the packet dropping is much higher for lower priority packets than higher priority packets. There is no priority fairness during packet dropping condition which directly affects the overall throughput and delay in the network. Therefore, the reported priority mechanism in AODV diminishes the total QoS in the network. In order to enhance the QoS in MANET, a new priority aware AODV protocol is proposed. In priority aware AODV (PA-AODV), the priority is assigned by externally (user defined/application based) according to their requirements (data rate). In this proposed method, the rate cutting mechanism is deployed based on the threshold value, priority information and transmission rate.

Whenever, the cumulative sum of transmission rate field of communication exceeds the threshold limit, the low priority packets communication is routing down (not able to transfer). If the cumulative sum of transmission rate does not exceed the threshold limit, the communication among the nodes is initiated for all the connections without any degradation of service. The best effort mechanism ensures more or less constant throughput, high packet delivery ratio and low end to end delay which in turn is higher quality of service.

IV. LITERATURE SURVEY

In the year of 2015, the author "Jayson K. Jayabarathan" proposed a paper titled “Quality of Service Enhancement in MANET using Priority Aware Mechanism in AOMDV Protocol", in that he described such as: Priority Aware Adhoc On Demand Multipath Distance Vector (PA-AOMDV) protocol is proposed in order to enhance the Quality of Service (QOS)for Mobile Adhoc Networks (MANET). Due to the priority aware mechanism, PA-AOMDV protocol can provideprecise admission control. The simulation results confirm that the throughput and packet delivery ratio of proposed PA-AOMDV is better than the reported one. An on-demand QOS routing protocol based on AOMDV is developed for mobile adhoc networks. It can build a QOS route from a source to destination with reserved bandwidth. The proposed attempt works the best is small networks under low networks mobility.

In the year of 2016, the author "Jayson K. Jayabarathan" proposed a paper titled "QoS enhancement in MANETs using priority aware mechanism in DSR protocol", in that he described such as: a priority aware dynamic source routing (PA-DSR) protocol is proposed in order to enhance the quality of service (QoS) for mobile ad hoc networks (MANETs). The priority aware mechanism is implemented through a rate cutting mechanism which is eventually executed based on their date rates. It works best in small networks under low network mobility. It is hoped that in the future, ad hoc networks will emerge as an effective complement to infrastructure wired and wireless LANs and even wide area-mobile networking services.

In the year of 2017, the author "Jayson K. Jayabarathan" proposed a paper titled "Quality of Service Enhancement of Mobile Adhoc Networks Using Priority Aware Mechanism in AODV Protocol", in that he described such as: Priority Aware Adhoc On Demand Distance Vector (PA-AODV) protocol is proposed in order to enhance the Quality of Service (QoS) for Mobile Adhoc Networks (MANET). The network parameter such as Throughput, Packet Delivery Ratio (PDR) and End to End Delay (EED) is estimated for the proposed PA-AODV protocol. Due to the priority aware mechanism, PA-AODV protocol can provide precise admission control. The simulation results confirm that the throughput and packet delivery ratio of proposed PAAODV is better than the reported one.

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V. EXPERIMENTAL RESULTS

The following figure illustrates the Normal AODV Throughput vs. Time.

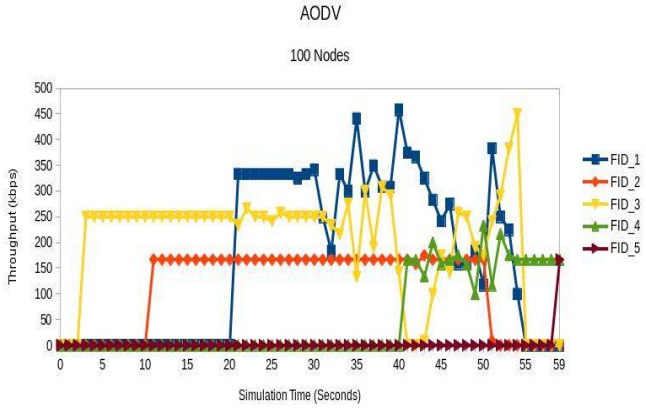

Fig.1 Normal AODV Throughput vs. Time

The following figure illustrates the PA_AODV QOS Throughput Vs Time.

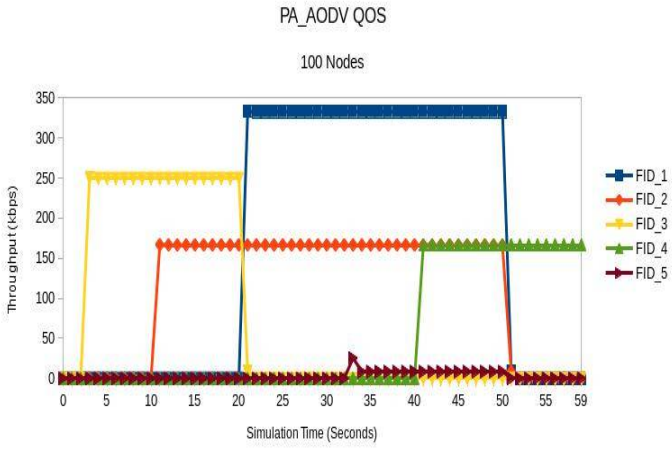

Fig.2 PA_AODV QOS Throughput Vs Time

Throughput / Protocol	FID_1		FID_2		FID_3		FID_4		FID_5	
	E	A	E	A	E	A	E	A	E	A
AODV	332.8	293.90	166.4	162.55	249.6	230.56	166.4	166.41	8.32	5.74
PA_AODV	332.8	322.34	166.4	162.55	249.6	236.91	166.4	166.41	8.32	8.32

Fig.3 Throughput Protocol

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Delay	FID_1	FID_2	FID_3	FID_4	FID_5
AODV	185.93	21.01	151.18	78.26	408.59
PA_AODV	15.76	19.37	20.82	21.39	71.19

Fig.4 Delay

PDR	FID_1	FID_2	FID_3	FID_4	FID_5
AODV	100	100	100	100	100
PA_AODV	100	100	97.48	100	100

Fig.5 Packet Delivery Ratio

VI. CONCLUSION

The proposed mechanism has the clear performance improvement over conventional mechanism. There is a significant improvement in Throughput, Packet Delivery Radio (PDR) and Reduction in Delay. In this system, Priority Aware Adhoc On Demand Distance Vector (PA-AODV) protocol is proposed in order to enhance the Quality of Service (QoS) for Mobile Adhoc Networks (MANET). The network parameter such as Throughput, Packet Delivery Ratio (PDR) and End to End Delay (EED) is estimated for the proposed PA-AODV protocol. Due to the priority aware mechanism, PA-AODV protocol can provide precise admission control. The simulation results confirm that the throughput and packet delivery ratio of proposed PAAODV is better than the reported one. An on-demand QoS routing protocol based on AODV is developed for mobile adhoc networks. It can build a QoS route from a source to destination with reserved bandwidth. We developed priority aware algorithm for calculating the priority. It works best in small networks under low networks mobility. It is hoped that in the future, ad hoc networks will emerge as an effective complement to infrastructure wired and wireless LANs and even wide area-mobile networking services.

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