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A COMPARATIVE STUDY OF AODV AND CROSS LAYERED AODV FOR MULTIPATH ROUTING IN MANET

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ABSTRACT

Ad hoc network is a multi-hop wireless network formed by a collections of mobile nodes without the intervention of fixed infrastructure. The mobile hosts are self-organized and can be deployed everywhere and at any time. multipath routing is the routing technique of using multiple alternative path through a network which can yield a variety of benefits such as fault tolerance, increased bandwidth, or improved security. The proposed protocol as the critical feature to adapt cross-layer interface in multipath mobile ad-hoc network. In this article show case improved method for existing system.

KEYWORDS

MANET, AODV, CSSOR, energy, ad-hoc.

1. INTRODUCTION

Mobile Ad hoc Networks (MANETs) have been fundamentally utilized as a part of strategic network related applications to enhance war zone communications. Early ad-hoc network can be followed back to DARPA Packet Radio Network Project (PRNET) in 1970s. The PRNET project utilized ALOHA [1] and in this manner utilized CSMA ways to deal with help the dynamic sharing of the radio resources, and included multi-hop communication among nodes by presenting a few separation distance vector routing protocols. In the early 1990, the U.S. Bureau of Defense kept on supporting exploration projects, for example, Global Mobile Information Systems (GLOMO) and the Near-Term Digital Radio program (NTDR).

The current advances in scaling down, and the proposition of open guidelines (Bluetooth, IEEE 802.11, RFID) for wireless communication, have incredibly encouraged the sending of ad hoc network and support for further developed capacities. This enables a node to go about as a wireless terminal and additionally a repeater and still be sufficiently minimized to be mobile. A self arranging mobile gathering of such gadgets associated with wireless connections is said to be an Ad-hoc network. A wireless network is ordinarily a decentralized network[2].

Wireless mobile ad-hoc networks are self-arranging, dynamic network in which node are allowed to move. Wireless network do not have the complexities of foundation setup and organization, empowering gadgets to make and join network "on the fly" – anyplace, whenever.

In Multipath routing is the network of utilizing various option paths through a network, which can yield an assortment of advantages, for example, adaptation to non-critical failure, expanded transfer speed, or enhanced security. In Multipath routing is the strategy of utilizing various option paths through a network, which can yield an assortment of advantages, for example, fault tolerance, increased bandwidth, or improved security.

Multipath routing is the spreading of activity from a source node to a destination node over various paths through the network. The web is a critical piece of the worldwide communication. Qos, throughput, and delay are troublesome issues with current single path routing design. multipath routing gives much better general network execution by permitting better sharing of the accessible network assets.

2. LITERATURE REVIEW

S.Palanisamy et.al (2016) depicts the path association builds up the connection from source to destination by means of middle of the road nodes. In mobile Ad hoc arrange the path is temperamental because of portability of nodes. The multipath routing protocol gives adaptation to non-critical failure and load adjusting. This adaptation to internal failure is utilized to rapidly recoup from course failures. [3]

SeemaTiwari1 et.al (2016) Analysis An Energy Saving Multipath AODV routing protocol, which in light of node remaining energy and Threshold esteem based plan for choosing just two paths that have most extreme energy value. Pick one way from two of them that have most extreme vitality for communication and second way is hold for later use as backup route of action. In this path, when fundamental route is never again being used because of connection disappointment, vitality fatigue second route is utilized for information transmission which ration vitality devoured in reroute start process. Reenactment comes about demonstrates that it indicates better execution as far as Packet Delivery Ratio and End-to-End defer in contrast with AODV routing protocol.[4]

D.Srinivasa Rao et.al (2016) thought about a protocol, called Poly-Meshed routing protocol (PMRP) which cluster based routing protocol and conveys the idea of work tree. It lessens routing overhead and enhance the steering disclosure by coordinating the between cluster on-demand and intra-cluster table-driven routing, which can expand the execution in the Throughput, Packet Delivery Ratio, Routing Overhead, End to End delay, and Energy Consumption when contrasted and AODV (Ad hoc On demand Distance Vector) protocol.[5]

Ranjeet Kaur et.al (2013) compared an essential route neglects to convey the packets, the auxiliary route can be utilized. The multipath routing gives a superior adaptation to internal failure in the feeling of speedier and productive recuperation from route failure. This additionally gives better Load Balancing. This paper tends to issues and difficulties of the different multipath routing protocols in MANETs.[6]

Shiva prakash et.al (2010) describes the routing and power administration end up noticeably basic issue. In this generally utilized field, considering the two protocols and investigative systems for energy efficient routing. The principle concentrate on inspiration, look into challenges, late advancement and alterations in existing straight routing protocols to make them as energy efficient. [7]

Rashmi Gupta et.al (2016) Analysis the primary concentrate is on the energy of the sensor nodes and security of the sensor nodes. As AODV is conventional calculation for portable Ad hoc network, the idea of AODV is utilized as a part of changed design to get the various paths in single route discovery stage for least vitality utilization. Furthermore, for security reason we utilize the two surely understood cryptographic calculations RSA and Diffie Hellman one by one discover which gives best execution regarding time taken. [8]

P.Periyasamy et.al (2013) describes a Multipath routing protocols build up different courses between nodes. The development of different route ought to be finished with least overhead and bandwidth consumption. The motivation behind this article is to examine the attributes and usefulness of different multipath routing protocols and to do the execution correlation between these multipath routing protocols to pick the best among them to use in large networks. [9]

Rohit Jain et.al(2013) Compare An assortment of routing protocols have been proposed and a few of them have been widely reproduced or actualized too. The normal conviction is that the same is valid for specially ad-hoc networks, i.e., multi-path routing adjusts the heap altogether superior to anything single-path routing. Our Protocol, called MPOLSR and MDART is a multipath routing protocol for MANET. [10]

3. MULTIPATH ROUTING PROTOCOL

The Multipath routing successfully diminishes the recurrence of route discovery in this manner the inertness for finding another route is decreased when at present utilized route is broken. The multipath routing has all the earmarks of being a promising method for specially appointed routing protocol. giving different route is useful in communication, especially in the MANETs where route wind up noticeably old as often as possible in light of mobility and poor remote connection quality. various paths can be helpful in enhancing the successful transfer speed of communication, reacting to clog and overwhelming activity, and expanding conveyance unwavering quality.

Single path routing may bring about clog influencing the network as far as bandwidth, throughput and delay. To defeat the issues of single path routing, we are wanting to outline multipath and cross-layered routing protocol for MANET.

The most path issue is that it is regularly the focal way of the network and typically constantly congested as each node tries to do information transmission by means of this focal path. Single way protocols are fault tolerant and don't have the ability to appropriate the heap. To defeat the burden of single path routing, scientists concentrate on the possibility of multipath routing. It is acquired from the conventional circuit exchanged network where call blockages are stayed away from by redirecting call to some other route [11]. When all ways are known to sender, most vital issues are about how to choose among every accessible paths and how to convey stack among nodes.

To adapt to the advanced difficulties, for example, application decent variety and progression changes, setting up path for various application is very bulky. MANET design likewise represents some imperative constraints, for instance, limited bandwidth and energy sparing. Analyst tries to locate the best way among every single accessible course to fulfill the need. Developing from single path to two paths which goes about as a reinforcement route on the off chance that that essential path comes up short demonstrates better. This approach likewise includes the blame tolerant element where one way breaks while the other one assumes control. With the progression of time, these methodologies were not adequate for the client prerequisite and consumer loyalty. Multipath routing strategy was utilized to accomplish more productivity and load dispersion among paths [12]. Multipath approaches are essentially separated into two classifications, that is, interface disjoint and hub disjoint multi -paths. Shared medium constantly has a tendency to be congested and furthermore lessens the execution of the network because of parcels misfortune and delay. Multi-hop communication additionally needs the common collaboration required between physical, MAC, and steering layer. Likewise, versatility additionally represents the requirement for foundation of new route over and over Shadowing condition include RSS (Received Signal Strength) is utilized for balancing out the connection.

One of the significant difficulties is likewise on choosing that what number of quantities of paths ought to be utilized. Utilizing more ways likewise includes the extreme over-burden with exceptionally minor change in the throughput. Greater part approaches utilized a few ways for multipath conspire. A portion of the upsides and downsides of the multipath routing protocol.

3.1 MULTIPATH ROUTING ADVANTAGES AND DISADVANTAGES

For reproduction work, we utilize AODV (ad-hoc on-demand distance vector) [DSR (Dynamic Source Routing), OLSR (Optimized Link State Routing), PLQBR (Predictive Location-Based QoS, Routing in Ad Hoc Networks), QAODV (Quality of Service for Ad Hoc On-Demand Distance Vector Routing), CEDAR (Core Extraction Distributed Ad Hoc Routing), SAODV (secure impromptu on-request separate vector), and CSROR (Cross-Layer Secure and Resource-Aware On-Demand Routing). AODV chips away at the theory of DSDV by enhancing the on-request conspire. This aides in finding the progressive courses, additionally by lessening the route support stage. Just the dynamic nodes will trade and keep up the control data. Goal grouping number is utilized by source hub to abstain from circling and freshness of the route [13]. Like DSR, AODV communicate RREQ to its neighbors, however not at all like DSR source routing isn't utilized. Here, source node and middle of the road hubs will store the following jump steering data in its routing table and RREQ will be rebroadcasted. Once the RREQ achieves the last goal, it answers with the RREP to the turnaround way where sections are made at the middle of the road nodes. In the event that middle of the road nodes know the goal, they may be permitted to send RREP if their grouping number is equivalent or more noteworthy to the succession number said in the RREQ. In the event that any mistake happens, RERR (Route ERROR) will be created and transmitted to both end nodes. RERR additionally makes the end nodes evacuate the relating route sections. The principle inconvenience of AODV is that if succession number of source hub is little, at that point the number is utilized by middle of the road nodes and can prompt stale route too causing the RERR every now and again.

4. PROPOSED AND OBJECTIVE METHOD

In MANET, there are numerous applications and might be an assortment of situations. A single route determination component may perform well in one situation yet may not in another. For instance, AODV routing protocol may perform well for basic applications yet isn't appropriate for multimedia or such applications which require security. Likewise, CSROR may function admirably to guarantee some kind of security; be that as it may, it isn't reasonable for basic applications, which needn't bother with security. Keeping in see extensive variety of uses and situations related with MANETs, we propose an adaptive mechanism which chooses multipath routes from source to destination by considering the type of application.

The proposed protocol dependably chooses at least two than two ideal route relying upon sort of use. The route choice process is versatile and nearly coordinates the application prerequisites. Diverse sorts of utilizations have distinctive requirements. An ideal route is constantly chosen as a matter of route; be that as it may, different applications can pass on their individual requirements to the proposed protocol utilizing couple of parameters, for example, bandwidth, delay, and security. The default route is utilized for those applications, which are non-delicate and need not bother with more bandwidth. Default course route the briefest way from source to goal like AODV.

Multimedia applications need such route, which has more bandwidth and least end-to-end delay. For such application, the proposed routing protocol chooses at least two than two route which are bandwidth rich having least delay from source to destination.

Secure route is chosen when some kind of touchy application is sent from source to destination. The routing protocol deals with organize layer related security assaults.

In the proposed routing protocol, some imperative highlights are as per the following:

- (i) The sort of use is characterized by application layer.
- (ii) Security module is working at network layer.
- (iii) Bandwidth and end-to-end delay parameters are taken from medium access layer.

5. RESULT AND DISCUSSION

Reproduction Parameters. With a specific end goal to assess the performance of our proposed protocol, we routing reenactments in modeler.

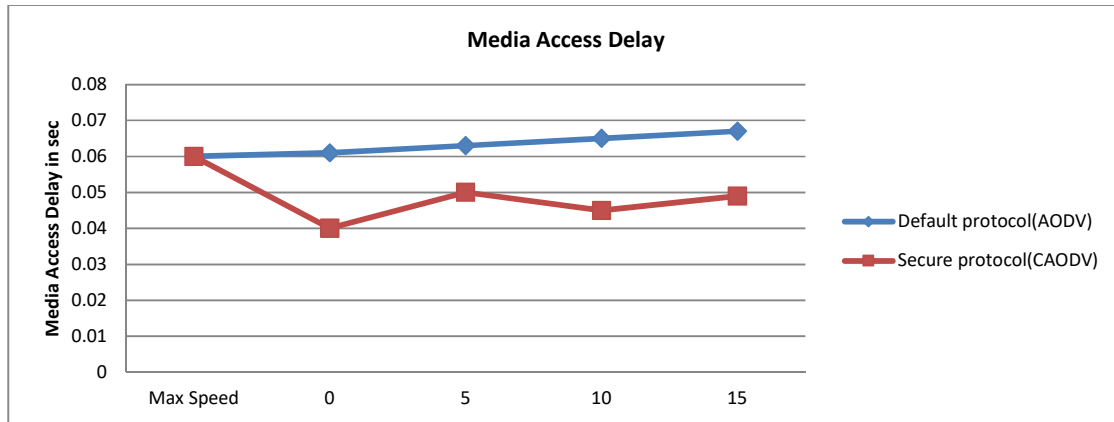
NS2 Simulation Result of Comparing with Each Other. As a matter of first importance, we looked at the changed variations, that is, default, mixed media, and secure proposed routing protocol.

Media get to defer is given in Figure 1. For this situation, the default variation beats the other two, by having beneath 0.001 sec media get to defer within the media access of 50 nodes.

TABLE 1: MEDIA ACCESS DELAY FOR DEFAULT, SECURE PROTOCOLS

| Number of node | Default protocol | Secure protocol |
|----------------|------------------|-----------------|
| 10 | 0.001 | 0.003 |
| 20 | 0.0015 | 0.005 |
| 30 | 0.0014 | 0.0045 |
| 40 | 0.0013 | 0.0055 |
| 50 | 0.0014 | 0.0049 |

FIGURE 1: MEDIA ACCESS DELAY

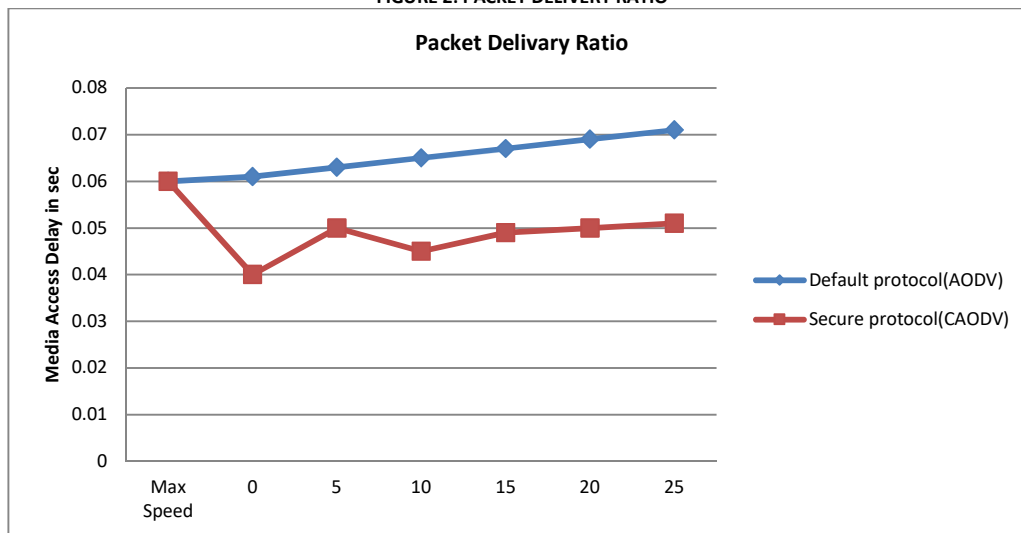


It demonstrates the packet delivery ratio at most extreme speed between AODV, CAODV, and proposed mechanism. AODV delivery is diminished with the expansion in speed. CAODV likewise demonstrates the 77% delivery rate, while our proposed mechanism indicates 88% delivery rate at all speeds.

TABLE 2: PACKET DELIVERY RATIO

| Max Speed | Default protocol(AODV) | Secure protocol(CAODV) |
|-----------|------------------------|------------------------|
| 0 | 0.001 | 0.001 |
| 5 | 0.002 | 0.0012 |
| 10 | 0.004 | 0.0015 |
| 15 | 0.005 | 0.0017 |
| 20 | 0.007 | 0.0018 |
| 25 | 0.008 | 0.0019 |
| 30 | 0.009 | 0.0021 |

FIGURE 2: PACKET DELIVERY RATIO

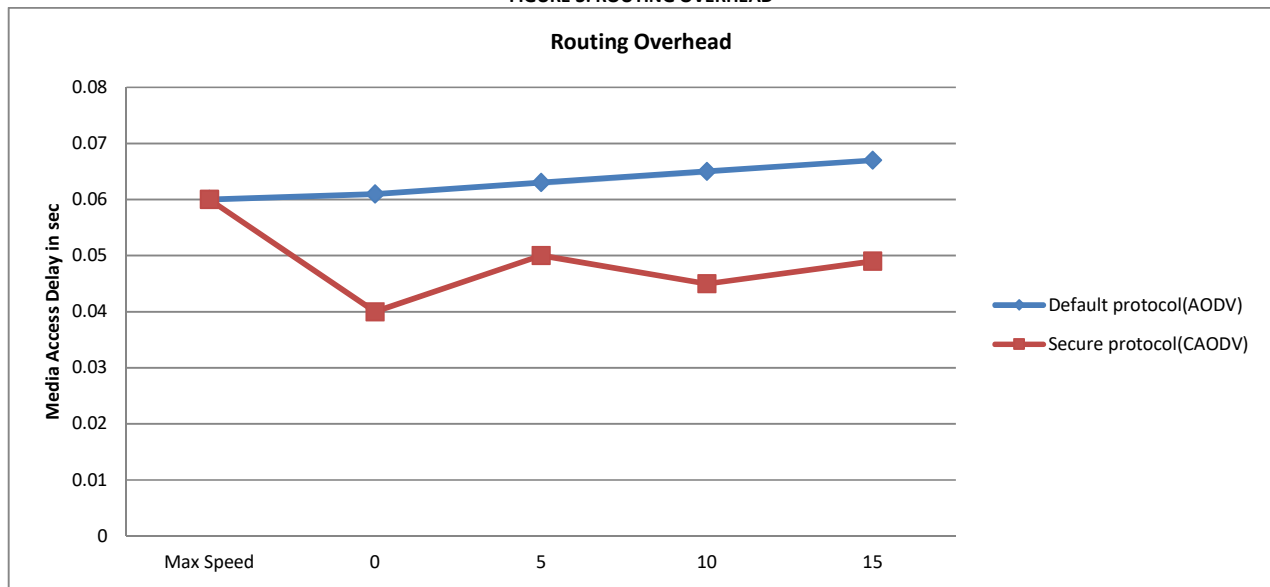


Routing overhead is cited in suggests that through increasing mobility the overhead will also be increased. However, proposed mechanism tends to show the overhead becomes stable after someday showing no main variation.

TABLE 3: ROUTING OVERHEAD

| Time in sec | Default protocol (AODV) | Secure protocol (CAODV) |
|-------------|-------------------------|-------------------------|
| 0 | 14000 | 8400 |
| 300 | 13700 | 7900 |
| 600 | 12600 | 8100 |
| 900 | 11450 | 8300 |
| 1200 | 11900 | 8400 |

FIGURE 3: ROUTING OVERHEAD

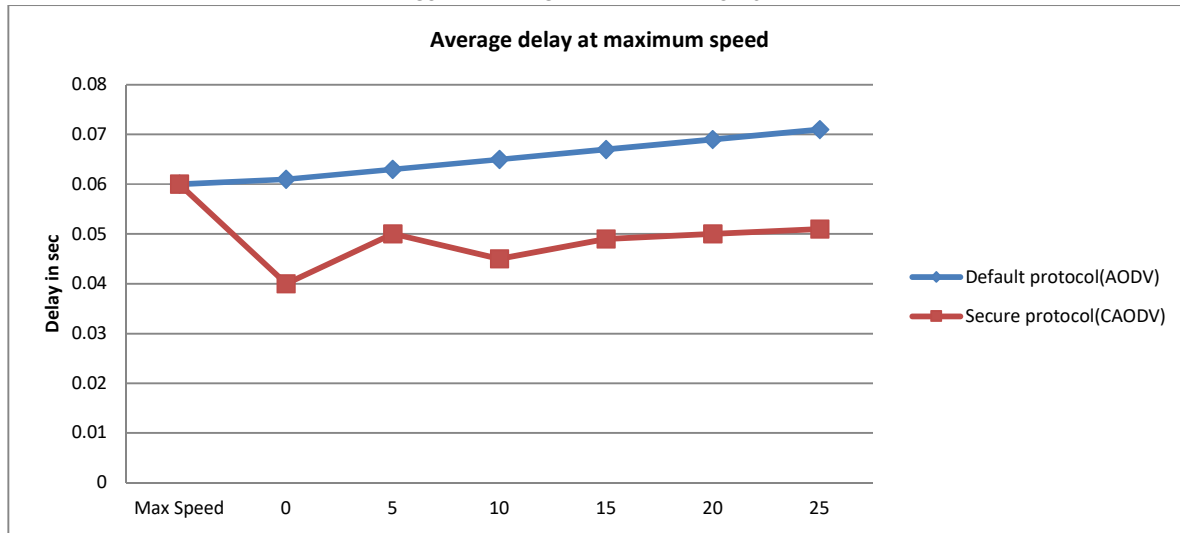


The average end-to-end delay for a network in presence of malicious nodes is proven in smallest end-to-end delay is located in case of CAODV. AODV that has barely greater end-to-end delay compared to CAODV and proposed mechanism due to involvement of cryptographic operations in route discovery.

TABLE 4: AVERAGE DELAY AT MAXIMUM SPEED

| Max Speed | Default protocol(AODV) | Secure protocol(CAODV) |
|-----------|------------------------|------------------------|
| 0 | 0.06 | 0.06 |
| 5 | 0.061 | 0.04 |
| 10 | 0.063 | 0.05 |
| 15 | 0.065 | 0.045 |
| 20 | 0.067 | 0.049 |
| 25 | 0.069 | 0.05 |
| 30 | 0.071 | 0.051 |

FIGURE 4: AVERAGE DELAY AT MAXIMUM SPEED



6. CONCLUSION

In this studies work we supplied cross-layer multipath routing protocol for MANET. The proposed protocol has critical features, this is, security and adaptive nature. these critical capabilities are completed with the aid of multipath framework using cross-layer interface. The comparison covers maximum of the scenarios together with the packet delivery ratio, average delay, and routing overheads with and without malicious nodes. The proposed protocol may be very powerful in maximum of the eventualities that we examined. In future, we're planning to further strengthen the security of proposed routing scheme by introducing packet encryption and key exchange mechanism. Moreover, we may remember to test and put into effect it in real scenarios.

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