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Preventing Black Hole Attack in Mobile Ad-Hoc Networks Using On-Demand Distance Vector

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Abstract: The main objective of this research work is to improve the main advantage of this protocol is that routes are established on demand and destination sequence numbers are used to search out the newest route to the destination. The affiliation setup delay is lower. one in all the disadvantages of this protocol is that intermediate nodes will result in inconsistent routes if the supply sequence range is extremely previous and therefore the intermediate nodes have a better however not the newest destination sequence range, thereby having stale entries. Additionally multiple Route Reply packets in response to one Route Request packet will result in serious management overhead. Another disadvantage of AODV is that the periodic beaconing results in unnecessary bandwidth consumption. The variable used to set the black hole node being activated or deactivated. This will be used to inform the aodv routing protocol that if the node black hole property is set true then it will behave as a black hole node the performance of the AODV is very good as it provides more than 92 % throughput under dense traffic circumstances.

Keywords: Health Care, Natural language processing, Fuzzy Logic, Classification, Intelligent Decision Support System, Identifying patients, diagnosis.

I. INTRODUCTION

The unexpected On-Demand Distance Vector (AODV) algorithm allows dynamic, self-starting, multi hop routing between collaborating mobile nodes wishing to determine and maintain an advertisement hoc network. AODV permits mobile nodes to get routes quickly for brand spanking new destinations, and doesn't need nodes to take care of routes to destinations that aren't in active communication [1]. AODV permits mobile nodes to reply to link breakages and changes in network topology in an exceedingly timely manner. The operation of AODV is loop-free, and by avoiding the Bellman-Ford "counting to infinity" downside offers fast convergence when the unexpected network topology changes (typically, when a node moves within the network)[2]. When links break, AODV causes the affected set of nodes to be notified in order that they're able to invalidate the routes using the lost link. The destination sequence range is formed by the destination to be included alongside any route info it sends to requesting nodes. Given the selection between 2 routes to a destination, a requesting node is needed to pick the one with the best sequence range. AODV is a method of routing messages between mobile

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computers [3]. It allows these mobile computers, or nodes, to pass messages through their neigh bours to nodes with which they cannot directly communicate. AODV does this by discovering the routes along which messages can be passed. AODV makes sure these routes do not contain loops and tries to find the shortest route possible. AODV is also able to handle changes in routes and can create new routes if there is an error.

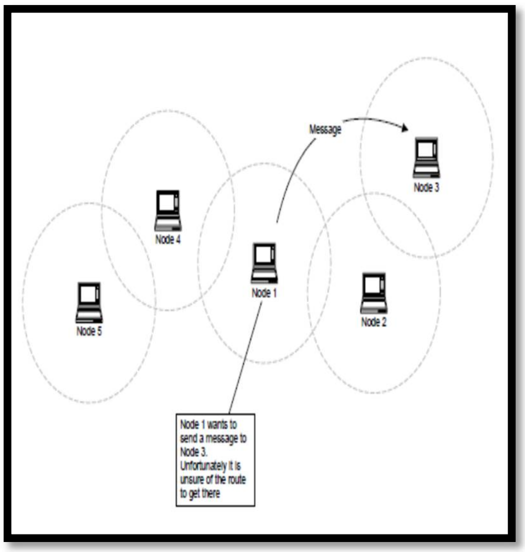

FIGURE 1: ROUTE DISCOVERY IN AODV

The circles illustrate the range of communication for each node. Because of the limited range, each node can only communicate with the nodes next to it. Ad hoc On-Demand Distance Vector (AODV) Routing could be a routing protocol for mobile circumstantial networks (MANETs) and different wireless ad-hoc networks [4]. it's jointly developed in Nokia analysis Center, University of California, Santa Barbara and University of Cincinnati by C. Perkins, E. Belding-Royer and S. Das. AODV is capable of each unicast and multicast routing. It's a reactive routing protocol that means that it establishes a route to a destination solely on demand. In distinction, the foremost common routing protocols of the web are proactive, that means they notice routing ways independently of the usage of the ways. AODV is, because the name indicates, a distance-vector routing protocol. AODV avoids the counting-to-infinity downside of different distance-vector protocols by using sequence numbers on route updates, a method pioneered by DSDV [5].

II.RELETED WORK

A node keeps track of its Neighbours by listening for a HELLO message that each node broadcast at set intervals. When one node needs to send a message to another node that is not its Neighbour it broadcasts a Route Request (RREQ) message [6]. The RREQ message contains several key bits of information: the source, the destination, the lifespan of the messageand a Sequence Number which serves as a unique ID. In the example, Node 1 wishes to send a message to Node 3. Node 1's Neighbours are Nodes 2 + 4. Since Node 1 cannot directly communicate with Node 3, Node 1 sends out a RREQ. The RREQ is heard by Node 4 and Node 2.

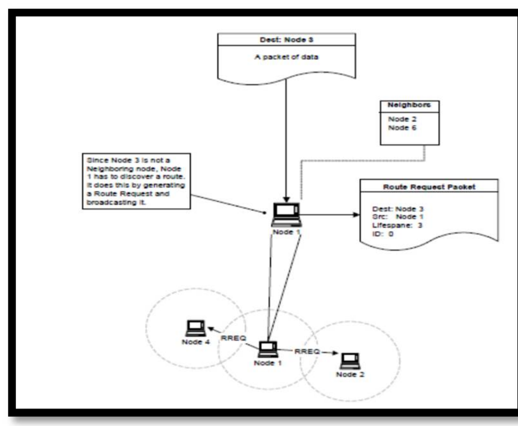

FIGURE 2: ROUTE DISCOVERY BY RREQ

When Node 1's Neigh bours receive the RREQ message they have two choices; if they know a route to the destination or if they are the destination they can send a Route Reply (RREP) message back to Node 1, otherwise they will rebroadcast the RREQ to their set of Neighbours. The message keeps getting rebroadcast until its lifespan is up [7]. If Node 1 does not receive a reply in a set amount of time, it will rebroadcast the request except this time the RREQ message will have a longer lifespan and a new ID number. All of the Nodes use the Sequence Number in the RREQ to insure that they do not rebroadcast a RREQ In the example, Node 2 has a route to Node 3 and replies to the RREQ by sending out a RREP. Node 4 on

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the other hand does not have a route to Node 3 so it rebroadcasts the RREQ [8].

Sequence numbers serve as time stamps. They allow nodes to compare how "fresh" their information on other nodes is. Every time a node sends out any type of message it increases its own Sequence number. Each node records the Sequence number of all the other nodes it talks to. A higher Sequence numbers signifies a fresher route. This it is possible for other nodes to figure out which one has more accurate information. In the example, Node 1 is forwarding a RREP to Node 4. It notices that the route in the RREP has a better Sequence number than the route in its Routing List. Node 1 then replaces the route it currently has with the route in the Route Reply [9].

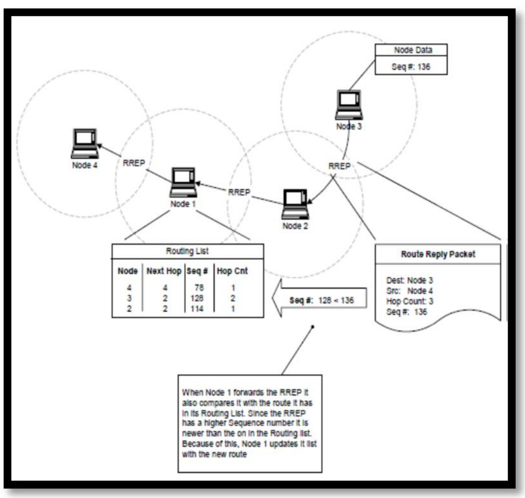

FIGURE 3: SEQUENCE NO. IN AODV

The Route Error Message (RERR) allows AODV to adjust routes when Nodes move around. Whenever a Node receives RERR it looks at the Routing Table and removes all the routes that contain the bad Nodes. The diagram illustrates the three circumstances under which a Node would broadcast a RERR to its neigh bours [10]. In the first scenario the Node receives a Data packet that it is supposed to forward but it does not have a route to the destination. The real problem is not that the Node does not have a route; the problem is that some other node thinks that the correct Route to the Destination is through that Node. In the second scenario the Node receives a RERR that cause at least one of its Routes to become invalidated. If it happens, the Node would then send out a RERR with all the new Nodes which are now unreachable In the third scenario the Node detects that it cannot communicate with one of its Neigh bours [11]. When this happens it looks at the route table for Route that uses the Neighbour for a next hop and marks them as invalid. Then it sends out a RERR with the Neighbour and the invalid routes.

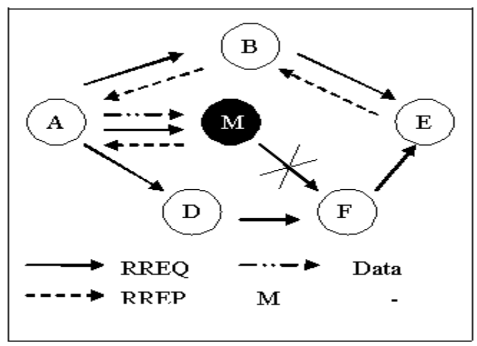

Figure 4: Blackhole Attack

PURPOSE of RESEARCH

Research and Application Challenges

1.The main objective of this experiment is to perform Preventing black hole attack in mobile ad-hoc networks using Anomaly Detection.

2. Detecting Blackhole Attacks in Disruption-Tolerant Networks through Packet Exchange Recording.

III. EXPERIMENT and IMPLEMENTATION

NS uses 2 languages as a result of the simulator has 2 totally different sorts of things it must do. On the one hand, detailed simulations of protocols need a systems programming language which might efficiently manipulate bytes, packet headers, and implement algorithms that run over giant knowledge sets. For these tasks, the run-time speed necessary is vital is very important and also the turn-around time is a smaller amount important. On the opposite hand, an outsized a part of network analysis involves slightly varying parameters or configurations, or quickly exploring variety of eventualities [12]. In these cases, the iteration time is additional necessary. Since configuration runs once (at the start of the simulation), the run time of this a part of the task is a smaller amount necessary. C++ is quick to run however slower to alter, creating it appropriate for detailed protocol implementation. OTCL runs abundant slower however will be modified terribly quickly (and interactively), creating it ideal for simulation configuration

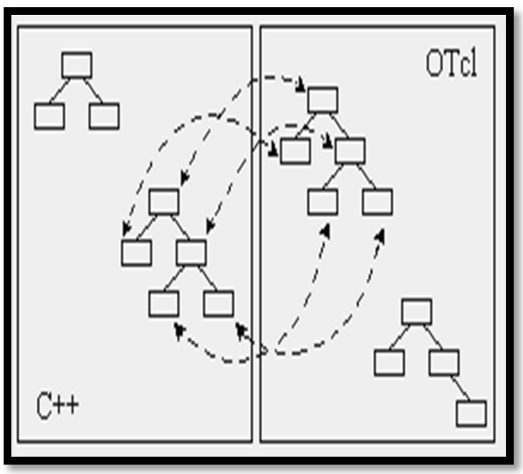

FIGURE 5: C++/OTCL DUALITY

Protocols like TCP and UPD, traffic supply behavior like FTP, TELNET and CBR, router we currently briefly examine what data is stored during which directory or file in ns- NS (version 2) is an object- oriented, discrete event driven network simulator developed at UC Berkeley written in C++ and OTCL. NS is primarily helpful for one thing native and wide space networks. It implements network queue management mechanism like Drop Tail, RED and CBQ, routing algorithms like AODV, DSR, and more [13]. NS conjointly implements multicasting and a few routing algorithms like AODV, DSR and a lot of. NS conjointly implements multicasting and a few of the MAC layer protocols for LAN simulations.

NAM provides a visible interpretation of the network topology created. The applying was developed as a part of the VINT project. Its options are as follows. Following figure displays the NAM application and its parts [14].

- Provides a visible interpretation of the network created
- Can be executed directly from a TCL script
- Controls embody play, stop, ff, rw, pause, a show speed controller and a packet monitor facility.
- Presents data like throughput, variety packets on every link.

IV. RESULT

Scenario 1: 30 nodes and 2 Blackholes.

TABLE 1: RESULT ANALYSIS

Time	Throughput
10	20.0 %
20	40.0 %
30	41.0 %
40	42.35 %
50	42.36 %
60	63.0 %

V. CONCLUSION

The performance of the AODV is very good as it provides more than 90 % throughput under dense traffic circumstances also. The AODV is simplest of the routing used by the Mobile Ad-Hoc Networks [15].

The attack simulated significantly hampered by the Black hole Attack.

(1) In the first scenario of 30 nodes with 2 black hole nodes the performance of the aodv reached till 72% maximum. With the average being 56%.
(2) In the second scenario of 40 nodes with 3 blackhole nodes the performance of the aodv reached till 72% maximum. With the average being 54%.

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The scenario and the results supports that the Blackhole attack severely hampers the performance of the AODV or any other Ad-Hoc network in which there is no security mechanisms and detection of such types of nodes and attacks.

VI. FUTURE WORK

improve the performance of black hole attack severely hampers the performance of the aodv or any other ad-hoc network in which there is no security mechanisms and detection of such types of nodes and attacks.

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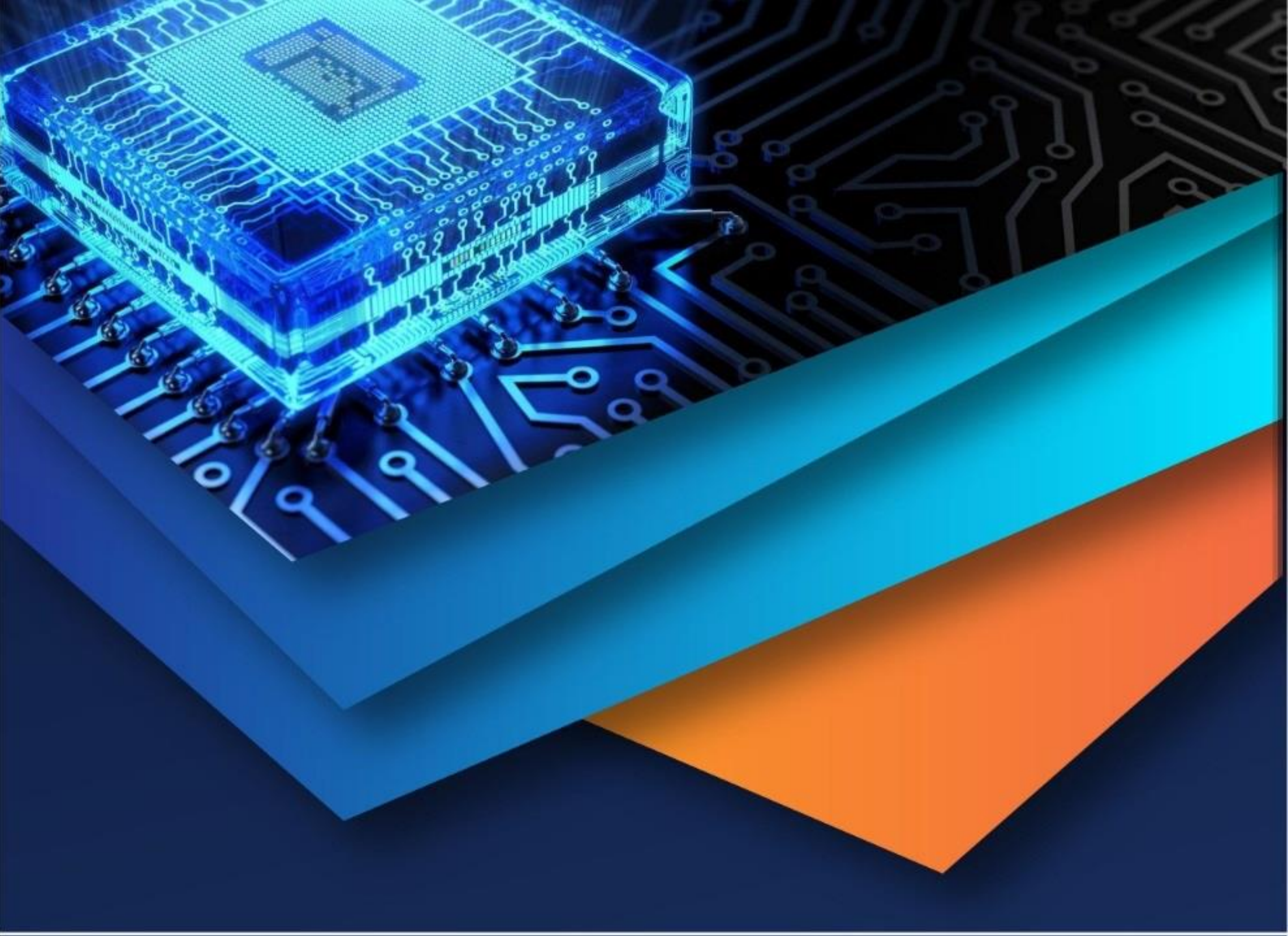

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