Optimized AODV Protocol for minimizing Routing path within mobile nodes in AMMET

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***Abstract*— Autonomous Mobile Mesh Network (AMMNET) is another class of Mobile Ad-hoc Network (MANET), which is strong against network partitioning not at all like MANET. So these AMMNET are utilized as a part of emergency administration and combat zone correspondence, in which all users of group need to work in gathering scattered in application territory. Dissimilar to traditional mesh network, the mobile mesh nodes of an AMMNET are equipped for taking after the mobile users in the application territory, and arranging themselves into a suitable system topology to guarantee great network for both intragroup and intergroup interchanges. But routing of data and tracking mobile client makes mesh node drains more energy. This problem is addressed by introducing optimized AODV routing protocol in mobile clients such that mobile nodes will find the nearest path to destination or intergroup router. So that an efficient and secure path is found by mobile node to transmit data and the intragroup mesh node can only track mobile client.**

Index Words*— *Autonomous Mobile Mesh Network, Mobile Ad-hoc Network, Optimized AODV, Mobile Mesh Nodes, Mobile Clients

I. INTRODUCTION

Wireless communication technology is a standout amongst the most changing and empowering advancements. Mobile Ad Hoc NETwork (MANETs) is one of the mainstream wireless communication technologies. In MANET there is no pre-constructed framework for communication, such a network does not require any base for communication. Mobile nodes help to forward information parcels from source to destination node utilizing multiple-hop relay, and goes about as routers. Thus MANET is suitable where no altered framework is accessible or infeasible. The ad hoc network can be reused for diverse applications by migrating network in better places at distinctive time thus it is practical.

MANET is formed by number of nodes, which are dynamic in nature. The element way of nodes makes directing extremely troublesome, and leads to separation of courses often which influences network integration. This makes MANET to experience network apportioning. This limit makes MANET infeasible where colleagues need to work in groups for example, combat zone communication and emergency administration. An Autonomous Mobile Mesh Network (AMMNET) is a network which contains mobile clients and mesh node. The wireless mesh nodes contain multiple radios in single node which serves to handle multiple recurrence groups. These mesh nodes additionally have versatility, not at all like standard mesh network. Mobile mesh nodes in AMMNET move alongside mobile clients in application terrine, and build network topology and helps mobile clients to impart. At the point when mobile clients move in application terrine mobile clients following calculation is adopted to track the mobile clients by mesh node regarding portability of clients.

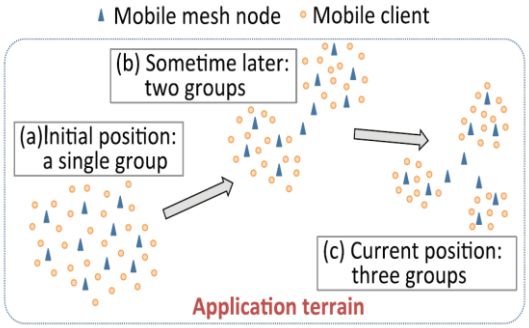


Fig. 1. Representation of Autonomous Mobile Mesh Network (AMMNET)

AMMNET contains mobile clients and mobile mesh node in one group. At the point when mobile clients begin moving mesh clients additionally move along with mobile clients (fig1a). The node of AMMNET part into groups (fig1b) with time and structures two are more intra-groups. The mesh nodes adjust system topology to shape integration between every single mobile client (fig1c) and make inter-groups.

Mobile clients in AMMNET suffer from overlapping channel [1] in communication. Missing of client node is the main problem arises in this type of network. The location of each mobile mesh node is given with a GPS and then the mesh node can find the location of mobile client within its sensing range. RFID [3] is another way for finding the location of nodes. If mobile mesh nodes are given with RFID reader to detect the mobile client. AODV [4] is a secured protocol which is used in MANET. Optimized AODV protocol [6] provides a secure routing of data in the dynamic wireless network, where multiple paths and multi-interface exists.

The mesh nodes in AMMNET will act as routes also hence in this paper mesh nodes are also referred as routers. Optimized Ad hoc On-Demand Distance Vector Protocol (AODV) routing protocol which is used in forwarding data in MANET is only used to transmit data in AMMNET.

II. EXISTING SYSTEMS

AMMNET is another class of network where mobile clients are strong against network partitioning. The mobile mesh nodes give the directing and hand-off of data to the mobile clients of AMMNET, by this mesh nodes, the mobile clients can impart. The mobile clients send data specifically to the mesh nodes. These mesh nodes are utilized as routers and transmits data to the destination.

The mesh nodes, acts as router as well as the primary employment of mesh nodes to track the mobile clients and discover its location. This makes the mesh nodes to deplete its battery power. In the event that mesh node falls flat its can be supplanted by new one and the mesh network will perceive and reconfigure new mesh node consequently.

On the off chance that the mobile clients in application terrine increments with time however number of mesh nodes won't expand, it shapes overhead on the mesh nodes to track all the mobile clients. In the event that the mobile clients vanishes then the mesh nodes has no capacity to pursuit the missing mobile client. The AMMNET as number of mobile nodes, while move of data they experience the ill effects of covering of channels.

Disadvantages

- Drains battery power of mesh node fast.
- Overhead is created at mesh node by continues tracing of mobile clients and routing data.
- Overlapping of channels.
- Number of mesh nodes will not increase with increase of mobile clients.
- Mesh nodes are not capable of missing mobile clients.

III. PROPOSED SYSTEM

AMMNET contains mobile clients and mesh nodes where mesh nodes are used for tracking of mobile clients and forwarding data for mobile clients. The mesh nodes are over headed by both tracking the location of mobile clients within its bandwidth range and transmitting or routing of mobile clients data to the destination in the network.

An Optimized AODV protocol is proposed in this paper, which is a secure and enhanced AODV protocol. Optimized AODV protocol is the one which provide the mobile clients to route the data by themselves with in the Intragroup, and make mesh nodes only to locate the mobile clients. With the help of optimized AODV protocol multi target routing is also done.

By providing the mobile clients with Optimized AODV protocol overhead of the mesh nodes is reduced which also helps mesh nodes to look after mobile clients efficiently. Since mobile clients are also taking part of routing inside group the battery of mesh node is saved which earlier was used in routing of data in Intragroup.

Advantages

- Achieves performance superior to existing protocols in terms of energy efficiency.
- Reduces replacement of mesh nodes.
- The mobile mesh nodes adapt their topology accordingly to archive full connectivity for all the mesh clients.
- A mobile client tracking solution to deal with the dynamic nature of client mobility.
- An AMMNET tries to prevent network partitioning to ensure connectivity for all its users. This property makes AMMNET a highly robust MANET.
- Reduce overhead of mesh node.
- Minimizes delay and increases through put.
- Minimizes power consumption in mesh nodes.

IV. SYSTEM DESIGN

An AMMNET is a mesh-based infrastructure that advances information for mobile clients. A client node can join with any adjacent mesh node, which helps transfer information to the destination mesh node by means of multihop sending. Like stationary remote mesh systems, where routers are conveyed in settled areas, routers in an AMMNET can forward information for mobile clients along the steering ways manufactured by any current impromptu directing conventions, for instance, AODV. Dissimilar to stationary remote mesh systems, where routers are sent at altered areas, routers in an AMMNET are mobile stages with self-governing development ability. They are furnished with situating gadgets, for example, GPS, to give navigational support while following mobile clients.

Clients are not needed to know their areas, and just need to occasionally send Becon messages. When mesh nodes get the Becon messages, they can distinguish the clients inside its transmission range. With this capacity, mesh nodes can constantly screen the portability of the clients, and move with them to give them consistent network. Mesh nodes can trade data, for example, their areas and the rundown of recognized clients, with their neighboring mesh nodes.

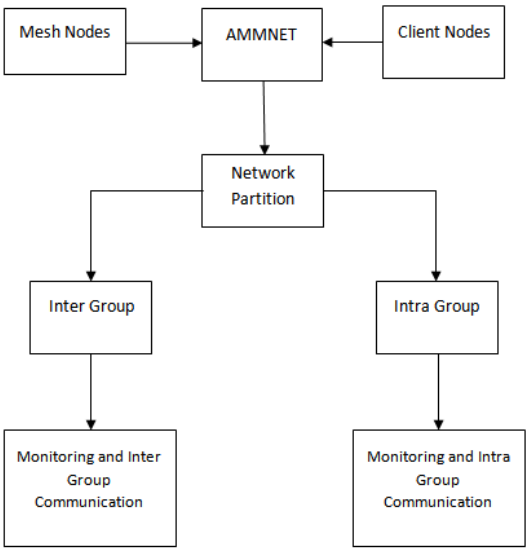


Fig. 2. System Architecture

The mobile clients stats moving and undergo network partition. The mesh node follows the mobile client and form groups of clients. The mesh nodes act as inter-router and intra-router to make all mobile clients to communicate with

them. After formation of groups mesh nodes are divided into three types according to the function it has been triggered.

- *Intragroup router*

If a mesh node has at least one mobile client within the radio frequency range of mesh node, which helps to route the clients data from one router to another router within the group is called intra-group router. Mesh node in Fig. 2 act as intra-group router.

- *Intergroup router*

If the mesh node is inside a group (Fig. 2) and helps to forward mobile clients data from its group to destination in other group then it is called as intra-group routers.

- *Free routers*

The mesh nodes without any mobile client within its range (Fig. 2) and helps to route data from inter-group router to other inter-group router is called free router.

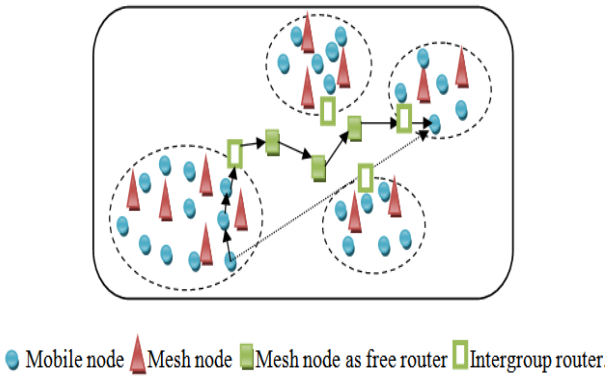


Fig. 3. Functions of mesh nodes

A. Mobile Client Tracking

At first all the mobile clients send Becon message to the mesh node inside its range. The mesh node check the clients rundown to discover the mobile client from which it got message and in the event that it is not present, solicitation to neighboring mesh nodes for client rundown. On the off chance that mobile client is show in between gathering then switch and distinguish the node. On the off chance that the mobile node is new then mesh node adds the node to its rundown and take after the new mobile clients of that gathering.

Algorithm 1: Mobile tracking algorithm

Step1: Send Becon message to mesh node within the range.
Step2: In intra-group request client list from neighboring mesh node and all are covered by neighbors.
Step3: In inter-group, retrieve location of router and identify.
Step4: If free, navigate to inter-group and request router to follow the new intra-group member (mobile client)

B. Topology Adoption Locally

A star topology of the local routers is made by changing over intra-group switch to inter-group routers, of which other group inter-group switch is in its range. At that point all neighbor inter-group routers are processed to star topology and bridge network is assembling to interface bridge network. The routers are activated to embrace new topology and after that free routers are recovered to add to the new topology.

Algorithm 2: local topology construction

Step1: Compute single star topology model.
Step 2: Build bridge network connecting all neighbors.
Step 3: Trigger router to adopt new topology.
Step 4: Reclaim free router to topology.
Step 5: End

C. Topology Adoption Globally

After development of local topology, a star topology ought to be joined between free routers, which there are no mobile clients in its range and activated as free routers. A message is telecasted to all the routers to gather routers area data to embrace global topology such that all groups are inter joined by bridge network. In the event that there are free routers exhibit a subset is shaped and free routers are sent. Another subset of inter-group routers is associated with free routers and a global star topology is built.

Algorithm 3: global topology construction

Step1: Broadcast a message to all bridge routers to collect information and coordinate global adoption.
Step 2: If free router, deploy a subset of inter-group router.
Step 3: Free routers deploy a subnet of router.
Step 4: If router at inter-group are more, adopt free subnet of router to connect to inter-group routers.
Step 5: Send Becon messages to router and collect information and repeat.

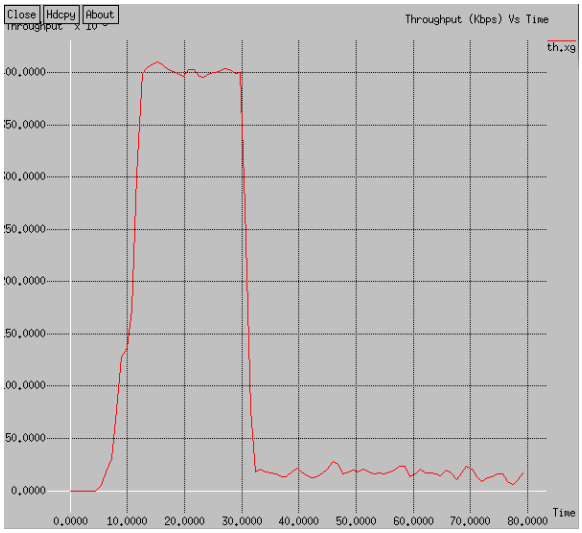
D. Routing in Intragroup

With the help of optimized AODV protocol the data from a mobile client is routed to destination which is inside a same group then mesh nodes are not used. The mobile clients are only used to find the route by broadcasting the path request to neighboring mobile clients. Many paths are formed but a path with less hops are selected and a multi destination is also achieved by a single path where more than one client shares the bandwidth and transmits message at a time.

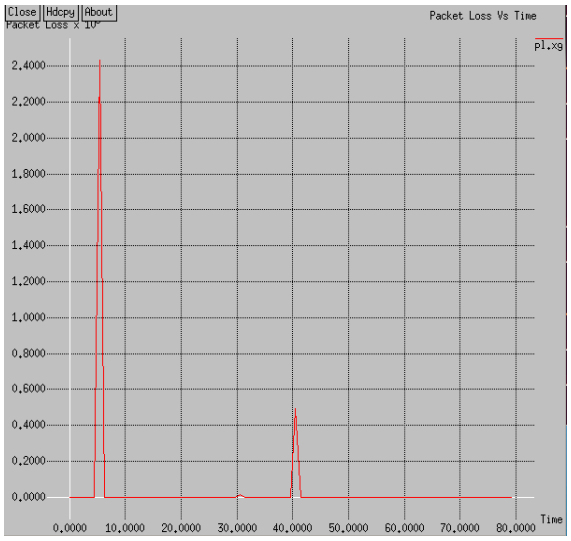
E. Routing in Intergroup

If the mobile client needs to transmit data to the destination placed out of the group then intergroup routing is done. Here the mesh nodes which are acting as intergroup router will find the route to the group where the destination is with the help of free routers as intermediate nodes and transmit data to that group.

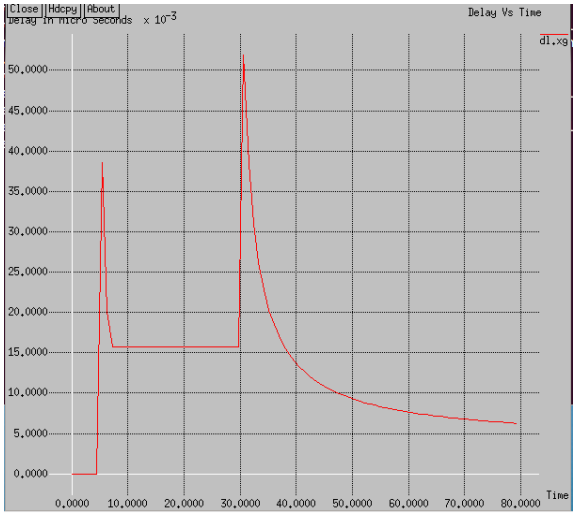
V. RESULT



To discover throughput of the data forwarding of the mobile clients in the network an xgraph is plotted by taking throughput in Kbps versus time. At the point when the mobile clients transmit data in a gathering without moving to another groups the through put is most extreme, however in the event that mobile clients changes bunch the throughput will lessen by little sum.



The loss of packets is found by plotting a chart of parcel loss at y axis and time at x axis. At the time of topology adaption and reproduction the mesh nodes are over headed and packet loss will be more. At the time of no over head there is a base or no packet loss is happened.



By taking delay of packet as consideration there is a delay at the time of group management and at normal transition. Delay of packets can be seen by plotting graph by taking delay at y axis and time at y axis.

VI. CONCLUSION

An arrangement of mobile nodes will convey in application terrine without experiencing network partitioning with the assistance of mesh nodes by shaping inter-groups and intra-groups. The appropriation of network topology with presentation of new nodes is progressively done in AMMNET. The Optimized AODV protocol helps in routing of data by mobile nodes in Intragroup and reduces overhead at the mesh nodes. But the problem of missing client still exists because if the mobile client goes away from the application area mesh nodes cannot locate them.

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