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RESEARCH ARTICLE

Monitoring and Self-Transmitting Data Using Zone Routing Protocol in Ad-hoc Network towards Effective Mobility Management

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Abstract— The network environment today plays an very important role in communication. It Includes both wired and wireless with the recent past Ad-hoc network (MANET) has evolved over wired networks because of the mobility support features available in the MANET-with the advent of features such as infrastructure less, ability to support 10,000 of nodes in ad-hoc fashion, reliability, scalability etc, but the challenging facts of MANET is limited battery power, congestion avoidance, traffic overhead and packet loss due to critical factors. the various ad-hoc network protocols supplement the solutions towards the above factors but it was still research area to work on it for the mobility support features with excellent or efficient communication towards the communication is initially implemented towards the simple ZRP (Zone Routing Protocol) which is processed with the help of searching algorithms such as DFS (Depth First Search) along with networking topology (Mesh Network). Here also identified some node which is most appropriately fixed in that zone is specified as central node(CN) which maintains the history of details like cookies in system environment must maintain the presence of nodes states in the active environment with the node which is not participated for a long time is identified as Inactive node(IAN).Through this way the power consumption mechanism and efficient utilization of node in a ad-hoc network communication is improved with some level of extents towards the existing position. Ad-hoc network itself as no any fixed infrastructure and a node created in their own fashion and communicates with other node in a network. But, additionally focus on each node in a network thereby automatically self decision that in terms processed as self transmitting dedicated task by automatically by itself with other node in a particular (Zone) region. In this way the overall effectiveness of individual node participation is completely notified/monitored and stored for the future performance of that node. Hence, estimate the overall power aware routing (PAR) and effectiveness of an individual node in a network is identified and performance improvement is shown in graph.

Keywords: - MANET, Ad-hoc network, ZRP, DFS, Mesh network, CN, IAN, PAR

I. INTRODUCTION

During initial state the communication will takes place through wired network, but wired network as some predefined setup to share the information between two parties involved in communication such as using TCP/IP protocols etc., In this network itself can categories as three types of networks as local Area Network, Metropolitan Area Network, Wide Area Network. All these have significant variations with each one of them.

The next level of the network communication is wireless network which is an advent over the previous model (i.e) wired network because of their mobility. The wireless network environment does not have any predefined/established path-way to communicate over other node present in a network. During the initial state of wired network over wireless network has face several challenges but it has still some advantages over the existing wired network. So that the current technology is highly move towards wireless ad-hoc network. The term ad-hoc is Latin and means "for this purpose". The term often relate with ad-hoc is called MANET i.e. mobile ad-hoc network. In simple, it is a self-configuring infrastructure fewer networks with number of mobile nodes connected through wireless. It shows this network has no specified way to move data from source to destination. Hereafter refer the term ad-hoc and MANET which is similar word, it differs depends on the usage.

The ad-hoc network has decentralized type of wireless network while because every node in a network can communicate with each other node present in a network with some kind of network topology or existence of resource usage. In general, node to node communication can takes place through routing. Routing is defined as selecting the best and optimum shortest path among the alternatives. For selecting best path routing protocol such as Dijikistra, Krushkal's algorithm etc., These algorithms can helps to improve the quality of data delivery between end to end node. The routing table has maintained complete history of each and every node present in the network, because it maintains node status and their overall participation of other nodes present in a network. Even though routing table maintains history of all nodes present in a network, but particularly in ad-hoc network does not have any centralized node to update the status of particular node present in that zone.

In MANET, each and every node can act as a router as well as destination node or information receiving node/destiny node. while communication takes place in MANET has face the challenges such as power transmission or Energy efficiency, Link failures, over network traffic or congestion avoidance, packet loss etc., which are still in research area to overcome those critical factors. There are number of authors and researches focusing towards these challenging as performance improvement approach. But still the results are measurable specifically in the case link failures occur due to these two major reasons: Node dying of energy exhaustion and node moving out of the radio range of its neighboring node.

Node has not aware of their responsibility towards other node in a network (eg. Central node). In the case congestion control the node must be aware of data delivery towards their source to destination. In this case, the MANET has two types protocols called proactive and reactive protocols. The proactive protocols must be aware of data delivery path from source to destination in advance, whereas Reactive protocol must decide their route after reacting the present node to destiny (current) node. So the prior responsibility about the node information is always less. The Zone Routing Protocol(ZRP) is used to improve over these scheme next challenging factors involved in ad-hoc is called packet loss or packet failures. The packet failures in MANET is primarily caused due to obstruction/destruction caused due to mis-guideness choosing path to one node towards the next.

The congestion control over a mobility failure adaptive routing protocol at the network layer. the congestion non-adaptive leads to the following difficulties: long delay, high overhead and many packet losses. In packet loss when the congestion is detected in particular route. the AVG_MSG of data sending/forwarding towards the route is reduced up to MIN_MSG level. So that ,reduce the packet loss. In this case the route node (i.e) node which is active in the particular zone must be aware of "sending automatic reports" to their nearer node about the status of the existence data delivery herby some immediate action has been taken over on the node involved in the zone in-order to reduce the above factors as mentioned.

II. **RELATED WORK**

There are number of scenarios and articles related with wireless ad-hoc network with the number of innovative ideas related to the facts: Most of previous works focused on routing (i.e) in ad-hoc networks deals with the problems of finding and maintaining correct router to the destination during mobility and changing topology. Because the topology decides the destination communication stability. The Simple implementation algorithm which guarantees strong connectivity and assumes limited node range. Especially in MANET the node strength may be increased or decreased. But the signal availability is scalable up to 10,000 nodes in a network. For this process itself decide to focus on shortest path algorithm is used in this strongly connected backbone network. However, the route may not be the minimum energy solution due to the possible omission of the optimal links at the time of backbone connection network calculation.

1. Yao-Nan Lien et al[6] proposed a new TCP congestion control mechanisms by router-assisted approach. Their proposed TCP-protocol, called TCP Muzha uses the assistance provided by routers to achieve better congestion control. To use TCP Muzha, routers are required to provide some information allowing the sender to estimate more accurately the remaining capacity over the bottleneck node with respect to the path from the sender to the receiver With this information TCP Muzha will be able to enhance the performance of both TCP network.

2. S.Karunakaran et al[5] have presented a cluster Based Congestion Control(CBCC) protocol that consists of scalable and distributed cluster-based mechanisms for supporting congestion control in mobile ad hoc networks.

The distinctive feature of their approach is that it is based on the self-organization of the network into clusters. The clusters autonomously and productively monitor congestion within its localized scope.

3. Bhadauria, Sharma [2] proposed the information about network congestion is collected and distributed by mobile agents (MA). The mobile agent measures the queue length of the various traffic classes and te channel contention and estimates the total congestion metric to find the minimum congestion level in the network.

4. Kazuya Nishimur et al [9] proposed a routing protocol that reduces network congestion for MANET using multi agents. they use two kinds of agents: Routing Agents to collect information about congestion and to updated the routing table at each node, and Message Agents to move using this information. In the future, they will investigates a better evaluation function and discuss the limits of its effectiveness. The evaluation function itself may change depending on the environment. Incorporating learning into the function is also an interesting issue.

5. Vishnu Kumar Sharma et al presented the power control methods, the nodes are selected based on the power level. The nodes with maximum power level are selected as listening nodes(LN) which will always be in active mode and left over nodes are selected as non-listening nodes(NLN) which will awake in periodic manner. If the node getting the data packet is not wakeful, the packet is transmitted through LN towards the destination.

6. S.Aravind et al proposed a methodology of routing protocol for misbehaving node in a network called route management protocols for ad-hoc network(Rmp-Ant) with a power management scheme called as routing intelligent mobile agent (MARI)protocol and discussing about the various scheme to improve routing protocol performance by using mobility prediction. The protocol used here enables nodes to detect misbehavior changing from normal behaviors by observing the status of the nodes

Another solution to bandwidth and traffic control is dynamically varying topologies and cross layer design which provides the possibility to create lightweight and flexible substrate for the demanding ad hoc wireless network. The alternative solution provides little bit improvement over the hop to hop efficiency. In multi ad-hoc network compares by hop count, routing traffic overhead throughput delay by the IETF (Internet Engineering Task Force) mobile ad-hoc network MANET. Next, alternative approach for MANET protocol is DYMO (Dynamic MANET on Demand Routing Protocol). Even though the number above method describes about mobility management. The following concepts deals play a vital role towards this research area they are

1. Proactive Energy Aware-Routing
2. Reactive Energy Aware-Routing
3. DSR protocol
4. Energy aware metrics etc.,

III. DESIGN AND IMPLEMENTATION

So, for this paper discussing about the existing approach related to the MANET in order to improve the effectiveness over the facts such as routing management, end-to-end data delivery, congestion packet loss, energy efficiency etc., Here, dealing with the concepts of protocol called ZRP. It is a hybrid wireless network routing protocol that uses both proactive and reactive protocols when sending information over the network. The intra-zone routing protocol(IARP) and Inter zone routing protocol(IERP) use respectively as both proactive and reactive protocols as used between routing zone. The ultimate aim of ZRP is to reduce processing delay overhead by selecting the most efficient type of protocols to use throughout the route. This route information is maintained by routing table in the network protocols. in general TCP/IP to calculate the destination of messages that is responsible for forwarding. The table is a small in memory database managed by the routers built in hardware and software.

The routing table with (OSPF) open shortest path First is used to traverse the data from one node in the network to another node in a network. Here, the following diagrammatic representation of node in the particular zone to communicate with every other node in the zone is represented. The simple mesh topology is used for data communication with the routing table maintains the list of nodes involved in the communication and their states such as active node(AN) and inactive nodes(IAN) are identified and update routing history table(RHT).

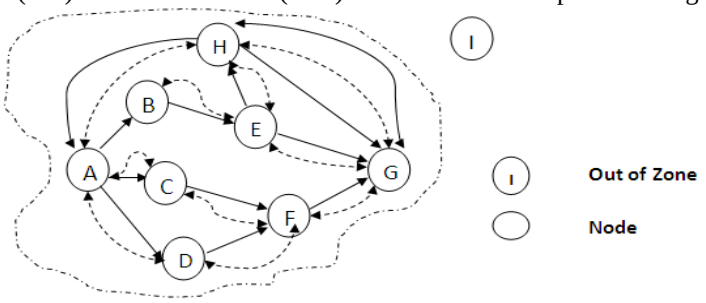


fig.1: Zone Routing Protocol (ZRP)

The node in the networks are A, B, C, D, E, F, G, H etc, and node I is the out of zone. So that is not an active participation in the network communication because it is considered to be an out of zone. But all the other nodes are within communication environment and their participation involved with other node in a network is processed and statuses are updated in routing table. Here each and every node act as router (i.e) forwarding data from every node in a network to every other node in a network otherwise called M:N data communication with mesh topology direction.

TABLE 1: ROUTING TABLE WITH NODES AND THEIR STATUS

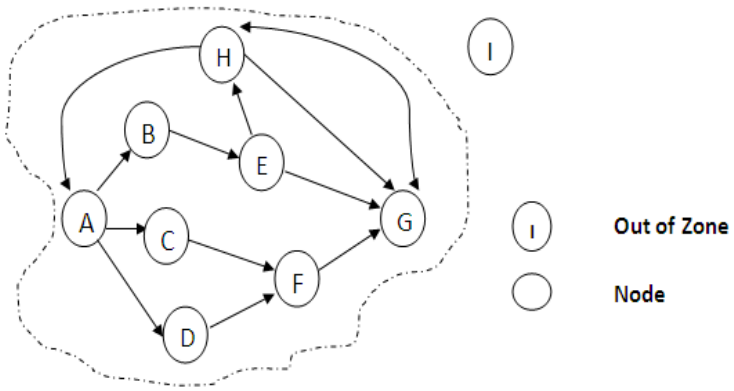
SL. NO	NODES()	STATUS
1	**Source Nodes:** A,B,C,D,E,F,G,H	Participant Node: nodes involved in communication
2	A->B->E->G->H(5)	Possible path/routing to communication from source to destination optimum routing path
3	A->B->E->H(4)	
4	A->C->F->G->H(5)	
5	A->D->F->G->H(5)	
6	**Destination Nodes:** A,B,C,D,E,F,G,H	In ad-hoc all nodes act as both source and destination here: H is consider to be destination node.
7	I	Not involved in communication(ZRP)-Outer Zone

Every node in ad-hoc network acts as source node as well as destination because every node in network can communicate with other node. Consider all nodes as source, destination it position change depends upon the node usage. In the above ZRP, A is a source to transmit data to H, the possible way of data flow direction is :

A->B->E->G->H (or)

A->B->E->H

so the purpose of using routing table(RT) is update the node status (i.e) whether it is active nodes A,B,C,E,G,H are always possible to active so that only node in ad-hoc network can decide them self with help of optimum routing choose the desired path (i.e) A->B->E->H. In this case all the nodes are active similarly if the node D, act as a source to forward data to H it can select the path either D->C->B->H or D->E->H or D->E->H or D->C->E->H or D_>F->E->H among the possible way the node D can select the desired path as D->E->H. Now compare the above case with current scenario, the node which is active over long period time now consider as Long Live Node(LLN) and the node which is activated for particular transaction is called(selectively active



node).So, the node which is selectively activated for this case while the other path in routes are busy during this time in order to reduce the congestion control and delay processing the node 'F' is selectively activated for communication. But for the entire case 'E' is always active but the node is very busy in this case. The node 'E' is still active and traffic is generated. So in order to reduce the congestion over this path , automatically self transisted towards other.(i.e) nearer to current source to destination node is selected and forwarding data to that node. Then select C node. (i.e) D -> C -> B -> H through this path data can forward. In this case, a new node is selectively activated for data transmission in order to reduce congestion avoidance. The power utilization may also be reduced because this node 'C' is already in the active node so power efficiency can be reduced and selective/alternative path selected in order to minimize the packet delay involved in the network. But for this case ,utilize the source F->G->H for data transmission path and this focus certain specific backup energy/power

utilization towards that network so that our ultimate effectiveness of data transmission is reduced parallel of other critical factors such as packet loss, congestion , delay, maximum power utilization can be raised. So these factors are gradually reduced by alerting each node status towards other node in a network, so that overall performance is improved over this scheme.

IV. EXPECTED PERFORMANCE ANALYSIS

The performance analysis of the factors that supports for data transmission in ad-hoc network with normal routing mechanism versus the node with self-transmitting data towards destination node while reducing the maximum data loss, congestion avoidance, end- to end delay and improving battery power and energy efficiency towards the particular zone its node involved in this network. Thereby overall improvement over the data transmission in the ad-hoc network is achieved. The predicted performance analysis is shown below

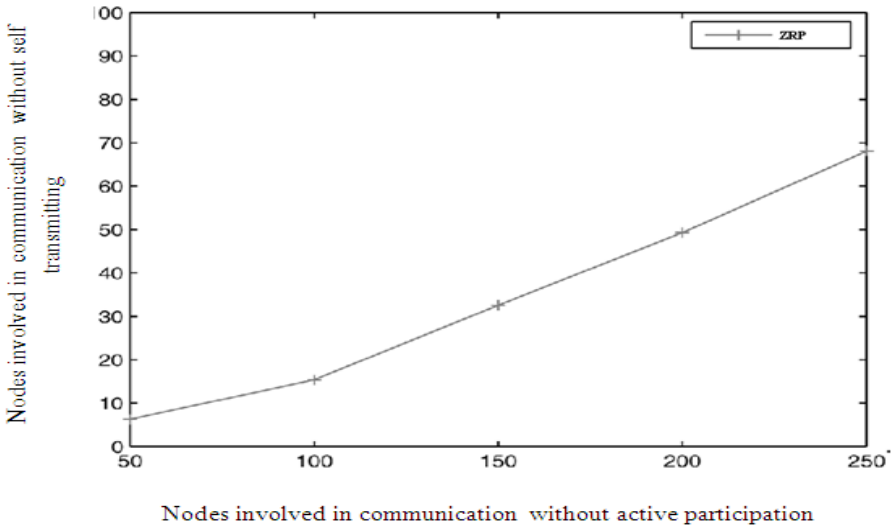


Fig.3*:* Protocol Ad-hoc network communication with zone Routing protocol to route data without self-transmitting**.**

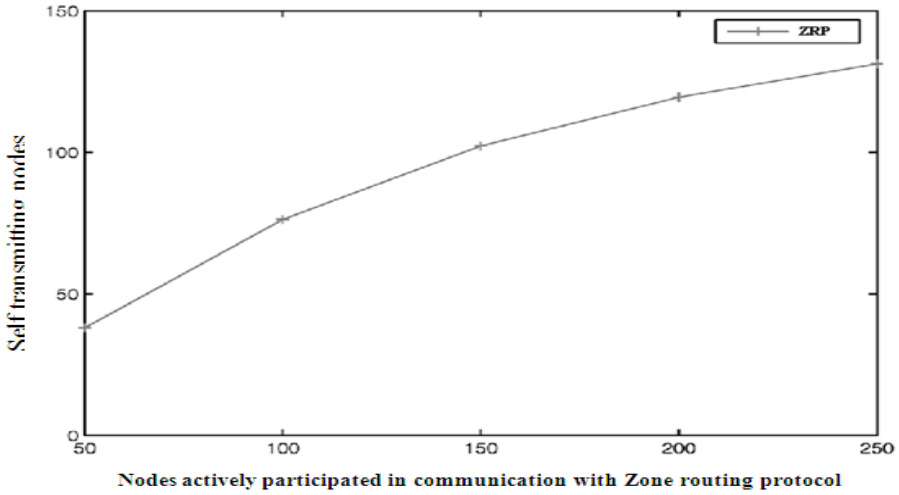


Fig 4: Ad-hoc network with self transmitting data between nodes

In the second case, it shows improved ratio of data transmission along the nodes activated in ZRP is described their by the overall rate of performance as expected and the predicted result over here.

V. CONCLUSION

The Ad-hoc wireless network is an infrastructure less network. The node in this network can act as router as well as destination depends on the needs of data sharing. But so far the optimum path is chosen by the nearer node in this zone. Here, implement the concept self transmitting data between the nodes with selection criteria such as choosing the node which is ever in active state. Selecting appropriate alternative node when the active node which is maximum busy for the entire zone communication and Keep inactive node as such (i.e) while using active node in a network require less energy consumption rather than choosing Inactive node to

active state. While choosing the Inactive node as alternative way for communication in such case the reliability can't be achieved that expected. So, in this paper the self-transiting decision rights given to every node in the zone can work based on the routing status updating table. Through this the overall effectiveness and performance of the entire network criteria is achieved.

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