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Analysis of Cluster Based Zone Routing Protocol in MANET through Network Simulator

V. Venkataramanan, K. Shankar, D. Vinoth, S. Archana

Abstract*— The employment of routing data from a source to a destination in a network is dispute. Many routing protocols are suggested for mobile ad-hoc networks. Usually there are two approaches first one is Proactive and another one is Reactive [3]. In which the Zone Routing Protocol (ZRP) is a composite routing protocol for MANET [2], the ZRP integrates the advantages of the proactive and reactive approaches by conserving an up-to-date topological map of a zone medial on each node. Within the zone, routes are instantaneously available. For destinations outside the zone, ZRP manipulates a route ascertainment procedure, which can profit from the local routing information of the zones. Clustering is a method that divides the network into inter depended substructures, called clusters. Each cluster has a cluster head. It acts as a temporary base station within its zone or cluster and communicates with other cluster heads. In existing system [4], [5], Source cluster node transmits a packet to the source cluster head and then it transmits a packet to destination cluster head through intermediate node and intermediate cluster head. The destination cluster head moves a packet to the destination node. In proposed system the source cluster node transmits a packet to the source cluster head then it transmits a packet to the destination cluster head and it moves to the destination node without using intermediate nodes and cluster heads. The proposed System is simulated in Network Simulator 2 (NS2). The ZRP supplies good packet delivery ratio and curtails time delay compared to existing system. Without using intermediate nodes curtails the time to bring back the route to destination and it utilizes few nodes therefore the packet loss is less. Each cluster heads knows about neighbors cluster head therefore it is easy to identify the destination cluster head and route discovery to the destination is understandable one.

Keywords: Ad-hoc Network, BRP, IARP, IERP, MANET, Zone Routing Protocol (ZRP),

I. INTRODUCTION

Mobile ad hoc networks (MANET) can be ascertained as a group of enormous number of mobile nodes that form momentary network without aid of any enduring network framework or medial access point. MANETs are self-organizing and self-configuring multihop wireless networks where, the design of the network modifies actively [1]. This is due to the mobility of the nodes. Nodes in these networks use the same random access wireless channel, cooperating in a friendly manner to using themselves in multihop forwarding. The nodes in the network not only act as hosts but also as routers that route data to/from other nodes in network. In mobile ad-hoc networks where there is no framework support as is the case with wireless networks, and because a destination node might be out of confine of a source node transmitting packets [2], a routing process is constantly required to find a path so as to forward the packets suitably between the source and the destination. Within a cell, a base station can extent all mobile nodes outside routing via broadcast in common wireless networks. In the case of ad-hoc networks, each node must be adequate to forward data for other nodes. This actualizes additional problems ahead with the complications of active topology which is fluctuating connectivity changes. This paper analyzes the performance of zone routing protocol. This paper is organized as follows section 3 deals with the classification of routing, section 4 presents the Working principle section 5 coevals the Simulation Environment Section 6 deals with the Outputs and Section 7 Concludes with the Conclusion and Future Prospects.

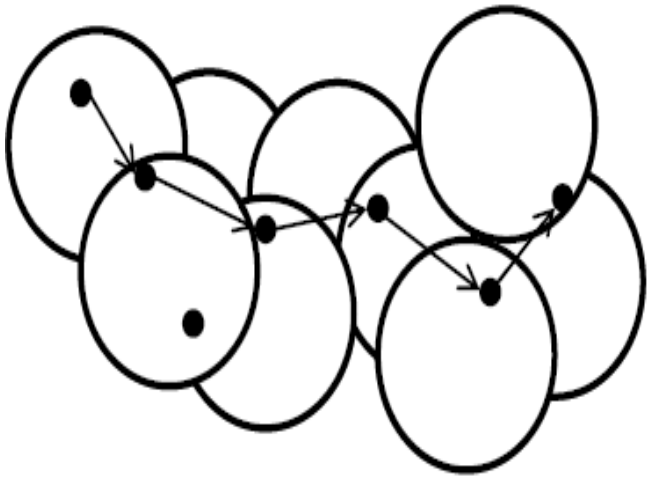

Fig.1 Architecture of MANET

II. CLASSIFICATION OF ROUTING PROTOCOLS IN MANET

Categorization of routing protocols in MANET's can be done in several ways, but most of these are done rely upon routing strategy and network structure. According to the routing strategy the routing protocols can be categorized as Table-driven and source initiated, while rely upon the network framework these are classified as at routing, hierarchical routing and geographic position assisted routing [7],[11].

A. Hybrid Routing Protocol

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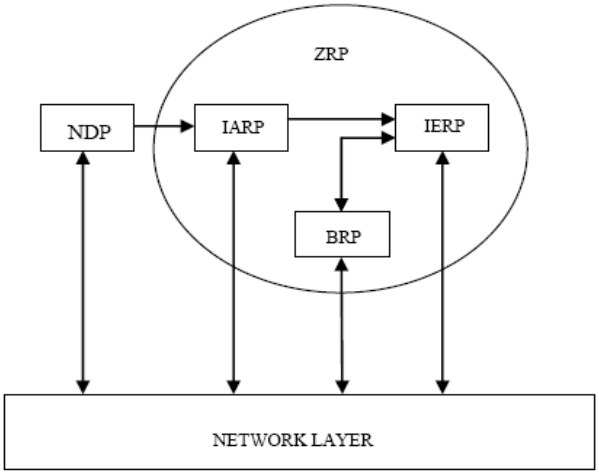

Fig 2 ZRP Architecture

Zone Routing Protocol [ZRP] is a well-known hybrid routing protocol that it is suitable for large-scale networks [3]. The ZRP framework is accomplished to provide equity between the different proactive and reactive routing access. Its name is derived from the use of "zones" that define the transmission radius for every participating node.

This protocol uses a proactive or table driven is used for node discovery within a node's instantaneous neighborhood, while interzone communication is conveyed out by using reactive or on stipulated approaches.

ZRP uses the reality that node communication in reconfigurable networks is mostly confined, thus the changes in the node topology within the vicinity of a node are of primary significance.

ZRP makes use of this distinguishing to assign a structure for node communication with other enduring protocols. Local neighborhoods, called zones, are defined for nodes [3],[6]. The routing zone of a given node is a subset of the network, inside which all nodes are reachable within less than or equal to zone radius hops. The size of a zone is based on ρ factor, which is defined as the number of hops to the perimeter of the zone. There may be various overlapping zones, which helps in route optimization.

ZRP's IARP depends on an underlying NDP to identify the presence and absence of neighboring nodes, and therefore, link connectivity to the nodes. The data processing about neighbors is required to construct a routing zone of a given node [3]. A neighbor is confined as a node with which direct communication can be organized. Neighbor discovery is attained by either the Intrazone Routing Protocol or simple "Hello" packets. Node discovery is attained with periodic transmission of beacon packets or with indiscriminate snooping on the channel to identify the communication hustle.

IARP is proactive access and it consistently maintains up-to-date routing tables [3]. Since the scope of IARP is confined within a zone, it is also referred to as a "Limited Scope Proactive Routing Protocol [LSPRP]." Route queries outside the zone are reproduced by the route requests based on the circumference of the zone. The IERP uses a reactive approach for communicating with nodes in distinct zones. Route queries are sent to peripheral nodes using the BRP Since a node does not resend the query to the node in which it received the query originally, the control overhead is significantly decreased and excessive queries are also underrated.

III. WORKING PRINCIPLE

The system design explains in source cluster the source node transmit a packet to source cluster head. The source cluster head transmits a packet to destination cluster. In destination cluster the destination cluster head receives a packet from source cluster head and then the destination cluster head transmits a packet to destination node.

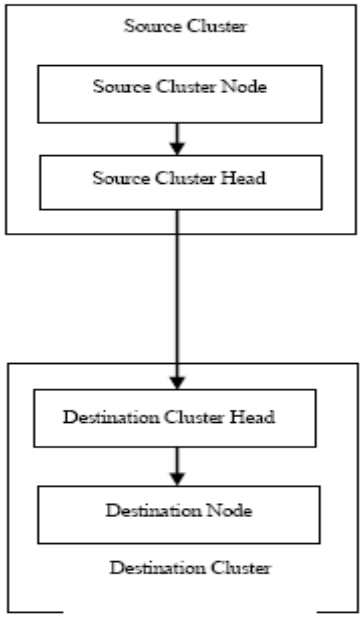

Fig 3 System design for proposed system

IV. COMPARISON BETWEEN PROPOSED AND EXISTING SYSTEM BLOCK DIAGRAM

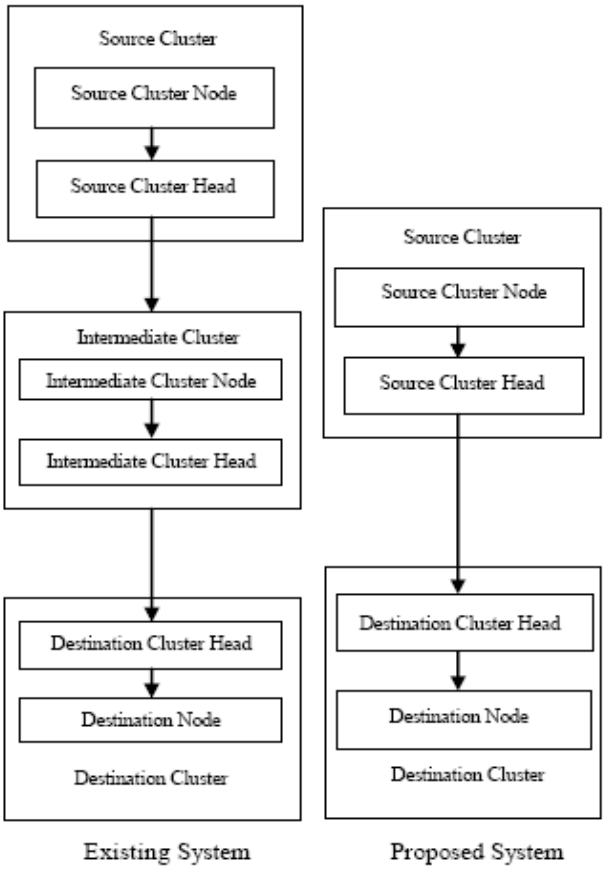

Fig 4 System design for Proposed and Existing system

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The Existing system design explains in source cluster the source node transmit a packet to source cluster head. The source cluster head transmits a packet to intermediate nodes and intermediate cluster heads. The intermediate cluster heads transmit a packet to destination cluster. In destination cluster the destination cluster head receives a packet from intermediate cluster head and then the destination cluster head transmits a packet to destination node. In proposed system, without using intermediate nodes and intermediate cluster heads reduces complexity to create route between source to destination and it reduces time to deliver packet and packet loss and provide good packet delivery ratio.

V. SIMULATION ENVIRONMENT

This proposed routing protocol has been implemented by the Network Simulator2 (NS2). The Network Simulator is mainly utilized to implement the routing protocols in the networking research. The Main focus of our analysis is reducing the time delay, traffic, less packet loss and good packet delivery ratio. The simulation results are shown below.

Number of Nodes	50
Packet size	512bytes
Transmission Radius	2200x2200
Simulation Time	300 (sec)
Antenna	Omni antenna
Channel	Wireless channel
Bandwidth	$2x10^6$
Propagation Model	Two Ray Ground
Queue	Drop tail/ Pri Queue
Layer	Link layer
X Width	2200
Y Width	2200
Supporting protocol	DSDV
Bit Rate	CBR

Tables 1 Simulation Environment

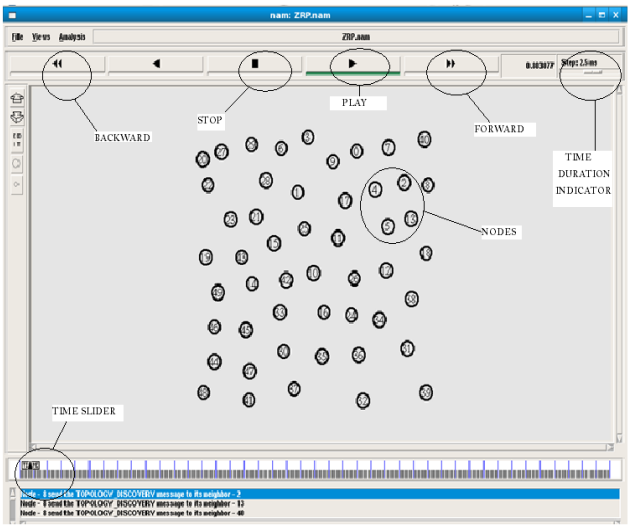

Fig 5 Node Placement

The Fig 5 represents that each node is positioned according to their program for suitable transmission and receiving.

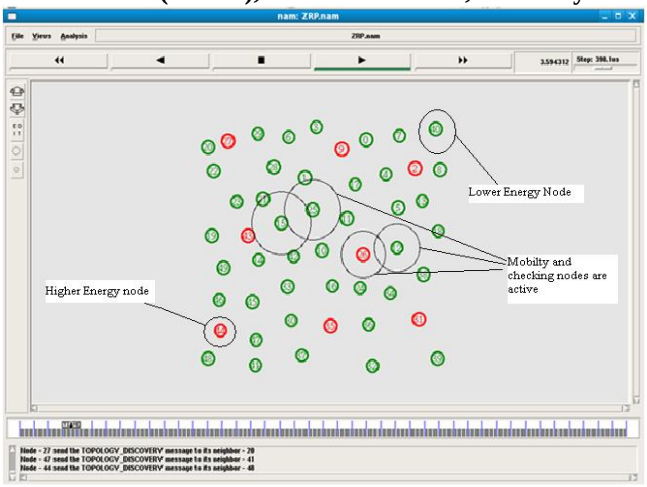

Fig 6 Selection of energy level nodes

Fig 6 Shows , the red color nodes are higher energy level nodes. The energy levels are based on maximum number of data transmiting and receiving. Green color nodes are lower energy level. By using brocasting check the active mobility of nodes.

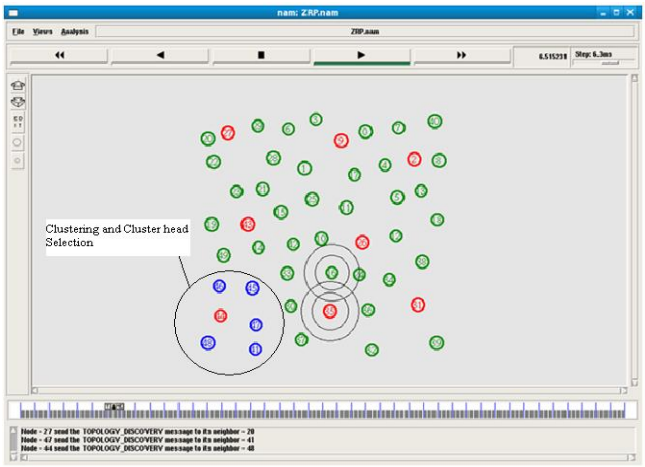

Fig 7 Clustering

From Fig 7 Shows The cluster members are selected in the cluster Head . The Cluster Head selectios are based on energy levels. The energy levels are calculated based on the capability of maximum transmitting and receiving of datas. Here the red color nodes are cluster heads and blue color nodes are cluster members.

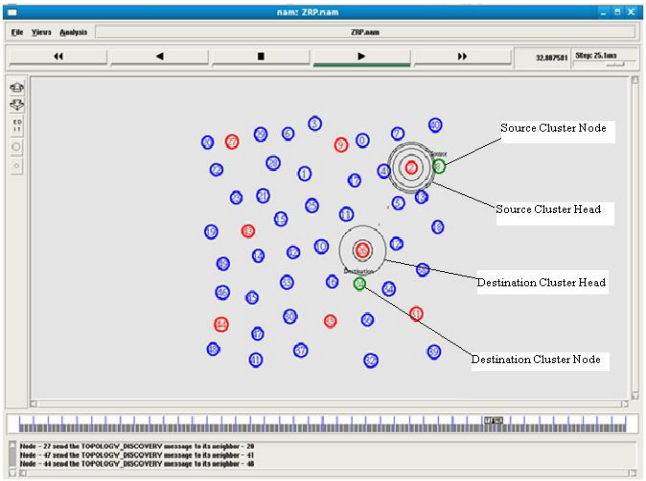

Fig 8 Data transmitting from source to destination

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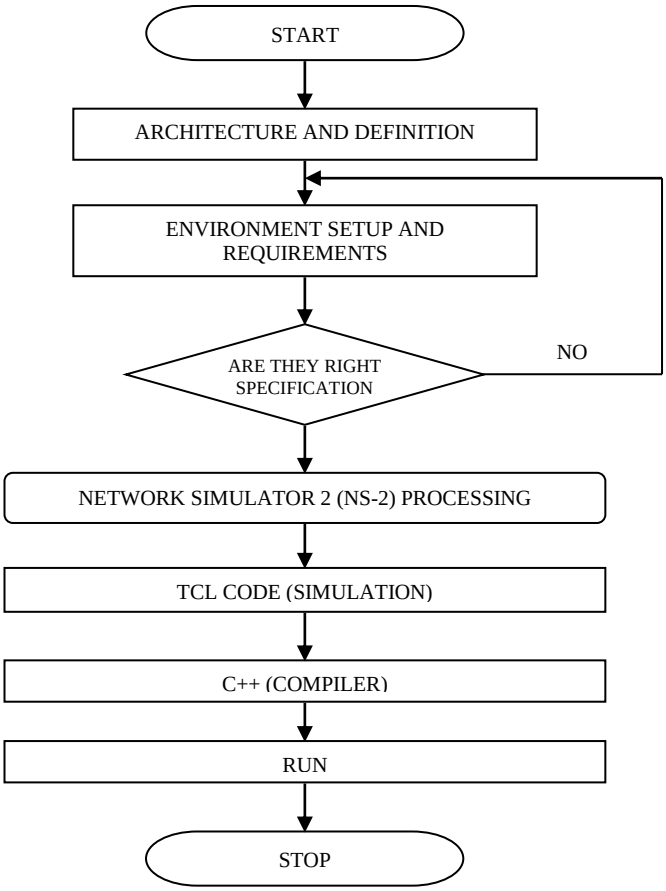
Fig 8 shows the source node transmits a data to source cluster head and it transmits a data to destination cluster head and it sent to destination node.

VI. DESIGN METHODOLOGY



VII. CONCLUSION

The proposed routing protocol Cluster Based Zone Routing Protocol [ZRP] transmits a packet from source cluster node to source cluster head and then it transmits a packet to the destination cluster head and it moves to the destination node without using intermediate nodes were analyzed by using NS-2. The Cluster Based Zone Routing Protocol provides good packet delivery ratio and reduces time delay compare to existing system without using intermediate nodes it reduces the time to recover the route to destination and uses few nodes to transmit so the packet loss is less. Each cluster heads are knows about neighbors cluster head so it is easy to identify the destination cluster head and route discovery to the destination is simple. The source cluster head destroy the total route to the destination and it creates a fresh route to the destination.

VIII. FUTURE WORK

The proposed routing protocol has a better time delay and good packet delivery ratio and less packet loss compare to existing routing protocol Ad hoc On-Demand Distance Vector Routing Protocol (AODV). In existing system the source node sends a data to destination node packet by packet. It take more time to deliver a packet and more traffic and packet loss is occur but proposed Blocks of Zone Routing Protocol (BZRP) transmits a block of packets to destination Which will be analyzed further based on the Standards

IX. ACKNOWLEDGMENTS

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