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RESEARCH ARTICLE

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ENERGY EFFICIENT HYBRID ROUTING PROTOCOL IN MANET

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ABSTRACT

Routing in Mobile Ad-hoc Networks is a widely researched area in the recent years. Many researchers have proposed various techniques for efficient route the data from source to destination and compared their approach with the already existing approaches. In this paper, a novel technique for hybrid routing is proposed which includes the properties of both proactive and reactive approaches and each node in the network stores the most frequent routes in its cache memory, so that it can be accessed within no time. The proposed approach is tested on both with attack and without attack scenarios and results of the same can be compared. In future the approach must be implemented for large network density and can be compared with other hybrid routing protocols.

Keywords: Hybrid routing, MANET.

INTRODUCTION

MANET is group of wireless devices known as wireless nodes and it is linked dynamically and sending information. Ad-hoc networks are those networks which have no fixed infrastructure. Every node is acting as router and also it helps to forward the traffic from neighboring nodes. These ad-hoc networks mostly utilized for military applications. There are two type of MANET network infrastructured and Infrastructure less networks [2].

In the infrastructure network, gateways are fixed, this type of network also called as cellular network. The infrastructure networks having fixed BS which are associated to another BS with the help of wires or cables. It carries a cell and all the nodes are laid inside the cells which helps to connect with the nearest base station. When the host node travels out of range then handoff occurs, it means host mobile is continuously communicated with the network. Example of infrastructure network is WLANs.

In the infrastructure less network, routers are not fixed. All the node can linked dynamically and moves in random manner. The responsibility is given to the terminals for controlling and organizing the nodes. In order to attain efficient routing several protocols has been presented for mobile Adhoc network. Wireless ad-hoc network [6] have many advantages:

Dynamic Configuration: in this configuration, ad-hoc network can modify over time dynamically. In comparison with LAN configuration, it is simple to change the topology of wireless network.

Table driven: Table-driven routing protocols try to sustain the consistent, update routing info from every node to other node in network. These protocols are required every single node to sustain

more than one table to preserve the routing information.

Source initiated (or *demand driven*): this configuration is distinct from the table driven configuration. In this routing configuration, routes are created only when it is required by any of source node. If any of the nodes desires to create a route to its final destination, then it begin a route finding process in the network. When the route is found then this process is completed and all other route permutations have been examined. Now, when the route is created, then route maintenance process maintains the route till other destination became inaccessible [11].

Hybrid: This routing protocol can combine the features of two categories. Nodes are belong to a specific geographical region or with particular distance from concerning node are told in routing zone and use the table driven routing protocol. [12] Communication between the nodes in the different zones are relied on on-demand or source-initiated of protocols.

LITERATURE SURVEY

Zone Routing Protocol [1](ZRP) has the first hybrid protocol proposed in literature which employs both table driven and source initiated protocols. It defined the zone of each node that consists of k neighborhood. [2] Routing zone can be performed with the use of proactive routing protocol and routing between nodes in distinct zones can be performed by the on-demand routing protocol. The ability to compute and store, as well as the instability of the wireless communication medium result in topology changes fast and unpredictable. These ZRP can perform the effective route discovery via *border-casting*; route requests can be spread by the multicasting directly to nodes on border of its zone. Size of zone can be determined dynamically based on the network load [3].

Another routing protocol (ZHLS) [4] is proposed which divides network into the non-overlapping zones that based on the physical location information.

Neng-Chung Wang et al. [11] presented a greedy location-aided routing protocol for mobile ad hoc networks. In this work, GLAR approach is used in order to improve efficiency of LAR in mobile networks. In this protocol, initially baseline is decided. Thus, it can be easy to find better routing path with this GLAR protocol. Alberto Gordillo Muñoz et al. [4] proposed Multicast over vehicle adhoc networks. In this work, several approaches are categorized and compared which provides its merits and demerits to give better result for multicast over vehicle adhoc network.. The objective is to provide a qualitative analysis of the LAR protocol in different city scenarios in Vehicular Ad hoc Networks.

HARP, relied on Distributed Dynamic Routing [6] protocol to decompose the network into their zones. HARP may a hybrid protocol that separates the network into [7] several zones. A number of forward nodes in every zone can responsible to communicate the nodes in their zones. HARP[8]can used own custom protocol for the inter-zone routing, whose goal can reduce the delays via early path maintenance. While HARP can create the zones of varied sizes, it contains no control over zones and doesn't adjust dynamically their sizes.

SHARP [9] can be utilized the protocol which is used to perform the routing. Every SHARP node can be determined network neighborhood. In this, FSR [10], Fisheye State Routing, may link-state protocol which exchanged the periodic link-state information. This period of link state propagation can be determined by one distance to other destination. ADV [11] may be algorithm which defines the demand of characteristics to vary the frequency and size of the routing updates. Some researchers can be examined the protocols with their timer-directed route.

PROPOSED METHODOLOGY

The proposed approach in this work maintains a cache memory which saves the routing information. Initially, each route in the network must be found out using the reactive protocol mechanism which minimizes the excess bandwidth used in case of proactive protocol and the route information is stored in the cache memory which is limited and can be accessed fast as compared to any

other memory and same machine cycle (time to access the memory). Now, as the routing information is saved in the memory and constantly updated time to time, routing through the most frequent route is looked as proactive in which the route is fixed and saved in the memory. This helps in overcoming the drawback of reactive routing in which there is no need to flood the network every time for the most frequent routes and the route request delays. So, using this scheme a single protocol acts as both reactive and proactive routing protocol.

Trust factor of each node is calculated by taking the two parameters i.e. frequency of its use and number of retransmissions from that node. Frequency of use of any node is maintained in the cache memory along with the route information. The more the frequency of node the more is the trust factor. Another important parameter is the number of retransmissions from that node means the data lost while it is routed or transmitted from that node. It also includes the energy consideration regarding that node. As the number of retransmissions from any node increases, the energy required to retransmit the data also increases.

The routing table maintained in the cache memory updates itself according to the trust value which further reduces the routing overhead.

RESULTS AND DISCUSSIONS

Figure 1 shows the graph between Residual Energy remaining at the node and consumed by the node to transfer data and the total number of nodes in the network. As the nodes in the network increases, energy consumed also increases but energy consumed by the proposed model is less than the energy consumed by the basic hybrid routing protocol approach.

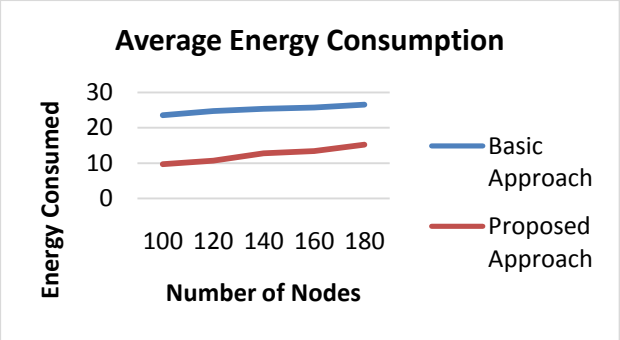

Figure 1: Average Energy Consumed vs Number of Nodes

Figure 2 shows the graph between the throughput of the network and the number of nodes. The graph shows that the throughput of the network in the proposed cache based approach is better than the basic hybrid routing protocol approach.

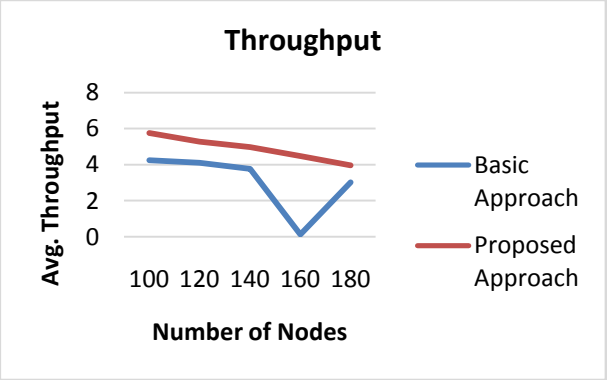

Figure 2: Throughput of the Network vs Number of Nodes

Figure 3 shows the comparison of the average packet delivery delay for both basic and proposed approach. Here basic approach means the route calculated consists of nodes which are non trusted and in the proposed approach the nodes considered in determining the route as trusted.

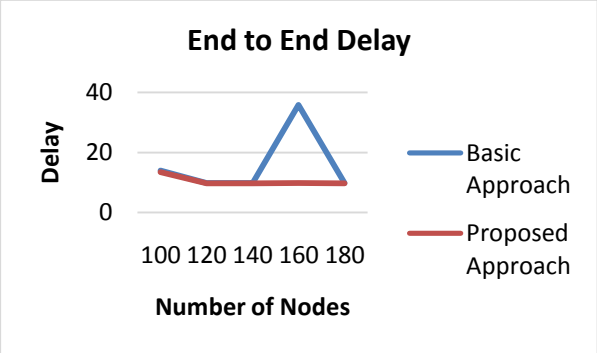

Figure 3: Packet Delivery delay vs Number of Nodes

Conclusion and future scope

In a cache memory based frequent route saving approach, the most frequent route is saved in the memory and updated likewise. The result shown above validates our protocol Also proposed protocol outperforms the basic approach for both throughput and energy consumed. It means that the transfer of packet is both energy efficient and consumes less time to reach to the destination.

In future, the proposed protocol must be tested for large number of nodes and with heavy data transfer on the network.

REFERENCES

[1]. Manel Guerrero Zapata**.** "SecureAdhoc On-DemandDistanceVectorRouting"**.** ACM Mobile Computing and Communications Review (MC2R), 6(3):106--107, July 2002.

[2]. Manickam, P., et al. "Performance comparisons of routing protocols in mobile ad hoc networks." *arXiv preprint arXiv:1103.0658* (2011).

[3]. Zygmunt J. Haas and Marc R. Pearlman. *"The Performance of Query Control Schemes for the Zone Routing Protocol*". *IEEE/ACM Transactions on Networking*, Aug 2001.

[4]. Kannhavong, Bounpadith, et al. "A survey of routing attacks in mobile ad hoc networks." *Wireless communications, IEEE* 14.5 (2007): 85-91.

[5]. P. Samar, M. R. Pearlman, and Z. J. Haas. Hybrid Routing:" *The Pursuit of an Adaptable and Scalable Routing Framework for Ad Hoc Networks*". The Handbook of Ad hoc Wireless Networks, CRC Press, 2002.

[6]. Sun, Hung-Min, et al. "A collaborative routing protocol against routing disruptions in MANETs." *Personal and ubiquitous computing* 17.5 (2013): 865-874.

[7]. NikaeinNavid, Wu Shiyi, and Christian Bonnet. "*HARP: Hybrid Ad hoc Routing Protocol*". International Symposium on Telecommunications, IST2001, 2001.

[8]. Bhoi, Sourav Kumar, I. H. Faruk, and Pabitra Mohan Khilar. "CSRP: A Centralized Secure Routing Protocol for mobile ad hoc network." *Emerging Applications of Information Technology (EAIT), 2012 Third International Conference on*. IEEE, 2012.

[9]. Haas, Zygmunt J., Pearlman, Marc R., Samar, P.: "*The Bordercast Resolution Protocol (BRP) for Ad Hoc Networks*", June 2001, IETF Internet Draft.

[10]. Wang L., Olario. S : "*A two-zone hybrid routing protocol for mobile ad hoc networks*", Dec 2004, IEEE transactions on parallel and distributed networks.

[11]. Chahidi, Badr, and AbdallahEzzati. "Hybrid Routing Protocol For wireless sensor networks." *International Journal of Computer Science Issues(IJCSI)* 9.2 (2012).

[12]. R. Boppana and S. Konduru." *An Adaptive Distance Vector Routing Algorithm for Mobile, Ad Hoc Networks*". In *IEEE Infocom 2001*, Mar 2001