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"PERFORMANCE ANALYSIS AND STUDY OF REACTIVE ROUTING PROTOCOL IN WIRELESS COMMUNICATION"

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ABSTRACT

The mobile ad-hoc networks is considered a group of wireless mobile nodes that are capable of communicating with each other without the use of network infrastructure or any centralized administration. A MANET have a large number of potential applications like tactical networks, emergency services, commercial and civilian environments. In this work our proposed scheme simulate in network simulator 2.34. In simulation process we used 10, 20, 30 and 50 nodes. The evaluation of performance is measured by packet delivery ratio, End to end delay and packet throughputs. Our proposed scheme is compared with existing DSR Protocol and gives good results in compare with existing method.

Key Words: *Wireless networks, Mobile ad-hoc networks, Routing protocol, Dynamic source routing, Ad-hoc on demand distance vector routing.*

I. INTRODUCTION

Mobile Ad-hoc Network is nothing but a collection of hosts which are mobile and can configure, organize and maintain themselves according to the network. Host node provides information from/to other nodes and router discovers and maintains routes for other nodes in the networks. These mobile hosts communicate with each other through wireless channels having no centralized control. Those routing protocols that not only discover but also store more than one route in the routing table for each destination node are called to be multipath routing protocols. As the routes are broken in the wireless network due to movement of nodes, hence transmission of data becomes unreliable and prone to error.
In order to overcome the unreliability, load, congestion and fault in the wireless network due to the use of single path routing protocols, multipath routing protocols are being used.
In mobile ad hoc network, nodes communicate with one another using multi-hop wireless links. Each node acts as a router and host in its respective network. Under the wireless network, all nodes are given an ability to communicate with the rest of the network while being mobile. Intermediate nodes are used to route the nodes which are out the range to bring them back into the network. Dynamic topology, Energy, security and bandwidth are some constraints of Mobile ad hoc network. To furnish and maintain the network, antennas are being used in the form of wireless transmitters and receivers.

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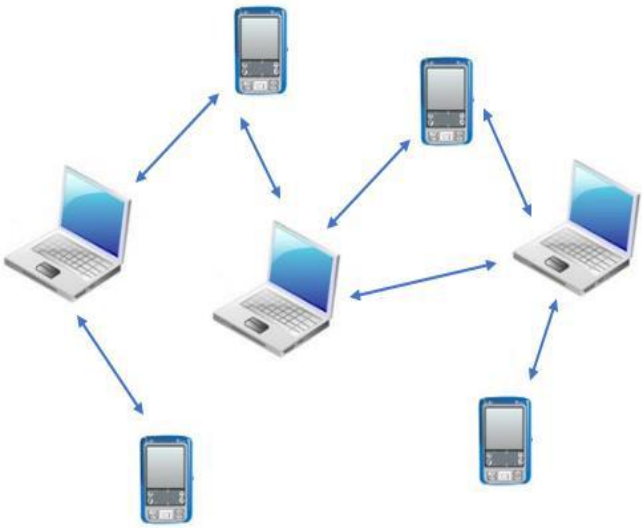

Fig 1: Mobile Ad Hoc Network

MANETs consist of wireless hosts that communicate with each other in the absence of a fixed infrastructure. They are used in disaster relief, conference and battlefield environments, and received significant attention in recent years. The position-based routing protocols are the type that use node location information instead of linking information to routing. The routing decisions are based on source node, neighbor nodes, and destination node locations. Each node finds its location by GPS or via another positioning system. The source node finds the location of a destination node with a suitable location server. MANETs have a dynamic topology, plus multihop capability characteristics which are both very important. In a dynamic topology, nodes are free to move arbitrarily. Each mobile host becomes a potential router, and it is possible to dynamically establish routes between them, as well as nodes to an existing route. The network topology changes rapidly and randomly at unpredictable times. In multihop capability, there must be a router in each node. In general, the cellular networks—also called single-hop networks—rely on a fixed wired infrastructure to achieve and maintain an end-to-end connection. Conversely, a mobile node in an ad hoc network cannot reach the destination directly because of the node's limited transmission range (unless, however, the destination node is the neighbor node). Thus, the information must flow through other nodes. This requires the mobile hosts to incorporate routing functionality so that they can act both as routers and hosts. In Mobile Ad hoc Networks, the topology of network changes dynamically due to the mobility of nodes. So, the destination node might be out of the range of source node. Therefore, there is always a need for routing procedure to find a path between source and destination nodes for data transfer.

II. APPLICATION OF MANET

Some of the typical applications include :

- Collaborative work*:* For some business environments, the need for collaborative computing might be more important outside office environments than inside and where people do need to have outside meetings to cooperate and exchange information on a given project.
- Military battlefield: Ad-Hoc networking would allow the military to take advantage of commonplace network technology to maintain an information network between the soldiers, vehicles, and military information head quarter.
- Local level: Ad-Hoc networks can autonomously link an instant and temporary multimedia network using notebook computers to spread and share information among participants at e.g. conference or classroom. Another appropriate local level application might be in home networks where devices can communicate directly to exchange information.
- Personal area network and Bluetooth : A personal area network is a short range, localized network where nodes are usually associated with a given person. Short-range MANET such as Bluetooth can simplify the inter communication between various mobile devices such as a laptop, and a mobile phone.

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- Commercial Sector: Ad hoc can be used in emergency/rescue operations for disaster relief efforts, e.g. in fire, flood, or earthquake.

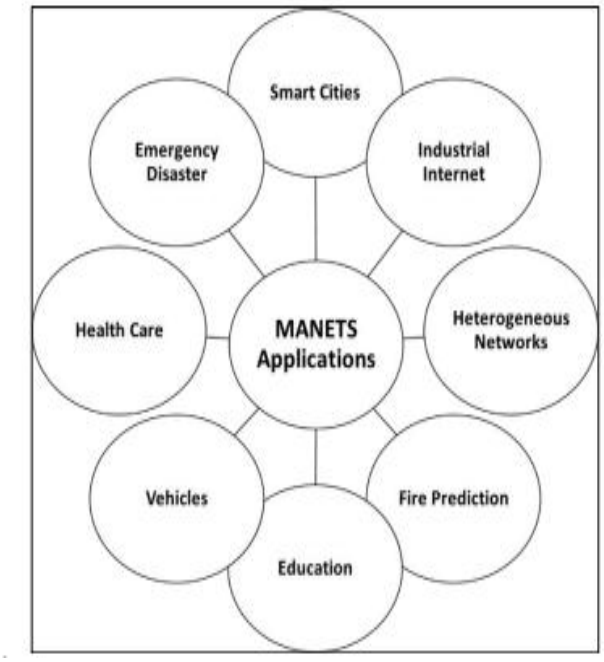

Fig 2**:** Applications of MANET.

III. SECURITY GOALS IN MANET

Security is an essential requirement in wireless ad hoc networks as compared to wired networks. Security is an important issue for ad hoc networks, especially for those security-sensitive applications. Security in wireless network is becoming more and more important while the using of mobile equipments such as cellular phones or laptops is tremendously increasing. Security in MANETs is challenging task and difficult to achieve as there is no central server and base station. In fact, the security hole provided by Ad hoc networking is not only the Ad hoc network itself, but the bridge it provides into other networks.

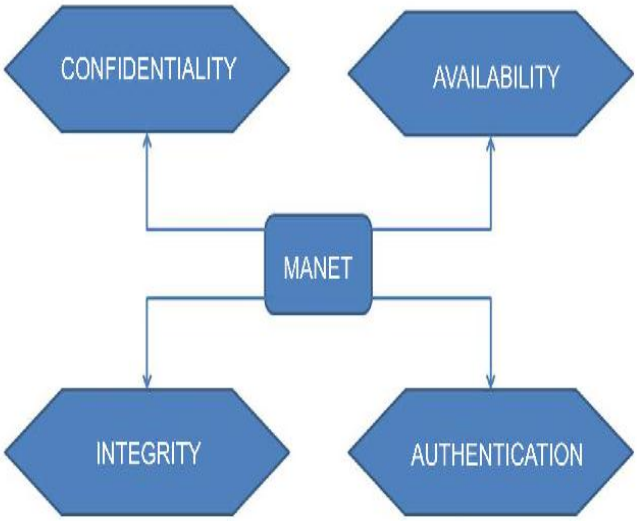

Fig 3: Security goals of MANET.

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Availability: Availability means the assets are accessible to authorized parties at appropriate times. Availability applies both to data and to services. It ensures the survivability of network service despite denial of service attack.

Confidentiality: Confidentiality ensures that computer-related assets are accessed only by authorized parties. Protection of information which is exchanging through a MANET. It should be protected against any disclosure attack like eavesdropping unauthorized reading of message.

Integrity: Integrity means that assets can be modified only by authorized parties or only in authorized way. Integrity assures that a message being transferred is never corrupted.

Authentication: Authentication is essentially assurance that participants in communication are authenticated and not impersonators. The recourses of network should be accessed by the authenticated nodes.

Authorization: This property assigns different access rights to different types of users. For example a network management can be performed by network administrator only.

Non-repudiation: Non-repudiation will facilitate the ability to identify the attackers even after the attack happens. This prevents cheaters from denying their crimes. This ensures that the information originator cannot deny having sent the message.

IV. EXPERIMENTAL WORK

To investigate the effectiveness of the proposed scheme for improvement of performance of MANET network using Dynamic source routing and Ad-hoc on demand distance vector routing protocol on a simplified topology was carried out using Network Simulator version (ns-2.34).

Ad hoc On-Demand Distance Vector, AODV, is a distance vector routing protocol that is reactive. The reactive property of the routing protocol implies that it only requests a route when it needs one and does not require that the mobile nodes maintain routes to destinations that are not communication. AODV guarantees loop-free routes by using sequence numbers that indicate how new, or fresh, a route is. The AODV protocol is one of the on-demand routing protocols for ad-hoc networks which are currently developed by the IETF Mobile Ad-hoc Networks (MANET) working group.

It follows the distance vector approach instead of source routing. In AODV, every node keeps a local routing table that contains the information to which of it neighbors it has to forward a data packet so that it reaches eventually the desired destination. In general, it is desirable to use routes which have minimal length according to hop-count as a distance metric.

Simulation is a fundamental tool in the development of MANET protocols, because the difficulty to deploy and debug them in real networks. The simulation eases the analyzing and the verification of the protocols, mainly in large-scale systems. It offers flexible testing with different topologies, mobility patterns, and several physical and link-layer protocols.

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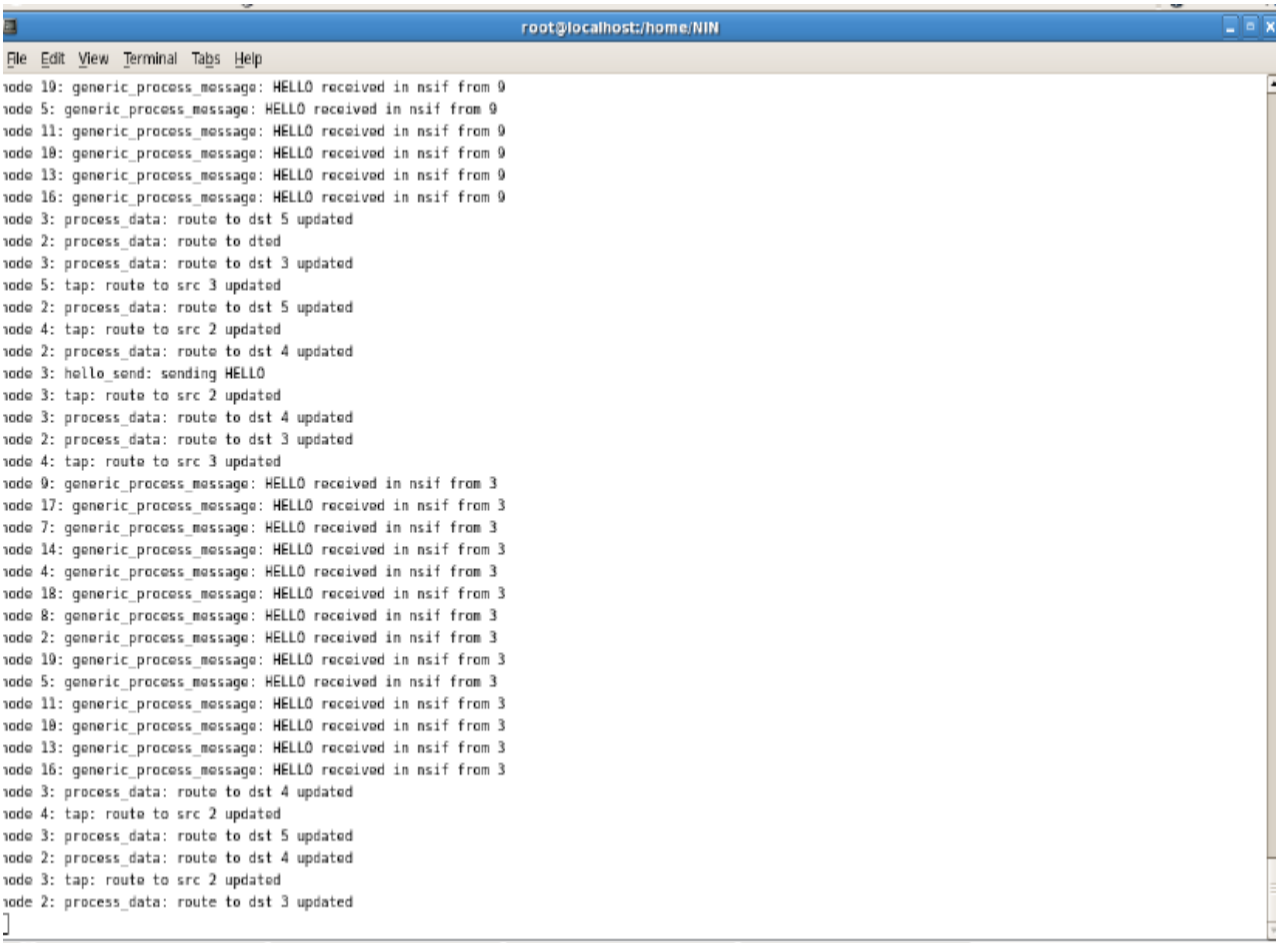

Fig 4: This window shows the running files status for the shell files used in a red hat enterprise Linux.

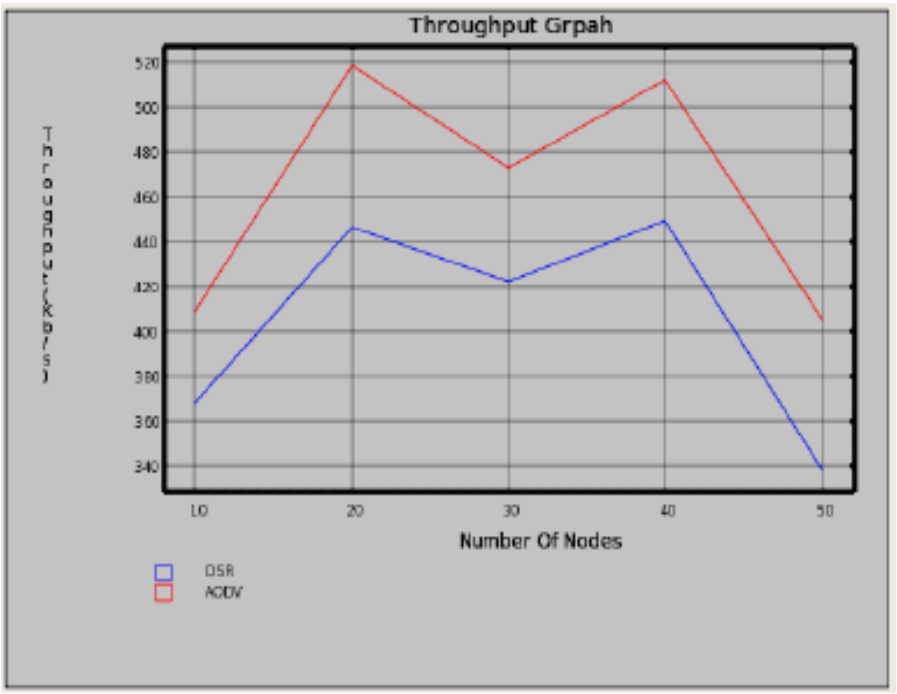

Fig 5: These graph shows that the comparative performance evaluation for the existing DSR and proposed AODV with the performance parameter is Throughput.

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V. CONCLUSION

Our proposed ad-hoc on demand distance vector routing protocol is very efficient in comparison in dynamic source routing protocol. For the evaluation of performance our protocol tested in different network scenario tested through simulations for different distributions of nodes and wormholes and different connectivity models. Under all the evaluated scenarios, the technique demonstrates excellent detection probabilities with few false alarms that depend on the value of threshold.

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