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Survey Paper on Mobile Ad-hoc Network using Different Routing Protocol

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ABSTRACT: Mobile ad-hoc network (MANET) has got tremendous success and attention due to its self- maintenance and self-configuration properties or behavior. Based on wired and wireless networks, the network topology of MANETs changes rapidly by means of routing attacks. Hence, providing security to this infrastructure-less network is a major issue. The routing protocols for ad-hoc networks cope well with the dynamically changing topology but are not designed to accommodate defense against malicious attacker. Malicious nodes have opportunities to modify or discard routing information or advertise fake routes to attract user data to go through themselves. In this article, we discuss a hybrid technique using anonymity, one-way trapdoor protocol, hash functions, and elliptic curve cryptographic to mitigate attacks in the MANET. The flooding procedure is used in the route discovery process and produces a storm of the broadcast, leading to an increase in packet loss and control overhead. In this work we study and evaluate the quality of services parameters for different routing protocol.

KEYWORDS: Mobile Ad-hoc network, Wireless sensor network, Cognitive radio network, Performance parameter, Quality of services

I. INTRODUCTION

WSNs are systems of internationally spread and customized systems that detect and collect atmospheric factors and transmit the data to a centralised location. WSNs may detect warmth, sounds, particulate emissions, moisture, and weather, between other factors. In order to communicate sensor data electronically, these systems are comparable to mobile ad hoc networking include that the rely on mobile connections and spontaneously system development. WSNs detect external atmospheric parameters such as warmth [1-4], vibration, and humidity. Wired versions are reversible, collecting information and permitting management of sensing action. The construction of those connections was spurred by tactical applications such as combat surveillance. Such systems are used in both corporate and commercial purposes, such as processes industry measurement and controlling and equipment condition checking [5].

A WSN is comprised of "modules," which may amount anywhere between a some to hundreds or even thousands and are all connected to different detectors. A wireless transponder with only an internally and externally antennae, a CPU, an electronic circuits for interfacing with the sensing, and a power provider, usually a batteries or an incorporated form of harvested power, are all typical elements of similar networks [6]. A node in the network might be the length of a shoebox to (conceivably) a grains of powder, notwithstanding the fact that minuscule sizes that has yet to be reached. Pricing for sensing nodes range from the few bucks to billions of millions, dependent on the network node sophistication. Height and budget constraints constrain power, capacity, computation performance, and telecommunications capacity. The design of a wirelessly node may vary from a simple ring topology to a complicated multi-hop wirelessly meshes networking. Dissemination may be accomplished by routed or inundation. Figure 1 shows the Wireless Network Sensor [7].

Computer networks micro sensors technologies is a critical leading innovation. In November 1999, Economic Magazine called it one of the 21 most important innovations for the 21st millennium. Inexpensive, intelligent devices with a slew of on-board instruments, connected using Wi-Fi networks and the World wide web, and extensively implemented, enable new ways to instruments and manage households, organizations, and the ecosystem [9-12]. In

addition, interconnected micro sensors provide the capability for a variety of missile defences, offering new powers in espionage, monitoring, as well as other operational purposes. Cameras are often used to gather knowledge for rescue operations, power administration, patient observation, and stock asset tracking. If sensors are to empower, secured communications techniques must be devised to protect the system and its consumers [13].

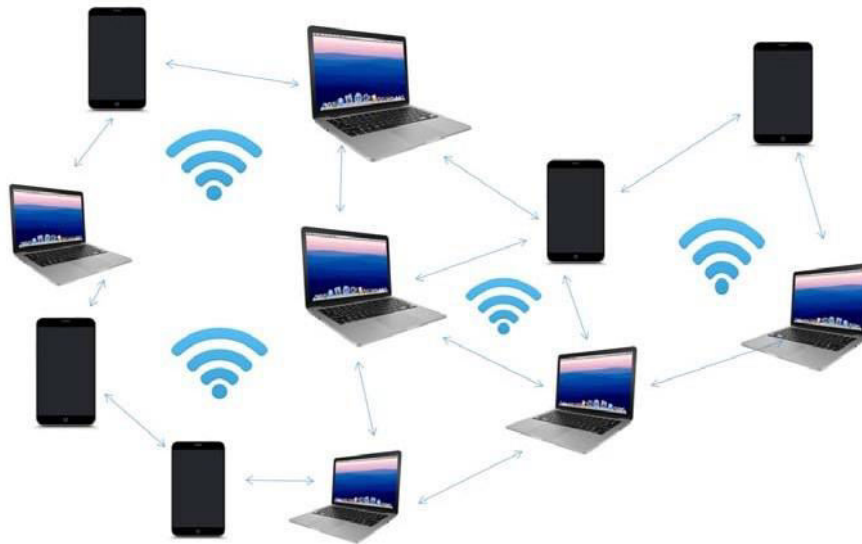


Figure 1: Example of mobile ad hoc network (MANET) structure [2].

II. LITERATURE REVIEW

Two kinds of MANET protocols are dominantly used: proactive and reactive protocols. While proactive protocols, such as optimized link state routing (OLSR), construct the routing table in advance, reactive protocols, such as ad-hoc on-demand distance vector routing (AODV), process route search whenever a packet delivery is required.

Mobile ad-hoc wireless networks give us the high probability and high properties to create networks, without any central management or infrastructure, independent and temporary network, that is means wide ubiquitous networks. The intermediate nodes should be able to communicate between them to send and receive the data with ability using at anytime and anywhere, the mobility of the intermediate node between the source and destination gives us unstable topology maybe the connection between the nodes will be breakoften. Therefore, the strategies to design any wireless depend on path routing and protocol selection. In this paper they study and evaluate the effect of mobility on the routing protocols DSDV, AODV and DSR in two different scenarios, the density of nodes and different area in NS2.35 simulation by using threeperformance metrics in the evaluating the routing protocols are Average Throughput, Packet Delivery Ratio and Average End-to-End Delay.

Mobile Ad-hoc Networks (MANETs) are self-sufficient networks that can work without the need for centralized controls, pre-configuration to the routes or advance infrastructures. The nodes of a MANET are autonomously controlled, which allow them to act freely in a random manner within the MANET. The nodes can leave their MANET and join other MANETs at any time. These characteristics, however, might negatively affect the performance of the routing protocols and the overall topology of the networks. Subsequently, MANETs comprise specially designed routing protocols that reactively and proactively perform the routing. This paper evaluates and compares the performance of two routing protocols which are Ad-Hoc On-Demand Distance Vector (AODV) and Optimized Link State Routing (OLSR) in MANET environment. The study includes implementing a simulation to examine the performance of the routing protocols based on the variables of the nodes' number and network size. The evaluation results show that the AODV outperforms the OLSR in most of the simulated cases. The results further show that the number of nodes and network size has a great impact on the Throughput (TH), Packet Delivery Ratio (PDR), and End-to-End delay (E2E) of the network.

A mobile ad-hoc network is a collection of mobile nodes that goatherd to exchange data and information from source to destination. Typically, MANET has no infrastructure, which can call it an infrastructure-less network. The node in the network communicates directly with the neighbor nodes that are already within the wireless range of that node. MANET has several types of routing protocols that can be used to establish links between nodes. These routing protocols are different in their mechanisms, which are AODV and DSR. In this paper this simulation study carries out two routing protocols to evaluate their performance and quality of service in terms of energy consumption and packet delivery ratio. The comparison study was carried out using the NS2 simulator. The results of the simulations show better performance of DSR over AODV in different scenarios.

VANET is a branch of MANETS, where each vehicle is a node, and a wireless router will run. The vehicles are similar to each other will interact with a wide range of nodes or vehicles and establish a network. VANETs provide us with the infrastructure to build new solutions for improving safety and comfort for drivers and passengers. There are several routing protocols proposed and evaluated for improving VANET's performance. The simulator is preferred over external experience because it is easy, simple, and inexpensive. In this paper, we choose AODV protocol, DSDV protocol, and DSR protocol with five different nodes density. For each protocol, as regards specific parameters like (throughput, packet delivery ratio, and end-to-end delay). On simulators that allow users to build real-time navigation models of simulations using VANET. Tools (SUMO, MOVE, and NS-2) were used for this paper, then graphs were plotted for evaluation using Trace-graph. The results showed the DSR is much higher than AODV and DSDV, In terms of throughput. While DSDV is the best choice because of the low average end to end delay. From the above, we conclude that each strategy has its own negative and positive aspects that make it ideally suited to a particular scenario than other scenarios.

The most important experiences we discovered from several disasters are that cellular networks were vulnerable, and the loss of the communication system may have a catastrophic consequence. Mobile ad-hoc networks (MANETs) play a significant role in the construction of campus, resident, battlefield and search/rescue region. MANET is an appropriate network for supporting a communication where is no permanent infrastructure. MANET is an effective network that uses to establishing urgent communication between rescue members in critical situations like, disaster or natural calamities. The sending and receiving data in MANET is depending on the routing protocols to adapt the dynamic topology and maintain the routing information. Consequently, This paper evaluates the performance of three routing protocols in MANET: ad-hoc on-demand distance vector (AODV), destination sequenced distance vector (DSDV), and ad-hoc on-demand multipath distance vector (AOMDV). These protocols are inherent from different types of routing protocols: single-path, multi-path, reactive and proactive mechanisms. The NS2 simulator is utilized to evaluate the quality of these protocols. Several metrics are used to assess the performance of these protocols such: packet delivery ratio (PDR), packet loss ratios (PLR), throughput (TP), and end-to-end delay (E2E delay). The outcomes reveal the AOMDV is the most suitable protocol for time-critical events of search and rescue missions.

The existing network infrastructure may not work well in a disaster environment caused by a fire or an earthquake. Instead of relying on the existing infrastructure, communicating through a mobile ad hoc network (MANET) is recommended because MANET can configure a network without an infrastructure communication system. In addition, firefighters conducting emergency activities in harsh environments surrounded by flames and smoke need a communication system to assist their rapid firefighting operations. Existing work is not suitable for indoor firefighters communications because they did not consider the indoor disaster environment well. In this proposed scheme, dual channels (i.e., 2.4 GHz and sub-GHz bands) are used for an efficient routing table configuration. Data frame and HELLO message are exchanged through the 2.4 GHz band, while the neighbor list of each node is exchanged through the sub-GHz band. Each node can configure the routing table based on the exchanged neighbor list. A performance evaluation is conducted to compare the proposed technique with enhanced versions of optimized link state routing (OLSR) and destination-sequenced distance vector routing (DSDV). The results show that the proposed scheme outperforms the other two MANET routing algorithms (i.e., OLSR-mod and DSDV-mod) in terms of the packet delivery ratio (PDR), end-to-end delay, and initial routing table configuration time approximately 27.8%, 4.7%, and 166.7%, respectively.

Disasters could cause communication systems to partially or completely down. In such a case, relief operations need a rapidly deployed communication system to save lives. Exchanging information among the rescue team is a vital factor to make important decisions. Communication system required to be robust to failures, rapidly deployable, easily maintainable to provide better services. Wireless ad-hoc networks could be the choice of establishing communication

with the aid of existing infrastructure in a post-disaster case. To optimize mobile ad-hoc network performance, address the challenges that could lead to unreliable performance is required. One and the most crucial key challenge is routing information from a sender to a receiver. Due to the characteristics of a disaster environment such as signal attenuation, communication links exist between rescue crew is short-lived, suffer from frequent route breakage, and may result in unreliable end-to-end services. Many routing protocols have been proposed and evaluated in different network environments. This paper presents the basic taxonomy of Mobile Ad Hoc Networks and the state of the art in routing categorizes (Proactive, Reactive, Geographic-aware and Delay tolerant Networks (DTN)).

III. ROUTING PROTOCOL

Routing in the wireless networks are categorized into 3 types based on the structure of the network. They are Flat routing, Hierarchical Routing and Location Based Routing [4]. In flat routing, all the nodes of the network perform the same functionality and work together to collect/generate the data and routing to the destination. The Sensor Protocols for Information via Negotiation (SPIN) protocol and Directed Diffusion protocol belong to flat network routing. In the hierarchical routing, the entire network is divided into many clusters to improve the scalability and utilize the energy of the nodes efficiently. For Example LEACH (Low Energy Adaptive Cluster Hierarchy) routing protocol [5]. In Location based routing, location details of each node are monitored continuously to find the routing path for the communication. Global Positioning System (GPS) devices are used along with network nodes. For example: Geographic and Energy Aware Routing (GEAR). Figure 1 shows the classification of routing protocols based on the network structure.

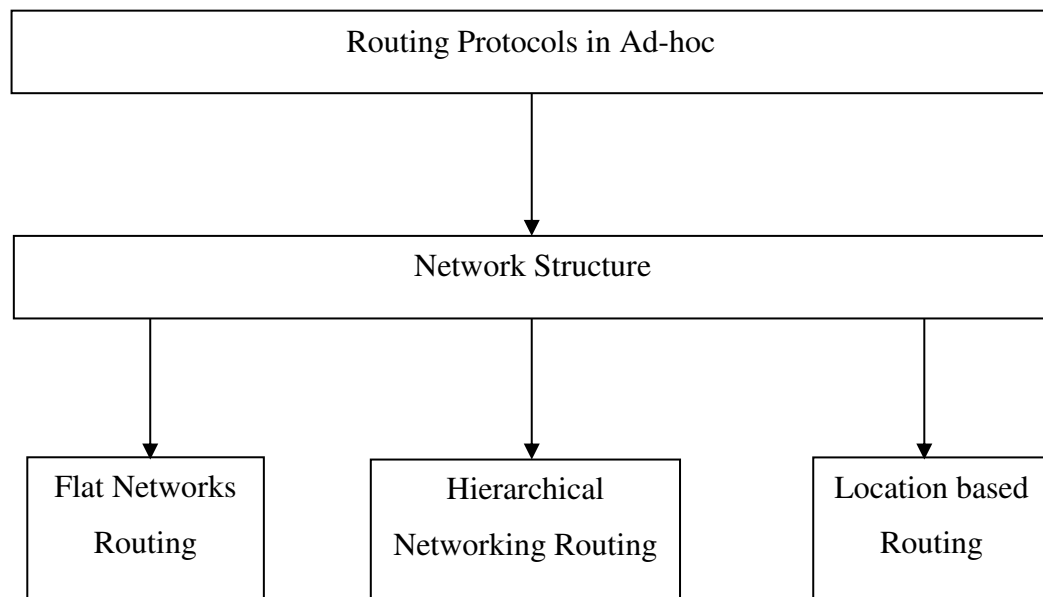


Figure 2: Classification of routing protocols in WSN

In Clustered Architecture, the sensor nodes are logically organized into several clusters depending on the nodes' geographic proximity or other parameters considered by the clustering algorithms [6]. Each cluster is governed by the cluster head node which is yet another sensor node but probably with more energy.

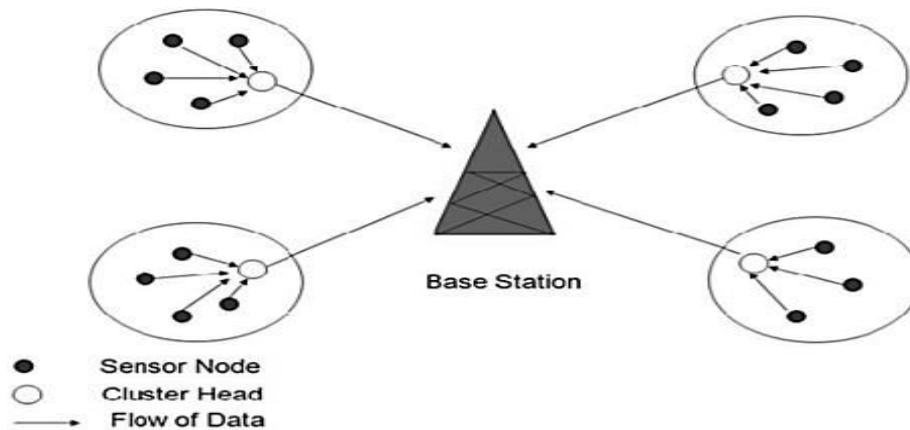


Figure 3: Clustered architecture of wireless sensor network

The data communication happens in hierarchical fashion, for example, from cluster member node to respective cluster head node and then from a cluster head node to the Base Station either directly or through some other cluster head nodes.

The advantage of such network architecture is that the overall energy expenditure for data communication is minimized. Moreover the network remains stable while it is scaled up in terms of number of nodes. Figure 2 shows a Clustered Architecture of wireless sensor network.

IV. DESIGN ISSUE OF ROUTING PROTOCOL

Routing protocols of MANETs have many design issues due to MANETS characteristics like node mobility, power limitations of the node, hidden and exposed terminal problem etc. Other issues to be taken into consideration are security, quality of services, reliability, channel utilization [18]. A brief discussion on various issues is given below.

Node Mobility: The major challenge that the routing protocol has to face is highly dynamic network topology due to the mobility of nodes. Random speed and direction of motion of nodes result in frequent breaks in preconsidered network topologies and end to end paths.

Power Limitations of Node: Nodes in MANETs are battery operated. The number of transmission attempts consumes considerable battery power. The routing protocol must account the available battery power of node while selecting as an intermediate node in a path.

Hidden and Exposed Terminal Problem: Hidden terminal problem refers to a collision of packets due to simultaneous transmission from two nodes which are not in the direct transmission range of each other but in the transmission range of a receiver. The collision occurs when both nodes transmit data without knowing each others status of the activity. Exposed terminal problem refers to inability of the node to transmit because neighbor node occupies the channel. Due to this an effective channel utilization is affected.

Radio channel: Link capacity and link error probability have time-varying characteristics in MANETs. This makes routing protocol to find alternate good quality links continuously [19]. This problem becomes more complex because of retransmissions due to collisions of data packets. Therefore routing protocol must find an efficient route with less congestion.

Bandwidth: Radio channel in a wireless network is band limited and therefore data rate offered is less compared to wired channels like an optical fiber. The routing protocol must limit the generation of the control packet to save bandwidth. It is possible when there is a limitation on sharing topological information among the nodes.

Security: Security is one of the important concern in wireless networks compared to fixed networks. Wireless networks are more prone to physical threats at the link level. The routing protocol must embed some sort of encryption to data being transmitted to ensure secure transmission of data.

V. CONCLUSION

Mobile Ad Hoc Networks have evolved rapidly and are finding numerous applications in the areas of self-creating, self-organizing and self-administering wireless networks. The present paper describes use of and comparison of three routing protocols. The parameters used for comparison are throughput and delay in response by varying the number of mobile nodes. A random waypoint mobility model was used for fixing the mobile nodes. In this paper we study

different research work using different protocol, In future we also increase the performance for these quality of services parameters, there are some parameters are network overhead, end to end delay, throughput and packet delivery ratio.

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