SECURITY & POWER CONSUMPTION CHALLENGES IN MANET: A REVIEW

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ABSTRACT

The instant development of network takes the concern of researcher to make it more user-friendly. This paper is a review on the wireless network. The wired technology is a conventional approach but now day's Wireless technology is most popular approach in. There are many wireless network technologies available like cellular network, ad-hoc network, sensor network. Mobile Ad-hoc network is one of them. MANET works without using any base station, infrastructure and topology. In MANET the nodes uses radio waves in order to transmit and receive the data. MANET also has its own demerits. This paper gives an idea of mobile Ad-hoc Network. Protocol used in MANET and some security issues. This paper also discussed about the types attacks which are possible in mobile ad-hoc network. It seems to be that there is a major issue related to power consumption in mobile ad-hoc network. This paper it gives the reason and the solution related to the power consumption in MANET.

KEYWORDS: MANET, Protocols, Attacks, Power consumption.

I. INTRODUCTION

Network is a technique use to connect the devices for sending and receiving the data. There are two basic types of network categorized. First is wired network the other one is wireless. These are differentiated with the help of the connecting medium used. The wireless network has further categorized into two parts. These are cellular network and Ad-hoc network. The cellular network is work for the mobile communication. On other hand the ad-hoc network is used for data communication. Both networks have the base station. Each may use some wired network to establish the backbone of the network [1].

A mobile ad hoc network is a number of nodes that are able to change their position randomly but still they can communicate. In order to co-ordinate with other nodes here no centralized device available. These nodes are capable of sending and receiving data own their own. They can also perform routing. So Ad-hoc network is very popular due to unstructured network. Due to this property, there are so many practical application used in this time.

1. It can use by army. Border is a most sensitive area where communication should take place 24 hours. But some time there is need to establish a communication network instantly. This time Ac-hoc network plays an efficient role.
2. At the time of natural disaster like tsunamis, earth quack, twisters can destroy the infrastructure of whole communication system. So the rescue team can use the Ad-hoc network on the spot.
3. The Mining is a dynamic area which is changed after the mine every day. So the static network may create problem in data communication. This is also a place where Ad-hoc network gives the efficient results.
4. This methodology can also apply for the event management. Due to small area of event with large number of co-coordinating nodes Ad-Hoc network is the best option.

Figure 1 shows the basic classification of the network. In this paper we are paying attention to the mobile ad-hoc network. This paper is basically divided in to six sections. First one is introduction. Second is mobile ad-hoc network. This gives some basic idea of MANET. In section three we will discuss the various characteristics of the mobile node of this network. Now the issues of power

consumption of MANET node will discussed in section four. After that the conclusion and references will given in last.
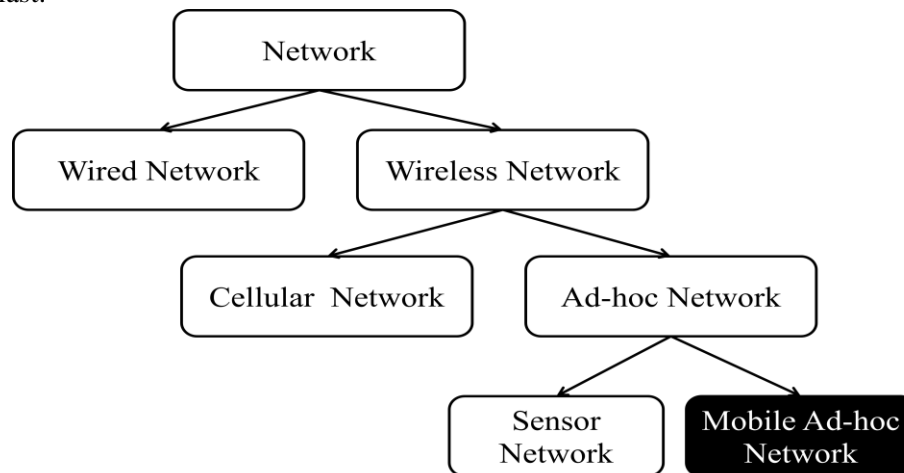

Figure 1 Classification of Network

II.   MOBILE AD-HOC NETWORK

MANET is a type of wireless network as given in figure 1. It is network of number mobile node having ability of routing and transmitting and receiving data. It works without any centralized management. Here each node work as a client and the router. This network no fix topology used due to node mobility. Here dynamic topology is applied [3].
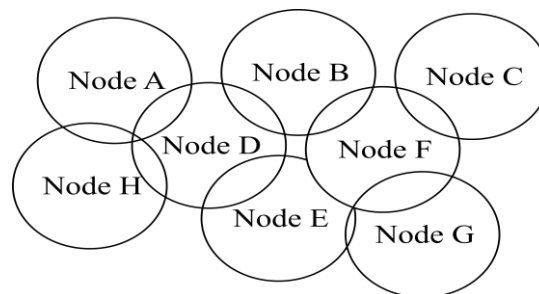

Figure 2: Ad-hoc Network

Figure 1 shows the small Ad-hoc network with their nodes. Here each node has its range. It is must for receiving node to in the network of sender node in order to complete the communication. It is possible that sender and receiver node not connected directly so they can take the help of other adjacent nodes. If there is an isolated node in network than the node will not receive or transmit the data to any other network so communication never takes place until the isolated node comes under the range of other connected node of the network. There are some problem with Ah-hoc network like Limited resources, Weak authorization services, Dynamic topology and protocol availability. Limited resource have the problem of limited   security, in authorization trust is necessary otherwise vulnerable to attacks will possible. The changeable network topology makes it hard to identify malicious nodes. All protocol has written for wired network which does not work in wireless network.

III.   CHARACTERISTICS OF NODES IN MANET

There are many properties of the node in MANET. Some of them are discussed here.
1. Each Node can transmit and receive the message.
2. They are connected with a fix radio frequency.
3. Each node is movable.
4. The mobility needs the source of power which is given by the small battery
5. There is no fix topology between the nodes. Topology can change every time.

6. There is no fix infrastructure because of the dynamic topology.
7. Each node can work as a router so no base station needed.

IV. PROTOCOLS OF MANET

Protocols are a collection of rules, works in-between two systems. Communication network protocol is depending on the medium used [3, 4, 17]. Routing is significant task in which destination node path has to decide. Now nays many protocols available for wireless network which are applicable in MANET. Figure 2 shows the basic classification of routing protocols of MANET. The table driven protocols share the routing table and perform the routing in the network. The other type of protocol called on demand routing protocol. In these protocol node search will done with the current request of the user [4]. When the route request packet comes the flooding will apply and finally the routing will perform in order to search the path of destination end user. Both the protocols also called the proactive and reactive respectively. The third category is hybrid of the above protocol. This protocol uses both the concepts of proactive and reactive protocols for routing. Apart from this the flow oriented and hierarchical are two other method which can use in order to routing in Ad-hoc Network [5].

In other words the routing protocol is a generalized terminology to define to get the suitable path by which data can efficiently send to the receiver end. Whether, these routing protocols are responsible to perform dynamic routing and information sharing as well [6].
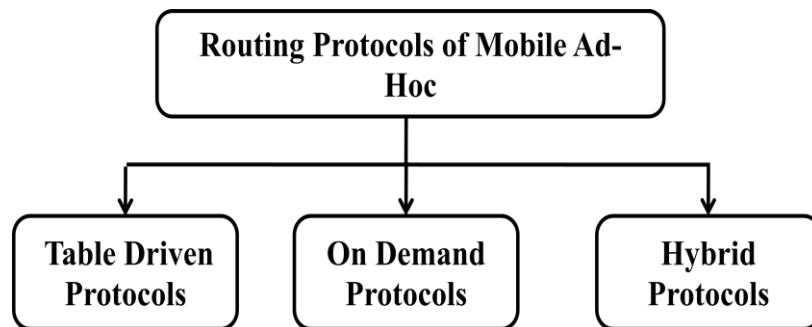

Figure 3 Routing Protocols in Ad-Hoc Networks

V. SECURITY CONSTRAINTS

Mobile Ad-Hoc network has several loop holes by which the attack in MANET is possible. This attack can do by any node of the network. These nodes itself take part in the malicious actions. This type of nodes called the active node and attack is known as active attack. On other hand some nodes do not involve in the malicious activity directly. This type of action is done by the passive node in passive attack. In both cases such type of node called the malicious node. In Mobile ad-hoc network there are some major concerns in order to secure the network. There all security should be applied in the province of data. These are the principle of network security [7,17].

Authentication: It is based on the right access of a user. In ad-hoc network there may be various anonymous user with the existing users. Which one is authorized to communication? This answer will find out by the authentication policies.

Confidentially: In this concept the message should only know to sender and receiver. None of the nodes have the information regarding the transmitting message.

Integrity: this concept ensures that the message hasn't any changes during the transmission in the network.

Availability: this is necessary for the sender's end. It shows the receiver is online or not.

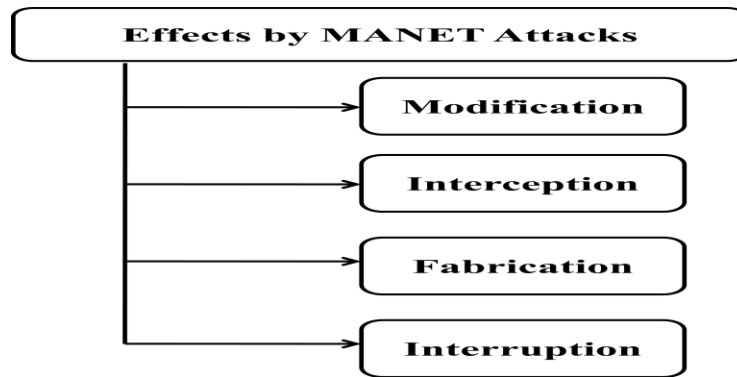**Non-repudiation:** it is concept to prevent the repudiation of message [7,8].

Figure 4 Effects in MANET by Attacks

VI.   POWER CONSUMPTION ISSUES IN MANET

Each mobile mode has the four basic modes to power utilization. These are Transmission Mode where node performs the transmission task, Reception Mode where node work as a receiver and get data from somewhere. Idle Mode when the node is isolated from network and not participating in network, Overhearing Mode where the node has extra job. So the battery consumption depends on issues bellow:

1. Transmission & Receiving of data is a first important part. It means how much the data has transmitted or received by the node. It is directly propositional to the battery consumption.
2. Size of packet is also effect in this issue. Some time it seems to be that the header size is increased so that unnecessary the packet size will increase. It becomes the cause to use more power consumption.
3. Packet duplicity is always a major problem in both types of network (wired and wireless). Duplicate packet uses the energy of the network which decreases the performance of the network.
4. In case of routing there is a need to search the shortest path for packet delivery. This shortest path must be reliable. It is necessary to make the shortest path using trusted node.
5. Node should have the ability to shutdown when they are in idol condition
6. Power consumption also play key role in security.

In present scenario the power is an important factor to make the network efficient. Above we have described some factors. We have to focus on these factors by which the network works efficiently.
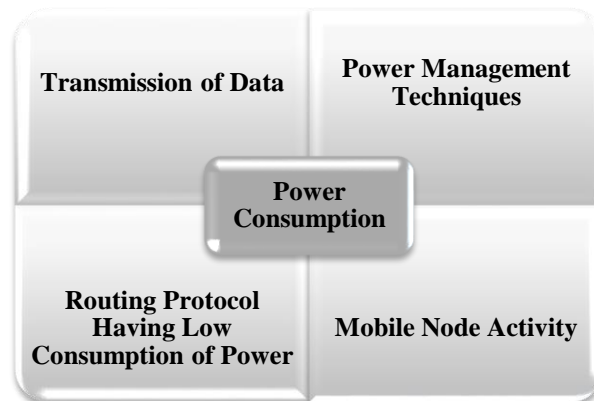The power consumption can be optimized by using some methodology as below.

Figure 5 Power Consumption

Transmission range of the network is very impotent factor of power consumption. This range increases the area of network of individual node. So it need more power. We can apply the various power management techniques. Routing takes more power. Routing process makes various changes in its table so it needs lots of processing. Due to this process we need some routing protocol which will

efficient in case of routing overhead. Now the last is mobile node activity. Most of the time mobile node moves in the network. When it changes its location then there is need to update routing table. It will again search the path. Apart from that high speed processor, high range of radio wave to transmit and receive the data packets and its local instruments like HDD, disk Drive etc increases the power consumption in network.

VII. CONCLUSION

This paper is study of the various issues of MANET. Here it seems to be that power consumption of a mobile node is a strong problem in this era. as the mobile ad-hoc network is applicable in those era where the node need to move like the PAN, on the border etc. it seems to be that the power is a important feature to use the mobile as long as possible. So it is necessary to make the strategy regarding the power consumption.

VIII. FUTURE WORK

There are many problems shown in this paper. The major problems are related to power consumption and security issues of the MANET. It seems to be that there are so many attacks can possible in mobile Ad-Hoc Network. In future we will try to present a hybrid model for worm hole attack detection and prevention that is based on Statistics Based scheme and graphical based solution of wormhole problem.

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