A Simplistic Overview of MANET

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Abstract: *MANET-A collection of mobile nodes that forms a temporary network dynamically .They have the capability of communicating with each other without utilizing a network infrastructure or centralized administration. In my paper, I have focused to give instant overview on history of MANET, Conceptual aspect through characteristics, types of manets, challenges, Attacks related to manet, Applications involved in MANET.*

Keywords: Generation, Ad-Hoc-Networks, M.A.N.E.T, Attacks, Applications

I. HISTORICAL DEVELOPMENTS OF MANET

Year of Sponsorship: 1970's
Type: Packet Radio Network
Sponsoring Agency: Defense-Advanced-Research-Projects-Agency
MANET is acronym for " Mobile Ad hoc NETwork".
Ad-hoc Latin means "for this".
Ad-hoc-networks could be classified into three generations as follows:.

1.1 First Generation(1972-1980)

- Known as PRNET (Packet-Radio-Networks).Packet-Radio-Networks was the first ad-hoc network.
- It utilizes radio-frequency technology to send/transmit and receive data.
- ALOHA,CSMA and distance-vector routing PRNET were utilized on an experimental basis to put forward networking capabilities in a competitive environment.

1.2 Second generation(1980-1990)

- Known as SURAN (Survivable Adaptive Radio Networks) program.
- Developed Global Mobile information system and Near term Digital Radio(NDTR).

1.3 Third Generation (1990 onwards)

- Known as Commercial ad-hoc network. Bluetooth was introduced in 1998.Here Eight devices communicate with each other in a small network.
- The third generation used in the present day is Ad-hoc-networks.

II. CONCEPTUAL CHARACTERISTICS OF MOBILE AD HOC NETWORKS

A Mobile Ad hoc NETwork is comprehensive set of MANET-routers.
Role of Mobile-Router's is to organize ,maintain routing-structure over dynamic wireless interfaces.

2.1 Characteristics of MANET

1. Each MANET node acts as host and router. indicating its autonomous behavior.
2. When a node of source and destination for a message is not in radio range, the MANETs performs multi-hop routing.
3. It has intermittent nodal connectivity.

4. It has High user density and a large level of user mobility.
5. Identical features of nodes with similar responsibilities forms a completely symmetric environment.
6. The nature of operation for security, routing and host-configuration is distributed.
7. No presence of centralized firewall.
8. Network topology is dynamic in nature.
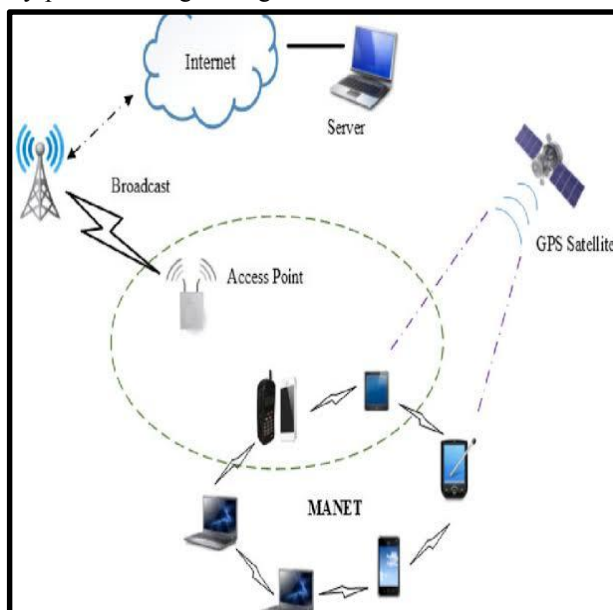9. It possesses less memory-power and light weight features.

Figure 1: Basic Manet Architecture

III. TYPES OF MANETs

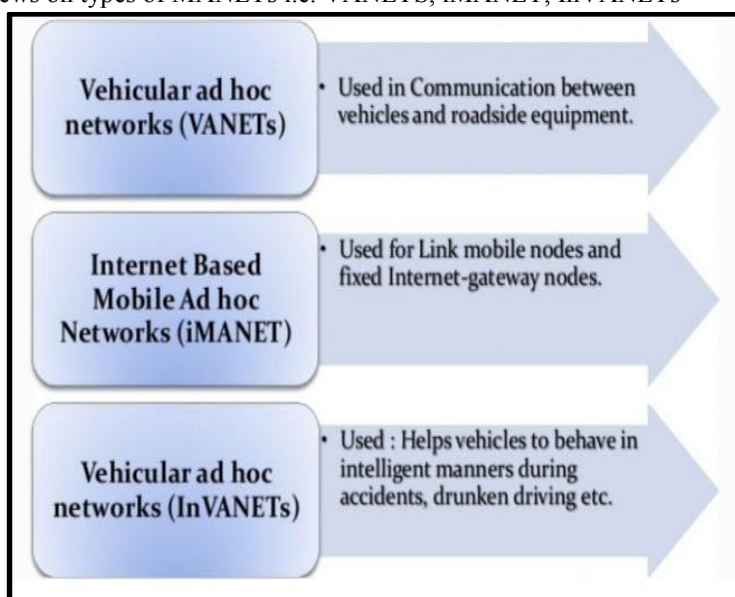The Following figural views on types of MANETs i.e. VANETS, iMANET, InVANETs

Figure 2: Types of Manets

1. VANET: They are formed using the mobile-ad-hoc-networks principles. It effectively communicate with vehicle /roadside equipment's.

2. IMANET: A wireless ad-hoc-network supporting TCP-UDP as well as IP Internet- protocols. It utilizes a routing protocol establishing automatic linkage between mobile nodes and routes.
3. INVANET: It facilitates usage of artificial intelligence to handle un-expected situations of accidents and collision of vehicles.

IV. APPLICATIONS

1. Maintains military battlefield by establishing an information-network among the soldiers, and military information headquarters.
2. There is a need for collaborative computing that might be more important to external office environments than internal and where people do need to have outside meetings to cooperate and exchange information on a given project.
3. It can link a temporary multimedia network with notebook computers for sharing of information between participants at a conference or classroom.
4. Short-range MANETs viz. Bluetooth can ease the inter-communication between various mobile devices such as a laptop, and a mobile phone.
5. It can be used in emergency/rescue operations for disaster relief efforts, e.g. in fire, flood, or earthquake.

V. CHALLENGES IN MANET

1. No availability of centralized administration entity for management operation of the various mobile nodes.
2. Mobile nature of nodes allows them to connect dynamically in an arbitrary manner. Links differ in time in relation to the proximity of one node to another node.
3. Another challenge is to identify relevant newly moved-nodes and informing about their existence needs dynamic updation to employ automatic optimal-route-selection.
4. Mobile-nodes depend on the power of batteries, which is a limited resource.
5. The more mobile in nature the higher security risks to both legitimate network-users and attackers.
6. Degradation of the received signal caused by several error sources
7. Implementation of a standard addressing scheme possesses big challenges.
8. MANETS has dynamicity in connection and disconnection of the variable links.
9. One of the major challenges is Maintenance of topology by updating information of dynamic links among nodes in MANET's.

VI. LAYER SPECIFIC ATTACK

The following tabular figure describes manets attacks on Internet layer:

Layer	Attacks
Application layer	Repudiation, data corruption
Transport layer	Session hijacking, SYN flooding
Network layer	Wormhole, blackhole, Byzantine, flooding, resource consumption location disclosure attacks
Data link layer	Traffic analysis, monitoring, disruption MAC (802.11), WEP weakness
Physical layer	Jamming, interceptions, eavesdropping
Multi-layer attacks	DoS, impersonation, replay, man-m-the-middle

VII. CONCLUSION

Using the above points we can conclude that various mobile ad hoc networks can provide efficient and effective communication between mobile nodes participating in dynamically established networks of nodes. From all above we can find that MANETs act as supportive infrastructure to gain future omnipresent environment. MANET provides versatile-network in current situations but becomes non-reliable because it is immune to attacks also.

REFERENCES

[1]. Mr. L Raja, Capt. Dr. S Santhosh Baboo, "An Overview of MANET: Applications, Attacks and Challenges" International Journal of Computer Science and Mobile Computing, Vol.3 Issue.1, January- 2014.

[2]. Kayna Mahajan, Harjit Singh, "MANET its types, challenges goals and approaches: A review" International Journal of Science and Research, Volume 5 Issue 5, May 2016.

[3]. http://shodhganga.inflibnet.ac.in/bitstream/10603/28 058/7/07_chapter1.pdf

[4]. http://www2.ece.rochester.edu/courses/ECE586/lectu res/MANETS_Routing.pdf

[5]. https://pdfs.semanticscholar.org/4b44/07ac5c69db3ce 0b7a524f2093abf20c161dd.pdf

[6]. http://www.nipunharitash.com/wpcontent/uploads/2016/04/MANETS.pdf

[7]. http://www.ijsret.org/pdf/120371.pdf

BIOGRAPHY

Mr. Rajesh Yadav is working as Assistant Professor in V. K. Krishna Menon College with an overall teaching experience of 6 + years. He has completed his M.Sc. (Computer Science) along with NET and B.Ed. He has also completed his diploma in machine learning using R Studio and Diploma in Data analytics. He has participated in more than 200 seminars, webinars , workshop (at national and international level) all inclusive. He has successfully completed more than 60 Faculty development programmes and more than 12 certificate courses in online mode. He has presented research papers in a national and international conferences and published papers in reputed national and international journal as well as conference proceedings. His research areas of interest are Machine Learning, Data science, Cloud Computing, Automata, Internet of things.