Mobile Ad-hoc Networks (MANETs)

Elementrix Classes

MANET stands for Mobile Adhoc Network also called a wireless Ad-hoc network or Ad-Hoc wireless network that usually has a routable networking environment on top of a Link Layer ad hoc network.. They consist of a set of mobile nodes connected wirelessly in a self-configured, self-healing network without having a fixed infrastructure. MANET nodes are free to move randomly as the network topology changes frequently. Each node behaves as a router as they forward traffic to other specified nodes in the network.

MANET may operate a standalone fashion or they can be part of larger internet. They form a highly dynamic autonomous topology with the presence of one or multiple different transceivers between nodes. The main challenge for the MANET is to equip each device to continuously maintain the information required to properly route traffic.
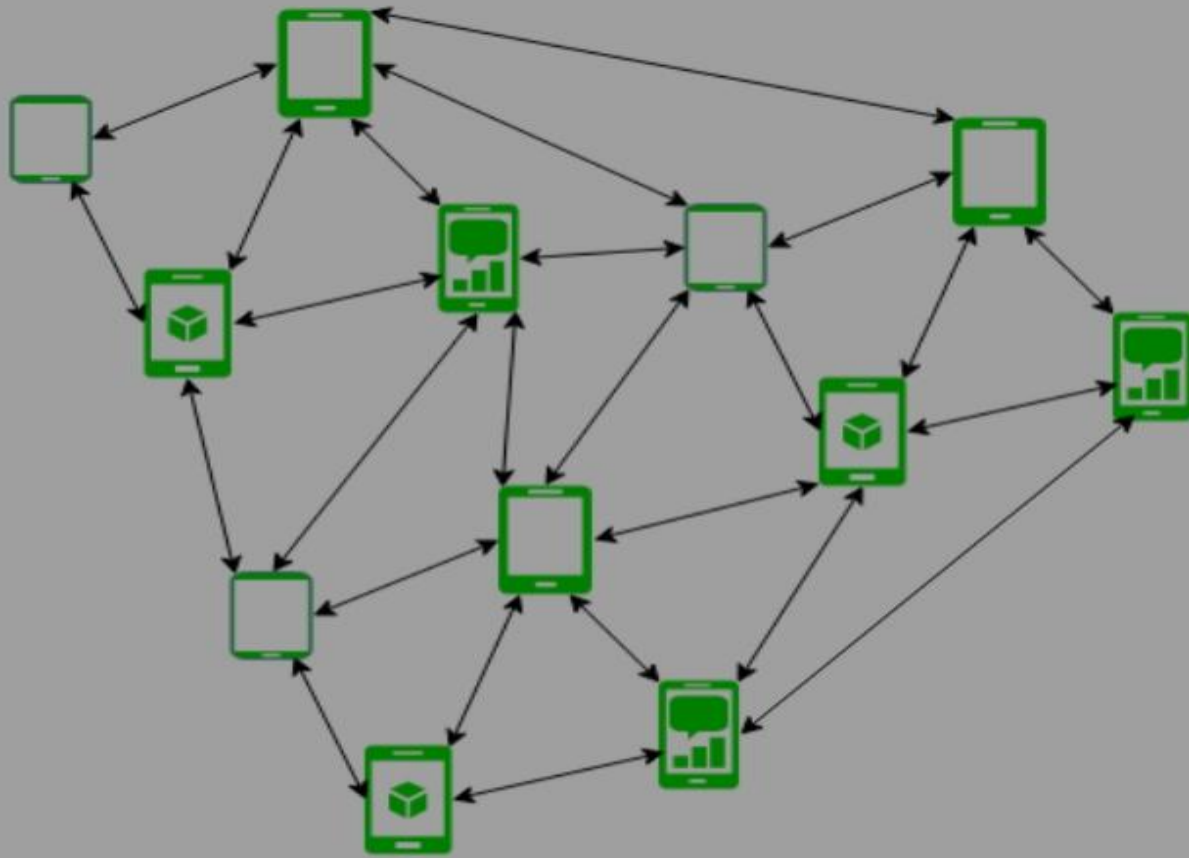
Figure - Mobile Ad Hoc Network

MANETs consist of a peer-to-peer, self-forming, self-healing network MANET's circa 2000-2015 typically 2/2 communicate at radio frequencies (30MHz-5GHz). This can be used in road safety, ranging from sensors for the environment, home, health, disaster rescue operations, air/land/navy defense, weapons, robots, etc.

Characteristics of MANET –

Dynamic Topologies:

Network topology which is typically multihop may change randomly and rapidly with time, it can form unidirectional or bi-directional links.

Bandwidth constrained, variable capacity links:

Wireless links usually have lower reliability, efficiency, stability, and capacity as compared to a wired network

Autonomous Behavior:

Each node can act as a host and router, which shows its autonomous behavior.

Energy Constrained Operation:

As some or all the nodes rely on batteries or other exhaustible means for their energy. Mobile nodes are characterized by less memory, power, and lightweight features.

Limited Security:

Wireless networks are more prone to security threats. A centralized firewall is absent due to the distributed nature of the operation for security, routing, and host configuration.

Less Human Intervention:

They require minimum human intervention to configure the network, therefore they are dynamically autonomous in nature.

Advantages of MANET are:

1. Separation from central network administration.

2. Each node can play both the roles ie. of router and host showing autonomous nature.

3. Self-configuring and self-healing nodes do not require human intervention.

4. Highly scalable and suits the expansion of more network hub.

Disadvantages of MANET are:

1. Resources are limited due to various constraints like noise, interference conditions, etc.

2. Lack of authorization facilities.

3. More prone to attacks due to limited physical security.

4. High latency i.e. There is a huge delay in the transfer of data between two sleeping nodes.

पढ़िए और पढ़ाइये

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