



Wireless Ad Hoc Network

Network without infrastructure



1. **Dynamic Topology:**

- MANETs have a dynamic topology as nodes move unpredictably. This dynamic nature makes it challenging to establish and maintain stable network connections.
- Frequent changes in network topology require efficient routing protocols that can adapt to these changes.

2. **Limited Bandwidth and Energy Constraints:**

- Devices in ad hoc networks often operate on limited battery power. Energy efficiency is crucial, and communication protocols need to be designed to minimize energy consumption.
- Limited bandwidth is another constraint, requiring efficient use of available resources for data transmission.

3. **Routing Protocols:**

- Developing robust and efficient routing protocols for ad hoc networks is challenging due to the dynamic nature of the topology.

challenges related to ad hoc wireless networks

Ad hoc wireless networks in mobile computing, also known as Mobile Ad hoc Networks (MANETs), present several challenges due to their dynamic and decentralized nature. These challenges impact the design, implementation, and performance of ad hoc wireless networks. Here are some key challenges related to MANETs:

Dynamic Topology

Limited Bandwidth and Energy Constraints

Routing Protocols

Security Concerns

Quality of Service (QoS) Provisioning

Scalability

Resource Management

Topology Control:

Interference and Channel Access

Mobility Management





4. Security Concerns:

- MANETs are susceptible to various security threats, including eavesdropping, data tampering, and denial of service attacks.
- The absence of a centralized infrastructure makes it challenging to implement traditional security measures.

5. Quality of Service (QoS) Provisioning:

- Providing QoS in MANETs is challenging due to the dynamic nature of the network. Ensuring reliable and timely delivery of data while considering factors like bandwidth, delay, and jitter is complex.

6. Scalability:

- As the number of nodes in the network increases, scalability becomes a concern. Traditional routing protocols may face scalability issues when dealing with a large number of nodes.

7. Resource Management:

- Efficient resource management, including bandwidth allocation and energy conservation, is crucial for the proper functioning of MANETs.
- Optimizing resource usage while considering the dynamic nature of the network is a significant challenge.



8. Topology Control:

- Maintaining control over the network topology is essential for efficient routing and resource management.
- Strategies for topology control involve adjusting transmission power and selecting appropriate neighbors to optimize network connectivity.

9. Interference and Channel Access:

- In wireless environments, interference and contention for the shared medium can impact the performance of communication.
- Designing efficient medium access control (MAC) protocols to manage channel access and reduce collisions is a challenge.

10. Mobility Management

- Efficiently handling node mobility is critical. Protocols must adapt to changes in the network caused by node movements while maintaining connectivity and minimizing disruptions.

