

# A Brief Review on an Analogy between MANET and WSN

**Mayur N. Bhalia**

Lecturer, E.C. department, Government Polytechnic, Rajkot, Gujarat, India  
mayur.bhalia@gmail.com

## **Abstract:**

A wireless channel situated the Wireless sensors network (WSN) and Mobile Ad-hoc Network(MANET) in an unlicensed spectrum that could be obstructed by other radio wave technologies operating within the same frequency range. MANET is capable of organize themselves and self-repair. To monitor environmental and physical factors, sensor networks use a variety of nodes that are dispersed at random within a given area. The objective of this study is to show that the WSN is an unusual kind of ad hoc wireless network that may be utilized to offer a wireless communication structure that enables us to discover, measure, and respond to events that happen in any environment also we study on simalarities and difference between them.

**Keywords:** MANET, WSN, Factors, Self-organization.

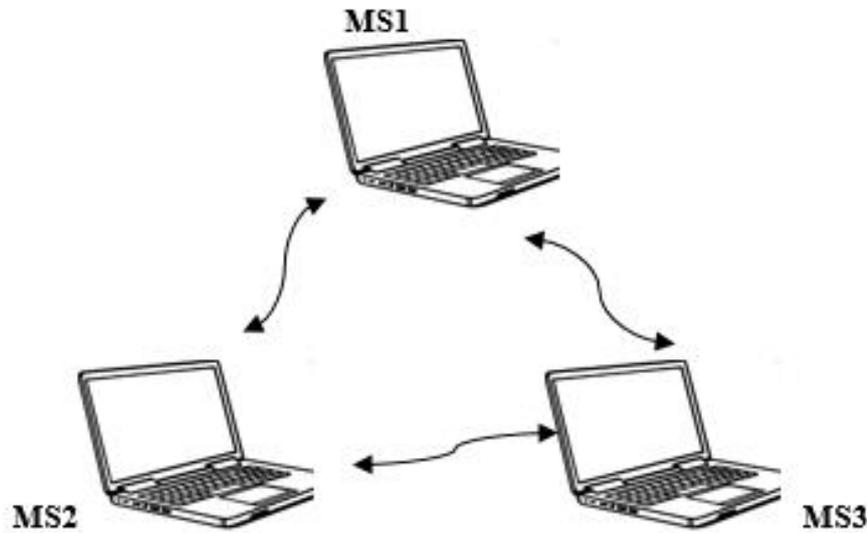
## **I. INTRODUCTION**

In situations where, fixed network infrastructure is unavailable, MANET, an autonomous group of mobile devices (such as laptops, smartphones, wireless sensors, etc.) will communicate with one another via wireless links and assist in providing the required network functionality in a distributed manner. New and fascinating applications are made possible by this kind of network, which can function as a stand-alone network or as several points of connection to cellular networks or the Internet. Examples of application scenarios include personal networks, meeting rooms, and emergency situations like floods and earthquakes. Mobile Ad Hoc Networks (MANETs) has become one of the most favorite areas of research now a day because of its challenges related to its protocols. MANET is the new emerging technology which enables users to communicate without any need of any fixed infrastructure, because of this; sometimes it is also called an infrastructure less network. Due to some advance features like cheaper, small and more powerful devices make MANET a fastest growing network. Whether if we talk about Wireless Sensor Network, or WSN, is a network of nodes with sensing and compute capabilities that are widely dispersed throughout an abandoned area. Sensor nodes are small devices that combine communication, processing, and sensing. WSNs can be used for sensor node surveillance, monitoring safety, and environmental data acquisition. WSNs have the following benefits: cost, size, time synchronization, flexibility, adaptability, security, and power efficiency. Wireless sensor networks (WSNs) consist of a large number of low-cost, high-intensity sensor nodes as well as one or more base stations. These small nodes are capable of a wide range of important tasks, including data transfer, event sensing, and order processing. WSNs have been replacing conventional networks because to many compensations, including ease of use, wide transmission range, and identity association.

## **II. OUTLINE OF MOBILE AD-HOC NETWORK**

Due to the difficulties associated with its protocols, Mobile Ad Hoc Networks (MANETs) have emerged as one of the most popular study topics nowadays. MANET[1,11], follows IEEE Standard 802.11, also known as an infrastructure-less network, is a new and developing technology that allows users to interact without the need for any established infrastructure. MANET is the fastest growing network because of some advanced features, such as smaller, more affordable, and more powerful devices. A MANET is adaptive and self-organizing. In a mobile ad hoc network, a device should be able to detect other devices in the same network and take the appropriate actions to establish communication and share information and services with them.

MANET makes it simple to add and remove devices from the network and enables the devices to stay connected to the network. As illustrated in Figure 1, a mobile ad hoc network, or MANET, is not dependent on a fixed infrastructure to function, in contrast to infrastructure wireless networks, in which every user communicates directly with an access point or base station.



**Fig. 1** MANET for peer to peer communication (MS stands for Mobile Station)

## II (A). Characteristics of MANET[11]

### 1) Autonomous network:

Since each node functions as a router on its own, there is no centralized administration to oversee the operations of the various mobile nodes or devices in this type of network.

### 2) Energy Constrained Operation:

Due to its mobility, a MANET's nodes may rely on batteries for some or all of their energy. Optimal power management is a crucial need for these nodes.

### 3) No need for fixed infrastructure:

All nodes or devices in this type of network are mobile and can connect with one another whenever necessary.

### 4) Dynamic network topology:

Anywhere in the network, nodes can migrate at random. Thus, the dynamic network topology will enter the picture, where the network's topology varies at random and unpredictable periods due to nodes.

### 5) Bandwidth optimization:

Compared to wired networks, wireless links have a significantly smaller capacity in terms of node count. Congestion will therefore become an issue in this network when an application requests more nodes to join, which raises the network capacity and brings about the best possible utilization of bandwidth.

### 6) Physical Security:

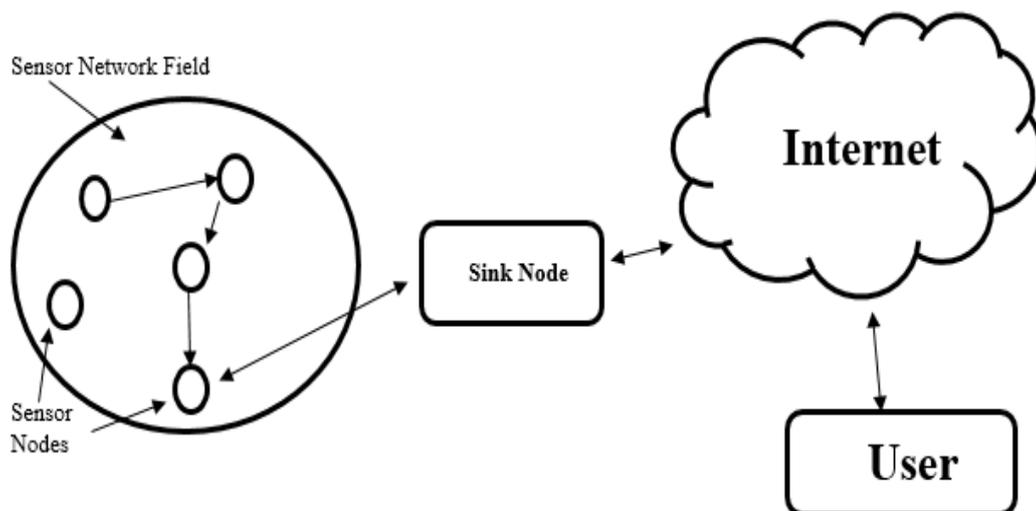
Wireless links increase the risk of security since they allow both network users and attackers to access shared wireless media or peer-to-peer communication. The wireless network must take into account a firewall to prevent any attacks.

**II (B). MANET based Applications[2]**

Sr. No.	Application Area	Final Application
1	Commercial	Portable offices, Road and weather conditions, taxi-cab networks, inter-vehicle networks, and way advice are examples of vehicular services.
2	Educational	When setting up a meeting of any kind or giving a lecture to the faculty and students on a college or university campus
3	For Gaming Zone	To engage in any type of multiplayer gaming
4	Networks based on sensor	Utilized in a variety of sensor-based home applications that interface with consumer electronics devices
5	Device network	It is capable of creating a wireless connection between multiple mobile devices
6	Defense	Ad hoc/sensor networks are great options for use in warfield management, and many military applications call for instant communications setup.
7	Telemedicine	When helping an injured person of a traffic accident in a remote area, the paramedic needs access medical records, such as a scan, and may require a doctor's support via video conference in order to perform an emergency intervention. In reality, the paramedic might have to immediately send the injured person's X-ray-imaging and other diagnostic testing from the scene of the collision back to the hospital.

**III. FRAMEWORK OF WSN**

A network of several tiny nodes, known as sensors, that rely on centralized wireless signal communication is known as a wireless sensor network (WSN). A unique network called a WSN, follows IEEE 80215.4 standard, spreads to detect an area of interest. Sensor network nodes are constrained by their finite computational capability, communication bandwidth, and energy supply. Sensor nodes should be usable in wide areas and should be able to adapt and function in changing environments Compared to sensor networks, which are frequently thickly and redundantly deployed, traditional wireless networks are frequently orders of magnitude smaller in scale. Additionally, nodes can be added to and removed from the network dynamically without human intervention, and they primarily use broadcast communication models[3,4]. Unattended deployment and an unfriendly, unstable environment make wireless sensor networks more susceptible to failures. Passing link failures occur more frequently in WSNs than continuous failures, especially when low-power wireless links are highly dynamic[5,6]. Route vibration, emergent link employment of connections on replacement paths, and competing data flow over intervening router buffers are all effects of link faults. Figure 2 shows the basic WSN architecture in which Sensor nodes are in charge of collecting environmental data and transmitting it to a sink node, which is in charge of overseeing and facilitating all communications between other nodes. The placement of a sink node has a significant impact on lifetime and energy consumption in WSNs because the sink node or base station, receives the data gathered by the network from multiple sensor nodes and delivers it to the end user[7].



**Fig. 2** Basic WSN Architecture

### III (A). Characteristics of WSN[8]

- 1) The capacity to handle node failures, or communication breakdowns
- 2) Node mobility.
- 3) The topology of dynamic networks
- 4) Scalability to a huge deployment scale
- 5) Node heterogeneity
- 6) The capacity to tolerate challenging environmental circumstances
- 7) Operation without supervision
- 8) Usability and widespread implementation
- 9) The amount of power used

### III (B). Applications of WSN

- 1) Military operations' physical security
- 2) Monitoring of habitats
- 3) Observation of the environment
- 4) Monitoring of structures and seismic activity
- 5) Tracking objects
- 6) Automation in industry
- 7) Applications in biomedicine

## IV. COMPARISON OF MANET WITH WSN

### IV (C). Advantages of MANET against WSN

- 1) Data rate is higher
- 2) Nodes mobility is higher as number of nodes are less
- 3) Nodes consume more energy
- 4) Less prone to failure
- 5) Designed to carry rich multimedia data
- 6) Less memory constrained

### IV (D). Limitation of MANET against WSN

- 1) No Central Infrastructure, which arise management problem
- 2) Generally formed for short duration
- 3) Number of nodes(users) are less
- 4) Node are more stable in WSN
- 5) MANET is close to civilization
- 6) More expensive

## V. CONCLUSION

The key concepts, key characteristics, applications, and key distinctions between WSN and MANET have all been discussed[9]. Wireless sensor networks (WSNs)[10] are a particular kind of ad hoc networks that use a wireless channel installed in an unlicensed spectrum that can be obstructed by other radio waves technologies operating at the same frequency. While MANET contact is closed to humans, WSN focuses on environment interaction. While WSN data is centrally located, MANET's nodes share network control, hence it has no. A background network that allows network operations to be centrally controlled. Although the data rate in WSN is quite low, MANET can carry rich multimedia data. Whereas MANET has fewer nodes that typically move ad hoc, sensor networks have a vast number of nodes that typically spread once in their lifetime.

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