# RESEARCH ARTICLE

## PERFORMANCE EVALUATION OF WLAN NETWORK BASED DSR PROTOCOL USING OFDM (802.11A) AND EXTENDED RATE PHY (802.11G)

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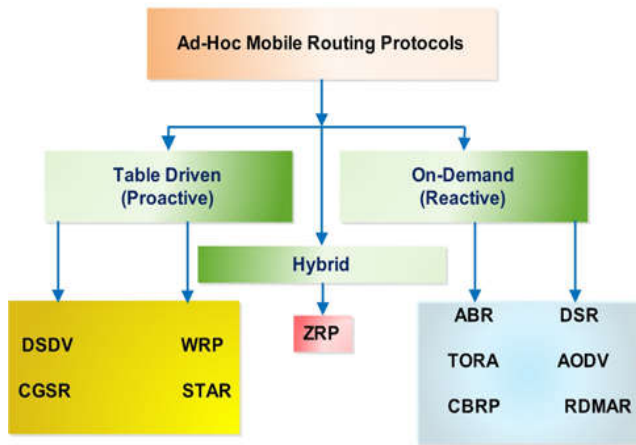| ARTICLE INFO | ABSTRACT |
|---|---|
| | Wireless mobile ad-hoc networks are characterized as networks without any physical connections. In these networks there is no fixed topology due to the mobility of nodes, interference, multipath propagation and path loss. Hence a dynamic routing protocol is needed for these networks to function properly. Many Routing protocols have been developed for accomplishing this task. The purpose of this paper is to study, understand, analyze and discuss mobile ad-hoc routing protocol DSR (Bouke, 2011) which is a on demand protocol. Considering the No. of hops, Traffic sent, Traffic received, route discovery time, Delay, throughput and network load in DSR routing protocol, it is evaluated and analyzed over different data rates (Bapuji and Sharma, 2011). |

# INTRODUCTION

## Manet

Stands for "Mobile Ad Hoc Network." A MANET is a type of ad hoc network that can change locations and configure itself on the fly. Because MANETS are mobile, they use wireless connections to connect to various networks. This can be a standard Wi-Fi connection, or another medium, such as a cellular or satellite transmission (Acrkhe, 2004; Bapuji and Sharma, 2011).



The purpose of the MANET working group is to standardize IP routing protocol functionality suitable for wireless routing application within both static and dynamic topologies with increased dynamics due to node motion or other factors Mobile Ad Hoc Networks (MANETs) are an emerging type of wireless networking, in which mobile nodes associate on an extemporaneous or ad hoc basis. MANETs are both self-forming and self-healing, enabling peer-level communications between mobile nodes without reliance on centralized resources or fixed infrastructure (Kassim and Rahman, 2011; www.wikipedia.com). Routing is an activity or a function that connects a call from origin to destination in telecommunication networks and also play an important role in architecture, design and operation of networks. Ad-hoc networks are wireless networks where nodes communicate with each other using multi-hop links. There is no stationary infrastructure or base station for communication. Each node itself acts as a router for forwarding and receiving packets to/from other nodes. Routing in ad hoc-networks has been a challenging task ever since the wireless networks came into existence. The major reason for this is the constant change in network topology because of high degree of node mobility. A number of protocols have been developed for accomplish this task which are shown in below Fig. (Bouke, 2011; Vats, and Sachdeva, 2012)
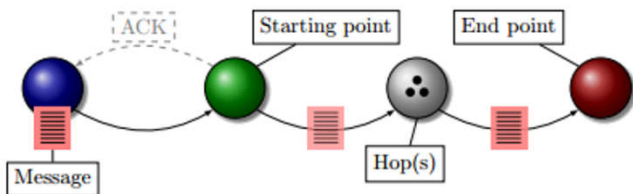
## DSR

The Dynamic Source Routing protocol (DSR) is based on source routing, which means that the originator of each packet determines an ordered list of nodes through which the packet must pass while traveling to the destination (Mohapatra and Kanungo, 2011; Vats and Sachdeva, 2012). The key advantage of a source routing design is that intermediate nodes do not need to maintain up-to-date routing information in order to route the packets that they forward, since the packet's source has already made all of the routing decisions.

This fact, coupled with the entirely on-demand nature of the protocol, eliminates the need for any type of periodic route advertisement or neighbor detection packets. The DSR protocol consists of two basic mechanisms: Route Discovery and Route Maintenance (www.wikipedia.com). Route Discovery is the mechanism by which a node S wishing to send a packet to a destination D obtains a source route to D. Route Maintenance is the mechanism by which a packet's originator S detects if the network topology has changed such that it can no longer use its route to the destination D because some of the nodes listed on the route have moved out of range of each other. Figure 2.1 shows the basic operation of the DSR protocol.

### Simulation scenarios

**A. Simulation Software** The software used in this study is OPNET Modeler. OPNET is a network and application management software designed and distributed by OPNET Technologies Inc. OPNET provides technologies, protocols, communication devices for academic research, assessment and improvement (Bapuji and Sharma, 2011; www.opnet.com).

**B. Simulation Model** In our proposed model, we have simulated a 100 nodes network model. A large geographic location has been divided into various cells of hexagonal shape.
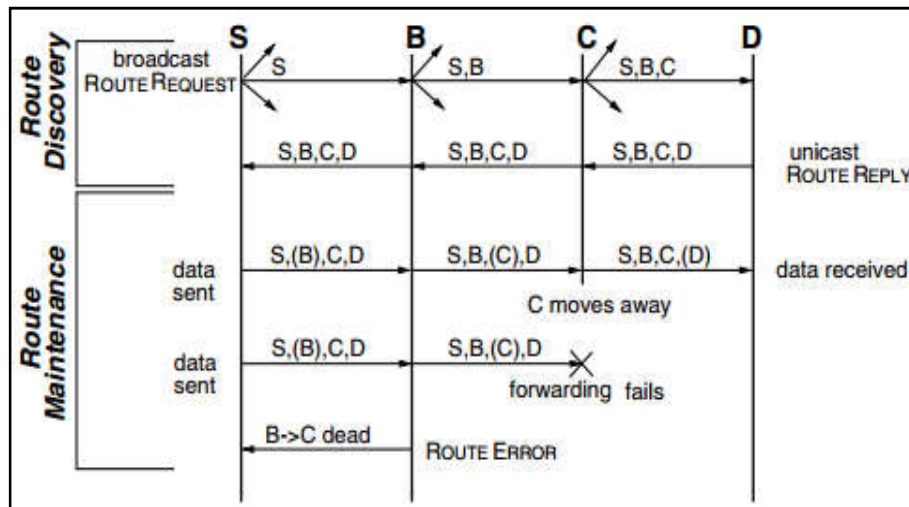


**Figure 2.1 Basic operation of the DSR protocol showing the building of a source route during the propagation of a ROUTE REQUEST, the source route's return in a ROUTE REPLY, its use in forwarding data, and the sending of a ROUTE ERROR upon forwarding failure. The next hop is indicated by the address in parentheses**

### WLAN Parameter

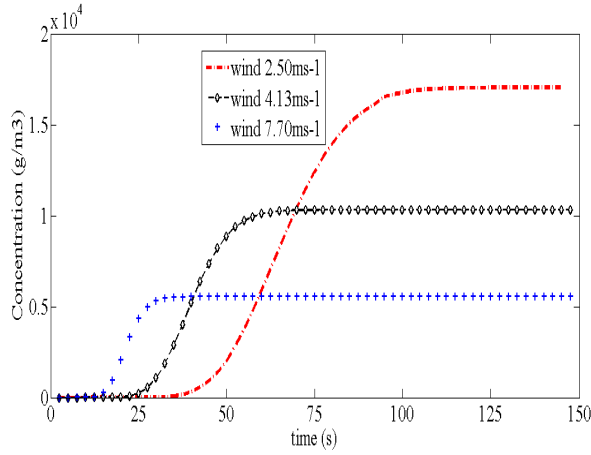| Parameters | Value |
| --- | --- |
| Operation Mode | 802.11a/g |
| Node Position | Rectangular |
| No. of Nodes | 100 |
| Speed | 100 m/s |
| Simulation Time | 1000 sec |
| BSS identifier | Auto assigned |
| Data rate | 24,36 mbps |
| Transmit power (W) | 0.020 |
| Addressing Mode | IPV4 |
| Routing protocol | DSR |
| Buffer Size | 1024000 |
| Packet reception-power threshold | -95 |

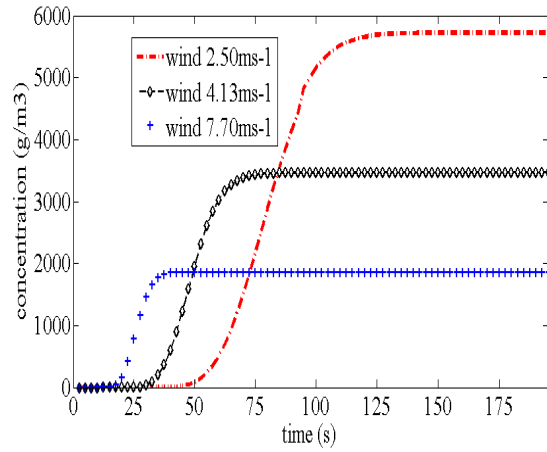**Figure 1. Pollutant concentration vs time, distance = 150m and height = 150m**



**Figure 2. Pollutant concentration vs time, distance = 200m and height = 150m**
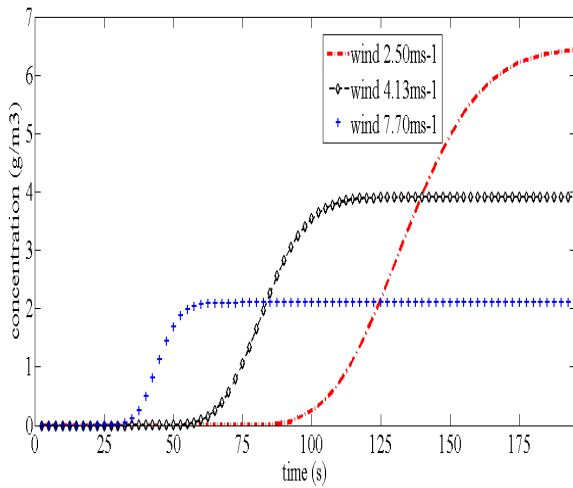


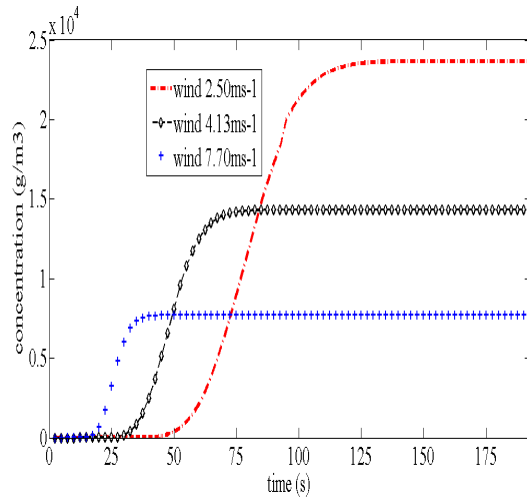**Figure 3. Pollutant concentration vs time, distance = 400m and height = 150m**



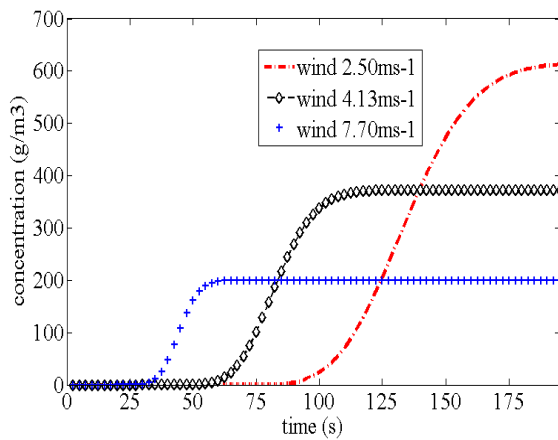**Figure 4. Pollutant concentration vs time, distance = 150m and height = 200m**



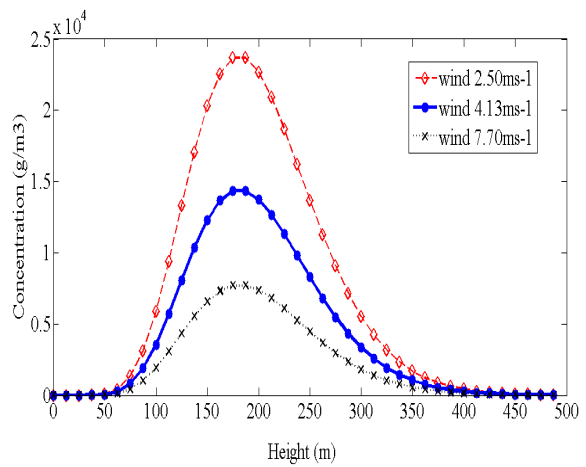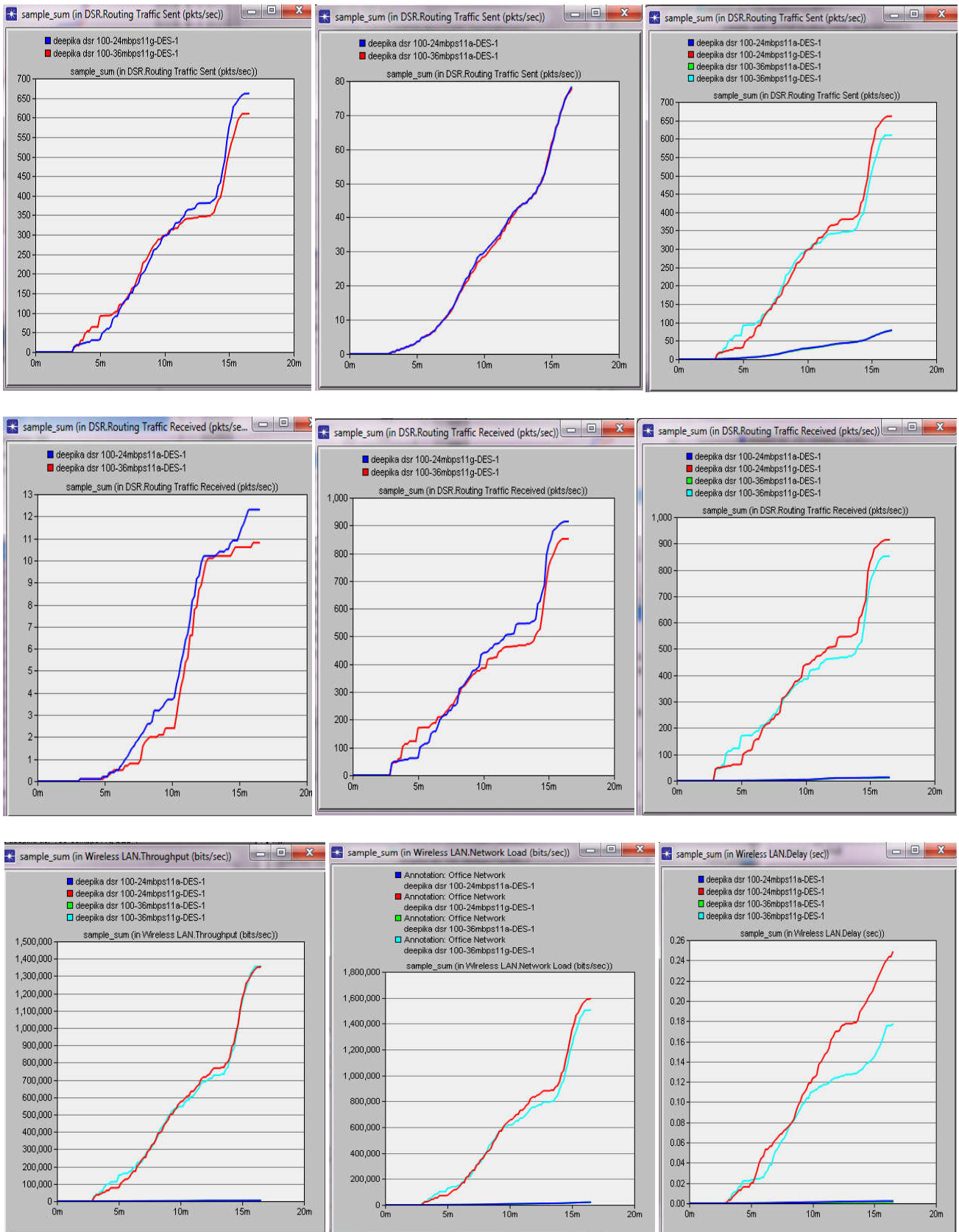**Figure 5. Pollutant concentration vs time, distance = 150m and height = 400m**



**Figure 6. $CO_2$ concentration distribution at distance = 150m, wind speed 4.46ms$^{-1}$, 6.38ms$^{-1}$ and 7.07 ms$^{-1}$**

## Conclusion

The ability for nodes to form ad hoc networks in the absence of communication infrastructure is a critical area of current research. There are existing communication needs which ad hoc networks can meet, such as military and commercial applications, and the development of ad hoc network technology will enable new classes of applications. With the

potential for low cost deployment and high availability, coupled with the dropping costs of wireless transceivers, ad hoc networks are becoming economically and technologically feasible right now. After reviewing the concept of wireless ad-hoc network and DSR routing protocol with respect to seven parameters delay, traffic sent, traffic received, network load , throughput, no of hopes, route discovery time it is conclude that the selection of efficient and reliable protocol is a critical issue. In this simulation work we get simulation graphs and from graphs we can analyze that the performance of DSR routing protocol with respect to different matrices WLAN based IEEE802.11a and IEEE802.11g with data rate of 24mbps and 36mbps in 100 nodes network, but it is not necessary that this perform always better in all the networks, its performance may vary by varying the network.

## REFERENCES

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