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A General Study on the Transfer of Multimedia Messages over Mobile Adhoc Networks

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ABSTRACT
Mobile Adhoc Networks are created and organized by a collection of nodes. Sending Multimedia data through these networks is a challenging process. In this paper some of the routing protocols namely AODV, DSDV, OLSR and FSR are taken to perform a general study. The QOS Parameters like Packet Delivery Ratio, Routing Control Overhead, Normalized Routing Load, Average End to End Delay, Throughput, and Jitter are analyzed for these protocols.

General Terms
Mobile Adhoc Networks.

Keywords
AODV, DSDV, OLSR, FSR, QOS Parameters.

1. INTRODUCTION
Multimedia is playing a vital role in almost all applications pertaining to government, education, finance etc. Nowadays, wireless networks especially, mobile adhoc networks are widely used for the transfer of data. While transferring multimedia data many parameters like delay, jitter which are related to the satisfaction of the user are to be considered. In this paper the transfer of multimedia data is assumed over mobile adhoc networks and the performance is analyzed using various parameters. In Mobile adhoc networking, two major types of protocols are used predominantly. They are Proactive routing protocols and reactive routing protocols. Although there exists many categories of protocols, these two classifications exists form the beginning of the wireless network. In Proactive routing, each node maintains the network topology information in the form of a table. Each node keeps the up-to-date information of the routes by constant updating of information. In reactive routing the route is created only when the source requests a route to a destination. The route is formed by the flooding technique. In this paper these two types of protocols are taken for analysis.

2. OVERVIEW OF PROTOCOLS

2.1 AODV (Ad hoc On demand Distance Vector Protocol)
AODV provides dynamic self starting routing between mobile nodes. It is a loop free protocol which uses destination sequence number for each route. It is a reactive routing protocol which selects route on demand. Route Requests (RREQS), Route Replies (RREPs) and Route Errors (RERRS) are the message types defined by AODV. The route is obtained when the destination is reached or an intermediate node with a route to destination is reached. When a link break is detected RERR message is used to notify other nodes that a loss has occurred. It deals with Route table management

2.2 DSDV (Destination sequenced distance vector protocol)
Each node maintains a routing table which stores, next hop, a sequence number and forwards the routing table to neighbors. It is a proactive routing protocol where the route is fixed initially. This guarantees loop free routes by proving a single path to destination. The path is selected by a distance vector shortest path algorithm. It introduces large overhead due to periodic update of messages.

2.3 OLSR (Optimum Link State Routing protocol)
It is a point to point proactive protocol, based on link state algorithm. Each node maintains topology information about the network by periodically exchanging link state messages. Here MPR (Multi point Relays) are used to transfer route information quickly. So routes between every node are available immediately when transmission begins

2.4 FSR (Fish eye State Routing protocol)
FSR is the Fish Eye State Routing protocol which exchanges the information to the neighbor nodes only and not with the entire network. This is a proactive routing protocol. The information in the table is maintained and corrected periodically. Entries corresponding to the nodes which are far away are propagated with less frequency than the nearby destinations. FSR produces the accurate distance and route information about the node which are within the scope of the source node. However, the knowledge of the best route to a distant destination is compensated by the fact that the route becomes progressively more accurate as the packet gets closer to destination

3. PARAMETERS FOR MULTIMEDIA MESSAGES
The performance metrics includes the following QoS parameters such as Packet Delivery Ratio, Routing Control Overhead, Normalized Routing Load, Average End to End delay, Throughput, and Jitter

3.1 Pocket Delivery Ratio
Packet delivery ratio(PDR) is defined as the ratio of the Number of Packets received to the Number of Packets Sent. This metric specifies the accuracy and reliability of the routing protocol. It will specify the loss rate of the protocols. It affects the maximum throughput that the network can support.

3.2 Routing Control Overhead

Routing Control Over head is the number of Control packets used for sending the messages transmitted over the network, expressed in bits per second or packets per second This include requests, replies and error messages. It measures the scalability of the protocol, and the network

3.3 Normalized Routing overload

This is the ratio of the Number of control packets used to the Number of packets received at the destination. This gives a measure of the cost involved and the efficiency of the protocol.

3.4 Average End to End Delay

Average End to End delay is the average time taken by a data packet to reach from source node to destination node. It is the ratio of total delay to the number of packets received

3.5 Throughput

It is the number of bits received per second by the destination, which is the amount of data successfully transferred from source node to destination node

3.6 Jitter

Jitter is the delay between adjacent packets For multimedia message transfer. This is the main parameter taken into consideration for analysis

4. SIMULATION AND ANALYSIS

4.1 Simulation

The performance of the protocols AODV, DSDV, OLSR, and FSR are studied by sending multimedia messages over mobile adhoc networks using NS-2.

Table 1. Simulation Parameters

Number of Nodes	100
Simulation Area	1000mX1000m
Buffer Size (Queue Length)	50 Pkts
Packet size	1024 Bytes
Application Traffic	Video traffic(Evalvid)
Simulation Time	200 Secs
Number of Connections	50
Connection duration (sec)	20
Data interval	0.01,0.02,0.03,0.04,0.05,0.06 ,0.07,0.08,0.09,1.00
Connections	10,20,30,40,50,60,80,100,12 0,140,150

4.2 Analysis

The parameters are analyzed with the number of connections and the data interval

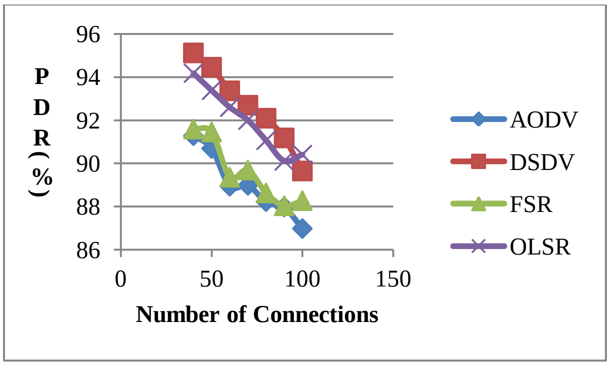

Figure 1. Packet Delivery Ratio with varying number of Connections

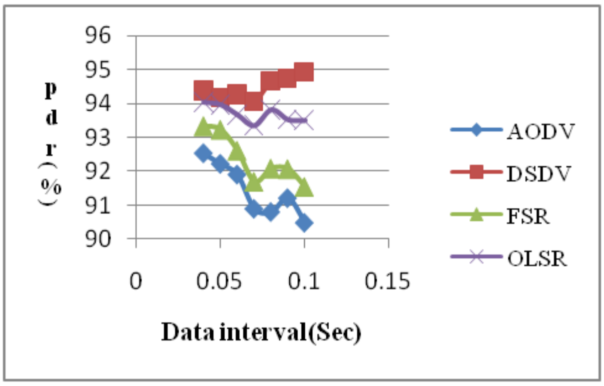

Figure 2. Packet Delivery Ratio with varying Data interval

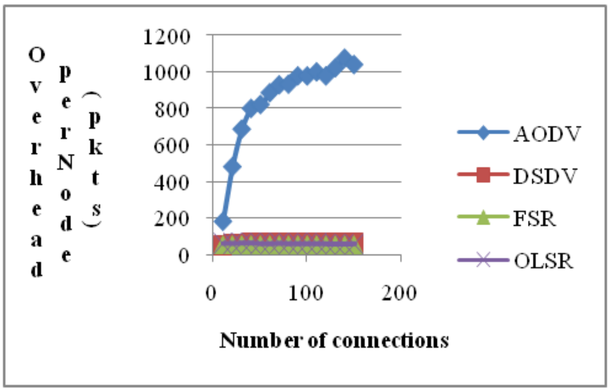

Figure 3. Overhead per node with varying number of connections

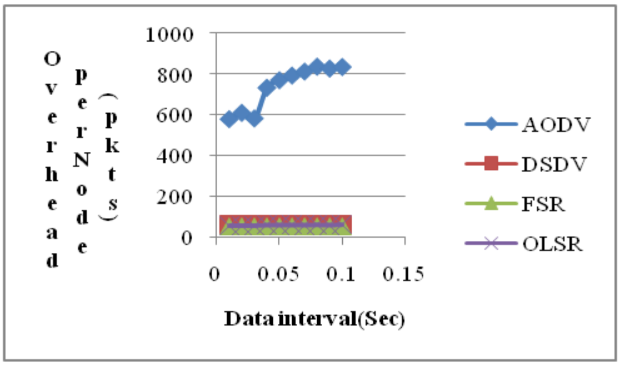

Figure 4. Overhead per Node with varying Data interval

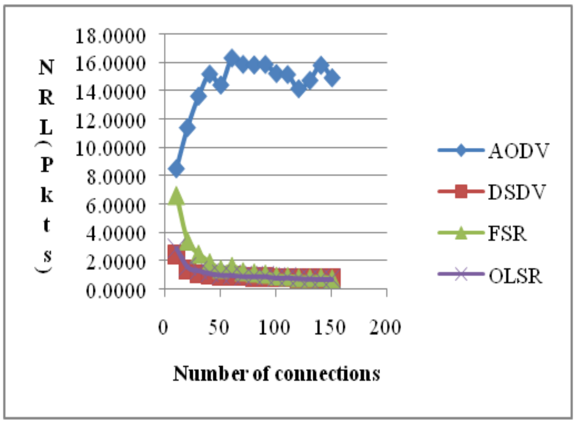

Figure 5 . NRL with varying Number of Connections

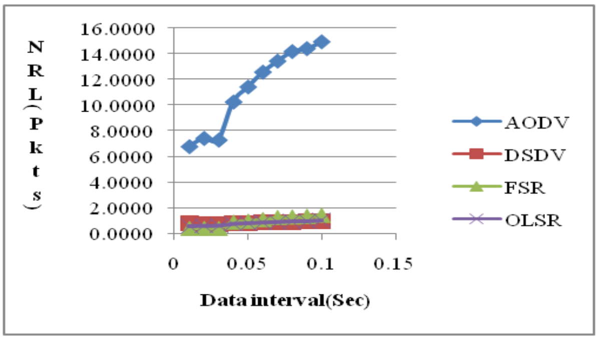

Figure 6. NRL with varying Data interval

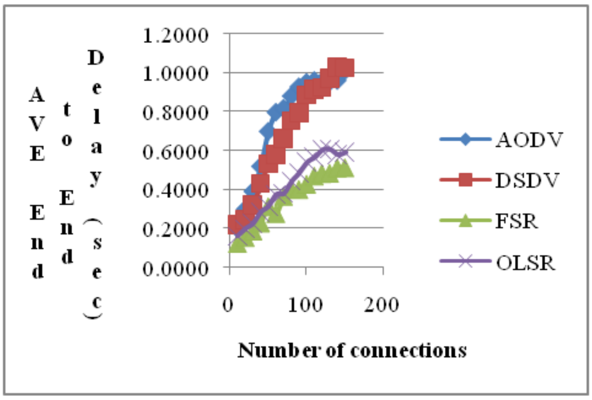

Figure 7. Average End to End Delay with varying Number of Connections

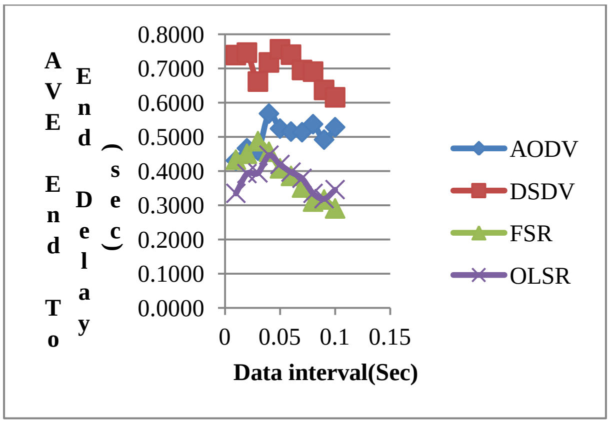

Figure 8. Average End to End Delay with varying Data Interval

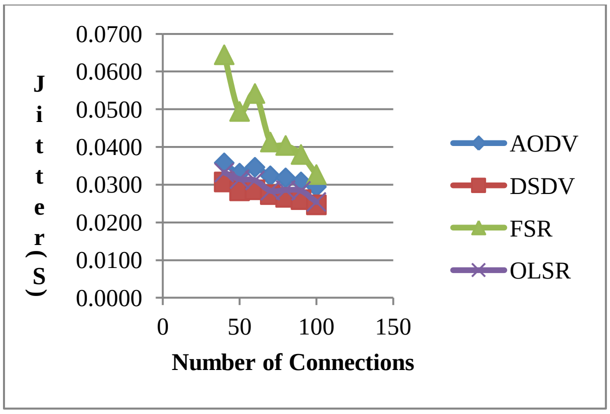

Figure 9. Jitter with varying number of Connections

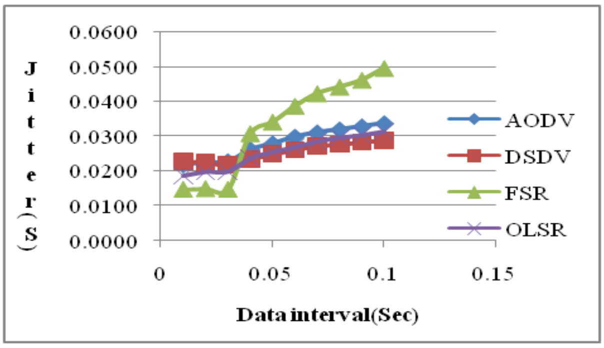

Figure 10. Jitter with varying Data Interval

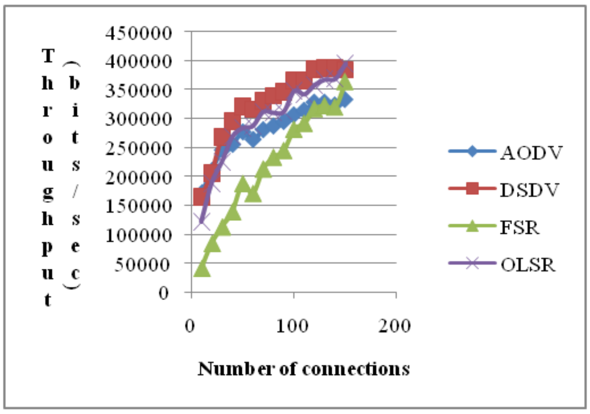

Figure 11. Throughput with varying number of connections

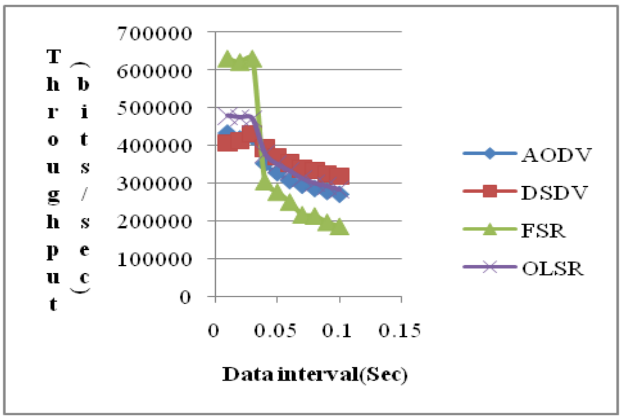

Figure 12.Throughput with varying Data interval

The four protocols are behaving similarly with respect to PDR. In DSDV and OLSR protocol the Packet delivery ratio is Maximum. The overhead involved in AODV protocol is higher as it is a reactive routing protocol and needs often updating of the routing information. As the overhead increases the normalized routing load also increases. The AODV is having much higher NRL compared to other protocols since the number of control packets involved in the communication is higher. The OLSR is behaving well with respect to delay as it uses the technique of MPR (Multi Pont Relay). DSDV suffers from maximum End to End Delay. As the Route establishment is initiated after an initial delay for finding the best route to destination. The jitter is also low in the case of OLSR and DSDV protocols since the best route is fixed after running a best route finding algorithm. The throughput is good in case of OLSR and DSDV compared to the other two protocols when the first data packet comes, it is kept until the best route is found, thus avoiding the frequent changes of the route tables. Here, The rebroadcasts are reduced by delaying the advertisement of unstabilized routes. This enhances the accuracy of valid routes resulting in the increased throughput

5. CONCLUSION

Only the main QOS parameters are taken for analyzing the multimedia message transfer. Jitter and delay are the two main QOS parameters for multimedia message transfer. The Users satisfaction depends on the minimum jitter and minimum delay for multimedia messages. Our study shows that the DSDV and OLSR are the two protocols behaving well with respect to jitter and delay. No security aspects are considered in this paper. The message is assumed to be sent without any security threats. In future, these aspects may be considered and the analysis may be carried out.

6. REFERENCES

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