Performance Comparison of AODV and DSDV Routing Protocols in Mobile Ad Hoc Networks (MANET) using NS2

Network Routing and Switching Lab (CSE-426)

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Objective:

A Mobile Ad hoc network (MANET) is a kind of wireless ad-hoc network, and is a self-configuring network of mobile routers connected by wireless links. The routers are free to move randomly and organize themselves arbitrarily, thus the network's wireless topology may change rapidly and unpredictably. There are various routing protocols available for MANETs. The most popular ones are DSR, AODV and DSDV. This report examines two routing protocols for mobile ad hoc networks– the Destination Sequenced Distance Vector (DSDV) and the Ad hoc On-Demand Distance Vector routing (AODV) and evaluates both protocols based on packet delivery fraction and throughput while varying number of sources and pause time.

Introduction:

AODV (Ad hoc On-Demand Distance Vector):

Ad-hoc On-demand distance vector (AODV) is another variant of classical distance vector routing algorithm. It establishes a route to a destination only on demand. AODV adopts traditional routing tables; one entry per destination. AODV provide unicast, multicast and broadcast communication.

DSDV (Destination-Sequenced Distance-Vector Routing):

DSDV is one of the most well-known table-driven routing algorithms for MANETs networks based on the Bellman-Ford algorithm. It is a distance vector algorithm which uses sequence numbers originated and updated by the destination, to avoid the looping problem. The advantage of DSR is allowing it to reduce routing load by storing routing information using route caching.

NS2:

ns is a name for series of network simulators, specifically ns1, ns2 and ns3. These simulators are used in the simulation of routing protocols, among others, and are heavily used in ad-hoc networking research, and support popular network protocols, offering simulation results for wired and wireless networks alike.

Simulation parameter:

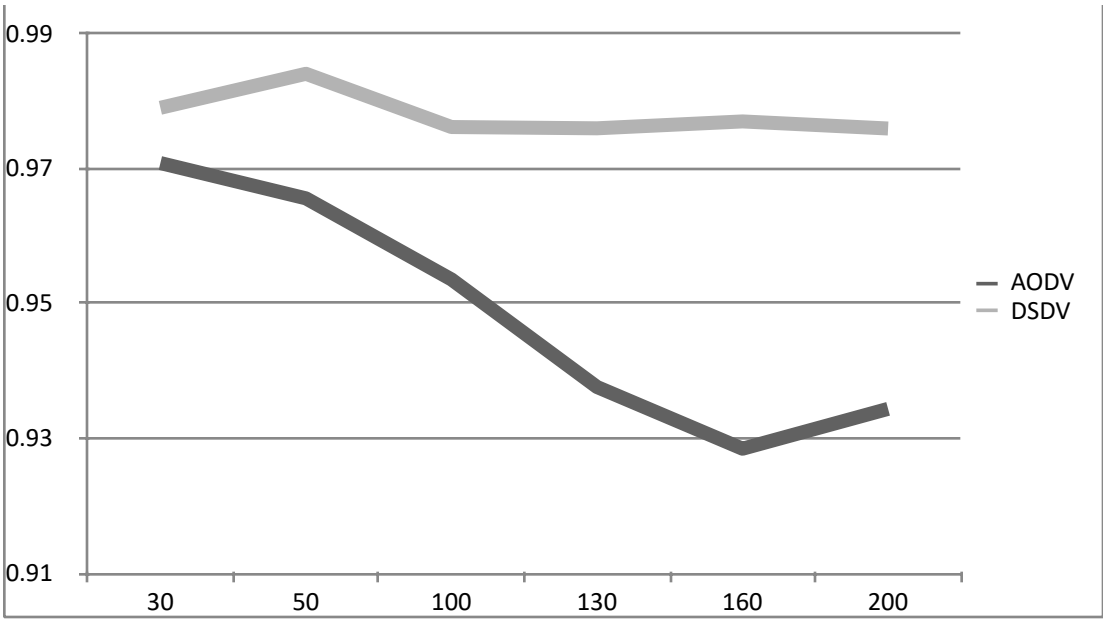
Parameter	Value
Simulator	NS-2.34
Simulation Area	1500 X 1500
Mobile Nodes	30,50,100,130,160,200
Pause Time	5,10,15,20,25,30
Traffic Type	TCP
Simulation Time	200 sec.

Table : Simulation Parameters.

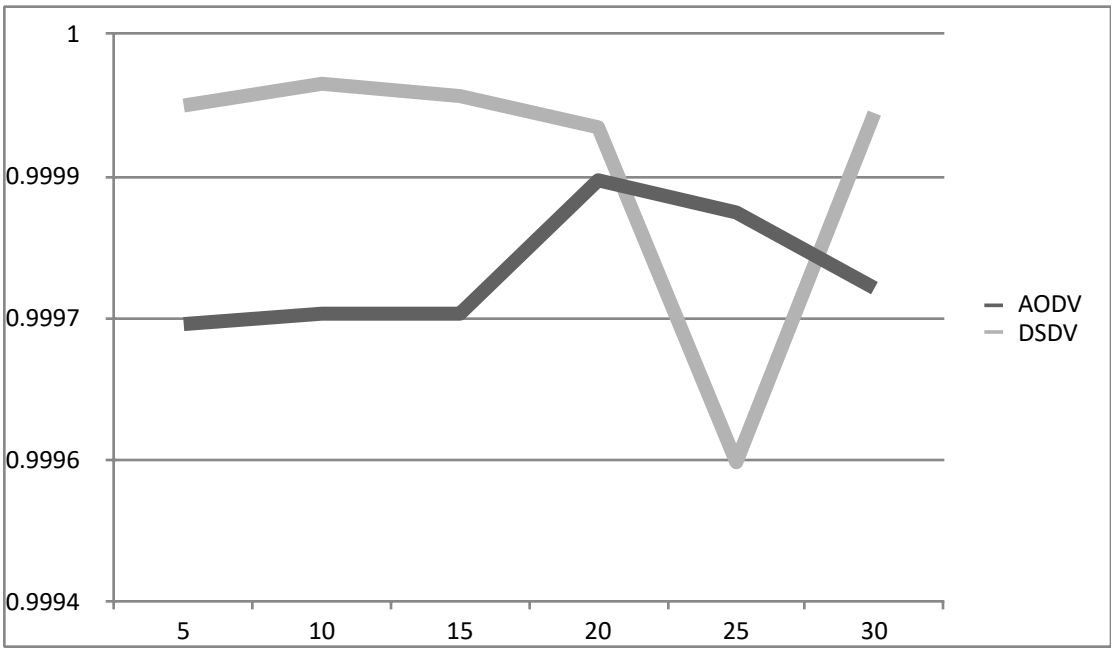
Performance Metric:

While comparing two protocols, we focused on different performance measurements such as Average Delivery time, Packet Delivery ratio, Packet loss and Throughput.

(i) Packet delivery Ratio: This is the ratio of the number of data packets successfully delivered to the destinations to those generated by TCP sources.

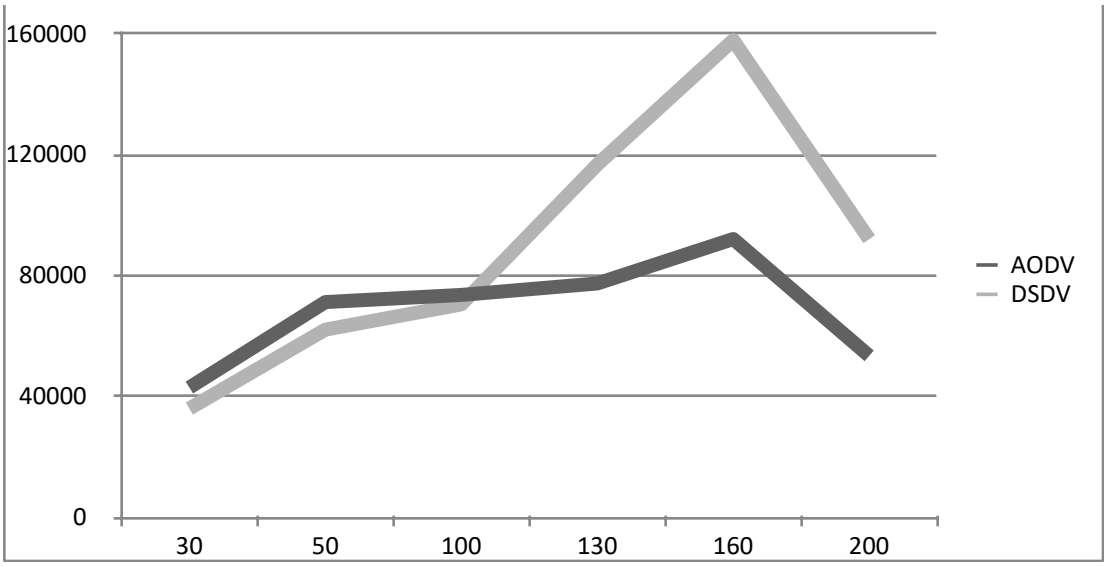


Graph 1: Delivery Ratio on changing node number

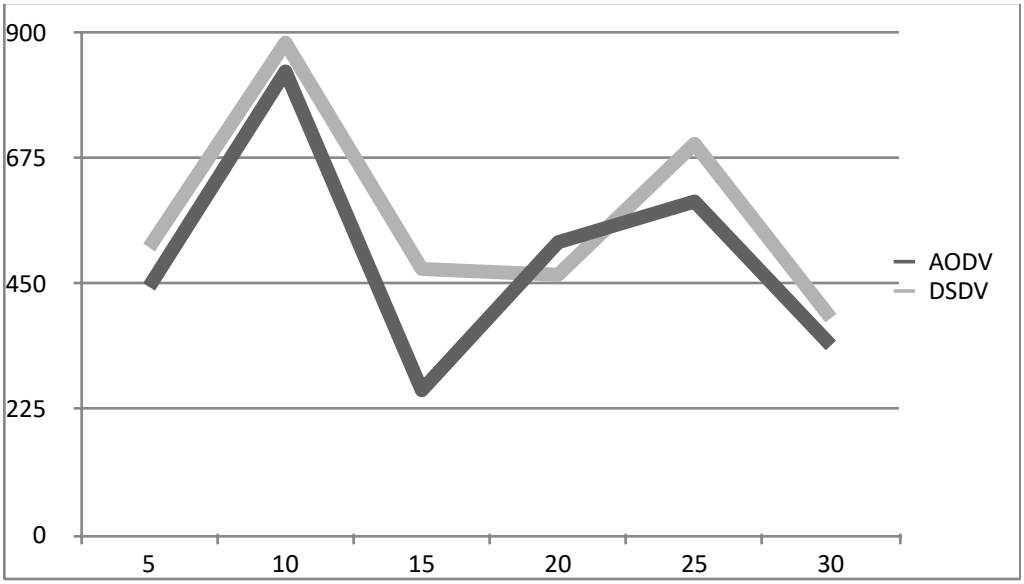


Graph 2: Delivery Ratio on changing Pause Time

(ii) Throughput: Throughput is the average rate of successful message delivery over a communication channel.

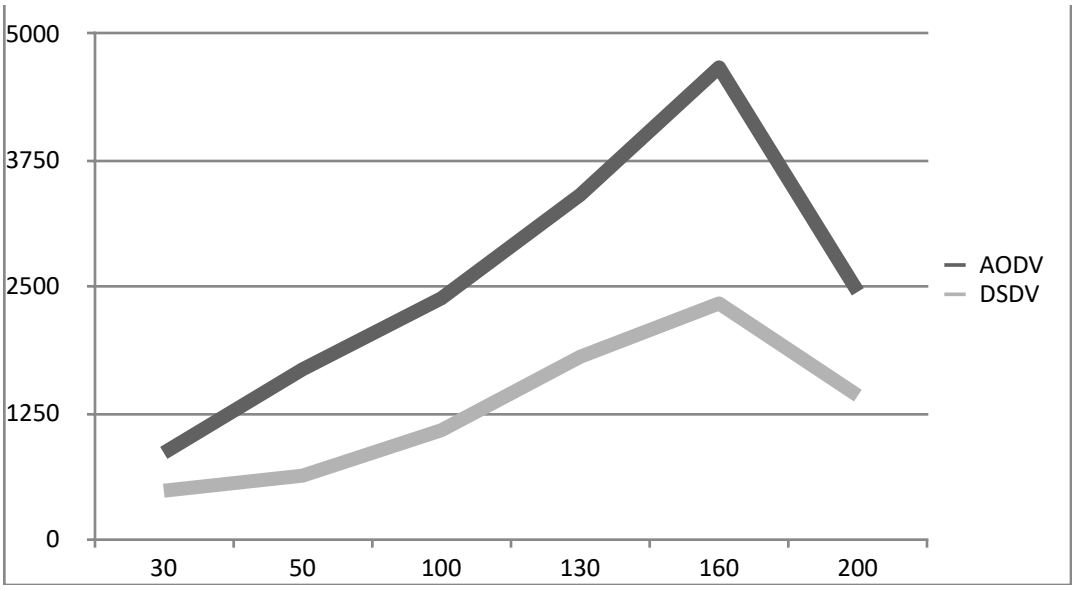


Graph 3: Throughput on changing node number



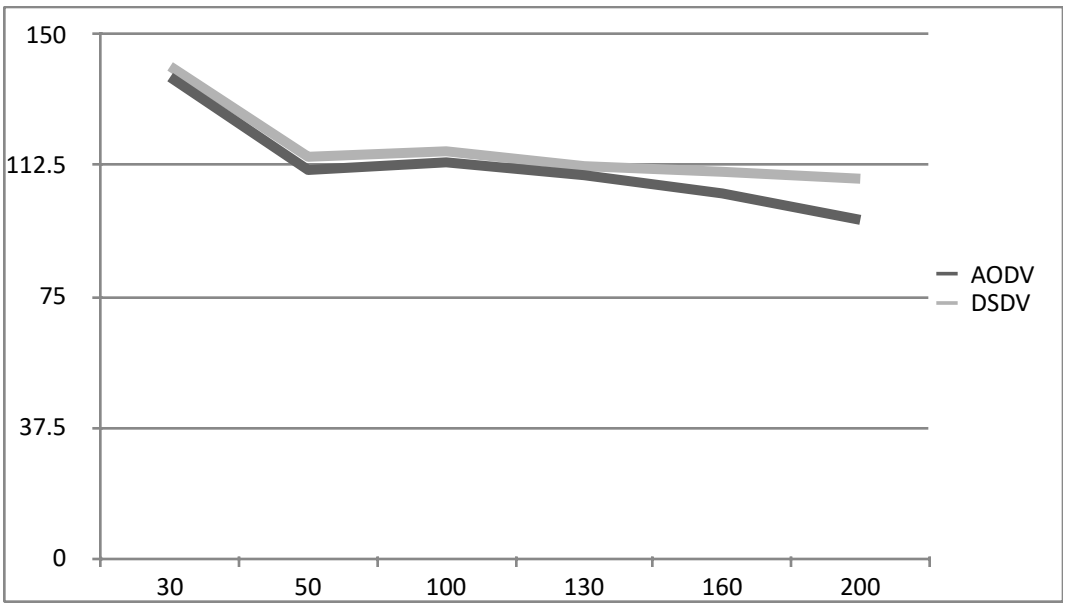
Graph 4: Throughput on changing pause time

(iii) Packet Loss: This is the number of packets that never reached the destination.



Graph 5: Packet Loss on changing node number

(iv) Average Delivery Time: This is the average amount of time needed to deliver a packet to the destination successfully.



Graph 6: Average delivery time on changing node number

Conclusion:

The result of the simulation indicates that AODV and DSDV gives different performance under different node density. Both protocols perform better in low density and the delivery ratio of DSDV is much better than AODV. In terms of pause time DSDV perform better in lower pause time but AODV is better under higher pause time. Our simulation also shows that AODV lost much more packet then DSDV in transmission. DSDV also provide better throughput than AODV.