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Congestion Avoidance in Node Communication Network using NS-2 Simulation

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Abstract: Wireless mobile unintentional networks (MANETs) square measure self configuring, dynamic networks during which nodes square measure unengaged to move. a serious performance constraint comes from path loss and multipath weakening several Manet routing protocols exploit multi methods to route packets. The likelihood of winning packet transmission on a path relies on the reliableness of the wireless channel on every hop. speedy node movements conjointly have an effect on link stability, introducing an oversized physicist unfold, leading to speedy channel variations. However, thanks to their inherent characteristics of dynamic topology and lack of centralized management security, Manet is susceptible to varied styles of attacks thanks to that the congestion happens within the Network. the most categories of routing protocols square measure Proactive, Reactive and Hybrid. A Reactive (on-demand) routing strategy may be a fashionable routing class for wireless unintentional routing. the look follows the concept that every node tries to cut back routing overhead by causation routing packets whenever a communication is requested. during this work an endeavor is to implement to avoid the congestion within the networks. The construct of AOMDV has been wont to avoid the congestion from the network. The parameters are calculated like finish to finish Delay and Packet Delivery quantitative relation that shows the accuracy of the projected work.

Keywords: AODV, AOMDV, Congestion, WSN (Wireless Sensor Networks).

I. INTRODUCTION

Congestion happens once the traffic load injected into the network exceeds out there capability at any purpose of the network. Typically, WSNs operate beneath lightweight load however massive, sudden, and correlated-synchronized impulses of packets could suddenly arise in response to a detected or monitored event. All packets should be directed towards one or additional sink nodes. sizable amount of generated packets additionally because the uncontrolled use of scarce network resources could cause congestion.

Congestion management is to forestall overwhelming the network. The networks and methods within the net have finite capability and if a sender transmits on the far side that, packets are lost that isn't healthy. Congestion happens once the number of information sent to the network exceeds the out there capability. Such scenario results in inflated buffer house usage in intermediate nodes over the information path, resulting in knowledge losses just in case of shortage of resources. Transmitted knowledge begin to be born once out there buffer resources, that ar physically restricted, ar exhausted.

Such scenario decreases network reliableness within the sense of service provisioning for knowledge communications. Transport-level protocols improve reliableness by implementation of various error recovery schemes. However, they may cause excessive knowledge retransmissions, reducing a vital parameter like network utilization, whereas at a similar time increasing latency in knowledge delivery.

Symptoms of congestion

In ancient net wired networks, buffer drops area unit taken as a sign of congestion, whereas congestion management is sometimes administered in associate end-to-end manner. End-to-end CC approaches won't be effective in such error prone environments as a result of the end-to-end nature might lead to reduced responsiveness inflicting enhanced latency and high error rates, particularly throughout long periods of congestion. moreover, simulation studies conducted , in WSNs wherever the wireless medium is shared victimization Carrier Sense Multiple Access (CSMA)-like protocols, wireless channel competition losses will dominate buffer drops and increase quickly with offered load. the matter of channel losses is worsened around hot spot areas, as for instance, within the proximity of an occurrence, or round the sink. within the former case, congestion happens if several nodes report an equivalent event at the same time, whereas within the latter case congestion is old as a result of the joining (many-to-one) nature of packets from multiple causation nodes to one sink node. These phenomena lead to the starvation of data rate within the neighborhood of senders, whereas the wireless medium capability will reach its higher limit quicker than queue occupancy.

Thus, queue occupancy alone cannot accurately function a sign of congestion. Also, as a result of their severely affected nature, WSNs necessitate autonomous, decentralized CC methods that promise quick, effective and economical relief from congestion. Decentralized

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approaches area unit expected to adopt a hop-by-hop model wherever all nodes on a network path may be concerned within the procedure. every node ought to build choices primarily based solely on domestically out there data (e.g. buffer load, channel load) since none of them has complete data regarding the system state.

1. The main challenges are to achieve
2. low number of collisions and retransmissions
3. low packet loss resulting in high reliability and low energy tax
4. low latency
5. acceptable throughput
6. fault tolerance

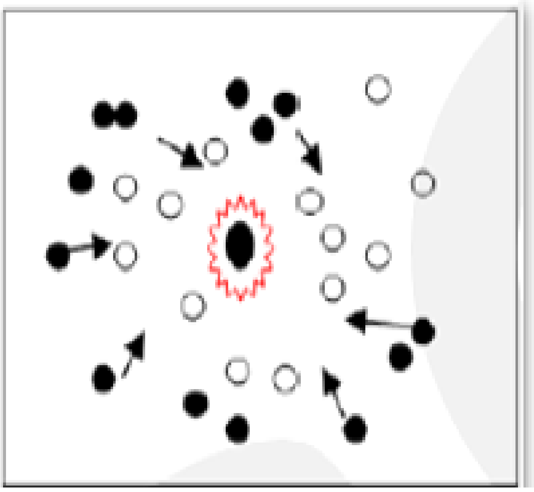

Figure 1: Source Congestion

II. LITERATURE REVIEW

[1] Pavlos Antoniou and Andreas Pitsillides, Andries Engelbrecht, Tim Blackwell" Mimicking the Bird Flocking Behavior for Controlling Congestion in Sensor Networks", IEEE, 2010.
This study deals with the matter of congestion in wireless sensing element networks (WSNs) and proposes a strong and selfadaptable nature-inspired congestion management approach for realtime event-based applications. WSNs face necessary limitations in terms of energy, memory and process power. The uncontrolled use of restricted resources in conjunction with the unpredictable nature of WSNs in terms of traffic load injection, wireless data rate fluctuations and topology modifications (e.g. owing to node failures) could cause congestion. Inspiration is drawn from the flocking and obstacle turning away behavior of birds to 'guide' packets bypass obstacles like congestion regions and dead node zones. Recent studies showed that the flock-based congestion management (Flock-CC) approach is powerful, self-adaptable and energy-efficient, involving stripped data exchange and process burden once utilized in uniform grid topologies. The relevancy of the Flock-CC in random topologies is investigated during this paper. Performance evaluations showed that Flock-CC was able to each alleviate congestion and minimize energy tax. Also, Flock-CC incontestible lustiness against failing nodes, and outperformed alternative congestion-aware routing approaches in terms of packet delivery quantitative relation, end-to-end delay and energy tax.

[2] Riccardo Poli, James Kennedy ,Tim Blackwell" Particle swarm optimization An overview", 2006
Particle swarm optimization (PSO) has undergone several changes since its introduction in 1995. As researchers have learned regarding the technique, they need derived new versions, developed new applications, and revealed theoretical studies of the consequences of the assorted parameters and aspects of the algorithmic program. This paper contains a snap of particle swarming from the authors' perspective, as well as variations within the algorithmic program, current and in progress analysis, applications and open issues.

[3] Yousuke Matsuura" Performance Evaluation of TCP Congestion Control Mechanism based on Inline Network Measurement", 2006
TCP metropolis is that the most generally deployed variant of Transmission management Protocol (TCP), which means that just about all transmission control protocol implementations within the current OSs square measure supported that version of transmission control protocol. However, transmission control protocol has the matter that the performance deteriorates particularly in large-bandwidth and long-delay networks. to unravel the matter, our analysis cluster has planned a congestion management mechanism as another to the standard transmission control protocol metropolis. Their planned mechanism uses the knowledge of the physical and presently accessible information measure of the network path between sender and receiver hosts for congestion management. one in all the novel ideas of the planned mechanism is that they deploy Associate in Nursing formula supported a logistical growth model and a Lotka-Volterra competition model from physics in control the congestion window size of a transmission control protocol affiliation.

The physical/available information measure data square measure obtained through Associate in Nursing inline network measure technique we have a tendency to has already planned, that measures the information measure by mistreatment data/ACK packets happiness to the transmission control protocol affiliation, while not mistreatment extra searching packets. Their analysis cluster has additionally planned the Interrupt Coalescence-aware Inline measure (ICIM) for activity information measure over one Gbps, that cannot be obtained by existing measure algorithms/tools. However, they need not evaluated the planned congestion management mechanism with ICIM in high speed and long-delay networks, whereas the planned mechanism is meant to be deployed to such network surroundings. during this thesis, through intensive simulation experiments, they evaluate the performance of our mechanism in high-speed and long-delay networks. we have a tendency to evaluate the

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performance of our mechanism in terms of outturn, the modification within the congestion window size and queue length of the bottleneck link. Also, they compare the performance of our mechanism with those of alternative existing transmission control protocol variants, and gift that our mechanism achieves smart performance. It achieves nearly 100% of link utilization whereas keeping the queue length of the bottleneck link tiny, no matter the modification in accessible information measure of the network path.

III. OBJECTIVES

AOMDV protocol can be used to avoid congestion by detecting hot spot and reducing traffic rate. It take channel list of all other neighboring nodes collect it and senses the channel is free and send the data to that very node adjacent to congested node and choose alternate path for reducing congestion.

a. To Understand Role of AOMDV in Wireless sensor network (WSN)
b. To reduce collision by choosing the alternate path when congestion occur within the network.
c. To reduce collision, improve Packet delivery ratio (PDR).
d. To calculate the Queuing Delay in the Network.
e. To improve network transmission rate.
f. To decreases end to end delay caused within the network.

IV. PROPOSED METHODOLOGY

Step 1- Initially, Create Nodes in Network and initialize the packets transmission.
Step 2- Different nodes are connected to each other within the network for the end to end delivery of packets.
Step 3- Sensor node is transmitted data to sink and packet flow within the network using flock cc approach that guides the flow of packets and leads to avoid collision of packets transfer and packet loss can be minimized.
Step 3- when node failure occur ,due to that congestion arises within the network and to avoid that the alternate path is to be followed by packets delivering from source to sink node.
Step 4- AOMDV protocol is to be used to avoid congestion by detecting traffic and chose alternate path. It take channel list of all other neighboring nodes collect it and senses the channel is free and send the data to that very node adjacent to congested node and choose alternate path for reducing congestion.
Step 5-This way the data moves from source to another node by following the defined path over the network.
Proposed work has been implemented in NS-2 2.34 using AOMDV Protocol to measure PDR and End to End Delay. Parameters can be modified to get improved results.

V. RESULTS

We will compare the performance of routing protocols with the help of ns-2 simulator and assumed 25 nodes to be used in the network scenario.

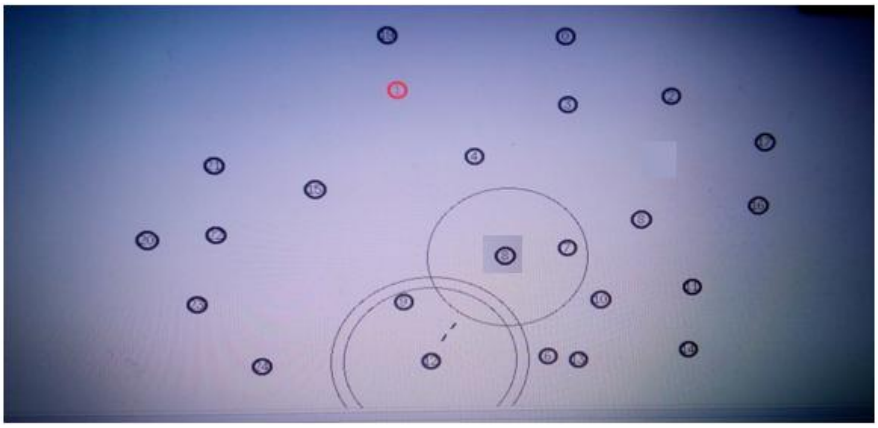

Figure 2: packet transmission from source to destination

Table 1: Packet Delivery Ratio

Nodes- PDR	AODV	AODMV
20	0.2	0.84
30	0.44	1
40	0.25	0.97
50	0.1	0.14
60	0.15	0.49

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The performance of the mentioned tables results are described in the section.

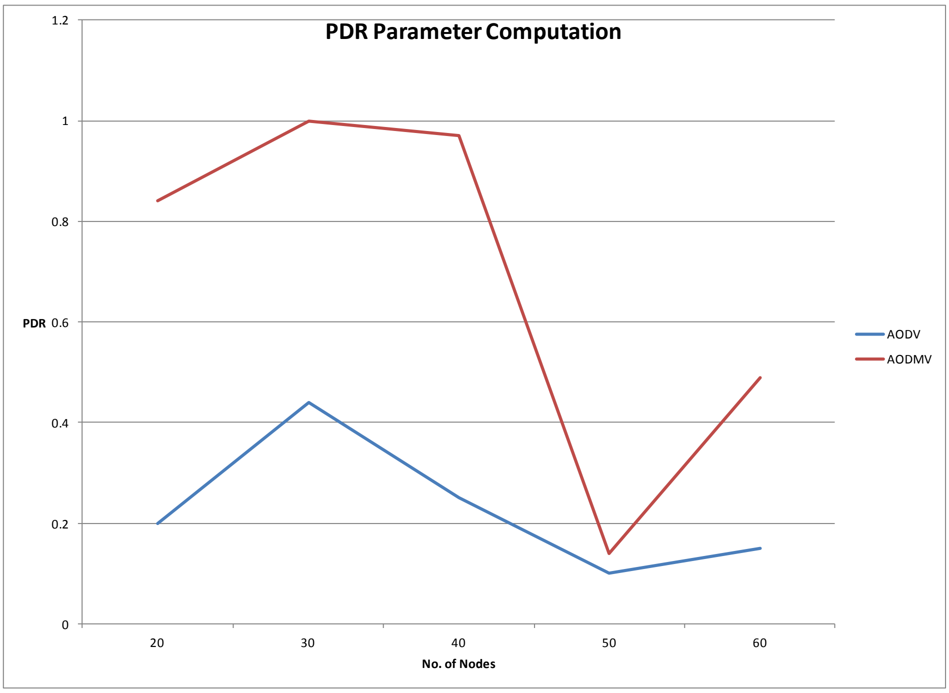

Figure 3: PDR Graphically

Table 2: End to End Delay

Nodes- EndtoEnd Delay	AODV	AODMV
20	102.9	102.57
30	108	105.26
40	109	106.15
50	104.5	102.04
60	112.5	111.37

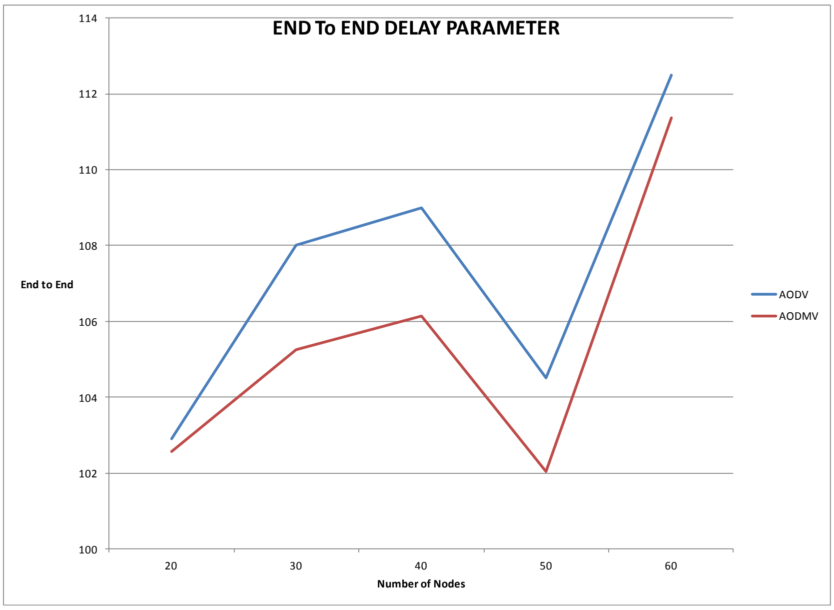

Figure 4: End to End Delay Graphically

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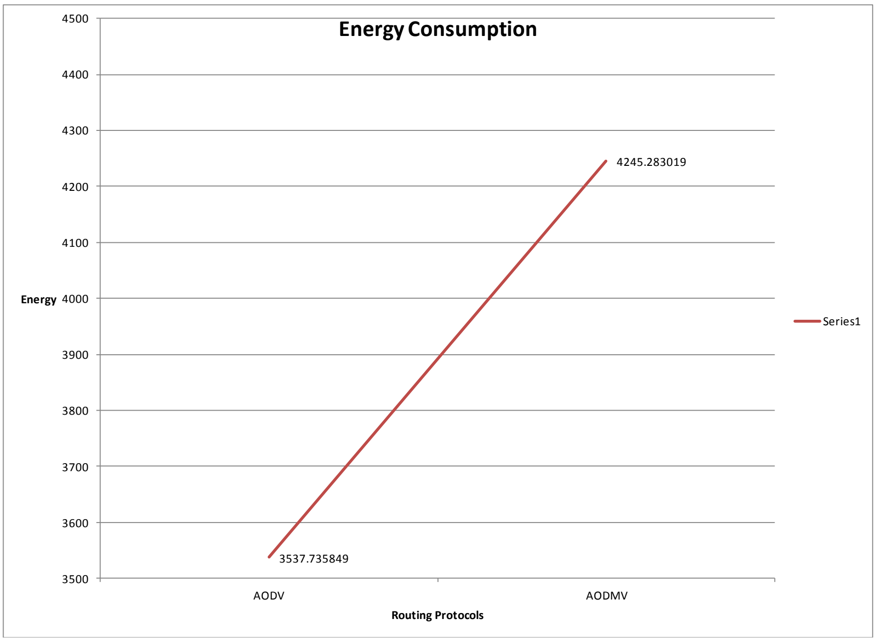

Figure 5: Energy Consumption

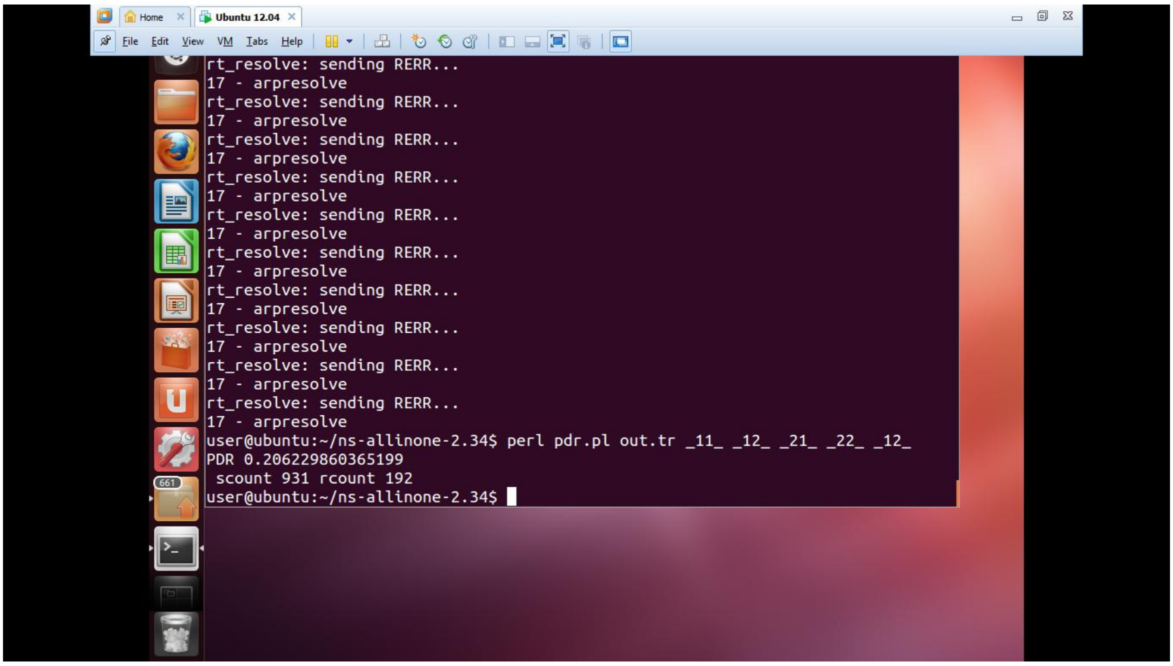

Figure 6: Packet Delivery Ratio on Network Layer

VI. CONCLUSION AND FUTURE WORK

In this we've studied the performance analysis of the routing protocols i.e. AODV, AOMDV victimization ns-2 machine in 802.11 networks. The NS-2 has been put in properly and prepared to be capital punishment the TCL script. during this project, we have a tendency to calculate the packet delivery quantitative relation, throughput, packet Loss and time delay for AODV, AOMDV routing protocols on Network Layer. The results has been generated for the various protocols with Congestion and intelligence implementation and calculated the various parameters like End-to-End Delay, PDR, Packet Loss in transmission from sender to receiver. we have a tendency to conclude that comparison is finished in an exceedingly very economical approach of various protocols. The values calculated for the nodes ar correct and their equivalent graphs are drawn with efficiency. The comparison purpose is complete and exhausted a really correct and economical approach

The higher than work is going to be conducted at the important time platform and it ought to even be tested on cross layer. The higher than work is conducted on

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Network Layer. However in future it are often tested on cross layer or combined layer i.e. mackintosh Layer + Network Layer. The work also will be conducted on the 802.15 and 802.16 standards. Further, the investigation is often done on security of AODV and improvement proposal for higher secure communication in network surroundings.

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