The Powerful Activity of DSDV Algorithm in WSN System

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Abstract*: Lately, technological developments in the strategy of processors, memory and radio communications have pushed an attention in the field of sensor network. Networks of those devices are denoted as Wireless Sensor Networks (WSNs). WSNs make possible information accumulation and investigation on an unmatched scale. Indeed, they have concerned care and get wide range of application in diverse areas. The Choice of the protocols and routing are the greatest common schemes that are to be dedicated when manipulative every type of wireless networks likes WSNs. In this paper, performance investigation of "Destination Sequenced Distance Vector DSDV" protocol is done. All the cases for working the protocol are discussed and the time for transmission the information is calculated within multi cases. The results show that this protocol is more strong and robust against the worst cases of losing the nodes or link failure within the network with minimum time for transfer the information through the WSN.

Index Terms*: WSN, DSDV, transmission time, sending and receiving node.

I. INTRODUCTION

Progresses in wireless communications and reduction of hardware devices have assisted the improvement of decreasing "cost, power and multi-functional sensor nodes". This equipment is tiny in dimension and interconnects in small spaces within a channel [1]. These small nodes that involve sensing, information treating and interactive components are recognizing the purposes of "sensor networks". WSN is collected of a huge amount of sensor that is tightly organized either within a phenomenon or more near to it [2]. The central duty of WSNs is to link the hole among the physical domain and the virtual domain. Therefore, the jobs for these kinds of networks are frequently described by nearby link between the physical and calculating array [3]. WSN was technologically advanced for an extensive variety of fields such as "habitat monitoring, object tracking, precision agriculture, building monitoring, military systems, and healthcare" [4]. The previous WSN uses were restricted to a particular purpose called "sense and send" with small limited information handling tasks [5]. WSNs unlike from classical distributed structures in many features. Sensor network are frequently prepared with an imperfect and nonrenewable power source and a treating element with a minor memory size. Furthermore, the sensor bandwidth is lesser than the wired network and radio processes are comparatively none cheap associated to pure calculation. Two common kinds have been conceived that is static and dynamic uses. In the static kind, all necessities are recognized earlier emerging and arranging the software on sensors. In dynamic application WSNs treats with dynamic necessities and changeable coming actions and work on the situation data near it [6].

II. WSN

WSNs are extensively regarded as the greatest significant tool in the present time. From previous time, it takes great care in the field of college circles and manufacturing in all branches. It classically contains a huge quantity of wireless sensor nodes. These sensor nodes interconnect within small space through a wireless channel and work together to achieve a shared mission. The simple idea for WSNs is that, even though the ability of every separate measuring device node is restricted, the cumulative energy of the whole network is adequate for the designed job. WSN is described within compressed stages of sensor nodes positioning, greater undependability of sensor nodes, and lower power, complexity, and memory restraints [7].

These nodes interconnect together to share their information got from measurements occupied by the node. Some time to resend their information to a vital group point. The benefit of these types of networks is that "the communication between the devices is performed wireless and there is no need for any additional network infrastructure". Hence these kinds of networks are stretchy that makes them exciting to applied in definite situations [8].

But WSN's have certain minor drawbacks that can be described as the following things: "limited processing power, limited memory, low power, low rate, limited range and the devices within a WSN are mostly battery driven". Since the node in WSNs are regularly tiny devices the computational energy of these nodes is normally slight because no space to permit the existence of a great quantity of hardware [9]. Also because the nodes are wireless they want to get their power from a battery that wants to be re-energized. In case the battery of a node is useless and not changed it finishes the function inside the WSN. In case of the amount of nodes with no battery energy ranges a definite threshold the WSN may be failure. In spite of these drawbacks WSNs are broadly works in numerous types of applications such as "military surveillance, health and environmental monitoring" [10]. The Figure 1 demonstrates the simple architecture of a WSN with sensors to govern the specific job. The figure 2 demonstrates the components of WSN from the side of hardware and software components.

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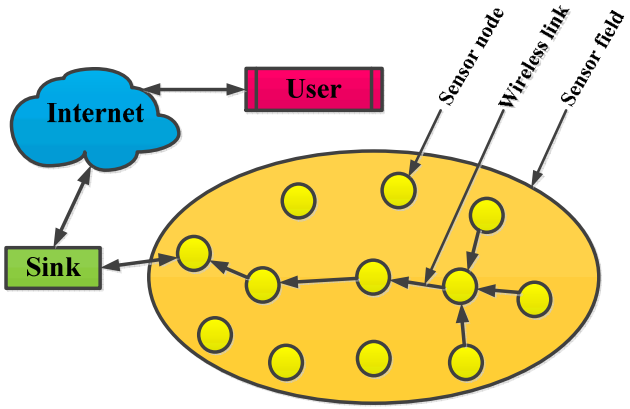

Figure 1: the simple construction of WSN

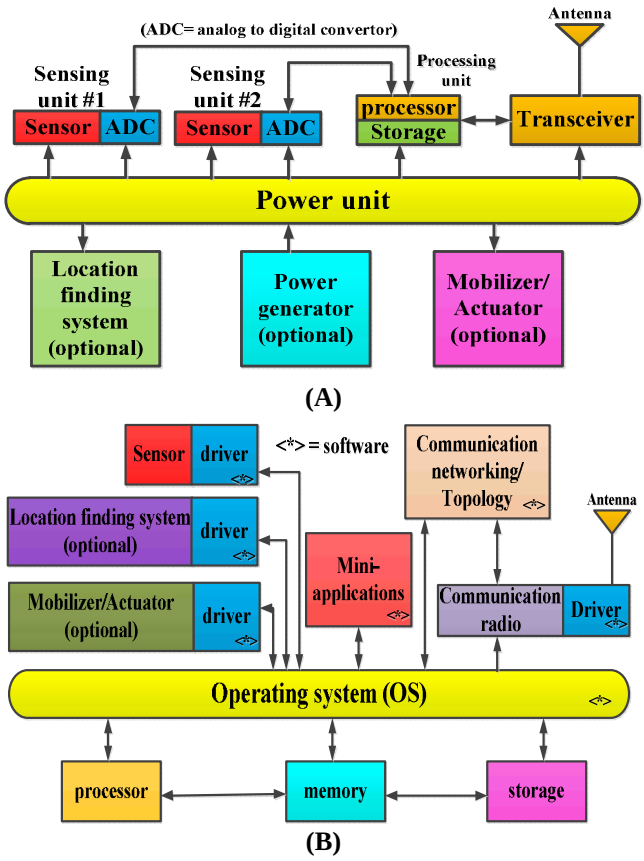

Figure 2: the common components of WSN, (A) the hardware (B) the software

III. THE APPLIED OF THE DSDV PROCEDURE IN WSN

The applied of the DSDV algorithm within wireless sensor network (WSN) will be mentioned in this paragraph. The protocol layer that used in DSDV will be mentioned. Then describe the data structure procedure that is packet format and data structure.

Figure 3 explain the protocol layer in DSDV algorithm. The DSDV applied the send and receive primal.

The SpeckMAC procedure delivers numerous primitives to permit for the sending and receiving of information from other nodes.

The blocking transmits will reach when the packet was provided as a controversy has been fine spread. Because of reduction effort of the code inside "network layer" the simple was extensively workings within applied the DSDV. The execution characterized here never work a regular to timetable the broadcast of different bits from the networks.

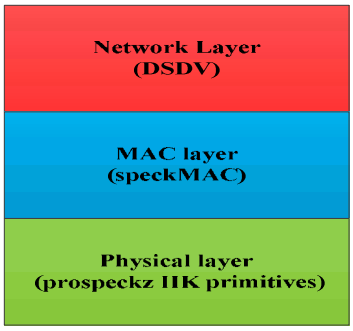

Figure 3: The stacks of DSDV procedure

The packet design uses within MAC layer in WSN was explained in Fig. 4. In order to keep split via layers, summarize the whole layers within the information space of the "MAC layer packet:. This strategy choice is to get better performance over the modularity. Therefore, the packets begin was improved to contain DSDV-specific headers". This choice is selected because of restriction of length in data field. So, put the DSDV-specific headers in the data field lead to loss space and growth the transmission time [11]. The parts in the structure are as defined below:

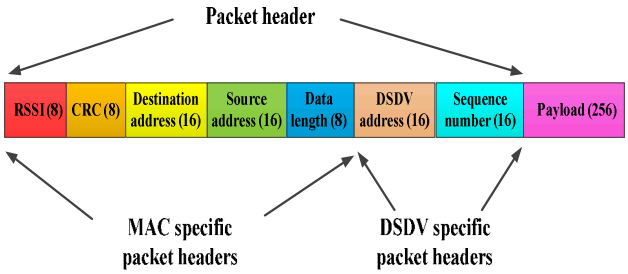

Figure 4: elementary packet construction with DSDV addition

A. MAC Layer-specific fields:

RSSI "Received Signal Strength Indicator": it is an amount of the power for the received signal strength in a wireless network. CRC "Cyclic Redundancy Check": is an error recognition technique which contains the design of a double byte checksum of a information chunk. It is run to find the inadvertent variety of information amid communicates. In this manner, the DSDV considers 65,536 distinct hubs in the system. Be that as it may, just 13 bits are involved, so the measure of hubs limits reach to 8191. Source Address: which are 16 bits span, keep the address of the hub that make the first packet.

IV. NET. LAYER REGION.

The DSDV Address is the double byte region used to keep destination for 2nd hub in the course for the bundle from beginning to last hub. Sequence Number is to keep the game plan number of the DSDV procedure bundle exchanged from that source. The Data length is the region which is 8 bits measurement, and shows the point of the load in bytes, to a supreme of 32. Payload: this territory is character exhibit of length 32. Along these lines, the outrageous region is restricted to 256 bits. Figure 5 clarifies the packet sorts utilized as a part of the occupation for "DSDV" framework

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composed with a pecking order. Two sorts of “packets” are exist which are “Protocol Packets and Data Packets” [12].

V. THE ROUTING TABLE IN DSDV ALGORITHM

The "routing table" has the data for entire hub in the structure. The info covers the address of the RN. Furthermore, accompanying jump that is every packet to the “RN” essential stay directed. "Routing table" within “DSDV” application was sorted out and regarded roundabout rundown. Fig.6 demonstrates the development for a solitary section within "the routing table". Fig.7 outlines for the associations among hubs within "routing table". The territory within a directing table passage contains [13]:

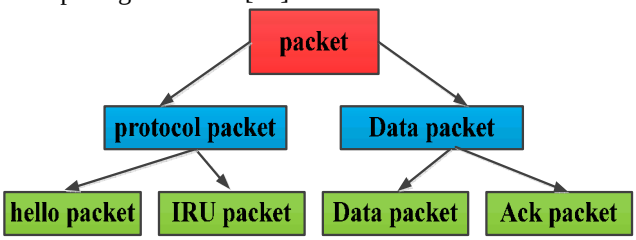

Figure 5: The DSDV packet kinds

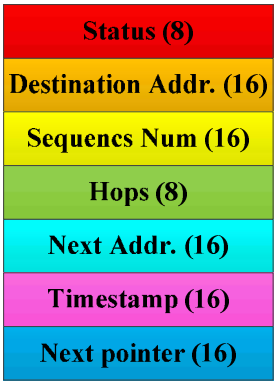

Figure 6: The entry of the DSDV routing table

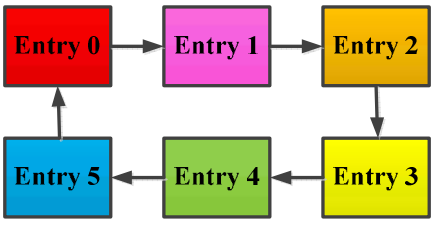

Figure 7: organization of DSDV routing table.

• Status: this area (8 bit) is for specify if the entry is full. Also used to specify if the entry is valid or not. Sometime use to check the significant change that should broadcast in the next IRU sent.

• Dest. Addr.: This part utilized for keep addr. For the hub that is characterized to way exists in the "routing table entry".

• Sequence number: this field is used to keep the number of the final data about the node.

• Hops: this zone is utilized to account the quantity of jumps to the hub written in the "Destination address field" in "routing table entry".

• Next address: this area is kept to but the address of the next node that the packet will send to it.

• Timestamp: this field is to keep the time about the last hub data within "routing table entry".

A. Adding a routing table entry

In this procedure another passage for a node Y can be additional to "the routing table" within double statuses:

• The “Hello packet” was got by Y, which was prior imperceptible.

• When the IRU bring from a neighbor has a passage for Y.

In the case of beginning, Y is the neighbor hub. In this way, it is one jump away. The rundown is looked till clear passage "determined by the Status field" was got. This gets to be one to designate passage was filled and substantial. Presently, "Destination address" turns into same as "the source address" for "Hello packet".

Additionally, "Sequence number area" is possessed with measure the "Sequence number area" for "received Hello packet". The bounces measure gets will be 1. Furthermore, the "Hop field" turns into the comparative measure of the "Destination address area". The nearby time is kept inside the Time stamp territory.

In the second case, the "payload of the received IRU" was loaded with "the routing table entry" for the hub Y. An unfilled steering table passage is found [14].

B. Adapting a “routing table” items

The "routing table entry" was altered within double statuses:

• Once more current data for the hub, showed through an upper succession numeral is gotten by a neighbor.

• At once course for a hub adjusted.

More current data was got from a neighbor once the following "Hello packet" was got. The right passage was built up and “arrangement number” zone is redesigned. Besides, the "Timestamp field" is recovered with the measure of the present neighborhood time. Adjustments in the course to a hub require either raise to-date of the quantity of bounces just, or even modified to the "Next address field" of the proportional "routing table entry". These varieties may show up after accepting of either "Hello packets" or "IRUs" [15].

C. Eliminate a routing table item.

The procedure for cancellation of a "routing table entry" could occur in double cases:

• Once never information around a hub is got inside more than an edge.

• Once an IRU has a section with an "odd sequence number".

In the accompanying sections, every case is considered thus. The "Time stamp area" for every "routing table entry" was tried for comprehend in case of the change among "present nearby time" with "timestamp" was grander a "pre-characterized limit" [16].

VI. PRACTICAL CASES WITH DETAILS OF DSDV

In this part the demonstration of process is done in order to illustrate the function of DSDV and how can it work in “WSN”. The easy design of network is taken into account. Therefore, the three nodes are taken in these examples. These examples explain in the first the process of creation of link and connection between nodes. Then explain how to broadcast the data to all nodes in the network. After that how the information transferred through multiple hops. Finally, the

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case of node failure is taken into accounts.

A. Node Discover and Route Propagation.

There are three stages for mutual discovery of nodes and broadcast of network data. The three phases are as spoken to in the three figures above.

1. Phase 1

The primary phase for procedure was indicated in Figure 8. Hubs one, two, and hub three are mutually ignorant for everyone. This was appeared using unfilled directing tables. Hub two gets Hello bundles from Nodes one and three. Hubs one and three acquire Hello packets from Node two.

2. Phase 2

Gathering for "Hello packets" for every hub from its neighbors prompt to production of the connections indicated in Figure 9. Hub two contains two neighbors. Hubs one and hub three have stand out neighbor.

3. Phase 3

At the point when the IRU is gotten from Node two, Nodes one and node three add passages to each different as showed in Figure 10. See that Nodes one and node three disregards the directing ways to its own particular all around characterized in the "IRU". "The Sequence number area" within the table of routing sectors to different hubs never neighbors keeps the arrangement number get in the IRU.

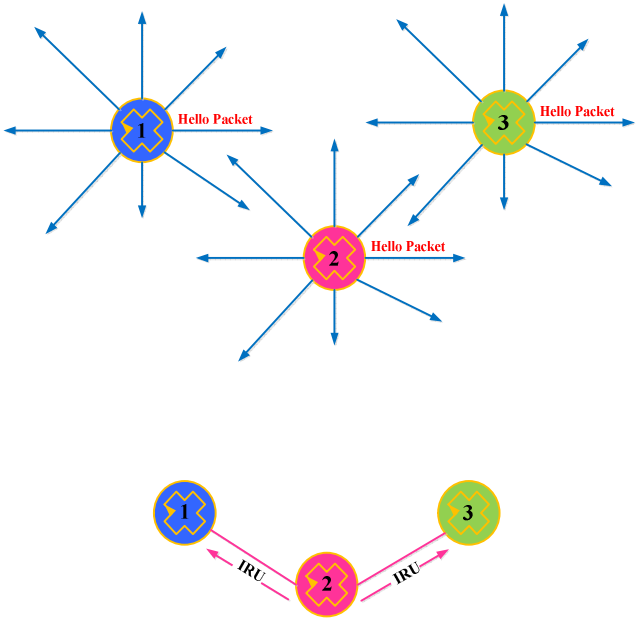

Figure 8: node detection and route broadcast of DSDV (stage 1)

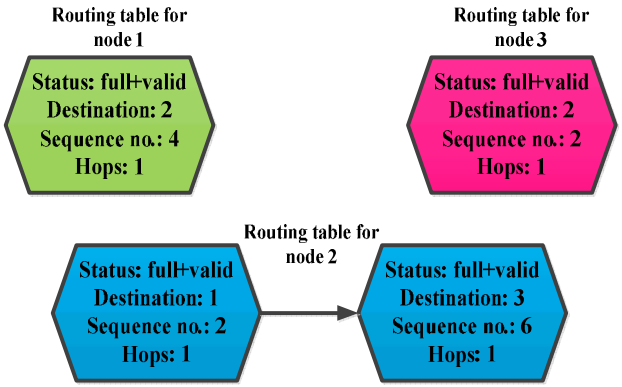

Figure 9: node detection and route broadcast of DSDV (stage 2)

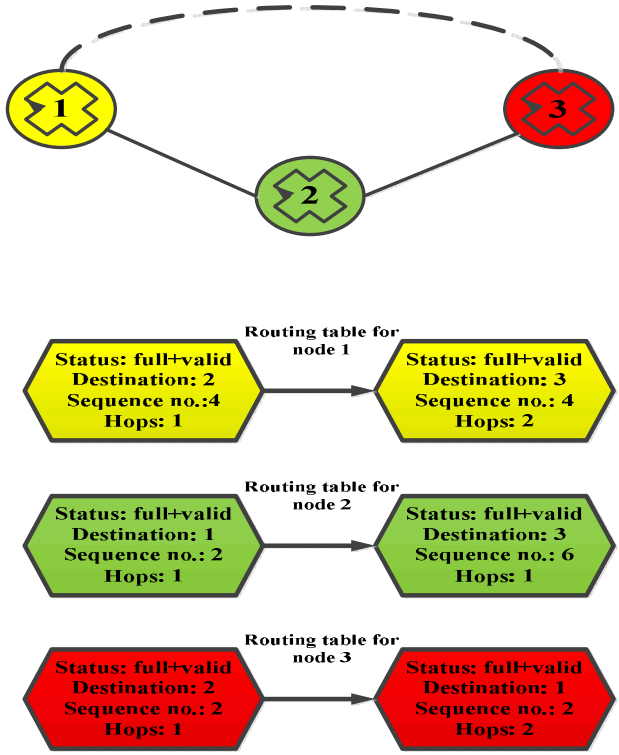

Figure 10: node detection and route broadcast of DSDV (stage 3)

B. Data Transmission

Within this procedure, the node three will receive the information packet from node one. The several hops is necessary for this procedure of communication. This procedure completed within double steps that explained in Fig. 11 and 12.

1. Phase1

It is seen that routing table passage for hub 1 that is exceptional for hub 3 that the following location is hub 2. Along these lines, hub 1 makes information packet with the assistance of address zone for hub 2. What's more, the address of hub 3 will be taken from the "last address range". The grouping number of information will be within the "sequence number counter".

2. Phase 2

At the point when Node 2 get the bundle tended to itself, it straightforward the information through packets and reach Node 3. It makes "the DSDV Address" and "the Destination Address field" and put it to the address for Node 3. After all these steps the information will transfer to node3.

C. Link Failure

In this area, the exchange of disappointment for node3 is finished. This system is done inside two phases as appeared in figures 13 and 14.

1. phase 1

Node2 perceives the disappointment of Node 3 by reason of clock wrap up. The next step is makes condition for "the routing table entry" to "Node3" to determine results that passage was not correct. At that point increment the "sequence number field" by1 for following most extreme odd number. After that named the "routing table section" as altered. After that, transmissions adjusted "routing table entry" within following "IRU" it propagate

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2. phase 2

In the first place, Node 2 sends "IRU" to Node1. In this way, "routing table passage" will overhauls in Node3 to show up the disappointment of Node 3. After that spread signal to other "IRU" that sends.

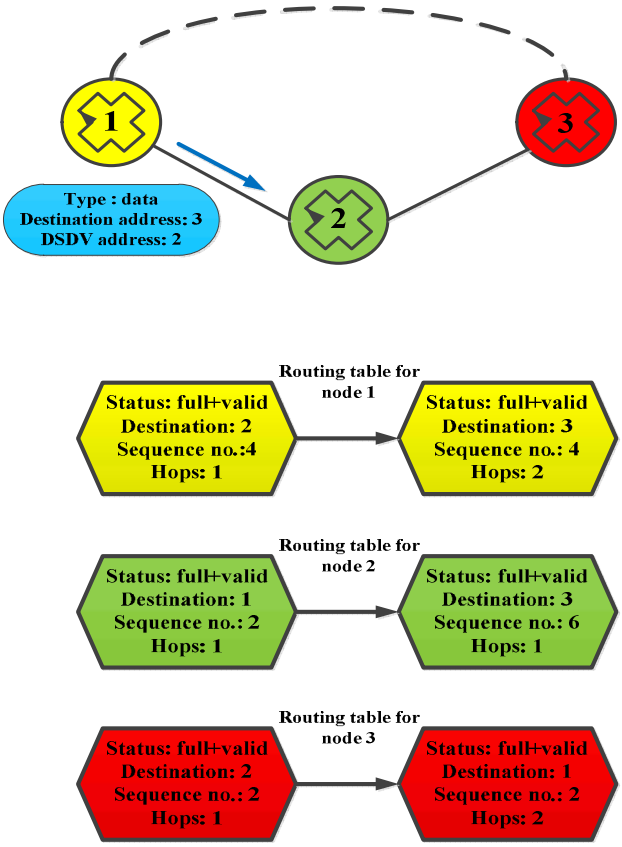

Figure 11: the process of data transmission in DSDV protocol (stage 1)

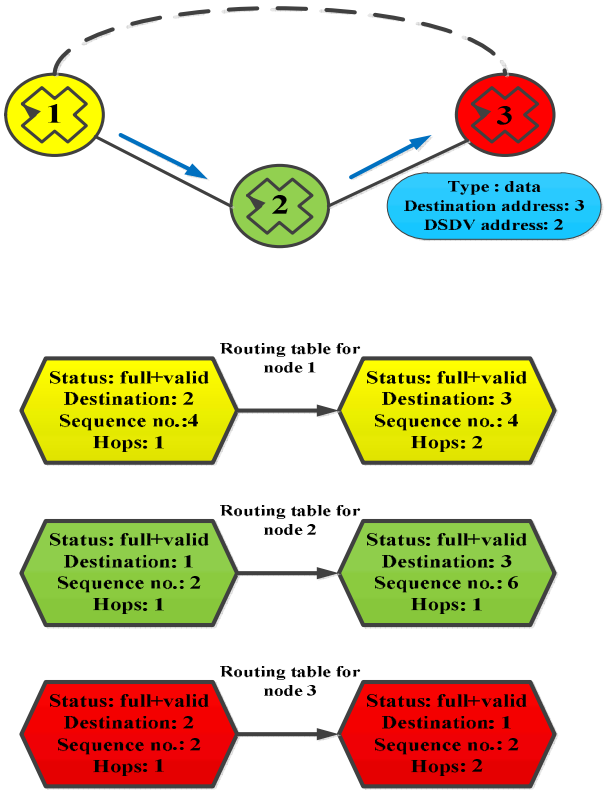

Figure 12: the process of data transmission in DSDV protocol (stage 2)

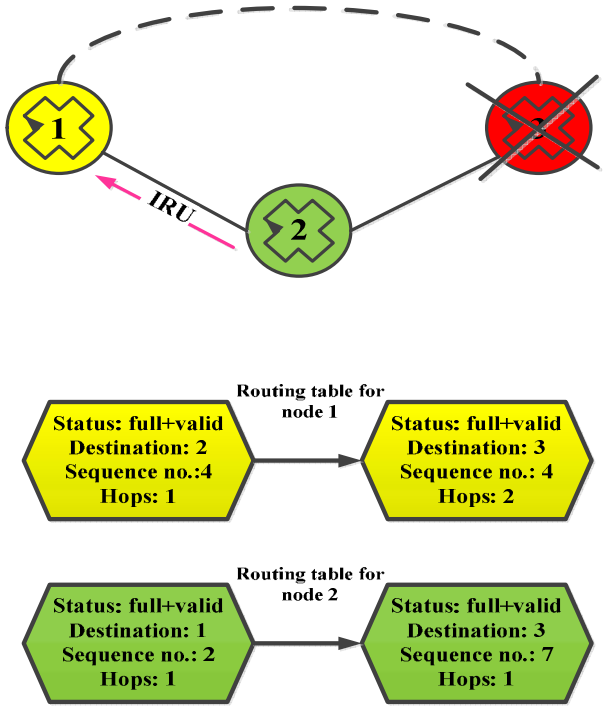

Figure 13: the link failure in DSDV protocol (stage 1)

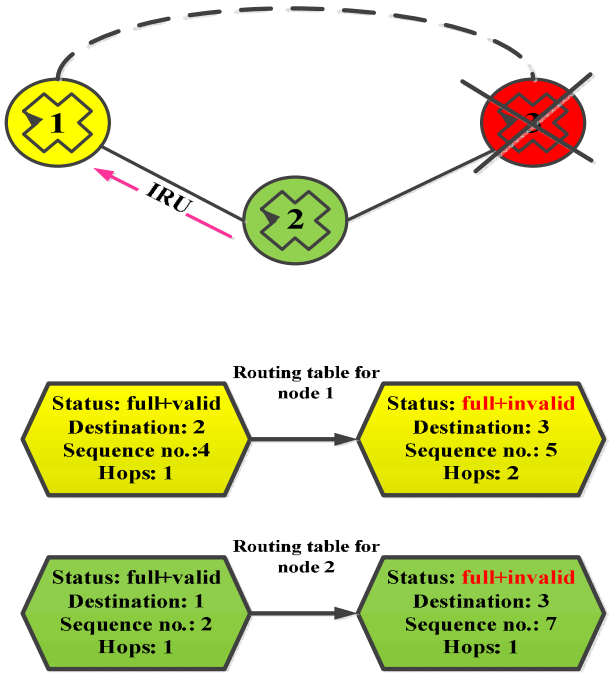

Figure 14: the link failure in DSDV protocol (stage 2)

VII. RESULTS AND DISCUSSION

There are three factors that work to specify the system that is modified. This metrics are: "Transmission Time, Delivery Ratio and Transmitter/Receiver On-time".

The Transmission period was run to ascertain the time involved for a packet to be sent through multi bounces in this methodology. This time contains:

- The time important to understands the course to the collector.
- The time requirement for the sender to make the packet.
- The time to delay until the medium is clear before the packet sent.
- The time important to sends the packet to the goal.

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• The time require at the last goal to get the packet.

The "delivery ratio" is unmistakable as "the relation between the amounts of packets sent by the sending node to the amount of packets got at the receiving node"..

The "Transmitter/Receiver (Tx/Rx) On-time" is well-defined as "the amount of the entire time that the transmitter or receiver are turned on at a node that runs the algorithm being considered".

The measurement of transmission time contains the usage of a three node to retain track of the time occupied to whole information spread.

There are many terms that are used in this method which are:

• Monitor Node (MN): which can be defined as "the node that tracks the transmission time. It is connected by wires to the sending and receiving nodes".

• Sending Node (SN): this can be defined as: "the node that sends the packet, and starts the timer on the MN".

• Receiving Node (RN): This can be defined as: "the node that receives the packet, and stops the timer on the MN".

The process for transmission time calculation (as shown in figure 15) is described as:

1. The node that send information and the node that receive information will be linking with the node that has the job of monitoring.
2. When SN, recognize the RN, it try to determine the path to RN.
3. The SN makes the "Sender Pin high". After that began the Counter. Also starts the Timer in MN.
4. The SN collects the Data packet to be transmitted to RN.
5. This information was transmitted via the MAC Layer.
6. The packet is sent via multi-hops as instruct in the routing table.
7. After accepting the information, the "MAC layer Interrupt Service Routine (ISR)" in the receiving node was energized. The packet is cushioned to the Receive Buffer.
8. "Mac layer ISR" in SN obtained the RR data. At that point copy it to the Receive Buffer.
9. The RN in the wake of accepting recoups the Data and dealing with it.

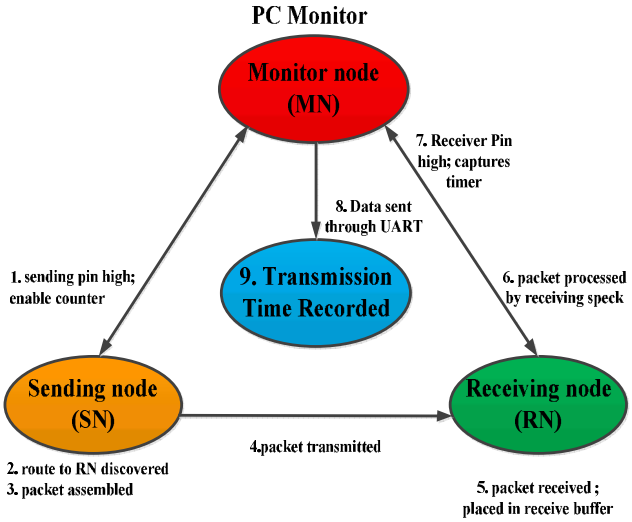

Figure 15: Strategy for Transmission period calculation in the DSDV calculation

The procedure utilized for decide of "Delivery Ratio" was less demanding as compare to utilized for measuring "transmission time". Two sorts of Data information within "DSDV" strategy were "Data packets and Acknowledgement packets". The procedure of calculate the "Delivery Ratio" is as appeared:

• The sending node propagates information at altered periods and reaches to receiving end node. The RN may have more jumps away.

• At once when receiving node get a Data, directly will expands a counter.

• directly when "the sequence number of a received data" pass a client characterized limit, the "RN" send "an Acknowledgment packet" contained the sequence of got data within "the payload".

• After Acknowledgement packet is received, "SN" determines "the Delivery Ratio".

• Moreover, "SN" restarts own "sequence number counter". "Delivery Ratio" was decides for "SN" by the calculation:

$$R_{dr} = \frac{P_r}{P_t} \times 100\%$$

R_{dr} : Represents "delivery ratio percentage".

P_r : represents data got in the RN.

P_t : Represents packets transmit at SN.

The "On-time" for the Tx and Rx are two different amount through the process of the system that calculated. The process for computing "Tx/Rx On-time" is by beginning and ending timers once the Tx or Rx of the node is become on or off. The time passed among beginning a timer and consequently ending it may be considered by:

$$T_p = (SCP \times [C_{old} - C_{new}])$$

Where: T_p = Time Passed

SCP = Source Clock Period

C_{old} = Count that is Old that is the amount of "count register" at once the time meter began

C_{new} = Count that is New that is the amount of "count register" at once the time meter stopped

• Global Counter (GC): This counter adaptable retains trajectory for entire period gone. Once the amount of the counter touches a "threshold" then the amount of the further double counters are "read out and reset".

• Transmitter Counter "TC": it adaptable catch whole period that the Tx is change on.

• Receiver Counter (RC): This adaptable catch the whole period that the Rc is change on.

As mention previously, a timer is become on at any time the Tx or Rx is turned on. Once it is become off, the time counter is halt. Once the amount of GC passes a threshold, the amounts of "TC and RC" were extracting. "Tx/Rx On-time" is evaluated by eqns:

$$Tx_{OT} = \frac{TC}{GC} \qquad Tx_{OT} \text{ is the TX on time}$$

$$Rx_{OT} = \frac{TC}{GC} \qquad Rx_{OT} \text{ is the RX on time}$$

The transmission time (as shown in figure 16) of the DSDV system was got via applying the procedure defined previously. Double nodes working through the DSDV

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operation were linked by wires to a third node working as MN. The Rx Pin at the MN is turned out to be high. The MN resets the "Tx and Rx Pin". At that point the SN reset "routing table information".

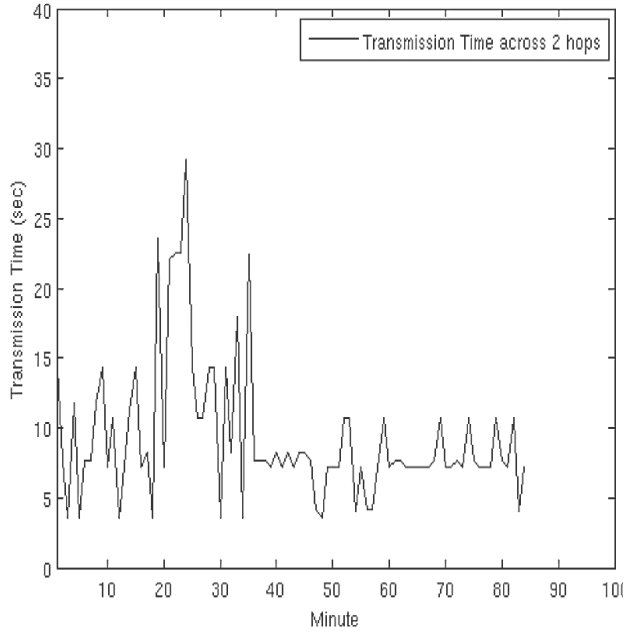

Figure 16: spread period for double hop spread

The o/p gained is displayed in Figure 17. The middling quantity of period the spreader stayed “on” was calculated and become a very little quantity which is 1.2 sec. per minutes. This matches and become 1.73% of the period. The receive rests, in middling, turned in to some extent higher amount of period. Around 1.6 second per minute. This matches to 2.67% of the period.

The mediocre "transmission time" (as appeared in figure 18) via two stages for “DSDV system” was computed and become “9.2sec”. Mediocre "delivery ratio" crosswise over one and double stages was ascertained to be 98.2% and 97.3% correspondingly. The "Tx and Rx On-time" figured to a hub within seven neighbors will found at “1.72% and 2.31%” correspondingly.

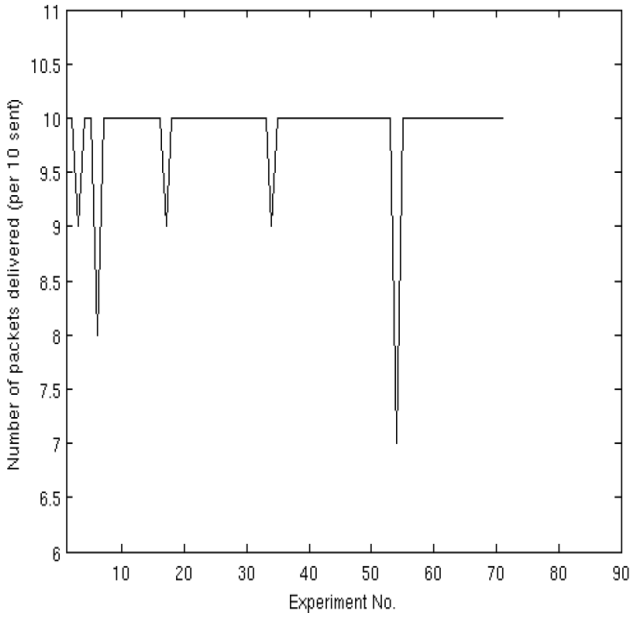

Figure 17: the number of packet delivered with experiments number

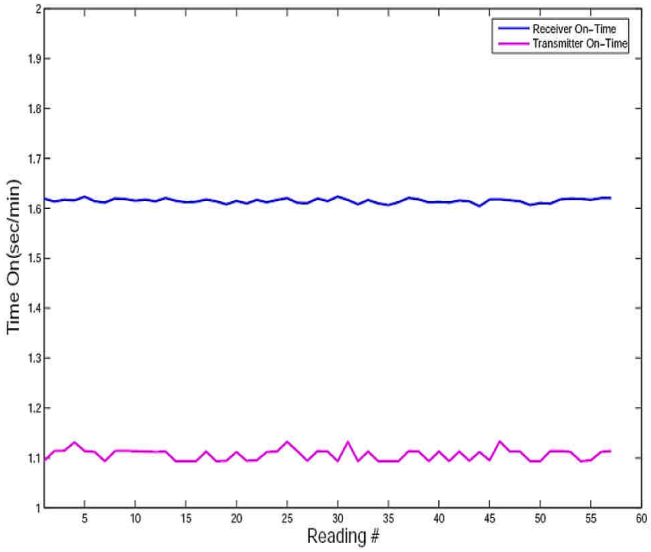

Figure 18: the relation between time on with reading in transmitting and receiving

VIII. CONCLUSION

This description created with a tiny idea of the important for “DSDV” usage within “protocol stack”. Following segment portrayed the “MAC layer primary” with information arrangement utilized as a part of the network layer, packets sorts characterized within “system layers”, and a depiction organized for “routing table”. Last segment indicated the procedure of DSDV calculation within the illustration assistance.

This paper depicted the measurements utilized for portrayal of the calculations and applications actualized of this mission. This was trailed by a information depiction of the methods used to done estimations on these measurements, and additionally the contrasts between the diverse executions while playing out the investigations of a similar metric. At last depicted the outcomes picked up from the portrayal of the DSDV strategy and examination of the outcomes obtained.

The strategy done for figuring the "delivery ratio" of the DSDV application was specified beforehand. The examining was connected inside twofold dissimilar surroundings. Time-period involved to transmit the packet through twofold hops was 9.2 seconds. "Tx/Rx On-time" was computed by a manner characterized already. The computation for a hub was with seven neighbors. The seven numbers was the extraordinary extent the "routing table" was limited to. At the point when Together the Tx and the Rx were altered on to an all the more little amount of the period in the impacts picked up in the working done on DSDV method has an upright power sparing components. The accompanying conclusions might be gotten from the outcomes got thus:

- The DSDV technique is sufficiently strong as delivery ratio residue deposit definitively extraordinary through numerous hops.
- The drop in the "delivery ratio" never is fit the bill to the "Mac Layer delivery ratio" just, yet to meddling among tremendous measures of packet from modified sources.

REFERENCES

1. Shio Kumar Singh, M P Singh and D K Singh, “Routing Protocols in

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Wireless Sensor Networks A Survey", International Journal of Computer Science & Engineering Survey (IJCSES), Vol. 1, No. 2, DOI : 10.5121/ijcses.2010.1206, November 2010.
2. Fengju An, "Density Adaptive Sleep Scheduling in Wireless Sensor Networks", Master of Science Thesis, Faculty of Electrical Engineering, Mathematics and Computer Science, Delft University of Technology, Netherlands, 2013.
3. Bilal Mustafa and Umar Waqas Raja, "Issues of Routing in VANET", Master thesis, School of Computing, Blekinge Institute of Technology, Sweden, 2010.
4. Luis Gironés Quesada, "A Routing Protocol for MANETs", Master of Science in Communication Technology, Norwegian University of Science and Technology, Department of Telematics, 2007.
5. Heng Luo, "A Best Effort QoS Support Routing in Mobile ad hoc Networks", Ph.D. thesis, The University of Edinburgh, 2011.
6. Ilker Demirkol, Cem Ersoy and Fatih Alagöz, "MAC Protocols for Wireless Sensor Networks: A Survey", IEEE Communications Magazine, 0163-6804/06, April 2006.
7. Jennifer Yick, Biswanath Mukherjee and Dipak Ghosal, "Wireless sensor network survey", Computer Networks, 52 (2008) 2292–2330, journal homepage: www.elsevier.com , 2008.
8. Ravi Kumar Bansal, "Performance Analysis of Cluster Based Routing Protocol in Manets", Master Thesis of Engineering, Computer Science and Engineering Department, Thapar Institute of Engineering and Technology, 2006.
9. Yujie Zhu, "Energy-Efficient Communication Strategies for Wireless Sensor Networks", Ph.D. thesis, School of Electrical and Computer Engineering, Georgia Institute of Technology, 2007.
10. Rajeshwar Singh, Dharmendra K Singh and Lalan Kumar, "Performance Evaluation of DSR and DSDV Routing Protocols for Wireless Ad Hoc Networks", Int. Journal of Advanced Networking and Applications, Volume: 02, Issue: 04, Pages: 732-737, 2011.
11. Kumar Prateek, Nimish Arvind and Satish Kumar Alaria, "MANET-Evaluation of DSDV, AODV and DSR Routing Protocol", International Journal of Innovations in Engineering and Technology (IJIET), Vol. 2 Issue 1, ISSN: 2319 – 1058, 2013.
12. Yatendra Mohan Sharma and Saurabh Mukherjee, "Comparative Performance Exploration of AODV, DSDV & DSR Routing Protocol in Cluster Based VANET Environment" International Journal of Advances in Engineering & Technology, IJAET ISSN: 2231-1963, Vol. 4, Issue 2, pp. 120-127, 2012.
13. Aman Kumar and Barinderpal Singh, "Performance Analysis of DSDV, I-DSDV Routing Protocol in Monile Ad Hoc Networks in IPv6 under Black Hole Attack", International Journal of Future Generation Communication and Networking (IJFGCN), Vol. 8, No. 4 , pp. 155-160, http://dx.doi.org/10.14257/ijfgcn.2015.8.4.15, ISSN: 2233-7857, 2015.
14. M. Pushpadevi and M.Sakthi, "Improved Minimum Delay Routing Using TBETX Routing Over DSDV Routing Protocol in Wireless Ad Hoc Networks", International Journal of Innovative Research in Computer and Communication Engineering, www.ijircce.com , Vol. 2, Issue 9, ISSN(Online): 2320-9801, ISSN (Print): 2320-9798, 2014.
15. B.N. Jagdale1, Pragati Patil, P. Lahane and D. Javale, "Analysis and Comparison of Distance Vector, DSDV and AODV Protocol of MANET", International Journal of Distributed and Parallel Systems (IJDPS) Vol.3, No.2, DOI: 10.5121/ijdps.2012.3210 121, 2012.
16. Biswaraj Sen and Sanku Sinha, "A Simulation Based Performance Analysis of AODV and DSDV Routing Protocols in MANETs", International Journal of Modern Engineering Research (IJMER) www.ijmer.com, Vol.2, Issue.4, pp-2404-2408, ISSN: 2249-6645, 2012.

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