COMPARISON OF AODV AND DSDV PROTOCOLS BASED ON ENERGY CONSUMPTION AND QOS PERFORMANCE

Ms. V.M.Gayathri¹, Assistant Professor, ¹Email:vmg188@gmail.com
Ms. S.Raichal², Assistant Professor, ²Email:s.raichal@gmail.com
Ms.Soniya³, Assistant Professor, ³Email:j.soniya0709@gmail.com
Dr. R.Nedunchelian⁴, Professor & Head, ⁴Email:chelian1959@gmail.com
(1),(2),(3),(4) Department of Computer Science & Engineering,
Saveetha school of engineering, Saveetha University Chennai-602 105.

ABSTRACT

Proposing Qos efficiency and energy efficiency routing protocols for mobile Ad hoc network (MANET) is a challenging task. Different routing protocols based on different features have been proposed to the IETE. Performance of many of these routing protocols have been evaluated focusing on metrics such as delay, routing overhead & packet delivery ratio. A Performance comparison of Destination Sequence Vector Routing(DSDV) and Ad hoc on demand Distance Vector Routing (AODV) Routing protocols with respect to energy consumption, routing energy consumption and QoS are explained thoroughly. A Simulation model using network simulator2 (NS2) with different mobility & traffic models are used for study the energy consumption of the network. Finally , comparison of results of the AODV&DSDV based on energy consumption & QoS is presented.

Index Terms –MANET,AODV,DSDV,QOS,ENERGY

I INTRODUCTION

A **mobile ad hoc network** (**MANET**) is a self-configuring infrastructureless network of mobile devices connected by wireless. *Ad hoc* is Latin and means "for this purpose".Each device in a MANET is free to move self-reliantly in any direction, and will therefore alteration its links to other devices regularly. Each must frontward traffic disparate to its own use, and therefore be a router. The primary challenge in constructing a MANET is arming each device to unceasingly maintain the information required to appropriately route traffic. Such networks may activate by themselves or may be related to the larger Internet.MANETs are a kind of wireless ad hoc networks that frequently has a routable networking environment on top of a Link Layer ad hoc network.The development of laptops and 802.11/Wi-Fi wireless networking have made MANETs a prevalent research topic since the mid-1990s. Many academic papers appraise protocols and their capabilities, assuming fluctuating grades of mobility within a limited space, regularly with all nodes within a few hops of each other. Different protocols are then assessed based on measure such as the packet drop rate, the overhead familiarized by the routing protocol, end-to-end packet delays, network throughput etc.

The proposed system discusses about the energy consumption and quality performance of AODV and DSDV protocols. AODV is a Adhoc On Demand Vector Routing Protocol where route will be established in on-demand basis . DSDV is a Direct Sequence Distance Vector routing protocol where the path is pre defined .The route from source to destination will be maintained in a routing table. Thus, using these protocols energy Consumption is calculated and compared. The work has been divided into four modules. Creation of mobility network topology is done with different mobility nodes. Second module deals with Calculation of energy consumption and Qos Performance of AODV protocol. Third module deals with Calculation of energy consumption and Qos performance of DSDV protocol. Fourth module compares AODV and DSDV protocol with the above factor using Xgraph of NS2.

II BACKGROUND

M. Bouhorma, H. Bentaouit and A. Boudhir [5] presented a comparison of recital between two reactive routing protocols for mobile ad hoc networks: dynamic source routing (DSR), ad hoc on demand distance vector (AODV). Packet delivery ratio, end-to-end delay with vaying mobility speed for each node were simulated using network simulator tool. Simulation exposed that though DSR flawlessly gauges to small networks with low node speeds, AODV is favored due to its more effectual usage of bandwidth.

A. Boukerche [6] have been proposed for ad hoc wireless networks. In this paper they compared the performance of the following routing protocols AODV, PAODV (preemptive AODV), CBRP and DSR. A change of workload and situations, as characterized by mobility of the nodes, load and size of the ad hoc network were simulated. Results specifies that instead of its development in reducing route request packets, CBRP has a larger overhead than DSR because of its intervallic hello messages but AODV's end-to-end packet delay is littlewhen compared to DSR and CBRP. PAODV has shown gradual increment over AODV.

V. Kanakaris, D. Ndzi and D. Azzi [20] assesses four ad-hoc network protocols (AODV, DSDV, DSR and TORA) in

various network balances taking into account for the mobility factor. The evaluation of these four protocols was carried out

using Network Simulator-2 (ns2), and the poor performance of TORA may be credited to its operation. Therefore added enquiry of TORA execution in ns2 desires to be carried out.

III MODULES DESCRIPTION

MODULES

- Network Architecture
- Calculation of energy efficiency and Qos on AODV
- Calculation of energy efficiency and Qos on DSDV
- Comparison using XGraph

NETWORK ARCHITECTURE

Mobile Wireless network is created with many number of nodes where each node will have different mobility speed.each node also will have their own characterisitcs like energy, receiving power , transmission power etc.,



ENERGY CALCULATION AND QOS ON EACH AODV

It is a reactive routing protocol which establishes a route to a destination only after getting request from the source or whenever it is needed that is, on demand. In disparity, the most communal routing protocols of the Internet are proactive, they find routing paths autonomously of the usage of the paths. AODV is a distance-vector routing protocol. AODV evades the counting-to-infinity problem. AODV is accomplished of both unicast and multicast routing.

In AODV, the network is hushed until a connection is needed. At that fact the network node that requires a connection broadcasts a request for connection. Other AODV nodes frontword this message, and top the node that they perceived it from, making an burst of impermanent routes back to the destitute node. When a node collects such a message and already has a route to the desired node, it sends a message rearward through a impermanent route to the requesting node. The destitute node then initiates consuming the route that has the smallest number of hops over other nodes. Idle entries in the routing tables are cast-off later a time.

Routing error message will be passed backward to the transmitted node in case of any link failures and again the sme process will be repeated. More over the main complexity is falls on the number of messages communicated to preserve the capacity of the network. The advantage of AODV is that it produces no additional traffic for communication along existing links. Also, it never require any memory and calculation because of its simplicity. However AODV needs further time to begin a connection, and the primary communication to establish a route is heftier than some other methods.

Based upon the formula's we are calculating the energy consumed on each node.

Residual Energy=Total Energy-energy consumed

Total energy consumed(ith node)=Σenergy consumed(ith node)

Packet delivery ratio and delays are calculated.

Packet delivery ratio=no. of packets receive/no of packets send

ENERGY CALCULATION AND QOS ON EACH DSDV

Destination-Sequenced Distance-Vector Routing (DSDV) is a table-driven routing scheme for ad hoc mobile networks. The key influence of the algorithm is to resolve the routing loop problem. Each entry in the routing table comprises a sequence number, the sequence numbers are usually level if a link is present; otherwise, an odd number is used. The number is created by the destination, and the emitter requires to send out the succeeding apprise with this number. Routing information is dispersed among nodes by sending full dumps rarely and lighter incremental apprises more regularly.



If a router accepts new information, then it uses the latest sequence number. If the sequence number is the same as the one previously in the table, the route with the improved metric is used. Stale entries are those entries that have not been rationalized for a while. Such entries as well as the routes expending those nodes as next hops are deleted.

Even though network is idle it requires a continuous update of its routing table which consumes battery power and little amount of bandwidth.

A new sequence number is needed whenever the topology of the network changes that too before the network re-converes. Thus, DSDV is not proper for highly dynamic networks.

Based upon the formula's we are calculating the energy consumed on each node.

Residual Energy=Total Energy-energy consumed

Total energy consumed(ith node)= Σ energy consumed(ith node)

Packet delivery ratio and delays are calculated.

Packet delivery ratio=no of packets receive/no of packets send

COMPARISON USING XGRAPH

After calculating Energy consumption and QOS on different protocol next step is to compare the output values using graph.XGraph is used for the purpose.



The above graph shows that Packet delivery ratio of dsdv is lesser than aodv protocol.



The above graph explains that energy consumption of aodv is higher than dsdv.

IV CONCLUSION AND RESULTS

By comparing AODV and DSDV its clear that AODV is performing well than DSDV protocol. That is, On demand protocol is running better than proactive protocol. Energyconsumption is less in AODV than DSDV protocol.

METRICS	DSDV	AODV
Energy Consumed	0.064862 Joules	0.03456 Joules
Average End to End Delay	1.657546 ms	1.234895 ms
Packet Delivery Ratio	0.850909	0.908561

The above table shows that comparison of aodv and dsdv protocol in terms of QOS and energy conumption.

			X Graph
Elle		nam: wireless-out.nam = 5	energy zg
warr	20.0000	Lile Yieurs Analysis wireless-out.aam	
00	18.0000	44	
warr	16.0000		
warr	14.0000	Ø	-
	12.0000	(0) 17	_
warr	10.0000	의 *	_
Loac	B.0000	-	_
char higt	6.0000		
SOR1 Ener	4.0000		
(roc	2.0000	P	
	0.0000	N EL	

The above screen shots explains that number of initial nodes at the beginnning. At the starting stage, every node will be in static position. Once simulation time starts each and every node will move according to the mobility speed.



The above figure represents the establishment of communication within the network.



The difference between previous and above figure is the speed of the mobility. Later one is for communication in a faster movement of nodes.

V FUTURE ENHANCEMENT

In future the comparison may be taken for AODV ,DSDV and DSR and also there is a possibility of adding one more metrics called security.there are lot of security issues are there in wireless networks.

REFERENCES

- [1] T. H. Tie, C. E. Tan and S. P. Lau, "Alternate link maximum energy level ad hoc distance vector scheme for energy efficient ad hoc networks routing," International conference on computer and communication engineering (ICCCE), 2010.
- [2] K. Akkaya and M. Younis, "A survey on routing protocols for wireless sensor networks," Ad Hoc Networks, Volume 3, Issue 3, Pages 325-349,2005.
- [3] D. B. Johnson, D. A. Maltz and Y. C. Hu, "The dynamic source routing protocol for mobile ad hoc networks (DSR)" IETF MANET Working Group, 2004.
- [4] L. Zhanjun, W. Rui, L. Qilie, L. Yun, C. Qianbin, and W. Ping, "An energy-constrained routing protocol for mobile ad hoc networks" International Conference on Communication Software and Networks, IEEE Computer Society, 2009.
- [5] M. Bouhorma, H. Bentaouit and A. Boudhir, "Performance comparison of ad-hoc routing protocols AODV and DSR," International Conference on Multimedia Computing and Systems, ICMCS '09, Pages 511 - 514, 2009.
- [6] A. Boukerche, "Performance evaluation of routing protocols for ad hoc wireless networks " Mobile Networks and Applications, Volume 9, Number 4, pages 333-342, Netherlands, 2004.
- [7] Broch, D. Maltz, D. Johnson, Y. C.Hu and Jetcheva, "A performance comparison of multi-hop wireless ad hoc networks " In Proceedings of the 4th Inc. Conference on Mobile Computing and Networking (ACM MOBICOM'98), pages 85-97,1998.
- [8] T. Camp, J. Boleng and V. Davies, "A survey of mobility models for ad hoc network research," Wireless Communications and Mobile Computing, Volume 2, Issue 5, pages 483-502, August 2002
- [9] C. Perkins, B. E. Royer and S. Das, "Ad hoc on-demand distance vector (AODV) routing," Internet RFCs, Publisher: IETF, Volume: 1, Issue: 3561, Pages: 1-38,2003.
- [10] D. Nitnaware and A. Verma, "Energy constraint node cache based routing protocol for ad hoc network," International Journal of Wireless & Mobile Network (IJWMN), Vol. 2, No. 1, 2010.
- [11] S. Doshi, S. Bhandare, and T. X. Brown, "An on-demand minimum energy routing protocol for a wireless ad hoc network," ACM SIGMOBILE Mobile Computing and Communications Review, ACM USA, Volume 6 Issue 3, July 2002.
- [12] L. Romdhani and C. Bonnet, "Energy consumption speed-based routing for mobile ad hoc networks," Proceedings of the 24th International Conference on Distributed Computing Systems Workshops (ICDCSW'04), IEEE Xplore, 2004.
- [13] K. Fall and K. Varadhan, "The NS manual (formerly NS notes and documentation)," Collaboration between Researchers at UC Berkeley, and Xerox PARC, 2010.
- [14] H. Moustafa and H. Houda, "Adaptive path energy conserving routing in MANETs," Ecole National eSuperieure des Telecommunications(ENST), Paris, 2003.
- [15] S. Kurkowski, T. Camp and M. Colagrosso, "MANET simulation studies: the incredible," ACM SIGMOBILE, Mobile Computing and Communication Review, vol. 9 Nu. 4, 2005.
- [16] A. K. Gupta, D. Sadawarti and A. K. Verma, "Performance analysis of AODV, DSR & TORA routing protocols," IACSIT International Journal of Engineering and Technology, Vol.2, No.2, ISSN: 1793-8236,2010.
- [17] G. Fang, L. Yuan, Z. Qingshun, and L. Chunli, "Simulation and analysis for the performance of the mobile ad hoc network routing protocols," The Eighth International Conference on Electronic Measurement and Instruments, IEEE Xplore, 2007.
- [18] J. Khan, S. 1. Hyder and K. Khan, "Efficiency and performance analysis of on-demand routing protocols in autonomous system," Australian Journal of Basic and Applied Sciences, Vol.5, No. 6, pages 1619-1631,2011.
- [19] X. Jing and M. J. Lee, "Energy-aware algorithms for AODV in ad hoc networks," International Conference on Mobile Computing and Ubiquitous Networking (ICMU), New York, 2004.
- [20] V. Kanakaris, D. Ndzi and D. Azzi, "Ad-hoc networks energy consumption: A review of the ad hoc routing protocols," Journal of Engineering and Technology, review 3, pages 162-167,2010.
- [21] A. Saeed, L. Khan, N. Shah, and H. Ali, "Performance comparison of two anycast based reactive routing protocols for mobile ad hoc networks," Computer, 2nd International Conference on Control and Communication, IC4, IEEE Xplore, 2009.