Volume 8, No. 2, March 2017 (Special Issue)
ISSN No. 0976-5697
International Journal of Advanced Research in Computer Science
REVIEW ARTICLE
Available Online at www.ijarcs.info

Routing Optimization in Cloud Networks

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***Abstract*:** The most predominant exigency of current cloud technology is to incorporate routing in an optimized manner. Routing when embodied efficiently is helpful in ameliorating the overall QOS of the cloud system. A cloud based network is distinctively marked by its capability of rendering a wireless connection between highly mobile nodes even in the absence of any predetermined infrastructure. In the absence of any framework cloud nodes function as routers transferring data through multiple hops. In comparison to all the routing protocols ZRP proves to be the best as it incorporates the advantages of both the proactive and reactive protocols. This paper studies the challenges faced by ZRP (Zone based Routing Protocol) and proposes an optimized approach for ZRP using shortest path selection technique. Energy efficiency is attained by eliminating all the other routes and replacing the routing table contents with only the shortest route to every destination, hence optimizing residual energy.

***Keywords*:** Cloud Network, Routing, ZRP, Optimization.

I. INTRODUCTION

Cloud computing has developed into a catchphrase in distributed computing owing to its distinguishing feature of proffering on-demand access to available resources from a common shared pool. The access is rendered via Internet observing a "pay as you go" trend [1,9,10]. When the router routing process commences, the particular packets are relayed in the available optimal direction based on the information stored within the local routing table. In case of all accurate routing table entries on all the routers, the packet follows the optimal path to reach the destination from the source. However, in case of faulty routing table entries, either due to a misconfiguration or due to learned routes not precisely reflecting the internetwork topology, can lead to formation of routing loops. Figure.1 depicts the cloud center routing methodology. A routing loop is a path within the internetwork for a network ID looping back onto it.

While routing in cloud using traditional ZRP, whenever a source node initiates a packet to be sent it is started by checking its own local zone for the destination by using IARP [7,8,11]and the packet is routed through the existing proactively maintained route. But in case the source is unable to find the destination in its own zone the packet is transferred reactively. In route request phase the source node sends a route request to adjoining peripheral nodes with the help of BRP [7,8,11]. If the node receiving the request is aware of the destination node it answers back through a route reply packet to the source. Otherwise the process of border-casting continues and the route requests propagate throughout network. Due to the mobile nature of the nodes links are broken and new ones are established often hence route maintenance becomes very important. The paper follows with Section 2 specifying literature review and gaps of study, continued with Section 3 discussing the proposed work and paper completes with conclusion & future scope and references.

Figure.1 Cloud Centre Routing Technology

II. LITERATURE REVIEW & GAPS OF STUDY

Anders [1] proposed information centric networking in which focus is shifted from the end-points in the network to the information objects themselves, with less care being placed on from where the information is fetched.**Changqiao Xu et al. [2]** analyzed the performance of multimedia distribution when making use of two multi-homing approaches named Single Path Transfer and Concurrent Multi-path Transfer, in which a single or all paths within an association are used simultaneously for data transmission. After performing an intense literature survey many limitations were recognized in ZRP routing discussed below as gaps of study:

1. In the scenario with highly overlapping zones the route request packet superfluously keep flooding the network.
2. Different scenario needs a determination of perfect zone radius.
3. Irrespective of the position of the recipient node in the zone the packets are forwarded with full power thus wasting power for nearby nodes.
4. With increase in the interspace between the peripheral and the source node, the zone gets extended. The limited transmission range of sender node provokes attempts to detect peripheral nodes resulting in excessive use of bandwidth.
5. In an attempt to maintain the proactive information of all the neighbouring nodes in the zone, the node keeps a record of all redundant routes to a particular destination. Thus increasing routing overhead.

III. PROPOSED WORK

The optimized routing methodology for cloud networks using ZRP aims at reducing routing overhead and avoid redundancy on every node in zone by selecting the shortest distance, between the nodes as the best path and eliminating other paths from the routing table [5,14,15,16]. Here, the distance between two corresponding nodes is calculated using Euclidean's formula. In this paper we have proposed memory optimization algorithm for ZRP, with a focal point of reducing unwanted use of memory and energy and bandwidth by choosing the shortest path [6,13,17].

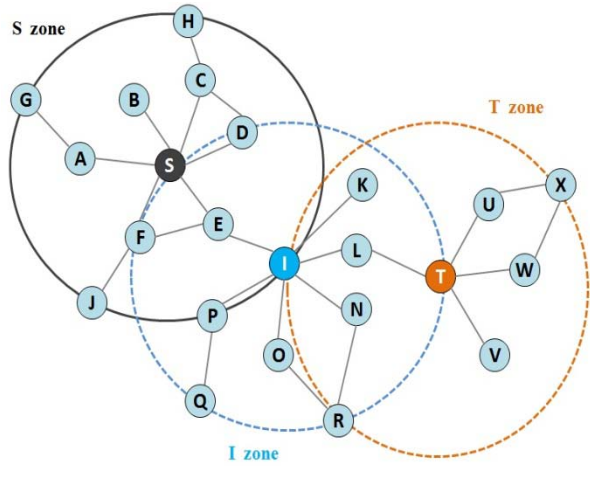

Figure2: A sample ZRP scenario for cloud based routing

Figure.2 explains the neoteric routing methodology presented in this paper. Every node on the network is assigned by a unique network id. In the given below network, sender H and destination J, as every node gathers the routing table information of its neighbouring nodes, H gathers the route table information available at C, similarly C , D, S, F, and E does. When C gets the multiple paths to destination J. after receiving the multiple path route information, C stores only single route information to reach out to J, following that if multiple paths exit, the best path will be stored from its routing table and choose.

IV. CONCLUSION & FUTURE WORK

The proposed optimized ZRP routing approach for cloud networks discussed in above sections optimizes the residual energy as compared with the traditional ZRP based approach. With traditional ZRP in order to maintain information related to the topology at higher levels utilization of memory increases since in IARP there is an existence of several paths from one node to another in every zone and the node keeps a note of all possible routes from one node to another which causes scarce bandwidth and memory. These gaps are specified for the problem formulation of neoteric approach which is further validated through simulation results depicted in section V. ZRP has a resource-constrained environment therefore consumption of every limited resource must be considered. Energy efficiency is therefore of paramount importance in ZRP that is constrained by limited resources. Traditional ZRP suffers through various factors like limited resources, concentration of load in a limited portion of the network, and routing of redundant information. Neoteric energy efficient ZRP routing approach presented in this paper analyses how the residual energy level of each zone can be optimized through aggregation of routes thus, making a significant improvement in the functional lifetime of ZRP based network.

V. REFERENCES

[1] Anders, "Efficient content distribution in an information-centric hybrid mobile network", Consumer Communications and Networking Conference (CCNC), IEEE, 2011.

[2] Changqiao Xu et al. (2011) A Novel Energy-Efficiency Social-Inspired Video Sharing Solution in Wireless Networks, International Journal of Distributed Sensor Networks Volume 2015 (2015), Article ID 518289.

[3] Dasgupta S., Saha S. , Bhowal D. & Bhowmik D. (2010). LBSPR: Location based shortest path routing protocol in MANET, *IEEE International Conference onComputational Intelligence and Computing Research* , pp. 1 -4.

[4] El-Sayed H. H. (2016). Shortest Paths Routing Problem in MANETs " International Journal of Applied Mathematics & Information Sciences, 10(5), 1885-1891.

[5] Haas Z. J. & Pearlman M. R. (1998). Providing Ad-Hoc Connectivity with Reconfigurable Wireless Networks Proceedings of the ACM SIGCOMM '98.

[6] Haas Z. J. & Pearlman M. R. , (2001). The performance of query control schemes for the zone routing protocol. IEEE/ACM Transactions on Networking (TON), 9(4), pp.427-438.

[7] Haas Z. J. , Pearlman M. R. & Samar P. (2002) The Zone Routing Protocol (ZRP) for Ad Hoc Networks IETF Internet Draft, draft-ietf-manet-zone-zrp-04.txt.

[8] Haas Z. J., Pearlman M. R. & Samar P. (2002). Bordercasting Resolution Protocol (BRP). IETF Internet Draft, draft-ietf-manet-brp-02. Txt.

[9] Kaur S. & Kaur S. (2013). Analysis of Zone Routing Protocol in MANET, International Journal of Research in Engineering and Technology, eISSN: 2319-1163.

[10] Kauraw M. & Sharma A (2016). Shortest Path Routing Protocol in Scalable Mobile Adhoc Networks on Demand Dynamic Randomized Source, International Journal of Advanced Research in Computer Science and Communication Engineering , 5(3) ISSN: 2278-1021.

[11] Pearlman M.R., Haas Z.J. (1999) Determining the optimal configuration for the zone routing protocol. IEEE Journal on Selected Areas in Communications, 17 (8), 1395-1414, doi: 10.1109/49.779922.

[12] Perkins E.C. & Bhagat P. (1994) Highly Dynamic Destination-Sequenced DistanceVector Routing (DSDV) for Mobile Computers, ACM SIGCOMM, 24(4).

[13] Zafar Sherin, Soni M. K., Beg M.M.S 2015. An Optimized Genetic Stowed Biometric Approach to Potent QOS in MANET. Procedia Computer Science Volume 62, 2015, Pages 410–418

[14] Zafar Sherin, Soni M. K. 2014. Biometric Stationed Authentication Protocol (BSAP) Inculcating Meta-Heuristic Genetic Algorithm. I.J. Modern Education and Computer Science, 28-35.

[15] Zafar Sherin, Soni M. K. 2014. A Novel Crypt-Biometric Perception Algorithm to Protract Security in MANET. Genetic Algorithm . I.J. Computer Network and Information Security, 64-71.

[16] Zafar Sherin, Soni M. K. 2014. Secure Routing in MANET through Crypt-Biometric Technique. Proceedings of the 3rd International Conference on Frontiers of Intelligent Computing: Theory and Applications (FICTA),713-720.

[17] Zafar Sherin , Soni M. K. , Beg M.M. S 2015 . QOS Optimization in Networks through Meta-heuristic Quartered Genetic Approach. ICSCTI,IEEE.