ISSN (Online) : 2278-1021
ISSN (Print) : 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 3, Issue 9, September 2014

A Novel Fuzzy Spray Logic Used In Delay Tolerant Nerwork to Secure Routing Scheme

SHUBASHINI.B[1], DR.ANTONY SELVADOSS THANAMANI[2]

Research Scholar, Department of Computer Science, NGM College, Pollachi, India[1]

Head, Department of Computer Science, NGM College, Pollachi, India[2]

Abstract: Distruption Tolerant Network (DTN) Sometimes it's in form of Delay/Disruption Tolerant Networking. Networking once involved huge computers that took up a large room and were stationary. Now networking devices are tiny and mobile. In a DTN network there may be repeated Disruptions or long Delays in the link between the network devices. In DTN an approach to computer network structural design that aims to attend to the technical issues in mixed networks that occurrence require in constant network connectivity. Delay Tolerant Networks (DTNs) make possible the data transfer when mobile nodes were only from time to time connected. Due to be short of reliable connectivity, DTN routing frequently follows store-carry-and-forward; i.e., after getting a few packets, a node carries that until it meet other node and then only it forwards the packets. while Delay tolerant network routing depend on mobile nodes to forward packets for other node, the routing concert (e.g., the amount of packets deliver to destinations) depends on whether the nodes comes in touch with every one or not.

Keywords: Delay Tolerant Networks (DTN); Epidemic; fuzzy; Prophet; Store-Carry-Forward, contact.

I. INTRODUCTION

Due to ambiguity and uncertainty of opportunistic network environment a fuzzy based Protocol is proposed to find the destination node in shortest time with less buffer usage Fuzzy-spray can reduce overall latency in DTN by intelligently selecting appropriate messages to send to the relay-node during its next contact time. It uses fuzzy logic to prioritize messages that are stored in the buffer, based only on local parameters from each message, namely forward transmission count and message size. There is no need to know a priori information about network such as node mobility model, or node-distribution across the deployed area. The simulation results show that fuzzy-spray has the best performance in terms of overall speed of delivery, and lowest average message delay compared with other existing algorithms. The protocol is based on two parameters: the Forward Transmission Count (FTC) and the message size. These parameters are input to a fuzzy rule which prioritizes the messages to be transmitted. Selected messages are broadcast to all the neighbors. The forwarding and replication techniques are the same as Epidemic (always and unlimited). The queue management is destination independent and is based on the message priority.

II. EMPIRICAL REVIEW

V. Cerf, S. Burleigh, A. Hooke (2000) This article describe an architecture for disruption-tolerant networks, and is an evolution of the architecture originally designed for the Interplanetary Internet, a communication system envisioned to provide Internet-like services across interplanetary distances in support of deep space exploration. This document describes an architecture that addresses a variety of problems with internetworks having operational and performance characteristics that make conventional (Internet-like) networking approaches either unworkable or impractical.

I.R. Chen, F. Bao, M. Chang, (2013) The Delay tolerant networks (DTNs) are characterized by high end-to-end latency, frequent disconnection, and opportunistic communication over unreliable wireless links. In this paper, we design and validate a dynamic trust management protocol for secure routing optimization in DTN environments in the presence of well-behaved, selfish and malicious nodes. We develop a novel model-based methodology for the analysis of our trust protocol and validate it via extensive simulation. Moreover, we address dynamic trust management, i.e., determining and applying the best operational settings at runtime in response to dynamically changing network conditions to minimize trust bias and to maximize the routing application performance. We perform a comparative analysis of our proposed routing protocol against Bayesian trust-based and non-trust based (PROPHET and epidemic) routing protocols. The results demonstrate that our protocol is able to deal with selfish behaviors and is resilient against trust-related attacks. Furthermore, our trust-based routing protocol can effectively trade off message overhead and message delay for a significant gain in delivery ratio. Our trust-based routing protocol operating under identified best settings outperforms Bayesian trust-based routing and PROPHET, and approaches the ideal performance of epidemic routing in delivery ratio and message delay without incurring high message or protocol maintenance overhead.

S.T. Cheng, C.M. Chen (2000) this paper describes an admission control algorithm for a multimedia server is responsible for determining if a new request can be accepted without violating the Quality of Service (QoS) requirements of the existing requests in the system. A novel quota-based admission control algorithm with sub-rating for two priority classes of requests is proposed in

ISSN (Online) : 2278-1021
ISSN (Print) : 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 3, Issue 9, September 2014

this study. The server capacity is divided into three partitions based on the quota values: one for each class of requests and one common pool shared by two classes of requests. Reward and penalty are adopted in the proposed system model. Given the characteristics of the system workload, the proposed algorithm finds the best partitions, optimizing the system performance based on the objective function of the total reward minus the total penalty. The experiment results show that the proposed algorithm performs better than one without sub-rating mechanism, and that the sub-optimal solutions found by the proposed approximation approaches are very close to optimal ones. The approximation approaches enable the algorithm to dynamically adjust the quota values, based on the characteristics of the system workload, to achieve higher system performance.

III. ROUTING PROTOCOLS IN DTN

Many Approaches have been adopted to achieve a reliable communication between the source and the destination. The proposed approaches have focused on a number of problems like improving the delivery ratio, optimizing the usage of available resources like buffer space, battery etc., increasing the scalability.

Mobility of nodes was seen as an obstacle to routing, but some approaches have used this very mobility in order to face the problem of discontinuity. Routing in Delay Tolerant Networks can be broadly classified into 3 types,

- Dissemination based.
- History Based.
- Incentive Based.

a. Dissemination Based

In Dissemination based routing in Delay Tolerant Network, the main focus is laid on better way for dissemination of the message in the network. Some of the basic ways that proposed are that of Epidemic[1],Spray and wait[5] Epidemic protocol makes sure that a message reaches destination by spreading the message in Omni-directions, just like a virus spreading an epidemic disease. By doing this, it is made sure that a message is under circulation and spreads throughout the network. But, the problem arises due to a large number of message transfers. Since in Delay Tolerant networks the nodes have a limited amount of buffer and energy (i.e. battery), epidemic protocol consumes a lot of battery for processing the messages and swapping them in and out of the buffer. Eventually all the nodes carrying the message will be left with just a single copy of message with them. Now these nodes wait until they directly come in contact to the destination node, so that they can transfer the intended message.

b.Incentive Based

These schemes take into consideration the fact that nodes in a DTN are controlled by rational entities like human, organizations etc. In such situations, it is obvious to assume that the nodes will behave selfishly in an attempt to conserve their resources and minimize the overheads. As for a message to travel from source to destination it requires the intermediate nodes to cooperate in forwarding the message, the delivery will be greatly hampered if the intermediate nodes are reluctant to cooperate. To manage message delivery under such conditions, incentive based routing was developed. In such schemes [3,15] every node is encouraged to pass a message for other nodes by giving an incentive. Incentive can be in form of a rating for a node. As the rating of a node increases, the messages sent by it will be preferred for forwarding by other nodes. Thus, resulting in higher chance of delivery of a message sent by the source. In a scheme called pair-wise Tit-For-Tat (TFT) was used while forwarding messages. Here a node forwards as much traffic for a neighbor as the neighbor forwards for it. Hence every node tries to forward more, so that its messages are sent smoothly over the network.

IV. EXPERIMENTAL RESULTS

A. Levy Walk Scenario

The scenarios are based on the internal movement of the nodes. Nodes are divided into two groups. The first group moving model is Stationary Movement model and the second movement model is Community model. The simulation area is 400*200 square meters and the messages are generated randomly by using Exponential distribution function. The interval time between two messages is 10-100 seconds. The buffer size is 100MB and the message size is 100-200KB.

B.Random Walk Scenario

In this scenario all settings are the same as the first scenario except the internal movement which is here set to Random Walk movement model.

C.Random Waypoint Scenario

All setting is the same as the first but the internal movement is Random Waypoint model.

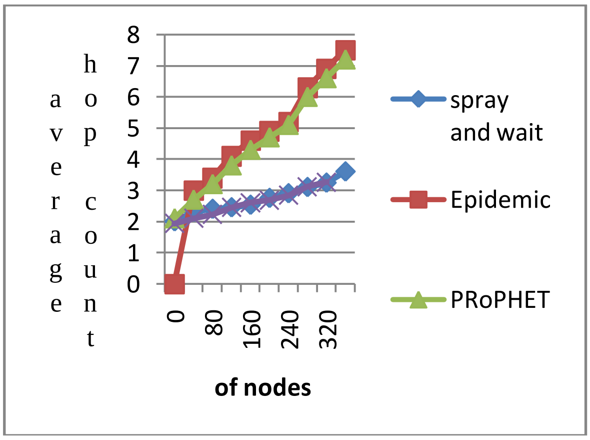

Fig 1: Average hop counts versus no. of nodes

In Figure 1, it's observed that the value of average hop count increases with an increase in the number of nodes. Its value is maximal when using the Epidemic protocol and minimal when using our proposed routing protocol (Decision *Fuzzy Spray*). Any other protocols performance is in between that of the Epidemic routing protocol and Decision Fuzzy Spray. Thereby a message sent from a source needs fewer hop count than before to arrive to the destination in our approach.

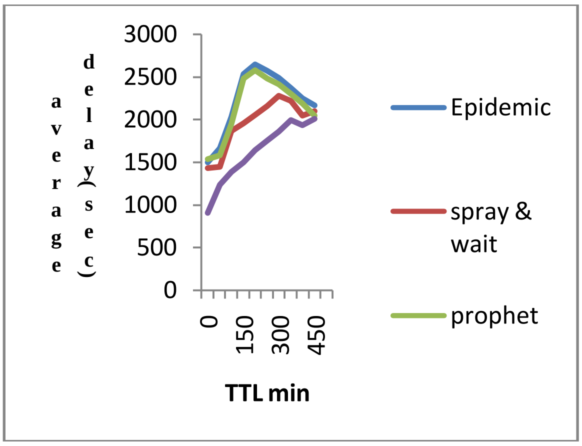

Figure 2 . Average message delay versus TTL

In Figure 2, it can be observed that the average message delay time increases when the time to live (TTL) increases, for all protocols. Its value is maximal when using the PRoPHET protocol, and minimal when using the Decision based Fuzzy Spray *routing* protocol. Again we prove that our approach is the best.

V. CONCLUSION

Decision based fuzzy-based routing protocol, called DFSW. Only two parameters were used here namely, energy value and probability of delivery as input to fuzzy spray system in order to figure the delivery expectedness value which determine the routing path for packets. During transmission it is needed only to pass delivery probability along with the actual message to the peer. The results show that this decision based fuzzy spray based multi constraint routing outperforms the existing routing algorithms. It always chooses the optimal path for routing with minimum routing overhead, and maximizes the throughput. This is attributed to the fact that fuzzy spray routing produces routes that are optimal and stable. As such, this reduces the possibilities of congestion in the network.

REFERENCE

[1] Shubashini .B ,Dr.Antony Selvadoss Thanamani," 'An opportunistic on routing protocols and persisting challenges in delay-tolerant networking" vol 2, issue 8, august 2014
[2] Bin Bin Chen, Mun Choon Chan. a Credit-Based Incentive System for Disruption Tolerant Network. IEEE Infocom, 2010.
[3] Dubois-Ferriere,H., Grossglauser, M., andVetterli, M. Age matters: efficient route discovery in mobile ad hoc networks using encounter ages. In ACM MobiHoc, 2003.
[4] M. Grossglauser, and D. N. Tse, Mobility Increases the Capacity of Ad Hoc Wireless Networks IEEE/ACM Transactions on Networking, August 2002.
[5] Q Li, W. Gao. A Routing protocol for socially selfish delay tolerant networks, Ad Hoc Network, 2011.
[6] P. Juang, H. Oki, Y. Wang, M. Martonosi, L. S. Peh, and D. Rubenstein. Energy-efficient computing for wildlife tracking: design trade-offs and early experiences with zebranet. In Proc. ASPLOS'02, October, 2002.
[7] F. Milan, J. J. Jaramillo, and R. Srikant. Achieving cooperation in multihop wireless networks of selfish nodes. In Proc. of workshop on Game theory for communications and networks (GameNets), ACM, New York, NY, USA, 2006.
[8] L. Qiu, Y. R. Yang, Y. Zhang, and S. Shenker. On Selfish Routing in Internet-Like Environments. In Proc. of ACM SIGCOMM, August, 2003.
[9] Thrasyvoulos Spyropoulos, Konstantinos Psounis, and Cauligi S. Raghavendra. Spray and wait An efficient routing scheme for intermittently connected mobile networks. In WDTN 2005:Proceeding of the 2005 ACM SIGCOMM workshop on Delay-tolerant networking, 2005.
[10] Y.-C. Tseng, S.-Y. Ni, Y.-S. Chen, and J.-P. Sheu, The Broadcast Storm problem in a mobile ad hocnetwork, Wireless Networks, 2002.
[11] A. Vahdat and D. Becker. Epidemic routing for partially connected ad hoc networks. Technical Report CS-200006, Duke University, April. 2000.

BIOGRAPHIES

B.SHUBASHINI is a Research scholar in Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi. She received her Master of computer science M.Sc (Cs) from Sri Ramakrishna college of arts and science for women , coimbatore under Bharathiar University, Coimbatore. She has presented a paper in National level conference and attended Workshop / Seminar. Her research focuses on mobile computing (Delay tolerant network).

Dr. Antony Selvadoss Thanamani is presently working as Professor and Head, Dept of Computer Science, NGM College, Coimbatore, India (affiliated to Bharathiar University, Coimbatore). He has published more than 100 papers in international/ national journals and conferences. He has authored many books on recent trends in Information Technology. His areas of interest include E-Learning, Knowledge Management, Data Mining, Networking, Parallel and Distributed Computing. He has to his credit 24 years of teaching and research experience. He is a senior member of International Association of Computer Science and Information Technology, Singapore and Active member of Computer Science Society of India, Computer Science Teachers Association, New York.