Volume 4, Issue 5, May 2014 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Routing Mechanism for the Improvement of Network Throughput

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Abstract: ***Nowadays with the increasing use of internet, rapid growth in the field of digital communication is observed. Hence, there is need to develop a technique that would improve the performance of the communication speed. This paper proposes a methodology to improve the throughput of the network with the help of adaptive routing algorithm. In this algorithm corresponding weight on possible path get find and as per lowest weight the shortest path assign from source to destination. This weight estimated using the Poisson traffic generator function provided by MATLAB software. The variable traffic load and mobility of the node may challenge to maintain stability in updating information. To maintain this stability there is another algorithm is introduced to improve throughput of the network by comparing two algorithms and selecting better one for best result.***

Keywords: Computer network, Poisson traffic generation, adaptive routing, shortest path algorithms, network through put

I. Introduction:

In the field of computer networking, the network like internet, LAN cellular network, MAN utilised for conveying data, music, image, video, voice like information from one source to destination over a bounded area or can be on anywhere in the world. There will be motive behind it to send this information over the network is in proper way such as at high speed, without any loss of information content without experiencing high traffic load from specific source to specific destination.

In this paper, the problem estimate because of heavy traffic, blocking probability are get decreased with the help of routing algorithm implemented on network. The traffic is generated here is using Poisson traffic generation [10] [9]. This helps to improve throughput of network by collecting the information about its each and every node traffic that placed on the path of source to destination. When all nodes traffic load is known, its distance is defined from the source node then it is easy to find blocking probability also [10] [3]. When source wants to connect to destination via a call then very first it is necessary to know about status of every node which connect in between path of source to destination. In this status it is defined how much blocking probability, which node is ready to connect, how much holding time required to connecting [10] [9]. This status of the node helps to find the shortest path between the source and destination. When this shortest path is determined the packet is send over the network and resulting network throughput is increased [1]. And call is propagates over the network with desired benefits like less holding time, minimum blocking probability, less traffic load, less distance between the source and destination.

Thus resulted in enhanced throughput, better routing path compare to other routing path in network which has less traffic hence call connect easily and faster. The source and destination defined are normally adaptive can be change as per concerned, hence routing has not on specific source and destination so there is routing table which updates continuously on the basis of distance between node, adaptive weights, holing time, or traffic load. The all traffic information based on arrival time, holding time, arrival rate and maximum arrival interval that can be formulated using Poisson traffic generating model [10].

II. Literature survey

PAPER 1 : Implementation of shortest path for networks Topology using MATLAB

The fundamental issue that is interconnection networks communication that has been computed optimally utilised the advantages of a parallel computer. *k-k* routing where the k proper packets send and receive in every processing unit PU is major basic communication problem. In homogeneous destination distribution, the routing is performing more efficiently and easily. In case of the random source and destination pattern, the results in delayed and overflowing buffer because of trivial pattern which lead to congestion while on routing. To reach from particular source to particular destination, use shortest path in which the total cost is to minimize the path in given network. An archetypical combinatorial optimization problem with verity of settings in widespread applications is its shortest path problem which is investigates extensively. The GUI is resulted for fast output of results which is based on Dijkstra Algorithm in this paper. The results of this algorithm are comparatively independent of network size and topologies for most of source-destination pairs. For node 4 to 30 nodes the standard network topologies implemented in MATLAB simulation.

In the evergreen industry the computer industry is there, especially for communications, automations, networking like applications. Inter-connection of computers held for transformation of information, data in very safely, efficiently, in

high speed manner, this network referred as a computer network. In this paper first of all there is concept of computer network and routing types such Bellman Ford Algorithm which is a decentralized algorithm and Dijkstra Algorithm which is a global routing algorithm as well as why routing is preferred is introduced. Then the most important routing topology for dynamic routing is estimate in problem evaluation. After problem formulation the methodology is there where the shortest routing path from particular source to another particular destination is stated. In next section, the simulation framework with the help of GUI feature of MATLAB is represented for shortest path using Dijkstra routing algorithm.

To solve routing problem a GUI frame is presented in this paper. One of the best paths can be gained by the use of this algorithm. With least information this algorithm resulted in best algorithm rather than another in which the more information is required. The MATLAB feature such as Graphic User Interface is implemented here for shortest path achievement. There is an advantage of it, that it gives high convergence rate.

In future development, the examination of link path simulation the issue is OSPF routing optimization problem. The multiple sub paths depend on formulations which are not subject of splitting. The other way is face with the searching of cutting inequalities of other types. In the failure robust IP networks valid for problem is problem of routing optimisation an open issue when it remains as it is.

PAPER 2 : Poisson Packet Traffic Generation Based on Empirical Data

An empirical traffic data dependent Poisson packet traffic algorithm is generated in this paper. Basically this algorithm involves two steps for forming Poisson packet traffic. In this two step first is consist Real traffic trace analysis, where in another step, there is generation of equivalent synthetic Poisson traffic. In new synthetic Poisson traffic the statistical parameter of first order is remains fixed as it is. With the help of negative exponential probability distribution with random manner new packet inter-arrival time series is generated using known mean, in which size of newly generated packet is described in random manner. A truncated exponential probability distribution is implemented since packet sizes are minimum and maximum.

The empirical data based Poisson packet traffic generation is described in this paper in detail. Normally packet traffic is defined with the help of major two properties such as inter arrival time and packet length sequence. The first step is analysed real packet traffic trace file for retrieving certain parameter. In next step a trace of new equivalent Poisson packet traffic is generated and truncated with exponential probability distribution. In second section of this paper generated packet traffic in fitted and implemented in exponential distribution in next section.

There is difference between connectionless-oriented packet switched data traffic and connection based circuit switched voice traffic in various basic ways which implemented in packet switching that not applicable for traffic models. With the classical Poisson concepts for modelling analysis results in speed enhance and highly- aggregated packet traffic in network. Since the Poisson equivalent traffic provides well-known and well defined conditions in simulation, its application is more reasonable in network optimisation and simulation technique. In this paper the equivalent Poisson packet traffic generation using an algorithm is explained, where interarrival time and packet size series in concerned with its properties are introduced. The basis of this algorithm is empirical data. This paper concluded that even Poisson traffic model enable to describe the major properties of real traffic, Instead of the Poisson equivalent traffic provides well-known and well defined conditions in simulation, its application is more reasonable in network optimisation and simulation technique. When equivalent Poisson and empirical packet traffic gets together then, resulted in the better option in an application.

PAPER 3 : Adaptive Routing Using Expert Advice

Adaptive routing algorithm mainly provides major advantages in maintenance of packet switched network communication. These algorithms gives better results in quality of service, such as quality in reducing order of packet delay, packet loss ratio. In sequential decision problem there are combining expert advice assumed in machine learning algorithm. The algorithm should perform any type of nature of system and asymptotically as well as is the goal of this algorithm. It shows survey on algorithm which interpret how different packet adaptive routing is used in switching networks.

In adaptive routing there is constantly network state get monitored , then collect the information after accumulating these information it update in routing table. The base of this paper is sequential decision problem in which decision is not on probabilistic manner and performed relative to set of experts for maximum possible nature of it. Hence an asymptotically the equivalent average loss is achieved as per best expert. For avoid this problem owner make its own decision but before making result he access the expert advice and then combined decision make its result more precise. After sequential prediction, the theoretical results are making related to it, which represent possibility to of online prediction algorithm. The next to it is routing model and shortest path routing problem. It gives expert decision on source to destination path. Sometimes one expert deals with one path for simplicity. The overall conclusion of expert algorithms and their applications explained in this paper. The algorithm implemented on full information and partial information. The full information gathered from by following perturbed leader, exponential weighting and tracking best expert. Where the partial information collected by label efficient decision and multi armed bandwidth problem or combination of both. This algorithm base on smallest distance and weight calculated from source to destination path.

The overview of machine learning algorithm with important class discussed in this paper for sequential decision problems. These algorithms give effective methods for combination of expert advice in the way that the algorithms have asymptotically the equal behaviour as best expert. It work for any type of natures of system,
Hence it is well accepted. To improve the quality of service the sequential decision algorithms is implemented in this paper in packet switching network for adaptive routing. The requirement of information availability in routing algorithm was founded by differential scenarios. In practical application these algorithms are based on quantity of prior information regarding with traffic is available on network. The aim of expert algorithm to design better work for rare, unknown, behaviour of the network.

PAPER 4 : Analysis of Shortest-Path Routing Algorithms in a Dynamic Network Environment

In computer network the network face by various problems during the exchange the information over the network. For degradation of performance of network the factors are responsible are traffic overload hence increased blocking probability, adaptive nature of routing which resulted in oscillatory response. This paper explained the issues in perspective of control theory and routing decision making
and its behaviour for shortest path algorithm in descriptive manner in shortest path algorithm generally analysis is done over minimum path between source to destination. The source route the information over the network by selecting minimum distance and traffic availability then update it in periodic manner. The Distance vector algorithm and link state algorithm are two classes of algorithm implemented here, which consist of routing table in each node in network. It is able to adapt topological changes and traffic changes with updating and uploading relative data of it thus reduce the traffic overload of network. But as varying high networking speed tends to unpredictable traffic pattern. Hence the traffic rates also uneven, capacity of path is tends dynamic in nature. With help of shortest path algorithm all this adaption results may be in performance degradation. In this paper perspective of control and decision making examined and analysed shortest path for adaptive nature.

There are some disadvantages related to this paper, such as it is very difficult find better path when there is estimation error is more. Thus routing algorithm should be required more adaptive with heavy traffic load and its shifting. Routing required more information in case of high traffic load and also coordinated with heavy traffic load changing. There should be sustained proper stability over on adaptation. With considering capacity of path for traffic the multipath algorithm is efficient in load balancing. There is difficult to make continues routing decisions allow for over loaded traffic and changing rapidly because it results in oscillation and also rout updating periodically is some sort of costly to implement.

PAPER 5 : SMART: Statistically Multiplexed Adaptive Routing Technique for Ad Hoc Networks

The problems related to maintenance and multiple routes in ad hoc network are discussed in this paper. The source node estimates the route by considering each neighbour node. In possible neighbour node each provides multiple paths. The related delay should be taken in to consideration from each neighbour as next hop. In this paper the next node neighbours potential evaluated on-line and traffic routed strategies are updated adaptively for number of neighbours. This paper gives this approach and defined traffic pattern using two types such as Poisson traffic and self–similar types. For static topologies algorithm is affected for bursts in traffic, with reduces buffer losses, packet delay by selecting less congested routes. This paper presented simulation results which gives effectiveness in mobility and using self similar traffic. The random waypoint model in which node moves varying speed by adapting degree of mobility. There is also the bursty nature with adverse effect is illustrated using experiment of self similar traffic and high congestion in a mobile.
In low network loads the mobility and congestion both handles properly with help of unified approach.
In this paper the adaptive routing gives several important observations such as in multihop networks, the effect of sequence of queue deals with different type of traffic for load balancing. The routing algorithm is also proactive in nature, basically in heavy and bursty traffic where high degree of mobility involved. Because of multiple paths there are several advantages such as availability of alternative path, better utilisation with high performance in resources, traffic pattern in extremely bursty network can ready to tackle all types of traffic.
Load balancing is another important advantage of adaptive routing where alternative path available for different weight. The adaptive algorithm helps in balancing load over on network.

III. Conclusion

The concluded from this paper, the network throughput is enhanced by aggregating information about corresponding nodes which form the path between source and destination which is updated in interval by using adaptive routing algorithm. Traffic load is finding by using Poisson traffic generator model in MATLAB software which gives holding time, arrival rate in maximum time and corresponding blocking probability is finding here easily. Also the distance from varying source to each node get find and depending on routing distance and traffic load information shortest path implemented from source to given destination. This help to determine shortest path with minimum blocking probability, less holding time, less congestion and traffic load route from source to destination.

References

[1] Amit Kamboj* & R. S. Chauhan*, *"*IMPLEMENTATION OF SHORTEST PATH FOR NETWORKS TOPOLOGY USING MATLAB*"International "Journal of Information Technology and Knowledge Management January June 2009, Volume 2, No. 1, pp. 155-158*

[2] Sudip Misra and B. John Oommen, ”Dynamic Algorithms for the Shortest Path Routing Problem: Learning Automata-Based Solutions” IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART B: CYBERNETICS, VOL. 35, NO. 6, DECEMBER 2005.

[3] Andr´as Gy¨orgy1, Gy¨orgy Ottucs´ak2 “Adaptive Routing Using Expert Advice”, The Computer Journal Vol. 00 No. 0, 2005
Yagvalkya Sharma 1, Subhash Chandra Saini 2, Manisha Bhandhari 3, 1, 2,3Electronics Dept. University College of Engg. RTU, Kota “Comparison of Dijkstra’s Shortest Path Algorithm with Genetic Algorithm for Static and Dynamic Routing Network” *International Journal of Electronics and Computer Science Engineering* 416

[4] Nenad S. Kojić1, Marija B. Zajeganović Ivančić1, Irini S. Reljin2 and Branimir D. Reljin2, “New algorithm for packet routing in mobile ad-hoc networks” JOURNAL OF AUTOMATIC CONTROL, UNIVERSITY OF BELGRADE, VOL. 20:9-16, 2010

[5] *Zheng Wang, Jon Crowcroft,”* Analysis of Shortest-Path Routing Algorithms in a Dynamic Network Environment*”* Department of Computer Science, University College London,Gower Street, London WC1E 6BT

[6] Mr. Kuldeep Kumar ” Role of Genetic Algorithm in Routing for Large Network” et.al / International Journal on Computer Science and Engineering (IJCSE)

[7] Nenad S. Kojić1, Marija B. Zajeganović Ivančić1, Irini S. Reljin2 and Branimir D. Reljin2,” New algorithm for packet routing in mobile ad-hoc networks” JOURNAL OF AUTOMATIC CONTROL, UNIVERSITY OF BELGRADE, VOL. 20:9-16, 2010©

[8] Mohd Yazid Idris, Abdul Hanan Abdulah, Mohd Aizaini Maarof, “A Synthetic Network Traffic Generator Tool for Normal and Anomaly Traffic Model”Faculty of Computer Science and Information System Universiti Teknologi Malaysia, Proceedings of the Postgraduate Annual Research Seminar 2006

[9] SARVESH S. KULKARNI *Department of Electrical and Computer Engineering, Villanova University, Villanova, PA 19085, USA,* G.R. DATTATREYA∗, *Department of Computer Science, University of Texas at Dallas, Richardson, TX 75083, USA,* “SMART: Statistically Multiplexed Adaptive Routing Technique for Ad Hoc Networks ∗”Wireless Networks 10, 89–101, 2004

[10] Andrej KOS, Laboratory for Telecommunications, University of Ljubljana, Faculty of Electrical Engineering Tržaška 25, 1000 Ljubljana, Slovenia, Janez BEŠTER Laboratory for Telecommunications University of Ljubljana, Faculty of Electrical Engineering Tržaška 25, 1000 Ljubljana, Slovenia ” Poisson Packet Traffic Generation Based on Empirical Data”.

[11] LIPING FU*.Department of Civil Engineering, University of Waterloo, Waterloo, ON, Canada, N2L 3G1L. R. RILETT,Department of Civil Engineering, Room 303D CE/TTI Tower, Texas A&M University, College Station, U.S.A.**,”** EXPECTED SHORTEST PATHS IN DYNAMIC AND STOCHASTIC TRAFFIC NETWORKS**“** Transpn Res.-B, Vol. 32, No. 7, pp. 499±516, 1998.

[12] Sudhanshu Choudhary Sha¯ Qureshi, Indian Institute of Technology, Kanpur, India,” Performance Evaluation of Mesh-based NoCs: Implementation of a New Architecture and Routing Algorithm” International Journal of Automation and Computing 9(4), August 2012, 403-413, DOI: 10.1007/s11633-012-0661-1

[13] “Flexible High Performance Tra_c Generation on Commodity Multi{Core Platforms” Nicola Bonelli, Andrea Di Pietro, Stefano Giordano, and Gregorio Procissi CNIT and Universit_a di Pisa, Pisa, Italy

[14] “On Path Selection for Traffic with Bandwidth Guarantees” Qingming Ma Peter Steenkiste, Computer Science Department, Carnegie Mellon University, Pittsburgh, PA 15213, USA

[15] Rakesh Kumar1 and Mahesh Kumar2,1Department of Computer Science & Applications, Kurukshetra University Kurukshetra, Haryana, India, 2Research Scholar, Department of Computer Science & Applications, Kurukshetra University Kurukshetra, Haryana, India.. “Reliable and Efficient Routing Using Adaptive Genetic Algorithm in Packet Switched Networks” IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 1, No 3, January 2012

[16] Yasuhiro Urayama and Takuji Tachibana,” Virtual Network Construction with K-Shortest Path Algorithm and Prim’s MST Algorithm for Robust Physical Networks” ,Proceedings of the International MultiConference of Engineers and Computer Scientists 2014 Vol I, IMECS 2014, March 12 - 14, 2014, Hong Kong.

