International Journal of Engineering and Advanced Technology (IJEAT)
ISSN: 2249-8958 (Online), Volume-8 Issue-4, April 2019

Link Based Routing Algorithm for the Desired Quality of Service of a Network

R.Bhargava Rama Gowd, S.Thenappan, GiriPrasad M.N

Abstract—The routing algorithms play a vital role in the network performance calculation where Quality of service matters there are two algorithms in routing i.e Local and Global Routing. Decisions can be taken effectively in local routing rather than Global routing [1]. This methodology altogether lessens the overheads connected with keeping up worldwide state data at every hub, which thus enhances the performance of the routing. In this paper we present a Restricted QoS steering calculation taking into account Probability of Blocking Link (LBP). We compare the performance of the algorithm w.r.t. 1) Delay between source and destination 2) Nodes 3)Consumed Energy 4)Alive Hubs 5) Dead Hubs 6) Dynamic Hubs 7) Rest Hubs 8) Routing Overhead 9) Packets Conveyed against the Constraint Based Routing(CBR) and Widest Shortest Path(WSP).

Keywords: CBR, Delay, Localized Routing; blocking probability, WSP

I. INTRODUCTION

Now a days Bandwidth is key role in the network point of view and various QOS Parameters like bandwidth, delay and Jitter etc. one of the constraint that meet QOS to be achieved is by Routing Algorithms. In particular link selection and path selection play a key role while dealing with routing algorithmThe QoS expression in the systems administration setting indicates an ensured level of administration imperatives which not be surpassed [2]. QoS routing alludes to the directing calculations that select ways with adequate remaining assets to meet the QoS imperatives. Despite the fact that there are numerous QoS measurements, transmission capacity is the most utilized metric as a part of assessing QoS directing calculations. In local routing each node knows the information of the other node and it is easy to identify if the failure occurs [3] showed the importance of the local routing and discuss the lacuna in Global routing. Hubs don't have to trade any worldwide system state data, which in turn avoids all problems associated with it as mentioned sometime recently. A vital part of restricted directing is that every source hub is obliged to keep up a foreordained arrangement of hopeful ways to all other destination hubs [4].

Manuscript published on 30 June 2019.
***** Correspondence Author (s)
R. Bhargava Rama Gowd, Research Scholar, Dept of ECE, JNTU,Anantapur, Anantapur, India.
Dr.S.Thenappan, Professor ECE Department, KNSIT,Bangalore,India.
Dr.GiriPrasad M.N, Professor,Dept of ECE, JNTU,Anantapur, Anantapur, India.

II. RELATED WORK

In worldwide steering calculations every hub needs to have a sensibly a mode perspective of the entire system topology, especially the worldwide connection state data with a specific end goal to perform directing. Then again, as the system topology and the accessibility of assets continue changing, keeping up an exact worldwide system perspective is unfeasible and includes impressive activity and handling overheads to the system.

In this paper we proposed the network consideration parameters where we defined the energy consumed, blocking probability, routing overhead and we will compare the CBR and WSP Qualityof service (QoS) steering can give expanded system usage contrasted with directing that is not delicate to QoS prerequisites of activity. On the other hand, there are still solid worries about the expanded expense of QoS directing, both as far as more mind boggling and regular calculations and expanded steering convention overhead. The fundamental objectives of this paper is to find the best route paths in the network To start with, we distinguish the parameters that focus the convention movement overhead, specifically (a) arrangement for activating upgrades, (b) affectability of this strategy, and (c) cinch down clocks that farthest point the rate of redesigns.

III.ALGORITHMS

In this paper we propose algorithm called Link-Based Localized Routing (LBP) which depends on the normal blocking likelihood of connections rather than paths.

A. Constraint Based Routing(CBR) Algorithm :

A constraint could could be least transmission capacity obliged per join (otherwise called transfer speed ensured limitation), end-to-end delay, most extreme number of connections navigated, incorporate/avoid hubs. CSPF is generally utilized as a part of MPLS Movement Building. The directing utilizing CSPF is known as Requirement Based Steering (CBR).

CBR obliges components for: (1) exchanging state data (e.g., resource accessibility) among CBR forms, (2) Keeping up this state data, (3) collaborating with the current intra-space steering conventions, and (4) Pleasing traffic requirements[7].

CBR discovers numerous routes utilizing CBR strategy and the best route will be chosen which will be having an insignificant deferral (delay).

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication (BEIESP)

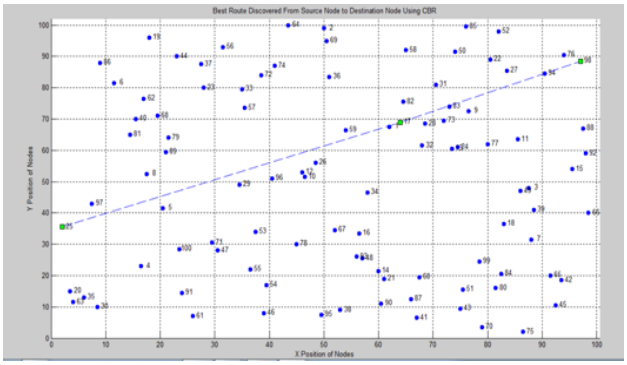

Figure1. Best route Found from Source Hub to Destination Hub Utilizing CBR

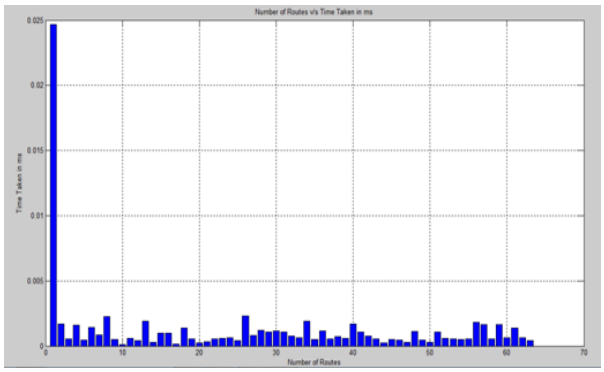

Figure 2. No of routes v/s Time taken in ms

Fig 1. Demonstrates the Best route found from source hub to destination hub out of numerous hubs and Fig 2. Demonstrates the Time Deferral Diagram figured against the no of routes found through CBR. The CBR will measures the postponement, So The route which is having the most reduced deferral will be considered as a best route.

B. Widest Shortest Path (WSP) Routing :

The most extensive way issue, otherwise called the bottleneck briefest way issue or the greatest limit way issue, is the issue of discovering a way between two assigned vertices in a weighted diagram, augmenting the heaviness of the base weight edge in the way[8]. Case in point, if the diagram speaks to associations between switches in the Web, and the heaviness of an edge speaks to the data transmission of an association between two switches, the most stretched out way issue is the issue of discovering an end-to-end way between two Web hubs that has the greatest conceivable transfer speed. The heaviness of the base weight edge is known as the limit or data transfer capacity of the way. It is conceivable to adjust briefest way calculations to process amplest ways, by altering them to utilize the bottleneck separation rather than way length. Be that as it may, by and large considerably quicker calculations are conceivable [5].

WSP directing finds different routes and the best route will be chosen as, the route with most reduced separation and delay.

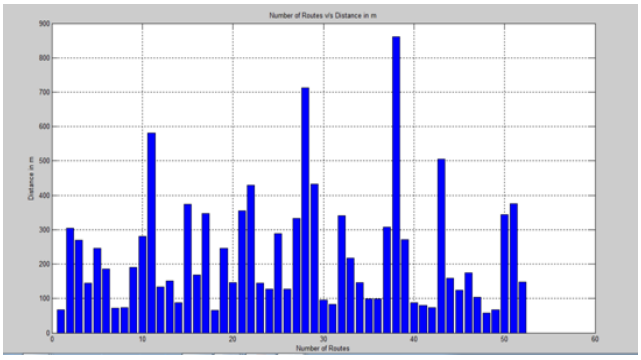

Figure 3. No of routes v/s Distance in m

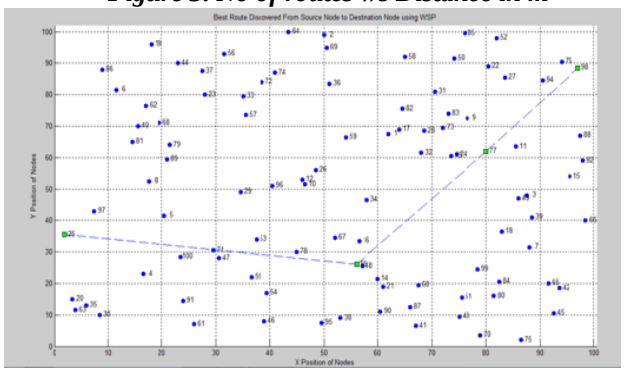

Figure 4. Best route Found from Source Hub to Destination Hub using WSP

Fig.3Demonstrates the Diagram of No of routes against the Separation. [6] WSP measures the Partition taken by each of the route towards the destination and the route which is having the most decreased detachment will be considered as a best route. Fig 4.Show the best discovered route from source center point to the destination center

C.Link- Based Localized Routing (LBP Based Routing) :

LBP is the most recent proposed restricted QOS directing calculation. It is a source based restricted steering calculation where source hub takes the directing choice. In spite of the fact that LBP offers the general practical casing of past restricted calculations, it contrasts on the grounds that it is taking into account join quality as opposed to way quality. LBP can judge the nature of a way by measuring the nature of all connections constituting this way. The nature of every individual connection is figured as the normal blocking likelihood of all stream endeavors along this connection. Every hub keeps up the blocking probabilities of its whole cordial connections which are figured as the aggregate number of blocked streams over the aggregate number of streams endeavored through a specific connection. In like manner all other restricted steering calculations, every source-destination pair keeps up a pre-portrayed arrangement of applicant ways. The hopeful way determination technique utilized as a part of this calculation is the same as the one connected CBR

1) *Messages:* Another setup message is made when another stream touches base at the source hub; it is then loaded with the receiver address, the stream QoS imperative and the applicant way it ought to go along, and afterward sent towards the destination.

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication (BEIESP)

As the setup message comes the way, it checks if the consequent connections have adequate lingering data transmission to fulfill the stream QoS limitation. At the point when the setup message touches base at its destination demonstrating that all connections along the way can oblige the asked for data transmission, the setup message is changed over to a win message and sent back along the same hopeful way to the source hub. Notwithstanding, if one of the connections along the chose way does not have adequate leftover transmission capacity, the stream is announced blocked and the setup message is changed over to a come up short message. When the source hub gets the achievement message, the obliged transmission capacity part of the chose way is saved for the length of time of the stream. A discharge message is made and sent by the source hub after the stream length of time times out to discharge the saved data transmission along the way.

2) Routing Mechanism: LBP depends on the normal blocking likelihood of the bottleneck join keeping in mind the end goal to take steering choices. As opposed to CBR, which performs steering in light of the way's blocking likelihood, the proposed calculation utilizes a more exact strategy by checking individual connection measurements. Whether a stream is conceded or rejected, the source hub gets the estimation of the most elevated blocking likelihood gathered amid the association endeavor. The normal worth is then relegated to the relating way to mirror its quality worth. In LBP when another stream is to be directed, the quality estimations of all applicant ways are contrasted and the way and the most minimal, i.e the best, esteem is decided to route the flow.LBP judges the nature of a way in light of the nature of every single individual connection constituting that way.

LBP discovers single route with low stream likelihood, where as if there should be an occurrence of CBR and WSP calculations numerous routes are found to find a single best route.

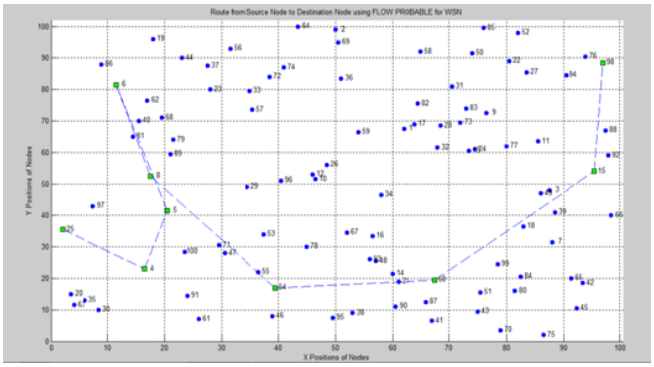

Figure 5:Route from Source Hub to Destination Hubusing LBP

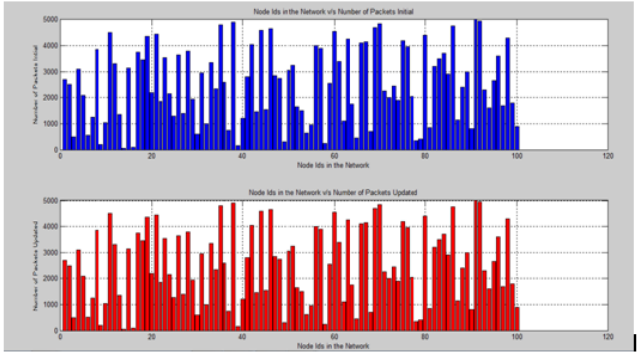

Figure 6. : Hub Id's in the network v/s Initial and Updated Bundles (Packets)

Fig. 5 and Fig. 6 demonstrates the Route from Source node to destination node using the Flow Probable (LFB) and The no of packets Conveyed from each of the hubs previously and after routing.

IV. PERFORMANCE EVALUATION

This segment assesses the execution of LBP. The execution of the proposed calculation is assessed utilizing MATLAB test system. COMPARISON PARAMETERS:

A. Delay between Source and Destination :

The time taken for the Repeat request is to go from the sender node to the destination node once the packet has received the receiver sends the Reply to the Source node.

$$E2E_{delay} = t_{stop} - t_{start}$$

Where,

t_{stop} = *This is the Time at which RRPLY is recieved*

t_{start} = *This is the Time at which RREQ is send*

B

C. Energy unused for the packet delivery from the node to node is calculated as follows consumed Energy :

$$TE_c = \sum_{i=1}^{l} E_i$$

Where,

l = *number of links*

E_i = *Energy consumed by the* i^{th} *link*

The energy consumed by the ith link given by

$$E_c = 2E_{tx} + E_{amp}\, d^{\gamma}$$

E_{tx} = *energy required for data transmission*

E_{amp} = *energy required for data generation*

d = *distance between two intermediate nodes*

γ = *environment factor*

$0.1 \le \gamma \le 1$

The Standard environment factor

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication (BEIESP)

D. Routing Overhead :

The Routing Overhead is given by the formula

$$Routing\,Overhead = \frac{Number\ of\ Control\ Packets}{Number\ of\ Data\ Packets}$$

Active Hubs:

The number of dynamic hubs is given by the formula

Nactive = **T**hubs – **N**hubs

Where, **T**hubs –Total no of hubs in the network

Nhubs- Number of hubs in route

E. Sleep Hubs :

The quantity of rest hubs in the network is given by

Nsleep = Thubs – Nactive

F. Dead Hubs :

The number of deadhubs in the network givenas :

Count of no of nodes whose Energy E<**B**/4

Where B – Initial Energy

G. Alive Hubs :

The quantity of alive hubs in the system given as

Energy E>= **B**/4

H. Flow Probability :

The stream likelihood (Flow probable) is calculated using:

$$P_b = B(E,m) = \frac{\frac{E^m}{m!}}{\sum_{i=0}^{m} \frac{E^i}{i!}}$$

- Pb is theblocking probability,
- *m* is resources
- $E = \lambda h$ is the normalized load (offered traffic stated in Erlang).

V. RESULTS

COMPARISIONS OF CBR, WSP, LBP

i. Time taken in milli-seconds

ii.

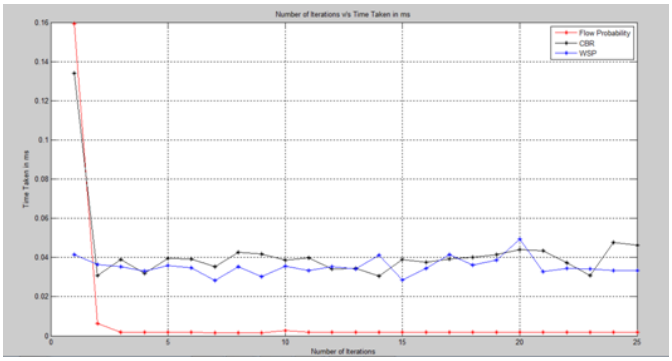

Figure 7. Number of loops v/s Time taken

iii. Number of Hops

iv.

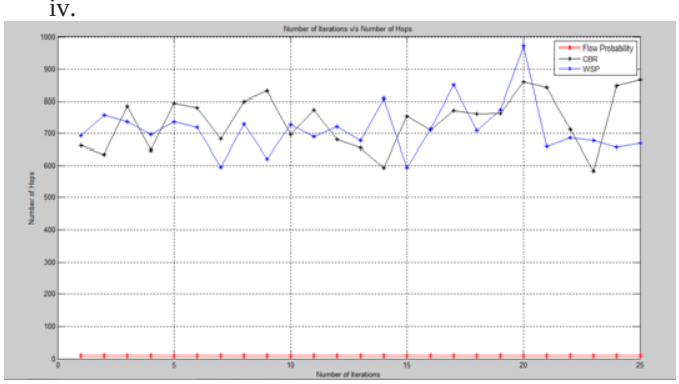

Figure 8.Number of iterations v/s Number Of Hops

v. Consumed Energy

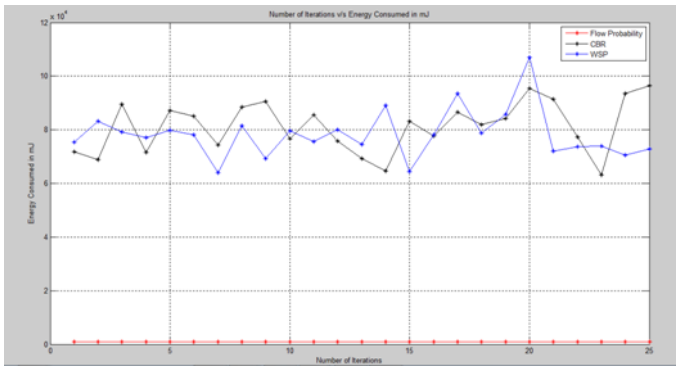

Figure 9. Number of iterations v/s Energy Consumed

vi. Alive Hubs

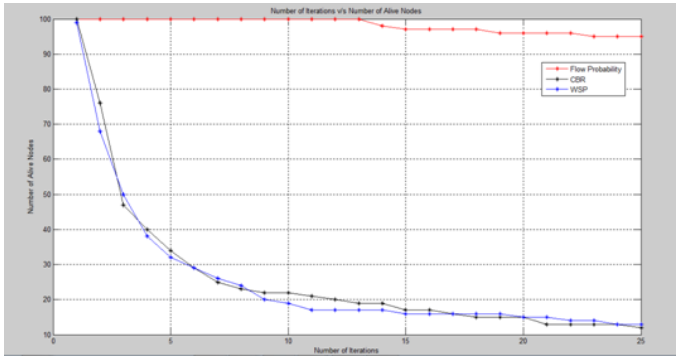

Figure 10. Number of iterations v/s Number of Alive Hubs

vii. Dead Hubs

viii.

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication (BEIESP)

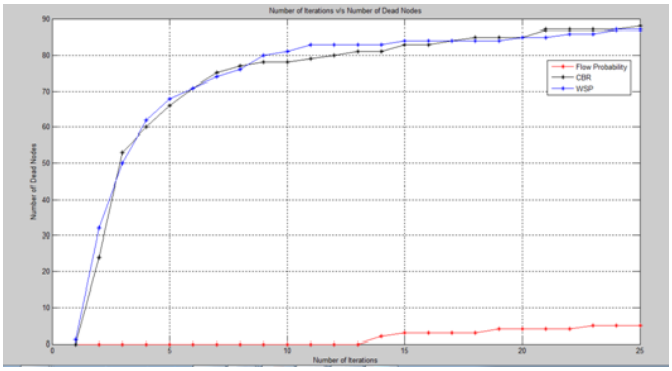

Figure 11. Number of iterations v/s Number of Dead Hubs

ix. Rest(Sleep) Hubs

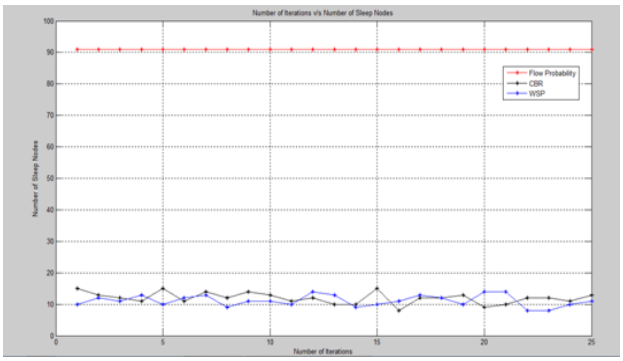

Figure 12. Number of iterations v/s Number of Rest Hubs

x. Dynamic(Active) Hubs

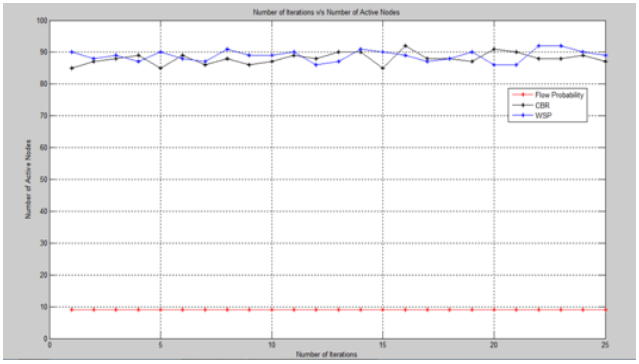

Figure 13. Number of iterations v/s Number of Active Hubs

xi. Routing Overhead

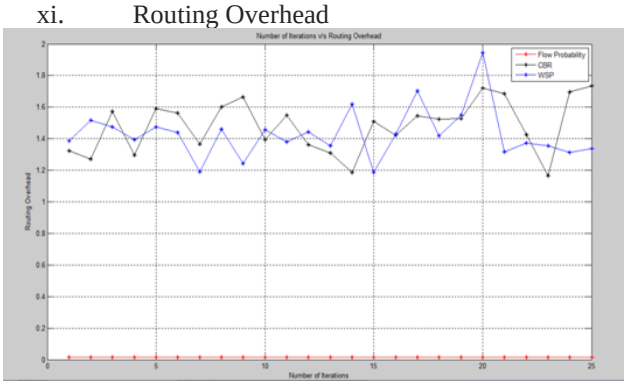

Figure 14. Number of iterations v/s routing Overhead

xii. Packets Conveyed

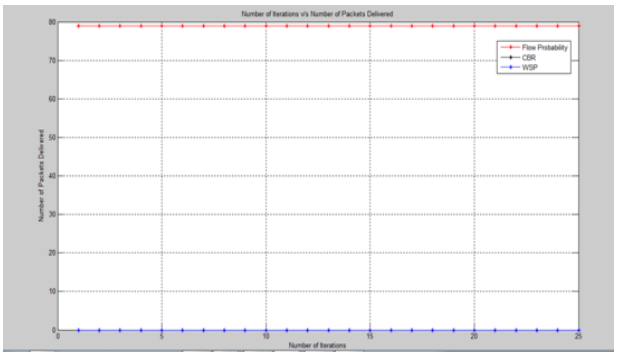

Figure 15.Number of iterations v/s Number of Packets Conveyed

VI. CONCLUSION

The paper presents an outline of limited directing ideas was introduced; another kept restricted QoS steering calculation was proposed, which is considering the connection blocking probabilities to judge the way quality. The execution of the proposed calculations was thought about w.r.t all parameters, for example, Postponement, Bounces, Vitality Utilization, Alive Hubs, Dead Hubs, Rest Hubs, Dynamic Hubs, Steering Overhead, Parcels Conveyed. Stream Likelihood Calculation (LBP) is the best contrasted with existing restricted calculations CBR and WSP.

In conclusion, the simulation results shows that the Link based routing gives better network performance in terms of energy consumed , number of routes etc can be satisfied by the QOS parameters and is compared with CBR and WSP. The link routing shows (LBP) better results in terms of Blocking probability as well.

REFERENCES

1. Steenstrup,Routing in Communications Net-works.Englewood Cliffs, New Jersey: Prentice-Hall, 19
2. S. Nelakuditi, *et all.*, "On localized control in QoS routing,"Automatic Control, IEEE Transactions *on*, vol. 47, pp. 1026-1032, 2002.
3. Nelakuditi, "Localized approch to providing quality-of-service," Ph. D., Dept. of Computer Science and Engineering, University of Minnesota, Minneapolis, 2001.
4. S. Chen &Nahrstedt, "An Overview of Quality-of-Service Routing for the Next Generation HighSpeed Networks: Problems and Solutions," IEEE Net-work Magazine,vol. 12, pp. 64 -79, 1998.
5. Alabbad & M. E. Woodward, "Localized Credit Based QoS Routing: Performance Evaluation Using Simulation," *in* the 40th Annual Simulation Symposium,Huntsville, AL 2006.
6. R. Jain, al., A quantitative measure of fairness and discrimination for resource allocation in shared computer system: Eastern Research Laboratory, Digital Equipment Corp., 1984.
7. Golaup&Aghvami, "A multimedia traffic modeling framework for simulation-based performance evaluation studies," Computer Networks, vol. 50, pp. 2071-2087, 2006
8. Camps, *et all.*, "Statistical Distribution of Traffic Sources in Network Simulation Tools," Proceedings of the World Congress on Engineering and Computer Science, 2008

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication (BEIESP)