is that the IntelRate controller can always control the variations of the IQSize around the TBO position. Therefore, the buffer never overflows and packets are never lost upon heavy traffic. In the meanwhile, the stable feature in IQSize and throughput guarantees the full bandwidth utilization.

F. Discussion

The good performances above demonstrated by the IntelRate controller also justify the rationale , the experiments under different link bandwidths above show that a choice of the TBO value works well in terms of the throughput performance and queuing delay.

On the other hand, the max-min fairness has shown that the IntelRate controller can guarantee the maximum output according to the biggest rate recorded in *req_rate* among all passing flows. This verifies that the controller meets our design objective of choosing the outmost edge value *D* of the output.

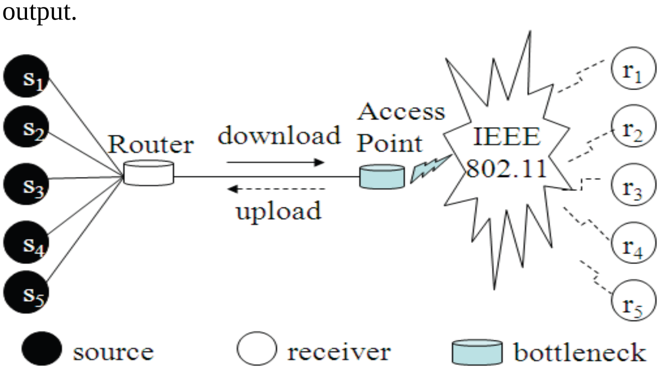

Figure: Wireless LAN.

6. Comparison

Our preliminary results in [53], [54] demonstrate that the IntelRate controller is superior to other explicit congestion controllers. For examples, the IntelRate controller has better robustness and link utilization than the XCP upon bandwidth variations; it has a lower requirement on computational and memory resources than API-RCP while having equivalent and even better performances (the comparisons of the computational intensity and memory requirement with other controllers will be presented in our other papers). Here we pick the QFCP and Blind (we didn't choose ErrorS or MAC from the same paper to do the comparison because ErrorS is an interchangeable algorithm of Blind and faces the same problem while MAC is too complicated to be put into practice so far) for further comparison, We use the same IEEE 802.11 wireless LAN (Local Area Network) as done in QFCP and Blind to do the comparison.

As shown in Fig. 14, the wireless LAN consists of 5 source destination flows (i.e., $si-ri$, i = 1, 2. . . 5). The bandwidth between si and the router is 100Mbps. The backhaul has 1Gbps bandwidth with 100ms propagation delay. The nominal bandwidth of the wireless is 11Mbps which needs to be probed by the controllers. In such a network, the wireless interface of the AP (Access Point) is the bottleneck when traffic flows from the wired network to the wireless network. The congestion controller resides in the AP to prevent the congestion. of each flow greedy by setting its desired sending rate to infinity. The parameters of QFCP and Blind controllers in the simulation are the same as those used in fig respectively. The buffer size *B* is set to 600 packets in all the controllers.

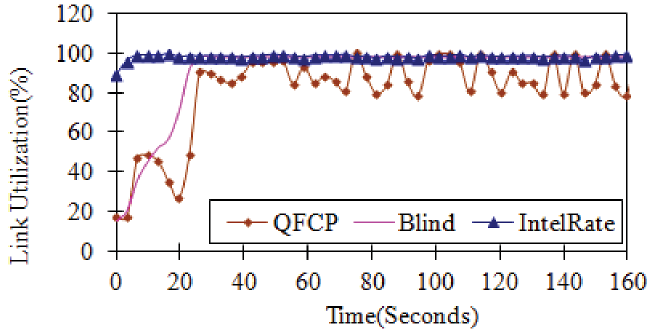

Figure: Link utilization.

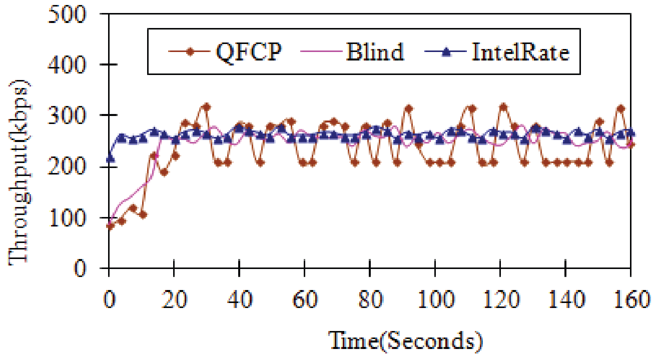

Figure: Source throughput

7. Future Scope

Any technique that provides zero packet loss can be recommended in the future work. In the future any techniques that minimizes the packet loss will be will be compatible, here this techniques also helps in minimising propagation delay for fast transmission without packet loss.

8. Conclusion

A novel traffic management scheme, called the IntelRate controller, has been proposed to manage the Internet congestion in order to assure the quality of service for different service applications. The controller is designed by paying attention to the disadvantages as well as the advantages of the existing congestion control protocols. As a distributed operation in networks, the IntelRate controller uses the instantaneous queue size alone to effectively throttle. the source sending rate with max-min fairness. Unlike the existing explicit traffic control protocols that potentially suffer from performance problems or high router resource consumption due to the estimation ofthe network parameters, the IntelRate controller can overcome those fundamental deficiencies. To verify the effectiveness and superiority of the IntelRate controller, extensive experiments have been conducted in OPNET modeller. In addition to the feature of the FLC being able to intelligently tackle the nonlinearity of the traffic control systems, the success of the IntelRate controller is also attributed to the careful design of the fuzzy logic elements.

References

[1] M. Welzl, *Network Congestion Control: Managing Internet Traffic*. John Wiley & Sons Ltd., 2005.
[2] R. Jain, "Congestion control and traffic management in ATM networks: recent advances and a survey," *Computer Networks ISDN Syst.*, vol. 28, no. 13, pp. 1723–1738, Oct. 1996.
[3] V. Jacobson, "Congestion avoidance and control," in *Proc. 1988 SIGCOMM*, pp. 314–329.
[4] V. Jacobson, "Modified TCP congestion avoidance algorithm," Apr. 1990.
[5] K. K. Ramakrishnan and S. Floyd, "Proposals to add explicit congestion notification (ECN) to IP," RFC 2481, Jan. 1999.
[6] D. Katabi, M. Handley, and C. Rohrs, "Congestion control for high bandwidth-delay product networks," in *Proc. 2002 SIGCOMM*, pp. 89– 102.
[7] S. H. Low, F. Paganini, J.Wang, *et al.*, "Dynamics of TCP/AQM and a scalable control," in *Proc. 2002 IEEE INFOCOM*, vol. 1, pp. 239–248.
[8] S. Floyd, "High-speed TCP for large congestion windows," RFC 3649, Dec. 2003.
[9] W. Feng and S. Vanichpun, "Enabling compatibility between TCP Reno and TCP Vegas," in *Proc. 2003 Symp. Applications Internet*, pp. 301– 308.
[10] M. M. Hassani and R. Berangi, "An analytical model for evaluating utilization of TCP Reno," in *Proc. 2007 Int. Conf. Computer Syst Technologies*, p. 14-1-7.
[11] N. Dukkipati, N. McKeown, and A. G. Fraser, "RCP-AC congestion

Author Profile

G .Ravi received his B.Tech degree from JNTU HYDERABAD and M. tech. degree from Pondicherry University and presently working in MRCET College as Assistant professor in Computer science Department.

Rahul Kumar his B.E degree in computer science and engineering from VTU University Belguam Karnataka, India