

# Bandwidth Management Using Hybrid/Cloud Configurations

Shakti Arora<sup>1</sup>, Assistant Professor, Computer Science Department

Panipat Institute of Engineering & Technology, Kurukshetra University, Kurukshetra, Haryana

E-mail: [shakti.cse@piet.co.in](mailto:shakti.cse@piet.co.in)

Harish Saini<sup>2</sup>, Assistant Professor, Computer Science Department

Panipat Institute of Engineering & Technology, Kurukshetra University, Kurukshetra, Haryana

E-mail: [shakti.cse@piet.co.in](mailto:shakti.cse@piet.co.in)

Suraj Sachdeva<sup>3</sup>, Juhi Batra<sup>4</sup>, Jasmine Batra<sup>5</sup>

Panipat Institute of Engineering & Technology, Panipat, Haryana

E-mail: [surajsachdeva61@gmail.com](mailto:surajsachdeva61@gmail.com)

**Abstract:** Bandwidth Management has been one of the major factor and came in front resulting a powerful scheme in measuring traffic over a network link and controlling the data packets used over communication channels, to avoid the filling up of the network link or the available capacity, which would undoubtedly results in the Network Congestion and poor performance of the network resulting in Rush Hour. Bandwidth throttling is also being considered as it is one of the key technique which is undertaken by all other aspects while the enhancements of the existing Management Processes. This key technique has also inclusion of blocking the network links just to secure some of the links making them free to use over a period of time conserving bandwidth. However resulting in Slow Loading of data, Skipping of calls, Shuttering of network over an area and availability of Low Bandwidth Network to the Educational Institutes and Centres. Hence needs an enhanced version of this Bandwidth Allocation Mechanism to improve the Quality of Service and to improve the efficiency of the network in the respected sectors or areas. Efforts present in this paper is to design and implement a new kind of technique of Cloud Architecture for the foreign devices. The enhanced network will provide the home users a high rate bandwidth platform with the varying rates and for the mobile or foreign users, completely new architecture is to

be implemented. Consequently this will also enhance the research activities in the network provider sector.

**Key Words:** Bandwidth Management, CPA (Cloud Preferred Architecture), Data Congestion, Quality of Service (QoS).

## I. INTRODUCTION

One of the processes of measuring traffic over a network link and controlling the communication through the data packets, to avoid the filling up of other link over the available capacity of the network/link or overfilling of the link known as **Bandwidth Management**, which would undoubtedly results in the Network Congestion in the network leading in Rush Hour and also the poor Quality of Service (QoS). Units to measure bandwidth are bits per second (bit/s) or bytes per second (B/s).

It has also been mentioned earlier that BM works as a general term for the collection techniques that are used by the institutes and the other parties or organisations which uses software and some other methodologies to restrict bandwidth for the students in institutions or in the corporate world by the companies which not allow many people use those bandwidths to access internet. But what

this explanation leads to do will surely meant for those who seeks to use unfair methods to use those unused bandwidths. Hence, this leads to a need of designing an enhanced BM technique for compelling and competent network communication and QoS.

Bandwidth Management using Hybrid/CloudArchitecture introduces to a structure where some separate blocks of networks in every sector can be amended and these blocks will be used as a cloud services by the Users which must be provided by their Network Providers with the regular charges.

Efforts placed in this paper are therefore directed at designing and implementation of an enhanced bandwidth management technique using upcoming intelligent technologies to regulate the limited network bandwidth available to access in the most sincere way, which will drastically improve network quality of service.

## II. LITERATURE REVIEW

Higher institutions where researches have been done along with the learning are facing major difficult parameters in their use of networked information resources simply because the cost/rate of bandwidth is exponentially high and it is almost difficult to improve international network connectivity "Ref. [5]". Some research works which were carried out in this realm by some researchers in order to find long lasting solution to these problems. Some of them are:

- **Dynamic & Adaptive Bandwidth Management** "Ref. [6]" was proposed to provide a satisfactory QoS which guarantees possible wireless multimedia services under variable traffic conditions. The proposed scheme was designed to provide high bandwidth utilization efficiency and low call blocking probability with minimum QoS fluctuation. The technique works pleasantly because it reduces the probability of frequent quality changes and provides more satisfactory services for higher priority flows but unfortunately, it only improves the QoS of some high priority flows.
- **Weighted Round** "Ref. [7]" was used to classified packets into various service classes and then assigned a queue of different percentage of bandwidth and they are serviced in round robin order. The technique works well because it ensures that all service classes have access to at least some configured amount of network bandwidth to avoid bandwidth starvation and not compromising the quality of service. The biggest drawback in this research is that it cannot guarantee fair link sharing. When configured to handle high bandwidth service applications like VoIP and IPTV, it may induce unwanted latency in the transmission.
- **Fair queuing** "Ref. [8]" was used to allocate network bandwidth based upon usage by personal flows. It is more intelligent in making choices than earlier, and is based on corresponding allocations rather than priority. The major problem in this fair queuing technique is that in most of the cases it manages fairness between the different flows rather than that of users or customer. Although it works well in an environment where there are a limited number of users and limited amount of definable flows. In order to effectively manage a network connection of any size, there is need for multifaceted approach that includes effective network monitoring, a sensible policy that defines acceptable behaviour, and a solid implementation that enforces these rules "Ref. [9]". Compelling management and optimization of bandwidth are critical to research and education and there is urgent demand for training skills and knowledge developed within this area. Research "Ref. [10]" has shown that majority of higher Institutions undertake little or no monitoring of their network bandwidth. The same research

also recommended that improving bandwidth management is probably the easiest way for universities to improve the quality and quantity of their bandwidth resources for educational purposes. Moreover, internet connectivity and access to network information resources are increasingly the crucial requirement for any research or educational academy or institution and to achieve this, capacity development within the area of bandwidth management is an essential element.

- **An Enhanced Bandwidth Management Scheme for Improved Quality of Service in Network Communication System using combination of SQUID and CBQ**

It was considered as an exclusive task which involves full understanding and weaknesses of the existing bandwidth management techniques. In actual it optimizes the limited bandwidth available with the use of ultimate conditioner script which leads to create a successfully stable platform by prioritizing the scarce bandwidth available and allow the network traffic to pass through the proper paths/chains. However it enables users to use the scarce bandwidth on different speed levels properly.

### III. SYSTEM DESIGN

The main aim and objective of this research work is to propound solution to the earlier structure of the existing system by designing an enhanced network BMS (Bandwidth Management System). In this research, a cloud structure is embedded in a network architecture where some network traffic will be given higher priority over the other traffic, based on the foreign mobile devices entering in different networks and this will be carried out on the main server of the network using Linux/Windows OS.

Enforcing this new BMS on the main server of Linux will improve the quality of services as compared to that of the Windows whereas it

also improves the security issues that are withheld in most of the scenarios. The network bandwidths proposed to be shared between two levels or two parts of a structure of a particular area. Any network traffic falls in these area will be provided with different speed rates for both respectively. Taking a simple example as best for the proposed system is- assuming that a person travelling from Destination A to Destination B subscribes a package of any Network Operator/Provider having speed of 20mbps and trying to operate email, pictures, Online video streaming, Online games will be given access by the cloud network structure of the same Network Provider in that area (being a foreign user for that particular area/sector). Leading to the separation of bandwidths in two levels one for the home users of an area and second for the foreign users or mobile users. Also differs on the basis of Downloading and Uploading.

Fig. 1 depicts the architecture of the new System.

Components involved in this enhanced structure are:

**Complete Computer System:** This system is used as a network server where all the previously mentioned software will be installed and configured.

**Router:** This will provide the data packets their routes to the destination from the cloud network or from the main network architecture.

**Network switch:** It is an AP (Access Point) creating bridge for the workstations present on the network architecture.

**UTP CAT-5 Network Cable:** It creates a physical connection between server, switch and the network architecture workstations.

**Network Card (NIC):** It is an interface between a terminal connector and the main sever.

**RJ-45 Terminal Connector:**Is a terminator at both the ends of a CAT-5 network cable.

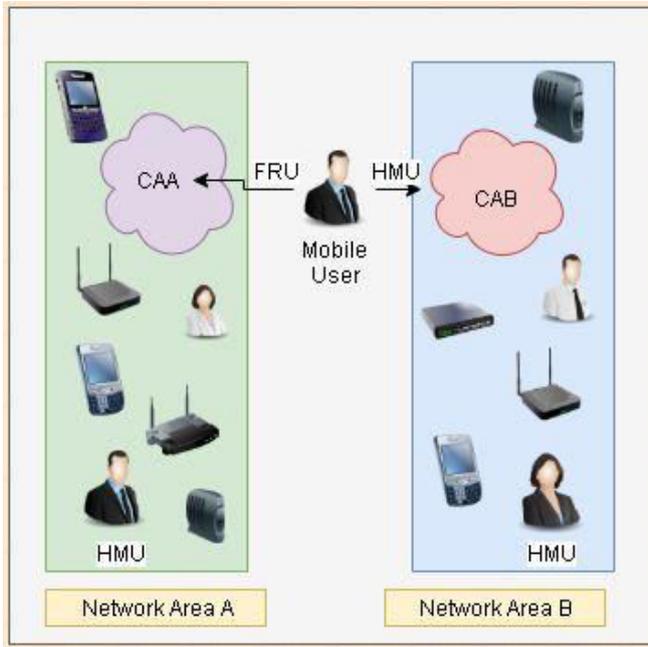


Fig. 1 A Network containing Cloud Network inside itself for foreign users

Terms used in Fig.1 are:

**CAA:** Cloud Architecture A

**HMU:** Home Agent/User.

**FRU:** Foreign User.

**CAB:**Cloud Architecture B

#### IV. RESULT

After ensuring and analysing all the related aspects and considerations, and putting all the configurations and efforts together the basic paper structure results in the proper ideology of a Cloud Configured Architecture for the Network to optimize the bandwidth by pushing the foreign users into the cloud servers and availing the free bandwidth resulting in the more bandwidths for the home users which also leads them with high speed internet connections for online games, online video streaming, web surfing, and many more aspects. This architecture also leads to the management of the calls and text messaging

by an individual as the servers of the home networks get free and providing more stable network without less fluctuation and also the number of the call drops will be decreased. The downloading rates for any type of files can be increased by the Network Providers at reasonable charges they provide.

Bandwidth Management using Cloud Configurations also free up the server loads like processing and database works which maintains the look up table, routing tables, IMEI information of the foreign devices as this all can be transferred to the cloud network easily.

#### V. CONCLUSION

In conclusion, designing and improved bandwidth management technique is a subtle task. Involving all the strengths and the weaknesses of the existing or earlier declared architectures or techniques. In the improved technique the solutions were proffer to the identified problems by moving all of the foreign related details and aspects to the cloud network architecture. The output generated of this technique shows the optimization of limited bandwidth of the home users and discarding the different means of tools and techniques used by the students in universities and locals citizens, bringing them all on a single network and availing more bandwidths with higher rates provided by the Network Providers or ISPs.

#### VI. REFERENCES

- [1] L. Chitanana, "Bandwidth management in universities in Zimbabwe: Towards a responsible user base through effective policy implementation," In *International Journal of Education and Development Using Information and Communication Technology*, volume 8, number 2, pp. 62-76, 2012.
- [2] HGuo and GKuo, "A dynamic and adaptive BM scheme for QoS support in

wireless multimedia network,” presented at “Vehicular Technology Conference”, VTC 2005-Spring. IEEE 61st, China, 2005.

[3] A. H. Rashwan, H. M. Elbadawy, and H. W. Ali, “Comparative assessments for different WiMAX scheduling algorithms,” in “*World Congress on Engineering and Computer Science*”, San Francisco, USA, volume I, October 20-22, 2009.

[4] M. Mirza, G. Rashed, and M. Kabir, “A comparative study of different Queuing techniques in VOIP, video conferencing and file transfer,” In “*Daffodil International University Journal of Science and Technology*”, volume 5, number 1, pp. 37-47, January 2010.

[5] LM Patnaik and KR Venugopal, “Bandwidth limiter”, in “*2nd International Conference on Information Processing*”, India: IK International Pvt limited, Jan., 2008.

[6] K. Mochizuki, S. Shimazaki, D. Hanawa, and K. Oguchi, “Proposal of new traffic control method in the next generation home network,” in “*Telecommunications and Signal Processing, 35th International Conference on Science & Technology*”, Seikei University, Musashino, Japan, 2012.

[7] Munir K. Yahya-Imam, Dr. P. Sellappan, Vathsala Devi, “An Enhanced Bandwidth Management Scheme for Improved Quality of Service in Network Communication System” in “*International Journal of Electronics and Electrical Engineering Volume 2, Number 2*”, June, 2014, Selangor, Malaysia.