

Bandwidth Monitoring and Reduction with Firewall Operation

Prof. Kalpna Saharan¹ Bipin Patil² Purnata Shingade³ Aparna Koul⁴ Shubham Shahane⁵
^{1,2,3,4,5}Department of Computer Engineering
^{1,2,3,4,5}D.C.O.E.R, Pune, Maharashtra

Abstract— With the emergence of various internet applications, the use of the internet is being abused in the maximum possible way. Various organizations strive to pay the exceeding amount for the usage of the excess bandwidth. Considering this issue, we have designed a powerful tool that assures comfort of the network administrator and reduces the burden of over usage of bandwidth for an organization. With the help of token bucket algorithm, we have devised a system that ensures efficient monitoring and reduction of the bandwidth, which erases some major drawbacks of the existing systems. In addition, when it comes to end-to-end measurement of bandwidth, this tool also provides robust features of IP tracking and IP blocking, hence providing the firewall operation. Moreover, the feature of capturing of live desktop is added, which gives the network administrator, full control and access to the client's screen. Designed with a different approach, this system enhances the comforts of a network administrator and hence the organization, this system ensures that there is no unauthorized usage of the internet and the bandwidth usage is within the predefined limits.

Key words: excess bandwidth, token-bucket algorithm, monitoring and reduction of bandwidth, end-to-end measurement of bandwidth, IP blocking, IP tracking, unauthorized usage

I. INTRODUCTION

The usage of the internet is being misuse due to its misuse in a variety of ways, leading to the wastage of bandwidth, introduction of viruses in the system, spyware, etc. Many organizations spend large amount of money to the ISP provider but the overall estimated cost of the bandwidth used for actual productive purpose proves to be too less than what is being paid [1]. In such situations, it becomes mandatory for a network administrator to manage the resources, which will lead to the optimized use of the resources. The bandwidth monitoring system is employed in order to find the usage of the available and bottleneck bandwidth and to control it from exceeding beyond the maximum value [1][2]. The firewall operation blocks the usage of unauthorized websites using their IP address, thereby minimizing the excess use of the allocated bandwidth [4]. Although the present system monitors the excess usage of bandwidth and ceases the access to unauthorized websites, one can surely download his personal documents saved on the Google Drive. This usage goes unnoticed most of the times, which proves the inefficiency of the system. For example, an employee access social networking sites like Facebook, Twitter, etc. during work hours, which abuses the efficient usage of the bandwidth. If the network administrator is aware of this loss, he/she can directly prohibit the person from using the bandwidth and thereby actions can be taken against the employee [7]. Our goal is to build most robust techniques in order to produce accurate results at each intermediate step.

II. LITERATURE REVIEW

A. Proposed System:

Our proposed system enables the network administrator to know the content, which is being used or being downloaded at the user's end, while he is monitoring the bandwidth usage. This assigns the administrator, the power to decide the status of the content as valid or invalid and if it is invalid content, then block the user whose bandwidth usage exceeds the maximum value. If the content is a valid content, the administrator will thus allow the user to go on with his current task, but he will be assigned a reduced bandwidth. Thus, our system deals with monitoring, controlling and reducing the assigned bandwidth. It should be noted that the technique of monitoring is applied to all the nodes, but the technique of controlling and reduction are applied to the node which exceeds in its bandwidth usage.

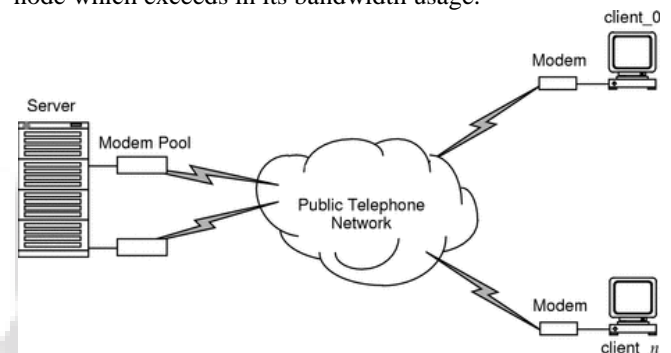


Fig. 1: Internet provide to server to client.

III. SYSTEM MODEL

A. Remote Desktop:

In Remote desktop you can take full control of your clients PC from your computer. Your home PC monitor will display exactly what your users monitor would normally display. You will also be able to share your home PC's disk drives with your office PC to transfer files. From this administrative can capture the live screenshots of users computer. In the bandwidth uses is abuse or increases then also admin can directly control the bandwidth uses. In this the unauthorized web sites can also block for that user. admin can see the live desktop of client computer and its uses. if uses is abused then admin can directly end the session of particular user. If uses is ok then admn cant end the session of user.

B. Bandwidth Monitoring:

In this project one bandwidth proxy server is created and connected to different clients through LAN. Then bandwidth is monitored and measured which provided by ISP's. For connecting NET, TCP/IP, FTP protocol is used.

After creating bandwidth proxy server, bandwidth is divided among the different client variably as per usage of each client. If we want to provide equal bandwidth among clients when only few of clients wants to NET connection

through bandwidth proxy server, it can also be done. In case many clients want different size of bandwidth accordingly their use, we can allocate variable bandwidth to each client. By using these criteria we can avoid wastage of bandwidth.

C. Firewall Operation:

In Internet network to avoid misuse by user of particular company the project is going to provide firewall like applications i.e. deny access to the particular site.

IP tracking and IP Blocking: In the uses user access the any web site firstly firewall operation, identify the ip of that web page from administrative then web site is usefull then it take to access to user otherwise firewall operation automatically block the particular web site for thir network.

D. Time Restriction:

By configuring bandwidth server we can allocate time restriction for a client for net use, by doing this client can not access NET beyond time limit. It will not only help to increase speed of internet but also increase the performance. Many companies pay ISP's according to the data access by company per month. The project can be used to show NET use of each client connected to bandwidth due to that administrator can generate monthly or weekly even daily report of each client's internet usage. If in case the ISP's NET use report does not match with report generated by administrator, then other possibilities like presence of viruses, spyware etc. can be checked. And if particular client is unnecessarily using the internet, administrator can give warning or can deny internet access to that client.

E. Algorithm:

1) Token Bucket:

The Token bucket is an algorithm used in packet switched computer networks and telecommunications networks. It can be used to check that data transmissions, in the form of packets, conform to defined limits on bandwidth and burstiness (a measure of the unevenness or variations in the traffic flow). It can also be used as a scheduling algorithm to determine the timing of transmissions that will comply with the limits set for the bandwidth and burstiness

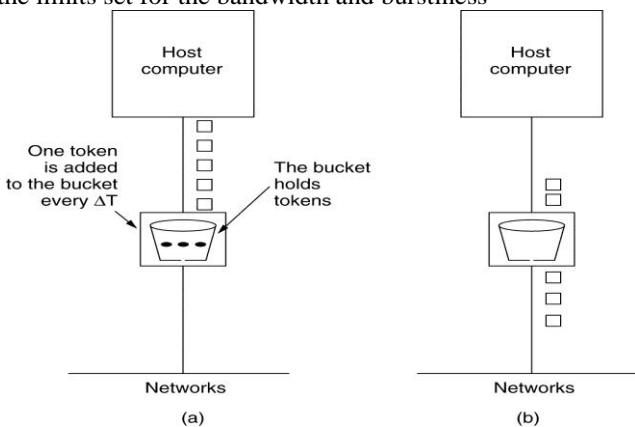


Fig. 2: Token Bucket Algorithm

The token bucket algorithm can be conceptually understood as follows:

- A token is added to the bucket every seconds.
- The bucket can hold at the most b tokens. If a token arrives when the bucket is full, it is discarded.
- When a packet of n bytes arrives, n tokens are removed from the bucket, and the packet is sent to the network.

- If fewer than n tokens are available, no tokens are removed from the bucket, and the packet is considered to be non-conformant.
- Implementers of this algorithm on platforms lacking the clock resolution necessary to add a single token to the bucket every $1/r$ seconds may want to consider an alternative formulation. Given the ability to update the token bucket every S milliseconds, the number of tokens to add every S milliseconds = $(r*s)/1000$

2) Experimental Result:

Steps of project working

- 1) Connect client and server through lan cable. And linked it in netbean.
- 2) Take port no and ip address of clients coputer to server .
- 3) After connecting client and server remote desktop capture the live deckto of clients machine.
- 4) Here following fig. shows that live desktop of client machine
- 5) After connection server provide Internet connection to client
- 6) It gives time restriction to client computer.
- 7) The client open the website the firewall operation checks the website is authorized or not.

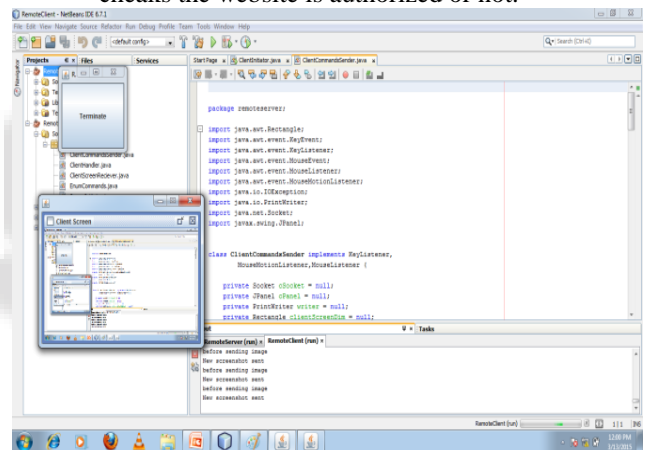


Fig. 3: Remote Desktop

IV. CONCLUSION

The bandwidth monitoring system thus reduces the abuse caused by the users to the allocated bandwidth. The network administrator can now relax as there are control and reduction techniques applied to the exceeding bandwidth usage. Some of the most important aspects considered during the analysis of the product's performance are its ability to prioritize and allocate network bandwidth among hosts on a network, provide enough security as to prevent tampering with or taking over a disproportionate amount of bandwidth, centralized operations, multiplatform GUI, etc

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