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Reducing Drop of Packets in the Network by Hybrid Mechanism

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ABSTRACT

We provide an analytical proof that the departure rate of a CBR flow at an overloaded link with FIFO buffers is proportional to the flow's share of the total offered load at the link. Exhaustive simulations have been done to analyze results, which are evaluated for performance metrics, such as throughput, packet delivery ratio and average end to end delay. The effect of variations in simulation time, number of nodes, and speed of mobile nodes on the network performance is analyzed over a wide range of their values. It is observed that the TCP/FTP offers a far better performance for throughput than UDP/CBR; in case of PDR, former offers an almost constant trend, whereas the latter shows highly varying (rising and falling) trends in all the three aforementioned scenarios. The average end to end delay of latter is lesser than former. The results follow these trends over a wide range of simulation parameters.

Keywords: Previous approach(Constant Bit Rate, Variable Bit Rate) , HYBRID mechanism, Coding, NS2 and X graph.

I. INTRODUCTION

The CBR service category is used for connections that transport traffic at a constant bit rate, where there is an inherent reliance on time synchronization between the traffic source and destination. CBR is tailored for any type of data for which the end-systems require predictable response time and a static amount of bandwidth continuously available for the life-time of the connection.[2][5] The amount of bandwidth is characterized by a Peak Cell Rate (PCR). These applications include services such as video conferencing, telephony (voice services) or any type of on-demand service, such as interactive voice and audio. For telephony and native voice applications CBR provides low-latency traffic with predictable delivery characteristics, and is therefore typically used for circuit emulation.[2][6].

II. METHODS AND MATERIAL

A. ABR

The ABR service category is similar to nrt-VBR, because it also is used for connections that transport variable bit rate traffic for which there is no reliance on time synchronization between the traffic source and destination, and for which no required guarantees of bandwidth or latency exist. ABR provides a best-effort transport service, in which flow-control mechanisms are used to adjust the amount of bandwidth available to the traffic originator. The ABR service category is designed primarily for any type of traffic that is not time sensitive and expects no guarantees of service. ABR service generally is considered preferable for TCP/IP traffic, as well as other LAN-based protocols, that can modify its transmission behavior in response to the ABR's rate-control mechanics.

ABR uses Resource Management (RM) cells to provide feedback that controls the traffic source in response to fluctuations in available resources within the interior ATM network. The specification for ABR flow control uses these RM cells to control the flow of cell traffic on ABR connections. The ABR service expects the end-system to adapt its traffic rate in accordance with the feedback so that it may obtain its fair share of available network resources. The goal of ABR service is to provide fast access to available network resources at up to the specified Peak Cell Rate (PCR).[2]

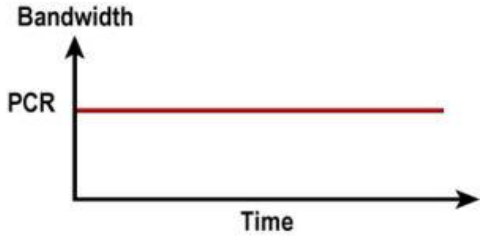

Figure 1: Packets Transfer in CBR Mechanism

B. QoS Enforcement – Traffic Shaping

In Packet Network, admission control, reservation is not sufficient to provide QoS guarantees

Need **traffic shaping at** the entry to network and within network Traffic shaping Decides how packets will be sent into the network, hence regulates traffic decides whether to accept a flow's data Polices flows

Traffic shape

A way of a flow to describe its traffic to the network Based on traffic shape, network manager (s) can determine if flow should be admitted into the network Given traffic shape, network manager(s) can periodically monitor flow's traffic
Classification of sources:

- Data – bursty, weakly periodic, strongly regular
- Audio – continuous, strong periodic, strong regular
- Video – continuous, bursty due to compression, strong periodic, weakly regular

Classification of sources into two classes:

- **Constant Bit Rate (CBR)** – audio

- **Variable Bit rate (VBR)** – video, data

Figure 2: An Illustration of CBR and VBR

CBR traffic (shape defined by peak rate) CBR source needs peak rate allocation of bandwidth for congestion-free transmission VBR traffic (shape defined by average and peak rate) average rate can be small fraction of peak rate underutilization of resources can occur if pessimistic allocation (peak rate allocation) is applied Losses can occur if optimistic allocation (average rate allocation) is applied

C. Hybrid Mechanism

HYBRID Mechanism is a simple procedure as compared to Variable Bit Rate and over Constant Bit rate which is very simple and not very effective. Here I used to compare both the method and generate the new one which is superior over the both and help to provide congestion control within the network. I made two simulation methods to test the performance of CBR and VBR in wired network separately. But then I found the average packet losses are almost same in both the cases. Therefore while in communication if packets lost are there it will affect the Quality of services. Therefore to minimize it HYBRID mechanism is used.

III. RESULTS AND DISCUSSION

D. Coding of Constant Bit Rate

```
#Create a simulator object
set ns [new Simulator]
#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf
#Define a 'finish' procedure
proc finish {} {
global ns nf
$ns flush-trace
#Close the trace file
close $nf
#Execute nam on the trace file
exec nam out.nam &
exit 0
}
#Create two nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
#Create a duplex link between the nodes
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
$ns duplex-link $n1 $n2 512Kbps 10ms DropTail
#Create a UDP agent and attach it to node n0
```

```
set udp0 [new Agent/UDP]
$ns attach-agent $n0 $udp0
# Create a CBR traffic source and attach it to udp0
set cbr0 [new Application/Traffic/CBR]
$cbr0 set packetSize_ 500
$cbr0 set interval_ 0.005
$cbr0 attach-agent $udp0
#Create a Null agent (a traffic sink) and attach it to node n1
set null0 [new Agent/Null]
$ns attach-agent $n2 $null0
#Connect the traffic source with the traffic sink
$ns connect $udp0 $null0
#Schedule events for the CBR agent
$ns at 0.5 "$cbr0 start"
$ns at 4.5 "$cbr0 stop"
#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"
#Run the simulation
$ns run
```

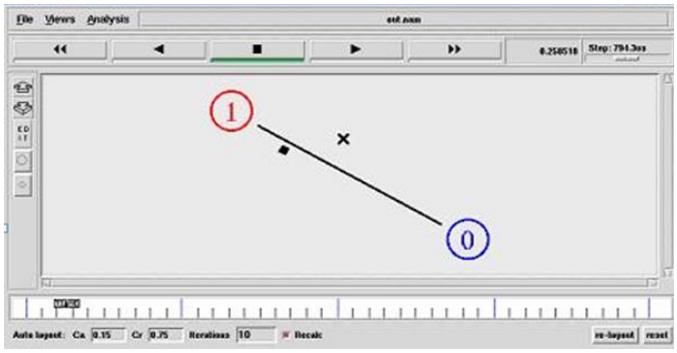

Figure 3: Cbr Traffic

E. Coding of Exponential Bit Rate

```
#Create a simulator object
set ns [new Simulator]
#Open a nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf
#Define a 'finish' procedure
proc finish {} {
global ns nf
$ns flush-trace
close $nf
exec nam out.nam &
exit 0
}
set n0 [$ns node]
set n1 [$ns node]
$n0 color blue
$n1 color red
#Connect the nodes with two links
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
proc smtp_traffic {node0 node1 } {
global ns
set smtp_UDP_agent [new Agent/UDP]
set smtp_UDP_sink [new Agent/UDP]
$ns attach-agent $node0 $smtp_UDP_agent
$ns attach-agent $node1 $smtp_UDP_sink
$ns connect $smtp_UDP_agent $smtp_UDP_sink
set smtp_UDP_source [new Application/Traffic/Exponential]
$smtp_UDP_source attach-agent $smtp_UDP_agent
$smtp_UDP_source set packetSize_ 210
$smtp_UDP_source set burst_time_ 50ms
$smtp_UDP_source set idle_time_ 50ms
$smtp_UDP_source set rate_ 100k
$ns at 0.2 "$smtp_UDP_source start"
$ns at 3.2 "$smtp_UDP_source stop"
}
smtp_traffic $n0 $n1
$ns at 4.0 "finish"
$ns run
```

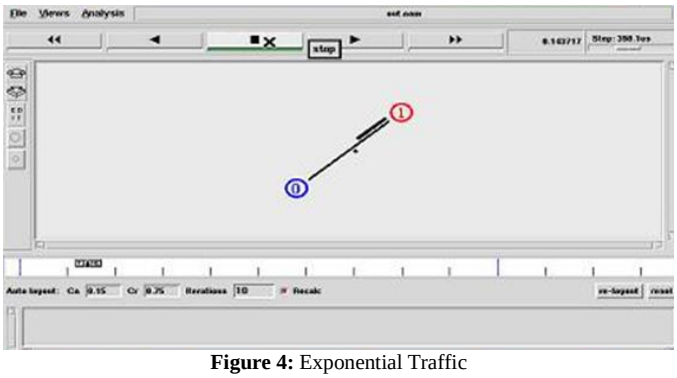

Figure 4: Exponential Traffic

F. X-Graph

X-graph is tool used in NS-2 simulator to show the result of the calculation done. This tool comes together with all-in-one program of network simulator. It automatically get installed with the package installer and to run the outcome it does not require any special instruction.

IV. CONCLUSION

In this paper we evaluate Constant Bit rate (CBR), Exponential Bit Rate or Variable Bit Rate (VBR) and found that in CBR mechanism the loss is minimum as compare to VBR. But we cannot negotiate on the Quality of service which is provided by the CBR traffic which is low as compare to VBR. Therefore an average

of both the technique that is HYBRID Bit Rate is created which ultimately it can be used for the communications on a network Link and to avoid network congestion and poor performance of the network

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Asst. Prof. Pankaj Richhariya was born in Madhya Pradesh India. He has completed Mtech (Computer Science and Engineering) and perusing PhD. He has working HoD of CSE Department in BITS, Bhopal. He has many research paper published in International Journal and attend the International conference. His area of interest includes network security, Data mining and Database Security.

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