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Maximizing Quality of Service within the Network by Using Hybrid Method

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ABSTRACT—
In this paper we will used to study the performance of Drop down in a network through different QoS metrics like Nam Output and X-graph. To design a model for Network Topology for achieving high data rates and accurate simulations. To evaluate the performance of Drop tail using congestion window in a network scenario. The performance of the simulated model has been evaluated using Network Simulator 2.35.The algorithm for congestion control is the main reason we can use the Internet successfully today despite resource bottlenecks and largely unpredictable user access patterns. We focus on the effect of different queue algorithms, such as Drop Tail and Congestion window.

Keywords—Previous approach (Drop tail, Congestion window), Hybrid method, Coding, Diagram, NAM and X graph.

I. INTRODUCTION

Bandwidth management is a way to control congestion. There are 2 algorithms used that are commonly utilized now days in network. Drop Tail and Congestion window. Drop Tail is easy to implement but has problem of synchronization and Congestion window is complicated but it avoid collision.[1] Another way is:-QUEUE MANAGEMENT can also be used to control the queue size. It contains:- Passive Queue management:- Which drops packets when queue is full. Active queue management:-which drops packets before the buffer getting full. [2]

II. DROP TAIL

Tail Drop, or Drop Tail, is a very simple queue management algorithm used by Internet routers, e.g. in the network schedulers, and network switches to decide when to drop packets and when to accept to forward the packet to destination.[10] With tail drop, when the queue is filled to its maximum capacity, the newly arriving packets are dropped until the queue has enough room to accept incoming traffic as shown in figure 1. It uses First in first out mechanism.

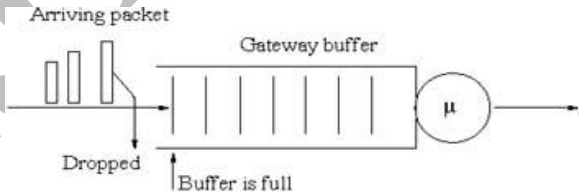

Figure 1: An Illustration Of Drop Tail

III. CONGESTION WINDOW

The congestion window is one of the factors that determine the number of bytes that can be outstanding at any time. The size of this window is calculated by estimating how much congestion there is between the two places. The sender maintains the congestion window. This is not to be confused with the TCP window size which is maintained by the receiver.[12] This is a means of stopping the link between two places from getting overloaded with too much traffic.

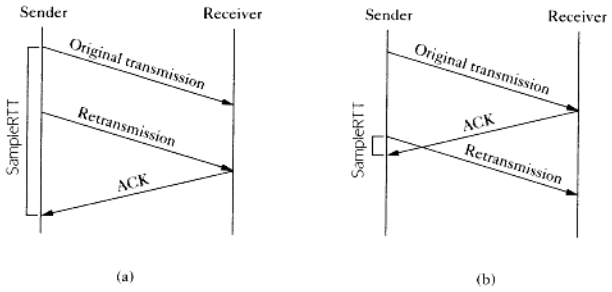

FIGURE 2: An Illustration of Congestion Window

IV. HYBRID METHOD

Hybrid method is simply the merger of drop tail as well as congestion window together. Both as specific mechanism to avoid bottleneck in the network. Therefore a hybrid method is produced by merging both the method to provide better Quality of services to the user and by utilizing minimum amount of resources. As if amount of resources are used less the chance of having loss will decreases and maintenance cost will comes out to be low.

V. CODING

```
set ns [new Simulator]

$ns color 0 green

set f0 [open out0.tr w]
set f1 [open out1.tr w]
set f2 [open out2.tr w]
set f3 [open out3.nam w]
$ns namtrace-all $f3

set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]

$ns duplex-link $n0 $n3 1Mb 100ms DropTail
$ns duplex-link $n1 $n3 1Mb 100ms DropTail
$ns duplex-link $n2 $n3 1Mb 100ms DropTail
$ns duplex-link $n3 $n4 1Mb 100ms DropTail

proc finish {} {
```

```
        global ns f0 f1 f2 f3

        $ns flush-trace
        close $f0
        close $f1
        close $f2
        close $f3
        exec nam out3.nam &

        exec xgraph out0.tr out1.tr out2.tr -geometry 800x400 &
    exit 0
}

proc attach-expoo-traffic { node sink size burst idle rate } {
        set ns [Simulator instance]
        set source [new Agent/UDP]
        $ns attach-agent $node $source

        set traffic [new Application/Traffic/Exponential]
        $traffic set packetSize_ $size
        $traffic set burst_time_ $burst
        $traffic set idle_time_ $idle
        $traffic set rate_ $rate

    $traffic attach-agent $source

        $ns connect $source $sink
        return $traffic
}

proc record {} {
    global sink0 sink1 sink2 f0 f1 f2
        set ns [Simulator instance]
    set time 0.5

    set bw0 [$sink0 set bytes_]
    set bw1 [$sink1 set bytes_]
    set bw2 [$sink2 set bytes_]

    set now [$ns now]

    puts $f0 "$now [expr $bw0/$time*8/1000000]"
    puts $f1 "$now [expr $bw1/$time*8/1000000]"
    puts $f2 "$now [expr $bw2/$time*8/1000000]"

    $sink0 set bytes_ 0
    $sink1 set bytes_ 0
```

```
    $sink2 set bytes_ 0

    $ns at [expr $now+$time] "record"
}

set sink0 [new Agent/LossMonitor]
set sink1 [new Agent/LossMonitor]
set sink2 [new Agent/LossMonitor]
$ns attach-agent $n4 $sink0
$ns attach-agent $n4 $sink1
$ns attach-agent $n4 $sink2

set source0 [attach-expoo-traffic $n0 $sink0 200 2s 1s 100k]
set source1 [attach-expoo-traffic $n1 $sink1 200 2s 1s 200k]
set source2 [attach-expoo-traffic $n2 $sink2 200 2s 1s 300k]

$ns at 0.0 "record"

$ns at 10.0 "$source0 start"
$ns at 10.0 "$source1 start"
$ns at 10.0 "$source2 start"

$ns at 50.0 "$source0 stop"
$ns at 50.0 "$source1 stop"
$ns at 50.0 "$source2 stop"

$ns at 60.0 "finish"

$ns run
```

VI. DIAGRAM

The diagram of the Hybrid method is shown in the figure 3, figure 4 , figure 5 and figure 6 . Node 4 is the destination node while node 1,2,3 are the source nodes.

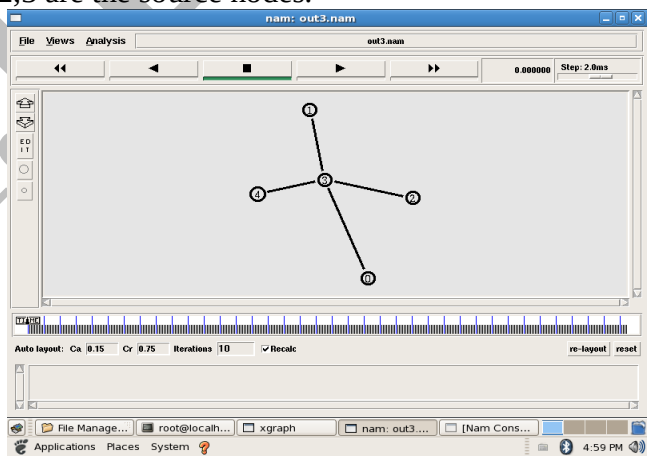

Figure 3: Setup of simulation

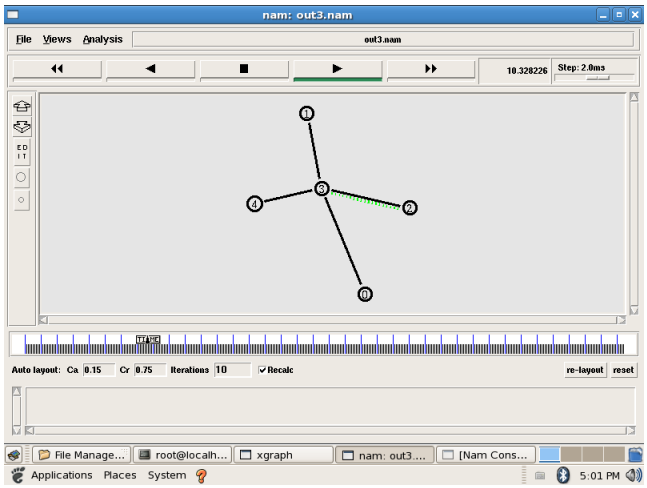

FIGURE 4: Node 2 start sending data

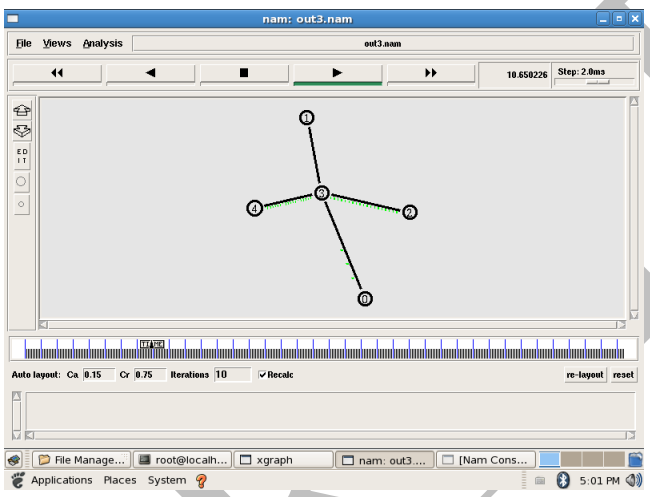

FIGURE 5: node 3 and node 2 start sending data

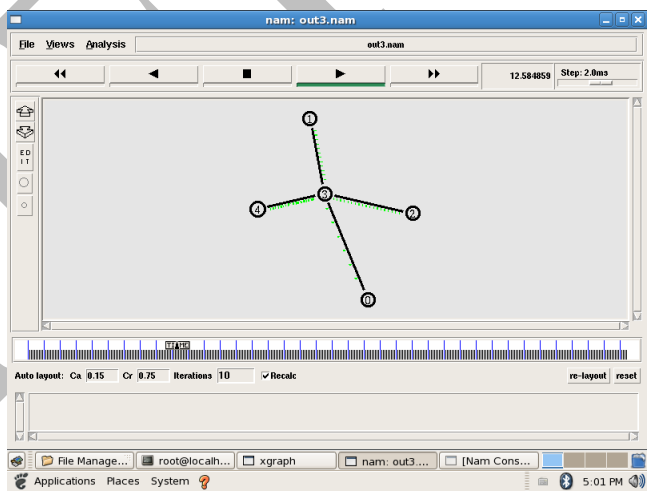

FIGURE 6: node 1 node 2 node 3 start sending data

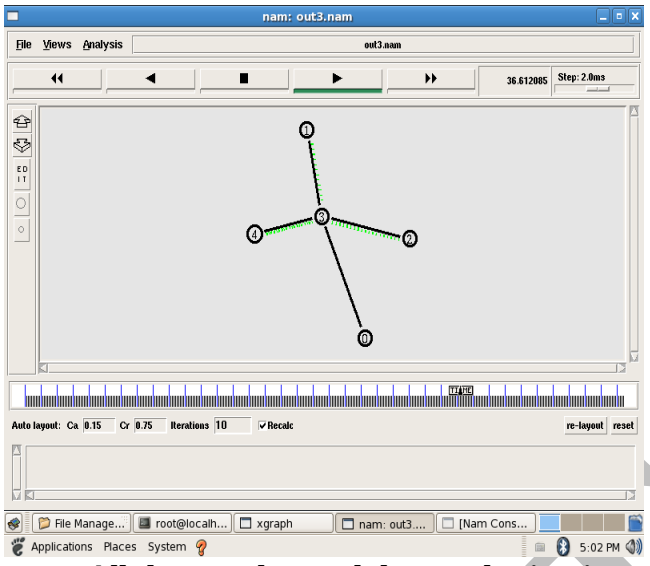

FIGURE 7: All three nodes send data to destination node 4

VII. NETWORK ANIMATOR TOOL

NAM is the network animator tool generated by the simulator itself. We can execute this file directly without including it in the Tcl script for the simulation which we are searching about [1]. This can be cleared from the figure (screen shot) presented below in Figure 8.[12][11]

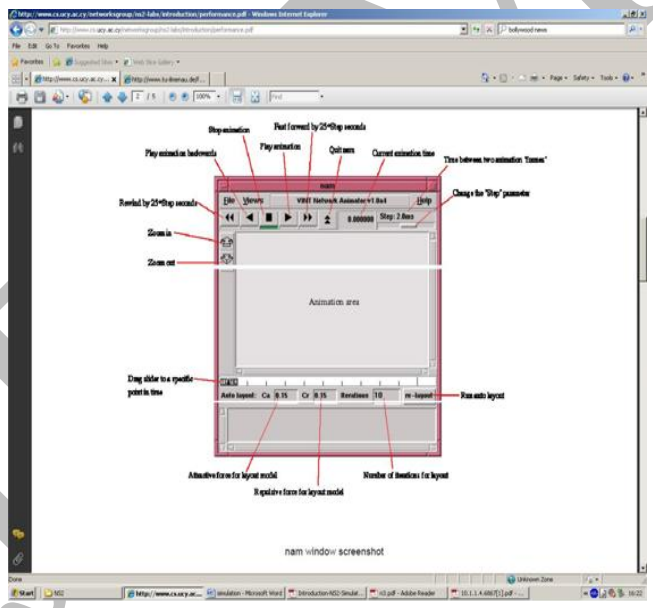

FIGURE 8: Network Animator Tool

VIII. 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. The outcome or the result of the Modified Drop Tail Queue is in the .hpgl format and also shown in figure 9.[11][12]

Figure 9: X graph Of Modified Drop Tail Queue Mechanism

IX. SIMULATION PAREMETER

Parameters used in simulation are discussed under the Table 1, as shown below.

Parameters	Values or Protocols
Simulation Tool	Network Simulator (NS) 2
Simulation Time	3000 sec
Traffic Generator	Ftp
Connections	Duplex-Link
Queue Size	10 Mb
Congestion window	23.9 Mbps
Operating System	Open lx (linux environment)
Virtual Machine	V M Ware

Table 1: Paramenters used for simulation

X. CONCLUSION

In this paper we evaluate Drop tail, Random Early Detection algorithm and hybrid method, and found that Hybrid method is a simple procedure as Random Early Detection algorithm and over Drop tail 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 with in the network. I made two simulation methods to test the performance of RED and Drop tail 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 is there it will affect the Quality of services. Therefore to minimize it Hybrid Method is used. It can be used to provide better Quality of Service.

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