A Review on Flow Control using Computer Networks

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Abstract- In this paper, I have discussed about flow control from sender to receiver and to control flow of data we have techniques/methods like Stop and wait and sliding window protocol. Here the purpose is, out of those methods which one has take less time complexity if packet is corrupted and which one can take less retransmissions if packet was lost. The importance of this paper is to know which technique is good at efficiency and time to send packet from sender to receiver after the packet was lost.

I. INTRODUCTION

In this paper, Computer networks means collection of computers which share data among themselves.[1][3] Here Flow Control means, there is a sender and receiver, the sender sends Unconditional flow of packets towards receiver, but if receiver processor is high it may process the packets .otherwise if receiver process is slow , it will not consume the data and it will drop upcoming packets.[2] To avoid this lost of packets we have flow control methods such as stop and wait , go back N, selective repeat, sliding window protocols to reduce lost of packets at receiver , but in computer networks time is most important factor to send a packet. Here we are going to see which one of the flow control methods will consume/take less time to process packet.

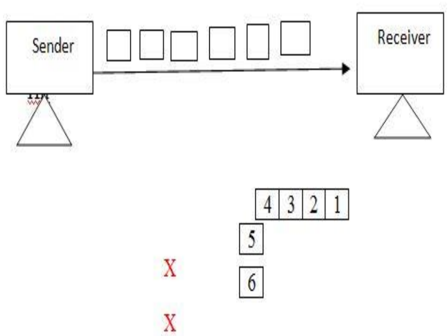


Fig.1: General diagram for packet losing

II. FLOW CONTROL TECHNIQUES

A. Stop and wait protocol

It works as follows, A Source sends a frame and Destination receives a packet, if it shows willingness to accept another packet by sending back the acknowledgement to the packet just received[5].

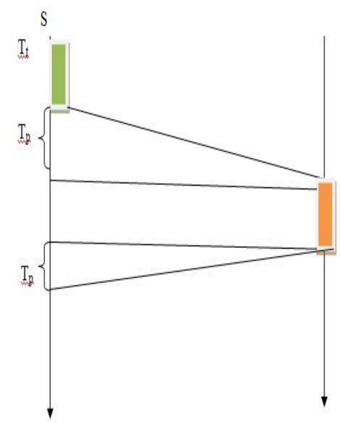


Fig.2: Stop and wait protocol the total time taken to send one packet is,

Total time = $T_t + 2 * T_p$

Where

T_p = Propagation time.

T_t = Transmission time.

Here sender sends a packet and stops and wait for an acknowledgement .

Here we are using Tt efficiently and then we are waiting 2*Tp time completely to find efficiency.

η= useful time/Total Cycle time

$\eta = Tt/(Tt+2*Tp)$

$\eta = 1/(1+2*(Tp/Tt))$ [dividing numerator and denominator by Tt]

η=1/(1+2a) [where a= Tp/Tt]

Through put=No. of. bits send per second.

Through put/Effective bandwidth/Band width utilization = $L/(T_t+2*T_p)$

In a totaltime of T_t+2*T_p able to send ‘L’ bits.

B. Sliding window protocol

A sliding window mechanism is used to integrate cumulative acknowledgement and flow control functions in a easiest manner.[7]It is most popular to control flow from sender to receiver.[9]

It is divided into 2 types

2.2.1. Go Back N. 1. Sender window size in Go Back N is ‘N’. Example: GB10 – sender window size is 10.

2. The sender window size is always 1.(N>1)

3. Receiver window size is one(1).

Example: GB4:

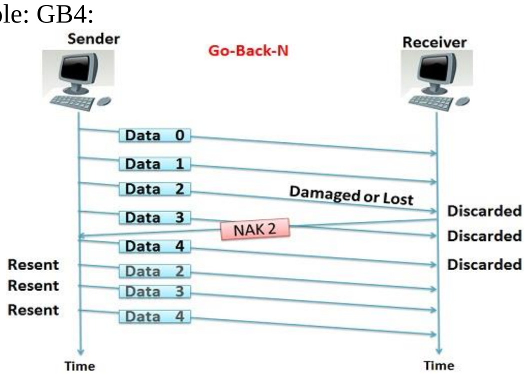


Fig.3: Go Back N. [8] It has cumulative Acknowledgement.[6]

In the above example our sender window size is GB4(4) and sender sends 4 packets one by one. If data ‘0’ gets acknowledgement ,After getting acknowledgement for 1st bit next data should send .i.e.4.and after receiving acknowledgement for 2nd bit data should send to sender i.e. 5.

Here every sender has time out timer, let us say that here 2nd packet is lost automatically packet 3,4,5 are discarded, then it will go back N from last packet but not from lost packet , and after that resend 2,3,4,5 again.

2.2.2. Selective repeat. 1. Sender window size is > 1.

2. Receiver window size is equal to sender window size.

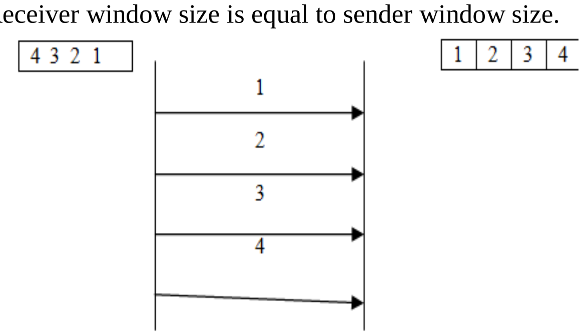


Fig.4: No packet lost

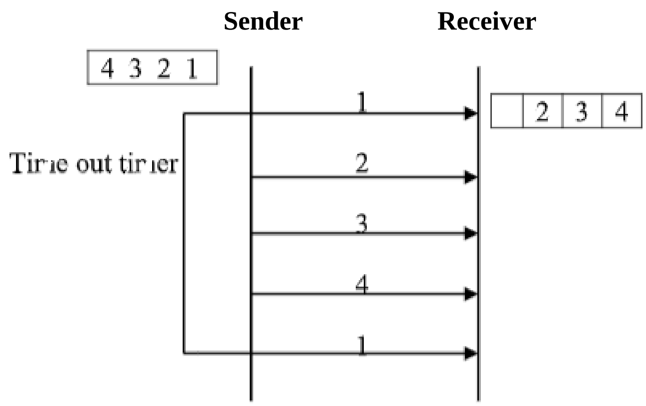


Fig.5: Packet 1 is lost

In this protocol sender window size and receiver window size are equal.[2][4] Let us say that sender is sending ‘n’ packets. Here receiver is in a better position to accept any of those ‘n’ packets in any order. In this sender is sending ‘n’ packets then receiver is waiting for ‘n’ packets then in if case packet 1 is lost, then there is no problem to remaining packets the receiver will receive out order packets. At sender side for packet 1 receiver cannot send acknowledgement then after time out completed at sender side and sender is going to selectively repeat only that packet.

III. RESULT ANALYSIS

A. Stop and wait protocol

In stop and wait protocol we have to send to packets from source to destination out of which every 4th packet is lost then how many packets we are going to send totally.

Sol : write out 10 packets

1 2 3 4 4 5 6 7 7 8
9 10 10

(Lost) (Retransmitted) (Lost) (Retransmitted)
(Lost) (Retransmitted)

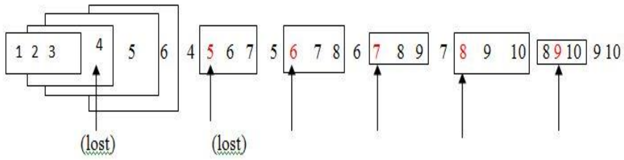
Out of this 4 packets are lost and again we have to count from the next packet.

No. of . packets that are transmitted is 13 and no. of. Packets that are retransmitted is 3

i.e(4, 7 , 10).

3.2.Sliding window protocol

3.2.1. Go Back N. In Go Back 3, protocol we have to send 10 packets from source to destination out of which every 4th packet is lost then how many packets we are going to send.



Number of transmission=27

3.2.2. Selective Repeat In Selective Repeat window size is 3 we have to send 10 packets from source to destination out which every 4th packet is lost then how many packets we are going to send.

1 2 3 4 4 5 6 7 7 8 9 10 10

(lost) (lost) (lost)

Number of transmission=13

IV. CONCLUSION

In a nutshell, selective repeat and stop and wait protocols are similar in transmission when compared to Go Back N. Here Go Back N has more transmissions when compared to selective repeat and stop and wait protocols.

In case of packet corrupted selective repeat protocol has negative acknowledgement (NACK) and not in stop and wait protocol .In case any corrupted packet occur in selective repeat protocol in very next NACK will send to sender and packet will retransmit immediately without waiting for timeout. In stop and wait any corrupted packet occur there is no NACK concept it will wait until time out. So in case of corrupted packet Selective repeat is efficient.

V. REFERENCES

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