CSE322 Computer Networks Sessional

Asif Ajrof 1705092

TCP-Peach: A New Congestion Control Scheme for Satellite IP Networks

Paper Information

TCP-Peach: a new congestion control scheme for satellite IP networks

- I.F. Akyildiz; G. Morabito; S. Palazzo
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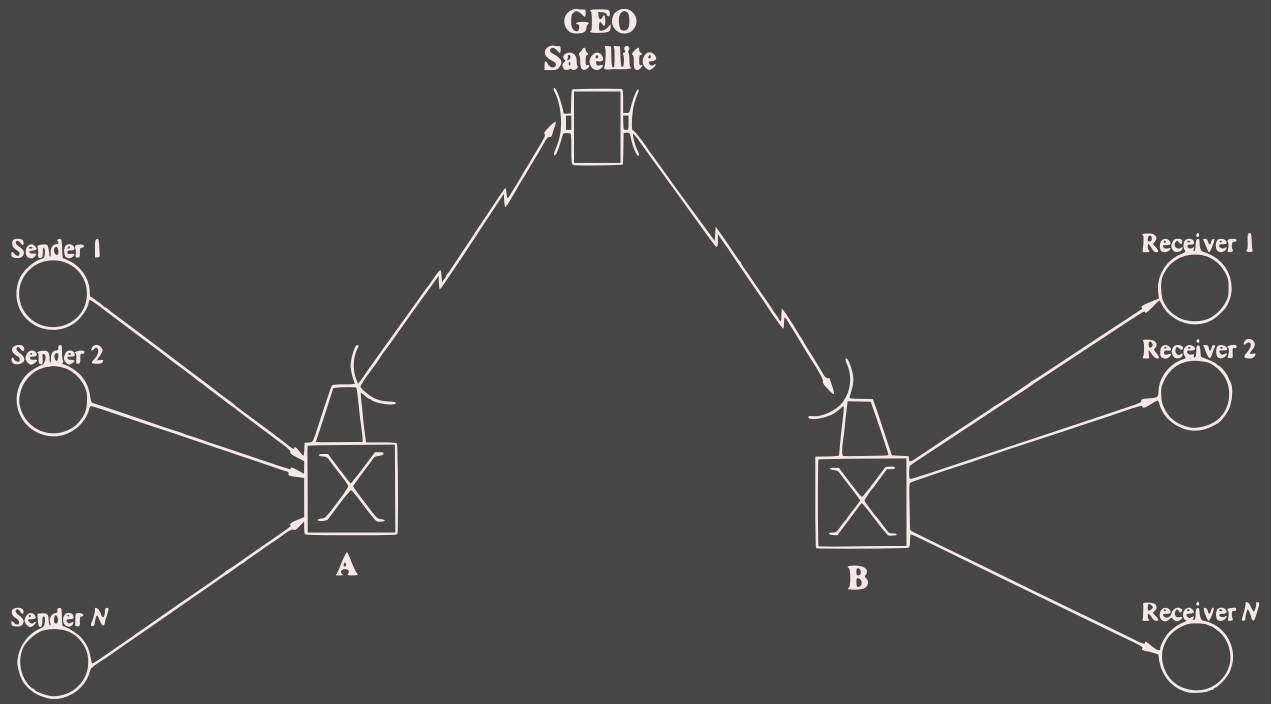
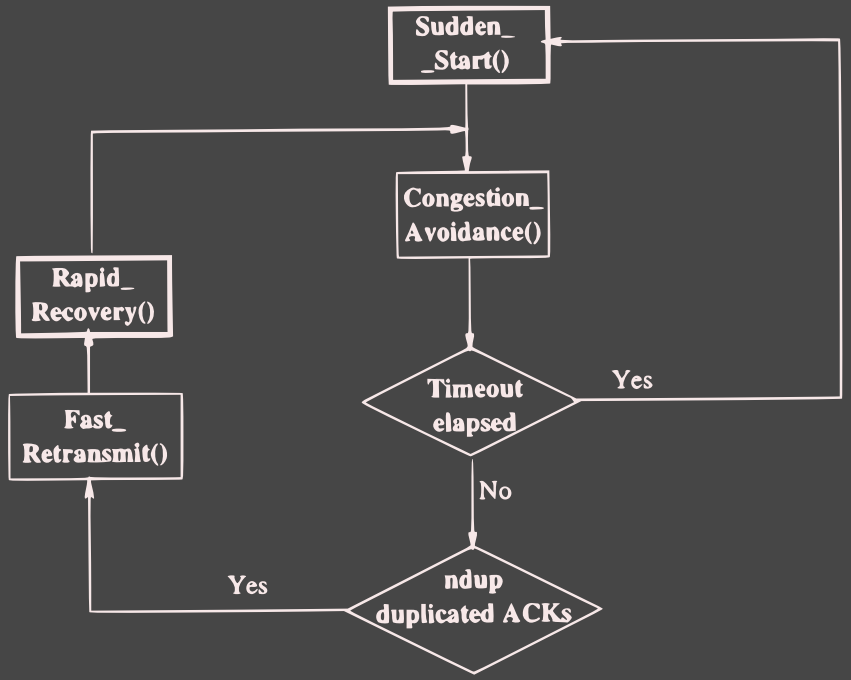
Satellite Network



Duration of the slow start phase for LEO, MEO, and GEO satellites

Satellite Type	RTT	$t_{SlowStart}$ (B=1Mb/sec)	$t_{SlowStart}$ (B=10Mb/sec)	$t_{SlowStart}$ (B=155Mb/sec)
LEO	50 msec	0.18 sec	0.35 sec	0.55 sec
MEO	250 mesc	1.49 sec	2.32 sec	3.31 sec
GEO	550 msec	3.91 sec	5.73 sec	7.91 sec

TCP-Peach Scheme



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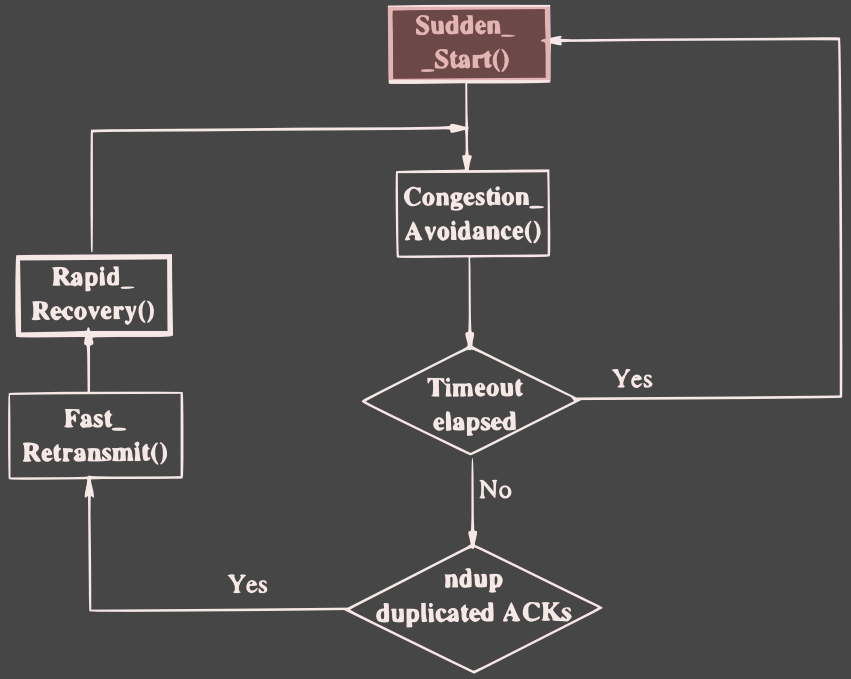

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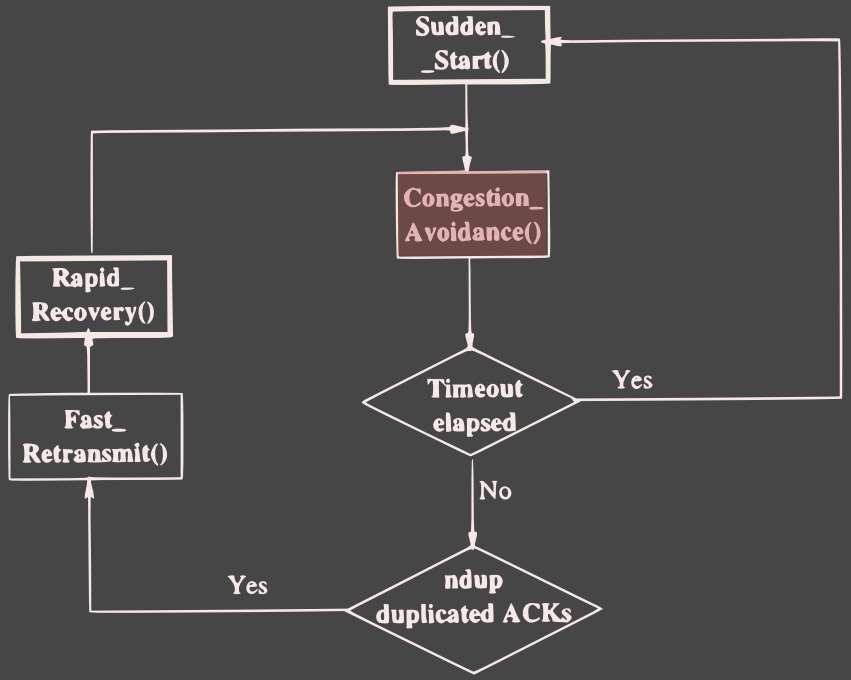

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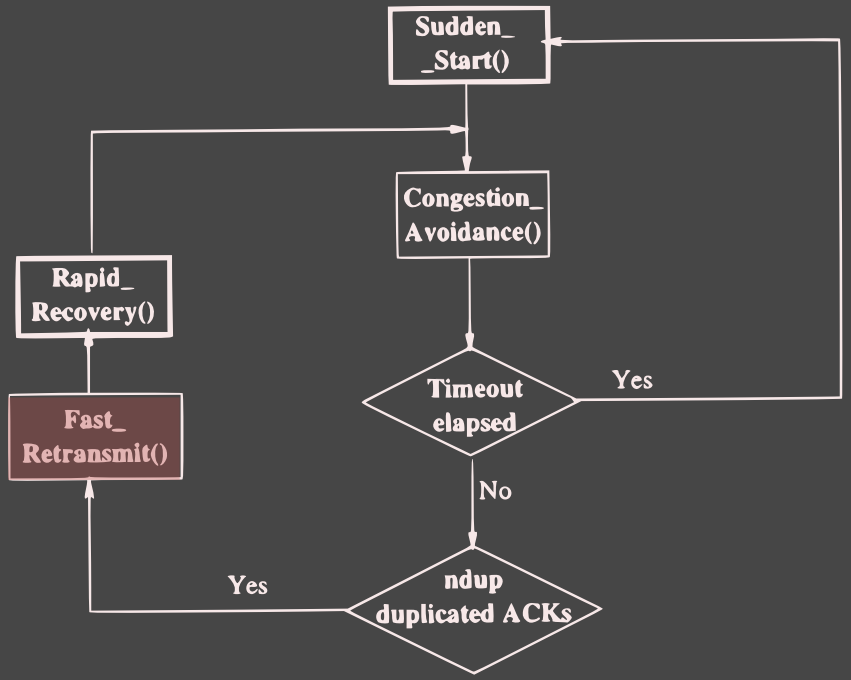
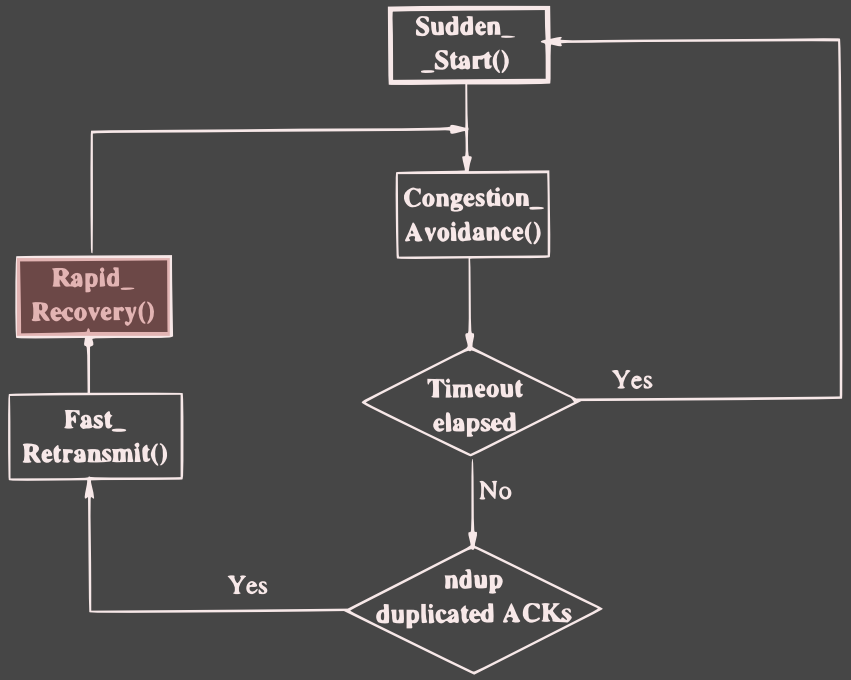
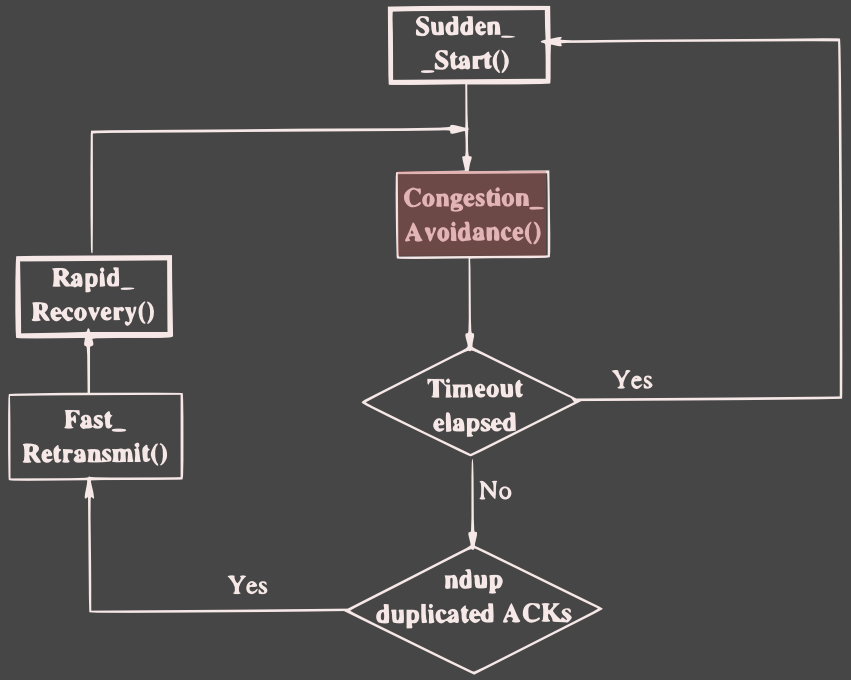


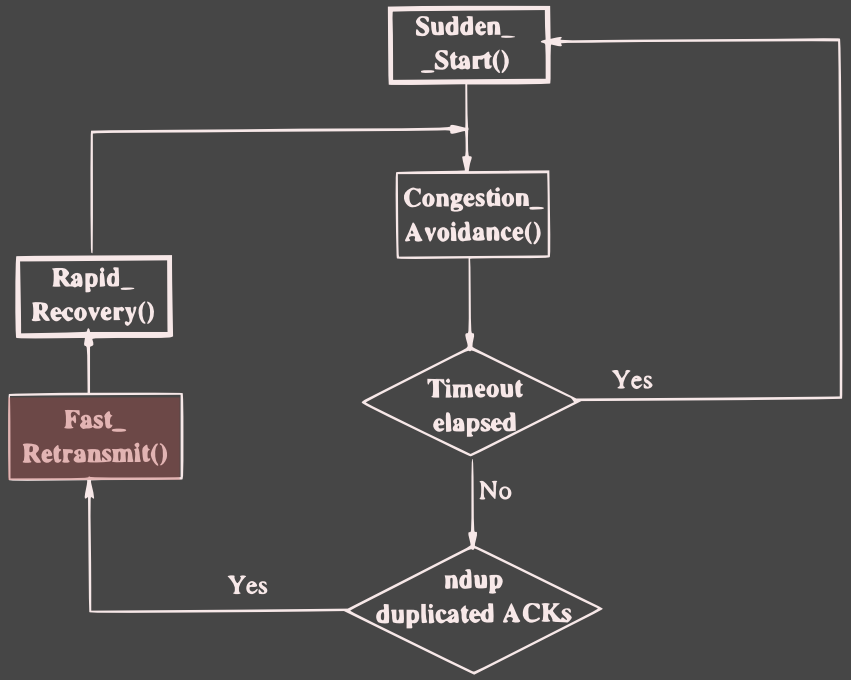
TCP-Peach Scheme



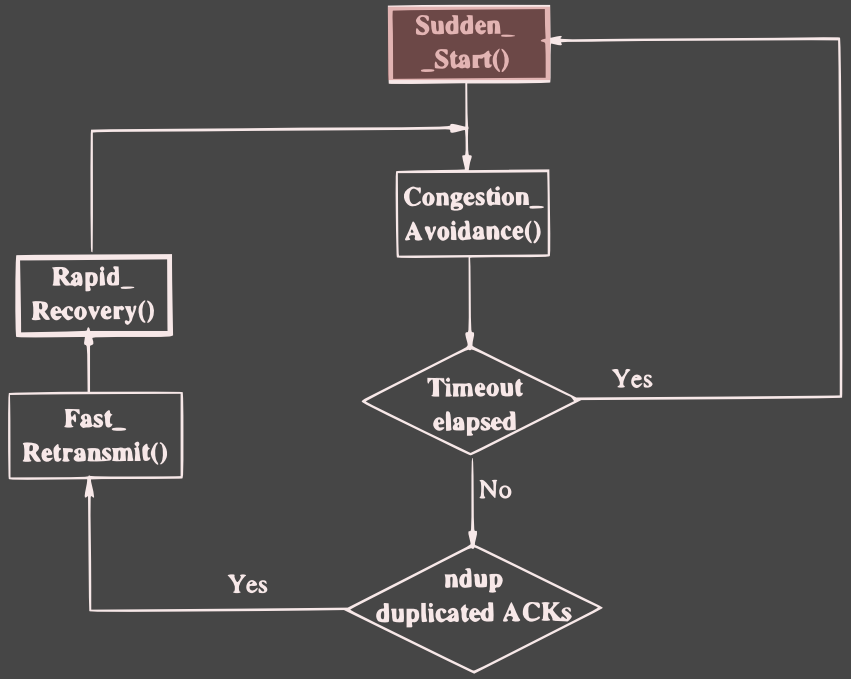
TCP-Peach Scheme



TCP-Peach Scheme



TCP-Peach Scheme



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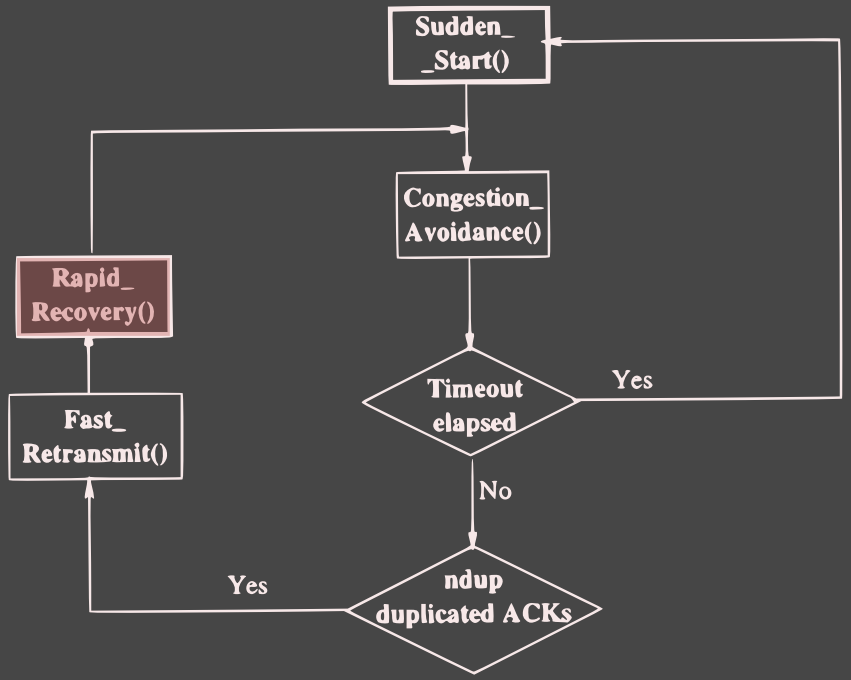
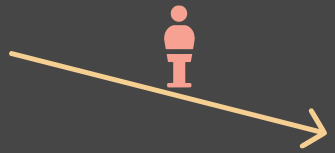


Dummy Segment



- Low-priority segments
- A copy of the last transmitted data segment
- If path is congested, then discards the dummy segments first. Consequently, dummy segments do not cause a throughput decrease of actual data.
- The sender interprets the ACKs for dummy segments as the evidence that there are unused resources in the network and accordingly, can increase its transmission rate

Dummy Segment

Upon receiving an ACK for a dummy segment, the sender checks the value of *wdsn.*

If wdsn = 0
then cwnd := cwnd + 1
if wdsn ≠ 0
then wdsn := wdsn – 1
and, cwnd := cwnd

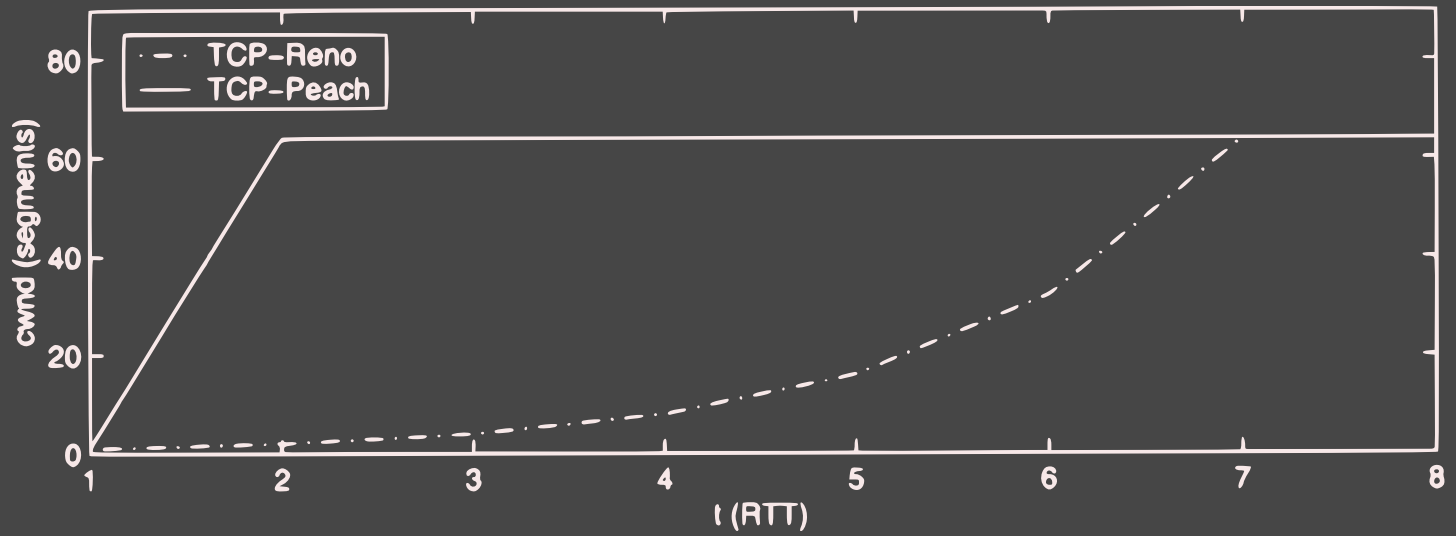
Sudden_Start()

```
Sudden_Start( )
    cwnd=1;
    τ = RTT/rwnd;
    send(Data_Segment);
    for (i=1 to rwnd − 1),
        wait(τ);
        send(Dummy_Segment);
    end;
end.
```

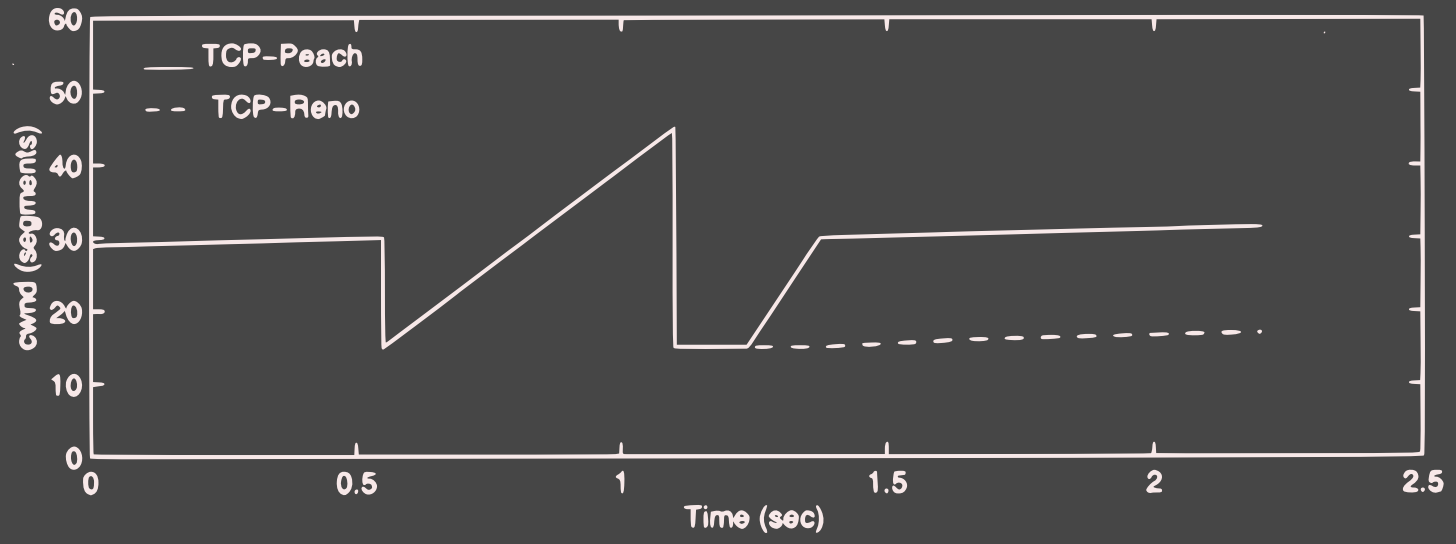
Rapid_Recovery()

```
Rapid_Recovery()
  cwnd=cwnd/2;
  adsn=2*cwnd;
  wdsn=cwnd;
  infl_seg=0;
  t_Retr=t;
  END=0;
  while (END=0)
    if (ACK_ARRIVAL)
      if (DATA_ACK_ARRIVAL)
        cwnd=cwnd+1;
        infl_seg=infl_seg+1;
      else if (DUMMY_ACK_ARRIVAL)
        if (wdsn=0)
          cwnd=cwnd+1;
          infl_seg=infl_seg+1;
        else
          wdsn=wdsn-1;
        end;
      end;
      if (cwnd>nackseg)
        while(cwnd>nackseg)
          send(Data_Segment);
          nackseg=nackseg+1;
        end;
      else if (adsn>0)
        send(Dummy_Segment);
        send(Dummy_Segment);
        adsn=adsn-2;
      end;
      if (LOST_SEGMENT_ACKED)
        END=1;
        cwnd=cwnd-infl_seg;
      end;
    end;
    if (t>t_Retr+RTO)
      Slow_Start();
    end;
  end;
end.
```

Comparison between TCP-Peach and TCP-Reno in the beginning of a new connection



TCP-Peach and TCP-Reno behaviour when segment losses occur due to link errors



Thank You