

**Improvement In TCP/IP Performance.**

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**Abstract**

In this paper a survey study is made on various factors and method that are responsible and required for the purpose of tcp performance improvement .The different environment and situation dependency creates varying scenarios here in our problem domain the different scenarios like mobile networks , third generation wireless network , integrated wireless lan, multi hop network are discussed to make a collective analysis of concerned problem and various approaches are also discussed to solve those problems.

**Keywords**-Third generation wireless network , Multihop network.

**Introduction**

Various data application uses tcp/ip for example this protocol get widely used in third generation wireless networks similarly it's usage can be seen in cellular networks and integrated wireless lan , mobile network and wireless multihop networks uses this protocol . The factor of protocol performance improvement is very crucial issue and various steps and analysis are done in this area .

There are various algorithms that are designed to improve the tcp performance under different environment . Our paper is divided into portions explain the survey analysis on the improvement of tcp performance on wireless network and mobile network .

**A Look On TCP Performance On 3G Wireless Network**

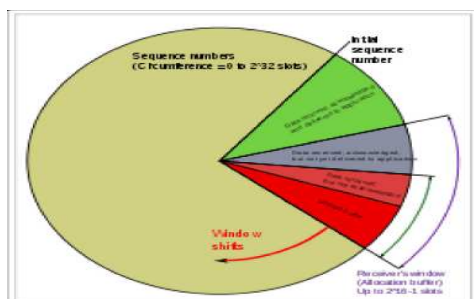
The tcp performance deals with the activity of tcp miss-reacting with wireless losses that implies to congestion losses finally leads to poor throughput .Handoffs and disconnection cause short and long pauses in wireless connection . To deal with this M-TCP , Freeze-TCP methods are used. The another problem of packet dropping arises for long lived flow in congested router.

The solution for above problem get proposed using AR that is a network dependent solution and get propagated on radio network controller the purpose of all this is to get sawtooth congestion window behaviour of the TCP source under the environment of changing delays and rates . The AR algorithm leads to make the increment in long lived tcp flows throughput

There are various points it does not cover like estimation of number of data packets in transit from source is needed that comes under it's drawback that will lead to the birth of new solution in this direction that will cover the these drawbacks .

Window regulator algorithm showed improvement in AR algorithm . The receiver window based method with acknowledgement pacing ensure fairness in different flows. In the same domain the random early drop get used for short and long flow under different flows with different weight and it is done to provide differentiation .

For scheduling between multiple flows of a single user foreground background scheduling is used . For scheduling packets across users PF scheduling is used.



TCP sequence numbers and receive windows behave very much like a clock. The receive window shifts each time the receiver receives and acknowledges a new segment of data. Once it runs out of sequence numbers, the sequence number loops back to 0.

**Fig 1. [8]**

Mun Choon Chan and Ram Ramjee explained the simulated analysis in this domain .**Window regulator is defined in two variations :-**

- Window regulator static
- Window regulator dynamic
- Window regulator with ACK buffer

The usage , implementation and comparative analysis is done by authors in paper in a very lucid manner. Performance of long lived tcp flows can be analysed by looking on following:-

- 1.Throughput versus buffer size(single user )
2. Throughput versus buffer (multiple user)
3. Throughput versus RTT
4. Throughput versus wired latency
- 5.Impact of random and congestion losses

**Short flow differentiation includes the following:-**

1. Intra user scheduling
2. Inter user scheduling
  - 2.1 PF scheduler
  - 2.2 PF-SP scheduler
  - 2.3 PF-RP scheduler

The authors thus explained various analysis in concerned domain , their work originated window regulator that improved TCP performance under channel variations and for any buffer size at the congested router . Various observation made on window regulator schemes and comparative analysis is done with other schemes with this scheduling and buffer sharing algorithm are also discussed .In scheduling robustness is decided by comparative analysis.

To achieve all these results ns2 (network simulator ) is used ,Firstly simulation topology is designed and then various graphical results are obtained for different analysis.

### **A Look On TCP Performance On Integrated Wireless Lan And Cellular Network**

Wireless application protocol is widely used for wireless information services delivery on wireless network . WAP2.0 standard is used wireless and cellular network.

Humphrey Rutagemwa , Minghui Shi ,Xuemin Shen , Jon W. Mark proposed an analytical framework for evaluating the performance wireless profiled TCP in wireless lan and cellular network.

The performance measuring factors are as follows:-

1. Transient congestion window
2. Steady congestion window
3. Recovery due to transmission errors
4. Recovery due to handover

**The performance evaluation factors are as follows:-**

1. Short term fast retransmit performance

2. Short term retransmission timeout performance
3. Long term efficiency performance
4. Long term throughput performance

The main outcomes of this analysis are:-

1. During hard handovers of network increment in maximum window size improves efficiency under high transmission error environment but reduces in low transmission error environment.
2. When soft upward vertical handover takes place increment in congestion window decreases the time of premature timeout.

**The authors explained the future aspect of proposed model in following ways:**

1. Cross layer and adaptive design
2. Networks residence times
3. Integrating markovian channels

### **A Look On TCP Performance On Wireless multi HOP Network**

Optimal CSMA is widely accepted due to their provable optimality in throughput and fairness over wireless multihop network without message passing . Jinsung Lee ,Hyang-Won Lee ,Yung Yi ,and Song Chong proposed a additional virtual queue on the mac layer that significantly improve the TCP performance when optimal CSMA is used like underlying mac .The reason of poor performance of TCP is that with TCP , link experiencing few chances will unable to increase its queue length .

**Various topology used in concerned scenario :-**

1. Flow in middle
2. Heterogeneous hops
3. Heterogeneous protocol

**Three scenarios are taken for performance evaluation:-**

1. Flow in middle scenario
2. Multihop scenario
3. TCP+UBC scenario

Experimental results are shown for various comparison analysis .

### **A Look On TCP Performance On Mobile Network**

A lot of work has been done in this concerned area includes:-

1. Methods based on based station assistance that contains:
  - I-TCP
  - MTCP
  - WTCP
2. End to end Approaches and methods includes:
  - Fast transmission

- Explicit base station notification
- Freeze TCP

Wanjiun Liao ,Chang Jung Kao , and Chin-Hei Chien proposed a transport layer procedure to improve the efficiency and performance of transport control protocol in mobile network .This process comprised of loss classifier and congestion window extrapolator .In roaming cause of packet loss is determined by loss classifier and tells the reason of packets not receiving during roaming . Adjustment of window size is done on the basis of congestion window extrapolator .Finally authors show their experimental results showing improvement in TCP performance for mobile user in roaming .

### Conclusion

In this paper we reviewed various approaches and methods that are given by various authors to improve the TCP performance on wireless networks , cellular networks and others .The purpose of this collective analysis is to present the solution set under one domain and try to evolve some more efficient approaches under the concerned problem domain. We organised the solutions from various direction that will make vision clear to all those working in this area.

### Acknowledgement

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