ISSN: 2278-0181
NCACS-2015 Conference Proceedings

Energy Enhancement for Secured 3G/4G Mobile Data Networks

[1]Jebakumar Immanuel. D, [2] Cibi. P, [3] Gowri. G, [4] Jayavani. P
[1]Assistant Professor [2] [3] [4] UG Students
Department of Computer Science and
Engineering SNS College of Engineering
Coimbatore, Tamilnadu, India

Abstract **— Mobile computing in recent years has lot of enhancement in the field of networks and communications and also in design of simulators. In existing system, Data transmission in the 3G/4G Mobile Data Networks works in increased data rate. Due to the collision in the network the delay is increased while data transfer and the energy efficiency reduced. In this paper the performance of the network is studied. The main problem identified on this study is that poor network connection and tolerance of the network is not sufficient. The security and privacy of the network is also low. NDRT estimation is used to enhance the energy efficiency of the network. Routing table is generated using RTG method. Hash key is used to increase the security.**

I.INTRODUCTION

WIRELESS communication technology has been making significant progress in the recent past and will be playing a more and more important role in access networks, as evidenced by the widespread adoption of wireless local area networks (WLANs), wireless home networks, and cellular networks. These wireless access networks are usually interconnected using wired backbone networks, and many applications on the networks run on top of the transmission control protocol/Internet protocol (TCP/IP).Inferring the unused capacity or *available bandwidth*is of great importance for various network applications[3]. Obtaining useful estimates of the available bandwidth from routers is often not possible due to various technical and privacy issues or due to an insufficient level of measurement resolution or accuracy. The key to the successful integration of a new or enhanced transport protocol is to use standard based and well-structured software components that have predictable behaviours under a large number of scenarios[7]. We believe it is a good practice to have a TCP protocol that has both predictable performance and nice social behaviours under diverse scenarios. The TCP protocol should be capable of high throughput when available bandwidth permits, and it should have good network behaviours such as maintaining stable and small queueing delay and not forcing heavy packet losses. The long-term evolution (LTE) as defined by the 3rd Generation Partnership Project (3GPP) is a highly flexible radio interface LTE supports both frequency-division duplex (FDD) and time- division duplex (TDD), as well as a wide range of system bandwidths in order to operate in a large number of different spectrum allocations[8].

We find that nearly half of the paths measured have a non-accessbottleneck link with available capacity less than 50 Mbps. Moreover, the percentage of observed paths with bottlenecks grows as we consider paths to lower-tier destinations. Surprisingly, the bottlenecks identified are roughly equally split between intra-ISP links and peering links between ISPs [1]. Our observations provide key insights into the location and nature of performance bottlenecks in the Internet, and in some cases, address common impressions about constraints in the network. To obtain a robust estimate, it is necessary to develop an estimator that allows the identification and elimination of noise due to cross traffic along the network path [6].

Based on all the above references and concepts, we developed an energy enhanced 3G/4G mobile data network by providing high security using Hash key method.

II.ENERGY EFFICIENCY IN MOBILE DATA NETWORKS

The goal toreduce the amount of energy required to provide products and services.There are many motivations to improve the energy efficiency Collision in Mobile Data Network increases during data transfer,so energy efficiency get reduced.To improve the energy efficiency a new method called NDRT (Node Deployment Routing Table) is introduced.PDF(Probability Density Function) is created to establish the node deployment. Routing table is generated using RTG method and get up0dated frequently. Since mobility concept is used ,we estimate the energy efficiency only for the varying network. III.TECHNIQUES TO EVALUATE THE PERFORMANCE OF MOBILE DATA NETWORK

In mobile computing the performance of the network can be evaluated with the help of queue length and link buffer size estimation.By using the Ant-net Algorithm the shortest path between the nodes are identified. By increasing the life time, the energy efficiency is also increased.On behalf of the shortest path the Delay is reduced.Security of the network is increased by the hash keys in the network. The packet delivery ratio is increased.

Various techniques used for performance evaluation of networks are compared below

1. *AN EMPIRICAL EVALUATION OF WIDEAREA INTERNET BOTTLENECKS*

A common belief about the Internet is that poor network performance arises primarily from constraints at the edges of the network. As access technology evolves, enterprises and end-users, given enough resources, can increase the capacity of their Internet connections by upgrading their access links. The positive impact on overall performance may be insignificant, however, if other parts of the network subsequently become new performance bottlenecks. In this the location and the characteristics of future bottleneck link in the network is considered. The aim is to study the characteristics of links within or between carrier ISPs that could *potentially* constrain the bandwidth available to long-lived TCP flows, called *non- access* bottleneck links. Using a large set of network measurements discovered and classified such links according to their location in the Internet hierarchy and their estimated available capacity.

There were two key contributions:

1) A methodology for measuring bottlenecks links and

2) A classification of non-access bottleneck links in terms of their location, available bandwidth and latency.

The observations provided key insights into the location and nature of performance bottlenecks in the Internet, and in some cases, address common impressions about constraints in the network. This work proves instrumental in improving the performance of future network protocols and services in terms of which bottlenecks to avoid (and how to avoid them). It used some of the measurement methodology as follows

1. *Choosing sources*:

The bottlenecksfaced by well-connected end-point choose as sources such that they have no bottlenecks in their own access networks, are geographically dispersed, and do not introduce biases due to connectivity to a few upstream.

2. *Choosing destinations*:

The network paths measure must be representative of typical Internet paths. Therefore the destinations consist of routers within various ISPs belonging to each of the four tiers of the Internet hierarchy. it also include paths through public exchange points, which are commonly considered significant bandwidth bottlenecks, by picking destination routers within small tier-4 ISPs attached to popular public exchanges like MAE.

3. Measurement tools:

To identify bottlenecks and report the available bandwidth and latency we developed a tool, *BFind*, that uses techniques motivated by TCP's bandwidth probing behavior and operates in a single-ended mode without requiring superuser access (unlike most bandwidth measurement tools).

4. Classification metrics:

For the bottlenecks links discovered by BFind identify if the link was within an ISP or between ISPs. Then further classify the links according to the tier of the ISP(s), and comment on the observed available bandwidth on different types of bottleneck links.

Our results imply that buying bandwidth from two different tier- 1 ISPs (e.g., to reduce peering-point crossings) may not be much better from a performance perspective than buying twice as much bandwidth from a single tier-1 ISP. It may also be more economical to buy from one ISP. Also, a shorter route to a destination that passed through a tier-1-tier-1 peering link might be better than a longer route within a single lower-tier provider.

5. *SOME FINDINGS ON THE NETWORK PERFORMANCE OF BROADBAND HOSTS*

There has been a rapid growth in the popularity of and the research interest in peer-to-peer (P2P) systems and applications. P2P systems have been built for file sharing, content distribution, overlay multicast, etc. While some of the "peers" in these systems may be well-connected machines on academic or enterprise networks1, a large fraction of them are (or are expected to be) less well- connected machines such as home PCs. An interesting question is what the quality of network connectivity between such "real world" peers is and what implications this has for applications.

While there have been extensive measurement studies of network connectivity and performance between end hosts in the Internet, these have mainly focused on well- connected machines on academic and research networks. A few recent efforts have tried to glean information on the network performance of real world peers from measurements of popular P2P applications initiated from well-connected hosts. While these efforts have yielded useful information, they have been hampered by their indirect approach; for instance, it has been hard to determine exactly what the latency or TCP throughput between two peers is.

In this paper describes *PeerMetric*, an efforts have undertaken to directly measure P2P network performance from the vantage point of broadband-connected residential hosts. This is accomplished by running measurement agents on residential hosts running Microsoft Windows 2000/XP. It considered only broadband hosts (with cable modem or DSL connections) because these constitute a disproportionately large fraction of hosts in P2P systems, and this fraction is likely to increase with more widespread deployment of broadband. We deployed PeerMetric on 25 broadband hosts distributed across 9 geographic locations in the U.S. However, given their broadband connectivity it expects their network performance to be representative of broadband hosts in real P2P systems. So loosely uses the terms "peer" and "P2P" in the context of these hosts.

This gathered a large set of TCP throughput, ping, packet-pair and trace route measurements from these vantage points during the several period of time.

Here are some of our key findings:

1. Thereisa high degree ofasymmetry in bandwidth, with the median downstream and upstream available bandwidth (measured as the TCP throughput from and to a well-connected server) being 900 Kbps and 212 Kbps, respectively.
2. P2P latencies are much higher than those between well-connected hosts; P2P ping times even within a city are 30-60 ms compared to 3-4 ms between university hosts in similar locations.
3. P2P ping time is a poor predictor of P2P TCP throughput, which makes ping time an unattractive metric for peer selection in bandwidth-intensive applications such as file sharing.
4. Latency is still important for applications such as P2P search that typically involve exchanging short messages. For these applications it shows that a simple delay-vector based approach [6] is very effective in identifying nearby hosts (in terms of ping time) without requiring direct P2P measurements.
5. This argue that the traditional metrics of goodness for application level multicast (which focus, for instance, on minimizing the use of long-haul, backbone link bandwidth) may be inappropriate in the context of broadband hosts, where the last-hop (upstream) bandwidth is the most constrained resource.

The inverse relationship between RTT and throughput predicted by theory is masked by the wide range in last-hop bandwidths. A packet-pair based bottleneck bandwidth estimate, on the other hand, is a good predictor of TCP throughput in the case of DSL hosts. However, packet-pair measurements are unreliable in a cable modem setting, presumably because of the way bandwidth throttling is done.

3. pathChirp: EFFICIENT AVAILABLE BANDWIDTH ESTIMATION FOR NETWORK PATHS

A new self-induced congestion available bandwidth estimation scheme we call *pathChirp*.Advantage of chirps (or any other packet train) over packet pairs is that they capture critical delay correlation information that packet pairs do not. PathChirp exploits these advantageous properties of chirps to rapidly estimate available bandwidth using few packets. To avoid confusion, we emphasize that the only commonality between pathChirp and our Delphi algorithm is the chirping packet train.Delphi uses chirps to estimate the available bandwidth at a range of different time scales based on a multifractal tree model for the bandwidth over time. It does not use the self-induced congestion principle.If the probing rate exceeds the available bandwidth over the path, then the probe packets become queued atsome router, resulting in an increased transfer time. On the other hand, if the probing rate is below the available bandwidth, the packets face no queuing delay.The available bandwidth can then be estimated as the probing rate at the onset of congestion. The paper presented pathChirp, an active probing scheme that uses a novel “packet chirp” strategy to dynamically estimate the available bandwidth along an end-to-end network path. Internet and testbed experiments as well as simulations reveal that pathChirp provides accurate, though somewhat conservative, estimates of the available bandwidth. In addition, pathChirp outperforms existing tools in terms of estimation accuracy and efficiency. The current algorithm of pathChirp for available bandwidth estimation mainly uses information about whether delays are increasing or decreasing in the signatures.

pathChirp Overview: It estimates the available bandwidth along a path by launching a number of packet chirps(numbered m=1,2…)from sender to receiver and then conducting a statistical analysis at the receiver.

Excursion segmentation: pathChirp segments each signature into regions belonging to excursions and regions not belonging to excursions.

V.CONCLUSION& FUTURE WORK

Therefore delays in mobile networks can be reduced by using NDRT method. The security of the network can also be increased by generating Hash key. Thus the performance evaluation of the network is done with the parameters called Packet delivery ratio, Threshold value, network throughput, Data loss, initial energy, remaining energy and the simulation time period**.**

REFERENCES

[1] A. Akella, S. Seshan, and A. Shaikh, “An empirical evaluation of wide-area internet bottlenecks,” inProc. ACM IMC, NewYork, NY, USA, Oct. 2003.
[2] K. Lakshminarayanan and V. Padmanabhan, “Some findings on the network performance of broadband hosts,” inProc. ACM IMC, New York, NY, USA, Oct. 2003.
[3] V. Ribeiro, R. Riedi, R. Baraniuk, J. Navratil, and L. Cottrell, “PathChirp: Efficient available bandwidth estimation for network paths,” inProc. PAM, 2003.
[4] M. Hirabaru, “Impact of bottleneck queue size on TCP protocols and its measurement,”IEICE Trans. Inf. Syst., vol. E89-D, no. 1, Jan. 2006, pp. 132–138.