Packet Internet Billing Framework to Enhance Service Level Agreement (SLA) In Convergence Network

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ABSTRACT

In line with the recent expansion of mobile technology over appliances and software's, the technology itself much exposed to the insufficient of bandwidth issues. Globally the demands are growing from one time to another with robust applications and appliances. Modern people now very much relying on gadget and most of them are in mobile technologies.

This paper is about to recognize how Service Level Agreement (SLA) can play major role in controlling global internet bandwidth by various level of Internet Service Provider (ISP). It is understood the discussed model can be cross platform from various format of SLA and bandwidth technologies. With this, present internet users able to efficiently use internet bandwidth and satisfy them with fees which reflects on they demands.

KEYWORDS

Bandwidth Management; Convergence Network; Service Level Agreement; Internet Service Provider; Advanced Network

1 INTRODUCTION

People in present digital period demanding for fast and consistent internet connections either for individual or corporate usage to support their daily mobilization needs. Presently the overall charge for total usage is based on the agreed terms and condition between ISP and the subscriber. Majority of the users using broadband and they are so tight with service level agreement (SLA) which are various terms and conditions from one Internet Service Provider (ISP) to another ISP.

While most SLAs today deal with availability and time to repair metrics, they are increasingly being extended to include latency, throughput, CIR, burst levels, sustained average traffic level, and jitter information. With SLA, end users will be guaranteed on the connection not on the performance, however it is different compared to corporate users, whereby the agreement of SLA will be back to back with Service Level Guarantee (SLG)[1,2]. Most SLA systems rely on averages of multiple pings. SLA information can be gathered through sniffing, client agents , client simulation, and active monitoring.

In a nutshell, majority of ISP are not concerning on the performance issues, their objective to ensure the connection are available at the best effort. Meaning the ability to connect to the internet is not equally from one hour to another depending on number of users and allocated bandwidth on that particular exchange by the ISP. Various researches made at normal network, mesh network and up to data center approach [3-5] on how SLA can assist company in getting the utmost performance without jeopardize the Quality of Service (QOS). Since cloud become defector for future internet expansion , SLA will ultimately plays relevant role in managing user needs and ensure the stability and security are well equipped [6-8].

Technical report made by *Envisional Ltd on Jan year 2011*, stated the following outcome of internet usage;

i. Across all areas of the global internet, **23.76% of traffic was estimated to be infringing**. This excludes all pornography, the infringing status of which can be difficult to discern.

ii. The level of infringing traffic varied between internet venues and was highest in those areas of the internet commonly used for the distribution of pirated material.

iii. **BitTorrent traffic** is estimated to account for 17.9% of all internet traffic. Nearly two-thirds of this traffic is estimated to be non-pornographic copyrighted content shared illegitimately such as films, television episodes, music, and computer games and software (63.7% of all bittorrent traffic or 11.4% of all internet traffic).

iv. **Cyberlocker traffic** – downloads from sites such as MegaUpload, Rapidshare, or HotFile – is estimated to be 7% of all internet traffic. 73.2% of non-pornographic cyberlocker site traffic is copyrighted content being downloaded illegitimately (5.1% of all internet traffic).

v. **Video streaming traffic** is the fastest growing area of the internet and is currently believed to account for more than one quarter of all internet traffic. Analysis estimates that while the vast majority of video streaming is legitimate, 5.3% is copyrighted content and streamed illegitimately1, 1.4% of all internet traffic.

vi. Other **peer to peer networks and file sharing arenas** were also estimated to contain a significant proportion of infringing content. An examination of eDonkey, Gnutella, Usenet and other similar venues for content distribution found that on average, 86.4% of content was infringing and non-pornographic, making up 5.8% of all internet traffic.

2 RELATED WORK

From the statement of this report, internet is being use excessively either in good point of view or in damaging without proper control and execution. To overcome this problem, author will propose the proposal to come out with internet billing which will be tied to packets use. The packets will be according to different categorization and purposes. Such as streaming, VOIP, data, audio, multimedia, local lan (metro-e) and virtual private network which may consists of various network architecture such as Ethernet, asynchronous transfer mode (atm), X-25, Frame Relay, FDDI and etc[9-12].

As for this solution, internet billing will no more static to the package applied or block used, users will be charged on the individual packet usage. Such as total packets for streaming will be different rate with total packets of normal browsing data[13-14]. With this aid, ISP may lift a burden on entertaining users demand for bandwidth supply and various demands over predefined SLA. Parents can perform parents control to know the details of the packets, for instance the streaming may be narrow down to the sites that frequently use or the name of the file which has been excessively download via ftp, http or torrent.

Study made [24-25] still unable to justify how to control the bandwidth utilization and looks like, ISP will be burden with the demands. Their solution most likely identical with bandwidth management where by users allocated with preset bandwidth in line with their subscription with desired ISP[15]. Premium users may enjoy full access and some users may exceed the allocated bandwidth by paying the extra packets. This solution the still unable to resolve the said problem mentions earlier by the author [16-20].

With that, author beliefs that this title can resolve many issues and not limited to the said problems. Among others issues that can be address, such as;

- Green computing
- Parent controls
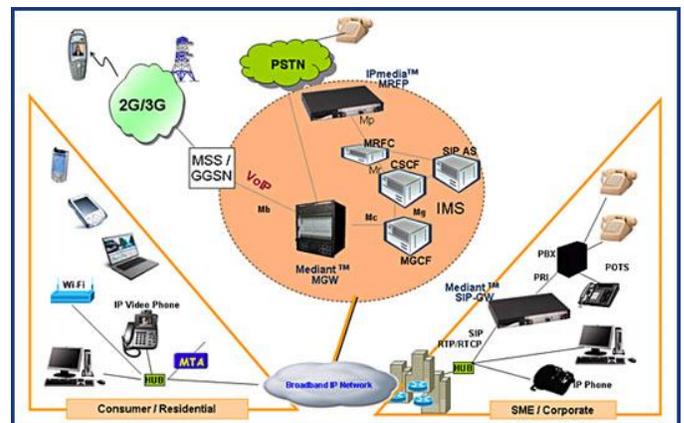- Healthy internet activities
- Efficient Internet Billing

Figure 1. Convergence Network Diagram

3 AUTHOR APPROACH

Development of this framework will comprise of bandwidth broker whereby it will functions as multi agents. Among the key functions is to analyze utilization of every packets based on individual application and coming from different Internet Service Provider (ISP).
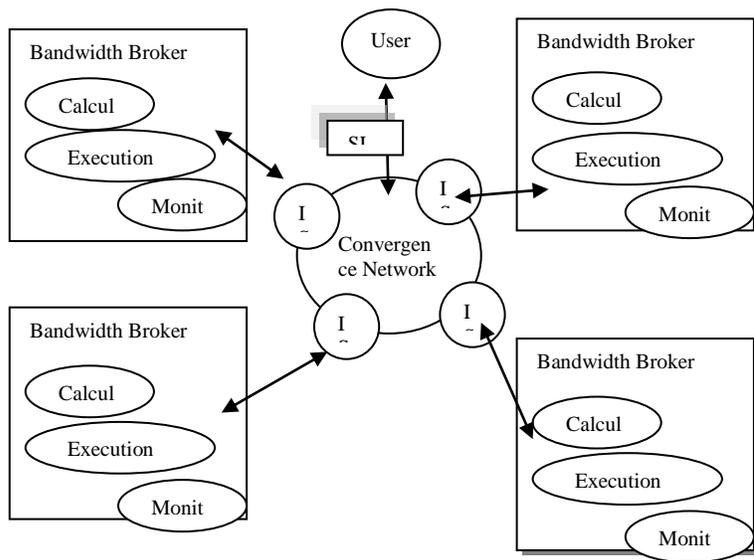

Figure 2. Framework for the proposed research

In figure 2, bandwidth broker [20-21] available at any ISP and from that the calculation will be done at ISP's own infrastructure. SLA will be between end users and the convergence network providers, however, billing will be calculated at every ISP and total will then is a compilation on packet utilization.

SLA negotiations will also take place among ISP's own package [22-23], for instant the demands speed are not available to download one HD movie with the total size of 4GB, alternatively , the different of speed or time ± 5 will be offers to the subscribers transparently and this will be visible in their final bills.

By having this approach and model, SLA will be transparent within convergence network and the ability to apply internet bandwidth efficiently and ethically.

4 FUTURE WORK

Author will enhance the conceptual model into working prototype model and this will be developing using JAVA technology due to its security, stability and cross platform feature. The assessment of the developed prototype will be level with various bandwidth benchmark the actual performance of node of the connected machines.

Another characteristic that will be streamline in future developments are the ability of the agent to minimize the power consumptions and make it works greatly in offline and online mode.

5 CONCLUSION

Bandwidth is the greatest demand by current generation and peoples really seek for creative innovation to fulfill the needs. Moving large amount of information across network links meant knowing secret commands [26]. By contrast, today anyone can accidentally save a 1 GB file to a network drive, or attach a large video clip to an email, without realizing the impact of what they're doing. Having mention this, this solution are closely in line with the bottleneck issues between demands and supplies of bandwidth.

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