A survey on performance analysis of policer for QoS based Routers in Next Generation Network

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Abstract--Next generation Networks (NGN) are required to support the seamless delivery of voice, video and data with high quality. In this work, we propose and demonstrate an efficient NGN QoS-Aware resource and admission control and management methodology which guarantees the QoS requirements. The advantages of the proposed method, in terms of QoS gains, are demonstrated through modeling of the main QoS parameters. Among the many issues faced by NGN is the quality of service (QoS) issue as would be with any IP based network; which is measured in terms of network latency, throughput, packet delay variation, packet loss etc. Several techniques try to solve this issue in a best effort environment. Multi Protocol Label Switching (MPLS) was found to be the technology which seems to solve the problem better than others primarily due to its traffic engineering capabilities.

Keywords: NGN QoS, admission control, transport resource, control and management, IP/MPLS.

I. INTRODUCTION

The QoS means to meet out certain requirements or guarantees to a particular traffic which might include giving preferential treatment to some traffics over others e.g. voice and video traffics are more sensitive to delay and packet delay variation and loss as compared to file transfer or email. QoS can be provided by resource over-provisioning which in many cases is not possible or by network management which is the task of the QoS techniques. ATM was the first technology for providing QoS [2] but has the disadvantage of a large overhead (5 bytes to 48 in an ATM cell). IntServ provides guaranteed services but has scalability problems due to large number of RSVP messages going on in the network to reserve the resources for each flow separately [2]. DiffServ is the other way round having good scalability (class based QoS rather than flow based) but only provides coarse quality of service; providing only the preferential treatment to some traffic classes over the others [3]. Multi Protocol Label Switching (MPLS) is a new emerging technique where the packets are fast switched across the interfaces of a router i.e. the layer 2 functionality using 32-bit labels instead of routing by IP header which is a comparatively slow process. Besides this, Traffic Engineering (TE) is also possible through MPLS which leads to balancing the network traffic and efficient use of network resources, thereby making it possible to achieve higher network throughput. MPLS on the other hand is much like DiffServ in that the service differentiation takes place at the ingress only and all routing decisions are taken there.[3] Next-generation network (NGN) is a new concept commonly used by network designers to depict their vision of future telecommunications networks. Even if the required resources are successfully reserved, the delay, jitter, and other QoS parameter values may be out of range because of the interference of other traffic. [5]

II. PREPARATİON OF PAPER

2.1 Structuring of Paper

This work proposes the Performance analysis of policer for QOS based routers Next Generation Network (NGN) to collect the information for carrying out work the following literature review studied.

2.1.1Umer Mushtaq Mir, Ajaz H. Mir, Adil Bashir, "DiffServ-Aware Multi Protocol Label Switching Based Quality of Service in Next Generation Networks"[3].

Next Generation Networks (NGN) is the future of communication which will provide each and every service over the same network. The network will only act as a bit highway or a packet highway, forwarding packets of each and every kind over the internet protocol or IP.Among the many issues faced by NGN is the quality of service (QoS) issue as would be with any IP based network; which is measured in terms of network latency, throughput, packet delay variation, packet loss etc. Several techniques try to solve this issue in a best effort environment. Multi Protocol Label Switching (MPLS) was found to be the technology which seems to solve the problem better than others primarily due to its traffic engineering capabilities.

2.1.2 Boyoung Rhee, Sungchol Cho, Jin Xianshu, Sunyoung Han, "QoS-Aware Router Combining Features of Conventional Routing and Flow-aware Routing Based on Resource Management over NGN"[7].

RACF (Resource and Admission Control Functions) provides QoS control functions including a resource reservation, admission control and gate control in order to get the desired QoS for communication and permission to access needed resources. RACF is composed of PDF(Policy Decision Function) and TRCF(Transport Resources Control Function). TF (Transport Functions) is the set of functions that support the transmission of media information and control information.

2.1.3 Yasusi Kanada, "Policy-based End-to-End QoS Guarantee Using On-Path Signaling for Both QoS Request and Feedback"[5].

Yasusi Kanada proposes in his research as the QoS parameters in reservation and feedback messages should coincide and the mechanisms for these two can be similar.Therefore, we designed a protocol called SNSLP for both QoS request and feedback messages.SNSLP was implemented on the top of RTCP for both an experimental network with policy-based QoS control and a voice application called voiscape. In addition, an implementation method using routers without an SNSLP stack for policy-based routing is described and the result of implementation is reported.

2.1.4 Cherif Ghazel, Leila Saïdane, "Satisfying QoS Requirements in NGN Networks using an Optimized Resource Control and Management Method"[1].

The proposed an extension of RTCP called SubRTCP that enabled middle nodes to monitor an RTP session and to report the result using the same RTCP session.Cherif Ghazel and Leila Saïdane proposed and demonstrate an efficient NGN QoS-Aware resource and admission control and management methodology which guarantees the QoS requirements.

2.1.5 Xi Zhang, Wenchi Cheng, and Hailin Zhang, "Heterogeneous statistical QoS provisioning over 5G Mobile Wireless Networks"[2].

As per Xi Zhang, Wenchi Cheng, and Hailin Zhang, The 5G mobile wireless networks are expected to provide different delay-bounded QoS guarantees for a wide spectrum of services, applications, and users with extremely diverse requirements. Since the time-sensitive services in 5G multimedia wireless networks may vary dramatically in both a large range from milliseconds to a few seconds and diversity from uniform/constant delay-bound to different/variable delay-bound guarantees among different wireless links, the delay-bound QoS requirements for different types of services promote the newly emerging heterogeneous statistical delay-bounded QoS provisioning over 5G mobile wireless networks, which, however, imposes many new challenging issues not encountered before in 4G wireless networks.

2.2 Figure & Explanation

Three high density signals are generated by packet generator.Then these three different signals with high density are given to three different policers where,it goes through packet counter and packet driven clock.
The packet driven clock is handled by the control logic where the different policies will be set for getting the better quality of services

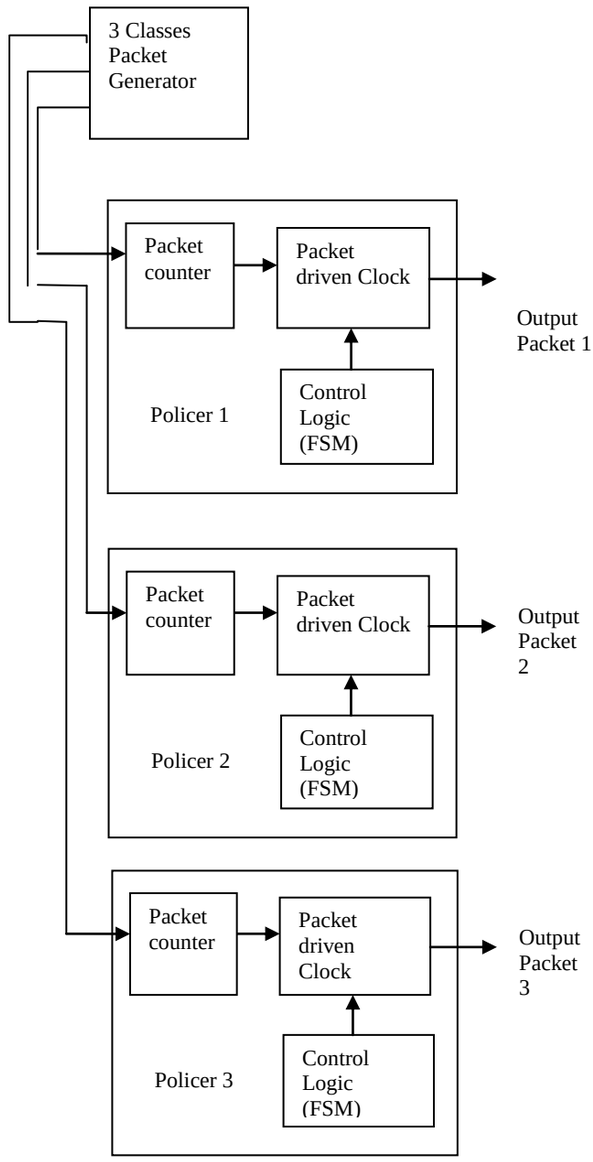

Fig. 1 Proposed System

2.3 Performance Evaluation Parameters

The performance of proposed work will be evaluated with the following parameters:

1. Delay:As can be seen the packet delay for video traffic reduced almost 10 times with MPLS. Similar results were obtained for other real time applications like VoIP pcm quality or gsm quality which is very encouraging. This was mainly due to the traffic engineering

capabilities of MPLS as all the previously unused links utilized hence no queues were formed as against the simple IP network which used only the shortest path and there were long queues.

2. Jitter:Like the delay, the jitter in voice decreased to almost zero in an MPLS enabled network.
3. Throughput: Network throughput almost increased three and a half times courtesy less delay and packet drop in MPLS network. For individual applications similar results were obtained.
4. Packet drop:Packet drop can be obtained by taking the difference of traffic sent and traffic received. The remaining traffic is but natural,dropped.

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