Internet Traffic Control System and Mobile Broadband Communication System in ATM Networks

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Abstract
MPLS is an advanced forwarding scheme which allows the network to achieve the benefits provided by traffic engineering techniques. The establishment of an end to end LSP between two IP/MPLS networks inter connected through an ATM backbone is still an open issue. This focuses in an MPLS ATM environment and address problem of provisioning a fast LSP establishment with certain QOS between 2 MPLS sub networks inter connected through an ATM backbone. The PNNI is used in ATM backbone as a routing and signaling protocol. In order to achieve the paper objectives and new PNNI elements are defined and evaluated. Voice has been the primary application in wireless network to date. However packet based application and higher bandwidth requirements to sustain these applications are ever emerging. As in wire line packet based networks while IP routing is well understood IP network by itself is still not achieved and its depart on the backbone that can offer QOS guarantee. MPLS is a newer technology that offer service information layer 2 switching and connection oriented that allows traffic engineering control traffic flows in the network. The purpose of it to show how MPLS QOS Architecture can be employed to provide traffic engineering in broadband wireless network.
Keywords: Multiservice traffic, Mobile Broadband systems

I. Introduction

To meet QOS requirements of end user QOS based routing is supported to find a path from source to destination which can satisfy user requirements on bandwidth end to end delay. Besides this should be done dynamically instead of being configured statistically. In case there are several feasible path available the path selection can be based on some policy constraints . We can choose the path which cut less money or the one via the designed service provider.

To optimize the network resource usage this is an objective from service provider's point of view. Easy service provider wants to maximize the utilization of their current network facilities thus to maximize its resource. Besides this is also a requirement from network engineering perspective. QOS based routing is expected to direct network traffic in an efficient way that can maximize the total network throughput. One can scheme is to always choose the shortest path among the feasible candidates because layer path means using more network resources.

Gracefully degrade network performance when things the congestion can happen. When network is in heavy load, QOS based routing is expected to give better performance than best effort routing. Which can degrade the performance is dramatically. In the network framework which has multiple framework which has multiple service classes of traffic the resources should be allowed fairly among all the classes. The starvation of lower priority classes can be avoided. This allocation can be done in a dynamic fashion.

Scalability in terms of number of nodes and traffic flows. Flexibility since it is not tied to a single forwarding technology. Simple and fast forwarding which imposes network performance. Capability to support traffic engineered path and service differentiation and essential for QOS provisioning.

II. Related works

Check for the availability of required resources and reservation. Assign labels for the communication. The exact form of the label is dependent on the type of connection oriented network in question. Program the switch fabric to map incoming labels to outgoing labels. This will allow user data bits following on the connection after it is setup to the forwarded through the switch fabric based on this configuration. We refer to this confirmation as a switch mapping table.

Set control parameters for scheduling and other run time algorithm. In packet switching network if waited fair queuing is used in the switch fabric to schedule packets the computed equivalent capacity and buffer space allocated for this connection are used to program the scheduler. Even in circuit switched network such a sonnet network there could be certain parameters. Transparency required for how the sonnet switch handle bytes in the overhead portions of the incoming and outgoing signals.

The amount of state information increases proportionally with the number of flows. This places a huge storage and processing overhead on the routers. Therefore this architecture does not scale well in the internet core. The requirement on router is high. All routers must have RVSP admission control. MF classification and packet scheduling. Ubiquitous deployment is required for guaranteed service. Incremental deployment of controlled load service is possible by deploying controlled load service and RVSP functionality at the bottleneck nodes of a domain and tunneling the RVSP messages over other parts of the domain.

III. Simulation Results

As we consider the network confirmation to be series of snapshots changing over time the satellite constellation is analogous to a fixed network during a particular snapshot. Therefore routing boils down to having a suitable routing strategy for each snapshot to another. Hence there would be a switching table for each snapshot. The complexity of the routing issue lies in having high volumes of data with different QOS parameters and the traffic density change during the delay. Given the memory constraints and bound the satellite and the large periodically it is not practical to have the switching table for all the snapshots as bound.

Since we can calculate all the snapshot offline we can have switching table for just a few snapshot on board the satellite and after a given period of time we can flush out the old ones and upload switching bounds for the next few snapshots required for routing. The set of switching tables up load to a satellite from a ground station should be adequate to last until the satellite flies over the next ground station. Thus the satellite can be said to be analogous to stored program computers and switching table analogous to program instructions.

In the distributed system laboratory of Department of computer science at Texas A&M University we have implemented and tested a version of next ATM LAN with 5 ATM switches and a cluster of workstations running Solaris. A comprehensive performance evaluation is not given here due to space limitation nevertheless we report some findings on the relationship between host load and application to application delay.

The data furnished here are based on 2 popular benchmarks which have been widely used in studies of this nature. The data sets are MPEG-1 encoded VBR video traces. The first benchmark is from the movie starve and the second is from a videoconferencing trace. The user application presents one MPEG frame every 40cms in each connection. The host load is measured by the member of such connection supported.

For the case whether the RTTC uses the table driven method and the slot size is chosen to be 10ms to 20ms and all the applications are given the same priority. For the case where the RTTC uses the rate function control method application on a host are divided in to two groups with one group given a higher priority than the other. The ordinate is the delay in MS and the absicissa is the host load in terms of the number of connections supported. As the number of connections the host increases the applications to delay the increase. At some point the throughput is saturated in the sense that if the number of connections is further increased next can no longer admit any more connections regardless of their deadlines. This is because at that point buffer may currently we are enhancing next with additional core capabilities including support for heterogeneous networks fault tolerance and security.

For the table driven method the saturation comes up earlier and abruptly when the slot size is smaller than when the slot size is bigger. This is because next as a traffic manager and server has to consume CPU time. A server frequently awoken consumes more CPU capacity. With the table driven method the delay is sensitive to the slot size. When the load is light the load with the small slot size is better. Note that a small slot size implies relatively more overhead due to time control. When the load is light this overhead is not a problem. However when the load is heavy this overhead plays a significant role causing drastic increases in the delay. For the RFC method [1] the delayed load relationship is more sensitive than that of the table driven method. This is because the delay with the RFC method is directly dependently on the prevailing hurt environment with the table driven method the delay mainly depends on the table structure.

Table 1: Table driven table

X	Y	0.60	0.70	080	0.90	1.0
20	80	6.3	9.0	16.2	36.9	43.6
50	50	7.7	11.1	26.5	56.1	64.6
80	20	10.3	15.8	19.7	106.9	0
90	10	11.9	19.3	106.2	0	0

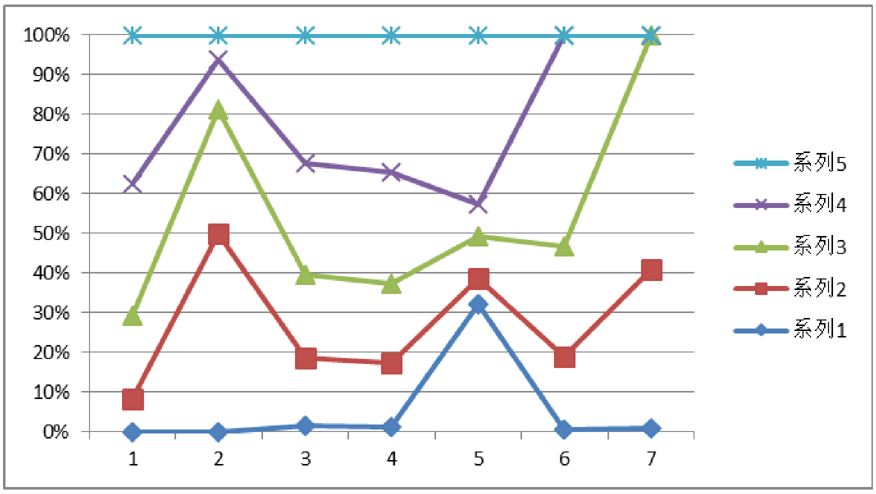


Table 2: RFC Table

Input	Attempt	Established	Dropped
0.91	718	187	531
0.87	510	175	365
0.80	476	160	316
0.71	372	118	221
0.61	332	107	198
0.42	172	83	89
0.37	166	73	93

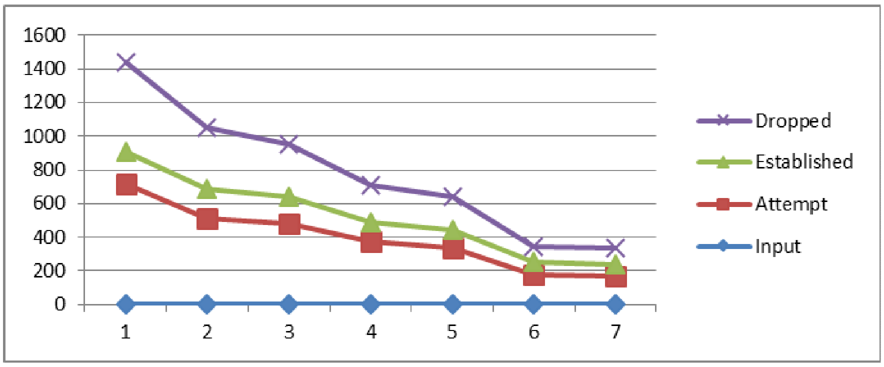
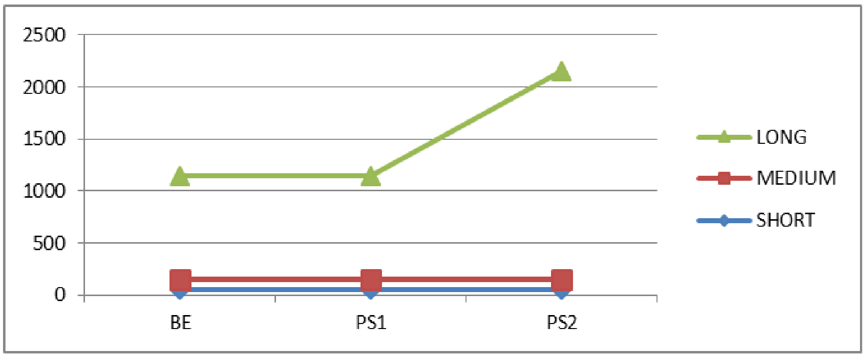


Table 3: QOS table

CT	BE	PS1	PS2
SHORT	50	50	50
MEDIUM	100	100	100
LONG	1000	1000	2000



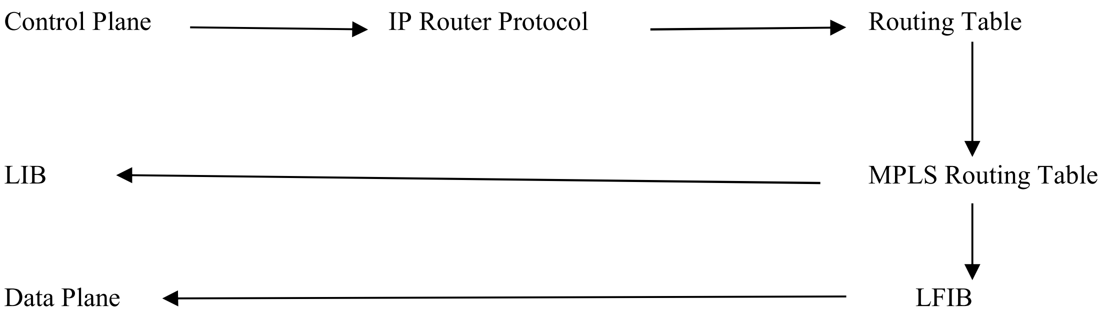
IV. Performance Results

As we consider the network configuration to be a series of snapshot changing over time the satellite constellation is analogous to a fixed network during a particular snapshot. Therefore routing boils down to having a suitable routing strategy for each snapshot to another. Hence there would be a switching table for each snapshot. The complexity of routing issue lies in having high volumes of data with different QOS parameters and the traffic density change during the day. Given the memory constraints on bound the satellite and the large periodically it is not practical to have the switching table for all the snapshots on board. Since we can calculate all the snapshot online we can have switching tables for just a few snapshot onboard the satellite and after a given period of time. We can flush out the old ones and upload switching loads for the next few snapshots required for routing.

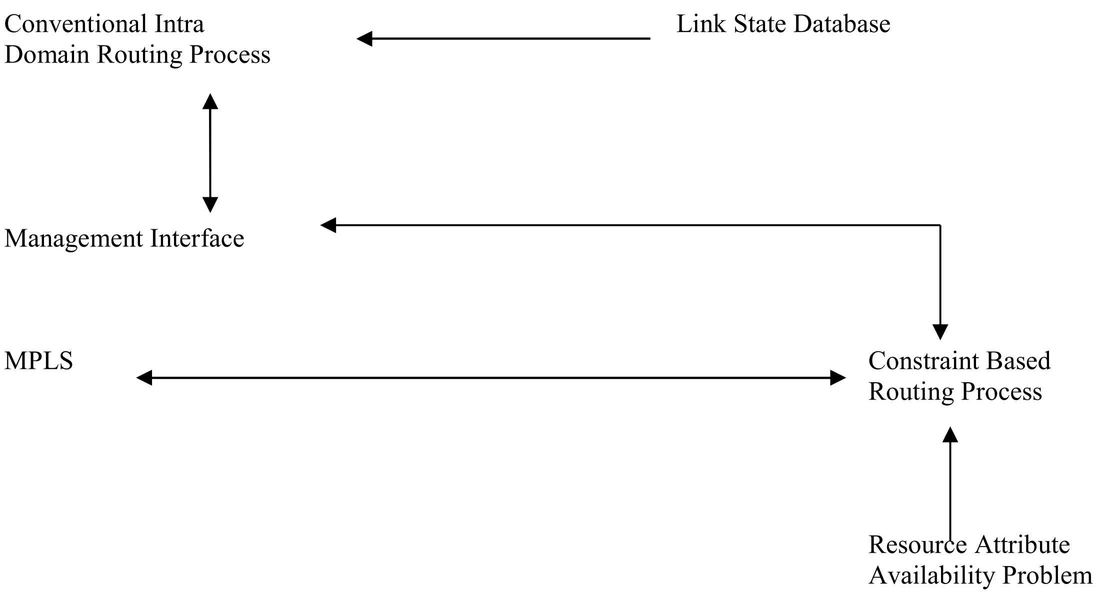
The high priority applications using the RFC method have a much smaller delivery than the low priority applications. This justifies the observations commonly made about priority driven scheduling being a feasible method to manage delays. However we notice that the high priority applications to achieve their small delay at the cost of other connections. Simulations are the process of testing a designed model on a platform which initiates the real environment. It provides the opportunity to create modify and study the behavior of proposed design so that one can predict its strength and weakness before implementing the model in real environment. The opnet modeler has been used to perform the simulation on MPLS and traditional IP network.

In our simulation a parameter of particular internet is the propagation of bandwidth allowed for primary and backup pools. The value of this parameter is fixed throughout and affects the placement in the network. We used the value for this parameter calculation here is 20 evently distributed backup pool percentages between 5-100 are used and the one that gives maximum placement of request is selected for all the experiments. From the simulation results it is clear that the proposed algorithm addresses the shortcomings of currently used SPF algorithm and seeks to balance to load on the network avoiding congestion and better resource utilization improving and performance.

Plan of Router



Constraint Based Routing Process



V. Conclusion

To provide QOS guarantee in the internet QOS based routing is an important component. In this paper we introduce the concept of QOS and QOS based routing, examine different QOS based routing algorithm and its relations to some other QOS techniques QOS based routing for multicast and wireless are also included. Due to the complexity of the problem by now QOS based routing is still in the research stage. Another related technique is policy based routing. This means making routing decision based on administrative policies. The policy related products are already available. Both QOS based routing and policy based routing belongs to constraint based routing. This is the routing scheme subject to multiple constraints.

We have explained the reasons why conventional theory of queuing systems in appropriate to be used in the delay analysis of queuing system when arrival traffic is functional. Then we have given concise method of delay computation of deterministic querying systems. Finally we have desired the computation method of delay when arrival traffic is functional.

Glossary

MPLS - MULTI PROTOCOL LABEL SWITCHING
IP – INTERNET PROTOCOL
ATM – ASYNCHRONOUS TRANSFER MODE
QOS – QUALITY OF SERVICE
PNNI - PRIME NETWORK TO NETWORK INTERFACE
RVSP – RESOURCE RESERVATION PROTOCOL
LAN – LOCAL AREA NETWORKS
RFC – REQUEST FOR COMMENT
CAC – CALL ADMISSION CONTROL
DLCI – DATA LINK CIRCUIT IDENTIFIER
CBWFQ – CLASS BASED WEIGHTED FAIR QUEING
MDRR – MODIFIED DEFICIT ROUND ROBIN
WRED – WEIGHTED RANDOM EARLY DETECTION

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