End-To-End Qos in Interdomain Routing

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Abstract---Many real-time multimedia and critical applicationscan migrate to Internet, provided it can support better QoS in an Inter-domain environment. The main challenges on this front can be split into two parts; the first part is to develop mechanisms for information exchange, signaling and path set-up. The second part is to find an optimal inter-domain path subjected to multiple QoS constraints. We address the second part in this paper. Providing end-to-end Quality of Service (QoS) guarantees for interdomain routing remains a challenge for next generation Internet. As various realtime, mission-critical, and bandwidth-sensitive applications are migrating to the Internet Protocol (IP) Networks the, need for end-to-end QoS is becoming acute. The paper presents a novel approach to achieve end-to-end QoS support by proposing a new Alliance Network model. The most important aspect of the proposed model is its compatibility with existing BGP infrastructure, such that the traditional BGP traffic continues in a normal fashion. The Alliance Network sets-up interdomain paths for premium traffic that require specific QoS guarantees using interdomain MPLS tunnels with resource reservation. The Alliance Network provides enhanced geographical reach and market penetration for the alliance partners through premium service offerings.

I. Introduction

Internet has grown tremendously in terms of capacity, complexity, and number of network domains. Simultaneously, there is migration of various services toward IP networks. Internet traffic is forwarded on a best effort basis without any guarantee on service and performance. This may result in poor quality of service quality for applications requiring service differentiation. The need for timely delivery of real time applications like telephony, video conferencing or guaranteed bandwidth for mission-critical applications has led to a high demand for end-to-end QoS guarantees. For this we need to switch from traditional datagram based interdomain routing to flow based or virtual connection based routing model. Hence, the QoS routing at the interdomain level is essential. Such a task is significantly more complex and challenging than intradomainQoS routing. Internet has evolved with distributed path selection mechanisms, which maintain full independence of individual ASes. It only addresses the basic reachability needs without taking into account individual connection requirements.

II. Literature Survey

Till year 2000 the concept of QoS were restricted to definition of internet QoS ,traffic ,packet classification etc, Scalability and QoS route aggregation capability were two major problems still left to solve. By separating control policy from data forwarding mechanism, we can have a relative stable mechanism. Concatenation of domain-to-domain data forwarding provides end-to-end QoS delivery.

BGP is very complex. The underlying policies of BGP are commonly misunderstood. The VS routing scheme is analyzed under both static and dynamic network scenarios and shows excellent success-rate in finding feasible paths, meeting the requests with bandwidthand delay requirements. It is highly scalable.

The ADE architecture is technology independent and helps in achieving effective end- to -end QoS the Alliance model represents a very practical scheme for implementing end-to-end QoS routing in the interdomain, inter provider environment .The gap between the BGP policies & effective QoS can be achieved with ADEs.

The BGP makes QoS functionalities extension rather difficult. By using the Alliance Model this can be achieved. The ADE implementation uses session based path setup and resource reservation to create an end-to-end data path across multiple ASes

The goal to aggregate intradomainQoS state with less data and less information loss can be achieved using geometry based approach. It uses regular plotline and just 6 tuples to represent the aggregate information. Aggregation is one of the essential parameters to define end-to-end QoS. The geometric based approach has lower aggregation error ratio than existing approaches

III. Scope Of The Project

Various critical enterprise applications for supply chain and resource management, *viz.* SCM, ERP, CRM, need high level of availability and stable access bandwidth. Financial institutions require their critical data synchronized in real time and require always-on connectivity. Corporate telephony, video-conferencing and telecommuting need any-to-any connectivity and real-time performance across multiple geographies. In Software as a Service (SaaS) scenario, the servers providing services are always accessible from virtually anywhere in the world

Clearly we need to provide end-to-end QoS guarantees spanning across multiple ASes to support such applications and services. However, resources available in shared, public networks are finite and may lead to contention among users causing degraded performance.

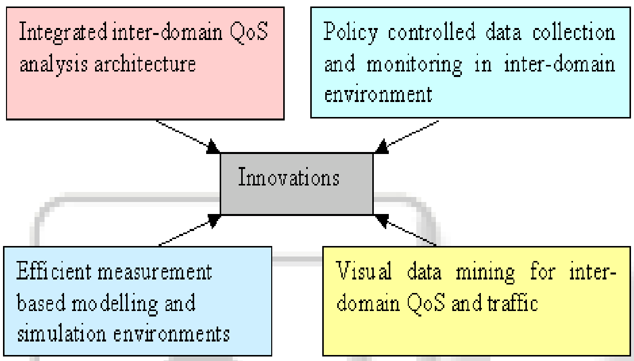
Using public networks for any application is cost effective. Moreover, leased line approach may not scale in the cases of the communication requirements among multiple geographically spread entities.

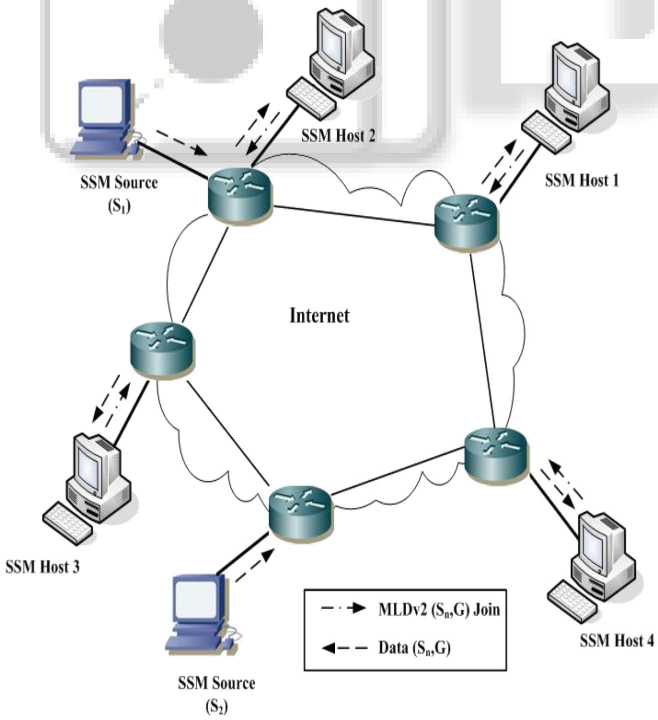
Clearly, we need to provide end-to-end QoS guarantees spanning across multipleautonomoussystems (ASes) on public network to enable such premium applications and services by separating them from other basic access or best-effort services.

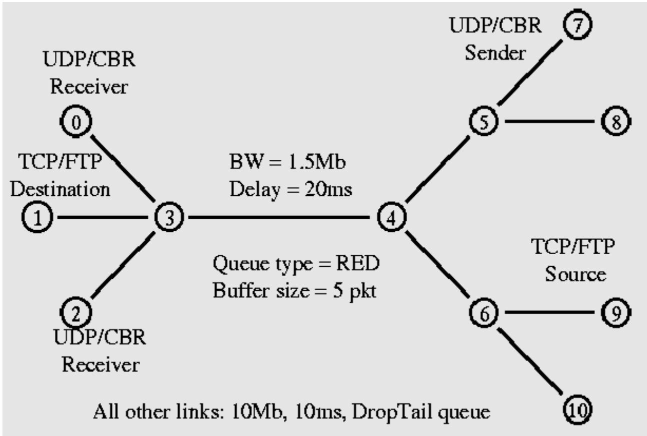
IV. Problem Defination

Routing deployed in today's Internet is focused on connectivity and typically supports only one type of datagram service called "best effort" .Current Internet routing protocols, e.g. OSPF, RIP, use "shortest path routing", i.e. routing that is optimized for a single arbitrary metric, administrative weight or hop count.

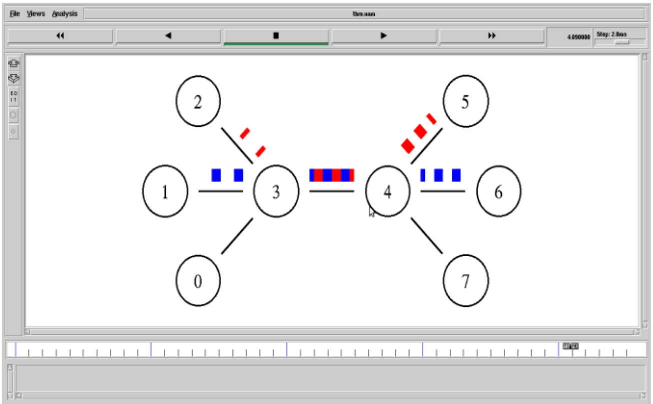
QoS-based routing must extend the current routing paradigm in three basic ways. First, to support traffic using integrated-services class of services, multiple paths between node pairs will have to be calculated. Second, today's opportunistic routing will shift traffic from one path to another as soon as a "better" path is found. The traffic will be shifted even if the existing path can meet the service requirements of the existing traffic. Third, as mentioned earlier, today's optimal path routing algorithms do not support alternate routing. If the best existing path cannot admit a new flow, the associated traffic cannot be forwarded even if an adequate alternate path exists

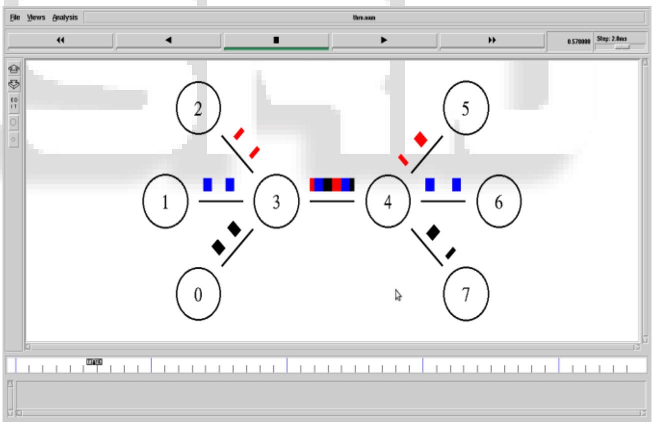


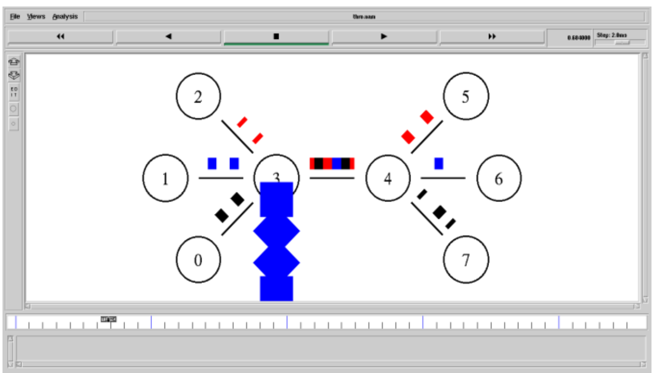


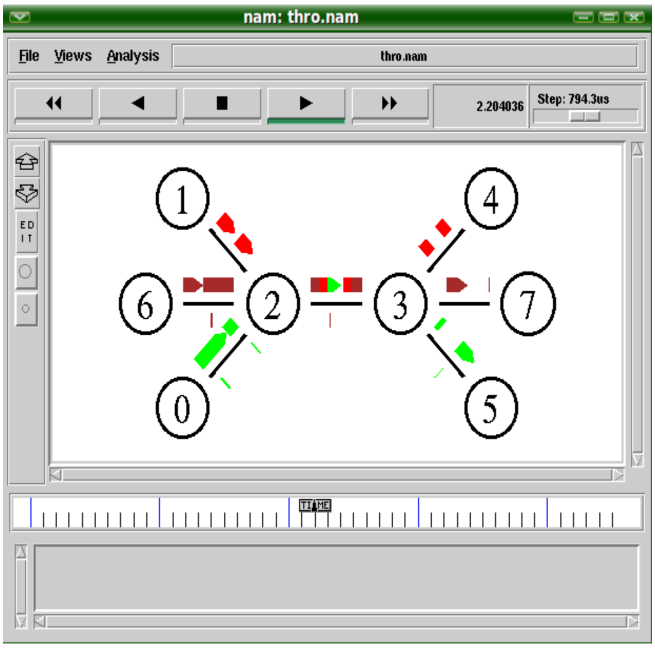


Screenshots









V. IMPLEMENTATION

The implementation will be in Network Simulator-2 which provides environment for creating simulation models. Here, we have implemented a simple system consisting 6 nodes. The main objective was to show that how end to end QoS can be obtained in an interdomain routing.

NS-2 is a discrete event simulator for networking research which works at packet level and provides substantial support to simulate bunch of protocols like TCP, UDP, FTP, HTTP and DSR.

The core of ns-2 is also written in C++, but the C++ simulation objects are linked to shadow objects in OTcl and variables can be linked between both language realms. Simulation scripts are written in the OTcl language, an extension of the Tcl scripting language.

Result

Fast, flexible, and low-cost access coupled with "Any to Any" type of connectivity make it the most attractive platform. However, such diverse services have different QoS requirements and need end-to-end QoS support for achieving best performances.

We have developed a basic networking simulation model which shows how packets or data get transfer from one location to another without affecting the size, the content and the integrity of the data or packet.

We have measured the various parameters that define the quality of service like scalability, throughput, delay, cell loss ratio etc and have compared with the results obtained by using the traditional tools and have come to a point that by using new tools and technologies we are getting much better output and these tools can be used to solve the various problems faced by complex networking system.

The features provided are:

1) *Ease of use:*

By using the tool, the implementation of end-to-end QoS can easily be achieved and is very simple to use without much complex functionalities.

2) *Cheap:*

The effective end-to-end QoS can easily achieved without investing much on complex equipments.

3) *Complex Scenarios Can Easily Be Tested:*

Even the complex events which occur due to overloading or due to congestion can easily be resolved.

4) *Fast:*

The results are quickly obtained & hence better performance.

VI. CONCLUSION

With the significant increase in traffic on the internet in the recent past and the resources on the internet being shared, the need of end-to-end quality of service (QoS) guarantee has become critical. Every day new services and applications are added on the popular IP networks and this trend is likely to continue for a foreseeable future.

Hence there is must to provide end to end secure transmission over the network. The complexities are getting bigger day by day and to directly implement them in real world is not possible due to high cost. So the system first gets tested in virtual world i.e. in simulation model and all the liabilities gets removed so that the system than can efficiently perform in real environment.

Thus by using the simulation model we can build such a system that can help the actual system to run effectively and efficiently in real complex scenarios

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