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Sync Preempted Probability Algorithm in the Integrated Services (IntServ) MPLS Network

Jyoti Tewari[1], Ankur Dumka[2], Gulista Khan[3]

[1]College of Engineering, Teethankar Mahaveer University, Moradabad, India

[2]Associate Professor, UPES, Dehradun Uttarakhand, India

[3]Assistant Professor, College of Engineering, Teethankar Mahaveer University, Moradabad, India

Abstract: ***This work presents an implementation of an algorithm Sync Pre-empted Probability Algorithm for Integrated Services MPLS network under Windows platform. The algorithm, which comprises of Maximum Probability of LSPs (Label Switching Paths) selection and the network resource allocation, embed in to the ingress router to transfer traffic between client and server. In traditional network, the shortest path is used to forward packets. This may Cause congestion on a link. In this manner the link utilization is very low in the network. We try to avoid all of the traffic congesting with the shortest path. In case of overload situation the next incoming traffic will be routed to another LSP then the link utilization will be promoted. Hence, we maintain the quality of services throughout all of the links from entry point to exit and we promote the link utilization and resource management to achieve Quality of Service requirements efficiently. The experimental results of the work shows that this approach can optimize network resources efficiently and distribute the traffic over the MPLS network.***

Keywords: MPLS, IntServ, QoS, traffic engineering, SPPA

1. Introduction

Traffic Congestion is one of the salient issues that affect overall performance of the network. Network traffic has become very dynamic due to a variety of factors, such as the number of users that varies with time, multimedia applications, burst traffic due to a failure and more. Recently, Multi-Protocol Label Switching (MPLS) networks have emerged as a technology with many promising features such as traffic engineering, Quality of Service provisioning, and speeding up the traffic transmission [7]. In MPLS Quality of Service is set of techniques to control bandwidth, delay and jitter and packet loss in a network. Quality of Service also provides techniques to supervise network traffic. Quality of Service manages when and how data is dropped when obstruction occurs through network administrators. Multiprotocol Label Switching (MPLS) is a mechanism in high-performance telecommunications networks that directs data from one network to the next which is based on short path labels rather than long network addresses, avoiding complex lookups in a routing table. The labels identify virtual links (*paths*) between distant nodes rather than endpoints. MPLS can encapsulate packets of various access network protocols. MPLS supports a range of various technologies. However, MPLS still suffers from the non-transient conditions (packets not able to recognize source or destination path) that sometimes cause congestion. Actually congestion does not always occur when the network is short capacity, but rather, when the network resources are not efficiently utilized. In MPLS IntServ or integrated services is an architecture that specifies the elements to guarantee quality of service (QoS) on networks. IntServ can send data either in any format to reach the receiver without interruption. IntServ specifies a fine-grained QoS system, the idea of IntServ architecture in MPLS is that every router in the system implements and every application require some kind of guarantees has to make an individual reservation. Flow Specs describe what the reservation is for, while RSVP is the underlying mechanism to signal it across the network. Thus, it is important to develop an algorithm that efficiently and dynamically adjusts all the available resources.

2. Proposed Algorithm (Sync-Preempted Probability Algorithm) SPPA

The Sync-Preempted Probability Algorithm was implemented in the MPLS network to support Intserv-aware traffic engineering and all the LSPs are reestablished by using Sync/Paired from ingress router to egress router. The overall structure works in the user space and kernel space. The netfilter is the most important parts of the kernel space used to classify the packets, QoS and fair queuing. The chief component in the user space is the RSVP daemon. The daemon is built to response the RSVP signaling and to maintain the MPLS state. It is also responsible for the allocating and installation of the MPLS labels during LSP set.

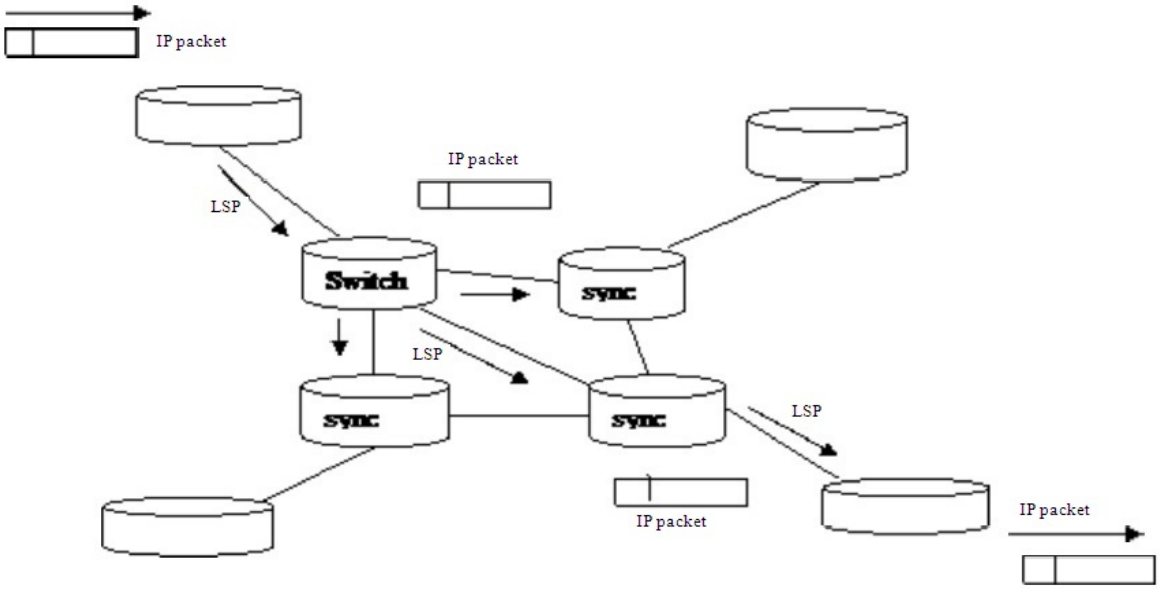

Figure 1: Sync MPLS Network

Sync technology is the process of copying the correct set of data between two or more participants (such as computers, devices, or services) at the appropriate time. In the network there are some Difficulties that is integrating different types of data; detecting and resolving conflicts; working with other participants of different capabilities or participants that require different subsets of data and handling unreliable networks. Over these some problems Sync Framework can help for providing solution on these problems. Sync Framework benefits a variety of applications that require data Sync. There are some software that can use for data update among participates. Example: personal information management (PIM) software can use Sync Framework to propagate PIM data updates to all participants. In Business applications sharing of data that is any documents, files can use Sync Framework to ensure that all team members receive document updates, and that any conflicts over concurrent updates are correctly handled. Media management software that runs on a personal computer and manages media on a mobile device can use Sync Framework to easily perform updates to the device. Sync Framework meets the requirements of these applications by providing a set of components that developers can choose from. Some components synchronize specific types of data, while others enable you to create completely custom solutions. Sync Framework provides a powerful design and a flexible approach to Sync. Benefits of the design include the following:

- An extensible model that lets you integrate multiple data sources into a Sync ecosystem.
- A managed API for all components and a native API for select components.
- Conflict handling for automatic and custom resolution schemes.
- Filters that let you synchronize a subset of data, such as only those files that contain images.
- A compact and efficient metadata model that enables Sync for virtually any participant, without significant changes to the data store.

3. Flowchart of Sync-Preempted Probability Algorithm

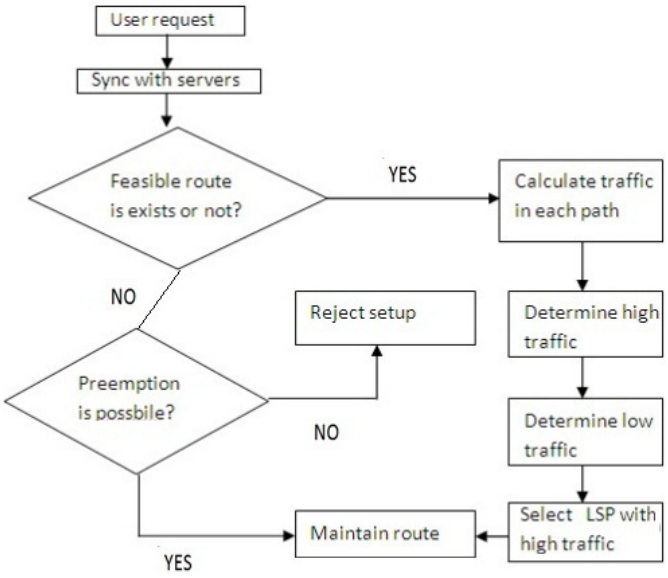

Figure 2: Flowchart of Sync-Preempted Probability Algorithm

4. Conclusion

In this work, we have verified the feasibility of the Sync pre-empted probability Algorithm in Integrated Services MPLS network for supporting the Peer-Peer Sync Quality of Service and the resource optimization by using the real-time applications. In the scenario there has been a tremendous growth over the Internet. New applications present new traffic patterns and Quality of Service (QoS) requirements. To improve the satisfaction of the user Quality of Services, we have to develop new Quality of Services algorithm. The Sync pre-empted probabilities Algorithm Implementation avoid pre-emption, load balancing and Congestion supports the Integrated Services in MPLS network. The experiment results indicated that the Sync pre-empted probability

Algorithm is better than existing pre-empted probability Algorithm. It achieved the appropriate results even though the optimized flow did not transfer the traffic by shortest path.

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