

# Influence on IP-QoS the Scheme of Multi-class Routing Choose in MPLS

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**Abstract:** MPLS (multiple protocol label switch) combines the switching technology of ATM with the routing technology of IP protocol, and will become the key protocol for network in future. In this paper, the scheme of multi-class routing choose in DiffServ and MPLS is introduced. The influence of IP-QoS with Multi-class Routing Choose in MPLS is explained. With the scheme of multi-class routing choose in MPLS, The QoS of different information is realized.

**Keywords:** MPLS; DiffServ; Single-class Routing; Multi-class Routing; IP-QoS;

## 1. Introduction

With the rapid development of Internet and multimedia communication progress, IP network quality of service is of great importance. People have higher requirements on the quality of the transmission of information, such as the transmission delay and latency jitter, security, and reliability. Because of the different types of business with different business features and quality of service (QoS) requirements, it needs to improve the appropriate mechanism. So that it can efficiently provide resource utilization, and guarantee QoS in different types of business<sup>[1]</sup>.

The QoS service quality refers to send and receive information between the user and the user and to transfer information between the communications equipment on information delivery quality conventions. QoS is using bandwidth, delay and packet loss, jitter and other parameters described about grouping the quality of the transmission, is an end-to-end system architecture. At present, based on IP technology of the Internet, service providers want to minimize the cost of infrastructure for maximum ROI, this makes the network quality of service becomes a hot issue..

## 2. Single-class routing mechanism and its defects

In traditional IP network routing system, routing algorithm did not have full network resource control capability, it is based on simple criteria, such as hops minimum determining routing, It did not take full account of the resource usage, and network status. Use these algorithms will make the network data stream into the same link, causing some serious network congestion, some portion of the resource is free, and this led to significant decline in the utilization of the entire network, not optimal performance.

Differentiated services (DiffServ) system is to maximize the effectiveness of Internet network to meet the multimedia diversification of business requirements, ensuring that the business of different QoS service. This system, because of its simple and extended ability, enforced on a large network of important mechanisms QoS service. DiffServ system now in many policy routing<sup>[2]</sup>, and more using the same source - destination node

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(Source-Destination Pair, SD on) between the flow through the line with multiple constraints selected the path of single-end forward, the so-called single-class routing (Single-Class Routing, SCR) system. The traditional single-class routing policy include the following: ① Widest-Shortest Path (WSP), it is a set of shortest path to select one of the longest path as the path to the final data forwarding; ② Bandwidth-inversion Shortest Path (BSP), with the number 1 instead of bandwidth/bw to compute the shortest path; ③ Enhanced Bandwidth-inversion Shortest Path (EBSP), through the cost function used a penalty factor to enhance BSP.

In the above mentioned several algorithms, is a data between SD to select a path, this creates a problem, when bandwidth to meet the requirements of the stream, to delay more sensitive high priority clustered stream through may longer paths, to its delay performance requirements. This is likely to choose a bandwidth meets the needs of the hop count is the shortest path to pass packets, will definitely affect the SCO high priority data QoS performance. At the same time DiffServ architecture in a single stream using resource reservation, in the event of congestion, the various priority clustered flow between the high-priority business flow preemption low priority traffic service resources, resulting in a large number of low priority traffic, but lost packets so that low-priority data transfer performance decreases dramatically. This is known as the class room effect (Inter-Class Effect).

Since different business flows, such as delay, bandwidth and other performance requirement is inconsistent, you should consider a different clustered stream using different paths to be forwarded, in order to achieve different QoS requirements of the business flow of transport, and more effective implementation on a limited network resources. Many types of routing is in this case be taken<sup>[3]</sup>.

### **3. MPLS-based multiple-class routing Mechanism**

Because a different clustered stream have different flow characteristics and different QoS requirements. This requires the use of another language other than that of traditional routing mechanism of new mechanisms to better address, type of routing mechanism is a high priority between SD to gather streams, and low priority clustered stream a different path, becoming effective meet different aggregation flow QoS.

In the DiffServ architecture with traffic engineering (MPLS)<sup>[4]</sup>, which absorbed a DiffServ simple and flexible features, but also retains the fast forward and MPLS Traffic Engineering application benefits, not only can avoid local congestion, and can give full play to the entire network bandwidth advantage can effectively guarantee QoS.

In the DiffServ architecture through policy routing, data flow bypasses the load weight of path, select load light path for packet forwarding. Only taken into account when making routing to the user demand for resources to be committed, can it provide the network service quality. In more than one path based on bandwidth and hops a balanced policy to select bandwidth sufficient one path, as a SD on all clustered flow between the forward path. SP algorithm is based on hop D algorithm implementation. According to the characteristics of the operation D algorithm, you can use enhanced SP algorithm<sup>[5]</sup>. Get a pair of SD on the shortest path between, short paths and 3 short paths, and so multiple paths. Then, according to the bandwidth conditions are different priority aggregation choose different forwarding path. Gather streams BE simplified into two categories, EF, EF and BE clustered stream using the SP and BSP two different algorithms to select two paths. Because the class room effect mainly by the highest priority EF clustered flow intensive nodes and bandwidth resources. Therefore, only choose two paths, subject to the bandwidth requirements of conditions, the shortest path for EF clustered stream-to-use AF and BE shared another chosen path.

In MPLS networks in implementation mechanisms, you need to complete the MCR, such as data classification, DSCP field mapping, route selection, label distribution, and the corresponding PHB Scheduling forward and other work, node consists of enhanced SP routing algorithm<sup>[5]</sup>, completed a SD on routing, depending on the traffic of MPLS label<sup>[6]</sup>, completed different QoS requirements in MPLS label mapping, to form a different kind of different paths for routing, load balancing, avoid the traditional routing rules of congestion. Complete a different priority business flow QoS routing.

### **4. Many types of routing mechanism on the effects of IP-QoS**

In MPLS network QoS, the most important is in the QoS features IP and MPLS QoS features equal relations established between, and can provide better than IP-QoS higher service level guarantee. IntServ can provide detailed network service, because of its scalability problems, therefore more suitable for setting up the edge network. The main actions set DiffServ the edge node, and you don't need in each network node to save state information, more suitable for organizing backbone network. MPLS is a combination of ATM switching technology and IP Protocol Routing technology, the key to the future network protocols, implement the MPLS service quality assurance will give network service provider to bring more revenue, as network users with higher QoS service level. In the based on MPLS Traffic Engineering, LSP routing strategy and traditional shortest SP (Shortest Path) algorithm<sup>[7]</sup> different, it is able to achieve load balancing, avoid the traditional routing rules of congestion. Complete a different priority business flow QoS routing.

Routing and QoS close relationship exists between. If routing incorrectly, transport congestion occurs in the process, resulting in the loss of the data packet rate suddenly, will not be able to reach the level of QoS requirements of users. Only when taking into account the needs of the user on resources, it will be able to provide the user with that commitment to network quality of service. When you import a LSP LSR determine, using multiple types of constraint-based routing mechanism<sup>[8]</sup>, which is the entrance to the LSR Advisory link state database, applying the enhanced SP routing algorithm, select have sufficient network bandwidth, and each network elements have enough storage space link, calculated in this way, through the label after LSP mapping and distribution, at the entrance to the LSR and export LSR connections between, on the path to the entrance to the LSR tag data group, began in the LSP in forwarding. This data transmission process effectively lower the probability of occurrence of congestion, improve user QoS guarantee level.

QoS management system in the business is running continuously monitor business performance, which was taken into account when routing user demand for resources to be committed to providing the network service quality. In the IP network to achieve the QoS guarantee in the business.

## 5. Conclusion

Judging by the bandwidth of a simplified many class routing mechanism, thus EF and BE, AF service flow to optimize the routing path reasonable. Aggregation of different priority streams Different priority clustered stream, as on latency, bandwidth, throughput, and so different performance requirements, the path by different routes. MPLS networks for non-shortest path routing support for the implementation of this scheme provides a good platform. In MPLS domain implementation service quality assurance will give network service provider to bring more revenue, as network users with higher QoS service level.

## 6. References

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