MPLS NETWORKS AND DIFFERENT NETWORKS TYPE

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MPLS (Multiprotocol label switching) is a protocol for accelerating and shaping network traffic, which essentially means MPLS sorting and prioritizing your data packets based on their class of service (such as IP phone, video, or Skype data). When using MPLS protocols, the available usable bandwidth is increased and critical applications such as voice and video are guaranteed 100% uptime. The following article is devoted to the analysis of routing flow models in MPLS networks

Key words: MPLS, recording, VPN, flexibility, data, packet, router, domain, routing protocol.

Traditionally, the main requirements for backbone technology have been high throughput, low latency, and good scalability. However, the current state of the market dictates new rules of the game. It is no longer enough for a service provider to simply provide access to its IP backbone. The changing needs of users include access to integrated network services, virtual private networking (VPN), and a number of other intelligent services. Growing demand for value-added services over simple IP access promises huge revenue for Intemet providers.

To solve emerging problems, the MPLS architecture is being developed, which provides the construction of backbone networks with practically unlimited scalability, increased speed of processing graphics and unprecedented flexibility in terms of organizing additional services. In addition, MPLS enables the integration of IP and ATM networks, so that service providers can not only save their investment in asynchronous transmission equipment, but also benefit from the combined use of these protocols.

The development of the MPLS architecture is the responsibility of the working group of the same name, which is part of the routing section of the IETF consortium. Representatives of the largest suppliers of network solutions and equipment take an active part in the activities of the group. The MPLS architecture brings together the

best elements of all these developments and should soon become an Internet standard thanks to the efforts of the IETF and companies interested in bringing this technology to market as soon as possible.

In traditional IP networks, in general, packets are routed based on the destination IP address. Each router in the network has information about which interface and to which neighbor it is necessary to forward the incoming IP packet.

MPLS is a packet marking method that prioritizes data. Most network connections must analyze each packet of data at each router in order to accurately understand its route.

Types of routers

CE router used on the client node side, which connects directly to the operator's router.

The CE communicates with the router on the carrier side (PE) and exchanges routes within the PE. The routing protocol used can be static or dynamic (internal gateway protocol such as OSPF or external gateway protocol such as BGP).

There certain commonly used abbreviations that need to be clarified.

Customer Edge (CE) router connects to the Provider Edge (PE) router.

PE router - operator-side border router (domain MPLS) to which CE devices connect. The PE prefix to a router means that it covers equipment capable of working with a wide range of routing protocols, in particular:

Border Gateway Protocol (BGP) (PE-PE or PE-CE link);

Dynamic Routing Protocol (OSPF) (communication between router and PE);

Multiprotocol Label Switching (MPLS) (communication between a PE router and a P.); Some PE routers also perform traffic marking.

P - router - internal router of the network of the operator (provider) of the MPLS domain. In Multiprotocol Label Switching (MPLS), router P functions as a core network transit router. The P router is usually connected to one or more PE routers.

How MPLS works

An ingress router with MPLS (recall, multiprotocol label switching, from English) will mark data packets when entering the network by labeling, therefore, routers will understand exactly where the data is going, without having to analyze the data packet again and again.

To understand how the MPLS technique works, it should be noted that in a traditional IP network, each router has to perform an IP lookup by constantly looking it up in tables with data packets and then forwarding it to the next level until the data packets reach the desired destination.

MPLS technology assigns a label to all IP packets, and in the meantime, the routers themselves decide to forward the packet further to the next device due to the desired label value. The label is added as part of the MPLS header, which is added between the frame header (2nd OSI layer) and the packet header (3rd OSI layer) and, in fact, they are further superimposed on each other. The MPLS technique instead performs "label switching" where the first device performs a routing lookup as before, but instead of finding the next hop, it finds the final destination router along a predetermined route. The router determines the label based on the information that the routers will use to further route traffic without the need for any additional IP address lookups, upon reaching the destination router, the label is removed and the packet is delivered using normal IP routing.