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CONSTRUCTION OF INFORMATIVE SYSTEMS ON THE BASE OF MPLS TECHNOLOGY

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Modern networks and services of connection accomplish passing to principle with the use as central technology of IP. Technology of Multi Protocol Label Switching arose up as key opening technology for this process of migration. Technology of MPLS proved the value as a mean of providing new services, and also providing of transition from old networks to new one. The development of MPLS technology resulted in appearance of tasks, related to new technology of organization of networks. It is confirmation of accordance the standards of industries to the development and control of possible workings indexes

Introduction

The cutback of economic activity of the last years and surplus carrying capacity of networks of backbones forced the providers of services and operators of connection in earnest to analyze recumbent of expenses on the resources of networks. As an actual carrying capacity became, essentially, a commodity, the attention of industry was concentrated on providing additional services, necessary for user. As a result, adopting new technologies possibility of provider to unite incomparable existent networks become key in profitable development of all services: old and new. A corporate market was shown by the same response on a slump is multiplying efficiency due to application of new technologies which do such improvements possible.

Therefore technology of MPLS is very attractive for the providers of connection. With its help it is possible to process the great number of services, both traditional and new within the limits of one network. It allows to give the greater volume of appendixes and services in the network of provider of services, thus, abbreviating requirements to the equipment, to place on territory of user.

Integration and association is a slogan of modern corporate environment. Obviously, that a transition to MPLS goes by complete motion. Every large operator of connection in the USA and many in an international scale opened out or plan to open out the main networks of MPLS. Researches, conducted a research center Infonetics in 2003, show that 62% providers of services are presently busy at in a certain form convergence of networks of telecommunications on IP or IP/MPLS, 86% plan to do it in 2004. As traditional services, such as a relay frames and ATM, can be transported on the network of MPLS, such convergence of networks often remains transparent for the enterprise of end user. A forward movement is to the newest inexpensive services, such as Ethernet, additionally instrumental in advancement.

Besides the networks of large operators MPLS finds also the way in the large corporate networks of organizations, such as enterprises of retail business, companies of investments, government bodies and military powers, organizations of health protection, industrial enterprises.

MPLS and its application

In computer networking and telecommunications, Multi Protocol Label Switching (MPLS) is a data-carrying mechanism that belongs to the family of packetswitched networks. MPLS operates at an OSI Model layer that is generally considered to lie between traditional definitions of Layer 2 (Data Link Layer) and Layer 3 (Network Layer), and thus is often referred to as a "Layer 2.5" protocol. It was designed to provide a unified data-carrying service for both circuit-based clients and packet-switching clients which provide a datagram service model. It can be used to carry many different kinds of traffic, including IP packages, as well as native ATM, SONET, and

Ethernet frames. In particular, MPLS dispenses with the cell-switching and signaling-protocol baggage of ATM.

MPLS recognizes that small ATM cells are not needed in the core of modern networks, since modern optical networks (as of 2008) are so fast (at 40 Gbit/s and beyond) that even full-length 1500 byte packets do not incur significant real-time queuing delays (the need to reduce such delays – e.g., to support voice traffic – was the motivation for the cell nature of ATM).

The purpose of work

The purpose of work is the analysis of technology in telecommunication and computer sciences. We discover and solve adopting new technologies possibilities of provider to unite uncomparable existent networks that become key in profitable development of all services: old and new.

The decision of a problem

We will begin with a value and actuality of introduction of new technology. We'll pay attention to basic benefits and analyse that fact, how technology works and what it is necessary for this.

Benefits of MPLS

MPLS technology allows a single network to support both new and existent services, creating the effective way of passing to the IP-infrastructure. MPLS functions both over existing (DS3, SONET) and new infrastructure (10/100/1000/10G Ethernet) and networks (IP, ATM, relays of frames, Ethernet and TDM).

MPLS allows to form a traffic. The obvious (exactly certain) routing and function of forming of traffic will help to make more the compact the greater volume of information within the limits of present carrying capacity.

MPLS supports providing services with the assured quality of service (QOS). Packages which must be delivered with high quality can be marked, allowing providers to provide the defined small values of delay for vocal and video of signals in through connection. MPLS simplifies requirements treatments, produced to the routers, as routers are simply passed by packages, based on the fixed labels.

Virtual private networks (VPN) on a base MPLS regulated better, than VPN on the base of user, as they are based on the network of provider, abbreviating the same the necessity of configuring and management for an user.

MPLS traffic engineering – LSP attributes benefits

The MPLS Traffic Engineering–LSP Attributes provides an LSP Attribute List feature and a Path Option for Bandwidth Override feature. These features have the following benefits:

The LSP Attributes List feature provides the ability to configure values for several LSP-specific path options for TE tunnels.

One or more TE tunnels can specify specific path options by referencing an LSP attribute list.

LSP attribute lists make the MPLS TE user interface more flexible, easier to use, and easier to extend and maintain.

The Path Option for Bandwidth Override feature provides a single command that allows a TE tunnel to fall back temporarily to path options that can reduce bandwidth constraints.

Traffic Engineering Bandwidth and Bandwidth Pools

MPLS traffic engineering allows constraintbased routing (CBR) of IP traffic.

One of the constraints satisfied by CBR is the availability of required bandwidth over a selected path. Regular TE tunnel bandwidth is called the global pool. Subpool bandwidth is a portion of the global pool. Subpool bandwidth is not reserved from the global pool if it is not in use. Therefore, subpool tunnels require a higher priority than nonsubpool tunnels.

Method of MPLS work

MPLS technology is used for optimization of transmission of traffic on a network.

Although MPLS can be used in many different environments of networks. MPLS is the most widespread application domain for today.

In accordance with MPLS technology labels are appropriated packages for their transmission on a network. Labels join in heading of MPLS, inserted in the package of information (Figure 1).

These short labels of the fixed length carry information which shows every community knot (to the router), how to process and pass packages from a source to the recipient. They matter only on the area of local connection between two knots. As every knot is passed by a package, it replaces a current label the proper label for providing of routing of package to the next knot. This mechanism provides very high commutation of packages on the backbone network of MPLS. MPLS includes all best IP-routing of 3th level and commutation of 2th level. Actually MPLS sometimes calls protocol of "level 2". While the intellect of network layer is required routers, to define where to pass a traffic, switchboards need only to pass information on a next transit area, and it is natural simpler, quick and cheaper. MPLS depends on traditional protocols of routing of IP, to declare and set a network topology. Then MPLS is laid on over this topology. MPLS predetermines the way of distribution of information on a network and encodes this information as a label which is understood by the routers of network. This approach oriented to establishment of connection came into question before. As planning of route takes place in the initial moment of time and on verge of network (where the networks of user and provider of services meet), the MPLS-noted information is required by less calculable possibilities from routers, to cross the kernel of network of provider of services.

Routing of MPLS

The networks of MPLS are organized by the noted routes (LSP) for passing information on a network. LSP is determined a sequence well-aimed, appointed knots on the way of the following of package from a source to the recipient. LSP send packages one of two methods: successive routing (on areas) or obvious (exactly certain) routing.

Successive routing. In this case every router of MPLS independently chooses a next transit area for the set class of equivalence (to the equivalence) of transmission (FEC). FEC describes the group of packages of identical type: all packages of the appropriated class of FEC get the identical mode of routing. The classes of FEC can be based on the route of IP-addresses or requirements of quality of service for a package, such as a small size of delay.

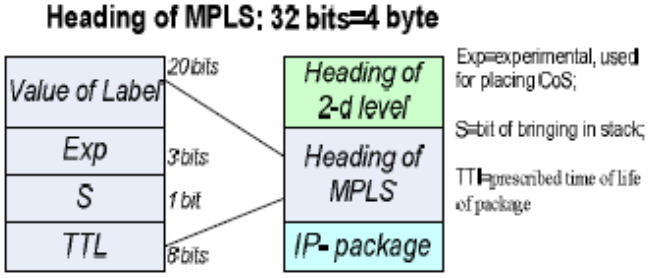

Fig. 1. Format of heading of MPLS in package

In the case of the successive routing MPLS uses information of topology of network, distributed traditional protocols of the internal routing (IGP) are protocols of routing, such as OSPF or IS-IS. This process is reminded by the process of the traditional routing in IP-networks, and LSP follow routes, prescribed IGP.

Obvious routing. In this case in advance determined weigh list of knots which LSP passes through. A certain route can be optimum or not, but he is based on common presentation of network topology and, potentially, on additional limitations. This method is named routing with limitations (Constraint-Based Routing). To guarantee QOS, resources on a route can be reserved. It will allow to open out in a network the process of forming of traffic for optimization of the use of carrying capacity of network.

Informative base. For organization and notification of network every router of MPLS builds an informative base (LIB) is a table in which determined, how to pass a package. This table binds every mark to proper FEC and outgoing port which a package will be passed on. This LIB usually created in addition to the routing directory and informative base transmissions (FIB) which serve traditional routers.

Operating indexes (productivity)

One of the primary supposed advantages of MPLS was an increase of network performance, related to the process of commutation on marks in opposition routing on an IP-address. Although it is less widespread for today, but work of routers of PE on verge of network of MPLS still supposes a search and appropriating on IP (or other protocols).

Producers and providers of services identically must test and characterize the devices of MPLS on the interfaces of great number of types (Ethernet, POS, ATM) for the receipt of traditional high-quality indexes of plane of information:

Carrying capacity of communication of data; Loss of packages; Delay; Jitter.

Due to achieving the last years in area of the instrument room routing the productivity of devices grew, so that support of traffic on linear speed of transmission is usually provided. But it is assumed that the modern routers of MPLS are able to execute many functions with operating requirements at the level of planes of information (traffic), management (routing), providing of safety and administration. In connection with the routers of MPLS implementation of great number of protocols is required simultaneous, possibilities of co-operation with in a number of technologies and application of QOS, and also other processes of management a traffic, reality is such, that the complete productivity is not achieved. Operating indexes must be examined in the different scenarios of the use depending on that fact how projected and a network is exploited.

Along with the indexes of expansibility and productivity can exist competitive differentiators for the producers of equipment. For the providers of services and managers of networks they are the key criterion of choice of suppliers of equipment.

Conclusion

MPLS technology proved the value on business of providing new services at the simultaneous providing of transition from old networks to new one. Carrying out convergence of new and traditional services of networks by means of network of MPLS, providers and operators of connection can inculcate the possibilities, promising the considerable economy of operating costs. As a result MPLS finds wide distribution in networks all over the world as standard main technology for the networks of convergences.

However MPLS is extremely difficult technology, summarizing the wide range of functional possibilities and appendixes. Producers, elaborative technology of MPLS, and also organizations, bargaining to open out MPLS on a network, must take into account complication of technology, its permanent development status and its influence on the productivity and expansibility of network.

To manage with complication of MPLS, it is necessary to test and estimate authenticity of large range of protocols, services, appendixes and vehicle providing.

Successfully to use technology of MPLS on a network, for the managers of networks and producers of products of MPLS it is very important to have an exhaustive and correctly projected decision for verification of accordance and testing of operating indexes.

Determination of descriptions of these elements is an important process, as they directly influence on quality of services, given an eventual user.

Literature

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