The Cost and Management Challenges of MPLS Services

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Introduction

In the last IT Impact Brief I discussed the factors that are motivating companies to deploy MPLS services. In this brief, I will discuss the characteristics of the MPLS services that are currently available in the marketplace and will analyze both the cost and the management challenges that are associated with deploying these services.

The last IT Impact brief was based in part on some interviews that I conducted. One of the interviewees was a senior network engineer for an information solutions provider. Another interviewee was a network planner for a company in the hospitality industry. This impact brief will also be based in part on the discussions that I had with these interviewees, who will be referred to in this brief as The Network Engineer and The Network Planner.

MPLS Services

When an IT organization analyzes a service provider's MPLS service offerings there are many facets of the service offering that need to be understood. For example, most service providers state that they support two options relative to managing the router on the customer premise. Note that it is common to refer to this router as the CE (customer edge) router. In one option, the service provider manages the CE router and in the other option, the IT organization manages the CE router.

The challenge for IT organizations is to determine if both of these options are indeed viable. For example, until recently most service providers were much more aggressive at marketing the managed CE router option. However, recently some service providers have become much more willing to also discuss having the customer manage the CE router.

Another aspect of MPLS services that needs to be understood is the routing protocols that the service provider supports on the link between the CE router and the PE (provider edge) router at the Service Provider's PoP (Point of Presence). Most service providers will support an array of standards based protocols such as RIPV2 and OSPF. However, not all service providers will support proprietary protocols such as EIGRP.

In addition, IT organizations need to understand that there are significant differences in terms of how service providers define the MPLS service classes. For example, Verizon's MPLS service offering is comprised of five traffic classes, while the AT&T MPLS service offering is comprised of four traffic classes.

However, both companies allow further sub-categorization of some of their service classes. As a result, the Verizon service offering supports eight service levels and the AT&T service offering supports six service levels.

MPLS Pricing Structure

It is difficult to give an accurate detailed description of MPLS pricing. That statement is true in part because the actual price that IT organizations pay for MPLS services is impacted by factors such as the size and the length of the contract that the IT organizations signs with the service provider.

That statement also is true because the various service providers price their MPLS services somewhat differently. For example, virtually all service providers have a pricing structure for MPLS services that includes a cost for the access circuit and the port speed. In many cases, the pricing structure also includes a cost for advanced services as well as for what is referred to as the CoS (class of service) profile. Advanced services include functionality such as network based firewalls, Internet access and IP multicast. As mentioned, in virtually all cases there will be a separate charge for each of these advanced services. One exception to that statement is that Sprint does not have a separate charge for IP multicast.

To exemplify what is meant by the CoS profile, consider a hypothetical MPLS service offering that has only three service classes. Those classes being:

- **Real Time** – This class is intended for applications such as voice or video
- **Guaranteed** – This class is intended for time sensitive, mission critical applications such as SAP
- **Best Effort** – This class is intended for all bulk data applications as well as non-time critical applications

The CoS profile refers to how the capacity of the service, as determined by the port speed, is distributed over these three service classes. For example, it would be possible to assign the entire capacity of the port to real time traffic only. Alternatively, it would be possible to assign the entire capacity of the port to best effort traffic only. In most cases, a service that assigns the entire capacity of the port to real time traffic would cost more than a service that assigned all of the traffic to best effort. One exception to that statement is that Sprint does not charge differently based on the CoS profile.

The Network Engineer stated that his company has implemented an MPLS service with a CoS profile that places all of the traffic into a best effort service class. He stated that this service costs less than, and has similar performance to, the frame relay services that his organization previously used. He further stated that his organization will look at changing the CoS profile over time if there is a need to support applications that require low levels of network delay, packet loss or jitter.

The network planner stated that his company has deployed an MPLS service with a CoS profile that is 30% guaranteed and 70% best effort. In the MPLS service that the network planner referred to, the 'guaranteed' service class has the same purpose as the guaranteed service class described above. He stated that his organization deployed this MPLS service offering because it was much cheaper than the frame relay service that they had previously used. He also stated that if he wanted to deploy a CoS profile that was 30% real time, 40% guaranteed, and 30% best effort, that the monthly recurring cost would increase by about 25%.

MPLS Management Considerations

The Network Engineer stated that there were a lot of challenges relative to managing an MPLS service. For example, his organization wants to monitor the performance of the network in order to determine if they are getting the service levels that they were promised. He stated that an even bigger management issue that they have relative to their use of MPLS services is the need to determine which applications belong in each of the service classes, and then to make sure that on an ongoing basis each of his company's applications are placed in the correct MPLS service class.

The Network Planner pointed out that the frame relay network his company previously used had a hub and spoke design. As a result, his organization could get good visibility into the performance of the frame relay network by placing probes at the hub site. He stated that since MPLS is an “any-to-any” network, there is no longer a central hub. He further said that his organization looked at two alternative ways to deploy MPLS services and keep the visibility that they required. One of the approaches was to use the NetFlow functionality on their Cisco routers in order to generate raw traffic data and to transmit this data to a central site for processing. The other approach was to deploy more probes. Because of the amount of the WAN bandwidth consumed by the NetFlow data, The Network Planner stated that his organization decided to deploy additional probes.

Summary

As discussed in the last IT Impact Brief, a significant percentage of companies are in the process of deploying MPLS services. The deployment of MPLS services is motivated by some compelling factors; i.e., the need to support delay-sensitive applications such as VoIP, as well as the ability to save money.

However, as discussed in this IT Impact Brief, the deployment of MPLS will dramatically affect how IT organizations manage their wide area networks. One example of the required change in WAN management is that IT organizations can no longer rely on gaining visibility into how their WAN is performing by placing probes at hub locations. As a result, IT organizations need to implement alternative ways of gathering traffic data.

Another example of the change in WAN management is that the deployment of MPLS services places even greater pressure on IT organizations to regularly monitor their networks and to understand the applications that utilize them. That follows because in most cases the price of the MPLS service depends on the CoS profile. As a result, IT organizations need the ability to monitor their network to ensure that they have the correct CoS profile, and that their applications are mapped to the appropriate service class. Failure to do this could negate the IT organization's ability to achieve the goal that they established when they decided to deploy MPLS. For example, if the company has a CoS profile with a larger real time traffic class than is necessary, they will not save as much money as they hoped. On the other hand, if the real time traffic class is smaller than necessary, they will not be able to adequately support delay-sensitive applications such as voice.

In the February IT Impact Brief I discussed how IT organizations utilized network and application performance alarms. The next IT Impact Brief will come back to this topic and look at how innovation in the area of analytics has the potential to overcome the issues associated with how companies set and manage performance alarms.