MANAGED MPLS
A HOLISTIC APPROACH TO INTEGRATED IT
1. Executive Summary

The fast paced global expansion of enterprises has necessitated better connectivity among their business units and effective means for data management. Network management emerges as a key concern for a CIO with enterprises always on the look out for an all time available network which is secure, scalable and flexible enough to accommodate the vast expanding array of services. The global economic slowdown has further pressed the enterprises for adopting a network solution with an optimal total cost of ownership (TCO) and maximum value proposition.

Multi-protocol Label Switching (MPLS) based network solution is fast emerging as a viable alternative for enterprises with the need for a converged network for all their mission critical applications and services. The business value of MPLS network service like lower TCO, higher efficiency, better connectivity, value maximization and business continuity evinces the shift for the same instead of some other contemporary technologies.

In addition, the current service provider models enable the entire task of network and data management to be outsourced to a service provider who dispels the need for domain expertise in managing the network. Enterprises now can focus on their core competencies and delight their customers.

This whitepaper provides enterprises and their CIO’s the much needed perspective on managed MPLS services and helps understand the architecture, business value and benefits of the services. The emerging partnerships among value chain participants and their associated business models are providing enterprises to choose a solution which fits their network usage. The strong market feelers further substantiate an enterprise’s migration for a MPLS network service which has immense future potential.

The paper includes cases of successful implementation of Managed MPLS network solutions in diverse set of enterprises with varying sizes and requirement complexities. These projects, executed by Tata Communications Limited with network powered by CISCO equipment will be an excellent guide for enterprises who wish to upgrade their network services to the managed MPLS based services.

The paper ends with a six point formula for enterprises to assess their network requirements and arrive at an optimal network strategy. The formula includes the process of choosing a service provider which is most critical in adopting a managed MPLS network solution for any enterprise.

2. Need for Managed Services: What are CIOs looking for?

A CIO is always on the lookout for any solution that would improve, fine-tune and make his enterprise stronger in the information arena and deliver value to the key stakeholders in his enterprise.

What CIOs are essentially looking for is an attractive value proposition, continuity and connectivity at all times, reduction in cost, enhanced performance levels and garnering operational efficiencies

There are several solutions and applications in the marketplace that suit different needs of a CIO. The need of the hour, however, is an integrated approach to IT both from the infrastructure and application perspective. CIOs are investigating various options to be able to arrive at a holistic approach. Adopting Managed MPLS is a step towards achieving this purpose.

The Managed MPLS model satisfies the CIOs need by adoption of a two-pronged approach: of adopting an integrated perspective of IT needs for an organization and thereby provide maximized value on IT investments.
The concept of a managed service provider has evolved from the need to remain competitive in an area where technology adoption and the plethora of services that are required to be managed and deployed are of increasing complexity and dynamic in nature.

The managed service provider enables enterprises to strategically outsource their needs while retaining control and having a higher level of sophistication. It is essentially a symbiotic partnership that can help the enterprise and managed service provider leverage their areas of expertise.
3. Managed Service Provider Model

When an enterprise goes in for a managed solution it needs to evaluate Self management of the network vis-à-vis managed service provider management by outlining its requirements.

A typical organization would consider factors such as IT resource maintenance, IT efficiency by recording IT performance, enterprise-wide applications, storage, security and network management. The complete financial investment would be an obvious factor considered along with those mentioned above.

With a hosted model, enterprises can have a strategic outsourcing partnership that offers the following benefits:

- MSP model enables converged networks and thereby establishes a single point of accountability
- Reduces overheads involved in vendor management
- Offers highly flexible and scalable solutions that can be altered dynamically
- Centralized monitoring facilitates better network management
- Managing changing technology needs on the go enabling quicker go-to market
- Eliminate capital expenditure and optimize operating cost associated with building network infrastructure
- Enabling security by monitoring at a single location the intrusions occurring at various points in the network
- Last but not the least, well defined Service Level Agreements (SLA) help to achieve the desired quality of service

The matrix below explains some of the concern areas for an enterprise for a self vis-à-vis a hosted model.

**Figure 3.1: Self vs. Hosted Model Comparison**

<table>
<thead>
<tr>
<th>Domain Expertise</th>
<th>Concern Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Security</td>
</tr>
<tr>
<td>Self</td>
<td>High</td>
</tr>
<tr>
<td>Hosted</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Having established the benefits of a MSP model, the key criteria to implement the model would be converged networks. With MPLS as a recognized solution for converged networks, it is not surprising that Managed MPLS is evolving as the first step towards Managed Services.

4. Managed MPLS Architecture

Converged networks are gaining prominence lately primarily due to the increasing need of applications on an enterprise-wide basis. MPLS emphasizes on convergence as a core aspect of a network.

The concept of MPLS entails label switching: where a unique label is added to each packet that contains data and this label is used to switch and route the packet through a network. Deployment of MPLS architecture can
have significant benefits some of which are listed below

- Converged networks could be based on either hub and spoke or mesh architecture
- The traffic can be prioritized based on different applications
- Business continuity by having a failover mechanism
- Proactive monitoring to denote any irregularities

**Figure 4.1: Network Architecture Diagram**

The MPLS architecture is structured in a way where it

- Allows the enterprise to cross connect locations where they can interact with each other over existing network architecture.
- Allows for extensive scalability as locations can be added dynamically and also traffic routing is eased.
- Supports extensive bandwidth requirements at the cost as dedicated links.
- Performance of the network also increases significantly as the network becomes delay sensitive and supports high data intensive applications.
- Enables the definition of a class of service that can deliver the required quality of service to the enterprise customer. This class of service concept also helps the enterprise manage performance better as priorities can be assigned to manage the traffic of the network.

### 5. Business Value of Managed MPLS

This section aims to convert the network benefits of Managed MPLS into business value. The business value of managed MPLS is demonstrated by the fact that it allows enterprises to leverage on a variety of levels

- Firstly, on the level of investment and reduction in the total cost of ownership over a period of time
- Secondly, the managed model would help enterprises in focusing on core expertise and outsource overhead functions
Lastly, leverage on the extensive service portfolio of the service provider, which allows the enterprises to maximize on value addition to their existing networks.

Figure 5.1: Shift towards network convergence

5.1 The Total Cost of Ownership (TCO)

By going in for Managed MPLS, the enterprise can significantly reduce upfront costs and investment in management of the infrastructure.

- **Staff**: It can also reduce costs from the perspective of reduction of in-house IT staff to manage and maintain the network.
- **CAPEX**: There is also no capital expenditure outlay for an MPLS network in terms of additional network infrastructure as it can overlay the existing architecture.
- **Network cost**: The network cost for international connections (e.g. IPLC) is very high for point to point connectivity but with regard to MPLS networks, network cost becomes 20 – 40 percent cheaper.
- **Lowering TCO**: Cost reduction is also achieved in terms of an operational expenditure model not only for the bandwidth but also for varying applications. This reduces the significant investment in software installation and deployment costs. A managed MPLS model can reduce IT operations cost by 50 percent, which can be a significant contribution to improved profit margins.
- **Central management**: From maintenance perspective there exists a singular unifying architecture, which helps better control and management of resources involved.

5.2 Efficiencies

In an environment that is competitive and dynamic an enterprise needs to strategically prioritize regarding its business objectives that need to be met and the functions that support the main objective. In this process it needs to gain efficiencies in terms of its operations and increase performance of its network and productivity of its employees.

- **Responsiveness**: For any enterprise, resolution time of issues and response time is key in order to maximize productivity of employees using the network. With deployment of MPLS architecture it is seen that the number of connectivity issues experienced by end users fall significantly. The network essentially becomes more dependable and uptime of the network is increased.
• **Applications:** The Application layer also allows the MPLS architecture to deploy and host data and media rich applications across the network that facilitates a more collaborative form of interaction amongst employees, which leads to higher productivity.

• **Core Expertise:** In a managed MPLS model enterprises by strategically outsourcing their network management can significantly reduce the burden on in-house IT staff allowing them to focus on areas aligned to the main objective while still retaining a control over their network by defined SLAs.

• **Control:** The MPLS architecture also allows central administration and management of the network to have an enterprise-wide perspective. This leads to gaining tremendous efficiencies in enterprise-wide deployment of applications, reducing IT staff at each disparate location, response time increases as well as resolution of network issues can be now centrally managed.

5.3 **Connectivity and Continuity**

Connectivity and Continuity are the two primary issues that a network should address. MPLS supports this by offering any to any connectivity and also having the provision for a disaster recovery mechanism while ensuring a more resilient network.

• **Virtualization:** The architecture of MPLS allows the creation of a virtual network that allows enterprises to have seamless connectivity. The virtualization of any network offers enterprises the ability to provide services and host applications to all the end points of the network from a single central source. This enables centralized management by aiding cost and resource management at a single point.

• **Business Continuity:** This can also be addressed by having a disaster recovery center to which centers can connect in times of a failure.

• **Security:** The core architecture is never exposed and steps like packet filtering and monitoring can ensure that the network is resilient to different forms of attack such as Denial of Service.

5.4 **Value Maximization**

The decision-making involved in going in for Managed MPLS should be value-based where the enterprise needs to evaluate how the service provider is going to add value to the enterprises business.

Managed MPLS allows the enterprise to maximize the value in business not only by strategically outsourcing network management and adhering to levels of performance but by also offering an extensive service portfolio of existing applications that are deployed by the service provider that enables enterprises to derive value from them.

• **Productivity:** Value maximization is achieved on the dimension of productivity and increased response time as the network and service provider function at a level where a higher response time enables end users to have applications that give them faster results and gain efficiencies.

• **Issue Resolution:** A service provider that caters to issue resolution immediately gives the enterprise the added advantage of engaging with a partner that understands their business and also is equipped with the tools to resolve those issues.

• **Prioritization:** The class of service definition enables enterprises to tailor network requirements according to their need and allocate higher bandwidth to critical applications and thus deliver more value.

• **Business Agility:** Value Maximization also involves the business agility achieved by the enterprise; managed MPLS caters to that by offering a host of collaboration services and building inherent flexibility in the network.

Thus, the value maximization concept leads to enterprises managing the resources at their disposal effectively and also extracting the maximum value by hosted applications on the network.
6. Enhanced features of MPLS

The benefits of Managed MPLS may be best gauged by the various value-added services that form a layer above the converged architecture. The enhanced features based on applications reiterate the holistic approach that most organizations should adopt. In spite of the limited offerings, Managed MPLS offers a great future potential to deploying all types of applications on the MPLS cloud.

The managed MPLS allows an enterprise to leverage on an extensive service portfolio of the service provider, which involves multicast capabilities and also the ability of offering analytics and other applications that can be deployed as and when needed by the enterprise. These multicast abilities involve the variety of applications that can be transmitted across the network by effective usage of the bandwidth in the network.

Some of the popular options are

- Telepresence
- Managed security services
- Web or IP videoconferencing
- Hosted services (hosted messaging, hosted storage solutions)
- Application performance monitoring (APM)
- Unified Communications
- Voice over IP and many more.

With usage of services like video on demand, web conferencing and the like being extensively used by an enterprise, the multicast ability enables optimum usage of multiple services in a network and sustain designated levels of performance.

6.1 The Application Ecosystem

Managed MPLS has led to the evolution of an application ecosystem that covers the complete IT needs of the organization.

The application layer resides on top of the MPLS network cloud. This application layer can offer enterprises services that enable them to achieve a lower TCO, gain efficiencies, adopt a more collaborative environment and gain more visibility into their functioning.

Figure 6 1: Applications residing over the MPLS network
By having a strong application portfolio they pose an attractive service offering to the enterprise end user. The application ecosystem can include IT services that comprise of storage solutions, managed security, Hosting & co-location facilities and services like extended access and back-up solutions.

With enterprises evolving into meshed communities across different geographic locations applications like Telepresence are offered by service providers, which provide a value proposition to enterprises enhancing the decision-making process while containing travel expenditure.

Value Added Service offerings can become the key value proposition on which the managed MPLS model hinges with service providers differentiating themselves on this parameter gaining the required competitive advantage.

6.2 The Service Product Matrix

The Managed MPLS business model also has a value proposition that ties in the hardware products and services offered over the network.

This service/product combined offering can distribute costs for an enterprise over a period of time. Through a single offering, enterprises are often saved from the decision-making involved in contacting all the participants in the value chain and also obtain a comprehensive solution that addresses their business needs.

**Figure 6 2: Service /Product Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Managed Networks</th>
<th>Telepresence</th>
<th>Multimedia applications</th>
<th>VOIP</th>
<th>Managed Security</th>
<th>Managed Storage Services</th>
<th>Hosting and Co-location services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Infrastructure</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leased Line</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Managed Leased Line</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Internet</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>MPLS</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Managed MPLS</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

The exhaustive list of applications that can be enabled on a Managed MPLS is a serious contender to existing networks in organizations. These applications enable a holistic approach thereby lowering TCO and achieving better IT efficiencies.

7. Understanding the Managed MPLS services Value Chain

In a highly evolving and competitive managed services marketplace, the grouping of the different value chain participants could range from hardware vendors, system integrators (SI), and independent system vendors (ISV) to Telecom Service Providers, auxiliary players and customers.

**Value Chain Analysis**

The functions of each value chain player although clearly defined may overlap/clash. Considering this complex nature of the market, a strategic alliance between the appropriate value chain players is crucial for efficient delivery of services to enterprises. Enterprises can now chose among a set of partnership models of the value chain players.
Support Functions Partnership:
These partnerships are largely connected to functional areas that facilitate the delivery of services. In this set-up a TSP partners with an SI with the objective of scalability and faster go-to-market, as the function that is outsourced is completely handled by the SI.

Infrastructure cum Support Partnership:
This involves the synergy of a hardware vendor, TSP and a SI. The responsibilities of the TSPs have completely revamped with the drastic change in the offerings of the value chain players. For instance, in this partnership with support functions taken care by the SI, the TSP essentially services the areas depicted in the figure:

*Figure 7-1: The evolving partnership model*

Under this model, Enterprises can look at partnerships like that of Tata Communications Ltd. (TCL) and CISCO. TCL has partnered with CISCO to provide managed MPLS services in the global market and is leveraging the synergy of the partnership. CISCO’s global presence and rich experience in the network equipment space lends muscle to the partnership and makes it a value proposition to enterprises. The partnership provides enterprises the advantage of having a single point of contact for all issues and resolutions related to either hardware or services.

Moving further, TCL’s symbiotic relationship with Tata Consultancy Services Ltd. (TCS), its fellow group company, which is a leader in Indian IT space, adds to the attractiveness of the partnership’s offering. TCS, which acts as an SI in the partnership offers reliability and dependability, which is bound to give a significant mileage to TCL-CISCO partnership in the future.

8. Business Models

As a key section of the TCO framework it is imperative to understand the impact of Managed MPLS on existing business models. In the past, enterprises laid equal emphasis on both capital as well as operational expenditures when investing in network management. The ratio of these investments differed depending upon the technology and service provider. The emerging business models in managed services, however, provide enterprises the flexibility of looking only at the operational expenditures. CAPEX-based pricing models are now losing significance with more and more service providers having business models to support a cost-effective option for enterprises.

The common business models in managed MPLS involve that of a synergetic partnership between the enterprise and service provider. The approach is to change from a CAPEX-based model to an OPEX-based one.
In case of OPEX models, the cost is significantly decreased as managed service providers can subsidize the cost of the service and applications hosted on the network as they cater to multiple enterprises. The OPEX-based models therefore are ones used for pricing by the emerging service providers. Notable ones:

1. **Subscription Models**: The customer pays an amount periodically to the service provider for availing the managed MPLS network services. This payment is usually done annually and the provider notifies the customer one quarter in advance. The costs are split into:
   - a one-time cost, which is paid up front when the network is set up by the provider
   - a recurring cost, which is paid periodically (usually annual)

2. **Pay for Use Models**: The customer pays for the quantum of services utilized in a particular period. This model is usually used when the enterprise has some special service requirements for a limited time period.

Enterprises can choose among alternatives based on projected usage of services on the network. A customizable OPEX model is what an enterprise can aim at in negotiating with a service provider.

Consider a portfolio of services used by an enterprise as described earlier:

Enterprises now have the flexibility to opt for applications and services as per their usage. Telepresence is an upcoming service, which can be explored by enterprises through a pay-per-use option before subscribing to the same. If use of video-based applications like video conferencing, video messaging is not frequent, the enterprise may use the same on demand and pay accordingly. The rest of the services are important in any enterprise and may be subscribed for full usage.

It is therefore recommended for an enterprise to analyze its services requirements and decide upon the services package. A careful choice on the part of enterprises can further optimize the cost effectiveness of the MPLS network solution.
9. Market Overview

The growth exhibited by the Indian enterprise data services market has shown a constant increase buoyed by special network requirements among organizations. Enterprises can observe that among the enterprise data services, MPLS-based revenues contribute significantly. This substantiates the acceptance of MPLS-based solution to network management problems by enterprises. The progression towards MPLS services with complete network management by the service provider is seen as an important driver for the growth of MPLS services market. The contribution of MPLS revenues as a result is forecast to grow to nearly 58.46 percent by the year 2013.

The managed MPLS revenues account for 32 percent of the total MPLS revenues as shown; likely to increase to about 50 percent by FY2015.

These strong market figures and estimates are driving a wide range of service providers to enter the MPLS data services market. This has led to a healthy market competition with enterprises now having a set of providers to choose from.

9.1 DRC Framework for Managed MPLS Market

In spite of the strong market figures, enterprises need to be well informed about the various market and industry factors, which may affect their decision of adoption of managed MPLS services. These factors can be represented in the Drivers-Restraints-Challenges (DRC) framework as presented below.
10. Is Managed MPLS the future?

MPLS is a standard, which emerged about a decade earlier with several technologies and has been successful, in overcoming fears of obsolescence. It is one technology that has been upheld by leading industry bodies and associations around the globe. MPLS basically integrated label switching capabilities of the Asynchronous Transfer Mode technology with packet orientation of the Internet Protocol thereby providing any-to-any connection.

MPLS services have immense popularity and a tremendous growth potential compared to its contemporary technologies like leased internet lines (DLC), ATM/FR and connected WAN. Some key reasons for this are:

- MPLS embraced IP whereas ATM technology proponents were finding ways of running over IP.
- MPLS is designed to work in multiple protocol environment be it ATM, Frame Relay, Sonet or Ethernet giving it immense flexibility over other options.
- MPLS supports a bouquet of value-added services and applications including Layer 2 and Layer 3 VPNs, Ethernet services and traffic engineering making it very adaptable to any kind of enterprise. This has driven many current enterprises to adopt MPLS and the same is bound to continue in the future as well.
- MPLS provides a number of metrics in terms of the traffic volume, latency and so on, which enable efficient network traffic management for an enterprise.
- MPLS is easily scalable, which is critical for the present day burgeoning enterprises.

These factors in addition to the business value of MPLS make it a clear winner over other prevalent technologies. The fact that these services are now provided as a service offering by mature partnerships with clear business models certainly adds mileage to the run of managed MPLS as the “Future of Enterprise Data Services!”

11. Successful Implementation of Managed MPLS

11.1 HDFC Bank: MPLS VPN services pave way for growth

HDFC Bank Ltd., a premier bank in India, has routinely adopted IT to enable its core business. In one such move, the IT staff of the bank decided that a VPN (Virtual Private Network) was needed to replace hub-spoke connections on point-to-point links in Tier-2 and Tier-3 towns in India to reduce total cost of ownership (TCO).

HDFC Bank chose Tata Communications as one of its telecom service providers to deliver VPN solutions that would seamlessly converge data, voice, video and multimedia on a global MPLS network. Based on a network topology with an “any-to-any” network architecture based on CISCO powered equipment, Tata Communications’
VPN offering optimized bandwidth and also featured quality of service (QoS) and prioritization of critical applications (multiple classes of service). Tata Communications also delivered seamless and automatic traffic switching from a state-of-the-art data center in Mumbai to a separate disaster recovery center in case of an outage.

Moreover, Tata Communications was able to implement MPLS-based VPN service within 30 days of the purchase order (a primary requirement of the bank) since it did not require local access feasibility for connecting the branches. HDFC Bank can now consider running quality of service and prioritization of critical applications on the MPLS VPN network for the same cost in the future.

11.2 Lemon Tree - Managed Hosting and Storage

Lemon Tree Hotels, one of India’s fastest-growing hotel chains, required a highly robust and scalable solution, to accommodate an 11-hotel build-out over the next two years, and a reservation and billing system that would be available 24x7x365, with minimal disruptions.

Users needed high-performance access to mission-critical business applications, linked to a centralized, remotely hosted server and storage system. Tata Communications met Lemon Tree Hotels’ needs by providing an integrated CISCO powered MPLS VPN service to all existing properties. As part of its strategic expansion plan, the hotel chain decided to have its Data Center hosted at Tata Communications’ Managed Services Operation Center (MSOC), enabling hotel management to better focus on its core job duties, instead of network and IT infrastructure concerns.

Previously, Lemon Tree Hotels had hosted applications at each individual hotel location. Now, however, the company needed a common platform to host a multi-tier property application and to consolidate data for reporting and analysis. To meet these requirements, Tata Communications established a centralized, robust network architecture solution based on CISCO powered equipment that could accommodate the networking needs of new hotels as they are built, optimizing performance, reducing total cost of ownership, and enhancing peace of mind. Tata Communications was also able to answer concerns about reliability and uptime, and meet the company’s security and service quality requirements.

11.3 Cognizant Technology Solutions: Enabling a scalable platform

Cognizant is a NASDAQ-listed, US-based organization delivering a full range of application outsourcing, business process consulting and system integration services. Increasing its global reach through business diversification, Cognizant realized a vital need for transcontinental connectivity and efficient security mechanisms. The existing, legacy IPL network, responsible for interconnecting their various offices, was expensive, tedious and difficult to coordinate with multiple telecom operators and networks. On the legacy network, new locations could not be seamlessly integrated, leasing bandwidth was not economical and rerouting of traffic was difficult to manage.

Therefore Cognizant approached Tata Communications with diverse requirements for integrating its disbursed
development centers (seven within India, four in the US and one each in the UK and China). Cognizant required any-to-any connectivity, as its India development centers needed to be able to connect to any of its worldwide centers.

**Figure 11-3: MPLS Converged Network: Cognizant**

- End-to-end turnkey service provisioning
- Fully managed redundant infrastructure
- Multiple last mile access options delivering desired uptimes
- Real-time network management system reporting
- Cost-effective, secure, legacy free private network based on CISCO powered equipment on shared platform
- Scalable network, in terms of reach and bandwidth
- Disaster recovery and business continuity solutions

Tata Communications migrated Cognizant’s existing WAN to an L3 MPLS network based on CISCO powered equipment, which provided future scalability, offered the option of running security encryptions, and ensured reliability in delivering maximum uptime. In the event of a disaster, an automatic failover allows all of Cognizant’s domestic locations to connect to Tata’s Disaster Recovery Center (DRC) in Chennai, India.

Tata Communications’ MPLS platform seamlessly integrated Cognizant’s domestic operations with its global business. Cognizant was able to leverage the built-in security and triple play support for future applications. The CISCO powered network’s simple, any-to-any configuration can grow with Cognizant’s global business expansion, enabling voice, data and video convergence onto a single network infrastructure. Tata Communications essentially offered Cognizant a superior global network scale and proven experience for developing industry-specific vertical solutions especially for the IT/ITES sector.

### 12. Recommendations

It is suggested that enterprises follow a “6 point formula” to arrive at an optimal network strategy. This formula provides a comprehensive approach to assess the various network requirements of an enterprise with suitable checks at each stage to choose the best option among alternatives. The following steps are an excellent guide for CIOs of enterprises to adopt the most viable and emerging technology for their network and data management:

1. **Assess Network requirements:**
   
   An enterprise needs to assess its network architecture to evaluate its needs correctly. It needs to determine whether its networks are across disparate locations internationally or regionally and if they need to be integrated. It needs to assess the variety of network architectures deployed on its network and how best it can optimize that to serve its bandwidth requirements. The search for a network architecture, which addresses all these requirements optimally ends with managed MPLS network, which serves current needs and also is flexible for the future.

2. **Identify enterprise applications to be hosted and services required:**
   
   An enterprise then needs to determine how it deploys applications across the network and their priority and criticality to end users. Another parameter that comes into play is the uptime of these applications and how end users will access these on the network.

   A managed MPLS model caters to this by its myriad service portfolio and a high class of service capability, which enables priority to mission critical applications.
3. Recognize the need for convergence and moving towards the same:
The enterprise also will have to evaluate its shift towards a converged network and how having one can enhance its productivity and delivery of value to its customers. This also involves assessing its future expansion plans and how flexible and scalable the network needs to be to address this. MPLS offers converged unified network architecture, which is a one-stop-arrangement for different network services be it voice, video or data related.

4. Arrive at an optimal business model:
Enterprises must model their network solution based on their individual network and application requirements. There are various partnership models based on which service provider’s partner with organizations. Managed MPLS service models provide a shift towards an OPEX-based business model from CAPEX-based models. Enterprises can now choose among various OPEX model alternatives according to their application/service requirements and usage characteristics. Managed MPLS service providers provide enterprises to fit an OPEX model suitable to their network usage and requirements, which leads to cost-effectiveness of the network solution.

5. Evaluate the service providers, choose the best strategic partner and implement the network solution:
Enterprises must recognize that the solution to all their network and data management problems is partnering with a right service provider. An enterprise going for managed MPLS service can consider some criteria to evaluate a service provider, which makes their decision-making process easier. The ideal traits of a managed MPLS service provider are depicted in the following figure.

The specific attributes in each of the ideal traits of a managed service provider are shown in the figure. The rank indicates the level of importance that can be given to each of the traits in deciding among a list of service providers. Enterprises can partner with the service provider with the best capabilities across all these traits.

6. Post Implementation Roadmap:
The show does not end with implementation of a network solution in an enterprise, it is just the beginning. Enterprises must ensure that their Service Level Agreement (SLAs) incorporate adequate levels of conflict management, change management and support from the provider. The objectives of strategic outsourcing would be completely fulfilled only if the enterprises can focus on their core competency with minimal apprehensions with regard to network and data management.

The proposed 6-point formula for enterprises essentially helps enterprises understand their networking needs and thus arrive at managed MPLS network as an optimal solution for the same. It further guides them how to arrive at the best partnership taking into consideration the business models, service provider traits and post implementation checklist. An enterprise taking this formula and adopting managed MPLS services will be on a path of empowerment, where it can provide 100 percent focus on its core competences and delight their customers!