

LightRiver Technologies, Inc.  
Tech Byte

# MPLS | Layer 2.5



## MPLS: What is Layer 2.5?

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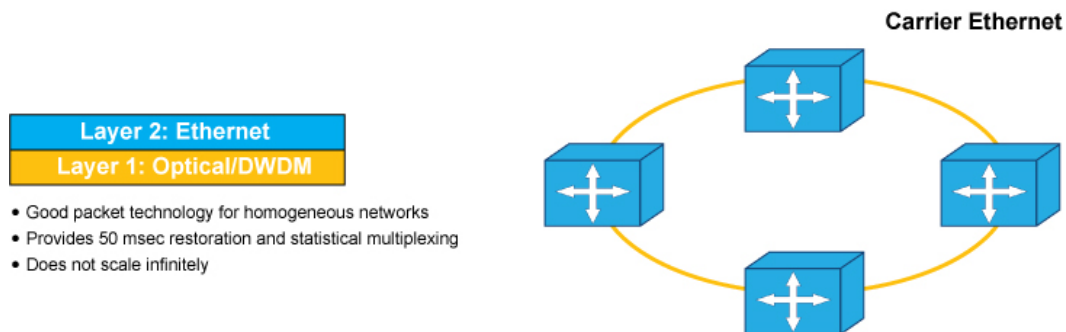
Almost everyone connected to communications has heard of the OSI model (aka, 7-Layer Stack). It defines how bits are communicated and become applications. Typically layers are described in whole numbers: Layer 1, Layer 2...Layer 7.

Multiprotocol Label Switching (MPLS), an important communications protocol/technology is often described as “Layer 2.5”. But, what does this mean and, more importantly, why is it important to the telecommunications transport network?

First, a review of the first three layers of the OSI model:

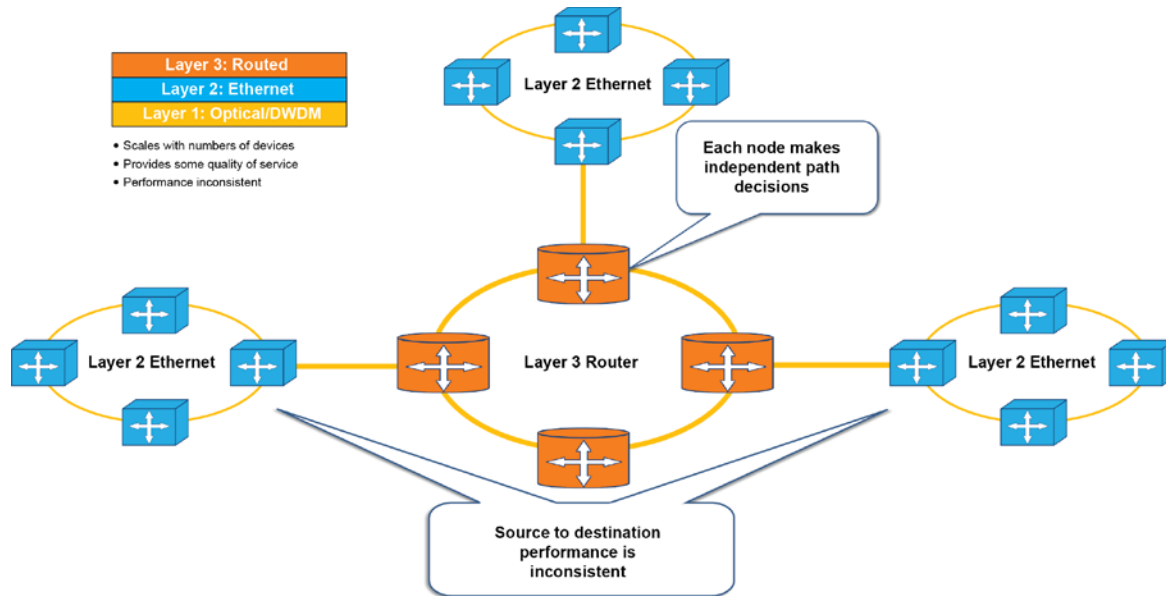
- Layer 1 – Physical (think “optical”). Layer 1 simply defines the relationship between a device and the transmission media. Today this is typically fiber and wave division multiplexing (WDM). [Layer-1 moves the 0’s and 1’s across the network media].
- Layer 2 – Data Link (think “Ethernet”). Layer 2 defines how to communicate between devices on the same network. Layer 2 is predominantly Ethernet. [Layer-2 groups the 0’s and 1’s into meaningful “packets” of information].
- Layer 3 – Network (think “IP”). Layer 3 defines how to communicate between devices on different networks. This communications can be accomplished with garden variety routing (Layer 3) or MPLS (Layer 2.5). [Layer-3 moves the packets between networks].

Layer 2, called Carrier Ethernet in transport networks, can be used to communicate within a homogeneous network with a finite number of devices. However, due to the shared nature inherent in data media, Layer 2 arbitrates collisions on the network to ensure that communications occur. But as a network scales in number of devices, performance can degrade.



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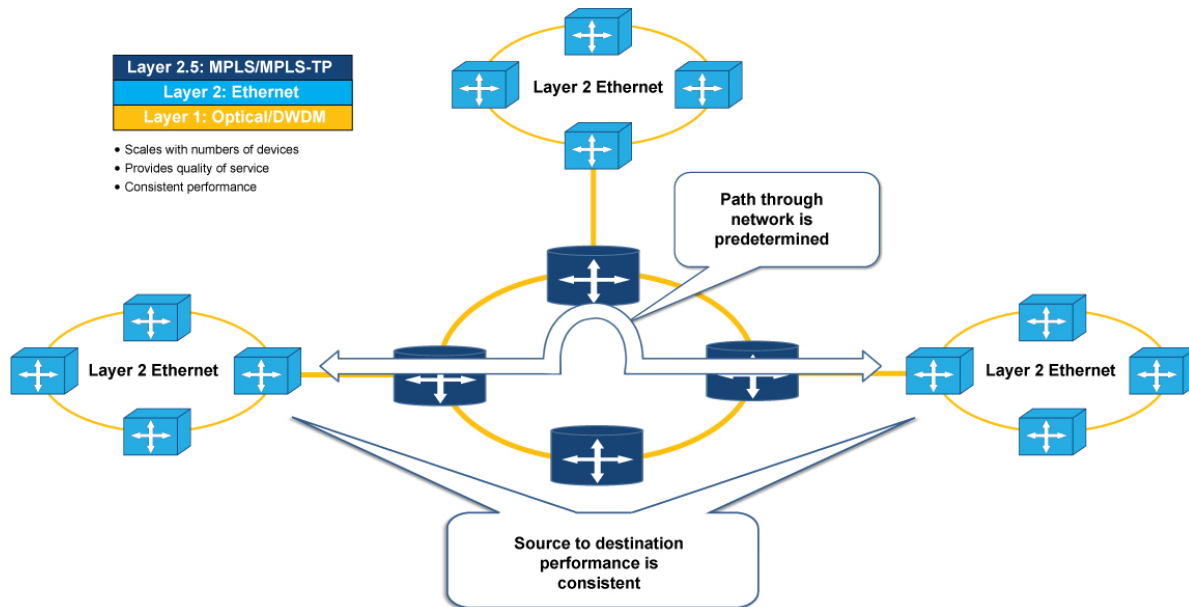
Layer 3, typically performed with routers, adds scalability in networks by selecting the best routes through, and between, networks and adding some quality of service. Layer 3 is fully dynamic - packet routing from source to destination is determined at each hop along the route based on the most current topology information. As a result, Layer 3 routing is not all that deterministic. Sequential packets can take different routes from source to destination through the network, causing inconsistent performance.



MPLS was created to apply the benefits of packet to mission critical and carrier class networks without the non-deterministic behavior. MPLS uses Layer 3 processes to find pathways from source to destination and then creates an information set that defines these pathways so that multiple packets can traverse the network in a consistent manner.

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MPLS-TP (Transport Profile) adds more control to MPLS. MPLS-TP functions as MPLS does, except that the tunnels are provisioned in the same way as SONET/TDM circuits. This delivers the performance required in mission critical and carrier class networks by providing 50 msec protection switching, managing traffic flow, reducing jitter and latency, allowing sub-networks to be securely segregated and easing the routing decision load on the network.



MPLS has been dubbed “Layer- 2.5” since it brings the best of both worlds – it forwards packets with the speed of Layer-2 while preserving the scalability and dynamic capabilities of Layer-3

To learn more about LightRiver’s MPLS | Layer 2.5 solutions, give us a call at (941) 552-9410 and speak to one of our experts or visit us on the web at [www.LightRiver.com](http://www.LightRiver.com).