SD-WAN Experts

SD-WAN or MPLS: A Pricing Analysis

SD-WAN experts™

It's pretty much axiomatic among SD-WAN providers that organizations can save money by switching to SD-WANs. The low-cost of Internet services relative to MPLS services allows companies to reduce their monthly spend on bandwidth "by as much as 90%" as some SD-WAN providers claim.

Here at SD-WAN Experts, we're not tied to any one technology, recommending SD-WANs or MPLS depending on user requirements. SD-WANs often reduce monthly bandwidth charges, but rarely do those savings approach 90 percent. One recent WAN analysis we ran for a customer, for example, showed a monthly bandwidth savings of only 10 percent. We still thought SD-WANs were the right call for several reasons. Here's why.

The Scenario

The customer was interested in reducing his monthly MPLS spend. The company had MPLS to 11 locations across the US — 1 data center and 10 branch offices. Each location was within 40ms of the data center.

The customer spent $15,200 a month on primary recurring charges — $2,200 for a 20 Mbps/s MPLS connection at the data-center, $825 for 5 Mbps MPLS connections at branch offices. In the event of an MPLS outage, the locations would VPN over the secondary Internet connections to one another. The monthly charge for all secondary Internet connections was $5,650. General Internet access to all the sites was only provided through a centrally firewalled connection at the data center.

SD-WAN Alternative

To replace MPLS with direct Internet access (DIA) connections, we recommended bringing a 100 Mbps connection into the data center and 10 Mbps into the branch offices. The customer would keep the secondary connections and add LTE connections for additional redundancy.

SD-WAN would reduce their bandwidth charges, but not by 90%. All totaled monthly savings would be 24 percent when compared with MPLS (see table 1). The real difference, though, was in the value of SD-WAN.

Table 1: MPLS vs. SD-WAN Pricing Scenario

	MPLS			SD-WAN				
	Bandwidth	Primary (MPLS)	Secondary (DIA)	Bandwidth	DIA	SD-WAN Appliance	LTE	Total
Data Center	20	$2,200.00	$1,100	100	$500	$458	$25	$983
USA 1-6	5	$825.00	$250	10	$175	$135	$25	$335
USA7	5	$825.00	$1,200	10	$500	$135	$25	$660
USA8	5	$825.00	$1,200	10	$1,100	$135	$25	$1,260
USA9	5	$825.00	$300	10	$275	$135	$25	$435
USA10	5	$825.00	$350	10	$1,050	$135	$25	$1,210
Subtotal		$10,450.00	$5,650					$6,553

DIA = Direct Internet Access

All costs are assumed to be monthly recurring charges

With MPLS, the customer received a 20 Mbps connection at the data center versus a proposed 100 Mbps connection for the Internet. To put that another way, with the Internet he paid $13 per Mbps/month instead of $110 per Mbps/month for MPLS. The per-megabit price is even lower when you factor in the secondary DIA connections, which sat dormant with MPLS, but could now be used with SD-WAN.

A big reason for the minor difference in pricing comes back to real-world Internet services. SD-WAN providers assume that low-cost Internet access is available to every office anywhere, but often that's not the case. This customer had four offices (USA 7, 8, 9, and 10) lacking the necessary fiber or cable connections for DIA (Direct Internet Access). The service provider needed to pull the cable or fiber, increasing DIA costs by nearly six-times. Had fiber or copper already been available at each of the branches, the monthly SD-WAN charge would have been 33 percent less than with MPLS.

Packet Delivery

A big motivation for MPLS is the predictability of packet delivery. Although MPLS is a shared medium, using labels to isolate your packets from those of other customers, it's also a managed service. MPLS services are engineered to meet 0.1 percent packet loss depending on the selected Class of Service (CoS); Internet services can reach 1 percent packet loss and higher.

For this customer, though, there were a couple of things to keep in mind. First, Internet service quality has improved dramatically over the years. This customer had offices on a common Internet backbone, which further reduced packet loss. The effects of packet loss are also particularly acute when there's significant latency, but in this case, the offices were only 40 milliseconds apart.

SD-WANs also have two features that help address loss. By connecting to and monitoring multiple Internet services, SD-WANs appliances can select the paths with the least loss. The more paths they can choose from, the greater the likelihood of finding a path with the right loss characteristics. Some SD-WAN also apply error correction techniques to fix loss, though in my experience that's less helpful when packet loss stems from network congestion, as is typically the case on the Internet.

Availability

The ability to choose between multiple paths also allows customers to address the uptime limitations of Internet connections. There's a simple formula for calculating the uptime of combining two fully redundant connections, such as LTE and DIA. Keeping the secondary DIA adds a third-level of failover protection at a minimal cost, often as little as $25/month.

What's more with SD-WANs ability to load balance connections, local loop redundancy is significantly improved. Paths are run in active/active mode. In the event of a line disruption of some kind on the primary path, traffic is moved over to the secondary paths and the preconfigured traffic and business policies in the SD-WAN relegate access to the secondary,

now primary, connection. Active/active connections with MPLS are possible, but introduce significant routing complexity. What's more the switchover time can take as much as 40 seconds, if you're depending on routes to converge. Several SD-WAN players now offer sub-second failover to preserve session-state. A few go even a step further and duplicate packets across connections. In the event of a failure of the primary connection, packets across the secondary connection still reach the destination.

Security

Like many new customers, this company wasn't particularly concerned with security on his MPLS network. MPLS's traffic separation gave him enough piece of mind even though the data was not being encrypted. Across the Internet, of course, encryption is a requirement and every SD-WAN provider that we know today builds their SD-WAN fabric from encrypted tunnels.

Bottom Line

Even with the marginal savings on the MRC, we still thought SD-WANs made sense. The customer would receive greater resiliency and more than twice the bandwidth than with MPLS. He would be able to deploy new sites far faster by not having to wait for the service provider to provision a line. Installation is also much easier. He can do all of that AND still save some money? SD-WAN got the nod here.

For detailed information and insight about SD-WAN vendors and how best to leverage them in your network, [sign up for a personal WAN assessment](#)

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