

DYNAMIC PATH CONTROL: REAL-TIME TRAFFIC UPDATES FOR THE HYBRID WAN

As organizations adopt public cloud services and unified communications, network architects are looking for affordable ways to improve the performance and the availability of branch office connectivity. The current practice of connecting branch offices to a single MPLS connection leaves the office vulnerable to network outages while backhauling Internet traffic wastes bandwidth and adds latency (See Figure 1).

Many organizations are turning to hybrid networks, connecting branch offices to the local internet and the MPLS backbone. Internet connectivity provides low-cost resiliency and access to cloud services, the MPLS backbone provides access to corporate services.

But connecting offices to multiple paths on the same or different networks presents a number of architectural challenges. Traffic loads need to be balanced across the paths to maximize a company's investment in its WAN services. Latency- or loss-sensitive traffic must be placed on paths the appropriate service quality, which also requires gathering real-time network statistics. Other applications may need to be designated to one path or another, such as for security or cost reasons. Silver Peak addresses all those challenges with its next-generation path selection technology, Dynamic Path Control.

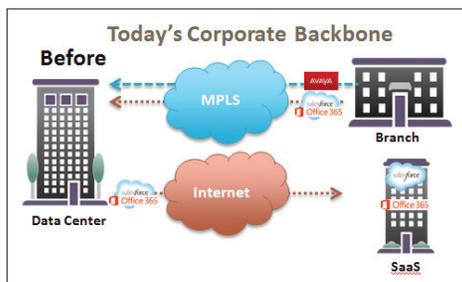


Figure 1: Many organizations backhaul Internet to the datacenter, wasting bandwidth and adding latency.

OVERVIEW

Silver Peak has long been able to maintain parallel paths between sites and gather fine-grained network statistics. Dynamic Path Control combines the two capabilities so Silver Peak can make real-time traffic decisions for any application - selecting the fastest, least congested or most available path between locations.

Statistics gathered from standard tools, such as ICMP ping tests, can be misleading. Ping tests issue a command times once a second, insufficient to draw valid, real-time decisions. By contrast, Silver Peak's forward error correction (FEC) and packet order correction (POC) technologies constantly gather network statistics, thousands of times a second, without adding significant overhead. Ping tests would require over 12 hours to register results with similar accuracy (see "How to Accurately Measure Packet Loss").

With real-time intelligence, Silver Peak allows organizations to safely treat multiple connections as a single one. Replace expensive MPLS connections with low-cost internet connections; improve branch office availability and cloud performance by complementing MPLS with local internet access. Dynamic Path Control prevents links from becoming imbalanced or application performance from being undermined by changing network conditions.

Configuration is also intuitive. Network engineers use Silver Peak's Global Management System (GMS) to choose the path-selection action for a given traffic flows (See Figure 2). Path selection options include:

- **Lowest latency or loss** where Silver Peak dynamically selects the path for a traffic flow based on the lowest loss or latency.

Path control with real-time network intelligence is like the difference between a GPS and a GPS with traffic updates. Dynamic Path Control makes network architectures smarter, more agile.

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VLAN	Destination	Path	Fallback
any.any	chicago	best latency	pass-through
any.any	chicago	tun1	drop
any.any	dallas		pass-through
any.any	auto		continue
any	pass-through		pass-through
	pass-through-unshaped		pass-through
	drop		
	chicago		
	dallas		
	new-york		
	santa-clara		

Figure 2: Silver Peak offers a range of path selection options.

- **Balanced** where Silver Peak balances traffic flows between the available tunnels based upon optimum bandwidth utilization.
- **Manual** where a traffic flow is designated for a preferred path.

Traffic flows can be identified based on their protocol, source address, destination address, application, DSCP, or VLAN.

TECHNICAL BENEFITS

Path control with real-time network intelligence is like the difference between a GPS and a GPS with traffic updates. Dynamic Path Control makes network architectures smarter, more dynamic, allowing them to:

- **Prevent problems before they occur.** By monitoring packet loss rates and latency fluctuations, Silver Peak often identify emerging problems before they impact the application, switching traffic to another path before the connection fails completely (See Figure 3).
- **Reduce costs by replacing MPLS or private line with multiple low cost links.** Internet connections are a fraction of the price of MPLS, but their quality is often erratic and suffers from significantly higher loss and latency. Now IT can get the best of the both worlds by load balancing across internet connections from different

providers (i.e. dual homing), intelligently selecting the optimum path (See Figure 4).

- **Improve availability without wasting resources.** Balancing traffic across two connections, such as an MPLS primary link and an xDSL or ISDN secondary link, improves site availability without wasting the bandwidth of the secondary connection. High priority traffic can be kept on the primary network, low priority traffic on the secondary link, and in the event of a failover, prioritize the high-priority traffic over the lower priority traffic on the critical link (See Figure 5).
- **Avoid costly backhaul.** Some organizations consolidate internet access in one location, backhauling internet traffic across the MPLS network. With Dynamic Path Control, business critical traffic can continue across the MPLS network while internet traffic is diverted across a secondary internet connection.

DEPLOYMENT STEPS

1. Identify the branch offices that can benefit from Dynamic Path Control,
2. Check service contracts before deploying Dynamic Path Control. Shadow connections or backup internet lines may carry one price if left unused, but a higher price once active. Clarify those terms and obligations and renegotiate as necessary.
3. Determine traffic characteristics and priority. Silver Peak will automatically balance traffic across your connections, finding the path with the least latency and loss. Alone that's revolutionary and will allow network architects to rethink their branch office connectivity. Greater control can be provided by designating the appropriate path selection option.
4. Let Silver Peak do the rest.

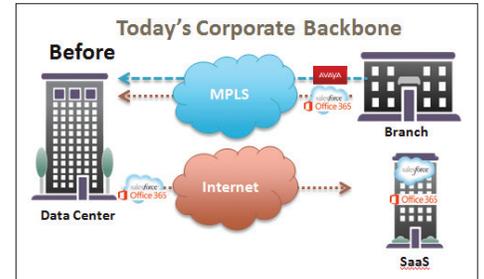


Figure 3: Silver Peak switches traffic to an alternative path on the same or different network, before loss or latency can disrupt the application.

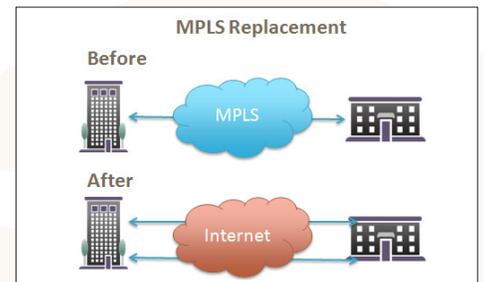


Figure 4: Replace MPLS with multiple low-cost internet connections

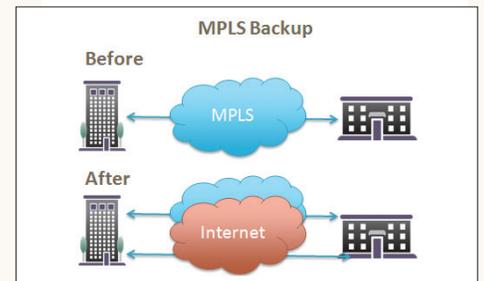


Figure 5: Add a backup connection, improve site availability and utilize its bandwidth.

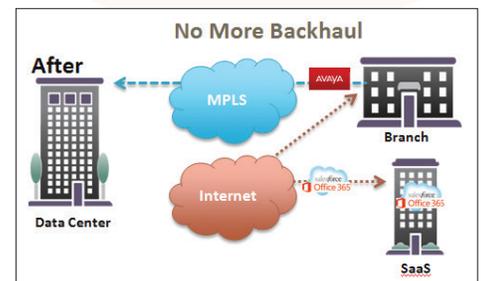


Figure 6: Avoid backhauling Internet traffic across the MPLS network. Send Internet traffic through a local Internet connection and corporate traffic across the MPLS network.