



Why SD-WAN Deployment Hinges on End-to-End Monitoring

Changing corporate infrastructure is a difficult process. Beyond the challenges of satisfying business concerns and defining the scope, implementation can give any network veteran visions of sleepless nights and late-night maintenance windows. For CIOs however, the allure of ripping and replacing MPLS, migrating to a UCaaS provider, and saving money is core among the assumptions of implementing SD-WAN.

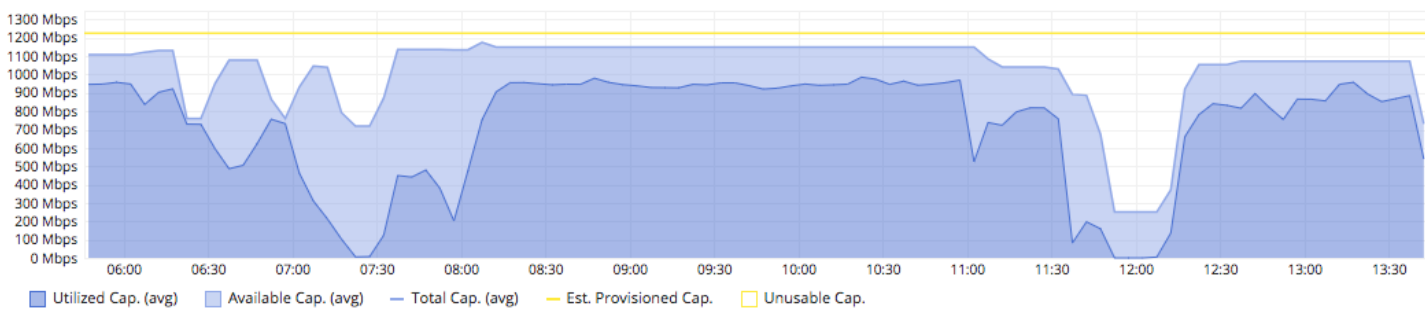
Enterprises are starting to see that new SD-WAN deployments get blamed for any major issue after the installation. The challenge is that most organisations that move to SD-WAN have some reliance on the cloud but still haven't solved their monitoring problem. Fundamentally, monitoring user experience of cloud applications requires new methods and different metrics. Without these in-place before, during, and after an SD-WAN deployment, IT teams are left with little visibility and big headaches.

AppNeta has worked with key SD-WAN vendors as well as customers who have implemented SD-WAN solutions to identify where deployments go wrong. Typically it isn't an issue with the network, the architecture, the team, or the SD-WAN solution. It's an issue with the expectation.

Baselining Before your SD-WAN Deployment

The cost of this change can be dramatic. SD-WAN as a solution is maturing, but compared to network infrastructure it is still extremely young. As a result, it's not surprising that IT teams frequently encounter issues when implementing what amounts to new architectures in traditional infrastructure. Chief among these is visibility. SD-WAN opens the door to direct internet access where maybe none existed before, and it adds complexity to routing rules. SD-WAN can offer basic metric-based visibility in the WAN, but end-user experience is an end-to-end project. Lacking visibility in any area can severely hinder the troubleshooting process for network teams.

AppNeta routinely sees that new deployments of SD-WAN are blamed for performance degradation even though metrics provided by the SD-WAN vendor show that the system is working well. The issue is that customers have trouble quantifying the network improvement and don't have a baseline to compare to. Using the same metrics before and after a deployment can be crucial to convincing yourself and others that the deployment was successful. One bad call post-deployment is usually enough to cast blame, and being armed with the data to confirm or deny these claims is essential.



Metrics to Track: *Capacity*

With SD-WAN there are two connections and both have to be monitored in order for network ops teams to effectively troubleshoot issues. With multiple bypass pairs in the flagship monitoring point offered by AppNeta it's simple to monitor application usage, the network delivery path and the end-user experience over the paired connections.

The end-to-end capacity is probably the single most important metric to track when looking at an SD-WAN deployment. With MPLS networks the capacity is generally reliable because it is known. Technically you pay for bandwidth, but because of the guarantee of performance offered by MPLS providers the end-to-end capacity should be roughly equivalent to the committed information rate that is paid for. With direct internet access paid for by an ISP (and even more so if you're using 4G LTE links) the capacity is far more variable. SD-WAN configuration often relies on knowing how much capacity is available to set QoS, TCP segment size, and other settings. Beside API integration, SD-WAN deployments don't automatically update as the connection changes.

Validating the Deployment

For good reasons, network disruptions are not tolerated by business units during the work day. Because of this, network teams that implement changes late at night or after-hours often get caught in a dilemma when it comes to testing their changes. Testing reverts to the lowest common denominator. Does the phone connect? Can we ping the server? Engineers run a quick test on the data side to make sure that the changes were implemented correctly and that tangential systems are still working as expected. Any seasoned network engineer can recount a time where changes were made only to find out the next morning that the system crumbled under load.

Validating the Voice

Here the baseline created in the pre-deployment phase is crucial because it allows engineers to verify in rather short order if critical systems are still running well. Network engineers test the data plane well when changes are implemented. Testing voice is much more difficult. It requires someone on the other side to pick up and, more often than not, issues only occur when many concurrent calls are connected.

AppNeta specifically allows users to combine approaches to deal with the differences in voice and data traffic. The continuous testing combines specially curated packet trains that consist of small and large packets. These are treated differently during their travel over the network and monitoring with both is essential to understanding what will happen when the lights are turned on in the morning.

Metrics to Track: **MOS**

The Mean Opinion Score (MOS) is a very powerful metric when looking at voice performance over time. Typical voice assessment tools provide a score for the network during a maintenance window or before occupancy using load generation to simulate calls. This is a good benchmark, but doesn't indicate the end-user experience day-to-day. Continuous monitoring of MOS can be much more powerful. AppNeta allows continuous MOS testing to show a whole host of issues associated with VoIP and video conferencing in production environments. While MOS is an aggregate metric, AppNeta can offer it on every network path between users, offices and your data centres. Identifying concurrency issues or class of service issues is much easier when you don't have to rely on employee tickets to roll in when users are fed up with performance.



Monitoring SD-WAN Long-term

SD-WAN is most-often deployed to bond MPLS and internet connections into one logical connection that it can intelligently route traffic over the WAN. Because of that purpose SD-WAN is built looking out past your firewall, not into the LAN and the infrastructure you own. This isn't a bad thing, but it means that other tools must fill in the picture when considering a full end-to-end view of voice communications and conferencing.

Networking monitoring has always been metric based. Every tool claims to show you latency, loss, and sometimes jitter and bandwidth on certain links. The questions is where that metric applies. If you take a VoIP call as an extremely simplified example there is the LAN from which

the call is placed, infrastructure in front of the SD-WAN, the WAN traversed (whether through cloud-hosted VoIP or through a data centre connection), the receiving SD-WAN device, and LAN infrastructure on the recipient's end. Latency provided by SD-WAN will likely only include the WAN connection. This isn't wrong, but it's not taking into account the whole picture. Trending SD-WAN latency over time is valuable and can tell you when there is an increase in that section of the full delivery path for the call, but unless you're validating that data against a truly end-to-end view your troubleshooting efforts may be more difficult.

Metrics to Track: *Everything Else*

SD-WAN is now a critical piece of infrastructure. Tracking the performance of your applications over time is essential. Metrics like latency, data loss, jitter, TCP retransmits, QoS markings and others allow for better alerting and better knowledge of the steady-state of the network. Seeing the network topology and the devices in your infrastructure is one thing, but monitoring over every link from endpoints across your organisation guarantees visibility into even the most transient of issues.

AppNeta monitoring points offer for Deep Packet Inspection to allow you to understand the impact of every application on your network. With active, continuous testing that consumes minimal overhead AppNeta can tell you the experience of applications that consume data or the quality of voice and video applications in real-time. AppNeta has designed hardware and software monitoring points to help monitor architectures utilising SD-WAN, but baselining, validating and continuously improving the deployment over time is the key path to success.

ABOUT APPNETA

AppNeta is the leader in proactive end-user performance monitoring solutions built for the distributed digital enterprise. With AppNeta, IT and Network Ops teams can assure continual and exceptional delivery of business-critical applications. AppNeta's SaaS-based solutions give IT teams essential application and network performance data, allowing them to continuously monitor user experience across any application, network, data center or cloud. For more information, visit www.appneta.com

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