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The Carriers Speak: The Future of Managed SD-WAN Services

A Heavy Reading white paper sponsored by Accedian, Amdocs, and VMware

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INTRODUCTION

Heavy Reading has been conducting surveys focused on software-defined WANs (SD-WANs) and SD-WAN services for more than five years. Past surveys have revealed concerns about the cannibalization of high value carrier services such as MPLS and the most cost-effective and efficient way to deploy, manage, and secure SD-WAN services. Today, Heavy Reading is seeing enterprises turning away from DIY SD-WAN implementations and looking to managed services. Carriers agree that SD-WAN has, to a large extent, been additive to MPLS services and that MPLS will be around for the next decade. However, they also observe that new MPLS implementations are decreasing. SD-WAN is becoming a pull service and MPLS has started a slow, gradual decline. Service providers (SPs) are seeing the move toward hybrid networks and cloud access, where MPLS or leased lines are likely to be replaced at smaller sites with SD-WAN and broadband access. Partners to the telcos have an opportunity to assist in this journey by helping the telcos develop new monetization strategies centered on services that are growing in terms of both numbers of customers and revenue, such as SD-WAN.

Heavy Reading's current **SD-WAN Managed Service Survey** looks at how SPs are building and managing their SD-WAN service—how they are monetizing the service, where they are encountering challenges, and where they see an opportunity for differentiation. This report presents the key highlights from the larger survey.

DEMOGRAPHICS

The Heavy Reading SD-WAN Managed Service Survey was conducted in 4Q20 and pulled in 103 respondents. Mobile and converged operators made up the bulk of the respondent pool, accounting for 63% of overall responses. An additional 27% came from the fixed-line and cable operator community. The remaining 10% hailed from hosting and cloud providers (4%), mobile virtual network operators (MVNOs)/mobile virtual network enablers (MVNEs) with infrastructure (3%), and others (3%).

Geographical breakdown

The US accounted for just under half of the respondents. The Asia Pacific/Australia region provided the second largest block, with close to one-fifth of overall responses. Canada and Central/South America/Caribbean rounded out the Americas region with an additional 14%. All of Europe, the Middle East, and Africa together accounted for a fifth of respondents (20%).

Primary job function

As is the case with most Heavy Reading surveys, the majority of the respondents, 61%, were from technical networking roles: network planning and engineering, R&D, and network operations. One-fifth were from management, marketing, and finance. Security operations/architect made up just under 10% of respondents. The data center is more heavily represented in recent surveys; 8% of respondents were from IT in this survey. Data analytics and "other" made up the remaining 3% of respondents.

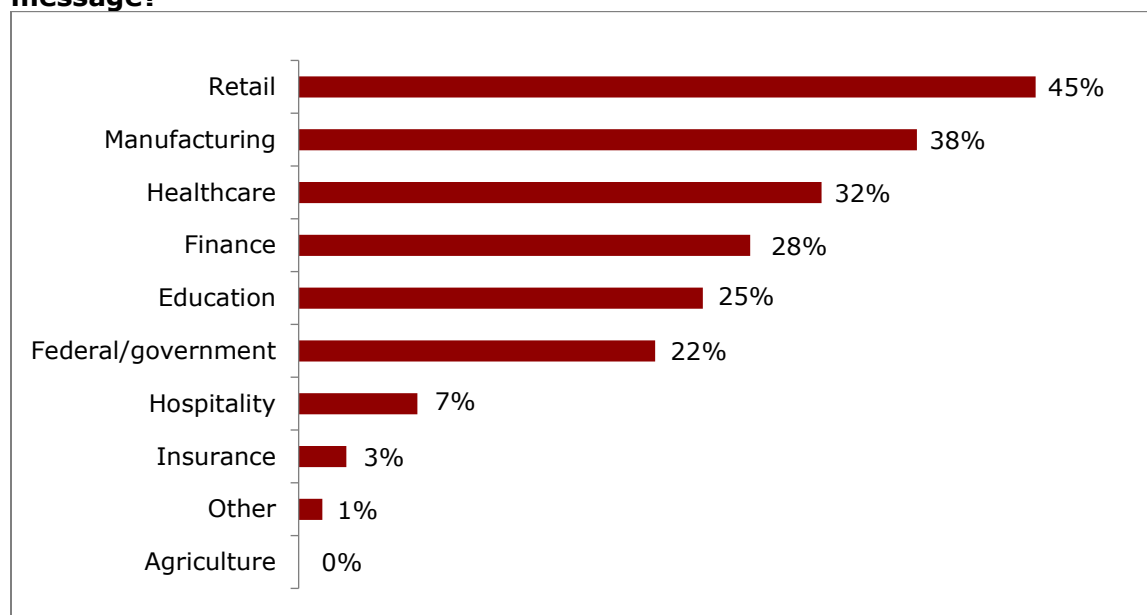
Revenue

28% of respondents reported their companies have revenue of over \$5bn. Another third have revenue of between half a billion and \$5bn. The remaining 40% have revenue under half a billion. These smaller SPs include regional business units of larger carriers (e.g., Telefónica), dominant carriers of smaller countries, and over-the-top (OTT) vendors, hosting vendors, and MVNOs/MVNEs.

SD-WAN SERVICES IN VERTICAL INDUSTRIES

A clear vertical industry hierarchy has emerged in the adoption of SD-WAN services. Over two-thirds, 68%, of Heavy Reading's survey respondents identified a vertical industry focus for their SD-WAN services. As seen in **Figure 1** below, retail leads in terms of vertical industry. SD-WAN is an ideal technology for connecting multiple storefronts, warehouses, and delivery hubs. Retailers also want to be able to provide customers with a multichannel experience—enabling them to easily connect with the retailer's online presence while the customer is in the store. This gives the customer access to the "endless aisle," allowing them to virtually browse items that are out of stock or not on display and have selected products shipped to their home.

Figure 1: Which verticals are you focusing on that have a clear/specific vertical message?



n=69

Source: Heavy Reading

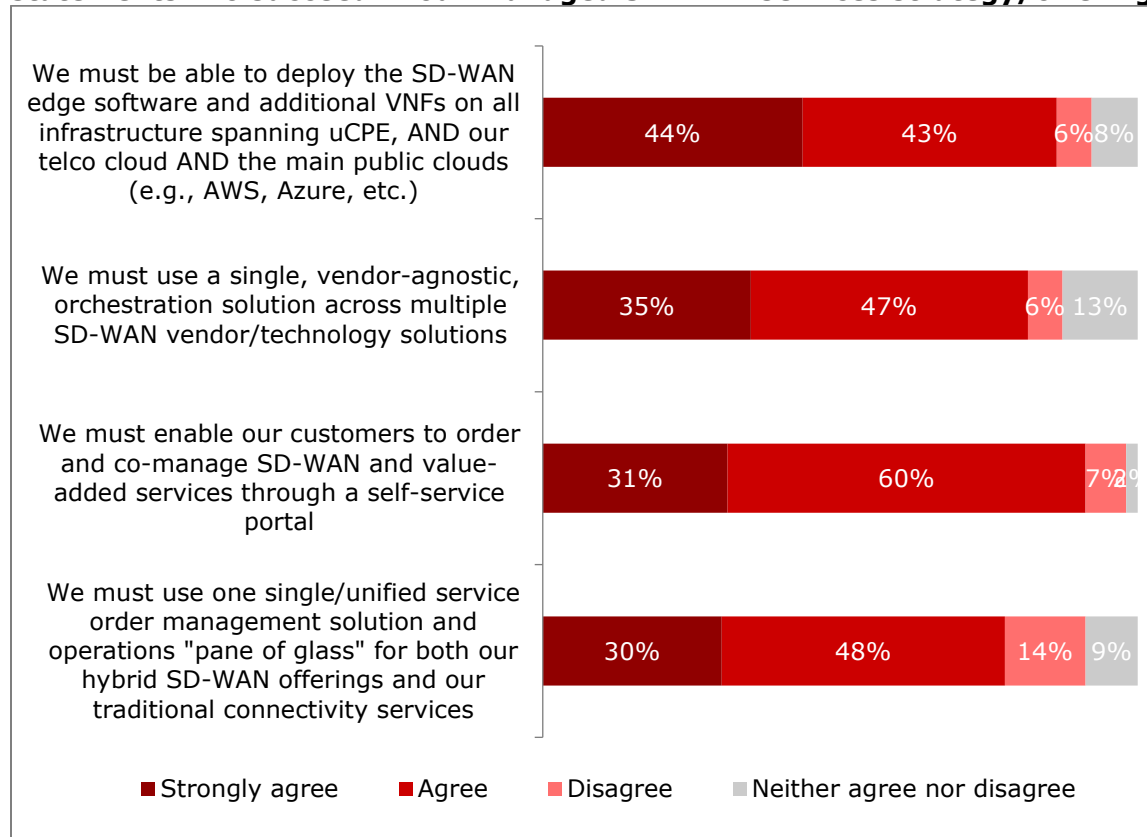
Manufacturing is likewise full of use cases that leverage SD-WAN capabilities. Locations are often globally distributed, demanding a cost-effective, global solution with the flexibility to add/move/change sites quickly. Because it is software-defined and cloud-based, SD-WAN offers this flexibility. Even at critical production sites, SD-WAN can provide backup connectivity secondary to MPLS or leased lines. Connectivity on the factory floor, in the warehouse, and throughout the supply chain is critical in the manufacturing space—and well suited to an SD-WAN service solution.

Healthcare is seeing a rise in the use of cloud applications, a shift that has been accelerated by the COVID-19 pandemic and increased demand for remote healthcare. Like retail and manufacturing, healthcare is characterized by the need to connect multiple disparate locations such as doctor’s offices, hospitals, and pharmacies. With SD-WAN, healthcare IT can establish connectivity across this entire healthcare ecosystem.

SD-WAN GROWING PAINS

What do SPs believe is most important, from a technical perspective, to ensure the success of their managed SD-WAN service offering moving forward? Presence or reach was the dominant response. This refers to being able to install SD-WAN software and adjunct virtual network functions (VNFs) across the network—from the customer premises equipment (CPE) through the public and private cloud. Being able to implement a single, vendor-agnostic orchestration system across a multi-vendor environment was number two on the vendor wish list. A single pane of glass controlling order management for both SD-WAN and other connectivity services came in last—but this is likely to be as much due to carrier conditioning as anything else. SPs are used to a cap-and-grow strategy for their product portfolio. The cost and complexity of integrating disparate systems is so great that it makes more sense to continue to treat them separately as one service grows in customers and revenue while the other one begins to decline.

Figure 2: Do you agree or disagree with the following technical forward-looking statements? To succeed in our managed SD-WAN services strategy/offering:



n=103

Source: Heavy Reading

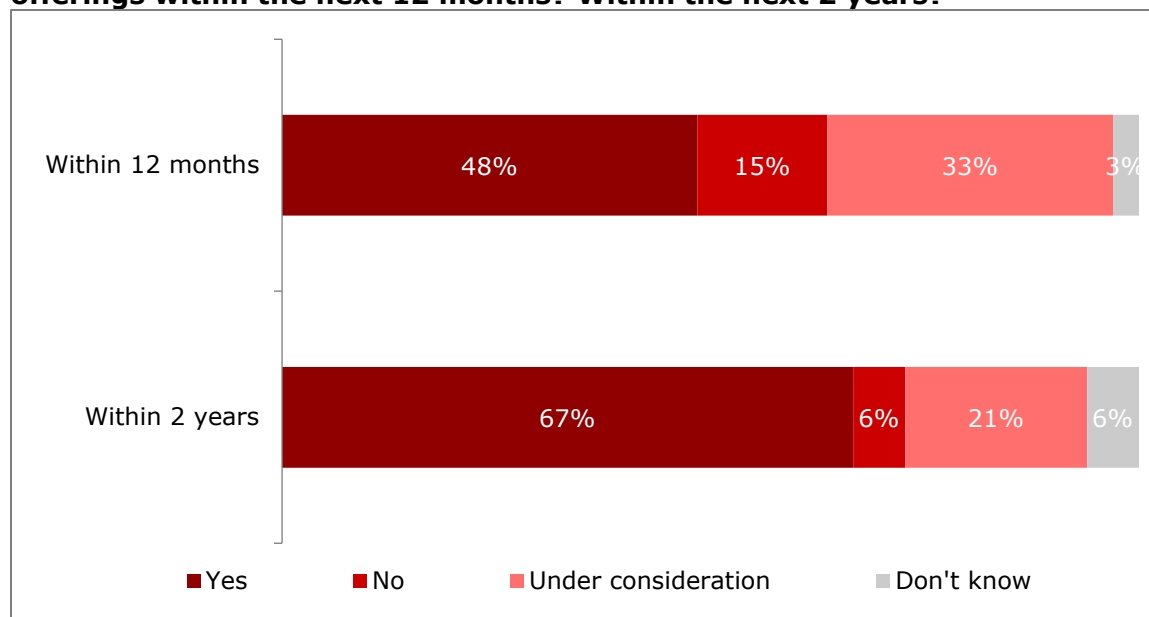
All these characteristics can affect customer experience. However, the choice with the most direct impact, a customer portal, nearly tied for last in “strongly agree” votes. But it dramatically outpaced the other possible selections in “agree” votes. These results indicate SPs know that a customer portal is an important feature of their service offering, but it is not paramount in the success of the offering.

When looking at respondents from companies with \$5bn or more in revenue, the first two line items swap places. Only 31% of these large telcos strongly agree with the first statement, while 48% strongly agree with the second. Do large telcos believe that the ability to deploy SD-WAN software throughout the network is table stakes while a unified orchestration system is anything but guaranteed? Heavy Reading thinks that is likely. The survey also shows that the large telcos are more likely to have three or more SD-WAN vendor solutions represented in their network, making a unified orchestration system that much more critical.

SD-WAN SECURITY—A MOVE TO THE CLOUD

The concept of the secure access service edge (SASE) was introduced in August 2019, less than a year and a half ago. Nevertheless, virtually all of Heavy Reading’s respondents either have plans to implement SASE within the next two years or are considering it. More and more enterprise workloads are skipping the centralized corporate data centers and are processed in the cloud as part of a software as a service (SaaS) offering or at the edge via a multi-access edge computing (MEC) solution.

Figure 3: Will your company add a SASE platform to your SD-WAN-related solution offerings within the next 12 months? Within the next 2 years?



n=99

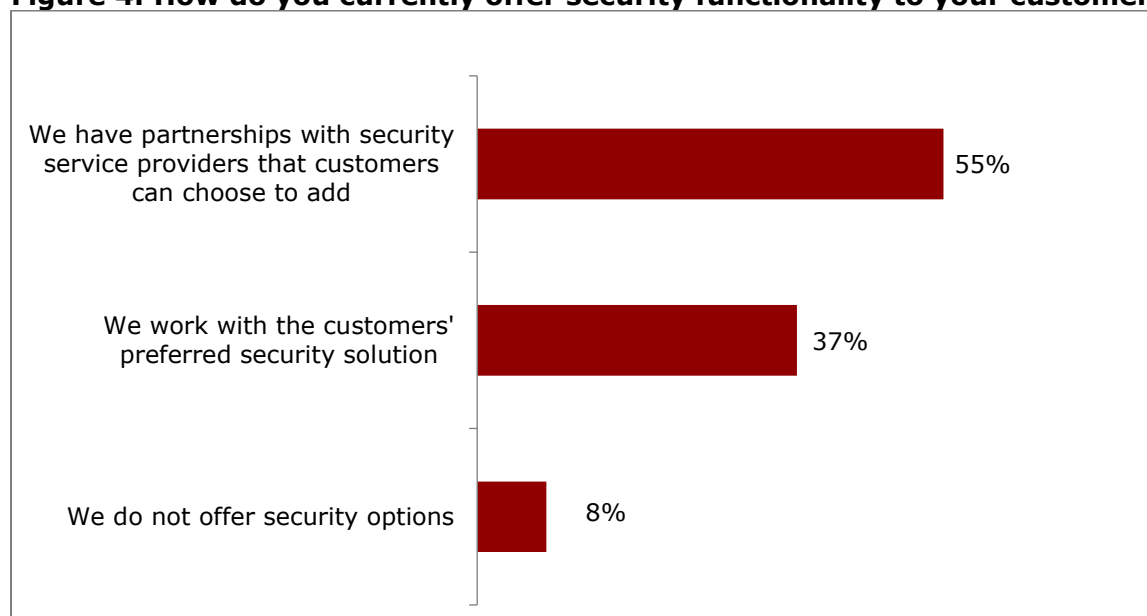
Source: Heavy Reading

SASE does not require SD-WAN, but the cloud-centric solutions are ideally suited to each other, combining SD-WAN with security and delivering them as a cloud service. Unlike a firewall, SASE links policy enforcement to the IP address or physical location of a device. As

a result, SPs and enterprises using a SASE platform can support zero-trust security on their SD-WAN service, ensuring consistent policy enforcement and security regardless of where or on what device the user is working. The SP is also able to implement content inspection—scanning active sessions for malware and sensitive content.

Although SASE has not been around for long, the consensus, among the surveyed SPs is that it is the future of security for SD-WAN networks. While anticipating the implementation of SASE solutions, Heavy Reading’s respondents are mostly relying on partnerships with existing security SPs for cloud-based or on-premises security solutions (see **Figure 4**). Over a third will incorporate the customer’s preferred security solution. Those that do not offer a security option are few and are likely to be smaller SPs, according to Heavy Reading’s demographic breakdown.

Figure 4: How do you currently offer security functionality to your customers?



n=99

Source: Heavy Reading

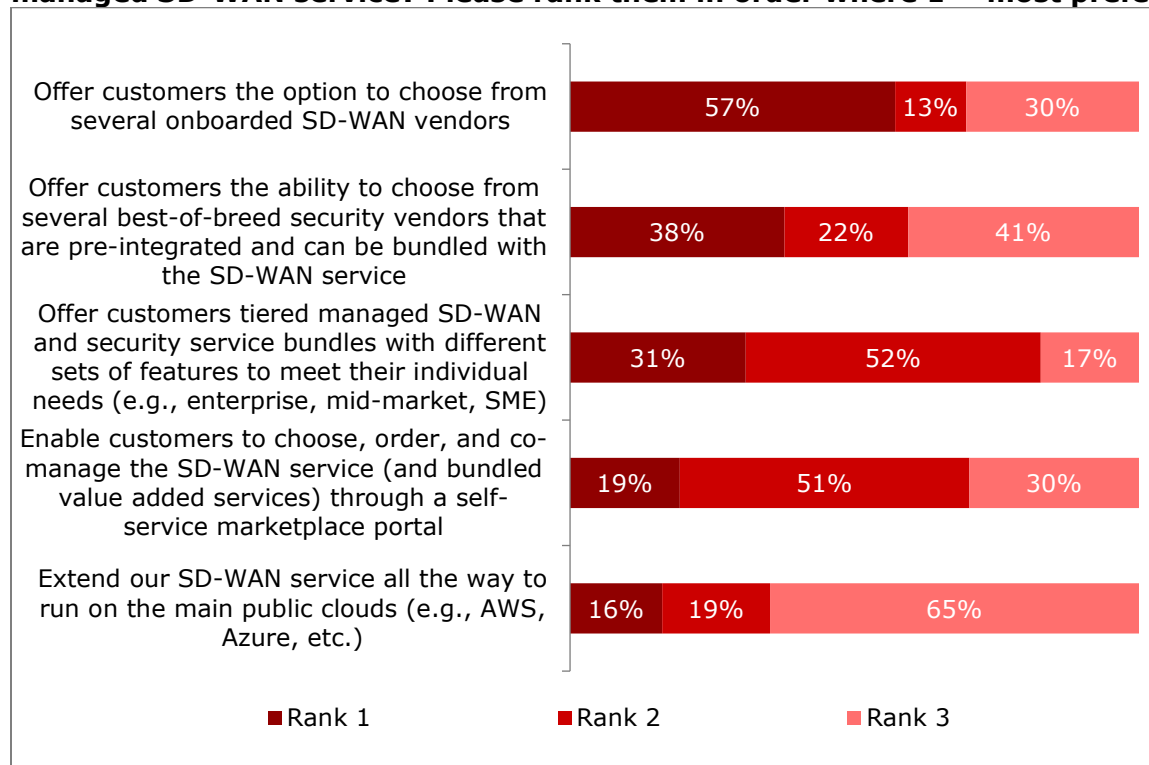
STANDING OUT IN THE CROWD

SPs are differentiating SD-WAN services in line with their standard practices—by enabling enterprise customers to choose either their preferred SD-WAN platform or their preferred security platform, or both. Given the complexities of supporting multiple platforms, together with the fact that they will soon be implementing cloud-based security via SASE, these top service differentiators may be short-lived.

Offering service bundles that are targeted at the specific needs of the customer elevates the conversation away from platform choices and toward the enterprise business needs. And this is certainly the direction in which valued SP partners want to take their relationship with the enterprise. In fact, service bundles—if the first and second ranked choices are combined—represent the most popular response from survey respondents, coming in a significant 13 percentage points higher than the next most popular differentiators—platform choice and customer portals.

A key use of WAN service customer portals in the past has been to monitor service-level agreements (SLAs)—which themselves are a challenge to implement in multilayer, multidomain, multicloud, and geographically dispersed SD-WAN networks. With this in mind, it is small wonder that customer portals do not rank higher as differentiators. Customer service portals allow managed service customers to monitor network and site performance. However, customer portals that enable the enterprise to not only monitor their SD-WAN service, but also add, modify, and delete sites score high on user satisfaction evaluations.

Figure 5: What are your top three preferred approaches for differentiating your managed SD-WAN service? Please rank them in order where 1 = most preferable.



n=100

Source: Heavy Reading

Respondents are least interested in extending their SD-WAN service to run on hyperscaler clouds such as Amazon Web Services (AWS) and Azure. SPs continue to be concerned that partnering agreements with the hyperscalers will ultimately result in them going direct to the enterprise after skimming high value services from the SP.

After a discussion of the SPs perspective on differentiators, it is easier to understand what they believe are the biggest challenges in delivering SD-WAN as a managed service. “Managing network performance across hybrid SD-WAN, MPLS, and IP VPNs” emerges as the most significant challenge. It has an even higher response rate, of 71%, if the pool is limited to SPs with over \$5bn in revenue.

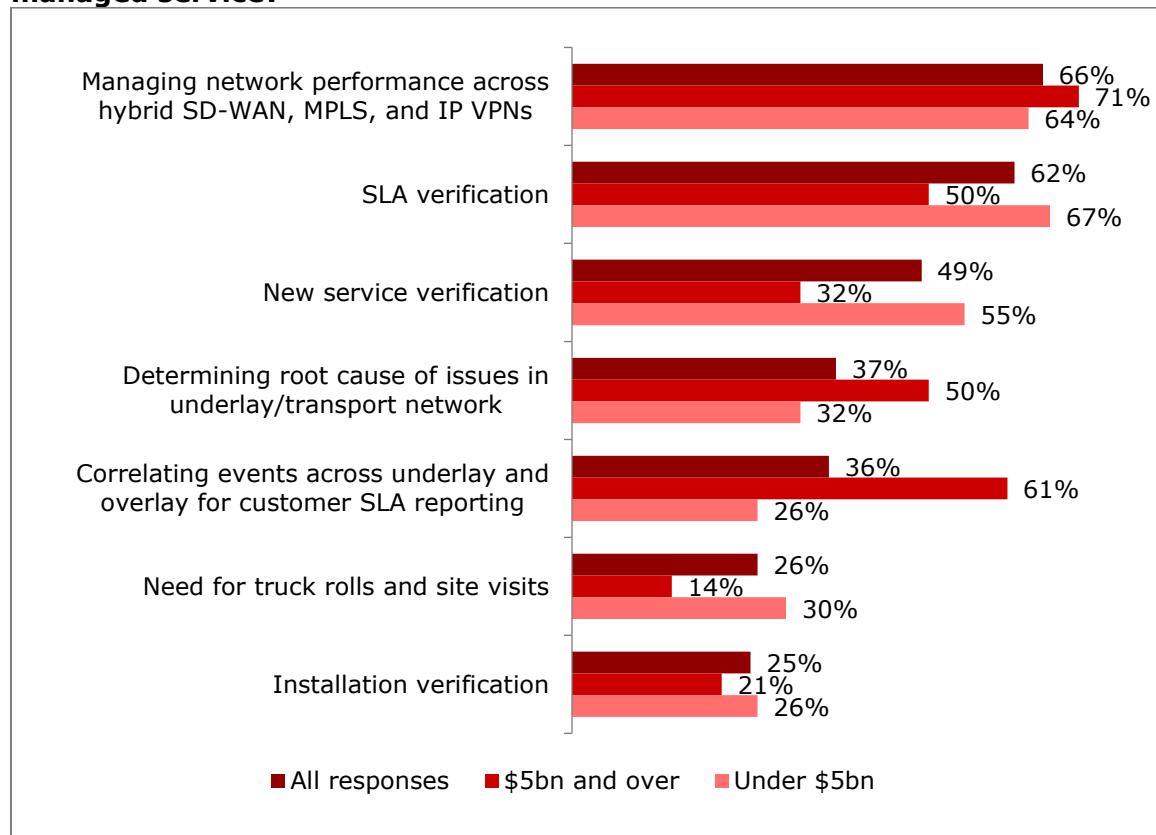
The other challenge where the response from \$5bn+ SPs was greater than that of the total survey population was the multidomain management challenge—“correlating events across underlay and overlay for customer SLA reporting.” 61% of large carriers noted this as a

concern compared to *only 26%* of those with revenue of under \$5bn. This response is related to the number two challenge identified—"SLA verification"—which requires the correlation of events across the overlay and underlay network. Multilayer root cause analysis is also connected with underlay/overlay SLA reporting, clarifying that the challenge lies not only with the SLA reporting side of the equation, but also with the multilayer root cause analysis side.

"New service verification" ranks third in Heavy Reading's list, with just under half of respondents citing it as a concern. It is clear that automation has permeated the entire SD-WAN service lifecycle. Heavy Reading anticipates this is a challenge that SPs will overcome through automation within the next 12 months.

Truck rolls and site visits are always a concern with the SPs due to the cost and time they incur. However, they rank low on Heavy Reading's list of challenges, along with installation verification. This is a testament to the degree of automation already available in the form of remote management and configuration in today's software-based SD-WAN solutions.

Figure 6: What are your three biggest challenges to delivering SD-WAN as a managed service?



n=101

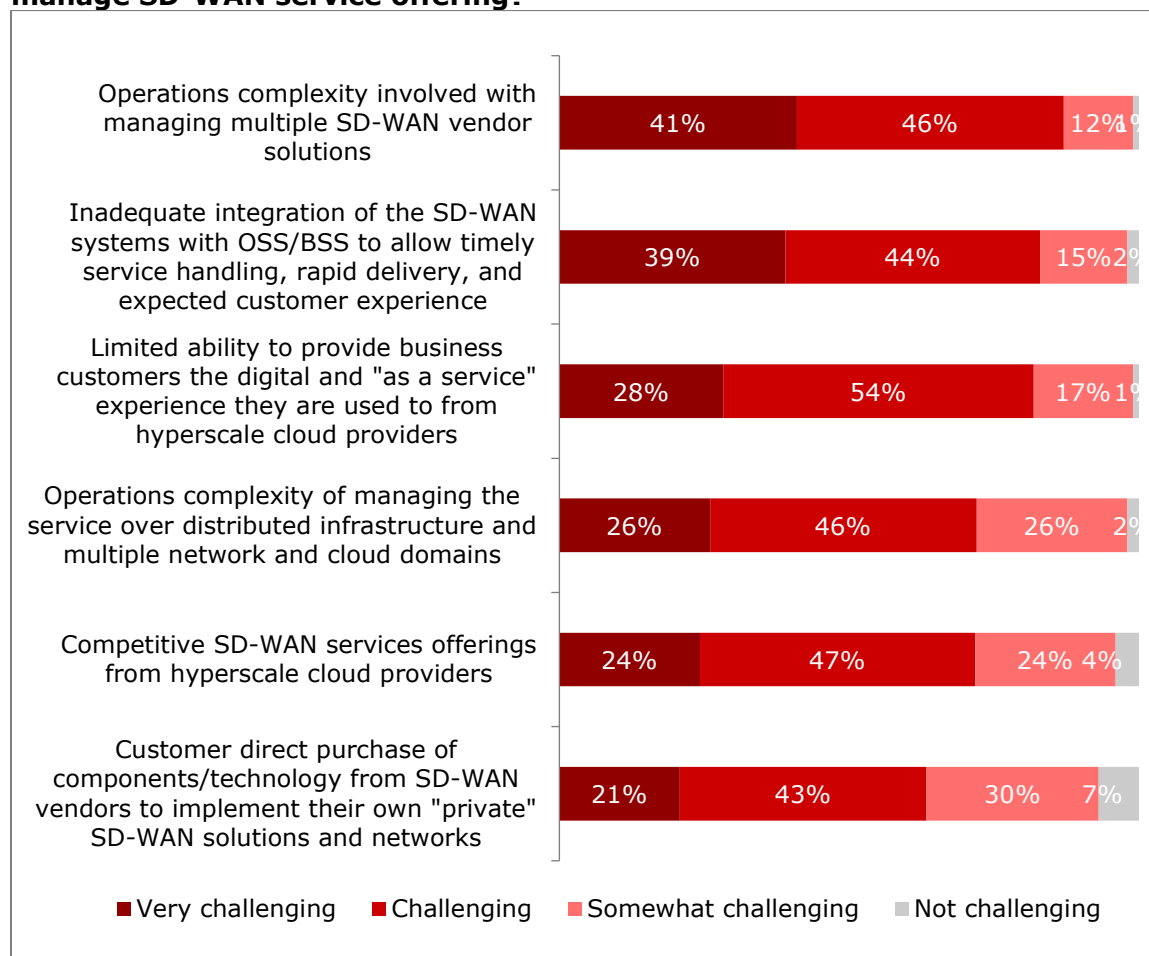
Source: Heavy Reading

MANAGEMENT AND ORCHESTRATION: A PERENNIAL CHALLENGE

The survey results confirm that management of SD-WAN services is a challenge for the SPs—from SLA verification to root cause analysis to underlay/overlay event correlation and managing network performance across hybrid network services. They also reveal that SPs believe a single orchestration system across SD-WAN platforms is required moving forward and that a single pane of glass for managing all WAN services is also important. How are SPs working toward these goals? What tools are they are relying on to see them into a new generation of SD-WAN services?

Heavy Reading asked survey respondents about the challenges they face in managing an SD-WAN solution (see **Figure 7**). Their response was loud: “everything is a challenge.” Each statement garnered a “very challenging” or “challenging” vote from the majority of respondents, ranging from 87% for the complexity of managing multiple SD-WAN vendor solutions to 64% for the difficulty of dealing with SD-WAN DIYers.

Figure 7: How challenging is each aspect below to your company’s ability to manage SD-WAN service offering?



n=101

Source: Heavy Reading

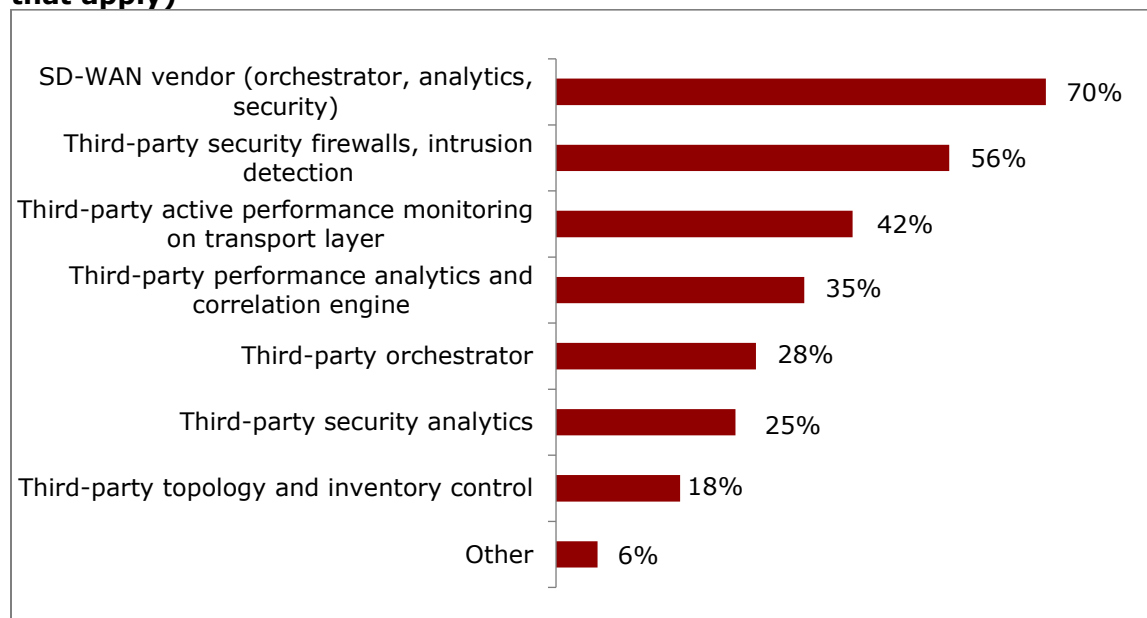
The respondents identified that supporting multiple SD-WAN solutions is their key challenge. However, the next two challenges had very similar scores. The lack of integration with operations/business support systems (OSS/BSS) for fast provisioning, real-time performance visibility, etc. affects the entire customer experience, playing into the hands of hyperscalers.

Providing a hyperscaler-like as a service experience was much less of a challenge to the larger Tier 1 operators—only 14% of which identified it as a “significant challenge,” compared to 34% for the remainder of respondents. The large Tier 1 operators have established partnerships with the hyperscalers to address this limitation. These partnerships are benefiting everyone today—customers, SPs, and hyperscalers. However, the carriers are worried, and rightly so, that while they may think of a product offering as along the lines of a build-manage-transfer project, the hyperscalers may think of it as a build-manage-retain-all-high-margin-value project. The likelihood of this happening is underscored by the second to last concern—“competitive SD-WAN service offerings from hyperscale cloud providers.” Although the hyperscalers do not have the beachfront property of SPs in terms of proximity to the customer, nor management and control of the transport services, they are more than capable of managing the SD-WAN and the workloads running over it. The only questions are: Do they want to? Do they believe that their strengths in centrally located hyperscale data centers will be diluted if they follow the trail of workloads that benefit from compute and storage capabilities at the edge of the network?

Three of the top four challenges address the difficulty of managing a highly distributed service across multiple platforms, networks, and cloud domains and integrating it into existing OSS/BSS. These are core challenges for the carriers every time they introduce a new service. How is SD-WAN any different and how are the SPs addressing these challenges? Heavy Reading identifies some of the technologies and strategies the SPs are bringing to bear on these challenges.

Notably, more than 60% of respondents use three or more different management tools to manage SD-WAN services, with 16% using five or more tools. What are these tools and how satisfied are the SPs with them? 70% of respondents rely on management solutions from the SD-WAN vendors—bundled, pre-integrated solutions that include orchestration, analytics, and the security. However, they are also likely to implement some management functions à la carte; SPs are most likely bring in a third-party, best-of-breed solution for security firewalls and intrusion detection. A specific security solution is also often requested by the enterprise, a request that SPs are motivated to honor to maintain the customer relationship.

Figure 8: What type of tools are you using to manage SD-WAN services? (Check all that apply)



n=102

Source: Heavy Reading

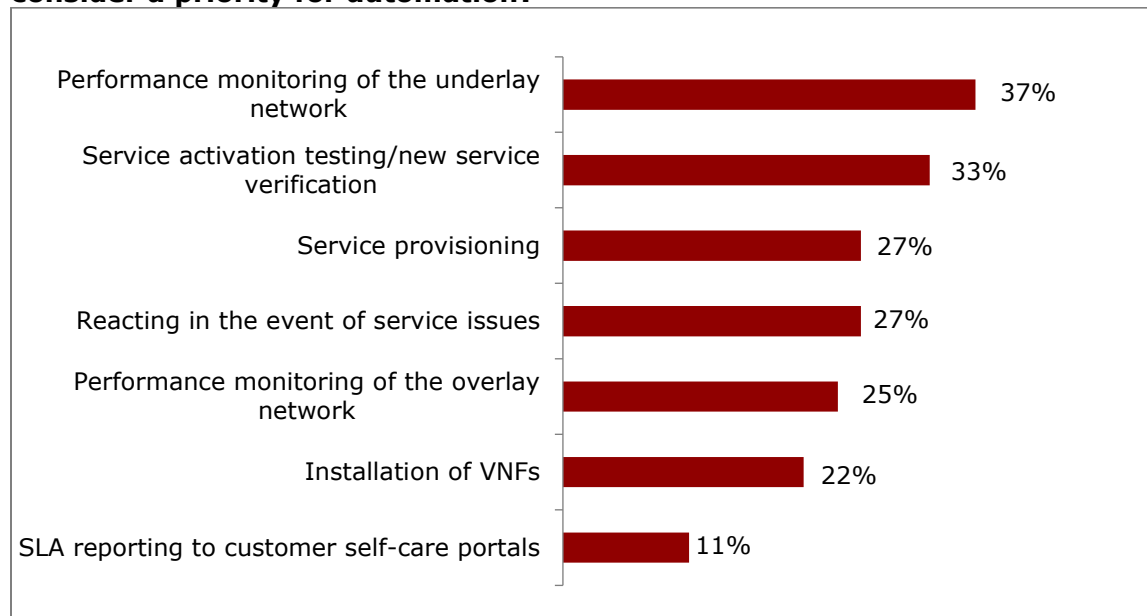
“Active performance monitoring on transport layer” and “performance analytics and correlation engine” are the next tasks most likely to be sourced separately from a third party. This is critical to get visibility into physical network performance, as well as SD-WANs, and to correlate events for customer reporting and SLAs. These are followed by “third-party orchestrator”—where the SP may decide that features such as pre-integrated VNFs, VNF orchestration, partner authentication, or cloud collaboration provide enough additional benefit to warrant going with a separate third-party orchestrator. “Third-party security analytics” are used to help keep up with the size and volume of cyberattacks. They can combine a big data platform with advanced analytics, threat detection, monitoring, and incident response. “Third-party topology and inventory control” allow SPs to use information on network topology and configuration to isolate network elements, understand their effect in the network, and correlate alarms and troubleshoot issues.

THE ROLE OF AUTOMATION

Reacting in the event of service issues is getting some focus by the SPs, with 27% indicating that it is an automation priority moving forward. Not surprisingly, “performance monitoring of the underlay network”—the thorn in the side of many an SP—heads the list in terms of priority. Automation of the overlay network is far down on the list since it is the task most likely to already be automated.

Service provisioning, verification, and activation—while they have been automated by over half of the survey base—are tasks that the remainder of the base identifies as a priority for automating.

Figure 9: Out of those tasks that are not fully automated, which two do you consider a priority for automation?



n=97

Source: Heavy Reading

The automation of SLA reporting captured the lowest number of responses. Heavy Reading suggests that one of the reasons for this result is that the automation of SLA reporting is dependent on other tasks that must be automated first. Accurate SLA reporting cannot be achieved without performance monitoring of the underlay network—the number one priority. When this is achieved, the importance of SLA reporting will rise in priority. Heavy Reading sees this as an opportunity for differentiation. With the growth in cloud applications, edge computing, critical Internet of Things (IoT) services, and network slicing, the customer must be able to make informed decisions that take into account all layers of the network. Accurate, multilayer SLA reporting can set an SP apart from the rest of the crowd.

CONCLUSIONS

Heavy Reading's survey results show that SPs believe SD-WAN will be a key tool to deliver on the demands of the network. However, many challenges and concerns remain:

- **Integrating management of the overlay and the underlay:** Throughout the survey, the difficulty of unified management, root cause analysis, and problem resolution of the combined overlay and underlay network emerged as a significant issue. It is one where the SPs could clearly benefit from an assist by their SD-WAN partner ecosystem.
- **Moving security to the cloud:** The debate, if any, is over: the carrier respondents are behind SASE and are planning their SASE implementations today. Many questions remain, however, regarding how to translate what is essentially a framework into deployments in a production network.

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- **Accelerating automation:** Service provisioning, testing, and verification are at the top of the list for further automation—but automation is key to all aspects of deploying and managing an SD-WAN service. As one of the operators reflected recently, automation is more important than either security or agility because it is the first step in rolling out a secure and agile service.
 - **Removing complexity from the network:** Despite the massive amounts of integration work most SPs have done on their service offerings, they are still looking to limit the number of SD-WAN solutions, security solutions, and management tools they employ within the SD-WAN service. They will not succeed, but maybe they can get some help. One of the SP's main jobs in a managed service is to remove complexity from the enterprise and take that complexity on themselves. As the network expands, mergers and acquisitions are made, and customer choices are taken under consideration, it is difficult for an SP of any scale to limit the portfolio of products available to the customer. It is, however, possible to adhere to standards, follow Metro Ethernet Forum (MEF) service standard specifications, adopt CI/CD methodologies and tools, implement standard APIs, and partner with solution providers that do the same.
 - **Implementing advanced features on customer portals:** Heavy Reading lists this last, not because it is least important, but because it is dependent on the resolution of the challenges mentioned above, most notably integrating management of the overlay and the underlay and accelerating automation. Many customers buy multiple services from the same SP—MPLS, SD-WAN, and other services. The SPs offer single sign-on portals that provide visibility into all services purchased by the enterprise, including the SD-WAN overlay. However, the utility of these portals can be greatly enhanced if SPs offer enterprises the ability to move, add, or change sites automatically. It can also be enhanced if SPs provide SLA reporting that encompasses the underlay network, as well as the overlay, and enable active monitoring of the network, in addition to passive monitoring, to determine current service availability or response time. By doing so, they enable real-time troubleshooting and network optimization. These capabilities can transform the utility of a customer portal and be a significant differentiator for the SP.

SD-WAN products and services continue to evolve. The challenges emerging today are not as focused on how to deploy or manage SD-WAN. Rather, they are focused on how to deploy services faster and how to manage SD-WAN better.

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We are committed to empowering our customers with the ability to see far and wide across their IT and network infrastructure and a microscopic ability to dive deep and understand the experience of every user, helping them to delight their own customers each and every time.

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ABOUT AMDOCS

Provided by Amdocs.

Amdocs' **Service and Network automation** solution ([NEO](#)) helps service providers successfully build and deliver their managed SD-WAN combined with security services. NEO simplifies and accelerates onboarding and integration of new vendors and partner solutions, new service offerings, service activation and fulfilment, and end-to-end service management and assurance. NEO includes unified inventory and resource management, as well as closed-loop operations for maximizing both network underlay and service overlay performance.

Our standard-based (ETSI, MEF, TMF and ONAP) solution converges open source and vendor-agnostic service models which reduce the complexity and cost of service lifecycle automation and orchestration of multi-vendor environments comprising SD-WANs and various VAS VNFs and CNFs, enabling service [innovation](#), differentiation, and agility.

Our solution's cloud-native, microservices-based architecture ensures the highest levels of scalability and operational efficiency, while integration with various infrastructures and [cloud](#) options enables SD-WAN and security network function deployment flexibility on customer premises, as well as on telco and public clouds.

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