SD-WAN STRATEGIES SURVEY REPORT 2019

Contents

Report Authors

Sterling Perrin
Principal Analyst
Heavy Reading

Sterling has more than 15 years' experience in telecommunications as an industry analyst and journalist. His coverage areas at Heavy Reading are optical networking and SDN. He also authors Heavy Reading's Packet-Enabled Optical Networking Market Tracker and Next-Gen Core Packet-Optical Market Tracker.
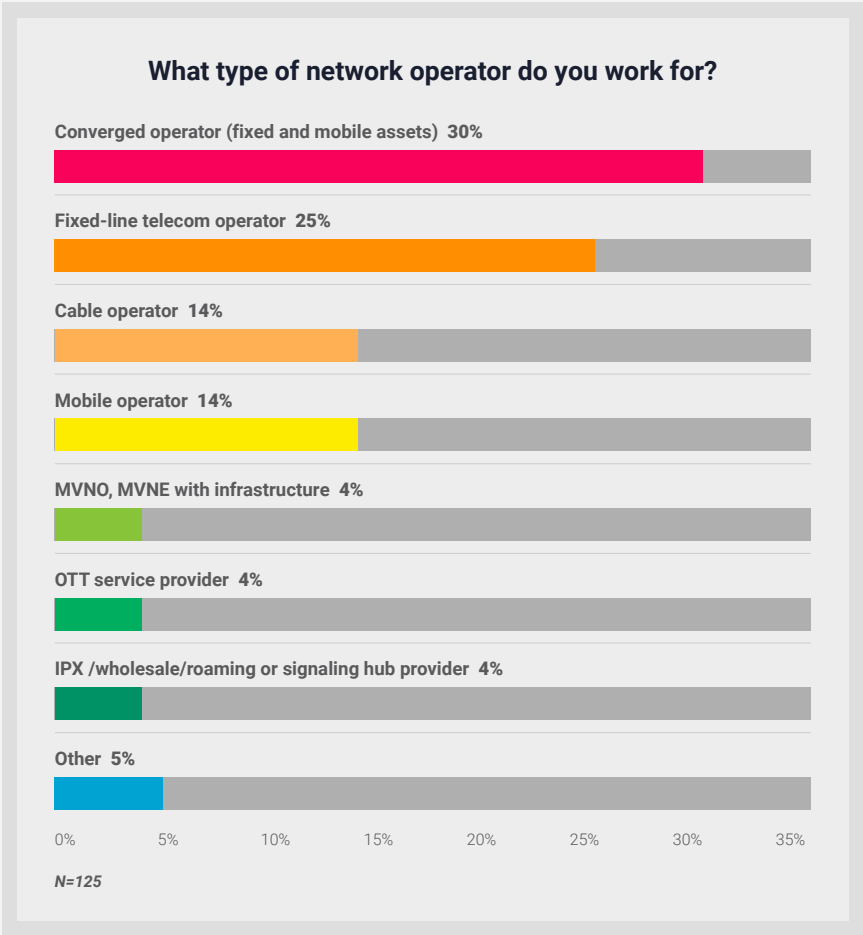
Jim Hodges
Chief Analyst
Heavy Reading

Jim leads Heavy Reading's research on the impact of the NFV-enabled virtualized cloud on the control plane and application layers, both in the fixed and mobile core and at the enterprise edge. Jim also focuses on the security impacts that cloud and emerging cloud-based technologies such as 5G introduce from a cyber-threat detection perspective, as well as the business opportunities associated with delivery of security capabilities via a managed services model.

Introduction

Light Reading/Heavy Reading and MEF are excited to share the results of our second annual joint global SD-WAN services survey. Thanks to MEF and our industry sponsors, we can deliver the full results to the industry to help network operators make the best decisions for their own SD-WAN strategies moving forward.

The study focuses specifically on managed software-defined wide area network (SD-WAN) services offered by network operators to enterprise customers. Working closely with our sponsors, we split the survey into three sections:

• **Orchestration for Managed SD-WANs**

• **Application Security for SD-WANs**

• **Standardization of SD-WANs**

What type of network operator do you work for?

Converged operator (fixed and mobile assets) 30%

Fixed-line telecom operator 25%

Cable operator 14%

Mobile operator 14%

MVNO, MVNE with infrastructure 4%

OTT service provider 4%

IPX /wholesale/roaming or signaling hub provider 4%

Other 5%

0% 5% 10% 15% 20% 25% 30% 35%

N=125

In what region is your company headquartered?

- NA.....................................48%
- EMEA 30%
- AP.....................................13%
- ROW..................................9%
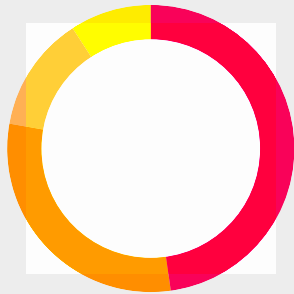
N=125

What is your company's annual revenue?

More than $5 billion 30%

$1 billion to $5 billion 19%

$500 million to $999 million 15%

$200 million to $499 million 13%

$50 million to $199 million 15%

Less than $50 million 8%

0%   5%   10%   15%   20%   25%   30%   35%

N=125

We conducted the survey in November 2019 and solicited responses by email invitations to Light Reading's database of network operators worldwide. Additionally, MEF pushed out the survey to their membership. After removing incomplete surveys and verifying respondents as working for network operators, we ended up with the 125 qualified respondents that make up the final survey group. Of the total, 52 survey respondents were MEF members, representing 42% of the total.

At 30%, the majority of operators surveyed work for converged network operators, followed by fixed line-only operators at 25%. Cable operators and mobile-only operators each accounted for 14% of the survey group. Beyond these categories, no other individual category scored higher than 4%.

North American operators made up the majority of survey respondents, accounting for 48% of the total (primarily from the US). Following North America, EMEA operators accounted for 30% of the survey group. Operators from the Asia-Pacific region comprised 13% of respondents, and Rest of World operators were 9%. >

What is your primary job function?

Engineering 33%

Network planning 14%

Corporate management 11%

Operations/services 11%

Sales & marketing 10%

Consulting 6%

Operations/transmission 3%
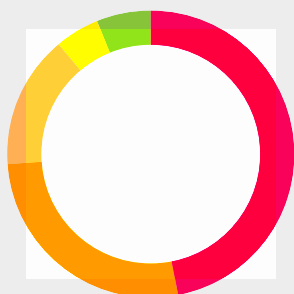
Customer relationship management 1%

Other 10%

0%   5%   10%   15%   20%   25%   30%   35%

N=125

Which of the following statements best matches your company's current position regarding SD-WAN? (Full Survey Group)

- ● **Already implemented commercial SD-WAN**......... 47%
- ● **Now building commercial SD-WAN**......... 27%
- ● **Plan to implement commercial SD-WAN within 12 months**.............. 15%
- ● **Plan to implement commercial SD-WAN in 12 to 24 months** 5%
- ● **Have yet defined the timeline** 6%

N=125

A broad mix of company sizes is represented in the survey group, though tier 1 operators generating $5 billion or more in annual revenue make up the largest share (at 30% of the total). Large operators generating $1-5 billion in annual revenue accounted for 19% of respondents, followed by operators generating $500-999 million annually (15%) and operators making $200-499 million (13%). Finally, smaller operators making less than $200 million per year accounted for 23% of the survey.

For the respondents individually, technical roles dominate. At one-third of respondents, the largest percentage were in engineering roles, followed by network planning (14%), and corporate management and operations/services (each at 11%). Sales and marketing employees accounted for 10% of respondents. Beyond these roles, no other job functions received a double-digit share.

### THE STATE OF MANAGED SD-WAN ADOPTION

After several years of hype, operators are moving aggressively to roll out commercial SD-WAN services. In our survey, nearly half (47%) reported that they have already implemented commercial SD-WANs and an additional 27% reported that they are now building out their commercial services. An additional 15% expect to implement SD-WANs within the next 12 months while just 5% expect commercial rollouts in the next one to two years.

While the results indicate strong SD-WAN rollouts by service providers overall, the implementations by the MEF member subset of the survey group are especially aggressive. More than three-quarters (76%) of MEF members surveyed reported that they have already implemented commercial SD-WANs, while an additional 8% reported that they are now building out their commercial services.

The results show that MEF members are indeed leading adopters in SD-WAN managed services. Despite strong initial rollouts, we are still in early days of commercialization.

Which of the following statements best matches your company's current position regarding SD-WAN? (MEF Members Only)
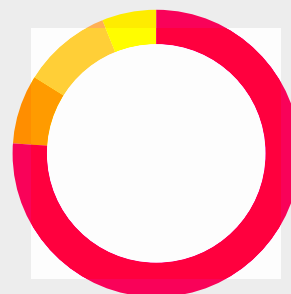
- ● **Already implemented commercial SD-WAN**......... 77%
- ● **Now building commercial SD-WAN** 8%
- ● **Plan to implement commercial SD-WAN within 12 months**.............. 10%
- ● **Have yet defined the timeline** 6%

N=52

What percentage of your company's overall enterprise WAN revenue do you think SD-WAN will account for in the following years?

	2019	2020-2021	2022-2023
Less than 10%	65%	31%	10%
10%-29%	23%	40%	42%
30%-49%	6%	20%	28%
50%-70%	4%	6%	14%
70%+	2%	2%	7%
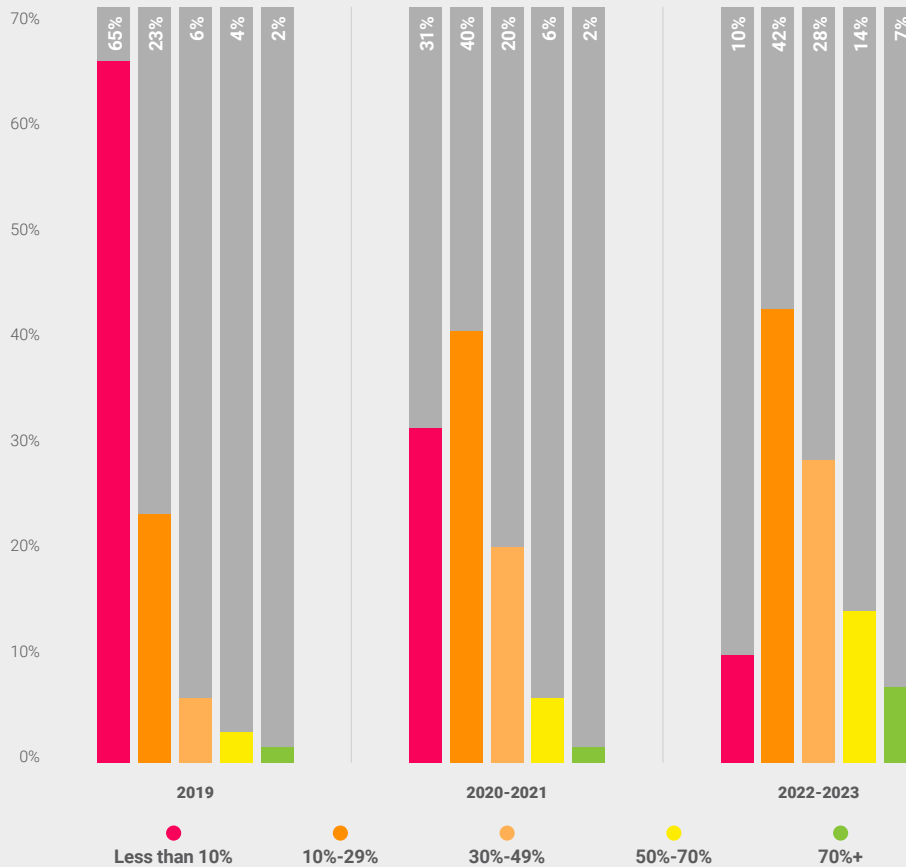
N=125

Nearly two-thirds (65%) of operators surveyed reported that SD-WANs will account for less than 10% of enterprise WAN revenue in 2019, but that share is expected to increase in the coming years. Forty percent of respondents expect that SD-WAN's share of enterprise revenue will increase to 10-29% in the 2020-2021 timeframe. And more than one quarter (28%) of survey respondents believe that SD-WAN will generate more than 30% of enterprise revenue during those years.

Looking out to 2022-2023, expectations are even more optimistic. During this timeframe, nearly half of respondents (49%) expect that SD-WANs will account for more than 30% of overall enterprise revenue. For 21% of respondents, SD-WAN is expected to account for at least half of their enterprise business.

The following sections of this report provide a deeper dive into service provider plans and expectations for SD-WANs with a focus on the crucial areas of SD-WAN orchestration, application security, and standardization and certification. In total, the results paint a picture of a promising emerging market on which service providers have placed high hopes as a top generator of revenue growth both in itself and as a beachhead for adding a host of virtualized networks functions and other value-added services. ∎

ORCHESTRATION FOR MANAGED SD-WANS

KEY TAKEAWAYS

- More than three quarters of respondents reported that a single orchestrator across SD-WAN vendors is at least "important" for them, with 22% of respondents reporting that a single orchestrator across SD-WAN vendors is "critical" for their strategy.

- Despite the greater complexity, 48% of operators surveyed reported they expect to see multi-vendor SD-WANs per customer. Of the remainder, 32% reported they do not expect multiple SD-WANs within a single enterprise and 20% said they are still deciding. The survey results indicate that some level of multi-vendor interoperability within a single enterprise customer will likely be required for many operators.

- Concerns about SD-WAN complexity are top of mind as threats to operators' SD-WAN strategies, according to our survey. Complexity of managing a multi-vendor ecosystem topped the list of foreseen threats, followed by the complexity of managing a multi-cloud ecosystem.

A Mix of SD-WAN Deployment Options

At this early stage, a number of different deployment options have emerged for operators to offer managed SD-WAN services to their enterprise customers. Possible options include universal CPEs (uCPEs) deployed on customers' premises, uCPEs based in either telco or private clouds, bare metal CPEs deployed on customers' premises, and virtualized functions housed in public clouds.

To better understand operator preferences among the various deployment models, we asked service providers to rate the relevance of these SD-WAN deployment scenarios ranging from "critical," at the high end, to "not important at all," at the low end. The results were fairly mixed across all options, though some differences in priorities were evident. Sixty-eight percent of respondents rated on-premises uCPE as at least "important" – the highest percentage of all the options, with 20% rating the option as "critical." On the other end, the public cloud scenario was selected as at least "important" by just 48% of the survey group, with only 14% viewing public cloud as "critical." Finally, the bare metal CPE on-premises was rated as "critical" by the highest percentage of respondents (selected by 23%), even as a high percentage also selected this option as only "somewhat important" or as "not important at all."

When it comes to managed SD-WAN solution models, operators' views are decidedly mixed. In our survey, 40% of respondents said they intend to employ a mixed model, in which they procure SD-WAN products from individual vendors, rely on the SD-WAN vendors' VNF ecosystems, and use service orchestration to manage the multi-vendor SD-WAN service. Further, regarding the two ends of the spectrum – the full turn-key approach and the full DIY approach– the respondent base was nearly evenly divided. Thirty-two percent said they prefer a turn-key operation with SD-WAN, VNFs, hardware and orchestration all sourced from the same vendor. And 28% said they prefer a DIY model in which the
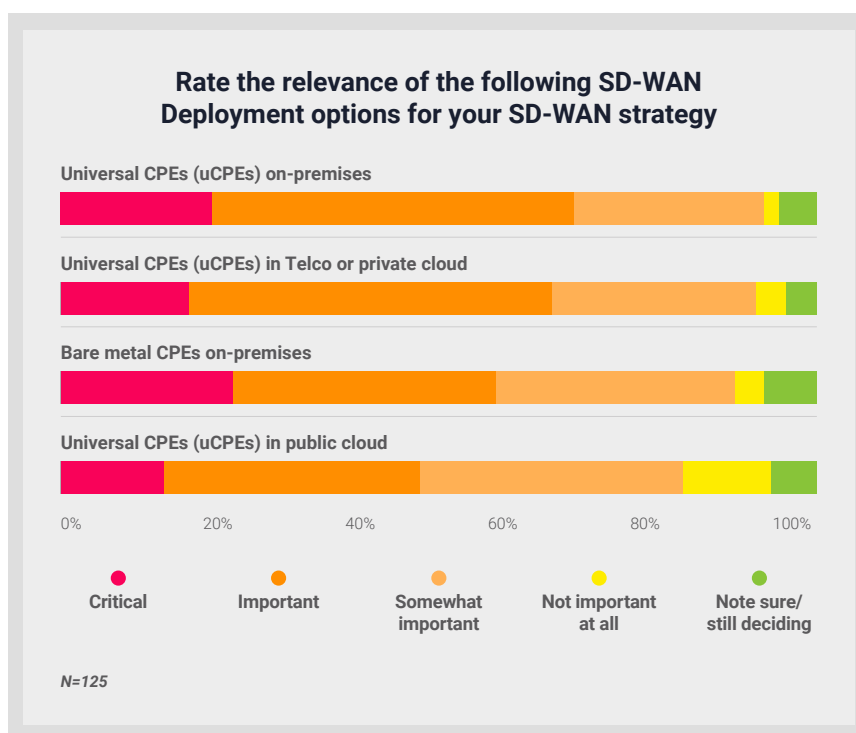
operator sources all of the components individually and uses an orchestrator to manage them all.
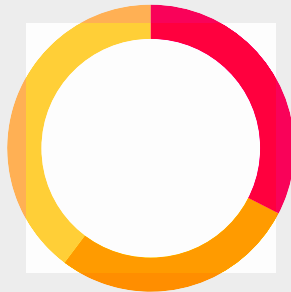
TIME TO FOCUS ON ORCHESTRATION

In a multi-vendor environment of SD-WANs and various VNFs, the service orchestration function is essential to operator deployments – as indicated in the results above. We asked operators to rate the importance of having a single orchestrator across their SD-WAN vendors, as opposed to using separate VNFs managers for each vendor. More than three quarters of

respondents (77% of the survey group) reported that a single orchestrator across SD-WAN vendors is at least "important" for them, with 22% of respondents reporting that a single orchestrator across SD-WAN vendors is "critical" for their strategy. At 20%, a minority of the survey group reported that a single orchestrator is only "somewhat important" and just one percent said that a single orchestrator is "not important at all." Multiple options exist for multi-vendor deployments in managed SD-WANs.

The most common scenario for operators is having enterprise customers that prefer different SD-WAN vendors. >

Rate the relevance of the following SD-WAN Deployment options for your SD-WAN strategy

Universal CPEs (uCPEs) on-premises

Universal CPEs (uCPEs) in Telco or private cloud

Bare metal CPEs on-premises

Universal CPEs (uCPEs) in public cloud

0%   20%   40%   60%   80%   100%

● Critical   ● Important   ● Somewhat important   ● Not important at all   ● Note sure/ still deciding

N=125

Which SD-WAN solution model suits your plan the most?

- ● **Turn-key:** procure from a vendor that offers a turn-key service including SD-WAN VNFs, uCPEs, orchestration........... **32%**
- ● **DIY:** Build a telco cloud, an ecosystem of enterprise VNFs (including SD-WAN), and use an orchestrator and automation tools to manage the ecosystem................... **28%**
- ● **Mixed:** Procure from individual SD-WAN vendors, rely on their ecosystem of enterprise VNFs, and use a service orchestrator to manage a multi-vendor SD-WAN service.. **40%**

N=123

How important is it to have a single orchestrator across SD-WAN vendors, as opposed to a separate, proprietary VNF manager per vendor?

- ● **Critical** **22%**
- ● **Important** **55%**
- ● **Somewhat Important**......... **20%**
- ● **Not important at all** **1%**
- ● **Not sure/Still deciding**......... **1%**

N=124

Thus, enterprise customer A uses SD-WAN vendor A, and enterprise customer B uses SD-WAN vendor B. Here, operators use orchestration to manage across the various deployments and, as indicated, seek to use a single orchestrator for this function.

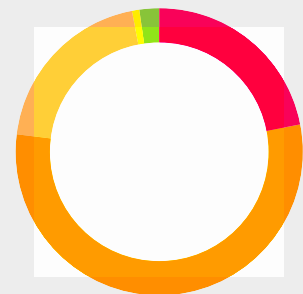Additionally, there is a deeper degree of multi-vendor deployment in which multiple SD-WAN vendors are used within a single enterprise customer – adding a greater level of complexity for the operator that would manage these SD-WAN deployments. Interestingly, and despite the greater complexity, 48% of operators surveyed reported they expect to see multi-vendor SD-WANs per customer. Of the remainder, 32% reported they do not expect multiple SD-WANs within a single enterprise and 20% said they are still deciding. The survey results indicate that some level of multi-vendor interoperability within a single enterprise customer will likely be required for many operators.

Do you expect to use multiple SD-WAN vendors per enterprise for large enterprise customers?

- ● **Yes**..................................... **48%**
- ● **No** **32%**
- ● **Not sure/undecided**........... **20%**

N=124

Just over three-quarters of operators surveyed (76%) expect to bundle private networks with their SD-WAN services, including networks for factories, campuses and others. Following private networks bundles, VPNs or similar security services ranked second (selected by 66% of operators), following by unified communications (selected by 58%). Mobile workforce ranked last among the bundle options, and was selected by 46% of respondents.

MANAGING COMPLEXITY IS KEY

Concerns about SD-WAN complexity are top of mind as threats to operators' SD-WAN strategies, according to our survey. Complexity of managing a multi-ven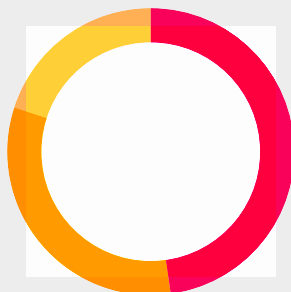dor ecosystem topped the list of foreseen threats, followed by the complexity of managing a multi-cloud ecosystem. Following these two complexity challenges, competition fears form the next tier of challenges.

The shifting market dynamic from connectivity to applications (allowing vendors to sell direct) ranked third, while competition from SD-WAN vendors selling direct ranked fourth.

Encouragingly for the market, the two economics issues we presented to respondents both ranked at the bottom of the threats list. The economics of multi-vendor SD-WANs ranked fifth out of six, and limited enterprise demand for SD-WANs was at the bottom. ■
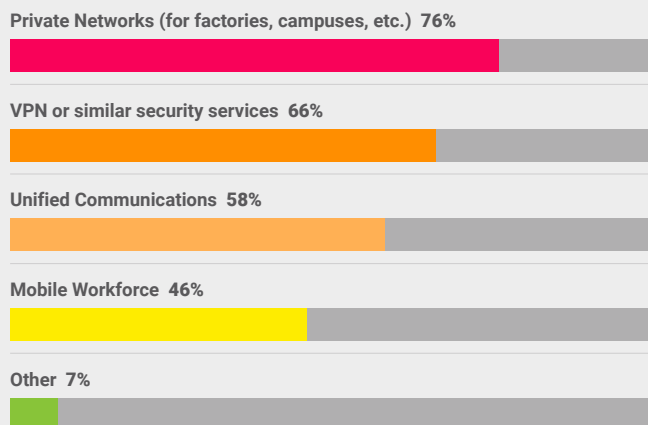
Which adjacent enterprise services do you plan to bundle with SD-WAN service?

Private Networks (for factories, campuses, etc.) 76%

VPN or similar security services 66%

Unified Communications 58%

Mobile Workforce 46%

Other 7%

N=123

Please rank the threats you foresee for your SD-WAN strategy

| Threat	Overall Rank	
Complexity of managing a multi-vendor ecosystem	1	SCORE: 511
Complexity of managing a multi-cloud SD-WAN deployment	2	SCORE: 477
The SD-WAN entry point shifts from connectivity to enterprise applications, enabling vendors to sell direct	3	SCORE: 405
SD-WAN vendors selling direct to enterprises	4	SCORE: 398
Economics of a multi-vendor SD-WAN offering	5	SCORE: 346
Limited enterprise demand for managed SD-WAN services	6	SCORE: 267

N=123

SD-WAN is an opportunity for service providers to expand their product portfolio and revenues through both connectivity and value-added services. The first wave of SD-WAN deployments were single vendor SD-WAN platforms, but the second wave of SD-WAN deployments is truly a multi-domain game. In this multi-domain scenario, it's not only necessary to orchestrate underlay and overlay networks, but also to provide full visibility of an end-to-end service. Enterprise services can be located either on-premises or on a cloud-based platform (enterprise private cloud, a telco cloud, or a public cloud).

Ericsson considers a model-driven approach to ensure better scalability and vendor flexibility. It incorporates open standards and tracks ongoing efforts by the Linux Foundation, ETSI, TM Forum, and MEF. Ericsson defines an orchestration strategy that accommodates both hardware and software platforms and integrates with an NFV infrastructure that supports OpenStack-based, container-based or bare-metal applications. It also built a closed-loop automation that continually monitors the health of the overall system, across multiple service domains.

Ericsson Dynamic Orchestration enables rapid deployment for service providers and consists of components for orchestration, assurance, analytics, inventory, network management and test automation. New VNFs can be easily onboarded thanks to our ability to manage the full lifecycle of VNFs, with integrated test automation for seamless and reliable deployments, and closed-loop assurance to ensure ongoing smooth operation. With our platform capabilities, service providers can build out bundles of SD-WAN services, while extending value with a full-stack NFV platform that can span beyond SD-WAN into multiple domains.
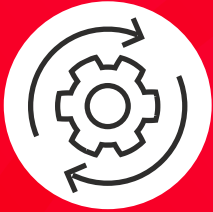
SD-WAN: COMMERCIALIZING OPERATIONAL EFFICIENCY, SECURITY AND VALUE-ADD

KEY TAKEAWAYS

- SD-WAN growth is both WAN operational efficiency and VAS service driven

- Security is a leading VAS service

- One of the reasons for SD-WAN security growth is access to a flexible reference architecture deployment model

- Flexibility will continue to be vital going forward as SD-WAN continues to evolve and adopts a greater measure of automated centralized control and reporting

- SD-WAN equipment purchase decision makers vary depending on which functions SD-WAN is being deployed to support (e.g. WAN vs. VAS services)

FORTINET

Start with Operational Efficiency but don't forget services

In many respects, the rise of SD-WAN can be attributed to the fact that it represents a more agile and operationally efficient reference architecture. However, the service aspects are also important, since SD-WAN by nature was designed to be an extensible and flexible service delivery architecture.

These points were reinforced when we asked service providers to rank SD-WAN capabilities when introducing commercial SD-WAN services. As shown in the figure, operational efficiency scored highest in the "critical" band – at 46%. However, business impacts are also critical to SD-WAN commercial success, which is why business model flexibility (36%), VaS support (29%), and flexible licensing and pricing models (25% and 22% respectively) also garnered strong support in aggregate "critical" and "important" scoring.

Another key indicator of the importance of services was noted when asked service providers to rank SD-WAN service implementation priorities. As shown in the figure below, not surprisingly WAN-based VAS ranked the highest (43%) in terms of already implemented services. But in many respects, the key observation here is that security (40%) has also developed into a strategic VAS implementation imperative. This is confirmed by the almost identical scoring of WAN and Security based on "already implemented" and "implementing now" scoring levels (WAN = 77% and Security = 76%).

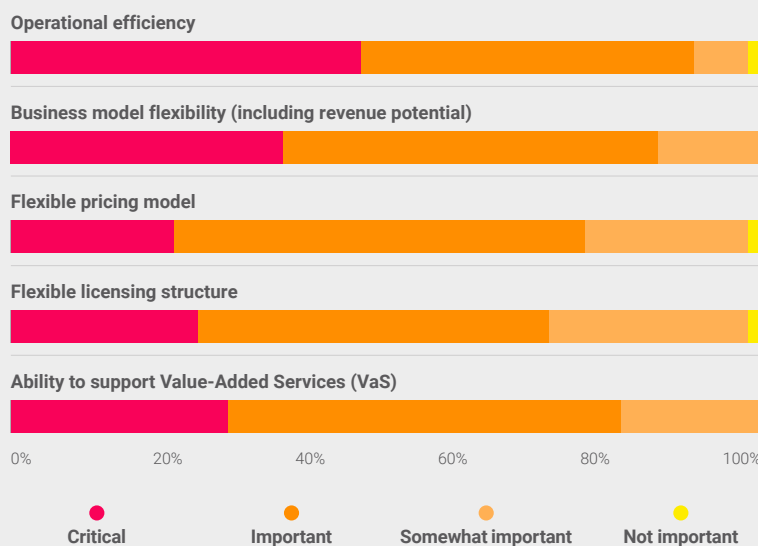## SD-WAN SECURITY ARCHITECTURE PREFERENCES: ALL GOOD

Given the importance of security in a value-add context and given SD-WAN VAS services by default address a broad

market, intuitively it stands to reason that a flexible security architecture is vital to meeting all security demands. This theory was validated when we asked service providers their preferred SD-WAN security architecture.
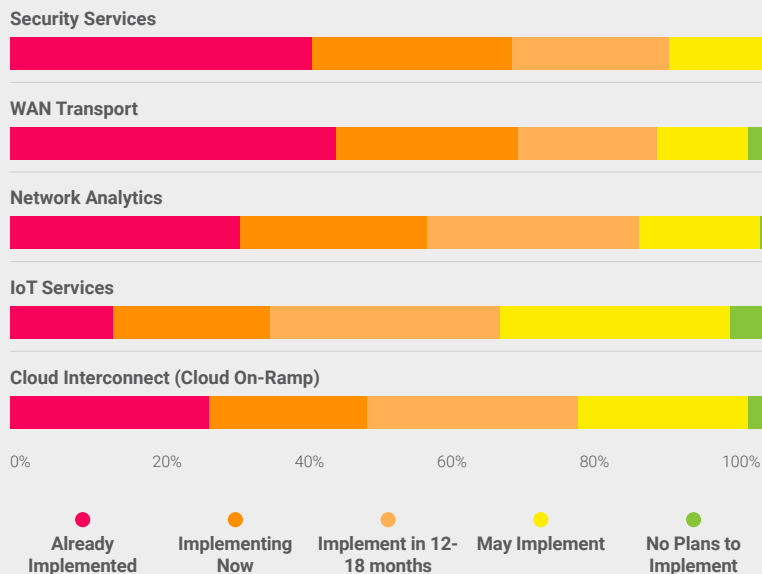
As illustrated in the figure below, essentially all the security architecture options from the integrated next-gen firewall (30%), to the uCPE option with firewall VNFs (26%), to cloud-based security (23%), to even SD-WAN paired with a next-gen firewall (21%) are relevant. >

> "DECISION MAKERS CAN VARY DEPENDING ON WHETHER THE SERVICE PROVIDER IS DEPLOYING SD-WAN TO SUPPORT ONLY BASIC WAN FUNCTIONALITY OR IF **THERE IS ALSO A STRONG FOCUS ON VAS SECURITY-BASED FEATURES**"

How important are the following capabilities when introducing a new commercial SD-WAN service solution?

Operational efficiency

Business model flexibility (including revenue potential)

Flexible pricing model

Flexible licensing structure

Ability to support Value-Added Services (VaS)

0%   20%   40%   60%   80%   100%

● Critical   ● Important   ● Somewhat important   ● Not important

FORTINET

What Value-Added Services are you planning to offer on top of your SD-WAN solution?

Security Services

WAN Transport

Network Analytics

IoT Services

Cloud Interconnect (Cloud On-Ramp)

0%   20%   40%   60%   80%   100%

● Already Implemented
● Implementing Now
● Implement in 12-18 months
● May Implement
● No Plans to Implement

What is the most desirable security architecture for SD-WAN service delivery?

SD-WAN with integrated next-gen firewall 30%

uCPE with SD-WAN and Firewall VNFs chained together 26%

SD-WAN with cloud-based security services 23%

SD-WAN with third party next-gen firewall 21%

While this input could be interpreted as inconclusive, Heavy Reading believes the close weightings of the various options accentuates that SD-WAN security represents a strong value proposition since it is not in any way encumbered by the need to deploy a single architecture with entrenched limitations. Instead, what seems to cause enterprise customers the greatest level of angst are the costs associated with WAN operation (34%) as networks scale and application visibility and control (24%), which is logical given the application-centric world service providers now find themselves in.

MANAGEMENT, MONITORING, REPORTING, AND PROVISIONING IN THE AGE OF AUTOMATION

There is little if any dispute, that the continued evolution of SD-WAN will demand the adoption of advanced management and automation capabilities as this focus on application-centric delivery sharpens commercially.

Amongst these as illustrated below, based on "critical" response levels, service providers are focusing on centralized management and monitoring (49%), reporting and analytics (38%), and zero-touch provisioning (33%). The priorities make sense on several levels.

For instance, all three capabilities will assist service providers in addressing enterprise customer concerns

What is the most common concern enterprises raise when considering the purchase of SD-WAN services?

Value	Percent	
Application visibility and control	24.0%	COUNT: 30
WAN operational costs	33.6%	COUNT: 42
Security	17.6%	COUNT: 22
Monitoring and management	12.8%	COUNT: 16
Adopting cloud applications and workloads	12.0%	COUNT: 15
Totals		COUNT: 125

![Fortinet logo]

How important are the following management and automation capabilities to your company in the operation of a commercial SD-WAN solution?

Centralized management and monitoring

Reporting and analytics

Zero-touch provisioning

Role-Based Access Controll (RBAC)

0%   20%   40%   60%   80%   100%

● Critical   ● Important   ● Somewhat important   ● Not important

Who is the key SD-WAN purchase decision maker in your organization for the following functions – Network Administration – Security Monitoring and Enforcement – Cloud Adoption?

	Network Administration	Security Monitoring and Enforcement	Cloud Adoption
Network Operations Leader	Rank 1 (score 302)	Rank 2 (score 275)	Rank 1 (score 273)
Security Operations Leader	Rank 3 (score 208)	Rank 1 (score 284)	Rank 3 (score 217)
Development Operations Leader	Rank 2 (score 228)	Rank 3 (score 191)	Rank 2 (score 254)

related to WAN operational costs and application visibility and control noted above. Additionally, all these capabilities, including role-based access control (RBAC), will be foundational to enabling the adoption of cloud-based automated processes and access-based security policy.

SD-WAN PURCHASE DECISION MAKERS: HORSES FOR COURSES

The phrase "horses for courses" is frequency used in recruiting circles to reflect that it's important to consider the job requirements when selecting the right person to execute these requirements. SD-WAN purchase decision makers also adhere to this axiom. For example, when we asked service providers to identity primary decision makers, as noted in the table below it largely depended on the requirements.

In the case of making SD-WAN purchasing decision for Network Administration, the Network Operations leader attained the highest ranking (scoring 302 points), while for Security Monitoring and Enforcement the Security Operations leader attained the highest score (284), followed closely by Networks Operations leader (275). In the case of making cloud-based SD-WAN decisions, here again the Network Operations leader attained the highest scoring by a slight margin (273) followed by the DevOps leader (254)

Based on the range of inputs, while the Network Operations leader generally stands ahead of its peers in two of three categories, ultimately decision makers can vary depending on whether the service provider is deploying SD-WAN to support only basic WAN functionality or if there is also a strong focus on VAS security-based features. ■

Leading cybersecurity vendor, Fortinet, has emerged as a market driver for Secure SD-WAN, a capability aligned with current demand as organizations begin to look for integrated solutions that protect them from the security risks associated with SD-WAN and local Internet breakout exposing branch offices to the Internet. Fortinet's carrier-grade Secure SD-WAN solution includes best-of-breed next-generation firewall (NGFW) security, SD-WAN, and advanced routing in a single integrated offering. For service providers building managed services and seeking business agility and optimized ROI, Fortinet Secure SD-WAN enables multi-tenancy at scale and automates operations for faster customer onboarding. Almost 90% of SD-WAN vendors do not offer built-in security, but with Fortinet's

Secure SD-WAN solution, customers get some of the industry's best threat protection and threat detection capabilities, as well as IPS, web filtering, sandboxing and even SSL inspection, integrated with one of the top SD-WAN solutions on the market. This supports service providers delivery of hybrid WAN transport services with consistent security. Additionally, Fortinet enables branch automation and accelerated cloud connectivity to allow service providers to offer a cloud-scale branch.

An active member of MEF since 2017, Fortinet is collaborating with the MEF community on SD-WAN standardization and certification initiatives to enhance service providers SD-WAN services and drive secure WAN Edge transformation.

STANDARIZATION OF SD-WANS

KEY TAKEAWAYS

- At 86%, nearly all of the service providers surveyed believe that monitoring the availability of third-party underlay connectivity is at least important, and 36% of providers feel that this visibility is absolutely critical.

- Among MEF member SD-WAN early adopters, 94% reported that monitoring availability in third-party underlay connectivity is at least important, with over half (52% of respondents) reporting that this visibility is absolutely critical for them.

- Eighty-one percent of service providers said that it is at least important for the SD-WAN edge to have a common API to translate between popular cloud providers when SD-WANs are used in multi-cloud deployments. And nearly one-third (30%) of respondents said that a common API for multi-cloud deployments is absolutely critical.

- 37% of service providers rated application security standardization for SD-WAN services as critical, the highest of any standardization options provided. Orchestrating and automating multiple SD-WAN service implements followed, rated as critical by 30% of the survey group.

- Service provider Interest levels are high and nearly uniform across SD-WAN certification programs, including technology certification, services certification, and professional certification. All three certification types were rated as at least important by 73% of more of the survey group.
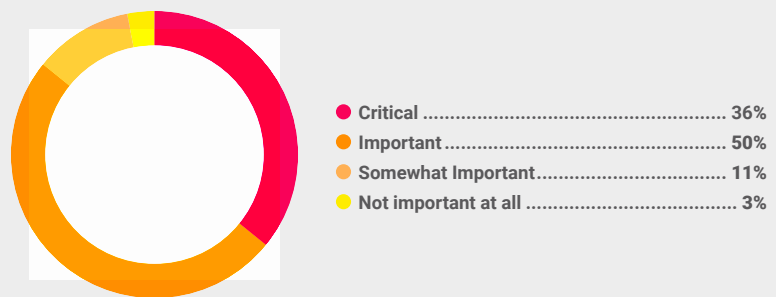
Orchestrating SD-WANs

SD-WAN is an overlay service provided on top of various underlay access connectivity, including Internet, MPLS, LTE and others. One of the key benefits of this OTT service is the ability to run SD-WANS across multiple underlay connectivity providers, without the need for formal service arrangements among providers. The downside, however, is that, to date, providers have no visibility into third-party provider underlay networks.

Significantly, our survey data shows that such ability to monitor availability of third-party provider underlay networks is in high demand among service providers. At 86%, nearly all of the service providers surveyed believe that monitoring the availability of third-party underlay connectivity is at least important, and 36% of providers feel that this visibility is absolutely critical. Just 14% of respondents reported that third-party visibility is either "somewhat important" or "not important at all."

When we segmented results to include only the MEF-member respondents, the results were even more stark. Among MEF members surveyed, 94% reported that monitoring availability in third-party underlay connectivity is at least important, with over half (52% of respondents) reporting that this visibility is absolutely critical for them. As we noted earlier in the report, the MEF member respondents are early adopters of SD-WAN services, and, thus, represent a sophisticated user group in our survey. We believe that strong preferences shown by MEF members in the survey results – such as these – will ultimately filter into the mainstream SD-WAN market.
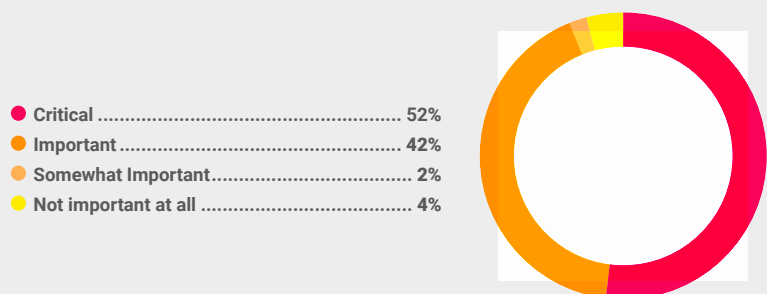
Beyond third-party underlay visibility, several other SD-WAN capabilities are important to SD-WAN providers as well. We asked respondents about the importance for customers to programmatically connect to the SD-WAN provider's dashboard to merge their enterprise dashboard with SD-WAN and other services. >

How important is it for the SD-WAN service provider to monitor availability of Underlay Connectivity Services used by the SD-WAN service but delivered by another service provider?

- Critical **36%**
- Important **50%**
- Somewhat Important.................................. **11%**
- Not important at all **3%**

N=125

How important is it for the SD-WAN service provider to monitor availability of Underlay Connectivity Services used by the SD-WAN service but delivered by another service provider? (MEF Members Only)
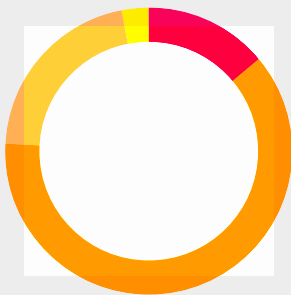
- Critical **52%**
- Important **42%**
- Somewhat Important.................................... **2%**
- Not important at all **4%**

N=52

> " AN OPERATOR MIGHT HAVE TWO CUSTOMERS USING TWO DIFFERENT SD-WAN VENDORS, AND **THE SD-WAN PROVIDER SEEKS A COMMON ORCHESTRATION ACROSS THE TWO DEPLOYMENTS."**

Just over three-quarters of service providers (76%) reported that this ability is at least important, though, for most, it's not a critical requirement. Just 14% of service providers reported that merging dashboards is a critical capability.

Operation of SD-WANs across multiple cloud providers is also important to service providers. Eighty-one percent of service providers said that it is at least important for the SD-WAN edge to have a common API to translate between popular cloud providers when SD-WANs are used in multi-cloud deployments. And nearly one-third (30%) of respondents said that a common API for multi-cloud deployments is absolutely critical. Just 18% of service providers surveyed feel that this interoperability function is only "somewhat important" or "not important at all."

WHERE TO STANDARDIZE?

MEF has embarked on several standards efforts related to SD-WAN. In our survey, we wanted to understand which types of SD-WAN standards are most important to service providers. Topping the list of options provided, 37% of service providers rated application security for SD-WAN services as critical. Orchestrating and automating multiple SD-WAN service implements followed, rated as critical by 30% of the survey group.

In this instance, an operator might have two customers using two different SD-WAN vendors, and the SD-WAN provider seeks a common orchestration across the two deployments.

Beyond these two standardization areas, critical interest falls off sharply. Enabling SD-WAN service subscribers to set intent-related performance and security objectives and translating them to policy levels was rated as critical by 23% of respondents.

How important is it for SD-WAN service subscribers to be able to programmatically connect to the SD-WAN service provider's service dashboard to merge their enterprise dashboard with SD-WAN and other services?

- ● Critical 14%
- ● Important 62%
- ● Somewhat Important......... 21%
- ● Not important at all 3%

N=125

How important is it for the SD-WAN Edge to have a common API that translates between popular public cloud providers when an SD-WAN service is used in a multi-cloud deployment?
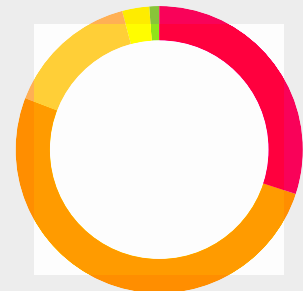
- ● Critical 30%
- ● Important 51%
- ● Somewhat Important......... 15%
- ● Not important at all 3%
- ● Notsure/Still deciding.......... 1%

N=123

Normalizing terminology and language of SD-WAN to enable uniform best practice orchestration ranked at the bottom of the list and was rated as critical by just 19% of respondents.

A NEED FOR CERTIFICATION PROGRAMS

In addition to standards, MEF is active in SD-WAN certification programs. In our survey, we wanted to understand which types of SD-WAN certification programs are most important to service providers. Results show that service provider interest levels are high and nearly uniform across technology certification, services certification, and professional certification. All three certification types were rated as at least important by 73% of more of the survey group. ■

How important are the following areas of SD-WAN-related standards for your company?

Application security for SD-WAN services 37%

Orchestrating and automating multiple SD-WAN service implementations (for example, one implementation uses Vendor A, another uses Vendor B) 30%
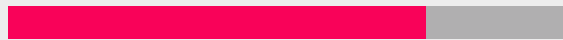
Enabling SD-WAN service subscribers to set intent-related performance and security objectives and have that translated into granular technical policies at the network level 23%

Normalizing the terminology and language of SD-WAN to enable uniform best practice orchestration solutions to be built in the Service Orchestration layer 19%
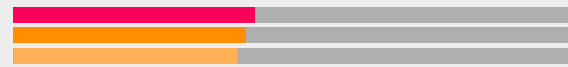
0% 5% 10% 15% 20% 25% 30% 35% 40%

N=125

Critical

How important are service, technology, and professional certification programs (such as those for Carrier Ethernet) for accelerating SD-WAN market growth?

Critical

Important

Somewhat Important

Not Important

Not sure/Still deciding

0% 10% 20% 30% 40% 50% 60%

SD-WAN technology certification: validating conformance to industry standards

SD-WAN services certification: validating conformance to industry standards

SD-WAN professional certification: addressing technical skills shortages

N=125

MEF has emerged as the leading industry organization shaping the SD-WAN managed services market through standardization and emerging certification of services, technologies, and professionals.

SD-WAN standardization is taking place within the context of the MEF 3.0 Global Services Framework. It is part of MEF's transformational initiative to define, deliver, and certify a family dynamic Carrier Ethernet, Optical Transport, IP, SD-WAN, and security services orchestrated across automated networks using LSO APIs. Combining standardized overlay SD-WAN services with dynamic underlay connectivity services will enable service providers to offer powerful hybrid networking solutions with unprecedented user- and application-directed control over network resources and service capabilities.

KEY DEVELOPMENTS:

- In July 2019, MEF published the SD-WAN Service Attributes and Services (MEF 70) standard to help accelerate SD-WAN market growth.

- MEF is working on the next phase of SD-WAN standardization – MEF 70.1 – which includes defining (1) additional service attributes for application business importance and (2) underlay connectivity service parameters required to deploy an SD-WAN service.

- MEF also is progressing work focused on (1) application security for SD-WAN services, (2) intent-based networking for SD-WAN, and (3) information and data modeling standards that will accelerate LSO API development for SD-WAN services.

- In November, MEF introduced its MEF 3.0 SD-WAN certification program for services and technologies and is on track to announce the first certified companies in Q1 2020.

- In November, MEF announced its new SD-WAN Certified Professionals (MEF-SDCP) program. More than 200 professionals from 80 companies participated in the beta test phase. The MEF-SDCP exam will be generally available this December.