



MEF 3.0 SD-WAN Services & Certifications – Frequently Asked Questions

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1. How would you characterize today's SD-WAN market?

The SD-WAN market is one of the hottest in the communications industry, with tens of billions of dollars in revenue at stake throughout the next 5 years.

- The global managed SD-WAN services market is expected to reach nearly \$6.4 billion by 2023 (CAGR of 42% during 2018-2023), according to Frost & Sullivan.
- The US managed SD-WAN services market alone is projected to be \$4.5 billion by 2023 (CAGR of 74% during 2018-2023), according to Vertical Systems Group.
- IDC estimates that the global SD-WAN infrastructure market (excluding managed services) will reach \$5.3 billion by 2023 due to strong enterprise demand and the embrace of SD-WAN by leading service providers seeking to provide enterprises with dynamic management of hybrid WAN connections with guaranteed QoS on a per-application basis.

Today's SD-WAN market shares similarities to the early days of today's estimated \$US 85+ billion Carrier Ethernet market before standardization and services, technology, and professional certification took hold. There is a lot of excitement about performance/price advantages, greater flexibility, etc., but there is also a huge need for education and alignment on terminology to help increase market efficiencies.

2. What is MEF's role in the SD-WAN market and how does this relate to the broader connectivity services market?

MEF is the world's leading communications industry organization shaping the direction and growth of the SD-WAN services market through standardization and certification of services, technologies, and professionals.

In July 2019, MEF published the industry's first global standard defining an SD-WAN service and its service attributes to help accelerate SD-WAN market growth and enable creation of powerful new hybrid networking solutions optimized for digital transformation.

SD-WAN service standardization has been conducted within the context of the [MEF 3.0 Global Services Framework](#). It is part of a transformational initiative to define, deliver, and certify a family of dynamic Carrier Ethernet (CE), Optical Transport, IP, SD-WAN, and security services orchestrated across automated networks using LSO (Lifecycle Service Orchestration) APIs.

Combining standardized SD-WAN services with dynamic high-speed underlay connectivity services will enable service providers to offer MEF 3.0 hybrid networking solutions with unprecedented user- and application-directed control over network resources and service capabilities.

SD-WAN is the way to interface policy with an intelligent software defined network. Standardization makes it easier for integration to work across multiple types of underlying transport services. In the end, the combination of standardized and orchestrated overlay and underlay services will provide a better customer experience with improved service capabilities and guaranteed resiliency.

3. What is in the SD-WAN standard and why is it relevant?

MEF's [SD-WAN Service Attributes and Services \(MEF 70\)](#) standard describes requirements for an application-aware, over-the-top WAN connectivity service that uses policies to determine how application flows are directed over multiple underlay networks irrespective of the underlay technologies or service providers who deliver them.

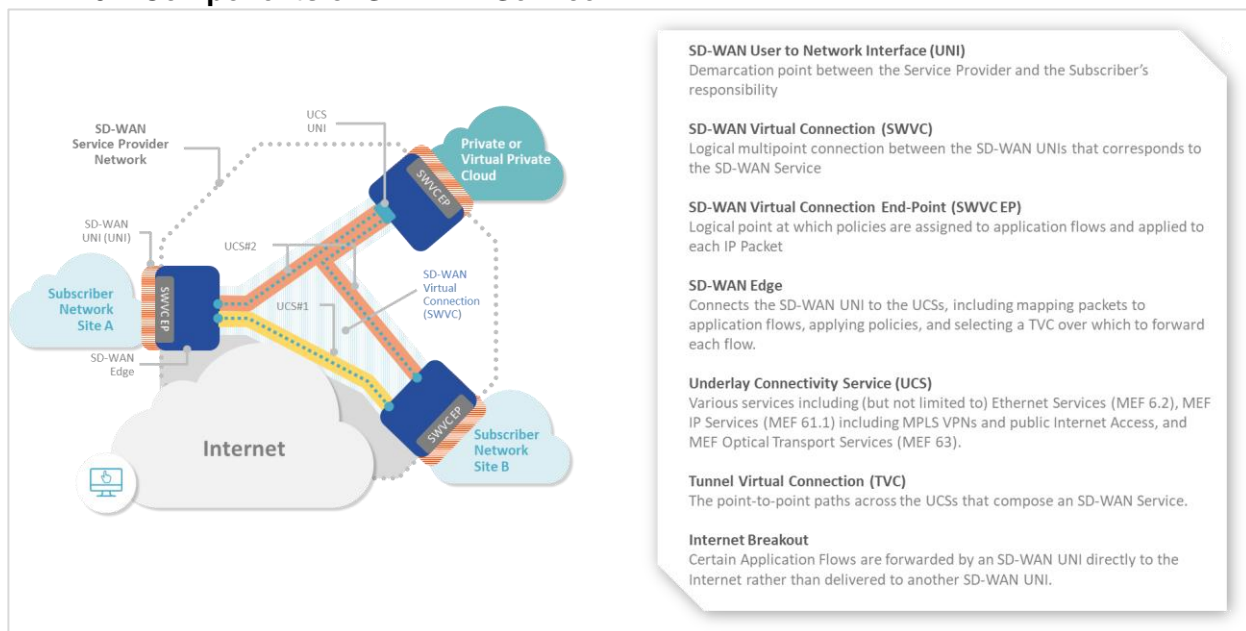
MEF 70, among other things, defines:

- Service attributes that describe the externally visible behavior of an SD-WAN service as experienced by the subscriber.
- Traffic handling rules.
- Key technical concepts and definitions like an SD-WAN UNI, the SD-WAN Edge, SD-WAN Tunnel Virtual Connections, SD-WAN Virtual Connection End Points, and Underlay Connectivity Services.

SD-WAN standardization offers numerous benefits that will help accelerate SD-WAN market growth while improving overall customer experience with hybrid networking solutions. Key benefits include:

- Enabling a wide range of ecosystem stakeholders to use the same terminology when buying, selling, assessing, deploying, and delivering SD-WAN services.
- Making it easier to interface policy with intelligent underlay connectivity services to provide a better end-to-end application experience with guaranteed service resiliency.
- Facilitating inclusion of SD-WAN services in standardized LSO architectures, thereby advancing efforts to orchestrate MEF 3.0 SD-WAN services across automated networks.
- Paving the way for creation and implementation of certified MEF 3.0 SD-WAN services, which will give users confidence that a service meets a fundamental set of requirements.

MEF 70 – Components of SD-WAN Service





4. What is next for SD-WAN standardization?

The next phase of SD-WAN standardization currently underway – MEF W70.1 ("W" indicates work in progress) – will be of high interest to many enterprises. This work includes defining:

- Additional service attributes for application business importance and prioritization.
- Underlay connectivity service parameters required to deploy an SD-WAN service.

MEF also is progressing related standards work focused on:

- Application security for SD-WAN services.
- Information and data modeling standards that will accelerate LSO API development for SD-WAN services.
- Intent-based networking for SD-WAN that will simplify the subscriber-to-service provider interface.

5. Can you explain MEF's work on application security for SD-WAN?

MEF's Application Security for SD-WAN project (MEF W88) is focused on defining policy criteria and actions to protect applications (application flows) over an SD-WAN service. Work includes defining threats, security functions, and security policy terminology and attributes, and then describing what actions a security policy should take in response to certain threats.

Threats being addressed can come from within the SD-WAN subscriber's network or externally from the Internet when connecting to public clouds and other Internet hosts. One key area the project is currently addressing is defining Zones whereby the enterprise subscriber defines a grouping of subnets, using business function naming, where unique security policies are applied. Examples of Zones include a Point-of-Sales (POS) Terminal Zone where POS terminals are segregated from the rest of the network to protect payment card transactions connecting to a data center from being scanned and information stolen. Another Zone could be a Guest Wi-Fi Zone where visitors are allowed access to the Internet but are segregated from the corporate network. For each Zone, security policies would be applied for various defense postures.

6. Can you elaborate on MEF's LSO work related to orchestration of SD-WAN services?

Within a broader MEF Services Model (MSM) project related to orchestration of MEF 3.0 services, MEF is modeling the SD-WAN specifications to be used for LSO APIs across many reference points within the LSO framework. The initial focus of the SD-WAN work centers on LSO Legato, which supports interactions between business applications and service orchestration functionality. The SD-WAN work also has applicability for the LSO Cantata and LSO Allegro interfaces associated with product- and service-related management interactions between a customer and a service provider.

7. Can you explain MEF's approach to intent-based networking (IBN) for SD-WAN?

MEF's IBN work aims to enable an SD-WAN service subscriber to set intent-related performance and security objectives and have that be translated into granular technical policies at the network level. Toward this goal, MEF is building Domain Specific Languages (DSLs) – using restricted natural languages – that will simplify APIs that sit between end-users and service providers.



8. How long do you think it will take for industry players to align on SD-WAN standards?

Different service and technology providers will have their own pace, but companies generally will want to align to MEF 70 and follow-on standards because of the confidence that this helps instill in customers.

Dozens of service provider and technology companies already have voiced support for MEF work, contributed to standards development, participated in SD-WAN-related Proof of Concept demonstrations, and/or otherwise aligned with the SD-WAN standard. This includes players like AT&T, Comcast Business, CenturyLink, Colt, Orange Business Services, PCCW Global, Spectrum Enterprise, Telia Company, Verizon, Fujitsu Network Communications, Nuage Networks, Versa Networks, Infovista, Cisco, Spirent, Amdocs, Silver Peak, and other MEF member companies.

Having the support of ONUG is a boost for our SD-WAN work as well because it brings enterprise end-user requirements and perspectives into the game.

MEF's SD-WAN standardization work already is starting to draw the attention of some big purchasers of WAN services. As an example, technical leaders at one of the largest buyers of connectivity in the world informed MEF that they are looking at aligning on MEF SD-WAN terminology, similar to what they have done with MEF-defined Carrier Ethernet.

9. How would you characterize the importance of MEF SD-WAN services, technology, and professional certification?

Recent research from Heavy Reading indicates that 76% of 125 surveyed service provider professionals worldwide believe that SD-WAN services certification is “critical” or “important” for accelerating SD-WAN market growth. Seventy-three percent of this same group believe SD-WAN technology and professional certifications are also critical or important for market growth.

10. What is the status of MEF 3.0 SD-WAN certification and how many companies have been certified?

In November 2019, MEF [publicly introduced](#) the MEF 3.0 SD-WAN Certification Program, with Spirent as the SD-WAN Authorized Certification and Test Partner (ACTP). Certification involves rigorous tests of the service attributes and requirements defined in MEF 70 and described in detail in the upcoming MEF SD-WAN Certification Test Requirements (MEF W90) standard.

Seven companies participated in the MEF 3.0 SD-WAN certification pilot. In January 2020, MEF [announced](#) the first group of certified technology vendors, including Nuage Networks, Versa Networks, and Infovista. In March 2020, MEF announced that Comcast Business, PCCW Global, Spectrum Enterprise, and Telia Company are the first service providers certified for MEF 3.0 SD-WAN services.

Service and technology companies interested in participating in the MEF 3.0 SD-WAN Certification Program should contact Daniel Bar-Lev, MEF, (Daniel@mef.net).



11. What are the next steps for MEF 3.0 SD-WAN certification?

The MEF 3.0 SD-WAN Certification Program will be transitioning from a pilot to general availability during the next few months. We expect MEF W90 to move into the final phase of MEF membership and Board approval in 2H March 2020, with the goal of the published standard being available in mid-2020.

MEF 3.0 SD-WAN certification will evolve as additional SD-WAN standards roll out. The evolution of MEF 70 to MEF 70.1 will be accompanied shortly thereafter by an evolution of MEF 90 to MEF 90.1. We currently expect the draft MEF 70.1 standard will be available in 4Q 2020.

12. Are there other companies in the MEF 3.0 SD-WAN certification pipeline?

We anticipate that several more companies will receive MEF 3.0 SD-WAN certification within the next few months, and we are preparing for increased activity in 2H 2020.

13. What is the status of MEF SD-WAN professional certification?

In November 2019, MEF [announced](#) the SD-WAN Certified Professional (MEF-SDCP) program. MEF's SD-WAN professional certification is the industry's only exam verifying knowledge, skills, and abilities in the domains of SD-WAN based on the MEF 70 as well as other fundamentals of SD-WAN solutions. This exam is designed for technically-oriented SD-WAN professionals ranging from pre-sales to network/service engineering and operational personnel in the service provider, technology vendor, and enterprise communities.

There are now more than 200 MEF-SDCPs employed by 95+ companies worldwide. We expect the number of MEF-SDCPs to ramp significantly in coming quarters.

Click [here](#) to learn more about and register for the MEF-SDCP exam.

14. Does MEF 70 deal with interoperability among SD-WAN technology vendors?

Neither MEF 70 nor MEF W70.1 cover SD-WAN protocols for vendor equipment interoperability standards.

However, in 1Q 2020, MEF launched an ad hoc initiative to investigate the potential for a standardized approach to enable SD-WAN interoperability (data plane & control plane) between different SD-WAN vendors. This initiative will explore use cases such as network edge and 5G and could evolve into a formal project.

The problem today is that it currently is not possible to develop/deploy a common SD-WAN-enabled network edge by managed service providers and cloud providers without losing key SD-WAN capabilities such as traffic steering and telemetry. SD-WAN edge devices provided by one vendor cannot communicate with similar devices provided by a different SD-WAN vendor without losing key SD-WAN capabilities.



15. Can you elaborate on your SD-WAN partnership with ONUG and why it is important?

In October 2019, MEF and ONUG announced we are collaborating to ensure that enterprises are provided with communications services optimized for digital transformation in the multi-cloud era. MEF will leverage ONUG's hybrid multi-cloud enterprise end user requirements to accelerate development of MEF 3.0 SD-WAN managed services standards and related certification programs for services, technologies, and professionals. For the first time, enterprise users, technology vendors, and service providers will formally engage together to drive the development of SD-WAN service delivery models and standards.

ONUG and MEF will collaborate on the joint definition of common service models and APIs for automating SD-WAN services, with initial areas of focus including:

- ONUG SD-WAN 1.0 service models and API requirements specifications
- ONUG SD-WAN 2.0 multi-cloud integration use cases
- Application security for SD-WANs
- Intent-based networking and service automation for SD-WANs

16. How can service, technology, or enterprise professionals participate in or learn more about MEF's SD-WAN work?

The following links offer useful information available to all industry professionals:

- [MEF YouTube Channel](#) – includes perspectives of service and technology providers
 - [MEF 3.0 Workshop Video – SD-WAN Services](#) | [slides](#)
 - [MEF 3.0 Workshop Video – Application Security for SD-WAN](#) | [slides](#)
 - [MEF19/MEF 3.0 PoC Videos](#) – includes multiple demos involving SD-WAN
- [MEF 3.0 SD-WAN services page](#) on MEF.net
- [SD-WAN Service Attributes and Services \(MEF 70\) standard](#)

MEF's [Enterprise Advisory Council \(EAC\)](#) offers an excellent opportunity for enterprises to learn more about and influence MEF work related to SD-WAN, application security, service automation, and other MEF 3.0 initiatives. The EAC is a collaborative council of leading enterprises designed to strengthen the channels of communications among end-users, service providers, and vendors involved in digital transformation initiatives. We have a limited number of seats remaining open on the council for large to multi-national enterprises, and participation is free. Enterprises can learn more about this program by contacting eacinfo@mef.net.

More detailed information is available to MEF members on the [MEF Applications Committee Home page](#) and the [MEF 3.0 SD-WAN Certification Pilot Information](#) page on the MEF wiki.

Contributions to the SD-WAN work are welcomed. Send an inquiry to sd-wan@mef.net for more details on how you can participate.



17. What are leading industry professionals saying about MEF's SD-WAN standardization and certification work?

The following are examples of public comments from leading service, technology, and market research professionals on MEF's SD-WAN standardization work and its relevance to the industry.

Bob Victor, SVP Product Management, Comcast Business

"Becoming one of the first service providers to achieve MEF 3.0 SD-WAN certification underscores our commitment to being a technology and standards leader to improve the quality, management and interoperability of Ethernet and IP services for our customers. We're proud to lead the industry as the combination of SD-WAN, Ethernet and broadband connectivity displaces legacy networking and transport technologies." (MEF PR, March 2020)

Frederick Chui, Chief Commercial Officer, PCCW Global

"PCCW Global's managed SD-WAN service is available in 80 countries and provides our customers with intelligent path selection on a dynamic high-speed underlay of IP-MPLS, Global Internet Access (GIA) and broadband connections. We are proud to be among the first few service providers in the world to be certified for MEF 3.0 SD-WAN services and applaud MEF for their efforts in setting up the first industry-wide SD-WAN standard (MEF 70). Our enterprise and wholesale customers embarking on their digital transformation journey can therefore expect better interoperability and improved application performance across disparate service providers' domains." (MEF PR, March 2020)

Satya Parimi, Group Vice President, Data Products, Spectrum Enterprise

"We are proud that Spectrum Enterprise is one of the first MEF-certified SD-WAN service providers because it demonstrates our commitment to industry standards and innovation. As wide area networks evolve, enterprises can confidently partner with Spectrum Enterprise to guide them on their WAN journey and match the right SD-WAN design and access service to the client's specific network needs and at the client's preferred pace." (MEF PR, March 2020)

Tomi Airola, Head of Business Networking, Telia Company

"Telia is proud to be one of the first service providers to have successfully achieved the MEF 3.0 SD-WAN certification milestone. We view our MEF 3.0 certification as a key step in addressing the requirements of our enterprise customers. Certification is especially important for helping customers simplify the process of selecting a service provider that is committed to standardized global services. SD-WAN has become an essential part of Telia's managed services portfolio to accelerate our customers' digital transformation journey." (MEF PR, March 2020)

Roman Pacewicz, Chief Product Officer, AT&T Business

"We're seeing a significant change in how customers are using SD-WAN now versus two years ago, and that evolution is what makes service standards from MEF so critical. Today, and moving forward, SD-WAN is about delivering application performance. As the underlying networks — Optical Transport, Carrier Ethernet, and IP — are under greater pressure to be more ubiquitous, easy to provision, on-demand and elastic, that is where the MEF 3.0 construct comes into play. MEF's role is creating a standards-based, intelligent network across multiple carriers that will eliminate friction as we work with each other to deliver application performance at the level of efficiency our customers are seeking." (MEF PR, August 2019)



Mirko Voltolini, Global Head of Network of Demand, Colt Technology Services

“The MEF 70 standard sets the foundation for the adoption of common SD-WAN service attributes between service providers. The definition of a common standard for SD-WAN services will allow the industry to coordinate and align on the technology development. It will enable us to build end to end services across disparate service providers’ domains and serve our global customer needs.” (MEF PR, May 2019)

Laurent Perrin, Head of Application Driven Networks, Connectivity, Orange Business Services

“Orange Business Services is very pleased to support the first MEF SD-WAN standard. Our customers are expecting agile and application driven network services and we believe that this new standard will facilitate the adoption and deployment of SD-WAN and meet their expectations. We look forward to working with MEF on ongoing initiatives to develop the interoperability of SD-WAN solutions and to define standardized APIs that will allow to integrate SD-WAN in a simplified and fully secured end-to-end orchestration model, from the end user to the applications.” (MEF PR, October 2018)

Shawn Haki, Senior Vice President Business Products, Verizon

“Verizon is pleased to support MEF’s industry-leading SD-WAN standardization work. SD-WAN is the way to interface policy with an intelligent software defined network, and standardization makes it easier for integration to work across multiple types of underlying transport services. What that means for our end customers is it lets them get a better overall experience relative to their applications, with support for a broader range of use cases, guaranteed service resiliency, and improved service capabilities in an always on, always connected world.” (MEF PR, August 2019)

Michael Strople, President, Allstream

“Customers are embracing SD-WAN to improve network performance, obtain affordable and reliable connectivity to cloud applications, and gain greater visibility and control over network services. MEF’s SD-WAN service standardization will benefit all industry stakeholders by eliminating confusion regarding SD-WAN service components, core capabilities, and concepts. Standardization also will enable service and technology providers to focus on providing a core set of common capabilities and then building on that for differentiated offerings, helping ensure maximum flexibility for customers.” (MEF PR, May 2019)

Ralph Santitoro, Head of SDN/NFV/SD-WAN Services, Fujitsu Network Communications

“SD-WAN services are transformative and have raised the expectations for network services. They enable subscribers to focus on application performance and visibility and apply policies to regulate compliance based on business importance and security. SD-WAN services also facilitate and accelerate an enterprise’s multi-cloud digital transformation. The MEF 70 standard is the commencement of several MEF SD-WAN projects that I anticipate will simplify operations and accelerate the time to sell, deploy and support SD-WAN services.” (MEF PR, May 2019)

Nan Chen, President, MEF

“Combining standardized SD-WAN services with dynamic high-speed underlay connectivity services – including Carrier Ethernet, Optical Transport, and IP – enables service providers to deliver powerful MEF 3.0 hybrid networking solutions with unprecedented user- and application-directed control over network resources and service capabilities.” (MEF PR, August 2019)



Sunil Khandekar, Head of Nuage Networks from Nokia

“Demand for SD-WAN is growing rapidly in all market segments and geographies, and there is strong momentum for it to be delivered as a managed service. The availability of the MEF 3.0 SD-WAN technology vendor certification is an important step in providing enterprises an industry benchmark for vendor selection and Nuage Networks from Nokia is proud to demonstrate its SD-WAN market leadership as a member of the first group to achieve this certification milestone.” (MEF PR, January 2020)

Kumar Mehta, Co-founder and CDO, Versa Networks

“SD-WAN has become a key part of the managed services portfolio of service providers globally in order to accelerate their enterprise customers’ digital transformation journey. With more than 60 percent of enterprises projected to deploy SD-WAN over the next two to four years, service providers needed to come together and establish standards, to help enterprises understand what they are buying and evaluate different solutions to accelerate services across automated networks. We congratulate MEF in taking a leadership role and are pleased to demonstrate our commitment to the standards by achieving MEF 3.0 SD-WAN certification.” (MEF PR, January 2020)

Mike Wilkinson, CPO, Infovista

“Infovista is proud to have successfully completed the MEF 3.0 SD-WAN certification. We view our MEF 3.0 certification as a key milestone in addressing the requirements of both service providers and enterprises. We believe that it will help SD-WAN users in selecting a vendor that is committed to a market model that provides service consistency and interoperability.” (MEF PR, January 2020)

Marc Cohn, Head of Virtualization, Spirent

“Spirent joins MEF in congratulating Comcast Business, PCCW Global, Spectrum Enterprise, and Telia Company in attaining the first MEF SD-WAN service certifications. By participating in the pilot, the four leading SD-WAN MSPs validated and enhanced the industry’s first SD-WAN Certification Program, building upon the three initial pilot SD-WAN product certifications announced in January. We are proud to contribute as the neutral SD-WAN testing/validation/assurance authority.” (MEF PR, March 2020)

Nick Lippis, Co-Founder and Co-Chairman, ONUG

“ONUG is eager to help define MEF 3.0 SD-WAN managed service standards to ensure that they address the critical requirements of the Global 2000 on their digital transformation journey. The ONUG board welcomes communications service providers and managed service providers to join the ONUG Community and participate in the development of SD-WAN reference solutions, based on MEF standards, that will be featured in proof-of-concept demonstrations at future ONUG and MEF events. This collaboration between our organizations will be instrumental in helping enterprise technologists accelerate their adoption of SD-WAN products and services.” (ONUG PR, October 2019)

Rosemary Cochran, Principal and Co-Founder, Vertical Systems Group

“These first MEF 3.0 SD-WAN certifications achieved by Comcast Business, PCCW Global, Spectrum Enterprise, and Telia Company are very important. This signifies that MEF 3.0 certification is a new competitive differentiator for SD-WAN service providers, as well as the benchmark for assuring compliance with globally recognized SD-WAN specifications. Our research shows a direct relationship between a commitment to MEF certification and the business success of market leading companies. We anticipate similar results for MEF 3.0 SD-WAN certification.”



Mike Sapien, Chief Analyst, Ovum Enterprise Services

“The MEF SD-WAN standard efforts come at a good time as customer adoption starts to increase and service providers struggle to keep up with market demand. Hybrid networking, including SD-WAN services, can only grow in adoption and deployment, and having the same definitions and standard for comparison should make it easier for the providers and customers to understand the various service attributes and confirm feature alignment. Customers are becoming more aware of the more common features beyond routing, and having this standard as a reference will help in current and future deployments.” (MEF PR, August 2019)

Jennifer Clark, Principal Analyst, Heavy Reading

“The momentum of SD-WAN adoption, along with the large and ever-growing community of players in the SD-WAN ecosystem – vendors, service providers and enterprises – has created an information vacuum in terms of how we deploy SD-WAN over multiple underlay connectivity services and across multiple service provider networks. The MEF SD-WAN standard is the first step to addressing this vacuum with a common language by which we can define SD-WAN services and service attributes. This and the MEF follow-on SD-WAN standards are the building blocks leading to a MEF SD-WAN certification process, which enterprise SD-WAN customers will need as they evaluate and deploy SD-WAN services.” (MEF PR, August 2019)

Greg Bryan, Senior Manager, Enterprise Research, TeleGeography

"Our WAN Manager Survey indicates that in 2018 fewer than 1/5th of enterprises had already installed SD-WAN and 1/3 were still researching their SD-WAN options. With dozens of potential suppliers to choose from – from technology start-ups to large SD-WAN managed service providers – WAN managers will benefit from the standards MEF has worked to create in this space." (MEF PR, May 2019)

Lee Doyle, Principal Analyst, Doyle Research

“As adoption of SD-WANs accelerates, enterprises will increasingly choose managed services as a delivery model. This collaboration between ONUG and MEF brings together key stakeholders to lead the market in developing SD-WAN standards, which will be critical to enabling the widespread adoption of SD-WAN services.” (ONUG PR, October 2019)