MEF 3.0 SD-WAN & SASE:

Frequently Asked Questions

December 2021, v11

Summary

This FAQ will bring you up to speed on the latest perspectives from MEF and shed light on a host of new SD-WAN and SASE-related initiatives that will benefit enterprises, service providers, and technology vendors. We address 23 common questions and provide links to additional material that should be of value to a wide range of industry professionals.

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SD-WAN & SASE Markets

1. How would you characterize the SD-WAN market?

The SD-WAN market is fast-growing with tens of billions of dollars in revenue at stake over the next 5 years. Multiple analyst firms expect security to be an increasingly important factor in SD-WAN sales.

SD-WAN Services

- The global managed SD-WAN services market is expected to grow at a 38% CAGR from $2.85B in 2020 to $14.5B in 2025, according to Frost & Sullivan. This estimate includes both SD-WAN overlay and associated underlay connectivity services.
- Appledore Research estimates the global SD-WAN services market – including both service provider managed and integrated services – will reach at least $22B in 2027.
- Vertical Systems Group estimates the U.S. carrier managed SD-WAN services market surpassed $1B in 2020. This number includes SD-WAN service features as well as WAN access connectivity.

SD-WAN Technology Vendors

- IDC estimates the global SD-WAN infrastructure market will grow at a 19% CAGR from $3B in 2020 to $7B in 2025.
- Dell'Oro estimates the SD-WAN technology market will grow from $1.5+B in 2020 to at least $4B in 2025. The firm says the market grew 39% year over year in 1H21, with vendors increasingly differentiating around security.
- Appledore Research estimates the global SD-WAN software supplier market is poised to grow from $1.2B in 2020 to a minimum of $7B in 2027.
- The SD-WAN vendor market is expected to grow at a 38% CAGR from $1.23B in 2019 to $6.27B in 2024, according to Frost & Sullivan. The market reportedly experienced a surge of pent-up demand in 2021 as businesses embraced SD-WAN as a top priority, along with hybrid cloud services and network and application security.
- Futuriom estimates the SD-WAN tools and software market will grow from $2B in 2020 to $2.85B in 2021 and reach $4.6B by 2023.

2. How would you characterize the SASE market?

The emerging Secure Access Service Edge (SASE) market combines network connectivity (e.g., SD-WAN), security functions, and subscriber policies to meet a higher level of performance and assurance required by the modern enterprise. The combined elements of the SASE services and technology markets appear poised to be worth tens of billions of dollars during the next five years. That said, market forecasting is complicated by a lack of common terminology for SASE services and technology – a challenge that MEF is addressing with its standards work.

SASE Services

- Today, only a small fraction of SD-WAN and managed security service providers market specific SASE services, although this is likely to change in coming quarters.

SASE Technology Vendors

- Dell'Oro defines a SASE technology market that pulls from 3 major technologies: SD-WAN, firewalls, and secure web gateways (SWG). The firm estimates that the SASE technology market will grow from hundreds of millions of dollars in 2020 to "double digit billion-dollar' revenue by 2025. SASE implementations fall into two main categories: (1) unified, single-vendor solutions and (2) disaggregated, multi-vendor, multi-product solutions.
- Gartner estimates the SASE technology market will grow at a 42% CAGR to reach nearly $11B in 2024.
- The 650 Group estimates SASE product revenues will surpass $11B by 2025.

3. What is MEF's role in the SD-WAN and SASE markets?

MEF is the world's leading communications industry organization shaping the SD-WAN services market through standardization and certification of services, technologies, and professionals. MEF began its SD-WAN work in 2018 and a year later published the first global standard (MEF 70) defining an SD-WAN service and its service attributes.

Building upon its heritage as the leading authority defining SD-WAN and other network services, in 2020 MEF launched its strategic initiative to define a standardized SASE services framework that can be used by enterprises and service providers to transform consumption of cloud services and applications in the form of SASE services.

MEF thus far has initiated 25+ SD-WAN and SASE standards-related initiatives within the context of the MEF 3.0 Global Services Framework. This work is part of a transformational mission to define, deliver, and certify dynamic Carrier Ethernet (CE), Optical Transport, IP, SD-WAN, SASE, and Edge Computing services orchestrated across automated networks using LSO APIs. A principal goal is to enable service providers to offer MEF 3.0 hybrid networking solutions with unprecedented user- and application-directed control over network resources and service capabilities, guaranteed performance, and security.

Dozens of service provider and technology companies have contributed to standards development, certified SD-WAN services and technologies, participated in SD-WAN-related Proof of Concept demonstrations, and/or otherwise aligned with MEF's SD-WAN standards.

MEF's SD-WAN-related certification programs have helped align the industry on common terminology, instill confidence in services and products, and drive market growth.

- Many of the world's leading providers of SD-WAN solutions have achieved MEF 3.0 certification, including 11 service providers and 6 technology vendors.
- Five of the top 6 service providers in Vertical Systems Group's U.S. Carrier Managed SD-WAN Services LEADERBOARD and the top 4 technology vendor leaders identified by Dell'Oro are MEF 3.0 SD-WAN-certified.
- Today, there are more than 720 MEF SD-WAN certified professionals (MEF-SDCPs) employed by 121+ companies worldwide.

MEF SD-WAN & SASE Standards

4. What is the status of MEF's SD-WAN and SASE standardization work?

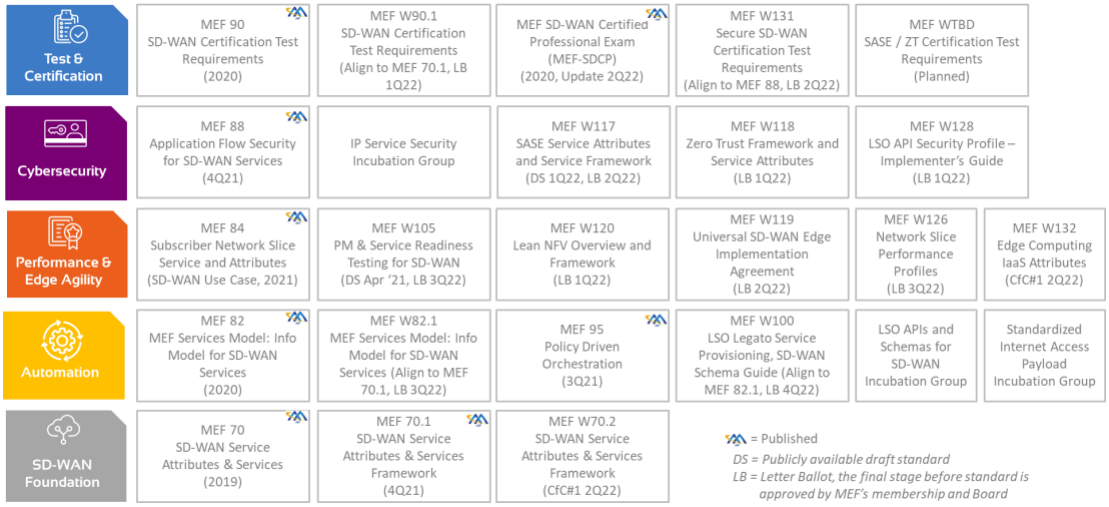
MEF has initiated 25+ SD-WAN and SASE-related initiatives over the last several years, eight of which have been brought to completion thus far. MEF SD-WAN & SASE Initiatives summarizes and links to these various items of work. Recently published standards include:

- MEF 70.1 SD-WAN Service Attributes and Services Framework (November 2021)
- MEF 88 Application Flow Security for SD-WAN Services (November 2021)

Companies participating in the development of the new MEF 70.1 and MEF 88 standards include: AT&T, Bell Canada, CMC Networks, Orange, PCCW Global, Cisco, Fortinet, Versa Networks, Nokia, Albis-Elcon, Ciena, Fujitsu, Futurewei, Oracle, and Spirent.

MEF currently has 17+ active SD-WAN and SASE-related projects and incubation groups across five broad areas: SD-WAN foundation, automation, performance & edge agility, cybersecurity, and test & certification.

MEF SD-WAN & SASE-Related Work



5. What is in the MEF 70.1 SD-WAN Service Attributes and Services Framework standard?

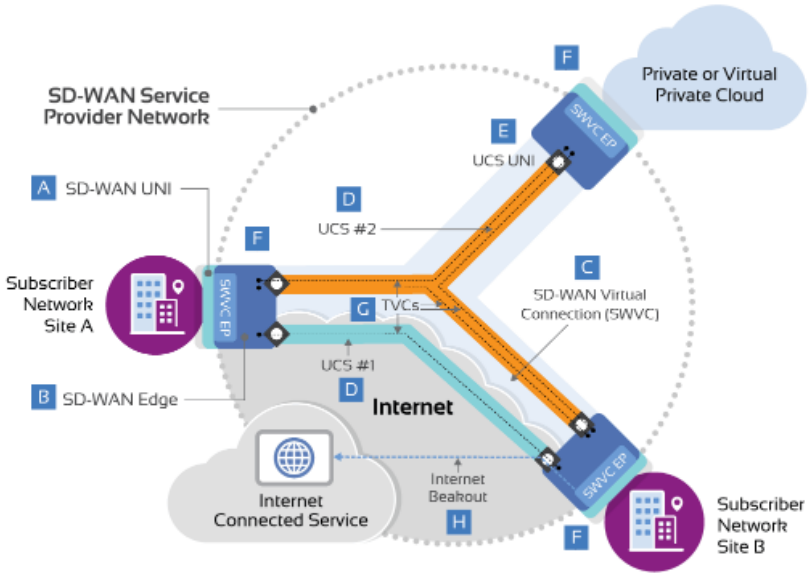
MEF 70.1 SD-WAN Service Attributes and Services Framework describes requirements for an application-aware, over-the-top WAN connectivity service that uses policies to determine how application flows are directed over multiple underlay networks irrespective of the underlay technologies or service providers who deliver them.

Building upon MEF 70, MEF 70.1 includes the following key elements:

- SD-WAN service concepts, service attributes for an SD-WAN virtual connection (SWVC), SWVC end point, and SD-WAN UNI, and new service attributes for an underlay connectivity service (UCS), UCS end point, and UCS UNI.

- SD-WAN service framework for defining instances of a service based on definitions, service elements, and service attributes.
- New measurable performance metrics for policy-defined application flows.
- New support for virtual topologies that can be assigned by policy.
- New support for partitioning subscribers IP hosts into zones and assigning zone-wide policies.
- Provides the infrastructure to support application flow security defined in MEF 88.

SD-WAN Service Components



A SD-WAN User-to-Network Interface (SD-WAN UNI)
Demarcation between Service Provider and Subscriber responsibility.

B SD-WAN Edge
Connects SD-WAN UNI to UCSs, maps packets to application flows, enforces policies, and selects TVC, over which to forward each flow.

C SD-WAN Virtual Connection (SWVC)
Logical multipoint connection between the SD-WAN UNIs, which corresponds to the SD-WAN Service.

D Underlay Connectivity Service (UCS)
Any WAN service used by the SD-WAN, e.g., MEF Ethernet Services (MEF 6.2), MEF IP Services (MEF 61.1), MPLS VPNs and Internet Access, and MEF Optical Transport Services (MEF 63).

E UCS User-to-Network Interface (UCS UNI)
Demarcation between the service provider of the underlay connectivity service, and the subscriber responsibility.

F SD-WAN Virtual Connection End Point (SWVC EP)
Logical point where application-flow policies are assigned and applied.

G Tunnel Virtual Connection (TVC)
Point-to-point paths across UCSs that compose an SD-WAN Service.

H Internet Breakout
Application flows forwarded from an SD-WAN UNI directly to the Internet rather than delivered to another SD-WAN UNI.

SD-WAN standardization offers numerous benefits that help accelerate SD-WAN market growth and improve customer experience. Key benefits include:

- Enables a wide range of ecosystem stakeholders to use the same terminology when developing, buying, selling, deploying, and delivering SD-WAN services.
- Makes it easier to interface policy with intelligent underlay connectivity services to provide a better end-to-end application experience with service resiliency.

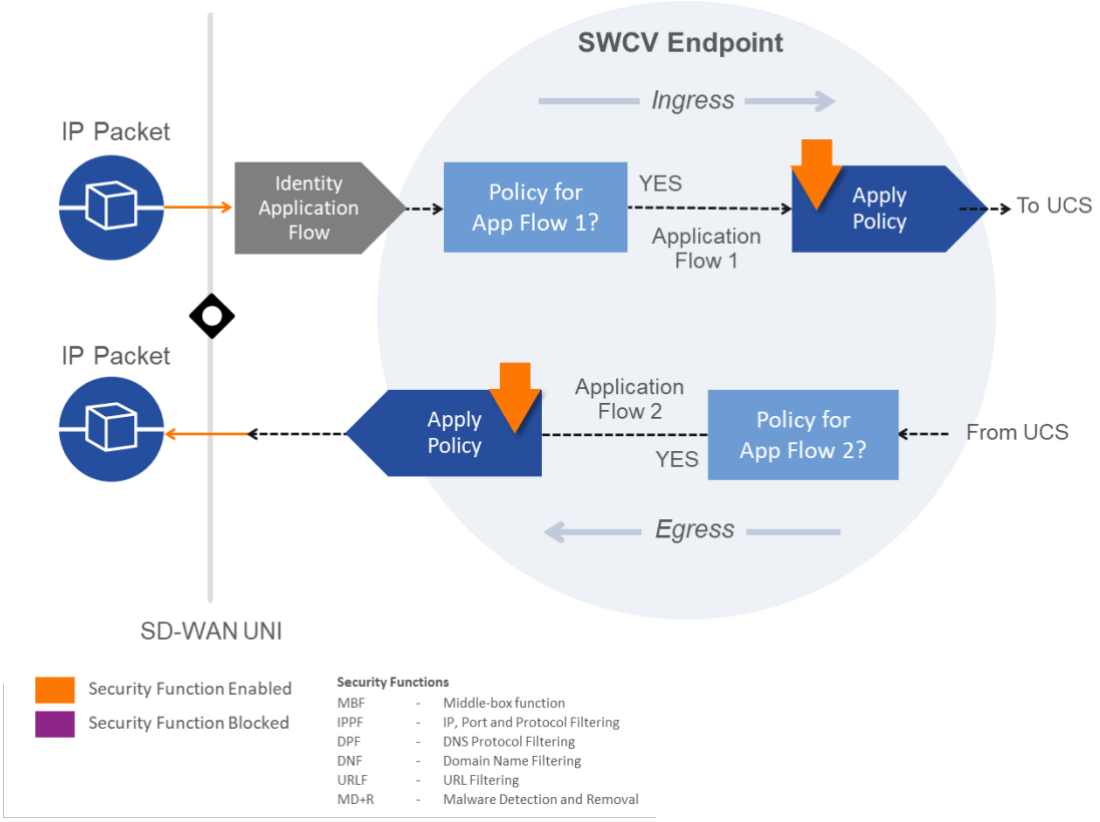
- Facilitates inclusion of SD-WAN services in standardized LSO architectures, thereby advancing efforts to orchestrate SD-WAN services across automated networks.
- Facilitates creation of certified MEF 3.0 SD-WAN services, which give users confidence that a service meets a fundamental set of requirements.

6. What is in the MEF 88 Application Flow Security for SD-WAN Services standard?

MEF 88 Application Flow Security for SD-WAN Services is MEF's first cybersecurity standard and is the basis for the MEF 3.0 Secure SD-WAN certification planned for 2022. It specifies policy criteria and actions to protect application flows over an SD-WAN service. This includes defining threats, security functions, and security policy terminology and attributes, and then describing what actions a policy should take in response to certain threats.

MEF 88 leverages the concept of zones defined in MEF 70.1. With zones, an enterprise subscriber defines a grouping of subnets where unique security policies are applied. Examples 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.

Application Flow Security for SD-WAN Services



7. What are some key SD-WAN and SASE standards coming up in 2022?

MEF has multiple SD-WAN and SASE standards in the pipeline for 2022 that we believe will be of high value to the market. Dozens of experts have participated in their development. These include the following ("W" before a number represents work in progress):

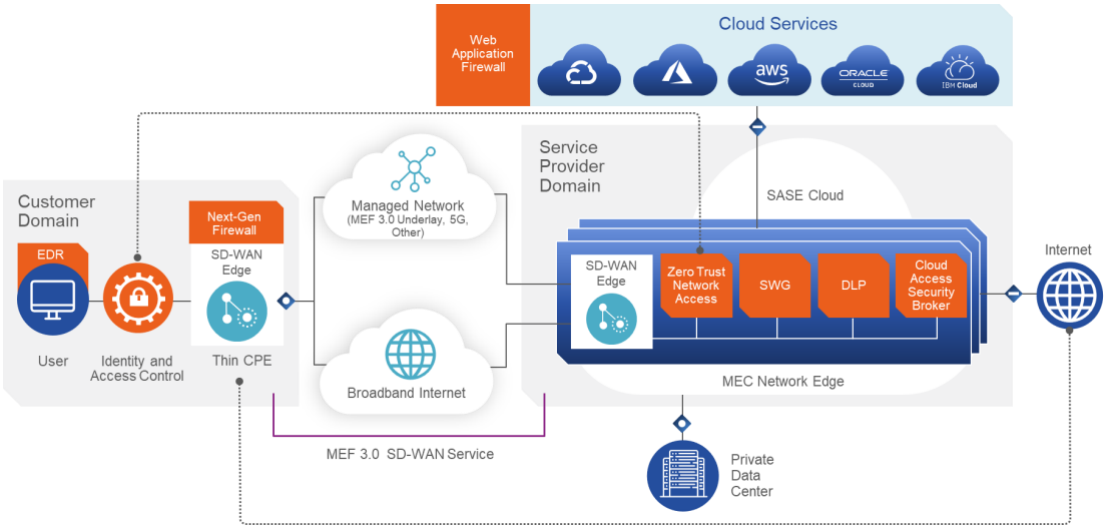
- MEF W117 SASE Service Attributes and Service Framework
- MEF W118 Zero Trust Framework and Service Attributes
- MEF W119 Universal SD-WAN Edge Implementation Agreement
- MEF W105 Performance Monitoring and Service Readiness Testing for SD-WAN

8. What is MEF's approach to SASE services defined in MEF W117?

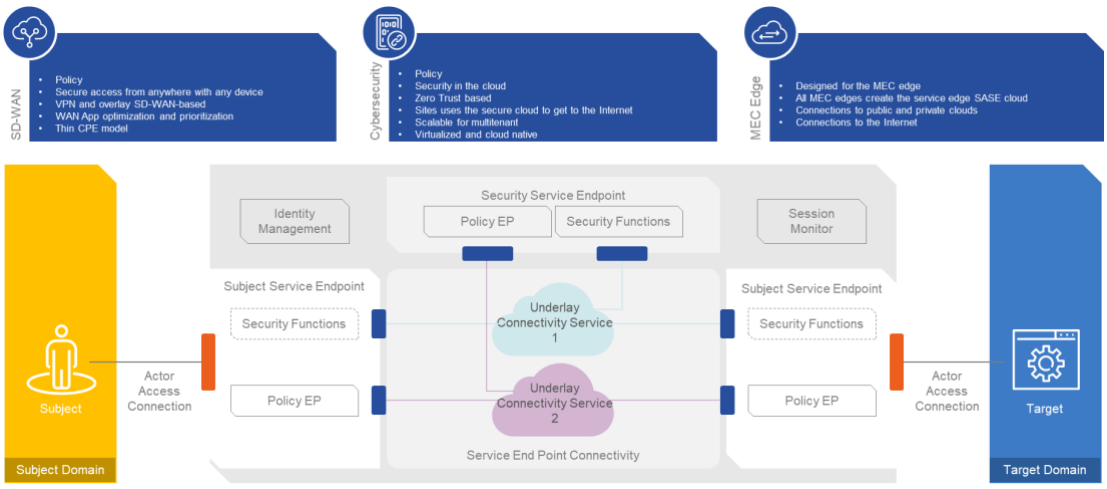
MEF W117 SASE Service Attributes and Service Framework will be the industry's first standard defining SASE services and attributes. SASE combines security functions and connectivity services with subscriber policies to address modern security concerns. A SASE service enables secure access and secure connectivity for subscriber users, devices, and applications to targeted resources (applications or devices). This access is independent of the location of users, devices, and applications and is authorized according to subscriber policies.

The SASE service secures the flow of IP packets between a subject actor and a target actor by recognizing a SASE session, authenticating the actors, implementing security functions, and determining forwarding behavior by applying and monitoring policies to the session.

Secure Access Service Edge (SASE)



Secure Access Service Edge (SASE)



Important expected SASE standardization benefits include:

- Increases industry efficiency by aligning stakeholders on common terminology when developing, buying, selling, deploying, and delivering SASE services.
- Makes it easier to interface policy with security functions to provide cloud-based cybersecurity postures from anywhere.
- Facilitates inclusion of SASE services in standardized LSO architectures, thereby advancing efforts to orchestrate MEF 3.0 SASE services from enterprises and between cybersecurity ecosystem partners.
- Facilitates creation of certified MEF 3.0 SASE services, which will give users confidence that a service meets a fundamental set of cybersecurity requirements.

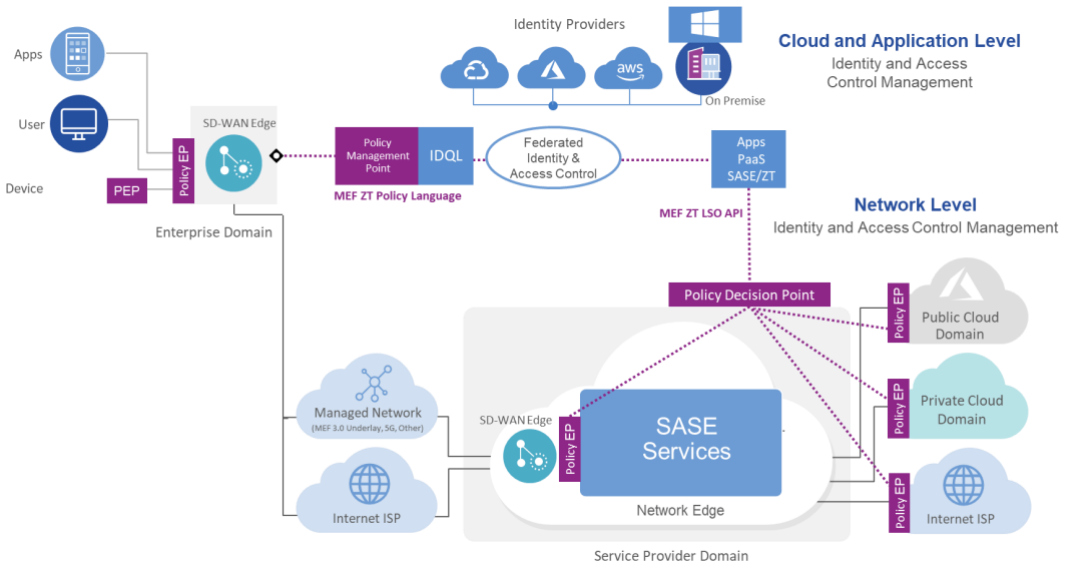
9. How does SASE compare to the traditional approach to network security?

The SASE concept adjusts for a fundamental change in how enterprise users access business systems and increased demand for lower-latency edge compute capabilities closer to the user. The well-defined and static network edge of the past is being replaced by more users working outside corporate walls and accessing business systems beyond corporate data centers. SASE shifts the focus from site-centric to user-centric security. The user can be anything and anywhere, and security and network functions can be distributed away from the enterprise data center to maximize the availability of high-performance edges (e.g., PoPs) and security clouds.

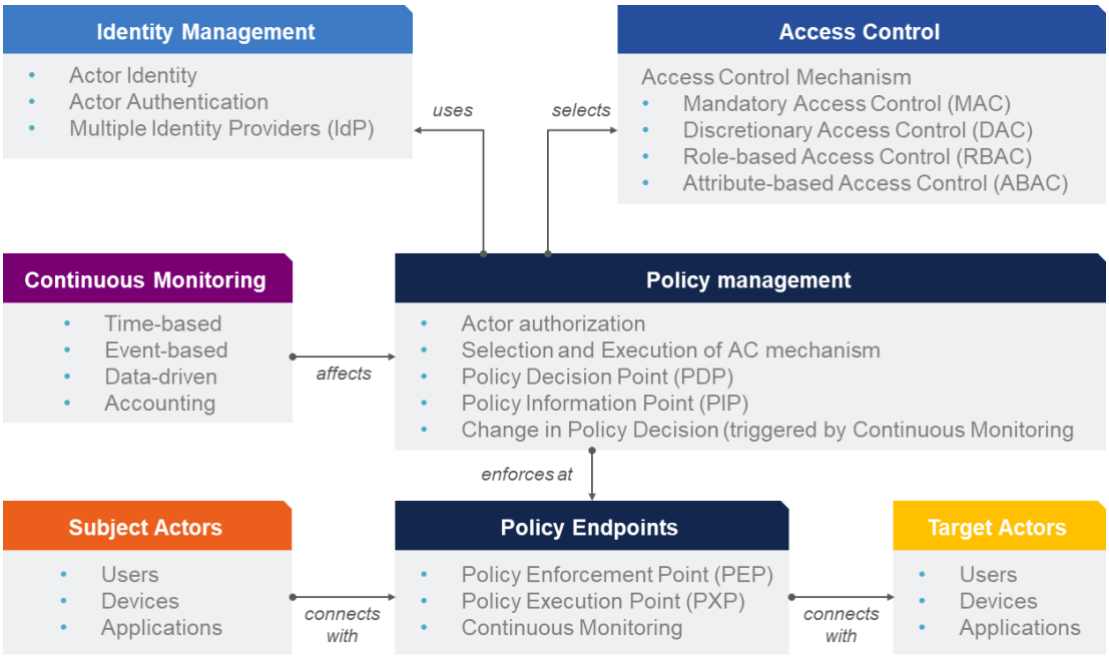
10. What is in the upcoming MEF W118 Zero Trust standard?

MEF W118 Zero Trust Framework and Service Attributes defines a Zero Trust Framework (ZTF) and service attributes for dynamic policy-based actions applied to users, devices, and applications wanting to access networked resources. The ZTF consists of subject and target actors, identity management, access control, policy, policy end points, and continuous monitoring. While MEF W118 does not define a specific service, it does define ZTF service attributes that can be used by MEF-defined services, as shown in the SASE example below.

Zero Trust Framework



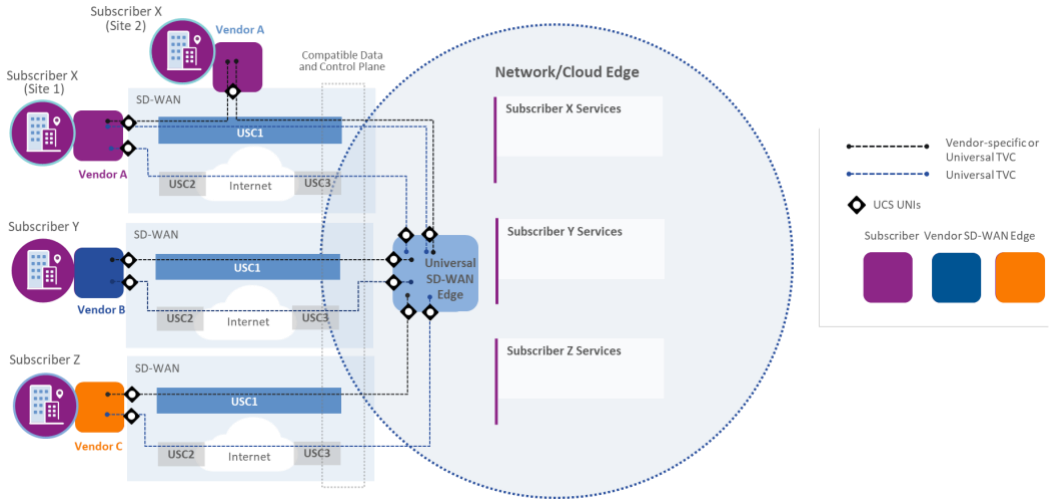
SASE Service Incorporating Zero Trust



11. What is in the upcoming MEF W119 Universal SD-WAN Edge standard?

MEF W119 Universal SD-WAN Edge Implementation Agreement is focused on advancing vendor SD-WAN vendor interoperability at the edge – a critical pain point for many providers of SD-WAN services. MEF W119 defines a Universal SD-WAN Edge (USWE) function that can be implemented in multiple vendors' SD-WAN edge devices and also as a virtual network function (VNF). This includes a minimum set of functions and capabilities for the SD-WAN data, control, telemetry, and management planes that will enable interoperability between the USWE and vendor equipment.

Universal SD-WAN Edge



12. What is in the upcoming MEF W105 Performance Monitoring and SRT standard?

MEF W105 Performance Monitoring and Service Readiness Testing (SRT) for SD-WAN defines a consistent method to address faults, monitor the performance of an SD-WAN service (MEF 70.1) and perform testing to verify that the service is ready for application flows and associated policies to be added. SD-WAN PM uses IP packets to make performance measurements and calculate performance metrics as specified in MEF W70.1. SD-WAN PM is divided into three parts: (1) performance metrics per application flow per SD-WAN Virtual Connection (SWVC) end point ordered pair, (2) performance monitoring metrics per Tunnel Virtual Connection (TVC), and (3) threshold crossing alerts (TCAs).

13. What SD-WAN automation standards have been published thus far?

MEF thus far has published two SD-WAN automation-related standards: MEF 82 and MEF 95.

MEF 82 MEF Services Model: Information Model for SD-WAN Services describes MEF 70 in a programming object model representation that can be used to build LSO APIs to orchestrate SD-WAN services. This document defines the MEF Services Model (MSM) as well as the UML classes, data types, and enumerations for representing SD-WAN services. MEF currently has an active project – MEF W82.1 – to update MEF 82 to align to MEF 70.1.

MEF 95 Policy Driven Orchestration provides a unified policy framework for MEF 70.1 and other SD-WAN and SASE-related standards. MEF 95 specifies how policy-based management and modeling can be used to realize orchestration functionality defined in MEF 55.1 Lifecycle Service Orchestration: Reference Architecture and Framework. It includes an example Domain Specific Language (DSL) that provides an intent program to connect multiple SD-WAN users between multiple sites.

14. What additional SD-WAN automation-related standards are in development?

MEF has several active LSO-based automation initiatives designed to enable faster rollout of SD-WAN services:

- MEF Internet Access Payload Incubation Group – focused on driving standards alignment on an Internet Access product payload that can be included in the LSO Marketplace. Many service providers have called upon MEF to prioritize LSO Sonata support for automation of Internet Access services, with SD-WAN being a driving factor.
- MEF W100 LSO Legato Service Provisioning, SD-WAN Schema Guide – defines a JSON/YAML-based SD-WAN schema guide for LSO Legato service provisioning. This standard falls within the scope of the MEF Services Model project and will align with MEF W82.1.
- LSO APIs and Schemas for SD-WAN Incubation Group – focused on tracking and coordinating efforts on LSO APIs and schemas for an SD-WAN service defined in MEF 70.1. The IG will assess the need for an SD-WAN product specification or corresponding product model and schemas. LSO APIs for SD-WAN covered by the IG include LSO Legato, LSO Allegro, and LSO Cantata.

15. Can you describe the SD-WAN use case in the MEF 84 Network Slice standard?

Enterprise users are looking for a frictionless end-to-end experience with guaranteed performance and security from their devices to their applications/services, regardless of a user's location. The idea with network slicing is to carve out a subset of the end-to-end network infrastructure that could carry performance objectives and, in the future, security objectives. The end-to-end network slice needs to be orchestrated across all the individual networks involved in providing a subscriber's end-to-end experience, including the subscriber network, the service provider network(s), and the cloud provider network.

MEF 84 Subscriber Network Slice Service and Attributes describes network slicing within the context of MEF LSO and MEF services. MEF 84 uses the term "Network Service" to define a network slice offered as a service to one or more subscribers. The idea is that service providers can structure and organize subsets of their infrastructure into network slices that can be managed, controlled, and orchestrated independently from other network slice subsets.

In an example SD-WAN use case, an enterprise could buy a set of several network slices (i.e., real-time, premium, or business) and overlay their SD-WAN performance objectives onto each

of these slices. The end-to-end network slice could be based on networks involving both wireline and wireless resources, including 5G.

See the MEF CTO Chat: MEF End-to-End Slicing, SD-WAN, and 5G (September 2020) for a deeper discussion of this topic with illustrations.

16. To what extent have industry players embraced MEF's SD-WAN standards?

We are still in the ramping phase when it comes to embracing MEF's SD-WAN standards, but we are encouraged by the progress we are seeing worldwide, including support from industry-leading service and technology providers.

MEF's SD-WAN standardization work already is starting to draw the attention of some big purchasers of WAN services. As an example, the U.S. federal government's General Services Administration has formally added SD-WAN to their Enterprise Infrastructure Solution (EIS) Service Guide used by government agencies and has called upon EIS contracted suppliers to comply with current and future MEF SD-WAN standards. The U.S. government is the largest buyer of connectivity services in the world.

Certification

17. How would you characterize the importance of MEF SD-WAN service, technology, and professional certifications?

Research from Heavy Reading indicates that 76% of 125 surveyed service provider professionals worldwide believe that SD-WAN service 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.

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

In late 2019, MEF introduced the MEF 3.0 SD-WAN Certification Program, with Spirent as the SD-WAN Authorized Certification and Test Partner (ACTP). The current certification involves rigorous tests of the service attributes and requirements defined in MEF 70 and described in detail in the MEF 90 SD-WAN Certification Test Requirements standard.

As of December 2021, 17 companies have achieved MEF 3.0 SD-WAN certification.

- 11 service providers: AT&T, Colt Technology Services, Comcast Business, Lumen, PCCW Global, Spectrum Enterprise, Tata Communications, Telia Company, Verizon, and Windstream.
- 6 technology vendors: Cisco, Fortinet, Infovista, Nuage Networks, Versa Networks, and VMware.
- Complete lists of MEF 3.0 certified SD-WAN certified companies can be found in the MEF Services Certification Registry and the MEF Technology Certification Registry.

Companies interested in participating in the MEF 3.0 SD-WAN Certification Program should contact MEF.

19. What is next for certification of SD-WAN & SASE services and technologies?

MEF 3.0 service and technology certification is evolving with the development of SD-WAN, secure SD-WAN, and emerging SASE and Zero Trust standards.

- MEF W90.1 SD-WAN Certification Test Requirements is the basis for phase 2 of the MEF 3.0 SD-WAN certification program planned for 2022. MEF W90.1 specifies rigorous test requirements for service attributes, functions, and capabilities defined in MEF 70.1. Key goals include making the certification highly relevant to the buyers of SD-WAN services and moving toward automated and virtualized testing, which will help accelerate and scale certifications.
- MEF W131 Secure SD-WAN Certification Test Requirements is foundational to the new MEF 3.0 Secure SD-WAN certification planned for 2022 that will provide an opportunity for service and technology companies to differentiate their SD-WAN solutions. MEF W131 describes test requirements to validate conformance with the MEF 88.
- MEF's Test & Certification Committee is exploring the market opportunity for MEF 3.0 SASE and Zero Trust certification. MEF potentially would develop test requirements standards to validate conformance with (1) the MEF W117 SASE Services and Attributes standard and (2) the MEF W118 Zero Trust Framework and Service Attributes standard.

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

Introduced in late 2019, MEF's SD-WAN Certified Professional (MEF-SDCP) program is the industry's only exam verifying knowledge, skills, and abilities in the domains of SD-WAN based on the MEF 70 standard 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.

As noted above, 720+ MEF SDCPs are employed by 121+ companies.

Click here to learn about and register for the MEF-SDCP exam. Visit the MEF Professional Registry to see a list of MEF-SDCP and other certified professionals.

21. What are next steps for MEF SD-WAN professional certification?

MEF's Test & Certification Committee currently is working on updates to the MEF-SDCP exam to incorporate information from MEF 70.1, MEF 88, and MEF W105. The goal is to launch a new exam in 2022.

Participate in MEF

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

MEF SD-WAN & SASE Initiatives provides summaries and links to various items of work and serves as a useful starting point and a helpful resource to share with colleagues.

There are evolving resources and information on the SD-WAN and SASE sections of the MEF website, and the MEF Infinite Edge Series on YouTube offers valuable perspectives from thought-leading service and technology providers on SD-WAN and SASE-related topics.

Contributions to the SD-WAN and SASE work are welcomed. Contact MEF to express your interest and to obtain details on how you can participate.

Industry Perspectives on MEF SD-WAN & SASE

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

Below are nearly 30 examples of public comments from leading service, technology, and market research professionals on MEF's SD-WAN and SASE standardization work and SD-WAN certification.

Service Provider Perspectives

Aamir Hussain, *Chief Product Officer and Senior VP, Verizon Business Group*
"MEF 3.0 standards help drive SD-WAN and Carrier Ethernet interoperability for enterprises, service providers, and technology developers. Additionally, they drive end-to-end automation resulting in an improved customer experience and lower TCO. As a MEF 3.0 certified service provider, Verizon leverages these standards and capabilities to help drive our own Network-as-a-Service strategy. We are long-time supporters and contributors of the MEF mission." (MEF PR, June 2021)

Will Eborall, *AVP, Product Marketing Management, AT&T Business*
"There is value in these certifications, as they align with the telecommunications industry to help deliver the highest quality in networking functions. As companies continue their digital transformation, these standards assist to demonstrate the managed service providers' compliance in critical service functions around performance, assurance, and agility. It's definitely accelerated many aspects of our business." (MEF PR, June 2021)

Rupesh Chokshi, *VP Cybersecurity, AT&T*
"I think bodies and organizations like MEF can play a very important role as they bring the ecosystem together….We are providing that very critical infrastructure. So, the more standardization, the more scale, the more interoperability and federation, the better off we're going to be in the long run." (MEF Infinite Edge – SASE, March 2021)

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)

Shena Seneca Tharnish, *VP, Cybersecurity Product Management, Comcast Business*
"I believe that standardization of new technology like SD-WAN and new frameworks like SASE are beneficial to all – not just the end consumer, but also the technology providers and the service providers – all those that are involved in architecting these solutions for business consumption. Standardization also allows for more efficient integration among technology partners involved in increasing consumer confidence that they're going to select quality products or solutions that have been vetted as secure, safe, and reliable." (MEF Infinite Edge – SASE, March 2021)

Mirko Voltolini, *VP, Innovation, 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)

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)

Vassilis Sanidas, *VP, Security Solutions Management, Global Presales & Technology Engagement, PCCW Global*
"One of the biggest challenges facing SASE adopters is the lack of standardization, which can create significant confusion for an enterprise considering a transition to the new technology. Standardization is very, very important." (MEF Infinite Edge – SASE, March 2021)

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)

Marten Scheffer, *Managing Executive for Enterprise Technology and FTTX, Vodacom Business*
"The MEF 3.0 certification underscores Vodacom Business's commitment to being a technology and standards leader which improves the quality, management and interoperability of Ethernet and IP services for all our clients across the continent. The accolade highlights that indeed Vodacom Business offers best in class SD-WAN service offerings. (Vodacom Business PR, October 2020)

Jeremy Wubs, *SVP for Product, Marketing, and Professional Services, Bell Business Markets, Bell Canada*
"MEF's done a fantastic job. It's kind of why I was excited to join around the journey to SD-WAN – to help set and guide those standards….If you're in the domain of setting and guiding the standards around SD-WAN, you have a responsibility, an obligation to make sure SD-WAN has a security posture and framework around it. You can't go and drive the industry standards around SD-WAN and say, hey, good luck to everybody on security." (MEF Infinite Edge Series – SASE, March 2021)

Jeremiah Ginn, *Software Defined Evangelist – Global Business – RMI, AT&T Business*
"Creating standardized abstract definitions for SASE-managed services offers an excellent opportunity for industry leaders to join this MEF effort, thereby growing the market, reducing market fragmentation, and enabling different stakeholders to maximize innovation in their respective areas of strength." (MEF Guest Blog, June 2021)

Laurent Perrin, *Director, Application Driven Networks, 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)

Michael Strople, *President & CEO, 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)

Technology Expert Perspectives

Nan Chen, *President, MEF*
"MEF has a proven track record of standardizing abstract constructs, attributes, and architectures for network services such as SD-WAN, Carrier Ethernet, Optical Transport, and IP. By achieving consensus on what a converged networking and security framework and associated SASE services should look like, MEF can empower technology and service providers to focus on providing a core set of common capabilities and then building their own innovative, differentiated offerings beyond those core features." (MEF PR, August 2020)

Pascal Menezes, *CTO, MEF*
"The SASE concept adjusts for a fundamental change in how enterprise users access business systems and the associated increased demand for lower-latency edge compute capabilities closer to the user. The well-defined and static network edge of the past is being replaced by more users working outside corporate walls and accessing business systems beyond corporate data centers. SASE shifts the focus from site-centric to user-centric security. The user can be anything (human, IoT, etc.) and anywhere, and security and network functions can be distributed away from the enterprise data center to maximize the availability of high performance edges (e.g. PoPs) and security clouds." (MEF PR, August 2020)

JL Valente, *VP, Product Management, Enterprise Routing and SD-WAN, Cisco*
"As businesses accelerate their digital initiatives and adoption of hybrid, multicloud network environments, SD-WAN continues to be the preferred choice for secure access and delivers the best user experience when connecting to cloud applications. To help fuel the growth of SD-WAN services, Cisco is supporting standards and certifications including MEF 3.0 to provide exceptional SD-WAN service capabilities, simplified integration, and peace of mind for optimized application experiences with guaranteed resiliency." (MEF PR, June 2021)

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)

Apurva Mehta, *Co-Founder and Chief Technology Officer, Versa Networks*
"MEF and its members continue to be at the forefront of driving industry standardization, collaboration, and innovation across leading technologies. Versa is excited to be participating in the MEF SASE initiative and sharing our expertise based on Versa SASE enabling businesses and organizations to deliver, enforce, and monitor networking and security in the cloud and on-premises for comprehensive security, application performance, multi-cloud connectivity, and consistent policy." (MEF PR, August 2020)

Jonathan Nguyen-Duy, *VP, Field CISO, Fortinet*
"Standards are fabulous because it allows consumers and enterprises to understand what is being offered and to judge and see what's best for them. I applaud the MEF efforts around that." (MEF Infinite Edge – SASE, March 2021)

Charles Eckel, *Principal Engineer, Global Technology Standards, Cisco; Co-Chair of MEF Test & Certification Committee*
"Standardization is really key to growing the market and accelerating the deployment of SASE services. (MEF Infinite Edge – SASE, March 2021)

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)

Industry Analyst Perspectives

Rosemary Cochran, *Principal & Co-Founder, Vertical Systems Group*
"MEF 3.0 certifications are having a significant impact on the networking industry worldwide. Our research over many years has tracked the strong correlation between Carrier Ethernet market share leadership and compliance with MEF specifications. Now this trend is developing for Managed SD-WAN as market leading service providers and platform suppliers attain MEF 3.0 certification. Ultimately the advantages gained are competitive differentiation, services assurance for customers, and streamlined collaboration among industry players." (MEF PR, June 2021)

Mauricio Sanchez, *Research Director, Network Security and Data Center, Dell'Oro*
"While SASE is in its early days, I applaud the SASE standardization efforts that MEF has undertaken. In the near term, they are contributing vocabulary and aligning conceptual frameworks that are vital to getting the industry to rally behind common implementation approaches. In the long term, let us hope that the resulting standards help make multi-vendor SASE a reality and accelerate adoption." (MEF Guest Blog, April 2021)

Ron Westfall, *Research Director and Senior Analyst, Futurum Research*
"Enterprises are swiftly expanding their digital workforces, increasing the number of users, devices, and services touching their network. As a result, the attack surfaces of their networks are enlarged, increasing exposure to malicious attacks across cloud and on-prem environments. Service providers' ability to offer secure enterprise connectivity services is essential to boosting the value of their evolving cloud-based offerings. There are many SASE attributes that, once standardized on the basis of MEF SASE Services, will create a strong foundation to deliver innovative security services and solutions that enterprises will value in meeting their unified network and security business objectives." (MEF PR, August 2020)

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)

MEF 3.0 SD-WAN & SASE FAQ

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