



MEF 3.0 SD-WAN Services – Frequently Asked Questions

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. IDC estimates that the global SD-WAN infrastructure market (excluding managed services) will reach \$US 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. The US managed SD-WAN services market alone is projected to reach \$US 4.5 billion by 2023, according to Vertical Systems Group.

Today's SD-WAN market shares similarities to the early days of today's \$US 80+ 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 emerging 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 facilitate creation of powerful new hybrid networking solutions that are 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.

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:

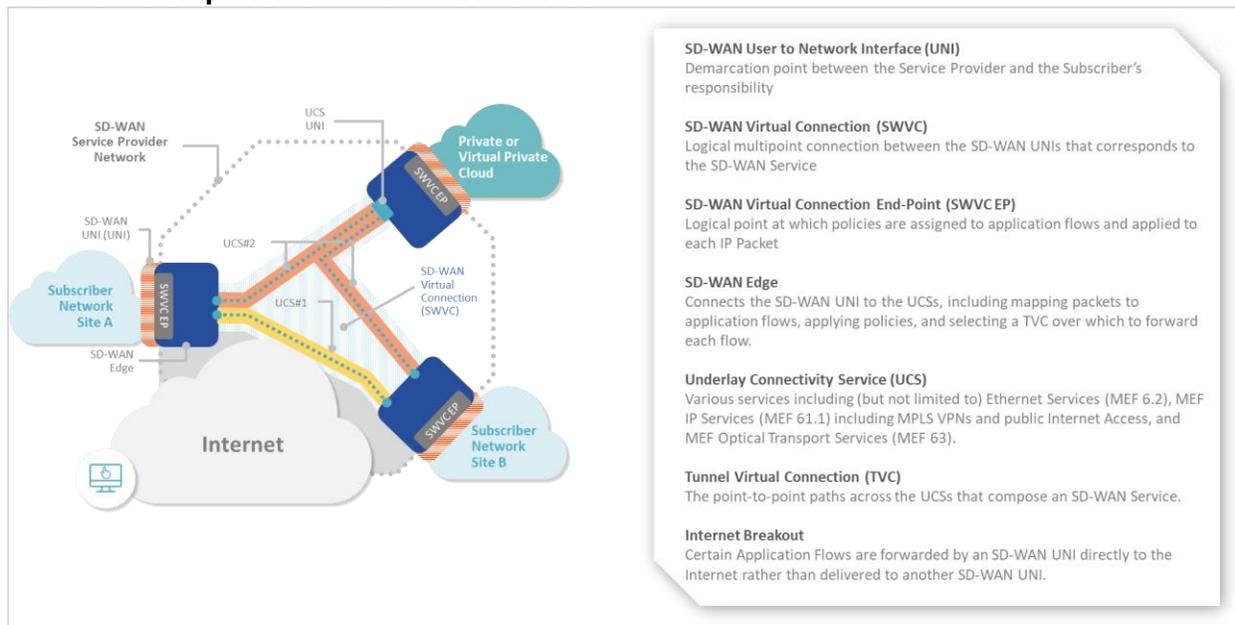
- Service attributes that describe the externally visible behavior of an SD-WAN service as experienced by the subscriber.
- Rules associated with how traffic is handled.

- 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?

MEF already has begun work on the next phase of SD-WAN standardization – MEF 70.1 – that will be of high interest to many enterprises. This work includes defining:

- Service attributes for application flow performance and business importance.
- SD-WAN service topology and connectivity.
- Underlay connectivity service parameters.

MEF also is progressing related standards work focused on:

- Application security for SD-WAN services.



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

MEF also is working with ONUG – the voice of the Global 2000 enterprises – to advance standardization of MEF 3.0 SD-WAN services.

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

SD-WAN benefits end customers by enhancing their applications network traffic. The appetite to combine application protection with network efficiency is high. Hence, MEF is focused on defining the first standard description of a security service. Security done wrong actually could negate SD-WAN benefits in speed and availability.

MEF’s Application Security for SD-WAN project 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.

The 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 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.

7. 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.

8. Can you explain 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

9. 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.

We already have dozens of service provider and technology companies who have voiced support for MEF work and contributed to standards development. This includes players like AT&T, Comcast Business, CenturyLink, Colt, Orange Business Services, Verizon, Fujitsu Network Communications, Nuage Networks, Cisco, Spirent, Amdocs, Silver Peak, and other MEF member companies.

Having ONUG's support for our work is a big boost 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.

Another important part of the story will be SD-WAN certification that leverages MEF's experience in certifying CE worldwide.

10. What is the status of SD-WAN certification and does that cover?

MEF will soon be publicly introducing a new MEF 3.0 SD-WAN Certification Program.

MEF 3.0 SD-WAN Certification enables service and technology providers to validate that their solutions conform to the SD-WAN Service Attributes and Services (MEF 70) standard. The certification will test the service attributes and their behaviors defined in MEF 70 and described in detail in the upcoming MEF SD-WAN Certification Test Requirements (MEF 90) standard. Demonstration of conformity with the industry's first SD-WAN services standard is a valuable reference baseline for users choosing a service supplier in the inevitable confusion of a fast-growing new market.

Service and technology companies interested in participating in the pilot should contact Daniel Bar-Lev, MEF, (Daniel@mef.net).

11. Will MEF be introducing SD-WAN professional certification?



MEF is dedicated to helping organizations overcome skills gaps that can impede successful network and service transformation, including in the domain of SD-WAN. Stay tuned for more information.

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

No. MEF is not creating SD-WAN protocols for vendor equipment interoperability standards. MEF is focused on defining an SD-WAN service with its attributes and policies that describe aspects of the SD-WAN service behavior or capability. This is regardless of how the provider or their SD-WAN vendor implements the service.

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

[MEF19](#) offers an excellent opportunity for industry professionals to engage directly with the top service and technology professionals shaping the SD-WAN services market and leading MEF standardization and certification work. SD-WAN will be a dominant topic in MEF 3.0 Proof of Concept Showcase demonstrations and conference sessions at MEF19, held 18-22 November 2019 in Los Angeles, California. Visit <http://www.MEF19.com> for registration and event information.

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

- [MEF 3.0 SD-WAN services page](#) on MEF.net
- [SD-WAN Service Attributes and Services \(MEF 70\) standard](#)
- [MEF YouTube Channel](#) – includes perspectives of service and technology providers
- [On-Demand Webinar - SD-WAN Service Growth and Automation Through Industry Alignment](#)

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 eaacinfo@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.

14. 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.

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)

Robert Victor, Senior Vice President of Product Management, Comcast Business

"MEF 3.0 SD-WAN standardization is a critical contribution to the industry, helping eliminate obstacles to the market adoption of SD-WAN. MEF is committed to establishing a common terminology and set of standards for industry stakeholders. We're excited to see how this helps speed our customers transition from legacy to next generation SD-WAN networks like Comcast Business's ActiveCore™ platform." (MEF PR, August 2019)

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)

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)

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)

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)

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)

Sunil Khandekar, Founder & CEO, Nuage Networks

“We are very pleased with MEF’s very fast progress in standardizing SD-WAN services. MEF brings industry-recognized standardization to a rapidly developing SD-WAN marketplace by defining both SD-WAN services and open APIs that provide an essential foundation for utilizing the full power of SDN and NFV technologies. By leveraging this framework, SD-WANs can be deployed in a fully disaggregated fashion on an open CPE platform and provide comprehensive SD-WAN functionality as well as on-demand service chaining of VNFs to provide the flexibility and choice that enterprises need from SD-WAN solutions.” (MEF PR, October 2018)

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)

Rosemary Cochran, Principal Analyst & Co-Founder, Vertical Systems Group

“In the latest MEF/Vertical survey, service providers worldwide cited the lack of an industry-accepted SD-WAN definition as a major business challenge. MEF is tackling this key issue with the first SD-WAN Service Standard resource that defines the common terminology and



framework needed by service providers and technology suppliers working to expand the SD-WAN market.” (MEF PR, May 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)