



MEF19

MEF 3.0 SD-WAN Services



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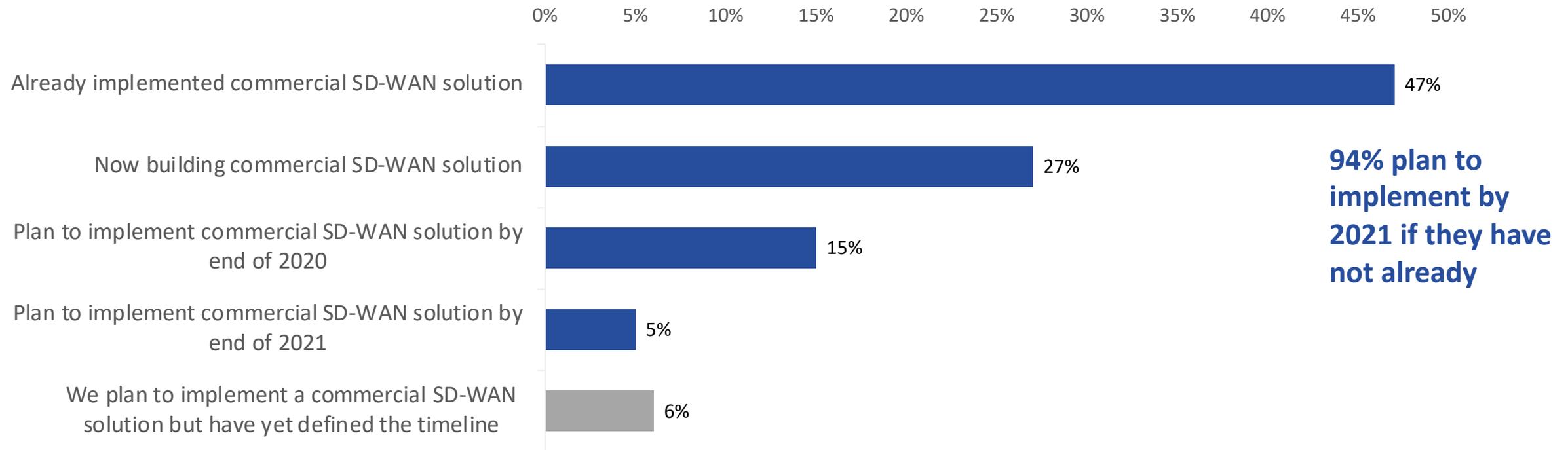


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What are plans for offering commercial SD-WAN service?

Commercial SD-WAN Service Plans



Heavy Reading, *SD-WAN Services Strategies*, November 2019. Based on survey responses from 125 service provider professionals based in every region of the world.

What are the biggest threats to your SD-WAN strategy?

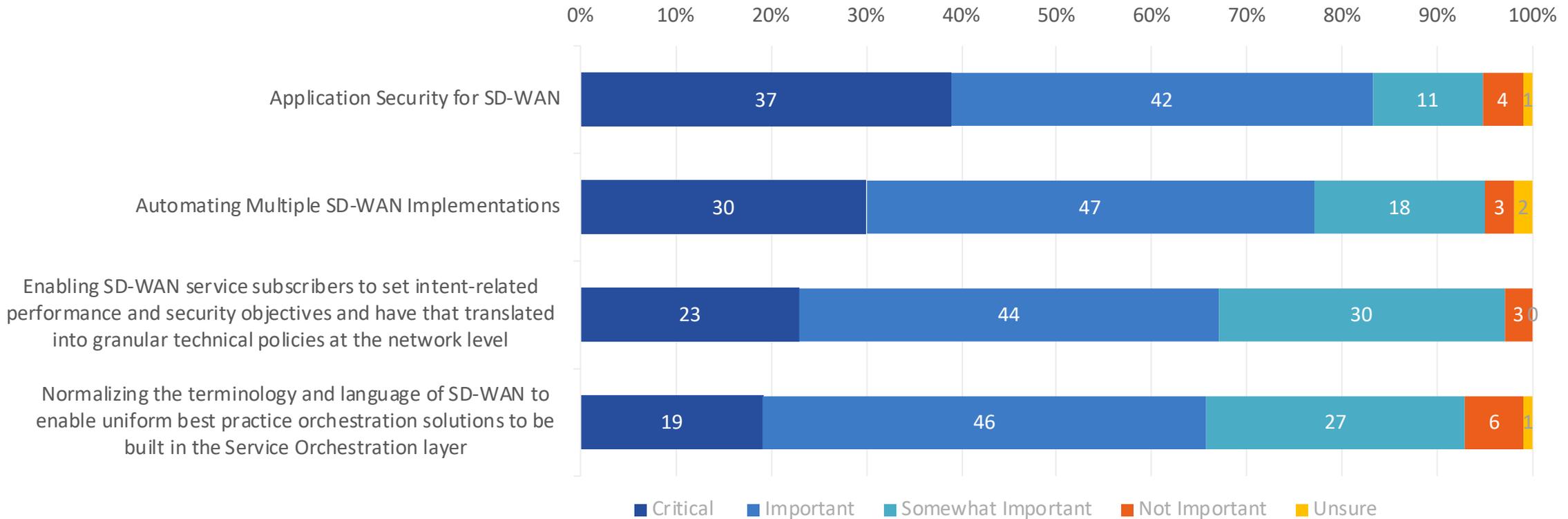
Threat	Rank
Complexity of managing a multi-vendor ecosystem	1
Complexity of managing a multi-cloud SD-WAN deployment	2
The SD-WAN entry point shifts from connectivity to enterprise applications, enabling vendors to sell direct	3
SD-WAN vendors selling direct to enterprises	4
Economics of a multi-vendor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



Heavy Reading, SD-WAN Services Strategies, November 2019. Based on survey responses from 125 service provider professionals based in every region of the world.

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

SD-WAN-Related Standards Activities



Heavy Reading, *SD-WAN Services Strategies*, November 2019. Based on survey responses from 125 service provider professionals based in every region of the world.

MEF 3.0 SD-WAN Strategy

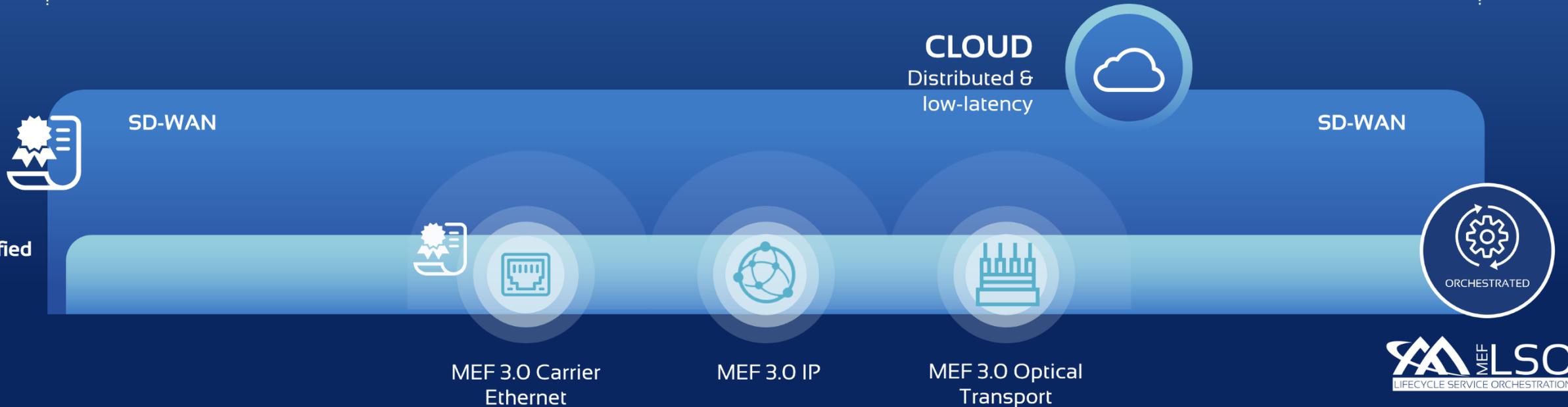
- Accelerate market growth & innovation through standardization & certification of services, technologies, professionals.
- Combine standardized overlay SD-WAN services + dynamic underlay connectivity services to create powerful MEF 3.0 hybrid networking solutions orchestrated by LSO APIs.
- Deliver unprecedented user- and application-directed control over network resources and service capabilities.

Overlay & Underlay MEF 3.0 Services Orchestrated by LSO APIs



OVERLAY SERVICES

Application-centric, Policy-driven, Assured



UNDERLAY CONNECTIVITY SERVICES

Assured, Dynamic, High-Speed

Expected market impact of the MEF SD-WAN standard



Simplifies buying, selling, assessing, and delivering SD-WAN services, **accelerating market growth.**



Interfaces policy with intelligent underlay connectivity services, **improving application experience with guaranteed resiliency.**



Facilitates SD-WAN service orchestration using MEF LSO architecture across **automated networks.**



Enables certified MEF 3.0 SD-WAN services, enhancing market confidence, driving **market growth.**

The MEF 3.0 SD-WAN Services standard is supported by >30 service provider & technology supplier & testing companies.



MEF SD-WAN Service Standard (MEF 70)



- 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.

MEF 70 Details



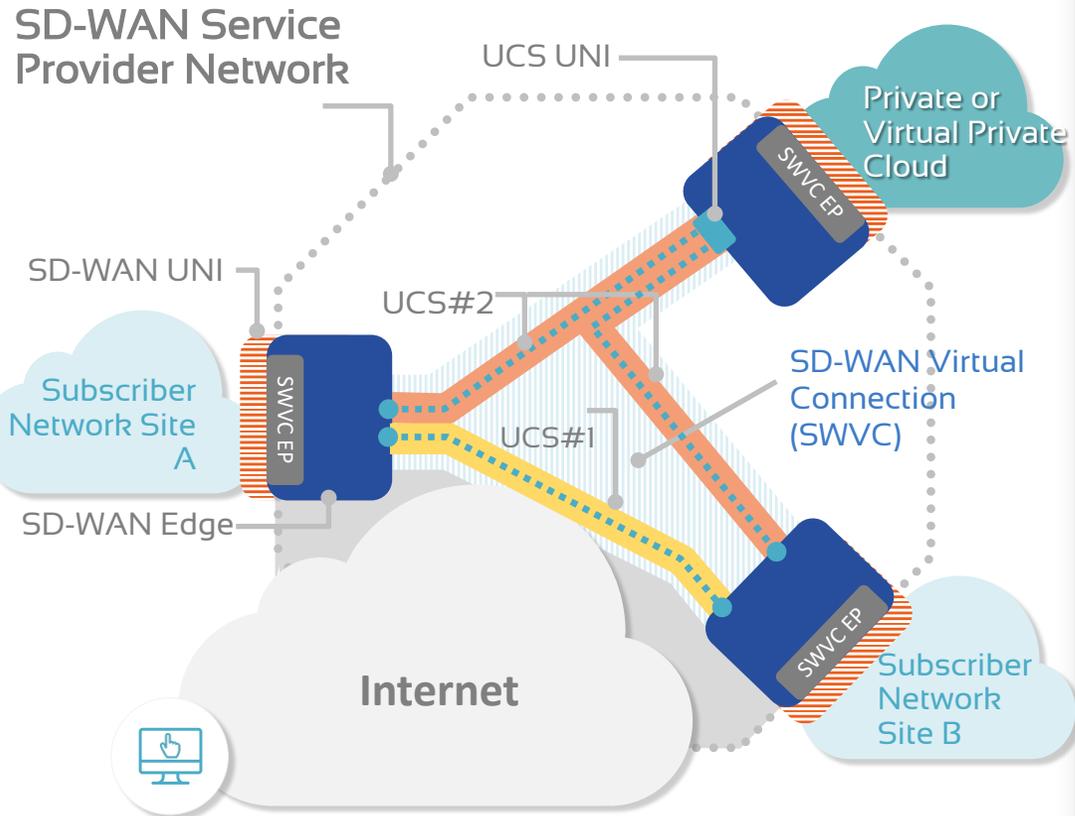
MEF 70 SD-WAN Service Characteristics

- The Subscriber connects to the Service at an SD-WAN UNI
- The SD-WAN Service provides a layer 3, IP routed network
 - The basic unit of transport at the SD-WAN UNI is an IP Packet
- Ingress IP Packets at UNI are segregated into Application Flows classified on Layer 2-7 info
- The SD-WAN Service supports policy-based traffic management
- The SD-WAN Service utilizes one or more Underlay Connectivity Services
- SWVC topologies are defined by Policies and IP forwarding constraints
- SD-WAN Services offer encryption between SD-WAN Edges
- Service quality objectives are based on the Policy applied to each Application Flow

MEF 70 SD-WAN Service Characteristics (Continued)

- Application Flows can be blocked/discarded at an SWVC End Point by Policy
- Each Application Flow can, by Policy, be subject to a bandwidth commitment and limit
 - Members of an Application Flow Group share a single bandwidth commitment and limit.
- Managed SD-WAN Services typically provide a Subscriber web portal or API
 - with a dashboard of network health and performance and application information.
- In a co-managed SD-WAN Service a portal or API can enable the Subscriber to modify aspects of the SD-WAN service
 - such as defining Application Flows and creating/modifying Application Flow Policies, etc.
- SD-WAN Services align with MEF LSO principles including Service Orchestration

Components of MEF SD-WAN Service



SD-WAN User to Network Interface (UNI)

Demarcation between Service Provider and Subscriber responsibility

SD-WAN Virtual Connection (SWVC)

Logical multipoint connection between the SD-WAN UNIs that corresponds to the SD-WAN Service

SD-WAN Virtual Connection End-Point (SWVC EP)

Logical point where application flow policies are assigned and applied

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

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)

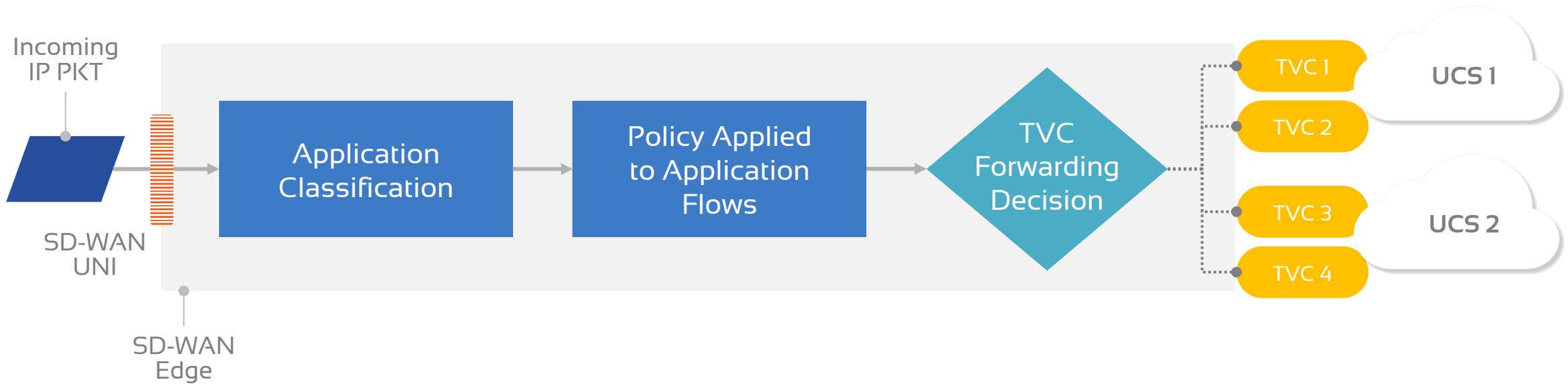
Tunnel Virtual Connection (TVC)

Point-to-point paths across UCSs that compose an SD-WAN Service

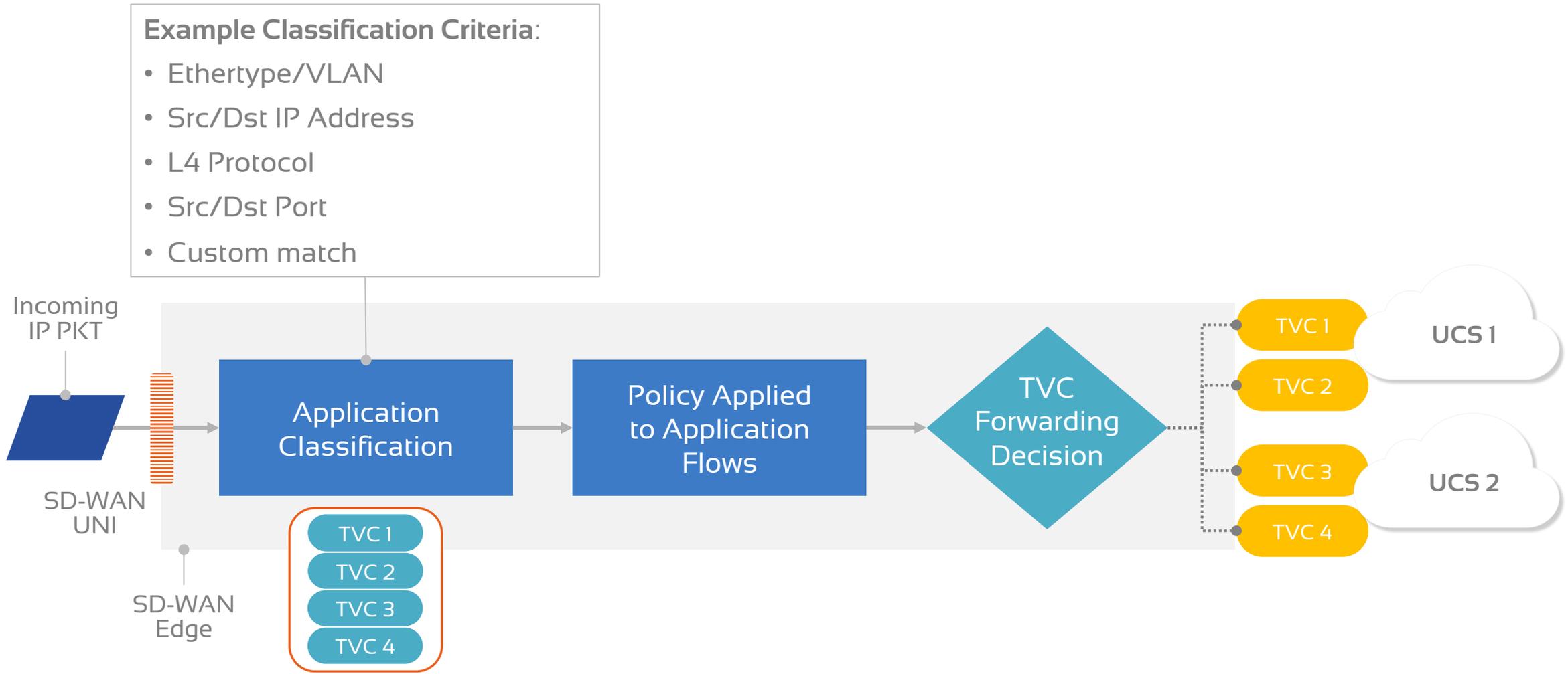
Internet Breakout

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

SD-WAN Application Flow & Policy Function



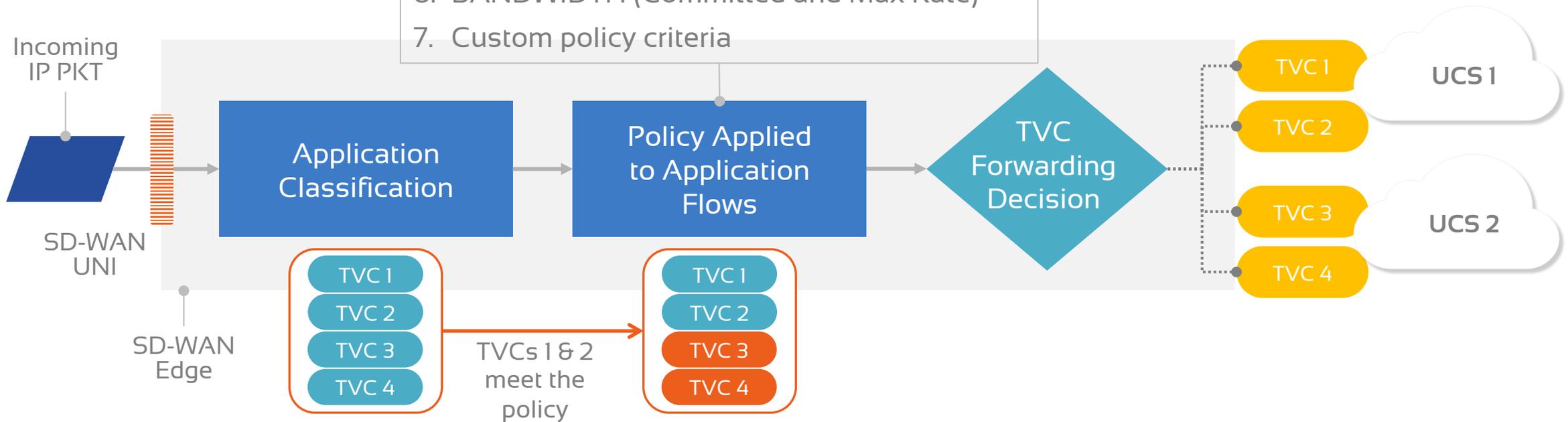
SD-WAN Application Flow & Policy Function



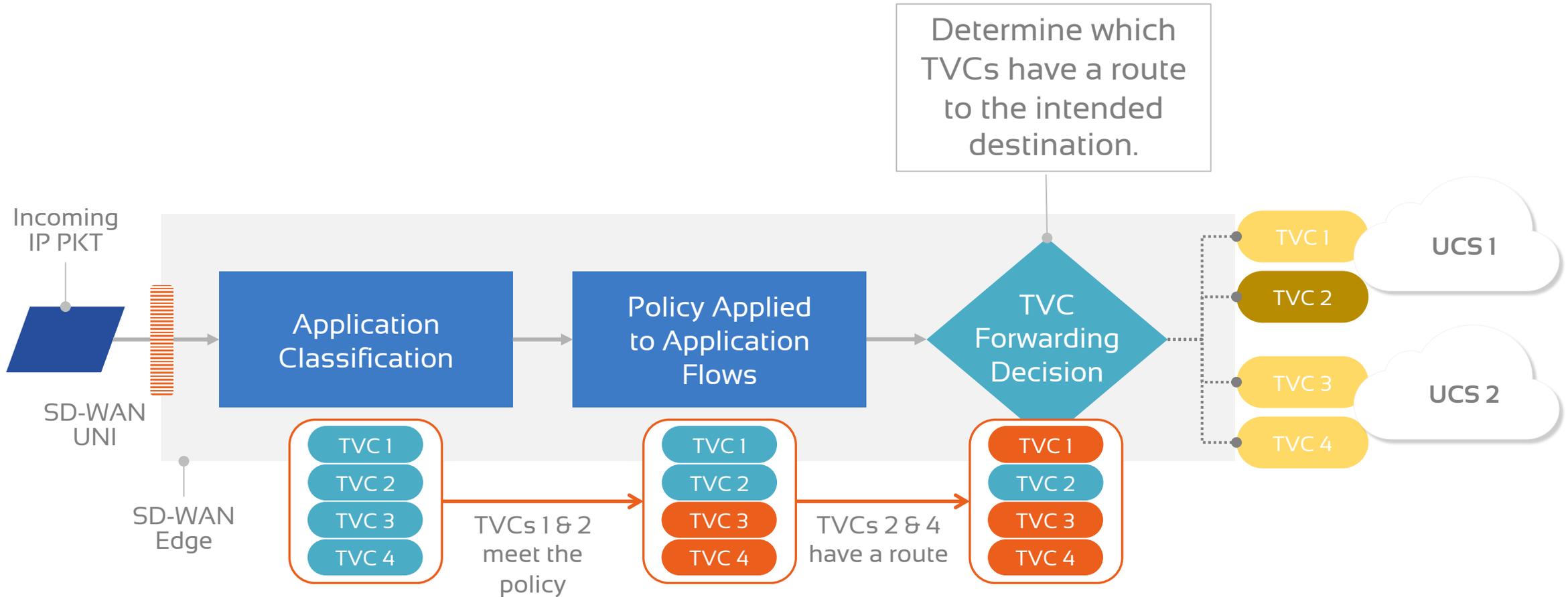
SD-WAN Application Flow & Policy Function

Each Policy includes:

1. ENCRYPTION (Yes, Either)
2. PUBLIC-PRIVATE (Private-only, Either)
3. INTERNET-BREAKOUT (Yes, No)
4. BILLING-METHOD (Flat-Rate-only, Either)
5. BACKUP (Yes, No)
6. BANDWIDTH (Committed and Max Rate)
7. Custom policy criteria



SD-WAN Application Flow & Policy Function



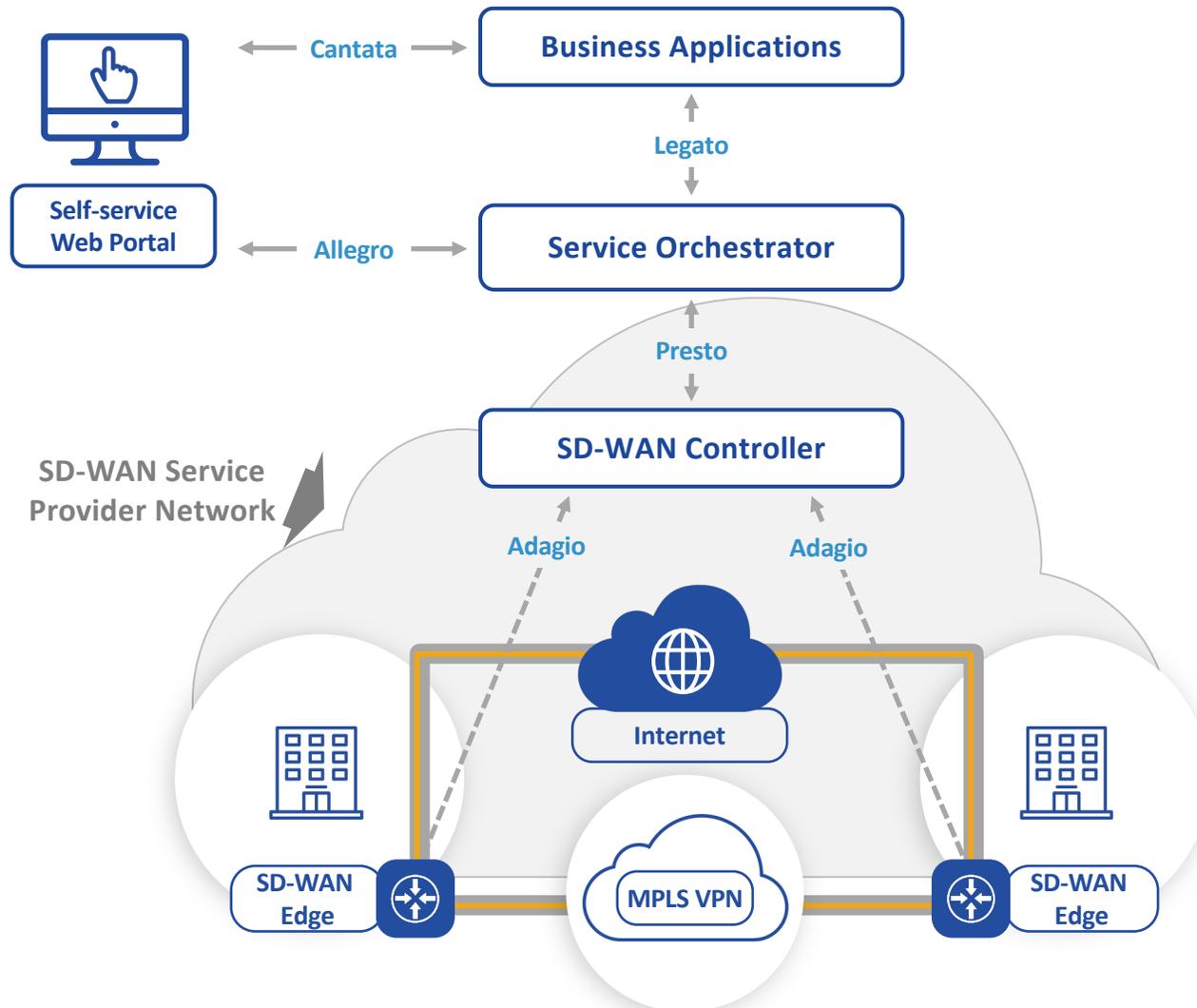
SD-WAN Service Use Cases



SD-WAN Service Use Case

1

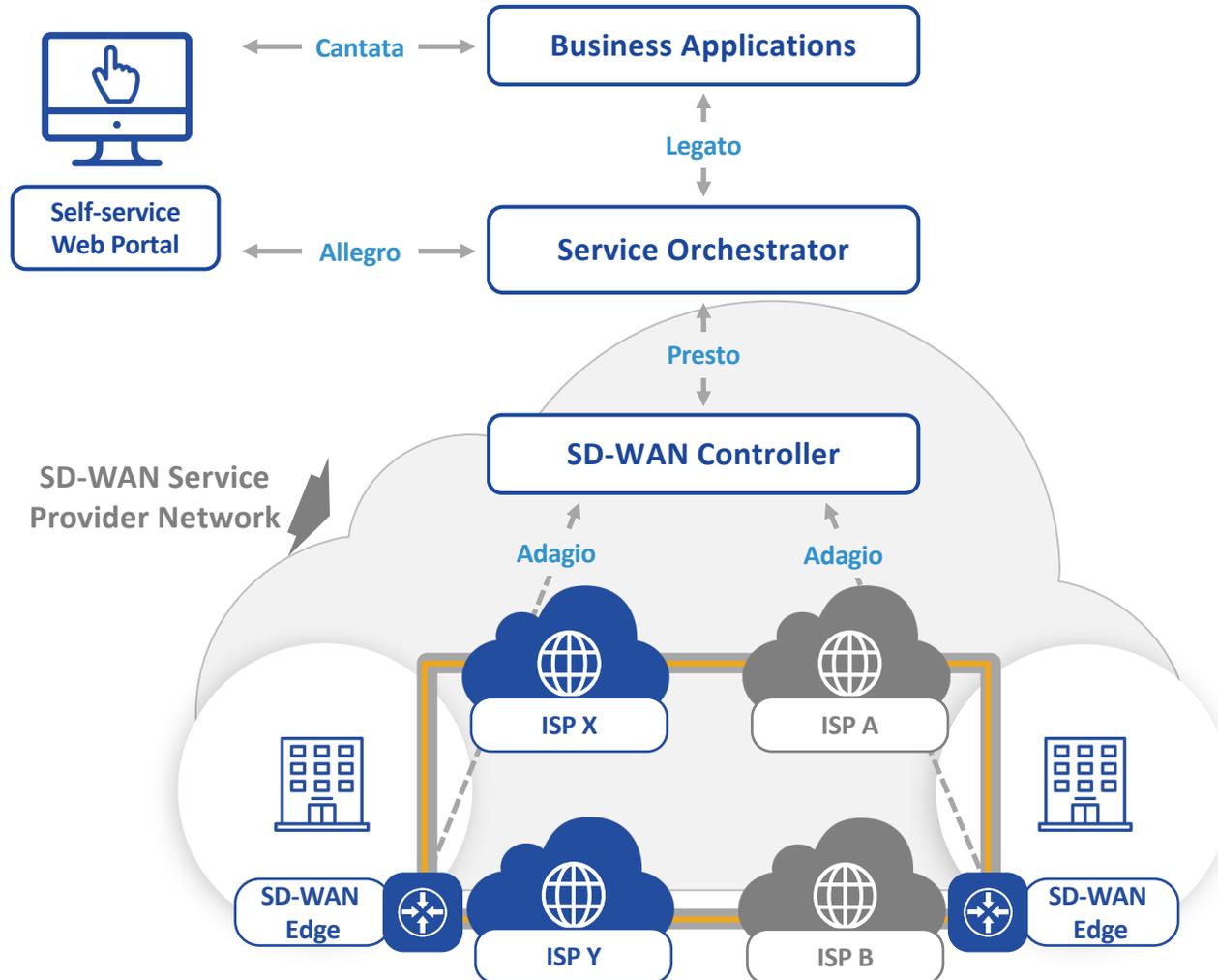
Hybrid WAN: SD-WAN Service over Internet and MPLS UCSs



- Encrypted SD-WAN TVCs over the Internet UCS
- Can often increase site-to-site bandwidth at no additional cost
- Increased network availability and resiliency
- Internet and MPLS VPN UCS can be provided by different service providers

SD-WAN Service Use Case

Dual Internet UCSs: SD-WAN Service over Multiple ISPs



- Encrypted SD-WAN TVCs over each Internet UCS from each ISP
- Using multiple ISPs achieves provider diversity
- Increased network availability and resiliency
- ISPs may not be the SD-WAN Service Provider

Next Steps & Related Projects



SD-WAN Service investment for accelerated growth.



MEF w70.1 (Phase 2 of MEF 70)

- Additional service attributes related to application business importance and prioritization
- Underlay Connectivity Service parameters required to deploy an SD-WAN Service



MEF w88 - Application Security for SD-WAN services

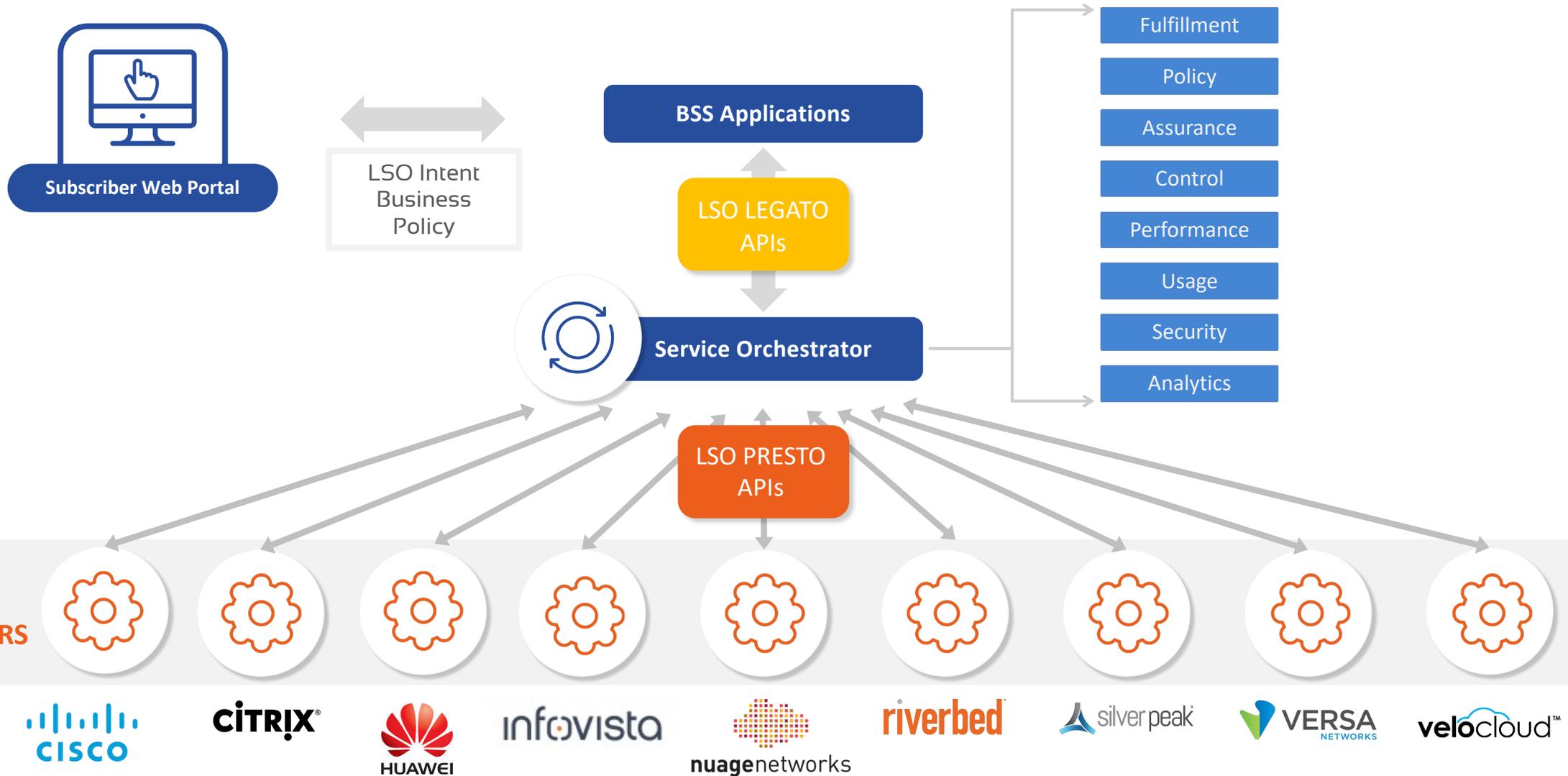


Information and data modeling standards including LSO Legato

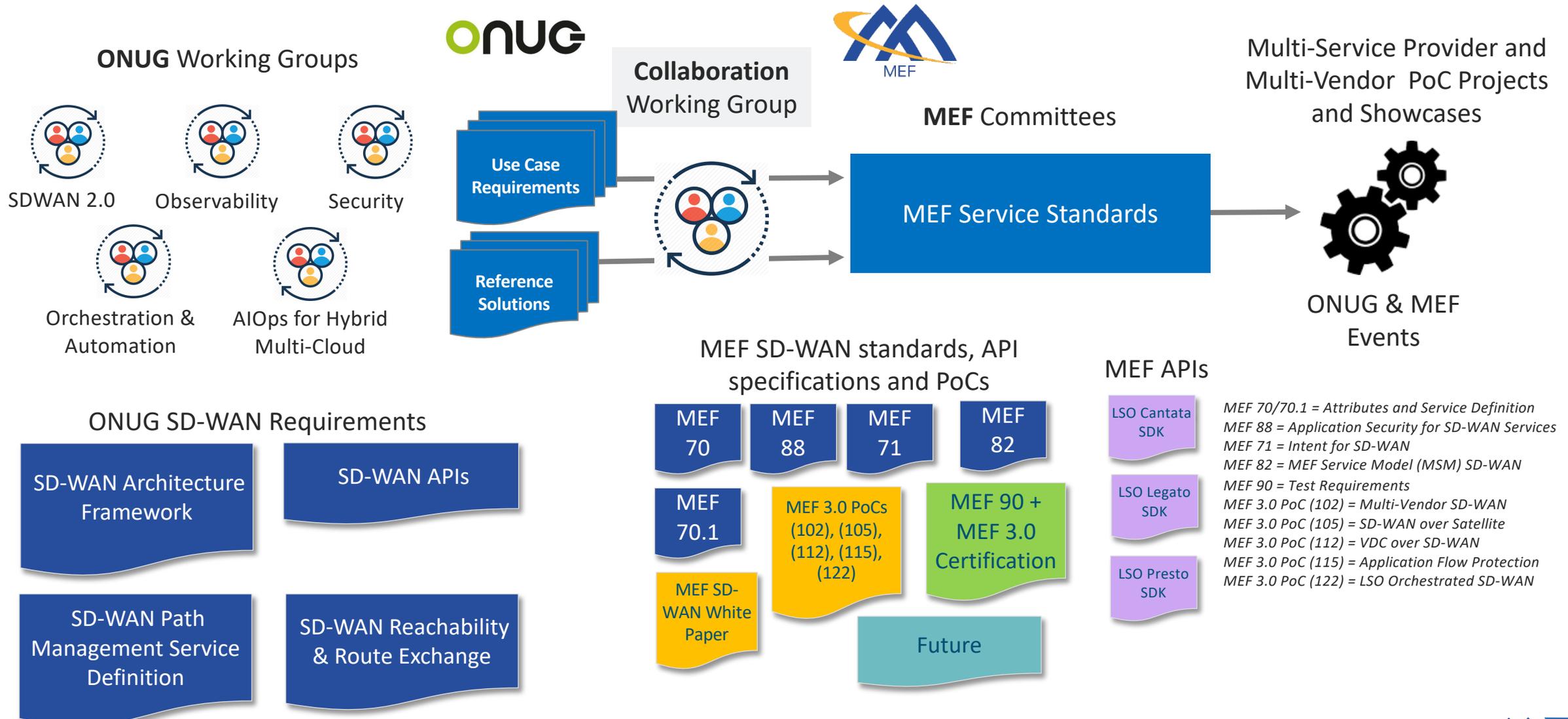


Intent-based networking for SD-WAN

Multi-Vendor SD-WANS using LSO Presto APIs



MEF – ONUG Collaboration Model



MEF 3.0 SD-WAN Services White Paper – NEW!

- Intended for SD-WAN Service Providers and their enterprise customers
- Introduces standardized (MEF 70), managed SD-WAN services and their building blocks
- Describes use cases for managed SD-WAN services
- Highlights requirements of managed SD-WAN services in different market verticals
- Overview of MEF's continuing SD-WAN work
 - Service certification
 - Professional certification
 - LSO for SD-WAN
 - Application Security for SD-WAN Services
 - Intent for SD-WAN

[Download from MEF.net](https://www.mef.net)

<https://www.mef.net/mef-white-paper-request/>



MEF White Paper

MEF 3.0 SD-WAN Services

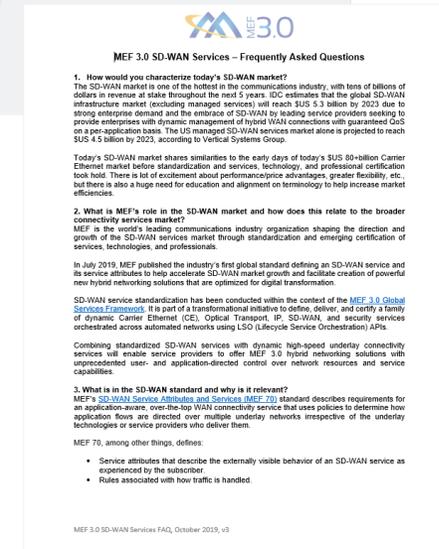
November 2019

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MEF SD-WAN Summary

- SD-WAN Service Standard **MEF 70**
 - Version 2 (MEF 70.1) started
- Extension to the SD-WAN Project
 - Application Security for SD-WAN
 - Intent Based Networking for SD-WAN
 - LSO APIs
- **MEF 3.0 SD-WAN Service & Technology Certification**
 - Pilot Certification in progress
 - SD-WAN Certification Test Requirements (Working Draft MEF 90)
- **MEF SD-WAN Professional Certification**
 - In a “Beta for MEF members and certified professionals
 - General availability in mid-December
- [MEF 3.0 SD-WAN White Paper \(Nov 2019\)](#)
- [MEF 3.0 SD-WAN Frequently Asked Questions](#) on MEF.net

[More on MEF 3.0 SD-WAN](#)



ft represents MEF work in progress and is subject to change.

MEF 19

