MEF 3.0 CE Service Certification Overview

An Introduction

October 20, 2020

MEF

Topics

1. {Company} Objectives for MEF Certification

2. MEF Quick Overview

3. MEF 3.0 CE Services

4. MEF 3.0 CE Services Certification

    – How it works - at a glance

    – Nature of testing

    – Certification process

    – Preparing for testing

    – Certification registries

    – Marketing support

5. Background Information

    – Additional benefits & testimonials, MEF-CECP Professional Certification, MEF membership information

{Company} Objectives for MEF Certification

MEF Quick Overview

Mission – Develop a Global Federation of Dynamic, Trusted & Certified Services

MISSION Statement

Develop a global federation of network, cloud, and technology providers supporting dynamic, assured, and certified network services that power enterprise digital transformation.

Trusted services
- Performance assured
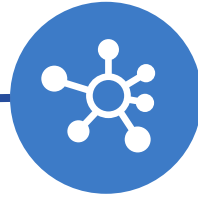- Secure
- Underlay & overlay

Global Federation
- Inter-provider service automation
- Business & operational layers
- Extending to enterprise & cloud

Organization
Founded in **2001** with **200+** members including **130+** service providers

Differentiation
Focused on **revenue-generating services**

Credibility
Enabled the **$85+B CE** service & technology market
Driving **SD-WAN** service & technology market

Adoption
Successful industry alignment through **certification**

MEF 3.0's Global Services Framework
Accelerate assured services across automated networks

Assured
- Security & SASE
- SD-WAN
- IP
- Carrier Ethernet
- Optical Transport

Automated
- Orchestration across multiple providers
- Orchestration over multiple network technology domains
- Standards and SDKs

Agile
- Cloud-based test & certification platform
- On-demand, user-initiated
- For both services & LSO APIs
- Plus certified professionals

Expanded
- MEF global membership
- MEF 3.0 Proofs of Concept
- MEF LSO Developer Community
- Open source projects & SDOs
- Enterprise Advisory Council
- Events, workshops, webinars

MEF 3.0 CE Services

About MEF 3.0 CE Services

MEF 3.0 CE services are orchestration-ready and **support a wide variety of applications** and use cases provide the highest level of performance, assurance, and agility available in the $60+ billion global CE services market.
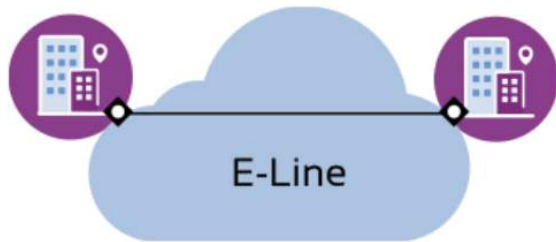
The MEF 3.0 CE service portfolio includes a set of **certifiable subscriber services** and a set of **certifiable operator services**

MEF 3.0 CE services **incorporate dozens of published standards**, substantially increasing capabilities, and raising the performance bar well above globally ubiquitous and widely certified CE 2.0 services.

MEF 3.0 CE Subscriber Services (Retail)

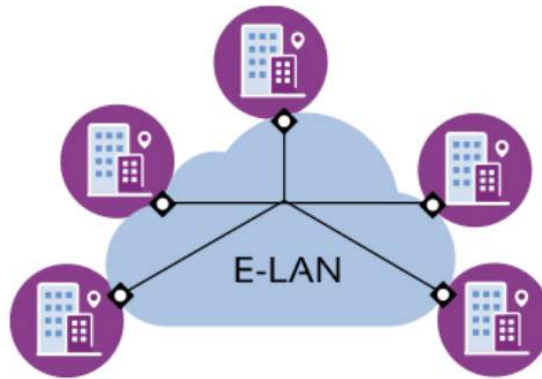## Carrier Ethernet E-Line Service

E-Line services enable point-to-point connectivity between endpoints.

EPL, EVPL Variants
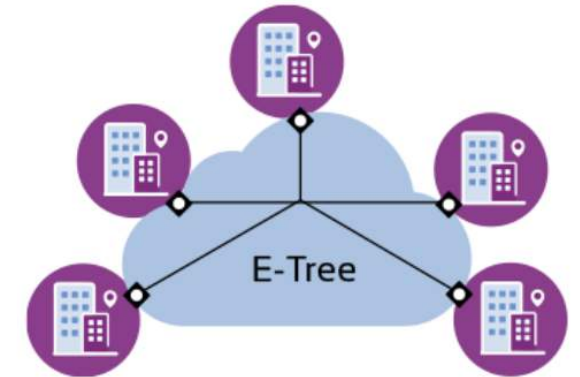
Carrier Ethernet E-LAN Service

E-LAN services enable multipoint-to-multipoint connectivity.

EP-LAN, EVP-LAN Variants

Carrier Ethernet E-Tree Service

An E-Tree is a rooted multipoint service that enables sites with hub and spoke multipoint connectivity.
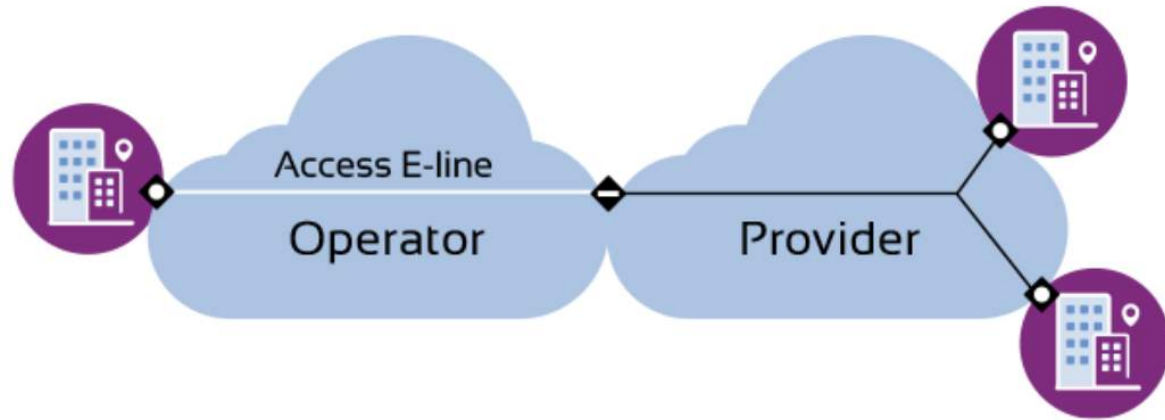

EP-Tree, EVP-Tree Variants

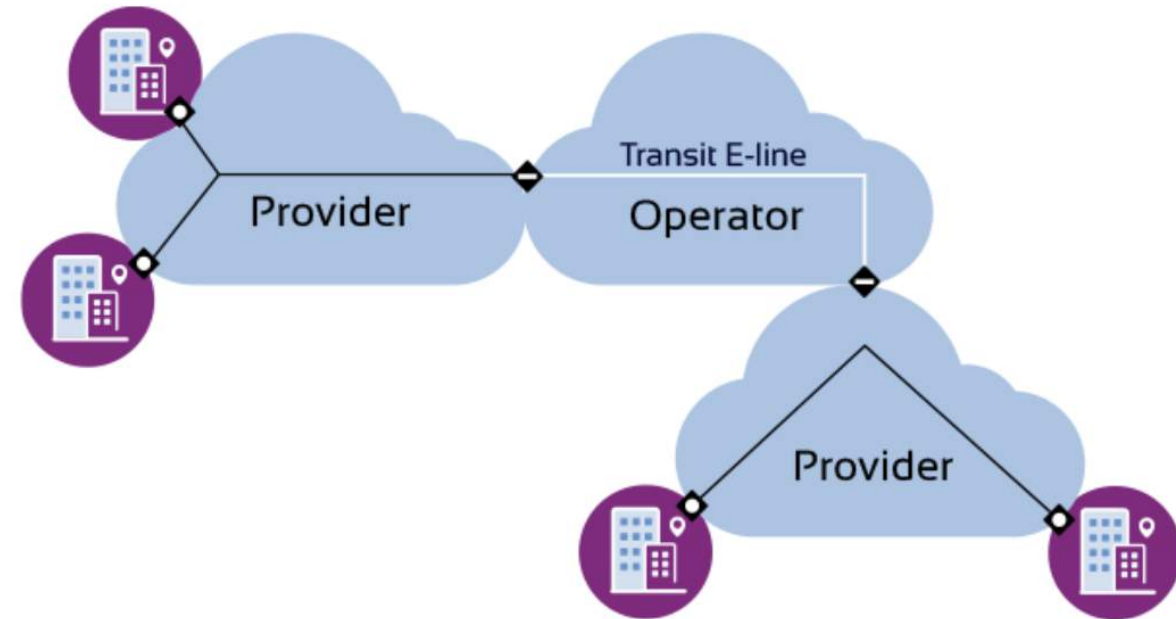# MEF 3.0 CE Operator Services (Wholesale)

Access E-Line Service

Access E-Line services enable point-to-point connectivity to extend a service to off-net subscriber sites.

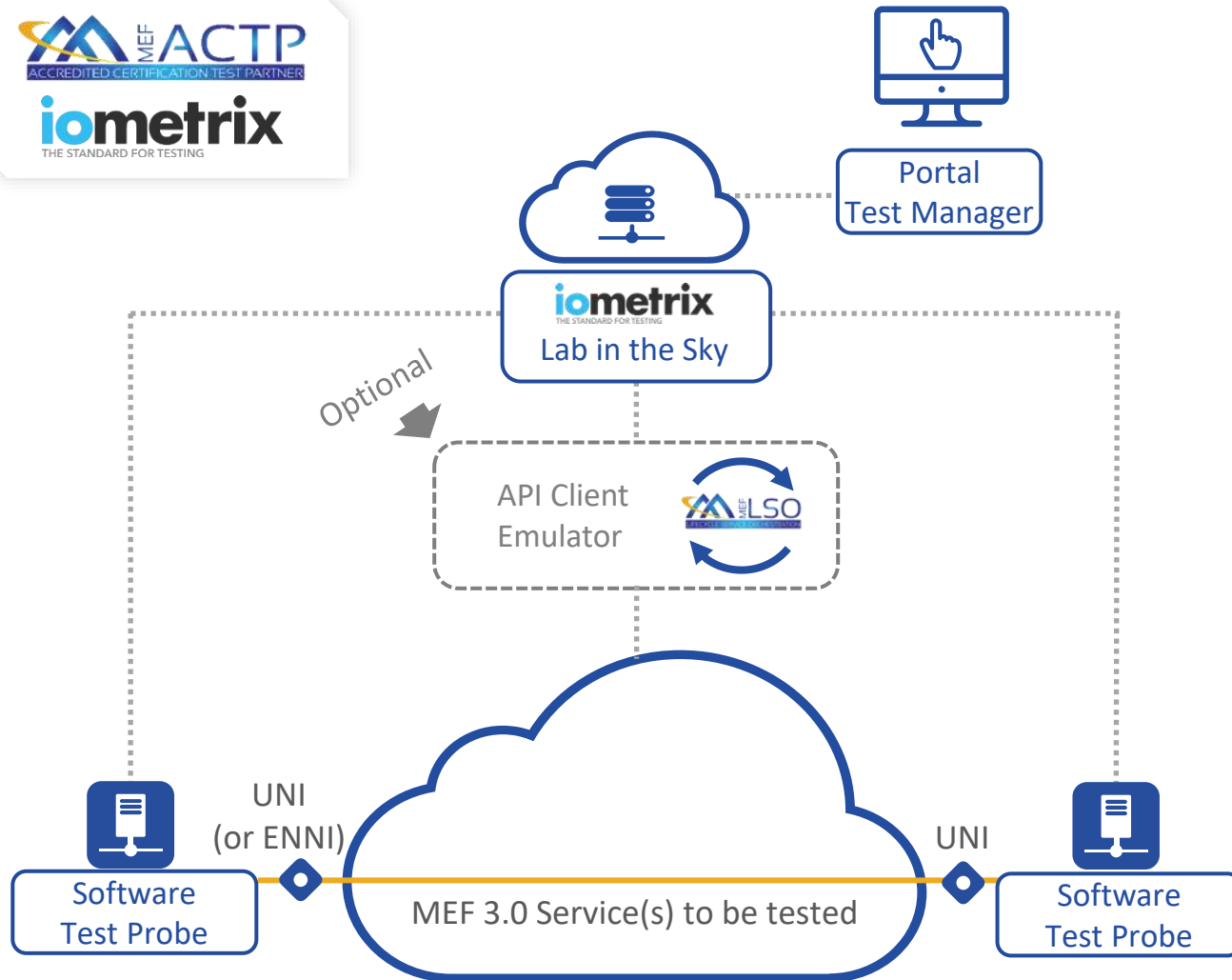A-EPL, A-EVPL Variants

Transit E-Line Service

Transit E-Line services enable point-to-point connectivity to join multiple provider networks through an intermediate Carrier Ethernet network.

MEF 3.0 CE Certification

How it Works - MEF 3.0 CE Certification Test Environment

MEF ACTP
ACCREDITED CERTIFICATION TEST PARTNER
iometrix
THE STANDARD FOR TESTING

Portal
Test Manager

iometrix
THE STANDARD FOR TESTING
Lab in the Sky

Optional

API Client
Emulator
MEF LSO

UNI
(or ENNI)

UNI

Software
Test Probe

MEF 3.0 Service(s) to be tested

Software
Test Probe

CLOUD MANAGER
Create | Execute | Compute and log test cases

USER PORTAL
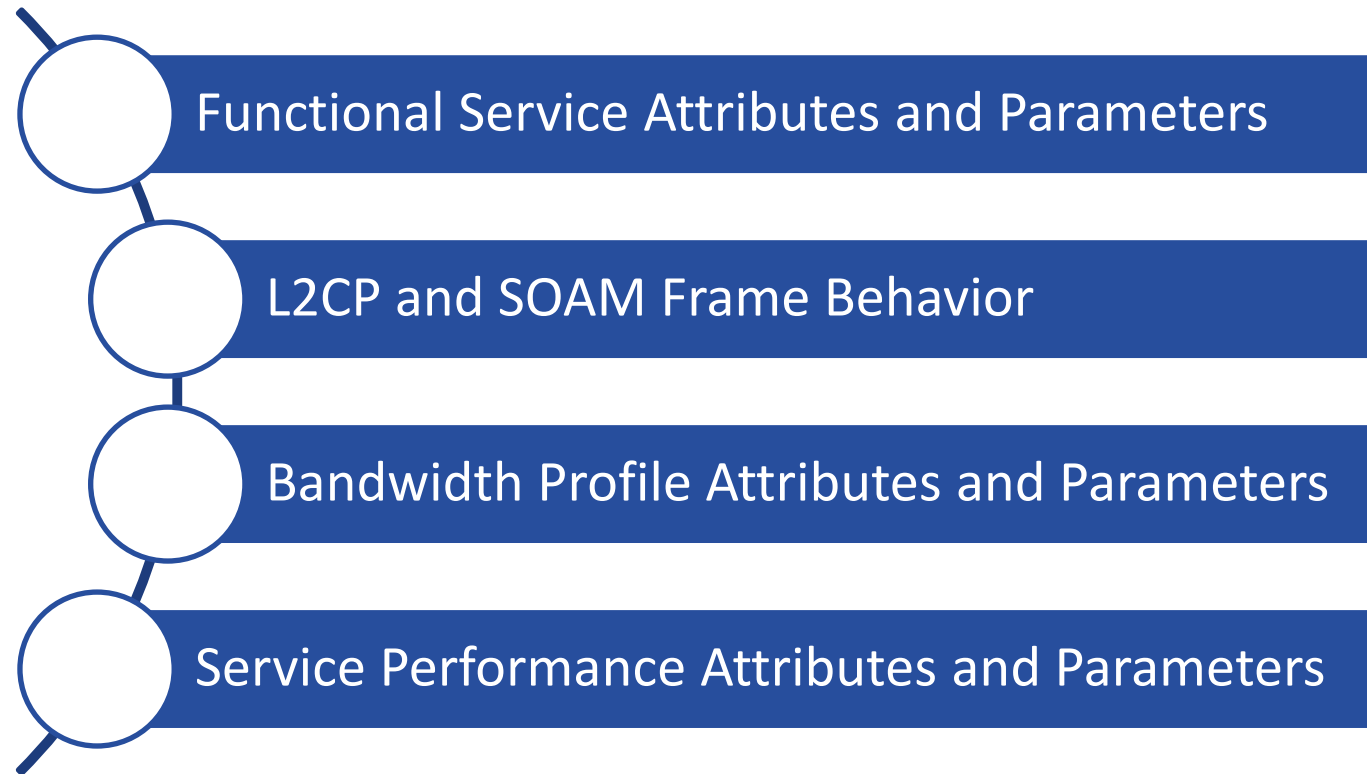Setup | Test | Review the results

SOFTWARE PROBES
Customer owned white-boxes run test software

MEF

Nature of Testing
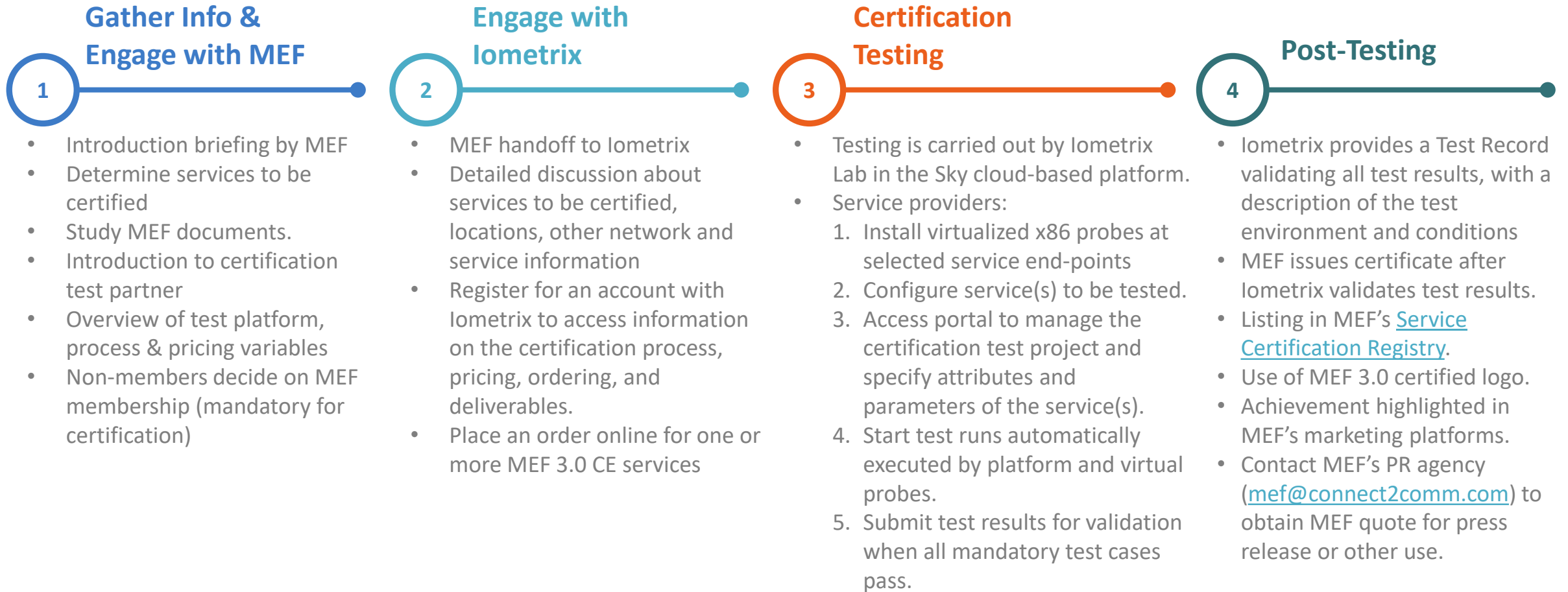
MEF 3.0 Certification testing validates the conformity of four separate categories of Carrier Ethernet service attributes and parameters defined in MEF Technical Specifications for subscriber and wholesale CE services

- Functional Service Attributes and Parameters
- L2CP and SOAM Frame Behavior
- Bandwidth Profile Attributes and Parameters
- Service Performance Attributes and Parameters

MEF 3.0 Certification High Level Workflow

06 Publication in MEF Registry & Marketing Support

01 Engage with MEF, Program Introduction, Membership Info, Intro to Iometrix

02 Account with Iometrix, Obtain Pricing, Activate Subscription, Access Portal, Identify Testing Locations

03 Configure MEF 3.0 Service(s) on Network / Product , Connect to Cloud and Setup Probes

04 Run Tests, Review Test Results and Troubleshoot - You Have 6 months of Platform Access!

05 Submit Test Results to Iometrix for Validation

MEF 3.0 CERTIFIED

MEF 3.0 CE Certification Workflow - In Detail

Gather Info & Engage with MEF

1

- Introduction briefing by MEF
- Determine services to be certified
- Study MEF documents.
- Introduction to certification test partner
- Overview of test platform, process & pricing variables
- Non-members decide on MEF membership (mandatory for certification)

Engage with Iometrix

2

- MEF handoff to Iometrix
- Detailed discussion about services to be certified, locations, other network and service information
- Register for an account with Iometrix to access information on the certification process, pricing, ordering, and deliverables.
- Place an order online for one or more MEF 3.0 CE services

Certification Testing

3

- Testing is carried out by Iometrix Lab in the Sky cloud-based platform.
- Service providers:
  1. Install virtualized x86 probes at selected service end-points
  2. Configure service(s) to be tested.
  3. Access portal to manage the certification test project and specify attributes and parameters of the service(s).
  4. Start test runs automatically executed by platform and virtual probes.
  5. Submit test results for validation when all mandatory test cases pass.

Post-Testing

4

- Iometrix provides a Test Record validating all test results, with a description of the test environment and conditions
- MEF issues certificate after Iometrix validates test results.
- Listing in MEF's Service Certification Registry.
- Use of MEF 3.0 certified logo.
- Achievement highlighted in MEF's marketing platforms.
- Contact MEF's PR agency (mef@connect2comm.com) to obtain MEF quote for press release or other use.

* The CE Services Test Requirements (MEF W91) specifies the service attributes and parameters to be verified in testing of MEF 3.0 CE subscriber services (E-Line, E-LAN, and E-Tree) and operator services (Access E-Line and Transit E-Line)

New MEF Services Certification Registry

There are 48 MEF 3.0 Certified Companies

Certification Registry Detail

Preparing for Certification - Start with MEF Standards

MEF 3.0 Technical Specifications

23.2 — CoS IA Phase 3

10.3 — Services Attributes Phase 3

6.2 — Services Definitions Phase 3

26.2 — ENNI & OVC Services Attributes Phase 3

45 / 45.0.1 — L2CP

51 — OVC Services Definitions

MEF 3.0

MEF W91 Certification Test Requirements

MEF 3.0 — Certification Test Requirements

MEF W91 is the Starting Point!

MEF W91 defines what is tested and efficiently points to the underlying MEF services standards for both subscriber and operator services.

Need a Business Case?
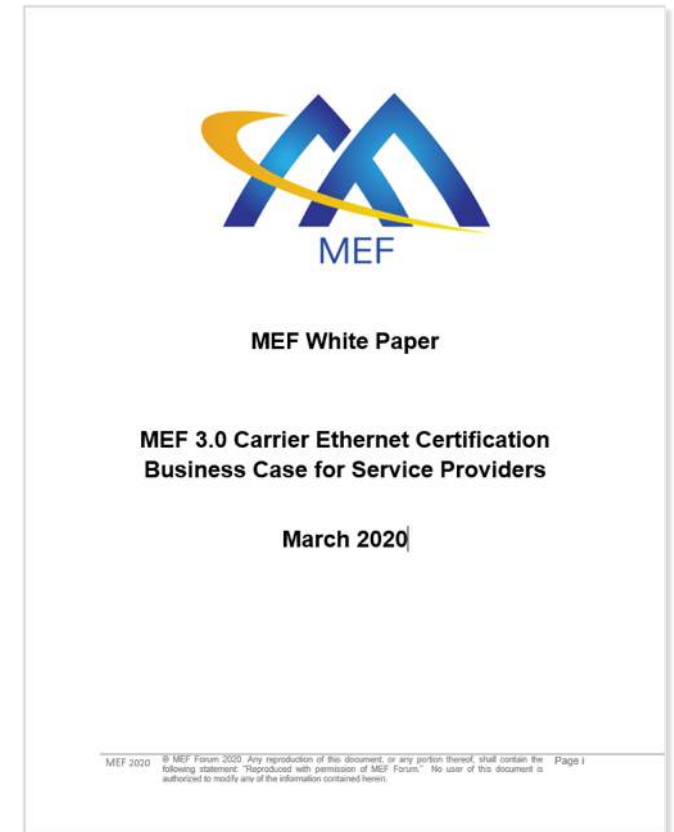## *MEF 3.0 CE Services Certification Business Case White Paper*

- Intended to help service provider decision makers drive deployment & certification of MEF 3.0 CE retail and wholesale services + maximize their sales & marketing potential

- Explores how certification can strengthen customer relations, increase revenue opportunities, and improve operational efficiencies

Contents

- Executive Summary

- Introduction

- Benefits for Service Providers

- Service Provider Market Adoption

- Certifying MEF 3.0 CE Services

- Conclusion

Link

MEF White Paper

MEF 3.0 Carrier Ethernet Certification Business Case for Service Providers

March 2020

MEF 2020   © MEF Forum 2020 Any reproduction of this document, or any portion thereof, shall contain the   Page i
following statement: "Reproduced with permission of MEF Forum." No user of this document is
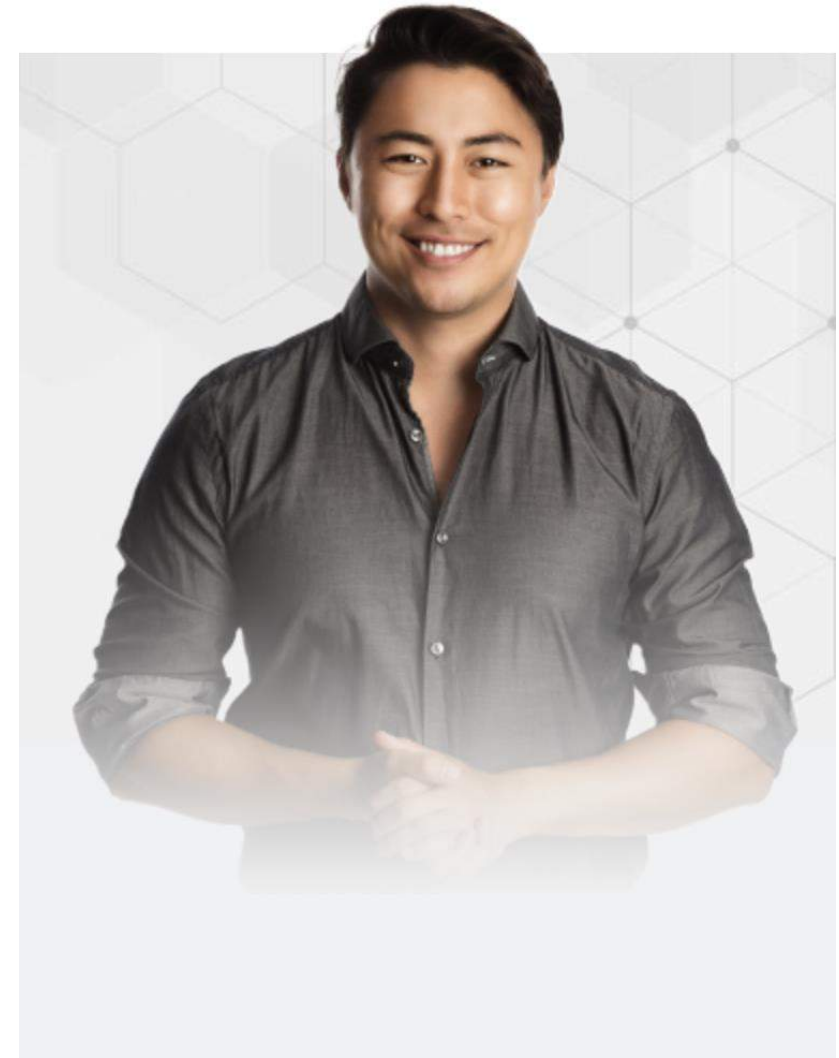authorized to modify any of the information contained herein.

Budgetary Pricing and Important Terms

- Pricing for a single service, including white boxes is less than US$20K

- Volume pricing discounts are offered for additional services

- Pricing includes access to the test platform for 6 months, providing the ability to test incrementally and iteratively

- MEF membership is required before testing begins

MEF 3.0 CE Services Certification Benefits

Service Providers - General

Validation of Performance Excellence

Certification validates that CE services conform to the highest levels of performance, assurance, and agility established by the world's defining authority for standardized network services.

Competitive Differentiation

Service providers can compete more effectively by setting themselves apart from the crowd with higher-value services proven capable of addressing the demanding connectivity requirements of digital transformation.

Faster RFI/ RFP Response & Customer Evaluation

Service providers can reduce their time and operational costs when responding to RFIs/RFPs by using certification to validate service capabilities specified in RFI/RFP checklists. Presence in MEF's Service Certification Registry simplifies and accelerates evaluation by customers.

Confidence Boost for Sales Force

Service provider sales teams can operate with greater confidence in pursuing business with even the toughest customers when armed with certified solutions in their portfolios and certification logos signifying proven quality and value.

Quicker R&D for Advanced Services

The automated, cloud-based platform used for MEF 3.0 CE certification testing liberates service providers to run their own compliance tests in an on-demand fashion. This helps service providers tighten up their service development process, enhance their product offering through in-depth validation of advanced features, and speed overall service time-to-market.

Better Internal Coordination

Experience with MEF's certification program suggests that service providers can accelerate internal coordination among different departments (e.g. operations and engineering) in the process of introducing a new certified service.

MEF Can Help Marketing Your Certification!

- Quotes and boiler plate content for press release

- Logo and copy for corporate web site and collateral

- MEF registry listing

- Social media graphics and amplification

- Internal/external presentation materials

Summary: Certification Provides a path to scalable, revenue-generating services.

Leverage membership for product development & expertise.

Join MEF

1

Heighten skills to speed development & operation of MEF services.

Certify Team

2

Collaborate inside & outside your organization to maximize product potential.

Evolve Product

3

Achieve and promote certification to accelerate market opportunities.

Certify Service

4

MEF 3.0 CE Service Certification Overview

Background Information

October 20, 2020

Additional Benefits and Testimonials

MEF

MEF 3.0 CE Services Certification Benefits

Enterprise & Wholesale Customers

Builds Customer Confidence

Customers who purchase certified solutions can have greater confidence that they have met the highest levels of performance, assurance, and agility. The quality of customer engagement is enhanced when certified services are supported by MEF Carrier Ethernet Certified Professionals (MEF-CECPs).

Streamlines Buying Decision Process

Certification reduces the time, effort, and cost for customers to evaluate CE providers. The buying decision process can be simplified and accelerated when a customer has clarified their desire for MEF 3.0 CE certified services and can begin their selection process leveraging a list of providers in MEF's Service Certification Registry.

Faster, Efficient Interconnection (for Wholesale Customers)

Certification allows service providers to streamline inter-provider interconnection by aligning on common, well-defined service attributes. This can reduce the time to deliver retail services to off-network locations.

Basis for Standardizing SLAs

Certification testing facilitates standardization of service level agreements (SLAs) between CE service providers and customers.

Foundation for Innovation

Certification establishes a core set of required capabilities upon which CE service providers can build differentiated offerings tailored for end-user needs.

Accelerates Digital Transformation

Orchestration-ready CE certified services + LSO APIs enable a shift to dynamic/on-demand services that can (1) reach more locations by spanning multiple provider networks, (2) adapt in real-time to policy changes, (3) provide end-to-end visibility of performance and security, etc.

MEF 3.0 CE Services Certification Benefits

Service Providers – with a Federation of Automated Networks

Faster, Efficient interconnection

Certification allows service providers to streamline inter-provider interconnection by aligning on common, well-defined service attributes. This can reduce the time to deliver retail services to off-network locations.

Automated Ordering & Provisioning

Service providers are able to shift from a cumbersome legacy wholesale model – characterized by fixed bandwidth connections, complex manual processes, and a mix of email, spreadsheets, and proprietary portals and APIs – to an agile MEF 3.0 LSO Sonata standards-based wholesale model that enables automated ordering & provisioning multi-provider services.

Accelerated Service Delivery

Service providers can dramatically shorten service delivery for inter-provider MEF 3.0 CE services from months/ weeks to hours/minutes with near-instantaneous cycle times enabled by LSO Sonata APIs.

Faster Time to Revenue

Improved operational efficiencies with LSO APIs can help service providers reduce their time to revenue from days to hours/ minutes and avoid potential lost revenues.

Additional Revenue from New Orders

Improved quote to order conversions with faster response times strengthens customer loyalty and can lead to new orders.

New Revenue from On-Demand/ Dynamic Services

Automation of inter-provider MEF 3.0 CE services – with currently available and planned LSO APIs – opens opportunities to offer enterprise customers on-demand/ dynamic connectivity with coveted global reach, a key component of lucrative multi-cloud IT solutions.

MEF

Testimonials – North America

Jeremy Wubs, Senior Vice President, Marketing for Bell Business Markets, Bell Canada
"Bell has been a MEF member for more than a decade, and we are proud to play a leading role in the development of the standards that drive value for customers. As the only Canadian service provider to offer MEF 3.0 certified services, along with the country's largest team of active MEF certified professionals, Bell is supporting our customers in their digital transformation journeys with SLA backed performance aligned with international standards." (MEF PR, May 2020)

Chris Boone, Vice President of Business Services, Sparklight Business
"MEF 3.0 certification demonstrates the ongoing commitment of Sparklight Business to deliver the most advanced and secure Ethernet services across our footprint. Our business customers can be confident the Carrier-grade Ethernet services they're receiving are compatible with a global standard that will support all of their business needs well into the future." (MEF PR, May 2020)

Testimonials – Europe

Tomi Airola, Head of Business Networking, Telia Company

"Telia is proud to be the first service provider in the world to have successfully achieved both MEF 3.0 Carrier Ethernet and SD-WAN certifications. We view our MEF 3.0 certifications as key steps in addressing the requirements of our enterprise and wholesale customers to accelerate our customers' digital transformation journey. Alignment with the latest industry standards is a continuous job in which Telia Company invests to help customers simplify their onboarding process and daily operations." (MEF PR, May 2020)

Franck Morales, Vice President, Connectivity Services at Orange Business Services

"As a network-native digital services company, Orange Business Services is proud to be one of the first global service providers to deliver a certified MEF 3.0 Carrier Ethernet service, and we are pleased to see how new SD-WAN certifications are gaining more and more traction. Never has it been more important for the industry to have agile, flexible and trusted SD-WAN solutions combined with high-performance underlay connectivity to support the new digital needs of enterprises around the world." (MEF PR, May 2020)

Colin Sempill, Chief Executive at SSE Enterprise Telecoms

"Our goal as a telecoms business is to provide the highest quality Ethernet products and services for our customers. With the latest MEF 3.0 CE certification we're able to assure our clients that our offering can adhere to the highest capacity and excellence standards in the industry. The accreditation also supports the expansion of our network reach with Edge 3 and our overall market reach in the UK." (SSE Enterprise Telecoms PR, August 2019)

Testimonials – Asia Pacific

Ang Thing Jiun, Chief Technology Officer, TIME dotCom
"We are very proud to be among the first in the world to receive this certification and become part of the MEF 3.0 ecosystem, which acknowledges TIME's efforts to keep abreast of technological innovation and deliver dynamic products and services. Our customers can rest assured that they are receiving scalable, stable Ethernet services that are compatible with a global standard and that will support them through the evolution of network technology in the future. (TIME PR, January 2019)

Mr. To Dung Thai, Vice President of VNPT - Chairman of VNPT VinaPhone
"VNPT is proud to offer a broad portfolio of certified MEF 3.0 Carrier Ethernet services that comply with the industry's highest global standards. This is the development goal of VNPT as the corporation always desires to bring customers high quality products and services. Through MEF 3.0 certification, VNPT once again affirms our position as a world-class telecommunications service provider, contributing to digital transformation in Vietnam."

Dang Tung Son, Deputy Chief Executive Officer, CMC Telecom
"Ultimately we strive for this level of certification so that our global and domestic customers can have guaranteed peace of mind on compatibility and ease of integration. By becoming the first MEF 3.0 certified service provider in the world, we can proudly say that we are able to deliver scalable, reliable next-generation Ethernet services to enterprise and carrier customers across the diverse connectivity in the metro markets we serve."

Mohamed Asri Jaafar, Chief Executive Officer, Fiberail
"We are proud to be among the first in Malaysia and among the earliest in the world to receive this certification. The certification acknowledges our commitment and determination to be at par with the global standard in the provisioning of metro network services and delivering world class services to our customers. With the certification, our customers can look forward to more secured, advanced network services that meet global standards and are scalable to fulfill their future communication requirements and beyond, as part of our efforts in elevating Malaysia into a digital Nation."

Testimonials – CALA

Juan Carlos Naranjo, Chief Technology Officer, UFINET

"We are proud to be MEF members since 2015. During all these years, UFINET has witnessed the evolution of information technology and the important role that MEF has played in it. We consider MEF to be a keystone in today´s telecommunications developments, even more so in Latin America, a rapidly developing region with enormous growth potential. All MEF certifications have represented important milestones for UFINET, as we strive to become the neutral telecommunications operator of reference, worldwide. MEF 3.0 certification allows us to have a clear competitive advantage, as it ensures that products and services provided by UFINET meet the needs of customers through an effective quality management and homogenous system. Our decision to work with MEF 3.0 accreditation demonstrates our commitment to continually improve our products and services. We are proud to be MEF 3.0 compliant." (MEF PR, May 2020)

Isaias Alegria, Chief Technology Officer, Marcatel

"Being the first Mexican carrier to achieve MEF 3.0 certification is very rewarding for us and our customers. It is a guarantee that our Carrier Ethernet network fulfills the highest standards for performance and transparency. We are very pleased to be a member of the MEF organization. It has been very helpful in allowing us to align with the worldwide industry, as Marcatel is a worldwide service provider. We will continue to evolve in the process of delivering high-performance services while seeking the full satisfaction of our customers." (MEF PR, May 2020)

Marisa Trisolino, CEO, CMC Networks

"Being the first provider in Africa to achieve the MEF 3.0 certification is a significant achievement for CMC Networks. This certification positions CMC Networks to be recognized amongst the leaders in the industry and cements our commitment in providing world class services on the African continent. We pride ourselves in delivering industry leading technologies and products, and by aligning our Carrier Ethernet and SD-WAN products to the MEF standards ensures an efficient and rapid customer on-boarding process. CMC Networks will continue to expand and evolve our certification process with the MEF to cover the geographic regions we operate in and be the partner of choice for our customers digital transformation demands" (Company, May 2020)

MEF Membership Information

Opportunities for engaging with MEF

Consult & collaborate with peers

Lead/participate in business & technology projects

Educate, influence & evangelize the industry

Membership Information - General

- Fees: $17,250 annual Principal Membership fee

- Membership commences upon receipt of a membership application & runs for 12 months

- Currently there are approximately 200 member companies with 2/3rd being Service Providers – see the full list.

- See the MEF Board of Directors – all Principal Members are eligible to run, with elections held annually at the MEF Annual Meeting held in July each year

Membership Inclusions - I

- Unlimited employee access to the **MEF members-only wiki** containing:
  - All **documentation for technical work in progress,** including roadmaps, project online meeting dates/times, participating companies
  - **Standards presentations, graphics and logo libraries,** workshop agendas and presentations, useful for marketing presentations and internal training development
- **No-fee attendance to MEF quarterly meetings:**
  - Q1- APAC, Q2 - EMEA, Q3 – NA (annual meeting), Q4 -NA, collocated with MEF19), unlimited number of participants
- **Online member orientation session**
  - upon joining MEF and **annual, 2-hour online update session**, (or in person, travel schedule permitting) tailored for your staff by MEF senior staff
- Access to **selected industry analyst reports and surveys**
  - MEF collaborates with industry analysts to conduct and produce research and member surveys and these are generally made available as a membership benefit

Membership Inclusions - II

- **Quarterly members bulletin**
  - shares highlights from the last several months, summarizes work in progress, and provides an overview of committee work. This is the primary resource to understand the work across the organization and includes a short briefing presentation that members use for internal

- **Participation** at **MEF Marketing and Education events**
  - attendance, panel and presentation slots at **MEF Marketing and Education events** and forthcoming regional "Center of Excellence" programs
  - MEF participates in 30+ industry events around the globe which affords members the opportunity to participate as speakers on panels, main conference session, MEF workshops, MEF webinars etc..

- **Discounts to attend and/or sponsor**
  - MEF also arranges member discounts for attending MEF partner events such as Capacity, Layer123, Light Reading and Telecoms World/Terrapin

MEF-CECP Information

MEF Certification for Professionals

The industry's only vendor-neutral certifications to validate the knowledge, skills, and abilities in Carrier Ethernet, SDN/NFV and SD-WAN

MEF CECP — CARRIER ETHERNET — CERTIFIED PROFESSIONAL

MEF SNCP — SDN/NFV — CERTIFIED PROFESSIONAL

MEF SDCP — SD-WAN — CERTIFIED PROFESSIONAL

| Carrier Ethernet | SDN/NFV | SD-WAN |

MEF Certification for Professional

The industry's only vendor-neutral certifications to validate the knowledge, skills, and abilities in Carrier Ethernet, SDN/NFV and SD-WAN
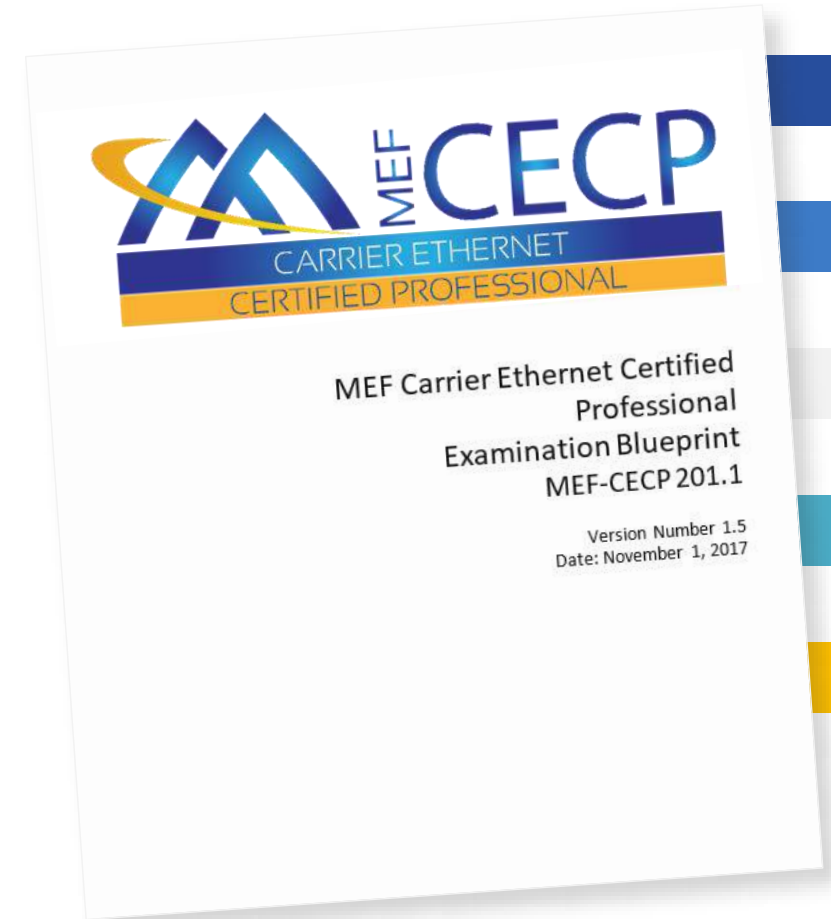
MEF CECP
CARRIER ETHERNET
CERTIFIED PROFESSIONAL

MEF SNCP
SDN/NFV
CERTIFIED PROFESSIONAL

MEF SDCP
SD-WAN
CERTIFIED PROFESSIONAL

| Carrier Ethernet | SDN/NFV | SD-WAN |

2+ certifications* = **MEF NETWORK EXPERT** status

* Certification must not be expired

MEF Carrier Ethernet Certified Professional (MEF-CECP) exam

Exam Details: 80 questions in 105 minutes

Language: English

Learning Topics Covered:
- Services and Attributes
- Class of Service and Traffic Management
- Service OAM
- Infrastructure, Operations, and Applications
- Ethernet, MEF Basics, and MEF Certification

Cost: US$420

MEF Carrier Ethernet Certified Professional Examination Blueprint MEF-CECP 201.1

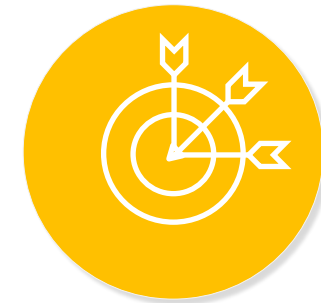Version Number 1.5
Date: November 1, 2017

MEF Accredited Training Providers

~90% of MEF certified professionals used a MEF-ATP

MEF Accredited Curriculum & Certified Instructors

Provide Consistency & Quality

MEF Accredited Training Providers