Introducing the Specifications of the Metro Ethernet Forum

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MEF 2	Requirements and Framework for Ethernet Service Protection
MEF 3	Circuit Emulation Service Definitions, Framework and Requirements in Metro Ethernet Networks
MEF 4	Metro Ethernet Network Architecture Framework Part 1: Generic Framework
MEF 6	Metro Ethernet Services Definitions Phase I
MEF 7	EMS-NMS Information Model
MEF 8	Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks
MEF 9	Abstract Test Suite for Ethernet Services at the UNI
MEF 10	Ethernet Services Attributes Phase I
MEF 11	User Network Interface (UNI) Requirements and Framework
MEF 12	Metro Ethernet Network Architecture Framework Part 2: Ethernet Services Layer
MEF 13	User Network Interface (UNI) Type 1 Implementation Agreement
MEF 14	**Abstract Test Suite for Ethernet Services at the UNI**
MEF 15	Requirements for Management of Metro Ethernet Phase 1 Network Elements
MEF 16	Ethernet Local Management Interface

* MEF 10 * replaced MEF 1 and MEF 5

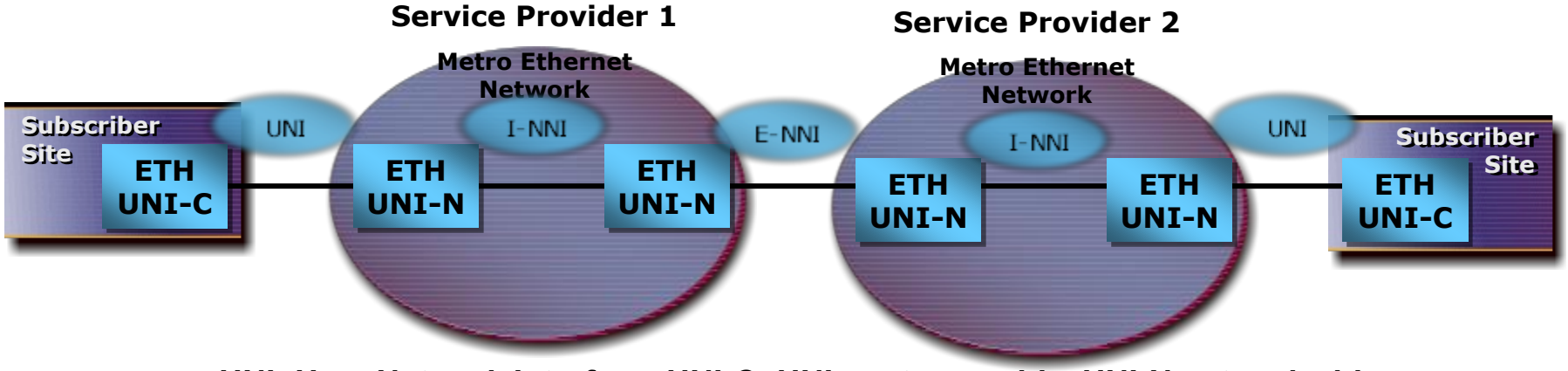
This Presentation

- **Purpose**
  - This presentation is intended as an introduction and companion to the MEF 14 Specification
- **Audience**
  - It is intended for Product Marketing, Engineering staff of member companies, or Service Provider Engineering staff involved in the certification of products and services that comply to the MEF specifications
- **Other Documents**
  - Presentations of the other specifications and an overview of all specifications is available on the MEF web site
  - Other materials such as white papers and case studies are also available

Introduction

MEF 14	Abstract Test Suite for Traffic Management Phase 1
Purpose	Defines the requirements and corresponding test procedures for Service Performance and Bandwidth Profile Service Attributes that may be specified as part of a Service Level Specification (SLS) for an Ethernet Service These tests are an essential part of the deployment of Carrier Ethernet Services since they provide a baseline for confident deployment of equipment that has already seen to be compliant. This in turn greatly minimizes interoperability issues.
Audience	Equipment Manufacturers building devices that are designed to conform to MEF Specifications. Service Providers conducting who require that their services comply to MEF Specifications

Ethernet Services "Eth" Layer



UNI: User Network Interface, UNI-C: UNI-customer side, UNI-N network side

NNI: Network to Network Interface, E-NNI: External NNI; I-NNI Internal NNI

MEF 14 Carrier Ethernet Compliance Testing

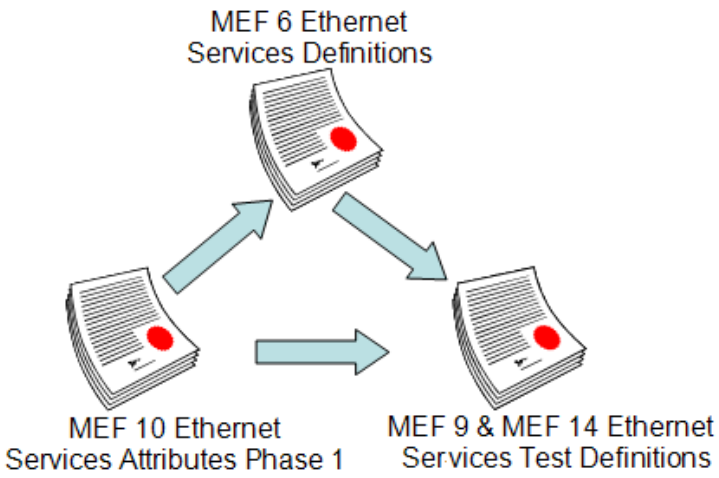
- MEF 14 Certification focuses on Traffic Management defined in MEF 10 and complements the tests of MEF 9
- Test Suites are defined from the point of view of the subscribers equipment that is used to access the UNI
- Carrier Ethernet Traffic Management defines two major areas for Carrier Ethernet Services:
  - **Service Performance**
    - Frame Delay Service Performance
    - Frame Delay Variation Service Performance
    - Frame Loss Ratio Service Performance
  - **Bandwidth Profile Rate Enforcement**
    - Bandwidth Profile per Ingress UNI
    - Bandwidth Profile per EVC
    - Bandwidth Profile per Class of Service
    - Multiple Bandwidth Profiles at the UNI
- **MEF 14 is used to create test plans for the MEF Certification Program**

MEF 14 Content

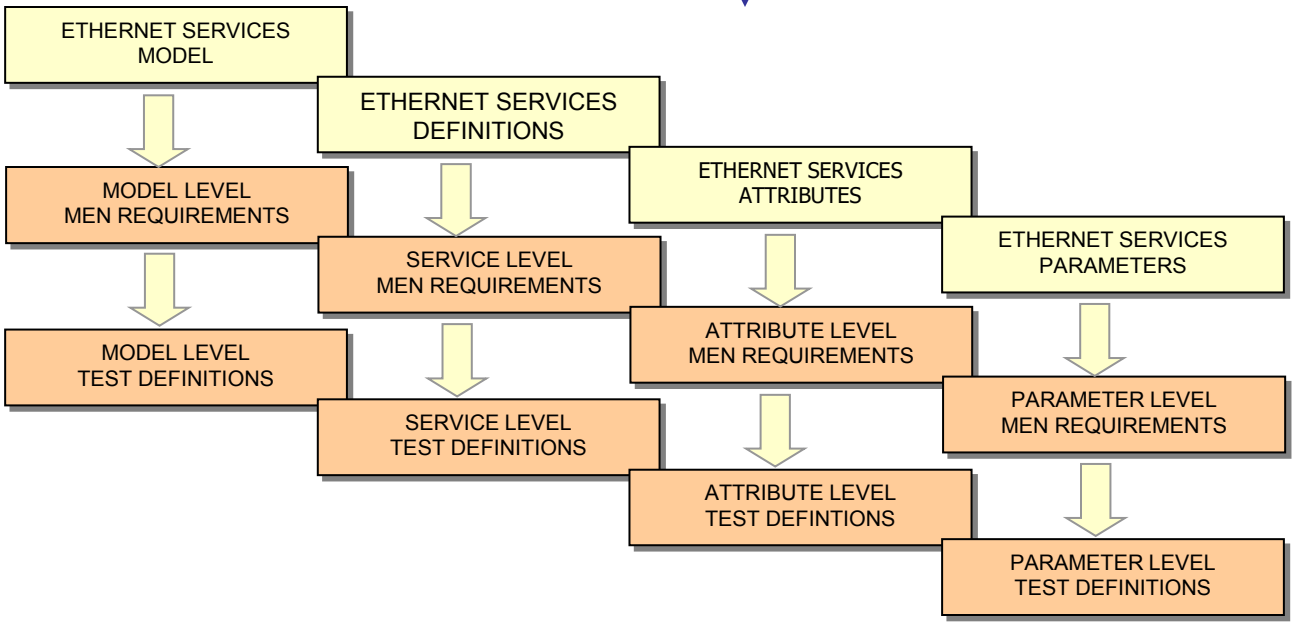
- **Introduction**
  - Introduces the relationship between the specifications and test definitions
- **Test Configuration**
- **Template for Abstract Test Cases for Traffic Management**
  - The tabular format used in the test cases
- **Abstract Test Cases for EVC Related Performance Service Attributes**
- **Abstract Test Cases for Bandwidth Profiles Service Attributes**

Relationship between MEF Documents

Relationship between different MEF Services Group documents and the Ethernet Services Test Definition Documents

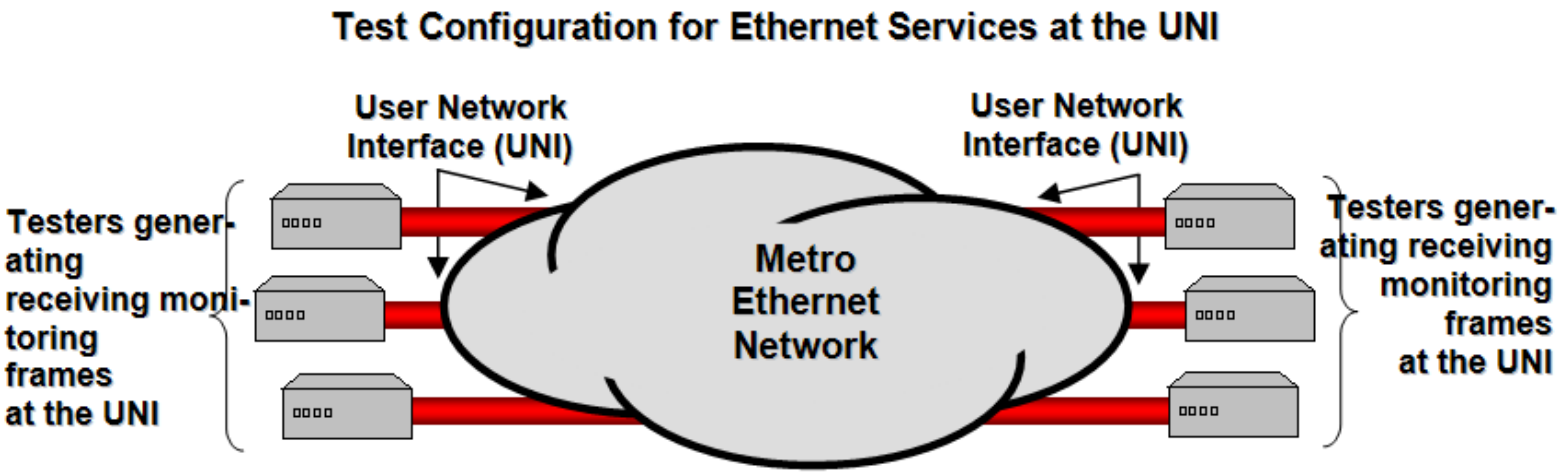


Relationship between the MEF Technical Committee Ethernet Services documents and the derived MEN requirements and correspondingly defined test definitions

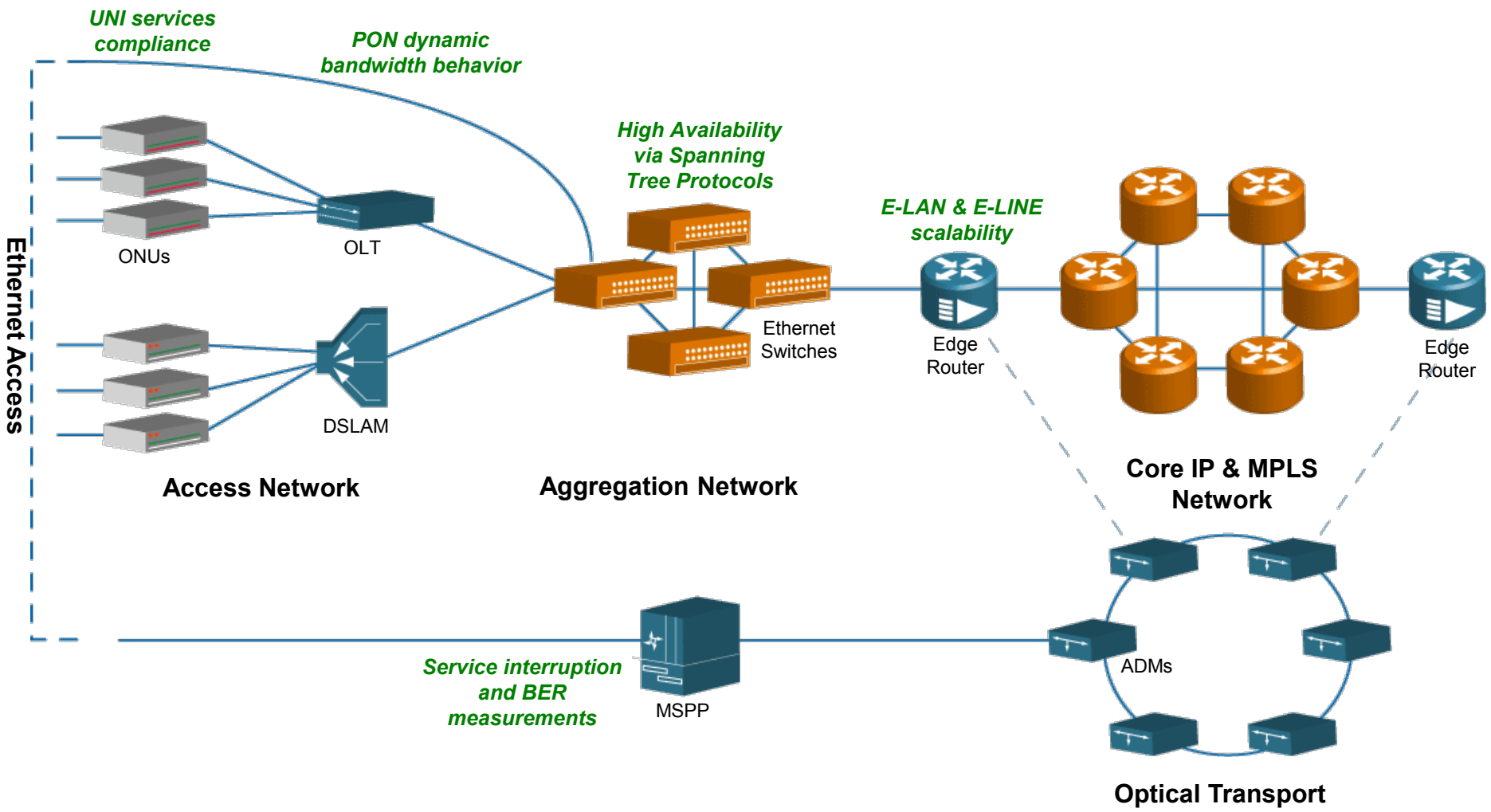


Test Configurations

- **Test devices represent subscriber equipment sending and receiving monitoring frames across the MEN**



Testing Carrier Ethernet Services & Infrastructure



The Ethernet Services Delivery Chain

Abstract Test Cases for Traffic Management

- **Each test case uses this template**
- **This template continues on the next slide**

ABSTRACT TEST SUITE FOR TRAFFIC MANAGEMENT: PHASE 1 *(… top half)*	
Test Name	Name derived from reference document
Test Definition ID	A punctuated alphanumeric string assigned to each defined requirement and test procedure couple using the following convention: 'one to three letter abbreviated source document name'. 'section number' - 'paragraph number in the section from which requirement is derived'. This number always figures as the last number of an ID. Ethernet Services Model=M; Ethernet Services Definitions=S. Example: M.6.1-4
Reference Document	Reference document and section (and paragraph when useful for clarity)
Test Type	Functional, Conformance, Interoperability or Performance
Test Status	Mandatory, optional
Requirement Description	Brief description of the service requirement that the MEN **MUST** or **SHOULD** satisfy
Test Object	Succinct description of test purpose
Test Configuration	Succinct description of test bed configuration
VLAN-ID/EVC Map	A sample VLAN ID/EVC Map is suggested. Variables augment it.

INGRESS UNI 'A'		EGRESS UNI 'B'	
CE-VLAN ID	EVC	CE-VLAN ID	EVC
10	EVC_1	10	EVC_1

Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1

Abstract Test Cases for Traffic Management

- **Each test case uses this template**
- **This template is a continuation of the previous slide**

ABSTRACT TEST SUITE FOR TRAFFIC MANAGEMENT: PHASE 1 *(… lower half)*	
Bandwidth Profile	**Per Ingress UNI** **UNI** / **Bandwidth Profile Parameters** UNI_A / CIR_A CBS_A EIR_A EBS_A Note 1 : ($0 < CIR_A \leq$ UNI Speed), ($CBS_A \geq$ maximum Service Frame size)
Service Performance	**CoS Identifier** / **EVC Performance Service Attributes** / **Performance Objectives** 1 / Frame Delay (FD) Performance / FD_1 Frame Delay Variation (FDV) Performance / FDV_1 Frame Loss Ratio (FLR) Performance / FLR_1
Test Procedure	Succinct description of the test procedure. CE-VLAN ID/EVC Maps are provided for all tests.
Units	Units can be time units, rates and counts in integers such as milliseconds, frames per second and numbers of valid frames. For the most part units used are defined in RFCs 2285, 2544, 2889.
Variables	Variables such as number of UNIs, EVCs and CE-VLAN IDs and frame formats and lengths **MUST** be described.
Results	Description of the textual, numerical and/or graphical format in which to display test results. Results can be Pass or Fail.
Remarks	Description of any particular observations that might effect the test result

Abstract Test Cases for Traffic Management

- The remainder of the specification defines the seven test cases below
- **Service Performance**
  - Frame Delay Service Performance *(example shown)*
  - Frame Delay Variation Service Performance
  - Frame Loss Ratio Service Performance
- **Bandwidth Profile Rate Enforcement**
  - Bandwidth Profile per Ingress UNI
  - Bandwidth Profile per EVC
  - Bandwidth Profile per Class of Service
  - Multiple Bandwidth Profiles at the UNI

Test Case 1: Frame Delay Service Performance

ABSTRACT TEST SUITE FOR TRAFFIC MANAGEMENT: PHASE 1	
Test Name	Frame Delay Service Performance
Test Definition ID	M.6.7.1
Reference Document	MEF 10 [Ethernet Services Attributes Phase 1]
Test Type	Conformance
Test Status	Mandatory
Requirement Description	For all Service Frames declared Green and associated with a particular Class of Service Identifier on a Point-to-Point EVC that arrive at the UNI during a time interval *T*, Frame Delay Performance **MUST** be less than or equal to the Frame Delay Performance Objective
Test Object	Verify that for all Service Frames declared Green and associated with a particular Class of Service Identifier on a Point-to-Point EVC that arrive at the UNI during a time interval *T*, Frame Delay Performance is less than or equal to the Frame Delay Performance Objective
Test Configuration	At least one EVC associating at least two UNIs is configured and at least one Bandwidth Profile with CIR > 0 is associated with at least one of the UNIs. Testers are attached to all UNIs in the configured EVCs
VLAN-ID/EVC Map	**INGRESS UNI 'A'**: CE-VLAN ID = 10, EVC = EVC_1; **EGRESS UNI 'B'**: CE-VLAN ID = 10, EVC = EVC_1 Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1.
Bandwidth Profile	**Per Ingress UNI**: UNI = UNI_A; Bandwidth Profile Parameters = CIR_A CBS_A EIR_A EBS_A Note 1 : ($0 < CIR_A \leq$ UNI Speed), ($CBS_A \geq$ maximum Service Frame size)
Service Performance	CoS Identifier = 1; EVC Performance Service Attributes = Frame Delay (FD) Performance; Performance Objectives = FD_1
Test Procedure	Tester offers Service Frames at the ingress UNI into the configured EVCs and measures Frame Delay as the time elapsed from the reception of the first bit of the ingress Service Frame declared Green until the transmission of the last bit of the Service Frame at the egress UNI. Frame Delay Performance is then calculated for a time interval *T*, as the P-Percentile of the Frame Delay for all Service Frames successfully delivered between the UNI pairs. Service Frames may be offered at an average rate up to CIR_A
Units	Time units
Variables	Bandwidth Profile Parameters CIR_A, CBS_A, EIR_A, EBS_A, UNIs interface Speed, number of EVCs per UNI, number and values of CE-VLAN IDs, number and values of CoS ID, time interval *T*, Performance Objective FD_1
Results	Pass or fail
Remarks	

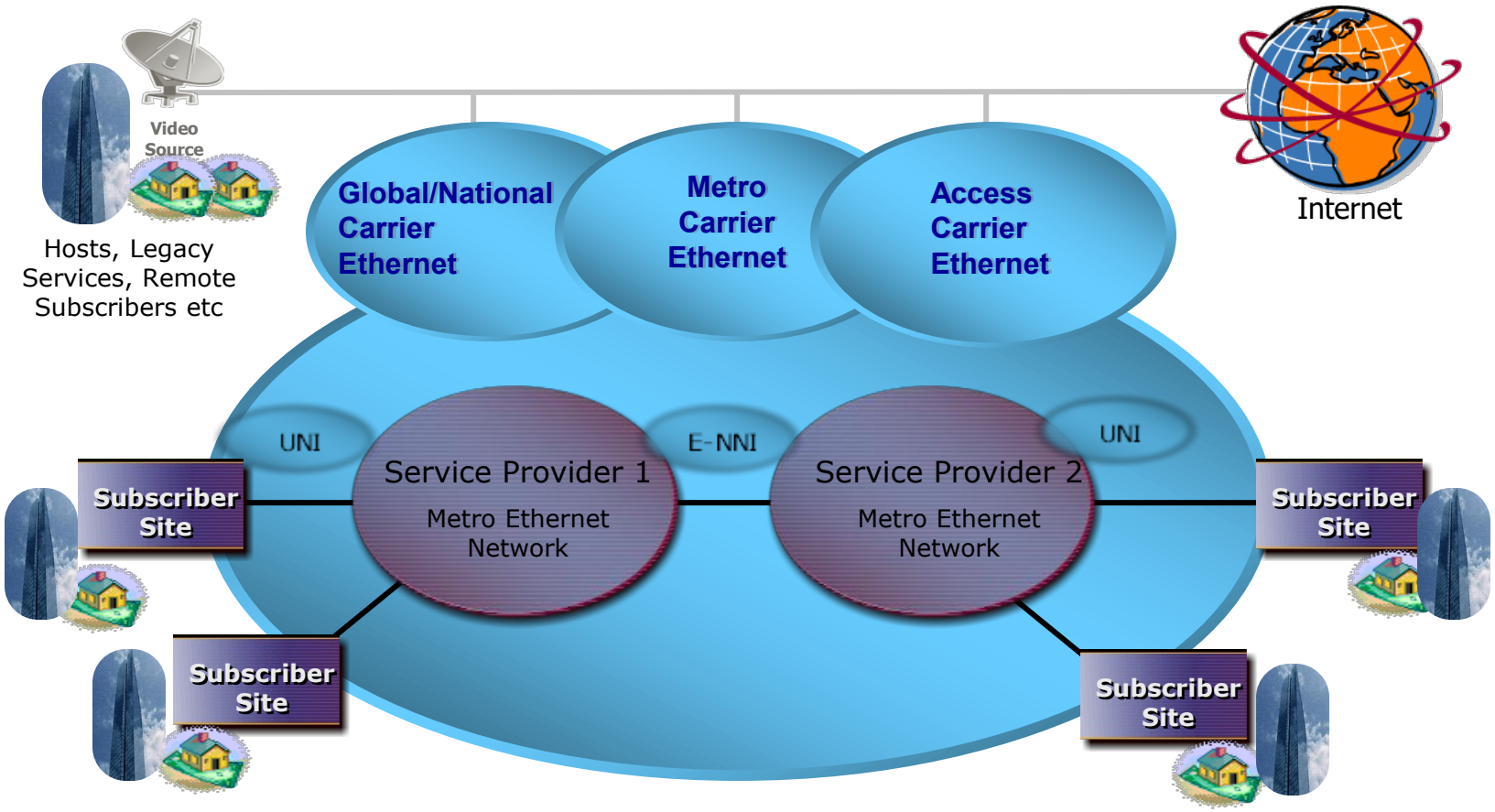
Summary

- **MEF 14 provides managed QoS backed by Service Level Specifications for Carrier Ethernet Services**
- **MEF 14**
  - **Provides the standard to measure, enforce premium Carrier Ethernet Services**
  - **Makes Carrier Ethernet directly competitive with premium legacy services**
  - **Provide the standard to enforce Carrier Ethernet that delivers residential triple play data/voice/video services.**

Summary and Next Actions

- **After reading this document you should now be familiar with**
  - The scope of MEF 14 and know that the test cases conform to a common template
  - The test cases are not as such a test plan. These must be created from test cases
- **Next Actions**
  - Read the full MEF 14 specification
  - This introduction to the specification should be read along with the other related introductions and specifications specifically with MEF 9, 10 and 6
  - For equipment manufacturers the next step is to read the specification to understand what (if any) changes to your systems are required to comply with the MEF 14.
  - It is also recommend to discuss certification issues and test plans with the MEF approved Certification lab

For Full Details …

… visit www.metroethernetforum.org

to access the MEF 14 specification