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* MEF 10 * replaced MEF 1 and MEF 5
**MEF 11**  
User Network Interface (UNI) Requirements and Framework

| Purpose | Defines a split demarcation function between the customer (Subscriber), and the Service Provider |
| Audience | Equipment Manufacturers building devices that will carry Carrier Ethernet Services. Useful for Service Providers architecting their systems. |

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**Ethernet Services “Eth” Layer**

- **Service Provider 1**  
  - Metro Ethernet Network
  - ETH UNI-N
  - E-NNI

- **Service Provider 2**  
  - Metro Ethernet Network
  - ETH UNI-N
  - E-NNI

**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 11: UNI Specification

- **A Specification**
  - Defines a split demarcation function between the customer (Subscriber), and the service provider (Network)
    - Each maintains its own side independently of the other.

- **UNI Types**
  - Type 1: Manual configuration of the CE side only completely compatible with all existing Ethernet customer equipment
  - Type 2: Allows the UNI-N to provision, configure, and distribute EVC information and the associated service attributes to the CE
  - Type 3: Allows the CE to request, signal and negotiate EVCs and its associated Service Attributes to the UNI-N.
UNI - Network Location

- An access network may exist between the subscriber and the MEN
  - In that case the UNI is still co-located at the subscriber edge
  - UNI-C is always IEE802.3 PHY connected
- The reference point between the access network and the Provider Edge (PE) equipment is called Service Node Interface (SNI)
  - The SNI definition is not in the cope of MEF 11
  - UNI-N functional components which implement the Service Provider side of the UNI functions may be distributed over an access network
Scope of UNI Framework

UNI Reference model
- MEF 11 Defines the functions of each
- Defines the supporting requirements
Plane Functions & Requirements

- **Data Plane**
  - Requires and 802.3PHY, supports 802.1Q/p tagged frames
    - Allows VLAN ID and COS information to be sent from subscriber to the MEN

- **Control Plane**
  - Provides communication link between the subscriber and network side
    - Designed to Allow for Dynamic service contract set-up and negotiation as well as service provisioning

- **Management Plane**
  - Allows for Device Configuration, Service OAM, and Service load-balancing/restoration
    - Allows for greater degree of managed service offering by the carriers
    - Allows for greater customer insight into the service level being delivered by the MEN
Potential for more value added services

- Demonstrates the three UNI functions distributed on either side of the UNI
- Allows for transport multiplexing (TMF) of separate UNI-C ETH Access links on a single underlying transport (TRAN) terminated at a single UNI-N
MEF has defined various UNI functionality

• **Type 1**
  – Manual configuration of the CE side only- completely compatible with all existing Ethernet customer equipment

• **Type 2**
  – Allows the UNI-N to provision, configure, and distribute EVC information and the associated service attributes to the CE

• **Type 3**
  – Allows the CE to request, signal and negotiate EVCs and its associated Service Attributes to the UNI-N.
UNI Defined Service Attributes

- UNI Identifier,
- Physical Layer (speed, mode, and physical medium),
- MAC Layer,
- Service Multiplexing,
- UNI EVC ID,
- CE-VLAN ID/EVC Map,
- Maximum number of EVCs,
- Bundling,
- All to One Bundling,
- Bandwidth Profiles, and
- UNI Layer 2 Control Protocol Processing.
EVC Defined Service Attributes

- EVC Type (Point-to-Point or Multipoint-to-Multipoint),
- UNI List,
- Service Frame Delivery,
- CE-VLAN ID Preservation,
- CE-VLAN CoS Preservation
- Layer 2 Control Protocol Processing, and
- EVC related Performance
UNI General Requirements

- UNI Type 1 MUST allow UNI-C of Subscriber equipments to connect to a UNI-N of MEN using an IEEE 802.3 2002 conforming interface.

- UNI Type I MUST allow UNI-C of Subscriber equipments, conforming to IEEE 802.1Q [5] and IEEE 802.1D [6], to connect to a UNI-N of MEN.

- UNI Type I MUST allow UNI-C of Subscriber equipments, implementing IEEE 802.3 end stations e.g. routers, to connect to a UNI-N of MEN.

- UNI Type 1 UNI-Ns MUST support the full range of CE-VLAN IDs, in accordance with IEEE 802.1Q tag.
UNI Type 1 MUST support at least one of the following IEEE 802.3 Ethernet PHYs:

- 10BASE-T in Full-duplex mode
- 100BASE-T including 100BASE-TX and 100BASE-FX in Full-duplex mode
- 1000BASE-X including 1000BASE-SX, 1000BASE-LX, and 1000BASE-T in Full-duplex mode
- 10GBASE-SR, 10GBASE-LX4, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, and 10GBASE-EW in Full-duplex mode
UNI Type 1 Data Plane Requirements

- UNI Type 1 MUST allow sending Subscriber’s IEEE 802.3-2002 compliant service frames across the UNI.

- When multiple EVCs are supported by UNI-N, UNI Type 1 MUST allow mapping of Service Frames to corresponding EVCs.

- UNI Type 1 MUST allow the mapping of Service Frames to the following types of EVCs:
  - Point-to-Point EVC
  - Multipoint-to-Multipoint EVC

- UNI Type 1 MUST support an option for ingress bandwidth profile across the UNI.

- UNI Type 1 MUST be transparent to higher layer protocols.
UNI Type 1 Data Plane Requirements

- **UNI Type 1 MUST** allow manual configuration to set-up or tear-down EVCs across the UNI
- **UNI Type 1 MUST** allow manual configuration to modify the service attributes associated with the EVCs across the UNI
- **UNI Type 1 MUST** allow manual configuration to modify the ingress bandwidth profile across the UNI, where the modification may result in increment or decrement of bandwidth
- **If Bandwidth Profile Parameter CIR is supported, UNI Type 1 MUST** allow manual configuration to modify CIR in the following granularities:
  - 1Mbps steps up to 10Mbps
  - 5 Mbps steps beyond 10Mbps and up to 100Mbps
  - 50 Mbps steps beyond 100Mbps and up to 1Gbps
  - 500 Mbps steps beyond 1Gbps
UNI Type 1 Control Requirements

- **UNI Type 1 MUST** support manual configuration of following service parameters at UNI-C and UNI-N.
- **CE-VLAN ID/EVC Map** allowing mapping each Subscriber service frame into an EVC.
- Parameters of Ingress bandwidth profile per UNI
- Parameters of Ingress bandwidth profile per EVC
- Parameters of Ingress bandwidth profile per CoS
- **CoS Identifiers**
- **Handling of UNI Layer 2 control protocols**, where the handling may include:
  - Tunneled through EVC
  - Discarded, or
  - Processed
- **UNI Type 1 MUST** support failure detection based on failure detection mechanisms of IEEE 802.3ah.
UNI Type 2 Requirements

- **UNI Type 2 UNI-C and UNI-N MUST be backward compatible with UNI Type 1.**

- **UNI Type 2 UNI-C and UNI-N MUST support sending Ethernet OAM frames, as required by UNI Type 2 management plane, across the UNI.**

- **UNI Type 2 UNI-C and UNI-N MUST support the service parameters to be communicated from UNI-N to UNI-C**

- **UNI Type 2 UNI-C and UNI-N MUST support the following Ethernet OAM mechanisms between UNI-C and UNI-N such that UNI can be managed:**
  - Connectivity verification which helps in establishing connectivity status between UNI-C and UNI-N.
  - Communicate the EVC availability status to the UNI-C.
UNI Type 3 Requirements

• UNI Type 3 UNI-C and UNI-N MUST be backward compatible with UNI Type 2 and UNI Type 1.
Summary and Next Actions

• After reading this document you should now be familiar with
  – The main MEF architecture functional components for the Ethernet layer
  – Relationships between functional model components
  – Relationships between subscriber and provider function

• Next Actions
  – This introduction to the specification should be read along with the other related introductions and specifications and become familiar with the UNI/NNI elements
  – ITU-T recommendation G.8010 is also recommended reading for implementation of Carrier Ethernet Services over native Ethernet
  – For equipment manufacturers the next step is to read the specification and use the reference model as the basis for implementation.
  – The implementation of actual infrastructure within Access
For Full Details ...

... visit [www.metroethernetforum.org](http://www.metroethernetforum.org) to access the full specification.