Technical Specification

MEF 42

ENNI and OVC Definition of Managed Objects

October 2013

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1. List of Contributing Members

The following members of the MEF participated in the development of this document and have requested to be included in this list.

Adva Optical Networking	EXFO Inc.
AT&T	Infinera
CableLabs	Omnitron Systems
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Comcast	Verizon

2. Abstract

This document specifies the External Network Network Interface (ENNI), Operator Virtual Connection (OVC), and Virtual User Network Interface (VUNI) Management Information Base (MIB) necessary to configure and monitor the Metro Ethernet Forum (MEF) ENNI, OVC, and VUNI that satisfy the requirements and definitions found in MEF 4 [8], MEF 26.1 [18], MEF 28 [19], the management requirements found in MEF 15 [15], the management objects as specified by MEF 7.2 [11] and ITU-T Q.840.1 [24], and the UNI and EVC objects found in MEF 40 [20].

3. Terminology and Acronyms

Term	Definition	Source
ASN.1	Abstract Syntax Notation One	OSI 8824 [29]
API	Application Programming Interface	
Bandwidth Profile	A characterization of Service Frame arrival times and lengths at a reference point and a specification of the disposition of each Service Frame based on its level of compliance with the Bandwidth Profile.	MEF 10.2 [13]
Bandwidth Profile Group	A collection of one or more bandwidth profiles associated with an interface or a service on an interface. Each bandwidth profile in the group is differentiated by a different Class of Service Identifier	This document
BSS	Business Support System	
Class of Service Frame Set	A set of Service or ENNI Frames that have a commitment from the Operator or Service Provider subject to a particular set of performance objectives.	MEF 10.2 [13]
Class of Service Identifier	The mechanism and/or values of the parameters in the mechanism to be used to identify the CoS Name that applies to a frame at a given UNI.	MEF 23.1 [17]
Class of Service Name	A designation given to one or more sets of performance objectives and associated parameters by the Service Provider or Operator.	MEF 23.1 [17]
CEN	Carrier Ethernet Network	MEF 12.1.1 [14]

Term	Definition	Source
CoS	Class of Service	MEF 23.1 [17]
CoS ID	Class of Service Identifier	MEF 23.1 [17]
EMS	Element Management System	MEF 7.2 [11]
ENNI	External Network Network Interface	MEF 26.1 [18]
EVC	Ethernet Virtual Connection	MEF 10.2 [13]
IEEE	Institute of Electrical and Electronics Engineers	
IETF	Internet Engineering Task Force	
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	
LAG	Link Aggregation Group	IEEE Std 802.3 [27]
L2CP	Layer 2 Control Protocol	MEF 6.1.1 [10]
L2CP Profile Group	A collection of one or more L2CP profiles associated with an interface or a service on an interface. Each L2CP profile in the group is differentiated by a different L2CP selection and processing type	This document
LAN	Local Area Network	MEF 4 [8]
MAC	Media Access Control	IEEE Std 802.3 [27]
MAU	Medium Attachment Unit	IEEE Std 802.3 [27]
MEF	Metro Ethernet Forum	
MEN	Metro Ethernet Network	MEF 4 [8]
ME-NE	Metro Ethernet Network Element	MEF 15 [15]
MIB	Management Information Base	RFC 2578 [2]
NE	Network Element	MEF 4 [8]
NMS	Network Management System	MEF 7.2 [11]
OAM	Operations, Administration, and Maintenance	MEF 17 [16]
OSS	Operations Support System	
OSS/J	OSS through Java Initiative. The OSS/J Initiative defines a set of APIs, with client access either by tightly or loosely coupled mechanisms, to foster an OSS component market.	[30]
OVC	Operator Virtual Connection	MEF 26.1 [18]
PDU	Protocol Data Unit	IEEE Std 802.1Q [25]
RFC	Request for Comment	
RUNI	Remote UNI	MEF 28 [19]
Service Frame	An Ethernet frame transmitted across the UNI toward the Service Provider or an Ethernet frame transmitted across the UNI toward the Subscriber	MEF 10.2 [13]
SMI	Structure of Management Interface	RFC 1157
SNMP	Simple Network Management Protocol	RFC 1157
SNMP Agent	An SNMP entity containing one or more command responder and/or notification originator applications (along with their associated SNMP engine). Typically implemented in an NE.	RFC 3411 [4]

Term	Definition	Source
SNMP Manager	An SNMP entity containing one or more command generator and/or notification receiver applications (along with their associated SNMP engine). Typically implemented in an EMS or NMS.	RFC 3411 [4]
SOAM	Service OAM	MEF 17 [16]
TC	Textual Conventions	RFC 4181 [6]
TLV	Type Length Value, a method of encoding Objects	
UML	Unified Modeling Language	Object Management Group (OMG)
UNI	User Network Interface	MEF 10.2 [13]
UTA	UNI Tunnel Access	MEF 28 [19]
VLAN	Virtual LAN	IEEE Std 802.1Q [25]
VUNI	Virtual UNI	MEF 28 [19]

Table 1 – Terminology and Acronyms

4. Scope

The scope of this document is to provide the SNMP ENNI-OVC MIB that supports the MEF ENNI, OVC, and VUNI that have been defined in MEF 4 [8], MEF 26.1 [18], MEF 28 [19], the management requirements found in MEF 15 [15], the managed objects found in MEF 7.2 [11] and ITU-T Q.840.1 [24], and the UNI and EVC objects found in MEF 40 [20].

This document includes the MIB necessary to support the MEF ENNI, OVC, and VUNI functionality: the **MEF-ENNI-OVC-MIB** that includes the MIB objects necessary to configure and monitor ENNIs, OVCs, and VUNIs.

The primary purpose of this document is to provide a mechanism to enhance interoperability between equipment/software vendors and between Service Providers and/or Operators. This document provides the Metro Ethernet Forum (MEF) ENNI, OVC, and VUNI configuration and monitoring within the Carrier Ethernet Networks (CENs) via SNMP MIBs.

5. Compliance Levels

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in RFC 2119 [1]. All key words must be in upper case, bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as **[Rx]** for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as **[Dx]** for desirable. Items that are **OPTIONAL** (contain the words **MAY** or **OPTIONAL**) are labeled as **[Ox]** for optional**.**

A paragraph preceded by **[CR*a*]<** specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, "**[CR1]<[D38]**" in-

dicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by **[CD*b*]<** specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by **[CO*c*]<** specifies an Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

6. Introduction

6.1 The Basic Need

One of the aspects of defining Carrier Ethernet Networks (CENs) is the need to ensure the compatibility between equipment/software vendors and Operators in order to facilitate interoperability in local, metro, national, and international networks. One of the common ways to do this is through a common management interface using publically available or enterprise specific SNMP MIBs.

The value of standard MIBs lies in a combination of (a) allowing an Operator to manage multiple types of equipment with a common MIB, (b) allowing equipment vendors to build one MIB that will work with multiple Operators, and (c) to some extent the common MIB helps make the managed objects more uniform, which can in fact help networks interoperability.

A MIB is a collection of managed objects that can be used for functions such as to provision an entity, query an entity for status information, or define notifications that are sent to a Network Management System (NMS) or an Element Management System (EMS). Collections of related objects are defined in MIB modules which are written using an adapted subset of OSI's Abstract Syntax One, or ASN.1 [29]. Standards for MIB modules are set by IETF and documented in various RFCs, primary of which are RFC 2578 *Structure of Management Information Version 2 (SMIv2)* and RFC 4181 *Guidelines for Authors and Reviewers of MIB Documents.*

6.2 The General Structure

A generalized system model is shown by Figure 1 that illustrates the relationship between the OSS/BSS, NMS, EMS, and Network Elements (NEs). The primary focus of this specification defines the interaction between the EMS (SNMP Manager) and the NE (SNMP Agent) via SNMP using the MIB module defined in this specification. Object names in the figure are examples only.

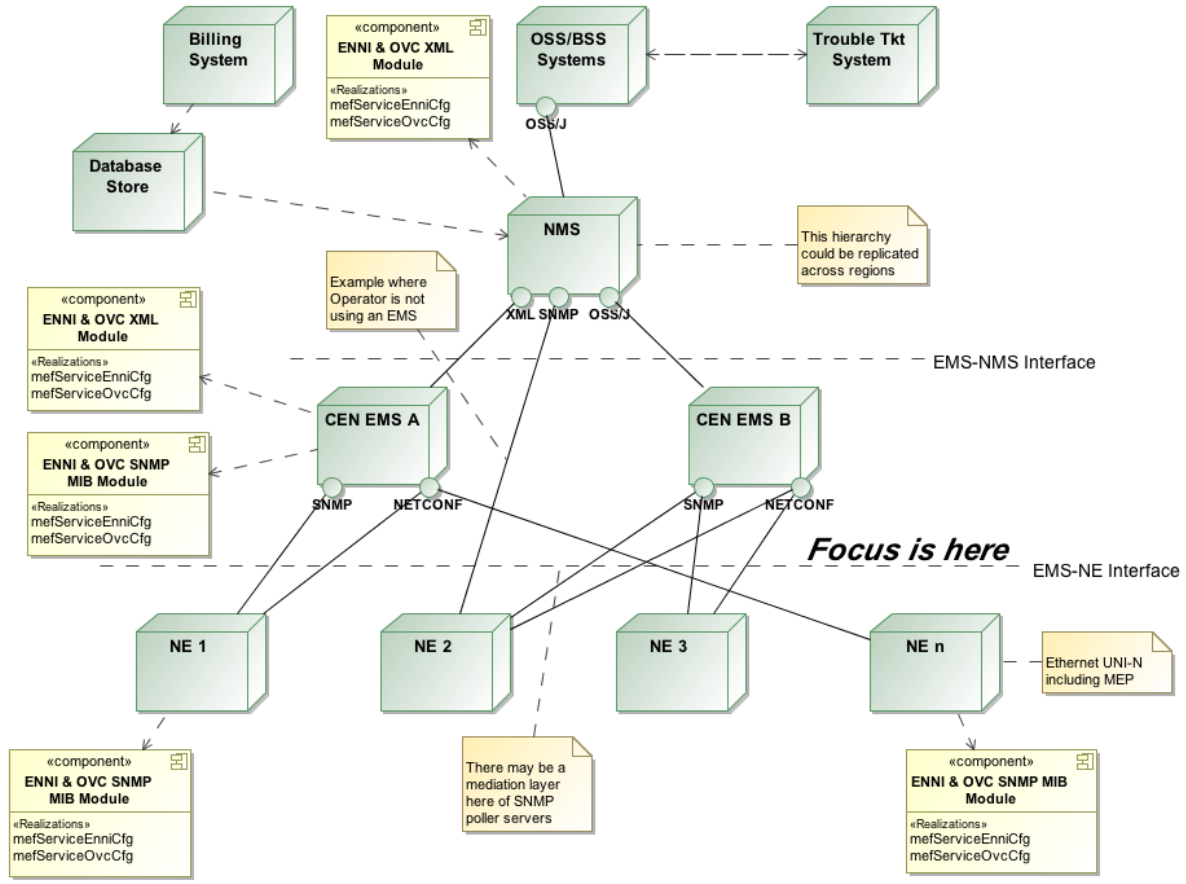

Figure 1 – Generalized OSS/BSS-NMS-EMS-NE Model

6.3 The Foundational Elements

MEF 7.2 [11] describes the overall Carrier Ethernet Management Information Model to identify and define the set of management information necessary to manage the Carrier Ethernet services as defined by the Metro Ethernet Forum. MEF 7.2 draws heavily upon the models defined in ITU-T Q.840.1 [24].

MEF 26.1 [18] describes the External Network Network Interface (ENNI) to support the extension of Ethernet services across multiple Operator CENs.

MEF 28 [19] describes the transparent extension of Ethernet services across multiple Network Operator CENs, where each Network Operator CEN is under the control of a distinct administrative authority

MEF 40 [20] describes the UNI and EVC MIB objects, including Class of Service (CoS) and Bandwidth Profile tables.

The relationship between the various documents and the ENNI-OVC MIB presented in this specification is illustrated by Figure 2. The UML models found in MEF 7.2 and ITU-T G.8052, and

the IEEE 802.3 [27] , 802.1D [26], and 802.1Q [25] specifications, provide a baseline for the ENNI-OVC MIB and the Ethernet interfaces.

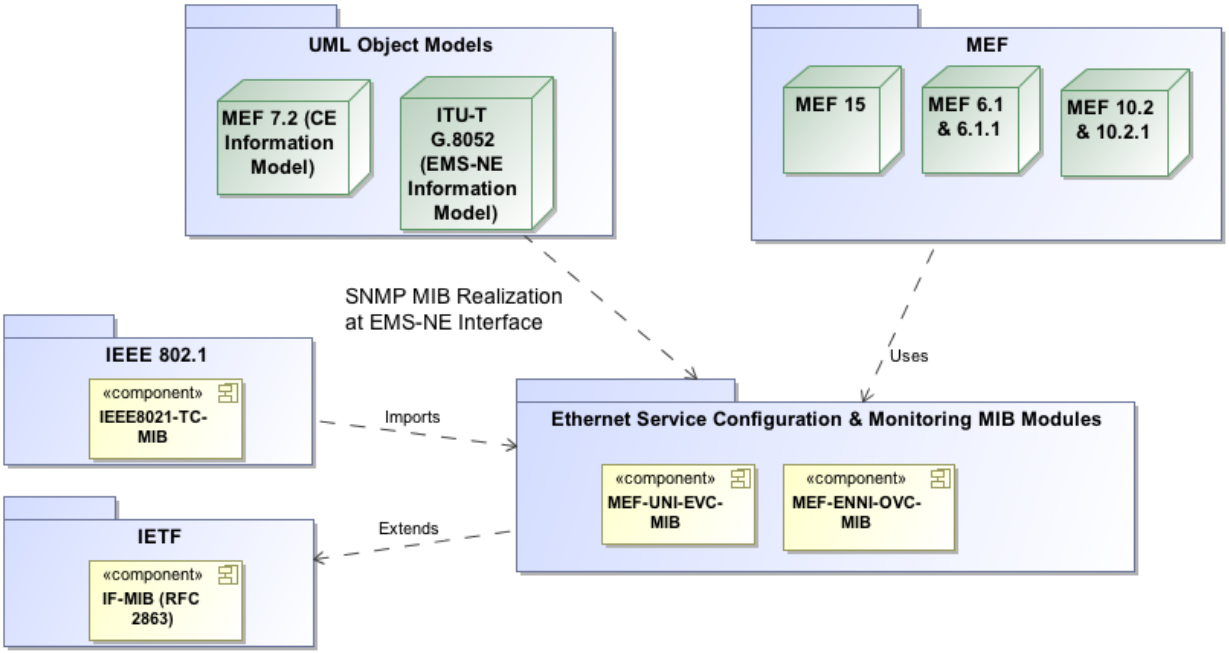

Figure 2 – Relationship between 802.1 MIBs, UML Models, and UNI-EVC MIB

6.4 Alignment with Other IETF MIBs and MEF Specifications

The ENNI-OVC MIB is based upon MEF 26.1 and MEF 28 Service Attributes and MEF 40 the UNI-EVC MIB [20]. A number of common elements are found in the IF-MIB, RFC 2863 [3], the MAU-MIB, RFC 4836 [7], and the EtherLike-MIB (RFC3635 [5]), which are necessary to support MEF compliant interfaces.

The correlation between the ENNI-OVC MIB and the MEF 26.1 and MEF 28 Service Attributes are listed in Table 2 - Table 7. Objects listed with (MEF40) are from MEF 40, the UNI-EVC MIB. Objects listed with (IF-MIB) are from the IF-MIB. Objects listed with (MAU-MIB) are from the MAU-MIB. Objects from this MIB are listed with (*). Objects names in bold are references to SNMP tables.

Specific SNMP objects listed in Table 2 are described in section 7.1 in this document and Section 6.1 of MEF 40 [20].

MEF 26.1 Attribute Name	MEF-UNI-EVC-MIB, MEF-ENNI-OVC-MIB, IF-MIB, MAU-MIB Objects
Operator ENNI Identifier	mefServiceInterfaceCfgIdentifier (MEF40), mefServiceEnniCfgIdentifier (*)
Physical Layer	mefServiceInterfaceCfgType (MEF40), ifMauType (MAU-MIB)
Frame Format	mefServiceInterfaceCfgFrameFormat (MEF40)

Number of Links	mefServiceEnniCfgNumberLinks (*)
Protection Mechanism	mefServiceEnniCfgProtection (*)
ENNI Maximum Transmission Unit Size	ifMtu (IF-MIB)
End Point Map	**mefServiceOvcEndPtPerEnniCfgTable** (*) **mefServiceOvcEndPtPerVuniCfgTable (*)**
Maximum Number of OVCs	mefServiceInterfaceStatusMaxVc (MEF40),
Maximum Number of OVC End Points per OVC	mefServiceEnniCfgMaxNumberOvcEndPts (*)

Table 2 - ENNI Service Attribute Alignment

Specific SNMP objects listed in Table 3 are described in section 7.2.

MEF 28 Attribute Name	MEF-ENNI-OVC-MIB Objects
VUNI Identifier	mefServiceVuniCfgIdentifier (*)
ENNI CE-VLAN ID value for ENNI Frames with no C-Tag or a C-Tag whose VLAN ID value is 0	mefServiceVuniCfgCeVidUntagged (*)
n/a	mefServiceVuniCfgCePriorityUntagged (*)
Maximum number of related OVC End Points in the VUNI Provider MEN	mefServiceVuniCfgMaxNumberOvcEndPoints (*)
Ingress Bandwidth Profile Per VUNI	mefServiceVuniCfgIngressBwpGrpIndex (*)
Egress Bandwidth Profile Per VUNI	mefServiceVuniCfgEgressBwpGrpIndex (*)
n/a	mefServiceVuniCfgL2cpGrpIndex (*)

Table 3 - VUNI Service Attribute Alignment

Specific SNMP objects listed in Table 4 are described in sections 7.3.1 and 7.3.2. They are implemented in two tables: ***mefServiceOvcCfgTable*** and the ***mefServiceOvcStatusTable***. Consequently, in Figure 5 this table is referenced twice.

MEF 26.1 Attribute Name	MEF-ENNI-OVC-MIB Objects
OVC Identifier	mefServiceOvcCfgIdentifier (*)
OVC Type	mefServiceOvcCfgServiceType (*)
OVC End Point List	**mefServiceOvcEndPtPerEnniCfgTable** (*) **mefServiceOvcEndPtPerUniCfgTable** (*) **mefServiceOvcEndPtPerVuniCfgTable** (*)
Maximum Number of UNI OVC End Points	n/a
Maximum Number of ENNI OVC End Points	mefServiceOvcStatusMaxNumEnniOvcEndPt (*)
n/a	mefServiceOvcStatusMaxNumVuniOvcEndPt (*)
OVC Maximum Transmission Unit Size	mefServiceOvcStatusMaxMtuSize (*), mefServiceOvcCfgMtuSize (*)
CE-VLAN ID Preservation	mefServiceOvcCfgCevlanIdPreservation (*)

CE-VLAN CoS Preservation	mefServiceOvcCfgCevlanCosPreservation (*)
S-VLAN ID Preservation	mefServiceOvcCfgSvlanIdPreservation (*)
S-VLAN CoS Preservation	mefServiceOvcCfgSvlanCosPreservation (*)
Color Forwarding	mefServiceOvcCfgColorForwarding (*)
	mefServiceOvcCfgColorIndicator (*)
Service Level Specification	n/a
Unicast Service Frame Delivery	mefServiceOvcCfgUnicastDelivery (*)
Multicast Service Frame Delivery	mefServiceOvcCfgMulticastDelivery (*)
Broadcast Service Frame Delivery	mefServiceOvcCfgBroadcastDelivery (*)
Layer 2 Control Protocol Tunneling	mefServiceOvcCfgL2cpGrpIndex (*)
n/a	mefServiceOvcCfgAdminState (*)
n/a	mefServiceOvcStatusOperationalState (*)

Table 4 - OVC Service Attribute Alignment

Specific SNMP objects listed in Table 5 are described in section 7.3.3.

MEF 26.1 Attribute Name	MEF-ENNI-OVC-MIB, MEF-UNI-EVC-MIB Objects
OVC End Point Identifier	mefServiceOvcEndPtPerEnniCfgIdentifier (*)
n/a	mefServiceOvcEndPtPerEnniCfgRole (*)
Trunk Identifiers	mefServiceOvcEndPtPerEnniCfgRootSvlanMap (*), mef-ServiceOvcEndPtPerEnniCfgLeafSvlanMap (*)
Class of Service Identifiers	**mefServiceCosCfgTable** (MEF40)
Ingress Bandwidth Profile Per OVC End Point	mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex (*)
Ingress Bandwidth Profile Per ENNI Class of Service Identifier	mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex (*)
Egress Bandwidth Profile Per End Point	mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex (*)
Egress Bandwidth Profile Per ENNI Class of Service Identifier	mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex (*)

Table 5 - OVC per ENNI End Point Service Attribute Alignment

Specific SNMP objects listed in Table 6 are described in section 7.3.4.

MEF 26.1 Attribute Name	MEF-ENNI-OVC-MIB, MEF-UNI-EVC-MIB Objects
UNI OVC Identifier	mefServiceOvcEndPtPerUniCfgIdentifier (*)
n/a	mefServiceOvcEndPtPerUniCfgRole (*)
OVC End Point Map	mefServiceOvcEndPtPerUniCfgCeVlanMap (*)
Class of Service Identifiers	**mefServiceCosCfgTable** (MEF40)
Ingress Bandwidth Profile Per OVC End Point at a UNI	mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex (*)
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex (*)
Egress Bandwidth Profile Per OVC End Point at a UNI	mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex (*)
Egress Bandwidth Profile Per Class of Service Identifier at a UNI	mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex (*)

Table 6 - OVC per UNI End Point Service Attribute Alignment

Specific SNMP objects listed in Table 7 are described in section 7.3.5.

MEF 28 Attribute Name	MEF-ENNI-OVC-MIB, MEF-UNI-EVC-MIB Objects
VUNI OVC Identifier	mefServiceOvcEndPtPerVuniCfgIdentifier (*)
n/a	mefServiceOvcEndPtPerVuniCfgRole (*)
OVC End Point Map	mefServiceOvcEndPtPerVuniCfgCeVlanMap (*)
Class of Service Identifiers	**mefServiceCosCfgTable** (MEF40)
Ingress Bandwidth Profile Per OVC End Point associated by a VUNI	mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex (*)
Ingress Bandwidth Profile Per Class of Service Identifier associated by a VUNI	mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex (*)
Egress Bandwidth Profile Per OVC End Point associated by a VUNI	mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex (*)
Egress Bandwidth Profile Per Class of Service Identifier associated by a VUNI	mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex (*)

Table 7 - OVC per VUNI End Point Service Attribute Alignment

[R1] The following objects found in the IF-MIB [3] **SHALL** be supported for MEF compliant Network Element ENNI interfaces: ***ifIndex***, ***ifDescr***, ***ifType***, ***ifMtu***, ***ifSpeed***, ***ifPhysAddress***, ***ifAdminState***, ***ifOperStatus***, ***ifLastChange***, ***ifHighSpeed***, ***ifAlias***, and ***ifLinkUpDownTrapEnable***.

[R2] The ***ifType*** value **SHALL** be ethernetCsmacd(6) for MEF compliant Network Element ENNI interfaces.

[R3] The following notifications found in the IF-MIB [3] **SHALL** be supported for MEF compliant Network Element ENNI interfaces: ***linkDown*** and ***linkUp***.

[D1] All the non-deprecated objects found in the IF-MIB [3] **SHOULD** be supported for MEF compliant Network Element ENNI interfaces.

[R4] The following objects found in the MAU-MIB [7] **SHALL** be supported for MEF compliant Network Element ENNI interfaces: ***ifMauType***, ***ifMauAutoNegAdminStatus***.

[D2] All the non-deprecated objects found in the MAU-MIB [7] **SHOULD** be supported for MEF compliant Network Element ENNI interfaces.

[R5] The following objects found in the EtherLike-MIB [5] **SHALL** be supported for MEF compliant Network Element ENNI interfaces: ***dot3StatsDuplexStatus***, ***dot3PauseAdminMode***.

[D3] All the non-deprecated objects found in the EtherLike-MIB [5] **SHOULD** be supported for MEF compliant Network Element ENNI interfaces.

[D4] The following objects found in the LAG MIB [28] **SHOULD** be supported for MEF compliant Network Elements ENNI interfaces that are configured with

mefServiceEnniCfgProtection set to "linkAggregation"
dot3adAggPortActorAdminKey and ***dot3adAggPortActorOperKey***.

6.5 Specific Relationship Between MEF 40 and this document

This document draws heavily upon the SNMP MIB objects found in MEF 40 [20], the UNI-EVC MIB.

- MEF 26.1 [18] and MEF 28 [19] common interface configuration, status, and statistic objects are covered in MEF 40 Section 6.1
- MEF 26.1 and MEF 28 Bandwidth Profile configuration objects and Traffic Performance Data Sets are covered in MEF 40 Section 6.4.
- MEF 26.1 and MEF 28 Class of Service Identifier objects are covered in MEF 40 Section 6.5.
- MEF 26.1 and MEF 28 L2CP objects are covered in MEF 40 Section 6.6.
- MEF 28 RUNI objects are covered in MEF 40 Section 6.2.

[R6] All the mandatory objects from the UNI-EVC MIB [20] for the common interface configuration, status, and statistic objects, Bandwidth Profile configuration objects, Traffic Performance Data Sets, Class of Service Identifier objects, and L2CP objects **SHALL** be supported for MEF compliant Network Elements that support the ENNI, OVC, and VUNI.

[R7] All the mandatory objects from the UNI-EVC MIB [20] for the UNI **SHALL** be supported for MEF compliant Network Elements that support the RUNI.

[D5] All the optional objects from the UNI-EVC MIB [20] **SHOULD** be supported for MEF compliant Network Elements that support the ENNI, OVC, VUNI, and RUNI.

6.6 Overview of the ENNI & OVC Configuration and Monitoring

A fundamental construct in Carrier Ethernet Networks (CENs) is the designation of a reference point in the network known as a UNI which provides a demarcation between the CEN and a Subscriber. The association of UNI reference points for the purpose of delivering an Ethernet flow between subscriber sites across a single CEN is accomplished by the Ethernet Virtual Connection (EVC).

MEF 26.1 and MEF 28 enhanced this concept with the addition of an External Network Network Interface (ENNI) reference point between multiple CEN Operators, and the Operator Virtual Connection (OVC) as is the building block for constructing an EVC spanning multiple Operator CENs as indicated by Figure 3 from MEF 26.1 as reproduced as Figure 3.

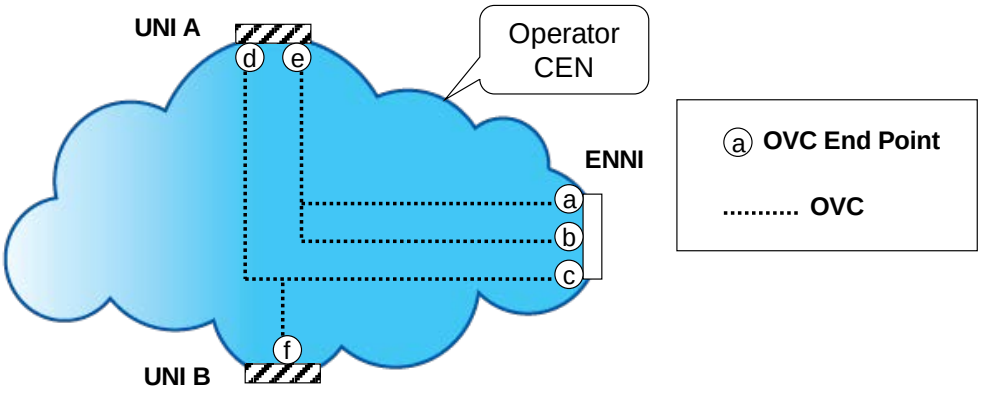

Figure 3 - Example of OVCs (Figure 3 of MEF 26.1)

MEF 28 has defined the UNI Tunnel Access (UTA) that allows a Service Provider to extend their reach to subscribers outside of their immediate serving area as illustrated by Figure 4. The key to this association is the Virtual UNI (VUNI) that allows the Subscriber service to be distributed between the Remote UNI (RUNI) and the VUNI.

The VUNI is associated with an ENNI on the Service Provider's side of the ENNI and has service attributes similar to those of a UNI and provides configuration of VUNI End Point service attributes.

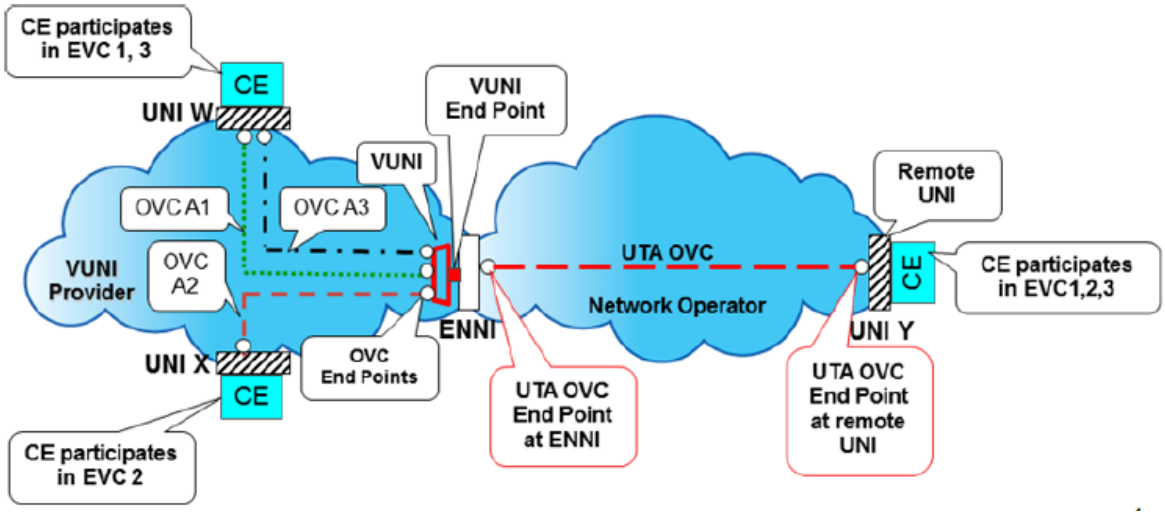

Figure 4 - Example of VUNIs (Figure 2 of MEF 28)

With this in mind the basis for configuration of a CEN is the association of a physical interface that serves as the ENNI reference point with one or more UNI reference points via the concept of an OVC. This document specifies an ENNI-OVC MIB that provides configuration and status.

This is illustrated in Figure 5, where light colored boxes are object groups and dark colored boxes are object tables. The references to a specific table inside a box indicate the specific table in this document that is correlated with either MEF 26.1 or MEF 28 Service Attributes.

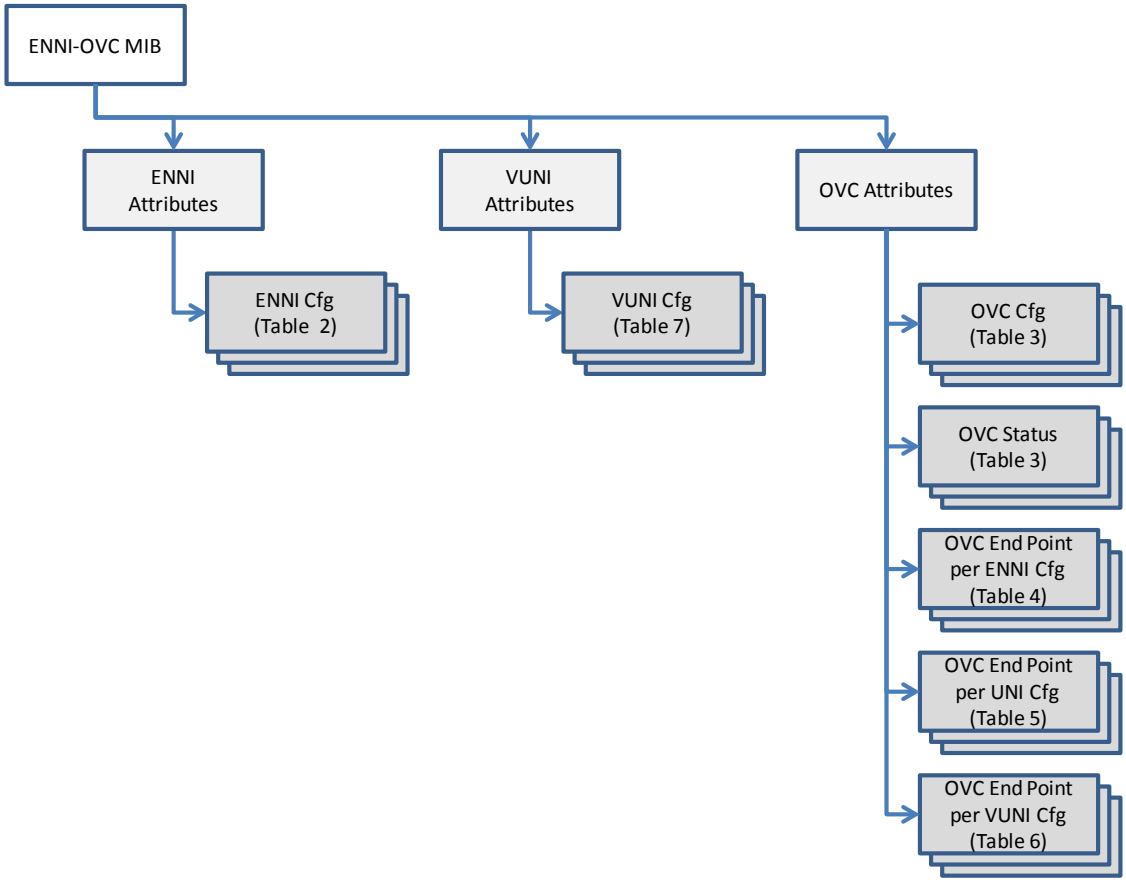

Figure 5 - ENNI-OVC MIB Structure

The configuration of an interface as an ENNI begins by using the UNI-EVC MIB to configure objects in the ***mefServiceInterfaceCfgTable*** and configuring an interface via the ***mefServiceInterfaceCfgType*** as a type "ENNI". Other interface options such as interface identifier, and frame format can be configured. Once an interface is fully configured the ***ifAdminStatus*** can be configured as "up".

Once the interface type and attributes are selected, the specific ENNI attributes can be selected by writing objects in the ***mefServiceEnniCfgTable.*** ENNI attributes such as ENNI identification and protection mechanism can be configured.

Specific VUNI attributes can be selected by writing objects in the ***mefServiceVuniCfgTable***. VUNI attributes such as VUNI identification and VID for untagged traffic can be configured.

After the interfaces in a network are designated as "UNI" or "ENNI", the OVC associations can be configured. This is accomplished by adding an OVC to the ***mefServiceOvcCfgTable*** and assigning ENNI, UNI, or VUNI End Points to this OVC via adding rows to the ***mefServiceOvcEndPtPerEnniCfgTable***, ***mefServiceOvcEndPtPerUniCfgTable***, or ***mefServiceOvcEndPtPerVuniCfgTable***.

The specific OVC attributes associated with a OVC End Point can be configured via the ***mefServiceOvcEndPtPerEnniCfgTable***, ***mefServiceOvcEndPtPerUniCfgTable***, or ***mefServiceOvcEndPtPerVuniCfgTable***.

6.7 Relationship Between EVC and OVC

There is a certain amount of overlap between EVC and OVC service attributes. In the area of assigning CE-VLANs to a UNI, R99 of MEF 26.1 states the following:

> *Each CE-VLAN ID **MUST** have one of the following mutually exclusive properties; 1) it maps to one OVC End Point, 2) it maps to one EVC that associates UNIs within the Operator MEN, 3) it does not map to either such an EVC or an OVC End Point.*

This implies that when an OVC End Point is defined at an UNI then the CE-VLAN mapping at the UNI is configured via the ***mefServiceOvcEndPtPerUniCfgCeVlanMap*** object and not the ***mefServiceEvcPerUniCfgCeVlanMap*** object. If a CE-VLAN ID is mapped to one object and the same CE-VLAN ID is attempted to be configured via the second object then an SNMP error would occur.

When both EVCs and OVCs are configured within an NE, similar attributes must be specified in each case. The following tables summarize those objects which set equivalent service attributes in the case of an EVC or an OVC.

UNI-EVC MIB Object	ENNI-OVC MIB Object
mefServiceEvcCfgServiceType	mefServiceOvcCfgServiceType
mefServiceEvcCfgMtuSize	mefServiceOvcCfgMtuSize
mefServiceEvcCfgCevlanIdPreservation	mefServiceOvcCfgCevlanIdPreservation
mefServiceEvcCfgCevlanCosPreservation	mefServiceOvcCfgCevlanCosPreservation
mefServiceEvcCfgUnicastDelivery	mefServiceOvcCfgUnicastDelivery
mefServiceEvcCfgMulticastDelivery	mefServiceOvcCfgMulticastDelivery
mefServiceEvcCfgBroadcastDelivery	mefServiceOvcCfgBroadcastDelivery
mefServiceEvcCfgL2cpGrpIndex	mefServiceOvcCfgL2cpGrpIndex

Table 8 - Correlation of EVC Table Objects and OVC Table Objects

UNI-EVC MIB Object	ENNI-OVC MIB Object
mefServiceEvcPerUniCfgIngressBwpGrpIndex	mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex

mefServiceEvcPerUniCfgEgressBwpGrpIndex	mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex
sumefServiceEvcUniCfgType	mefServiceOvcEndPtPerUniCfgRole

Table 9 - Correlation of EVC per UNI Table Objects and OVC per UNI Table Objects

Note: The numeric values used to represent "Root" and "Leaf" are the same for ***mef-ServiceEvcUniCfgType*** and ***mefServiceOvcEndPtPerUniCfgRole***.

7. ENNI-OVC MIB Overview

The ENNI-OVC MIB is divided into three different object groupings: ENNI Service Attributes OVC Service Attributes, and VUNI Service Attributes (as indicated by the light colored boxes of Figure 5). The ENNI-OVC MIB inherits the following attributes from the UNI-EVC MIB: the Bandwidth Profile Attributes, the Class of Service Identifier Attributes, the L2CP Attributes, and the Notification Objects. Included in Section 7.5 is the MIB compliance for the ENNI-OVC MIB.

7.1 ENNI Service Attributes

ENNI Service Attributes are configured via the ***mefServiceEnniCfgTable***.

Rows in the ***mefServiceEnniCfgTable*** table are automatically created by the NE with default values based upon an interface being selected as a type ENNI via the ***mefServiceInterface-CfgType*** object and are automatically deleted when an interface that is defined as an ENNI is changed to not be an ENNI.

Rows in this table are accessed via the ***ifIndex.***

After an interface is selected as an ENNI type the following attributes can be configured:

- ***mefServiceEnniCfgIdentifier*** - ENNI Identifier
- ***mefServiceEnniCfgNumberLinks*** - Number of physical links the ENNI is associated with. If more than one link is specified then a protection method needs to be selected.
- ***mefServiceEnniCfgProtection*** - Type of protection method on the ENNI
- ***mefServiceEnniCfgMaxNumberOvcEndPts*** - Maximum number of OVC End Point allowed per OVC that can be supported at the ENNI.
- ***mefServiceEnniCfgVuniNextIndex*** - Next available index that is used to create a new VUNI association on an ENNI port

7.2 VUNI Service Attributes

VUNI Service Attributes are configured via the ***mefServiceVuniCfgTable***.

Rows in the ***mefServiceVuniCfgTable*** table are created by the SNMP Manager by writing a row based upon the value of the ***mefServiceEnniCfgVuniNextIndex*** via the ***mefServiceVuniCfgRowStatus*** object. Rows are automatically deleted when an interface that is defined as an ENNI is changed to not be an ENNI or are deleted using the ***mefServiceVuniCfgRowStatus*** object.

Rows in this table are accessed via the ENNI ***ifIndex*** and the VUNI ***mefServiceVuniCfgIndex***.

After an ENNI is associated with a VUNI the following attributes can be configured:

- ***mefServiceVuniCfgIdentifier*** - VUNI Identifier
- ***mefServiceVuniCfgCeVidUntagged*** - CE VLAN VID that is associated with untagged traffic
- ***mefServiceVuniCfgCePriorityUntagged*** - CE VLAN priority that is associated with untagged traffic
- ***mefServiceVuniCfgSvlanMap*** - S-VLAN ID map associated with the VUNI
- ***mefServiceVuniCfgMaxNumberOvcEndPoints*** - Maximum number of OVC End Points allowed per OVC that can be supported for the VUNI
- ***mefServiceVuniCfgIngressBwpGrpIndex*** - Index from the Bandwidth Profile table that indicates the ingress Bandwidth profile associated with a VUNI
- ***mefServiceVuniCfgEgressBwpGrpIndex*** - Index from the Bandwidth Profile table that indicates the egress Bandwidth profile associated with a VUNI
- ***mefServiceVuniCfgL2cpGrpIndex*** - Index from the Layer 2 Control Profile table indicates the L2CP profile associated with a VUNI
- ***mefServiceVuniCfgRowStatus*** - Status of the VUNI configuration row in the table

7.3 OVC Service Attributes

OVC Service Attributes are divided into OVC Configuration Table, OVC Status Table, and the End Point Tables: OVC End Point per ENNI Configuration Table, OVC End Point per UNI Configuration Table, OVC End Point per VUNI Configuration Table.

7.3.1 OVC Configuration Table

OVC Service Attributes are configured via the ***mefServiceOvcCfgTable***. The next available OVC index is found by reading the ***mefServiceOvcNextIndex*** object.

An OVC is created by writing a row based on the value of ***mefServiceOvcNextIndex***. An OVC is deleted when a row in the ***mefServiceOvcCfgTable*** is deleted using the ***mefService-OvcCfgRowStatus*** object.

Rows in this table are accessed via ***mefServiceOvcCfgIndex***.

The following OVC attributes are configurable:

- ***mefServiceOvcCfgIdentifier*** - OVC Identifier
- ***mefServiceOvcCfgServiceType*** - OVC Service Type: point-to-point, multipoint-to-multipoint, rooted-multipoint
- ***mefServiceOvcCfgMtuSize*** - Maximum Ethernet frame size configured on an OVC
- ***mefServiceOvcCfgCevlanIdPreservation*** - CE-VLAN ID preservation or non-preservation selection
- ***mefServiceOvcCfgCevlanCosPreservation*** - CE-VLAN CoS preservation or non-preservation selection
- ***mefServiceOvcCfgSvlanIdPreservation*** - S-VLAN ID preservation or non-preservation selection
- ***mefServiceOvcCfgSvlanCosPreservation*** - S-VLAN CoS preservation or non-preservation
- ***mefServiceOvcCfgColorForwarding*** - ENNI color forwarding: Yes or No
- ***mefServiceOvcCfgColorIndicator*** - ENNI color indicator: PCP field or DEI bit
- ***mefServiceOvcCfgUnicastDelivery*** - Unicast delivery condition: discard, unconditional, or conditional
- ***mefServiceOvcCfgMulticastDelivery*** - Multicast delivery condition: discard, unconditional, or conditional
- ***mefServiceOvcCfgBroadcastDelivery*** - Broadcast delivery condition: discard, unconditional, or conditional
- ***mefServiceOvcCfgL2cpGrpIndex*** - L2CP group handling index, points to an entry in the ***mefServiceL2cpGrpCfgTable***

- ***mefServiceOvcCfgAdminState*** - Administration status of the OVC: locked or unlocked
- ***mefServiceOvcCfgRowStatus*** - Status of the OVC row in the table

7.3.2 OVC Status Table

OVC Service Attribute status objects are found in the ***mefServiceOvcStatusTable***. The ***mefServiceOvcStatusTable*** is created automatically by the NE based when the associated OVC is created in the ***mefServiceOvcCfgTable*** and is deleted when the associated OVC is deleted.

Rows in this table are accessed via ***mefServiceOvcCfgIndex***.

The following status service attributes are available on the OVC:

- ***mefServiceOvcStatusMaxMtuSize*** - Maximum Ethernet frame size that is possible on an OVC
- ***mefServiceOvcStatusMaxNumEnniOvcEndPt*** - Maximum number of OVC End Points per ENNI allowed on an OVC
- ***mefServiceOvcStatusMaxNumVuniOvcEndPt*** - Maximum number of OVC End Points per VUNI allowed on an OVC
- ***mefServiceOvcStatusOperationalState*** - Operational status of the OVC: enabled, disabled, testing, or unknown

7.3.3 OVC End Point per ENNI Configuration Table

OVC End Point per ENNI service attributes are found in the ***mefServiceOvcEndPtPerEnniCfgTable***. An entry in the ***mefServiceOvcEndPtPerEnniCfgTable*** is created by the SNMP Manager after an OVC has been created in the ***mefServiceOvcCfgTable*** if the interface type is ENNI. A row is added to the table by the SNMP Manager on a specific interface as indicated by ***ifIndex*** and using the OVC index, ***mefServiceOvcCfgIndex***, to create a row in the table.

The row is deleted automatically by the SNMP Agent when the associated OVC is deleted or the interface type is changed to not be an ENNI. The individual row is also deleted via the ***mefServiceOvcEndPtPerEnniCfgRowStatus*** by the SNMP Manager.

Rows in this table are accessed via the ENNI ***ifIndex*** and the ***mefServiceOvcCfgIndex***.

OVCs can't have an end point on an ENNI and also an end point on a VUNI on that same ENNI; but there could be an OVC End Point at one ENNI and another OVC End Point at a VUNI on a different ENNI.

- ***mefServiceOvcEndPtPerEnniCfgIdentifier*** - OVC End Point per ENNI Identifier
- ***mefServiceOvcEndPtPerEnniCfgRole*** - OVC End Point role of root, leaf, or trunk

- ***mefServiceOvcEndPtPerEnniCfgRootSvlanMap*** - OVC End Point S-VLAN ID map used for a type root or trunk

- ***mefServiceOvcEndPtPerEnniCfgLeafSvlanMap*** - OVC End Point S-VLAN ID map used for a type leaf or trunk

- ***mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex*** - OVC End Point ingress bandwidth profile and CoS Identifier selection, points to an entry in the ***mefServiceBwpGrpCfgTable***

- ***mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex*** - OVC End Point egress bandwidth profile and CoS Identifier selection, points to an entry in the ***mefServiceBwpGrpCfgTable***

- ***mefServiceOvcEndPtPerEnniCfgRowStatus*** - Status of the OVC End Point row in the table

7.3.4 OVC End Point per UNI Configuration Table

OVC End Point per UNI service attributes are found in the ***mefServiceOvcEndPtPerUniCfgTable***. An entry in the ***mefServiceOvcEndPtPerUniCfgTable*** is created by the SNMP Manager after an OVC has been created in the ***mefServiceOvcCfgTable*** if the interface type is UNI. A row is added to the table by the SNMP Manager on a specific interface as indicated by ***ifIndex*** and using the OVC index, ***mefServiceOvcCfgIndex***, to create a row in the table.

The row is deleted automatically by the SNMP Agent when the associated OVC is deleted or the interface type is changed to not be an UNI. The individual row is also deleted via the ***mefServiceOvcEndPtPerUniCfgRowStatus*** by the SNMP Manager.

Rows in this table are accessed via the UNI ***ifIndex*** and the ***mefServiceOvcCfgIndex***.

- ***mefServiceOvcEndPtPerUniCfgIdentifier*** - OVC End Point per UNI Identifier

- ***mefServiceOvcEndPtPerUniCfgRole*** - OVC End Point role of root or leaf

- ***mefServiceOvcEndPtPerUniCfgCeVlanMap*** - OVC End Point CE-VLAN ID map

- ***mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex*** - OVC End Point ingress bandwidth profile and CoS Identifier selection, points to an entry in the ***mefServiceBwpGrpCfgTable***

- ***mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex*** - OVC End Point egress bandwidth profile and CoS Identifier selection, points to an entry in the ***mefServiceBwpGrpCfgTable***

- ***mefServiceOvcEndPtPerUniCfgRowStatus*** - Status of the OVC End Point row in the table

7.3.5 OVC End Point per VUNI Configuration Table

OVC End Point per VUNI service attributes are found in the ***mefServiceOvcEndPtPerVuniCfg-Table***. An entry in the ***mefServiceOvcEndPtPerVuniCfgTable*** is created by the SNMP Manager after an OVC has been created in the ***mefServiceOvcCfgTable*** if the type is ENNI, but is associated with a VUNI. A row is added to the table by the SNMP Manager on a specific interface as indicated by ***ifIndex***, the ***mefServiceVuniCfgIndex***, and the ***mefServiceOvcCfgIndex***, to create a row in the table.

The row is deleted automatically by the SNMP Agent when the associated OVC is deleted or the interface type is changed to not be an ENNI, or the VUNI is deleted. The individual row is also deleted via the ***mefServiceOvcEndPtPerVuniCfgRowStatus*** by the SNMP Manager.

Rows in this table are accessed via the ENNI ***ifIndex,*** the ***mefServiceVuniCfgIndex***, and the ***mefServiceOvcCfgIndex***.

OVCs can't have an end point on an ENNI and also an end point on a VUNI on that same ENNI; but there could be an OVC End Point at one ENNI and another OVC End Point at a VUNI on a different ENNI.

- ***mefServiceOvcEndPtPerVuniCfgIdentifier*** - OVC End Point per VUNI Identifier
- ***mefServiceOvcEndPtPerVuniRole*** - OVC End Point role of root or leaf
- ***mefServiceOvcEndPtPerVuniCfgCeVlanMap*** - OVC End Point CE-VLAN ID map
- ***mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex*** - OVC End Point ingress bandwidth profile and CoS Identifier selection, points to an entry in the ***mef-ServiceBwpGrpCfgTable***
- ***mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex*** - OVC End Point egress bandwidth profile and CoS Identifier selection, points to an entry in the ***mef-ServiceBwpGrpCfgTable***
- ***mefServiceOvcEndPtPerVuniCfgRowStatus*** - Status of the OVC End Point row in the table

7.4 Notification and Notification Configuration Objects

There are no new notifications defined in this MIB.

7.5 ENNI-OVC MIB Conformance and Compliance

There are two conformances items: the ***mefServiceEnniOvcMibCompliances*** section and the ***mefServiceEnniOvcMibGroups*** conformance group.

The units of conformance are organized into the following mandatory groups:

- ***mefServiceEnniMandatoryGroup***
- ***mefServiceOvcMandatoryGroup***
- ***mefServiceOvcPerEndPtPerEnniMandatoryGroup***
- ***mefServiceOvcPerEndPtPerUniMandatoryGroup***

The units of conformance are organized into the following optional groups:

- ***mefServiceVuniOptionalGroup***
- ***mefServiceOvcPerEndPtPerVuniOptionalGroup***

8. ENNI-OVC MIB Requirements

The ENNI-OVC MIB defines the managed objects necessary to support MEF ENNI, OVC, and VUNI functionality.

The ENNI-OVC MIB is divided into the following groups (refer again to Figure 5):

- **mefServiceEnniAttributes** - defines the ENNI Service Attribute objects necessary to support ENNI configuration and status of MEF compliant Network Elements. This group includes the ***mefServiceEnniCfgTable***.

- **mefServiceVuniAttriutes** - defines the VUNI Service Attribute objects necessary to support VUNI configuration and status of MEF compliant Network Elements. This group includes the ***mefServiceVuniCfgTable***.

- **mefServiceOvcAttributes** - defines the OVC Service Attribute objects necessary to support OVC configuration and status of MEF compliant Network Elements. This group includes the ***mefServiceOvcNextIndex*** object, the ***mefServiceOvcCfgTable, mefServiceOvcStatusTable***, the ***mefServiceOvcEndPtPerEnniCfgTable***, the ***mefServiceOvcEndPtPerUniCfgTable***, and the ***mefServiceOvcEndPtPerVuniCfgTable***.

  [R8] The objects from the ***mefServiceEnniCfgTable*** **SHALL** be supported for MEF compliant Network Elements.

  [D6] The objects from the ***mefServiceVuniCfgTable*** **SHOULD** be supported for MEF compliant Network Elements.

  [R9] The ***mefServiceOvcNextIndex*** and the objects from the ***mefServiceOvcCfgTable*** **SHALL** be supported for MEF compliant Network Elements.

  [R10] The objects from the ***mefServiceOvcStatusTable*** **SHALL** be supported for MEF compliant Network Elements.

[R11] The objects from the ***mefServiceOvcEndPtPerEnniCfgTable*** **SHALL** be supported for MEF compliant Network Elements.

[R12] The objects from the ***mefServiceOvcEndPtPerUniCfgTable*** **SHALL** be supported for MEF compliant Network Elements.

[D7] The objects from the ***mefServiceOvcEndPtPerVuniCfgTable*** **SHOULD** be supported for MEF compliant Network Elements.

9. ENNI-OVC MIB Definitions

```
MEF-ENNI-OVC-MIB DEFINITIONS ::= BEGIN
  IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, enterprises
               FROM SNMPv2-SMI            -- RFC 2578
    RowStatus, TEXTUAL-CONVENTION, DisplayString
              FROM SNMPv2-TC             -- RFC 2579
    OBJECT-GROUP, MODULE-COMPLIANCE
              FROM SNMPv2-CONF           -- RFC 2580
    ifIndex
              FROM IF-MIB                -- [RFC2863]
    EntityAdminState, EntityOperState
              FROM ENTITY-STATE-TC-MIB   -- RFC 4268
    VlanId
              FROM Q-BRIDGE-MIB          -- [RFC4863]
    IEEE8021PriorityValue
              FROM IEEE8021-TC-MIB       -- IEEE 802.1Q
    MefServicePreservationType, MefServiceDeliveryType, MefServiceListType
              FROM MEF-UNI-EVC-MIB;

mefEnniOvcMib MODULE-IDENTITY
    LAST-UPDATED    "2013072212002" -- July 22, 2013
    ORGANIZATION    "Metro Ethernet Forum"
    CONTACT-INFO
       "Web URL: http://metroethernetforum.org/
        E-mail:  mibs@metroethernetforum.org
        Postal:  Metro Ethernet Forum
                 6033 W. Century Boulevard, Suite 1107
                 Los Angeles, CA 90045
                 U.S.A.
        Phone:   +1 310-642-2800
        Fax:     +1 310-642-2808"
    DESCRIPTION
            "This MIB module contains the management objects for the
            management of External Network Network Interfaces (ENNIs) and
            Operator Virtual Connections (OVCs) and intended for
            Metro Ethernet Network Elements (ME-NE).

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            All rights reserved.

    ******************************************************************************
    Reference Overview

    A number of base documents have been used to create this MIB. The following
    are the abbreviations for the baseline documents:

    [802.3] refers to IEEE Std 802.3 IEEE Standard for Ethernet',
        28 December 2012.
    [MEF6.1] refers to MEF 6.1 'Ethernet Services Definitions - Phase 2',
        April 2008
    [MEF 7.2] refers to MEF 7.2 'Carrier Ethernet Management Information Model',
        January 2013
    [MEF 26.1] refers to MEF 26.1 'External Network Network Interface (ENNI) -
        Phase 2', January 2012
    [MEF 28] refers to MEF 28 'External Network Network Interface (ENNI) Support
        for UNI Tunnel Access and Virtual UNI', October 2010
    [MEF 33] refers to MEF 33 'Ethernet Access Services Definition', January
         2012
    ******************************************************************************
           "
```

```
    REVISION        "201307221200Z" -- July 22, 2013
    DESCRIPTION
            "Initial Version."
    ::= { enterprises mef(15007) mefService(2) 3 }


-- ****************************************************************************
-- Object definitions in the Service ENNI-OVC MIB Module
-- ****************************************************************************
mefServiceEnniOvcObjects         OBJECT IDENTIFIER ::= { mefEnniOvcMib 1 }
mefServiceEnniOvcMibConformance  OBJECT IDENTIFIER ::= { mefEnniOvcMib 2 }

-- ****************************************************************************
-- Groups in the Service ENNI-OVC MIB Module
-- ****************************************************************************
mefServiceEnniAttributes         OBJECT IDENTIFIER ::= { mefServiceEnniOvcObjects 1 }
mefServiceVuniAttributes         OBJECT IDENTIFIER ::= { mefServiceEnniOvcObjects 2 }
mefServiceOvcAttributes          OBJECT IDENTIFIER ::= { mefServiceEnniOvcObjects 3 }


-- ****************************************************************************
-- Ethernet Service Textual Conventions
-- ****************************************************************************

MefServiceOvcEndPtRoleType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This object configures OVC End Point role.

         root(1)           Valid setting for all service types. A ENNI set
                           to this value may send frames to ENNIs configured
                           as 'root' or 'leaf'

         leaf(2)           Valid setting for Root-Multipoint OVCs only. A
                           ENNI set to this value may send frames to ENNIs
                           configured as 'root'

         trunk(3)          Valid setting for an OVC End Point that functions
                           as both a root and a leaf. Only one root S-VLAN ID
                           and one leaf S-VLAN ID is specified for the trunk.
                           Bundling is not allowed for this OVC End Point
                           role. This value is only valid for OVC End Point
                           on an ENNI

         other(4)          OVC End Point is not configured or illegally
                           configured. This value cannot be written, but
                           is only returned when the type is unknown.
        "
   REFERENCE
       "[MEF 26.1] 7.2.2 R31, R32"
    SYNTAX      INTEGER {
        root                (1),
        leaf                (2),
        trunk               (3),
        other               (4)
    }


-- ****************************************************************************
-- Ethernet ENNI Interface Service Attributes Configuration
-- ****************************************************************************

mefServiceEnniCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceEnniCfgEntry
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the specific ENNI service attributes configuration
        table for an MEF Ethernet compliant NE. The primary purpose of this table
        is to provide configuration of the ENNI for a ME-NE.

        Rows are automatically created in the table when an interface is
        configured as type ENNI via the mefServiceInterfaceCfgType object
        based upon the listed defaults by the SNMP Agent.

        Rows are deleted if the interface is configured to a non-ENNI by the
        SNMP Agent. A SNMP Manager can modify values of each of the objects
        in the row.

        This table may be sparsely populated based upon the number of ME-NE
        interfaces that are configured as type ENNI.

        Rows in this table are accessed by the IF-MIB interface object ifIndex.

        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 26.1]"
    ::= { mefServiceEnniAttributes 1 }

mefServiceEnniCfgEntry OBJECT-TYPE
    SYNTAX      MefServiceEnniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceEnniCfgTable."
    INDEX { ifIndex }
    ::= { mefServiceEnniCfgTable 1 }

MefServiceEnniCfgEntry ::= SEQUENCE {
      mefServiceEnniCfgIdentifier          DisplayString,
      mefServiceEnniCfgNumberLinks         Unsigned32,
      mefServiceEnniCfgProtection          INTEGER,
      mefServiceEnniCfgMaxNumberOvcEndPts  Unsigned32,
      mefServiceEnniCfgVuniNextIndex       Unsigned32
    }

mefServiceEnniCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..45))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the ENNI identifier. This is distinct from
        the mefServiceInterfaceCfgIdentifier and allows the naming of the
        ENNI separately from the Interface name. The identifier is
        an arbitrary text string that is used to identify an interface.
        Unique string values are chosen to uniquely identify the ENNI.

        This object is used to add an identifier to a service interface. The
        mefServiceInterfaceCfgIdentifier can be used to add a separate
        identifier that is associated with the physical interface name.

        Octet values of 0x00 through 0x1f are illegal.

        MEF 26.1 restricts the maximum size identifiers to 45 octets.
       "
    REFERENCE
```

```
       "[MEF 26.1] 7.1.1 R3, R4"
    DEFVAL { "" }
    ::= { mefServiceEnniCfgEntry 1 }

mefServiceEnniCfgNumberLinks OBJECT-TYPE
    SYNTAX      Unsigned32 (1..10)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the number of physical links that the
        ENNI is implemented with. When there are two links a protection
        mechanism is required to be specified by the
        mefServiceEnniCfgProtection object which normally indicates
        LAG in active/standby mode.
       "
    REFERENCE
       "[MEF 26.1] 7.1.4"
    DEFVAL { 1 }
    ::= { mefServiceEnniCfgEntry 2 }

mefServiceEnniCfgProtection OBJECT-TYPE
    SYNTAX      INTEGER {
        none                (1),
        linkAggregation     (2),
        other               (3)
    }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object type of resiliency mechanism for a specific ENNI. For
        a specific protection mechanism to be defined the
        mefServiceEnniCfgNumberLinks object must be more than '1'.

        none(1)             No protection mechanism defined. This setting
                            is required if mefServiceEnniCfgNumberLinks is
                            set to '1'

        linkAggregation(2)  Protection mechanism is Link Aggregation as
                            specified in [802.3], with one link in active
                            mode and one link in standby mode and requires
                            mefServiceEnniCfgNumberLinks is set to '2'

        other(3)            Protection method defined that is not
                            Link Aggregation active/standby mode with the
                            mefServiceEnniCfgNumberLinks set to > '1'
       "
    REFERENCE
       "[MEF 26.1] 6.0 R1, R2; 7.1.5 R11, R12, R13"
    DEFVAL { none }
    ::= { mefServiceEnniCfgEntry 3 }

mefServiceEnniCfgMaxNumberOvcEndPts OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4095)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the maximum number of OVC End Points per OVC
        that can be supported at the ENNI by the NE. If the maximum number
        OVC End Points is one, then hairpin switching cannot be supported
        at the ENNI.
       "
    REFERENCE
       "[MEF 26.1] 7.8"
    DEFVAL { 1 }
```

```
    ::= { mefServiceEnniCfgEntry 4 }

mefServiceEnniCfgVuniNextIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object contains an unused value for a VUNI on the ENNI on a
        MEF compliant NE, or a zero to indicate that none exist. This value
        needs to be read by the SNMP Manager in order to find an available
        index for row creation of a VUNI and then used when a row is created.
        This value is automatically updated by the SNMP Agent after the row
        is created.

        Referential integrity is necessary, i.e., the index needs to be
        persistent upon a reboot or restart of a NE.  The index
        is never to be reused for a new VUNI on the same MEF
        compliant NE until it wraps to zero.  The index value keeps
        increasing up to that time. This is to facilitate access control based
        on a fixed index for an EMS, since the index is not reused.
       "
    REFERENCE
       "[MEF 28]"
    DEFVAL { 1 }
    ::= { mefServiceEnniCfgEntry 5 }


-- ****************************************************************************
-- Ethernet VUNI Interface Service Attributes Configuration
-- ****************************************************************************

mefServiceVuniCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceVuniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the specific VUNI service attributes configuration
        table associated with an ENNI for an MEF Ethernet compliant NE. The
        primary purpose of this table is to provide configuration of the VUNI
        for a ME-NE.

        Rows in this table are created by the SNMP Manager by first reading
        the mefServiceEnniCfgVuniNextIndex object to find an available VUNI
        on an ENNI and then using this value when the row is created. If an
        object in the row is not defined during row creation time the object
        is set to the default value by the SNMP Agent.

        Rows are deleted by the SNMP Agent if the interface is configured to a
        non-ENNI, or by the SNMP Manager by using the mefServiceVuniCfgRowStatus
        object.

        An SNMP Manager can modify values of each of the objects in the row.

        Rows in this table are accessed by the IF-MIB interface object ifIndex
        and the mefServiceVuniCfgIndex.

        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 28]"
    ::= { mefServiceVuniAttributes 1 }

mefServiceVuniCfgEntry OBJECT-TYPE
```

```
    SYNTAX      MefServiceVuniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceVuniCfgTable."
    INDEX { ifIndex, mefServiceVuniCfgIndex }
    ::= { mefServiceVuniCfgTable 1 }

MefServiceVuniCfgEntry ::= SEQUENCE {
      mefServiceVuniCfgIndex                  Unsigned32,
      mefServiceVuniCfgIdentifier             DisplayString,
      mefServiceVuniCfgCeVidUntagged          VlanId,
      mefServiceVuniCfgCePriorityUntagged     IEEE8021PriorityValue,
      mefServiceVuniCfgSvlanMap               MefServiceListType,
      mefServiceVuniCfgMaxNumberOvcEndPoints  Unsigned32,
      mefServiceVuniCfgIngressBwpGrpIndex     Unsigned32,
      mefServiceVuniCfgEgressBwpGrpIndex      Unsigned32,
      mefServiceVuniCfgL2cpGrpIndex           Unsigned32,
      mefServiceVuniCfgRowStatus              RowStatus
    }

mefServiceVuniCfgIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The specific instance of a VUNI on an ENNI."
    REFERENCE
       "[MEF 28]"
    ::= { mefServiceVuniCfgEntry 1 }

mefServiceVuniCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..45))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the VUNI identifier. This is distinct from
        the mefServiceInterfaceCfgIdentifier and allows the naming of the
        VUNI separately from the Interface name. The identifier is
        an arbitrary text string that is used to identify an interface.
        Unique string values are chosen to uniquely identify the VUNI.

        This object is used to add an identifier to a service interface. The
        mefServiceInterfaceCfgIdentifier can be used to add a separate
        identifier that is associated with the physical interface name.

        Octet values of 0x00 through 0x1f are illegal.

        MEF 28 restricts the maximum size identifiers to 45 octets.
       "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { "" }
    ::= { mefServiceVuniCfgEntry 2 }

mefServiceVuniCfgCeVidUntagged OBJECT-TYPE
    SYNTAX      VlanId
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Configures the CE VLAN ID associated with untagged and priority
         Service Frames. It allows the identification of untagged and
         priority tagged traffic with a specific CE-VLAN ID.
        "
```

```
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 1 }
    ::= { mefServiceVuniCfgEntry 3 }

mefServiceVuniCfgCePriorityUntagged OBJECT-TYPE
    SYNTAX      IEEE8021PriorityValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Configures the CE VLAN Priority associated with untagged Service
         Frames. It allows the assignment of a specific VLAN priority to
         untagged traffic.
        "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 0 }
    ::= { mefServiceVuniCfgEntry 4 }

mefServiceVuniCfgSvlanMap OBJECT-TYPE
    SYNTAX      MefServiceListType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the S-TAG ID associated with the VUNI. S-TAG IDs
        can have a value of 1 to 4095.  A value of '0' is not allowed.
        The S-VLAN ID list must contain a single value in the case of a VUNI.

        A specific S-VLAN ID can only occur in the mefServiceVuniCfgTable
        or the mefServiceOvcEndPtPerEnniCfgTable, but not both
        simultaneously.

        A valid value is: '100'. S-VLAN ID 100 is associated with the
        S-VLAN map.
       "
    REFERENCE
       "[MEF 28] 7.2 R11"
    DEFVAL { "1" }
    ::= { mefServiceVuniCfgEntry 5 }

mefServiceVuniCfgMaxNumberOvcEndPoints OBJECT-TYPE
    SYNTAX      Unsigned32 (1..10)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the maximum number of OVC end points per VUNI.
       "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 1 }
    ::= { mefServiceVuniCfgEntry 6 }

mefServiceVuniCfgIngressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the ingress bandwidth profile group
        associated with the current VUNI. A value of 0 indicates that no
        interface ingress bandwidth profile group is associated with the
        VUNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
```

```
        using this value for mefServiceBwpGrpCfgIndex. There may be multiple
        entries in mefServiceBwpCfgTable using this index, each containing
        bandwidth parameters for a different Class of Service Identifier.
      "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 0 }
    ::= { mefServiceVuniCfgEntry 7 }

mefServiceVuniCfgEgressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the egress bandwidth profile group
        associated with the current VUNI. A value of 0 indicates that no
        interface egress bandwidth profile group is associated with the
        interface.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex. There may be multiple
        entries in mefServiceBwpCfgTable using this index, each containing
        bandwidth parameters for a different Class of Service Identifier.
      "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 0 }
    ::= { mefServiceVuniCfgEntry 8 }

mefServiceVuniCfgL2cpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index of the L2CP profile group
        (mefServiceL2cpGrpCfgIndex) associated with the current VUNI. A
        value of 0 indicates that no interface L2CP profile group is associated
        with the interface.

        This index indicates the L2CP profile group previously configured via
        mefServiceL2cpGrpCfgTable and mefServiceL2cpCfgTable using the value
        of the mefServiceL2cpGrpCfgIndex. There may be multiple entries in
        mefServiceL2cpCfgTable using this index, each containing
        parameters for a different L2CP protocol.
      "
    REFERENCE
       "[MEF 28] 7.1"
    DEFVAL { 0 }
    ::= { mefServiceVuniCfgEntry 9 }

mefServiceVuniCfgRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "The status of the row.

        The writable columns in a row cannot be changed if the row
        is active. All columns must have a valid value before a row
        can be activated.
      "
   ::= { mefServiceVuniCfgEntry 10 }
```

```
-- ****************************************************************************
-- Ethernet OVC Service Attributes Configuration
-- ****************************************************************************

mefServiceOvcNextIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object contains an unused value for an OVC on a
        MEF compliant NE, or a zero to indicate that none exist. This value
        needs to be read by the SNMP Manager in order to find an available
        index for row-creation of an OVC and then used when a row is created.
        This value is automatically updated by the SNMP Agent after the row
        is created.

        Referential integrity is necessary, i.e., the index needs to be
        persistent upon a reboot or restart of a NE.  The index
        is never to be reused for a new OVC on the same MEF compliant
        NE until it wraps to zero.  The index value keeps
        increasing up to that time. This is to facilitate access control based
        on a fixed index for an EMS, since the index is not reused.
       "
    DEFVAL { 1 }
    ::= { mefServiceOvcAttributes 1 }

mefServiceOvcCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceOvcCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the specific OVC service attributes configuration
        table for an MEF Ethernet compliant NE. The primary purpose of this table
        is to provide configuration of the OVC for a ME-NE.

        Rows in this table are accessed by the SNMP Manager via the OVC
        number object mefServiceOvcCfgIndex. A new row is created in the
        table by the SNMP Manager by first reading the mefServiceOvcNextIndex
        to find an available OVC number and using this value when the row
        is created. If an object in the row is not defined during row
        creation time the object is set to the default value by the
        SNMP Agent. Rows are deleted by the SNMP Manager via the
        mefServiceOvcCfgRowStatus object.

        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 26.1] 7.2"
    ::= { mefServiceOvcAttributes 2 }

mefServiceOvcCfgEntry OBJECT-TYPE
    SYNTAX      MefServiceOvcCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceOvcCfgTable."
    INDEX { mefServiceOvcCfgIndex }
    ::= { mefServiceOvcCfgTable 1 }

MefServiceOvcCfgEntry ::= SEQUENCE {
      mefServiceOvcCfgIndex                 Unsigned32,
      mefServiceOvcCfgIdentifier            DisplayString,
```

```
      mefServiceOvcCfgServiceType           INTEGER,
      mefServiceOvcCfgMtuSize               Unsigned32,
      mefServiceOvcCfgCevlanIdPreservation  MefServicePreservationType,
      mefServiceOvcCfgCevlanCosPreservation MefServicePreservationType,
      mefServiceOvcCfgSvlanIdPreservation   MefServicePreservationType,
      mefServiceOvcCfgSvlanCosPreservation  MefServicePreservationType,
      mefServiceOvcCfgColorForwarding       INTEGER,
      mefServiceOvcCfgColorIndicator        INTEGER,
      mefServiceOvcCfgUnicastDelivery       MefServiceDeliveryType,
      mefServiceOvcCfgMulticastDelivery     MefServiceDeliveryType,
      mefServiceOvcCfgBroadcastDelivery     MefServiceDeliveryType,
      mefServiceOvcCfgL2cpGrpIndex          Unsigned32,
      mefServiceOvcCfgAdminState            EntityAdminState,
      mefServiceOvcCfgRowStatus             RowStatus
    }

mefServiceOvcCfgIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The specific instance of an OVC number."
    ::= { mefServiceOvcCfgEntry 1 }

mefServiceOvcCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..45))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "This object indicates the OVC identifier. The identifier is
        an arbitrary text string that is used to identify an OVC.
        Unique string values are chosen to uniquely identify the OVC.

        Octet values of 0x00 through 0x1f are illegal.

        MEF 26.1 restricts the maximum size identifiers to 45 octets.
       "
    REFERENCE
       "[MEF 26.1] 7.2.5 R37, R38"
    DEFVAL { "" }
    ::= { mefServiceOvcCfgEntry 2 }

mefServiceOvcCfgServiceType OBJECT-TYPE
    SYNTAX      INTEGER {
        pointToPoint            (1),
        multipointToMultipoint  (2),
        rootedMultipoint        (3)
    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures the OVC service type for the ME-NE.

         pointToPoint(1)            OVC Point-to-Point service,
                                    used for EPL and EVPL services
                                    (Access EPL and Access EVPL)

         multipointToMultipoint(2)  OVC Multipoint-to-Multipoint Service,
                                    used for EP-LAN and EVP-LAN services

         rootedMultipoint(3)        OVC Rooted-Multipoint Service,
                                    used for EP-Tree and EVP-Tree services
        "
    REFERENCE
```

```
       "[MEF 26.1] 7.17.2 R22; 7.2.6; [MEF 33]"
    DEFVAL { pointToPoint }
    ::= { mefServiceOvcCfgEntry 3 }

mefServiceOvcCfgMtuSize OBJECT-TYPE
    SYNTAX      Unsigned32 (1522..16384)
    UNITS       "octets"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the configured OVC maximum service frame format
        size. It must be less than or equal to the
        mefServiceOvcStatusMaxMtuSize.
       "
    REFERENCE
       "[MEF 26.1] 7.2.10 R39, D2, R40, R41"
    DEFVAL { 1522 }
    ::= { mefServiceOvcCfgEntry 4 }

mefServiceOvcCfgCevlanIdPreservation OBJECT-TYPE
    SYNTAX      MefServicePreservationType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures the OVC CE-VLAN ID preservation. This object is
         used to achieve EVC CE-VLAN Id Preservation that is a key a property
         of the EPL and EP-LAN Service Types of [MEF 6.1].


         preserve(1)          The CE-VLAN ID is preserved. The ingress CE-VLAN
                              is the CE-VLAN ID at the egress UNI

         noPreserve(2)        The CE-VLAN ID is not preserved. The ingress
                              CE-VLAN ID may not be the CE-VLAN ID at the egress
                              UNI
        "
    REFERENCE
       "[MEF 6.1] 6.1; [MEF 26.1] 7.1.7.2 R24; 7.2.11 R42, R43, R44"
    DEFVAL { preserve }
    ::= { mefServiceOvcCfgEntry 5 }

mefServiceOvcCfgCevlanCosPreservation OBJECT-TYPE
    SYNTAX      MefServicePreservationType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC CE-VLAN CoS preservation. This object is
         used to achieve EVC CE-VLAN CoS Preservation that is a key a property
         of the EPL and EP-LAN Service Types of [MEF 6.1].

         preserve(1)          The CE-VLAN CoS is preserved. The ingress CE-VLAN
                              CoS is the CE-VLAN CoS at the egress UNI

         noPreserve(2)        The CE-VLAN CoS is not preserved. The ingress
                              CE-VLAN CoS may not be the CE-VLAN CoS at the egress
                              UNI
        "
    REFERENCE
       "[MEF 6.1] 6.1; [MEF 26.1] 7.1.7.2 R25, R26; 7.2.12 R45"
    DEFVAL { preserve }
    ::= { mefServiceOvcCfgEntry 6 }

mefServiceOvcCfgSvlanIdPreservation OBJECT-TYPE
    SYNTAX      MefServicePreservationType
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures the OVC S-VLAN ID preservation. This object
         describes the relationship of the S-VLAN ID at one ENNI and the
         S-VLAN ID of the corresponding frame at another ENNI. This object
         is not applicable to frames exchanged between an ENNI and a UNI.

         preserve(1)          The S-VLAN ID is preserved. The ingress S-VLAN
                              is the S-VLAN ID at the egress ENNI

         noPreserve(2)        The S-VLAN ID is not preserved. The ingress
                              S-VLAN ID may not be the S-VLAN ID at the egress
                              ENNI
        "
    REFERENCE
       "[MEF 26.1] 7.1.72 R23, R26; 7.2.13 R46, R47, R48"
    DEFVAL { preserve }
    ::= { mefServiceOvcCfgEntry 7 }

mefServiceOvcCfgSvlanCosPreservation OBJECT-TYPE
    SYNTAX      MefServicePreservationType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC S-VLAN CoS preservation. This object
         describes the relationship of the S-VLAN PCP at one ENNI and the
         S-VLAN PCP of the corresponding frame at another ENNI. This object
         is not applicable to frames exchanged between an ENNI and a UNI.


         preserve(1)          The S-VLAN CoS is preserved. The ingress S-VLAN
                              CoS is the S-VLAN CoS at the egress ENNI

         noPreserve(2)        The S-VLAN CoS is not preserved. The ingress
                              S-VLAN CoS may not be the S-VLAN CoS at the egress
                              ENNI
        "
    REFERENCE
       "[MEF 26.1] 7.2.14 R49"
    DEFVAL { preserve }
    ::= { mefServiceOvcCfgEntry 8 }

mefServiceOvcCfgColorForwarding OBJECT-TYPE
    SYNTAX      INTEGER {
        colorFwdYes             (1),
        colorFwdNo              (2)
    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC Color Forwarding. This object describes
         the relationship between the color on an ingress frame into the
         Operator Network and the color of the resulting egress ENNI
         frame.

         This object is not applicable to frames exchanged between an ENNI
         and a UNI.

         colorFwdYes(1)       Each ingress ENNI frame mapped to an OVC End
                              Point that is marked yellow cannot be
                              promoted to green at the egress ENNI

         colorFwdNo(2)        Each ingress ENNI frame mapped to an OVC End
```

```
                            Point that is marked yellow can be marked
                            green or yellow at the egress ENNI
        "
    REFERENCE
       "[MEF 26.1] 7.2.15 R50, O2"
    DEFVAL { colorFwdYes }
    ::= { mefServiceOvcCfgEntry 9 }

mefServiceOvcCfgColorIndicator OBJECT-TYPE
    SYNTAX      INTEGER {
        colorIndicatorPcp       (1),
        colorIndicatorDei       (2)
    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC Color Indicator for color aware service
         on an OVC.

         This object is not applicable to frames exchanged between an ENNI
         and a UNI.

         colorIndicatorPcp(1) Indicates color aware service is indicated
                              by the PCP bits of the S-TAG PCP values

         colorIndicatorDei(2) Indicates color aware service is indicated
                              by the DEI bit of the S-TAG DEI field
        "
    REFERENCE
       "[MEF 26.1] 7.3.3 R85, R86, R87"
    DEFVAL { colorIndicatorPcp }
    ::= { mefServiceOvcCfgEntry 10 }

mefServiceOvcCfgUnicastDelivery OBJECT-TYPE
    SYNTAX      MefServiceDeliveryType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC Unicast delivery condition.
        "
    REFERENCE
       "[MEF 26.1] 7.2.17 R72, R73"
    DEFVAL { unconditional }
    ::= { mefServiceOvcCfgEntry 11 }

mefServiceOvcCfgMulticastDelivery OBJECT-TYPE
    SYNTAX      MefServiceDeliveryType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC Multicast delivery condition.
       "
    REFERENCE
       "[MEF 26.1] 7.2.18 R74, R75"
    DEFVAL { unconditional }
    ::= { mefServiceOvcCfgEntry 12 }

mefServiceOvcCfgBroadcastDelivery OBJECT-TYPE
    SYNTAX      MefServiceDeliveryType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures OVC Broadcast delivery condition.
        "
```

```
    REFERENCE
       "[MEF 26.1] 7.2.19 R76, R77"
    DEFVAL { unconditional }
    ::= { mefServiceOvcCfgEntry 13 }

mefServiceOvcCfgL2cpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index of the L2CP profile group
        (mefServiceL2cpGrpCfgIndex UNI-EVC MIB) associated with the current
        OVC on an interface. A value of 0 indicates that no OVC L2CP profile
        group is associated with the OVC.

        This index indicates the L2CP profile group previously configured via
        the mefServiceL2cpGrpCfgTable and mefServiceL2cpCfgTable using the value
        of the mefServiceL2cpGrpCfgIndex. There may be multiple entries in
        mefServiceL2cpCfgTable using this index, each containing
        parameters for a different L2CP protocol.
       "
    REFERENCE
       "[MEF 26.1] 7.2.20 R78"
    DEFVAL { 0 }
    ::= { mefServiceOvcCfgEntry 14 }

mefServiceOvcCfgAdminState OBJECT-TYPE
    SYNTAX      EntityAdminState
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "This object specifies the administrative state of the OVC.

        If mefServiceOvcCfgAdminState is set to 'locked', the OVC will be
        administratively locked.

        If mefServiceOvcCfgAdminState is set to 'unlocked', the OVC will be
        administratively unlocked if previously locked.

        Other values of mefServiceOvcCfgAdminState are undefined.
       "
    REFERENCE
       "[MEF 7.2] 7.2.3"
    DEFVAL { unlocked }
    ::= { mefServiceOvcCfgEntry 15 }

mefServiceOvcCfgRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "The status of the row.

        The writable columns in a row cannot be changed if the row
        is active. All columns must have a valid value before a row
        can be activated.
       "
   ::= { mefServiceOvcCfgEntry 16 }


-- ****************************************************************************
-- Ethernet Service OVC Service Attributes Status
-- ****************************************************************************
```

```
mefServiceOvcStatusTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceOvcStatusEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the OVC service attributes status table for an
        MEF Ethernet compliant NE. The primary purpose of this table is to
        provide status information of the OVC for a ME-NE.

        Rows are automatically created in the table by the SNMP Agent when a
        row is created in the mefServiceOvcCfgTable. This table contains the
        same rows as the mefServiceOvcCfgTable.

        Rows are automatically deleted in this table by the SNMP Agent when
        the corresponding row is deleted in the mefServiceOvcCfgTable.

        Rows in this table are accessed via the OVC number object
        mefServiceOvcCfgIndex by the SNMP Manager.

        Rows in this table are persistent (non-volatile) upon reboot, but the
        values of the objects in a row are not persistent.
       "
    REFERENCE
       "[MEF 26.1 7.2"
    ::= { mefServiceOvcAttributes 4 }

mefServiceOvcStatusEntry OBJECT-TYPE
    SYNTAX      MefServiceOvcStatusEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceInterfaceStatusTable."
    INDEX { mefServiceOvcCfgIndex }
    ::= { mefServiceOvcStatusTable 1 }

MefServiceOvcStatusEntry ::= SEQUENCE {
      mefServiceOvcStatusMaxMtuSize         Unsigned32,
      mefServiceOvcStatusMaxNumEnniOvcEndPt Unsigned32,
      mefServiceOvcStatusMaxNumVuniOvcEndPt Unsigned32,
      mefServiceOvcStatusOperationalState   INTEGER
    }

mefServiceOvcStatusMaxMtuSize OBJECT-TYPE
    SYNTAX      Unsigned32 (1526..16384)
    UNITS       "octets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the OVC maximum configurable service
        frame format size. The actual configured size is set via the
        mefServiceOvcCfgMtuSize object.
       "
    REFERENCE
       "[MEF 26.1] 7.2.10 R39, D2, R40, R41"
    ::= { mefServiceOvcStatusEntry 1 }

mefServiceOvcStatusMaxNumEnniOvcEndPt OBJECT-TYPE
    SYNTAX      Unsigned32 (2..16384)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the maximum number of ENNI OVC End Points at
        different ENNIs for the NE.
       "
```

```
    REFERENCE
       "[MEF 26.1] 7.2.9"
    ::= { mefServiceOvcStatusEntry 2 }

mefServiceOvcStatusMaxNumVuniOvcEndPt OBJECT-TYPE
    SYNTAX      Unsigned32 (2..16384)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the maximum number of VUNI OVC End Points at
        different VUNIs for the NE.
       "
    REFERENCE
       "[MEF 28] 7.1"
    ::= { mefServiceOvcStatusEntry 3 }

mefServiceOvcStatusOperationalState OBJECT-TYPE
    SYNTAX      EntityOperState
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the operational state (current
        capability) of the OVC.

        If the value is 'enabled', the OVC is able to ingress and
        egress service frames and has been set to active.

        If the value is 'disabled' the OVC is not able to ingress and
        egress service frames, has detected an operational failure
        condition, or has failed an internal test.

        If the value is 'testing' the OVC has been placed into a test mode,
        either a troubleshooting mode or a test mode.

        If the value is 'unknown' the OVC is unable to report the operational
        state.
       "
    REFERENCE
       "[MEF 7.2] 7.2.3"
    ::= { mefServiceOvcStatusEntry 4 }


-- ****************************************************************************
-- Ethernet OVC End Point per ENNI Service Attributes Configuration
-- ****************************************************************************

mefServiceOvcEndPtPerEnniCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceOvcEndPtPerEnniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the specific OVC End Point per ENNI service
        attributes configuration table for an MEF Ethernet compliant NE. The
        primary purpose of this table is to provide configuration of the OVC
        End Point per ENNI service attributes for a MEF NE.

        Rows in the table can only be created by the SNMP Manager after the OVC
        is created and the mefServiceInterfaceCfgType is ENNI. Rows in this
        table are addressed by mefServiceOvcCfgIndex and ifIndex.

        Rows are deleted by the SNMP Manager via the
        mefServiceOvcEndPtPerEnniCfgRowStatus object or by the SNMP Agent if
        the associated OVC is deleted or the interface is changed to not be
        an ENNI.
```

```
        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 26.1] 7.2.1 O1, R29, R30; 7.3"
    ::= { mefServiceOvcAttributes 5 }

mefServiceOvcEndPtPerEnniCfgEntry OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtPerEnniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceOvcEndPtPerEnniCfgTable.
       "
    INDEX { ifIndex, mefServiceOvcCfgIndex }
    ::= { mefServiceOvcEndPtPerEnniCfgTable 1 }

MefServiceOvcEndPtPerEnniCfgEntry ::= SEQUENCE {
      mefServiceOvcEndPtPerEnniCfgIdentifier         DisplayString,
      mefServiceOvcEndPtPerEnniCfgRole               MefServiceOvcEndPtRoleType,
      mefServiceOvcEndPtPerEnniCfgRootSvlanMap       MefServiceListType,
      mefServiceOvcEndPtPerEnniCfgLeafSvlanMap       MefServiceListType,
      mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex Unsigned32,
      mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex  Unsigned32,
      mefServiceOvcEndPtPerEnniCfgRowStatus          RowStatus
    }

mefServiceOvcEndPtPerEnniCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..45))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the OVC End Point Identifier at the ENNI that
        is used by the Operator to identify an OVC End Point within the
        Operator CEN. It is intended for management and control purposes.
       "
    REFERENCE
       "[MEF 26.1] 7.3.1 R79, R80"
::= { mefServiceOvcEndPtPerEnniCfgEntry 1 }

mefServiceOvcEndPtPerEnniCfgRole OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtRoleType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object configures OVC End Point type for an ENNI.

         root(1)          Valid setting for all service types. A ENNI set
                          to this value may send frames to ENNIs configured
                          as 'root' or 'leaf'

         leaf(2)          Valid setting for Root-Multipoint OVCs only. A
                          ENNI set to this value may send frames to ENNIs
                          configured as 'root'

         trunk(3)         Valid setting for an OVC End Point that functions
                          as both a root and a leaf. Only one root S-LVAN ID
                          and one leaf S-VLAN ID is specified for the trunk.
                          Bundling is not allowed for this OVC End Point
                          role.

         other(4)         ENNI port is not configured or illegally
                          configured. This value cannot be written, but
```

```
                        is only returned when the type is unknown.
        "
    REFERENCE
       "[MEF 26.1] 7.2.2 R32, R33, R34, R35, R36"
    DEFVAL { root }
    ::= { mefServiceOvcEndPtPerEnniCfgEntry 2 }

mefServiceOvcEndPtPerEnniCfgRootSvlanMap OBJECT-TYPE
    SYNTAX      MefServiceListType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the S-TAG IDs associated with the specific
        OVC End Point of type 'root' or 'trunk' on an ENNI. S-TAG IDs can have
        a value of 1 to 4095. A value of '0' is not allowed. The S-VLAN ID list
        can be a single value or multiple values separated by a delimiter to
        indicate bundling. An individual S-VLAN ID can only occur once in the
        list for both this object and the
        mefServiceOvcEndPtPerEnniCfgLeafSvlanMap object.

        If the mefServiceOvcEndPtPerEnniCfgRole is 'leaf' this object must
        be empty.

        Some valid values are: '100', '1:10', '10,20,30'. In the first
        example only S-VLAN ID 100 is associated with the S-VLAN map.
        In the second example the S-VLAN map includes S-VLAN IDs 1 through
        10 (range of values). The third example indicates three separate values
        that make up the S-VLAN map. An OVC End Point
        mefServiceOvcEndPtPerEnniCfgRole of 'trunk' can only had one
        S-TAG ID in the map.

        A specific S-VLAN ID can only occur in the mefServiceVuniCfgTable
        or the mefServiceOvcEndPtPerEnniCfgTable, but not both
        simultaneously.
       "
    REFERENCE
       "[MEF 26.1] 7.1.7.1 R16, R17, R18, R19, R20, R21, R27; 7.3.2 R81, R82"
    DEFVAL { "" }
    ::= { mefServiceOvcEndPtPerEnniCfgEntry 3 }

mefServiceOvcEndPtPerEnniCfgLeafSvlanMap OBJECT-TYPE
    SYNTAX      MefServiceListType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the S-TAG IDs associated with the specific
        OVC End Point of type 'leaf' or 'trunk' on an ENNI. S-TAG IDs can have
        a value of 1 to 4095. A value of '0' is not allowed. The S-VLAN ID list
        can be a single value or multiple values separated by a delimiter to
        indicate bundling. An individual S-VLAN ID can only occur once in the
        list for both this object and the
        mefServiceOvcEndPtPerEnniCfgRootSvlanMap object.  An OVC End Point
        mefServiceOvcEndPtPerEnniCfgRole of 'trunk' can only had one
        S-TAG ID in the map.

        If the mefServiceOvcEndPtPerEnniCfgRole is 'root' this object must
        be empty.

        Some valid values are: '100', '1:10', '10,20,30'. In the first
        example only S-VLAN ID 100 is associated with the S-VLAN map.
        In the second example the S-VLAN map includes S-VLAN IDs 1 through
        10 (range of values). The third example indicates three separate values
        that make up the S-VLAN map.
```

```
        A specific S-VLAN ID can only occur in the mefServiceVuniCfgTable
        or the mefServiceOvcEndPtPerEnniCfgTable, but not both
        simultaneously.
       "
    REFERENCE
       "[MEF 26.1] 7.1.7.1 R16, R17, R18, R19, R20, R21, R27; 7.3.2 R81, R82"
    DEFVAL { "" }
    ::= { mefServiceOvcEndPtPerEnniCfgEntry 4 }

mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the ingress bandwidth profile group
        associated with the current OVC End Point on an ENNI. A value of 0
        indicates that no ingress bandwidth profile group is associated with
        the OVC End Point on a ENNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex found in the UNI-EVC
        MIB. There may be multiple entries in mefServiceBwpCfgTable using
        this index, each containing bandwidth parameters for a different
        Class of Service Identifier. mefServiceCosCfgType of value 'dscp' is
        not allowed.
       "
    REFERENCE
       "[MEF 26.1] 7.3.3 R83, O13, R84, D3, R86, R87; 7.3.4 R88, R89;
                   7.3.6 R92, R93
       "
    DEFVAL { 0 }
   ::= { mefServiceOvcEndPtPerEnniCfgEntry 5 }

mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the egress bandwidth profile group
        associated with the current OVC End Point on an ENNI. A value of 0
        indicates that no egress bandwidth profile group is associated with
        the OVC End Point on a EnNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex. There may be multiple
        entries in mefServiceBwpCfgTable using this index, each containing
        bandwidth parameters for a different Class of Service Identifier.
       "
    REFERENCE
       "[MEF 26.1] 7.3.3 R83, O13, R84, D3, R86, R87; 7.3.5 R90, R91
                   7.3.7 R94, R95
       "
    DEFVAL { 0 }
    ::= { mefServiceOvcEndPtPerEnniCfgEntry 6 }

mefServiceOvcEndPtPerEnniCfgRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "The status of the row.
```

```
        The writable columns in a row cannot be changed if the row
        is active. All columns must have a valid value before a row
        can be activated.
       "
   ::= { mefServiceOvcEndPtPerEnniCfgEntry 7 }


-- ****************************************************************************
-- Ethernet OVC End Point per UNI Service Attributes Configuration
-- ****************************************************************************

mefServiceOvcEndPtPerUniCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceOvcEndPtPerUniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table represents the specific OVC End Point per UNI service
        attributes configuration table for an MEF Ethernet compliant NE. The
        primary purpose of this table is to provide configuration of the OVC
        End Point per UNI service attributes for a MEF NE.

        Rows in the table can only be created by the SNMP Manager after the OVC
        is created and the mefServiceInterfaceCfgType is an UNI. Rows in this
        table are addressed by mefServiceOvcCfgIndex and ifIndex.

        Rows are deleted by the SNMP Manager via the
        mefServiceOvcEndPtPerUniCfgRowStatus object or by the SNMP Agent if
        the associated OVC is deleted or the interface is changed to not be
        an UNI.

        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 26.1] 7.2.1 R28; 7.5"
    ::= { mefServiceOvcAttributes 6 }

mefServiceOvcEndPtPerUniCfgEntry OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtPerUniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceOvcEndPtPerUniCfgTable.
       "
    INDEX { ifIndex, mefServiceOvcCfgIndex }
    ::= { mefServiceOvcEndPtPerUniCfgTable 1 }

MefServiceOvcEndPtPerUniCfgEntry ::= SEQUENCE {
    mefServiceOvcEndPtPerUniCfgIdentifier           DisplayString,
    mefServiceOvcEndPtPerUniCfgRole                 INTEGER,
    mefServiceOvcEndPtPerUniCfgCeVlanMap            MefServiceListType,
    mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex   Unsigned32,
    mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex    Unsigned32,
    mefServiceOvcEndPtPerUniCfgRowStatus            RowStatus
    }

mefServiceOvcEndPtPerUniCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..90))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the OVC End Point Identifier at a UNI that is
        used by the Operator to identify an OVC End Point within the Operator
        CEN. It is intended for management and control purposes.  Its
```

```
        value is the concatenation of the UNI Identifier object
        (mefServiceUniCfgIdentifier) and the OVC Identifier object
        (mefServiceOvcCfgIdentifier object).
       "
    REFERENCE
       "[MEF 26.1] 7.5.1 R96"
::= { mefServiceOvcEndPtPerUniCfgEntry 1 }

mefServiceOvcEndPtPerUniCfgRole OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtRoleType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object configures OVC End Point type for an UNI.

         root(1)          Valid setting for all service types. A UNI set
                          to this value may send frames to UNIs configured
                          as 'root' or 'leaf'

         leaf(2)          Valid setting for Root-Multipoint OVCs only. A
                          UNI set to this value may send frames to UNIs
                          configured as 'root'

         trunk(3)         Invalid value at a UNI. This value cannot be written,
                          and is never returned.

         other(4)         UNI port is not configured or illegally
                          configured. This value cannot be written, but
                          is only returned when the type is unknown.
        "
    REFERENCE
       "[MEF 26.1] 7.2.2 R31, R33, R34, R35, R36"
    DEFVAL { root }
    ::= { mefServiceOvcEndPtPerUniCfgEntry 2 }

mefServiceOvcEndPtPerUniCfgCeVlanMap OBJECT-TYPE
    SYNTAX      MefServiceListType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the CE-VLANs associated with the specific
        OVC on a UNI. CE-VLAN IDs have value of 0 to 4095. The CE-VLAN ID
        list can be a single value or multiple values separated by a delimiter.

        Some valid values are: '100', '1:10', '10,20,30', '1:4095'. In the
        first example only CE-VLAN ID 100 is associated with the VLAN map.
        In the second example the CE-VLAN map includes CE-VLAN IDs 1 through
        10 (range of values). The third example indicates three separate values
        that make up the CE-VLAN map. The last example indicates all CE-VLAN IDs
        are included in the map (range of values). CE-VLAN IDs can only map to
        one of the following mutually exclusive properties: 1) it maps to one
        OVC End Point, 2) it maps to one EVC that associates UNIs within the
        Operator MEN and corresponds with mefServiceEvcPerUniCfgCeVlanMap
        in the UNI MIB, 3) it does not map to either an EVC or an OVC End Point.
       "
    REFERENCE
       "[MEF 26.1] 7.5.2 R97, R98, O14, R99, R100"
    DEFVAL { "1:4095" }
 ::= { mefServiceOvcEndPtPerUniCfgEntry 3 }

mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
```

```
    DESCRIPTION
       "This object is the index number of the ingress bandwidth profile group
        associated with the current OVC End Point on an UNI. A value of 0
        indicates that no ingress bandwidth profile group is associated with
        the OVC End Point on a UNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex found in the UNI-EVC
        MIB. There may be multiple entries in mefServiceBwpCfgTable using
        this index, each containing bandwidth parameters for a different
        Class of Service Identifier.
       "
    REFERENCE
       "[MEF 26.1] 7.5.3 R101, R102, R103, R104, R105, R106, R107, R108
                   7.5.4 R109; 7.5.5, R110"
    DEFVAL { 0 }
   ::= { mefServiceOvcEndPtPerUniCfgEntry 4 }

mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the egress bandwidth profile group
        associated with the current OVC End Point on an ENNI. A value of 0
        indicates that no egress bandwidth profile group is associated with
        the OVC End Point on a EnNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex. There may be multiple
        entries in mefServiceBwpCfgTable using this index, each containing
        bandwidth parameters for a different Class of Service Identifier.
       "
    REFERENCE
       "[MEF 26.1] 7.5.3 R101, R102, R103, R104, R105, R106, R107, R108
                   7.5.6 R111; 7.5.7 R112"
    DEFVAL { 0 }
    ::= { mefServiceOvcEndPtPerUniCfgEntry 5 }

mefServiceOvcEndPtPerUniCfgRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "The status of the row.

        The writable columns in a row cannot be changed if the row
        is active. All columns must have a valid value before a row
        can be activated.
       "
   ::= { mefServiceOvcEndPtPerUniCfgEntry 6 }


-- ****************************************************************************
-- Ethernet OVC End Point per VUNI Service Attributes Configuration
-- ****************************************************************************

mefServiceOvcEndPtPerVuniCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MefServiceOvcEndPtPerVuniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
       "This table represents the specific OVC End Point per VUNI service
        attributes configuration table for an MEF Ethernet compliant NE. The
        primary purpose of this table is to provide configuration of the OVC
        End Point per VUNI service attributes for a MEF NE.

        Rows in the table can only be created by the SNMP Manager after the OVC
        is created, the mefServiceInterfaceCfgType is an ENNI, and an VUNI has
        been created on an ENNI by the mefServiceVuniCfgRowStatus object.

        Rows in this table are addressed by mefServiceOvcCfgIndex, ifIndex, and
        the mefServiceVuniCfgIndex.

        Rows are deleted by the SNMP Manager via the
        mefServiceOvcEndPtPerVuniCfgRowStatus object or by the SNMP Agent if
        the associated OVC is deleted, the interface is changed to not be
        an ENNI, or the VUNI is deleted in the mefServiceVuniCfgTable.

        Rows in this table and the values of the objects in the row are
        persistent (non-volatile) upon reboot.
       "
    REFERENCE
       "[MEF 28] 7.3"
    ::= { mefServiceOvcAttributes 7 }

mefServiceOvcEndPtPerVuniCfgEntry OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtPerVuniCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The conceptual row of mefServiceOvcEndPtPerVuniCfgTable.
       "
    INDEX { ifIndex, mefServiceVuniCfgIndex, mefServiceOvcCfgIndex }
    ::= { mefServiceOvcEndPtPerVuniCfgTable 1 }

MefServiceOvcEndPtPerVuniCfgEntry ::= SEQUENCE {
    mefServiceOvcEndPtPerVuniCfgIdentifier           DisplayString,
    mefServiceOvcEndPtPerVuniCfgRole                 INTEGER,
    mefServiceOvcEndPtPerVuniCfgCeVlanMap            MefServiceListType,
    mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex   Unsigned32,
    mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex    Unsigned32,
    mefServiceOvcEndPtPerVuniCfgRowStatus            RowStatus
    }

mefServiceOvcEndPtPerVuniCfgIdentifier OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..90))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
       "This object indicates the OVC End Point Identifier at a VUNI that is
        used by the Operator to identify an OVC End Point within the Operator
        CEN. It is the concatenation of the VUNI identifier
       (mefServiceVniCfgIdentifier)object and the OVC Identifier
       (mefServiceOvcCfgIdentifier).
       "
    REFERENCE
       "[MEF 28] 7.3 R14"
::= { mefServiceOvcEndPtPerVuniCfgEntry 1 }

mefServiceOvcEndPtPerVuniCfgRole OBJECT-TYPE
    SYNTAX      MefServiceOvcEndPtRoleType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object configures OVC End Point type for an VUNI.
```

```
          root(1)          Valid setting for all service types. A VUNI set
                           to this value may send frames to VUNIs configured
                           as 'root' or 'leaf'

          leaf(2)          Valid setting for Root-Multipoint OVCs only. A
                           VUNI set to this value may send frames to VUNIs
                           configured as 'root'

          trunk(3)         Invalid value at a VUNI. This value cannot be written,
                           and is never returned.

          other(4)         VUNI port is not configured or illegally
                           configured. This value cannot be written, but
                           is only returned when the type is unknown.
        "
    REFERENCE
       "[MEF 28]"
    DEFVAL { root }
    ::= { mefServiceOvcEndPtPerVuniCfgEntry 2 }

mefServiceOvcEndPtPerVuniCfgCeVlanMap OBJECT-TYPE
    SYNTAX      MefServiceListType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object indicates the CE-VLANs associated with the specific
        OVC on a VUNI. CE-VLAN IDs have value of 0 to 4095. The CE-VLAN ID
        list can be a single value or multiple values separated by a delimiter.

        Some valid values are: '100', '1:10', '10,20,30', '1:4095'. In the
        first example only CE-VLAN ID 100 is associated with the VLAN map.
        In the second example the CE-VLAN map includes CE-VLAN IDs 1 through
        10 (range of values). The third example indicates three separate values
        that make up the CE-VLAN map. The last example indicates all CE-VLAN IDs
        are included in the map (range of values).
       "
    REFERENCE
       "[MEF 28] 7.3 R14"
    DEFVAL { "1:4095" }
 ::= { mefServiceOvcEndPtPerVuniCfgEntry 3 }

mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the ingress bandwidth profile group
        associated with the current OVC End Point on an VUNI. A value of 0
        indicates that no ingress bandwidth profile group is associated with
        the OVC End Point on a VUNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex found in the UNI-EVC
        MIB. There may be multiple entries in mefServiceBwpCfgTable using
        this index, each containing bandwidth parameters for a different
        Class of Service Identifier.
       "
    REFERENCE
       "[MEF 28] 7.3 R14, R15, R16, R17, R18, R19, R20; 7.4 R23, R24, R27, R28"
    DEFVAL { 0 }
   ::= { mefServiceOvcEndPtPerVuniCfgEntry 4 }
```

```
mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
       "This object is the index number of the egress bandwidth profile group
        associated with the current OVC End Point on an VUNI. A value of 0
        indicates that no egress bandwidth profile group is associated with
        the OVC End Point on a VUNI.

        This index indicates the specific bandwidth profile group previously
        configured via mefServiceBwpGrpCfgTable and mefServiceBwpCfgTable
        using this value for mefServiceBwpGrpCfgIndex. There may be multiple
        entries in mefServiceBwpCfgTable using this index, each containing
        bandwidth parameters for a different Class of Service Identifier.
       "
    REFERENCE
       "[MEF 28] 7.3 R14, R15, R16, R17, R18, R19, R20; 7.4 R25, R26, R29, R30"
    DEFVAL { 0 }
    ::= { mefServiceOvcEndPtPerVuniCfgEntry 5 }

mefServiceOvcEndPtPerVuniCfgRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
       "The status of the row.

        The writable columns in a row cannot be changed if the row
        is active. All columns must have a valid value before a row
        can be activated.
       "
   ::= { mefServiceOvcEndPtPerVuniCfgEntry 6 }


-- ****************************************************************************
-- ENNI-OVC MIB Module - Conformance Information
-- ****************************************************************************


mefServiceEnniOvcMibCompliances OBJECT IDENTIFIER ::=
    { mefServiceEnniOvcMibConformance 1 }
mefServiceEnniOvcMibGroups      OBJECT IDENTIFIER ::=
    { mefServiceEnniOvcMibConformance 2 }


-- ****************************************************************
-- ENNI-OVC MIB Units of conformance
-- ****************************************************************

mefServiceEnniMandatoryGroup OBJECT-GROUP
    OBJECTS {
      mefServiceEnniCfgIdentifier,
      mefServiceEnniCfgNumberLinks,
      mefServiceEnniCfgProtection,
      mefServiceEnniCfgMaxNumberOvcEndPts,
      mefServiceEnniCfgVuniNextIndex
    }
    STATUS      current
    DESCRIPTION
       "Mandatory objects for the ENNI Service Attributes group."
    ::= { mefServiceEnniOvcMibGroups 1 }

mefServiceVuniOptionalGroup OBJECT-GROUP
```

```
    OBJECTS {
      mefServiceVuniCfgIdentifier,
      mefServiceVuniCfgCeVidUntagged,
      mefServiceVuniCfgCePriorityUntagged,
      mefServiceVuniCfgSvlanMap,
      mefServiceVuniCfgMaxNumberOvcEndPoints,
      mefServiceVuniCfgIngressBwpGrpIndex,
      mefServiceVuniCfgEgressBwpGrpIndex,
      mefServiceVuniCfgL2cpGrpIndex,
      mefServiceVuniCfgRowStatus
    }
    STATUS      current
    DESCRIPTION
       "Optional objects for the VUNI Service Attributes group."
    ::= { mefServiceEnniOvcMibGroups 2 }

mefServiceOvcMandatoryGroup OBJECT-GROUP
    OBJECTS {
      mefServiceOvcNextIndex,
      mefServiceOvcCfgIdentifier,
      mefServiceOvcCfgServiceType,
      mefServiceOvcCfgMtuSize,
      mefServiceOvcCfgCevlanIdPreservation,
      mefServiceOvcCfgCevlanCosPreservation,
      mefServiceOvcCfgSvlanIdPreservation,
      mefServiceOvcCfgSvlanCosPreservation,
      mefServiceOvcCfgColorForwarding,
      mefServiceOvcCfgColorIndicator,
      mefServiceOvcCfgUnicastDelivery,
      mefServiceOvcCfgMulticastDelivery,
      mefServiceOvcCfgBroadcastDelivery,
      mefServiceOvcCfgL2cpGrpIndex,
      mefServiceOvcCfgAdminState,
      mefServiceOvcCfgRowStatus,

      mefServiceOvcStatusMaxMtuSize,
      mefServiceOvcStatusMaxNumEnniOvcEndPt,
      mefServiceOvcStatusMaxNumVuniOvcEndPt,
      mefServiceOvcStatusOperationalState

    }
    STATUS      current
    DESCRIPTION
       "Mandatory objects for the OVC Service Attributes group."
    ::= { mefServiceEnniOvcMibGroups 3 }

mefServiceOvcPerEndPtPerEnniMandatoryGroup OBJECT-GROUP
    OBJECTS {
      mefServiceOvcEndPtPerEnniCfgIdentifier,
      mefServiceOvcEndPtPerEnniCfgRole,
      mefServiceOvcEndPtPerEnniCfgRootSvlanMap,
      mefServiceOvcEndPtPerEnniCfgLeafSvlanMap,
      mefServiceOvcEndPtPerEnniCfgIngressBwpGrpIndex,
      mefServiceOvcEndPtPerEnniCfgEgressBwpGrpIndex,
      mefServiceOvcEndPtPerEnniCfgRowStatus
      }
    STATUS      current
    DESCRIPTION
       "Mandatory objects for the OVC End Point per ENNI Service Attributes
        group."
    ::= { mefServiceEnniOvcMibGroups 4 }


mefServiceOvcPerEndPtPerUniMandatoryGroup OBJECT-GROUP
```

```
    OBJECTS {
      mefServiceOvcEndPtPerUniCfgIdentifier,
      mefServiceOvcEndPtPerUniCfgRole,
      mefServiceOvcEndPtPerUniCfgCeVlanMap,
      mefServiceOvcEndPtPerUniCfgIngressBwpGrpIndex,
      mefServiceOvcEndPtPerUniCfgEgressBwpGrpIndex,
      mefServiceOvcEndPtPerUniCfgRowStatus
      }
    STATUS      current
    DESCRIPTION
       "Mandatory objects for the OVC End Point per UNI Service Attributes
        group."
    ::= { mefServiceEnniOvcMibGroups 5 }

mefServiceOvcPerEndPtPerVuniOptionalGroup OBJECT-GROUP
    OBJECTS {
      mefServiceOvcEndPtPerVuniCfgIdentifier,
      mefServiceOvcEndPtPerVuniCfgRole,
      mefServiceOvcEndPtPerVuniCfgCeVlanMap,
      mefServiceOvcEndPtPerVuniCfgIngressBwpGrpIndex,
      mefServiceOvcEndPtPerVuniCfgEgressBwpGrpIndex,
      mefServiceOvcEndPtPerVuniCfgRowStatus
      }
    STATUS      current
    DESCRIPTION
       "Mandatory objects for the OVC End Point per UNI Service Attributes
        group."
    ::= { mefServiceEnniOvcMibGroups 6 }


-- ****************************************************************
-- ENNI-OVC MIB Module Compliance statements
-- ****************************************************************


mefServiceEnniOvcMibCompliance MODULE-COMPLIANCE
    STATUS       current
    DESCRIPTION "The compliance statement for the Ethernet Service ENNI-OVC MIB."
    MODULE
        MANDATORY-GROUPS {
            mefServiceEnniMandatoryGroup,
            mefServiceOvcMandatoryGroup,
            mefServiceOvcPerEndPtPerEnniMandatoryGroup,
            mefServiceOvcPerEndPtPerUniMandatoryGroup
        }

    GROUP mefServiceVuniOptionalGroup
    DESCRIPTION "The mefServiceVuniOptionalGroup is an optional
        Requirement."

    GROUP mefServiceOvcPerEndPtPerVuniOptionalGroup
    DESCRIPTION "The mefServiceOvcPerEndPtPerVuniOptionalGroup is an optional
        Requirement."

    ::= { mefServiceEnniOvcMibCompliances 1 }


END
```

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