***Use of the IEEE assigned Organizationally Unique Identifier for ITU-T***

**1. General**

ITU-T has a 3-octet IEEE assigned Organizationally Unique Identifier (OUI), that can be used to generate Universal LAN MAC addresses, Protocol Identifiers, and other purposes per IEEE Std 802TM, for use in Local and Metropolitan Area Network applications.

This OUI assignment reserves a block of each derivative identifier (e.g., Universal LAN MAC Addresses or Protocol Identifiers). The assignment of these derivative identifiers is unique regardless of the application.

The ITU-T OUI is: 00-19-A7 (hex)

IEEE Std 802TM specifies binary and hexadecimal representations for OUIs, LAN MAC Addresses and Protocol Identifiers; the hexadecimal representations are the same as that used for assigning OUIs.

**2. Use of OUI in a universal address**

IEEE Std 802TM-2014 clause 8 provides for MAC addresses based on a MA-L, containing an OUI, that are universally unique. This is a sequence of six octets. The first three take the values of the three octets of the OUI in order. The last three octets are administered by the ITU-T.

The following individual addresses are assigned:

|  |  |
| --- | --- |
| *MAC Address range* | *Assignee* |
| None | None |

The first (leftmost) bit in the binary representation is the I/G Address Bit. If set to 0 as above, it indicates an individual address. It may be set to 1 in an address allocated by the assignee to indicate that that address is a group address.

The following group addresses are assigned:

|  |  |
| --- | --- |
| *MAC Address range* | *Assignee* |
| 01-19-A7-00-00-00 to 01-19-A7-00-00-FF | R-APS per G.8032 |
| 01-19-A7-52-76-90 to 01-19-A7-52-76-9F | Multicast per G.9961 |

**3. Use of OUI as a protocol identifier**

IEEE Std 802TM-2014 clause 9.5 provides for the use of Protocol Identifiers in conjunction with the SNAP/SAP reserved LLC address. A Protocol Identifier is defined as a sequence of five octets. The first three octets take the values of the three octets of the OUI in order; the following two octets, the ITU-T sub-type, are administered by ITU-T.

There are two frame formats for using the OUI as a protocol identifier. The Ethertype frame format is the following.

# Format for the ITU-T OUI Ethertype format

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address = 0x01-80-C2-00-00-02 |
| 6 octets | Source Address |
| 2 octets | Ethertype = 0x88-B7 |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 2 octets  | ITU-T Subtype  |
| 40-1495 Octets(note) | Data and Padding |
| 4 | FCS |

# The LLC/SNAP frame format is the following.

# Format for the ITU-T OUI LLC/SNAP format

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address = 0x01-80-C2-00-00-02 |
| 6 octets | Source Address |
| 2 octets | Length  |
| 3 octets | LLC/SNAP header = 0xAA-AA-03 |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 2 octets  | ITU-T Subtype  |
| 40-1495 Octets(note) | Data and Padding |
| 4 | FCS |

The following ITU-T sub-types are assigned:

|  |  |  |
| --- | --- | --- |
| *ITU-T sub-type value* | *Protocol* | *Frame Format* |
| 00-02 | OMCI per G.986 | Ethertype |
| 00-03 | Backchannel Data per G.993.5 | LLC/SNAP |

**4. Use of OUI in IEEE 802.3 slow protocols**

IEEE Std 802.3TM-2012 Annex 57B defines an organizationally specific slow protocol (OSSP). ITU-T has defined a format for its OSSP and includes an ITU-T subtype to identify usage. The ITU-T subtype for use in OSSP can be either one or two octets.

**4.1. ITU-T OSSP: Two-octet subtypes**

The format of the OSSP frame with a two-octet subtype is the following.

# Format for the ITU-T OSSP (two-octet subtype)

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address = 0x01-80-C2-00-00-02 |
| 6 octets | Source Address |
| 2 octets | Ethertype = 0x88-09 (Slow Protocols) |
| 1 octets | Subtype = 0x0A (OSSP) |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 2 octets  | ITU-T Subtype  |
| 40-1495 Octets(note) | Data and Padding |
| 4 | FCS |

Note: the message size is recommended by IEEE not to exceed 128 bytes, but this value might be exceeded

The following ITU-T Slow Protocol two-octet sub-types are assigned:

|  |  |
| --- | --- |
| *ITU-T sub-type value* | *Protocol* |
| 00-01 | SSM per G.8264 |
| 01-00 to 01-FF | Reserved |

Note: The range 01-00 to 01-FF is used for the one-octet OSSP subtype and cannot be assigned as a two-octet OSSP subtype.

**4.2. ITU-T OSSP: One-octet subtypes**

The format of the OSSP frame with a one-octet subtype is the following.

# Format for the ITU-T OSSP (one-octet subtype)

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address = 0x01-80-C2-00-00-02 |
| 6 octets | Source Address |
| 2 octets | Ethertype = 0x88-09 (Slow Protocols) |
| 1 octets | Subtype = 0x0A (OSSP) |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 1 octets  | ITU-T Subtype  |
| 41-1496 Octets(note) | Data and Padding |
| 4 | FCS |

Note: the message size is recommended by IEEE not to exceed 128 bytes, but this value might be exceeded

The following ITU-T Slow Protocol one-octet sub-types are assigned:

|  |  |
| --- | --- |
| *ITU-T sub-type value* | *Protocol* |
| 01  | BACP per G.998.2 |

Note that one-octet subtypes will no longer be assigned.

**5. Use of OUI in IEEE 802.3 OAM**

IEEE Std 802.3TM-2012 clause 57 defines an organizationally specific OAM protocol. ITU-T has defined a format for its OSSP and includes an ITU-T subtype to identify usage.

The format of the OSSP frame is the following.

# Format for the ITU-T OAM

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address = 0x01-80-C2-00-00-02 |
| 6 octets | Source Address |
| 2 octets | Ethertype = 0x88-09 (Slow Protocols) |
| 1 octets | Subtype = 0x03 (OAM) |
| 2 octets | Flags |
| 1 octet | Code (OUI) = 0xFE  |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 2 octets  | ITU-T Subtype  |
| 37-1491 Octets(note) | Data and Padding |
| 4 | FCS |

Note: the message size is recommended by IEEE not to exceed 128 bytes, but this value might be exceeded

The following ITU-T sub-types are assigned:

|  |  |
| --- | --- |
| *ITU-T sub-type value* | *Protocol* |
|  | None assigned |

**6. Use of OUI for IEEE 802.3 MAC Control**

IEEE Std 802.3TM-2012 Annex 31 defines an organizationally specific extension to the MAC control channel. ITU-T has defined a format for its MAC-Control and includes an ITU-T subtype to identify usage.

The format of the MAC-Control frame is the following.

# Format for the ITU-T MAC Control

|  |  |
| --- | --- |
| Size | Field |
| 6 octets | Destination Address  |
| 6 octets | Source Address |
| 2 octets | Ethertype = 0x88-08 (MAC Control) |
| 2 octets | Opcode = 0xFF FE (extension) |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 2 octets  | ITU-T Subtype  |
| 39 Octets(note) | Data and Padding |
| 4 | FCS |

Note: the size of the *Data and Padding* field MUST be exactly equal to 39 bytes.

The following ITU-T sub-types are assigned:

|  |  |
| --- | --- |
| *ITU-T sub-type value* | *Protocol* |
|  | None assigned |

**7. Use of OUI in IEEE 1588 profileIdentifier**

IEEE Std 1588TM-2008 defines a protocol enabling precise synchronization of clocks.

The set of allowed Precision Time Protocol (PTP) features applicable to a device constitutes a profile. The required options, prohibited options, and the ranges and defaults of configurable attributes are described in the profile specification. The profile specification includes a profileIdentifier, which uniquely identifies the profile. The profileIdentifier is a 6-octet field based on an OUI. The profileIdentifier is defined in two places in IEEE Std 1588TM-2008: (a) it is printed in the profile document, as specified in 19.3.3, and (b) it is contained in a field of the CLOCK\_DESCRIPTION TLV, as specified in 15.5.3.1.2. Note that the profileIdentifier is referred to as the profileIdentity in 15.5.3.1.2 of IEEE 1588.

ITU-T has defined a format for its profileIdentifier that includes a structured ITU-T subtype.

# Format for the IEEE 1588 profileIdentifier

|  |  |
| --- | --- |
| Size | Field |
| 3 octets | ITU-T OUI = 00-19-A7 |
| 3 octets  | ITU-T Subtype  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Octet 0 | Octet 1 | Octet 2 | Octet 3 | Octet 4 | Octet 5 |
| ITU-T OUI | ITU-T profile | primaryVersion | revisionNumber |
| 00 | 19 | A7 |  |  |  |

The ITU-T Subtype is the last 3 octets of profileIdentifier. Octet 3 identifies the profile among all PTP profiles specified by ITU-T, octet 4 identifies the primaryVersion, and octet 5 identifies the revisionNumber.

The profileVersion is comprised of the primaryVersion and revisionNumber.  When a profile is updated the profileVersion is also updated.

If the profile updates result in PTP nodes that are

1. functionality incompatible with the previous profileVersion (such as the introduction of new mandatory dataset members, or change to ranges of dataset members), or
2. non-interoperable with PTP nodes operating according to the previous profileVersion (such as the introduction of new clockClass values, or mandatory TLV),

then the primaryVersion is updated.

If the profile updates are exclusively optional functionality or do not impact inter-operability with PTP nodes operating according to the previous profileVersion, then the revisionNumber is updated.

If the changes to the profile recommendation are entirely informational, or related to corrections, then the profileVersion does not have to be updated

The following ITU-T sub-types are assigned:

| *ITU-T Subtype value* | *IEEE 1588 Profile* |
| --- | --- |
| 00-01-00 | Recommendation: G.8265.1 (2010) *Precision time protocol telecom profile for frequency synchronization*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 1.0 |
| 00-01-01 | Recommendation: G.8265.1 Amd 2 (2012) *Precision time protocol telecom profile for frequency synchronization Amendment 2*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 1.1 |
| 00-01-02 | Recommendation: G.8265.1 (2014) *Precision time protocol telecom profile for frequency synchronization*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 1.2 (for implementations compliant to IEEE Std 1588‑2008) |
| 00-01-03 | Recommendation: G.8265.1 (2021) *Precision time protocol telecom profile for frequency synchronization*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 1.3 (for implementations compliant to IEEE Std 1588‑2019) |
| 00-02-00 | Recommendation: G.8265.1 Amd 1 (2022) *Precision time protocol telecom profile for frequency synchronization*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 2.0 (for implementations compliant to IEEE Std 1588‑2008) |
| 00-02-01 | Recommendation: G.8265.1 Amd 1 (2022) *Precision time protocol telecom profile for frequency synchronization*profileName: ITU-T PTP profile for frequency distribution without timing support from the network (unicast mode)profileVersion: 2.1 (for implementations compliant to IEEE Std 1588‑2019) |
| 01-01-00 | Recommendation: G.8275.1 (2014) *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network*profileName: ITU-T PTP profile for phase/time distribution with full timing support from the networkprofileVersion: 1.0 |
| 01-02-00 | Recommendation: G.8275.1 (2016) *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network*profileName: ITU-T PTP profile for phase/time distribution with full timing support from the networkprofileVersion: 2.0 |
| 01-02-01 | Recommendation: G.8275.1 Amd 1 (2017) *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network - Amendment 1*profileName: ITU-T PTP profile for phase/time distribution with full timing support from the networkprofileVersion: 2.1 |
| 01-02-02 | Recommendation: G.8275.1 Amd 1 (2020) *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network - Amendment 1*profileName: ITU-T PTP profile for phase/time distribution with full timing support from the networkprofileVersion: 2.2 (for implementations compliant to IEEE Std 1588‑2008) |
| 01-02-03 | Recommendation: G.8275.1 Amd 2 (2021) *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network - Amendment 2*profileName: ITU-T PTP profile for phase/time distribution with full timing support from the networkprofileVersion: 2.3 (for implementations compliant to IEEE Std 1588‑2019) |
| 02-01-00 | Recommendation: G.8275.2 (2016) *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network*profileName: ITU-T PTP profile for time distribution with partial timing support from the network (unicast mode)profileVersion: 1.0 |
| 02-01-01 | Recommendation: G.8275.2 Amd 1 (2020) *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network - Amendment 1*profileName: ITU-T PTP profile for time distribution with partial timing support from the network (unicast mode)profileVersion: 1.1 (for implementations compliant to IEEE Std 1588‑2008) |
| 02-01-02 | Recommendation: G.8275.2 Amd 2 (2021) *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network - Amendment 2*profileName: ITU-T PTP profile for time distribution with partial timing support from the network (unicast mode)profileVersion: 1.2 (for implementations compliant to IEEE Std 1588‑2019) |
| 02-02-00 | Recommendation: G.8275.2 Amd 3 (2022) *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network*profileName: ITU-T PTP profile for time distribution with partial timing support from the network (unicast mode)profileVersion: 2.0 (for implementations compliant to IEEE Std 1588‑2008) |
| 02-02-01 | Recommendation: G.8275.2 Amd 3 (2022) *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network*profileName: ITU-T PTP profile for time distribution with partial timing support from the network (unicast mode)profileVersion: 2.1 (for implementations compliant to IEEE Std 1588‑2019) |

**8. Use of OUI in ITU-T G.8013 ETH-MCC**

ITU-T G.8013 includes a maintenance communication channel (ETH-MCC) for maintenance communication using MCC PDUs. The MCC PDU includes OUI and Subtype fields that are used in combination to uniquely identify a message type. The OUI field contains a 3-octet OUI and the Subtype field contains a 1-octet type field that is assigned by the organisation identified by the OUI.

The format of MCC PDUs, including the ITU-T OUI, is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 |
|  | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 1 | MEL | Version (0) | OpCode (MCC=41) | Flags (0) | TLV Offset |
| 5 | OUI (00-19-A7) | SubOpCode |
| 9 | *[optional MCC data; else End TLV]* |
| : |  |
| : |  |
| Last |  | End TLV (0) |

The following ITU-T subtypes are assigned:

|  |  |  |
| --- | --- | --- |
| *ITU-T sub-type value* | *Message Type* | *Reference* |
| 1 | Expected Defect Message | ITU-T G.8013 (11/2013) Amd 1, clause 9.26 |
| 0, 2-255 | Reserved |  |

**9. Use of OUI in IEEE 1588 Vendor and standard organization extension TLVs**

IEEE Std 1588TM-2008 defines a protocol enabling precise synchronization of clocks.

The set of allowed Precision Time Protocol (PTP) features applicable to a device constitutes a profile. The required options, prohibited options, and the ranges and defaults of configurable attributes are described in the profile specification. A profile may also include the definition of new TLV’s, which are classified as vendor and standard organization extension TLVs in 14.3 of IEEE 1588. These organization specific TLVs include a 3-octect field, called organizationSubType, that provide a unique identifier to each TLV defined, as described in 14.3.2.4 of IEEE 1588.

**Format for the IEEE 1588 organization specific TLV fields**

|  |  |
| --- | --- |
| Size | Field |
| 2 octets | tlvType (0x0003) |
| 2 octets | lengthField |
| 3 octets | organizationId (00-19-A7) |
| 3 octets | organizationSubType |
| N octets | dataField |

The following ITU-T organizationSubType types are assigned:

|  |  |
| --- | --- |
| *ITU-T OrganizationSubType* | *IEEE 1588 TLV* |
| 00-00-00 | Reserved |
| 00-00-02 | INTERFACE\_RATE (defined in ITU-T G.8275.2) |

The following ITU-T networkProtocol enumeration is assigned (as per IEEE 1588 section 7.4.1, Network Transport Protocol):

|  |  |
| --- | --- |
| *Name* | *Value (hex)* |
| OTN | F0-00 |

**10. Requests for Additions**

ITU-T assignments of these can be requested via the Registration Assignment section of the SG15 web page (<http://www.itu.int/ITU-T/studygroups/com15/index.asp> ).

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