IEEE 802.3da SPMD:

MPoE: Externally Defined MPI Types

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1 Overview

1.1 Goals:

Add reporting and power allocation for "externally defined" MPI system power types.

1.2 Revision marking

Changes are in green underline, and additions are in blue underline.

1.3 Change log

- 5/19/25
    - First draft.
- 5/28/25
    - Polishing and review comments.
- 7/2/25
    - Polishing and review comments.
- 7/3/25
    - Fix footer, remove tracked changes

1.4 Open Items

1.5 Table of Contents

Contents

2 Overview of Changes

The major changes are:

1. Add support for Externally Defined MPI Types
2. Use OID/CID+subtype as the Externally Defined MPI Type
    a. OUI(https://standards.ieee.org/products-programs/regauth/oui/) and CID(https://standards.ieee.org/products-programs/regauth/cid/) are 24-bit identifiers administered by the IEEE Registration Authority(https://standards.ieee.org/products-programs/regauth/). They are used to identify organizations such as companies, associations, etc.
3. Change the MPSE, MPD and MPA TLV structures to be
    a. Number of Clause 189 entries
    b. Number of Externally Defined MPI Type entries
    c. Array of Clause 189 entries
    d. Array of Externally Defined MPI Type entries
4. Define new TLV components for Externally Defined MPI Types in the MPSE, MPD and MPA TLVs.

3   Clause 30 – Management

3.1   Clause 30 MPI identification and containment

3.1.1   MPoE MPSE capabilities

Add the following rows to Table 30–12 after the aMPSEMeasurementAge row.

				Basic	Recommended
aMPSEExternalMPIType	ATTRIBUTE	GET			X
aMPSENominalVoltage	ATTRIBUTE	GET			X

3.1.2   MPoE MPD capabilities

Insert the following row into Table 30–13 before the aMPDMeasurementAge row .

				Basic	Recommended
aMPDExternalMPIType	ATTRIBUTE	GET			X
aMPDNominalVoltage	ATTRIBUTE	GET			X

3.1.3   MPSE attributes

3.1.3.1   aMPSEExternalMPIType/ aMPSENominalVoltage

Make the following changes and then renumber 30.17.1.1 subclauses.

Add the following after aMPSEMeasurementAge .

```
<subclause number> aMPSEExternalMPIType
  ATTRIBUTE
  APPROPRIATE SYNTAX:
       An integer reporting the Externally Defined MPI Type. This is
       comprised of a 24-bit IEEE OUI/CID followed by an 8-bit type.
  BEHAVIOUR DEFINED AS:
     The Externally Defined MPI Type(see 189.3.1).

<subclause number> aMPSENominalVoltage
  ATTRIBUTE
  APPROPRIATE SYNTAX:
     INTEGER
  BEHAVIOUR DEFINED AS:
     The nominal voltage that this MPSE MPI outputs in millivolts.
```

3.1.4 MPD attributes

3.1.5 aMPDExternalMPIType/ aMPDNominalVoltage

Insert the following after `aMPDMeasurementAge`.

```
<subclause number> aMPDExternalMPIType
  ATTRIBUTE
  APPROPRIATE SYNTAX:
      An integer reporting the Externally Defined MPI type. This is
      comprised of an IEEE CID followed by an 8-bit type.
  BEHAVIOUR DEFINED AS:
    The Externally Defined MPI Type(see 189.3.1).

<subclause number>
    <subclause number> aMPDNominalVoltage
    ATTRIBUTE
    APPROPRIATE SYNTAX:
      INTEGER
    BEHAVIOUR DEFINED AS:
    The nominal voltage that this MPD can accept in millivolts.
```

3.2 TLVs

3.2.1 MPoE MPSE Status TLV

Replace the first two paragraphs in 79.3.10 as follows:

> The MPoE MPSE Status TLV allows DTEs to advertise capabilities and status for each of its associated MPSE MPIs to other DTEs on the mixing segment. A DTE shall have either MPSE or MPD MPIs, not a mix of both. A DTE may be associated with MPIs fully specified in Clause 189(see 189.3), Externally Defined MPI Types(see 189.3.1) or both.
>
> The TLV is composed of two entry counts(Table 79-22b), followed by an array of Clause 189 MPSE MPI entries (Table 79-22c) then an array of Externally Defined MPSE MPI entries (Table 79-22c1).
>
> The MPoE TLVs use a common format to encode scale and value for power, voltage and current. These are 16-bit values, with bit 15 indicating if the value is in units of 1(e.g., volts), or units of 0.001(e.g., millivolts). The following definitions are used below.
> - scaled power: bit 15 = 0 indicates bits 14:0 are in milliwatts vs watts
> - scaled voltage: bit 15 = 0 indicates bits 14:0 are in millivolts vs volts
> - scaled current: bit 15 = 0 indicates bits 14:0 are in milliamps vs amps

Change "Table 79–22b — MPSE Status TLV fixed elements" as follows

Field	Field width	Table reference or value/meaning
Clause 189 MPI Entry count	8	The number of entries
Externally Defined MPI Entry count	8	The number of entries

Change the title of "Table 79–22c —MPSE MPI Status TLV entry" to

Table 79–22c — Clause 189 MPSE MPI Status TLV entry

Add the following after "Table 79–22c —MPSE MPI Status TLV entry":

Table 79–22c1 — MPSE MPI Externally Defined Status TLV entry

Field	Field width	Table reference or value/meaning
MPI Pair Index	8	See Table 79-22d
Withdrawing power delay	8	See Table 79-22j
Externally Defined capabilities and status	16	See Table 79-22j1
Externally Defined MPI Type	32	See Table 79-22j2
Nominal voltage	16	See Table 79-22j3
Maximum power	16	See Table 79-22h
Allocated power	16	See Table 79-22i

Change the title of "Table 79– 22e—MPSE capabilities and status" to

Table 79– 22e— Clause 189 MPSE capabilities and status

Change "Table 79– 22f—MPSE supported Types" as shown

Bit	Function	Value/meaning
0	Type 0	1 = active 0 = inactive
1	Type 1	1 = active 0 = inactive
2	Externally Defined MPI Type	1 = active 0 = inactive
7:3	Reserved	-----

Change "Table 79– 22g—MPSE active Type" as shown

Bit	Function	Value/meaning
0	Type 0	1 = active 0 = inactive
1	Type 1	1 = active 0 = inactive
2	Externally Defined MPI Type	1 = active 0 = inactive
7:3	Reserved	-----

Change "Table 79–22h—MPSE maximum power" by replacing the current "Value/Meaning" text with

Maximum scaled power the MPSE can supply to the mixing segment

Change "Table 79–22t 22i—MPSE allocated power" by replacing the current "Value/Meaning" text with

Scaled power the MPSE has allocated for the mixing segment

Add the following after "Table 79–22j—Withdrawing power delay"

Table 79–22j1 — Externally Defined capabilities and status

Bit	Function	Value/meaning
0	Active	1 = active 0 = inactive
1	Withdrawing power notification	1 = active 0 = inactive
15:0	Reserved	--

Table 79–22j2 — Externally Defined MPI Type

Bit	Function	Value/meaning
--	Externally Defined Active Type	The Externally Defined type(OUI/CID + 8-bit type)

Table 79–22j3 — MPI nominal voltage

Bit	Function	Value/meaning
0:15	Nominal Voltage	MPI nominal input/output scaled voltage

3.2.2 MPoE MPD Status TLV

Replace the first two paragraphs in 79.3.11 as follows:

The MPoE MPD Status TLV allows DTEs to advertise capabilities and status for each of its associated MPD MPIs to other DTEs on the mixing segment. A DTE shall have either MPSE or MPD MPIs, not a mix of both. A DTE may be associated with MPIs fully specified in Clause 189(see 189.3), Externally Defined MPIs(see 189.3.1) or both.

The TLV is composed of two entry counts(Table 79-22k), followed by an array of Clause 189 MPD MPI entries (Table 79-22l) then an array of Externally Defined MPD MPI entries (Table 79-22l1).

The MPoE TLVs use a common format to encode scale and value for power, voltage and current values as defined in 79.3.10.

Change "Table 79–22k— MPD MPI Status TLV structure" as shown

Field	Field width	Table reference or value/meaning
Clause 189 MPI Entry count	8	Number of entries
Externally Defined MPI Entry count	8	Number of entries

Change the title of "Table 79–22l—MPD MPI Status TLV entry" to

Table 79–22l— Clause 189 MPD MPI Status TLV entry

Add the following after "Table 79–22l — Clause 189 MPD MPI Status TLV entry"

Table 79-22l1 —Externally Defined MPD MPI Status TLV entry

Field		Field width	Table reference or value/meaning
MPI Pair Index		8	See Table 79-22m
Temporary power delay		8	See Table 79-22u
Externally Defined capabilities and status		16	See Table 79-22w1
Externally Defined MPI Type		32	See Table 79-22j2
Nominal Voltage		16	See Table 79-22j3
Normal power		16	See Table 79-22r
Temporary power		16	See Table 79-22s
Temporary power duration		16	See Table 79-22t

Change the title of "Table 79–22n—MPD capabilities and status" to

Table 79–22n — Clause 189 MPD capabilities and status

Change "Table 79– 22o—MPD supported Types" as shown

Bit	Function	Value/meaning
0	Type 0	1 = active 0 = inactive
1	Type 1	1 = active 0 = inactive
2	Externally Defined MPI Type	1 = active 0 = inactive
7:3	Reserved	-----

Change "Table 79– 22p—MPD active Type" as shown

Bit	Function	Value/meaning
0	Type 0	1 = active 0 = inactive
1	Type 1	1 = active 0 = inactive
2	Externally Defined MPI Type	1 = active 0 = inactive
7:3	Reserved	-----

Change "Table 79–22q—MPD static power" by replacing the current "Value/Meaning" text with

The maximum scaled power the MPD draws before MPoE power negotiation

Change "Table 79– 22r—MPD normal power" by replacing the current "Value/Meaning" text with

Scaled Power the MPD needs to support its normal function in the range: 0 W <= Normal power <= Static power

Change "Table 79–22s—MPD temporary power request" by replacing the current "Value/Meaning" text with

Scaled Power the MPD needs for a defined duration in the range: 0 W <= Temporary power <= Static power. Ignored if "Temporary power notification" is not set.

Change "Table 79– 22v—MPD instantaneous voltage" by replacing the current "Value/Meaning" text with

The instantaneous scaled voltage observed by the MPD. Ignored if "Voltage monitoring" is not set.

Table 79-22w1 — Externally Defined capabilities and status

Bit	Function	Value/meaning
0	Voltage monitoring	1 = supported 0 = unsupported
1	Temporary power notification	1 = active 0 = inactive
2	Requested power priority flag	1 = Requested power priority valid 0 = Requested power priority invalid
5:3	Requested power priority	0 = highest 7 = lowest
15:6	Reserved	--

3.2.3   MPoE Power Allocated TLV

Replace the first paragraph in 79.3.12 as follows:

```
The MPoE Power Allocated TLV allows a DTE to advertise power allocation
information for each of its associated MPSE MPIs to other DTEs on the
mixing segment.

The TLV is composed of two entry counts(Table 79-22x), followed by an array
of Clause 189 MPD MPI entries (Table 79-22y) then an array of Externally
Defined MPD MPI entries (Table 79-22y). Within each array, the allocated
power entries are sorted by DTE MAC address, then by MPI Pair Index.

The MPoE TLVs use a common format to encode scale and value for power,
voltage and current values as defined in 79.3.10.
```

Change "Table 79– 22x—MPoE Power Allocated TLV fixed elements" as follows

Field	Field width	Table reference or value/meaning
Clause 189 MPI Entry count	8	The number of entries
Externally Defined MPI Entry count	8	The number of entries

Change "79–22z—MPD granted power" by replacing the current "Value/Meaning" text with

Scaled Power the MPD is allocated

3.3 PICS

3.3.1 Major capabilities/options

Add the following row(s) to the table in "79.5.3 MPoE Major capabilities/options:

Item	Feature	Sub clause	Value/Comment	Status	Support
*MPSEED	Externally Defined MPI Types	79.3.10	Externally Defined MPI Types in the MPSE Status TLV	MPSE:O	Yes[] No[]
*MPDED	Externally Defined MPI Types	79.3.11	Externally Defined MPI Types in the MPD Status TLV	MPD:O	Yes[] No[]
*MPAED	Externally Defined MPI Types	79.3.12	Externally Defined MPI entries in the Power Allocated TLV	MPA:O	Yes[] No[]

3.3.2 MPoE MPSE Status TLV PICS

Change/add the following row(s) to the table in "79.5.14 MPoE MPSE Status TLV" and renumber

Item	Feature	Sub clause	Value/Comment	Status	Support
MPSE2	Clause 189 entry count	79.3.10	The number of Clause 189 MPSE MPI entries in the TLV, see Table 79-22b	MPSE:M	Yes[] No[]
MPSE2a	Externally Defined entry count	79.3.10	The number of Externally Defined MPSE MPI entries in the TLV, see Table 79-22b	MPSE:M	Yes[] No[]
MPSE3	Clause 189 entry	79.3.10	Table of per DTE Clause 189 MPI entries, see Table 79-22b	MPSE:M	Yes[] No[]
MPSE3a	Externally Defined entry	79.3.10	Table of per DTE Externally Defined MPI entries, see Table 79-22b	MPSEED:M	Yes[] No[]

3.3.3 MPOE MPD Status TLV PICS

Change/add the following row(s) to the table in "79.5.15 MPoE MPD Status TLV":

Item	Feature	Sub clause	Value/Comment	Status	Support
MPD2	Clause 189 entry count	79.3.11	The number of Clause 189 MPD MPI entries in the TLV, see Table 79-22k	MPD:M	Yes[] No[]
MPD2a	Externally Defined entry count	79.3.11	The number of Externally Defined MPD MPI entries in the TLV, see Table 79-22k	MPD:M	Yes[] No[]
MPD3	Clause 189 entry	79.3.11	Table of per DTE Clause 189 MPI entries, see Table 79-22k	MPD:M	Yes[] No[]
MPD3a	Externally Defined entry	79.3.10	Table of per DTE Externally Defined MPI entries, see Table 79-22k	MPDED:M	Yes[] No[]

3.3.4 MPoE Power Allocated TLV

Change/add the following row(s) to the table in "79.5.16 MPoE Power Allocated TLV":

Item	Feature	Sub clause	Value/Comment	Status	Support
MPA2	Clause 189 entry count	79.3.11	The number of Clause 189 MPD MPI entries in the TLV, see Table 79-22t	MPA:M	Yes[] No[]
MPA2a	Externally Defined entry count	79.3.11	The number of Externally Defined MPD MPI entries in the TLV, see Table 79-22t	MPA:M	Yes[] No[]

4   Clause 189 – MPoE

4.1   System type power requirements

Add the following subclause to the end of 189.3 System type power requirements.

189.3.1 Externally Defined MPI Types.

In addition to the system types discussed in 189.3 above, MPoE supports using LLDP signaling to report Externally Defined MPI Types associated with the DTE and request/allocate power for those MPIs.

The Externally Defined MPI Type is comprised of a 24-bit OUI/CID and an 8-bit Externally Defined subtype. MPoE signaling treats the Externally Defined MPI Type as an opaque identifier.

These types of MPIs do not follow the specifications listed in 189.4, 189.5, 189.5, 189.7. It is the responsibility of the specifying organizations to address the following items:
- 189.6.2 Electrical distribution system compatibility
- 189.7 Environmental specifications

Both the MPSE and MPD MPIs for a given DTE MPI Pair Index must be the same type for any power to be allocated by the MPSE.

4.2   Clause 189 PICs

4.2.1   Major capabilities/options

Modify 189.8.3 Major capabilities/options table by adding the following rows after DTE-NSHRD as follows:

Item	Feature	Sub clause	Value/Comment	Status	Support
*MPSE-ED	Externally Defined MPSE MPI Types	189.3.1	Externally Defined MPSE MPI Types are supported	O/3	Yes[] No[]
*MPD-ED	Externally Defined MPD MPI Types	189.3.1	Externally Defined MPSE MPI Types are supported	O/3	Yes[] No[]

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