IEEE P802.3da
Comments #100-109 (Power-ODVA) on multiple instances of MPoE per DTE

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Motive to adopt MPoE

- ODVA specifies an Industrial multidrop solution based on Clause 147 (10BASE-T1S) and Clause 148 (PLCA)
  - "The CIP Networks Library Volume 2: EtherNet/IP Adaptation of CIP"
    - 8-10 Industrial EtherNet/IP In-cabinet Bus Media and Physical Layer

- Multidrop power (MPoE) was not defined at the time of specification development
  - ODVA defined engineered power without runtime management

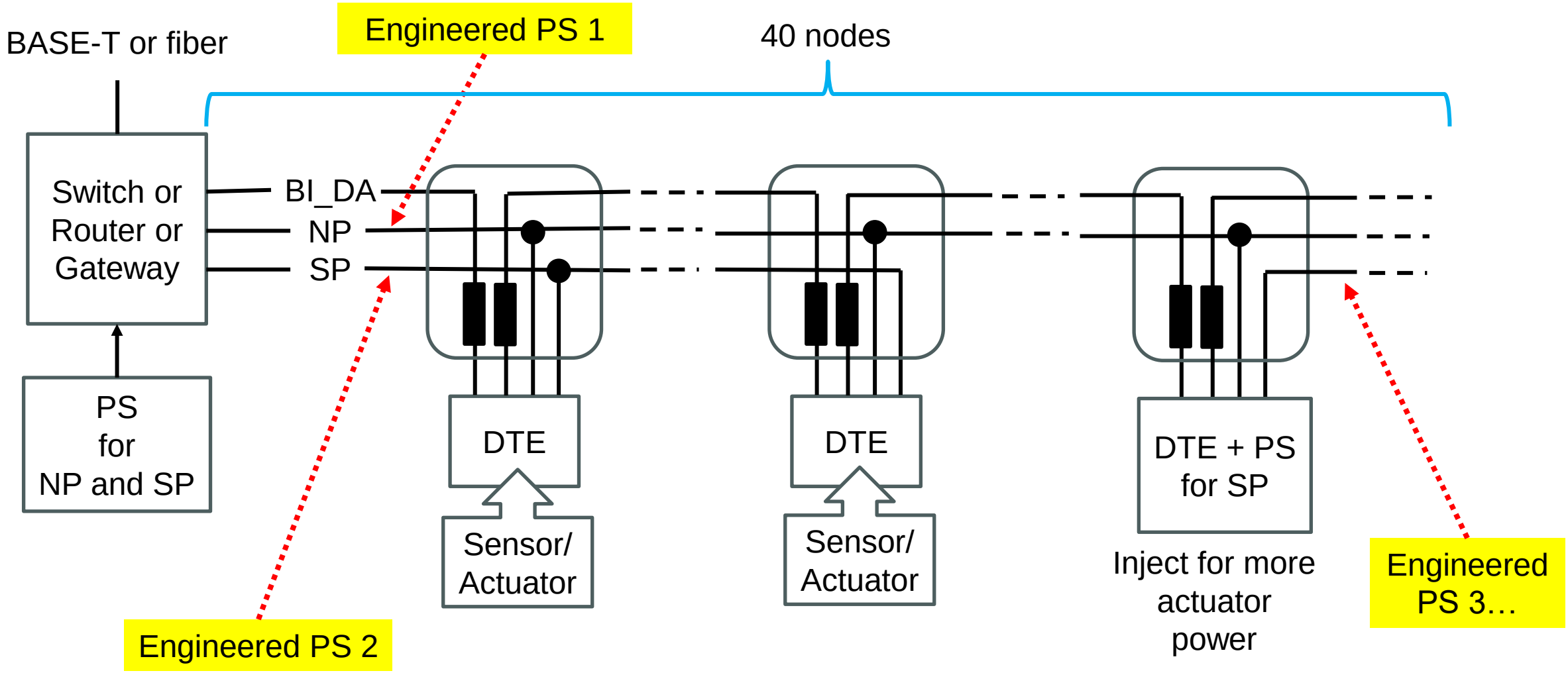
- **There is potential benefit for ODVA to adopt MPoE**

ODVA power structure

- ODVA power (and cabling) scheme specifies:
  - Communication (BI_DA) on first pair (compensated with very small inductors)
  - Network Power (NP) a second pair – for communication and sensors
  - Switched Power (SP) on third pair – for isolated actuators (can be boosted)

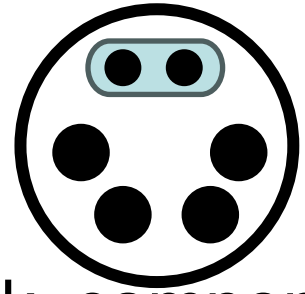
- Common industrial practice to “bring up” a system/workcell/machine:
  1. Power (boot) the communication and sensors
  2. Ensure the system is in state where it will not be damaged by application of actuator power
     - Product(s) may be entrapped due to power outage, and intervention is required
  3. Switch on actuator power once the state is OK
  4. Proceed to automatic control

Example ODVA power structure diagram



IEC 63171

- IEC 63171-7 (up to 7 way SPE connectors) and other “hybrid” connectors incorporate multiple power supplies in M8 and M12 form
  - Communication
  - Unswitched power
  - Switched power



- It is possible to have trunk, compensated tees, and drop cable using these IP67 connectors to reach >50 m into the field

- Other cable schemes carry ONLY switched and unswitched power, and these could add communication into the same cable – condensing two parallel cable runs into one

IEEE situation

- The project anticipated separation of power and data pairs
  - *189. Multidrop Power over Ethernet (MPoE)*
    - "… power and data using only a single balanced pair …"
    - "… power over a single pair multidrop wiring configuration **[separate from data]** …"
- The project did not anticipate the utility of MULTIPLE separate MPoE power pairs – managed by a single DTE
- Comments #100 – 109 provide a structure to accommodate this extension

MPoE management changes

- Extend Clause 30 for local configuration (e.g., via firmware)
- Extend Clause 79 for network management

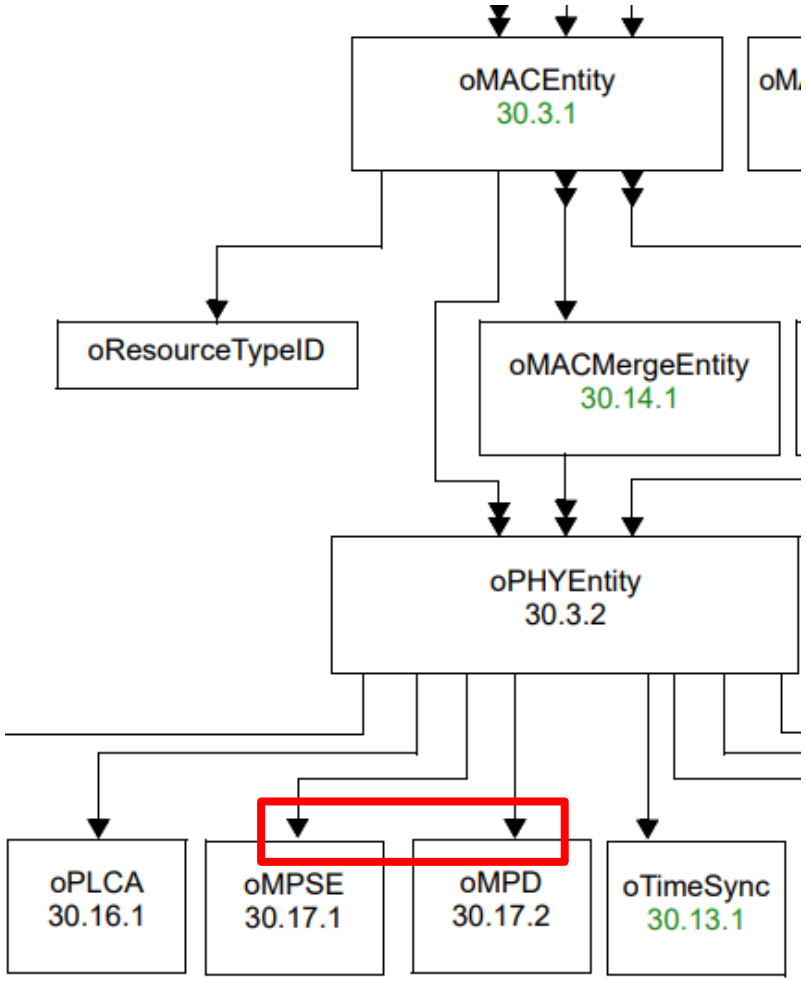
- Need an identifier for each instance of MPoE

Clause 30 MPSE/MPD management changes

- #103: Extend oPHYEntity with double arrowheads to contain one or more oMPSE and oMPD
- #104, 105: Add instance identifiers.

30.17.1.1.1 aMPSEID
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
A read-only value that identifies a specific MPSE interface that is associated with an oPHYEntity.
0 = co-resident data and power interface
1-3 = separate power interfaces;

30.17.2.1.1 aMPDID
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
A read-only value that identifies a specific MPD interface that is associated with an oPHYEntity.
0 = co-resident data and power interface
1-3 = separate power interfaces;



Clause 30 MPSE/MPD management changes

- #108, 109: Separate and multiple MPoE are most likely not the most common – make them optional.

Insert at top of table "aMPSEID", ATTRIBUTE", "GET", "X" under optional.

Table 30–12—MPoE MPSE capabilities

			MPSE Basic Package (mandatory)	MPSE Recommended Package (optional)
aMPSEAdminState	ATTRIBUTE	GET	X	

Insert at top of table "aMPDID", ATTRIBUTE", "GET", "X" under optional.

Table 30–13—MPoE MPD capabilities

			MPD Basic Package (mandatory)	MPD Recommended Package (optional)
aMPDType	ATTRIBUTE	GET	X	
aMPDAdminState	ATTRIBUTE	GET	X	

Clause 79 MPSE management changes

- #100: Extend MPSE Status TLV (field that is common to TLV variations). Use reserved bits to identify specific MPoE instance.

Table 79–22b —MPSE Status TLV elements

Field	Field size (bits)	Subclause reference
Capabilities and status	16	See Table 79–22c
Supported Types	8	See Table 79–22d
Active Type	8	See Table 79–22e
Max power	16	See Table 79–22f
Allocated power	16	See Table 79–22g
Withdrawing power delay	8	See Table 79–22h
Reserved	8	—

Table 79–22c—MPSE capabilities and status

Field width	Bit	Function	Units	Value/Meaning
16	0	Active	—	1 = active 0 = inactive
—	1	Withdrawing power notification	—	1 = active 0 = inactive
—	15:2	Reserved	—	—

Change Function Reserved Bit value "15:2" to "13:2". Add a row below for Function "Interface" and Bit value "15:14" with Value/Meaning of "00 = co-resident data and power ID", "01-11 = separate power ID".

Clause 79 MPD management changes

- #101: Extend MPD Status TLV (field that is common to TLV variations). Use reserved bits to identify specific MPoE instance.

- Note that **Table 79-22i title is wrong**

Table 79–22i—MPSE Status TLV elements

Field	Field size (bits)	Subclause reference
Capabilities and status	16	See Table 79–22j
Supported Types	8	See Table 79–22k
Active Type	8	See Table 79–22l
Static power	16	See Table 79–22m
Normal power	16	See Table 79–22n
Temporary power	16	See Table 79–22o
Temporary power duration	16	See Table 79–22p
Temporary power delay	8	See Table 79–22q
Reserved	8	16-bit alignment
Instantaneous voltage	16	See Table 79–22r
Voltage out of range	16	See Table 79–22s

Table 79–22j—MPD capabilities and status

Field width	Bit	Function	Units	Value/Meaning
16	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
—	3:5	Requested power priority	—	0 = highest 7 = lowest
—	15:6	Reserved	—	—

Change Function Reserved Bit value "15:6" to "13:6". Add a row below for Function "Interface" and Bit value "15:14" with Value/Meaning of "00 = co-resident data and power ID", "01-11 = separate power ID".

Clause 79 MPoE management changes

- #102: Extend MPoE Power Allocated TLV. Use reserved bits to identify specific MPoE instance.

Add Function Reserved Bit value "5:0". Add a row below for Function "Interface" and bits "7:6" with Value/Meaning of "00 = co-resident data and power ID", "01-11 = separate power ID".

Table 79–22t—MPoE Power Allocated TLV fixed elements

Field width	Bit	Function	Units	Value/Meaning
8	—	Entry count	—	The number of allocated power entries
8	—	Reserved	—	16-bit alignment

QUESTIONS?