IEEE802.3at Task Force

Flexible PD implementation driven Architecture 4P adhoc

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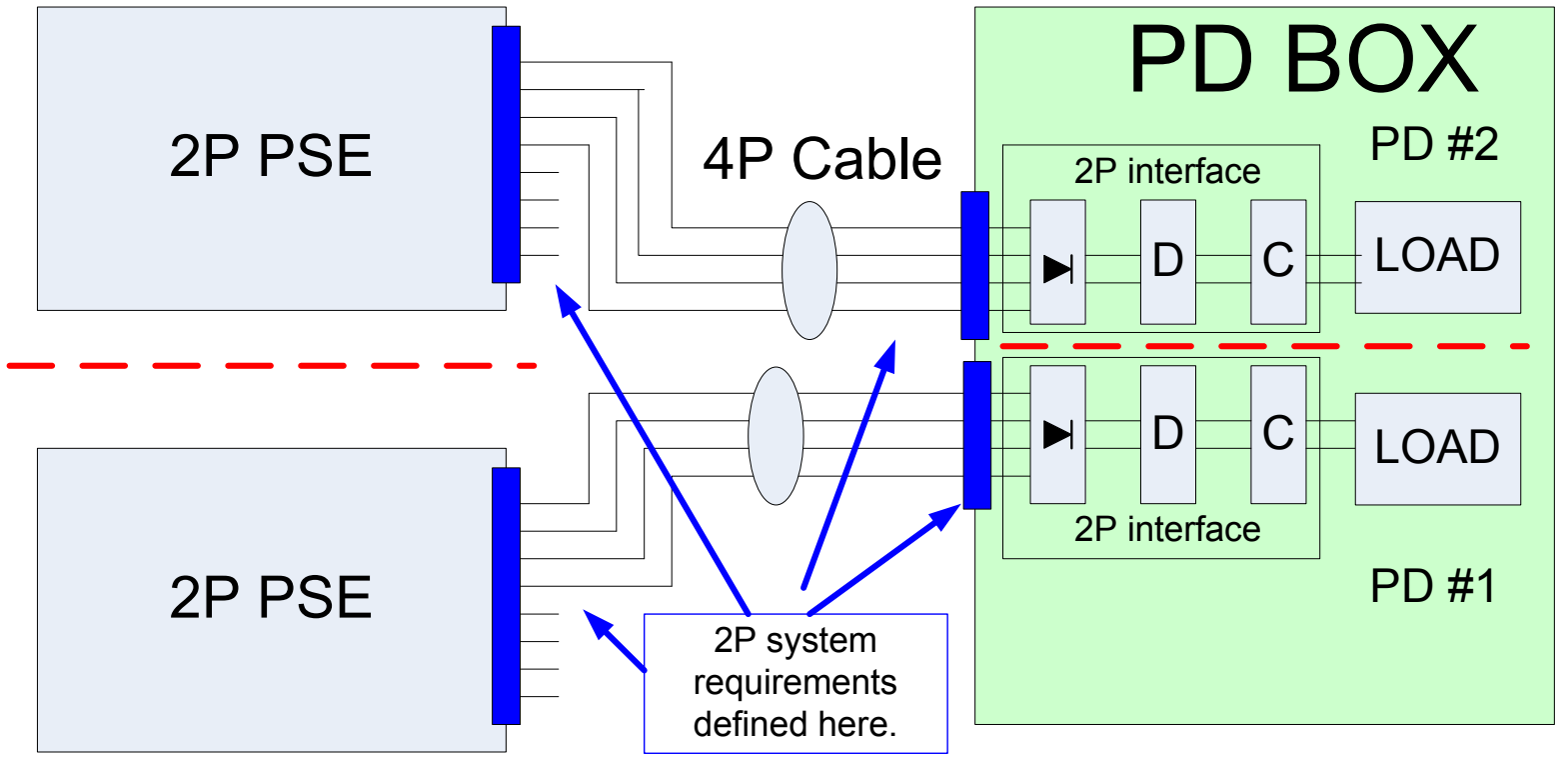
Purpose of this presentation

- Focus on system architecture that
  - allows flexible PD implementations and applications
  - allows simple and clear standard

Today We Can Do The Following….Figure 1



Environment A or B isolation as defined by IEEE802.3af

Connector. The 2 x 2P PSE may be located in the same box and port

Figure 1

But according to current 802.3af text we can't do Figure 2 which is = Figure 1

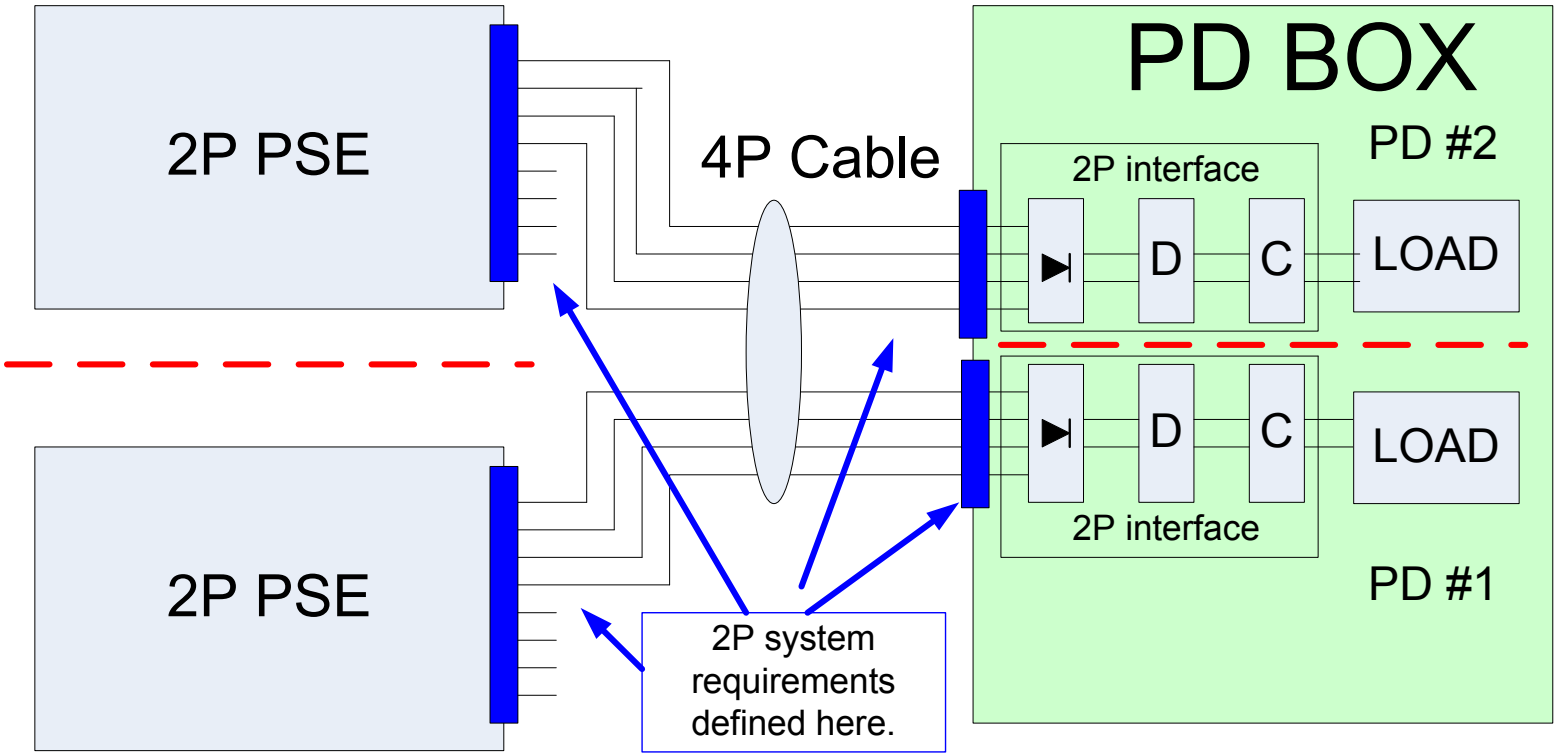
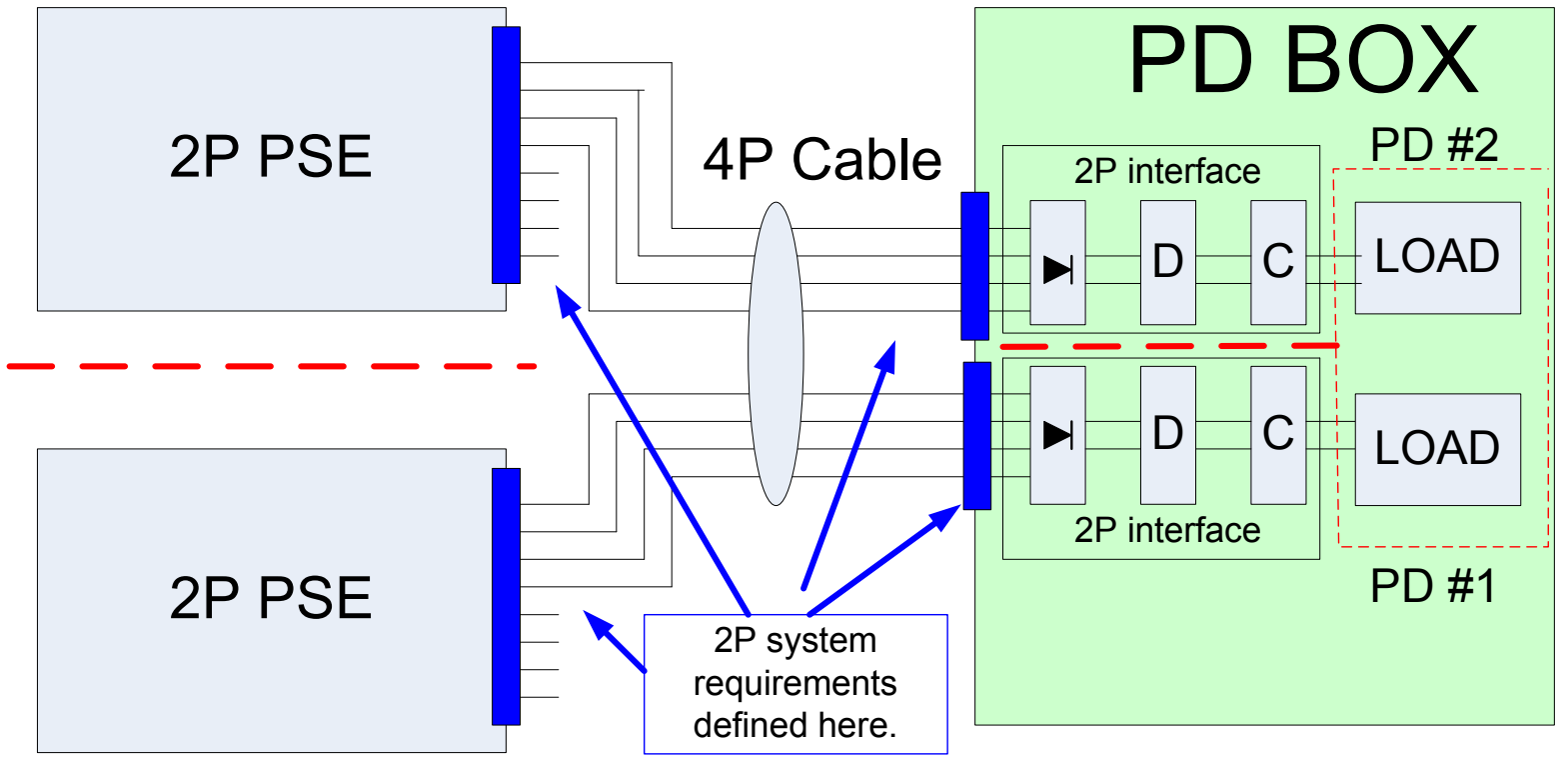


Figure 2

In addition, Figure 3 = Figure 2 = Figure 1



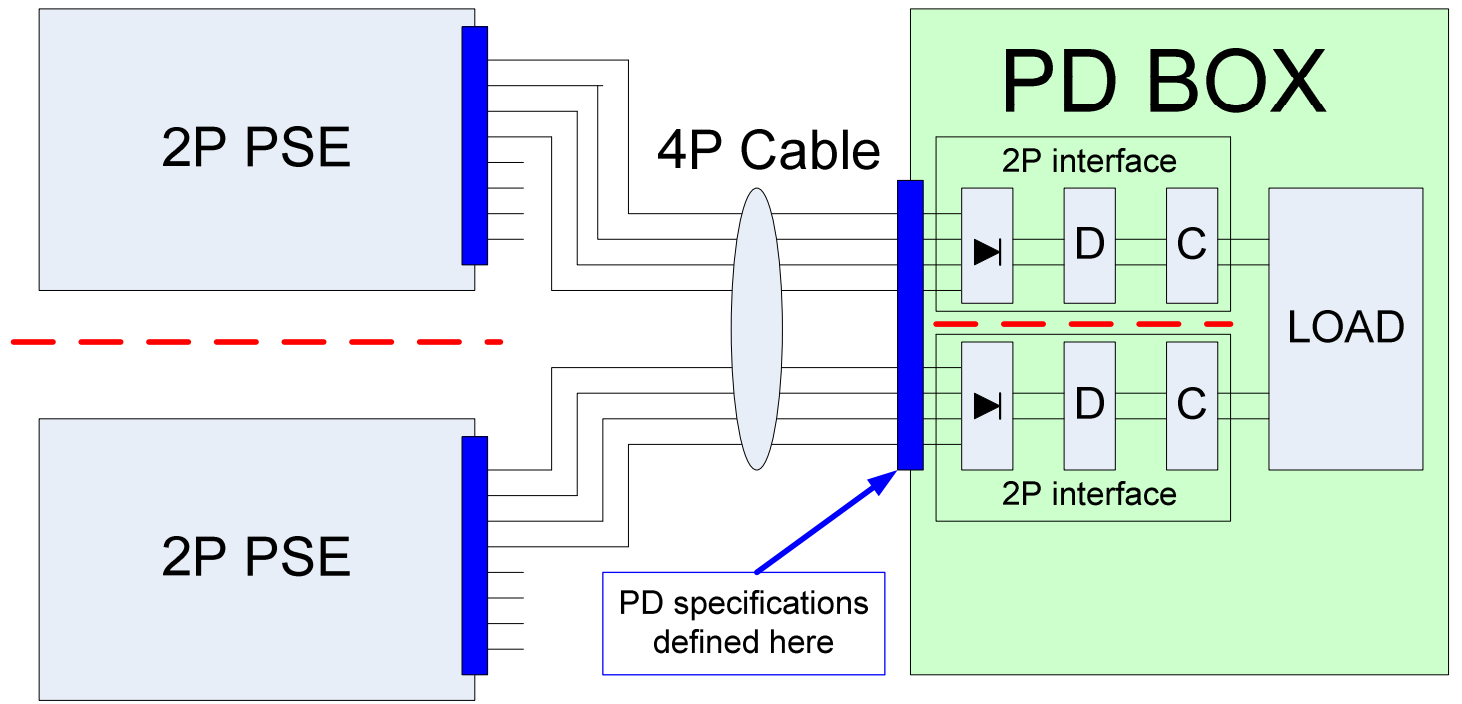
Environment A or B isolation as defined by IEEE802.3af

Connector. The 2 x 2P PSE may be located in the same box and port

Figure 3

So figure 4 is an example of flexible interface for N X 2P PD systems to support the need for higher power devices

- 2P System is the basic building block
- N Pair system is constructed by N x 2P system. At least one of the 2P includes data capabilities.



Environment A or B isolation as defined by IEEE802.3af

The 2x2P PSE may be located in the same box and port.

Figure 4

In short..

- It is always 2P interface.
- The rest is implementations.

Suggested Architecture Principles for the discussion

- 2P System is the basic building block
- 4P system is constructed by 2 x 2P independent system
  - N Pairs system is constructed by N X 2P systems which is like any multi-port PSE systems..
- Hence a PD that requires power over 4 pairs is actually a PD that is connected to TWO 2P systems and each 2P has all 2P functions.
- The rest is implementation specifics which are handled at the PD side.)

Questions such

- Current sharing or not?
  - Each 2P required to meet current level specifications for Vport, Iport, Icut and Ilim
  - Can be implemented by active current sharing or functional isolation or nothing pending on Pport, power architecture *and if it is Environment A or B.*
- *Interoperability issues*
  - *It is not different in principle from non compliant 2P PD which is connected to 2P PSE*
- Became easier to answer

Different System Architectures – Typical Applications

- Single Type 1 or 2 PD, Figure 1
- Two independent PDs (Y cable), Figure 2
- 2 x 2P, Single PS, Figure 3
- 2 x 2P, Dual PS, Single output. Figure 4
- 2 x 2P, Dual PS, dual outputs. Figure 5

802.3af/at 2P PDs – PD side.

Need to be supported by objectives

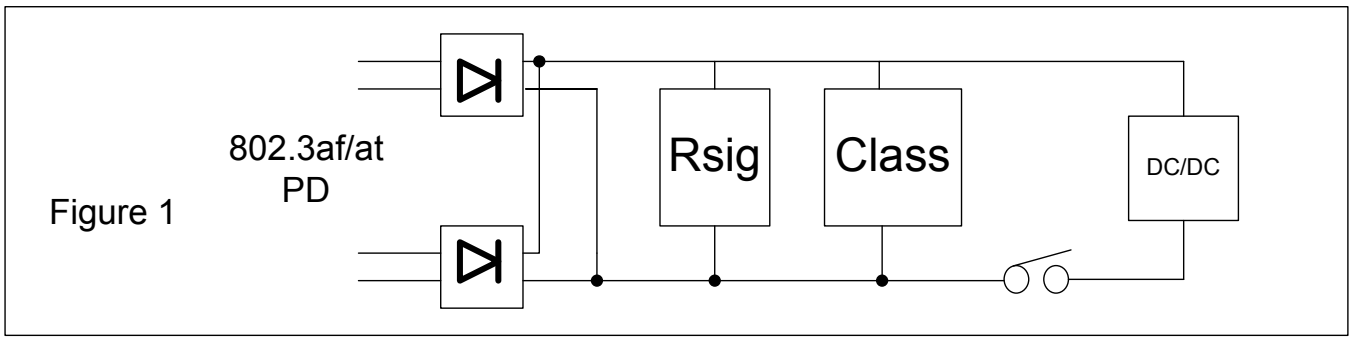


Figure 1

Common implementation

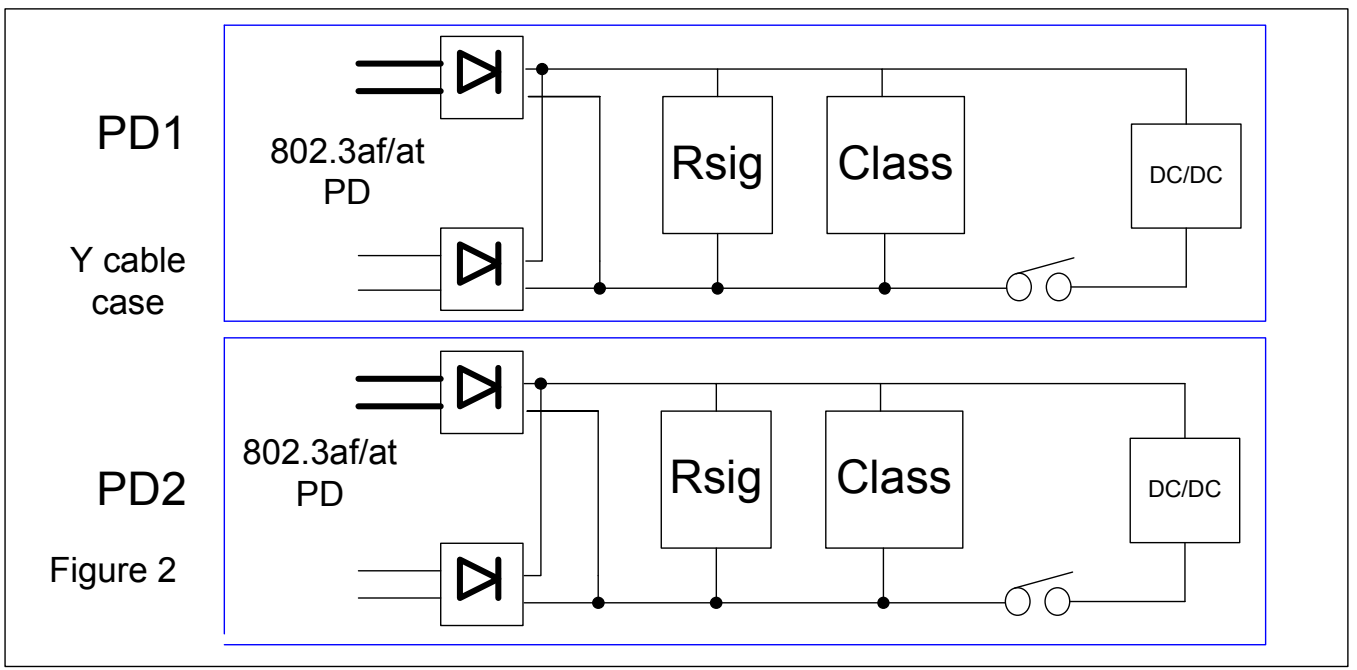


Figure 2

802.3at : 2x 2P Interface

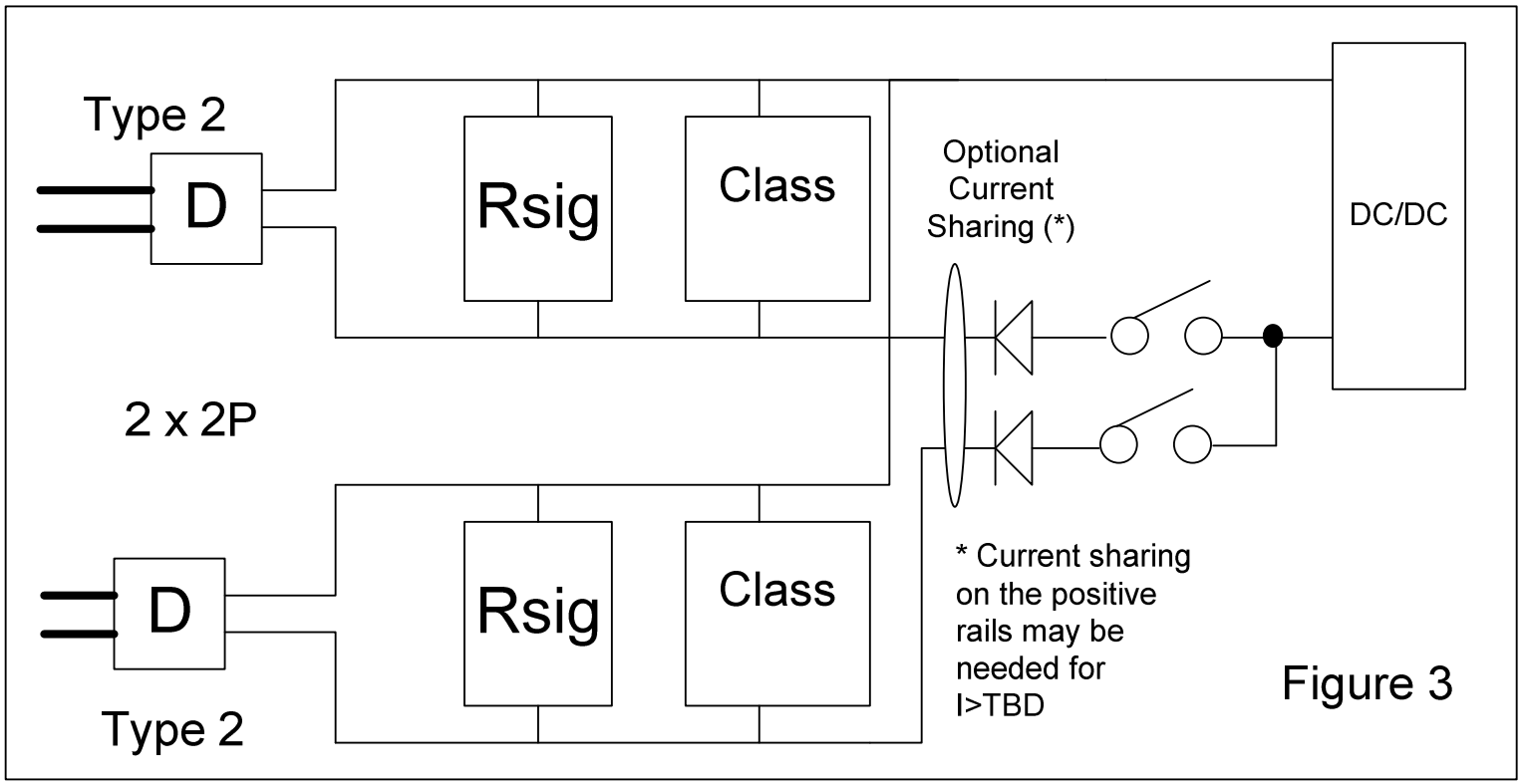
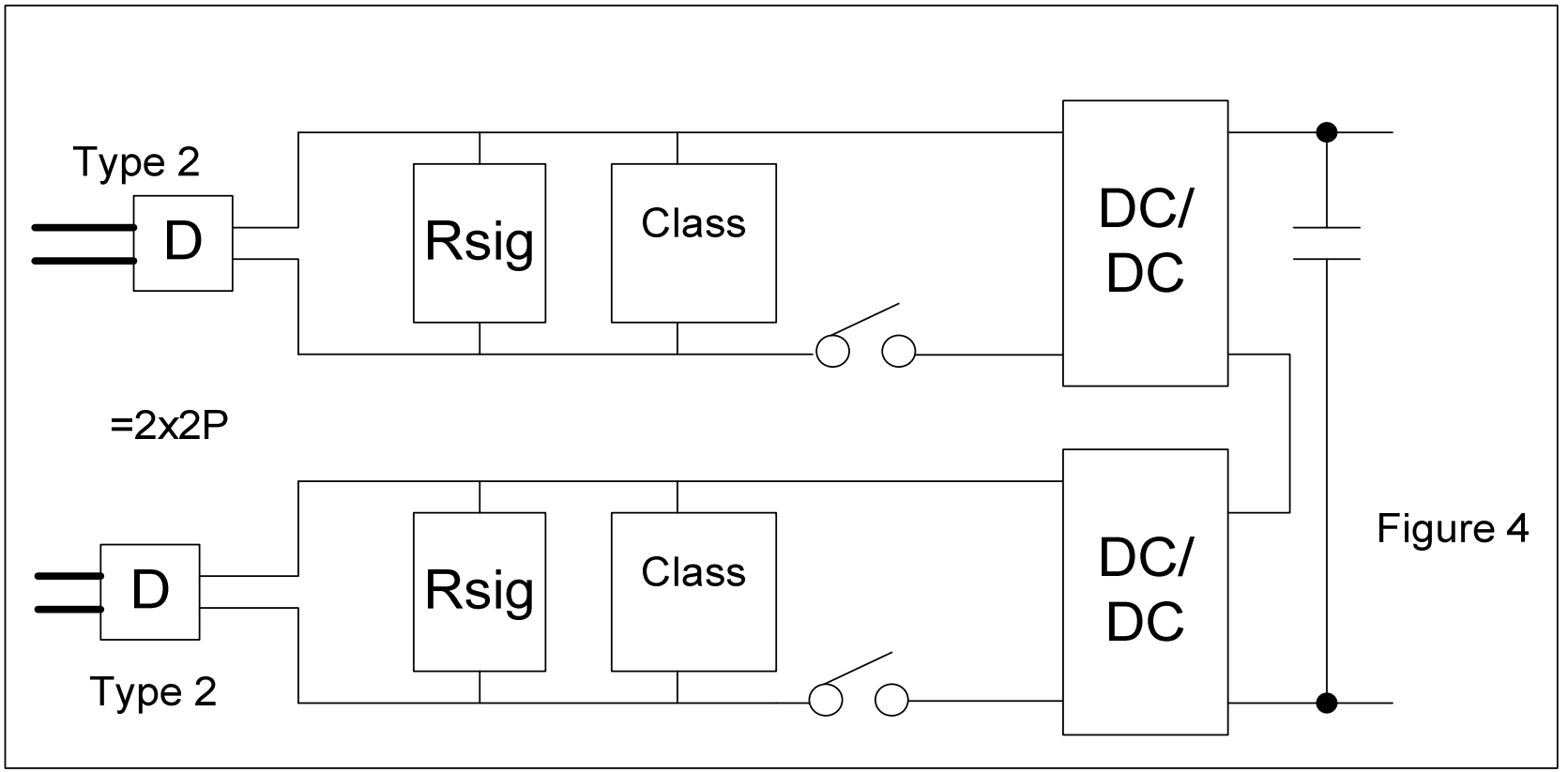


Figure 3

802.3at : 2x 2P Interface



Simplified 2 x 2P PD without the need for Active Current Sharing in most high power applications

- In this example each 2P has DC/DC however they operate on a single PD load

802.3at : 2x 2P Interface

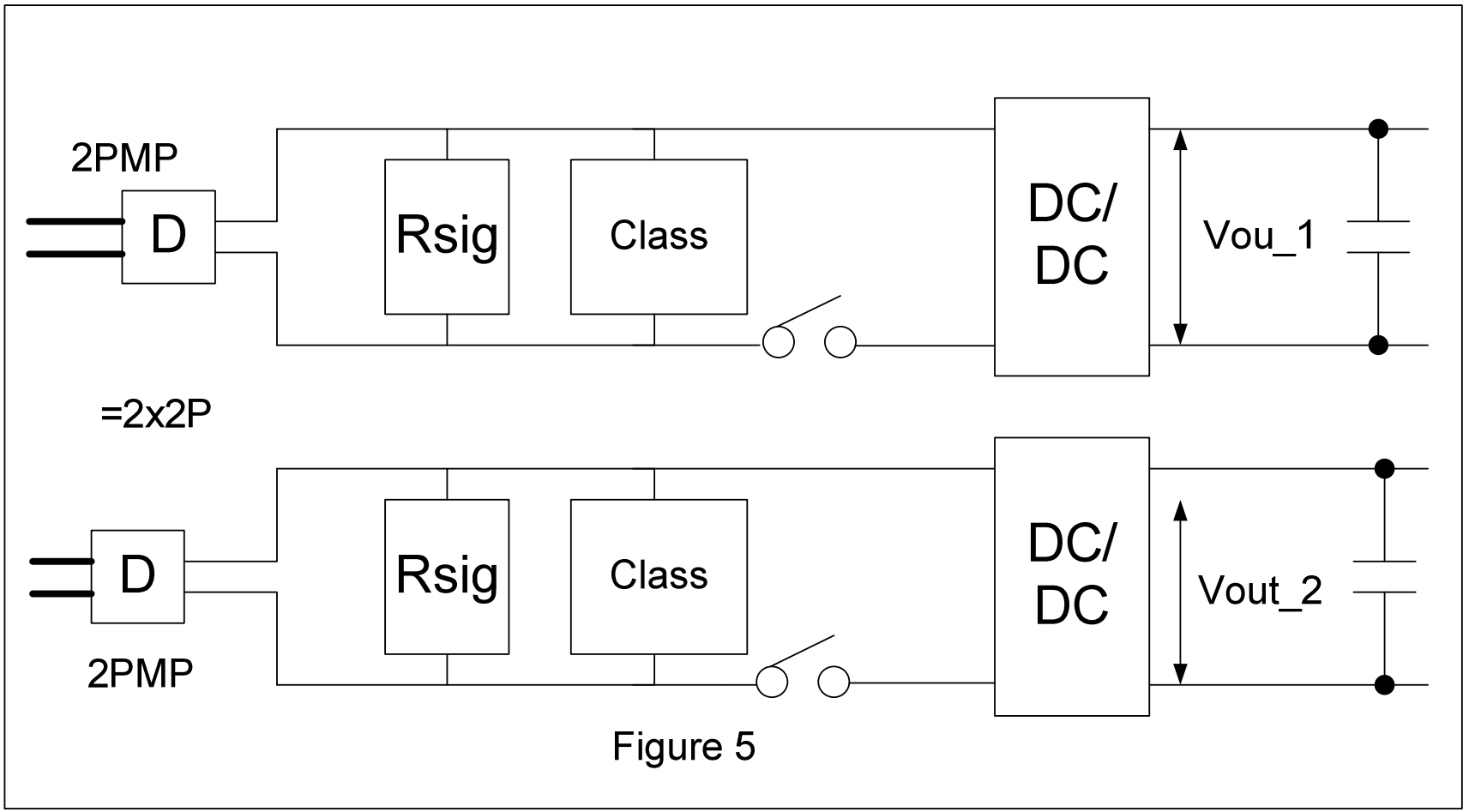
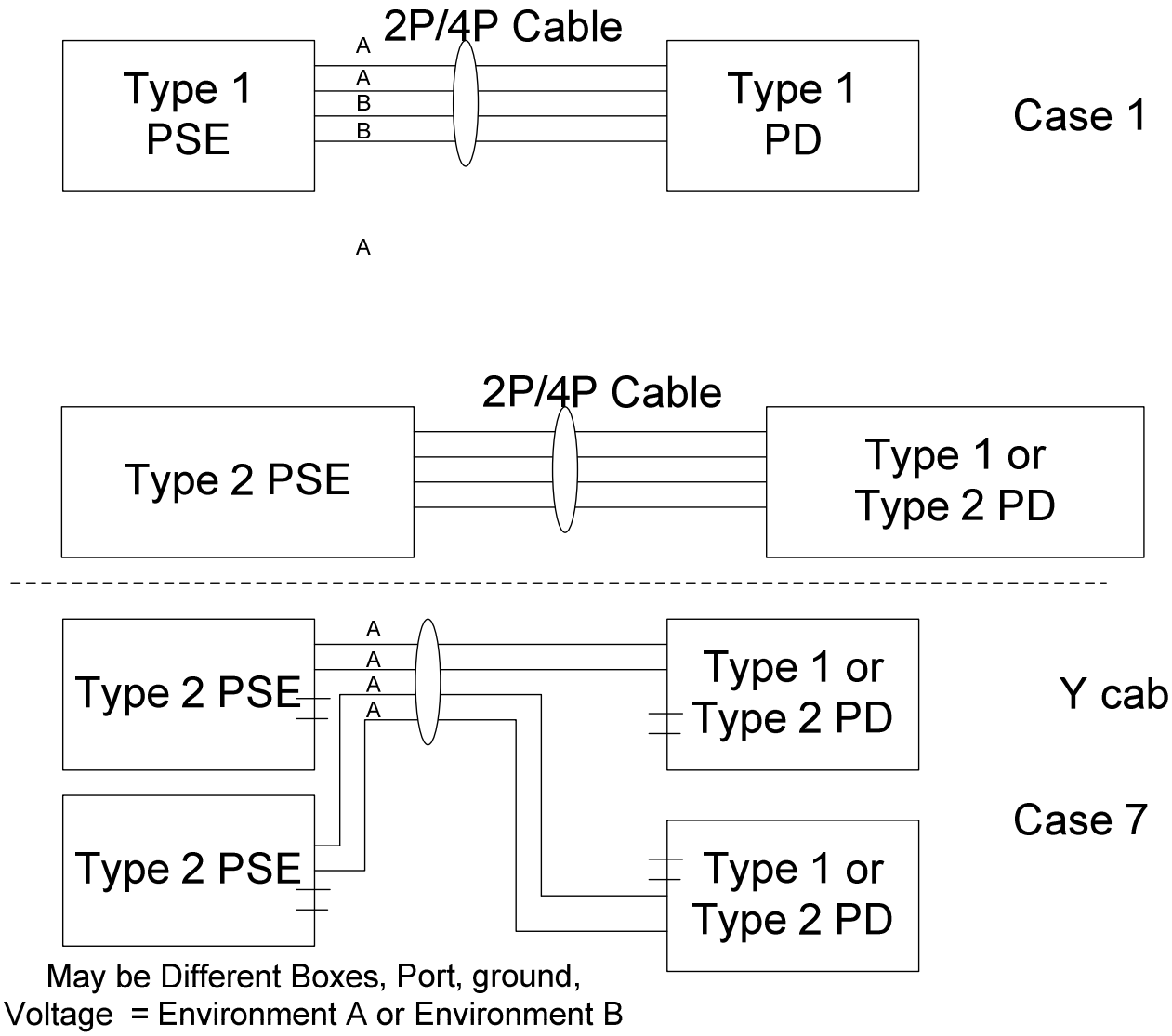


Figure 5

Simplified 2 x 2P PD without the need for Active Current Sharing

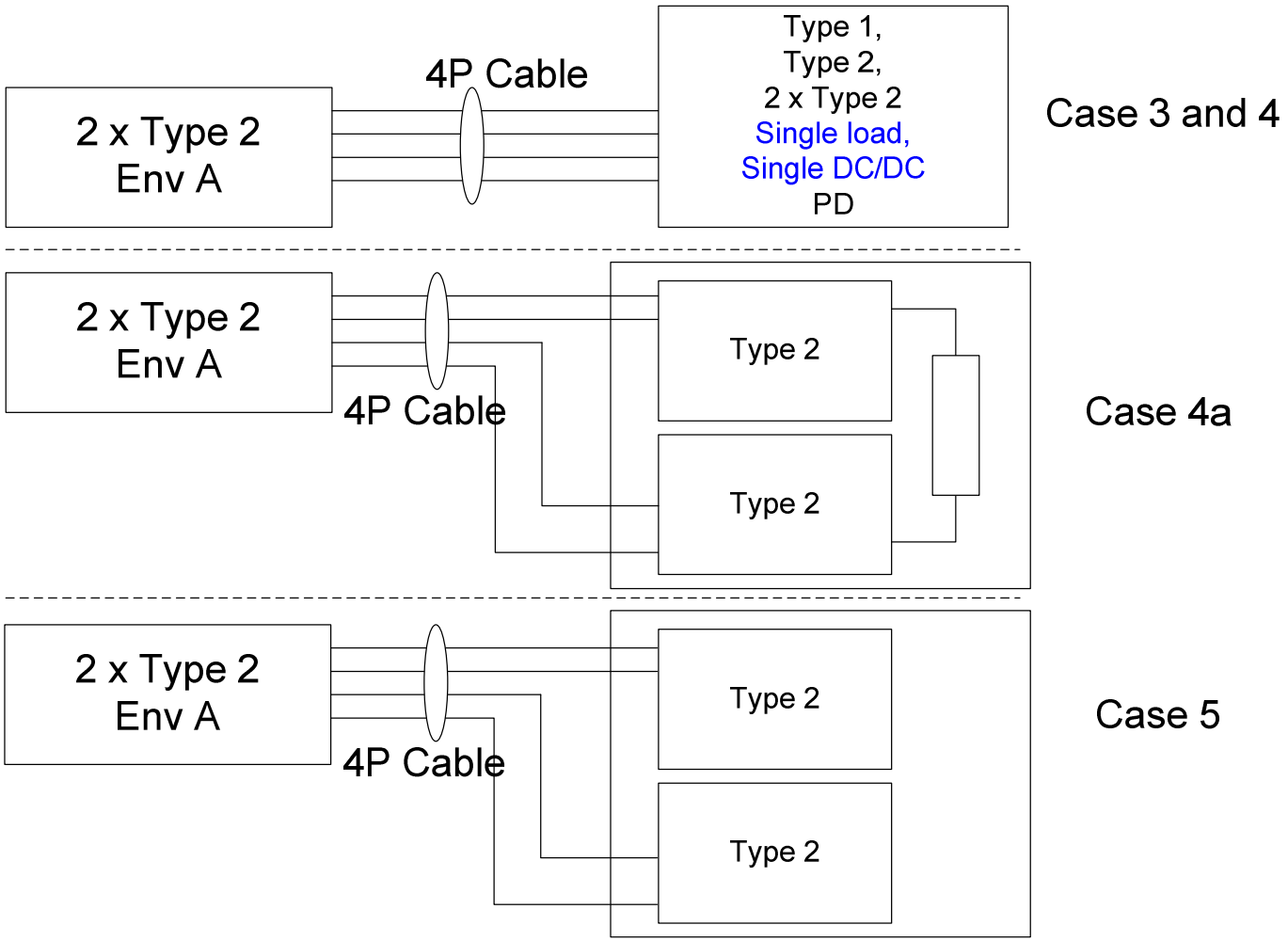
System Architectures

System Architectures

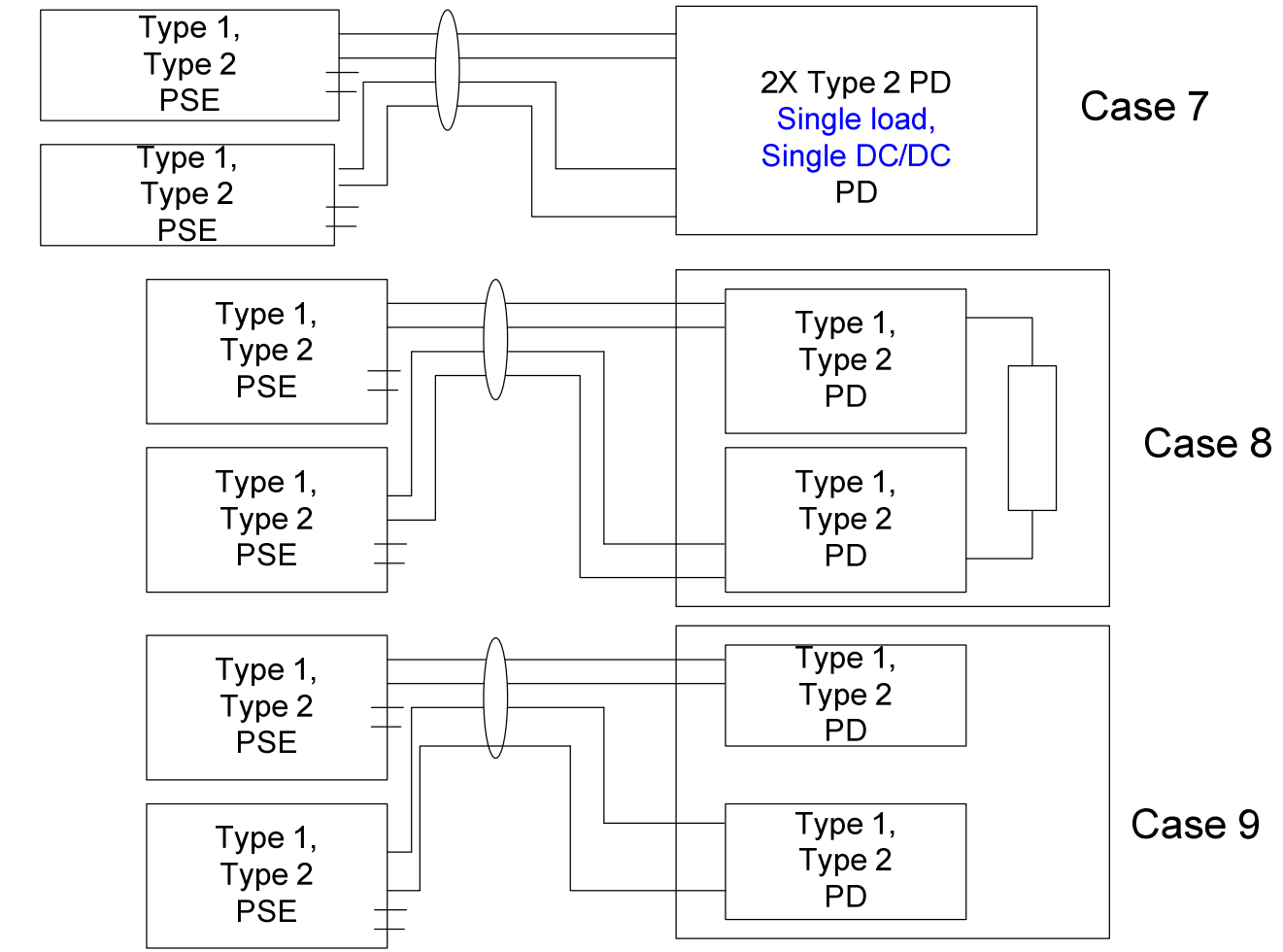


Exists today for 802.3af applications and is not precluded by 802.3af

System Architectures

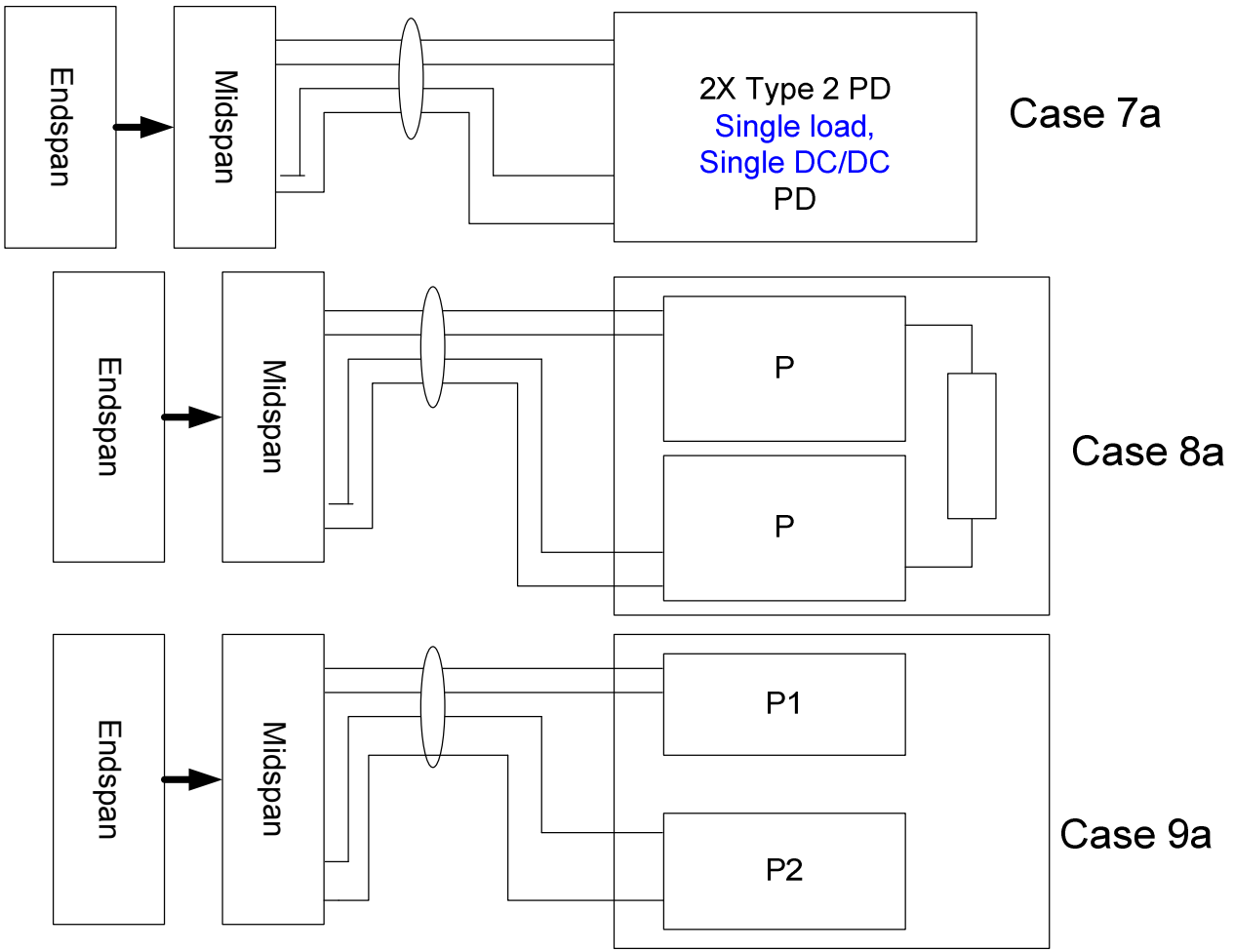


System Architectures



Different Boxes, Port, ground, Voltage = Environment B

System Architectures



Different Boxes, Port, ground, Voltage = Environment B

Possible PD-PSE permutations 1-1

#	PSE Port	PD type	PD load	Cable	Requires Current Sharing
1	Type 1	Type 1 (O,5C)	single	2P or 4P	NO
2	Type 2	Type 1(O,5C) Type 2	single	2P or 4P	
3	2XType 2 (Same port, box, Ground and Voltage Diff <TBD= ENV A)	Type 1(O,5C)	single	2P or 4P	
		Type 2		2P or 4P	
4		2 x Type 2	Single	4P	**YES,** if P>TBD **NO,** if P<TBD **or** functional isolation at the primary side of the PD.
5			Dual independent		**NO**, if each channel is functionally isolated at the PD side.

Possible PD-PSE permutations 1-2

#	PSE Port	PD type	PD load	Cable	Requires Current Sharing
7	2 x Type 2 (Environment B)	2 x Type 1 2 x Type 2 Y-Cable	Dual independent	4P	NO
8	2 x Type 2 (or 2x802.3af) (Environment B)	2 x Type 2	Single (ENV B)	4P	NO.
9			Dual independent ((ENV B)		NO.

Possible non operational conditions…with remedy 1-3

#	PSE Port	PD type	PD load	Cable	Comments
9	802.3af	Type 2	single	2P or 4P	-May not work (We know…) **- Remedy 1: See below** -PD indication is issued. (O)
		2 x Type 2	Single or Dual	2P or 4P	-May not work (We know…) **- Remedy 2: See below** -PD indication is issued. (O)
10	Type 2	2 x Type 2	Single	4P	

Remedy1:

Dual mode operation. Supported by 802.3at spec. Works at P<12.95W for Type 1 PSE, >12.95 for Type 2.

Remedy2:

Dual mode operation. Works at P<30W for Type 2 PSE, >30W for 2 x Type 2 PSEs.