

Benefits of Using PoE in Fire Alarm Systems

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SUPDET[®]

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Agenda

- What's PoE
- How PoE works
- Value of PoE
- Trend of building automation
- Benefit of using PoE in fire alarm systems

PoE Overview



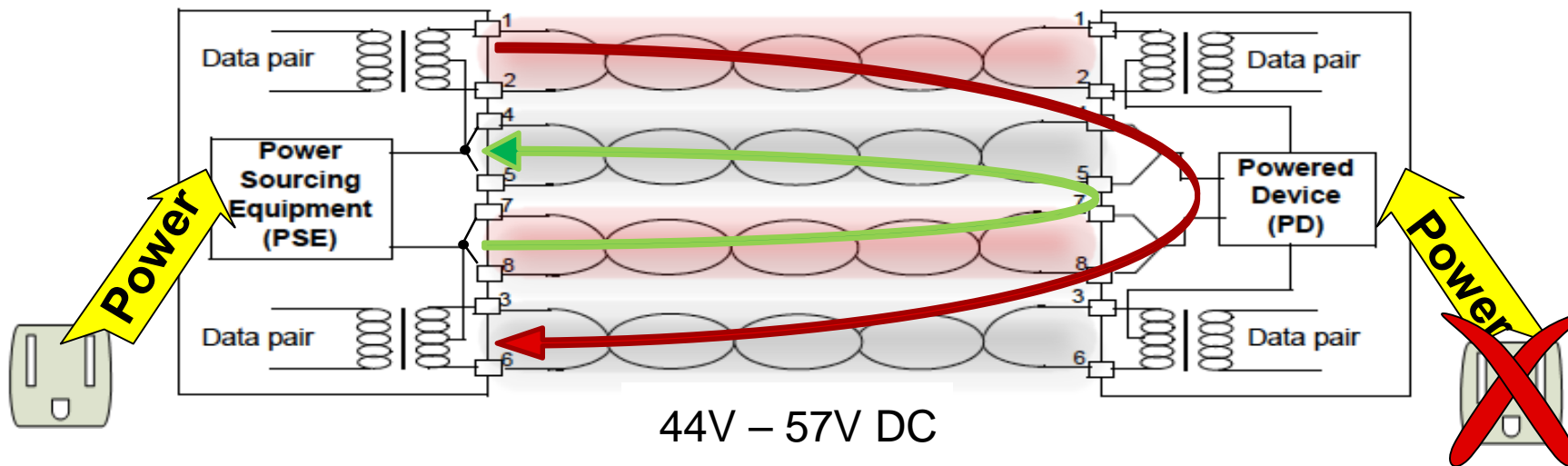
Switch/Hub



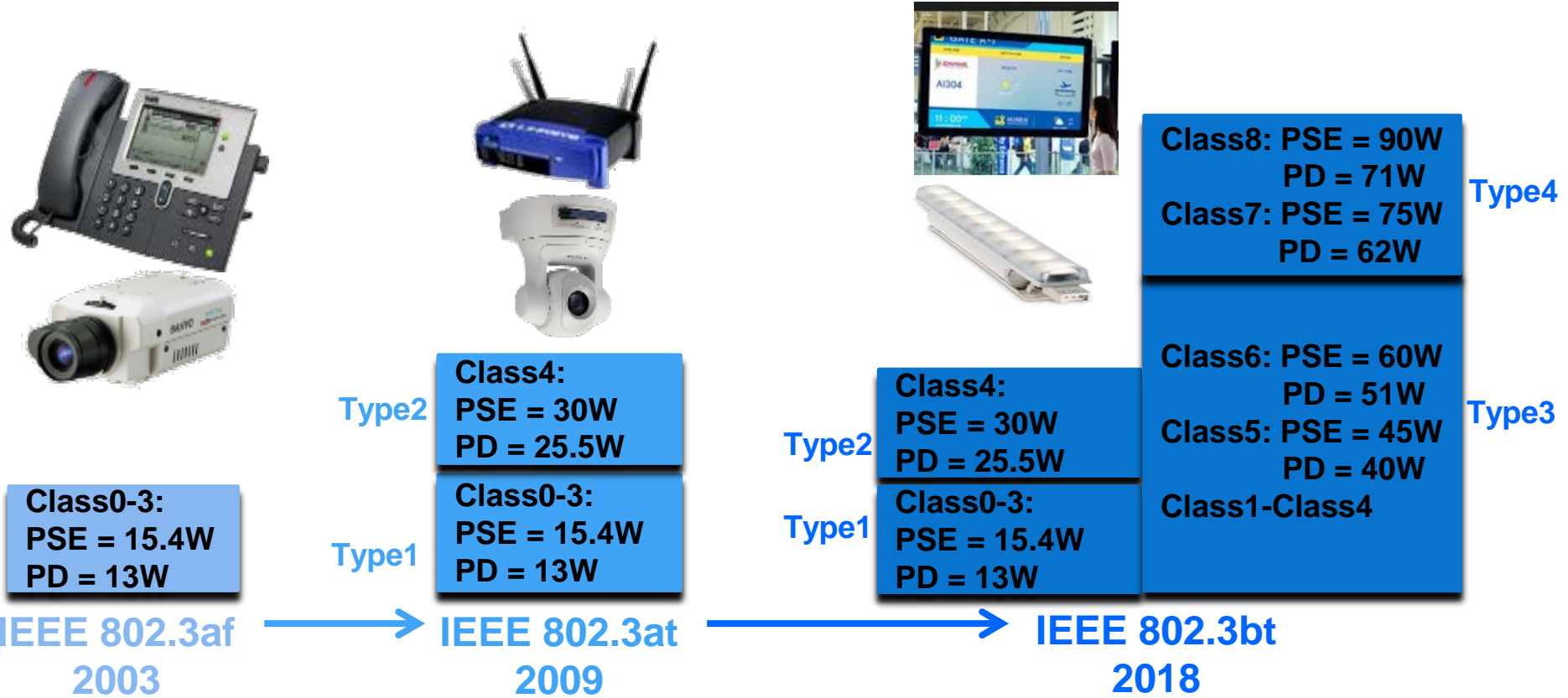
$\leq 100m$



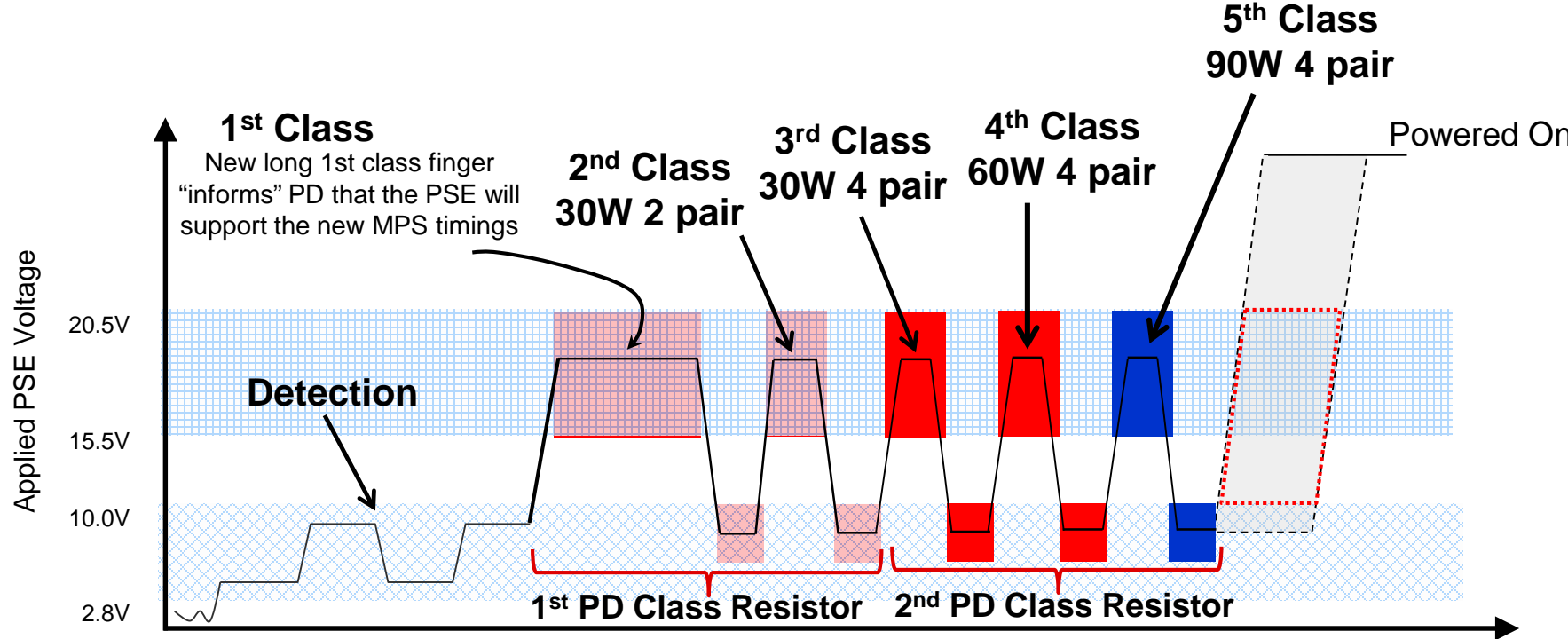
Powered End Station



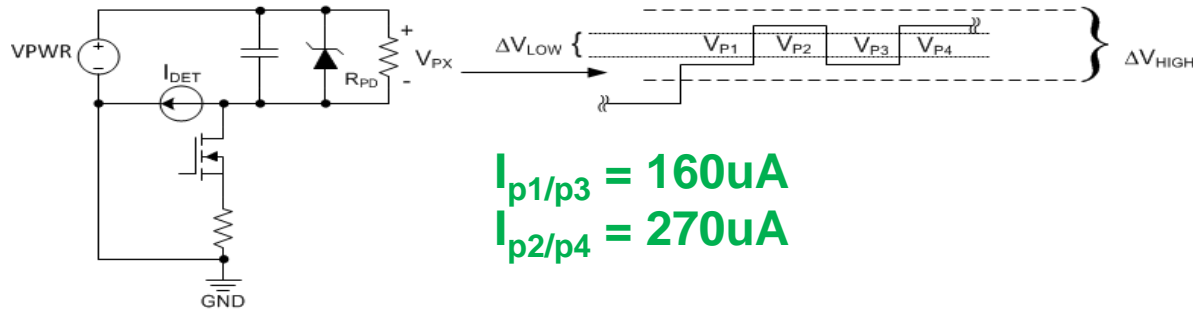
IEEE Standard History



How PoE Works



How PoE Works - Detection



$$I_{p1/p3} = 160\mu A$$

$$I_{p2/p4} = 270\mu A$$

$$R_{21} = \frac{V_{p2} - V_{p1}}{I_{p2} - I_{p1}}$$

$$R_{41} = \frac{V_{p4} - V_{p1}}{I_{p4} - I_{p1}}$$

$$R_{23} = \frac{V_{p2} - V_{p3}}{I_{p2} - I_{p3}}$$

$$R_{43} = \frac{V_{p4} - V_{p3}}{I_{p4} - I_{p3}}$$

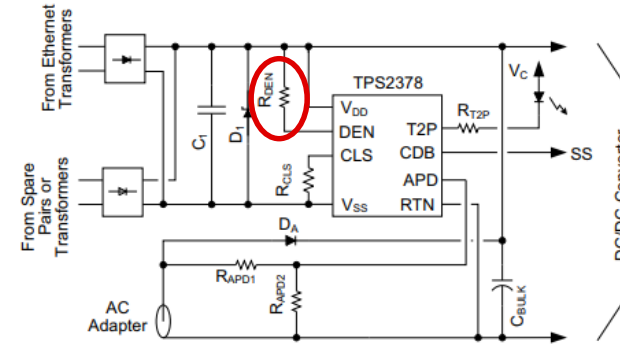
$$R_{OPEN} > 52.5k\Omega$$

$$33k\Omega \leq R_{REJ_HIGH} \leq 50k\Omega$$

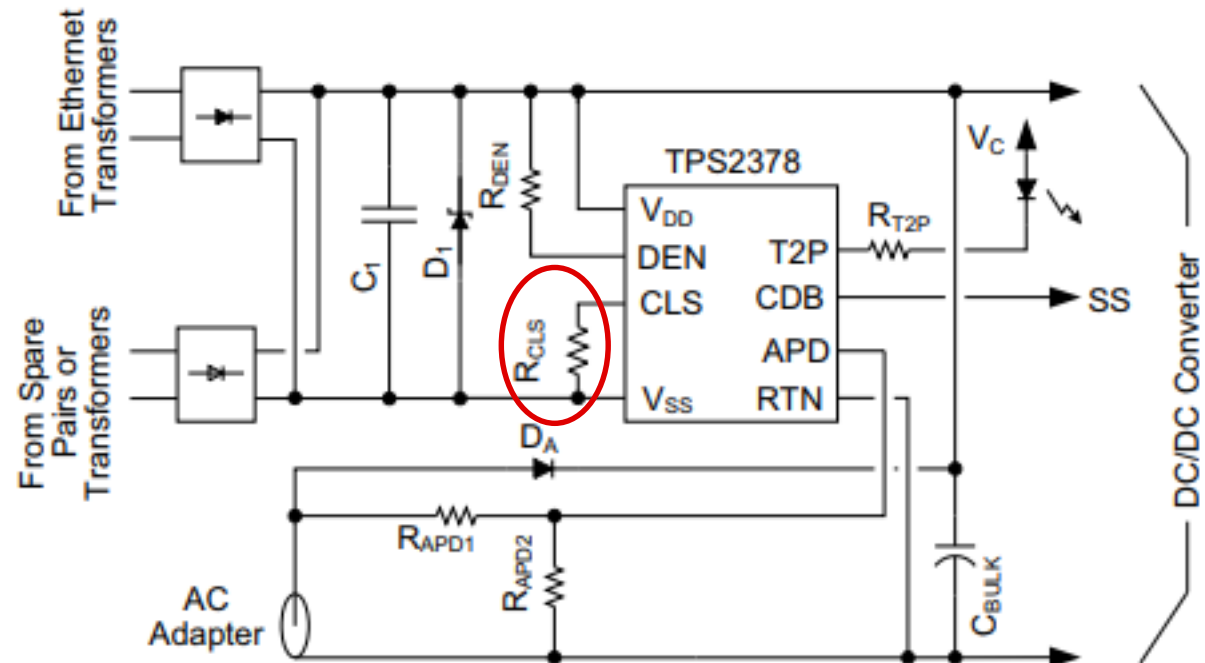
$$19k\Omega \leq R_{ACCEPT} \leq 26.5k\Omega$$

$$1.5k\Omega \leq R_{REJ_LOW} \leq 15k\Omega$$

$$R_{SHORT} < 400\Omega$$



How PoE Works - Classification



Class Level	I_{CLASS} Range (mA)	Power Sourced (W)	Power Delivered (W)
0	0 - 4	15.4	13
1	9 - 12	4	3.84
2	17 - 20	7	6.49
3	26 - 30	15.4	13
4	36 - 44	30	25.5

Value of PoE

1. Lower cost on system BOM and installation

- Reduce extra power adapter and cable
- No electrician required for installation, and the device is connected by RJ45 port through CAT5 cable

2. Safety

- PoE has multiple levels of protection for overload, short circuit and over temperature.
- PoE device performs handshaking before delivering power. This prevents damage from incorrect installation or unknown devices.

3. Flexibility

- 100m of cable enables devices to be installed at the remote place without AC plugs.
- PoE pass through PoE power to be delivered to anywhere in the network with star connection or mesh connection over 100m distance

4. Intelligence

- central controller has access to every PoE port to get status and diagnosis system fault.

Value of PoE

5. Easy plug and play with Ethernet Alliance Certified Logo

- Confidence of interoperability between certified products
- It's standards based and easy to recognize
- The arrows indicates the power direction (PSE/PD)
 - PSE: points out of the logo = sends power
 - PD: points into the logo = receives power
- The number indicated maximum power class supported



PSE Class "4" Logo



PD Class "1" Logo

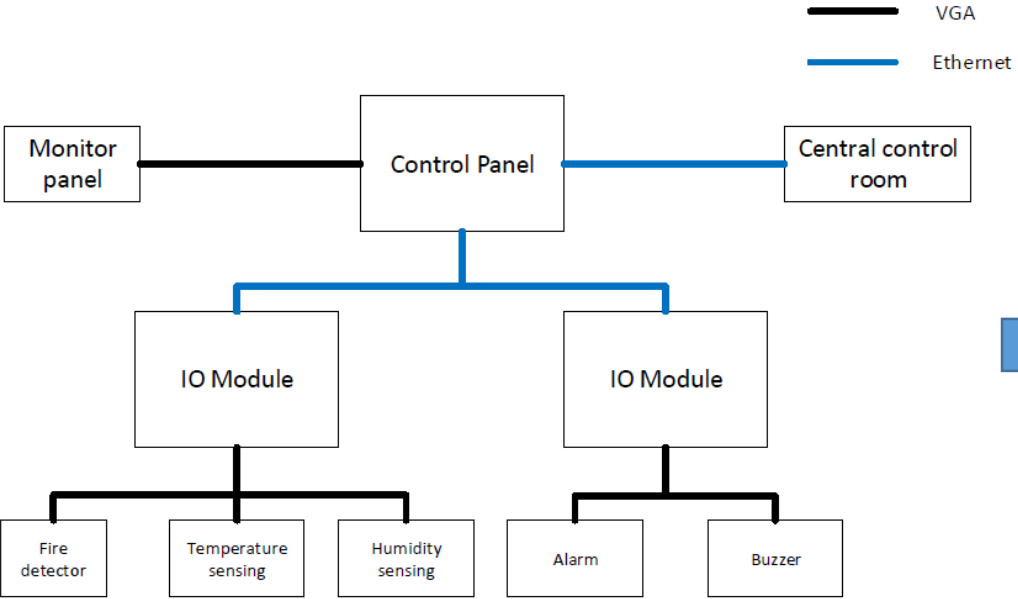
Trend of building automation



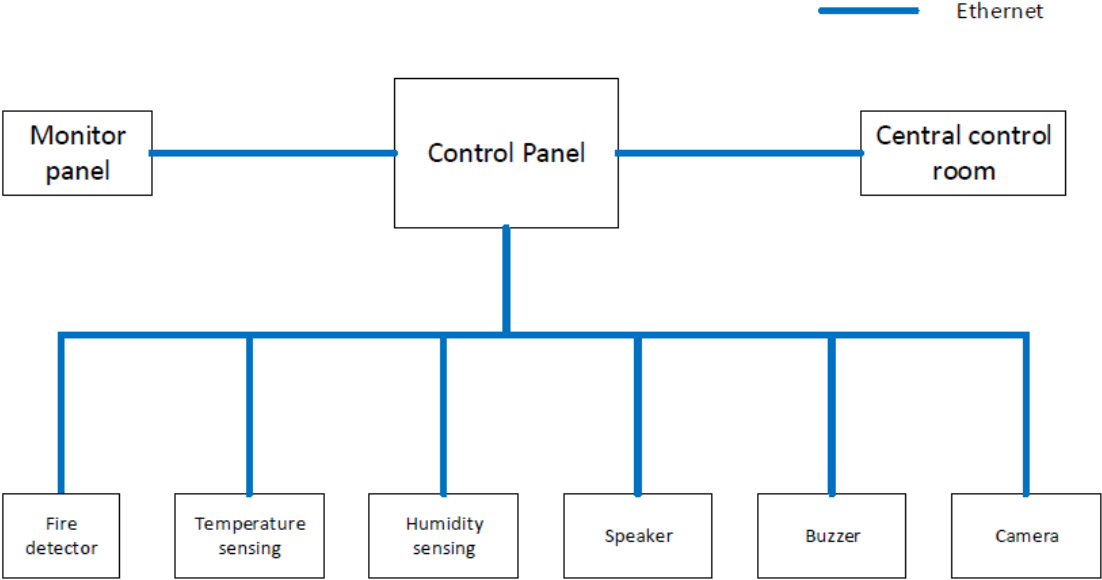
PoE can be found in:

1. IP network camera
2. Video doorbell
3. Video recorder
4. Smart lock
5. Occupancy detection
6. Barcode scanner
7. Building security gateway
8. Video audio system/Emergency speaker
9. Thermal imaging fire detection
10. LED lighting

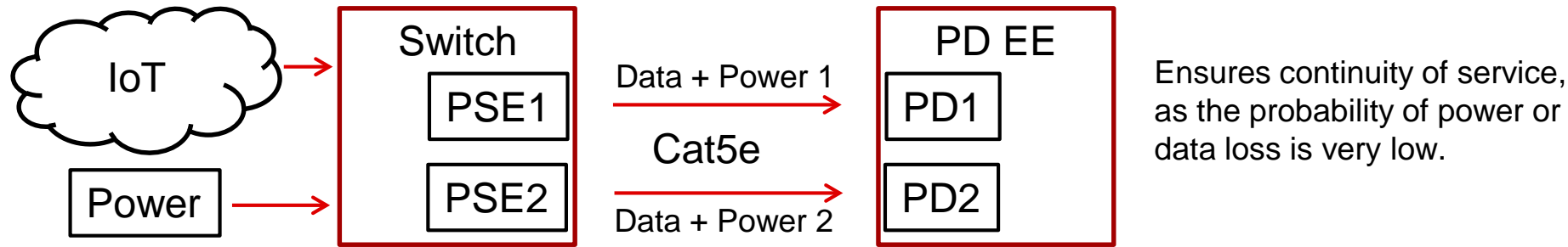
Fire Alarm Systems



+PoE



Redundancy and Hitless Failover in Firealarm Systems



- Redundancy at a smaller scale (not power outage of building or data service drop)
- PoE redundancy focuses on failures of the Cat5e on both data and power
 - Switch is usually safe in a room while Cat5e can be installed different ways
 - Plug in/out, accidental trips, Cat5e damage, harsh conditions
- IoT - Data sensitive EE: emergency speaker, smoke detector, thermal imaging fire detection, IP camera, Occupancy detection

Benefit of using PoE in Fire Alarm Systems

- Each smoke detector can have a unique IP address which is easy to be located when there is an alarm.
- Can trigger fire alarm automatically which saves time and reduces the lost.
- PoE redundancy input and battery input ensure the power presence to the fire alarm and smoke detector.
- Adding Occupancy detection also helps the control room to monitor who are in the area and take actions effectively.
- You get all of this for only \$1.3 more per port!

Questions?