

Comparison of PoE Solutions

Understanding the advantages of reliable PoE solutions from Zultys

Definition of a Reliable PoE Solution

Probably the most underestimated criteria in selecting a solution for Power over Ethernet (PoE) is the reliability of the backup power source when the normal power source has failed. This factor is critical when PoE is part of a larger deployment for telephony or security. When the ac power of a building fails, the normal power source to networking equipment fails, so each PoE device on the network (such as IP phones) should be powered by a reliable backup source. A reliable source ensures continuous operation of network devices until the normal power source is restored, or until proper shutdown of a business application. Reliability in this case means that the system must be predictable, long lasting, and have a low probability of electronic and mechanical failure.

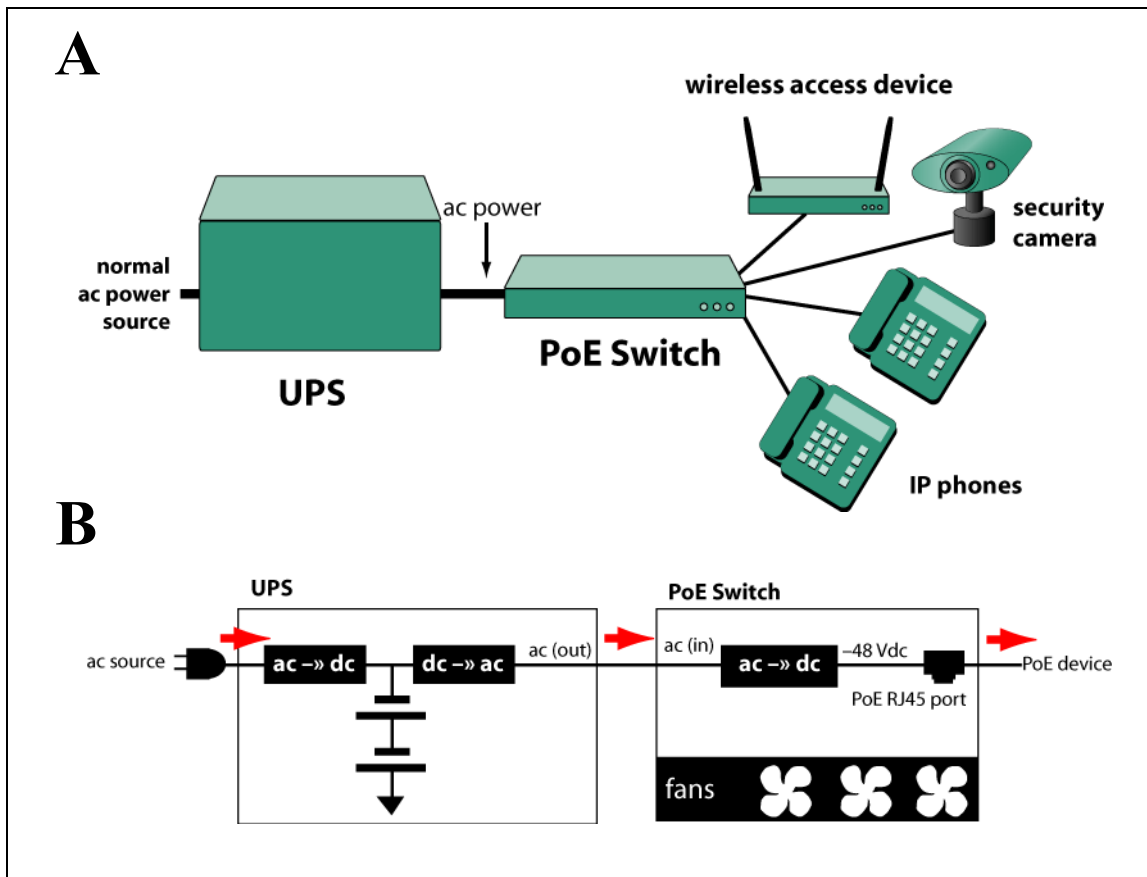


Figure 1: (A) Typical deployment for PoE with UPS. (B) Simplified circuit diagram of power conversion.

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PoE Switch and UPS

Many PoE solutions derive backup power from an ac power source, so they rely on the use of an Uninterruptible Power Supply (UPS) to provide continuous power when the normal ac power source fails. A UPS device does not simply pass through power to the PoE switch. Instead, it regenerates ac power. When the normal ac power source fails, the UPS generates the ac power from its charged capacity. The reliability of the solution of a PoE switch and a UPS is dependent on three factors:

- **Charge capacity of the UPS.** All UPS systems are based on a battery. The size of the battery determines how long the UPS can continue generating power to the connected PoE switch. Thus, the larger the battery, the longer the UPS can provide power to the PoE switch.
- **Complexity of its circuitry for generating backup power.** The more complex the circuitry is for generating the output power, the higher the probability of failure. In general, generating ac power has greater complexity than generating dc power, and requires more energy to accomplish. Thus, failure of a backup power device that generates ac power has a higher likelihood than failure of a device that generates dc power.
- **Complexity of the circuitry for generating PoE.** The PoE switch itself can fail, so the more complex its circuitry is for generating power for the PoE ports, the more likely the failure. PoE switches that take in ac power must have circuitry to convert ac power into -48 Vdc to provide power through the Ethernet ports. This conversion process constantly uses up energy, so the PoE switch must have internal fans that are always running to cool the conversion circuitry. Not only does the complexity of the ac to dc conversion increase the likelihood of electronic failure, but also the fans are susceptible to mechanical failure when they are always running. If a fan fails, the PoE switch must entirely shut down or the device will overheat.

Figure 1 shows a how the typical PoE solution is deployed using a PoE switch and a UPS. It also shows a simplified circuit of power connections for input and output.

Zultys' PoE Solution

Components

Zultys designed its PoE solutions specifically to operate reliably for critical applications like IP telephony. Zultys' PoE solutions ensure long lasting and predictable backup power for IP phones during a power failure. A PoE solution from Zultys comprises:

- DC powered PoE switch (models EPS24 or EPS48)
- -48 Vdc battery power unit (model BPS12)

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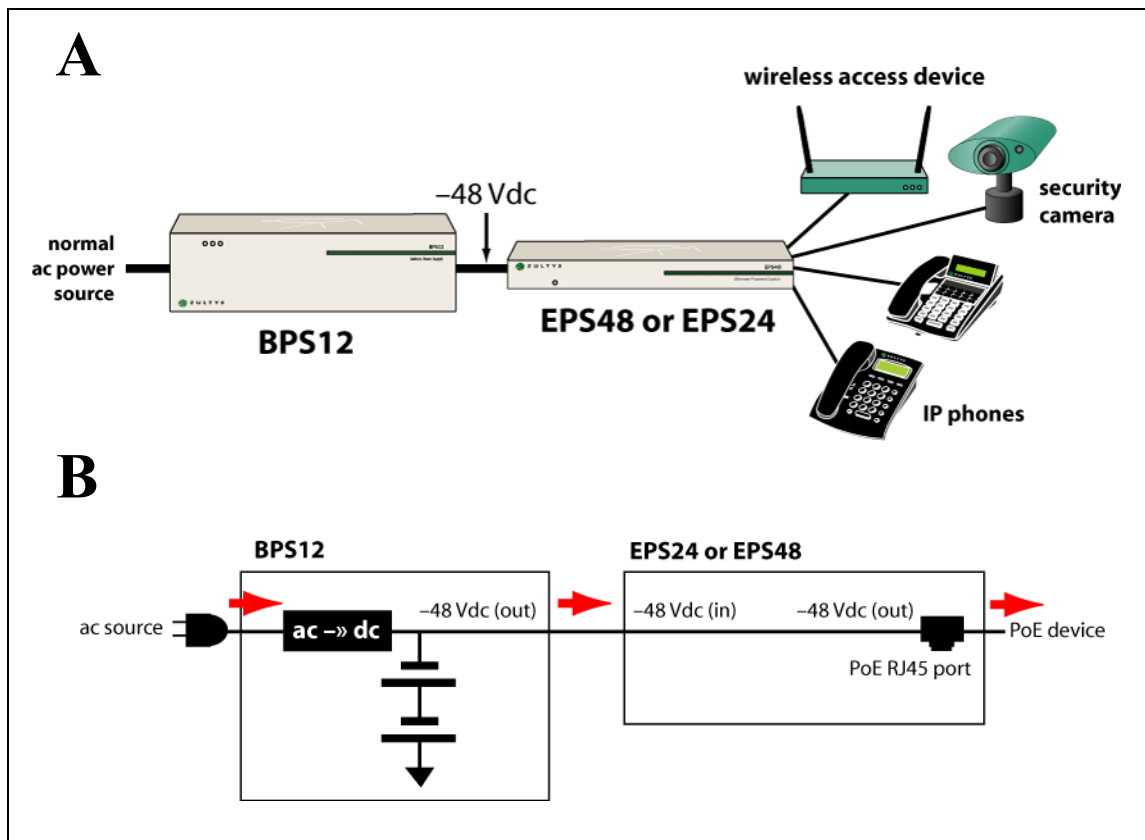


Figure 2: (A) Zultys' PoE solution with EPS24 or EPS48 and BPS12. (B) Simplified circuit diagram of power conversion.

Differences from typical PoE solutions

Figure 2 shows how Zultys' PoE solution is deployed and a simplified circuit of power connections for input and output. This solution differs from that of the ac powered PoE switch with UPS because of these differentiating factors:

- **The BPS12 does not need to generate ac power.** This simplifies the circuitry for the device that provides the power output. In UPS systems, ac power must be converted to dc power to charge the internal battery, and then the dc power must be converted back to ac power. The BPS12 only needs to convert the ac power input to dc power.
- **A Zultys PoE switch has a dc power input instead of ac power input.** This simplifies the complexity of circuitry that generates the power over Ethernet, and removes the need for constant operation of the internal fans, which in turn lowers the risk of failure of the PoE switch.

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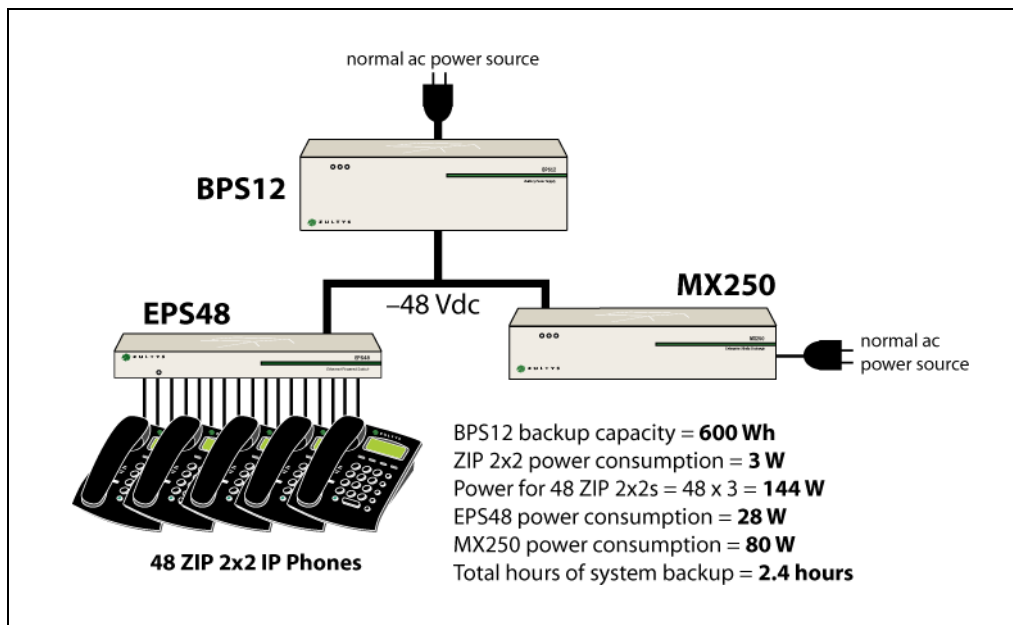


Figure 3: Example of Zultys' PoE system for a VoIP deployment.

- **The BPS12 is smaller and lighter than a UPS with similar charge capacity.** The BPS12 occupies only 3 RU in a 19 inch rack, and weighs less than 30 kg (67 lb). Comparable UPS devices are often larger and at least twice as heavy. This fact should not be ignored when considering the method and cost of shipping the device to the location of deployment.
- **Power from the BPS12 can be shared and cascaded with one or more PoE switch.** The backup power of the BPS12 can be divided among multiple Zultys PoE switches. You can also cascade BPS12 boxes together to increase the total backup capacity to the PoE switches.
- **The Zultys PoE solution is lower in cost.** When comparing the prices of a Zultys PoE solution with that of a standard PoE switch and a UPS with equivalent standby capacity, the combination of a BPS12 and Zultys PoE switch is attractively priced at 10% to 50% savings compared to other solutions.

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Example of Zultys' PoE Solution for IP Telephony

Zultys' PoE solutions are commonly used for IP telephony deployments where the PoE switches provide power and Ethernet connectivity for IP Telephones within the LAN. Figure 3 shows a sample deployment of a VoIP system deployed for 48 users of ZIP 2x2 IP phones. Each phone consumes an average of 3 W, the EPS48 consumes about 28 W, and the MX250 (IP PBX) consumes an average of 80 W. The BPS12 provides 600 Wh of backup power, so the total period of backup power for the complete VoIP system is 2.4 hours.

Conclusion

Zultys' PoE solutions are better value than typical PoE solutions because they are more reliable, physically smaller, more flexible in expansion of capacity and sharing of resources, and less expensive to own. Zultys' PoE solutions offer far better reliability than PoE solutions that comprise a UPS and a PoE switch with an ac power input. Zultys' PoE solution has fewer power conversions, temperature controlled fans rather than continuously operating fans, a smaller form factor, and a lighter weight. Increasing the capacity for PoE can be quickly achieved without any disturbance to existing cabling or rack installations. The pricing advantage for Zultys' PoE solutions is obvious when comparing solutions with equivalent charge capacity and warranty coverage. Zultys' PoE solutions make sense both technically and economically.

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