PoE: Standards and developments

PoE and IoT: the opportunities of an interconnected world

In the age of Internet of Things (IoT) PoE technology (Power over Ethernet) has become quite popular. PoE systems pass electric power along with data on the same twisted pair cable used for the data transmission.

The increase of intelligent devices and the applications developed for smart buildings require a higher power budget to grant a proper functioning. Sensors, IP cameras, LED lights, RFID and access control readers, smart TV and HotSpot are only a few examples of the devices connected to the network infrastructure that are powered through PoE.

There are several benefits connected to the use of PoE systems. The use of PoE and the deployment of a single connectivity system between highly technological devices allow a smart management of the building. On top of this, energy consumptions are optimized by the monitoring and check-up of power loads managed through the exchange of information between the different special systems. Designing a structured cabling system today must consider the present and future evolution of Ethernet systems and PoE solutions.

Standards development

Reference standards today as set by IEEE are the PoE 802.3af (Type 1) that provides up to 15,4W of DC power and PoE+ 802.3at (Type 2) that provides up to 30W of power. The limits set by these standards together with the maximum communication speed of 1Gigabit Ethernet, are not enough to fully answer the new requests of higher power budget.

The upcoming 802.3bt standard (fall 2018) also known as PoE++, 4PPoE or UPoE will be compatible with the former 802.3af and 802.3at systems. The power will be delivered on the 4 pairs of the cable and the new protocol will support 10 Gigabit Ethernet and the new possible speed of 2.5 Gbps and 5 Gbps together with the possibility to supply from 60 to 100W defined by IEEE on 2 levels or Types (Type 3 and Type 4).

Type	Standard	No. of used pairs	Power delivered (Watt)	Power available (Watt)	Max. Data Rate	Year of release
PoE	IEEE 802.3af (Type 1)	2	15,4	12,95	1000BASE-T	2003
PoE+	IEEE 802.3at (Type 2)	2	30	25,50	1000BASE-T	2009
PoE++ (4PPoE or UPoE)	IEEE 802.3bt (Type 3)	4	60	49	10GBASE-T	Expected in 2018
	IEEE 802.3bt (Type 4)	4	90	76		