APL – Advanced Physical Layer - Ethernet in the field of Process Automation plants based on IEEE 802.3.cg (10SPE)

Dr.-Ing. Jörg Hähniche, PROFIBUS Nutzerorganisation e.V, Karlsruhe, Germany;

Stefan Lüder, Siemens AG, Karlsruhe, Germany

Industrial Ethernet based networks are state of the art in factory automation. Industry 4.0, IIOT or “Big Data” applications are making the need for a seamless Ethernet based communication from the field to the cloud obvious. In process automation however, field instruments are still connected through 4…20 mA and HART. Process plants put challenging requirements on the physical layer that are not met by today’s Ethernet solution like 100/1000BASE-T: Power supply and communication via two wires for up to 1000m cable length are required in a harsh industry environment. Solutions fulfilling these requirements must as well allow the connection of common intrinsically safe devices like pressure or temperature transmitters without increasing the connection cost.

This paper presents the technology and the status of the Advanced Physical Layer project that has the goal to develop an independent protocol-neutral physical layer for process automation applications. APL will be based on the IEEE 802.3cg (10SPE) Standard that is currently under development. This task force was initiated by representatives of different industries, like Building Automation or Industry Automation to specify a 2-wire Ethernet technology that is suitable for many applications. The status of the development within the IEEE task force will also be presented. APL with IEEE 802.3cg as its basis aims to specify and standardize a common Ethernet Physical Layer providing communication and power over two wire data line that allows the economical connection of even simple devices like pressure or temperature transmitters.