lamaPLC Communication: EtherNet/IP

EtherNet/IP (*IP = Industrial Protocol*) is an industrial network protocol that adapts the *Common Industrial Protocol* (**CIP**) to standard Ethernet. EtherNet/IP is one of the leading industrial protocols in the United States and is widely used in a range of industries including factory, hybrid and process. The EtherNet/IP and CIP technologies are managed by ODVA, Inc., a global trade and standards development organization founded in 1995 with over 300 corporate members.

EtherNet/IP uses both of the most widely deployed collections of Ethernet standards –the Internet Protocol suite and IEEE 802.3 – to define the features and functions for its transport, network, data link and physical layers. EtherNet/IP performs at level session and above *(level 5, 6 and 7)* of the OSI model. CIP uses its object-oriented design to provide EtherNet/IP with the services and device profiles needed for real-time control applications and to promote consistent implementation of automation functions across a diverse ecosystem of products. In addition, EtherNet/IP adapts key elements of Ethernet's standard capabilities and services to the CIP object model framework, such as the *User Datagram Protocol* (**UDP**), which EtherNet/IP uses to transport I/O messages.

Ethernet/IP was estimated to have about 30% share of the industrial Ethernet market in 2010 and 2018.

Development of EtherNet/IP began in the 1990s within a technical working group of ControlNet International, Ltd.(CI), another trade and standards development organization. In 2000, ODVA and CI formed a joint technology agreement (JTA) for the development of EtherNet/IP. In 2009, the JTA was terminated and EtherNet/IP became under the sole control of ODVA and its members.

Today, EtherNet/IP is one of four networks that adapt CIP to an industrial network along with DeviceNet, ControlNet and CompoNet. All of these networks are managed by ODVA, Inc.

Technical Detail

EtherNet/IP classifies Ethernet nodes into predefined device types with specific behaviors. Among other things, this enables:

- Transfer of basic I/O data via User Datagram Protocol (UDP)-based implicit messaging
- Uploading and downloading of parameters, setpoints, programs and recipes via TCP (i.e., explicit messaging.)
- Polled, cyclic and change-of-state monitoring via UDP.
- One-to-one (unicast), one-to-many (multicast), and one-to-all (broadcast) communication via IP.
- EtherNet/IP makes use of TCP port number 44818 for explicit messaging and UDP port number 2222 for implicit messaging

Sources

Wikipedia (here)

EtherNet/IP topics on lamaPLC

Page	Date	Tags
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• lamaPLC Communication: DeviceNet	2024/11/16 20:43	bus, communication, devicenet, 62026-3, cip, can, ethernet ip, ethernet, controlnet, mac, peer-to-peer, canopen, allen-bradley, rockwell automation, bosch
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