lamaPlc: Profinet

Profinet (usually styled as PROFINET, as a portmanteau for *Process Field Network*) is an industry technical standard for data communication over Industrial Ethernet, designed for collecting data from, and controlling equipment in industrial systems, with a particular strength in delivering data under tight time constraints. The standard is maintained and supported by Profibus and Profinet International, an umbrella organization headquartered in Karlsruhe, Germany.

Profinet implements the interfacing to peripherals. It defines the communication with field connected peripheral devices. Its basis is a cascading real-time concept. Profinet defines the entire data exchange between controllers (called "**IO-Controllers**") and the devices (called "**IO-Devices**"), as well as parameter setting and diagnosis.

IO-Controllers are typically a PLC, DCS, or IPC; whereas IO-Devices can be varied: I/O blocks, drives, sensors, or actuators. The Profinet protocol is designed for the fast data exchange between Ethernet-based field devices and follows the provider-consumer model. Field devices in a subordinate Profibus line can be integrated in the Profinet system seamlessly via an IO-Proxy (representative of a subordinate bus system).

Profinet MRP

PROFINET media redundancy is optional with all conformance classes, but in some applications, it is critical for correct operation (for example, hot backup in a safety application). PROFINET offers network media redundancy through a ring topology. PROFINET has two main media redundancy classes defined. MRP – Media Redundancy Protocol which offers a few milliseconds of recovery time in a network up to 50 switches and MRPD – Media Redundancy for Planned Duplication which is a bumpless redundancy. MRP is typically used with Real Time (RT) and MRPD with Isochronous Real Time (IRT) but you can interchange depending on application requirements.

MRP and MRPD use the design of a ring manager which monitors the ring topology at all times for proper operation. If the ring becomes 'broken' then the manager has to notify the other *"clients"* on the ring that there is a failure and then switch to a line topology. In the case of MRP, this process may take a few milliseconds, but MRPD is faster and bumpless as it sends real-time frames already in both directions on the ring to the recipient of the data.

After the currently valid Profinet Standard, the **unexpected failure** of an MRP Ring can occur if **RSTP packets** are received in the MRP-Ring at the same time, more info» PROFINET - MRP-Ring: Wichtige Projektierungsempfehlungen bei Verwendung von RSTP

Engineering

The project engineering: of an IO system is nearly identical to the Profibus in terms of "look and feel":

- The properties of an IO-Device are described by the device manufacturer in a GSD file (General

Station Description). The language used for this is GSDML (GSD Markup Language) - an XML-based language. The GSD file serves an engineering environment as a basis for planning the configuration of a Profinet IO system.

- All Profinet field devices determine their neighbors.: This means that field devices can be exchanged in the event of a fault without additional tools and prior knowledge. By reading out this information, the plant topology can be displayed graphically for better clarity.
- The engineering can be supported by tools such as PROFINET Commander or PRONETA.

Sources

Wikipedia (here)

Profinet topics on lamaPLC

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