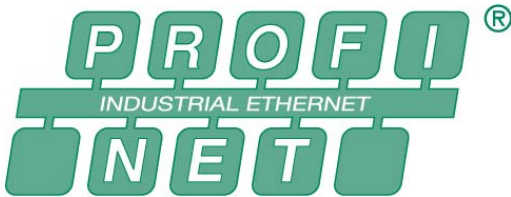




PROFIBUS and PROFINET • North America

A PTO White Paper **PROFINET IO Device Diagnostics – An Overview**



PROFINET IO Device Diagnostics – An Overview

As well as being the most comprehensive, all-encompassing automation network, PROFINET also provides the fastest, most thorough diagnostics. There is virtually no part of your network PROFINET can't reach and examine quickly and accurately. Yes, PROFINET can save time and money on installation, but it can save even more through faster troubleshooting and keeping your plant healthy.

PROFINET diagnostics are structured hierarchically; starting with the device information and moving down the ladder to module and channel diagnosis (see Figure 1). Additionally network and system status are available. In case of a fault the station name, slot, channel, channel type and information about the error itself can be accessed, so you'll always be on top of device faults.

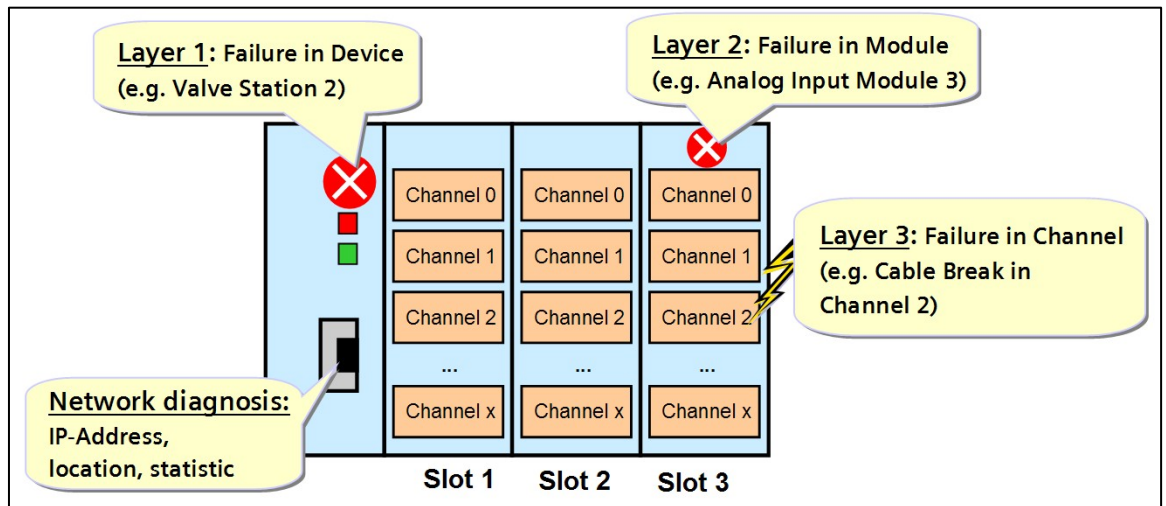


Figure 1: Diagnostic Types for a PROFINET IO Device

Some of the diagnostic errors that can be reported are short circuit, undervoltage, overvoltage, overload, over temperature, line break, upper (or lower) limit exceeded, power supply fault, fuse blown, etc. Also, each device manufacturer can report diagnostics specific to their PROFINET IO device.

Reporting Diagnostics

When an IO device detects a fault condition, it immediately sends an alarm to the IO controller with the diagnostic information (see Figure 2). The application program in the IO controller can then take appropriate action. The diagnostic information is also stored in the IO device and can be read later by an IO Supervisor (e.g., a PC or an HMI device). Diagnostic information is available where it is needed.

Additionally, some network switches also function as PROFINET IO devices. This gives the switch the capability to report diagnostic errors directly to the IO controller. For instance, in Figure 3 the switch reports

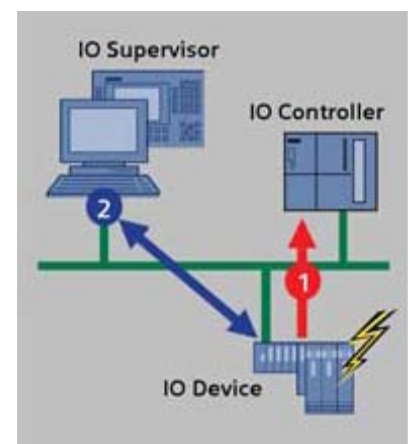


Figure 2: Diagnostic Reporting from PROFINET IO Device

an error to the IO controller when the communication link with IO Device 1 is disconnected. This status of the communication link can also be displayed on an HMI device as an alert so that the problem can be fixed quickly.

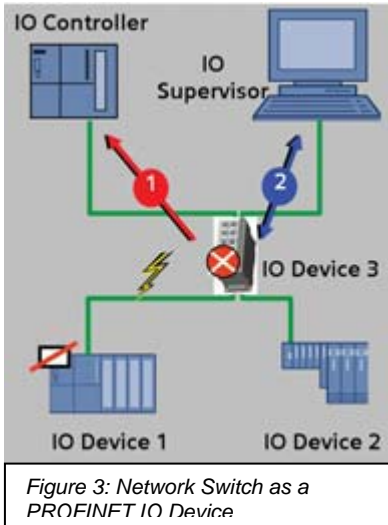


Figure 3: Network Switch as a PROFINET IO Device

PROFINET takes advantage of some widely used Ethernet protocols for network information gathering:

SNMP (Simple Network Management Protocol) - is perhaps the most widely used of all the Ethernet protocols for diagnostics. Using only 9 commands it monitors network devices and can be a great help in diagnosing faults. PROFINET uses standard 'MIBs' (Management Information Database), containing information about device name, IP address, location, status and statistics - and offers to have additional MIBs which can provide vendor specific diagnostic information.

LLDP (Link Layer Discovery Protocol) - is a discovery protocol that allows devices to be identified automatically and provide information about network topology. Basically, the way it works is at power-up each device gives information about itself to its neighbor. Later, SNMP is used to access the information gathered by LLDP. This enables configuration tools to discover the network topology.

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