



Migration Guide
PROFINET IO Device
Migration from V4.x to V4.5

Hilscher Gesellschaft für Systemautomation mbH
www.hilscher.com

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1 Introduction

1.1 About this document

This document describes the steps required to migrate an existing PROFINET IO Device application from stack/firmware Version V4.x to current available version V4.5.

This document describes the changes between the different releases of PROFINET IO Device Firmware V4 over time. For each new release the major differences compared to the previous release are shown.

Specific topics like taglist or Packet API are handled in own chapters within this document.

1.2 List of revisions

Rev	Date	Name	Chapter	Revision
1	2018-02-06	BM	all	Created
2	2019-08-22	BM	1.3 2.5, 3.5, 4.5	Reference to Protocol API Manual updated. V4.5.0 added.

Table 1: List of revisions

1.3 References to documents

This document refers to the following documents:

- [1] Hilscher Gesellschaft für Systemautomation mbH: Protocol API, PROFINET IO-Device, V4.5.0, Revision 3, DOC171101API03EN, English, 2019.
- [2] Hilscher Gesellschaft für Systemautomation mbH: Protocol API, PROFINET IO-Device System Redundancy, V4.5.0, Revision 3, DOC190603API03EN, English, 2019.

Table 2: References to documents

2 General

This chapter shows general changes between different releases.

2.1 Changes introduced with V4.1.0

No significant change was made with firmware V4.1.0.0 compared to V4.0.0.x.

2.2 Changes introduced with V4.2.0

The following changes were made starting with stack / firmware V4.2.0.0.

- IRT support was added to all 2-port firmware.
 - In order to use IRT for a product the corresponding IRT-related entries need to be added to GSDML file.
 - **Note:** Adding IRT support as new feature to a product requires creating a new DeviceAccessPoint in GSDML file. Application needs to be adapted to the new DAP module and submodule identifiers. A new PROFINET certification is required as well.
 - IRT functionality is **enabled by default** in all 2-port firmware.
 - In order to **deactivate** IRT support in the firmware in firmware version V4.2.0.0 the taglist needs to be modified.
- USB Marshaller support was added
- only 32 submodules can be used (older firmware supported up to 64)
- support for IO Supervisor AR was removed
- behavior of DPM field "ulCommunicationState" changed completely

2.3 Changes introduced with V4.3.0

The following changes were made starting with stack / firmware V4.3.0.0.

- netX52 single port firmware was renamed from "nx52pns_stdmac.nxf" to "X070D000_SinglePort.nxf"
- netX51 single port firmware was renamed from "nx51pns_stdmac.nxf" to "X060D000_SinglePort.nxf"

2.4 Changes introduced with V4.4.0

The following changes were made starting with stack / firmware V4.4.0.0.

- By default all firmware only support 2 IO ARs
 - Using the taglist editor it is possible to modify this parameter
- By default if firmware handles I&M data the I&M4 dataset is no longer supported
 - Using PNS_IF_SET_OEM_PARAMETER_REQ it is possible to activate I&M4 handling
- netX52 single port firmware was renamed from "X070D000_SinglePort.nxf" to "X170D000.nxf"
- netX51 single port firmware was renamed from "X060D000_SinglePort.nxf" to "X160D000.nxf"

2.5 Changes introduced with V4.5.0

The following changes were made starting with stack / firmware V4.5.0.0

- The netX 52 firmware no longer supports (in total) 4 IO ARs but only 3. In earlier releases it was possible to change the number of ARs in the tag list to 4 and the firmware successfully has started. This is no longer possible due to resource constraints.
- In addition to already provided firmware, several additional hardware platforms are officially supported now
 - netX 51 NXLFW
 - netX 100 NXLFW
 - netX 500 NXLFW
 - cifX
 - comX
 - comX 51
 - netJACK 100
 - netJACK 51
- The feature System Redundancy is supported now. However, a special firmware is required (LFW-PNS SR) which has this feature enabled. for identification, the System Redundancy enabled firmware uses Communication Class 0x1A in DPM Channel 0.
 - This feature is and will not be supported by regular standard firmware using Communication Class 0x0A as identifier in DPM Channel 0.
 - This feature is and will not be supported for netX 52-based hardware due to resource constraints.
- By default, IO Supervisor ARs are no longer supported. Support can be enabled at runtime using `PNS_IF_SET_OEM_PARAMETER_REQ`. This does NOT affect Supervisor DeviceAccess which is still enabled by default.

3 Packet handling (API changes)

This section describes packet API related changes of the different firmware release versions.

3.1 Changes introduced with V4.1.0

No services have changed with firmware V4.1.0.0 compared to V4.0.0.x.

3.2 Changes introduced with V4.2.0

No services have changed with firmware V4.2.0.0 compared to V4.1.0.x.

3.3 Changes introduced with V4.3.0

The following services have changed starting with stack / firmware V4.3.0.0.

Affected service	Description
Get list of configured submodule	This service was added
Set submodule state	This service was added
UserError Indication	This service was added
Read Record / Write Record	This service now supports up to 4KB of acyclic data. Field abRecordData no longer has fixed length 1024 but instead is defined without any length, thus abRecordData[]
Set OEM Parameter Service	Support for ParameterType 3 was added Support for ParameterType 8 was added

Table 3: Packets/Services affected by V4.3

3.4 Changes introduced with V4.4.0

A major rework of the public API header PNSIF_API.h was done. This harmonizes the header file with the Hilscher PROFINET IO Device protocol stack / firmware generation V3.x. The header file is now based on the generic Hilscher definitions structures and no longer refers to TLR or rcX.

The binary layout of the packets was not changed if not noted below. The names of fields were not changes if not stated below.

The following services have changed starting with stack / firmware V4.4.0.0.

Affected service	Description
Read AssetManagment	This service was added Application needs to handle service correctly in order to pass certification.
SendAlarm (generic)	This service was added
PROFInergy ASE related services	This service was added
AR Check Indication	This packet definition was extended for future use cases
Read I&M Service	Support for I&M5 was added Application needs to handle service correctly in order to pass certification.
Get Parameter Service	Support for several ParameterTypes was added <ul style="list-style-type: none"> ▪ PNS_IF_PARAM_ETHERNET ▪ PNS_IF_PARAM_DIAGNOSIS ▪ PNS_IF_PARAM_IM0_DATA ▪ PNS_IF_PARAM_IM5_DATA
Set OEM Parameter Service	Support for several ParameterTypes was added <ul style="list-style-type: none"> ▪ ParameterType 9 ▪ ParameterType 10 ▪ ParameterType 11 ▪ ParameterType 12 ▪ ParameterType 13
Add Channel Diagnosis	Value "0" is no longer accepted as ChannelErrorType in field usChannelErrType. The value is reserved according to Profinet specification and shall not be used.
Add Extended Channel Diagnosis	Value "0" is no longer accepted as ChannelErrorType in field usChannelErrType. The value is reserved according to Profinet specification and shall not be used.
Plug Module Service Plug Submodule Service Pull Module Service Pull Submodule Service Send Process Alarm Service Send ReturnOfSubmodule Alarm Service	The packet data field "hDeviceHandle" was renamed to "ulReserved" as no DeviceHandle is required to use this service (harmonized with stack generation V3.x).

Table 4: Packets/Services affected by V4.4

3.5 Changes introduced with V4.5.0

The following services have changed starting with stack / firmware V4.5.0.0.

Affected service	Description
Dynamic Reconfiguration Indication	This service was added and is only available for System Redudancy-enabled firmware.
SendAlarm (generic)	This service now supports sending ProcessAlarms with ChannelCoding (USI 0x8320).
Set OEM Parameter Service	Support for ParameterType 6 was added. Support for ParameterType 14 was added. Support for ParameterType 15 was added. Support for ParameterType 16 was added.
Get Parameter Service	Support for ParameterType PNS_IF_PARAM_PORT_STATISTIC was added.

Table 5: Packets/Services affected by V4.5

4 Taglist

The available taglist tags to modify firmware behavior were extended and changed between several firmware releases. The differences are described below.

4.1 Changes introduced with V4.1.0

The tag “PROFINET features” was added. It allows to set the amount of supported ARs for SharedDevice.

4.2 Changes introduced with V4.2.0

- A complete rework of LED related tags was done.
 - Although only 2 LEDs are used by firmware all 4 LEDs mentioned in Hilscher hardware reference design can now be modified in taglist.
 - The tags have been renamed to Hilscher default names (COM0_RED, COM0_GREEN, COM1_RED, COM1_GREEN).
- Using the existing tag “PROFINET features” it is now possible to deactivate IRT in the firmware.

4.3 Changes introduced with V4.3.0

An implicit change in firmware behavior was made for “PROFINET features” tag. If “NumberOfAdditionalARs” is set to 0 or 1 the firmware supports up to 64 submodules. If the “NumberOfAdditionalARs” is set to a value higher than 1 the firmware supports up to 32 submodules.

4.4 Changes introduced with V4.4.0

- The tag “PROFINET features” was completely reworked. It now allows a customization of required features and offers a higher flexibility.
 - The amount of parallel ReadImplicit services can be set
 - The amount of configurable submodules can be set
 - The minimum RPC buffer size can be set
 - Supervisor DA can be enabled/disabled
 - Some parameters can no longer be changed via taglist but need to be set via mailbox packet API
 - enable/disable IRT
 - enable/disable IO Supervisor
 - set the MinDeviceInterval
- by default (unmodified taglist) all netX52 based firmware now supports only 2 IO ARs

4.5 Changes introduced with V4.5.0

For all firmware (except net X52), the tag list offers the possibility to enable the “NDIS” feature which allows the use of netX as Ethernet Controller via DPM Communication Channel 1 (with limited throughput).

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5.2 Legal notes

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5.3 Contacts

Headquarters

Germany

Hilscher Gesellschaft für
Systemautomation mbH
Rheinstrasse 15
65795 Hattersheim
Phone: +49 (0) 6190 9907-0
Fax: +49 (0) 6190 9907-50
E-Mail: info@hilscher.com

Support

Phone: +49 (0) 6190 9907-99
E-Mail: de.support@hilscher.com

Subsidiaries

China

Hilscher Systemautomation (Shanghai) Co. Ltd.
200010 Shanghai
Phone: +86 (0) 21-6355-5161
E-Mail: info@hilscher.cn

Support

Phone: +86 (0) 21-6355-5161
E-Mail: cn.support@hilscher.com

France

Hilscher France S.a.r.l.
69500 Bron
Phone: +33 (0) 4 72 37 98 40
E-Mail: info@hilscher.fr

Support

Phone: +33 (0) 4 72 37 98 40
E-Mail: fr.support@hilscher.com

India

Hilscher India Pvt. Ltd.
Pune, Delhi, Mumbai
Phone: +91 8888 750 777
E-Mail: info@hilscher.in

Italy

Hilscher Italia S.r.l.
20090 Vimodrone (MI)
Phone: +39 02 25007068
E-Mail: info@hilscher.it

Support

Phone: +39 02 25007068
E-Mail: it.support@hilscher.com

Japan

Hilscher Japan KK
Tokyo, 160-0022
Phone: +81 (0) 3-5362-0521
E-Mail: info@hilscher.jp

Support

Phone: +81 (0) 3-5362-0521
E-Mail: jp.support@hilscher.com

Korea

Hilscher Korea Inc.
Seongnam, Gyeonggi, 463-400
Phone: +82 (0) 31-789-3715
E-Mail: info@hilscher.kr

Switzerland

Hilscher Swiss GmbH
4500 Solothurn
Phone: +41 (0) 32 623 6633
E-Mail: info@hilscher.ch

Support

Phone: +49 (0) 6190 9907-99
E-Mail: ch.support@hilscher.com

USA

Hilscher North America, Inc.
Lisle, IL 60532
Phone: +1 630-505-5301
E-Mail: info@hilscher.us

Support

Phone: +1 630-505-5301
E-Mail: us.support@hilscher.com