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Network-wide and CPU-wide Uniqueness of PROFIsafe Addresses

SIMATIC Safety Integrated

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1 Introduction

What are we talking about?

Basically, the PROFIsafe addresses must be network- and CPU-wide unique in any system configuration. Depending on the available network structure, the uniqueness of the PROFIsafe addresses might be put in question.

In addition, there are different specifications for the uniqueness for different types of F IO (PROFIsafe address type 1 and PROFIsafe address type 2). The PROFIsafe address types are shown in [Table 2-1](#).

This document presents different sample configurations to explain the uniqueness of PROFIsafe addresses.

Before dealing with the configurations in section [3](#) onwards, the next section gives a summary of the characteristic properties of PROFIsafe address types.

2 PROFIsafe Address Types

Properties of PROFIsafe address types

Table 2-1 Properties of the PROFIsafe address types

PROFIsafe Address Type 1	PROFIsafe Address Type 2
<ul style="list-style-type: none"> The uniqueness of the PROFIsafe address is ensured only through the F destination address. The F destination address must be unique network-wide and CPU-wide. The network-wide and CPU-wide uniqueness of each F destination address should be checked in the Safety printout by checking that the F destination address areas of all the F CPUs do not overlap. F destination address and F source address are entered in the CRC of the Safety program. 	<ul style="list-style-type: none"> The uniqueness of the PROFIsafe address can be ensured through the combination of F source address and F destination address. The F destination address must be unique CPU-wide and be different from all F destination addresses of PROFIsafe address type 1 in the same network. The F source address that is used for the F IO of an F CPU must be unique network-wide. F destination address and F source address are entered in the CRC of the Safety program.

Further information about assigning PROFIsafe addresses is available in the manual "SIMATIC Safety – Configuring and Programming" (under "Recommendations for Assigning PROFIsafe Addresses"). Link to manual:

<https://support.industry.siemens.com/cs/ww/en/view/54110126>

Division of the F IO into address types 1 and 2

Table 2-2 Division of the F IO into address types 1 and 2

PROFIsafe Address Type 1	PROFIsafe Address Type 2
<ul style="list-style-type: none"> ET 200M ET 200S ET 200pro ET 200iSP ET 200eco ET 200SP in Distributed Safety SINAMICS S / G / V KTPx00F MOBILE KP8F, KP32F 	<ul style="list-style-type: none"> S7-1200 ET 200SP in TIA Portal ET 200MP ET 200eco PN SIMATIC MICRO-DRIVE

Refer to the corresponding documentation to determine the PROFIsafe address type to which a DP standard slave/DP standard device belongs. If in doubt, presume PROFIsafe address type 1.

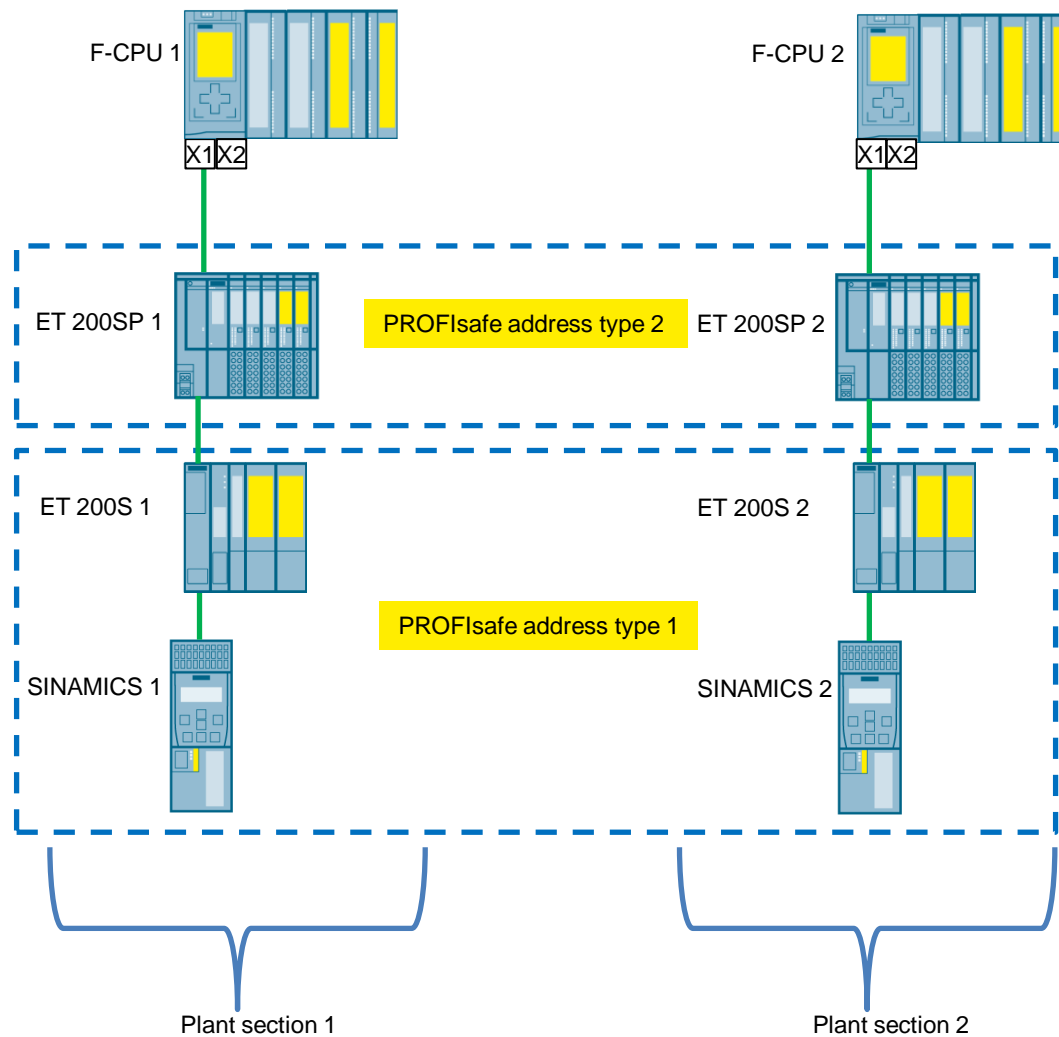
3 Initial Situation

Two plant sections with F-CPU each have F IOs of PROFIsafe address types 1 and 2 (see next figure).

The following holds for all the configurations shown here:

- ET 200SP 1, ET 200S 1 and SINAMICS 1 are assigned to F-CPU 1.
- ET 200SP 2, ET 200S 2 und SINAMICS 2 are assigned to F-CPU 2.
- The central F IO of the S7-1200/1500 belongs to PROFIsafe address type 2.
- The central F IO of the S7-300 belongs to PROFIsafe address type 1.
- There is no switching implemented between X1 and X2.

Figure 3-1 Initial situation



The next sections show communication options in different plant configurations. The focus is on ensuring the assignment of unique PROFIsafe addresses.

The selected hardware components in the configurations are by way of example. For example, statements about PROFIsafe address type 2 taking the example of the ET 200SP are also valid for the ET 200MP.

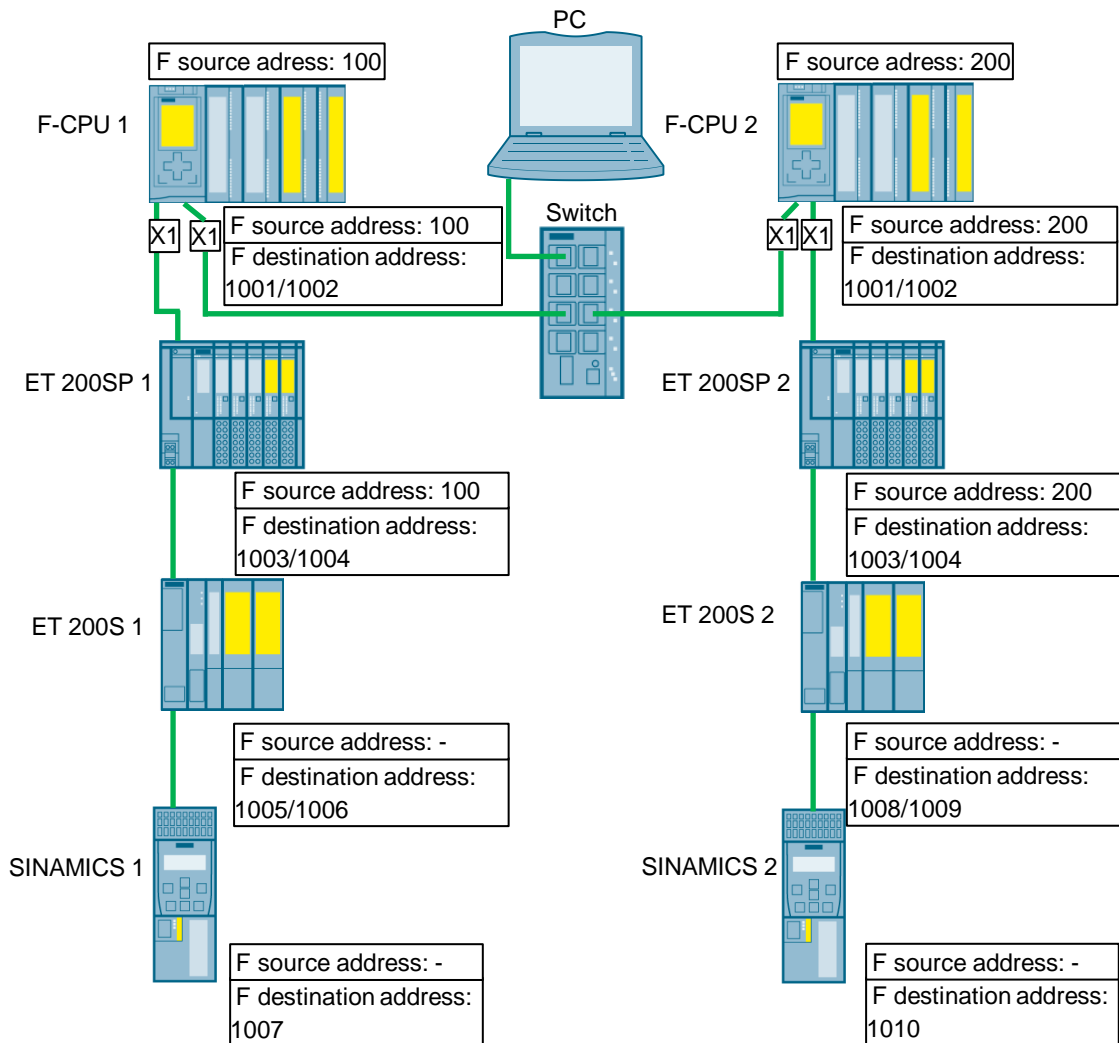
The statements made for PROFINET are also valid for PROFIBUS.

4 Plant Configurations

4.1 Network Setup via the PN Interface X1

The connection of both plant sections is via the PN interface X1 on each F-CPU. Both F-CPU are configured as IO controllers and have lower-level F IOs via the second port of X1.

Figure 4-1 Network via the PN interface X1



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4.1.1 Description of the Network Configuration

The configuration consists of a network, in other words each F-CPU could exchange data with each PROFIsafe user via X1.

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

4.1.2 PROFIsafe Addresses

PROFIsafe Address Type 2

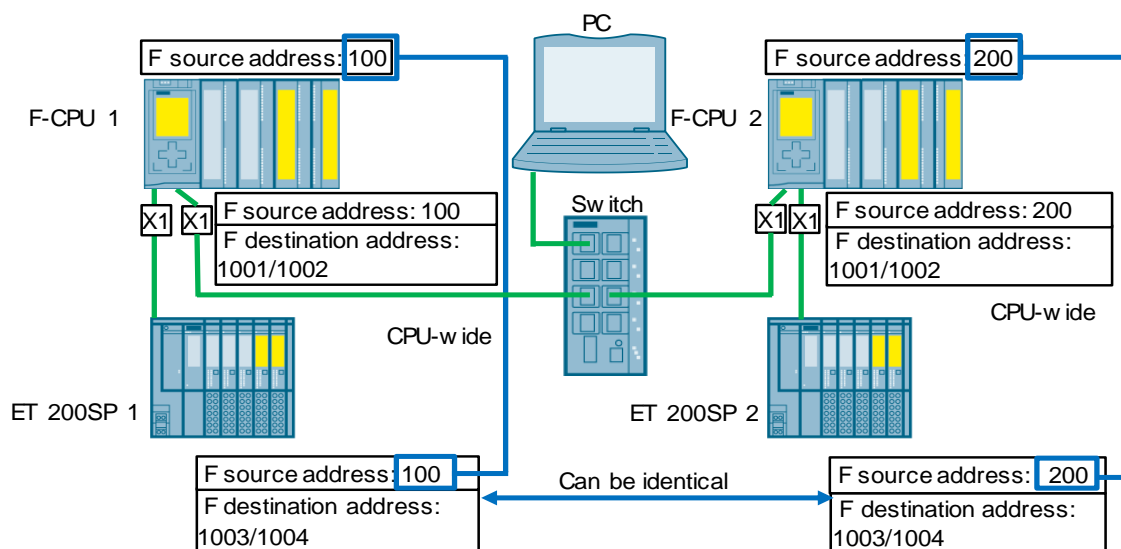
The F IOs of the ET 200SP belong to address type 2. Here the following holds for the uniqueness of the PROFIsafe addresses:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide.

Since F-CPU 1 and F-CPU 2 are in the same network and their F source addresses have to be unique network-wide, they must be different.

Since the F destination address of the ET 200SP only has to be unique CPU-wide, the F destination addresses of the ET 200SP F IO can be the same in both plant sections. The CPU-wide uniqueness refers to the F-CPU that has the same F source address as the associated ET 200SP in each case (see following figure).

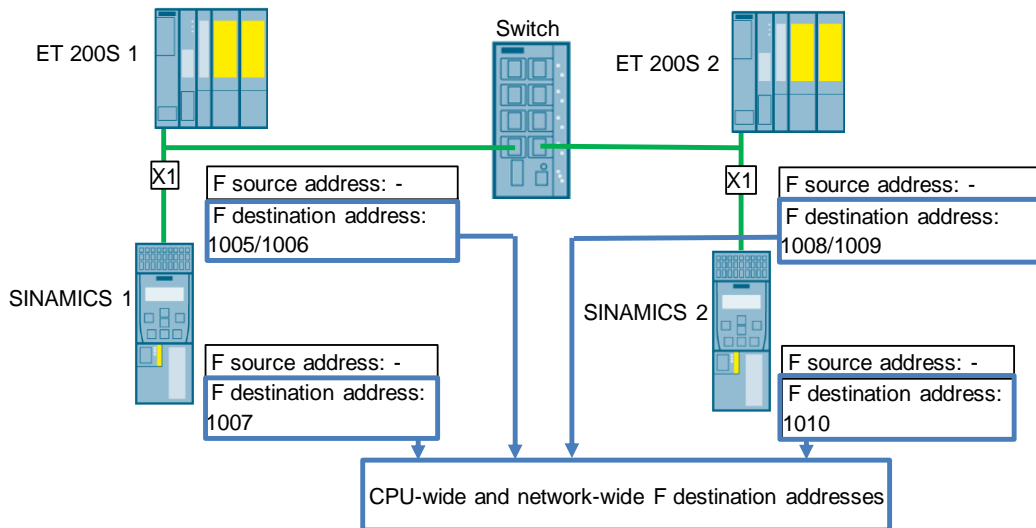
Figure 4-2 CPU-wide and identical F destination addresses



PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address. This means that the F destination address of the F IO must be unique network-wide and CPU-wide.

Figure 4-3 CPU-wide and unique F destination addresses



PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of the network formed via X1. There is no overlapping of the addresses with the central F IO of F-CPU 2 because the F-CPU 2 has no switching implemented between X1 and the backplane bus.

The same holds true for the F destination addresses 1001 and 1002 in the rack with F-CPU 2.

4.2 Network Setup via PN/PN Coupler

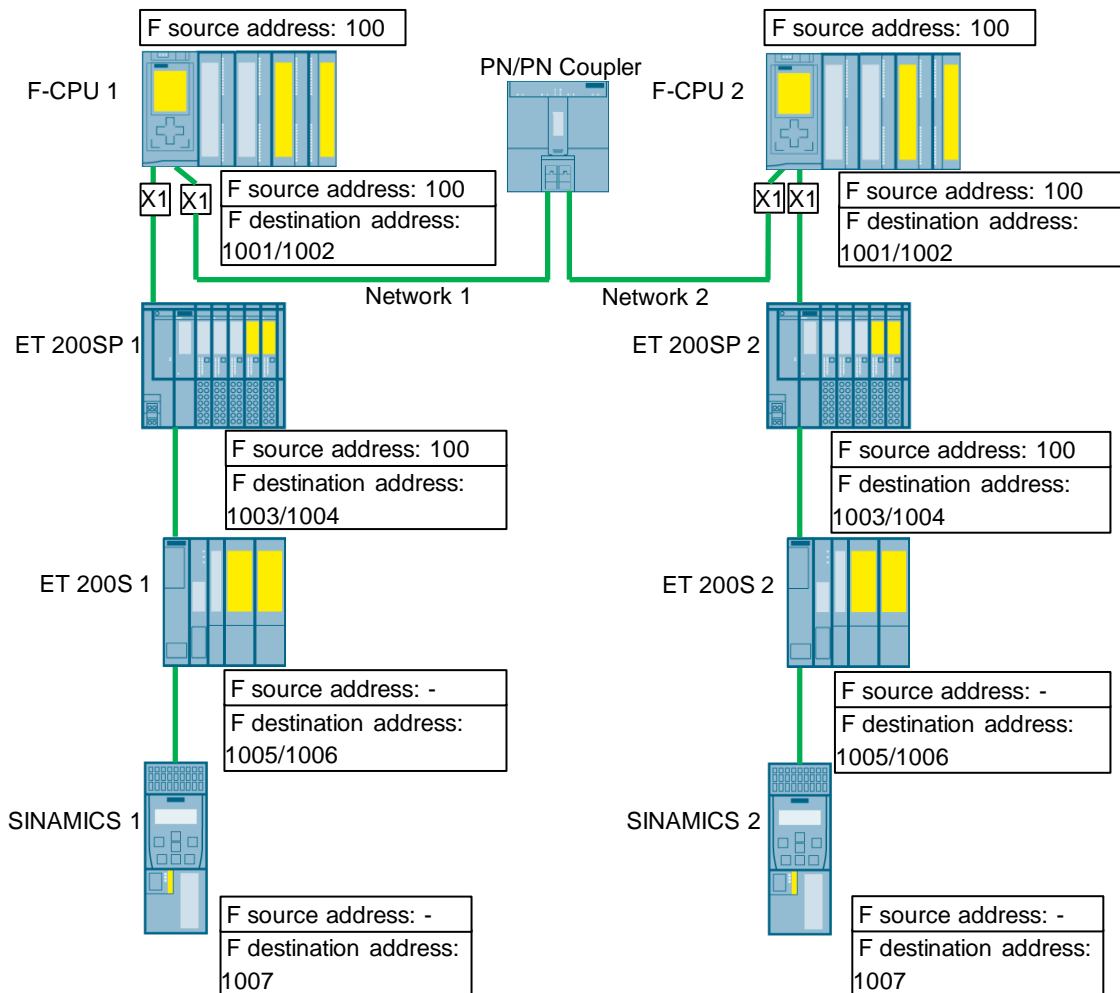
The connection of the two plant sections shown is via a PN/PN coupler (required for the IO controller to IO controller communication) that separates the two PN-IO networks. This means that the configuration consists of two networks each of which is connected to the F-CPU and PN/PN coupler via the PN interface X1. Both F-CPU are configured as IO controllers and have lower-level F IOs via the second port of X1.

Note

In addition to the PN/PN coupler, certain routers, such as the SCALANCE SC622-2C, also fulfill the requirements for network separation according to the PROFIsafe specification. If in doubt, please ask the manufacturer to confirm the suitability of the router.

An example configuration with a SCALANCE SC622-2C can be found in section [4.4](#).

Figure 4-4 Network setup via PN/PN coupler



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4.2.1 Description of the Network Configuration

The configuration consists of two networks with the initial situation described in section 3:

- Network 1 including the lower-level F IO of F-CPU 1
- Network 2 including the lower-level F IO of F-CPU 2

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

4.2.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IO of the ET 200SP belongs to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide.

Thanks to the decoupling via the PN/PN coupler there is only one F-CPU in each network. In this way F-CPU 1 and F-CPU 2 can have an identical F source address.

The F destination addresses of the ET 200SP are unique CPU-wide.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address. The F destination addresses of the F IO must be unique CPU-wide and network-wide. Here the F destination addresses of the central F IO have to be taken into account.

Thanks to the decoupling via the PN/PN coupler the F destination addresses of Network 1 can be the same as the F destination addresses of Network 2.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. Due to the CPU-wide uniqueness these must be different from F destination addresses of the network connected via X1.

This means the following for the configuration considered:

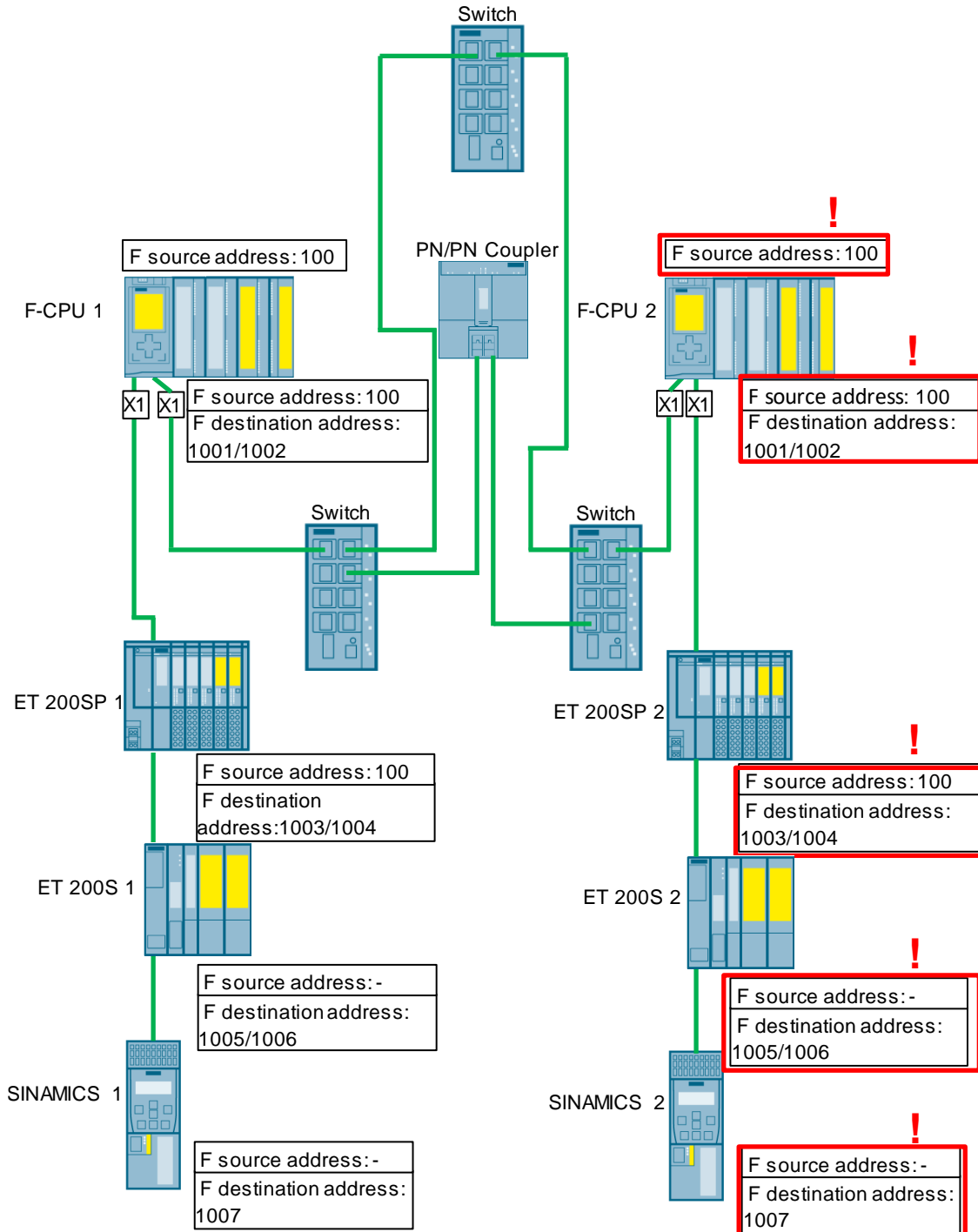
The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of Network 1 formed via X1.

The F destination addresses 1001 and 1002 in the rack with F-CPU 2 are unique CPU-wide and are different from the PROFIsafe addresses of Network 2 formed via X1.

4.3 Network Setup via PN/PN Coupler and Switch

Added to the plant configuration from section 4.2 and Figure 4-4 are a switch per plant section and a higher-level switch for IT connection.

Figure 4-5 Network setup via PN/PN coupler and switch – no uniqueness of PROFIsafe addresses

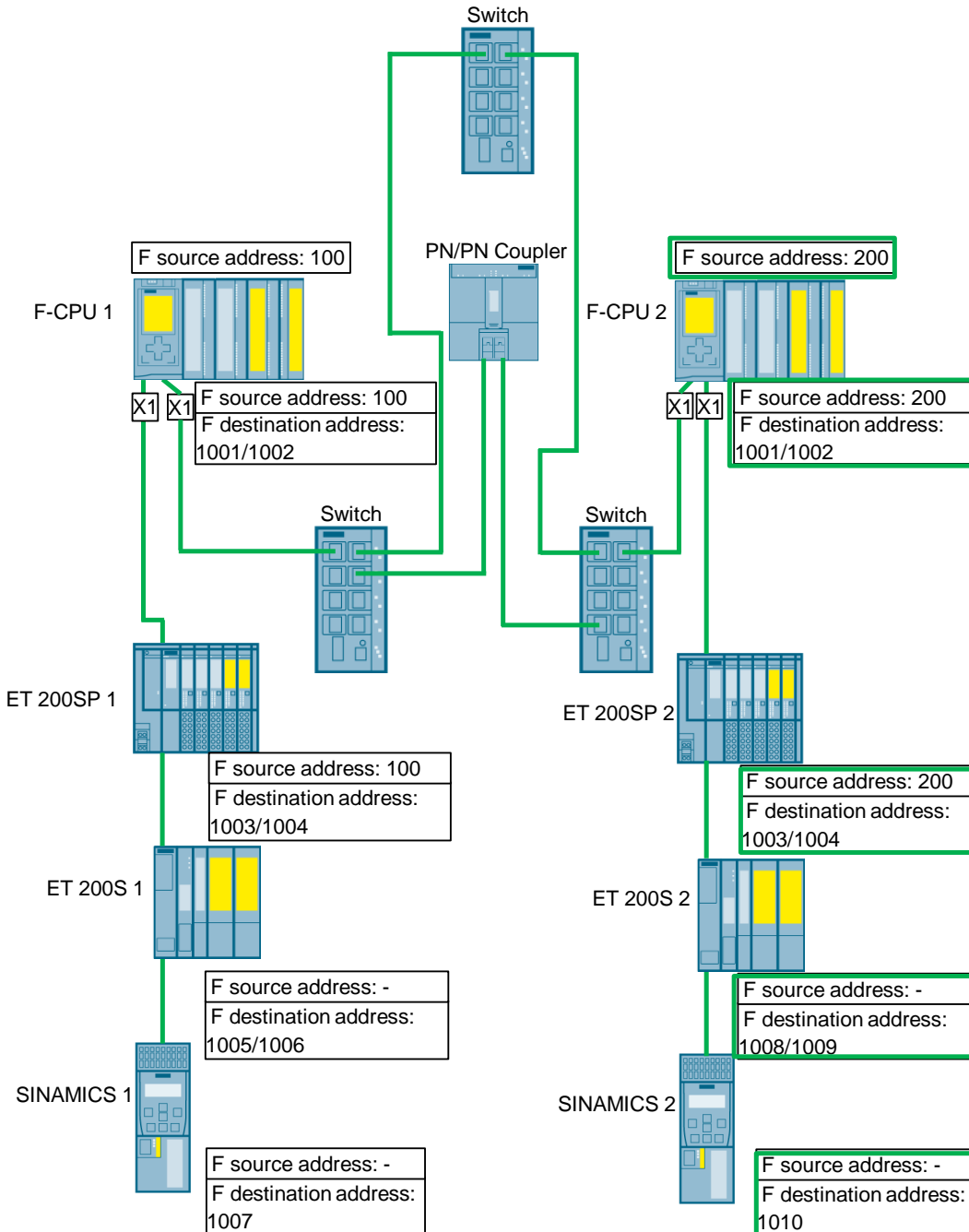


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The switches countermand the separation of Networks 1 and 2 via the PN/PN coupler. In this way F-CPU 1 and F-CPU 2 are in a common network. The PROFIsafe addresses are no longer unique.

The addressing shown below restores the uniqueness of the PROFIsafe addresses (corresponding to the case in section 4.1).

Figure 4-6 Network setup via PN/PN coupler and switch – uniqueness of PROFIsafe addresses



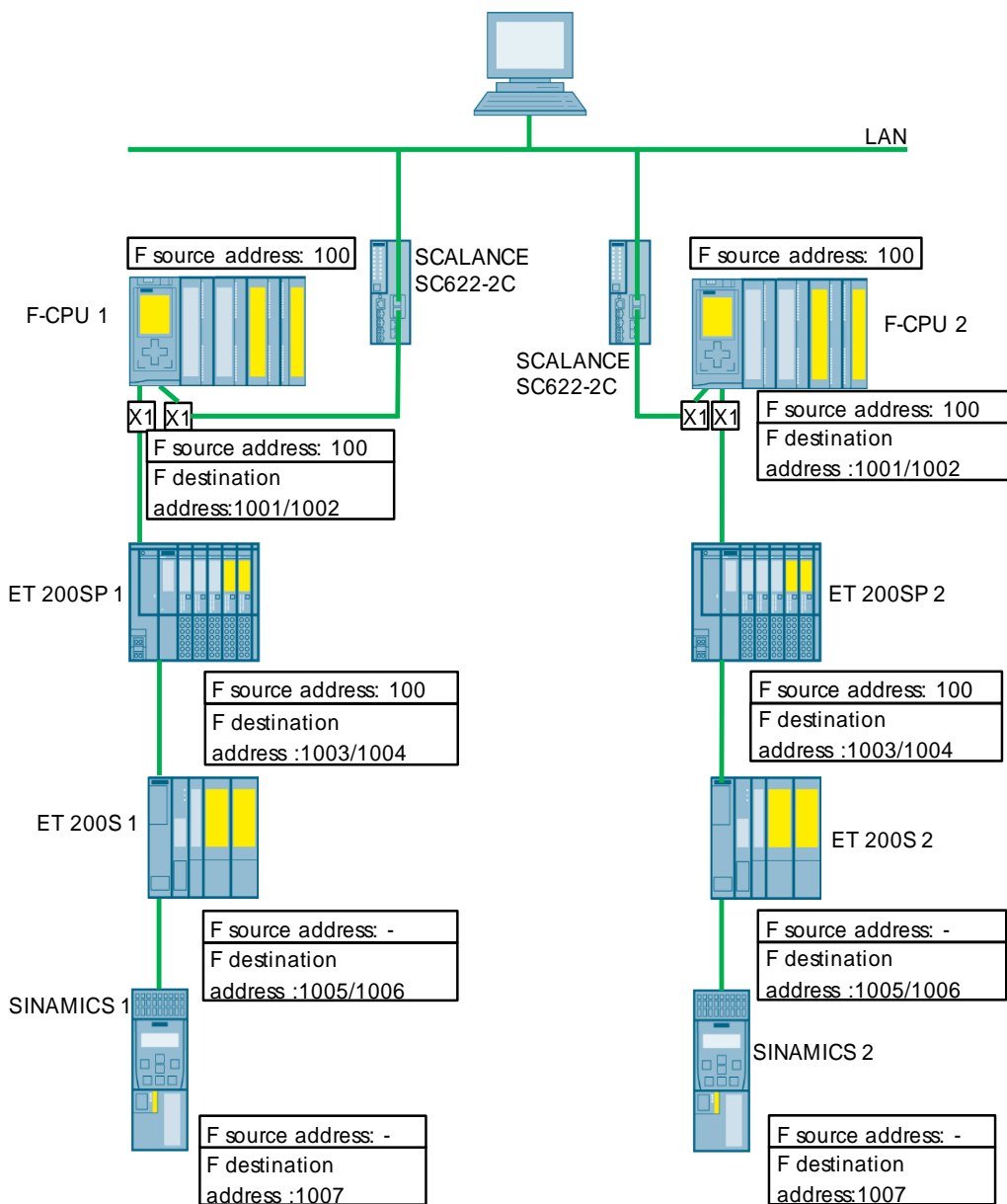
The information from section 4.1.2 applies for the uniqueness of the PROFIsafe addresses.

4.4 Network Setup via SCALANCE SC622-2C

The two plant sections shown below are each connected to a higher-level network via SCALANCE SC622-2C router. The SCALANCE SC622-2C device has no layer 2 bridging functionality and therefore represents a natural network boundary for PROFIsafe. The device fulfills the properties of a network isolator according to IEC 61784-3-3 (PROFIsafe).

The device is therefore suitable for the network separation of plant sections in which the uniqueness of the PROFIsafe addresses cannot be guaranteed. The PROFIsafe addresses can therefore be identical in both plant sections in this scenario. Due to the routing functionality of the SCALANCE SC622-2C, the F-PLC can still communicate with devices on the central LAN via IP.

Figure 4-7 Network Setup with SCALANCE SC622-2C router



4.4.1 Description of the Network Configuration

The configuration consists of two networks with the initial situation described in section 3:

- Network 1 including the lower-level F IO of F-CPU 1
- Network 2 including the lower-level F IO of F-CPU 2
- Network 3: higher-level network, e.g. for connection to IT

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

In principle, only one SCALANCE SC622-2C is required to separate the two system parts. In the configuration shown above, however, one SCALANCE SC622-2C is used for each plant section. With this concept, the configuration can be expanded by any number of plant sections without compromising the uniqueness of the PROFIsafe addresses.

4.4.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IO of the ET 200SP belongs to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide. Here the F destination addresses of the central F IO have to be taken into account.

Thanks to the decoupling via the SCALANCE SC622-2C there is only one F-CPU in each network. In this way F-CPU 1 and F-CPU 2 can have an identical F source address.

The F destination addresses of the ET 200SP are unique CPU-wide.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address. The F destination addresses of the F IO must be unique CPU-wide and network-wide. Here the F destination addresses of the central F IO have to be taken into account.

Thanks to the decoupling via the SCALANCE SC622-2C the F destination addresses of Network 1 can be the same as the F destination addresses of Network 2.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. Due to the CPU-wide uniqueness these must be different from F destination addresses of the network connected via X1.

This means the following for the configuration considered:

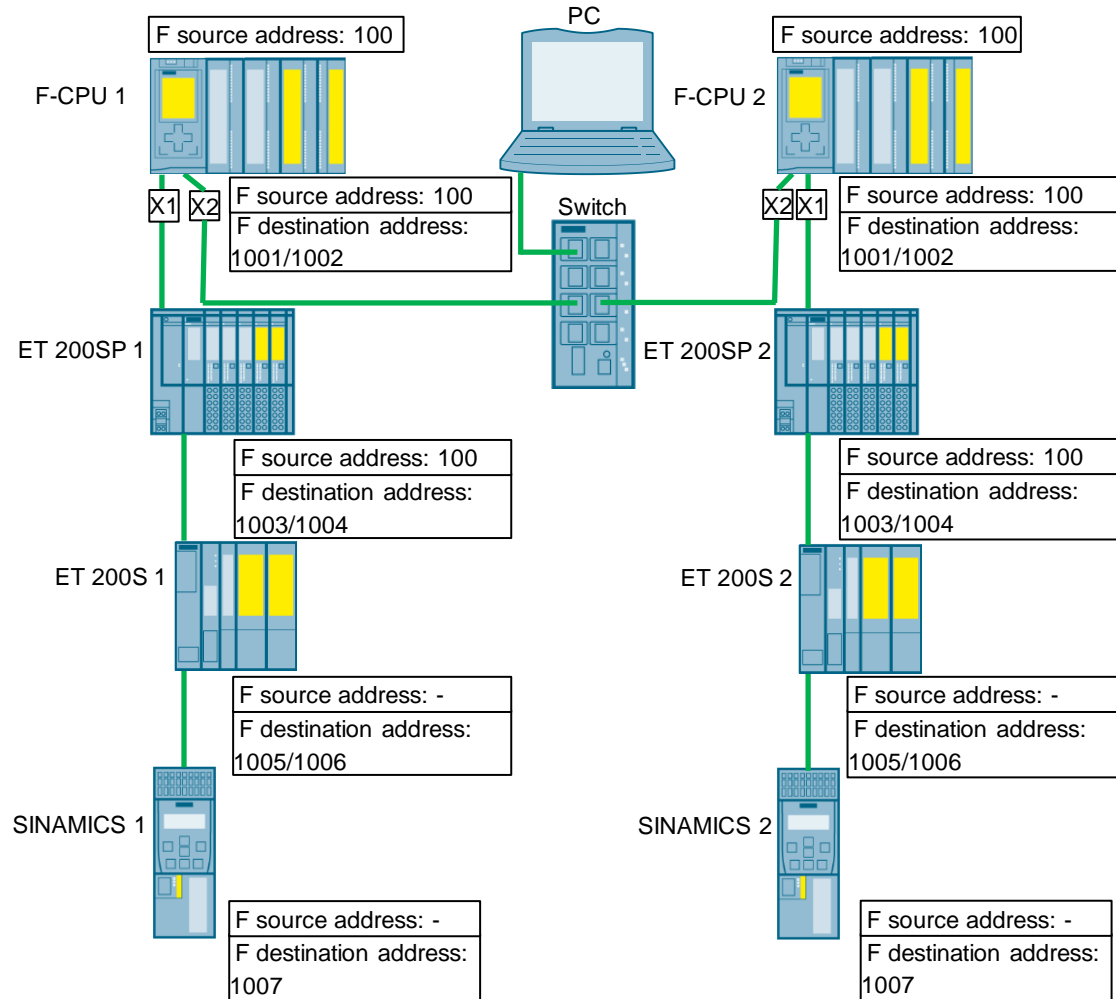
The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of Network 1 formed via X1.

The F destination addresses 1001 and 1002 in the rack with F-CPU 2 are unique CPU-wide and are different from the PROFIsafe addresses of Network 2 formed via X1.

4.5 PN-IO Connection via X2

Both F-CPU's have a lower-level F IO via X1. Between the two F-CPU a connection via the PN interface X2 exists.

Figure 4-8 PN-IO connection via X2



4.5.1 Description of the Network Configuration

The configuration consists of three networks with the initial situation described in section 3:

- Lower-level F IO via X1 of F-CPU 1
- Lower-level F IO via X1 of F-CPU 2
- PN-IO connection between F-CPU 1 and F-CPU 2 via X2

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

With IP forwarding functionality, communication can be carried out via X1 / X2 at IP level. The network-separating property between X1 and X2 for PROFIsafe is not affected when this function is activated.

NOTE The failsafe separation between the interfaces X1 and X2 can only be guaranteed for F-CPUs.

4.5.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IO of the ET 200SP belongs to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide. Here the F destination addresses of the central F IO have to be taken into account.

Since switching of the F-CPU is not implemented between X1 and X2 both F-CPUs can have the same F source addresses. For this case however we nevertheless recommend using different F source addresses. This is mandatory if F IO that has to be assigned to an F-CPU is connected via X2.

Since the F destination address of the ET 200SP only has to be unique CPU-wide, the F destination addresses of the F IO can be the same in both plant sections.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address. This is why the F destination addresses of the F IO have to be unique CPU-wide and network-wide.

Since switching is not implemented between X1 and X2 the F destination addresses can be identical in both plant sections.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of the network formed

via X1. Since switching of the F-CPU 2 is not implemented between X1 and X2, F-CPU 1 cannot access the lower-level F IO of F-CPU 2.

There is no overlapping of the F IO addresses of F-CPU 1 with the central F IO of F-CPU 2 because on F-CPU 2 switching is not implemented between the backplane bus and the local interface X2.

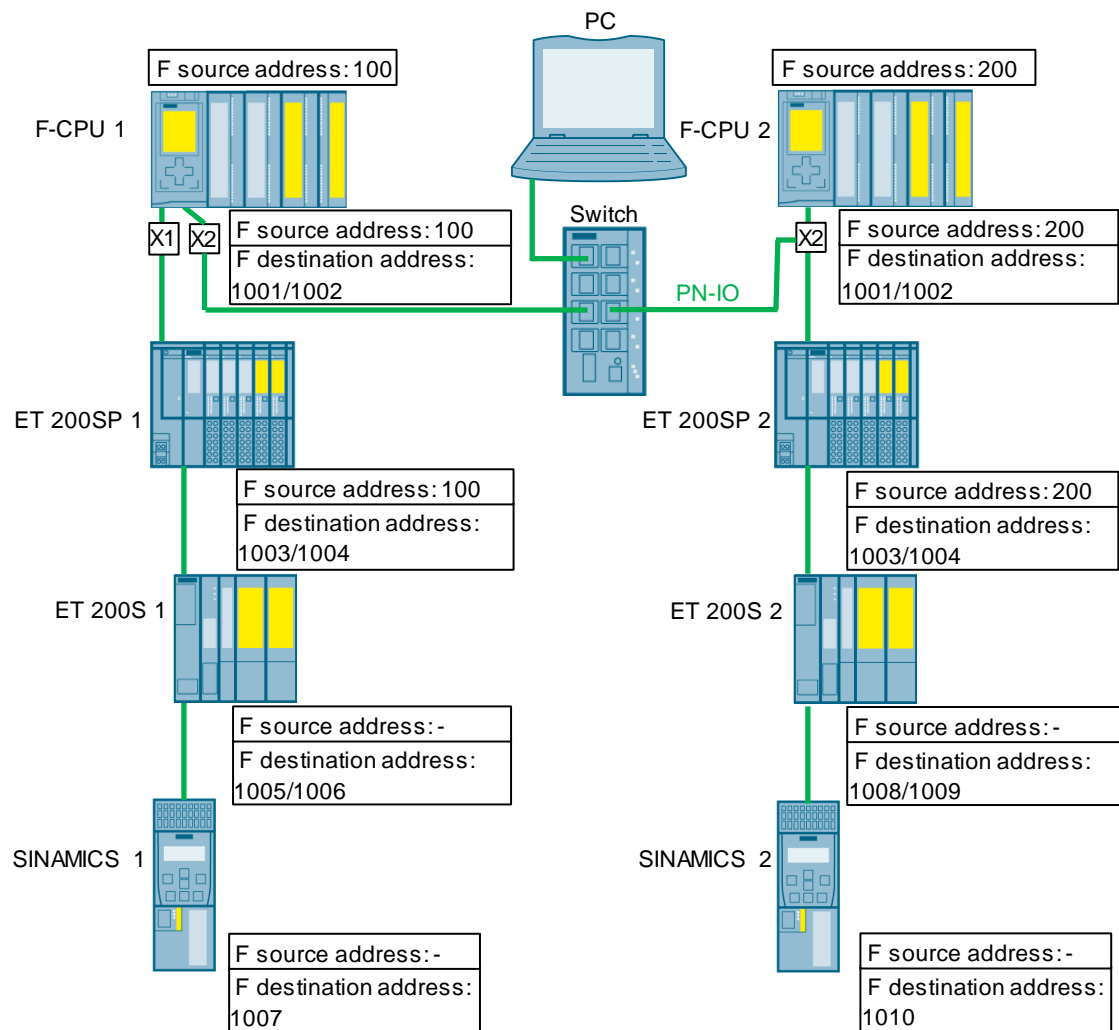
The same holds true for the F destination addresses 1001 and 1002 in the rack with F-CPU 2.

4.6 PN-IO Connection via X2 and Switch

Both F-CPU's have a lower-level F IOs. Using IO controller to I device communication via the PN interface X2 both PN-IO networks are connected with each other via a switch. F-CPU 1 can access the lower-level F IO of F-CPU 2 via X2.

Whereas with the F-CPU 1 the connection of the lower-level F IO and the IO controller to I device communication is via different interfaces (X1 and X2 (firmware V2.0 and higher)), with F-CPU 2 (differently to section 4.4) the connection is via the same interface (here via X2).

Figure 4-9 PN-IO connection via X2 that F-CPU 1 uses to access lower-level F IOs of F-CPU 2



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4.6.1 Description of the Network Configuration

The configuration consists of two networks with the initial situation described in section 3:

- Lower-level F IO via X1 of F-CPU 1
- PN-IO connection via X1 of both F-CPU's including the lower-level F IO of F-CPU 2

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

With IP forwarding functionality, communication can be carried out via X1 / X2 at IP level. The network-separating property between X1 and X2 for PROFIsafe is not affected when this function is activated.

NOTE The failsafe separation between the interfaces X1 and X2 can only be guaranteed for F-CPU's.

4.6.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IO of the ET 200SP belongs to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide.

The ET 200SP 2 could be addressed by both F-CPU 1 and F-CPU 2. In order to make a unique assignment both F-CPU's must have different F source addresses.

ET 200SP 1 and ET 200SP 2 can have the same F destination address because they have different F source addresses.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address. This is why the F destination addresses of the F IO have to be unique CPU-wide and network-wide.

Network-wide uniqueness is given when the F destination addresses of ET 200S and SINAMICS are different from each other and in both plant sections.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

F-CPU 1

The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of the network formed via X1 and X2. There is no overlapping of the addresses with the central F IO of F-CPU 2 because the F-CPU 2 has no switching implemented between the local interface X2 and the backplane bus.

F-CPU 2

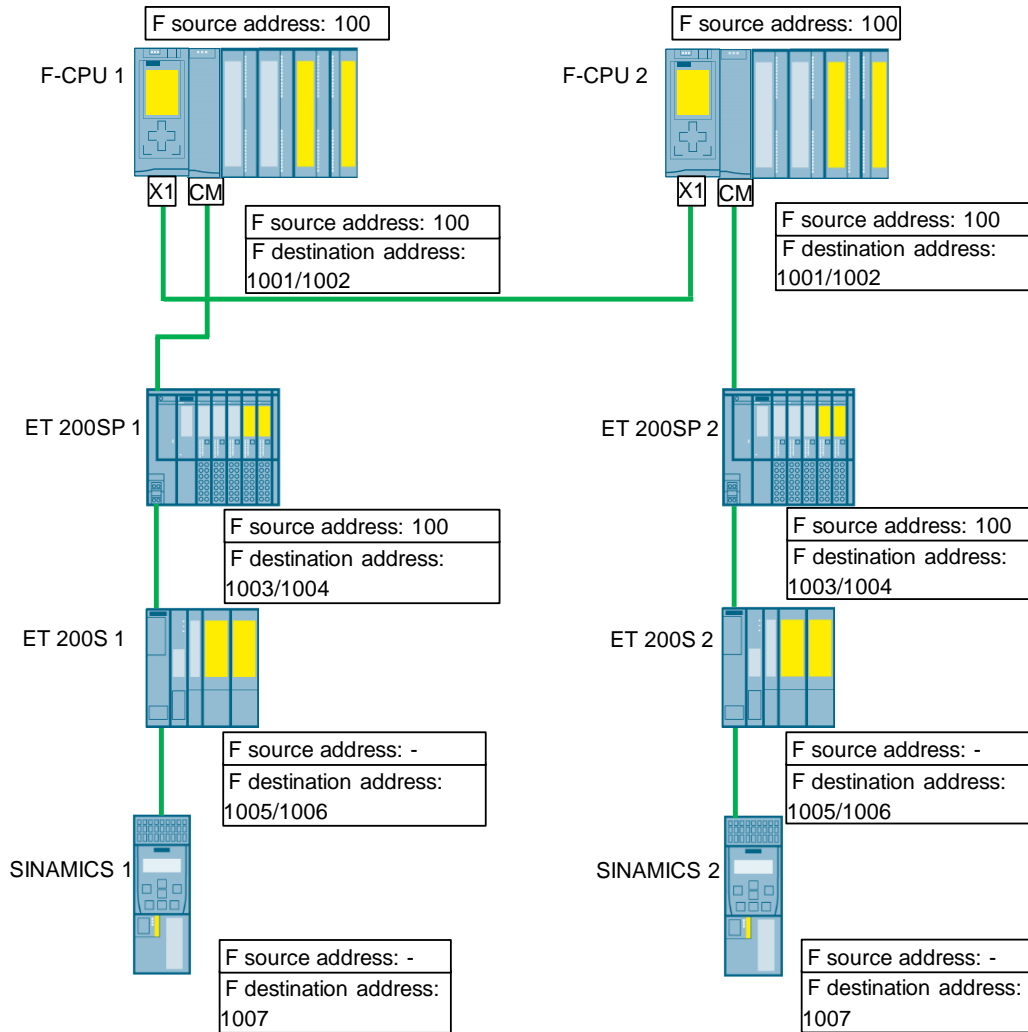
The F destination addresses 1001 and 1002 in the rack with F-CPU 2 are unique CPU-wide and are different from the PROFIsafe addresses of the lower-level F IO via X2. The lower-level F IO of F-CPU 1 does not have to be considered, because there is no switching implemented between X1 and X2.

There is likewise no overlapping of the addresses with the central F IO of F-CPU 1 because the F-CPU 1 has no switching implemented between X2 and the backplane bus.

4.7 PN-IO Connection via X1 and CM for Lower-level F IOs

Both F-CPU's have lower-level F IOs via the CM. The two CPU's are connected through via the interface X1. The networks formed via CM remain separated.

Figure 4-10 PN-IO Connection via X1 and CM for lower-level F IOs



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4.7.1 Description of the Network Configuration

The configuration consists of three networks with the initial situation described in section 3:

- PN-IO Connection via X1 of both F-CPU's
- Lower-level F IO via CM in F-CPU 1
- Lower-level F IO via CM in F-CPU 2

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

NOTE The failsafe separation between the networks on X1 and the CM can only be guaranteed for F-CPU.

4.7.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IOs of the ET 200SP belong to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide.

ET 200SP 1 can only communicate with F-CPU 1 and ET 200SP 2 can only communicate with F-CPU 2.

There is no switching implemented between CM and X1. This is why both F-CPU can have the same F source address. For this case however we nevertheless recommend using different F source addresses. This is mandatory if F IO that has to be assigned to an F-CPU is connected via X1.

Since the F destination address of the ET 200SP only has to be unique CPU-wide, the F destination addresses of the F IO can be the same in both plant sections.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address.

This is why the F destination addresses of the F IO have to be unique CPU-wide and network-wide. This is given because there is no switching implemented between the CM and X1.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of the network formed via CM.

Since switching of the F-CPU 2 is not implemented between CM and X1, F-CPU 1 cannot access the lower-level F IO of F-CPU 2.

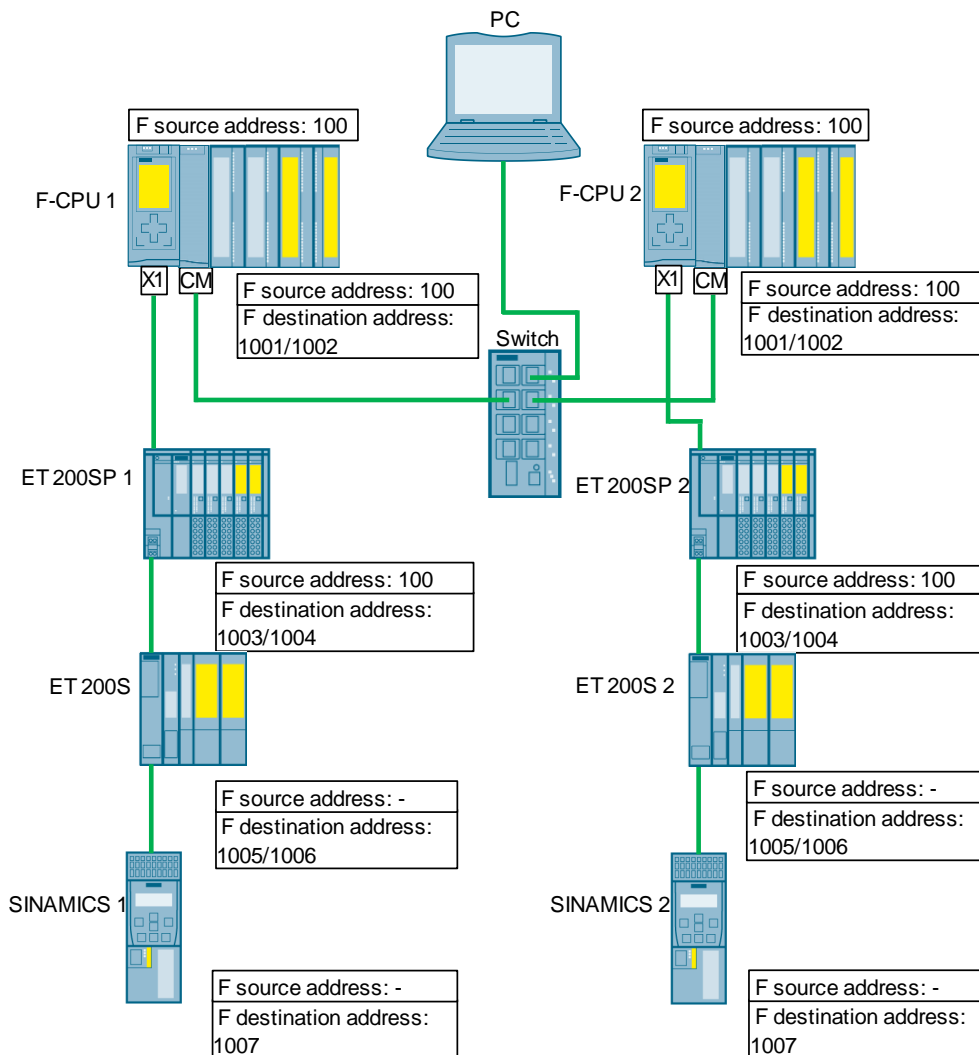
There is no overlapping of the addresses with the central F IO of F-CPU 2 because the F-CPU 2 has no switching implemented between X1 and the backplane bus.

The same holds true for the F destination addresses 1001 and 1002 in the rack with F-CPU 2.

4.8 CM for Communication with the Higher Level and Communication via X1 for Lower-level F IOs

The configuration in section 4.7 is changed so that the lower-level F IOs are each connected via X1 and communication with the higher level is done via the communication module (CM). The networks formed via X1 remain separated.

Figure 4-11 Communication via CM to the higher level and lower-level F IOs via X1



4.8.1 Description of the Network Configuration

The configuration consists of three networks with the initial situation described in section 3:

- CMs via switch to the PC
- Lower-level F IO via X1 of F-CPU 1
- Lower-level F IO via X1 of F-CPU 2

The central F IO can only be addressed via the corresponding F-CPU and must be taken into account with the CPU-wide uniqueness of the PROFIsafe address.

NOTE The failsafe separation between the networks on X1 and the CM can only be guaranteed for F-CPU.

4.8.2 PROFIsafe Addresses

PROFIsafe address type 2

The F IOs of the ET 200SP belong to address type 2. Here the following holds for the uniqueness of the PROFIsafe address:

- The F source address of the assigned F-CPU must be unique network-wide and
- The F destination addresses of the F IO must be unique CPU-wide.

ET 200SP 1 can only communicate with F-CPU 1 and ET 200SP 2 can only communicate with F-CPU 2.

There is no routing implemented between CM and X1. This is why both F-CPU can have the same F source address.

Since the F destination address of the ET 200SP only has to be unique CPU-wide, the F destination addresses of the F IO can be the same in both plant sections.

PROFIsafe address type 1

The F IOs of the ET 200S and the SINAMICS belong to address type 1. The F source address has nothing to do with the uniqueness of the PROFIsafe address.

This is why the F destination addresses of the F IO have to be unique CPU-wide and network-wide. This is given because there is no switching implemented between the CM and X1.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

The F destination addresses 1001 and 1002 in the rack with F-CPU 1 are unique CPU-wide and are different from the PROFIsafe addresses of the network formed via X1.

Since switching of the F-CPU 2 is not implemented between CM and X1, F-CPU 1 cannot access the lower-level F IO of F-CPU 2.

There is no overlapping of the addresses with the central F IO of F-CPU 2 because the F-CPU 2 has no switching implemented between CM and the backplane bus.

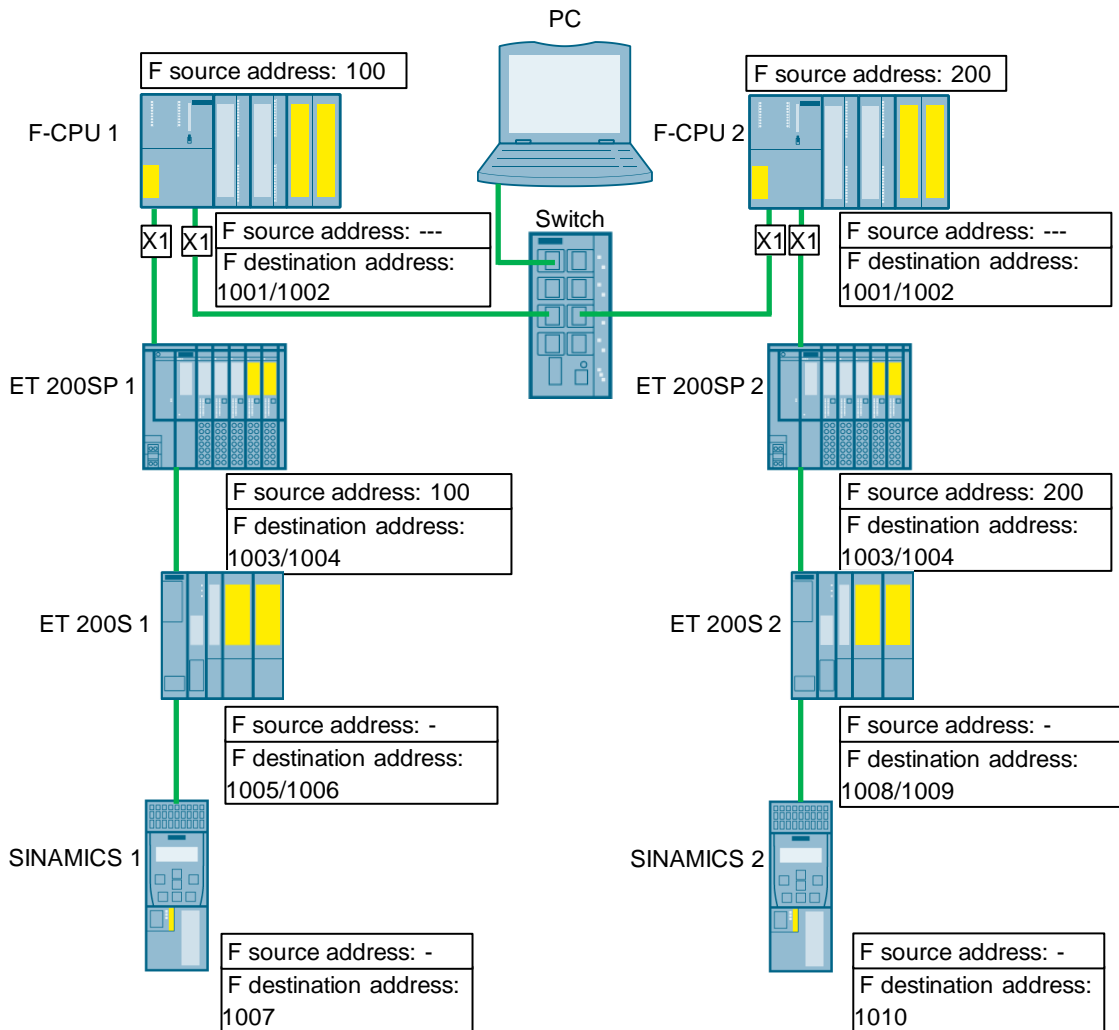
The same holds true for the F destination addresses 1001 and 1002 in the rack with F-CPU 2.

4.9 Configurations with the S7-300 CPU

4.9.1 With S7-300 and STEP 7 Safety V1x

The network setup via the integrated PN interface X1 shown in section 4.1 can also be done with the S7-300 and STEP 7 Safety V1x. The information about the PROFIsafe addresses is equally valid here. The two networks are connected with each other.

Figure 4-12 Network via the PN interface X1 with S7-300



The centrally slotted F IO can only have address type 1 (F source address not relevant). Since there is no routing between X1 and the backplane bus implemented with the F-CPU, the F destination addresses of all the centrally slotted F IOs can overlap. However, the F destination addresses must be unique in their own F-CPU.

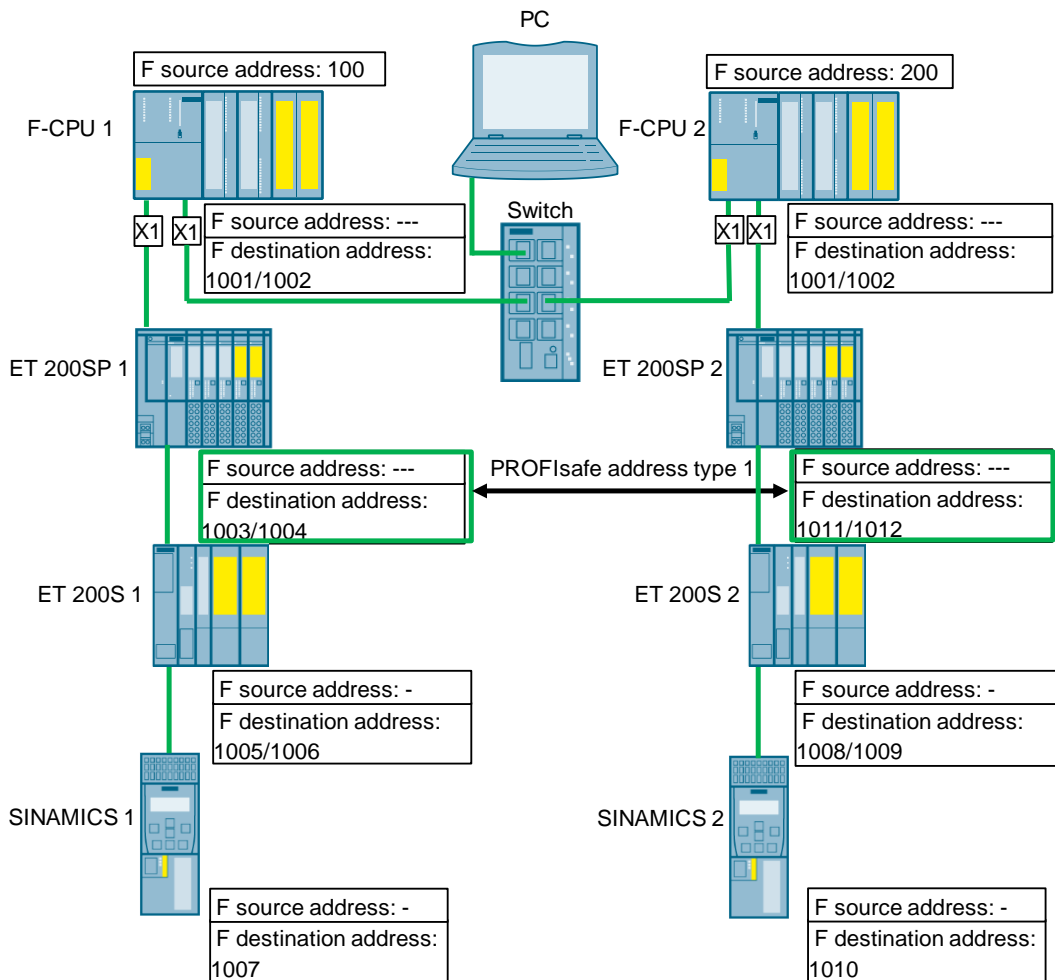
S7-1500 and S7-300 differ as follows with regard to possible configurations:

- CPU S7-300 does not have an interface X2.
- Fail-safe communication is not possible via the CP343-1.

4.9.2 With S7-300 and Distributed Safety

The network setup via the integrated PN interface X1 shown in section 4.1 can also be done with the S7-300 and Distributed Safety. The information about the PROFIsafe addresses is equally valid here CPU-wide. The two PN-IO networks are connected with each other.

Figure 4-13 Network via the PN interface X1 with S7-300



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The centrally slotted F IO can only have address type 1 (F source address not relevant). Since there is no routing between X1 and the backplane bus implemented with the F-CPU, the F destination addresses of all the centrally slotted F IOs can overlap. However, the F destination addresses must be unique in their own F-CPU and CPU-wide.

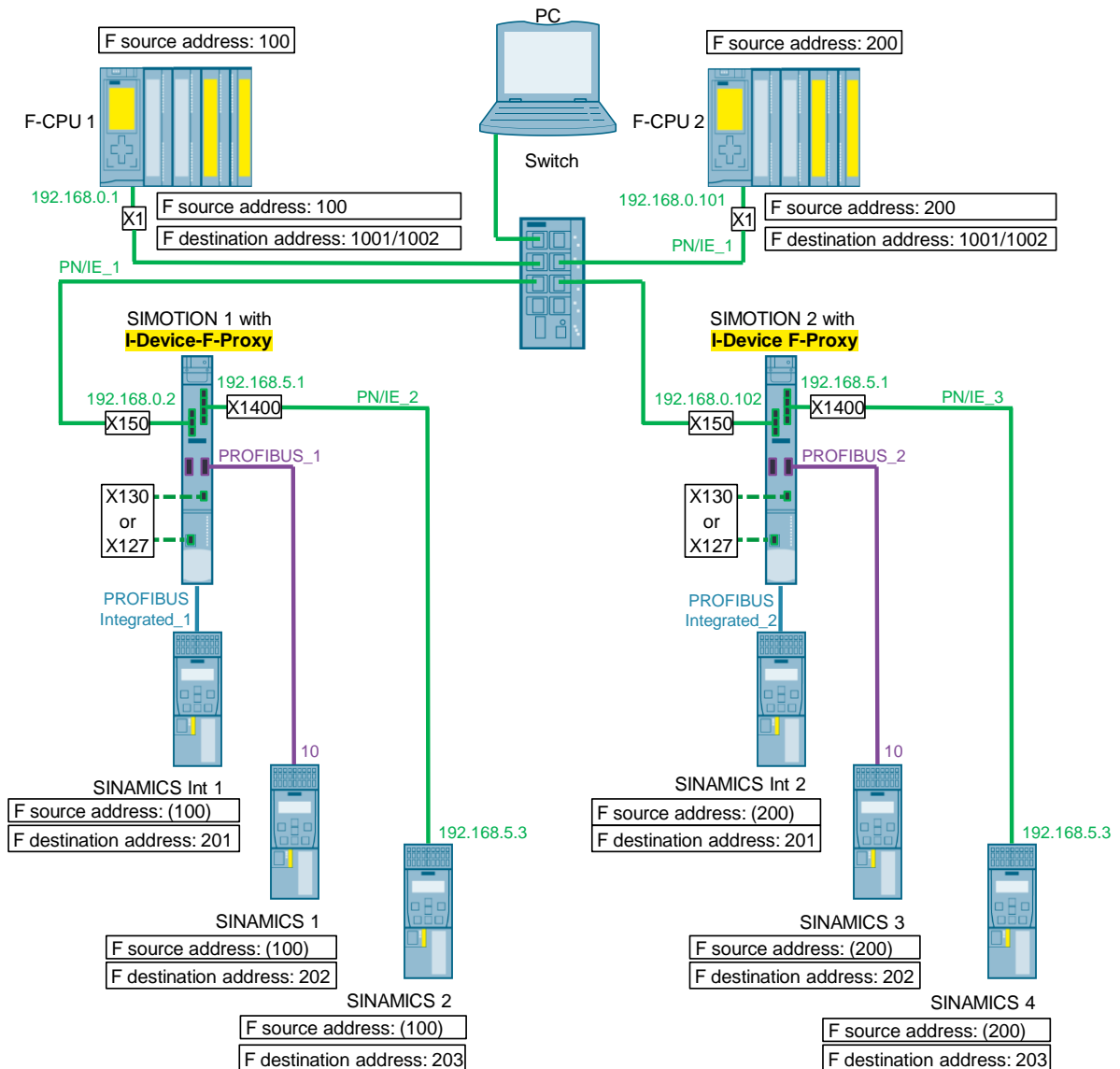
Distributed Safety handles the ET 200SP as F IO of the address type 1. The Engineering System therefore requires that the F destination address is assigned only once in a project (see figure above). The F source address has nothing to do with the uniqueness of the PROFIsafe address.

Refer also to the information in the FAQ response <https://support.industry.siemens.com/cs/ww/en/view/109479905>.

4.10 Configuration with SIMOTION F-Proxy

The following figure shows a configuration with the possibility of bridging by the SIMOTION D4x5-2 and using the I-Device-F-Proxy functionality:

Figure 4-8 Connection of two plant sections when using SIMOTION with I-Device-F-Proxy



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4.10.1 SIMOTION F-Proxy

SIMOTION has an integrated F-Proxy functionality for the connection of the integrated drives of SIMOTION D as well as SINAMICS drives via PROFIsafe. SINAMICS are controlled by SIMOTION but are located in a different communication domain than the F-CPU. The F proxy enables transparent forwarding of the safety telegrams from the SIMOTION I-Slave or I-Device interface to the respective SIMOTION master or controller interface on which the drive is configured. Despite the forwarding function of SIMOTION the PROFIsafe communication between F-CPU and drive is secured since the PROFIsafe drivers in the end points (F-CPU, drive) safely monitor the communication.

To use the F-Proxy functionality, the two communication paths, from the F-CPU to SIMOTION and from SIMOTION to the drive, must be configured separately (see section [4.10.4](#)).

For further information refer to the SIMOTION Communication system manual: <https://support.industry.siemens.com/cs/document/109767623>

4.10.2 Description of the Network Configuration

The configuration consists of two plant sections each with a SIMATIC F-CPU and a controller SIMOTION D4x5-2. Both plant sections are connected via Ethernet via Switch and form a network. The F-Communication is realized with I-Device-F-Proxys.

SIMOTION 1 is configured with the interface X150 as I-Device of F-CPU 1. The drives SINAMICS Int 1, SINAMICS 1 and SINAMICS 2 are connected to SIMOTION 1 via PROFIBUS Integrated, PROFIBUS or via the second Ethernet interface X1400.

SIMOTION 2 is configured with the interface X150 as I-Device of F-CPU 2.

The SINAMICS Int 2, SINAMICS 3 and SINAMICS 4 drives are connected to SIMOTION 2 via PROFIBUS Integrated, PROFIBUS or via the second Ethernet interface X1400.

4.10.3 PROFIsafe addresses

PROFIsafe address type 2

The configuration does not include F-Peripherals of PROFIsafe address type 2.

PROFIsafe address type 1

The SINAMICS F periphery belongs to address type 1. By using the F proxy functionality, the F source address can be configured in the drive in addition to the F target address (see configuration of the F addresses in Figure [4-17](#)). From the user's point of view, the drives thus work during operation (after the system has started up) like devices of PROFIsafe address type 2. In this case the uniqueness is ensured by the pair F source address and F destination address. Due to the separated configuration of the F addresses in the SIMOTION and the F-CPU (see section [4.10.4](#)), faulty addresses are reliably detected during startup.

The prerequisite for this is that the SINAMICS drives are connected via PROFIBUS Integrated, PROFIBUS or the second PROFINET interface of the SIMOTION and that there is no other network connection between the subordinate drives.

PROFIsafe addresses of the central F IO

The centrally slotted F IO has to have unique F destination addresses within its own F-CPU. CPU-wide uniqueness includes the central F IO and the accessible distributed F IO.

This means the following for the configuration considered:

The F destination addresses of the central F IO in the left plant section of Figure 4-14 have to differ from SINAMICS Int 1, SINAMICS 1 and SINAMICS 2.

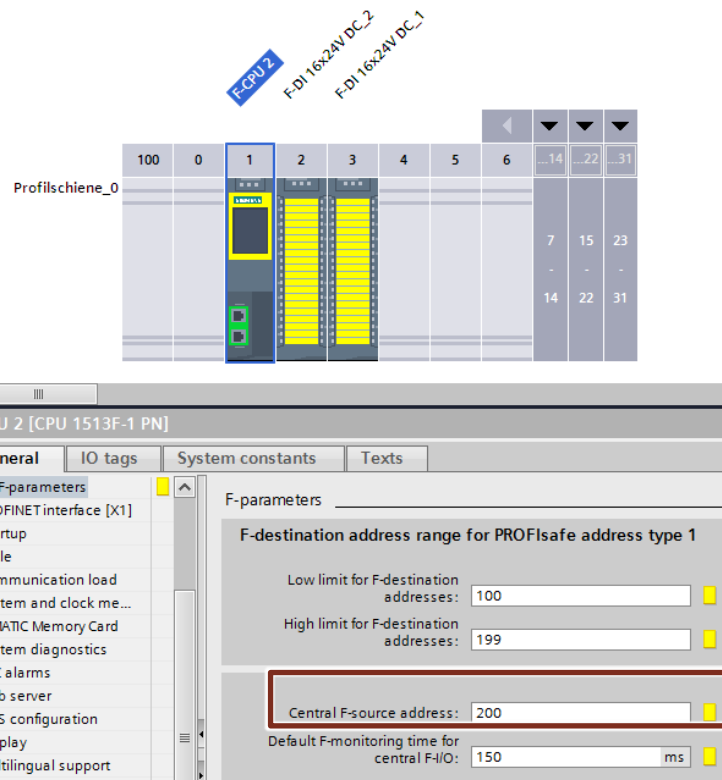
The F destination addresses of the central F IO in the right plant section have to differ from SINAMICS Int 2, SINAMICS 3 and SINAMICS 4.

4.10.4 Separated Configuration

To use the F-Proxy functionality the two communication paths, from the F-CPU to SIMOTION and from SIMOTION to the drive, must be configured separately. The F addresses must be the same in the following cases:

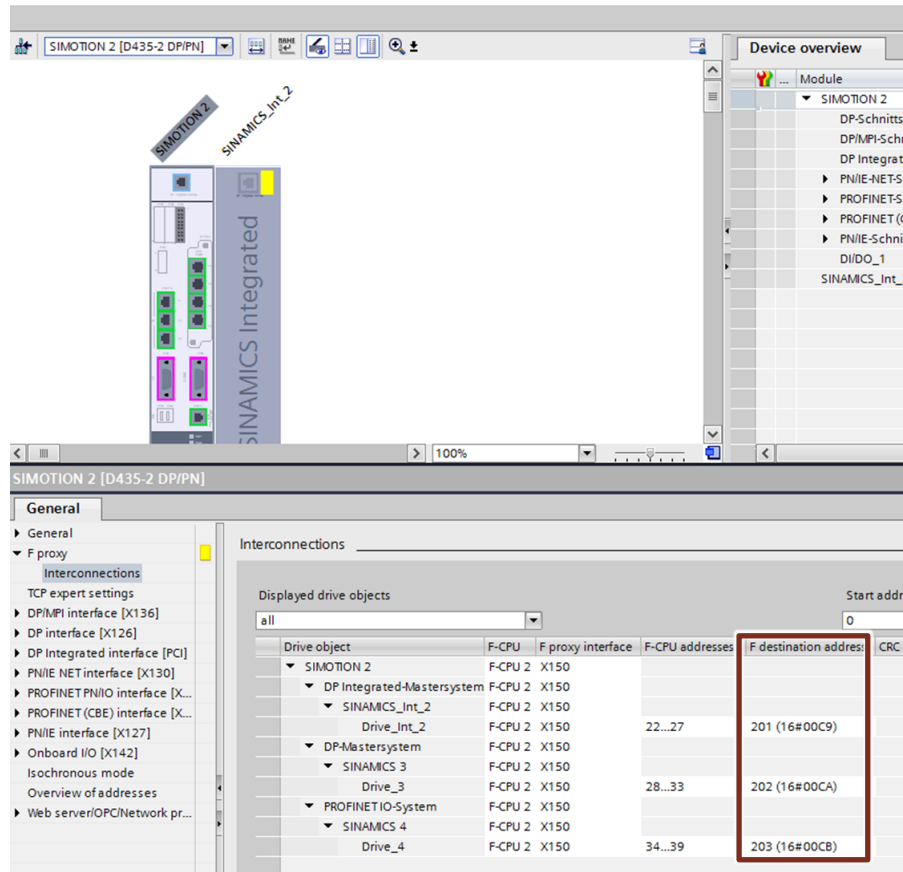
- Central F source address of the F-CPU

Figure 4-9 Configuration of the F source address of the F-CPU



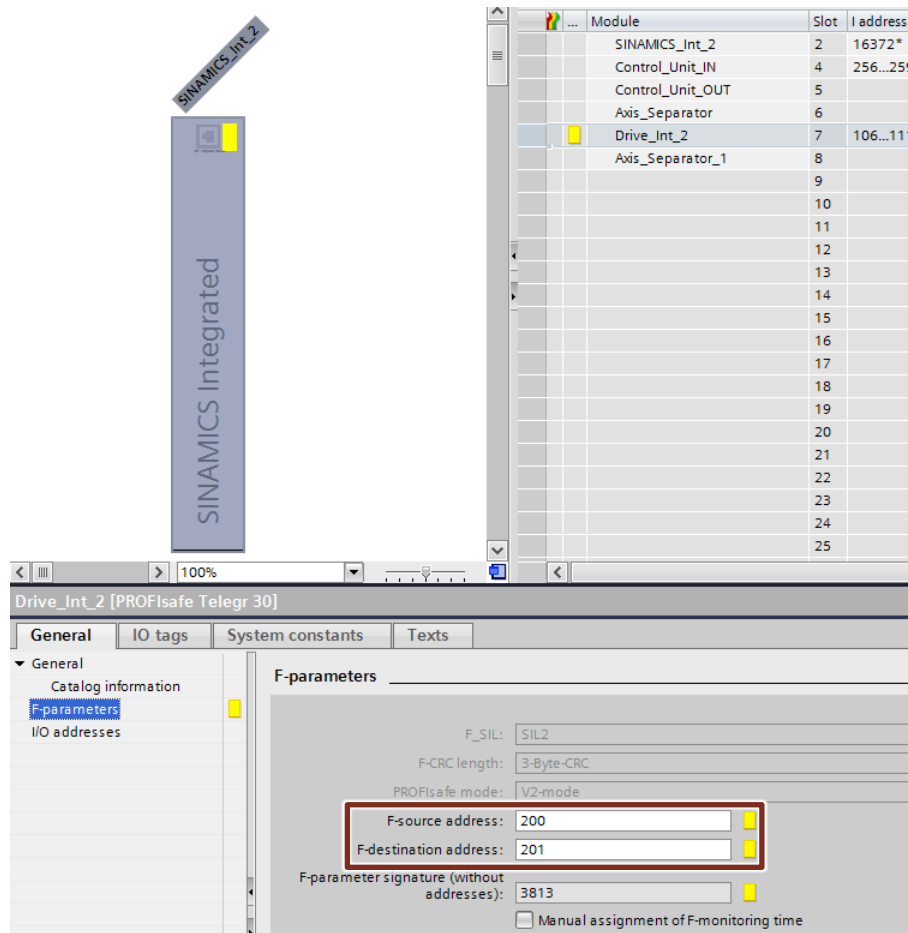
- PROFIsafe slot of the I-Device of the SIMOTION CPU (HW-configuration):

Figure 4-10 Configuration of the F destination addresses in the F-Proxy of the SIMOTION



- PROFIsafe slot of the drive on the SIMOTION CPU. Due to the F proxy functionality, the F source address can be set in addition to the F destination address:

Figure 4-11 Configuration of the F addresses of the respective drive



- Safety Configuration of the drive in SIMOTION SCOUT. The F destination address can be taken from the HW configuration:

Figure 4-12 Configuration of the F destination address of the drive in SIMOTION SCOUT

