SIEMENS

Configuration of an MRP Ring and a Topology with Two Projects

SCALANCE X, SIMATIC S7

Warranty and Liability

Contents

1 Introduction

1.1 Overview

MRP

MRP ("Media Redundancy Protocol") is a redundancy protocol for increasing the network availability in ring topologies and ensures smooth communication in PROFINET networks.

Topology

The topology is not necessarily a requirement for MRP to function, but it facilitates troubleshooting.

By defining the physical interconnection of the Ethernet ports in the topology view you can have the diagnostics status of the ports graphically displayed.

Configuration in the TIA Portal

If all the devices to be operated as media redundant are together in one TIA project (Project A), the configuration of MRP is very simple and easy because the TIA Portal ensures consistency and compliance with the rules.

Configuring a topology for easy diagnostics is also done with a few mouse clicks because all the devices are known and selectable through the integration in the network view.

Description of the problem

In some cases it is also necessary, for technical or plant-specific reasons, that a device belongs to the MRP ring from Project A as an MRP client, although it is in a different TIA project (Project B).
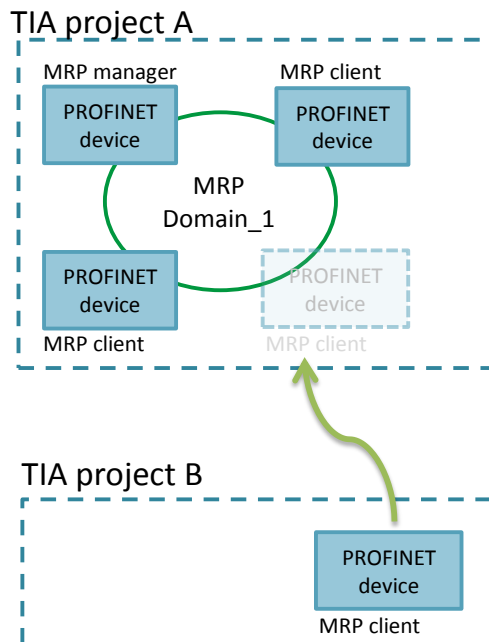
The TIA project (Project B) is inconsistent through the missing MRP manager and therefore cannot be compiled because the MRP rule "At least one PROFINET

interface in the ring must have the media redundancy role of 'Manager (auto)'" is not complied with.

Using a "Proxy PLC device" does not help in this case because the MRP settings were not taken into account during initialization.

Furthermore, configuring the topology is very difficult because only known devices integrated in the TIA project can be interconnected.

1.2 Demands and Requirements

Task

The task is to use appropriate methods to assign devices from different projects to a common MRP ring and ensure error-free compilation of the TIA project.

In addition, it should be possible to configure the topology.

Implementation

To achieve the above-mentioned task you need to use proxy and dummy devices.

Here we describe how to proceed to assign an HMI device (from TIA Project B) to the MRP ring (from TIA Project A) and to create a common topology.
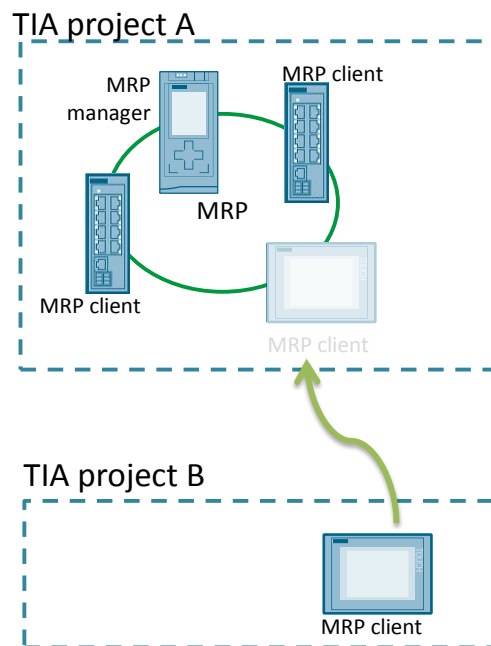
2 Engineering

Requirements

For the instructions below it is presumed that there are two TIA projects with the following configuration/parameters:

- TIA Project A: MRP domain with at most one MRP manager and at least one MRP client.

	IO device name	MRP domain	MRP role	Ring port 1	Ring port 2
1	IO device_1	mrpdomain-1	Client	Port_1 [X1 P1 R]	Port_2 [X1 P...
2	PLC_1.PROFINET interfac...	mrpdomain-1	Manager (auto)	Port_1 [X1 P1 R]	Port_2 [X1 P2 R]
3	Switch_2	mrpdomain-1	Client	Port_1 [X1 P1 R]	Port_2 [X1 P2 R]
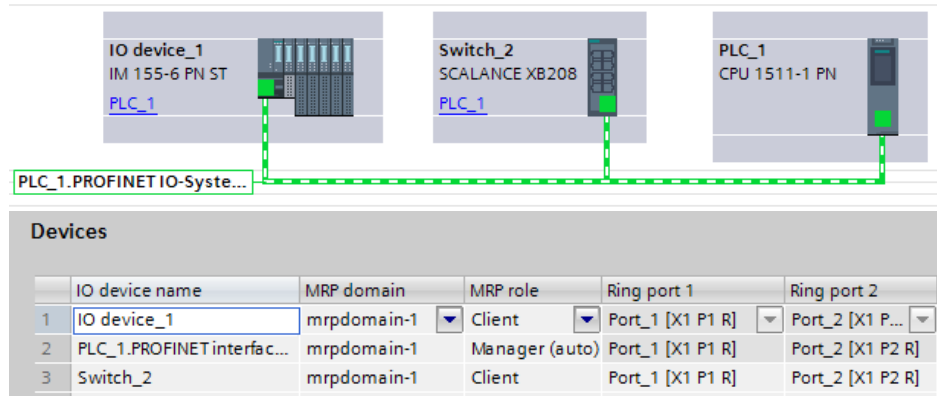
- TIA Project B: Configured HMI device with the property "MRP client"
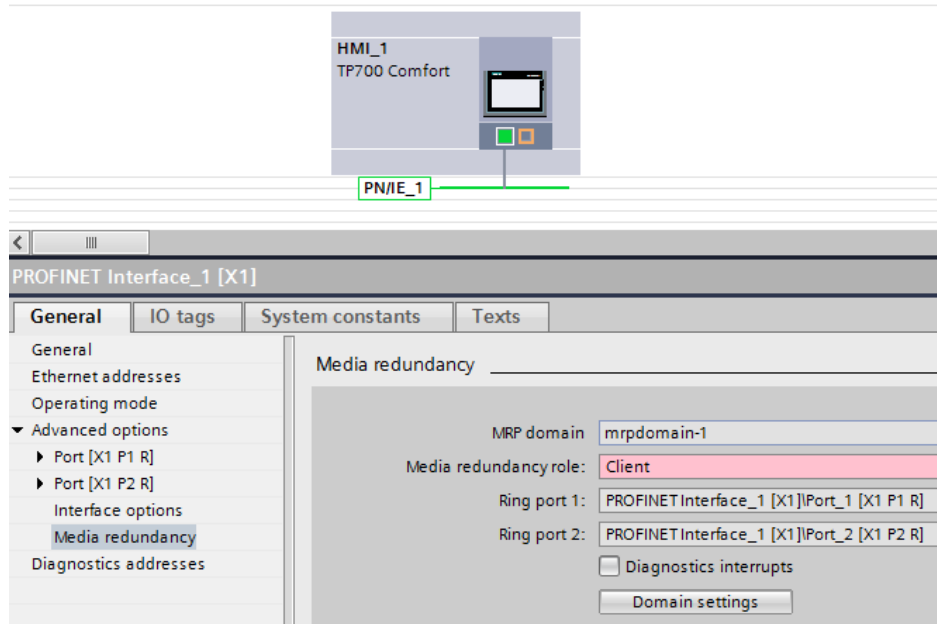
- Consistent IP address assignment between the TIA projects; all the devices are in one subnetwork and no IP addresses are double assigned.

- All the devices are pre-parameterized and have the assigned IP address and device name.

- The reconfiguration time with MRP is 200ms; therefore you must select a corresponding watchdog time of > 200ms for the PROFINET communication.

Preparation

Open a separate TIA Portal instance for each TIA Project. Through the parallel windows you can easily copy devices between the TIA projects or quickly compare the properties.

Change to the network view in both TIA projects.

2.1 Procedure in TIA Project A

Integrate the HMI dummy

1. In the network view of TIA Project B you mark the HMI device.

2. Copy the device to the clipboard via <Ctrl + C>.

3. Switch to the network view of TIA Project A and paste the HMI device as copy with <Ctrl + V>. Connect the PROFINET interface of the HMI copy to the existing subnetwork.
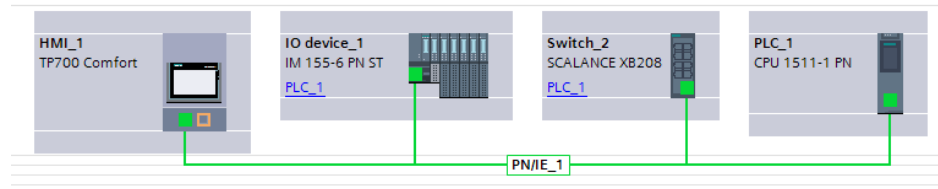
4. Check whether the IP address and the PROFINET device name match those of the real HMI device from Project B.

5. Create a topology of the MRP ring in the topology view; for this you connect all the Ring ports of the MRP nodes with each other according to your specifications.

6. Save and compile the TIA Project A.

Create device proxy data

1. In the project navigation you open the menu of your configured controller and switch to the item "Device proxy data".
   Double-click "Add new device proxy data".
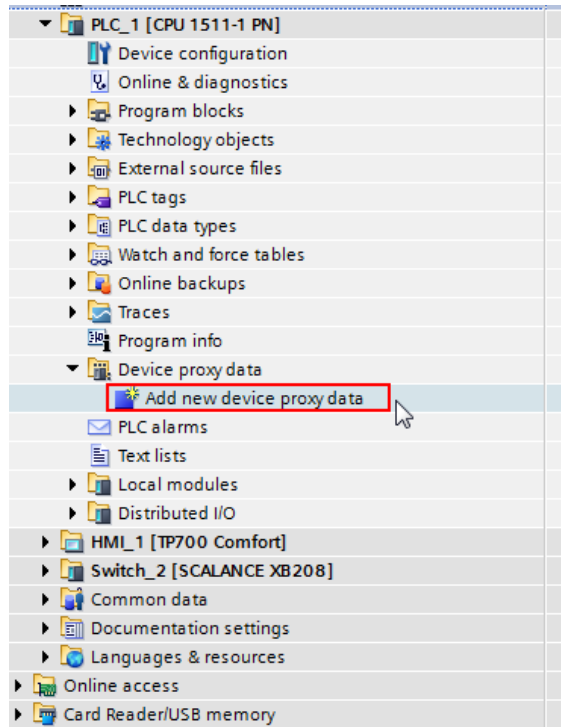
2. A new file is created.
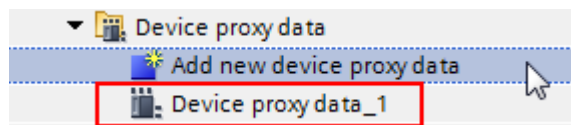
Open this file with a double-click.

3. Select the desired content for the export and export it via the "Export device proxy data" button.
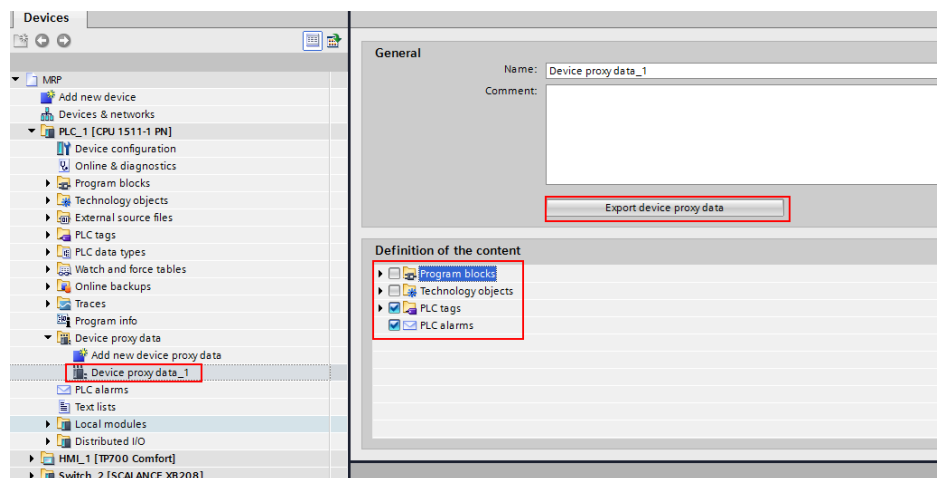
4. Save the file on the drive.

5. Close the Export procedure with "OK".

Download the project

Download Project A into the controller.

Result

The modules restart automatically and the downloaded configuration is activated.

If a module displays an error, use the TIA Portal diagnostics to search for the cause and clear the error.

2.2 Procedure in TIA Project B

Integrate the proxy file

1. Insert a device proxy PLC from the hardware catalog into the network view.
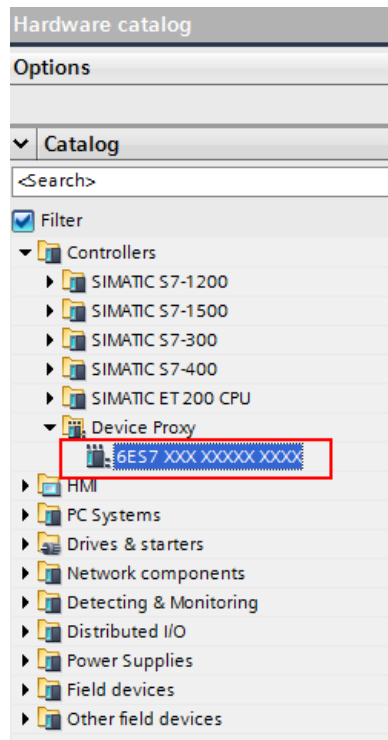
2. Mark the proxy PLC and initialize it via the corresponding item in the pop-up menu.
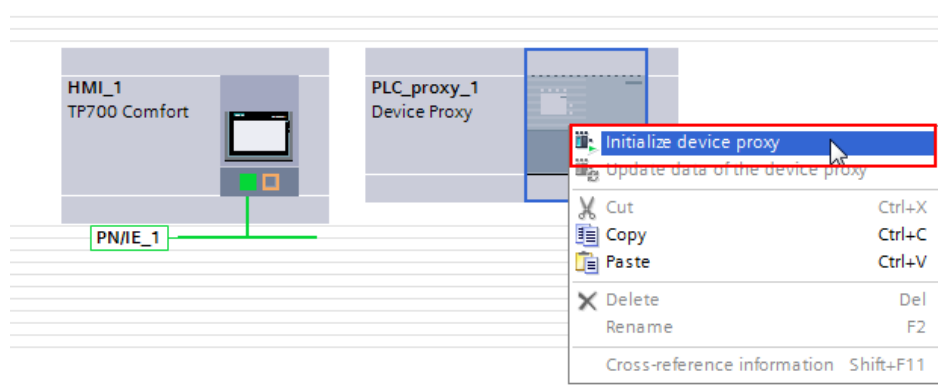
3. Navigate to the directory with the exported proxy file and open it.

4. Confirm the Import procedure with "OK".

5. Connect the HMI and the proxy PLC via an HMI connection.

Set up an MRP manager dummy

When you initialize the "Device proxy PLC" the MRP settings are not taken into account. The TIA project (Project B) is inconsistent through the (still) missing MRP manager and cannot be compiled without errors.

To be able to compile the project you need a dummy device with the "MRP Manager" function.

1. Via the hardware catalog insert an MRP-compatible device like SCALANCE X, for example, and parameterize this device as MRP manager.

2. Save and compile Project B.

Download the project

Download Project B into the HMI device.

Result
The HMI device is now a node of the MRP ring from Project A.
The MRP ring can now easily be diagnosed via the common topology configured in Project A.

3 Attachment

3.1 Siemens Services

Industry Online Support

Do you have any questions or need support?

You can access the complete Service and Support know-how and our services via the Industry Online Support.

The Industry Online Support is the central address for information about our products, solutions and services.

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- Repair Services
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The "Siemens Industry Online Support" app also provides optimum support when you are on the move. The app is available for Apple iOS, Android and Windows Phone.
https://support.industry.siemens.com/cs/de/de/sc/2067

3.2 Links and Literature

Table 3-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Download page of the entry https://support.industry.siemens.com/cs/ww/en/view/109741671

3.3 Change Documentation

Table 3-2

Version	Date	Change
V1.0	10/2016	First edition