

# Anybus<sup>®</sup> Edge Gateway<sup>™</sup> PROFINET

with Siemens S7-1500 PLC & TIA Portal

#### **APPLICATION NOTE**

SCM-1202-153 1.0 en-US ENGLISH



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#### 1 Preface

This document explains how to configure PROFINET communication between an Anybus Edge gateway and a Siemens S7-1500 PLC using TIA Portal software.

More documentation and downloads can be found at <u>www.anybus.com/support</u>. For more info regarding the PLC and TIA Portal, please visit the manufacturer's support website.

#### **1.1 Document History**

Version	Date	Description
1.0	2020-01-17	First release

#### **1.2** Document Conventions

Numbered lists indicate tasks that should be carried out in sequence:

- 1. First do this
- 2. Then do this

Bulleted lists are used for:

- Tasks that can be carried out in any order
- Itemized information
- An action
  - $\rightarrow$  and a result

User interaction elements (buttons etc.) are indicated with bold text.

Program code and script examples

Cross-reference within this document: Document Conventions, p. 3

External link (URL): www.hms-networks.com

## WARNING

Instruction that must be followed to avoid a risk of death or serious injury.

#### Caution

Instruction that must be followed to avoid a risk of personal injury.

(i)

Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

Additional information which may facilitate installation and/or operation.

## 2 General

#### 2.1 Prerequisites

- A basic knowledge of how to configure the Anybus Edge gateway and Siemens TIA Portal is assumed.
- The PLC must already be set up in Siemens TIA Portal.

#### 2.2 Data Exchange Model

The Input Buffer in the Edge gateway contains data coming from the PROFINET PLC. The Output Buffer contains data going to the PROFINET PLC.



The data exchanged with the PROFINET PLC can be mapped to all interfaces on the Edge gateway, such as Modbus, OPC-UA or MQTT.

### **3** Anybus Edge Gateway Configuration

#### 3.1 **PROFINET Network Configuration**

It is recommended that the PROFINET master controller sets the station name (device name) and the IP address of the Edge gateway. If you want to assign the IP address and station name manually you need to enter the advanced settings by clicking the **Advanced settings** box.

The name entered for **Device name suffix** is used to make the GSD file unique within the PLC hardware catalogue and changes parameters within the GSD file to do so.

Settings					Anybus			
🗞 🇱 🛞 🥬 🔀 🕄 🍞 Event Log Settings Export					뢎 🗧 admin 🗸			
General     Network     HMS-HUB	PROFINET IO Device							
PLC	Name	Module ID	Data type	Length	Index			
E 1/0	- Inputs							
Modbus Client/Master	- Outputs							
PROFINET ID Device OPC UA Server CODESYS Network Variables	Add Module Add Value Edit Delete Clone							
SNMP Manager	Settings							
<ul> <li>Services</li> </ul>	Device name suffix: Advance settings:	(Up to 32 alphane	umeric characters or hyphens, must not end with	h a hyphen)				
	OK Reload							
	Download GSD file							
	Download							

#### 3.2 I/O Data

Below is a screenshot where all the inputs and outputs are set up. Two input values and two output values. Input data is data that comes from the PROFINET PLC to the Edge gateway. Output data is data from the Edge gateway to the PLC.

Settings					Anybus°
🗞 🗱 🔗 🥬   🔁   🍞					슺 🖌 🧕 admin 🗸
General     Network     HMS-HIB	PROFINET IO Device				
PLC	Name	Module ID	Data type	Length	Index
□ I/O	Inputs				
Modbus Client/Master	DataFromPLC	1			0
PROFINET IO Device	- input_1		32-bit signed integer	1	1
OPC UA Server	- input_2		16-bit signed integer	1	1
CODESYS Network Variables	Outputs				
SNMP Manager	DataToPLC	1			0
Services	- output_1		16-bit signed integer	1	0
	output_2		32-bit signed integer	1	1
	Add Module Add Value Edit Delete Clone Settings				
	Device name suffix: GWDeviceName	(Up to 32 alpha	numeric characters or hyphens, must not end w	ith a hyphen)	
	Advance settings:				
	OK Reload				
	Download GSD file				
	Download				

To set up the PROFINET IO communication, start by adding a module and then add tags.

When the PROFINET configuration is complete, click **OK**. Download the GSD file by pressing the **Download** button. To activate the new PROFINET configuration, you need to reboot the gateway.

**E** For every change made in the PROFINET configuration, a new GSD file has to be downloaded from the gateway.

#### 4 Siemens TIA Portal Configuration

This section describes how to configure the PROFINET interface of the Anybus Edge gateway in Siemens TIA Portal.

#### 4.1 Adding the Anybus Device

To include the Anybus Edge gateway in the PROFINET network, a GSD file for the device must be imported into the configuration tool. GSD files can be downloaded from the support page for the gateway at www.anybus.com/support.

1. In the **Options** menu in TIA Portal, select **Manage general station description files (GSD)**.

Online	Options	Tools	Window	Help		
أ 🗉 ک	🍟 Setti	ngs				
	Supp	ort pack	ages			
	Mana Start	ge gene Automat	ral station tion Licens	descripti e Manage	on files (GS er	D)
<u> </u>	🐴 Shov	referen	ce text			
	🛄 Globa	I librarie	s			•

#### Fig. 1 Options menu

2. After the GSD file has been imported into the configuration tool the Anybus Edge gateway will be available in the hardware catalog.

Hardware catalog	
Options	
✓ Catalog	
<search></search>	tivi livi
Filter Profile: <all></all>	
Controllers	
🕨 🫅 HMI	
PC systems	
Drives & starters	
Image:	
Detecting & Monitoring	
Distributed I/O	
Power supply and distribution	
Field devices	
<ul> <li>Other field devices</li> </ul>	
Additional Ethernet devices	
▼ PROFINET IO	
Drives	
Encoders	
▼ Li Gateway	
HMS Industrial Networks	
▼ Im HMS Networks AB	

Fig. 2 Hardware catalog

- 3. Open the **Network View** tab to show the PROFINET network.
- 4. Drag the Anybus Edge gateway module from the hardware catalog into the network view.

Network	IMI connection		
<u></u>	I_J	<b>、</b> -	_
			=
PLC_1 CPU 1511-1 PN	GWDeviceName RT Standard		
	Not assigned		



5. Double-click on the Edge gateway in the Network View to open the **Device View**.

The device can be given a name in the **General** section of the **Properties** tab. In this example the device is named **GWDeviceName**.



Fig. 4 Properties tab

		📲 Topology view	h Network view	Device view
GWDeviceName [RT Standard	🛛 🖽 🕎 🌆 🔛 🛄 🔍 ±			
Grosteren .				
-				
				~
< <u>m</u>		> 10	0%	···· § ···· 1
K M GWDeviceName [RT Standard]		> 10	0% ▼ 1↓Info 1 U Diag	<u>,,ÿ</u> , ₹ ynostics ■ =
<ul> <li>M</li> <li>GWDeviceName [RT Standard]</li> <li>General 10 tags System</li> </ul>	tem constants Texts	> 10	0% ▼ LInfo 👔 🗓 Diag	, , , , , , , , , , , , , , , , , , ,
<ul> <li>K mm</li> <li>GWDeviceName [RT Standard]</li> <li>General IO tags Sys</li> <li>General ✓ PROFINETinterface [X1]</li> </ul>	tem constants Texts	) 10 Properties	0% ▼ Ni Info 1 Diag	,, ₹, ₹ ynostics □ =
GWDeviceName [RT Standard]       General     IO tags       Seneral       PROFINETinterface [X1]       General	tem constants Texts Ethemet addresses Interface networked with	> 10	0% ▼ LInfo 👔 🗓 Diag	,, ₹ ₹ jnostics

6. In the **PROFINET interface** section, click **Ethernet addresses** and select the subnetwork that you want to add the Edge gateway to.

Fig. 5 Add module to network

- 7. The added Edge gateway device will correspond to the previously made configuration in the Edge gateway interface.
  - For data going from the PLC to the gateway, this means that the tag input\_1 (32-bit value) will start on address QD20 and that the tag input\_2 (16-bit value) will have start address QW24 in the PLC
  - For data going from the gateway to the PLC, this means that the tag output\_1 (16-bit value) will start on address IW20 and that the tag output\_2 (32-bit value) will have start address ID22



Fig. 6 Adding modules

Make sure that the module addresses are within the process image of the PLC.

#### 4.2 Assigning IP Address and Device Name

An **IP Address** and a **Device Name** must be assigned to each configured device before downloading the PLC hardware configuration.

1. To set the IP address, go to the **Device View**. Click **Ethernet addresses** and enter the desired IP address for the device.

	ateway - GWDeviceName] 🔟 Diagnosti	cs 🛛 🗆 🤜
General IO tags System	n constants Texts	
▼ General	Ethomat address or	^
Catalog information		
<ul> <li>PROFINET interface [X1]</li> </ul>	Interface networked with	
General		
Ethernet addresses	Subnet: PN/IE_1	
<ul> <li>Advanced options</li> </ul>	Add new subnet	
Interface options		
Media redundancy	IR protocol	
Real time settings		
Port 1 [X1 P1 R]	Set IP address in the project	
Port 2 [X1 P2 R]		
Hardware identifier	IP address: 10 . 10 . 55 . 212	
Identification & Maintenance	Subnet mask: 255, 255, 255, 0	

#### Fig. 7 Set IP address

2. To set the Device name, right-click on the device in the **Device View** and select **Assign device name**.

GWDeviceName [KI Standa	🚽 🖽 🕎 🖌 🛄 🍕 ±	
	D	-
Guerte	Change device Write IO-Device name Start device tool	to Micro Memory Card
	X Cut	Ctrl+X
	I Сору	Ctrl+C
	Paste	Ctrl+V
	× Delete	Del
	🚽 Go to topology view	
	🚠 Go to network view	
	Compile	•
	Download to device	•
	💋 Go online	Ctrl+K
	🚽 🐼 Go offline	Ctrl+M

Fig. 8 Device view

- 3. Set **PROFINET device name** to the name used to identify the Edge gateway on the network. In this example, use **gwdevicename**.
- 4. In the table of "Accessible devices on the network", select the gateway that matches the MAC address of your device.

5. Click on Assign Name.

Assign PROFINET device name.	_	_	_	_	_	×			
	Configured PRO	FINET de	vice						
	PROFINET devic	ce name:	gwdevicename		-				
	Device type: RT Standard								
	Online access								
	Type of the PG/PC interface:								
	PG/PC i	interface:	Intel(R) PRO/1000 MT	Network Connection	1<3> 💌 🛡 💁				
Ļ	Device filter								
<u>a</u> _									
	M Only show	devices of	the same type						
	Only show	devices wi	th bad parameter settings						
	Only show	devices wi	thout names						
Arressibl	e devices in the network:								
IP address	s MAC address	Device	PROFINET device name	Status					
10.10.55	.212 00-30-11-02-5C-6E	Anybus	gwdevicename	💙 ок					
Flash LED									
<			1111			>			
			U	Ipdate list	Assign name				

Fig. 9 Assigning a device name

#### 4.3 Compile and Download

The project should now be saved and compiled for downloading and testing.

- 1. Save the project.
- 2. Right-click on the PLC and select **Compile > Hardware and software**.

es & netw	S7-1500 Add new device		PLC_	1 1511-1 PN	GWD	DeviceName
, i c	PLC_1 [CPU 1511-1 PN]	Change device			PLC_	1
ے <sup>ت</sup>	Online & diagnostics	Open				
	Program blocks	Open in new edi	tor			
	Technology objects	Open block/PLC o	ata type	F7	PLC_1.PROFINET IO-Syst	te
	External source files	Export CAx data				
	🕨 🚂 PLC tags	V cut		Ctrl+X		
	PLC data types	Copy		Ctrl+C		
	💌 🗮 Watch and force tables	Paste		Ctrl+V		
	🚔 Add new watch tab	X Delete		Del		
	Force table	Rename		F2		
	Online backups	📮 Go to topology vi	ew			
	Iraces	Go to network vie	ew			
	Device proxy data	Compile			the solution of the former from the solution of the solution o	
	PLC supervisions & ala	Download to dev	ice	<u> </u>	Hardware (only changes)	\$)
	PI Calarm text lists	Backup from onli	nline device		Hardware (rebuild all)	
	Local modules	💋 Go online		Ctrl+K	Software (only changes)	
	Distributed I/O	📓 Go offline		Ctrl+M	Software (rebuild all)	
		🖳 Online & diagnos	stics	Ctrl+D	Software (reset memory reserve)	

Fig. 10 Compiling

3. When the project has been compiled, right-click on the PLC again and select **Download to** device ► Hardware and software

Status	Status ! Target		Message	Action	
<b>†</b> ₩	Å	<ul> <li>PLC_1</li> </ul>	Loading will not be performed because preconditions are not met		
	▲	Stop modules	The modules are stopped for downloading to device.	No action	
	0	<ul> <li>Software</li> </ul>	Download software to device	Consistent download	
	0	Text libraries	Download all alarm texts and text list texts	Consistent download	
<				>	

Fig. 11 Load preview

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