## Technical Instructions for Configuring an S7 Connection

## S7-300 / S7-400 Industrial Ethernet CPs

## FAQ • January 2011



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### Question

How do you configure a specified and an unspecified S7 connection for data exchange between S7-300 and / or S7-400 over Industrial Ethernet CPs?

### Answer

The instructions and notes listed in this document provide a detailed answer to this question.

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## 1 Introduction

You can use the S7 communication through S7 connections for data exchange by way of the Industrial Ethernet CPs of S7-300 and S7-400.

In this example an S7-300 is connected over the PROFINET interface of the CP343-1 on the subnetwork 172.16.0.0. The S7-400 on the other hand is connected over the GBIT interface of the CP443-1 Advanced on the subnetwork 172.16.0.0. The PROFINET interface of the CP443-1 Advanced is connected on the subnetwork 192.168.99.0.

### **Configuration overview**

Figure 1-1 S7-300 S7 connection IP address: 172.16.43.2 subnet mask: 255.255.0.0 SCALALANCE X SCALALANCE X

Figure 1-1 shows an overview of the configuration.

## 2 Configuration

Below we describe how to configure an S7 connection for bilateral exchange of data by way of the Industrial Ethernet CPs of S7-300 and S7-400. The S7 connection is configured bilaterally in the S7-300 and in the S7-400.

### 2.1 Configuring CP343-1 and CP443-1 Advanced

### 2.1.1 Assigning IP addresses to CP343-1 and CP443-1 Advanced

The following IP addresses are used in this configuration.

Table 2-1

Industrial Ethernet CP	Interface	IP address	Subnet mask
CP343-1	PROFINET	172.16.43.2	255.255.0.0
CP443-1 Advanced	PROFINET	192.168.99.121	255.255.255.0
CP443-1 Advanced	GBIT	172.16.49.99	255.255.0.0

Assign the IP addresses to CP343-1 and CP443-1 Advanced.

Follow the instructions below for assigning the IP addresses.

No.	Configuration step	Note	
1.	Connect the SIMATIC Field PG on which the configuration created with STEP 7 is stored to the PROFINET interface of CP343-1. In Windows network settings → LAN (Local Area Network) of the SIMATIC Field PG you enter an IP address that is in the same subnetwork as that of CP343-1. In this example the IP address 172.16.43.100 and subnetwork mask 255.255.0.0 are used for the SIMATIC Field PG.	Internet Protocol (TCP/IP) Properties       Image: Constraint of the settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.            • Obtain an IP address automatically         • Uge the following IP address: <ul> <li>IP address:</li> <li>ITZ . 16 . 43 . 100</li> <li>Sybnet mask:</li> <li>255 . 255 . 0 . 0</li> <li>Default gateway:</li> <li>ITZ . 16 . 0 . 1</li> </ul> • Obtain DNS server address automatically <ul> <li>Obtain DNS server addresses:</li> <li>Preferred DNS server:</li> <li>ITZ . 16 . 0 . 1</li> <li>Alternate DNS server:</li> <li>Adgenced</li> </ul>	
2.	In the SIMATIC Manager you open the STEP 7 project that contains the configurations of S7-300 and S7-400 between which the data is to be exchanged over an S7 connection. By means of the menu PLC → Edit Ethernet Node you open the "Edit Ethernet Node" dialog.	SIMATIC Manager - S7         File Edit Insert PLC View Options Window Help <ul> <li></li></ul>	

No.	Configuration step	Note
3.	In the "Edit Ethernet Node" dialog you click the "Browse" button and select the MAC address of CP343-1.	Edit Ethernet Node       >         Ethernet node       Nodes accessible online         MAC gddress:       00-0E-8C-D9-F0-1D       Browse         Set IP configuration
4.	Enter the IP address and subnet mask of CP343-1. Click the "Assign IP Configuration" button to assign the IP address entered to CP343-1. Then click the "Close" button to close the "Edit Ethernet Node" dialog.	Lose       Help         Edit Ethernet Node       X         Ethernet node       Nodes accessible online         MAC gddress:       00.0E-8C-09F0-1D         Browse       Browse         Set IP configuration       Image: Double 12: Do
5.	Enter the assigned IP address in the Hardware Configuration of the S7- 300 station and download the configuration into the S7-300 CPU.	See section 2.1.2

No.	Configuration step	Note
6.	Connect the SIMATIC Field PG on which the configuration created with STEP 7 is stored to the PROFINET interface of CP443-1 Advanced. In Windows network settings → LAN (Local Area Network) of the SIMATIC Field PG you enter an IP address that is in the same subnetwork as that of CP443-1. In this example the IP address 192.168.99.100 and subnetwork mask 255.255.255.0 are used for the SIMATIC Field PG.	Internet Protocol (TEP/IP) Properties       Image: Constraint of the appropriate IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.         Image: Image
7.	Repeat configuration steps 2 to 4 to assign the IP address 192.168.99.121 and subnet mask 255.255.255.0 to CP443-1 Advanced.	
8.	Enter the assigned IP address in the Hardware Configuration of the S7- 400 station and download the configuration into the S7-400 CPU.	See section 2.1.3

## 2.1.2 Entering the IP address of CP343-1 in the Hardware Configuration and downloading the configuration into the CPU

After you have assigned the IP address 172.16.43.2 and subnet mask 255.255.0.0 to CP343-1 you enter the assigned IP address in the Hardware Configuration.

No.	Configuration step	Note
1.	In the SIMATIC Manager you mark the SIMATIC S7 300 station and double-click "Hardware" in order to open the Hardware Configuration of the S7-300 station.	SIMATIC Manager - S7         File Edit Insert PLC View Options Window Help         ST C:\Program Files\Siemens\Step7\S7Proj\S7_communication         ST C:\Program Files\Siemens\Siemens\Step7\S7Proj\S7_communication         ST C:\Program Files\Siemens\Step7\S7Proj\S7_communication         ST C:\Program Files\Siemens\Siemens\Step7\S7Proj\S7_communication         ST C:\Program Files\Siemens\Siemens\Siemens\Siemens\Step7\S7Proj\S7_communication         ST C:\Program Files\Siemens\Siemens\Siemens\Siemens\Siemens\Siemens\Siemens\Siemens\S15         ST C:\Program Files\Siemens\S15         ST C:\Program Files\Siemens\S15         ST C:\Program Files\S16         ST C:\Program Files\S16         ST S:\Program Files\S16         ST S:\Program Files\S16         ST
2.	In the Hardware Configuration of S7- 300 you double-click the PROFINET interface of CP343-1. The Properties dialog of the PROFINET interface opens.	HW Config - SIMATIC 300         Station Edit Insert PLC View Options Window Help         Image: Similar State
3.	In the Properties dialog of the PROFINET interface you click the "Properties" button to open the "Properties - Ethernet interface PN- IO" dialog.	Properties - cp3431 (R0/54.1)       Image: Configuration is a config

No.	Configuration step	Note
4.	Enter the IP address 172.16.43.2 and the subnet mask 255.255.0.0. Activate the "Set MAC address / Use ISO protocol" function and enter the MAC address 00-0E-8C-D9-F0-1D of CP343-1. Assign an existing subnet to CP343-1 or click the "New" button to create a new subnet. Apply the settings with "OK".	Properties - Ethernet interface CP 343-1 (R0/S4)         General       Parameters         If Set MAC address / use ISD protocol         MAC address:       00-0E-8C-09F0-1D         If IP grotocol is being used         IP address:       172.16.43.2         Subnet:       Po not use router         Image: Constraint of the image of
5.	Save and compile the hardware configuration of the S7-300 and then load the configuration into the S7-300 CPU.	INATIC 300         Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Option Edit Insert View Option Edit Insert PLC View Option Edit Insert V

### 2.1.3 Entering the IP address of CP443-1 Advanced in the Hardware Configuration and downloading the configuration into the CPU

After you have assigned the IP address 192.168.99.121 and subnet mask 255.255.255.0 to CP343-1 you enter the assigned IP address in the Hardware Configuration.

No.	Configuration step	Note	
1.	In the SIMATIC Manager you mark the SIMATIC S7 400 station and double-click "Hardware" in order to open the Hardware Configuration of the S7-400 station.	SIMATIC Manager - S7 File Edit Insert PLC View Options Window Help S7 C:\Program Files\Siemens\Step7\S7Proj\S7_communica SIMATIC 416-3 SIMATIC 416-3 SIMATIC 315 CPU 416-3 PN/DP CP 443-1 Advanced	
2.	In the Hardware Configuration of S7- 400 you double-click the PROFINET interface of CP443-1 Advanced. The Properties dialog of the PROFINET interface opens.	INATIC 416-3         Station Edit Insert PLC View Options Window Help         Image:	
3.	In the Properties dialog of the PROFINET interface you click the "Properties" button to open the "Properties - Ethernet interface PN- IO" dialog.	Properties - CP443-1GX20 (R0/S4.3)       X         General Addresses IP Configuration PR0FINET Synchronization Media Redundancy       Short description:         Short description:       PN0         Device name:       F24131GX21         ✓ Support device replacement without exchangeable medium         Interface         Type:       Ethernet         Device number:       0         Address:       192.168.99.121         Networked:       Yes         Comment:       Yes         DK       Cancel	

No.	Configuration step	Note
4.	Enter the IP address 192.168.99.121 and the subnet mask 255.255.255.0. Assign a subnet to the PROFINET interface of CP443-1 Advanced. In this example the subnet assigned to the PROFINET interface of CP443- 1 Advanced is different to that assigned to the PROFINET interface of CP343-1. Apply the settings with "OK".	Properties - Ethernet interface PN-ID (R0/54.3)       X         General       Parameters            Set MAC address:        Set MAC address:             IP address:        192.168.99.121             Subnet:           © not use router             Subnet:           Subnet:             Hensel(1)           Pioperties             OK           Cancel
5.	In the Hardware Configuration of S7- 400 you double-click the GBIT interface of CP443-1 Advanced. The Properties dialog of the GBIT interface opens.	Image: State of the second state o
6.	In the Properties dialog of the GBIT interface you click the "Properties" button to open the "Properties - Ethernet interface GBIT" dialog.	Properties - GBIT - (R0/S4.1)       General       Short ID:     GBIT       Device name:     GBIT       Interface       Type:     Ethernet       Device non:     0       Address:     172.16.49.33       Networked:     Yes       Properties       Commgnt:       ØK     Cancel

No.	Configuration step	Note
7.	Activate the "Set MAC address / Use ISO protocol" function and enter the MAC address 00-0E-8C-DB-D2-98 of CP443-1 Advanced. Enter the IP address 172.16.49.99 and the subnet mask 255.255.00. Assign the same subnet to the GBIT interface of CP443-1 Advanced as to the PROFINET interface of CP343-1. Apply the settings with "OK".	Properties - Ethernet interface GBIT (R0/S4.1)         General       Parameters         If       Set MAC address / use ISD protocol         MAC address:       00-0E-8C-D8-D2-38         IP address:       172.16.49.39         Subnet mask:       255.255.00         Image: Subnet:       Image: Subnet:
8.	Save and compile the hardware configuration of the S7-400 and then load the configuration into the S7-400 CPU.	IMATIC 416-3         Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options Window Help         Image: Station Edit Insert PLC View Options View Options Window Help         Image: Station Edit Insert PLC View Options View Option View Options View Option View Options View Options View Options View Option View Options View Options View Options View Options View Options View Options View Option View Options View OptionsView Option View Option View OptionsView OptionsView OptionsView

## 2.2 Configuring the S7 Connection Bilaterally

Once you have completed configuration of CP343-1 and CP443-1 Advanced and have downloaded the hardware configuration into the S7-300 CPU and the S7-400 CPU, then you configure the S7 connection for data exchange between S7-300 and S7-400 by way of Industrial Ethernet CPs.

The function blocks and system functions below are used for data exchange by way of S7 connections configured bilaterally in S7-300 and S7-400.

- FB/SFB12 "BSEND" and FB/SFB13 "BRCV"
- FB/SFB8 "USEND" and FB9 "URCV"
- FB/SFB14 "GET" and FB/SFB15 "PUT"

**Note** If you use the BSEND and BRCV or USEND and URCV services for data transfer, you must configure the S7 connection bilaterally for S7-300 and S7-400, because the services are based on the client-client principle.

You can use the PUT and GET services for data transfer by way of S7 connections configured unilaterally as well as by way of S7 connections configured bilaterally. They are based on the client-server principle.

Below we describe how to configure a specified and an unspecified S7 connection for S7-300 and S7-400.

### 2.2.1 Configuring a specified S7 connection

If the S7-300 and S7-400 between which there is data exchange are configured in the same STEP 7 project, then you configure a specified S7 connection.

The connection parameters below are used for the S7 connection in this example.

Connection parameters	S7-300	S7-400
Connection partners	S7-400 CPU	S7-300 CPU
Connection type	S7 connection	S7 connection
IP address	172.16.43.2	172.16.49.99
MAC address	00-0E-8C-D9-F0-1D	00-0E-8C-DB-D2-98
Partner IP address	172.16.49.99	172.16.43.2
Partner MAC address	00-0E-8C-DB-D2-98	00-0E-8C-D9-F0-1D
Connection setup	Active	Passive
ID (connection number)	2	2
LADDR (module start address)	W#16#0100	W#16#3FFA
Local TSAP	10.04	11.02
Partner TSAP	11.02	10.04

No.	Configuration step	Note
1.	In the SIMATIC Manager you open the STEP 7 project that contains the configurations of S7-300 and/or S7- 400 between which the data is to be exchanged over an S7 connection. By means of the menu Options → Configure Network you open NetPro where you configure the S7 connection.	SIMATIC Manager - S7         File Edit Insert PLC View Options Window Help         Customize         ST C: Program Files         ST C: Program Files         SIMATIC 416-3         SIMATIC 315         Rewire         Run-Time Properties         Compare Blocks         Reference Data         Define Global Data         Configure Network         Simulate Modules         Configure Process Diagnostics         CAX Data         Set PG/PC Interface
2.	Mark the CPU of the SIMATIC 300 station and create a new connection by means of the menu Insert → New Connection	

Follow the instructions below to configure a specified S7 connection.

No.	Configuration step	Note
3.	You configure the connection partner and the type of connection in the "Insert New Connection" dialog. Select the S7-400 CPU as connection partner. Select "S7 connection" as the connection type. Then click the "Apply" button to open the Properties dialog of the S7 connection.	Insert New Connection         Connection Partner         In the current project         S7         SIMATIC 416-3         In unknown project         Project:         S7         Station:         SIMATIC 416-3         Module:         CPU 416-3 PN/DP         Connection         In unknown project         To project:         S7         Station:         SIMATIC 416-3         Module:         CPU 416-3 PN/DP         Connection         Iype:         S7 connection         Iype:         S7 connection         Iype:         S7 connection         Ivpe:         S7 connection         Ivpe:         S7 connection         Ivpe:         S7 connection
4.	In the Properties dialog of the S7 connection → "General" tab you determine the connection number by means of the block parameter "ID". You specify the connection number at the "ID" input parameter of the function blocks or system functions used for sending and receiving the data. The function blocks and system functions are called in the user program of the CPU. Activate the function "Active connection establishment" because the S7-300 actively establishes the S7 connection.	Properties - S7 connection         General       Status Information         Local Connection End Point       Block Parameters         Eved configured dynamic connection       Local ID (Hex)         @ne-way       VE Eglabish an active connection         @connection Path       Logal         Logal       Pattger         End Point:       SIMATIC 315/ CPU 315-2 OP         Integrace:       CP 343-1(R0/S4)         Subnet:       Ethernet(1) [Industrial Ethernet]         Address:       00-0E-8C-D9-F0-1D         OK       Cancel

No.	Configuration step	Note
5.	In the "Properties" dialog of the S7 connection → "General" tab you see that the S7 connection is established between the addresses 00-0E-8C- D9-F0-1D and 00-0E-8C-DB-D2-98, i.e. the data is exchanged between S7-300 and S7-400 via CP343-1 and the GBIT interface of CP443-1. Click on the "Address Details" button.	Properties - S7 connection         General Status Information         Local Connection End Point         Decad Decade Connection         Decad Decade Connection         Decade Connection Path         Logal         Decade Connection Path         Logal         Partiger         End Point         CD         Intigrace:         CP 3431(R0/S4)         Subnet:         Ethernet[1] [Industrial Ethernet]         Ethernet[1] [Industrial Ethernet]         Address:         00-0E-8C-D9-F0-1D         DK       Cancel
6.	In the "Address Details" dialog the local connection end point in the S7- 300 and the connection end point in the communication partner are defined with the local TSAP and the partner TSAP respectively. The connection resource "10" and the CP's rack and slot are specified as the local TSAP in the S7-300 station. The connection resource "11" and the rack and slot of the S7-400 CPU are specified as the partner TSAP. Click on the "Close" button to close the dialog.	Address Details       End Point:       Local       Partner         End Point:       SIMATIC 315/ CP 3431       SIMATIC 416-3/ CP 416-3 PN/DP         Back/Slot:       0       4       0       2         Connection Resource       10       11       11         TSAP:       10.04       Slot of the CP in the S7-300 station       11.02       Slot of the S7-400 CPU         Iocal TSAP in the S7-300 station       Iocal TSAP in the S7-400 station       S7 Subnet ID:       0468 - 0006       0468 - 0006         Close       Help       Help       Help       Help       Help
7.	Mark the CPU of the SIMATIC 300 station. The configured S7 connection is now displayed in the connection table.	Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple intervence         Image: Simple intervence       Simple intervence       Simple intervence       Simple interv
8.	Mark the CPU of the SIMATIC 400 station. The configured S7 connection is now displayed in the connection table.	Simple in the initial initialini initini initial initialia initial initial initial initial init

No.	Configuration step	Note
9.	Once you have completed the connection configuration, you save and compile the configuration. Mark the SIMATIC 300 station and download the configuration into the S7-300 CPU. Then mark the SIMATIC 400 station and download the configuration into the S7-400 CPU.	SIMATIC 300         CPU DP CPU DP         CPU DP
10.	<ul> <li>Call the function blocks below in the user program of the S7-300.</li> <li>FB12 "BSEND" and FB13 "BRCV" or</li> <li>FB8 "USEND" and FB9 "URCV" or</li> <li>FB14 "GET" and FB15 "PUT"</li> </ul>	You will find function blocks in the library "SIMATIC_NET_CP $\rightarrow$ CP $\rightarrow$ CP 300 $\rightarrow$ Blocks". At the link below is a sample program for the S7-300 with the call of the function blocks FB12 "BSEND" and FB13 "BRCV". http://support.automation.siemens.com/WW/view/de/18 516182 At the link below is a sample program for the S7-300 with the call of the function blocks FB8 "BSEND" and FB9 "BRCV". http://support.automation.siemens.com/WW/view/de/22 791526 At the link below is a sample program for the S7-300 with the call of the function blocks FB14 "GET" and FB15 "PUT". http://support.automation.siemens.com/WW/view/de/18 610307
11.	Call the system functions below in the user program of the S7-400. • SFB12 "BSEND" and SFB13 "BRCV" or • SFB8 "USEND" and SFB9 "URCV" or • SFB14 "GET" and SFB15 "PUT"	These system functions are available in the library "Standard Library → System Function Blocks → Blocks". At the link below is a sample program for the S7-400 with the call of the system functions SFB14 "GET" and SFB15 "PUT". <u>http://support.automation.siemens.com/WW/view/de/18</u> <u>19293</u>

### 2.2.2 Configuring an unspecified S7 connection

If the S7-300 and S7-400 between which there is data exchange are configured in different STEP 7 projects, then you configure an unspecified S7 connection.

The connection parameters below are used for the S7 connection in this example.

Table 2-7

Connection parameters	S7-300	S7-400
Connection partners	Unspecified	Unspecified
Connection type	S7 connection	S7 connection
IP address	172.16.43.2	172.16.49.99
MAC address	00-0E-8C-D9-F0-1D	00-0E-8C-DB-D2-98
Partner IP address	172.16.49.99	172.16.43.2
Partner MAC address	00-0E-8C-DB-D2-98	00-0E-8C-D9-F0-1D
Connection setup	Active	Passive
ID (connection number)	3	3
LADDR (module start address)	W#16#0100	W#16#3FFA
Local TSAP	11.04	12.02
Partner TSAP	12.02	11.04

### Note

The configurations of the connection parameters for the S7-300 and the S7-400 must match.

#### Configuring an unspecified S7 connection for the S7-300

Follow the instructions below to configure an unspecified S7 connection for the S7-300.

No.	Configuration step		Note	
No.	Configuration step         In the SIMATIC Manager you open the STEP 7 project that contains the configuration of S7-300 which is to send and receive the data over an S7 connection.         By means of the menu Options → Configure Network you open NetPro where you configure the S7 connection.	SIMATIC Manager - S7 File Edit Insert PLC View S7 C:\Program Files S7 SIMATIC 416-3 SIMATIC 315	Note Options Window Help Customize Customize Customize Change Log Text Libraries Language for Display Devices Manage Multilingual Texts Rewire Run-Time Properties Compare Blocks Reference Data Define Global Data Configure Network Simulate Modules Configure Process Diagnostics	
		Set PG/PC Interface	-	



No.	Configuration step	Note
4.	In the Properties dialog of the S7 connection → "General" tab you determine the connection number by means of the block parameter "ID". You specify the connection number at the "ID" input parameter of the function blocks used for sending and receiving the data. The function blocks are called in the user program of the CPU. Activate the function "Active connection establishment" because the S7-300 actively establishes the S7 connection.	Properties - S7 connection         General Status Information         Local Connection End Point         Determine         Integration         Determine         Integration         Determine         Integration
5.	In the Properties dialog of the S7 connection → "General" tab you enter the IP address of the communication partner, i.e. in this example you enter the IP address 172.16.49.99 of CP443-1 Advanced. Click on the "Address Details" button.	Properties - S7 connection         General Status Information         Local Connection End Point         Exect configured dynamic connection         © Derviso         © Establish an active connection         © Send operating mode messages         Connection Path         Logal         Partger         End Point:         Connection Path         Logal         Partger         Integrace:         CP 343 1(R0/S4)         Unknown         Subnet:         Ethernet[1] (Industrial Ethernet]         Integrace:         TCP/IP IF         Address:         IT2-16.43.2         TCP/IP IF
6.	In the "Address Details" dialog the local connection end point in the S7- 300 and the connection end point in the communication partner are defined with the local TSAP and the partner TSAP respectively. The connection resource "11" and the CP's rack and slot are specified as the local TSAP in the S7-300 station. For the partner you enter the rack and slot of the S7-400 CPU and select the connection resource for the partner so that the local TSAP of the S7-400 is defined as the partner TSAP. Apply the settings with "OK".	Address Details       Example         Local       Partner         End Point:       SIMATIC 3157         Black/Slot:       0       4         Connection Resource       11       12         Inext       Slot of the CPU         Isack/Slot:       0         Inext       12         Inext       12         Inext       12.02         Slot of the CPU         Inext       12.02         Inext       10.02         Inext       10.02

No.	Configuration step	Note
7.	Mark the CPU of the SIMATIC 300 station. The configured S7 connection is now displayed in the connection table.	Image: Similar Control (Street Fic) (St
8.	Once you have completed the connection configuration, you save and compile the configuration. Mark the SIMATIC 300 station and download the configuration into the S7-300 CPU.	NetPro - [IoT (Network) D:\Projects\IoT]         Network Edit Insert PLC View Options Window Help         Image: State of the second compile         Ethernet(1)         Industrial Ethernet         Save and compile         download         Ethernet(2)         Industrial Ethernet         MPI(1)         MPI         PROFIBUS(1)         PROFIBUS         Image: SIMATIC 300         Image: SIMATIC 300 <t< td=""></t<>
9.	<ul> <li>Call the function blocks below in the user program of the S7-300.</li> <li>FB12 "BSEND" and FB13 "BRCV" or</li> <li>FB8 "USEND" and FB9 "URCV" or</li> <li>FB14 "GET" and FB15 "PUT"</li> </ul>	You will find function blocks in the library "SIMATIC_NET_CP $\rightarrow$ CP $\rightarrow$ CP 300 $\rightarrow$ Blocks". At the link below is a sample program for the S7-300 with the call of the function blocks FB12 "BSEND" and FB13 "BRCV". http://support.automation.siemens.com/WW/view/de/18 516182 At the link below is a sample program for the S7-300 with the call of the function blocks FB8 "BSEND" and FB9 "BRCV". http://support.automation.siemens.com/WW/view/de/22 791526 At the link below is a sample program for the S7-300 with the call of the function blocks FB14 "GET" and FB15 "PUT". http://support.automation.siemens.com/WW/view/de/18 610307

### Configuring an unspecified S7 connection for the S7-400

Follow the instructions below to configure an unspecified S7 connection for the S7-400.

No.	Configuration step	Note
1.	In the SIMATIC Manager you open	🍠 SIMATIC Manager - S7
	the STEP 7 project that contains the configuration of S7-400 which is to send and receive the data over an S7 connection. By means of the menu Options → Configure Network you open NetPro where you configure the S7 connection.	File       Edit       Insert       PLC       View       Options       Window       Help         Customize       Customize       Ctrl+Alt+E         Access Protection       >         ST C: VProgram       Files       >         ST       SIMATIC 416-3       Language for Display Devices       >         Manage Multilingual Texts       >       >         Rewire       Run-Time Properties          Compare Blocks       Reference Data       >         Define Global Data       Configure Network          Simulate Modules       Configure Process Diagnostics          CAx Data       >
2.	Mark the CPU of the SIMATIC 400 station and create a new connection by means of the menu Insert → New Connection	NetPro - [IoT (Network) D:\Projects\IoT]         Network Edit       Insert       PLC       View Options       Window       Help         Network Coljects       Ctrl+G       Image: Strain Str

No.	Configuration step	Note
3.	In the "Insert New Connection" dialog you select the item "unspecified" as connection partner. Select "S7 connection" as the connection type. Then click the "Apply" button to open the Properties dialog of the S7 connection.	Insert New Connection         Connection Partner         In the current project         S7         S1MATIC 315         CPU 315-2 DP         Unspecified]         All broadcast stations         All multicast stations         All multicast stations         In unknown project         Broject         Station:         Unspecified]         Module         Connection         Lype:       S7 connection         Ivpe:       S7 connection         OK       Apply         Cancel       Help
4.	In the Properties dialog of the S7 connection → "General" tab you determine the connection number by means of the block parameter "ID". You specify the connection number at the "ID" input parameter of the system functions used for sending and receiving the data. The system functions are called in the user program of the CPU. Deactivate the function "Active connection establishment" because the S7-400 is passively involved in establishing the S7 connection.	Properties - S7 connection         General       Status Information         Local Connection End Point       Block Parameters         Expediconfigured dynamic connection       Image: Configured dynamic connection         Image: Connection End Point       Block Parameters         Image: Configured dynamic connection       Image: Connection         Image: Connection Path       Image: Connection Path         Logal       Partger         End Point:       SIMATIC 416-37         Image: CP 443:1 Advanced, GBIT(R0/S4)       Unknown         Intgrace:       CP 443:1 Advanced, GBIT(R0/S4)         Subnet:       Ethernet[1] (Industrial Ethernet]         Address:       172:16:43:93         TCP/IP       Address Details

No.	Configuration step	Note
5.	In the Properties dialog of the S7 connection → "General" tab you enter the IP address of the communication partner, i.e. in this example you enter the IP address 172.16.43.2 of CP343-1. Click on the "Address Details" button.	Properties - S7 connection         General Status Information         Local Connection End Point         Exted confloated dynamic connection         Establish an active connection         Establish an active connection         Send operating mode messages         Details         Connection Path         Logal         End Point:         Connection Path         Logal         Integrace:         CP 4431 Advanced. GBIT(R0/S41)         Unknown         Integrace:         CP 4431 Advanced. GBIT(R0/S41)         Unknown         Integrace:         CP/IP IF         Address:         ITCP/IP IF
6.	In the "Address Details" dialog the local connection end point in the S7- 400 and the connection end point in the communication partner are defined with the local TSAP and the partner TSAP respectively. The connection resource "12" and the rack and slot of the S7-400 CPU are specified as the local TSAP. For the partner you enter the rack and slot of the CP in the S7-300 and select the connection resource for the partner so that the local TSAP of the S7-300 is defined as the partner TSAP. Apply the settings with "OK".	Address Details       Eather         Local       Pather         End Point:       SIMATIC 416-32/ (CPU 416-3 PN/DP       Unknown         Back/Slot:       0       2       0       4         Connection Resource       12       11       Intervention of the CP         Itext:       12.02       11.04       Slot of the CP         Iocal TSAP in the S7-400 station       Iocal TSAP in the S7-300 station       S7 Subnet ID:         OK       Cancel       Help
7.	Mark the CPU of the SIMATIC 400 station. The configured S7 connection is now displayed in the connection table.	Interpret       Statute       Statute

No.	Configuration step	Note
8.	Once you have completed the connection configuration, you save and compile the configuration. Mark the SIMATIC 400 station and download the configuration into the S7-400 CPU.	NetPro - [JoT (Network) D:\Projects\IoT]         Network       Edit         Industrial       Ethermet         Industrial       Ethernet         Ownload       Ethernet(2)         Industrial       Ethernet         MPI(1)       MPI         PROFIBUS(1)       PROFIBUS         SIMATIC 416-3
		CPU MPI/DP PN-IO CP GBIT PN-IO 416-3 PN/DP Advanc
9.	Call the system functions below in the user program of the S7-400. • SFB12 "BSEND" and SFB13 "BRCV" or • SFB8 "USEND" and SFB9 "URCV" or • SFB14 "GET" and SFB15 "PUT"	These system functions are available in the library "Standard Library → System Function Blocks → Blocks". At the link below is a sample program for the S7-400 with the call of the system functions SFB14 "GET" and SFB15 "PUT". <u>http://support.automation.siemens.com/WW/view/de/18</u> <u>19293</u>

### 2.3 Configuring the S7 Connection Unilaterally

Once you have completed configuration of CP343-1 and CP443-1 Advanced and have downloaded the hardware configuration into the S7-300 CPU and the S7-400 CPU, then you configure the S7 connection for data exchange between S7-300 and S7-400 by way of Industrial Ethernet CPs.

Using the function blocks/system functions FB/SFB14 "GET" and FB/SFB15 "PUT" you can also transfer the data over unilaterally configured S7 connections, because they are based on the client-server principle.

### 2.3.1 Configuring an S7 connection unilaterally for the S7-300

Below we describe how to configure an S7 connection unilaterally for S7-300. The connection parameters below are used for the S7 connection in this example.

Connection parameters	S7-300
Connection partners	Unspecified
Connection type	S7 connection
IP address	172.16.43.2
IP address of the communication partner	172.16.49.99
Connection setup	Active
ID (connection number)	4
LADDR (module start address)	W#16#0100
Local TSAP	12.04
Partner TSAP	03.02

Table 2-10

No.	Configuration step	Note
1.	In the SIMATIC Manager you open the STEP 7 project that contains the configuration of S7-300 which is to send and receive the data over an S7 connection. By means of the menu Options → Configure Network you open NetPro where you configure the S7 connection.	SIMATIC Manager - S7         File Edit Insert PLC View Options Window Help         State         ST         ST C: VProgram Files         ST         SIMATIC 416-3         SIMATIC 315         Rewire         Run-Time Properties         Compare Blocks         Reference Data         Define Global Data         Configure Network         Simulate Modules         Configure Process Diagnostics         CAX Data         Set PG/PC Interface
2.	Mark the CPU of the SIMATIC 300 station and create a new connection by means of the menu Insert → New Connection	Network Edit Insert PLC View Options Window Help         Network Edit Insert PLC View Options Window Help         Network Objects Ctrl+G         Ethermet(1)         Industrial Ethermet         PROFINET ID System         Ethermet(2)         Industrial Ethermet         MPI(1)         MPI(1)         PROFIBUS(1)         PROFIBUS         Image: SIMATIC 300         Image: SIMATIC 300

No.	Configuration step	Note
3.	In the "Insert New Connection" dialog you select the item "unspecified" as connection partner. Select "S7 connection" as the connection type. Then click the "Apply" button to open the Properties dialog of the S7 connection.	Insert New Connection         Connection Partner         In the current project         ST         Station:         Unspecified)         Module         Connection         Lype:         ST connection         Lype:         ST connection         Ivpe:         ST connection         OK         Apply         Cancel       Help
4.	In the Properties dialog of the S7 connection → "General" tab you determine the connection number by means of the block parameter "ID". You specify the connection number at the "ID" input parameter when you call the function blocks FB14 "GET" and FB15 "PUT". These function blocks are called in the user program of the CPU and are for sending and receiving data. Activate the function "Active connection establishment" because the S7-300 actively establishes the S7 connection.	Properties - S7 connection         General Status Information         Local Connection End Point         Pred configured dynamic connection         Pred contract (Connection Path         Logal       Partger         Interface:       [Preduction]         Unknown       Pred configured dynamic lithermet]         Interface:       [Industrial Ethernet]         Address:       17216.43.2         TCP/IP       Address Detalis         OK

No.	Configuration step	Note
5.	In the Properties dialog of the S7 connection → "General" tab you enter the IP address of the communication partner, i.e. in this example you enter the IP address 172.16.49.99 of CP443-1 Advanced. Click on the "Address Details" button.	Properties - S7 connection         General Status Information         Local Connection End Point         Development         Development         Development         Development         Detault
6.	In the "Address Details" dialog the local connection end point in the S7- 300 and the connection end point in the communication partner are defined with the local TSAP and the partner TSAP respectively. For the partner you select the connection resource "03", because the S7 connection is configured unilaterally for the S7-300. Specify the rack and slot of the S7- 400 CPU for the partner. The partner TSAP "03.02" is used in this example. Apply the settings with "OK".	Address Details       Patner         Local       Patner         End Point:       SIMATIC 3152         Back/Slot:       0       4         Connection Resource       12         Ihexi:       12.04         Iocal TSAP       12.04         Iocal TSAP in the S7-300 station       Partner TSAP         S7 Subnet ID:       0.468 -0006         OK       Cancel       Help
7.	Mark the CPU of the SIMATIC 300 station. The configured S7 connection is now displayed in the connection table.	Wethork - [S7 (Network) - C: \$7ragram FilestS7_communication]         Wethork Edt Inset: RC Vew Options Window Help         Image: Section of the seccccc of the section of the section of the section of th



### 2.3.2 Configuring an S7 connection unilaterally for the S7-400

Below we describe how to configure an S7 connection unilaterally for S7-400. The connection parameters below are used for the S7 connection in this example.

Tab	le	2-1	2
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Connection parameters	S7-400
Connection partners	Unspecified
Connection type	S7 connection
IP address	172.16.49.99
IP address of the communication partner	172.16.43.2
Connection setup	Active
ID (connection number)	5
LADDR (module start address)	W#16#3FFA
Local TSAP	15.02
Partner TSAP	03.02

No.	Configuration step	Note
1.	In the SIMATIC Manager you open the STEP 7 project that contains the configuration of S7-400 which is to send and receive the data over an S7 connection. By means of the menu Options → Configure Network you open NetPro where you configure the S7 connection.	SIMATIC Manager - S7         File Edit Insert PLC View       Options Window Help         State       Customize       Ctrl+Alt+E         Access Protection       Access Protection         ST C:VProgram Files       Change Log       Access Protection         State       SIMATIC 416-3       Text Libraries       Access Protection         SIMATIC 315       Rewire       Manage Multilingual Texts       Access Protecties         Remine       SimATIC 315       Compare Blocks       Reference Data       Access Diagnostics         Configure Network       Simulate Modules       Configure Process Diagnostics       CAx Data       Access Diagnostics
2.	Mark the CPU of the SIMATIC 400 station and create a new connection by means of the menu Insert → New Connection	Image: Simple content of the second dependence of the second depe

No.	Configuration step	Note
3.	In the "Insert New Connection" dialog you select the item "unspecified" as connection partner. Select "S7 connection" as the connection type. Then click the "Apply" button to open the Properties dialog of the S7 connection.	Insert New Connection         Connection Partner         Image: Im
4.	In the Properties dialog of the S7 connection → "General" tab you determine the connection number by means of the block parameter "ID". You specify the connection number at the "ID" input parameter when you call the system functions SFB14 "GET" and SFB15 "PUT". These system functions are called in the user program of the CPU and are for sending and receiving data. Activate the function "Active connection establishment" because the S7-400 actively establishes the S7 connection.	Properties - S7 connection         General Status Information         Local Connection End Point         Exect configured dynamic connection         Image: Decivery         Image: Deciv

No.	Configuration step	Note
5.	In the Properties dialog of the S7 connection → "General" tab you enter the IP address of the communication partner, i.e. in this example you enter the IP address 172.16.43.2 of CP343-1. Click on the "Address Details" button.	Properties - S7 connection         General Status Information         Local Connection End Point         Exped contigued dynamic connection         Image: Determine Connection         Determine Connection Path         Logal         Pattger         End Point:         SIMATIC 416-37         CPU 416-3 PN/OP         Integrace:         CP 443-1 Advanced, GBIT[R0/S4]         Indensis         Indensis         Indensis         Address:         IT2:16:43:29         TCP/IP Image:         OK       Cancel
6.	In the "Address Details" dialog the local connection end point in the S7- 400 and the connection end point in the communication partner are defined with the local TSAP and the partner TSAP respectively. For the partner you select the connection resource "03", because the S7 connection is configured unilaterally for the S7-400. Specify the rack and slot of the S7- 300 CPU for the partner. The partner TSAP "03.02" is used in this example. Apply the settings with "OK".	Address Details       Patner         Local       Patner         End Point:       SIMATIC 416.37         Back/Slot:       0       2         Connection Resource       15         TSAP:       15.02         Iocal TSAP in the S7-400       Partner TSAP         S7 Subnet ID:       0468 -0006         OK       Cancel
7.	Mark the CPU of the SIMATIC 400 station. The configured S7 connection is now displayed in the connection table.	MetPro-IS7 (Network) C: Program Files(S7_communication]         Industrial Ethernet         Ethernet(2)         Industrial Ethernet         MP(1)         MP(1) <td< td=""></td<>

