

## Industrial Communication for Automation

# simatic net

Brochure • April 2006



**SIEMENS**

# Introduction

## Your requirements

Do you want to bring new products quickly onto the market and at the same time be flexible and in a position to change your product range at short notice and shorten your time-to-market? Do you want to be able to manufacture efficiently at low costs? Do you want to optimize the capacity of your machines/plant and reduce plant shutdown times?

To fulfill these demands, all the machines in your plant must work perfectly together. Therefore, rely upon open, transparent automation communication not just within the whole company but also for external communication. Avoid isolated automation and information technology solutions by assuring:

- A seamless information flow from the actuator/sensor level right through to the management level
- Availability of information at any location
- Quick data exchange between the different plant sections
- Simple and transparent configuration and efficient diagnostics
- Integrated security functions to avoid unauthorised access
- Fail-safe and standard communication via the same connection

## Our offer

Communication networks are of utmost importance for automation solutions. SIMATIC NET – networking for industry offers a wide selection of modular blocks designed for industry, which help to efficiently solve your communication tasks:

- In the different automation areas
- Across the complete workflow
- For the complete plant life cycle
- For all sectors

SIMATIC NET offers solutions which both maximize the benefits of Ethernet and simply integrate field bus systems. Noticeable examples are:






- The penetration of the field level for the use of Industrial Ethernet
- Transparency from the field level through to the management level
- The promotion of mobile communication
- The integration of IT-technologies



# Contents

## Worldwide trends

Decentralization has been gaining worldwide importance for a number of years now. The distributed plant structure can reduce installation, maintenance and diagnostics costs. This involves intelligent devices working locally and being connected together across networks. Openness and flexibility are important in order to expand existing setups and to connect up third party systems. For this reason international boards/committees are defining and standardising the rules for bus systems.

Industrial Ethernet	
<b>Industrial Ethernet</b> (IEEE 802.3, IEEE 802.3u and IEEE 802.11 WLAN) – the international network standard for all levels	
<b>PROFINET</b> – the open Industrial Ethernet standard for automation	
PROFIBUS	
<b>PROFIBUS</b> (IEC 61158/EN 50170) – the international standard for the field level is the worldwide market leader for field busses	
AS-Interface	
<b>AS-Interface</b> (IEC 62026-2/EN 50295) links sensors and actuators using a two-wire cable, as a low-priced alternative to a wiring harness	
KNX	
<b>KNX/EIB</b> (EN 50090, ANSI EIA 776) is the universal bus system for the complete house and building technology. KNX was developed by the Konnex Association on the basis of EIB (European Installation Bus)	

The configurations shown in this brochure should be regarded as example configurations for information purposes only.

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# Industrial Communication for Totally Integrated Automation

With Totally Integrated Automation Siemens is the only vendor of a transparent, uniform product and system range for automation in all branches – from arrival of the raw materials through the production process to the output of the finished goods, from the field level through the production level right up to the management level.

The advantages of Totally Integrated Automation can be seen not just at the design and engineering stage but also during installation, commissioning, operation and maintenance.

Automation solutions can be developed at a minimum of effort allowing a more flexible and quicker adaptation to market demands.

Plants can be extended or altered without having to interrupt production.

Through the increasing use of Industrial Ethernet in automation, two topics within Totally Integrated Automation are becoming more and more important – PROFINET and SCALANCE.

## **PROFINET ... for increasing productivity in your plant**

You need a seamless information flow for your strategic decisions within your company – for the first manufacturing step through operation up to the management level. In order to achieve this you already rely on efficiency and transparency in your engineering.

**PROFINET**, the open and innovative standard based on

Industrial Ethernet fulfils all the demands of industrial automation and guarantees a uniform company-wide communication.

PROFINET enables distributed field devices to be connected directly to Industrial Ethernet and can be used for the solution of synchronous Motion Control applications. In addition,

PROFINET supports distributed automation with the help of component technology, vertical integration, and the solution



of safety-related tasks. Naturally, PROFINET also supports controller-controller communication.

## **SCALANCE ... for the security, flexibility and performance of your industrial communication network**

Totally Integrated Automation from Siemens has proved in successful applications across the globe the dimensions in which transparent solutions can be reached with common tools and uniform mechanisms. A key role in this has been played by the development of SIMATIC NET industrial communication. A new milestone in this development is SCALANCE, the new generation of components for the creation of transparent networks:

- Wired – electrical or optical – or wireless via Industrial Wireless LAN (IWLAN)
- In industry and similar environments.

And this in three different forms:

- The security modules from SCALANCE S are the core of the Siemens security concept for automation, that protects data and networks..
- Based on Industrial Wireless LAN, SCALANCE W ensures transparent communication in areas that are difficult to access with wired technology.
- The Industrial Ethernet Switches (active network components) from SCALANCE X ensure a future oriented network with the right switch for the required task!





A complete solution consists of

- Bus system with
  - passive network components e.g. cables
  - active network components e.g. switches
- Interfaces to connect the automation devices to the bus system
  - integrated interfaces
  - communications processors
- Network transitions e.g. links
- Software for the configuration of networks
- Tools for maintenance and diagnostics

SIMATIC NET offers all necessary components to create a complete system solution and supports the following bus systems:

**Industrial Ethernet** (IEEE 802.3 and 802.3u) – is the international standard for area networks.

At present Industrial Ethernet is the number one network in the LAN landscape, with a market share of over 90%. Industrial Ethernet is ideal for the creation of powerful long distance communication networks.

#### PROFINET –

The international standard uses Industrial Ethernet and makes real-time communication in the field level a reality, also integrating the enterprise level. PROFINET uses existing IT-standards to realize synchronous Motion Control applications, efficient manufacturer-independent engineering and high machine and plant availability on Industrial Ethernet. PROFINET supports distributed automation and enables fail-safe applications, as well as controller-controller communication.

#### PROFIBUS (IEC 61158/EN 50170) –





is the international standard for the field level and the worldwide market leader among field busses. It is the only field bus system that can be used for both manufacturing and process industry applications.

#### AS-Interface (IEC 62026/EN 50295) –

As a low-cost alternative to a cable harness the AS-Interface connects actuators and sensors using a two-wire cable.

The basis for building automation is the worldwide standard **KNX/EIB** (EN 50090, ANSI EIA 776).

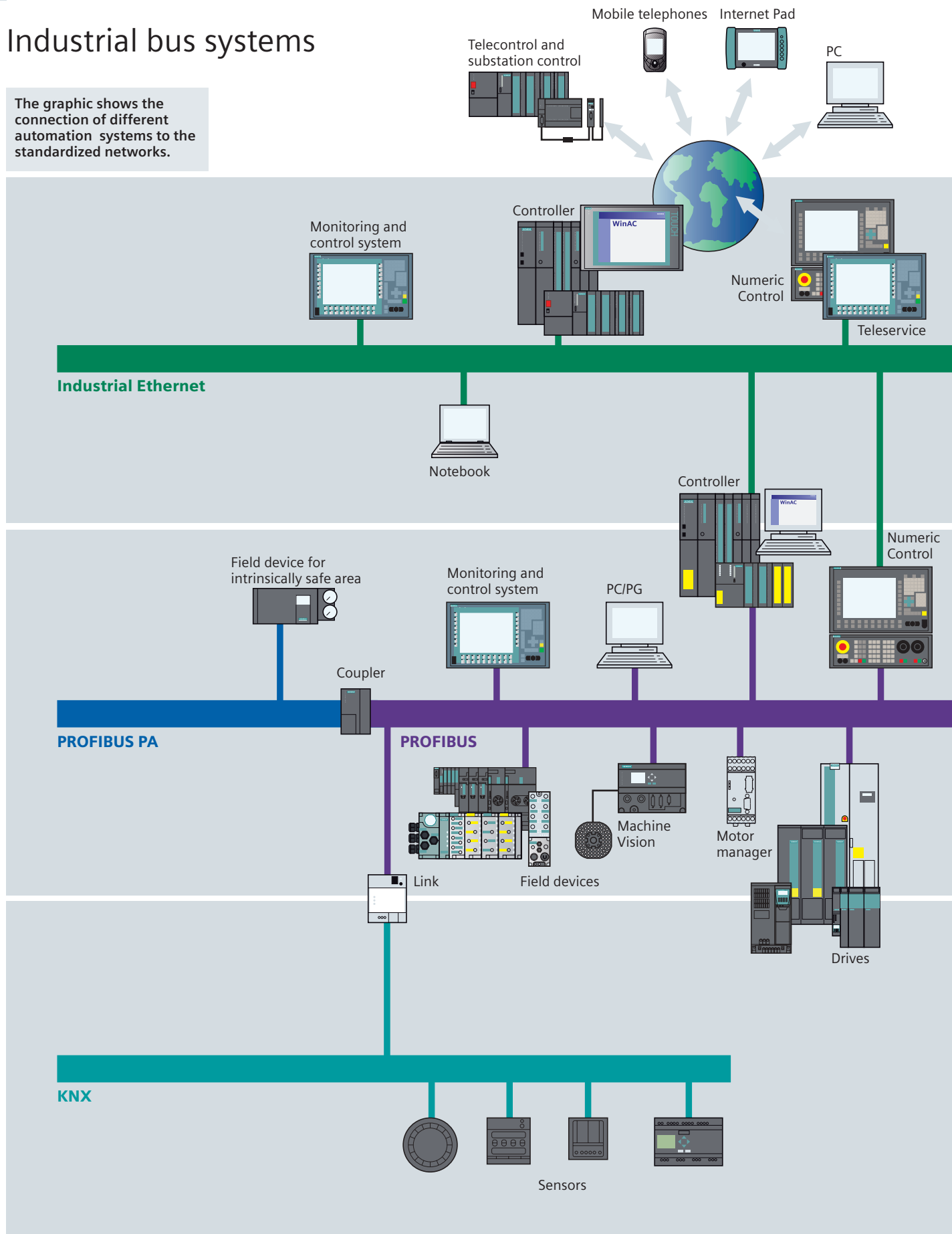
Network transitions are implemented using PLCs or links. Configuration and diagnosis can be performed from any point in the plant.

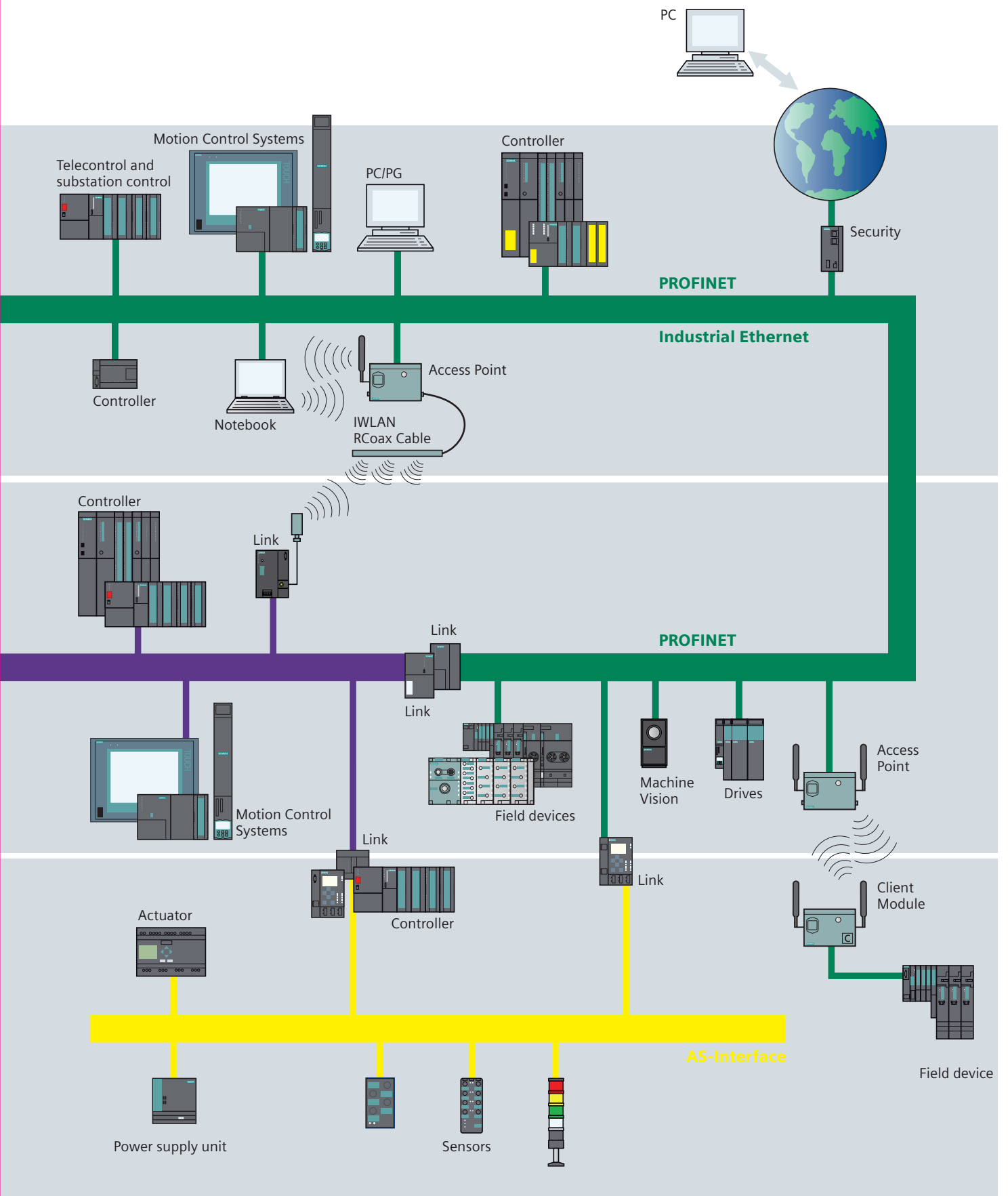
Bus system	Industrial Ethernet	PROFINET	PROFIBUS DP	AS-Interface
				
Level				
Enterprise Resource Planning (ERP) (e.g. PC)	■	□		
Control (e.g. S7-300)	■	■	□	
Motion Control (e.g. SIMOTION)	□	■	■	
intelligent field devices (e.g. ET 200S)	□	■	■	□
simple field devices (e.g. digital I/O-modules)		□	■	■
Sensor/actuator		□	□	■
Drives (e.g. SINAMICS)	□	■	■	
Fail-safe Communication		■	■	■

not suitable □ suitable ■ ideal

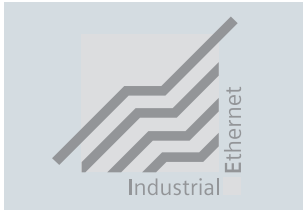
# Industrial bus systems

The graphic shows the connection of different automation systems to the standardized networks.





# Industrial Ethernet



Industrial Ethernet offers a powerful area and cell network in accordance with standard IEEE 802.3 (ETHERNET), IEEE 802.3u and IEEE 802.11 a/b/g/h (Wireless LAN) for industry.

Ethernet is the technology on which the Internet is based and offers many possibilities for worldwide networking.

The many possibilities provided by the Intranet, Extranet and Internet already available in today's office environments can also be utilized in production and process automation.

Ethernet technology, which has been used successfully over many years in combination with switching, full-duplex mode and autosensing, allows you to match your network's performance to your requirements.

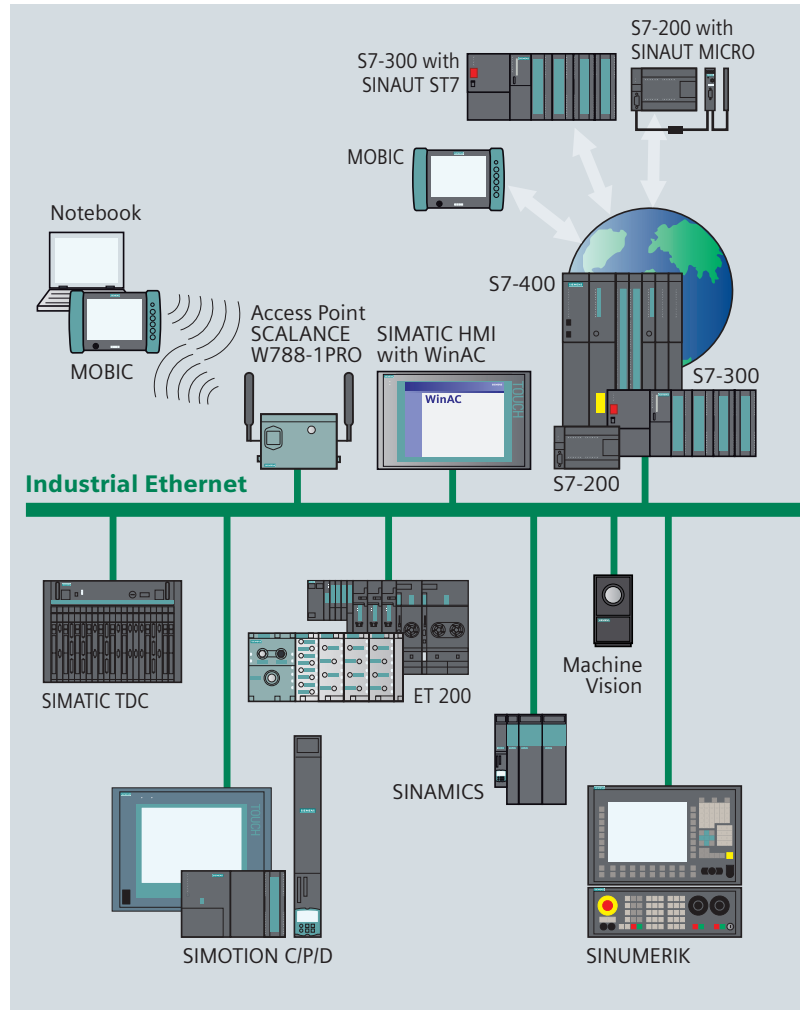
You can choose your data throughput rate to suit your particular needs, as integrated compatibility makes it possible to introduce new technology in stages.

With a market share of over 90% Ethernet is number one worldwide in today's LAN landscape.

Ethernet provides important benefits for your application:

- Fast commissioning thanks to a simple connection technology
- High availability, as existing plants can be expanded without any side effects
- Virtually unlimited communication capabilities due to scalable performance using switching technology and high data rates
- Networking of widely varied types of applications such as office and production applications
- Company-wide communication thanks to WAN (Wide Area Network) link-ups such as ISDN and Internet
- Investment protection thanks to continual compatibility developments
- Data storage for Industrial Wireless LAN (IWLAN)
- "Rapid Roaming" for extremely rapid passing on of moving nodes between various access points.
- Precise time-based assignment of events in the overall plant by means of plant-wide clock control.

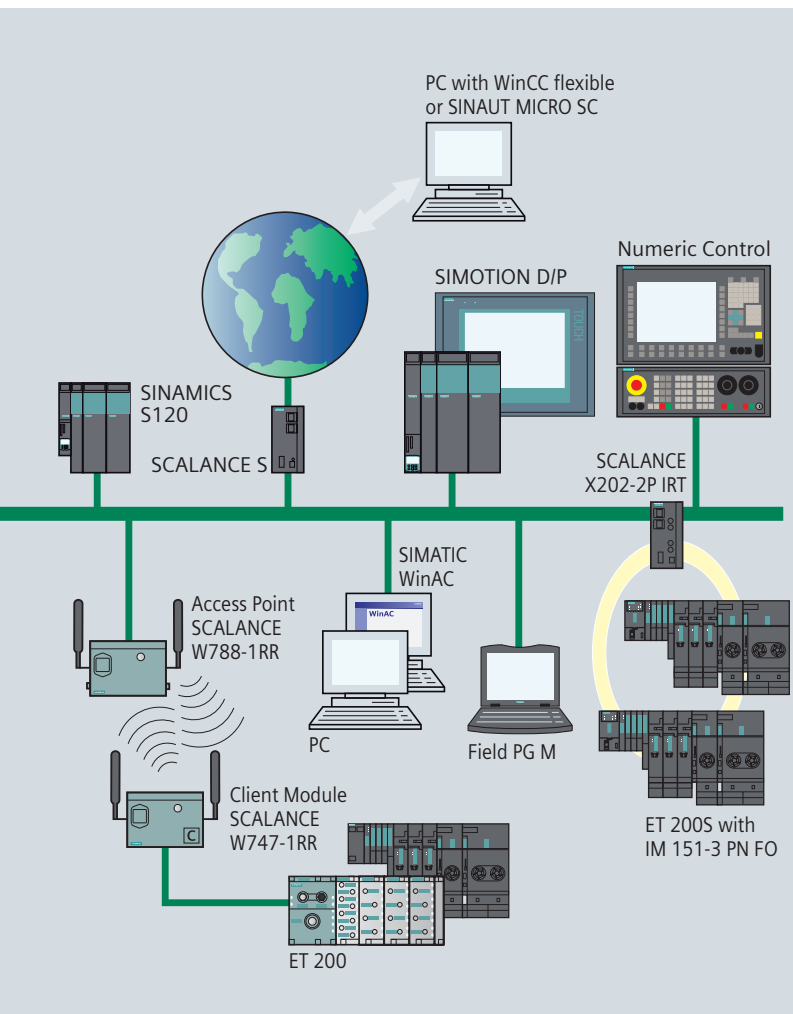
SIMATIC NET uses this well-proven, reliable technology. Siemens has already supplied far more than two million nodes for rough and noise prone industrial sites worldwide.



SIMATIC NET provides important extras to traditional Ethernet technology for use in industrial environments:

- Network components for use in rugged industrial environments
- Fast on-site cable assembly using the FastConnect cabling system with RJ45 technology
- High availability networks thanks to quick redundancy
- Constant monitoring of network components thanks to a simple but effective signalling concept
- Future oriented network components with the new SCALANCE X family.





The following communication functions/services are supported by Industrial Ethernet:

#### PG/OP communication

are integrated communication functions which allow SIMATIC, SIMOTION and SINUMERIK automation systems to communicate with every HMI device (TD/OP) and SIMATIC PG (STEP 7). PG/OP communication is supported by all networks.

#### S7 communication

S7 communication is the integrated communication function (System Function Block) for S7-400 or loadable function blocks for S7-300, which have been optimised for SIMOTION and for

SIMATIC S7/C7/WinAC. They also make it possible to link PCs and workstations to SIMATIC. The amount of useful data per request may not exceed 64 Kbyte.

S7 communication provides simple, powerful communication services as well as a network independent software interface.

#### S5 compatible communication (SEND/RECEIVE)

S5 compatible communication (SEND/RECEIVE) enables SIMATIC S7/C7 to communicate to existing systems, particularly SIMATIC S5 as well as to PCs via PROFIBUS and Industrial Ethernet.

FETCH and WRITE are also available on Industrial Ethernet ensuring that software created for SIMATIC S5 can continue to be used without any modification.

#### Standard communication

Standard communication consists of standardized data communication protocols such as FTP. With Industrial Ethernet fail-safe communication is also possible.

#### OPC

(OLE for Process Control)

is a standardised, open, vendor-independent interface. It is used to interface OPC-capable Windows applications to S7 communication, to S5-compatible communication (SEND/RECEIVE) and to PROFINET.

#### Information technology (IT) with email and Web technology

This form of standard communication links SIMATIC, SIMOTION and SINUMERIK to IT via Industrial Ethernet. In office environments email and Web browsers have become widely used communication resources. The most widely accepted communication path is Ethernet, although telephone lines and Internet are also popular.

#### Socket interface for Industrial Ethernet

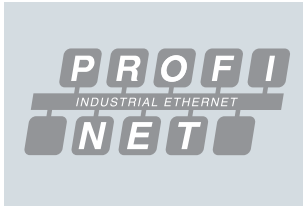
This interface enables data communication with computers via TCP/IP. Users can freely program the data exchange for this PC- and Unix-world interface.

In the SIMATIC S7 and SIMATIC TDC SEND/RECEIVE (S/R) blocks are used to access to TCP/IP.

#### PROFINET communication services

- PROFINET IO to connect distributed field devices to Industrial Ethernet
- PROFINET CBA for modular plant construction to achieve distributed automation configurations based on ready-made components

# PROFINET – the open standard for automation



PROFINET is the innovative and open Industrial Ethernet standard (IEC 61158) for industrial automation that links devices from the field level right through to the management level.

Through its transparency PROFINET supports plant-wide engineering and uses IT standards, even in the field level.

Existing field bus systems e.g. PROFIBUS can be simply integrated without changes in the existing devices.

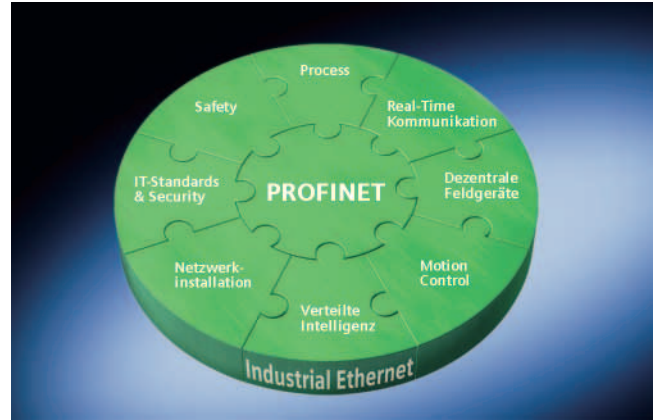
PROFINET takes account of:

## Real-time communication

PROFINET is based on Industrial Ethernet and uses TCP/IP (Transport Control Protocol/Internet Protocol) for parameterization, configuration and diagnostics. Real-time communication for the transmission of user/process data can take place on the same cable. PROFINET devices support the following real-time features:

### - Real-time (RT)

makes use of different priorities and optimises the communication stack of the bus nodes. This ensures a high performance data transfer in the area of industrial automation using standard network components.

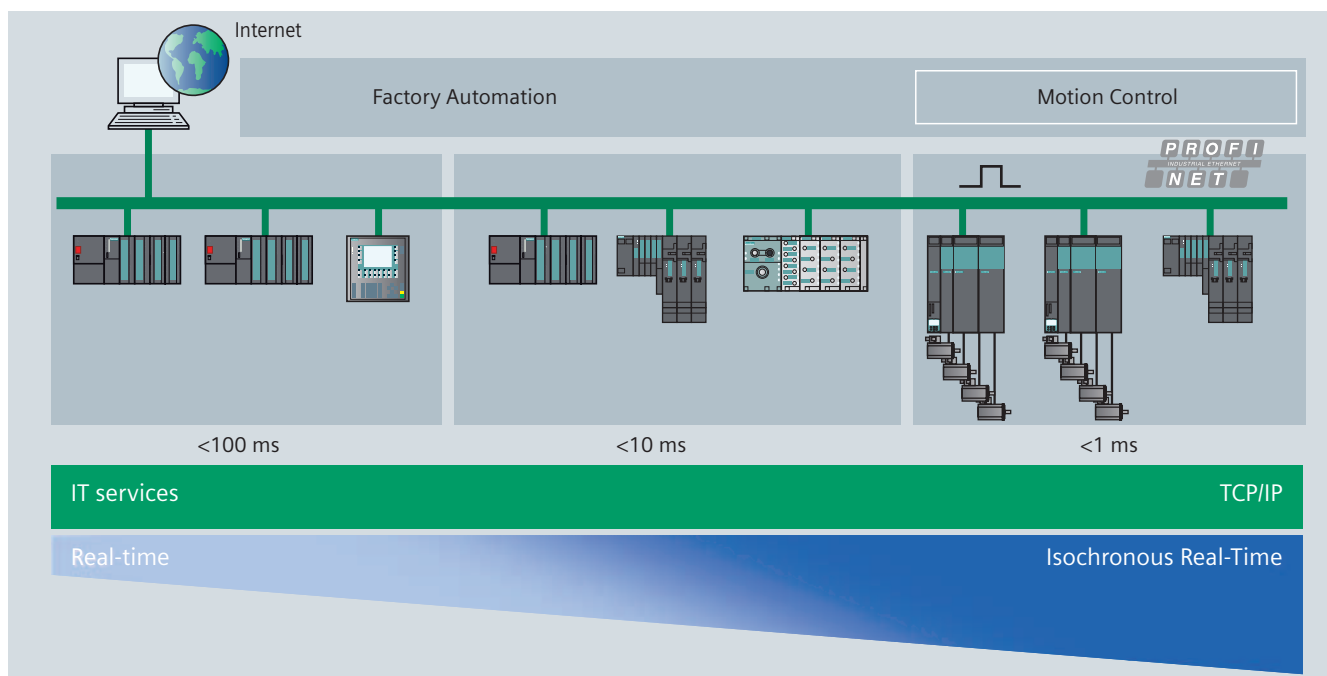


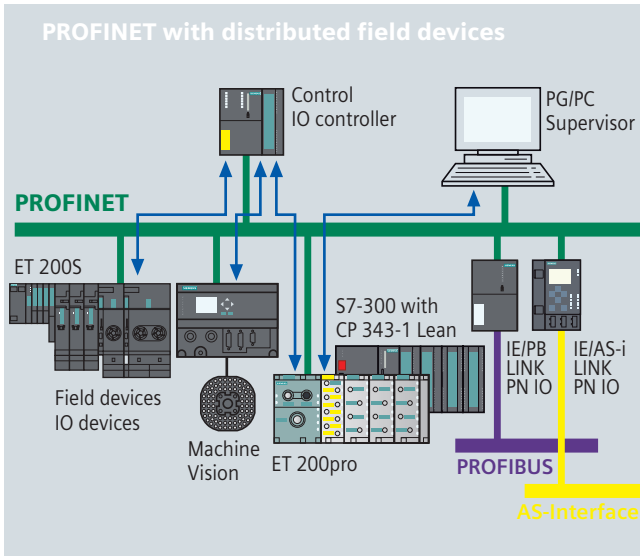
### - Isochronous Real-time (IRT)

For critical tasks, hardware-supported Isochronous Real-Time (IRT) is available - e.g., for motion control applications and high performance applications in factory automation.

The ASICs ERTEC (Enhanced Real-Time Ethernet Controller) supports both real-time features and is the basic technology for integrated system solutions using PROFINET.

As well as being integrated into Siemens products, the ERTEC technology will also be made available to other manufacturers. Support for the development of proprietary devices is provided in the form of development kits and competence centers.





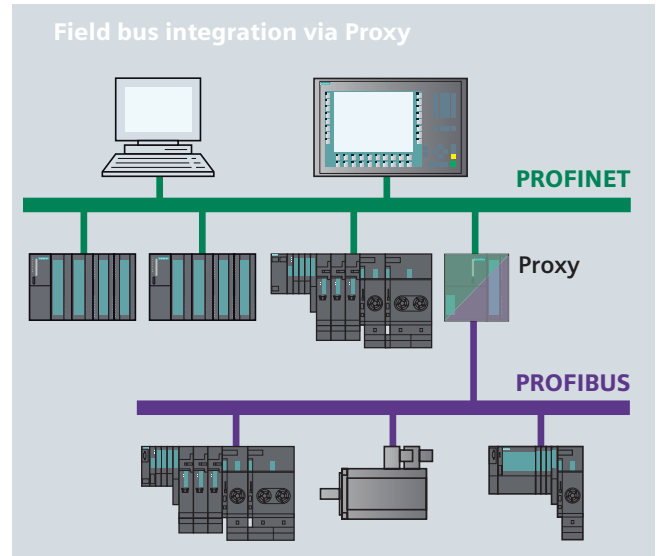
### Distributed field devices (PROFINET IO)

PROFINET enables the connection of distributed field devices (IO devices e.g. signal modules) directly onto Industrial Ethernet. Using STEP 7 these field devices can be assigned to a central controller (so-called IO controller). Existing modules and devices can still be used thanks to PROFINET proxies, thus ensuring investment protection. A configuration with standard and fail-safe modules in one single station is also possible.

An IO supervisor can be used in HMI or other diagnostic programs – similar to PROFIBUS – to provide detailed plant diagnostics. Data transmission takes place using real-time communication, configuration and diagnostics use TCP/IP or IT standards. The simple and field-proven engineering has been transferred from PROFIBUS to PROFINET here. From the viewpoint of programming with STEP 7, there is also no difference between accessing an I/O device via PROFIBUS or PROFINET. Based on the expertise accumulated with PROFIBUS, users can configure field devices on Industrial Ethernet extremely easily.

By retaining the device model, the same diagnostics information is available on PROFINET as on PROFIBUS. Along with device diagnostics, module-specific and channel-specific data can be read from the devices, enabling user-friendly and fast location of faults.

Apart from star, tree and ring structures, PROFINET systematically supports the line structure of the established fieldbuses.



By integrating switch functionality into the devices, as is the case with the S7-300 with CP 343-1 Lean or the distributed field devices SIMATIC ET 200S or ET 200pro, the usual line structures can be formed which are directly adapted to the machine or plant structure. This makes cabling less complex and eliminates the need for components such as external switches.

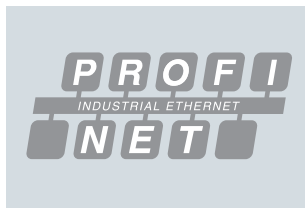
In addition to the products with degree of protection IP20, a complete portfolio is also available with degree of protection IP65, such as the field device ET 200pro or the switch SCALANCE X208PRO.

### Field bus integration

Proxies can be used to integrate existing field bus systems into new networks. This means that, for example, a PROFIBUS or AS-Interface master can access devices connected to Industrial Ethernet via a proxy that supports PROFINET. This means that investments and devices already made by plant and machine builders can be used in future networks and systems.

- PROFINET is the open Industrial Ethernet standard for automation
- PROFINET is based on Industrial Ethernet
- PROFINET uses TCP/IP and IT standards
- PROFINET is Real-time Ethernet and IRT
- PROFINET supports seamless integration of field bus systems
- PROFINET supports fail-safe communication via PROFIsafe

# PROFINET – the open standard for automation

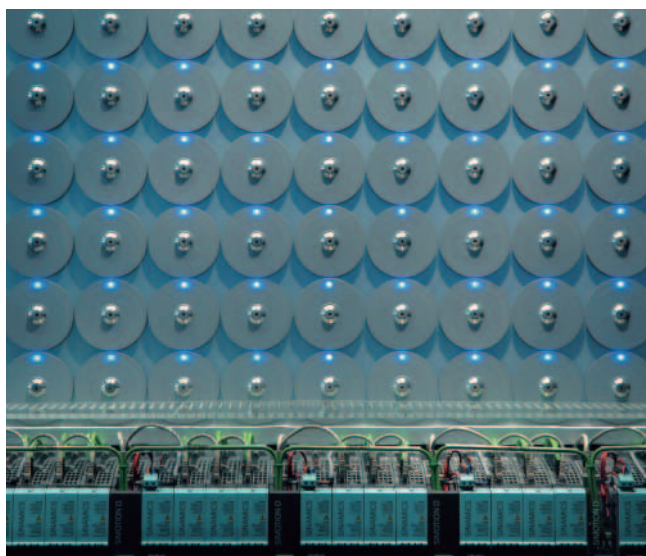


## Motion Control

Isochronous real-time (IRT)  
PROFINET enables the realisation of quick, synchronous drive controls for high performance Motion Control applications with a minimum of

time and effort. The standard drives profile PROFIdrive ensures a manufacturer independent communication between motion controllers and drives independent of the bus system – whether Industrial Ethernet or PROFIBUS.

Isochronous real-time communication and standard IT communication can be used simultaneously on the same cable without disturbing each another.



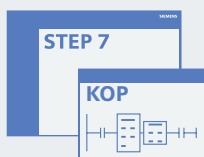
## Distributed intelligence and machine-machine-communication (PROFINET CBA)

PROFIBUS International has defined a standard for the realization of modular plant structures: PROFINET CBA (Component Based Automation). In the area of plant and machine construction the experiences gathered with modularization have been very promising. Frequently required parts are prefabricated so that they can be quickly combined to form an individual unit when an order is placed. PROFINET CBA allows this modularization concept to be extended to automation technology by means of special software components.

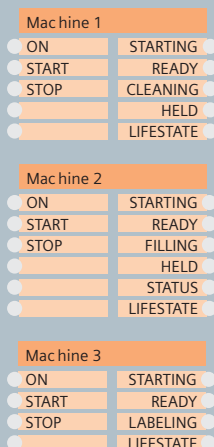
Software components are encapsulated reusable software functions. These can be individual technological functions such as controllers as well as application programs of entire machines. The components work as building blocks that may be flexibly combined - regardless of their internal programming. The communication between software components is exclusively done via component interfaces. From outside only the variables required for the combination with other components are accessible at these interfaces.

Software components are created with STEP 7 or other manufacturer-specific tools. SIMATIC iMap serves to generally configure the overall plant by graphically interconnecting the components. The degree of modularization does not determine the number of required automation devices. Assignment to a central or several distributed automation devices allows optimum utilization of the available automation hardware.

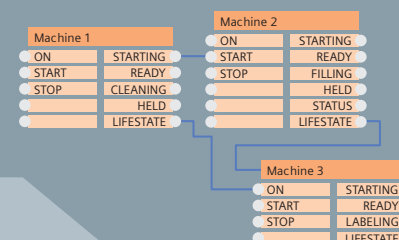
STEP 7:  
Configure devices  
Create user programs



STEP 7:  
Create  
PROFINET  
components



SIMATIC iMap:  
Graphical interconnection  
of components



## Network installation

Although PROFINET fulfils all the requirements for Industrial Ethernet in automation, no expert knowledge is required to install a PROFINET network. Network topologies in line, ring, tree or star structures can be simply realised using rugged cabling and connectors.

The "PROFINET installation guide" gives a detailed description of all the necessary steps required for a successful network installation. Depending on the requirements either copper or fibre optic cables can be selected and devices from various manufacturers can be connected using standardised rugged connectors (IP65/IP67).

For address allocation and network diagnostics PROFINET uses the IT standards DCP (Discover Configuration Protocol) and SNMP (Simple Network Management Protocol).

PROFINET offers new functions and applications for the wireless communication with Industrial Wireless LAN. This replaces technologies that are often subject to wear and tear, such as contact conductors, and it enables the use of automated guided vehicles, and personalized operator panels or maintenance devices. Industrial WLAN is based on the standard but also offers additional functions that enable high-performance connection of field devices to controllers:

- „Data reserving“  
is used to reserve the bandwidth between an access point and a defined client, thus ensuring reliable high performance for this client, regardless of the number of clients operated at the access point.
- „Rapid Roaming“  
for extremely rapid passing on of moving nodes between various access points.



These expansions to the standard enable high-performance wireless applications with PROFINET and SCALANCE W right down to the field level.

## IT Standards & Security

Within the concept of Web integration, data from PROFINET components can be displayed in HTML and XML format. This means that the data from the automation level can be accessed from any PC using a standard Web browser thereby significantly simplifying commissioning and diagnostics.

PROFINET provides a scalable security concept which prohibits data manipulation, unauthorised data access and operator errors without the necessity of expert IT knowledge and without obstructing the flow of production. This is achieved with the software and hardware modules of the SCALANCE S family.

## Safety

The well-proven PROFIBUS safety profile PROFIsafe, which enables the transmission of both standard and safety data on one bus cable, can also be used with PROFINET. Standard switches, proxies and links can also be used for fail-safe communication. Fail-safe communication with Wireless LAN (WLAN) is also possible.

This means that PROFINET also supports standard and fail-safe applications with a uniform configuration across the complete network, both for new plants or for the extension of existing plants.

## Process

PROFINET is the standard for all automation applications. The simple PROFIBUS integration in PROFINET means that even the process industry (including intrinsically safe areas) can be accessed.



# Optical PROFINET network structures with POF/PCF cabling

Optical fibers are recommended as an alternative for copper conductors in the case of strong electromagnetic interferences in the surrounding environment and for open-air plants and if no equipotential bonding is provided or electromagnetic emissions are to be avoided.

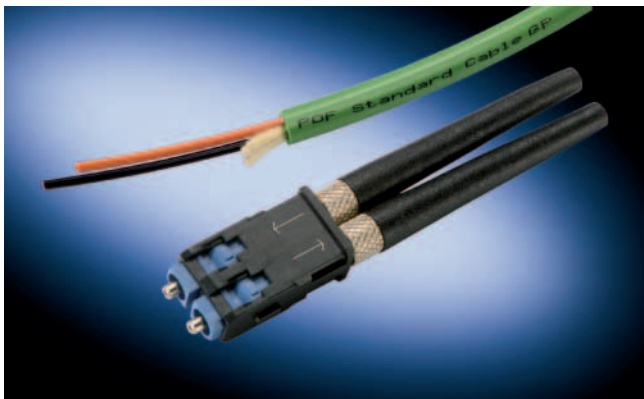
In optical network structures glass-fiber optical waveguides are used for large distances whereas for shorter distances plastic optical fibers made of light guiding plastics like Polymer Optic Fiber (POF) or plastic-coated glass fibers such as Polymer Cladded Fiber (PCF) are employed.

On the basis of Totally Integrated Automation Siemens A&D offers a comprehensive system solution including passive and active network components and distributed field devices with integrated POF/PCF interfaces. To ensure high availability the conductors are monitored for attenuation due to material ageing during commissioning and during network operation.

## Passive network components

The new SC RJ connection system for polymer optic fiber and polymer cladded fiber facilitates fiber optic cabling for machine oriented use. The new SC RJ connectors allow fast and easy assembly on site. They are standardized for PROFINET within the PROFIBUS International organization so that devices of different manufacturers can be interconnected.

Depending on their type, the plastic optical fibers devised for the SC RJ connection system can be used universally or for particular purposes in drag chains.



## Industrial Ethernet switches and media converters

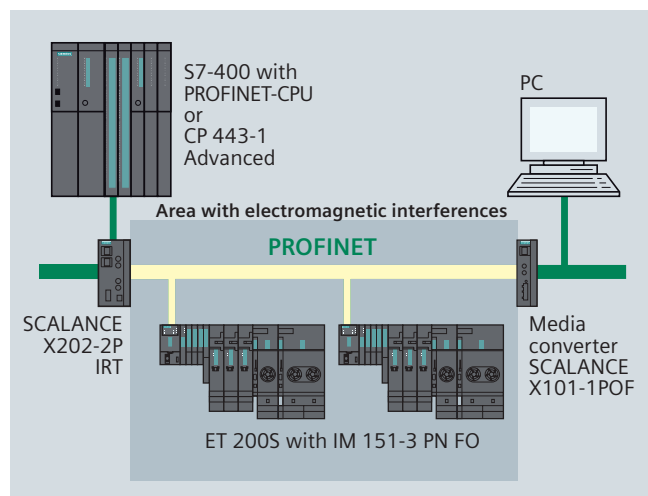
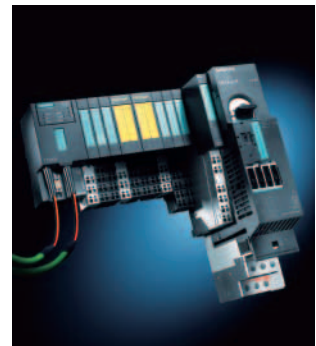
The SCALANCE X101-1POF media converter is ideally suited for the integration of devices with POF interfaces into existing network structures, as it converts electrical into optical signals. The media converter and the SCALANCE X200-4P IRT / X201-3P IRT / X202-2P IRT Industrial Ethernet switches were specially developed for the SC RJ cabling system. The integrated ASIC ERTEC provides the IRT functionality for the switches.

This makes the switches suitable for real-time communication. They can be diagnosed and configured via STEP 7.



## Distributed I/O

By means of the integrated POF interfaces of the new IM 151-3 PN FO interface module and the SC RJ cabling system, the SIMATIC ET 200S product family can be integrated into an optical PROFINET network. This allows, for the first time, the operation of safety-oriented PROFIsafe modules on the ET 200 via optical fiber connection. Existing modules can be used further, which makes them a safe investment. The integrated two-port switch allows easy creation of line structures directly adapted to the machine or plant structure.



# PROFINET products on Industrial Ethernet

## PROFINET CBA



### Programmable controllers

CPU 315-2 PN/DP  
CPU 315F-2 PN/DP  
CPU 317-2 PN/DP  
CPU 317F-2 PN/DP

CPU 319-3 PN/DP  
CPU 414-3 PN/DP  
CPU 416-3 PN/DP  
CPU 416F-3 PN/DP

**NEW**

CPU within a CBA component that allows data to be exchanged with other components over PROFINET and, with the proxy, over PROFIBUS

#### WinAC Basis with PN option

Software PLC, based on WinAC Basis WinAC PN acts as a proxy for PROFIBUS devices



### System interfacing for SIMATIC S7 and SINUMERIK

#### CP 343-1

Communications processor to integrate an existing S7-300 or a SINUMERIK 840D into a CBA application.

#### CP 343-1 Advanced CP 443-1 Advanced

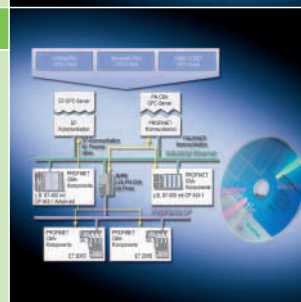
Communications processors with integral switch (CP 443-1 Advanced only) to integrate a SIMATIC S7-300/S7-400 or a SINUMERIK 840D (CP 343-1 Advanced only) into a CBA application.



### System interfacing for PG/PC

#### PN CBA OPC server

Permits direct access to variables in PROFINET CBA components via the OPC interface



### Network transitions

#### IE/PB Link

CBA proxy for integration of existing PROFIBUS devices into a CBA application The IE/PB Link also offers S7 and data set routing



### Engineering Tools

#### SIMATIC iMap

Multi-vendor software for graphic configuring of communication between components



# PROFINET products on Industrial Ethernet

## PROFINET IO

### Programmable controllers

CPU 315-2 PN/DP  
CPU 315F-2 PN/DP  
CPU 317-2 PN/DP  
CPU 317F-2 PN/DP  
CPU 319-3 PN/DP

CPU 414-3 PN/DP  
CPU 416-3 PN/DP  
CPU 416F-3 PN/DP

**NEW**

CPU as IO controller for processing the process signals and for directly connecting field devices to Industrial Ethernet



### System interfacing for SIMATIC S7 and SINUMERIK

#### CP 343-1

Communications processor for the connection of S7-300 or of SINUMERIK 840D to Industrial Ethernet.

Field devices are connected as IO devices via S7-300 to Industrial Ethernet using this.

#### CP 343-1 Lean

Communications processor with integrated 2 port switch for the connection of S7-300 to Industrial Ethernet. The CP allows linking to an IO controller as

intelligent IO device

**CP 343-1 Advanced** **NEW**

**CP 443-1 Advanced**

Communications processors with integrated switch (CP 443-1 Advanced only) as IO controller for the system connection of field devices to SIMATIC S7-300/S7-400 or SINUMERIK 840D (CP 343-1 Advanced only).



### System interfacing for PG/PC

#### CP 1616

PCI module for the connection of PG/PC to Industrial Ethernet with ASIC ERTEC 400 and integrated 4-port real-time switch. CP 1616 can be used both as IO controller and as IO device.

#### CP 1604

PC/104-Plus module for the connection of PC/104-Plus systems and SIMATIC Microbox with PC/104-Plus interface to Industrial Ethernet with ASIC ERTEC 400

and integrated 4-port real-time switch. CP 1604 can be used both as IO controller and as IO device..

#### Development Kit DK-16xx PN IO

Software development kit for CP 1616 and CP 1604 with LINUX driver in source code for the transfer to PC-based operating systems

#### SOFTNET PN IO

Communications software for operation of a PC / workstation as IO controller



### Network transitions

#### IE/PB Link PN IO

PROFINET proxy for transparent interfacing of existing PROFIBUS devices to an IO controller via Industrial Ethernet.

#### IE/AS-i LINK PN IO **NEW**

PROFINET proxy for modular interfacing of existing AS-Interface slaves to an IO controller via Industrial Ethernet.

#### IWLAN/PB Link PN IO

PROFINET proxy for transparent interfacing of existing PROFIBUS devices to an IO controller via Industrial Wireless LAN (IWLAN).



### Distributed IO

IM 151-3 PN  
IM 151-3 PN HF  
IM 151-3 PN FO **NEW**

Interface module for direct connection of ET 200S as IO device, with integrated 2 port switch for configuration of line structures (also via LWL).

#### PN/PN Coupler **NEW**

PROFINET module for a cross-plant, fast and deterministic IO data link between two PROFINET networks.

#### IM 154-4 PN HF

Interface module for direct connection of ET 200pro as IO device with integrated switch for the configuration of line structures with a high degree of protection (IP65/IP67).



## Motion Control & Drives

### CBE 20, CBE 30 **NEW**

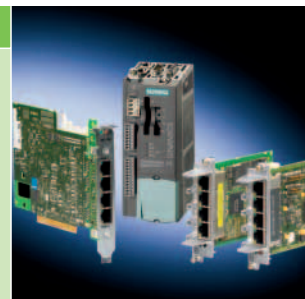
CBE 20 and CBE 30 are the PROFINET boards for connection of SINAMICS S120 or SIMOTION D to PROFINET.

### CU 310 PN **NEW**

Control Unit with PROFINET interface for SINAMICS S120 AC-Drives.

### MCI-PN **NEW**

With MCI-PN SIMOTION P, the PC-based version of SIMOTION, is connected to PROFINET.



## Engineering Tools

### STEP 7 / SIMOTION SCOUT

For configuring in the tried and tested PROFIBUS manner

### SINEMA E **NEW**

For planning, simulating and configuring industrial WLAN applications according to the 802.11 a/b/g standard.



## Technology components

### ERTEC 400

Ethernet Controller with integrated 4-port switch, ARM 946 RISC and PCI interface, data processing for both Real-time (RT) and Isochronous Real-time (IRT) with PROFINET.

### ERTEC 200 **NEW**

Ethernet Controller with integrated 2-port switch, ARM 946 RISC, data processing for Real-time (RT) and Isochronous Real-time (IRT) with PROFINET.

### Development Kit DK-ERTEC 400 PN IO

### Development Kit DK-ERTEC 200 PN IO **NEW**

The development kits support the development of in-house PROFINET IO devices.

### PROFINET IO Development Kit

Development kit based on standard Ethernet ASIC for the development of in-house PROFINET IO devices



## Image processing systems

### VS120

Vision sensor as IO device for object testing.

### VS130-2

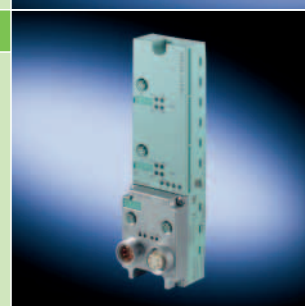
Vision sensor as IO device for reading 2D codes.



## RFID systems

### RF180C **NEW**

RFID communication module for all SIMATIC RF/MOBY identification systems.





# Network components for Industrial Ethernet und PROFINET

## Network infrastructure

### Passive Netzkomponenten

The quick assembly system for SIMATIC NET Industrial Ethernet – FastConnect (FC) – means that the structured cabling known in the office-world can be used in a rugged industrial environment. FastConnect cables can be assembled quickly and easily on-site.

In addition to the range of copper based FastConnect products including industrial installation cables, sockets, plugs and patch cables there is also a wide range of optical transmission media available.

### Industrial Ethernet Switches and media converters

The product family SCALANCE X offers a graded switch portfolio (Entry Level, unmanaged, managed and modular) and media converters.

In addition to the facility for the configuration and diagnostics of SCALANCE X switches using STEP 7, these provide optimized data transmission of PROFINET real-time telegrams through priority assignment derived from IEEE 802.1Q.



The network components control the data flow between the devices on the basis of these priorities.

Switches with copper and optical fiber conductor interfaces and integrated ASIC ERTEC are available for isochronous real-time requirements (IRT).

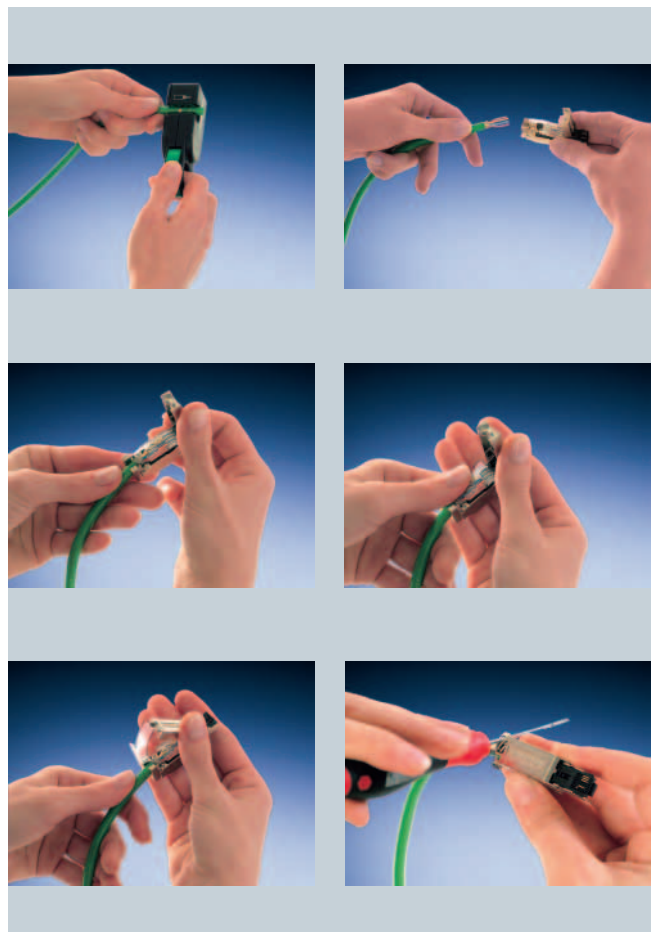
The various media converters of the SCALANCE X product line are ideally suited for converting electrical signals into optical signals.

### Industrial Wireless LAN

SCALANCE W, increased mobility and flexibility using Industrial Wireless LAN components for Industrial Ethernet and PROFINET, also for fail-safe communication.

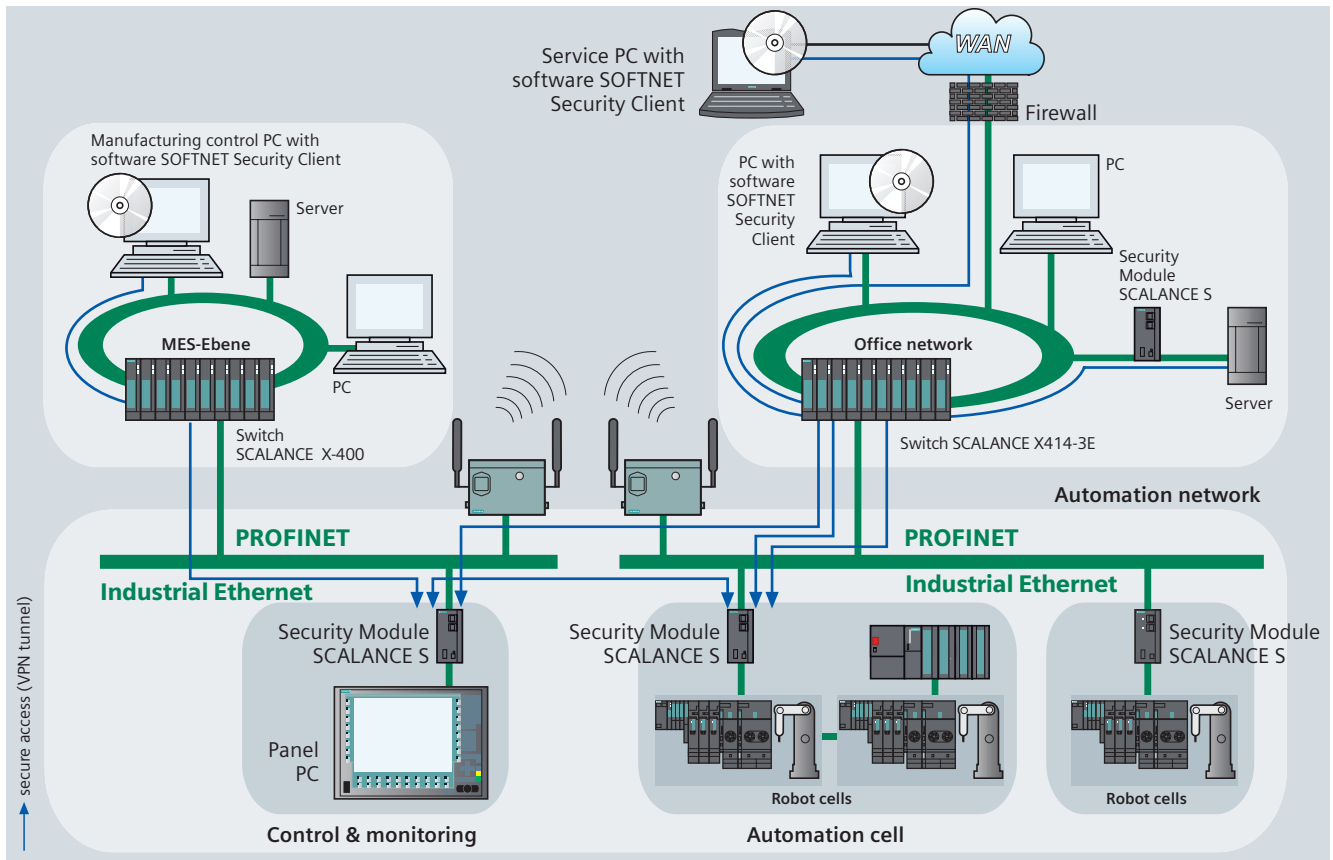
### Industrial Security

SCALANCE S, security modules for protection of automation networks and security when exchanging data between automation systems.





# Industrial Security for automation networks



Modern automation technology is built on communication and the networking of individual production islands. This means that the integration of automation components into office networks and company Intranets is becoming more important:

- Remote access for service purposes
- Increasing use of IT mechanisms such as Web servers and email in automation devices
- Use of wireless LANs

All this means that with industrial communication growing together with the IT world, automation devices are susceptible to the same dangers as we know in the office environment, namely hackers, viruses, worms etc.

The Siemens industrial security concept offers a security solution specifically designed for use in automation technology and fulfilling all the requirements of an industrial environment.

## Advantages of the SCALANCE S security concept

- Protects against spying and data manipulation
- Protects against communication overload

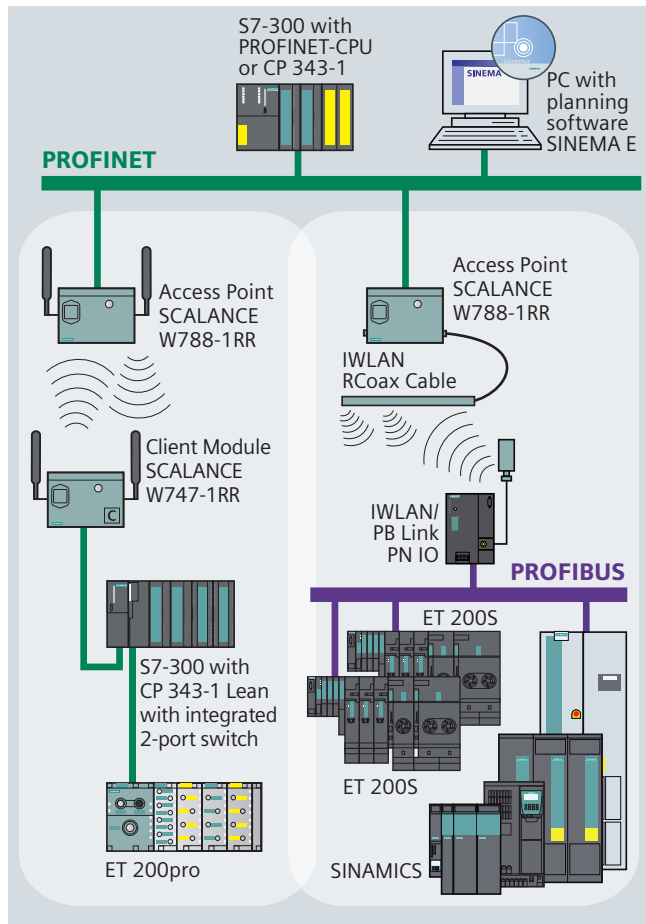
- Protects against mutual influences
- Protects against incorrect addressing
- User friendly and simple configuration and administration without special knowledge about IT security
- No changes or adjustments of the existing network are necessary
- No changes or adjustments of the existing application or network nodes are necessary
- Robust and designed for industry

**SCALANCE S Security Modules** offer scaleable security functionality:

- Firewall to protect automation devices from unauthorised access, independent of the size of the network to be secured
- Alternative or additional VPN (Virtual Private network) for
  - secure authentication of the network nodes and encryption of data transmission
- SOFTNET Security Client for protected access from PCs/laptops
  - to SCALANCE S protected automation devices

Protected communication  
with Safety and Security  
see page 30

# Industrial Mobile Communication



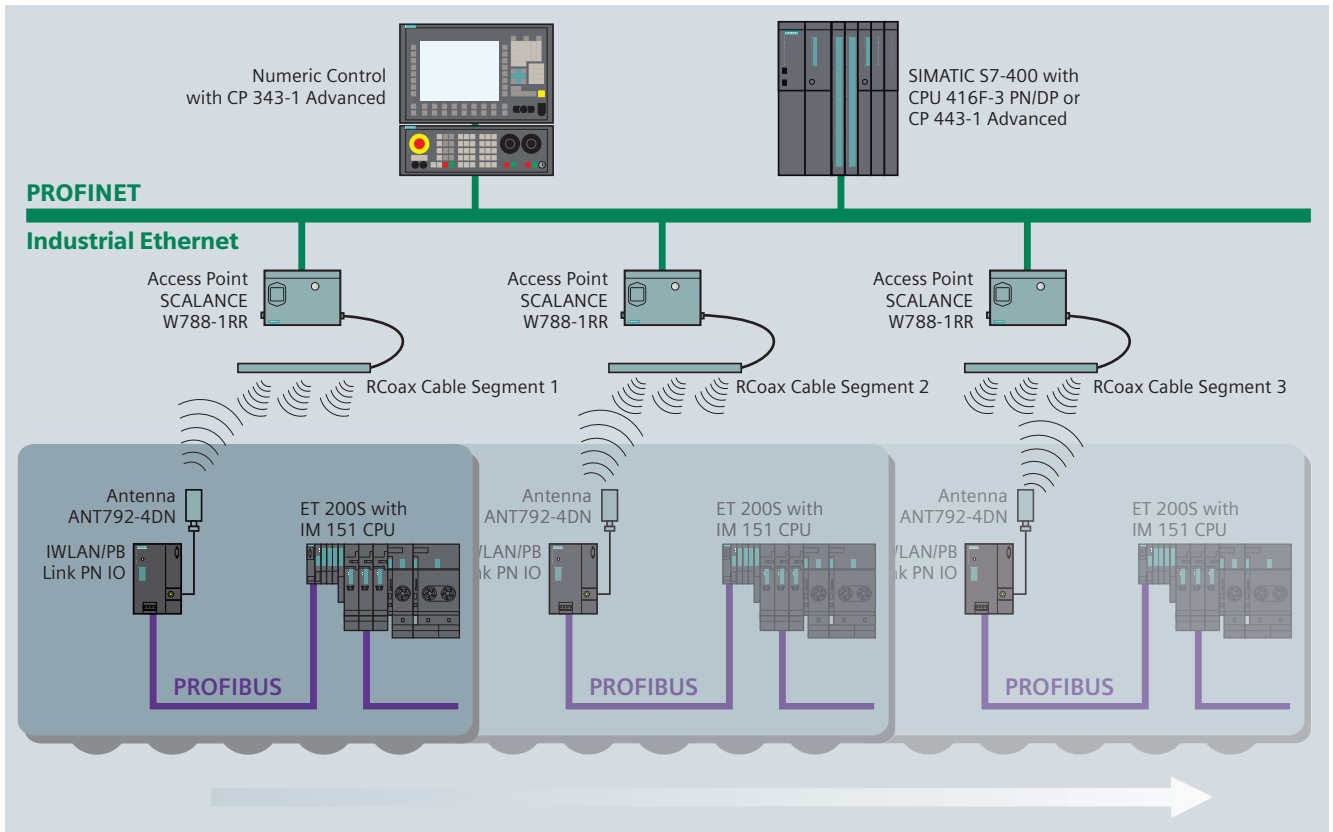
The key to future marketing successes lies in the ability to access data independent of time and place. Processes can be considerably improved by using mobile devices networked across wireless LANs. The great advantage of a wireless solution lies in the simple and flexible accessibility of mobile devices. These advantages can be used by implementing mobile solutions using Industrial Mobile Communication (IMC) products from SIMATIC NET. These products are developed on the basis of international standards e.g. according to IEEE 802.11, GSM, GPRS or UMTS. Fail-safe wireless communication via Industrial Wireless LAN is also possible.

## Advantages of wireless communication networks

- Increase competitiveness by reaching a higher level of flexibility and mobility
- Simplify maintenance work and service costs and reduce plant shut down times while at the same time optimizing the use of staff
- Spare parts lists and manuals can be accessed independent of location
- Business orders can be received and acknowledged online
- Continuous wireless network for voice and data across corporate business areas
- System solutions have been tried and tested as network components, communications processors and software are fully coordinated with wireless devices
- Remote diagnostics from any location helps to reduce service costs
- Hard-to-reach locations can be easily accessed and cabling costs reduced
- Quick commissioning of new installations by reducing the costs of installing the communication network by means of
- SINEMA E planning, simulation and configuration software
- There is no wear and tear or abrasion of rotating and mobile parts of plants
- Low-cost connection of devices which are hard to reach or in aggressive environments

## SCALANCE W – wireless communication

The SCALANCE W products offer a unique combination of reliability, robustness and security in one product. An expansion of the IEEE 802.11 Standard is made available with Industrial Wireless LAN (IWLAN), which is especially significant for industrial customers requiring a deterministic, redundant wireless solution. This is the first time that customers can have a wireless network that can be used for both critical process data (e.g. alarm signal), as well as for standard wireless communication (WLAN) such as service and diagnostics. SCALANCE W components for Industrial Wireless LAN and PROFINET, the Industrial Ethernet standard, provide a mobile solution for new applications down to the field level. The reliability of the wireless network can also be seen in the dustproof, spray water resistant metal housing of the devices (IP65), fulfilling the typically high SIMATIC demands on mechanical stability. The devices are fitted with modern mechanisms to recognize the user (authentication) and to encrypt the data and can be easily integrated into existing security policies. The function "Rapid Roaming" is available for extremely rapid passing on of moving nodes between various access points.



### Applications for RCoax Cable

- In difficult areas for radio transmission (e.g. in tunnels, channels and lift shafts), where the main focus is not on unlimited mobility but on safe data transmission by means of a service-friendly solution without mechanical wear. This is made possible by the defined conical radio field along the RCoax cables.
- The RCoax cables ensure a wear-free and reliable wireless link specially suited for conveyor systems, robots and every type of rail-mounted vehicle (monorail conveyors, driverless transport systems).
- Two cables for Industrial Wireless LAN use with the frequency bands 2.4 GHz and 5 GHz.

### Application examples

- Monorail conveyors
- Automated guided vehicle system (AGVS)
- Cranes
- Stacker cranes
- Transfer lines
- Tool-changing trolleys
- Robots
- Railway stations
- Underground railway systems
- Railway wagons
- Lifts
- Theater stages

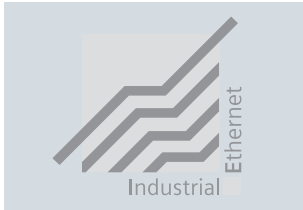
### Additional network components for IWLAN

- IWLAN/PB Link PN IO
- SCALANCE W-700
- Accessories:
  - Antennae
  - Termination Impedance
  - Lighting Protector
  - Power Supply



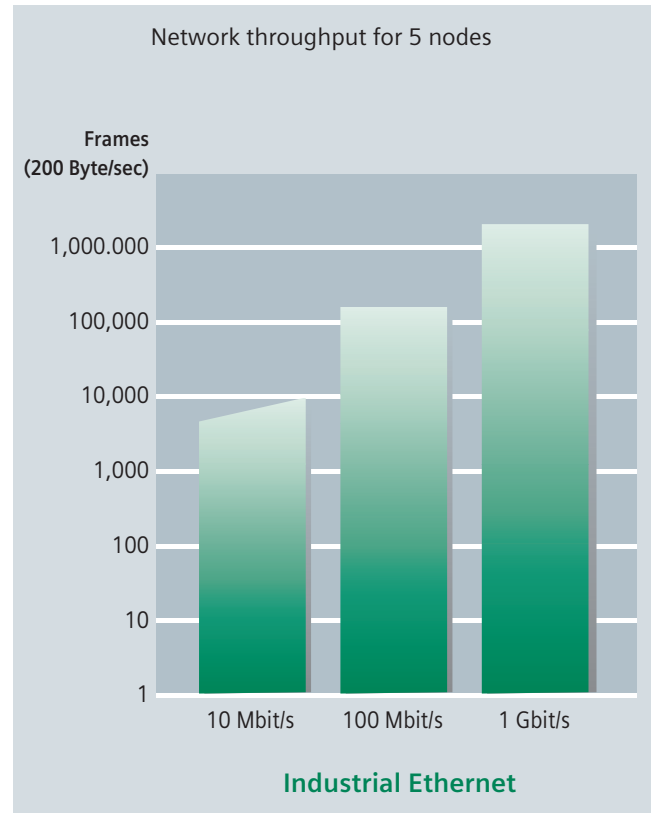
# Industrial Ethernet

## network performance and technologies



New technologies, when optimally used on Industrial Ethernet, can produce performance improvements of up to a factor of 50 or more. These technologies are:

- **Fast Ethernet** with 100 Mbit/s:  
Telegrams are transported much faster than with 10 Mbit/s and therefore reserve the bus for a much shorter time.
- **Gigabit Ethernet** with 1 Gbit/s:  
Compared to Fast Ethernet Gigabit Ethernet is a factor of 10 times faster and transport time on the bus is reduced to a tenth of the time.  
The 8-wire FastConnect cabling system from SIMATIC NET ensures that transmission rates of up to 1 Gbit/s are possible.
- **Full Duplex** excludes collisions:  
The data throughput increases enormously since common retries are unnecessary. Data can be sent and received simultaneously between 2 stations. The data throughput over a Full Duplex connection thus increases to 200 Mbit/s with Fast Ethernet and to 2 Gbit/s with Gigabit Ethernet.
- **Switching** enables parallel communication:  
Dividing the network into segments using a switch reduces the network load. Local data traffic in each network segment is independent of the traffic on the rest of the network, thereby making it possible for several frames to be in transport at the same time. The performance improvements stem from the fact that multiple frames are underway at the same time.
- **Autosensing** is the term used for network nodes (end devices and network components) which automatically detect the transmission rate of a signal (10 Mbit/s, 100 Mbit/s or 1 Gbit/s) and support autonegotiation.



# Active network components for Industrial Ethernet

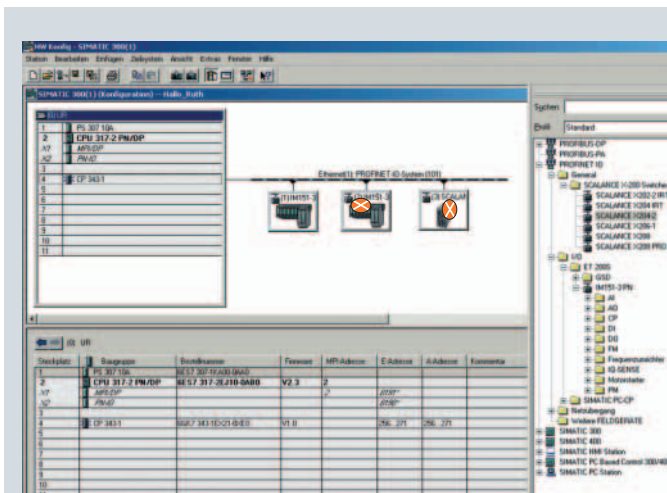
SCALANCE X is the new product family of Industrial Ethernet switches from SIMATIC NET. Switches are active network components aimed at distributing data to specified addressees. The SCALANCE X product range comprises different product lines, each one building on the previous one and optimally developed for the task in hand.

With the SCALANCE X products the network infrastructure is made available for PROFINET applications.



## SCALANCE X005 Entry Level

Unmanaged Switch with five ports and diagnostics on the device for use in machine or plant islands.



## SCALANCE X-100 unmanaged

Switches with electrical and/or optical ports, redundant power supply and signalling contact for use in "local-machine" applications.

## SCALANCE X-100 unmanaged media converter

Media converter for converting electrical signals into optical signals.

## SCALANCE X-200 managed

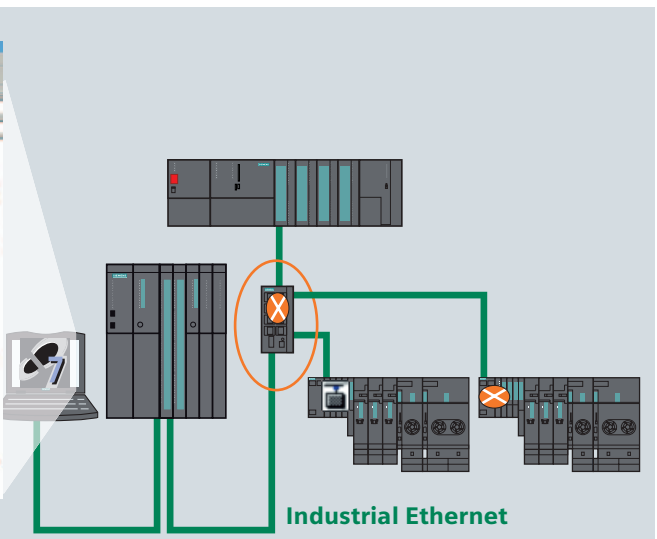
Can be universally used from local machine applications up to subplant networks. Configuration and remote diagnostics are integrated in the engineering tool STEP 7 giving the customer advantages in engineering, commissioning and operation. Devices with high degree of protection level allow mounting outside the switching cabinet.

These switches can also be used in plant subsections where there are demands for hard real-time communication and high availability (SCALANCE X-200 IRT). Standard data traffic (no real-time requirements) can also take place on the same cable thus eliminating the need for two separate networks.

## SCALANCE X-400 modular

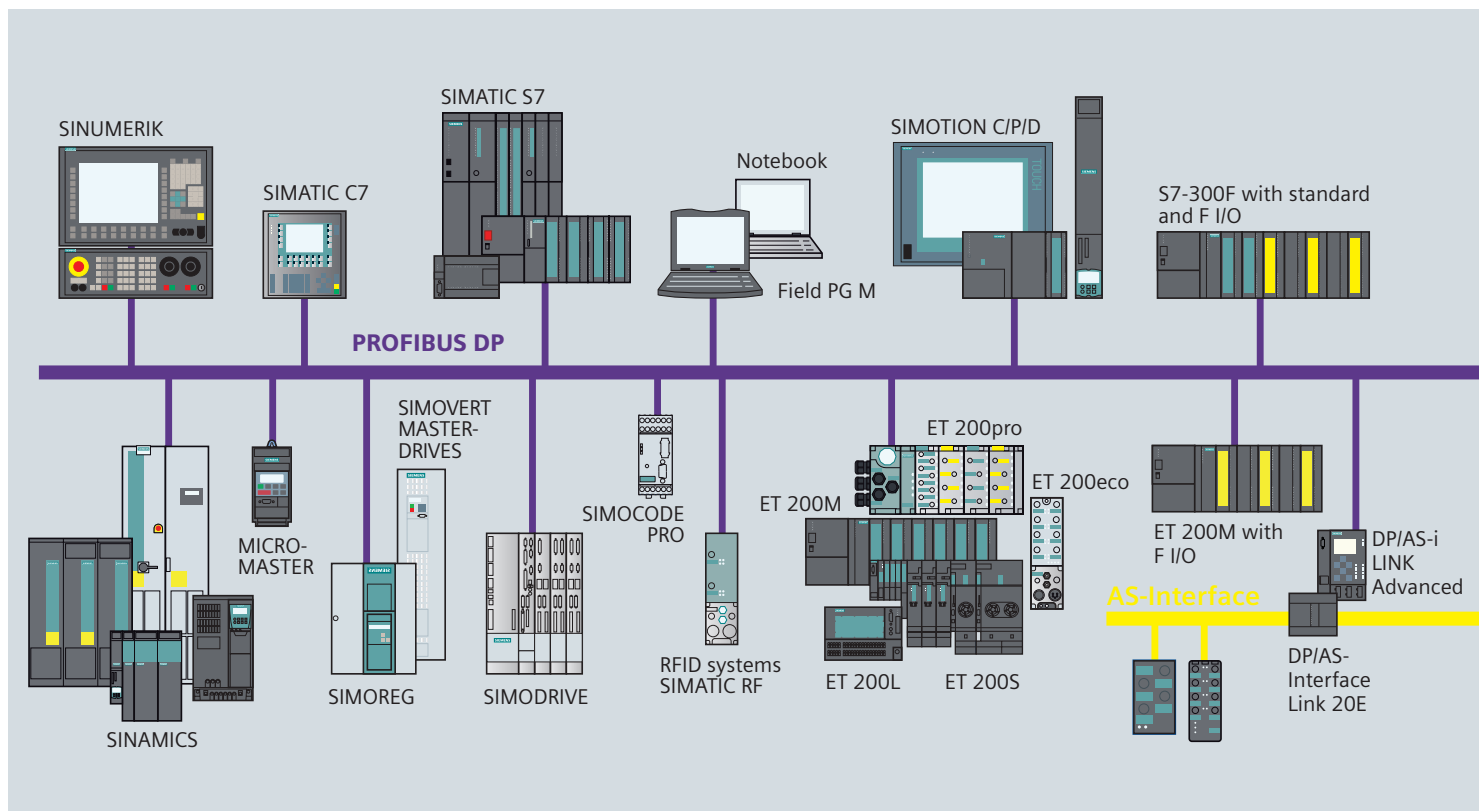
For use in high performance plant networks, which also have to meet the challenge of future developments e.g. high speed redundancy. Thanks to the modular concept these can easily be adapted to the task at hand. In addition a seamless integration of automation networks into existing office networks is possible thanks to the support of IT standards such as VLAN, IGMP, RSTP.

Routing functions on Layer 3 facilitate communication between network segments with different IP address ranges.





# PROFIBUS



PROFIBUS is used for the connection of field devices such as distributed peripherals or drives with automation systems such as SIMATIC S7, SIMOTION, SINUMERIK or PCs. PROFIBUS is an open, high performance, robust field bus system with short reaction times and compliant with IEC 61158. There are different PROFIBUS protocols for various applications.

## PROFIBUS DP

(Distributed Periphery)

is used for the connection of distributed field devices e.g. SIMATIC ET 200 or drives with very quick reaction times. PROFIBUS DP is used when actuators/sensors in the machine or plant (e.g. at the field level) are widely distributed.

In this case the actuators/sensors are connected to the field devices, which are supplied with output data according to the master/slave principle and provide the PLC or PC with input data.

## Openness on the whole range

Thanks to the openness of PROFIBUS DP it is of course possible to connect standardized components from various manufacturers together on the network. The IEC 61158/EN 50170 standard protects the customers investments. Member companies worldwide are supplying a great variety of products with PROFIBUS DP interface for field use. Siemens has a wide product range varying from CPUs, network components, communication software up to different field devices.

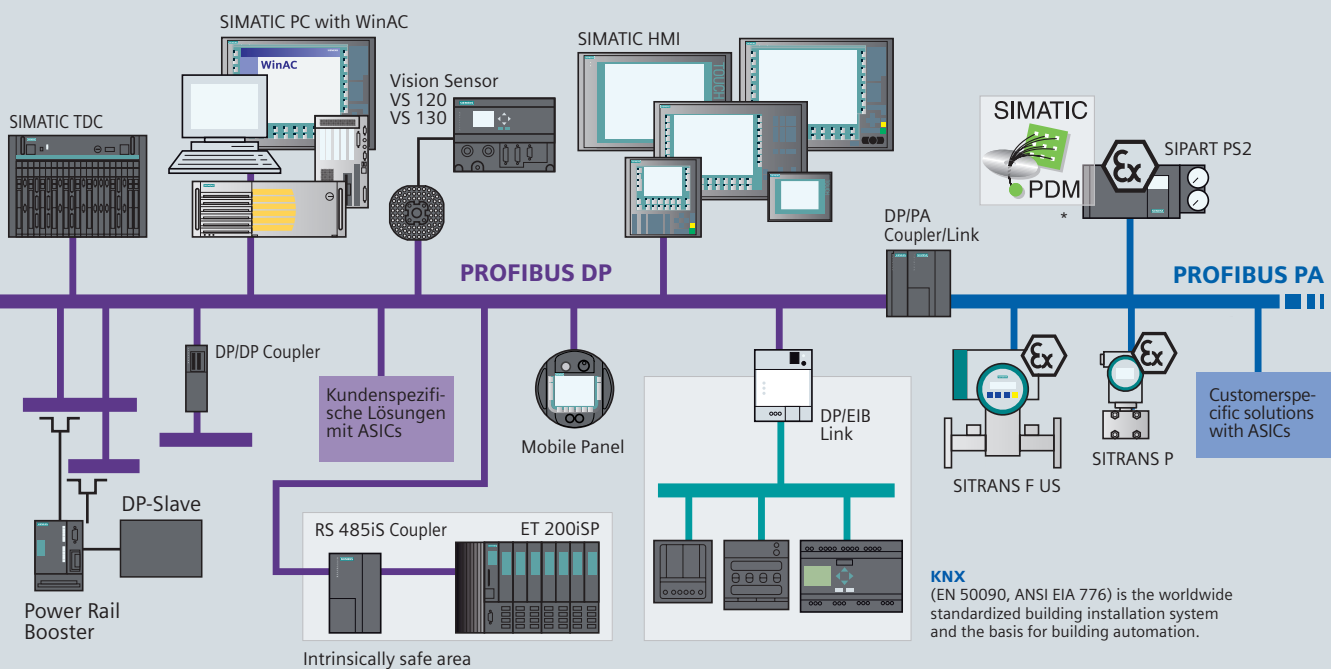
If you are a field device manufacturer, then we can offer you a wide range of products such as ASICs, training, certifications and a lot more.

## PROFIsafe

allows standard and fail-safe communication on the same bus cable. It is the solution for fail-safe communication via standard busses using the PROFIBUS services.

**Fail-safe PROFIBUS communication with PROFIsafe**

see page 32



\* PDM is a parameterization tool for intelligent field devices.

### Isochronous mode

CPU, drives, I/O and user program are synchronized to the PROFIBUS clock. The function "Isochronous mode" is supported by the SIMATIC S7-400 CPUs, SIMOTION/SINUMERIK and servo drives. The drives are activated using the PROFIdrive profile.

### PROFIBUS PA

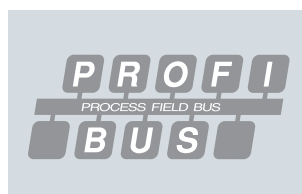
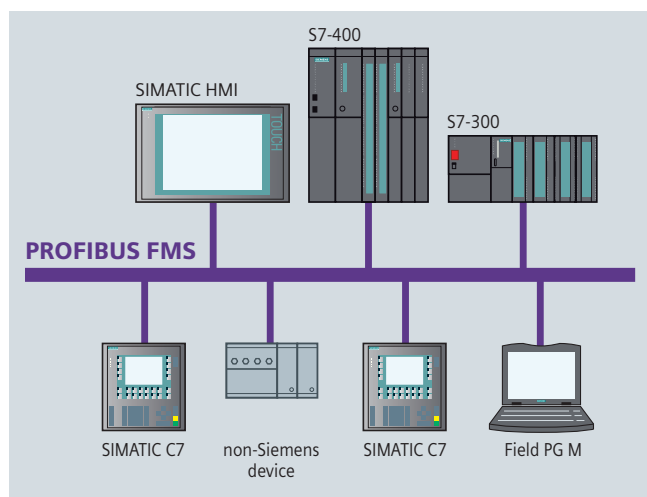
(Process Automation)

is an expanded version of PROFIBUS DP which offers intrinsically safe data and power transmission (e.g. measuring transducers in the food industry) according to the international standard IEC 6158-2 (same protocol, different physics).

### PROFIBUS FMS

(Fieldbus Message Specification)

For data communication between automation systems from different manufacturers. This means that not only Motion Control tasks but also distributed general control and measuring tasks can be accurately processed.



# AS-Interface

Sensors, valves, actuators, drives – many different components are used in the field level.

All of these actuators/sensors must be interfaced to an automation system.

Today distributed I/Os are being used in the field level as intelligent on-site outposts, so to speak.

As a price efficient alternative to a cable harness, AS-Interface connects the components using a two-wire cable.

AS-Interface is used where individual actuators/sensors are spatially distributed throughout the machine (e.g., in a bottling plant).

The AS-Interface is an open international standard

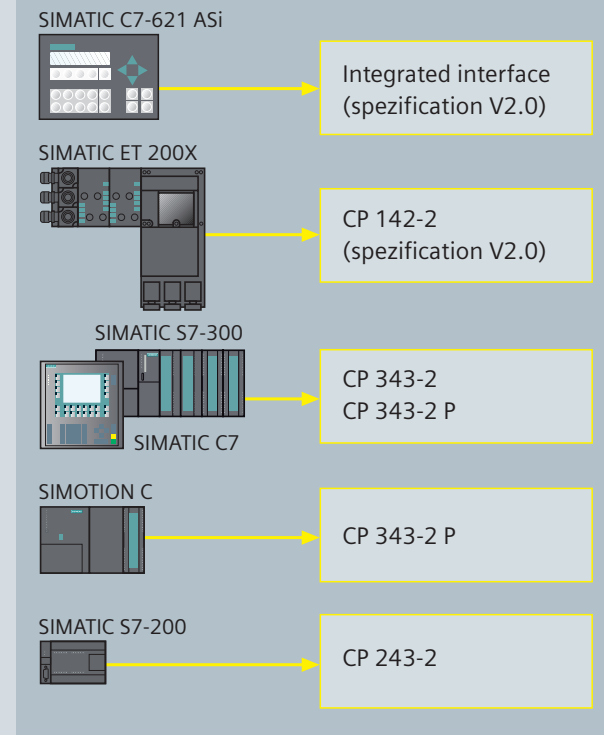
IEC 62026-2/EN 50295 and is supported world-wide by 280 member firms of the AS International Association, among which there are leading manufacturers of actuators and sensors. The system has proved its worth in the field since 1994, and with more than 10 million installed nodes, it is the unchallenged market leader among bit-oriented bus systems. AS-Interface is a single master system. There are communications processors (CPs) available for SIMATIC and for SIMOTION which operate as masters for controlling field communication.

The AS-Interface specifications V2.1 and V3.0 permit interfacing of up to 62 slaves. The AS interface specification 3.0 allows a maximum of 1000 digital inputs/outputs (profile S-7.A.A: 8DI/8DO as A/B slave) to be connected. New profiles permit extended addressing also for analog slaves. The "fast analog profile" speeds up the transmission of analog values. Thanks to the integrated analog value processing in the masters, accessing analog values is as easy as accessing digital ones. The connection of SIMATIC S7 Controller, WinAC or other systems to AS-Interface is realized by means of IE/AS-i LINK PN IO, DP/AS-i LINK Advanced or via the DP/AS Interface Link 20E.

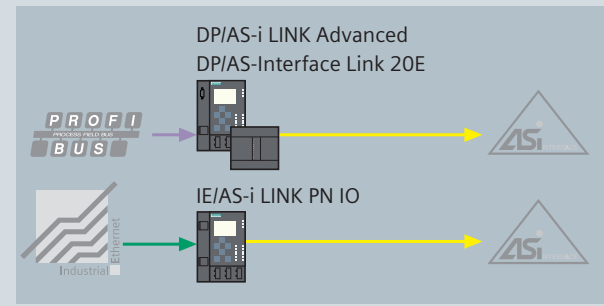


**Fail-safe AS-Interface communication**  
with ASisafe  
see page 34

## AS-Interface master



## AS-Interface Links

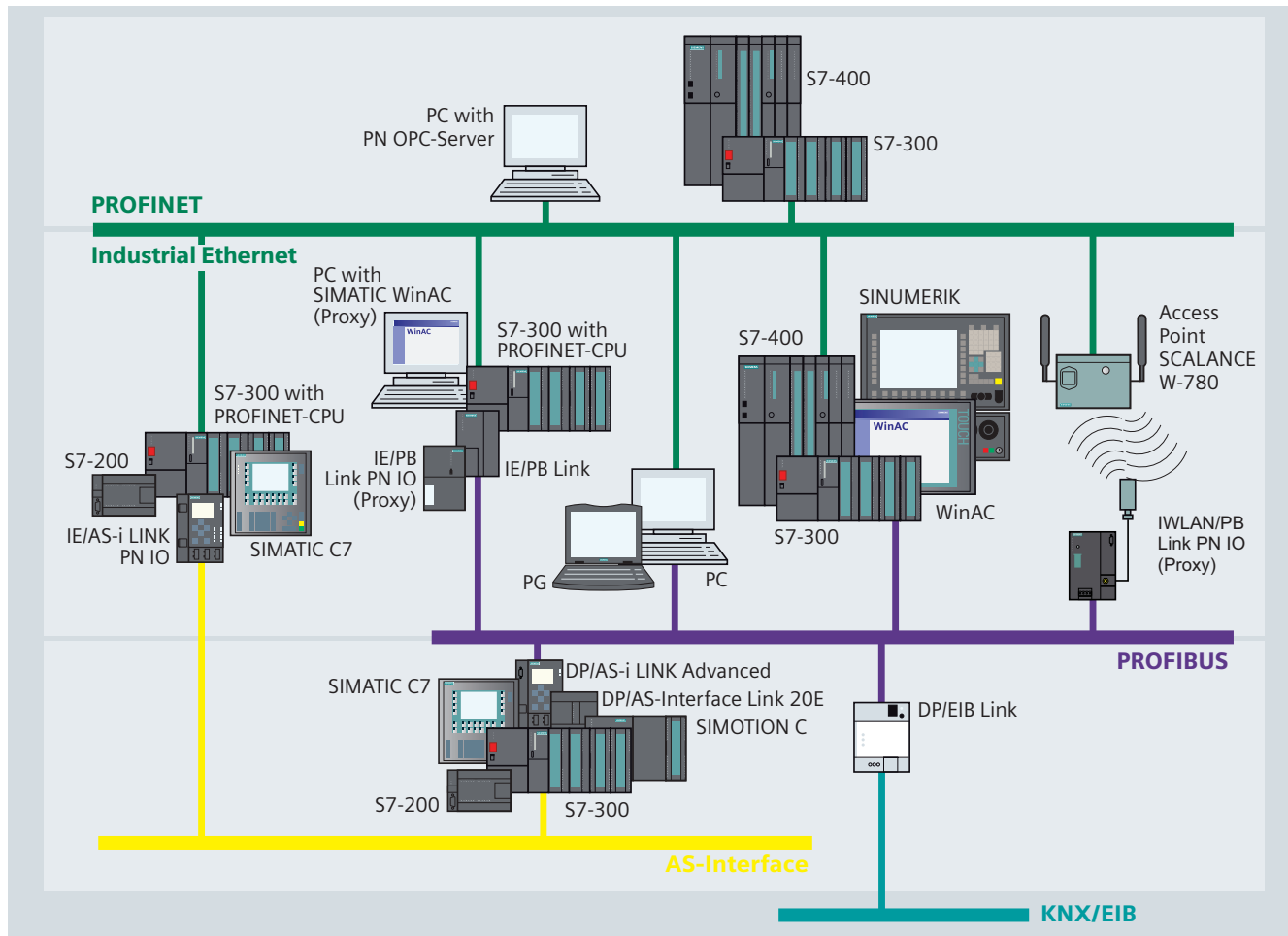


The DP/AS-i LINK Advanced or the DP/AS-Interface Link 20E (IP20) are available for connecting the AS-Interface directly to PROFIBUS DP, making it possible to use AS-Interface as a PROFIBUS DP sub-network.

The IE/AS-i LINK PN IO allows direct linking of AS-Interface to Industrial Ethernet and thus a seamless integration into the PROFINET environment.



# Network transitions



Network transitions between different bus systems are implemented through links, PLCs or PCs. In the latter 2 cases integrated interfaces and communications processors (CPs) are used. Links forward the data without any kind of changes from one network to another.

Such links are:

- IE/PB Link and IE/PB Link PN IO for the transition from Industrial Ethernet to PROFIBUS (also for fail-safe communication)
- IE/AS-i LINK PN IO für den Übergang von Industrial Ethernet zu AS-Interface
- IWLAN/PB Link PN IO for the transition from IWLAN to PROFIBUS
- DP/AS-i LINK Advanced and DP/AS-Interface Link 20E for the transition from PROFIBUS to AS-Interface
- DP/EIB Link for the transition from PROFIBUS to KNX/EIB

When PLCs such as SIMATIC S7-200, S7-300, S7-400, SINUMERIK or SIMOTION C, data is exchanged between the networks via communications processors or integrated interfaces. The data is pre-processed using a controller before being forwarded to the next network.

## PROFINET network transition with proxy functionality

PROFIBUS segments can be linked to Industrial Ethernet by means of devices with a representative function, so-called PROFINET proxies.

This can be done using a solution involving SIMATIC WinAC PN, SIMATIC S7-300/400 CPUs with DP- and PN interface, IE/PB Link or via IE/PB Link PN IO. An access point SCALANCE W-700 with IWLAN/PB Link PN IO can be used for a wireless network transition. This means that all standard PROFIBUS slaves can be used without any modification in PROFINET.



# Connection technology and transmission media

## Structured cabling compliant with ISO IEC 11801/EN 50173

FastConnect (FC) from SIMATIC NET is a quick assembly system for assembling copper cables for Industrial Ethernet and PROFIBUS. FastConnect cables can be assembled easily and quickly on-site.

This means that the existing RJ45 standard cabling technology can be used in an industrial environment thereby enabling industry-standard, structured cabling by means of installation cables and sockets.

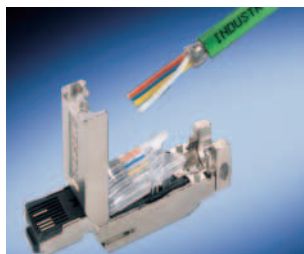
Significant cost-savings can be reached thanks to the quick and secure assembly system.



## FastConnect – the quick assembly system for Industrial Ethernet and PROFIBUS

The FastConnect system comprises special cables, a stripping tool and connectors:

- **IE FC TP cables**  
with special construction for fast assembly as FC TP Standard, FC TP Trailing, FC TP Flexible and FC TP Marine Cable (PROFINET compliant)
- Convenient insulation displacement system with the **FastConnect Stripping Tool**, which strips the outer shield and the braided shield with a precise measurement in one operation. The cables prepared in this way are connected to the FastConnect products using the insulation piercing method.



## ■ IE FC RJ45 Plugs (90°, 145° and 180°)

are resistant to interference thanks to their rugged metal housing and are the ideal solution for the installation of RJ45 connectors in the field (PROFINET compliant). The sleeves of the SCALANCE products and the IE FC RJ45 Plug provide additional strain relief and bending strain relief of the connection.

## ■ IE FC RJ45 Modular Outlet

also for Gigabit cabling

## ■ PROFIBUS FastConnect cables

shielded, 2-wire cables in different versions: a standard type, one with a PE sheathing, one with PUR sheathing and a halogen free one. There are also cables for underground installation, trailing cables and for use in intrinsically safe areas.

## ■ PROFIBUS bus connectors

with 30°, 35°, 60°, 90° and 180° cable outlet

## Data transmission via slip rings with movable communication nodes

Electrical transmission of the PROFIBUS DP signals are also possible via slip rings and telephone/standard cable using the SIMATIC Power Rail Booster (e.g. mono-rail).



## Optical data transmission

Optical data transmission can be done via either glass or plastic fiber optic cables. There are a number of different types of cables for indoor and outdoor use as well as a trailing cable and halogen free cables. The fiber optic cables are completely resistant to any electromagnetic interferences and are ideally suited for any future cabling developments.

## Wireless data transmission

With Industrial Wireless LAN a local radio network for wireless communication can be set up using an access point such as the SCALANCE W 788-1PRO and a wireless card such as the

CP 7515. RCoax radiating cables operated as antennae from SCALANCE W access points provide reliable radio links in areas challenging for radio, e.g. for monorail conveyors, cranes, stacker cranes.



# Safety & Security in Automation

Modern automation systems must be safe and secure. The terms "safety" or "security" have different meanings in conjunction with automation systems (PLCs, computers, drives, etc.) and networks.

## Machine safety

The objective of safety engineering is to protect people, machines and the environment from hazards and damages caused by machine malfunctions (hardware or software faults).

To do so, the whole system from the sensor to the evaluator and actuator must be regarded as a coherent entity.

This objective is reached through functional safety, which means that the machine always performs the safety function correctly.

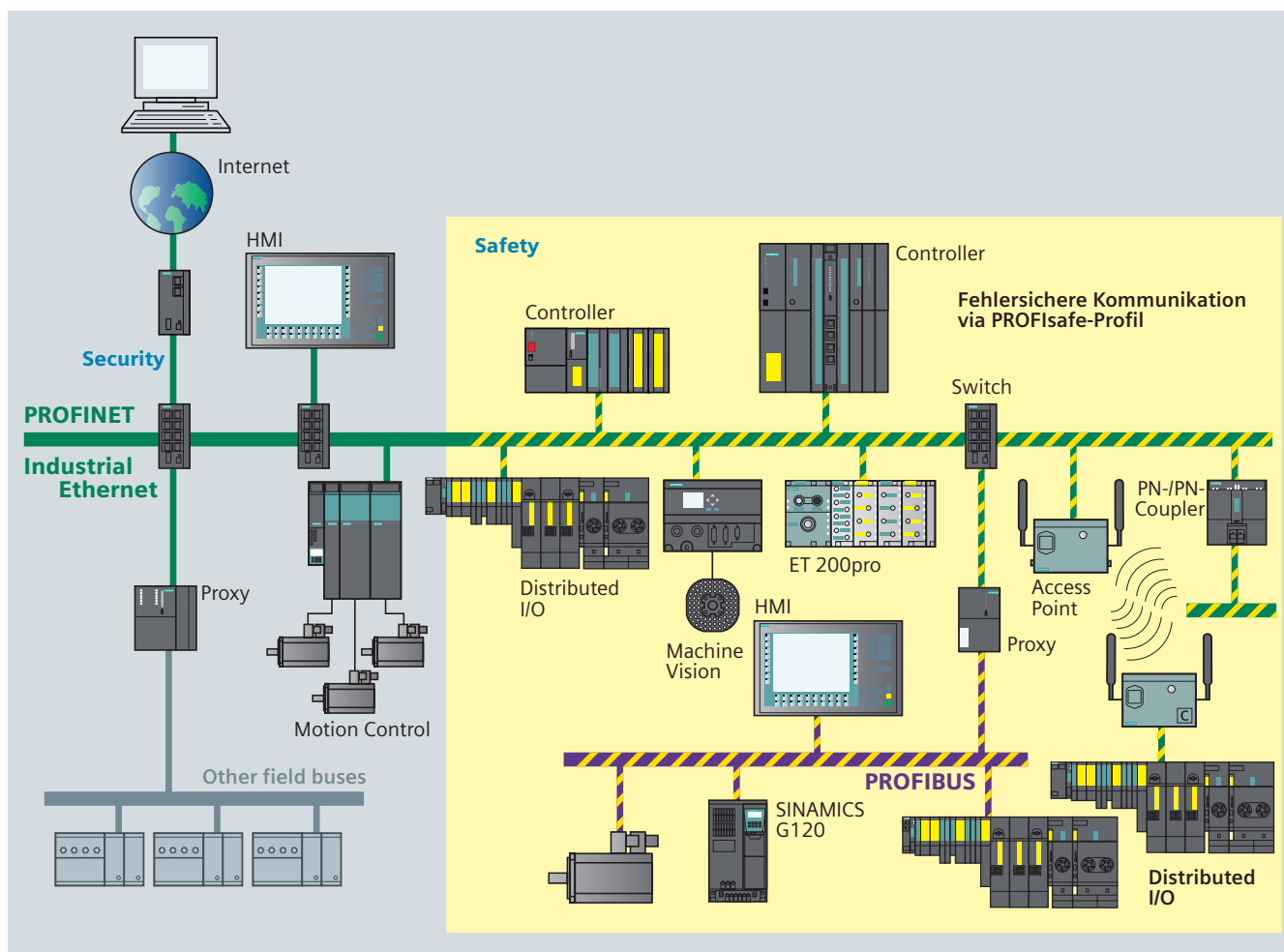
The insensitivity to occurring faults and errors is the decisive criterion for the safety integrity of a machine (i.e., the consequences of a fault in the machine).

The following technical measures enable the safety integrity to be improved:

- Diagnostics
- Redundancy
- Selection of immune and robust components

With "Safety Integrated", TIA provides an integrated, safe overall system with various product families, supported by:

- PROFSafe, the safety profile based on PROFIBUS and PROFINET
- ASISafe, the safety-related version of the actuator-sensor communication system AS-Interface.



### Information security – Security

is used with regard to the security of information within a system, that is

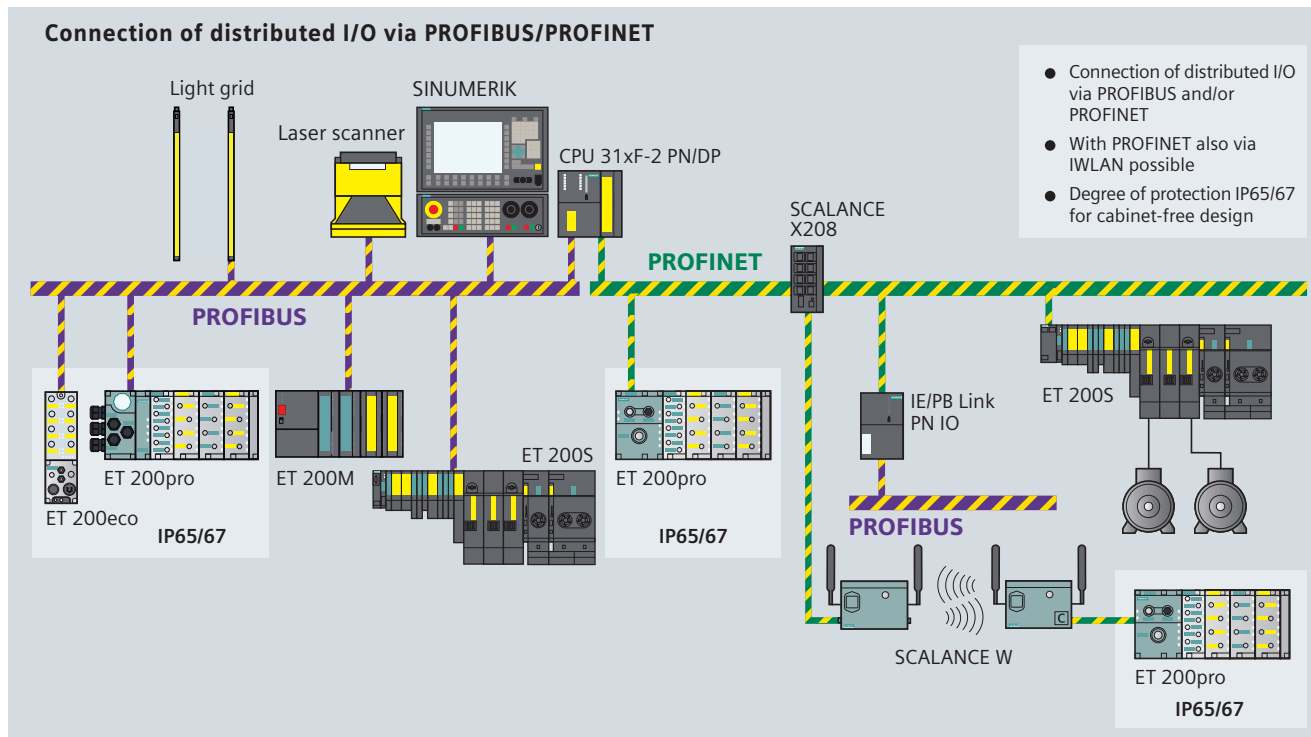
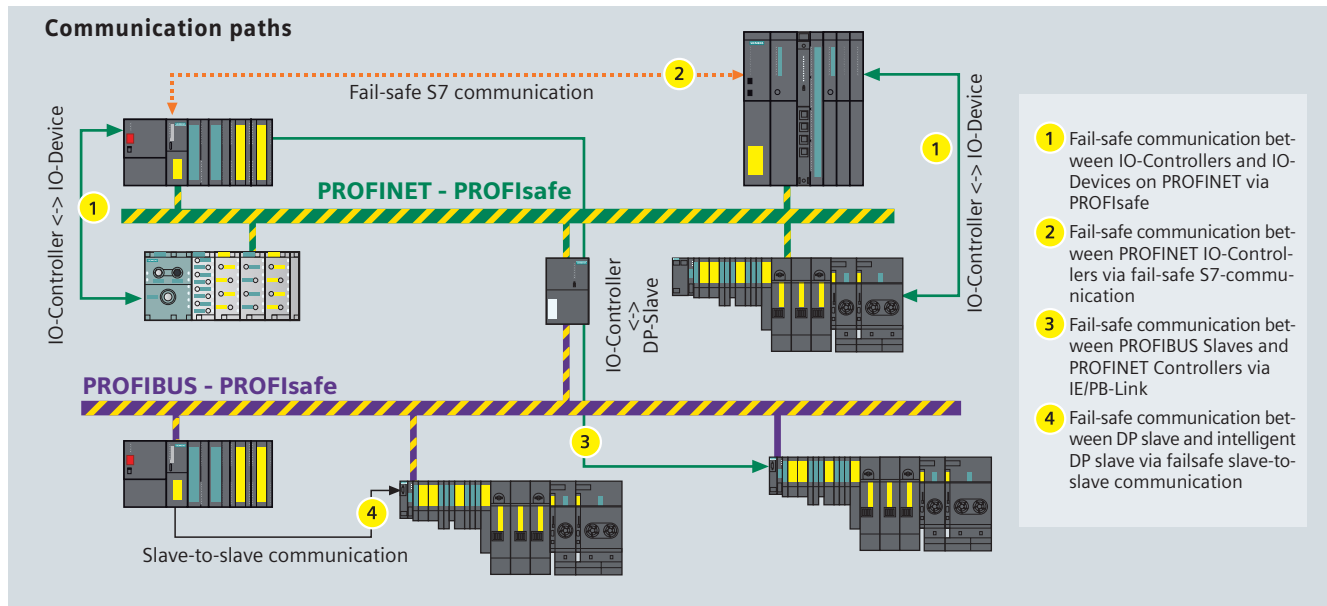
- Protection from espionage and data manipulation
- Protection against overloading of the communication system
- Protection against mutual interference
- Protection against addressing mistakes
- Easy, user friendly configuration and administration without the need for specialist knowledge using IT security techniques
- Changes or modifications to the existing network structure are not necessary
- No changes or modification of the existing applications or network stations are necessary
- Rugged, industry-compatible design

SCALANCE S security modules from Siemens offer a scalable security functionality:

- Firewall for protecting the programmable controllers from unauthorized access regardless of the size of the network to be protected
- Supplementary or alternative VPN (Virtual Private Network) for reliable authentication of the communication partners and encryption of the transmitted data
- SOFTNET security client for secure access from PCs and notebooks to programmable controllers protected by SCALANCE S



# Fail-safe communication PROFIsafe



## Safety technology with Safety Integrated

Safety engineering has been integrated into the standard automation for several years - on the basis of SIMATIC S7 Controllers, PROFIBUS and PROFIsafe. Since then, this trend-setting solution has proved successful in many thousands of applications worldwide.

The product spectrum of Safety Integrated comprises all necessary components from sensors and controllers to the actuators and is certified for the Safety Integrated Levels of the IEC 61508 up to SIL 3, as well as Category 4 of the EN 954-1.



### Expansion with PROFINET

The range has now been extended to include PROFINET-standard components, so that a complete product range with failsafe controllers, failsafe distributed IO and a corresponding engineering environment is available with immediate effect. This includes controllers for the mid to upper performance range, digital input/output modules as well as motor starters and frequency converters with IP20 protection and also IP65/67 protection for cabinet-free construction.

The new failsafe controllers have interfaces for PROFIBUS and PROFINET. The failsafe input/output modules can be operated via corresponding bus interface modules that can be connected either to PROFIBUS or PROFINET.

### PROFIsafe protocol

The "PROFIsafe" protocol profile, first developed for PROFIBUS DP, is used for communication between fail-safe controllers (SIMATIC, SINUMERIK) and fail-safe distributed I/Os.

PROFIsafe was the first communication standard based on IEC 61508 to allow standard communication and fail-safe communication on the same bus. With SIL3 (Safety Integrity Level 3), Category 4 (EN 954-1) it fulfills the highest demands for the manufacturing and process industries. PROFIsafe has been tested and approved by TÜV (German Technical Inspectorate) and by the BGIA (BG-Institute for Occupational Safety and Health).

### PROFIsafe Openness

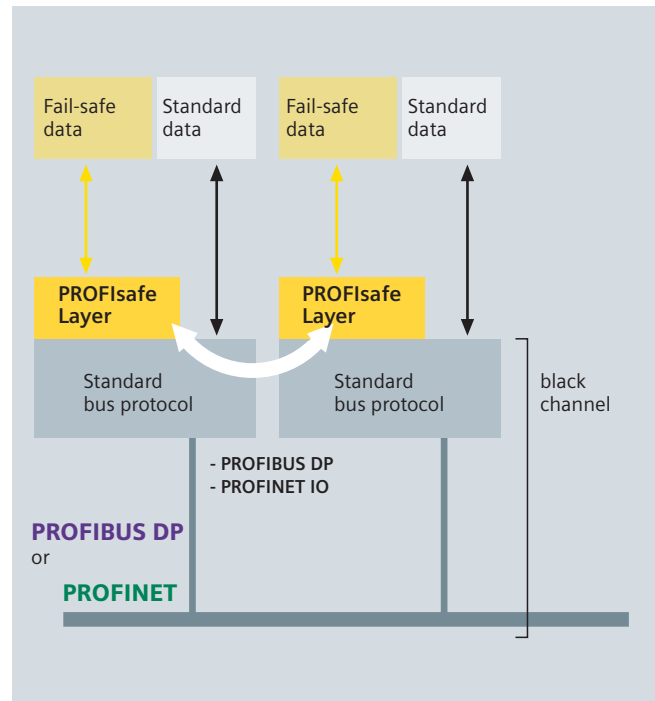
The PROFIsafe protocol V2 supports fail-safe communication for the open standard busses – either the well-proven PROFIBUS DP or all variants of the new fast bus system PROFINET IO. With the PA version PROFIBUS PA (IEC 61158-2) the integrated distributed automation expands into the process world, e.g. in hazardous areas. PROFIsafe is also used in the state-of-the-art radio technology.

### PROFIsafe functionality

PROFIsafe prevents transmission errors due to problems such as incorrect addressing, loss, delay etc. by:

- Sequential numbering of the PROFIsafe data
- Time monitoring
- "Password" based authenticity monitoring
- An optimized version of CRC.

The fail-safe SIMATIC components are part of **Safety Integrated**, the Siemens safety program based on SIRIUS, SIMATIC and SINUMERIK/SIMODRIVE products. PROFIsafe and ASIsafe are used for fail-safe communication. You find detailed information on Fail-safe communication in the "Safety Integrated system manual", 5th edition, chapter 4.



Using slave nodes, fail-safe encoder signals from a PROFIBUS station are transmitted to the fail-safe CPU. When these encoder signals have been logically linked an appropriate output signal is transmitted to a fail-safe PROFIBUS slave. Single channel transmission is used and there is no redundancy transmission path.

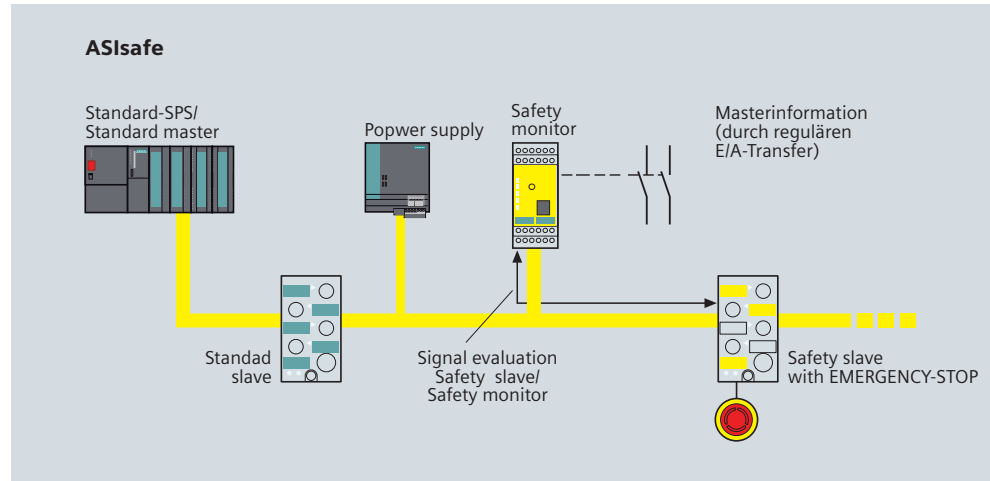
### Some advantages at a glance

- Same operating philosophy for standard and safety-related communication
- One PROFIBUS/PROFINET cable for both standard and safety-related communication
- Uniform configuring of standard and safety-related communication
- One engineering tool for the creation of standard and safety program
- Comfortable duplication of a solution on several machines/plants by copying the safety program
- Common data management for standard and safety program
- Shorter standstill times due to integrated diagnostics from sensors over the controller to the HMI system
- Support of fail-safe communication via Wireless LAN



# ASIsafe

The fail-safe SIMATIC components are part of **Safety Integrated**, the Siemens safety program based on SIRIUS, SIMATIC and SINUMERIC/SIMODRIVE products. PROIsafe and ASIsafe are used for fail-safe communication. You find detailed information on Fail-safe communication in the "Safety Integrated system manual", 5th edition, chapter 4.



The "ASIsafe" concept enables the integration of fail-safe components such as emergency stop switches, safety door switches or fail-safe light grids directly onto an AS-Interface network. These components which are fully compatible to familiar AS-Interface components (such as master, slaves, power supply, repeater etc.) are compliant with IEC 62026-2 and are jointly operated on the yellow AS-Interface cable. This means that up to Category 4 (EN954-1) and/or SIL 3 (IEC 61508) ASIsafe enables the fail-safe shutdown of devices without losing the advantage of a simple and low-cost cabling.

## Some advantages at a glance

- Minimum maintenance and standstill times due to integrated diagnostics
- Possibility of a cost-effective design, without fail-safe PLC and without a special master
- Increased flexibility through software-supported configuration
- Comfortable duplication of a solution on several machines/plants by copying of the safety program
- Faster overview of plant safety functionality using a simple graphical tool
- Direct, simple integration of hardware such as emergency-off switches, protective door switches or safety light arrays through integral AS-Interface slaves

## Configuration software asimon2+

### Simpler system commissioning

- Progressive teach-in of code sequences of secure AS-I slaves with diagnostic information
- Selectable number of simulated slaves

### Simpler diagnosis via AS interface

- Assignment of a fixed diagnosis index to the software function block
- Signalling of signal and relay outputs via AS interface

### New function blocks

- Monitoring block "zero sequence detection"
- Start blocks "activation via standard slave" and "activation via monitor input" (level sensitive)
- Block "operational ON/OFF switching via monitor input"

### Extension of function blocks

- Monitoring blocks with selectable functions "on site acknowledgement" and "starting test"
- Output blocks "door lock by delay time" and "door lock by zero-speed switch and delay time" now optionally with STOP1 for release circuit 1

# High-availability communication and redundancy

## Process or field communication

Manufacturing plants are designed and devised for around-the-clock operation. When a plant fails the results are often cost-intensive downtimes, high re-start costs and the loss of valuable materials. Redundant control systems such as the SIMATIC S7-H system protect against automation system failures.

## High-availability systems

The S7-400H is a high-availability programmable controller. Handling, programming, configuring and communication are the same as for standard systems. Depending on the network topology, redundant communication links can be so created that in the event of an error the system automatically switches over without any loss of data. Peripherals are connected to S7-400H via redundant PROFIBUS DP lines.

In the case of a failsafe, fault-tolerant construction, the communication between the failsafe CPUs takes place via failsafe S7 communication blocks.

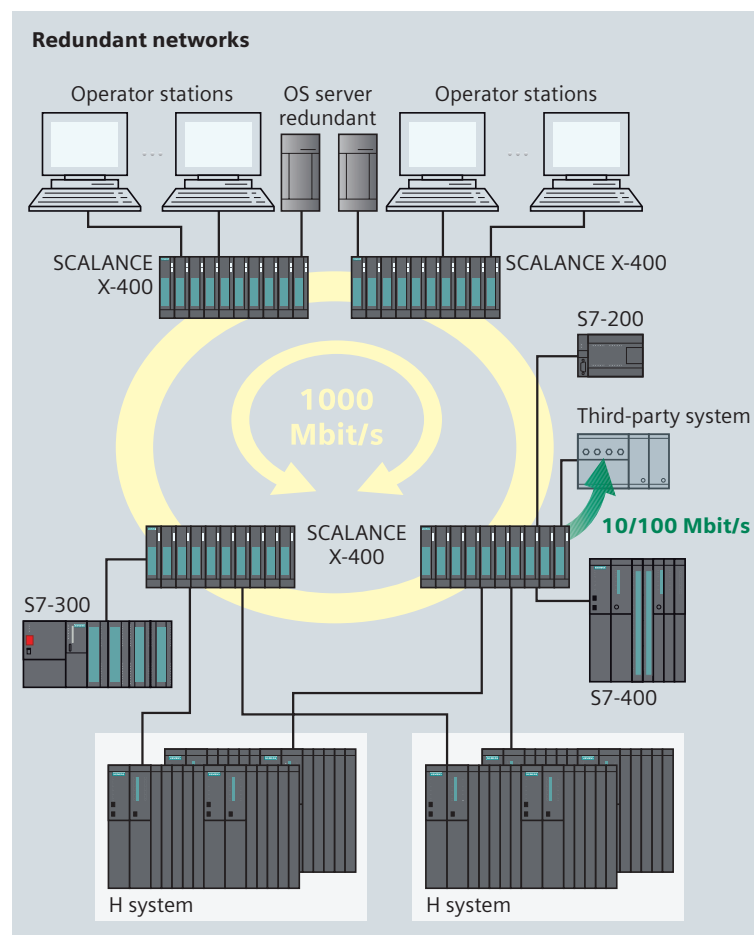
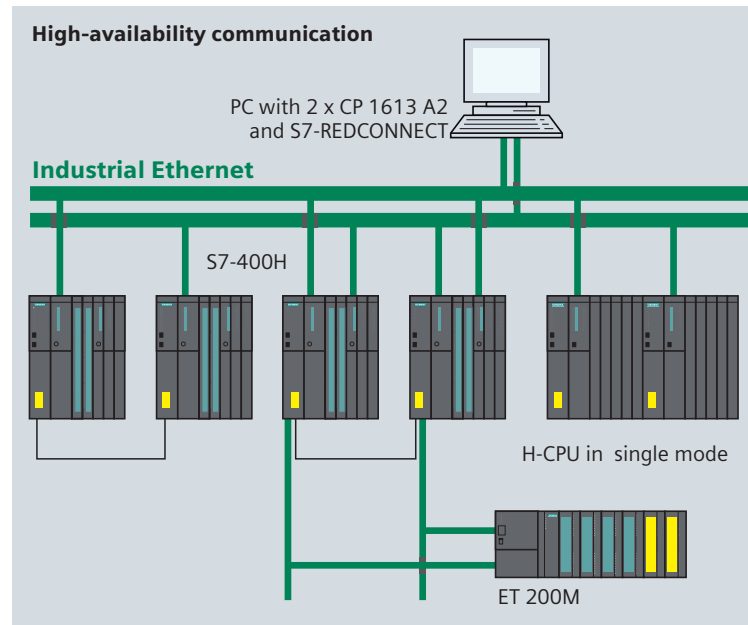
## Redundant networks

S7-REDCONNECT ensures problem-free communication between PC-applications (such as WinCC) and the S7-400H via redundant networks. PC-applications which already use S7 communication (e.g. via the OPC interface) may continue to be used without any modifications. Industrial Ethernet and PROFIBUS networks can be set up as redundant networks with switches from the SCALANCE X product range and with OSM, ESM and OLM. Thanks to a ring topology the network continues to work when one transmission path fails; failure of a network components effects only nodes in that segment.

## High-speed redundancy

Extremely fast reconfiguration of the network following an error is indispensable for industrial applications, because the connected data terminals will otherwise disconnect logical communication links. This would result in a process running out of control or emergency shutdown of the plant.

To achieve the necessary fast response times, SIMATIC NET uses a specially developed procedure for controlling redundancy. After an error (cable break or switch failure) a network can then be reconfigured to form a functional network infrastructure in a fraction of a second (less than 0.3 seconds in an optical ring consisting of 50 switches) and logical connections are not disconnected.



# Fault messages, Telecontrol and monitoring

## SINAUT Telecontrol

SINAUT, the telecontrol system based on SIMATIC S7, is made up of two independent systems:

### ■ SINAUT ST7

Versatile telecontrol system based on SIMATIC S7-300, SIMATIC S7-400 and WinCC for fully automatic monitoring and control of process stations exchanging data with each other or with one or several control centers via WAN or Ethernet (TCP/IP).

### ■ SINAUT MICRO

For monitoring and controlling distributed plants by means of wireless communication (GPRS) based on S7-200 and WinCC flexible or WinCC. Thanks to its bidirectional communication feature SINAUT MICRO can fulfil simple telecontrol tasks.

For both systems an OPC server is offered permitting connection to an external centralized control system (OPC client).

### SINAUT ST7

SINAUT ST7 allows a unified communication concept (TIA) and complete integration into the SIMATIC environment. Due to modular layout and support of different network forms and operating modes including Ethernet, flexible network structures can be created that may also contain redundant interfaces.

The networks can be optimally adapted to local conditions by making use of all transmission media available (e.g., dedicated lines, radio transmission, public switched systems, SMS, FAX).

The supplied software packages and STEP 7 allow an easy and cost-efficient initial configuration of highly complex networks and extensions.

### Control center

As the central control station you can have:

- SIMATIC S7-300 or S7-400 controllers
- SINAUT ST7cc, the PC control station (simple or redundant) based on WinCC; It is a control system specially designed to handle event triggered and time stamped data transmission from SINAUT systems.
- SINAUT ST7sc, enables the link of control centres from other manufacturers via OPC. SINAUT telecontrol can be linked to the control centres of other manufacturers by means of the "Data Access Interface". SINAUT ST7sc has a comprehensive buffering mechanism which ensures there is no data loss, e.g. when the OPC clients fail.

### SINAUT WAN networks

- Dedicated lines (copper and fiber optic)
- Private radio networks (optional with time-slot procedure)
- Analog telephone network
- Digitales ISDNv network
- Mobile network (GSM)

All networks can be combined in any manner, even redundant paths are possible. Star, line and node structures are possible.

### SINAUT via Ethernet

SINAUT communication over Ethernet or TCP/IP-based networks is possible between the station and the control point as well as between stations. Requirements for this are fixed IP addresses and connections similar to dedicated lines.

### Event triggered data transmission

The SINAUT software in the stations provides an event triggered process data transmission with the control center and between the individual CPUs.

### Local data storage

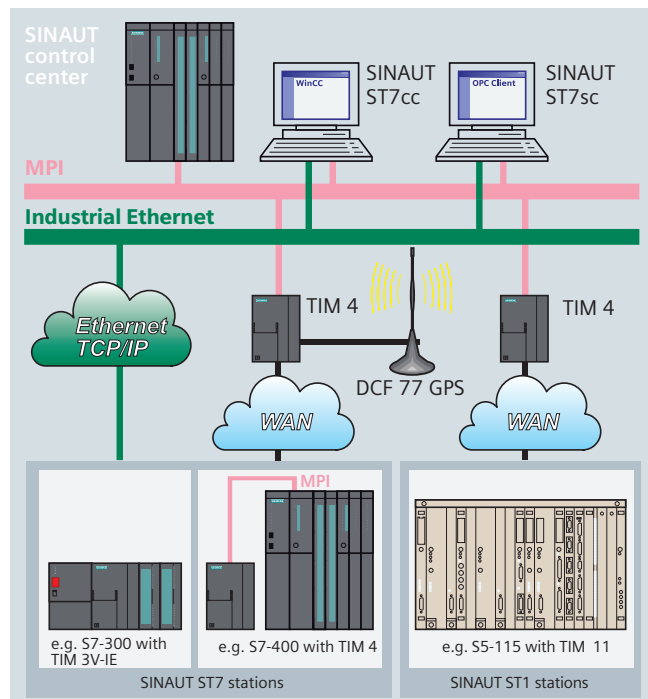
A special feature of the SINAUT ST7 system transmission module TIM is the local storage of the data frames (incl. time stamp) if the communication path is down, if a partner fails or if costs are to be minimized in a dial-up network.

### Date and time are always up-to-date

The DCF77 radio clock is used to supply the control center e.g. ST7cc and the CPUs with the date and time. The system always has the exact date and time including the summer/winter switchover. Instead of DCF77 it is also possible to use GPS (Global Positioning System) as the time source.

### SINAUT remote programming and diagnostics

All diagnostic and programming functions which are available from SINAUT and SIMATIC for station automation and SINAUT communication, can be used remotely through the communication path even while process data is being transmitted.



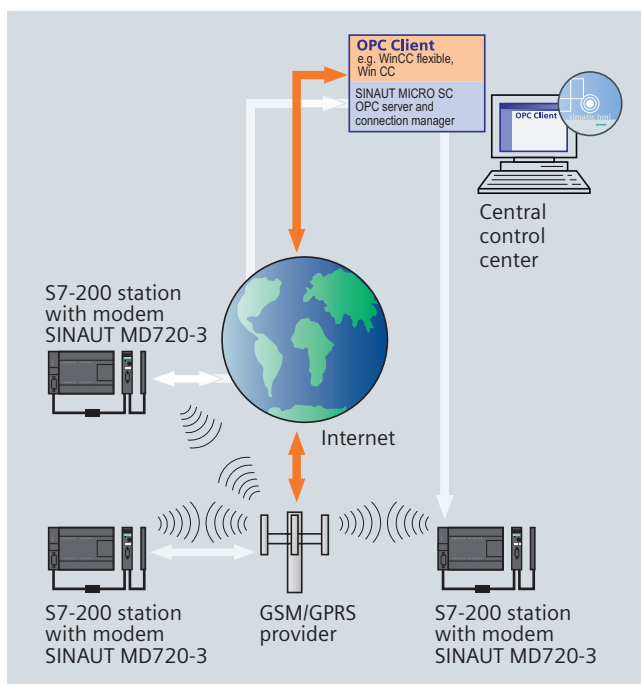
## SINAUT MICRO

SINAUT MICRO is a cost-efficient supplement for monitoring and controlling simple telecontrol tasks. It consists of a GSM-GPRS modem, an OPC and connection management software optimized for GPRS and a S7-200 program block package. With this package up to 256 SIMATIC S7-200 stations can easily and safely communicate with each other and with the control center over the GPRS mobile network. They are permanently online. SINAUT MICRO is the ideal solution for transmitting smaller volumes of data wirelessly. The system is configured with STEP 7 Micro/WIN.

The maintenance personnel can access the secured center from their home PCs via Internet Browser and query or set current values of the connected S7-200 stations. This means, for example, that fault messages directly sent by S7-200 remote stations and received by mobile phone in the form of SMS or faxes can be immediately analyzed in the center, which shortens reaction times considerably.

The routing functionality of the OPC server SINAUT MICRO SC allows bidirectional communication between S7-200 stations connected via the SINAUT MD720-3 modem.

Under WinCC the OPC server SINAUT MICRO can be combined with SINAUT ST7cc to create a cost-optimized central fault signalling and telecontrol system that can be extended as required.



## SIMATIC TeleService

The MPI interface of the SIMATIC S7/C7, SIMATIC TDC and SIMTION/SINUMERIK automation systems and OPs is extended via the telephone network. This is simply done by using a TS-adaptor plus a modem. The engineering tool Teleservice set ups a connection to the machine/plant and supports the known functions STEP 7, Drives ES and SIMOTION SCOUT and other diagnostic tools. The remote operations are done as if one was sitting in front of the machine. An additional PG/PC on the plant is not required.



# Diagnostics

Network and device diagnostics ease the commissioning and operation of a plant. They reduce the number of network failures and increase the safety and availability of the plant.

## Industrial Ethernet diagnostics

The data exchange of process and control data in a modern manufacturing plant nearly always takes place over Industrial Ethernet. In order to keep the number of network failures to a minimum you cannot do without diagnostics. However most analysis and management systems are too complex and expensive. The Siemens Industrial Ethernet components have the following diagnostic possibilities:

### Diagnostics with STEP 7/SIMOTION SCOUT

STEP 7 offers:

- Connection diagnostics
- Diagnostics of the assigned PROFINET field devices (even in the user program; module status as with PROFIBUS)
- Information about every switch port

### Diagnostics using IT functions

Pre-configured diagnostic pages can be displayed on a system with standard web browsers.

The following communications processors and network components support diagnostics using IT functions:

- S7-300 CPU with PROFINET interface
- S7-400 CPU with PROFINET interface
- CP 243-1 IT
- CP 343-1 Advanced
- CP 443-1 Advanced
- CP 1616
- CP 1604
- SCALANCE X-200 and X-400
- SCALANCE W-700
- SIMOTION with the option SIMOTION IT diagnostics
- SINUMERIK with MCIS products

### SNMP diagnostics

SNMP (Simple Network Management Protocol) is a special protocol for the administration of TCP/IP networks.

- PROFINET devices also support diagnostics via SNMP.
- The following Industrial Ethernet components offer diagnostic possibilities via SNMP:
  - - SNMP OPC-Server
  - - Industrial Ethernet Switches (SCALANCE X, OSM, ESM, ELS)

The use of SNMP OPC Server enables access to device information from SNMP capable Ethernet components via the OPC interface. In addition simple diagnostics and detailed information about network load or redundant network structures can also be displayed.

## Diagnostic features with Industrial Ethernet Switches:

- Display of information about the status of the network
- On-site diagnostics of data traffic with LED
- Remote diagnostics, integrated in STEP 7

## PROFIBUS diagnostics

### Commissioning with the bus tester

The bus tester BT200 can determine the status of bus segments in offline-mode i.e. without a connected master.

The bus tester offers the following functions:

- Bus cable diagnostics e.g. wire-break, short circuit
- Test the PROFIBUS interface of masters and slaves
- Test the accessibility of all slaves (life-list)

### Operation with the Diagnostics-repeater

The diagnostics repeater is capable of diagnosing the cable during operation. It shows the topology of the automation systems and recognizes the following cable errors:

- Wire-break
- Short circuit of signal cables
- Missing terminating resistor

### Diagnostics in STEP 7/SIMOTION SCOUT

In STEP 7/SIMOTION SCOUT the automation system topology is displayed graphically (overview diagnostics). Diagnostics symbols indicate diagnostics information about the monitored devices (e.g. PROFIBUS slave failed).
















A detailed window gives more detailed information about the individual modules (module status), for example:

- Module slot
- Channel number
- Cause of error (in text)





# Practical data







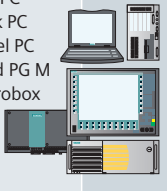

Bus system	AS-Interface	PROFIBUS DP	Industrial Ethernet	PROFINET
				
Criterion				
Data transmission rate	Updating time of ≤ 5 ms	9.6 Kbit/s – 12 Mbit/s selectable  31.25 Kbit/s <sup>1)</sup>	10/100 Mbit/s 1 Gbit/s (not with PROFINET)	
Number of nodes maximum	62	125  125 DP/PA Links <sup>1)</sup> 31 field devices per <sup>1)</sup> DP/PA Link	more than 1000	
Network size				
• LAN (Local Area Network)	electrical up to 600 m: - with Extension Plug up to 200 m - with Repeater or Extender up to 300 m - with Repeater and Extension Plug up to 600 m	- electrical up to 9.6 km - optical up to 90 km  Intrins. safe: max 1.0 km <sup>1)</sup> non intrins. safe: 1.9 km <sup>1)</sup>	- electrical up to 5 km - optical up to 150 km	
• WAN (Wide Area Network)			- worldwide using TCP/IP - wireless LAN	
Topology	Line   Tree   Star   	Line   Tree   Ring   Star    	Line   Tree   Ring   Star    	

<sup>1)</sup> with PROFIBUS PA

The table contains values gained from our experiences on different sites and is intended to serve as a recommendation for the selection of the optimum network.

# Industrial Ethernet devices and services



## Integrated interface – supported functions

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	PROFINET CBA	PROFINET IO	IT function	PROFIsafe
SIMATIC									
S7-200		CP 243-1	■	■					
		CP 243-1 IT	■	■				■	
S7-300 C7		CP 343-1	■	■	■	■	■		
		CP 343-1 Advanced	■	■	■	■	■	■	
		CP 343-1 Lean	■	■ 1)	■		■ 2)		
		TIM 3V-IE	■	■ 3)					
		TIM 3V-IE Advanced	■	■ 3)					
S7-400		CP 443-1	■	■	■				
		CP 443-1 Advanced	■	■	■	■	■	■	
SIMATIC TDC		CP 5100			■				
		CP 51M1			■				
PCS 7 PC		CP 1613 A2	■	■	■				
		CP 1616					■		
		CP 443-1	■	■	■				
SIMOTION									
SIMOTION P/D		MCI-PN 5)	■	■			■	■ 7)	
		CBE 30 6)	■	■			■	■ 7)	
SIMATIC PC/PG									
Box PC Rack PC Panel PC Field PG M Microbox		S7-1613 S7-REDCONNECT		■	■				
		Development Kit DK-16xx PN IO					■		
		CP 1616					■		
		CP 1604					■		
		SOFTNET PN IO					■		
		PN CBA OPC-Server				■			
		CP 1612							
SOFTNET S7/ SOFTNET S7 Lean	CP 1612	■	■	■					
	CP 7515	■	■	■					
PC-based Automation									
WinAC		WinAC Basis, WinAC RTX	CP 1613 A2/1612 8)	■	■	■ 9)	■ 10)		
		WinAC Slot 412/416	CP 1613 A2/1612 8)	■	■				

- 1) Only as server  
2) IO device only  
3) Only with SINAUT ST7 telecontrol protocol  
4) With CPU 416F  
5) In connection with SIMOTION P

- 6) In connection with SIMOTION D  
7) In connection with SIMOTION IT-Diag  
8) Also with integrated Ethernet interface of SIMATIC PC  
9) With Industrial DataBridge  
10) WinAC Basis with optional package

# Communications processor (CP) – supported functions

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	PROFINET CBA	PROFINET IO	IT funktion	PROFIsafe
SINAMICS									
S120		CBE 20 for SINAMICS S120 Multi-axis layout with CU 320	■				■		
SINUMERIK									
840D		CP 343-1	■	■	■	■	■		
		CP 343-1 Advanced	■	■	■	■	■	■	
Netzkomponenten <sup>1)</sup>									
SCALANCE X-200 X-200IRT		X204-2 / X204-2LD X206-1 / X206-1LD X208 / X208PRO X202-2IRT / X204IRT X200-4P IRT / X201-3P IRT X202-2P IRT					■	■	
SCALANCE X-400		X414-3E						■	
SCALANCE W		W-780/W-740						■	
		IE/AS-i LINK PN IO					■	■	
		IWLAN/PB LINK PN IO					■	■	

1) The components of the SCALANCE X, SCALANCE W and SCALANCE S product families can be used in all Industrial Ethernet networks for both, the configuration of the network and for data processing

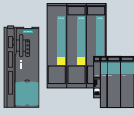

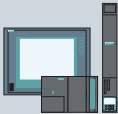


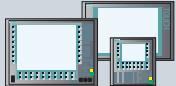

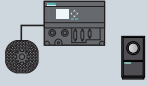

## Integrated interface – supported functions

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	PROFINET CBA	PROFINET IO	IT funktion	PROFIsafe
<b>SIMATIC</b>									
S7-300 C7		CPU 315/317-2 PN/DP	■	■	■ <sup>1)</sup>	■	■		
		CPU 315/317F-2 PN/DP	■	■	■ <sup>1)</sup>	■	■		■
		CPU 319-3 PN/DP	■	■	■ <sup>1)</sup>	■	■		
S7-400		CPU 414-3 PN/DP	■	■	■ <sup>1)</sup>	■	■		
		CPU 416-3 PN/DP	■	■	■ <sup>1)</sup>	■	■		
		CPU 416F-3 PN/DP	■	■	■ <sup>1)</sup>	■	■		■
ET 200S ET 200pro		IM 151-3 PN	■				■		
		IM 151-3 PN HF	■				■		■
		IM 151-3 PN FO							
		IM 154-4 PN HF	■				■		■
		PN/PN Coupler	■				■		■

1) open Industrial Ethernet communication

# Industrial Ethernet devices and services

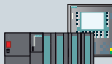







## Integrated interface – supported functions

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	PROFINET CBA	PROFINET IO	IT function	PROFIsafe
<b>SINAMICS</b>									
S120		CU 310 PN for SINAMICS S120 AC-Drives	■				■		
<b>SINUMERIK</b>									
		810D/840D	■ 1)	■				■	
		840D sl	■					■	
		840Di/Di sl	■					■	
<b>SIMOTION</b>									
SIMOTION C/P/D		integrated interface	■	■	■			■ 2)	
<b>SIMATIC PC/PG</b>									
Box PC Rack PC Panel PC Field PG M		SOFTNET S7/ S7 Lean	integrated interface	■	■				
		SOFTNET PN IO	integrated interface				■		
		PN CBA OPC server	integrated interface			■			
<b>PC-based Automation</b>									
WinAC		WinAC MP	integrated interface	■	■				
<b>SIMATIC HMI</b>									
Panels		TP/OP 270, MP 270/MP 370	■	■					
		TP/OP 177	■	■					
Visualization software PC/PG		WinCC flexible	■	■					
		WinCC	■	■	■				
<b>SIMATIC Sensors</b>									
Machine vision		VS 120/VS 130-2		■			■		
		VS 72x		■					
RFID-Systeme		RF180C		■			■		

1) With SINUMERIK PCU 50/50.3/70  
2) In connection with SIMOTION IT-Diag

# PROFIBUS devices and services

## Communications processors (CP) – supported functions


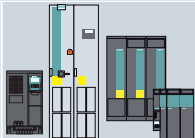




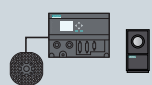

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	DP/PA	FMS	OPC	PROFIsafe	
SIMATIC										
S7-300 C7		CP 342-5/CP 342-5 FO	■	■	■	■				
		CP 343-5	■	■	■		■			
S7-400		CP 443-5 Basic	■	■	■		■			■ (with CPU 416F)
		CP 443-5 Extended	■	■	■	■				
		IM 467/467 FO				■				
SIMATIC TDC										
		CP 50M0				■				
SIMOCODE pro										
		CP 5512	■	■	■	■				
		CP 5611 A2	■	■	■	■				
SINUMERIK										
840D		CP 342-5/CP 342-5FO	■	■	■	■				
		CP 343-5	■	■	■		■			
SIMATIC PC/PG										
Box PC Rack PC Panel PC Field PG M		SOFTNET-DP SOFTNET-DP Slave	CP 5512/CP 5611 A2	■ 1)		■ 2)		■		
		SOFTNET-S7	CP 5512/CP 5611 A2	■ 1)	■	■				■
		DP-5613 CP mit DP-Base	CP 5613 A2/CP 5613 FO	■		■	■			■
		S7-5613	CP 5614 A2/CP 5614 FO	■	■	■				■
		FMS-5613	CP 5614 A2/CP 5614 FO	■		■		■		■
PC-based Automation										
WinAC		WinAC RTX	CP 5613 A2	■	■		■ (ohne PA)			
		WinAC Basis	CP 5611 A2	■	■		■ (ohne PA)			
		CP 5613 A2	■	■		■ (ohne PA)				
PC/Notebook										
PC		SOFTNET-DP SOFTNET-DP Slave	CP 5512/CP 5611 A2	■ 1)		■ 2)	■		■	
		SOFTNET-S7	CP 5512/CP 5611 A2	■ 1)	■	■			■	
		DP-5613 CP mit DP-Base	CP 5613 A2/CP 5613 FO	■		■	■		■	
		S7-5613	CP 5614 A2/CP 5614 FO	■	■	■			■	
		FMS-5613	CP 5614 A2/CP 5614 FO	■		■		■	■	

- 1) In connection with STEP 7  
2) Not with SOFTNET-DP slave



# Integrated interface – supported functions

The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	DP/PA	FMS	OPC	PROFIsafe
SIMATIC									
S7-300 C7		C7-635/636	■	■		■			
		CPU 315F/317F	■	■		■			■
S7-400		CPU 414H/417H	■	■		■			■
		CPU 416F	■	■		■			■
		CPU 41x -2/3 FM 458-1 DP (synchronous)	■	■		■			
		CPUs mit DP-Schnittstelle	■	■		■			
ET 200S		IM 151-1	■			■			
		IM 151-1 HF	■			■			■
		IM 151-7 CPU	■	■		■			
		IM 151-7 F-CPU	■	■		■			■
ET 200eco		BM141/-142/-143/-148	■			■			■ (BM 148 only)
ET 200M		IM 153-1	■			■			
		IM 153-2	■	■		■			■
ET 200pro		IM 154-1 DP	■			■			
		IM 154-2 DP HF	■			■			■
SINUMERIK									
		810D/840Di/840Di sl	■	■		■			
		840D/840D sl	■	■		■			■ (from NCU *.4)

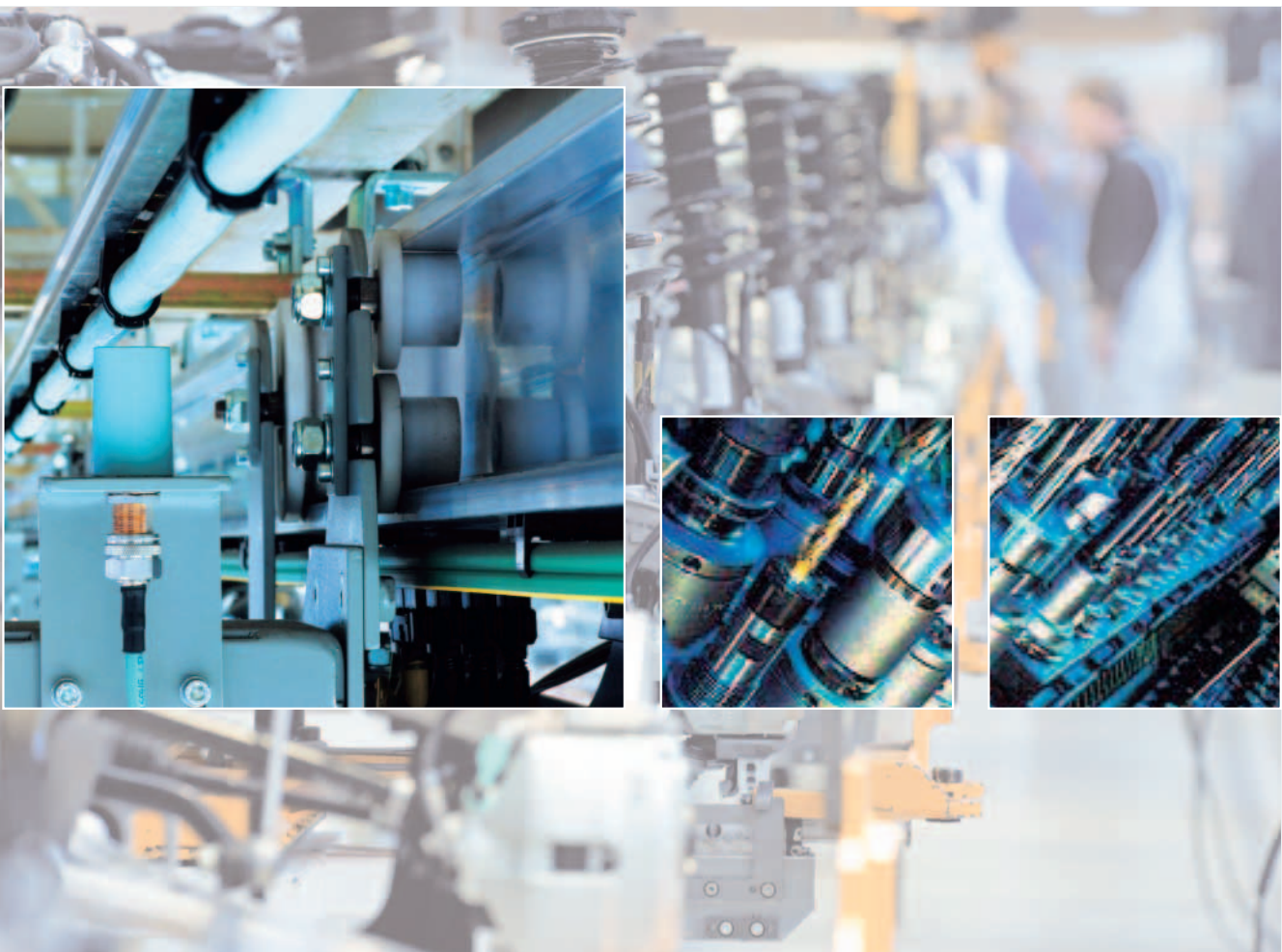
The following products support the listed functions or can be used in connection with this function.		Product	PG/OP	S7 communication	S5 compatible communication	DP/PA	FMS	OPC	PROFIsafe	
SIMOTION										
SIMOTION C/P/D		C230-2	■	■		■		■		
		P350	■	■		■		■		
		D425/435/445	■	■		■		■		
SINAMICS										
		G120/G130/150, S120/150	■			■			<div>■ (SINAMICS G120 only)</div>	
SIMATIC PC/PG										
Box PC Rack PC Panel PC Field PG M		SOFTNET-DP	• Box PC 627/840/ Microbox PC 420	■ 1)		■		■		
			• Rack PC 840/IL43							
		SOFTNET-DP Slave	• Panel PC 477/577/ 677/877	■ 1)			■		■	
			• Field PG M							
PC-based Automation										
WinAC		WinAC Slot 412/416	■	■		■				
		WinAC MP	■			■				
SIMATIC HMI										
Panels		OP, TP, MP	■	■	■					
Visualization software PC/PG		WinCC flexible	■	■	■			■		
		WinCC	■	■	■	■	■	■		
SIMATIC Sensors										
Machine vision		VS 120/VS 130-2		■						
		VS 72x		■						
RFID systems		ASM 456		■		■				

1) in connection with STEP 7

# Industrial Communication from Automation and Drives – Advantages at a glance

- Overall solution from the bus system right up to the engineering and diagnostics tools
- Investment protection thanks to compatible further development based on international standards
- Establishment of networked, safety-related applications using the PROFIsafe safety profile for PROFIBUS and PROFINET
- Integrated communication from the field level to the enterprise level (Enterprise Resource Planning)

- Real-time communication and data transfer on an Ethernet bus system
- High degree of mobility and flexibility through Industrial Wireless LAN
- Reliable protection of the automation solution against addressing errors or unauthorized access, for example
- Reliable, rugged and safe network components with integral diagnostics functions



# Fax form

This publication has provided you with an overview of communication methods and networks used in Totally Integrated Automation. Brochures and catalogs are available to provide more detailed information on specific devices, technologies and functionalities.

Please use this fax form and you will receive the documentation you request within a few days.

We thank you for your interest and are looking forward to receiving your fax!

## Broschüren

- ☐ Totally Integrated Automation
- ☐ Component Based Automation
- ☐ SIMATIC PCS 7 Process Control System
- ☐ Network solutions with Industrial Ethernet
- ☐ PROFINET
- ☐ Industrial Ethernet Communication / SCALANCE X
- ☐ Industrial Ethernet FastConnect
- ☐ Industrial Mobile Communication / SCALANCE W
- ☐ Industrial Security / SCALANCE S
- ☐ Network solutions with PROFIBUS
- ☐ AS-Interface
- ☐ SIMATIC Controller
- ☐ SIMATIC S7-200
- ☐ SIMATIC Technology
- ☐ SIMATIC Safety Integrated
- ☐ SIMATIC ET 200
- ☐ Logic module LOGO!
- ☐ SIMATIC PC
- ☐ SIMATIC Industrie Software
- ☐ SIMATIC IT
- ☐ SIMATIC Panels
- ☐ SIMATIC WinCC flexible
- ☐ SIMOTION
- ☐ SINAMICS
- ☐ SINUMERIK
- ☐ Variable-Speed Drives
- ☐ SIMATIC Sensors
- ☐ SINAUT TELECONTROL
- ☐ SIMATIC Power Rail Booster
- ☐ SIMOCODE pro – SIRIUS motor management and control devices

## Catalogs

- ☐ The offline Mall of Automation and Drives  
Catalog CA01 - on CD-ROM

## Please send your fax to:

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# Further Information can be found in the Internet

Technical documentation can be found in the  
SIMATIC Manuals Guide:

**[www.siemens.com/simatic-doku](http://www.siemens.com/simatic-doku)**

For a personal meeting you will find the contact  
partner in your area under:

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All about PROFINET can be found under:

**[www.siemens.com/profinet](http://www.siemens.com/profinet)**

Additional information about SIMATIC NET can be found under:

**[www.siemens.com/automation/simatic-net](http://www.siemens.com/automation/simatic-net)**

*In various SIMATIC NET components (e.g. SCALANCE, OSM/ESM, CPs with IT functions) comprehensive parameter and diagnostic functions (e.g. Web Server, network management) are available via open protocols and interfaces.*

*The open interfaces create an access to components which can however result in misuse though illegal activities.*

*By using these functions and the open interfaces and protocols (e.g. SNMP, HTTP, Telnet) suitable security measurements should be taken to ensure there is no unauthorized access to components and networks, particularly those connected to the WAN/Internet.*

*Automation networks should be separated from the company network by means of suitable firewall systems, e.g. SCALANCE S.*

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