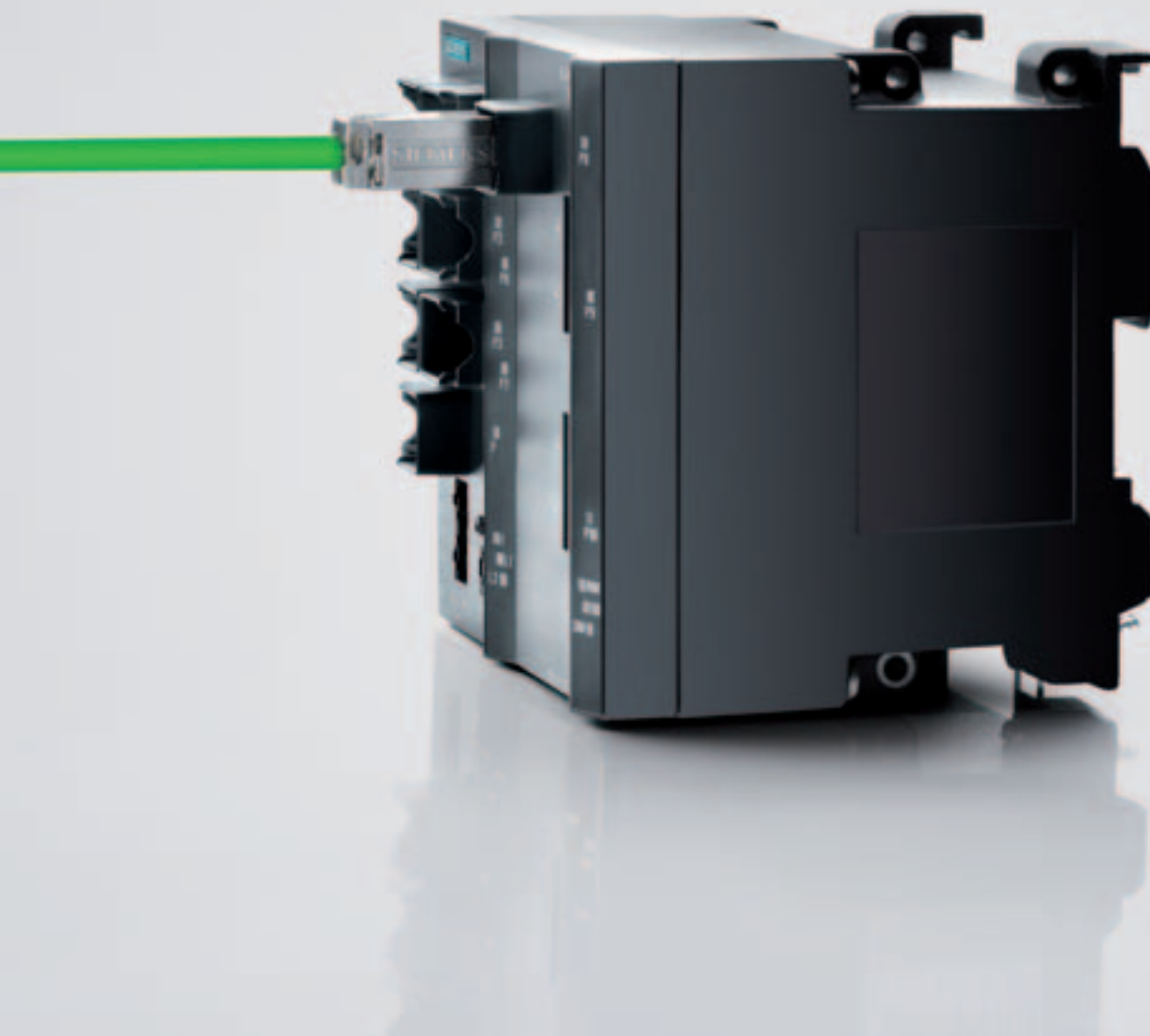


# Your markets change rapidly

Rely on SIMATIC NET for Industrial Ethernet to remain flexible!



## Industrial Ethernet

Answers for industry.

**SIEMENS**



# Scope

Future-proof data networks.

One of the keys to improved industrial productivity.



## Enterprise level and control level. Combined for added value.

Controlling your machines, monitoring your production lines, coordinating all your production areas – mastering these tasks would be unthinkable today without automation and respective data communication. An open and integrated system technology has proven its numerous advantages in all industrial sectors. However, requirements are continuously increasing: there is an increasing need for greater data throughput at the factory control level especially, e.g. due to the increase in device numbers, higher data volumes, more data-intensive tools, such as visualization, Web applications, Voice over IP, multimedia applications or the desire for centralized data management. To be able to meet these demands also in the future and thus hold your ground in the market, all corporate processes must be combined more efficiently. The vertical integration, i.e. a linkage from the fieldbus level through the control level on the shopfloor to the enterprise management level is a consequence of this realization.

## Industrial Ethernet. Networks for industrial demands.

In 1982, Ethernet established itself as a standard for office networks with its first products for business. Siemens is one of the pioneers who translated the advantages offered by this standard also to industrial processes. Not only the capacity available for the exchange of large data volumes predestined Industrial Ethernet for its application in the production industry.

Ethernet was advanced in terms of industrial suitability, availability, reliability, real-time capability, robust connection technology as well as for easy operability without expert IT knowledge. With a share of over 80 %, Ethernet is the network number one in the industrial landscape today. Thanks to its TCP/IP protocol (transmission control protocol/Internet protocol), Ethernet has created the basis for global networking via the Internet.

The SIMATIC NET from Siemens is the ultimate network driver of this Industrial Ethernet evolution – creating networks designed for industry.

## We`re setting trends

- The success story of Industrial Ethernet began in 1985, when Siemens introduced the industrial SINEC H1 based on IEEE 802.3. This was followed in 1989 with the optical variant SINEC H1FO.
- From 1985 onwards, the buzz word for the office level was Fast Ethernet with a baud rate of 100 MBit/s. Some 10 years later, Siemens offered the first Fast Ethernet switches for industrial use.
- The era of Fast Ethernet at the field level began in 2004 with PROFINET, the Industrial Ethernet Standard from Siemens.
- In 2007, after the successful introduction of a data rate of 1,000 MBit/s for the office level, the era of Gigabit Ethernet at the industrial control level also began at Siemens.

## Safety Integrated and wireless via PROFINET

Joint structures and technologies have improved the efficiency of engineering, operating and service tasks. The utilization of web technology, for example, today forms an integral part of numerous solutions. With the adaptation of Ethernet to Industrial Ethernet, the specific conditions of industrial processes can be fulfilled – also the required protection and safety functions.

With Safety Integrated, SIMATIC NET offers personnel and plant protection – and wireless as well!

Industrial Wireless LAN and the link of your local networks to WAN with Intranet/Internet provides you with access to information across your enterprise both globally and 24/7. SIMATIC NET with its Industrial Security capability protects your networks against undesired access from outside your enterprise and from undesired manipulations.



# Efficiency

**Industrial Ethernet.**

**Integration made simple – with SIMATIC NET.**

Ethernet-based communication from the office was introduced initially at the control level. Industrial Ethernet then came to be applied in the field with the automation standard PROFINET. Field devices from a variety of applications have been successfully integrated horizontally since then.

**Integrated connection to the enterprise level**

One of the main application advantages of Industrial Ethernet is the possibility of consistent networking – starting in the field level through the control level and on to the enterprise level. The above advantages are even further supplemented by the utilization of new IT technologies such as wireless LAN or web servers. This way, system networks can be linked effortlessly to other networks, e.g. an office LAN, Intranet or the Internet. This facilitates fast and direct access to all information required companywide.



### **Specific requirements for all levels**

If a vertically integrated network is to be established, the utilization of a joint protocol will not be enough. Both active as well as passive components must meet specific requirements in factory and logistics environments, which partially considerably differ from office applications. Network topology, network management, engineering and diagnostics and the application of IT standards for linking to the enterprise level are key here.

### **Separated but still talking**

It can happen that the field level and the control level are physically separated from one another: this allows load decoupling, but the two levels still have to communicate! That's no problem for the new communication processors for SIMATIC S7 controllers. The launch of separate network connections for Gigabit Ethernet and Fast Ethernet on one module allows the use of IT services

(IP routing) across the networks, e.g. access to a Web server. The access in this case is regulated with a configurable IP access list. And what do you get? You get data-intensive communication to the control level and fast response times for the lower-level field devices via PROFINET.

### **Harsh industrial environments**

Automation components are employed locally in control cabinets or even outside control cabinets with respectively high degrees of protection. Dust, humidity, extreme temperatures, impact and vibrations represent challenges for all products in industrial environments. The network components must be designed to take the flack.

### **Fail-safe and simple connection technology**

The FastConnect system for Industrial Ethernet from SIMATIC NET now supports structured wiring as per EN 50173 also for Gigabit Ethernet at the control level.



# Performance

Gigabit Ethernet.

Custom-built for high data volumes.



**Field level.  
The fastest response is wanted.**

Increasing bandwidth is not a pressing issue at the field level at present. A range of different fieldbus applications can be integrated horizontally for transmission rates of up to 100 Mbit/s without difficulty.

The best example is PROFINET, the open Industrial Ethernet Standard for the fieldbus.

**Control level.  
More bandwidth going forward.**

Broadband backbone structures and powerful server connections (e.g. SCADA servers, file transfer servers) are state of the art at the control level. Higher data throughput rates are in evidence here – due to the increasing numbers of users on the network or more data-intensive tools like visualization, vision systems and Web applications.

In addition, Voice over IP, video streaming or other multimedia applications give rise to higher data volumes.

In contrast to the field level, the focus is on bandwidth at the control level. Response times cause less concern. They can happily be on the order of 10 to 100 ms. Large data telegrams of up to 1,500 bytes for file transfers are a daily occurrence.

**Gigabit Ethernet. SIMATIC NET  
does the job at the control level.**

You want more performance for your system bus? You need maximum network availability? Then, fast ring redundancy is what you're looking for! You need high-performance server connections, e.g. for WinCC? And there is a requirement for adequate bandwidth for challenging automation tasks and IP traffic? That's no problem: SIMATIC NET products can deal easily with Gigabit applications at the control level!

**Integrated link to the enterprise level**

The vertical link to the enterprise level can be realized with a layer-3 switch or by the use of conventional IT standards.



Compact SCALANCE X-300 switches with Gigabit and Fast Ethernet ports



Modular SCALANCE X-400 switches for the flexible expansion of electrical and optical ports with the use of media modules



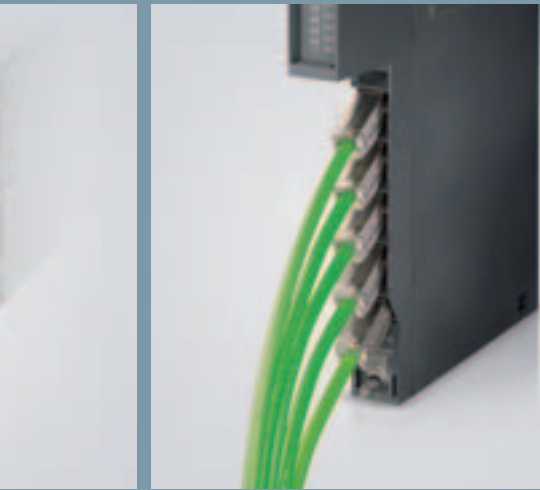
Communication processors for SIMATIC S7-300/400

# Portfolio

The future of your Industrial Ethernet Network.

Already reality with Gigabit Ethernet from SIMATIC NET.

The Fast Ethernet technology, which has been tried and tested for many years, in connection with switching, full duplex and autosensing together with gigabit-compliant products offer you the opportunity of investing in networks which are ready to meet all future network demands.



Marked increase in data throughput with CP 1623, the PCI-Express board

Get everything assembled quicker on site with Gigabit: FC RJ 45 Gigabit Plug

High system availability is among the essential requirements called for by many sectors. With the network components for Industrial Ethernet, the industrial communication with SIMATIC NET offers the right products in a systematic approach. With your investment in a network architecture based on switching technology, your network's smooth growing with your requirements is assured. Due to their scalability, switched networks offer an almost unlimited communication capacity.

**SCALANCE X switches.**  
**All switched on for high performance at the control level.**

SCALANCE X switches are specially designed for industrial requirements: rugged metal enclosure, DIN rail mounting, resistance to vibrations, insensitivity to electromagnetic influences.

In addition to products for Fast Ethernet, compact and modular switches with Gigabit Ethernet ports are available with either electrical and optical interfaces for designing line, ring and star topologies using IT standards for connecting to the enterprise level (VLAN, STP, RSTP, SNMP, ...). This is good news for the investor: you get access protection by means of an integrated security concept.

The SCALANCE X-414-3E is a HIGH PERFORMANCE CLASS switch that enables linking to the enterprise level via the integrated layer-3 function (IP routing).

**Network management.**  
**Fast diagnostics.**

Being informed on the condition of your network at all times bears major advantages. The SCALANCE X switches not only understand SNMP, but are also diagnostic-capable and thus seamlessly fit into state-of-the-art network management. For a business, the availability of networks whose fitness is always controllable and whose weaknesses can be rapidly identified is extremely soothing as such networks can be better optimized for future requirements.

**Two in one. The new communication processors for SIMATIC.**

The rollout of separate network connections in the new communication processors for SIMATIC S7-300/400 provide you with the following benefits:

- A link to the control level with Gigabit Ethernet
- A link to the field level with Fast Ethernet
- Full use of IT services via IP routing across the network
- Access protection with configurable IP access lists

**Faster response times for the lower-level field device connection**

The communication processors support the PROFINET Standard with real-time and isochronous real-time. And they assure high system availability through media redundancy.

**PCI Express board attains a new performance dimension**

CP 1623, the board for new PCI Express platforms, has not only two ports for Gigabit Ethernet on board, but also runs under the new Windows Vista Business/Ultimate operating system. The CP 1623 is also compatible with previous models!

**Giga speed with connection technology that is easy to handle on site**

Structured cabling as per EN 50173 is also available now for Gigabit Ethernet. In addition to the proven components in the Industrial Ethernet FastConnect system in the RJ45 standard version, the same concept is now available for Gigabit Ethernet.

# Availability

Your network runs 24/7. It's your choice.

The right technology, matching products and decisive details.

A unique offering from Siemens for the industry: PROFINET with PROFIsafe and integrated Industrial WLAN

## **Performance. Matched to future requirements.**

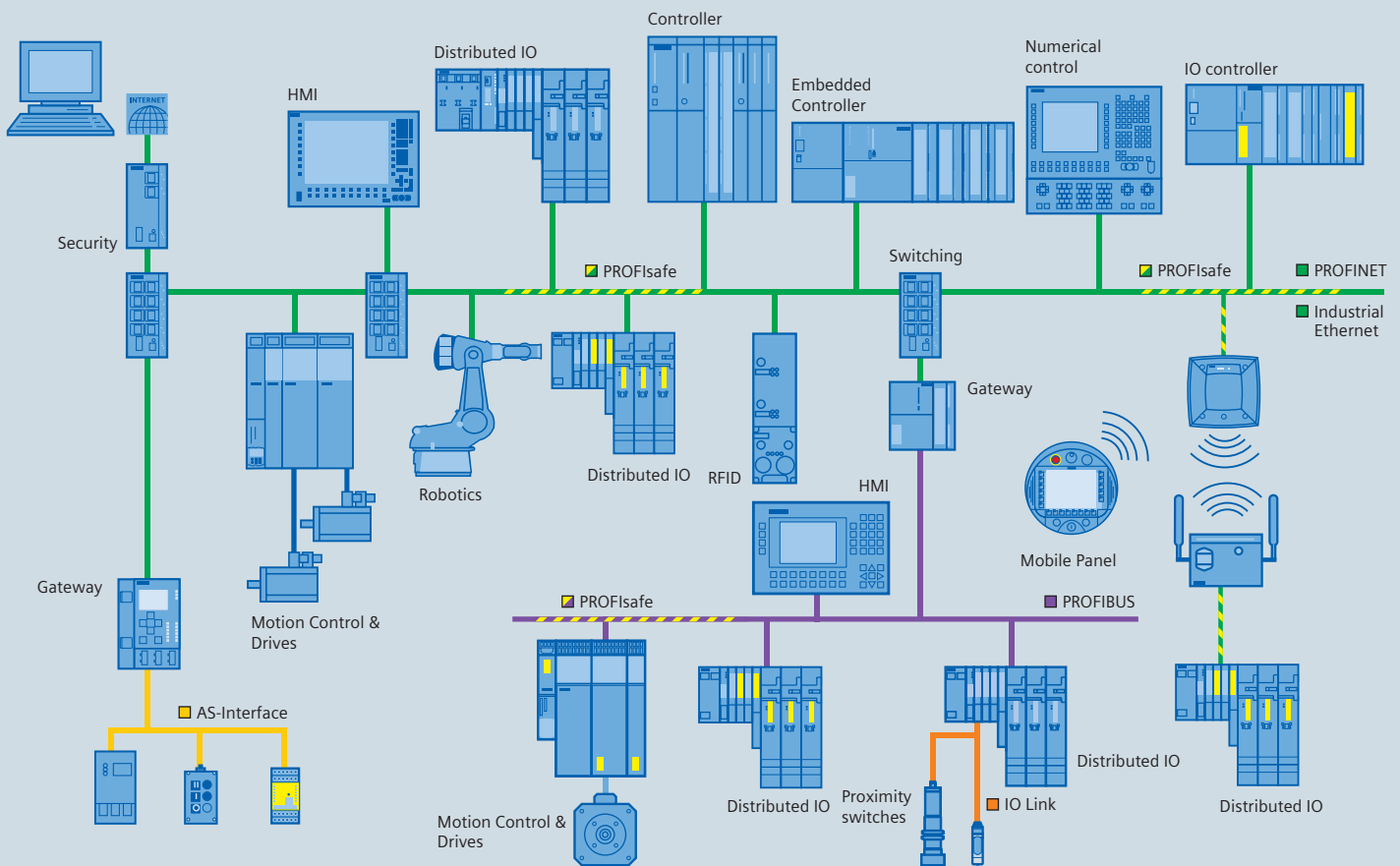
Thanks to its permanent advancement in consistently compatible steps, Siemens assures the protection of your investments. The new, high requirements placed upon your network in industrial applications have been mentioned in this brochure several times. With SIMATIC NET, the bar can be raised even higher.

## **SIMATIC NET. Designed for Industry.**

In addition to the overall concept and selection of the technology to be employed, sometimes also small but important details decisively contribute to the desired performance capacity. SIMATIC NET products have been consistently designed for industrial requirements. Examples: rugged metal enclosure, DIN rail mounting, resistance to vibrations, insensitivity to electromagnetic influences as well as safe plug connections with additional locking mechanism.

## **SIMATIC NET. Because networks must run.**

The prevention of transmission path failures can never be completely guaranteed. It is therefore all the more important to protect your network against functional failures. Downtimes cost a lot of money. Not least due to process technical reasons, the aspect of high system availability is on top of the users' priority lists. The integration of the network infrastructure in the engineering function accelerates troubleshooting and debugging and thus ups network availability.



### High availability – because it matters

If the office network fails for a few seconds or even minutes, that's not a big deal. It's a different story on your shopfloor: the requirements are stricter and system downtimes have to be avoided.

### High-speed redundancy. Eliminate failures.

SCALANCE X switches do the trick: high-speed redundancy (HSR). This concept is a specifically developed method of redundancy control. In practice, this means that an affected network is reconfigured into a functioning structure in less than 300 milliseconds.

In future, the changeover time until the system is available again will be less than 200 milliseconds with Siemens products equipped with the media redundancy protocol (MRP)! The advantages lie in the network's continued functioning thanks to the switch's ultra-fast reaction.

### Challenging requirements. SIMATIC NET meets them head on.

- Real-time capability up to high-performance motion control applications, e.g. angular-locked synchronism of axes
- Safety applications in accordance with safety classes for the connection of safety devices, e.g. Emergency STOP units
- Connection of field devices in hazardous environments
- Certification of the products for manifold applications, e.g. food and beverages industry, process industry, maritime applications, etc.

## Service & Support

Whether it's a service expert you're after or a spare part, or you want to talk to a product expert or if it's only a query you have: have a word with our Customer Support – they'll sort you out. Support with designing and planning your project. Starting with the detailed analysis of your current situations and what you're after through assistance with product and system issues to engineering the automation solution. Online Support offers all technical information!

Our Online Support provides fast and effective support – in five languages around the clock and around the world. The comprehensive information system is always available online at:

[www.siemens.com/automation/service&support](http://www.siemens.com/automation/service&support)

Competent assistance with technical issues with a wide range of services for our products and systems.

[www.siemens.com/automation/support-request](http://www.siemens.com/automation/support-request)

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