SIEMENS

Industrial Security

Network Security

Brochure

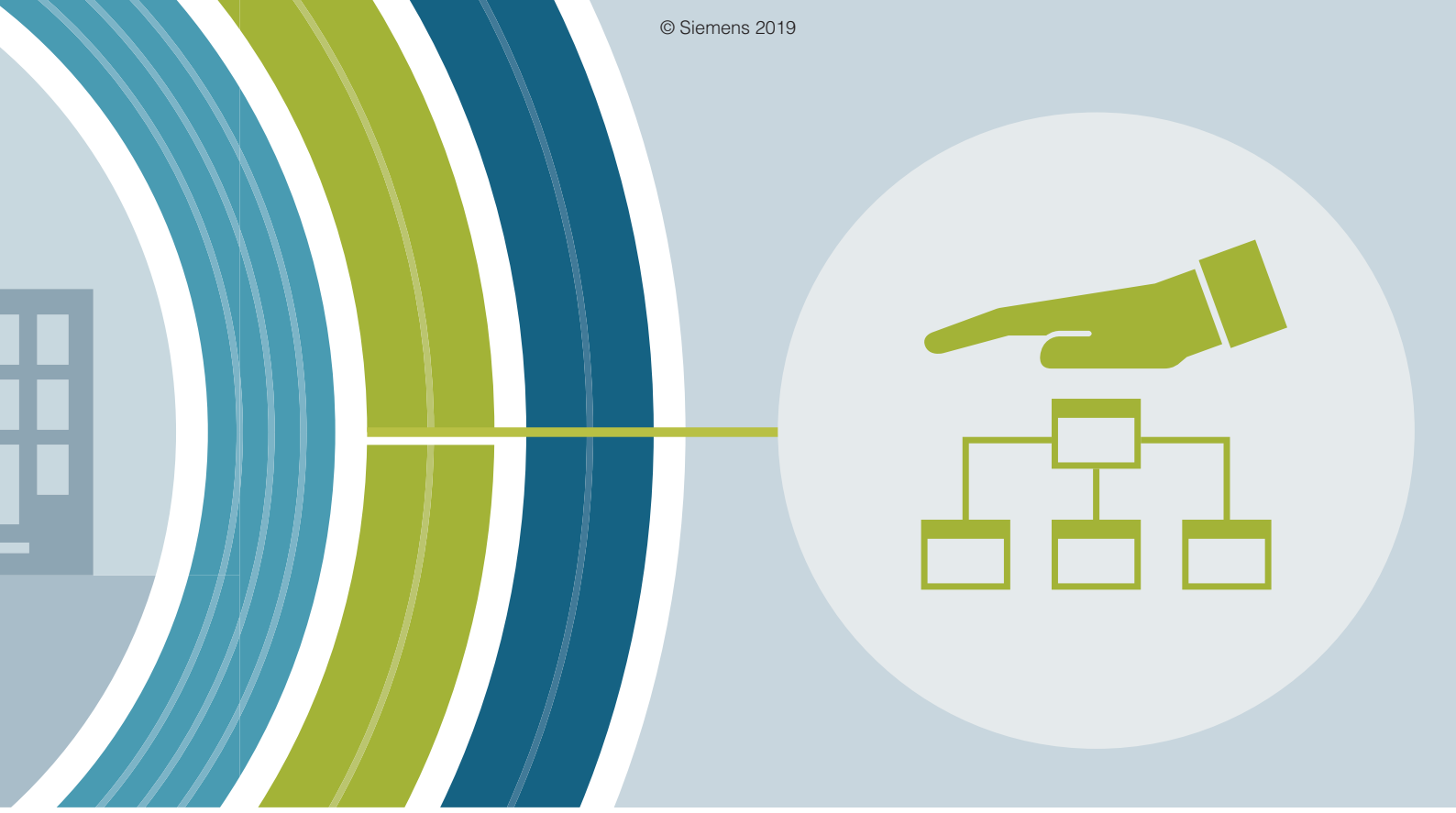
Edition 11/2019

siemens.com/network-security

The Internet serves as an enormous accelerator of business processes and has revolutionized business operations around the world. The resulting changes in the production industry can also be described as a revolution – the 4th Industrial Revolution. Industry 4.0 affects all aspects of the industrial value chain, including the very important aspects of industrial communication and security.

It is key here that, in light of digitalization and the ever increasing networking of machines and plants, data security is always taken into account. The use of industrial security solutions precisely tailored to the needs of industry is therefore of fundamental importance – and should be inseparably linked with industrial communication.

The topic of cybersecurity is also becoming increasingly important due to the constantly growing number of convergent networks in companies and the increased frequency of cyber attacks and has long been the focus of standardization efforts by international committees such as the International Electrotechnical Commission (IEC).
Moreover, security is also regulated at the national level by laws and regulations addressing critical infrastructures in particular in order to accommodate increased security requirements. Examples include the IT Security Act in Germany, the ANSSI Certification in France, NERC CIP in the USA and many more. Thanks to these standards and regulations, it is now possible to take advantage of the tremendous opportunities offered by open communication and the increased networking of production systems while also appropriately addressing the accompanying high risks. Siemens supports you here in adequately protecting your industrial plant from cyber attacks – as part of an integrated portfolio for industrial security.



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Industrial Security

A look at the threat situation

No.	Threat	Explanation
1	Introduction of malicious code via removable media and external hardware	The use of removable media and mobile IT components by external personnel always entails a major risk of malware infections. However, personnel are often unaware of the effects of malware.
2	Malware infection via Internet or intranet	Standard components used in company networks (e.g. operating systems, databases, browsers and email clients) usually contain vulnerabilities that an attacker can exploit to infiltrate the company network. From the infiltrated intranet or office network, the attacker can often proceed into the production network, either directly or with a follow-up attack.
3	Human error and sabotage	Deliberate actions – regardless of whether by internal or external offenders – are a massive threat to all security goals. Security can never be guaranteed through technical measures alone; organizational rules must always be established and followed.
4	Compromising of extranet and cloud components	Outsourcing of IT components to cloud solutions leads in some cases to system owners having only very limited control over the security of these components and the possibility of their being compromised. The components themselves may be connected directly to the local production, however.
5	Social engineering and Phishing	Social engineering is a method of gaining unauthorized access to information or IT systems through mostly non-technical actions and through exploitation of human traits, such as curiosity, helpfulness, trust, fear or respect for authority. Fraudulent emails – so-called phishing emails – that induce recipients into opening manipulated links or attachments with malware represent a classic example of this.
6	(D)DoS attacks	(Distributed) denial of service attacks can be used to disrupt both wired and wireless network connections as well as required system resources and cause systems to crash, e.g. to disrupt the functionality of an ICS.
7	Control components connected to the Internet	Despite manufacturer recommendations, ICS components are often connected directly to the Internet without having an adequate level of security and security mechanisms.
8	Intrusion via remote maintenance access	External access to ICS installations for maintenance purposes is a common practice. Access with default or hard-coded passwords is widespread. Access by manufacturers and external service providers for maintenance purposes is sometimes not limited to specific systems. As a consequence, further systems are accessible.
9	Technical malfunctions and force majeure	Failures due to extreme environmental influences or technical defects are always possible – the risk and the potential for damage can only be minimized here.
10	Compromising by smartphones in the production environment	The ability to display and change operating and production parameters on a smartphone or tablet is increasing being used in the production environment. Remote maintenance access via a smartphone or tablet represents a special case and adds an additional attack surface.

Threat overview

Source:
Based on BSI-CS 005 | Version 1.30 dated 1 January 2019
Note:
This list of threats was compiled in close cooperation between BSI (German Federal Office for Information Security) and representatives of industry.
Using BSI analyses, the Federal Office for Information Security (BSI) publishes statistics and reports on current topics relating to cybersecurity.

Defense in Depth

Network security as a central component of the Siemens industrial security concept

With defense in depth, Siemens provides a multi-faceted concept that gives your system both all-round and in-depth protection. The concept is based on plant security, network security and system integrity – according to the recommendations of IEC 62443, the leading standard for security in industrial automation.

Plant security

Plant security uses a number of different methods to prevent unauthorized persons from gaining physical access to critical components. This starts with conventional building access and extends to securing sensitive areas by means of key cards. Comprehensive security monitoring leads to transparency with regard to the security status of production facilities. Thanks to continuous analyses and correlations of existing data and through comparison of these with threat indicators, security-relevant events can be detected and classified according to risk factors. On this basis and through regular status reports, plant owners receive an overview of the current security status of their production facilities, enabling them to react swiftly to threats.

Network security

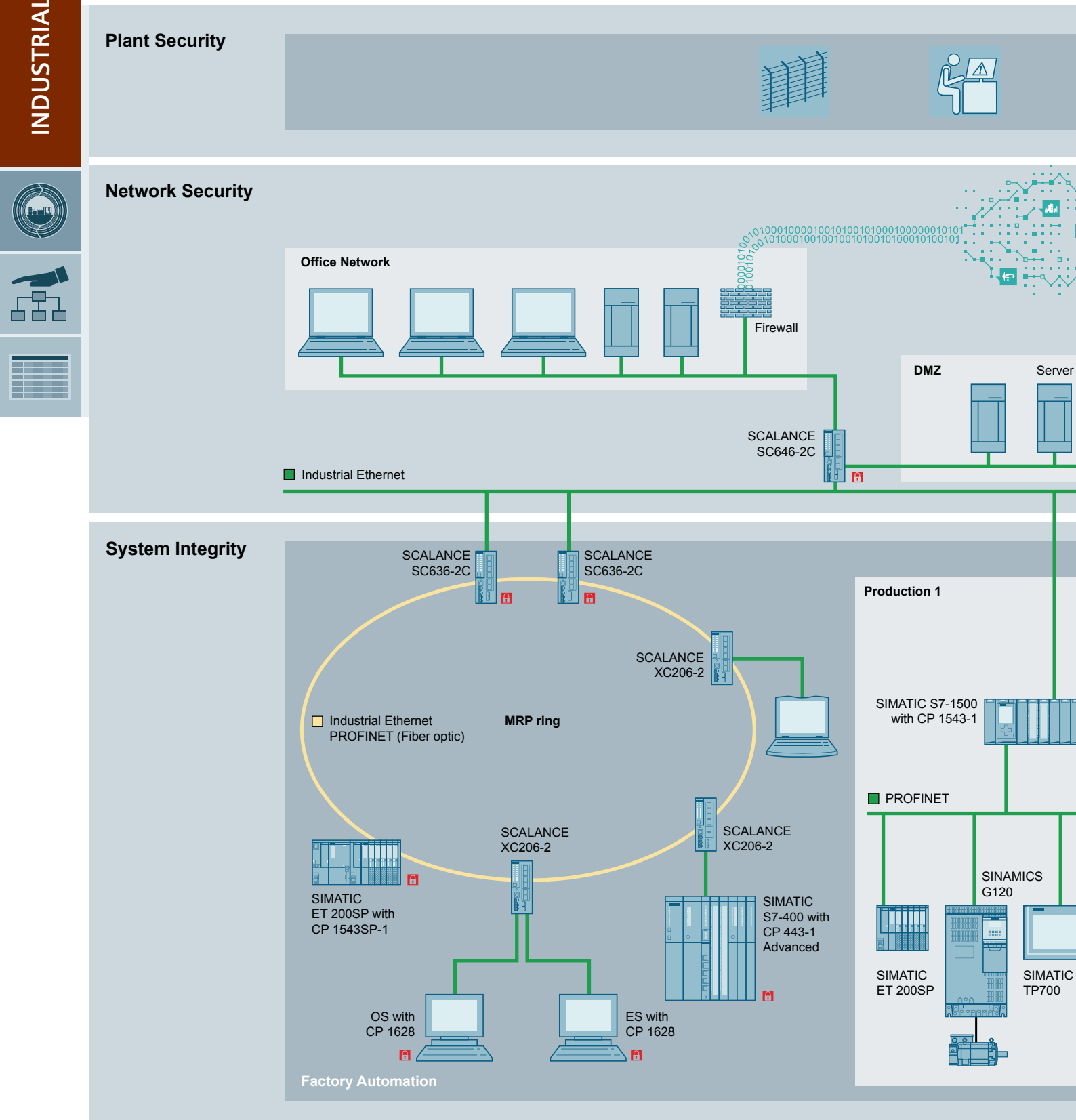
Network security means protecting automation networks from unauthorized access. This includes the monitoring of all interfaces such as the interfaces between office and plant networks or the remote maintenance access to the Internet.

It can be accomplished by means of firewalls and, if applicable, by establishing a secured and protected "demilitarized zone" (DMZ). The DMZ is used for making data available to other networks without granting direct access to the automation network itself. The security-related segmentation of the plant network into individually protected automation cells minimizes risks and increases security. Cell division and device assignment are based on communication and protection requirements. Data transmission can be encrypted using Virtual Private Network (VPN) and thus be protected from data espionage and manipulation. The communication nodes are securely authenticated. Automation networks, automation systems and industrial communication can be made secure with SCALANCE S Industrial Security Appliances, SCALANCE M industrial routers and security communications processors for SIMATIC.

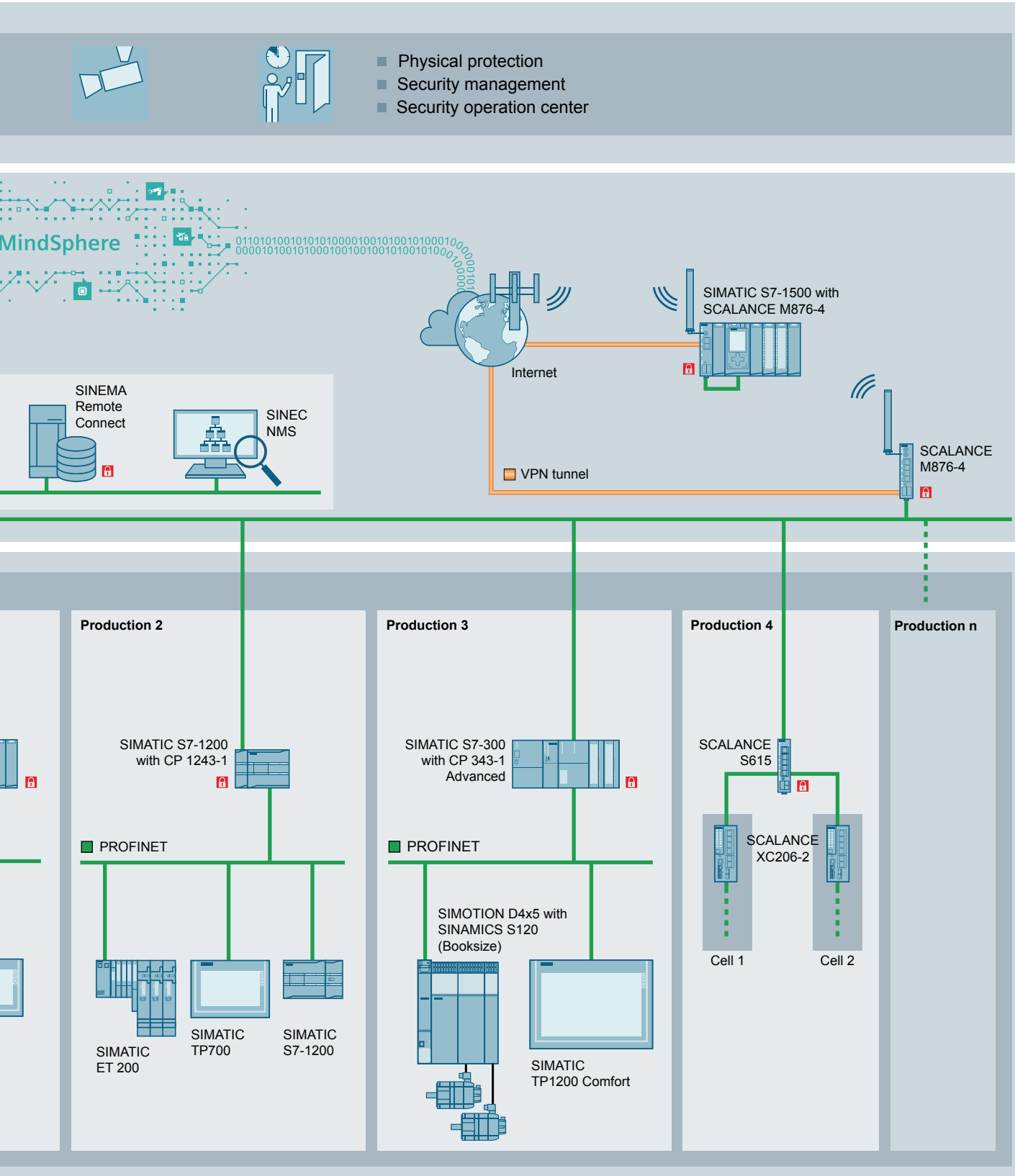
System integrity

The third pillar of defense in depth is the safeguarding of system integrity. The emphasis here is on protecting automation systems and control components such as SIMATIC S7-1200 and S7-1500 as well as SCADA and HMI systems against unauthorized access and on meeting special requirements such as know-how protection. Furthermore, system integrity also involves authentication of users, access and change authorizations, and system hardening – in other words, the robustness of components against possible attacks.

Industrial security at a glance



Secured communication, network access protection and network segmentation with Security Integrated components



Industrial security – More than just product functions

With the aim of taking a further step toward a secure digital world, Siemens is the first company to receive TÜV SÜD (German Technical Inspectorate/South) certification based on IEC 62443-4-1 for the interdisciplinary process of developing automation and drive products, and is also the initiator of the "Charter of Trust".

Based on 10 key principles, the members of the "Charter of Trust" set themselves the three goals of protecting the data of individuals and companies, preventing harm to people, companies and infrastructures and creating a reliable basis upon which trust is established and can grow in a connected, digital world.

Industrial security as part of Totally Integrated Automation

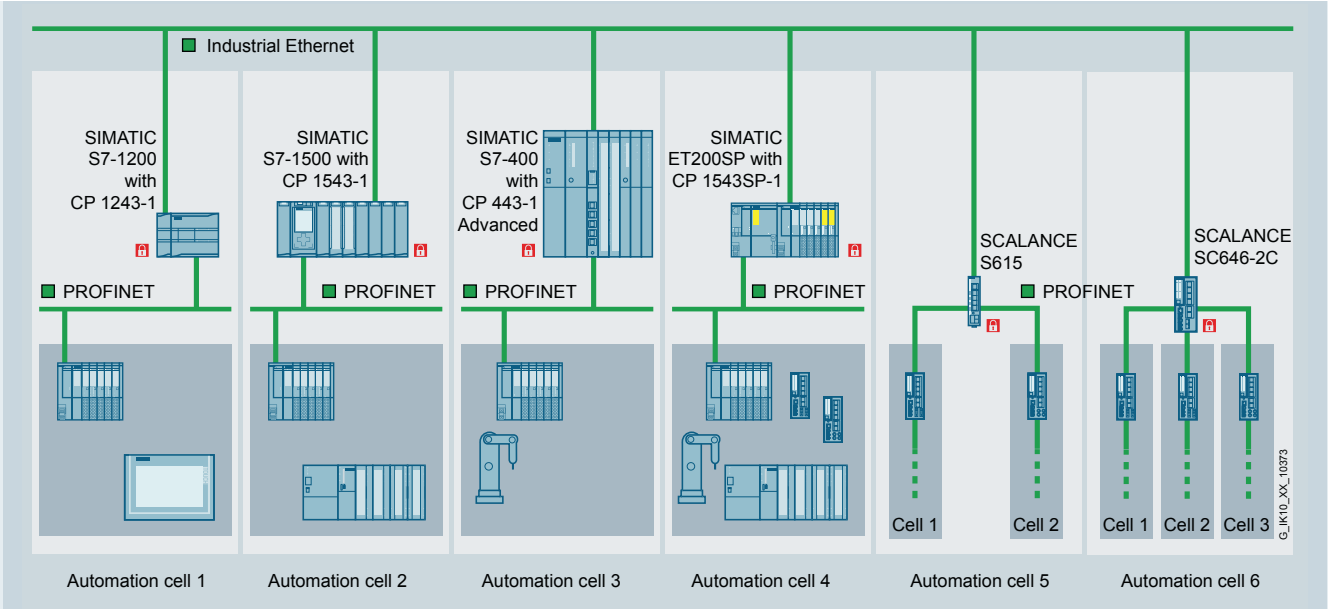
Totally Integrated Automation:
Efficient interaction between all automation components

With industry-compatible security products for network security and system integrity integrated in the TIA Portal, your automation solutions can be efficiently safeguarded and the defense in depth security concept for protection of industrial plants and automation systems can be implemented.

All Industrial Security Appliances and remote networks components are integrated in the TIA Portal and can be configured there. In addition to a central user management with the UMC option of the TIA Portal, the firewall rules for the security communications processors are also automatically assigned via the TIA Portal.

Network Security

Cell protection concept



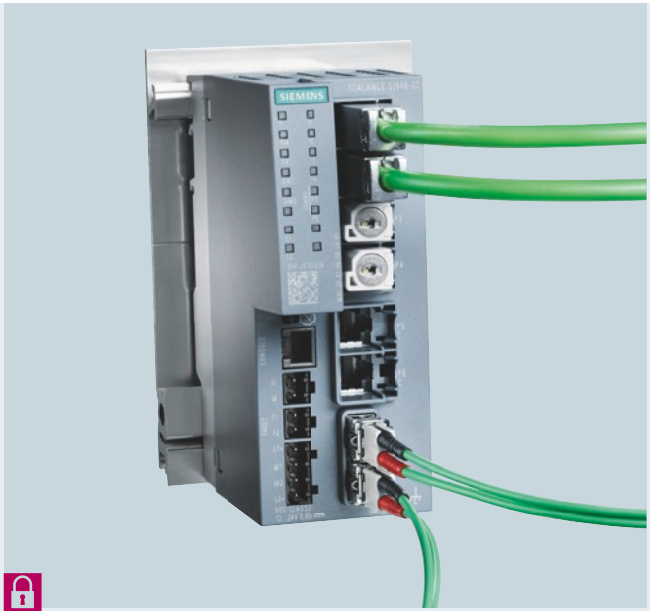
Secured communication between components with Security Integrated in separate automation cells

Industrial communication is a key factor for corporate success – as long as the network is protected. For realization of the cell protection concept, Siemens partners with its customers to provide Security Integrated components, which not only have integrated communication functions but also special security functions such as firewall and VPN.

Cybersecurity - comprehensive security mechanisms
Siemens helps its customers benefit from technological progress while keeping risks in areas such as cybersecurity as low as possible. A security solution can only be implemented optimally when it is continuously adapted to new threats. Taking this into account, the products, solutions and services from Siemens for cybersecurity offer proven protection in industrial plants, automation systems and industrial networks.

Cell protection concept
With the cell protection concept, a plant network is segmented into individual, protected automation cells within which all devices are able to securely communicate with each other. The individual cells are connected to the plant network in a secured manner with VPN and firewall. Cell protection reduces the susceptibility to failure of the entire production plant and thus increases its availability. Security Integrated products such as SCALANCE S Industrial Security Appliances, SCALANCE M industrial routers and the security communications processors can be used for implementation.

Industrial Security Appliance SCALANCE S



The SCALANCE S Industrial Security Appliances offer protection of devices and networks in discrete manufacturing and in the process industry, and protect industrial communication with mechanisms such as Stateful Inspection Firewall as well as Virtual Private Networks (VPN). The devices are suitable for industry-related applications and, depending on the requirement, are available with different port configurations (2 to 6 ports) and range of functions (firewall or firewall + VPN). All versions enable configuration over Web Based Management (WBM), Command Line Interface (CLI), Simple Network Management Protocol (SNMP), SINEC NMS network management as well as TIA Portal.

All Industrial Security Appliances support:

- User-specific firewall
- Network Address Translation (NAT), Network Address Port Translation (NAPT) for communication with serial machines with identical IP address bands
- Autoconfiguration interface for easy configuration of a connection to SINEMA Remote Connect
- Digital input (DI) for connection of a key-operated switch for controlled setup of a tunnel connection
- Simple device replacement with C-PLUG
- Redundancy mechanisms through VRRPv3

For more information on Industrial Security Appliances, visit:
siemens.com/scalance-s
Additional information on SINEMA Remote Connect on **page 18**.

Industrial Firewall Appliances

SCALANCE SC632-2C and SCALANCE SC636-2C

- Firewall performance approx. 600 Mbit/s
- Secured access between separate network segments through a bridge firewall
- Connection via 10/100/1000 Mbit/s ports and fiber optic for large distances (up to 200 km)
- Console port for direct access via programming device
- Secured redundant MRP/HRP connection for SCALANCE SC636-2C

Industrial VPN Appliances

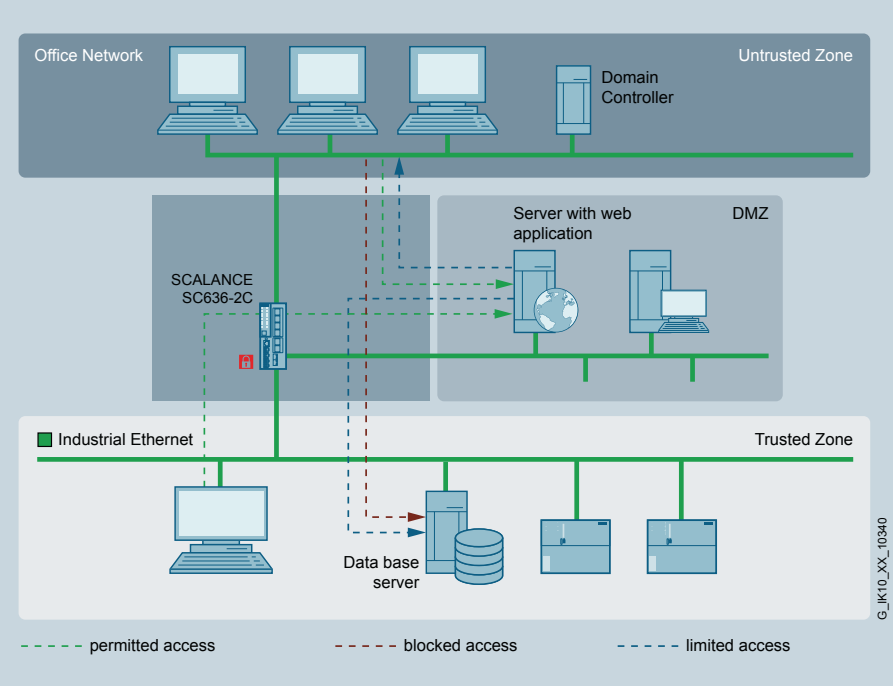
SCALANCE S615

- Firewall performance approx. 100 Mbit/s
- Management of up to 20 VPN connections with a data rate of up to 35 Mbit/s
- Connection via 10/100 Mbit/s ports

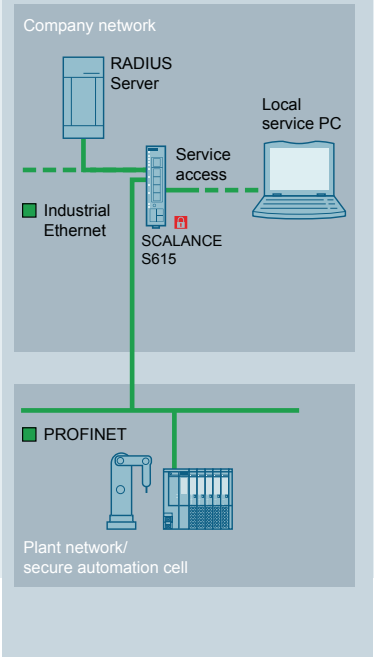
SCALANCE SC642-2C and SCALANCE SC646-2C

- Firewall performance approx. 600 Mbit/s
- Secured access between separate network segments through a bridge firewall
- Management of up to 200 VPN connections with a data rate of up to 120 Mbit/s
- Connection via 10/100/1000 Mbit/s ports and fiber optic for large distances (up to 200 km)
- Console port for direct access via programming device
- Secured redundant MRP/HRP connection for SCALANCE SC646-2C

Application example
Network access protection with DMZ



Network security as a central component of the Siemens industrial security concept



Connection of a local service PC via SCALANCE S615

Task
Network nodes or servers (e.g. MES servers) are to be accessible from both the secured network and the unsecured network without a direct connection between the networks.

Solution
A DMZ can be set up with the help of a SCALANCE SC636-2C. The servers can be positioned in this DMZ.

Advantages at a glance

- Increased security through data exchange via DMZ and prevention of direct access to the automation network
- Protection of automation networks against unauthorized access starting at the network boundaries

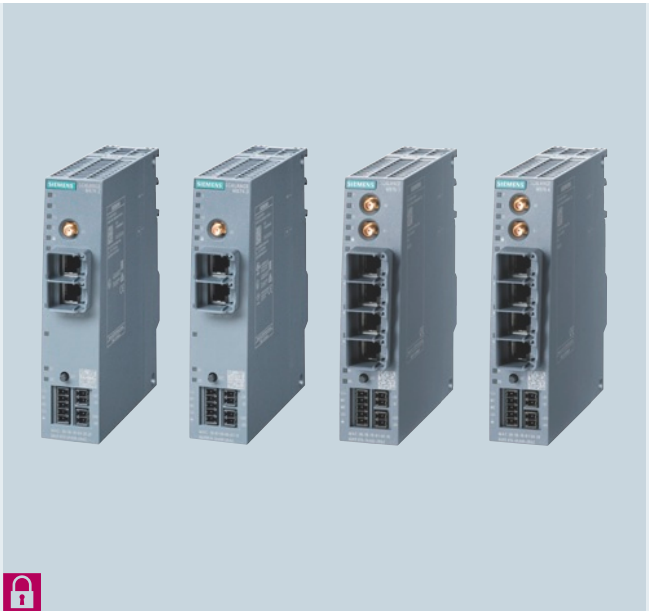
Task
The local network is to be protected against unauthorized access and authorized individuals are to receive only the access rights for their role.

Solution
The port of the Industrial Security Appliance (in this case the SCALANCE S615) defined as the DMZ port is the single locally accessible port. The Industrial Security Appliance is connected to the plant network and a lower-level automation cell. User-specific firewall rules are created for each user. To receive access to the network, the user must be logged in to the SCALANCE S with user name and password.

Advantages at a glance

- Securing the local network access
- Flexible and user-specific access rights
- Central authentication using RADIUS is possible

Application example
SCALANCE M industrial routers



The SCALANCE M portfolio consists of routers for Industrial Remote Communication applications such as Telecontrol and Teleservice. The integrated firewall and VPN (IPsec; OpenVPN as client and for connection to SINEMA Remote Connect) security functions protect against unauthorized access and make data transmission secure.

Wireless connection to remote networks
The wireless SCALANCE M routers use the globally available, public cellular telephone networks (2G, 3G, 4G) for data transmission.

SCALANCE M874-2 supports the GSM data services GPRS (General Packet Radio Service) and EDGE (Enhanced Data Rates for GSM Evolution).

SCALANCE M874-3 supports the UMTS data service HSPA+ (High Speed Packet Access) and therefore enables high transmission rates of up to 14.4 Mbit/s in the downlink and up to 5.76 Mbit/s in the uplink.

SCALANCE M876-3 supports dual-band CDMA2000 and the UMTS data service HSPA+. Thus, the device enables high transmission rates of up to 14.4 Mbit/s in the downlink and up to 5.76 Mbit/s in the uplink.

SCALANCE M876-4 supports LTE (Long Term Evolution) and enables high transmission rates of up to 100 Mbit/s in the downlink and up to 50 Mbit/s in the uplink.

Wired connection to remote networks
The wired routers of the SCALANCE M product family support the cost-effective and secured connection of Ethernet-based subnets and automation devices.
The connection can be made over existing two-wire or stranded cables or wired telephone or DSL networks.
The connection of PROFIBUS networks is also possible without any additional adapters or software.

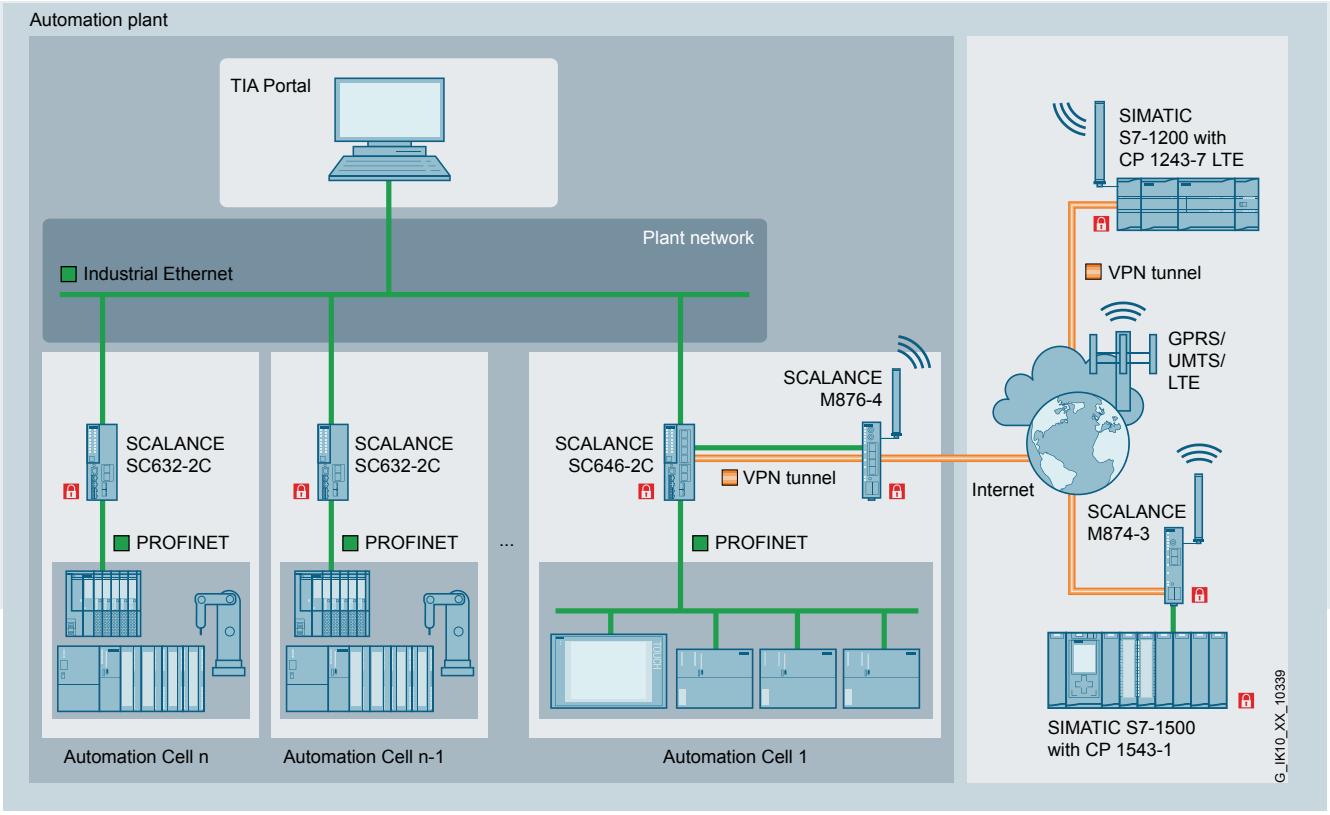
SCALANCE M804PB supports PROFIBUS/ MPI. This enables the device to have secured remote access to existing systems. Transmission rates up to 12 Mbit/s can be achieved.

SCALANCE M812-1 and SCALANCE M816-1 are DSL routers for connection to wired telephone or DSL networks that support ASDL2+ (Asynchronous Digital Subscriber Line). Thus, the devices enable high transmission rates of up to 25 Mbit/s in the downlink and up to 1.4 Mbit/s in the uplink.

SCALANCE M826-2 is an SHDSL modem for connection via existing two-wire or stranded cables and supports the ITU-T standard G.991.2. Thus, the device enables high symmetrical transmission rates of up to 15.3 Mbit/s per wire pair.

Application example

Secured remote maintenance with SCALANCE M and SCALANCE S



Secured remote access without direct connection to the automation network with industrial security components

Task

For servicing purposes, a system integrator requires secure access via the Internet to his machine or equipment at the end user. However, the integrator is to be given access only to specific devices and not to the plant network. In addition, a secured connection from the plant to a remote station via mobile networks (e.g. UMTS or LTE) is to be established.

Solution

Starting points for the connection of the system integrator are the VPN clients (in this case CP 1243-7 LTE, SCALANCE M874-3) with the end point: SCALANCE SC646-2C as VPN server in the automation system.

Advantages at a glance

- Secured remote access via the Internet or mobile networks such as UMTS or LTE by safeguarding the data transmission with VPN (IPsec)
- Restriction of access possibilities with integrated firewall function
- Secured remote access to plant units without direct access to the plant network with SCALANCE SC646-2C firewall

Task

Access of a system integrator to the machine is to be unlocked for individual end devices and services on a user-dependent and role-dependent basis.

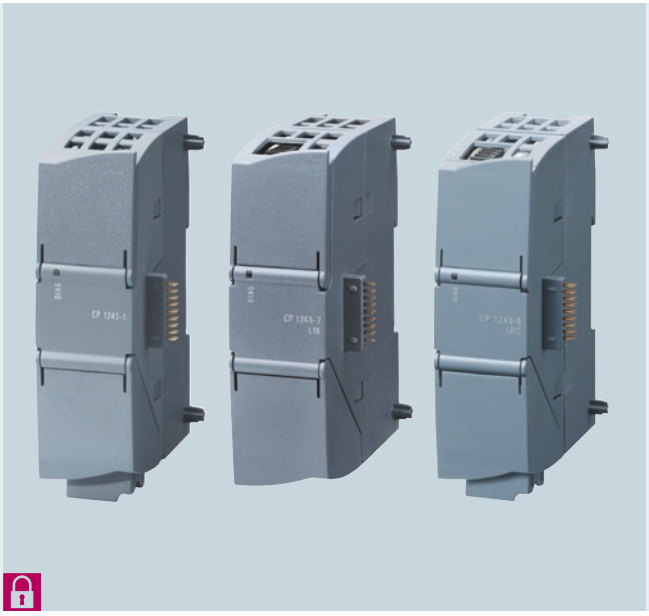
Solution

User-specific firewall rules can be temporarily enabled on the SCALANCE S Industrial Security Appliances with personalized user data for the duration of the service work.

Advantages at a glance

- Reduced security risk during service and maintenance
- Controlled and logged device access
- User-based and protocol-based access control to end systems of a network cell

Security communications processors for Basic Controllers, Advanced Controllers and Distributed Controllers



Security communications processors protect controllers with integrated firewall and VPN against data manipulation and espionage.

For SIMATIC Basic Controllers
CP 1243-1, CP 1243-7 LTE and CP 1243-8 IRC
The CP 1243-1 and CP 1243-7 LTE communications processors connect the SIMATIC S7-1200 controller to Ethernet networks (CP 1243-1) or mobile wireless networks (CP 1243-7 LTE). The CP 1243-8 IRC communications processor connects the controller to a telecontrol center via the telecontrol protocols SINAUT ST7, DNP3 and IEC 60870-5-104. With integrated firewall and VPN security functions, the communications processors protect S7-1200 stations and lower-level networks from unauthorized access and protect data transmission against manipulation and espionage by encrypting it.

Advantages at a glance

A special advantage of the security communications processors for SIMATIC controllers is the automatic creation of firewall rules during configuration with the TIA Portal. Configured communication connections are automatically enabled in the firewall so that the configuration effort and the error rate are drastically reduced.

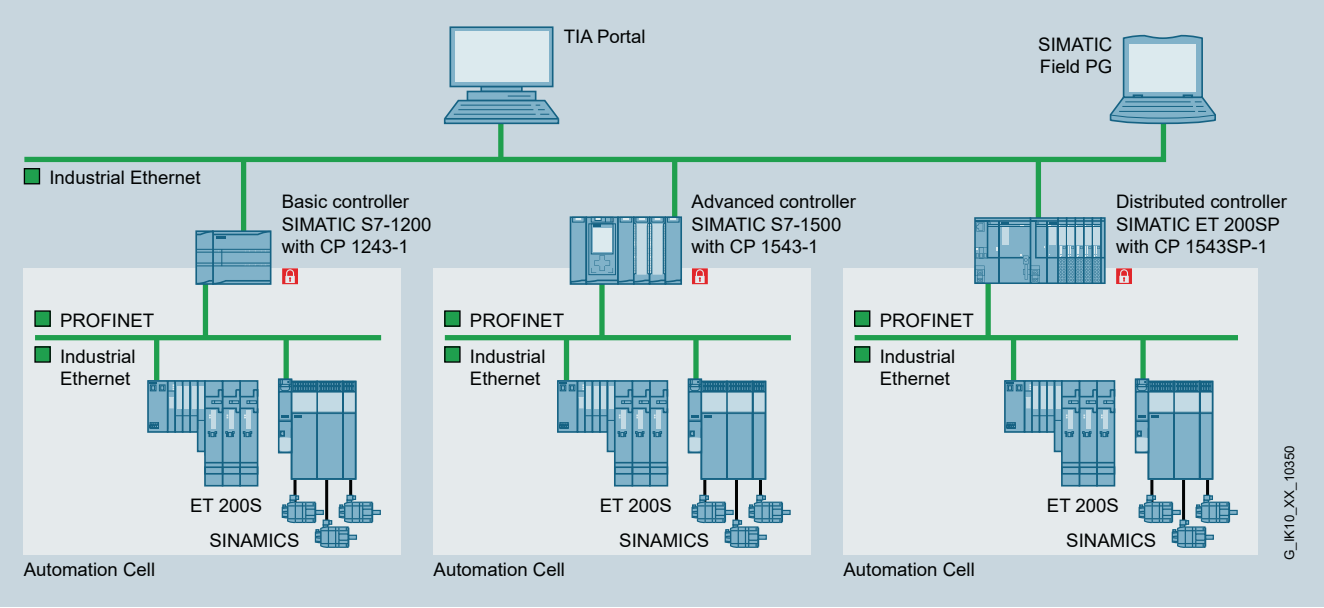
For SIMATIC Advanced Controllers
CP 1543-1
The CP 1543-1 communications processor securely connects the SIMATIC S7-1500 controller to Ethernet networks. With its integrated firewall and VPN security functions and protocols for data encryption such as FTPS and SNMPv3, the communications processor protects S7-1500 stations and lower-level networks from unauthorized access and protects data transmission against manipulation and espionage by encrypting it. The CP also has encrypted e-mail communication via SMTPS (Ports 587 and 25) and secure open communication via TCP/IP.

CP 1545-1
The CP 1545-1 with CloudConnect functionality enables easy and reliable transfer of all data from SIMATIC S7-1500 to MindSphere or a cloud solution that supports the standardized MQTT protocol, e.g. Microsoft Azure or IBM Cloud. The CP 1545-1 protects the SIMATIC S7-1500 station from unauthorized access with the integrated stateful inspection firewall. Integration into an IPv6 infrastructure is also possible. In parallel with the connection to cloud applications, the CP 1545-1 supports the connection to additional automation devices, such as HMIs, via Industrial Ethernet by means of the SIMATIC S7 protocol.

For SIMATIC Distributed Controllers
CP 1543SP-1
The CP 1543SP-1 communications processor allows the ET 200SP Distributed Controller to be flexibly expanded to include an Industrial Ethernet interface. This enables the setup of identical machines with the same IP addresses through network segmentation. It also offers extended security functions, such as encryption of all transmitted data using VPN with IPsec or the Stateful Inspection Firewall for secure access to the ET 200SP Distributed Controller.

Application example

Network segmentation with security communications processors



Segmentation of networks and protection of the SIMATIC S7-1200 with CP 1243-1, S7-1500 with CP 1543-1 and ET 200SP Distributed Controller with CP 1543SP-1

Task

Communication between the automation network and lower-level networks on SIMATIC controllers is to be secured by means of access control.

Solution

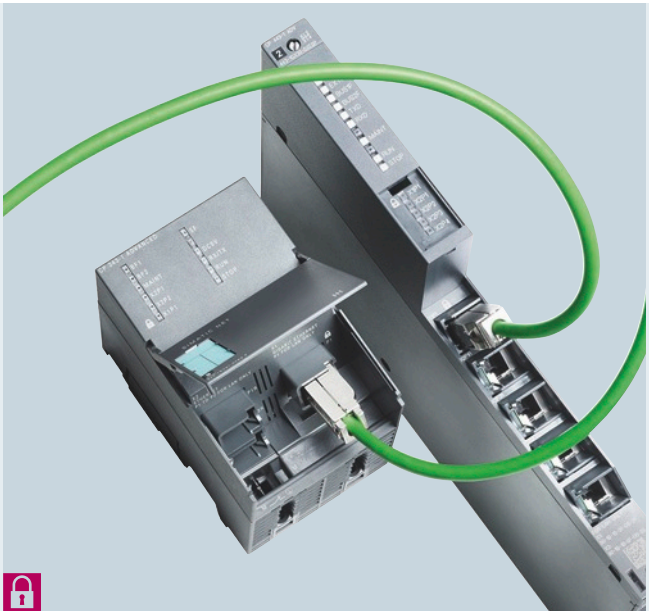
The communications processors are placed in the rack of the respective target systems (SIMATIC S7-1200, S7-1500, ET 200SP Distributed Controller) upstream of the automation cells to be protected. In this way, the communication to and from the SIMATIC CPU and lower-level automation cell is restricted to the permitted connections with the aid of firewall rules and, if necessary, protected against manipulation or espionage by setting up VPN tunnels.

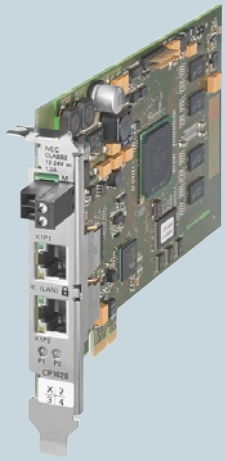
Advantages at a glance

- Secured connection of the SIMATIC S7-1200, S7-1500 and ET 200SP Distributed Controller to Industrial Ethernet by means of integrated Stateful Inspection Firewall and VPN
- Additional secured communication possibilities: File transfer and email
- Use in an IPv6-based infrastructure[1)]

[1)] Applies to CP 1543-1, CP 1543SP-1

Security communications processors for SIMATIC S7-300, S7-400 and PG/PC





CP 343-1 Advanced and CP 443-1 Advanced
Alongside the familiar communication functions, an integrated switch and Layer 3 routing functionality, the Industrial Ethernet communications processors CP 343-1 Advanced and CP 443-1 Advanced for SIMATIC S7-300 and S7-400 contain Security Integrated, i.e. a Stateful Inspection Firewall and a VPN gateway for protection of the controller and lower-level devices against security risks.

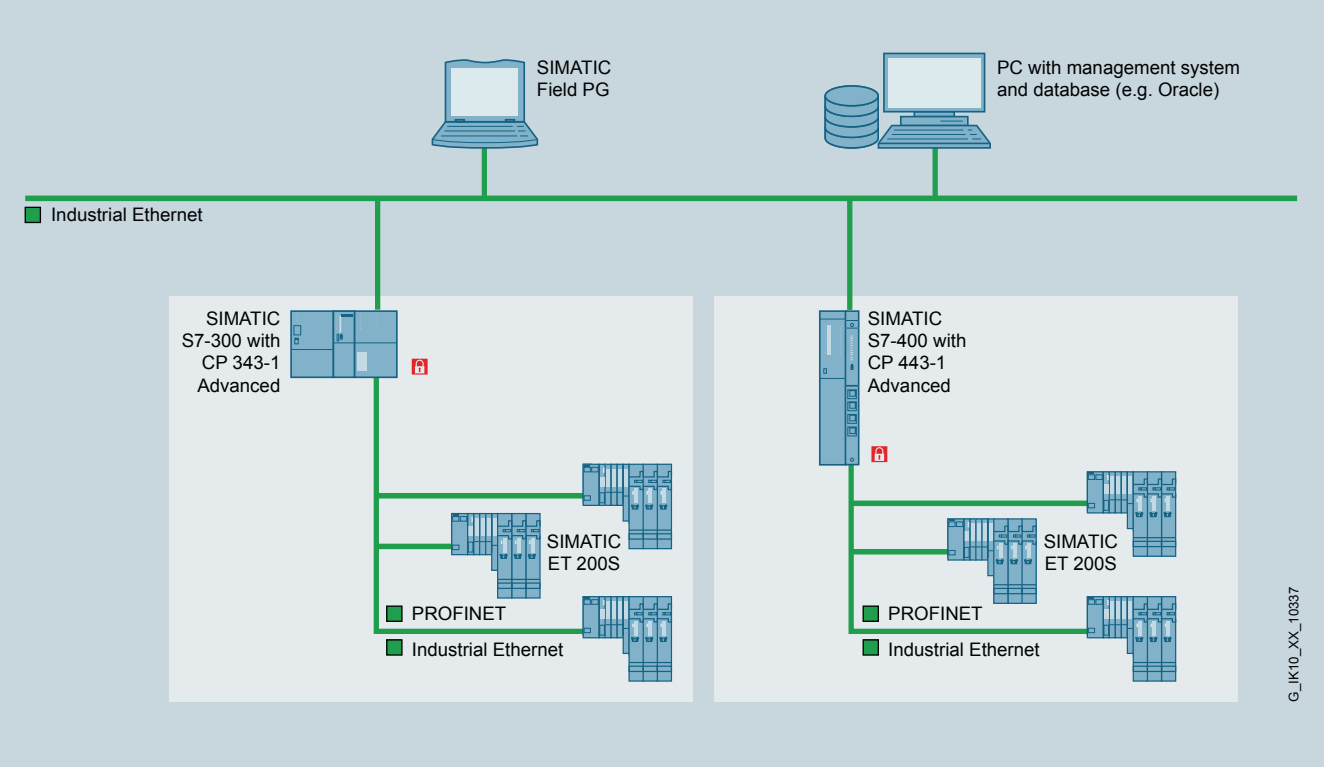
CP 1628
The CP 1628 Industrial Ethernet communications processor protects Industrial PCs through a firewall and VPN – for secured communication without special operating system settings. In this manner, computers equipped with the module can be connected to protected cells. The CP 1628 makes it possible to connect a SIMATIC PG/PC and PCs with PCI Express slot to Industrial Ethernet (10/100/1000 Mbit/s). Additional field devices can be flexibly connected to Industrial Ethernet via the integrated switch. Along with the automation functions, the communications processor also has Security Integrated, i.e. a Stateful Inspection Firewall and a VPN gateway for protection of the PG/PC system against security risks.

Advantages at a glance

A special advantage of the security communications processors for SIMATIC controllers is the automatic creation of firewall rules during configuration with the TIA Portal. Configured communication connections are automatically enabled in the firewall so that the configuration effort and the error rate are drastically reduced.

Application example

Network segmentation with security communications processors



Segmentation of networks and protection of the SIMATIC S7-300 and S7-400 controllers with CP 343-1 Advanced or CP 443-1 Advanced

Task

Communication between the administration system on the office level and lower-level networks of the automation level is to be secured by means of access control.

Solution

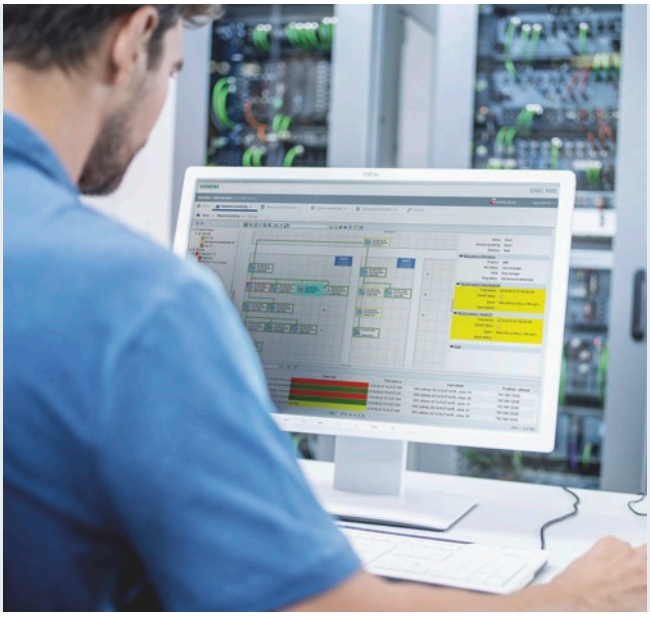
CP 343-1 Advanced and CP 443-1 Advanced are placed upstream of the automation cells to be protected. As a result, communication is limited to the permitted connections with the aid of firewall rules.

Advantages at a glance

- Firewall, VPN gateway and CP in one device: Advanced CPs come with integrated firewall and VPN security functions for implementing a protected automation cell and for protecting data transmission.
- Secure communication integration: CPs are easily configured with STEP 7 / TIA Portal; VPN tunnels can be set up between the CPs or to the SCALANCE S Industrial Security Appliance, the CP 1628 PC module and the SCALANCE M Internet and mobile wireless routers.

All CP 343-1 Advanced and CP 443-1 Advanced users get Security Integrated and do not need separate hardware or special tools besides SIMATIC S7 to configure the security of industrial plants.

Software for secured networks



SINEMA Remote Connect
The management platform for remote networks that facilitates remote access to machines and equipment around the world. SINEMA Remote Connect ensures the secured administration of tunnel connections (VPN) between the service center, the service engineers and the installed equipment. Direct access to the corporate network, in which the equipment or machine is integrated, is initially prevented. The service technician and the machine undergoing maintenance separately establish a connection to the SINEMA Remote Connect server. This then verifies the identity of the individual stations by an exchange of certificates, before access to the machine is granted.

The connection to SINEMA Remote Connect can be established using a variety of media, such as cellular phone networks, DSL or existing private network infrastructures.

With the SCALANCE M804PB industrial router, it is also possible to easily and economically connect existing PROFIBUS/MPI systems directly to SINEMA Remote Connect for secured remote access.

SINEC NMS Network Management System
With the powerful and future-proof Network Management System (NMS), the possibility exists for central, 24/7 monitoring, management and configuration of networks of up to several thousand nodes across industry sectors.

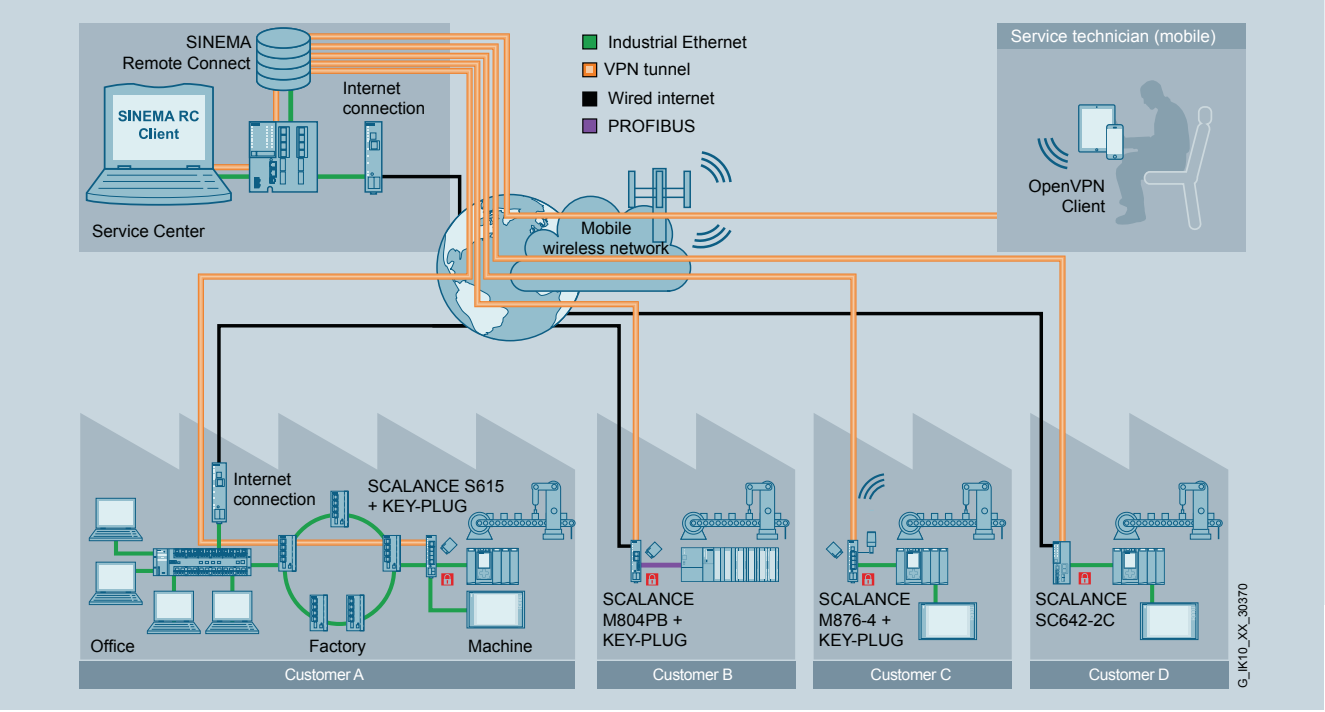
The NMS also enables efficient security management in accordance with IEC 62443. For example, access to the system and the range of functions available to each authorized user can be precisely controlled via the user role administration. The system provides system security through, among other things, encrypted data communication (via certificates and password) between the central SINEC NMS control instance and the SINEC NMS operations distributed in the network. The data communication between SINEC NMS and the infrastructure components in the network can also be encrypted (SNMP V3).

In addition, SINEC NMS provides a local documentation function via Audit Trails. For example, audit log entries can be traced by automatically documenting which user performs which activities in the system and when with a time stamp. That also produces significant time and cost savings for official tests.

Furthermore, information such as audit logs, system events and network alarms can be passed to a central location via syslog. SINEC NMS also offers central firewall and NAT management. Firewall components (SCALANCE SC-600/S615 and RUGGEDCOM RX1400/1500) can be centrally configured. The firewall rules are created using a graphical description of the permitted communication relationship in the network. The system then automatically generates the device-specific rules. It is also possible to use only the NAT management function independent of firewall management, or vice versa.

Application example

Secured access to plant sections with SINEMA Remote Connect



Configuration example for SINEMA Remote Connect – General overview

Task

Remote access for remote maintenance is to be possible for serial machines and larger plants with identical subnets. The remote access to special-purpose machines and sensitive areas, in particular, requires central management of the connections needed to acquire status and maintenance data. Easy and convenient creation of the corresponding routers with routing/NAT information should also be possible.

Solution

SINEMA Remote Connect – the management platform for remote networks – is used to centrally manage the connections between machines and service technicians. SINEMA Remote Connect manages both user rights and access authorizations and ensures that only authorized personnel are given access to remote machines.

Typical areas of application

- Plant and machine building
- Energy distribution / substations (municipal authorities)
- Logistics / port logistics
- Intelligent Traffic Systems (ITS) / transportation companies
- Water & wastewater (municipal authorities, etc.)

Advantages at a glance

- High transparency and security
- Local and central logging of all activities
- Central user administration
- Secured and easy access to plant sections from anywhere in the world
- Optimum connection of machines including machines with identical IP addresses in local subnets (NAT)
- Convenient management of different users (service technicians) through group management, including user-specific access rights, also to explicit IP addresses in the subnet (dedicated device access)
- Quick and effortless connection setup thanks to address book function
- Easy integration into industrial facilities
- No special IT know-how required thanks to simple user interface with autoconfiguration for end devices and SINEMA RC Client
- Secure and convenient multifactor authentication with user name / password and PKI Smartcard
- Operation in virtual environment is possible

Technical specifications

Industrial Security Appliances SCALANCE S

	Industrial Firewall Appliances		Industrial VPN Appliances		
Product type designation	SCALANCE SC632-2C	SCALANCE SC636-2C	SCALANCE S615	SCALANCE SC642-2C	SCALANCE SC646-2C
Article number	6GK5632-2GS00-2AC2	6GK5636-2GS00-2AC2	6GK5615-0AA00-2AA2	6GK5642-2GS00-2AC2	6GK5646-2GS00-2AC2
Transmission rate					
Transmission rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Interfaces					
Electrical connection	2x RJ45 port	6x RJ45 port	5x RJ45 port	2x RJ45 port	6x RJ45 port
Optical connection	2x combo port with SFP	2x combo port with SFP	–	2x combo port with SFP	2x combo port with SFP
for signaling contact	1x 2-pin terminal block	1x 2-pin terminal block	–	1x 2-pin terminal block	1x 2-pin terminal block
for power supply	1x 4-pin terminal block	1x 4-pin terminal block	1x 5-pin terminal block	1x 4-pin terminal block	1x 4-pin terminal block
C-PLUG removable data storage medium	Yes	Yes	Yes	Yes	Yes
Supply voltage, current consumption, power loss					
Supply voltage, external	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Range	9.6 V ... 31.2 V DC	9.6 V ... 31.2 V DC	10.8 V ... 28.2 V DC	9.6 V ... 31.2 V DC	9.6 V ... 31.2 V DC
Permissible ambient conditions					
Ambient temperature during operation [°C]	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C
Degree of protection	IP20	IP20	IP20	IP20	IP20
Design					
Module format	Compact	Compact	Compact	Compact	Compact
Product function: Security					
Firewall type	stateful inspection	stateful inspection	stateful inspection	stateful inspection	stateful inspection
Bridge firewall	Yes	Yes	No	Yes	Yes
User-specific firewall	Yes	Yes	Yes	Yes	Yes
Password protection	Yes	Yes	Yes	Yes	Yes
Product function with VPN connection	OpenVPN (as client for SINEMA RC)	OpenVPN (as client for SINEMA RC)	IPsec, OpenVPN (as client for SINEMA RC)	IPsec, OpenVPN (as client for SINEMA RC)	IPsec, OpenVPN (as client for SINEMA RC)
IPsec VPN data throughput	–	–	35 Mbit/s	120 Mbit/s	120 Mbit/s
Number of possible connections with VPN connection	0	0	20	200	200
Firewall data throughput	600 Mbit/s	600 Mbit/s	100 Mbit/s	600 Mbit/s	600 Mbit/s
NAT/NAPT	Yes	Yes	Yes	Yes	Yes
VRRPv3 coupling	6	6	2	6	6
MRP client / HRP client	No	Yes	No	No	Yes

SCALANCE M industrial routers

Product type designation	SCALANCE M wireless	
	M874-2, M874-3	M876-3, M876-4
Article number	6GK5874-2AA00-2AA2 6GK5874-3AA00-2AA2	6GK5876-3AA02-2BA2 6GK5876-4AA00-2BA2
Transmission rate		
at interface 1/2	10/100 Mbit/s	
GPRS transmission uplink/downlink, max.	85.6 Kbit/s	85.6 Kbit/s
EDGE transmission uplink / downlink, max.	237 Kbit/s	237 Kbit/s
HSPA+ transmission uplink/downlink, max.	5.76 Mbit/s	14.4 Mbit/s
EV-DO transmission forward link / reverse link	–	3.1 Mbit/s / 1.8 Mbit/s (M876-3 only)
LTE transmission uplink/downlink, max.	–	50 Mbit/s / 100 Mbit/s (M876-4 only)
ADSL2+ transmission uplink / downlink, max.	–	–
SHDSL transmission, max.	–	–
Interfaces		
Number of electrical connections		
- For internal network	2	4
- For external network	1	2
- For power supply	2	2
Electrical connection		
- For internal network	RJ45 port (10/100 Mbit/s, TP, autocrossover)	RJ45 port (10/100 Mbit/s, TP, autocrossover)
- For external network	SMA antenna sockets (50 ohms)	SMA antenna sockets (50 ohms)
- For power supply	Terminal strip	Terminal strip
Supply voltage, current consumption, power loss		
Supply voltage / range	10.8 V ... 28.8 V	10.8 V ... 28.8 V
Permissible ambient conditions		
Ambient temperature during operation [°C]	-20 °C ... +60 °C	-20 °C ... +60 °C
Degree of protection	IP20	IP20
Design		
Module format	Compact	Compact
Product function: Security		
Firewall type	stateful inspection	stateful inspection
Bridge firewall	No	No
User-specific firewall	Yes	Yes
Password protection	Yes	Yes
Packet filter	Yes	Yes
Product function with VPN connection	IPsec, OpenVPN (as client)	IPsec, OpenVPN (as client)
Number of possible connections with VPN connection	20	20
Key length		
1 | 2 | 3 with IPsec AES for VPN	128 bit | 192 bit | 256 bit	128 bit | 192 bit | 256 bit
with IPsec 3DES / with virtual private network	168 bit	168 bit
VRRPv3 coupling	2	2
MRP client / HRP client	No	No

SCALANCE M industrial routers

Product type designation	SCALANCE M wired			
	M812-1/M816-1		M826-2	M804PB
Article number	6GK5812-1BA00-2AA2 6GK5816-1BA00-2AA2		6GK5826-2AB00-2AB2	6GK5804-0AP00-2AA2
Transmission rate				
at interface 1/2	10/100 Mbit/s		10/100 Mbit/s	10/100 Mbit/s
GPRS transmission uplink/downlink, max.	–		–	–
EDGE transmission uplink / downlink, max.	–		–	–
HSPA+ transmission uplink/downlink, max.	–		–	–
EV-DO transmission forward link / reverse link	–		–	–
LTE transmission uplink/downlink, max.	–		–	–
ADSL2+ transmission uplink / downlink, max.	1.4 Mbit/s / 25 Mbit/s		–	–
SHDSL transmission, max.	–		15.3 Mbit/s	–
Interfaces				
Number of electrical connections				
- For internal network	1	4	4	2
- For external network	1	1	2	1
- For power supply	2	2	2	2
Electrical connection				
- For internal network	RJ45 port (10/100 Mbit/s, TP, autocrossover)			RJ45 port (10/100 Mbit/s, TP, autocrossover), D-SUB
- For external network	RJ45 DSL port	–	Terminal strip	RJ45 port (10/100 Mbit/s, TP, autocrossover)
- For power supply		–	–	Terminal strip
Supply voltage, current consumption, power loss				
Supply voltage / range	10.8 V ... 28.8 V		10.8 V ... 28.8 V	10.8 V ... 28.8 V
Permissible ambient conditions				
Ambient temperature during operation [°C]	0 °... +60 °C		-40 °C ... +70 °C	-20 °C ... +60 °C
Degree of protection	IP20		IP20	IP20
Design				
Module format	Compact		Compact	Compact
Product function: Security				
Firewall type	stateful inspection		stateful inspection	stateful inspection
Bridge firewall	No		No	No
User-specific firewall	Yes		Yes	Yes
Password protection	Yes		Yes	Yes
Packet filter	Yes		Yes	Yes
Product function with VPN connection	IPsec, OpenVPN (as client)		IPsec, OpenVPN (as client)	IPsec, OpenVPN (as client)
Number of possible connections with VPN connection	20		20	20
Key length				
1 | 2 | 3 with IPsec AES for VPN	128 bit | 192 bit | 256 bit		128 bit | 192 bit | 256 bit	128 bit | 192 bit | 256 bit
with IPsec 3DES / with virtual private network	168 bit		168 bit	168 bit
VRRPv3 coupling	2			2
MRP client / HRP client	No			No

CP 1243-1, CP 1243-7 LTE, CP1243-8 IRC, CP 1543-1, CP 1543SP-1 und CP 1545-1 communications processors

Product type designation	CP 1243-1	CP 1243-7 LTE	CP 1243-8 IRC	CP 1543-1	CP 1543SP-1	CP 1545-1
Article number	6GK7243-1BX30-0XE0	6GK7243-7KX30-0XE0	6GK7243-8RX30-0XE0	6GK7543-1AX00-0XE0	6GK7543-6WX00-0XE0	6GK7545-1GX00-0XE0
Transmission rate						
at interface 1	10/100 Mbit/s	Mobile wireless 4G/3G/2G	10/100 Mbit/s	10/100/1 000 Mbit/s	10/100 Mbit/s	10/100/1 000 Mbit/s
Interfaces						
to interface 1 according to IE	1x RJ45 port	Antenna connection SMA socket	1x RJ45 port	1x RJ45 port	using ET 200SP BusAdapter	1x RJ45 port
for power supply	–	1	1	–	–	
C-PLUG swap medium	–	–	–	–	–	
Supply voltage						
1 from backplane bus	5 V DC	–	5 V DC	15 V DC	–	15 V DC
external	–	24 V DC	24 V DC	–	24 V DC	
Permissible ambient conditions during operation						
- When installed vertically	-20 °C ... +60 °C	-20 °C ... +60 °C	-20 °C ... +60 °C	0 °C ... +40 °C	0 °C ... +50 °C	0 °C ... +40 °C
- When installed horizontally	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	0 °C ... +60 °C	0 °C ... +60 °C	0 °C ... +60 °C
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Design						
Module format	Compact S7-1200, single width	Compact S7-1200, single width	Compact S7-1200, single width	Compact S7-1500, single width	Compact module for ET 200SP	Compact S7-1500, single width
Product function: Security						
Firewall type	stateful inspection	stateful inspection	stateful inspection	stateful inspection	stateful inspection	stateful inspection
Product function with VPN connection	IPsec	IPsec	IPsec, SINEMA RC	IPsec	IPsec, SINEMA RC	
Number of possible connections with VPN connection	8	1	8	16	4	
Product function						
ACL – IP-based	No	No	No	No	No	No
ACL – IP-based for PLC/routing	No	No	No	No	No	No
Blocking of communication via physical ports	No	No	No	No	Yes	No
Log file for unauthorized access	No	No	No	Yes	Yes	Yes

CP 343-1 Advanced, CP 443-1 Advanced und CP 1628 communications processors

Product type designation	CP 343-1 Advanced	CP 443-1 Advanced	CP 1628
Article number	**6GK7343-1GX31-0XE0**	**6GK7443-1GX30-0XE0**	**6GK1162-8AA00**
Transmission rate			
at interface 1/2	10/1000 Mbit/s / 10/100 Mbit/s	10/1000 Mbit/s / 10/100 Mbit/s	10/1000 Mbit/s / –
Interfaces			
Electrical connection			
to interface 1 according to IE	1x RJ45 port	1x RJ45 port	2x RJ45 port
to interface 2 according to IE	2x RJ45 port	4x RJ45 port	–
of the backplane bus	–	–	PCI Express x1
for power supply	2-pin plug-in terminal strip	–	1x 2-pin terminal block
C-PLUG swap medium	Yes	Yes	–
Supply voltage, current consumption, power loss			
Type of power supply voltage	–	–	DC
Supply voltage			
1 from backplane bus	5 V DC	5 V DC	3.3 V DC
2 from backplane bus	–	–	12 V DC
external	24 V DC	–	24 V DC
Range	–	–	10.5 V ... 32 V DC
Permissible ambient conditions			
during operation		0 °C ... +60 °C	+5 °C ... +55 °C
- When installed vertically	0 °C ... +40 °C	–	–
- When installed horizontally	0 °C ... +60 °C	–	–
Degree of protection	IP20	IP20	–
Design			
Module format	Compact	Compact S7-400 single width	PCI Express x1 (half length)
Product function: Security			
Firewall type	stateful inspection	stateful inspection	stateful inspection
Bridge firewall	No	No	No
User-specific firewall	Yes	Yes	Yes
Product function with VPN connection	IPsec	IPsec	IPsec
Number of possible connections with VPN connection	32	32	64
Product function			
Password protection for Web applications	Yes	Yes	No
ACL – IP-based	Yes	Yes	No
ACL – IP-based for PLC/routing	Yes	Yes	No
Deactivation of services that are not needed	Yes	Yes	No
Blocking of communication via physical ports	Yes	Yes	No
Log file for unauthorized access	No	No	No
MRP client	Yes	Yes	No

SINEMA Remote Connect

Product type designation	SINEC NMS 50, 100, 250, 500	SINEMA Remote Connect	SINEMA RC Client
Article number	**6GK8781-1BA01-0AA0, 6GK8781-1DA01-0AA0, 6GK8781-1JA01-0AA0, 6GK8781-1TA01-0AA0**	**6GK1720-1AH01-0BV0**	**6GK1721-1XG01-0AA0**
Firewall type	–	–	–
Product function with VPN connection	–	IPsec/OpenVPN	OpenVPN
Number of possible connections with VPN connection	–	Unlimited or dependent on the target system, network	1:1 relationship with SINEMA Remote Connect server
Operating system	Desktop: Windows 10 (64-bit, Professional, Enterprise) as of version 1809 Server: Windows Server 2016 (64-bit), Windows Server 2019 (64-bit) Virtualization: ESXi V6.7	SINEMA RC Virtual Appliance has its own operating system	Windows 7 Ultimate, Enterprise, Professional SP1 (32 and 64 Bit), Windows 8.1 Pro (64-bit)
Web browser	Internet Explorer V11.0, Firefox V65.0 or higher, Google Chrome V72.0 or higher	–	–
System Integrity Check	Yes	–	–

Industrial Security

IE RJ45 Port Lock

IE RJ45 Port Lock

Physical network access protection with IE RJ45 Port Lock
A well-balanced and holistic security concept also includes physical protection measures. A known problem is the presence of open unused RJ45 ports that can be used by unauthorized persons to gain access to the network. The IE RJ45 Port Lock has been developed to reduce this risk. The IE RJ45 Port Lock enables mechanical locking of RJ45 ports at end devices or network components. The robust design of the port lock in the form of a plug-in connector completely occupies the RJ45 port. In this way, the insertion of RJ45 cables can be prevented and undesired use of unused RJ45 ports on unconfigurable network components can also be avoided. The detent lug of the RJ45 Port Lock is blocked by the integrated lock, which can only be unlocked with a mechanical key. Additional advantages of the port lock are its robust, industry-compatible mounting technology and its ease of installation without additional tools thanks to the RJ45-compatible design.

SIMATIC RF1000 Access Control Reader

SIMATIC RF1000 for controlling access to machines and equipment

SIMATIC RF1000 Access Control Reader
The growing demand for security and traceability increasingly calls for solutions that regulate and document access to machines and equipment. With SIMATIC RF1000, Siemens provides an RFID-based solution for easy and flexible implementation of electronic access management. Existing employee IDs are used as the basis for identification. This increases user friendliness and reduces costs. SIMATIC RF1000 series readers allow realization of finely-graded access concepts, documentation of processes and storage of user-specific instructions – according to the customer-specific application. And all with a single card. The compact size, low overall depth, high degree of protection (IP65 at the front) and temperature range from -25 to +55 °C allows the access control reader to be used directly on machines and equipment in harsh industrial environments.

Highlights:

- Use in the HF range (13.56 MHz) and LF range (125 kHz) (SIMATIC RF1040R only)
- Diagnostics via 3-color LED status display
- Prevention of misuse through protected and documented access to machines
- Simple integration into existing hardware (HMI devices, IPCs and Panels)
- ATEX II approval (for SIMATIC RF1060R and RF1070R only)
- Reading and writing of data on ID/card
- Creation of customer-specific parameter assignments for reader via the config card
- Handling and storage of customer-specific key material in the reader for data access

Security with SCALANCE X and SCALANCE W

SCALANCE X-200 product line

SCALANCE W-product family

SCALANCE X

The managed switches of the SCALANCE X product family are well suited for setup of line, star and ring structures.

The SCALANCE X-200, X-300, X-400 and X-500 switches can control network access and have the following security functions:

- Management ACL (Access Control List)
- IEEE 802.1X (RADIUS)
- 802.1Q-VLAN – enables logical separation of the data traffic between pre-defined ports on the switches
- Broadcast/Multicast/Unicast Limiter
- Broadcast blocking

In addition, the following secured protocols are supported:

- SSH
- HTTPS
- SNMP v3

SCALANCE W

Reliable wireless communication solution on different automation levels according to WLAN standard IEEE 802.11 – the SCALANCE W IWLAN products enable scalable applications.

SCALANCE W access points und client modules have the following security functions:

- Management ACL (Access Control List)
- IEEE 802.1X (RADIUS)
- Access protection according to IEEE 802.11i
- WPA2 (RADIUS)/WPA2-PSK with AES

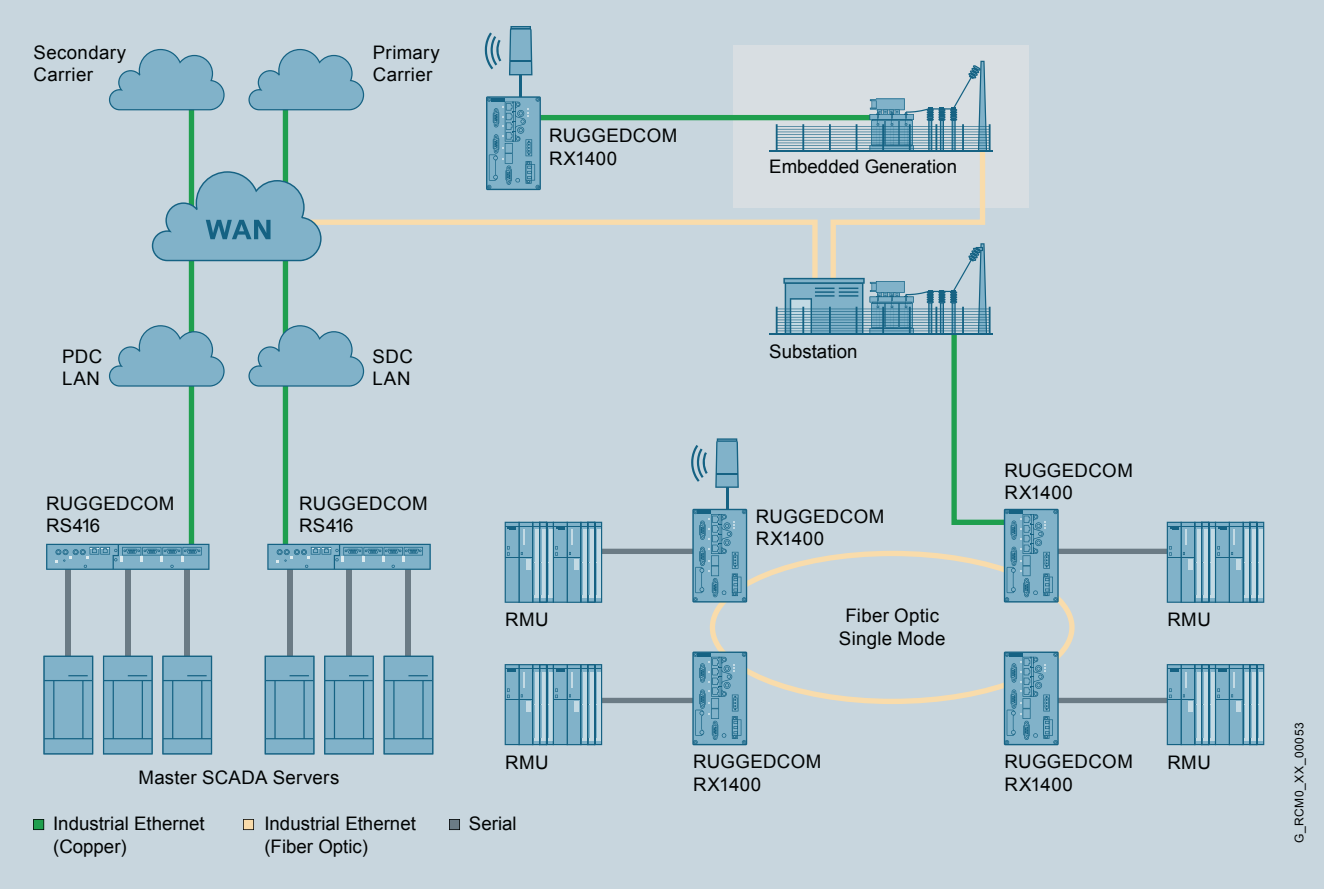
In addition, the following secured protocols are supported:

- SSH
- HTTPS
- SNMP v3

Inter AP-Blocking

increases the security in a network environment with multiple SCALANCE W access points. WLAN clients that are connected via a layer 2 network (switches) using different access points can communicate directly with one other. This could pose a security risk, depending on the application. „Inter AP Blocking“ is used to specify those communication partners or gateways that WLAN clients are permitted to communicate with, thereby minimizing the security risk. Communication with other devices in the network is prevented using KEY-PLUG W700 Security (6GK5907-0PA00). It can be used with all SCALANCE W access points with a KEY-PLUG slot. SCALANCE W 1700 devices include the function without KEY-PLUG.

Security with RUGGEDCOM

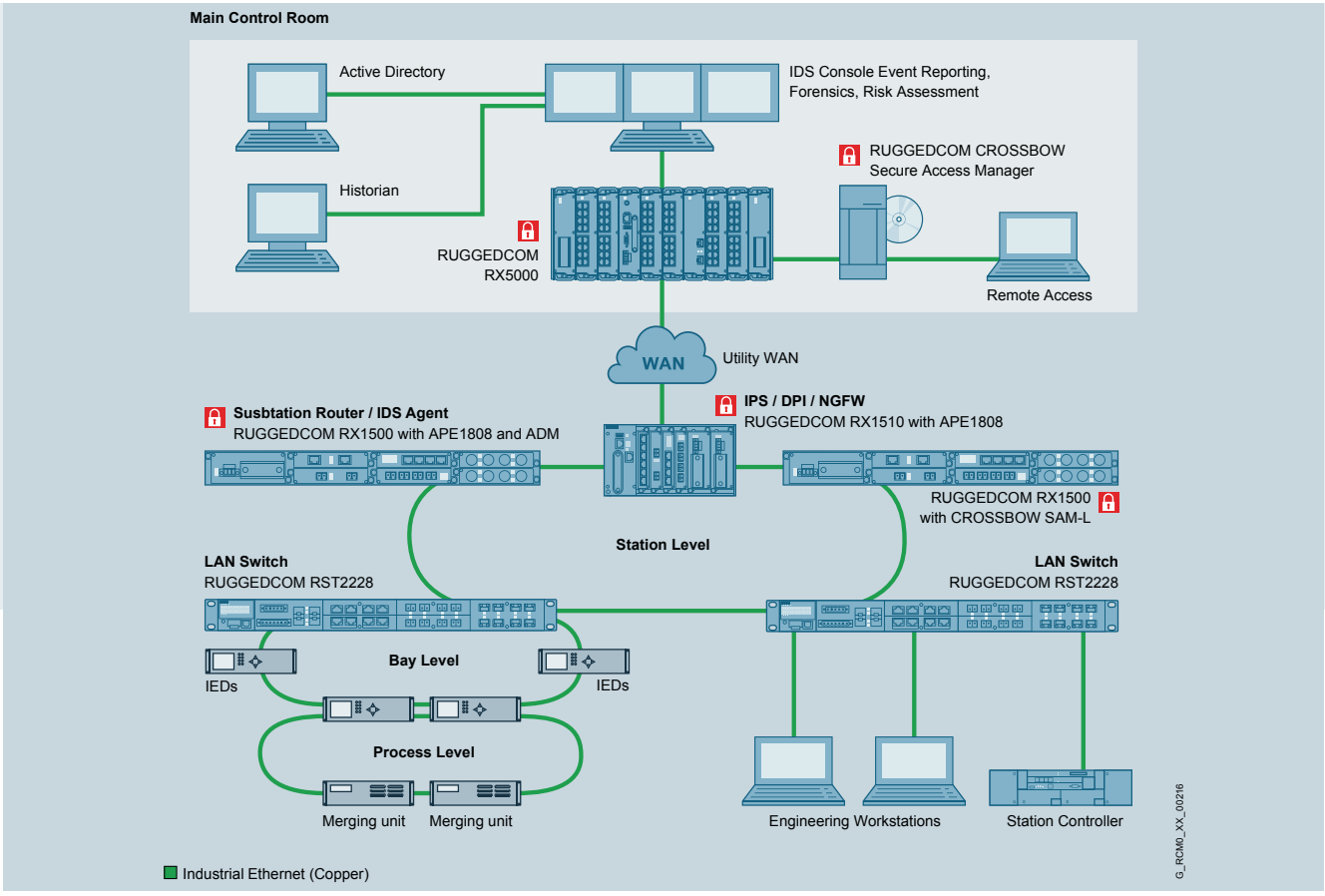


The RUGGEDCOM RX1400 is suitable for reliable connection of low-voltage transformer substations and distributed power generation plants over public mobile wireless networks.

RUGGEDCOM RX1400 and RM1224

Security is also an important issue in the energy sector. Automation and communication networks play a key role here for task-critical applications, and high reliability is of utmost importance. The following features of the RUGGEDCOM RX1400 and RM1224 address security threats at the network level:

- VPN (IPsec) – the integrated hardware encryption engine enables highly efficient IPsec data communication without use of the main processor
- Passwords – satisfy the NERC guidelines including the option for RADIUS-based authentication
- SSH / SSL – enhanced password protection with the option of encrypting passwords and data for transmission within the network
- Unblocking/blocking of ports – ability to block ports so that unauthorized devices cannot establish a connection to unused ports
- 802.1Q-VLAN – enables logical separation of the data traffic between pre-defined ports on the switches
- SNMPv3 – encrypted authentication and access protection
- HTTPS – for secured access to the web interface
- 802.1X – ensures that only permissible field devices can be connected to the device
- MAC address list – access control for devices that do not support RADIUS



RUGGEDCOM RX1500 with CROSSBOW and APE1808 - Application example

RUGGEDCOM RX1500 with CROSSBOW and APE1808
The figure illustrates the typical system architecture of a utility. The CROSSBOW Secure Access Manager (SAM) is the central enterprise server via which all remote access connections are established. It represents the sole trustworthy data source for clients from the perspective of intelligent electronic devices (IED). The SAM is connected via a secured WAN to gateway devices on the transformer substation, such as RUGGEDCOM RX1500 or another supported device.

RUGGEDCOM APE allows vendor-neutral software applications to be implemented and operated in harsh and business-critical environments. It can be used with the corresponding software for various applications in which data is analyzed directly at the source, thereby eliminating the need to install an external industrial PC. Examples of applications include firewalls, network analysis software and intrusion detection systems.

The RUGGEDCOM APE1808 can be plugged directly into any device of the RUGGEDCOM RX1500 Multi-Service Platform as a stand-alone module and fully utilize the built-in switching and routing possibilities of the platform. Thanks to its Intel quad core and x86_64 architecture that supports Linux and Windows 10, the RUGGEDCOM APE1808 provides a standards-based platform for commercially available software and thus enables partnerships with industry leaders in the detection and prevention of Internet threats.

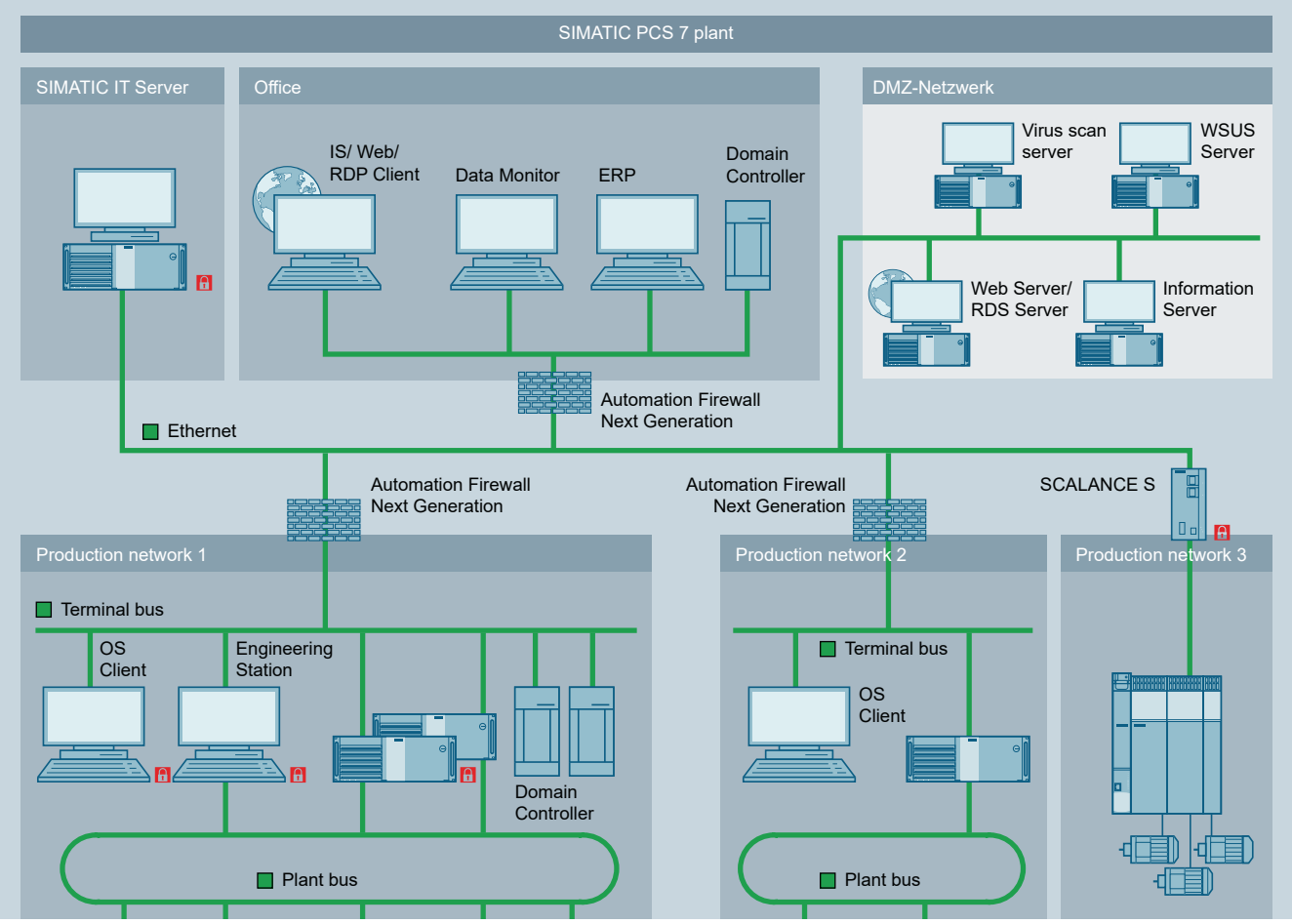
SIMATIC PCS neo Security and SIMATIC PCS 7 Security

SIMATIC PCS neo Security
The 100% web-based SIMATIC PCS neo process control system also relies on the proven defense in depth strategy. The issue of security is also top priority in SIMATIC PCS neo. Evidence of this can be seen in the TÜV certification of the product life cycle process based on IEC 62443-4-1 and the certification according to IEC 62443-3-3. The product development complies with current IACS security standards. Security is a „built-in" element of SIMATIC PCS neo. This means that comprehensive protection is guaranteed from the outset. Unneeded functionalities can be turned off when required in order to adapt systems to individual requirements.

The access protection of SIMATIC PCS neo is multifaceted. Of course, all functionalities and interventions require a corresponding authentication and authorization. In the case of especially critical functionalities, two-factor authentication is required in order to guarantee maximum security. In addition, the system provides a central user administration.

SIMATIC PCS 7 Security
A top priority in SIMATIC PCS 7 is that operating personnel always retain control over production and processes, even when security threats occur. Full operator control and monitoring capabilities are to be retained when actions are being taken to prevent or contain security threats in plants and networks. The purpose of the security concept for SIMATIC PCS 7 is to ensure that only authenticated users can perform authorized operator inputs on authenticated devices using the possible operator inputs assigned to them.
These operator inputs may only be performed using clearly-defined and planned access paths in order to ensure reliable production or coordination of an order without endangering people, the environment, the product, the goods to be coordinated, or the company's business. The SIMATIC PCS 7 security concept describes a defense in depth strategy based on the international standard IEC 62443. The implementation of this strategy in a system is described in detail in „PCS 7 Compendium Part F - Industrial Security".
SIMATIC PCS 7 is certified based on this recommended system configuration in accordance with IEC 62443-3-3 (TÜV Süd).

SIMATIC PCS 7 Security



SIMATIC PCS 7 Security – Security architecture based on defense in depth

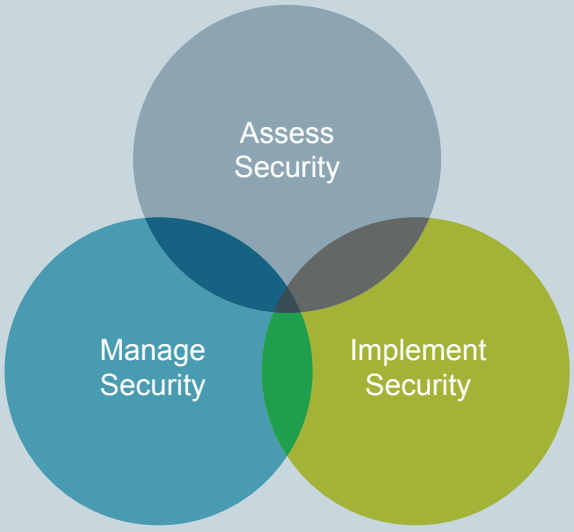
Multiple protection levels are created in order to minimize risks and to increase the security of systems.

Elements of the SIMATIC PCS 7 Security concept

- Physical access protection
- Cell segmentation using firewalls
- System hardening
- Patch Management
- User administration (SIMATIC Logon)
- Malware detection and prevention
- Training and processes

- Access protection: Systems and access controls secured by factory security including access authorizations by means of typos
- Firewalls: Segmentation of networks, formation of perimeter networks (DMZ), restriction and logging of network communication
- VPN: Use for encrypted communication, between networks (e.g. remote access)
- Whitelisting: Specification of the programs that are permitted to be run on your system
- Patch management: The system is kept current using an update strategy (e.g. with operating system, software and firmware updates). This minimizes the risk of an attack on known security gaps.
- User administration: Use of a central user administration in order to explicitly define access rights, group memberships, roles and policies for system users. This is done following the principle of limiting rights to those needed for the respective task.
- Virus scanner: Use of an up-to-date virus scanner to minimize the risk of harm and negative impacts on systems and system operation.
- Regular training of all personnel for the purpose of adhering to all defined processes and ensuring the security of the system.

Industrial Security Services



The increasing internetworking of production and office has made many processes faster and easier. Uniform use of the same data and information creates synergies. This trend, however, also poses increased risks.

Today it is no longer just the office environment that is under threat from viruses and hacker attacks. There is also a risk of intrusions, influencing of integrity and loss of know-how in production facilities. Many weak spots in security are not obvious at first glance. For this reason, it is advisable to review and optimize the security of existing automation environments in order to maintain a high level of plant availability.

The Industrial Security Services portfolio provides a comprehensive product range for developing, implementing and maintaining a strategy conforming to the defense in depth concept. The scalable offer includes comprehensive advice (Access Security), technical implementation (Implement Security) and continuous service (Manage Security).

Assess Security for a risk-based security roadmap

Assess Security includes comprehensive analysis of threats, identification of risks and concrete recommendation of security measures.

- You benefit from: a plant-specific and risk-based security roadmap for a consistently optimal security level.

Implement Security for risk reduction measures

Implement Security means the implementation of security measures to increase the security level of plants and production facilities.

- You benefit from: prevention of security gaps and better protection against cyber threats thanks to technical and organizational measures.

Manage Security for comprehensive, continuous protection

Manage Security means continuous monitoring, regular adjustment and updating of the implemented measures through our security tools.

- You benefit from: maximum transparency with regard to the security status of your plants and proactive prevention of potential threat scenarios thanks to our security tools, which are designed specifically for your industrial environment.

Automation Firewall Next Generation

In order to avoid the loss of productions and downtimes, the data traffic between networks must be checked, analyzed, and selectively released without affecting the process control system function. This is the only way to optimally protect the system without any disadvantages for productivity. Firewalls with complementary services are predestined for this. With the Automation Firewall Next Generation, Siemens offers a tested and validated standard firewall in three performance classes (220, 820, 850). It is designed for use with SIMATIC PCS 7 and WinCC.

The Automation Firewall Next Generation cooperates perfectly with the communication products of SIMATIC NET. It features comprehensive hardware and software functions for SIMATIC PCS 7 and WinCC projects, e.g.

- Application Layer and Stateful Inspection Firewall
- Classification of all applications, on all ports, at any time
- Enforcement security policies for each user and site
- High availability (active / active and active / passive)
- Redundant power supply input for increased reliability (PA-220 and PA-850)
- Hardened operating system (PanOS is Linux-based)
- Possibility to check Layer 7 traffic, such as of the S7 protocol (detection of start, stop, read, write) or of OPC
- Secure System Architecture

Advantages at a glance

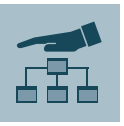
- Tested and released for SIMATIC PCS 7
- Protection against known and unknown threats
- Very good value for money
- First-class firewall solution for the segmentation of IT / OT networks based on the «Zones & Conduits» model of IEC 62443
- Time savings, as many application protocols are integrated by default

Service by Siemens

- Checking the plant network
- Development of a perimeter firewall concept
- Installation and configuration of a perimeter firewall in automation systems
- Documentation of the firewall configuration

Support by Palo Alto Networks (3 or 5 years)

- Premium Support Available 24/7
- Spare parts shipment and hardware replacement the following working day
- Feature releases and software updates, updates for subscriptions
- Documentation and FAQs, online portal for customer support



Terms, definitions

Cybersecurity
Cybersecurity, also referred to as computer security or IT security, is the protection of hardware, software, information and offered services of computer-based systems from theft, sabotage and misuse.

Demilitarized zone (DMZ)
A demilitarized zone or DMZ denotes a computer network with security-related control of the ability to access the connected servers. The systems in the DMZ are shielded from other networks (such as Internet, LAN) by one or more firewalls. This separation can allow access to publicly accessible services (e.g. email) while allowing the internal network (LAN) to be protected against unauthorized access. The point is to make computer network services available to both the WAN (Internet) and the LAN (intranet) on the most secure basis possible. A DMZ's protective action works by isolating a system from two or more networks.

Firewall
Security components that allow or block data communication between interconnected networks according to specified security restrictions. Firewall rules are configured for this. It is thus possible to specify that only a particular PC may access a given controller, for example.

Industrial Security
Industrial security comprises the protection of information, data and intellectual property during processing, transmission and storage in the industrial environment. Availability, integrity and confidentiality are to be safeguarded. The purpose is to defend against attacks, threats, dangers and economic losses and to minimize risks. Guidance is provided by various national and international standards such as IEC 62443, ISO/IEC 27000, ISO/IEC 15408 and the national laws in effect, e.g. Federal Data Protection Act in Germany.

Port security
The access control function allows individual ports to be blocked for unknown nodes. If the access control function is enabled on a port, packets arriving from unknown MAC addresses are discarded immediately. Only packets arriving from known nodes are accepted.

RADIUS (IEEE 802.1X):
Authentication via an external server
The concept of RADIUS is based on a central authentication server. An end device can only access the network or a network resource after the logon data of the device has been verified by the authentication server. Both the end device and the authentication server must support the Extensive Authentication Protocol (EAP).

System hardening
System hardening involves the disabling of unneeded interfaces and ports, thereby reducing the vulnerability of the network to external and internal attacks. Every level of an automation system is considered: the control system, network components, PC-based systems and programmable logic controllers.

Virtual Private Network (VPN)
A VPN tunnel connects two or more network nodes (e.g. security components) and the network segments behind them. Encrypting the data within this tunnel makes it impossible for third parties to listen in on or falsify the data when it is transmitted over a non-secure network (e.g. the Internet).

Virtual LAN (VLAN)
VLANs (IEEE 802.1Q) enable logical separation
of the data traffic between pre-defined ports on the switches. The result is several "virtual" networks on the network, which exists only once physically. Data communication takes place only within a VLAN.

Whitelisting
Whether it's for individuals, companies, or programs: a whitelist – or positive list – refers to a collection of like elements that are classified as trustworthy. Whitelisting for PCs ensures that only those programs that are actually required can be executed.

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
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