Industrial Remote Communication

Efficient remote access to plants, machines and mobile applications

SIMATIC NET

Answers for industry.
Urbanization, globalization, population growth and climatic change demand new solutions from industry that go far beyond conventional remote control and maintenance. The extended product range from Siemens supports a wide range of new applications alongside telecontrol and teleservice. Industrial Remote Communication offers the perfect solution for widely differing requirements with regard to availability, flexibility and bandwidth. These may be in factory automation, the process industry or in public infrastructure sectors, but also in areas such as mobility and energy supply – Industrial Remote Communication provides access to widely distributed machines, plants and applications of different sizes, both securely and economically.
Telecontrol

Telecontrol is the connection of process stations (Remote Terminal Units/RTUs) that are distributed over a wide geographical area to one or more central process control systems for the purpose of monitoring and control. Various different transmission components in the Remote Networks product spectrum support remote communication over a range of public and private networks. Event-driven or cyclic exchange of process data is performed using special telecontrol protocols and permits efficient control of the overall process.

Siemens supplies perfectly interacting system components and solutions for the control centers, outstations and networks. Configurations can then be perfectly adapted to meet customer requirements. Our product range also gives you maximum investment security – because right from the development stage, we consider the long lifetime and migration capability of our products and systems.

Teleservice

Teleservice involves data exchange with distant technical systems (machines, plants, computers, etc.) for the purpose of error detection, diagnostics, maintenance, repair or optimization.

Teleservice solutions from Siemens ensure efficient, economical diagnosis of distant plants, saving working time and traveling costs – at minimal engineering costs. Further application possibilities: advanced planning and implementation of preventive maintenance measures, optimization of subsystems and controllers by means of remote programming, or loading the latest program modules.
Remote Networks are public or private communication infrastructures for covering wide areas or long distances, for example mobile radio or fixed telephone networks. The extensive Siemens Remote Networks portfolio offers connection to both conventional and IP-based infrastructures. Groundbreaking security concepts for the use of mobile radio or Internet protect the communication systems against unauthorized external access.

More applications for Industrial Remote Communication

Remote communication over private and public networks continually results in new opportunities in both the public and industrial communication environments due to increasing bandwidths, higher availability and decreasing costs. This permits applications which go far beyond classical telecontrol and remote maintenance.

Examples include the centralized acquisition and evaluation of video data in trains or buses in order to enhance passenger safety (video surveillance) as well as data transmission for ticket machines, infotainment services and on-board Internet.

And that’s not all: Industrial Remote Communication enables the early detection of servicing and maintenance requirements for wind farms (condition monitoring) or transmission of status data from distribution stations and substations in the energy supply system (smart grid applications). It is also used in object and building monitoring for access control.

Part of Totally Integrated Automation

Our solutions for Industrial Remote Communication are based on SIMATIC, the leading automation system worldwide – and are therefore a part of Totally Integrated Automation (TIA), our open system architecture for plant-wide, seamless automation. Totally Integrated Automation stands for the perfect interaction of all implemented components – and therefore creates a firm basis for constantly increasing productivity.
Industrial Remote Communication

Telecontrol
- Permanent or spontaneously established connections
- Lower bandwidth requirements
- Optimized data throughput

Teleservice
- Sporadic connection establishment
- Medium bandwidth requirements

Further applications for Remote Communication
Such as video surveillance, smart grid applications, condition monitoring
- Permanent or spontaneously established connections
- Lower to higher bandwidth requirements
- Stationary and mobile applications

Each of these applications uses Remote Networks for data transmission.

Remote Networks
Remote communication over private and public heterogeneous networks
An extensive range of modems and routers facilitating diverse connection options to Remote Networks via dedicated lines, telephone networks, mobile radio and Internet.

Integration in the Industrial Security concept

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<tr>
<th>Availability</th>
<th>Flexibility</th>
<th>Bandwidth</th>
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Industrial Remote Communication:
Products for worldwide access to distant plants, remote machines and mobile applications.
Siemens offers the right solution for every application.
Telecontrol
Indispensable for wide-ranging demands

Industrial plants are frequently spread over wide areas, sometimes even extending beyond national borders. This is where efficient telecontrol with innovative solutions from Siemens pays for itself. It allows outstations to be monitored and controlled from a central control point via Remote Networks. Siemens supplies solutions both for small systems with minimum functional scope, as well as for extensive process plants with a high degree of automation – solutions which can be used independently or combined with each other.
With TeleControl Basic, we are offering you a system that is not only ideal for simple monitoring and control tasks, but also for the transmission of process data and for remote diagnosis and remote maintenance via GPRS and the Internet. Typical application areas are maintenance, the control of process plants and optimized operation of plants to achieve energy savings. The software and control concept is as well suited to the smallest applications with few stations as to large-scale projects, e.g.:

- Plants in the water supply, water treatment or environmental sectors (e.g. irrigation systems),
- Centrally controlled building management (e.g. lighting, heating)
- Control and monitoring of traffic technology (e.g. traffic light systems, tunnel projects)
- Monitoring of energy supply systems for measuring consumption and controlling costs (e.g. district heating networks, wind power generation)
- Remote monitoring of machine control systems and automation equipment (e.g. air-conditioning systems, vending machines)

### Efficient and economical

TeleControl Basic connects the control center via the TeleControl Server Basic software to the Remote Terminal Units (RTUs) that are based on SIMATIC S7-1200 and S7-200 controllers. Data transmission is realized via Remote Networks. A RTU facilitates both remote communication with the control center or service center as well as slave-to-slave communication with other outstations. Small-scale applications with just a few substations can therefore be implemented as well as large-scale plants comprising up to 5000 substations. International approvals permit worldwide use.

### The many benefits of remote communication

- Low-cost connection to Remote Terminal Units via Ethernet/Internet
- Secure, reliable connection via public networks with encrypted data transmission
- Fast, versatile data communication – station failure can be detected immediately
- Data security through buffering of several thousand data values. This means that downtimes in the transmission link can then be bridged.
- Fully automatic time stamping to enable subsequent, correct archiving of process data in the control system

### Economical

- Low investment costs
- No investment necessary for the communications infrastructure, because GPRS/Internet is available worldwide

### Easy to configure

- Quick and easy commissioning thanks to perfectly interacting system components
- Easy and convenient configuring of the outstations – by several users simultaneously (multi-user capability)
- Changes and expansions are possible during normal operation at any time
- Alerting of standby personnel through multi-level escalation management
- Interfacing to the control center software, such as WinCC, over OPC interface

The complete solution also includes the teleservice function. This gives internationally active plant and machine manufacturers, for example, worldwide access to the S7-1200 stations.
TeleControl Professional – Managing large-scale plants from a distance

In oil and gas pipelines, the outstations and metering stations are frequently over a thousand kilometers from the central plant or control center. A similar situation exists in the water supply and wastewater treatment sector, in power generation and distribution and in district heating supply. With our telecontrol solutions, we are offering you an innovative system for demanding monitoring and control tasks in widely spaced process plants with stringent demands on availability and data security.

Modular building block system with multiple advantages for plant operation

TeleControl Professional comprises our enhanced telecontrol systems for extensive expanded applications in the process industry. Remote Terminal Units based on SIMATIC S7-1200, SIMATIC S7-400 and SIMATIC S7-300 can be efficiently monitored and controlled using SIMATIC PCS 7, SIMATIC WinCC, SIMATIC WinCC OA (Open Architecture) or non-Siemens control systems using OPC. The outstations can communicate with each other as well as with one or more control centers. The consistently modular design of TeleControl Professional makes it extremely flexible.
Fast and versatile data communication

Communication is event-controlled. If an event occurs, the operating personnel are informed immediately and can then intervene in the process quickly (e.g. using commands or setpoint inputs). Parallel to this, important events can be sent to a mobile phone by SMS – if required also with a direct acknowledgment to the sending station.

Maximum data security

In our telecontrol solution, comprehensive measures to prevent data falsification and loss are important components of the system. Each transmission module has a large memory for several thousand data frames. Down-times in the transmission link can then be bridged. Special IP-based networks are protected through dedicated VPN solutions.

Fully automatic time stamping

To enable subsequent and correct archiving of process data in the control system, all data frames are assigned with a time stamp at their place of origin. The entire network is synchronized automatically – including daylight saving time changes.

Extreme ambient conditions

Variants of the TeleControl Professional outstations are also offered for use under extreme environmental conditions (SIPLUS extreme components).
Interfacing to control systems

Using the SIMATIC PCS 7 or SIMATIC WinCC control systems, automation of centralized plants and monitoring of decentralized, distributed subsystems can be combined in a single system. In this way, machines and plants can be operated and monitored from a single control desk, and configured using a single engineering system. Integration in Totally Integrated Automation also facilitates extensive savings in investment, operating and service costs.

Operator control and monitoring with SIMATIC WinCC: SINAUT ST7cc

For the data archiving which is essential in many sectors, the SINAUT ST7cc program package supplies the archive made available in WinCC with process data in accordance with the time stamp supplied by the RTUs. Interfacing with sector-typical logging systems is also possible. The SINAUT ST7cc configuring tool uses the same communication blocks as the underlying telecontrol system. The resulting object-based communication, from the sensors in the process through to the screen contents and databases of the control system, saves time and costs.

Interfacing to SIMATIC PCS 7 TeleControl and SIMATIC WinCC TeleControl

SIMATIC PCS 7 TeleControl and SIMATIC WinCC TeleControl both use the SINAUT ST7, DNP3 or IEC 60870-5 protocols for communication with the outstations. The engineering system is based on data base automation (DBA) technology and is equipped with an extensive function block library which also supports interfacing to telecontrol stations from other vendors.

Interfacing to control systems from other vendors

... with ST7sc over OPC interface

Using the SINAUT ST7sc program package with the OPC interface, the SINAUT ST7 stations can also be linked to control systems from other vendors. ST7sc has complex buffer mechanisms which prevent a data loss even upon failure of the OPC client. All process data are delivered with a time stamp, and configuration of the OPC interface is extremely user-friendly.

... with DNP3

Telecontrol stations with DNP3 can be connected to any control system, provided that it is equipped with a standard-compliant DNP3 master interface.

... with IEC protocol

Telecontrol stations with IEC can be connected to any process control system with a standard-compliant IEC 60870-5 interface.

Due to the internal time stamp, no data is lost even if the connection is temporarily interrupted.
Intelligent tools for effective engineering

Our innovative engineering system builds on SIMATIC tools and supports the graphical configuration of complete communication networks. The system automatically provides the configuration engineer with all options for linking in data from individual PLCs. Multiple addressing of process data is also possible – for example to several service centers or stations. Plausibility checks and address comparisons help when configuring complex networks.

Programming can be performed remotely

Both in the commissioning phase and during operation, program modifications or remote diagnostics are easy to carry out in the distant stations by remote access via the communication network – without interrupting ongoing process data communication. This saves traveling time and site maintenance visits and also creates the requirements for completely new service concepts.
Teleservice not only allows distant machines and plants to be maintained economically, it also allows you to establish the overall maintenance and servicing requirements in advance, preventing plant downtime. Should a fault occur despite this preventative action, teleservice will support localization and rapid troubleshooting of the fault. Further advantages: the ability to exchange status information and, where necessary, to optimize processes.
Simply respond faster

Teleservice enables plants to be diagnosed and maintained from anywhere in the world over telephone and Internet/mobile networks. It is also possible to make corrections to the user program, set parameters and transfer data. This plays an important part in reducing service deployments on site – by as much as 60%. The associated traveling expenses and personnel costs are also saved. Teleservice also facilitates a much quicker response to any disruptions.

The new trend: Remote maintenance of all network components via the Internet

Optimum teleservice depends on reliable, continuously available, secure, low-cost data connections. Remote Networks is the complete Siemens product range for your secure teleservice solution over the Internet:

- For permanent links, or simultaneous access to several plants, a solution comprising the SCALANCE S and SCALANCE M security and communication components is recommended, both on the service and plant side.
- For versatile remote maintenance from any Internet connection – whether in the office, home office or hotel room – SOFTNET Security Client is the right software solution for establishing a secure connection to the plants.
- For plants without a wired network connection, the mobile radio routers for GPRS or UMTS provide access to the service center for remote maintenance. In all cases, communication is reliably protected by means of authentication and encryption over a VPN tunnel (Virtual Private Network) to block external attacks.

SIMATIC TeleService: Perfectly interacting components for service personnel with Field PGs and TIA Portal for simple remote maintenance of SIMATIC controllers

- TeleService adapters can be combined with different types of modems and routers
- TeleService software with an access data management function enables easy connection to the automation components.

... and diverse function blocks

- Remote maintenance
  You can dial into a plant over the telephone system to read out status information and make corrections to the user program.
- Remote connection
  Data transmission via public communication links is possible as well as coordination of the process data exchange between several automation systems, if required.
- Send an SMS or e-mail from the plant
  You can send text messages and e-mails via the SIMATIC Controller.

SIMATIC IPC Remote Manager

This software package enables the realization of central service concepts for remote access to SIMATIC IPCs. System faults or program errors can then be rectified from a control desk, or BIOS and program updates can be installed.

SIMATIC Remote Support Services

Our service concept offers a secure, high-performance platform for remote access to machines and plants. Effective support is provided by the integration of Shared Experts from Siemens and the company’s own specialists.
New mobile radio technologies and broadband Internet support further applications such as video transmission, condition monitoring and smart grid applications, as well as object and building monitoring. Constantly widening opportunities for communication over Remote Networks provided by increases in bandwidth, higher availability and falling costs result in more and more innovative solution concepts.
Video surveillance

Modern industrial mobile wireless routers are ideally suited to use in moving objects such as trains or buses. They support bandwidth-hungry applications, such as real-time video transmission, from the passenger cell (video surveillance) and can therefore enhance passenger safety. The video data for all vehicles is monitored and processed in a control center. Data transmission for ticket machines, infotainment services and on-board Internet, as well as monitoring of the vehicle engineering (telemetry) are also possible.

The high uplink and downlink data rates of our mobile radio router with railway approval support a wide range of bandwidth-hungry data services to and from moving vehicles. The antenna diversity improves the quality of the connection during the journey. Sensitive data can also be transferred in a secure VPN tunnel.

Condition monitoring

Wind power plants are getting bigger and bigger, and their efficiency is steadily improving. This results in ever-increasing complexity, however. Plants require continuous monitoring in order to identify the need to replace wear parts well in advance. This increases the availability of the turbines and also ensures the legally required safety level. The SCALANCE M components for mobile radio networks are particularly suitable for connecting the wind farms to a control center. They are characterized by high data rates, high levels of data security and low installation costs. Continuous condition monitoring increases availability for many other capital goods and reduces maintenance costs at the same time. Data is continuously collected and evaluated for this purpose. Environmental data such as temperature, pressure and air humidity is acquired to ensure that capital goods only operate within the specified tolerance range. Complex measuring techniques, such as spectrum analysis, are also used to determine the condition of moving parts. A number of applications demand centralized evaluation and presentation of the measured data, since they are spread over a wide geographical area, for example. Distributed capital goods are therefore continuously monitored and the collected data is transmitted to the control center via Remote Networks. This places high demands on the bandwidth of data transmission as well as on the environmental conditions.

Smart grid applications

Energy networks will undergo considerable change over the next few years and decades. Until now, power generation, distribution and consumption have been largely independent of each other. The base load has been supplied by large power plants, and demand peaks and dips mastered by gas-fired power stations and pump storage systems respectively. The energy networks of the future will have to respond more intelligently, largely as a result of the increasing use of regenerative energy sources. Distributor and local network stations will be automated and interconnected. The status data for the respective stations will be continuously acquired and transferred to central control desks using SCALANCE M over Remote Networks at optimum bandwidth.

Object and building monitoring

With the increasing expansion of cellular networks and the resulting higher bandwidths, new possibilities open up for centralized monitoring of security-sensitive objects, plants or buildings, either through data interfacing for access control, event-driven single-image transfer, or online surveillance by video camera.
Siemens offers a wide range of modems and routers for the networking of widely-distributed plants, distant machinery or mobile applications. These devices facilitate ideal connection to Remote Networks for dedicated lines, telephone networks, mobile wireless or Internet. Integrated encryption and access protection mechanisms make a crucial contribution to security in data communication.
Remote Networks

The new SCALANCE M product spectrum provides the right network component for every application. SCALANCE M can be used universally in telecontrol, teleservice, and any other application for industrial remote communication. The connection to Remote Networks is made via private or public communications infrastructures such as dial-up networks, dedicated lines, Internet or mobile radio. The powerful modems and routers are characterized by a wide bandwidth, high performance and speed.

Highlights:
• Optimized for industrial use
• Integrated in the TIA landscape
• Encryption and access protection mechanisms (firewalls, VPN) for secure data communication
• Redundant configuration of transmission networks increases process availability
• Affordable permanent connection of machines and plants to the control center

Supplementary components for Remote Networks:

Industrial Ethernet components

In order to achieve extensive networks, the connection via Remote Networks can be supplemented with further network components from the SIMATIC NET product portfolio – for example with fiber-optic cable versions of the SCALANCE X Industrial Ethernet switches or SCALANCE W industrial wireless LAN components.

Industrial Security components

Security is paramount when designing Remote Networks, especially when you are dealing with IP-based networks such as Internet and mobile radio. In combination with other Security Integrated components such as SCALANCE S in the control room, it is possible to achieve a large number of Remote Networks with high-performance VPN encryption.

RUGGEDCOM components

With RUGGEDCOM, Siemens has enhanced its portfolio of network components for Industrial Ethernet with solutions for mission-critical applications in even the harshest environments. The highly specialized, robust RUGGEDCOM devices comply fully with both IEC 61850-3 and IEEE 1613. They fulfill the highest standards with regard to EMC, shock and vibration resistance as well as featuring an extended temperature range.
Find out more:

siemens.com/industrial-remote-communication

Find out everything you need to know about our products and services:

- Reliable monitoring and control of remote plants via telecontrol
- Efficient remote diagnostics with our teleservice solutions
- Secure data transfer via Remote Networks

Subject to change without prior notice
Article No.: E20001-A660-P820-V1-X-7600
Dispo 06366
21/51007 WS 03142.0
Printed in Germany
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For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. For more information about industrial security, visit www.siemens.com/industrialsecurity.

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