Flexibly networked for higher Availability and Performance

Electronics Company optimizes Production of Components for the Process Industry with in-house Industrial Network Technology

Telephone services via voice-over-IP, WLAN communication in separated networks – also outdoors, and access control via RFID: With industrial network components from its own product range, Siemens Haguenau is modernizing the production and the office environment. The end-to-end solution in place throughout the location makes it easy to fulfill the tasks flexibly, economically, and with high performance.

In the French Haguenau, Siemens manufactures field devices of the Sitrans family for the global market – including positioners, pressure and temperature transmitters, as well as gas analyzers and laser spectrometers. In 2010, the factory was expanded substantially. Characteristic for the production of a highly varied product spectrum in very small to medium quantities are frequent changes to the portfolio – and thus also to the production lines and workstations. One or two major changeovers per year are not uncommon. To be able to easily regroup and shift the production along with the IT technology, a flexible network structure is required.

Powerful, trouble-free networking is indispensable in a modern production: On the one hand, work assignments for line and machine controllers as well as work instructions for employees are transmitted and tracked over the network. On the other hand, the production statuses are continuously returned to central data servers. Add to this several hundred participants (PCs and telephones) at the office level.

At the Haguenau plant, Siemens manufactures, among other things, Sitrans field devices for the process industry in a wide range of versions, in very small to medium lot sizes. This requires frequent changeovers and thus flexible network technology.
Three-layered Network Architecture

The network for this is structured modularly and in three layers. At the heart are two core switches that are integrated into the higher-level Siemens network via routers and firewalls. Subordinated are several so-called concentrator switches in the factory. These two layers form a continuous 10-gigabit backbone over redundant fiber optic cables. Connected to it – also by fiber optic cables – are additional switches located near production lines and office areas. These either directly or via patch fields connect the participants in the field, which are grouped into logical units, at a consistent rate of one gigabit per second. As a result, entire subnets can be quickly and easily restructured and adjustments be flexibly made.

Planned, implemented, as well as maintained are the network projects of the production and associated office areas by the local IT department. Supporting them were network experts from the Siemens department Industrial Communication & Identification. They gave advice on the selection and application of suitable SCALANCE devices as well as on the upcoming planning of the WLAN topology; bringing many years of experience and competence in the field of industrial networks into the project.

In-house Network Components

The Siemens plant Haguenau relies on proven products from the company’s own product range. Another benefit in doing so is that the good usability and high performance of the in-house devices can be tested during constant use. This also applies to industrial-grade network components from the SCALANCE family – specifically to the managed switches SCALANCE XR324-12M. The 19” rack-mount switches with 24 ports have established themselves within a short time as the new standard in the plant. At present, approximately 20 of these devices are in use, predominantly in the more demanding production environment, but also at the office level. A medium-term goal is a unified standard.

The main task in the production is the connection of clients (controllers, PCs) to machines and workstations. The modular switches can be fitted with plug-in modules for electrical and optical transmission media, and can thus be easily integrated into existing heterogeneous networks. SCALANCE devices continue their flexibility when it comes to interfaces and protocols. Designed for industrial use, they support all communication standards established in the production environment – such as (Industrial) Ethernet or PROFINET. Requirements in both the production and the office environment could thus be fulfilled quickly and easily.

Easy Commissioning of SCALANCE Switches

The Haguenau plant did not employ device redundancy for the SCALANCE switches, since their individual configuration is automatically stored on a removable medium (C-Plug), which can be easily replugged. This does not call for special IT knowledge and greatly reduces the time required for replacing a switch in the production hall. The devices previously used first had to be preconfigured for the respective application by an IT technician, which inevitable meant longer downtimes.
In total, 25 access points of the type SCALANCE W786/W788 are to be installed throughout the plant to connect mobile network participants such as handheld scanners as well as printers. Another application is a guest WLAN separated from the Siemens network. Access to the access points will be regulated by two redundant IWLAN controllers of the type SCALANCE WLC711, which follow the extremely compact and rugged enclosure design of the SIMATIC IPC427 (“Microbox PC”).

The voice-over-IP telephone services are configured in a VLAN network. In it, approximately 250 telephones communicate through the SCALANCE switches. The data and language packets go through the same port – with the separation of data and language taking place via the tagging of the data packets. The telephones loop-through the network connection so that additional devices can be connected – reducing the required port number and thus the costs. All in all, the network encompasses 3000 ports.

Access Control via RFID

The Haguenau plant also breaks new ground when it comes to access control: The boom gates at the driveways to the plant and the employee parking lot are equipped with an RFID (radio frequency identification) system of the type SIMATIC RF600 – comprised of reader and antennas. The vehicles of authorized employees are fitted with an RFID label (transponder) that is read contact-free upon approach. The RFID readers are connected to a SIMATIC “Nano PC” over Ethernet, which – by means of SCALANCE switches – queries a central database for the authorization and enables the entry and exit.

Also connected to the network is the automated access control utilizing an RFID (radio frequency identification) system of the type SIMATIC RF600 from Siemens. The RFID antenna captures the data stored on the RFID label affixed to vehicles of authorized employees, while a SIMATIC Nano PC matches it to a network database and controls the boom gate.
Satisfied throughout

“Our production is characterized by the fact that products are added relatively often requiring existing lines to be changed and restructured. As “lead factory” for the other plants of the business unit, it is up to us to continuously improve the processes necessary for this,” states plant manager Udo Wiggermann. “In doing so, we also want to be a “lean factory”, that is, produce as efficiently and lean as possible. The rugged and high-performance, flexibly deployable network and RFID components from our colleagues are very well suited tools for this.”

This is also emphasized by Didier Mayer, director of information technology at Haguenau: “We are very satisfied with our new standard in the production. The already installed SCALANCE devices run stable and extremely reliable under all conditions. The tests for all future applications also have been highly promising and the implementation is imminent at several places.”

Competence in Process Instrumentation and Analytics

In Haguenau, Siemens manufactures field devices including positioners and pressure and temperature transmitters, as well as process analytics equipment such as gas analyzers and laser spectrometers for the global market. These components are the basis for the automation in the process industry, e.g., in plants for the chemical and petrochemical industry, in the production of food, or in the treatment of water.

With the construction of a new, 10,000-square-meter production line for magnetic flowmeters in 2010, the location was expanded to include a mechatronics manufacturing center for process instrumentation and analytics in Europe. The new facility is equipped with the latest production and testing systems as well as flow rate calibration devices for pipes exceeding two meters in diameter.