



SIEMENS



MOLKEREI AMMERLAND

Reference

Digitalization as a growth enabler

A powerful network infrastructure is the backbone for reliable production. Properly designed, it provides system transparency and flexibility for future expansions. This was recognized by Molkerei Ammerland where it was their desire for a new network concept that met these requirements to support the dynamic growth of the company.

The origins of the Molkerei Ammerland eG can be traced back to the year 1885. At that time, seven farmers joined forces to form Northern Germany's first dairy cooperative. Today, more than 2,000 farmers belong to the cooperative. The dairy employs approximately 700 people and exports its products to 60 countries worldwide.

The company operates two production facilities in Germany. The plant in Oldenburg produces fresh products such as milk, buttermilk and cream. The plant in Wiefelstede, about 25 kilometers away, is home to one of the largest and most modern cheese dairies in Europe.

In total, approximately 1.7 billion kilograms of milk are processed annually, which comes exclusively from farms of the cooperative within a radius of about 80 kilometers. In addition to the fresh products, it is primarily large transport units that are delivered to processing companies.



The Molkerei Ammerland produces approximately 122,000 tons of cheese annually.

Digitally networked systems for flexible production growth

The creamery and cheese dairy of Ammerland is located at the edge of the Dringenburg district of Wiefelstede. It has experienced strong growth for years with no end in sight. Only recently was the vast facility area enlarged by almost a third of additional production space. In addition to the daily production volume of approximately 350 tons of sliced cheese, Mozzarella will be produced there in the future as a new product. "We are constantly expanding, but every time a section is finished, we realize that we actually planned one size too small," says Michael Ollesch about the situation at the site, who is the system administrator of the Molkerei Ammerland.

As part of the expansions and continuous upgrades, in 2013 the production network was modernized using industrial grade components from Siemens. At that time, the entire plant already consisted of approximately 200 controllers, which were exchanging production-relevant data through more than 1,000 communication nodes.

For this extensive project, Molkerei Ammerland eG needed a competent partner that knows and understands the particulars of the food and beverage industry, while being able to meet stringent regulatory requirements. Other prerequisites included the delivery of an end-to-end solution and the assurance of support available at any time. Therefore, Molkerei Ammerland chose Siemens – its long-standing, proven partner.

Production without downtime

The production of cheese involves living cultures that develop within very narrow growth phases – and therefore require clearly defined production cycles. Furthermore, the continuously arriving milk deliveries must be processed within a certain time frame. This means that the production process has to run around the clock, 365 days a year. Plant downtime would quickly lead to a critical situation and thus must not happen. For this reason, plant availability has the highest priority. Due to the high degree of networking in the production process and the increasingly important exchange of data between the automation systems, it is absolutely necessary today for the production network to also provide such high availability. With the rising number of individual production cells, the production backbone becomes more and more vital for reliable and secure operation. To ensure this high availability, Molkerei Ammerland relies on a wide range of redundancy mechanisms. Besides special, industrial redundancy protocols, redundant and uninterruptible power supplies are employed for the network components.



All processes take place under controlled hygienic conditions.

Communication concept on a new basis

While modernizing their network infrastructure, Molkerei Ammerland also upgraded the passive network technology by laying high-performance fiber-optic data cables, on which all of the communication from the production, storage and refrigeration to the sewage treatment plant is running. Additional virtual networks (VLANs) were created through segmentation. Special attention was paid to the office network interface – so that an optimally matched interface between the conventional IT and the production network could be created with help from Siemens.

The SINEMA Server network management software from Siemens handles all monitoring and management tasks, and provides maximum transparency in the network. Molkerei Ammerland can thus – at any time – utilize various diagnostic and analysis functions and obtain validation reports on relevant data. By means of the SINEMA Server, firmware updates for the SCALANCE devices can now be centrally initiated.



In a control center, all processes are depicted and monitored.

The network components installed by Siemens include numerous SCALANCE X switches from the XR-300 and XR-500 families, which are housed in several control cabinets that are located in separate utility rooms. The SCALANCE XR528-6M switches form the core of the network with layer 3 functionality, 10 Gbps interfaces and matching power supplies. Attached to them are 17 SCALANCE XR324-4M EEC (Enhanced Environmental Conditions), 19-inch rack switches, which were specifically developed for use in energy systems or other extreme environments.



The SCALANCE X switches are installed in decentralized control cabinets.

The SCALANCE XR-300 EEC switches also feature redundantly designed power supplies where high availability is a must. Network redundancy mechanisms, such as the high-speed redundancy protocol (HRP), virtual router redundancy protocol (VRRP) and rapid spanning tree protocol (RSTP), combined with a clear ring structure enable short reconfiguration times, and provide maximum availability even in the event of a fault.

Server in virtual space

On the one hand, Ammerland's philosophy includes a strict separation between enterprise IT and the industrial environment. On the other hand, it must be possible to securely communicate and share production information with the company's ERP systems. "For security reasons, we wanted to strictly seal the plant off to the outside," says Molkerei Ammerland project manager Hans-Peter Hübner. "At the same time, we wanted to further expand the digitalization to make the entire system more flexible and to lay the foundation for future developments."

A powerful network infrastructure not only provides the communication backbone for smooth interaction between production processes, for Molkerei Ammerland, it was also the basis for one very distinctive feature, and possibly a first for the industry. Instead of numerous PCs in the production area, the plant leverages the company's IT computing center where a wide range of tasks run on virtual machines – including the Siemens PCS 7 process control system.

This forward-looking structure saves money and provides a higher level of system availability and redundancy. In addition, hardware and management resources are better utilized while the entire solution is scalable to support future expansions to the production area.

Commissioning during ongoing production

As previously mentioned, the cheese dairy operates continuously around the clock. Cows still produce milk during vacation time or holidays and on weekends and this milk must be continually processed. The renewal of the plant's network structure coincided with an enlargement of the production area by 17,000 square meters, and marks an important step into the future – as the next production expansion is already on the horizon.

The project lasted for four years and despite a complete overhaul to the system environment, no production interruptions were permitted. Professional planning for the conversion and expansion was therefore essential, which was derived in close cooperation between Siemens and the dairy project team. The network concept for the expansion of the dairy's production network with integration into the production backbone and connection to the IT was first developed by the Siemens Professional Services team following industry best practices. From the beginning, close collaboration between their production and IT departments ensured that operational technology requirements could be

addressed without compromise to IT policies. This joint effort led to a solution that both parties could be happy with and provides plenty of capacity for future expansions. To further ensure a smooth operation following project completion, customized on-site certification courses provided Molkerei Ammerland with a high level of industrial network knowledge.

For years, the infrastructure has been based on Siemens components, which have repeatedly proven their reliability. "We still have a SIMATIC S5 controller in operation. Its spare purchased at that time is still in its original box and has never been used," states Hübner. The project manager also is convinced of the overall solution from Siemens: "It only makes sense for things that belong together, to also be used together."

Security information

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 only form one element of such a concept. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>

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