# Servers – safely packed and well cooled

## New IT infrastructure at packaging machine manufacturer Schubert

**Gerhard Schubert GmbH in Crailsheim is a well-known fixture in the foodstuff industry. Schubert machines pack confectionery for major global companies, for instance. Schubert GmbH stands for both international success as well as for innovative high-end products. The company also followed these high requirements when installing a new data centre at the headquarters. The innovative rack-based cooling concept for high-density servers was quickly identified as a future-oriented solution and installed.**

If you have ever eaten a bar of chocolate or packet of biscuits, you will have held the work of a Schubert machine in your hands. There is hardly a major manufacturer in the foodstuffs industry that does not use Schubert equipment for packing up to 3,500 biscuits per minute, for example, or for packaging any other products that can be picked up with grippers or suction devices. Products packed include Arnott's biscuits (Australia) as well as a huge variety of sweets from many well-known branded companies. An open attitude towards new things can not only be seen in Schubert's products but also in the company's new headquarters, built in Crailsheim in 2005. Here, design and innovation are not mere empty clichés, but rather a reality that is lived out. For this reason, the new building is heated and cooled in a permanently environmentally friendly way by geothermal energy and heat pumps.

Management set a number of targets when the data centre was being planned as part of the new building. As few as possible powerful servers were wanted in order to limit power consumption - it was seen as making little sense to cool an entire room if the highest heat losses only occurred in the individual racks. "At this point in time, Rittal's RimatriX5 infrastructure solution was still very new on the market", explained Henning Schubert, the company's Database and System Administrator. "The idea of a rack-based air conditioning system fascinated our managing director and owner Gerhard Schubert so much that the necessary funds for investment were released. Another advantage of rack climate control is that no special building features have to be taken into consideration for the room concerned, especially as regards height. We have simply dispensed with the need for a false floor. We not only develop new technologies ourselves, but we are also happy to follow other innovative approaches." Conventional air cooling systems are hardly suitable, as very high levels of heat must be dissipated and these will be even higher in future. Schubert therefore decided on Rittal's LCP liquid cooling process.

### A new data centre – cooled with water from the well

The products and services provided by Gerhard Schubert packaging machines serve a very special market. That is why, right from the start, all original business processes have been presented by an ERP software system developed by the company itself and based on an Oracle database. This IT solution is therefore just as individual and tailor-made as the packaging machines – following the motto "there's nothing that can't be done". Henning Schubert again: "Our ERP system with its associated production planning system (PPS) and logistics module must not be allowed to stand still, because Schubert machines, despite all their custom features, have to be produced in around three months. This is a very tight deadline, and one that can only be adhered to with massive IT support."

A completely new IT infrastructure has been installed at Schubert. Currently, a total of 26 servers are installed in the eight racks made by Rittal. They use around 20 kW of electrical energy, most of which has to be removed from the racks again as heat. Because of this, three Liquid Cooling Packages (LCPs) from Rittal have been installed between the heavily loaded server racks. The cooled air is blown in directly in front of the 19" server level from these lateral, flange-mounted, air-water heat exchangers. The heated air is drawn up from the rear of the server and recooled. Thus the a microclimate with a high heat transfer volume in the closed rack – without any perforated doors. As a standard feature, this modular cooling solution removes up to 20 kW per rack. There is space for one to three cooling modules in each LCP, so that the cooling output can be increased when requirements increase - even when running.

A water circulatory system is needed for cooling. Here too, Schubert makes use of an innovative and environment friendly solution. Two wells have been drilled on the property. Cold water is taken from the suction well at a temperature of approx. 10°C. The coolant circuit for the LCPs is cooled by a water/water heat exchanger. Then the well water, heated by just 5°C, is returned to the second disposal well via the backwash. The water remains completely uncontaminated and is then recooled at a great depth. For extra secure climate control, a switch-over from well water to the municipal water supply is possible in a worst-case situation.

Henning Schubert once more: "After originally being sceptical towards having water in the data centre, we are now completely convinced by the efficient nature of the cooling. And so we have consistently implemented another decision: All of our servers have to be inside a rack. We have no individual stand-alone servers any more."

**A convincing solution in a demanding application**

At Schubert, the entire infrastructure has been reorganised. Where heat arises from dissipated power, electricity must be supplied first of all – no IT without electricity. Consequently an additional, uninterruptible power supply (UPS) and a safe, modular power distribution system from Rittal is also used. Input is via a power distribution rack, in which individually safeguarded power distribution modules can be attached as needed. Each module feeds one rack. Trained staff can now extend the power supply at any time without coming into contact with current.
Because fire also represents an additional, serious threat for IT installations, Schubert uses Rittal's rack fire extinguishing system in the server racks. An additional advantage of closed racks can be seen here, because fire cannot spread to neighbouring racks or to the room where they are kept. The fire extinguishing system is integrated in Rittal's CMC-TC monitoring system. All the relevant data on the computer centre's environmental parameters flows together here via an individual Web browser. This data includes information from the fire early warning system, as well as details of the power supply, the UPS and the LCP. Thus the CMC-TC forms the foundation for the safe operation of the data centre's infrastructure.

**Conclusion**

Schubert's ERP system forms the heart of an internationally renowned company with a staff of 800 that makes packaging equipment. All the company's operations are coordinated in Crailsheim. As a result, failures are completely unacceptable. The company calculates the cost of a breakdown at around € 40,000 per hour - despite the fact that production may continue autonomously for a while with material already taken from stock and before new material has to be called up from the stores and prior to further process steps.

The new data centre now employs the Rittal RimatriX5 infrastructure solution throughout. Henning Schubert concludes: "We have significantly cut energy costs thanks to the liquid-based and rack-based cooling of the servers. At the same time, we are achieving a cooling output in a very environmentally friendly way, and a performance that we would only have been able to achieve at the cost of far higher energy usage had we chosen a room air conditioning system. There are no hot spots – neither within the room, nor in the rack. So availability - in conjunction with a secure power supply - has now reached required levels".

**Components:** rack, LCP, UPS, PDR, PDM, CMC-TC, rack fire extinguishing equipment