

ABB CASE STUDY: ABB SMART BUILDINGS FACTORY IN SCHAFFHAUSEN, SWITZERLAND

Secure hosting of on-site IT equipment

Edge data center improves factory performance



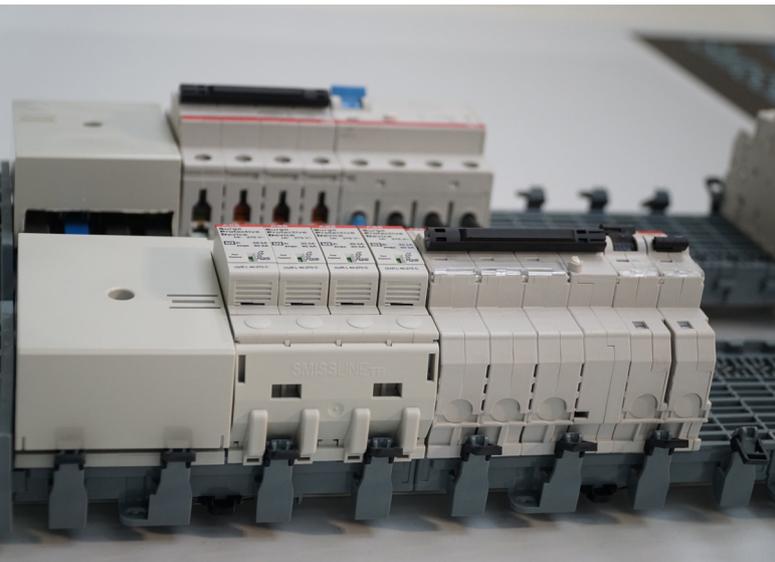
The Secure Edge Data Center (SEDC) is an all-in-one plug and play industrial data center solution that is specifically designed to run in industrial environments, bringing enterprise-grade IT capacity closer to the point of data collection and machine control.

The client

The ABB Smart Buildings factory in Schaffhausen, Switzerland, has global responsibility for several product groups within ABB. Among several million miniature circuit breakers per year, the factory also manufactures the SMISLINE touchproof power distribution system for low voltage sub-distribution cabinets, a circuit monitoring system and magnetic relays for ABB residual current devices. While these products are distributed globally and mainly address industrial and critical power applications such as data centers, the factory also provides switches and sockets which are specifically designed for private households in the Swiss market. On its 40'000 m², the factory not only hosts production machines but also a warehouse where imported goods from other ABB factories are stocked and distributed to ABB's Swiss customers.

The challenge

Over the last years, ABB's Smart Buildings factory in Schaffhausen has frequently upgraded their production and logistic systems to achieve a higher degree of automatization. Thereby, the latest robots from ABB were integrated in the production lines and autonomous storage systems had been installed. While these new technologies enable shorter lead times and higher product quality, they also require appropriate IT infrastructure and systems to operate smoothly and to store and back up relevant data.



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01 Miniature circuit breakers on the SMISLINE TP system

02 ABB robots as part of the production line

However, as many other production sites that had been designed when such IT systems were not required, the Smart Buildings factory does not have the suitable premises to host the IT equipment for their machines (e.g. server closet/room, etc.). Therefore, rooms that previously had a different purpose were transformed to include the on-premise IT. Whereas the room for the factory's main IT had been equipped with systems to provide a suitable environment for IT infrastructure, the room for the back-up IT lacks such an infrastructure. To increase the failure safety of the back-up IT, the factory's IT team was looking for a solution that addresses the following issues in this room:

1. Limited physical security and resiliency against external influences
2. The installed air conditioners are not appropriate to ensure stable climate conditions
3. No UPS (Uninterruptible Power Supply) systems to ensure continuous availability in case of a power outage
4. No fire extinguishing system in the room to protect equipment and plant against fire hazard and damage
5. No remote monitoring of environmental conditions inside the room

The above issues put a risk on the workloads that are running on this IT infrastructure. For instance, the backup SQL database for the factory's automated storage system is hosted on one of the servers. That means that the ~80'000 stock positions of the storage systems are continuously synched on a server according to real-life changes.



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The storage system also compares this data with the order pipeline and automatically arranges the stock accordingly to reduce delivery times. Additionally, the backup SQL storage system and the factory's production records runs on these servers. These records allow detailed analyses of production performance and enable measures to further improve the factory output and its quality. They also serve as a database for the claim management. Besides these two systems, the backup IT equipment also includes a secondary network connection and a redundant core switch to ensure network continuity and availability for the factory.

The solution

During their evaluation to upgrade the room with individual systems, the factory's IT team learned about the Secure Edge Data Center (SEDC) from ABB, HPE and Rittal ([ABB website](#)). This all-in-one turnkey solution accommodates all critical systems of a real-sized data center in a 19-inch server rack to reduce environmental and power-outage risks. The cabinet of the SEDC provides a secure and contained environment for IT equipment and its enclosure is IP55 rated (protection against dust and water jets). To ensure optimal climate conditions inside the cabinet, a rack cooling system is included and any condensate will be automatically pumped out. The SEDC also has a monitoring system that allows to remotely check climate conditions as well as the status of the integrated systems. On top of that, there is an early smoke detection and a

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01 Air conditioning unit providing temperature control for IT equipment prior to SEDC installation

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02 & 03 Previous setup in the room for back-up IT equipment

gaseous fire extinguishing system inside the cabinet to protect the IT equipment against fire damage.

To ensure a continuous power supply for the IT equipment, the SEDC features the ABB PowerValue UPS as well as the SMISLINE touchproof power distribution system (optionally in a redundant or non-redundant configuration). The power distribution also includes an overvoltage protection against surges. In case of a power outage, the IT systems can run up to 7 minutes on the UPS battery. The UPS will send a signal via SNMP to the IT equipment which gives it enough time to shut down gracefully before the battery runs out of power. Due to the combination of these systems, the SEDC offers an ideal customer solution for on-premise IT equipment and systems and it can be placed in harsh environments such as the production floor.

The results

By deploying a SEDC, the Smart Buildings factory could provide a secure environment for their back-up IT equipment and systems and addressed

all short-comings of their previous IT installation at once. On top of that, the Smart Buildings factory benefitted immediately from the following advantages:

1. Less investment costs

Compared to upgrading the room with individual systems to achieve an equivalent protection of the IT equipment, the SEDC cost about 25 kUSD less. Additionally, project management as well as system engineering for the installation of individual systems were not necessary and result in incremental savings.

2. Faster deployment

Since the SEDC is a standardized and pre-configured, yet modular and scalable solution, it had a short delivery time and could be deployed faster than individual systems. For its commissioning, the SEDC only required power and data connections and the installation of an external chiller.

3. Less operating cost

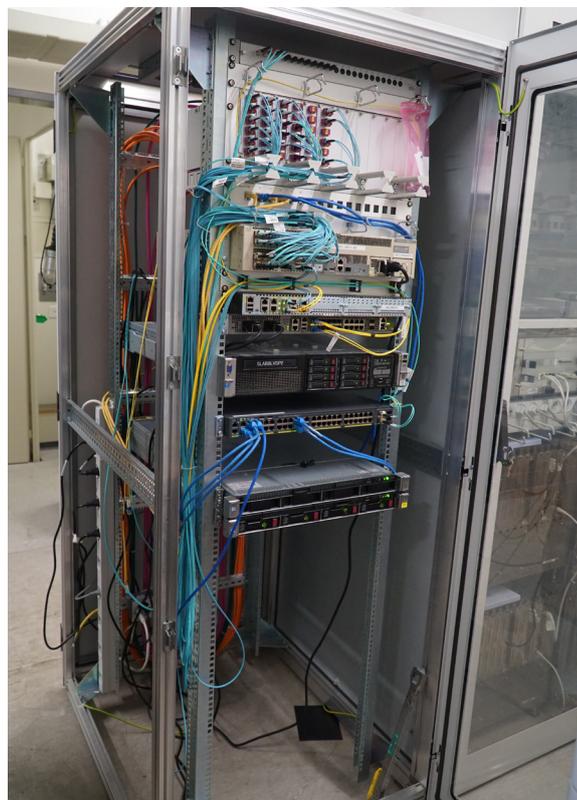
The former air conditioners had to cool down the whole room and were not suitable to ensure



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01 SEDC prior to installation features an enclosed structure for temperature control and ABB Power-Value UPS and SMISLINE touchproof power distribution system

stable climate conditions. Due to the contained environment only the air inside the SEDC needs to be managed now and both humidity and temperature can be tightly controlled. The internal, state-of-the-art cooling unit also runs more efficiently, which results in around 15-20% energy savings for cooling.

4. Less CO₂ emissions

The reduced energy consumption for cooling directly translates into 15-20% less CO₂ emissions. Every saved kilowatt hour of electricity means less CO₂ emissions due to less electricity generation. Therefore, the SEDC also improves the ecological footprint of the Smart Buildings factory.

5. Increased security

While the previous server cabinet was half open, the SEDC represents a contained environment and provides physical protection against external impacts (including ingress of dust and water). The integrated alarm function informs the factory's IT team about any unwanted openings in real time. To ensure optimal fire protection, the integrated fire detection and extinguishing systems are connected to the factory's fire detection system and immediately send out an alarm to the responsible stakeholders when it is triggered.

6. Increased failure safety of IT equipment

The remote monitoring systems provide live data about the status of the SEDC and send

warnings about deteriorating conditions. This enables predictive intervention and maintenance and the possibility to carry out counter measures to reduce the downtime of the IT equipment. In addition, the uninterruptable power supply system ensures continuous availability of the IT equipment in case of a power outage.

Why choose the SEDC?

Since the SEDC combines the core elements of a real sized data center within one rack, it is an optimal off-the-shelf solution to upgrade the factory's on-premise IT infrastructure and systems to today's standards. It allows to safely process data at the edge – instead of in the cloud – if such a need arises from various reasons such as a latency, bandwidth, security, regulatory compliance, etc. This enables real-time analysis and subsequent, automated action, faster response times, and it reduces the factory's external network traffic. In the end, the SEDC ensures a higher availability and failure safety of the IT equipment which ultimately improves the factory performance. Because the factory's back-up IT equipment only comprises a few servers, it was also more efficient to install a rack-sized solution instead of upgrading the whole room.

Secure Edge Data Center specifications	
International protection	IP55
Infrastructure redundancy	1N
IT cooling capacity	5 kW
Number of enclosures	1
Usable space	41 U
UPS autonomy time (full load)	7 min
Environmental monitoring	Yes
Fire detection	Yes
Dimensions (with casters)	800x1200x2250 mm
Automatic dispensing of cooling condensate	Yes



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Please direct your inquiries to sedc@hpe.com

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Interested in learning more about the Secure Edge Data Center? Visit <https://new.abb.com/data-centers/data-centers/secure-edge-data-center> and read [the brochure on the HPE website](#).