



Kieback&Peter

CLOUD-BASED

BUILDING AUTOMATION

Challenges and Opportunities

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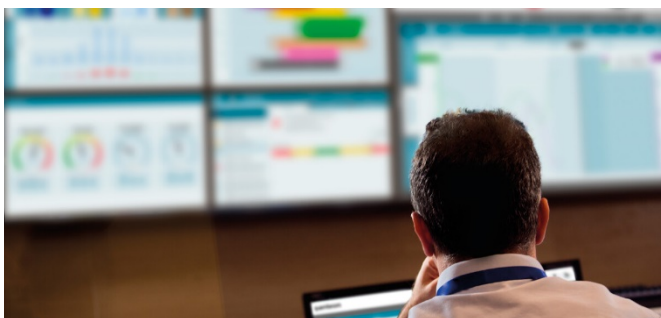
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Virtualization is very trendy—many organizations are currently replacing the physical parts of their IT with software-based components. This enables them to manage their IT capacities more efficiently. They also benefit from increased security and availability in their systems. However, this development also poses new challenges for building automation: more and more building operators want to virtualize their building management systems (BMS) in a data center. However, many existing systems still use serial technology that does not communicate with the virtual world. Because of the conversion costs alone, operators cannot simply replace these systems with network-enabled devices all at once. But there is a solution that can transfer even serial hardware to the cloud.

What are the benefits of virtualization?

There are almost 35 million computer workstations in Germany [1]. That means we have a lot more storage and computing power than we actually need. After all, hardly any PC runs around the clock. And many computers are far more powerful than we need them to be for our everyday “Office” work. When companies virtualize their hardware, they can manage their capacities centrally: if a virtual desktop requires more computing power, it can simply be taken from another area. If the total demand for storage or performance increases, IT staff have the flexibility to expand capacities in the data center. By managing resources centrally, organizations can save a lot of money on hardware procurement and operation.

Virtualization also increases operational reliability. For example, building management system (BMS) software that is installed on only a single, on-site server always poses a risk: if it fails, the BMS will be paralyzed as well. The facility managers are then no longer able to monitor and control their technical systems with the software. By contrast, software that is virtualized in a data center is almost always available—independently of the hardware.



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If one virtual system fails, another one takes over automatically. In conjunction with a solid IT security concept, virtualization also reduces the risk of hacker attacks on the hardware.

An Enormous BMS Migrates to the Cloud

Städtische Immobilienwirtschaft Dortmund, the real estate management agency for the city of Dortmund, has been enjoying the benefits of virtualization since 2017. The Energy Management Department manages over 1,300 buildings and properties, including schools, daycare centers, sports facilities, fire stations, administrative buildings and various cultural institutions. They mainly use building automation solutions in large buildings with sophisticated equipment.

With 435 connected properties and around 124,000 projected data points, this building management system is currently one of the largest in Europe. With the help of system integrators from Kieback&Peter, the city of Dortmund virtualized its BMS in the city’s own data center at the start of 2017. As a result, it now has a system with high availability that can be scaled as required.

As part of the virtualization, Kieback&Peter was tasked with converting a total of 92 buildings to the future-proof DDC4000 network technology by the end of 2017. The buildings were previously connected by modem only. To avoid interruptions during the modernization process, old controllers had to remain in use temporarily in some properties. However, the building operators wanted to use their virtual BMS to access the old serial devices during the transition phase as well. To achieve this, the

experts at Kieback&Peter employed a neat trick. First, they converted the modem connections to Ethernet IP via a BMS operator station. In other words, they decoupled the device data from the local network and specified it for the Internet. Finally, they forwarded the connections to the data center via Etherlink. This solution was advantageous because it allowed Kieback&Peter to modernize the hardware step by step without the city having to give up the usual functions of its building automation and virtual BMS.

Virtualization for Increased Operational Reliability

System security and availability were also two key reasons why Wiesbaden, the capital of the state of Hesse, decided to virtualize its BMS. At the end of 2015, the city's building authority commissioned Kieback&Peter to set up a building management system based on a cloud server.

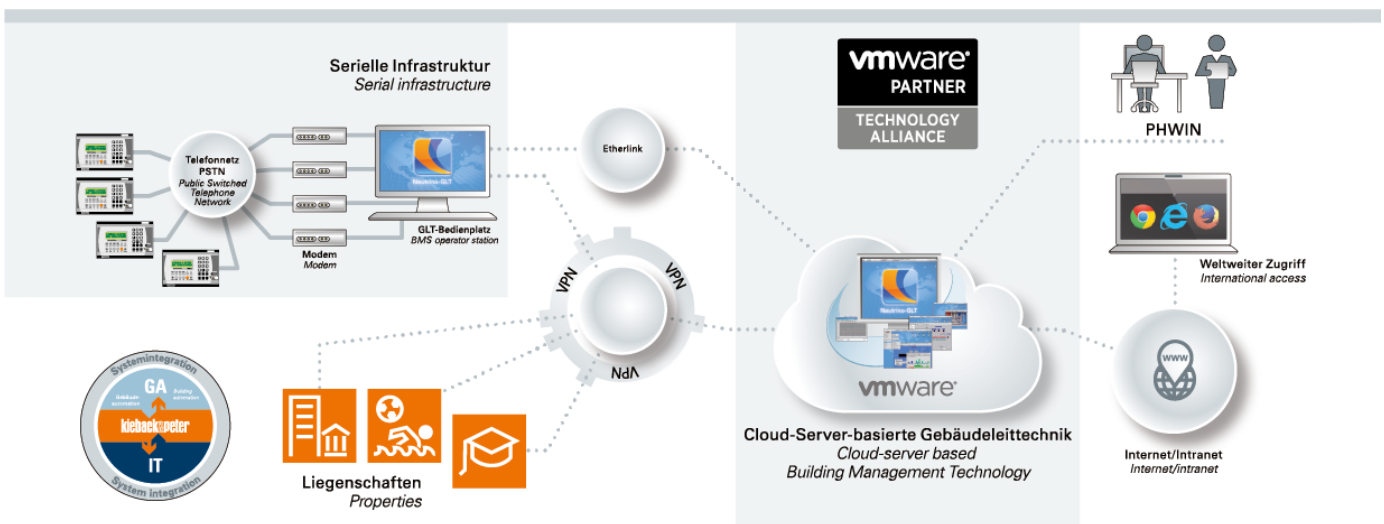
The computer center of the city-owned service provider WiTCOM (Wiesbadener Informations- und Telekommunikations GmbH) was available for the virtual BMS. The goal was to connect all automation stations for the various buildings and properties in this data center and embed them in a VPN infrastructure. "We wanted to be independent of third-party suppliers," explains project manager Markus Vetter from the building authority's Energy Management Department. "And we wanted constant access to the systems so we could respond more quickly to demands."

The building authority has about 90 employees and is responsible for all municipal buildings. These buildings were equipped with countless different technologies and devices of various origins and ages—and some still are. Again the system integrators from Kieback&Peter encountered old, serial automation stations from different manufacturers. They are now integrating them into the virtual infrastructure step by step, using the same principle as in Dortmund.

The project in the Hessian state capital is still in full swing: for organizational reasons, it was only possible to implement the conversion over a period of several years. "In principle, we are switching to new technology wherever renovations are being carried out anyway," explains Markus Vetter, project manager at the city's building authority. Andreas Roß, Head of Energy Management in Wiesbaden, adds: "Kieback&Peter has an inventory of our buildings. We discuss which buildings to prioritize." The challenge is similar to the one in Dortmund: until the modernization is completed, existing serial systems must continue to be operational while being fully integrated into the virtual building management system.

Virtualization Lays the Foundation for Artificial Intelligence

Virtualization enables building operators and energy managers to centrally aggregate a large amount of data from many different buildings.



The Wiesbaden building authority commissioned Kieback&Peter to set up a cloud server-based building management system.

They can combine these measured values and statuses with external data as needed. Operators can then use long-term evaluations, cluster analyses and other statistical methods to identify significant patterns and derive measures to make their buildings even more efficient, safe and comfortable. They can initiate and monitor these optimizations via the virtual BMS.

Artificial intelligence will handle some or all of these tasks in the near future, similar to autonomous driving. Kieback&Peter is working with various partners on this forward-facing topic—for example, on a predictive control system that uses building data as well as interfaces to incorporate weather forecasts, visitor flows or energy prices into the control strategy.

In August 2017, Kieback&Peter announced a collaboration with VMware. This California-based IT company is one of the world's leading providers of cloud infrastructure and corporate mobility. The partnership's goal is to explore the possibilities of IP-based building automation and develop practical applications in pilot projects with customers.

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Source [1] Statista 2017

