

Container technology takes edge-cloud combination to a new level



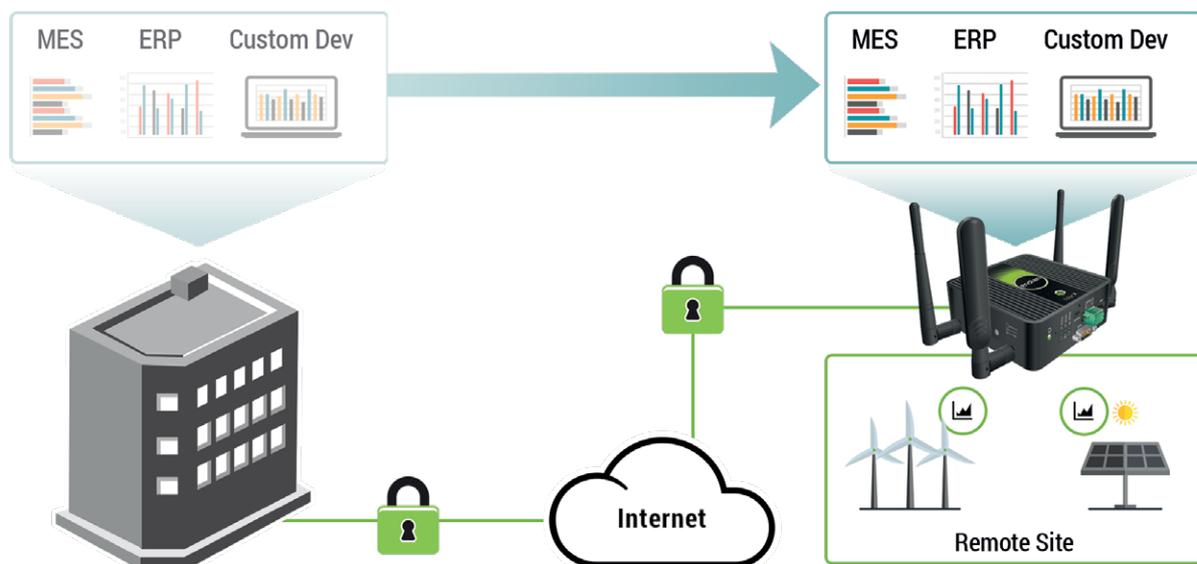
With digitalization, market conditions are changing at an increasing pace. Companies must react flexibly and quickly to change, while remaining open to future innovations. The right mix of edge and cloud computing, complemented by container technologies, forms the basis for sustainable industry 4.0 concepts.

The increasing degree of networking among machines and systems is leading to a constantly growing volume of data, which can serve as the basis for innovative business models. This requires the collection and evaluation of data. However, it does not always make sense to transfer all data to a central, higher-level IoT platform in the cloud. Using a cloud-based solution would require very large cloud computing capacity while also potentially causing bandwidth saturation at the remote site which can result in data loss or delay (latency). With the growing volume of data, edge computing is therefore becoming increasingly important.

Secure Edge Computing

Edge computing enables data to be processed exactly where it is generated, at the edge of the network, for example in a particular machine or production facility. Instead of a large amount of basic data, only the results achieved are transferred to a cloud IoT platform. An appropriate edge device, such as an IoT gateway, is required for pre-processing the data. Here you can set whether the data is to be transferred to the IoT platform only after evaluation on-site or if a certain limit value is exceeded or not reached.

An important requirement for data-based business models is that the data is always correct. This requires protecting the data from theft and tampering during processing and storage in the edge device and during transmission to the cloud IoT platform. The IoT gateway should therefore be equipped with a firewall and encrypt the data during transmission, end-to-end. The storage capacity of an IoT gateway also contributes to data security: if transmission to the central IoT platform via the Internet is not possible for a certain period of time, the data can be stored locally in the meantime and is then available for evaluation at a later point when Internet access is restored. This ensures that the analyses are based on consistent data sets.



Container technologies for more flexibility

If the data is processed at the edge of a network, for example in a local branch office, it makes sense to also operate the associated business applications there. The use of container technologies, such as Docker for example, makes the decentralized use of business applications possible and is therefore the next step towards greater agility.

A particular application with all its dependencies can be combined in a container without including an operating system. The independence from an operating system has two major advantages. First, a container requires less computing capacity than virtual machines. Second, it is independent of the application environment because it can be run with the host operating system that is available. If, for example, different operating systems are installed in distributed branches, the application can still be used equally in all branches via containerization.

Cloud and IoT platforms

As soon as machines and systems are securely networked, the data can be transferred to the cloud IoT platform. The platforms offer the possibility of merging and evaluating data from several company locations. If these data are also related to other factors, such as the outside temperature, conclusions can be drawn about the optimum operating conditions of a machine.

Ideally, the connection should also work in the other direction and can make a significant contribution to greater security here as well: via the permanent connection of an IoT gateway to the Internet or cloud, important updates can be installed at any time. For any type of security software, such as an intrusion prevention system, regular updates are a prerequisite for reliable protection against malware.

The right mix for future-proof concepts

For data processing in the IIoT, a mixture of edge and cloud computing is increasingly gaining acceptance. The addition of container technologies takes this combination to the next level, as it enables business solutions to be executed at the point of data collection while remaining independent of the IT environment. The use of container technologies is thus the key to more agility and the basis for future-proof concepts in the industry 4.0 environment.

Anatomy of a Secure Digital Platform

