BUZZWORD DEMYSTIFIER

Cloud, edge and fog computing

The eighth installment of ABB Review's Buzzword Demystifier parts the mists and explains cloud, edge and fog computing, and how these relate to ABB Ability™.

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Once upon a time, most industrial computing was performed in computing infrastructures local to the process concerned. This required substantial computing power to be embedded into the relevant devices, such as robots, automation controllers and

The ABB Ability digital platform provides the capabilities to implement complex digitalization offerings at the edge.

sensors. With the advent of the cloud, it became possible to locate computing capabilities in high-performance data centers and reduce local requirements. This migration was also driven by local computing devices – eg, smartphones or tablets – becoming more mobile but less able to hold and process data.

However, a wholesale move of data and processing from the front end to the cloud is not always good. There are, for instance, issues with latency: Process sensors often control actuators that have to react quickly to keep the process on track. Further, anything that is required to keep a process safe and stable is best executed close by. Another factor is the bandwidth occupied by large data transfers.

Data privacy, too, may be a reason for leaving data where it is.

These considerations have given rise to the term "edge computing," referring to the edge of the cloud. Is, then, edge computing not just computing as it was known before the cloud came along? The answer is "no" – the edge is local computing in the context of a cloud environment →1.

ABB Ability

As a core element of ABB's digital strategy, the ABB Ability platform is defined to encompass all digital components, from the device, to the automation system, to plant and enterprise level software, up to the cloud. The ABB Ability digital platform provides the capabilities to implement complex digitalization offerings at the edge, using ABB's automation offerings, and combine them with plant-level optimization. ABB Ability also allows the connectivity of these offerings to the cloud to enable larger-scale collaboration throughout a customer's ecosystem.

Cloud advantages

Sometimes the use of edge versus cloud is a design decision. Scalability is one determining factor: The cloud has advantages here regarding infrastructure, platform facilities, or provision of software-as-a-service (SaaS). Computing resources

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01 At the 2017 Hannover Messe, B&R (an ABB company) presented its Orange Box, an edge device. The Orange Box enables machine operators to collect and analyze data from previously isolated machines and lines and get them fit for the smart factory with a minimal effort. The controller collects operating data from any machine via its I/O channels or a fieldbus connection. From this data, so-called mapps generate and display OEE (overall equipment effectiveness) ratings and other KPIs, and can also share the information with higher-level systems via OPC UA.

can be made available dynamically – ideal when computational needs vary greatly. Collaboration is another factor – for example, where data has to be shared between organizations.

Combining functionality "as a service" on the cloud level with an on-site edge installation can bring cloud benefits to the plant. This also enables a cloud-based "as a service" business model for edge components. For example, benchmarking KPIs (key performance indicators) can be calculated at the edge, with analysis, comparison, and visualization done in the cloud. A customer provides the data and receives the benchmark results as a service. Analytics and optimization can follow a similar scheme.

Fog computing

Some tasks can be performed either in the cloud or at the edge. Here, full software portability between cloud and edge is a prerequisite. Software functionality can be offered in the cloud, or on-site. This duality postulates that the on-site infrastructure is a cloud at the edge and this arrangement is sometimes referred to as "fog computing." All clear? ●

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