

# Edge-to-cloud Industrial Control

We provide a modular and distributed industrial control systems which enables the scalability and flexibility required by the manufacturing environment. We aim to combine the strengths of edge and cloud computing by leveraging ideas including service-oriented architecture, data connectors, and digital twins. The benefit is a holistic, modular, and technology-neutral solution customized to individual needs.

## Challenge:

Traditionally, industrial control systems have been built in a centralized way, managing aspects such as data collection, analysis, and the issuing of commands to machines. However, systems with a monolithic architecture are difficult to customize due to the unique demands of businesses. To provide the additional flexibility required, the idea of a modular control system has been introduced. In this decentralized version, the tasks of data collection, analysis, and management are packaged and performed independently, and these software modules can be deployed to different locations. Some of the challenges introduced by this new paradigm are being addressed using techniques such as soft/virtual PLCs, but in some cases the need for a comprehensive solution remains unfulfilled.

## Solution:

We aim to support the use of a distributed control system to enable the scalability and flexibility required by modern manufacturing. To accomplish this, system components are deployed to where they make the most sense. For instance, data collection and analysis functionality can be deployed to the edge, closer to actual data sources for faster analysis without having to rely on network communication. Meanwhile, analysis results can be sent to the cloud, where it is processed to update the system's behavior as needed. This combines the strengths of edge computing (i.e., higher analysis speed) and cloud computing (scalability and centralized control). A service-oriented architecture is employed to implement this solution, along with connectors for data retrieval, digital twins for resource modeling, and dedicated coordination modules.

## Our offers:

- **Design and implementation:** Employing a service-oriented architecture for industrial control, taking the specific requirements of the existing production system into account.

- **Modular deployment:** Updating the system infrastructure and techniques to enable the independent deployment of modules.
- **Dynamic adaptation:** Modifying the behavior or the deployment location of modules in response to changes in the environment.
- **Workshops and analysis:** Evaluating the current state of existing systems and providing recommendations on how to increase their flexibility.

## Why work with Fraunhofer IKS:

Our focus is on providing a highly responsive control system that can be easily extended and adapted. We provide a technology-neutral perspective backed by excellent research and experience, as well as in-house expertise in system engineering, AI, and safety. Thus, we offer individual solutions that consolidate business needs and state-of-the-art approaches.

## Contact us for more information

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