A Container-based IoT-oriented Programmable Logical Controller

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Abstract

The programmable-logical-controller (PLC) has been the key building block of industrial control systems throughout the whole automation revolution, where its role has been mainly to command low-level regulatory feedback control loops. Modernized versions of PLCs aim at facilitating its integration with cloud-based solutions, in the context of the Industrial Internet of Things (IIoT) paradigm. This work is a step forward in this direction and presents a container-based formulation of an IoT-oriented programmable controller, named IoT-PLC, in which each functionality works within a separate container. This IoT-PLC device has regulatory control capabilities, fog-computing functionalities as filtering and field data storage, and multiple wireless interfaces managed independently by individual containers. A virtual device model is used as an abstraction method to represent real entities, and OPC-UA is available for straightforward compatibility with the upper control layers.

Keywords

Cloud computing, Process control, Databases, Sensors, Protocols, Industries, Containers.