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A Generic Framework for Rapid Development of OPC UA Servers

This paper describes a new approach for generic design and efficient development of OPC UA servers. Development starts with creation of a design file, in XML format, describing an object-oriented information model of the target system or device. Using this model, the framework generates an executable OPC UA server application, which exposes the per-design OPC UA address space, without the developer writing a single line of code. Furthermore, the framework generates skeleton code into which the developer adds the necessary logic for integration to the target system or device.

This approach allows both developers unfamiliar with the OPC UA standard, and advanced OPC UA developers, to create servers for the systems they are experts in while greatly reducing design and development effort as compared to developments based purely on COTS OPC UA toolkits. Higher level software may further benefit from the explicit OPC UA server model by using the XML design description as the basis for generating client connectivity configuration and server data representation. Moreover, having the XML design description at hand facilitates automatic generation of validation tools.

In this contribution, the concept and implementation of this framework is detailed along with examples of actual production-level usage in the detector control system of the ATLAS experiment at CERN and beyond.

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