Autonomous Runtime Consumer Interface Generation and Deployment for Service Interoperability

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Abstract

The new Industry 4.0 approach contributes to addressing evolving industrial requirements, which are continuously fueled by changing market demands. This situation leads to growing complexity and considerable increases in development and maintenance costs. A significant portion of engineering time is dedicated to the integration and interconnection of heterogeneous components. The solution for interoperability issues and the reduction in the associated engineering time are thus key tasks for increasing productivity and efficiency. Therefore, this paper provides an engineering approach to create interoperability among heterogeneous systems in Service Oriented Architecture (SOA) based environments by means of generating an autonomous consumer interface code at runtime. This paper aims to present a novel interoperability solution. The proposed approach makes use of service interface descriptions to dynamically instantiate a new autonomously generated interface that solves service mismatches between a provider and a consumer. This paper includes the definition of the consumer interface generator system, as well as the benefits and challenges associated with the autonomous generation and deployment of a consumer interface code at runtime. To illustrate the potential of this approach, a prototype of the system, which shows positive results, is implemented and tested.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

Figure 1

Arrowhead consumer interface generation scenario.

Figure 2

Generation process sequence diagram.

Figure 3

Consumer interface generator system|functional blocks and services.

Figure 4

Scenario 1. Complete consumer code generation.

Figure 5

Scenario 2. External interface code generation.