A Mediated Approach towards Web Service Choreography

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Abstract. The notion of Choreography is intended to describe how to consume Web Services, i.e. making use of their functionality. Two approaches are currently discussed for Choreography description: the individual view approach and the common view approach. This paper argues that these are complementary and presents an approach for combing both views, including the concept of mediation for resolving possibly occurring heterogeneities.

1 Introduction

A Web Service provides a computational functionality that can be invoked over the Internet. In order to allow usage of a Web Service, i.e. consuming its functionality, a behavioral interface description is needed that defines how to communicate with it in order to retrieve its functionality. Also, several Web Services might have to interact in order to accomplish a goal given by a user. The aim of Web Service Choreography is to provide means for describing behavioral interface of a single Web Service, and for specification of interaction protocols for Web Service collaborations.

Currently, two approaches are discussed for Choreography description that seem to be contradictory at first sight. We identify both approaches and show that they are complementary, and we outline a concept for integrating them.

2 Existing Web Services Choreography efforts

The so-called individual view approach that underlies WSCI [1], the initial W3C effort not continued anymore, understands Choreography as the external visible behavior and communication interface of a single Web Service for consuming its functionality. In the manner of bottom-up engineering, the behavioral interfaces of single Web Services are combined into global collaboration models afterwards. The major description elements are those behavioral aspects of the service where user interaction is required (external visible behavior), the information to be interchanged, and the expected messaging sequence. In contrast, the common view approach as the basis of WS-CDL [3], the ongoing effort of the W3C Choreography working group, under-

stands Choreography as a multi-participant contract that describes the common observable behavior of collaborating Web Services from a global viewpoint. The aim is to define a description technique for global interaction models without regard to the specific behavioral interfaces of the Web Services that are ought to collaborate, whereby the major description elements are the collaboration participants, the information interchanged, and control structures for information-driven interaction.

Both approaches aim at establishing collaboration of Web Services for achieving a given goal by arranging their individual behavior interfaces. Regardless whether commencing from the behavior descriptions of individual Web Services or from the model for collaboration, a suitable Choreography description technique has to comprise both aspects. Thus, existing Choreography efforts are complementary, but they only present partial solutions. Besides, a major aspect not considered in the mentioned efforts is handling of heterogeneities occurring between Web Services, which naturally arise within open and distributed environments like the Internet.

3 Integrated Choreography Description with Mediation

The initial situation given when Web Services shall collaborate is that there are Web Services with individual behavioral interfaces, and a goal that shall be solved by collaboration of these services. While determining the interaction protocol for the collaboration, heterogeneities might arise between the behaviors of the Web Services on the data level (terminology mismatches), protocol level (the messaging sequence), and process level (the business processes). Thus, we introduce Choreography Mediators for resolving these heterogeneities and allow establishing of well-formed, deadlock free interaction protocols for a collaboration with compatible behaviors of the interacting Web Services. This approach derives the interaction protocol for collaboration out of given Web Service behavioral interfaces and the collaboration goal, thus combines the individual view and the common view approach, and it embraces the required mediation facilities for resolving possibly occurring mismatches.

Specification of such Mediators requires a sound formal basis as well as compatibility of the description means for individual behavior interfaces and global interaction protocols. Based on initial work [2], the proposed approach is currently elaborated for Choreography within the Web Service Modeling Ontology WSMO [4].

References

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