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Semantic Web Services

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Erratum

Due to an error that occurred during the data conversion process the figures on page

188,
290
and 291

are not printed properly.

Please find attached the correct versions of the figures.

Axioms

An axiom is considered to be a logical expression together with its non-functional properties. Generally the conceptual model does not assume a particular logical language, although it does suggest a language.

7.2.2 Services

The *Service* element of WSMO provides a conceptual model (a meta model in MOF terms) for describing in an explicit and unified manner all the aspects of a service, including its non-functional properties, functionality and the interfaces to obtain it. An unambiguous model of services with well-defined semantics can be processed and interpreted by computers without human intervention, enabling the automation of the tasks involved in the usage of Web Services, e.g. discovery, selection, composition, mediation, execution or monitoring.

As discussed in Chap. 6, the word *service* can be understood in different ways, with slightly different meanings: as provision of value in some domain, as a software entity able to provide something of value and as a means of interacting online with a service provider.

WSMO provides a unifying view of a service; the value the service can provide is captured by its *capability*, and the means to interact with the service provider to request the actual performance of the service, or to negotiate some aspects of its provision, is captured by the service *interfaces*. The software entity able to provide the service is transparent to us, and we are only concerned with its interaction style and with what other services are used to actually provide the value described in the capability. The distinction made between abstract service and concrete service in Chap. 6 is not built into WSMO; however, a WSMO capability can be used to model abstract services, whereas a concrete service is determined during the execution of a choreography.

Notice that in WSMO the interaction with a service can be realised by using Web Services in the WSDL [3] sense. However, we are not restricted to WSDL as the grounding of services.

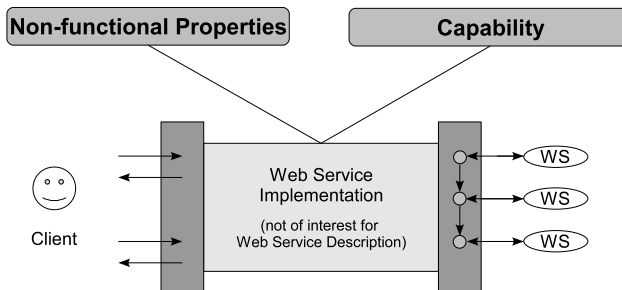


Fig. 7.3. WSMO service – general description

and for service delivery, where the existence of different message exchange patterns has to be overcome in the communication.

Let us now see how the different levels of mediation are applied in the context of the micro-architectures presented in Sect. 6.4 of Chap. 6.

Figure 10.1 summarises the role of mediation from the point of view of the service requester. Data mediation is performed by the message lift/lower component, which transforms incoming and outgoing messages to a canonical format that can be used by the rest of the modules. Ontology mediation takes place between the discovery/definition component and the application logic component, and between the delivery component and the application logic. Finally, protocol mediation takes place in the delivery component, using the choreography descriptions referenced by the provider agent during the service definition interaction.

Figure 10.2 summarises the role of mediation from the point of view of the service provider. Data and ontology mediation take place in the same locations of the architecture as in the service requester case. The only difference is related to the role of protocol mediation, as aforementioned: the service provider just provides descriptions of its choreography to the service requester, and hence no mediation takes place here at the protocol level.

In the following sections, we will provide a general overview of the current state of the art in mediation in the first three of the aforementioned levels. We start positioning mediation in the context of the case study scenarios defined in Chap. 6. Then we will describe some of the existing approaches to data, ontology and protocol mediation. We exclude process mediation from this chapter because it is out of the scope of current research in Semantic Web Services. As aforementioned, process

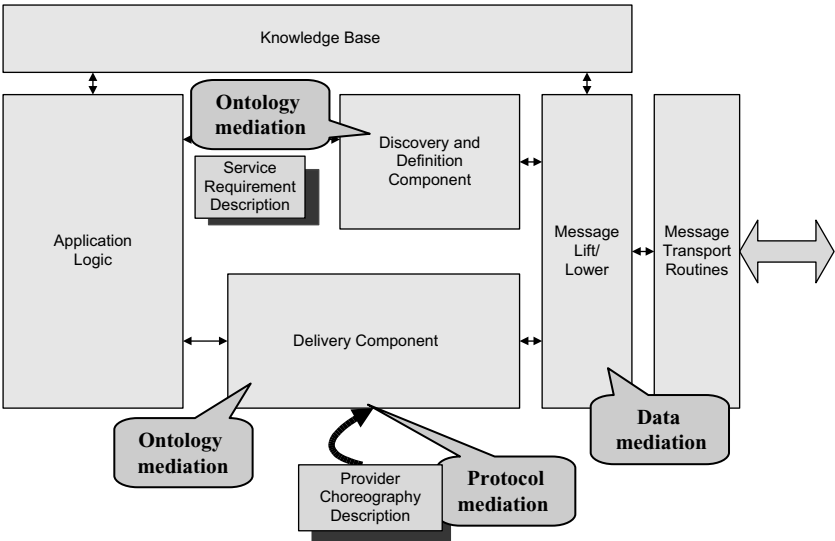


Fig. 10.1. Mediation from the point of view of the service requester

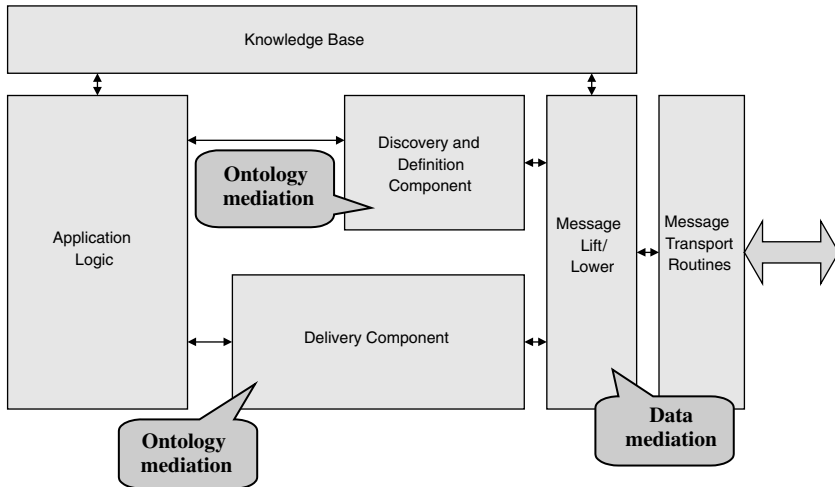


Fig. 10.2. Mediation from the point of view of the service provider

mediation normally needs of a process re-engineering task to achieve a successful interaction between the services involved in a conversation. Some of the concrete approaches described in each of the following sections are taken from the work performed in the context of the SWWS project. Finally, we provide the conclusions to the work presented and describe what we think will be the future trends in mediation in the Semantic Web Services domain.

10.2 Mediation in Case Study Scenarios

This section illustrates the notion of mediation by revisiting the example case studies listed in Chap. 6. For each of the example scenarios, mediation is identified and characterised in the context of the particular case study.

10.2.1 Scenario A

In this scenario, the needs of the customer notification agent will be mainly related to data and ontology mediation. Data mediation will be needed because the information obtained from the banks with respect to the current balance of different accounts, the information about consumer good companies with respect to future payments to be done, and the data sent through any of the different user notification means (SMS, e-mail, etc.) will be available in different formats (services from different banks and consumer good companies will use different formats for dates and currency amounts, and different notification means will need different types of formats for sending the text of the notification, among others). Ontology mediation will be needed because each service will probably be using a different terminology to refer to the customer

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