Web Service enablement for B2C interactions

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Web Services are emerging as powerful standards for the management of Business-to-Business transactions in the Web: [1] identifies three main branches of the research area concerning Web Services: *service description languages*, such as WSDL and DAML-S [3], describing Web Services in a machine interpretable way; *service discovery platforms*, such as Jini and UDDI, supporting the automatic location of Web Services in possibly distributed environments; and *service composition systems*, such as [1], aimed at creating customized services by integrating a number of available Web Services. With the exception of the work in [2], these approaches focus on the management of low-level communication and coordination of Web Service processes, as this is essential to enable the automatic execution of tasks in the supply chain. However, they do not support the direct interaction of the end-user with distributed services, although this is becoming a central requirement, with the expansion of Web-based Business-to-Customer (B2C) services.

The ISHTAR project aims at the creation of an infrastructure supporting the development of user-adaptive portals exploiting Web Services in B2C interactions. The ISHTAR infrastructure, under development, is based on a three-layered architecture (Figure 1): the first layer handles the user interface generation and the dialog with the user; the second one bridges the user interaction and the backend service provision, by managing the cooperative decomposition of the user's goals into atomic goals. The third layer is devoted to the satisfaction of such atomic goals, by discovering the needed Web Services, contacting them and monitoring the status of the execution. Each layer is populated by agents that communicate with each other according to a communication protocol that supports the verification of the satisfiability of the user's goals, the exchange of information about possible solutions and the negotiation of alternative solutions with the user and with the Web Services.

ISHTAR does not make any assumption on the internal implementation of the agents, to allow freedom in the selection of the knowledge representation and reasoning techniques applied within specific Web portals: the introduction of two layers for the decomposition and management of the user's goals, and the organization of the third layer as a set of Specialized Agents, supports
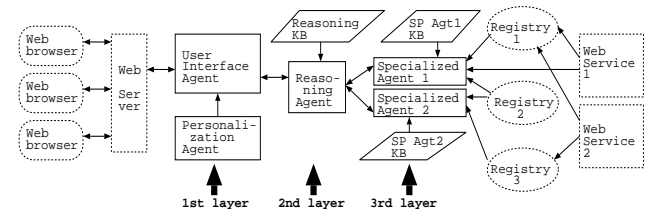

Figure 1: The ISHTAR architecture

the use of possibly heterogeneous technologies in the service composition and execution phases. However, the infrastructure offers facilities for the interaction with the user and the interoperation with Web Services, to leverage the development of Web portals: e.g., a set of agent wrappers (Java classes) built on a standard technology (J2EE, Java 2 Platform, Enterprise Edition) support session management and synchronous/asynchronous messaging between agents. Moreover, ISHTAR offers an extensible communication protocol and a straightforward support to Web Service discovery and execution, by providing a set of specific wrappers built on top of standard APIs (JAXR, JAXM, and JAX-RPC). These wrappers make the Web Service integration easier for the developer, who does not need to care about details concerning the search in the registry and the interaction with the service. The access to Web Services is supported by the Java Web Services Developer Pack, which enables the Specialized Agents to understand WSDL, SOAP, ebXML and to connect to registries such as UDDI.

References

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