A Goal-Based Semantic Web Service Browser

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Abstract. We present a novel approach for the visualization and browsing of Web services. In contrast to most existing tools that categorize Web service with respect to specific description elements, our tool is based on *goals* that describe the objective that a client wants to solve by using Web services while abstracting from the technical details. The data structure for our search space visualization is a graph that organizes goal templates – i.e. generic and reusable objective descriptions – with respect to their semantic similarity, and keeps the relevant knowledge on the available Web services for solving them; the graph is generated automatically by semantic matchmaking. The browsing tool is implemented as a new plug-in of the Web Service Modeling Toolkit WSMT, an integrated development environment for Semantic Web services. [1]

1 Overview

Browsing facilities are important for Web service application developers for assisting in the search for suitable candidates. In contrast to most existing tools that rely on often imprecise classification schemes of Web services and mainly remain on the level of technical details, our tool supports browsing on the level of goals which allows clients to inspect and better understand the available Web services with respect to the problems that can be solved by them.

Our technique is based on goal templates as generic and reusable descriptions of objectives that clients want to achieve by using Web services. The underlying data structure is a so-called *SDC graph* that organizes goal templates in a subsumption hierarchy and captures the relevant knowledge on the suitability of the available Web services for solving the goals as the result of discovery runs. For two goal templates G_i, G_j with $subsume(G_i, G_j)$ it holds that (1) the solutions for the child G_j are a subset of those for the parent G_i, and thus (2) the Web services that are usable for G_j are a subset of those usable for G_i. A SDC graph can be generated automatically for a given set of goal templates and Web services, and it is based on semantic matchmaking of rich functional description [2].

The prototype is realized by visualizing SDC graphs within the Web Service Modeling Toolkit WSMT, an integrated development environment for Semantic Web services [1]. Figure 1 shows a screenshot for the original data set defined in the shipment scenario of the SWS challenge (see `www.sws-challenge.org`).

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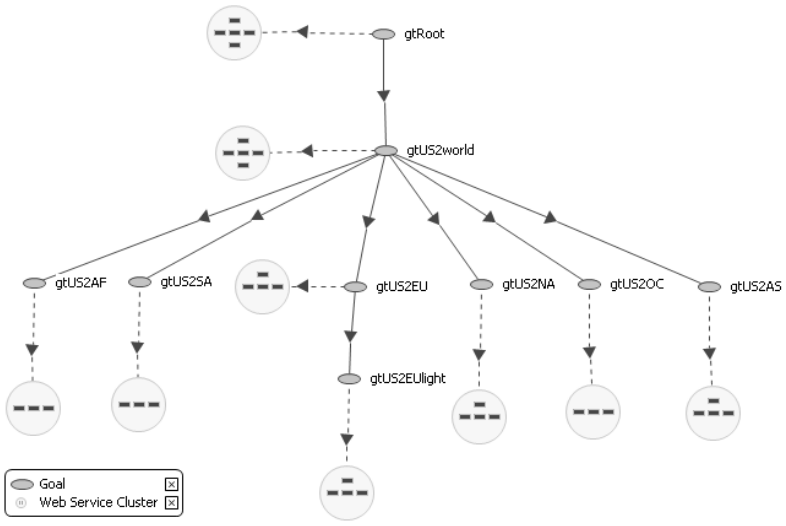

Fig. 1. SWS Browser in WSMT that visualizes a SDC Graph

The root node `gtRoot` is a goal template that describes the objective of shipping a package of any weight from anywhere in the world to anywhere in the world. `gtUS2world` is concerned with package shipment from the USA to anywhere in the world such that *subsume*(`gtRoot,gtUS2world`); the relation to the other goal templates is analog. This constitutes the *goal graph* as the backbone of our SWS browser, while each goal template is associated with a *Web service cluster* that contains all suitable Web services. The client can stepwise navigate down to more detailed views by double-clicking on specific elements.

2 Implementation

The SDC graph is created and managed by a caching mechanism for enhancing the computational performance of Web service discovery [2], which is implemented as open-source software and is available at `http://members.deri.at/~michaels/software/sdc/`. The WSMT is an open-source IDE that provides editing, browsing, and management facilities for the SWS techniques developed around the WSMO framework available at `http://wsmt.sourceforge.net`.

References

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