

Web Service composition in the Drupal content management system

Concept for a master thesis in Software Engineering & Internet Computing

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Introduction

Drupal¹ is an open source content management system written in PHP and has gained a large user base. The goal of this master thesis is to extend Drupal in a way that it is capable to act as web service client and to integrate web service calls into the framework and the data flow. Based on that, the use of multiple web services in one work flow should be possible – web service composition.

To accomplish this task it is necessary to get a decent understanding on the web service standards and to evaluate already existing approaches and implementations. The Rules² module (a plugin for Drupal) uses events, conditions and actions to build complex work flows and will be the primary focus for integrating web service communication as actions.

The development will be an open process, all code and knowledge will be provided to the Drupal community as modules and documentation.

Theoretical part and scientific research

In order to do a sound design and to learn from established standards there will be a theoretical section to deal with the following foundations:

- Recent developments in Service Oriented Architecture, Web Services and REST Services
- WSDL – the web service description language and its use to lookup operations, parameters, endpoints, etc.
- WADL – the web application description language, the counterpart to WSDL in the REST world
- Unification of services: how can we abstract both SOAP services and REST services and access them through a common interface?
- Web services and content management systems – how do they fit together?

As web service composition is a very active research topic, there will be discussion about

- Composition of web services: orchestration vs. choreography, static and dynamic bindings
- Lessons learned from WS-BPEL (business process execution language), similarities to the intended Drupal-Rules-integration
- WS-CDL (choreography description language)

Practical part and implementation

The development of code will consider the following aspects:

¹ <http://drupal.org>

² <http://drupal.org/project/rules>

- The extension will be designed and written for the upcoming Drupal 7 and Rules 2 releases
- Discussion about PHP and web services, SOAP message exchange and REST clients
- Extracting web service meta data from WSDL and WADL
- Providing an accessible container for web service meta data with a well-defined API and implementations for SOAP/XML services, REST services and REST-RPC hybrids
- Robustness: dealing with errors, SOAP faults, wrong specified REST meta data and unavailable web services
- Providing a user interface that allows an easy management of web services, specifying meta data for them and their composition
- Export and import of composed web service work flows to and from other Drupal instances
- Versioning of web service descriptions and change management

Use case for taxonomy translation

To illustrate the work and to have a practical proof of concept, a use case for automatic taxonomy term translation will act as a reference application. Consider this environment:

A Drupal-based job exchange platform assigns specific terms to a job advertisement from a taxonomy in a specific language. For example “Maschinenbau” is added as a german term for the industry field. As a first step in the work flow, the term is sent to a simple translation web service which returns all corresponding terms in the target language. For “Maschinenbau” it would return “engineering; engine building; mechanical engineering” as English translations.

To find the most relevant term in the job advertisement context, a machine learning component wrapped in a web service is used. The german term and the English translations are transmitted to the service and a weighted score for each suggestion is returned.

Based on the weight the new English term can be assigned.

