



## A web-based evaluation service for ontology matching

Jérôme Euzenat, Christian Meilicke, Heiner Stuckenschmidt, Cássia Trojahn dos Santos

► **To cite this version:**

Jérôme Euzenat, Christian Meilicke, Heiner Stuckenschmidt, Cássia Trojahn dos Santos. A web-based evaluation service for ontology matching. Proc. 9th demonstration track on international semantic web conference (ISWC), Nov 2010, Shanghai, China. No commercial editor., pp.93-96, 2010. <hal-00793277>

**HAL Id: hal-00793277**

**<https://hal.inria.fr/hal-00793277>**

Submitted on 22 Feb 2013

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# A web-based Evaluation Service for Ontology Matching

Jérôme Euzenat<sup>1</sup>, Christian Meilicke<sup>2</sup>,  
Heiner Stuckenschmidt<sup>2</sup>, Cássia Trojahn<sup>1</sup>

<sup>1</sup> INRIA & LIG, Grenoble

<sup>2</sup> University of Mannheim

**Abstract.** Evaluation of semantic web technologies at large scale, including ontology matching, is an important topic of semantic web research. This paper presents a web-based evaluation service for automatically executing the evaluation of ontology matching systems. This service is based on the use of a web service interface wrapping the functionality of a matching tool to be evaluated and allows developers to launch evaluations of their tool at any time on their own. Furthermore, the service can be used to visualise and manipulate the evaluation results. The approach allows the execution of the tool on the machine of the tool developer without the need for a runtime environment.

## 1 Introduction

Evaluation of matching tools aims at helping designers and developers of such tools to improve them and to help users to evaluate the suitability of the proposed methods to their needs. The Ontology Alignment Evaluation Initiative (OAEI)<sup>3</sup> has been the basis for evaluation over the last years [1]. It is an annual evaluation campaign that offers several data sets organized by different groups of researchers. However, additional effort has to be made in order to catch up with the growth of ontology matching technology. The SEALS project<sup>4</sup> aims at providing standardized datasets, evaluation campaigns for typical semantic web tools and, in particular, a software infrastructure for automatically executing evaluations. In this context, we have developed a web-based evaluation service that allows developers to launch their own evaluations at any time while using a set of approved datasets. It is based on the use of a web service interface wrapping the functionality of a matching tool to be evaluated. In the following, we describe the main components of our service and present a complete evaluation example.

## 2 Evaluation Service Architecture

The evaluation service is composed of three main components: a web user interface, a BPEL workflow and a set of web services. The web user interface is the

<sup>3</sup> <http://oaei.ontologymatching.org/>

<sup>4</sup> Semantic Evaluation at Large Scale <http://about.seals-project.eu/>

entry point to the application. This interface is deployed as a web application in a Tomcat application-server behind an Apache web server. It invokes the BPEL workflow, which is executed on the ODE<sup>5</sup> engine. This engine runs as a web application inside the application server.

The BPEL process accesses several services that provide different functionalities. The *validation service* ensures that the matcher web service is available and fulfills the minimal requirements to generate an alignment in the correct format. A *redirect service* is used to redirect the request for running a matching task to the matcher service endpoint. The *test iterator service* is responsible for iterating over test cases and providing a reference to the required files. The *evaluation service* provides measures such as precision and recall for evaluating the alignments generated by the matching system. A *result service* is used for storing evaluation results in a relational database.

Once the web service matcher implementation has been deployed and published at a stable endpoint by the tool developer, its matching method can be invoked within the BPEL workflow. For that reason, an evaluation starts by specifying the web service endpoint via the web interface. This data is then forwarded to BPEL as input parameters. The complete evaluation workflow is executed as a series of calls to the services listed above. The specification of the web service endpoint becomes relevant for the invocation of the validation and redirect services. They implement internally web service clients that connect to the URL specified in the web user interface.

Test and result services used in the BPEL process require to access additional data resources. For accessing the test data, the test web service can access the metadata describing the test suite, extracts the relevant information and forwards the URLs of the required documents via the redirect service to the matcher, which is currently evaluated. These documents can then be accessed directly via a standard HTTP GET-request by the matching system. The result web service uses a connection to the database to store the results for each execution of an evaluation workflow. For visualizing and manipulating the stored results we use an OLAP (Online Analytical Processing) application, which accesses the database for retrieving the evaluation results. Results can be re-accessed at any time e.g., for comparing different tool versions against each other.

### 3 Evaluating a Matching Tool

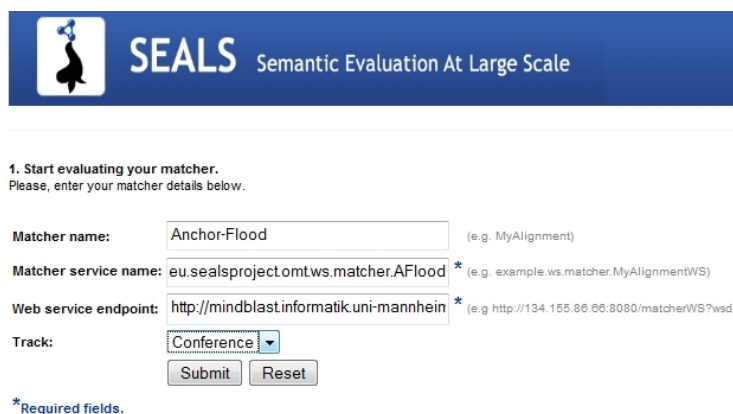
For demonstration purposes, we have extended the Anchor-Flood [2] system with the web service interface<sup>6</sup>. This system has participated in the two previous OAEI campaigns and is thus a typical evaluation target. The current version of the web application described in the following is available at <http://seals.inrialpes.fr/platform/>. At <http://alignapi.gforge.inria.fr/>

<sup>5</sup> ODE BPEL Engine <http://ode.apache.org/>

<sup>6</sup> Available at <http://mindblast.informatik.uni-mannheim.de:8080/sealstools/aflood/matcherWS?wsdl>

tutorial/tutorial15/, there is complete information about how to create a valid matcher.

In order to start an evaluation, one must specify the URL of the matcher service, the class implementing the required interface and the name of the matching system to be evaluated (Figure 1). Three of the OAEI datasets have been selected, namely Anatomy, Benchmark and Conference. In this specific example, we have used the conference test case.



The screenshot shows the SEALS (Semantic Evaluation At Large Scale) web interface. At the top is a blue header with the SEALS logo and text. Below the header, there is a section titled "1. Start evaluating your matcher." with a sub-instruction: "Please, enter your matcher details below." The form contains the following fields and controls:

- Matcher name:** A text input field containing "Anchor-Flood". To its right is the text "(e.g. MyAlignment)".
- Matcher service name:** A text input field containing "eu.sealsproject.omtws.matcher.AFlood". To its right is the text "(e.g. example.ws.matcher.MyAlignmentWS)" and an asterisk indicating it is a required field.
- Web service endpoint:** A text input field containing "http://mindblast.informatik.uni-mannheim". To its right is the text "(e.g. http://134.155.86.66:8080/matcherWS?wsdl)" and an asterisk indicating it is a required field.
- Track:** A dropdown menu with "Conference" selected.
- Below the dropdown are two buttons: "Submit" and "Reset".

At the bottom left of the form area, there is a note: "\*Required fields."

**Fig. 1.** Specifying a matcher endpoint as evaluation target.

Submitting the form data, the BPEL workflow is invoked. It first validates the specified web service as well as its output format. In case of a problem, the concrete validation error is displayed to the user as direct feedback. In case of a successfully completed validation, the system returns a confirmation message and continues with the evaluation process. Every time an evaluation is conducted, results are stored under the endpoint address of the deployed matcher (Figure 2).

The results are displayed as a table (Figure 3), when clicking on one of the three evaluation IDs in Figure 2. The results table is (partially) available while the evaluation itself is still running. By reloading the page from time to time, the user can see the progress of an evaluation that is still running. In the results table, for each test case, precision and recall are listed. Moreover, a detailed view on the alignment results is available (Figure 4), when clicking on the alignment icon in Figure 3.

## 4 Final Remarks

Automatic evaluation of matching tools is a key issue for promoting the development of ontology matching. In this demo we have presented a web-based tool for automatic evaluation of matching systems that is available for the research community at any time. The major benefit of this service is to allow developers to debug their systems, run their own evaluations, and manipulate the results immediately in a direct feedback cycle.



Home

List of evaluations available for this endpoint (click on the link to see the results):

Evaluation ID: [http://mindblast.informatik.uni-mannheim.de:8080/TestMatcher100/aflood/matcherWS?wsdl2010/07/07\\_13:50:43](http://mindblast.informatik.uni-mannheim.de:8080/TestMatcher100/aflood/matcherWS?wsdl2010/07/07_13:50:43)  
 Click at the evaluation ID link to refresh the results  
 Track: Conference  
 Started: 2010-07-07 13:50:55.0

Evaluation ID: [http://mindblast.informatik.uni-mannheim.de:8080/TestMatcher100/aflood/matcherWS?wsdl2010/07/07\\_14:06:12](http://mindblast.informatik.uni-mannheim.de:8080/TestMatcher100/aflood/matcherWS?wsdl2010/07/07_14:06:12)  
 Click at the evaluation ID link to refresh the results  
 Track: Anatomy  
 Started: 2010-07-07 14:06:36.0

**Fig. 2.** Listing of available evaluation results.

Test	Precision	Recall	Status	Alignment
cmt-conference	0.30	0.38	completed	
cmt-confOf	0.45	0.31	completed	
cmt-edas			not completed	
cmt-ekaw			not completed	
cmt-iasted			not completed	
cmt-sigkdd			not completed	
conference-confOf			not completed	
conference-edas			not completed	
conference-ekaw			not completed	

**Fig. 3.** Display results of an evaluation.

✓ **Correct correspondences**

Paper = Paper  
 ConferenceChair = ConferenceChair  
 Review = Review  
 Conference = Conference  
 Person = Person

[Back to top](#)

✗ **Incorrect correspondences**

writtenBy = isWrittenBy  
 reviewsPerPaper = relatedToPaper  
 date = endDate  
 email = hasEmail

[Back to top](#)

⚠ **Missing correspondences**

assignedTo = isReviewedBy  
 hasAuthor = isWrittenBy

**Fig. 4.** Detailed view on an alignment.

**Acknowledgements** The authors are partially supported by the SEALS project (IST-2009-238975).

## References

1. J. Euzenat, A. Ferrara, L. Hollink, V. Malaisé, C. Meilicke, A. Nikolov, J. Pane, F. Scharffe, P. Shvaiko, V. Spiliopoulos, H. Stuckenschmidt, O. Sváb-Zamazal, V. Svátek, C. T. dos Santos, and G. Vouros. Results of the ontology alignment evaluation initiative 2009. In *Ontology Matching Workshop*, 2009.
2. H. Seddiqui and M. Aono. Anchor-flood: results for OAEI 2009. In *Proceedings of the ISWC 2009 workshop on ontology matching*, Washington DC, USA, 2009.