

## VAMP: Semantic Validation of MPEG-7 Profiles

**Martin Höffernig, Michael Hausenblas, Werner Bailer**

JOANNEUM RESEARCH Forschungsgesellschaft mbH  
Institute of Information Systems and Information Management  
Steyrergasse 17, 8010 Graz, Austria  
`{firstname.lastname}@joanneum.at`

**Raphaël Troncy**

CWI Amsterdam, The Netherlands  
`raphael.troncy@cwi.nl`

**Abstract:** This paper describes the VAMP web application for the validation of MPEG-7 descriptions with respect to semantic constraints defined in a profile. The semantic constraints are formalised using an ontology and a set of rules.

**Key Words:** Metadata, Ontology, Semantic Web, MPEG-7, Validation

**Category:** H.5.1

### 1 Introduction

MPEG-7 [MPEG7 2001], formally named Multimedia Content Description Interface, can be used to create complex and comprehensive metadata descriptions of multimedia content. To reduce the syntax variability, MPEG-7 has introduced the notion of *profiles* that constrain the way multimedia descriptions should be represented for particular applications. Since MPEG-7 and profiles are defined in terms of an XML schema, the semantics of its elements has no formal grounding. An approach for expressing this semantics explicitly by formalising the constraints of a profile using ontologies and logical rules is presented in [Troncy et al. 2006]. The use of the MPEG-7 descriptors in a particular context can thus be specified and validated.

VAMP<sup>1</sup> is a Semantic Web Application for validating the conformance of MPEG-7 documents to the semantics of a given profile. The idea and the implementation of VAMP is described in [Troncy et al. 2007].

### 2 General Workflow

Given a MPEG-7 document, VAMP validates whether it conforms to a selected profile or not. First, the MPEG-7 input document is checked for syntactic validity against the Profile XML Schema. Second, the MPEG-7 description is converted

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<sup>1</sup> <http://vamp.joanneum.at>

into RDF with respect to an ontology capturing the semantics of the selected profile. Since not all of the semantic constraints can be described by an (OWL) ontology, logical rules are also used for representing them. Finally, these RDF triples are the input data for the semantic consistency check of the knowledge base containing the ontology and the logical rules.

In contrast to [Garcia and Celma 2005, Tsinaraki et al. 2004, Hunter 2001, Arndt et al. 2007], we do not intend to completely map the MPEG-7 description tools onto an OWL ontology, but rather use Semantic Web technologies to represent those MPEG-7 semantic constraints defined in natural language that cannot be expressed using XML Schema. Our approach is therefore complementary to these other attempts for formalizing MPEG-7.

### 3 The VAMP Web Application

VAMP is available as a web interface for humans (Figure 1), and as a REST-style<sup>2</sup> Web service for agents.

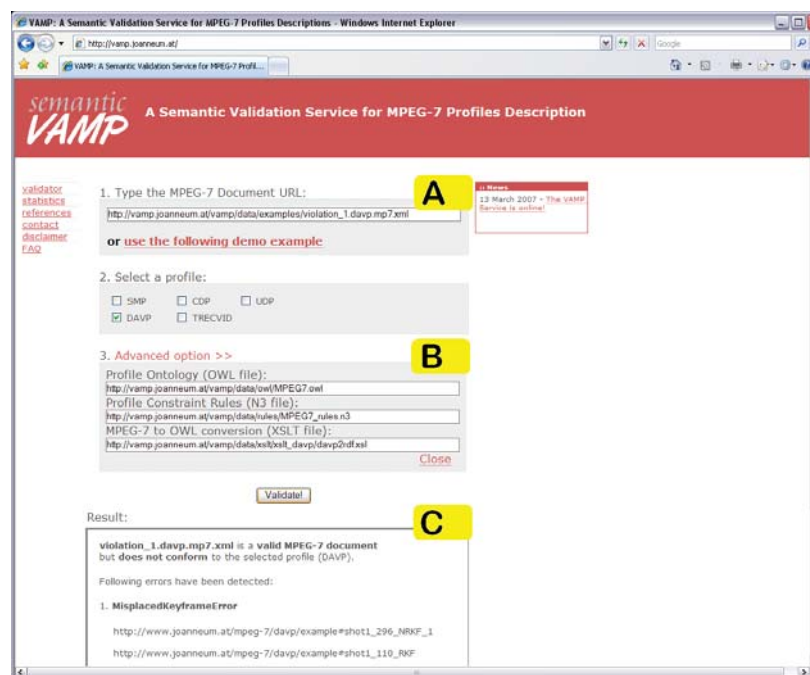


Figure 1: The VAMP Web interface.

<sup>2</sup> <http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm>

The user enters the URI of the description to be validated (A). In an advanced mode, optional parameters corresponding to an alternative formalisation of the semantic constraints can be entered (B). The **Validate** button provides a meaningful explanation of the errors detected in the description (C).

At the time of writing parts of the Detailed Audiovisual Profile (DAVP) [Bailer and Schallauer 2006] are formalised and available in VAMP. Formalisations of other profiles (SMP, CDP, UDP) and de-facto profiles (such as the TRECVID format) are planned in the near future.

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