INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE

Project-Team WAM

Web, Adaptation and Multimedia

Rhône-Alpes

THEME SYM

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2. Overall Objectives

The WAM project (Web, Adaptation and Multimedia) was created in January 2003 to explore the field of adaptative multimedia on the Web, with a special focus on XML documents transformation and adaptation.

2.1. The Multimedia Web

Diversity on the Web increases steadily, be it the diversity of information or the diversity of access devices and communication networks. Diversity of information comes from the multimedia Web. Information shared on the Web consists of text for a significant part, but also of pictures, drawings, video, animations, music, voice, etc. These media can just stand independently from each other, like a movie or a song that can be played for itself, but the multimedia documents we consider in our research are compound documents that tightly integrate pieces of information from different media. In these multimedia documents, the various components have to be choreographed to make sense as a whole.

Devices also are multiple. The workstation or personal computer that was typically used in the early days of the Web is no longer the dominant access device. In Japan, for instance, more cell phones than PCs are now used to access the Web. TV sets are also following this trend. Recent developments in the TV industry clearly show the convergence between television and the Web. Web users can watch at TV programs on their desktops while TV sets can be used to access Web sites. The digital television technology is borrowing more and more techniques from the Web, such as XML, for instance. The automotive industry is also developing embedded devices that provide access to the Web. The Web is ubiquitous and all sorts of devices with very different capabilities are involved in Web access.

Simultaneously, these devices are using new kinds of networks, ranging from personal networks such as Bluetooth to the global Internet. In the broad range of communication technologies, wireless and mobile networks (UMTS, WiFi) are taking an increasing part. Their original features make a big change from the traditional wired Internet and have a strong impact on the way information is exchanged over the Web.

2.2. Document Adaptation

The increasing diversity of information, devices and networks makes the original scheme of the Web inefficient. The usual model of a single Web page designed for a large color screen accessed through a high speed network does not work any more. Some information providers face this problem by developing their contents into different versions, each one suited to a specific class of devices. Another approach is to create information in a single, universal format and to adapt it automatically to the environment where it is delivered.

The WAM project works along the second approach. It aims at developing models, methods, architectures, protocols, formats, languages that allow content to be adapted "on the fly" to the context in which it is actually used. In this approach, no restriction is put on the type of information that has to be adapted; multimedia information is considered with the broad diversity of media that are now commonplace on the Web.

Content adaptation is not something that comes into play at the last moment, when information is delivered to the client. To enable efficient adaptation, the original information must present some features that make adaptation easier or even possible at all. This means that the production methods should also be involved in the whole process of content adaptation. The WAM project is especially interested in authoring tools for the Web, with the perspective of creating multimedia documents that ease adaptation and improve device independence. Several editors are currently under development. LimSee3 is dedicated to the production of multimedia documents where time and synchronization play a key role. Amaya addresses multi-namespace XML documents containing text, mathematics, animated graphics and using style sheets. Finally new work has recently started to develop tools for manipulating spatialized sound in multimedia documents.

2.3. XML Transformations

It is clear that a major means to adapt documents is to transform them according to the actual context where they are used. The project focuses on structured multimedia documents represented as XML structures. Regarding transformations, the objective is to characterize the theoretical and practical tools needed for efficiently transforming XML structures, and to develop models, formalisms and algorithms that are necessary for transformation languages.

A strong motivation for this research on transformations is adaptive multimedia, but transformation of XML documents and data has actually a broader range of applications. Transformations are ubiquitous in the processing of structured information on the Web, ranging from formatting to repurposing and life-cycle management. Actually, XML transformations are considered as a key paradigm for document processing.

3. Scientific Foundations

3.1. Transformations

Keywords: *XML structure transformations*, *XPath*, *automata*, *document models*, *document transformations*, *logic*, *modal logic*, *path expressions*, *transformation languages*.

Participants: Pierre Genevès, Nabil Layaïda, Vincent Quint.

Structure transformation is a specific domain that can be approached following different abstraction levels with respect to programming specifications. The lowest level is based on general purpose languages, such as Python or Java, associated with dedicated libraries and toolkits that implement a standard structure manipulation API, typically the DOM. On the opposite, there are dedicated languages, such as XSLT, which abstract over data and control complexity through a tree-based data model and a powerful execution model.

Some properties are expected from specialized languages in order to help solving the most common problems: expressiveness, verifiability, efficiency, modularity, reusability, scalability, succintness, correctness, etc. These properties are studied using the fundamental connection between language theory, mathematical logic, structured languages and query languages. Most of our theoretical work follows this approach.

The goal of the research published so far is limited to establishing new theoretical properties and complexity bounds. Our research differs in that we seek, in addition to these goals, efficient implementation techniques and concrete design that may be directly applied to XML systems. We also consider that some more properties are of particular importance for XML structure transformations, namely:

- *Type checking*: The types we considered are structural constraints over documents expressed in formalisms such as DTD or XML Schema. Few techniques are able to exploit typing information of the input or output documents to provide type-safe transformations. In this domain, algorithmic advances have led to the creation of new research languages, such as XDuce, based on efficient containment of regular tree types. However, many challenges remain. While type-checking full XSLT or XQuery is theoretically impossible (these are Turing-complete languages), one challenge is to push the "decidability envelope" further for type-checking standard XML transformations. Another challenge is to provide effective algorithms usable in practice for realistic scenarios.
- *Efficiency:* Transformation languages may benefit from static analysis whenever performance is concerned. Static analysis techniques usually take advantage of robust formal semantics to help development of optimized compilers and runtimes.
- *Processing with restricted access policies*: Some applications may require particular policies for accessing XML data, that are incompatible with the current state of the art. For instance, many transformation languages assume that the whole structure to be transformed is available when the transformation process is run. In streaming applications however, the input data flow may be very large or even infinite and the transformation has to be performed on the fly, with bounded memory resources.

3.2. Adaptation

Keywords: *World Wide Web*, *adaptation*, *adaptive multimedia*, *authoring*, *device independence*, *document formats*, *multimedia*.
Participants: Sébastien Laborie, Nabil Layaïda.

The purpose of multimedia document adaptation on the Web is to customize content for the variety of devices and networks that are now sharing the Web with traditional desktop computers. As a result of these changes, the Web infrastructure need to be reconsidered as a device-independent architecture, where information resources can be efficiently accessed with various types of devices and networks.

To reach this goal, the WAM project is following two complementary approaches: a comprehensive, global approach that requires several changes in the current Web infrastructure, and an approach that uses the current infrastructure and legacy content for adaptation.

There is no general solution to the problem of device independence today. Most efforts are rather dedicated to the development of good practices. To make progress towards a solution, two aspects are considered in the project: device-independent architectures and automatic content adaptation.

Ideally, content would be created or generated in a single universal format that could be delivered "as is" to any conceivable device. In practice this seems impossible, so the real techniques seek to minimize the number of variants needed, each variant being targeted at as wide a range of devices as possible.

The problem of adpative infrastructures is addressed through profiles, negotiation protocols and transcoding techniques. A profile is a formal representation of the context in which content is used: user abilities and preferences, device capabilities and limitations, network characteristics, etc. These descriptions must cover both static and dynamic parameters since the system conditions may change over the time.

To transform multimedia documents, one can rely on their semantics. The semantics considered here do not deal with the document content, but with the composition that is made explicit in a Web document:

- *Temporal semantics:* in what order and when should each piece of information be presented to the user.
- *Spatial semantics:* what are the relative positions of the document components on the display space.
- *Navigational semantics:* how are pieces of information related in the hypertext network.

With this approach, adaptation can be done in very general semantic terms, independently from the multimedia objects. This makes it also possible to abstract (model) existing content into a unified representation, and then to facilitate the adaptation process.

3.3. Multimedia Documents Authoring

Keywords: *authoring environments*, *editing*, *multimedia*, *structured editing*, *templates*.

Participants: Romain Deltour, Agnès Guerraz, Émilien Kia, Jacques Lemordant, Jan Mikáč, Vincent Quint, Cécile Roisin, Irène Vatton.

We are working on interactive authoring environments. Developing such environments is a challenging issue: structured multimedia documents are complex objects and the process of creating and updating them is complex too. Well-established paradigms for static office or technical documents do not work. The traditional WYSIWYG approach is useless in a context where the final form of the document (What You Get) is multiple and unknown at creation time. In addition, writing down the description of a document in some multimedia document language is extremely difficult, given the various levels of representation that are involved: content, logical structure, layout, style, synchronization, hypertext structure, navigation, dynamic behaviours, etc. New approaches are needed.

On the Web, multimedia documents are based on XML. They are considered through several types of structures: layout, time, navigation, animations. We are working on techniques that allow users to manipulate all these structures in homogeneous environments. The key idea is to present simultaneously several views of the document, each view showing a particular structure, and allowing the user to manipulate it directly. As the various structures of a document are not independant from each other, these views are "synchronized" to show the consequences of every change in all other views. The XML markup, although it can be accessed at any time, is handled by the tools, and the author does not have to worry about it.

Two editing tools based on this concept are under development, Amaya and LimSee. In Amaya the emphasis is put on the integration of several XML vocabularies and associated technologies, and on direct interaction with the Web: the user can edit remote documents in exactly the same way as local files. With LimSee the focus is on the time dimension of multimedia documents and their continuous media contents.

3.3.1. Authoring Models and Templates

Even with tools providing views for direct manipulation of various structures, the authoring task is often considered as too complex for most users because it requires a deep understanding of the semantics of the language (e.g. the SMIL timing model, or the most advanced features of XHTML). We are therefore working on a new authoring model for multimedia documents that allows the creation of generic or dedicated authoring tools with appropriate user-friendly GUI.

Our approach is first to focus on the logical structure of the document while keeping some semantics of proven technologies such as SMIL. The second core idea is to tightly integrate template definitions in this document model: the template is itself a document constrained by a schema-like syntax. The continuum between templates and documents permits to edit templates generically as any other document and within the same environment. It also allows a more natural authoring process where documents can be progressively created from existing templates up to a final state where all place-holders are filled and all options are decided: during all this process, the document has a status which is between a pure template and a completed instance.

The LimSee3 model based on these concepts is under development and will provide a generic platform for the development of dedicated authoring tools.

The same kind of model is implemented in Amaya, where it allows to cover the very wide variety of Web documents: institutional pages, technical reports, slide shows, curriculum vitae, address books, etc. The specific components of all these documents can be represented by the model in terms of lower-level languages such as XHTML. Authors can then handle documents in terms of these specific components while finally producing standard-conformant documents.

3.3.2. Editing Compound Documents through Databinding

Compounding by references means that documents using different languages (namespaces) are linked by references. This allows separate languages to work together, but implementations of the languages to be separated. Compound documents can be authored by a variety of means and we are interested in multimedia-centric authoring tools that can create time-based, interactive content.

We study the creation of these authoring tools through databinding. Databinding for compounding document formats by inclusion being still at the research level, we are considering databinding for compounding document formats by reference. Strongly typed references and access to different documents are well supported by the Eclipse Modeling Framework (EMF) schema compiler. This is a great advantage when it comes to build a graphical editing tool for compound documents and we have adopted it. We are specifically interested by problems related to events flow in a multi-document environment and by how different languages should cooperate in rendering to the screen and the auditory space.

Feedback on this research is given by constructing an editor for SVGT- iXMFT games on mobiles devices. iXMFT (interactive eXtensible Music Format Tiny) is a format we have designed for digital interactive audio on mobiles and for which a soundtrack manager can be built using JSR-234 audio engines.

3.4. Multimedia Document Formats and Description

Keywords: *audio formats*, *digital library*, *document description*, *document formats*, *document models*, *document query*, *document templates*, *metadata*, *microformats*, *multimedia*.

Participants: Marc Caillet, Jacques Lemordant, Vincent Quint, Cécile Roisin, Irène Vatton.

Work on specific formats for audio has started recently in WAM. More specifically, we are participating in an international initiative for creating a new format for digital interactive audio for mobiles. Seven years after the completion of the I3DL2 guidelines (3D Audio Rendering), IAsig (Interactive Audio special interest group) should announce in 2007 the completion of a new interactive audio file format (C data structures) to complement I3DL2. This new format, based on the open standard XMF file format, will be called Interactive XMF (iXMF). At some point, iXMF will play the same role for audio as SMIL-based declarative animation is playing for SVG graphics objects and special effects. Main objects in iXMF are cues like “get the ball rolling”, a cue being defined as a symbolic name associated to a graph of audio elements producing a continuous soundtrack from discrete media chunks. However, iXMF with its 4-level hierarchical model for mixing and muting (t! rack, chunk, cue, and mixgroups) is a complex file format, which has not been designed with mobiles in mind. No reference implementation (C++ or Java) has been scheduled in the near future.

Regarding discrete media in multimedia documents, popular document languages such as XHTML can represent a very broad range of documents, because they contain very general components that can be used in many different situations. This advantage comes at the price of a very low level of representation. The concepts of microformats and semantic XHTML were developed to tackle this weakness. They add semantics to Web pages while taking advantage of the existing (X)HTML infrastructure. This approach enables new applications that can be deployed smoothly on the Web. But there is currently no way to describe rigorously this type of markup and authors of Web pages have very little help for creating and encoding semantic markup. A language that addresses these issues is developed in the team. Called XTiger, its role is to specify semantically rich XML languages in terms of other XML languages, such as XHTML.

Whereas document formats represent a multimedia document with all its internal structures, description languages describe a document from outside and provide metadata. In the area of description languages for multimedia documents, significant standardization efforts have been spent recently, such as MPEG-7 for instance, but the problem is not solved yet. Many application domains cannot cope with the description languages available today. We are working on this issue in cooperation with INA, the French archive of broadcast radio and television. We are defining a structure description language for audio-visual documents, focusing on formal consistency to make descriptions usable in very large bases, such as archives of audio-visual documents. Typical applications of this work are producing a thematic audio-visual offer from archives, or producing the same interactive application on various media (CD-ROM, DVD, Web).

4. Software

4.1. Amaya

Participants: Émilien Kia, Irène Vatton.

Amaya is an open source Web editor, i.e. a tool used to create and update documents directly on the Web. Browsing features are seamlessly integrated with editing features in a uniform environment that allows users to save files locally and on remote servers as well. This follows the original vision of the Web as a space for collaboration and not just a one-way publishing medium.

Work on Amaya is a joint effort with W3C that started to showcase Web technologies in a fully-featured Web client. The main motivation for developing Amaya was originally to provide a framework that can integrate many W3C technologies during their development, with the goal of demonstrating these technologies in action while taking advantage of their combination in a single, consistent environment.

Amaya started in 1996 as a HTML editor. Support for the creation and debugging of CSS style sheets was soon added. It was then extended to support XML and an increasing number of XML applications such as the XHTML family, MathML (for mathematical expressions), and SVG (for vector graphics). It now allows all those vocabularies to be edited simultaneously in compound documents. Amaya includes a collaborative annotation application based on the Resource Description Framework (RDF), XLink, and XPointer.

Now that a number of languages are implemented in the editor, developments focus on accessibility and usability. The latest extensions are oriented towards robustness, completeness and ease of use. An important development was completed in 2006 for improving the user interface on Mac OS-X, including the new Intel platforms. Support for additional CSS properties was also added.

Many contributions were received from several external developers and had to be coordinated with the project team. They concern localisation in various languages (Taiwanese, Chinese, Japanese), tests and adaptations to new platforms. Other contributions provided various improvements and new features. One of the most significant contributions makes Amaya a very efficient tool for authoring complex mathematical expressions.

A prototype implementation of the templating feature enabled by the XTiger language (see section 3.4) was developed. At the end of 2006, a production quality development started to fully support this feature with a convenient user interface. This development will contribute to the Palette project (see section 6.1).

Four public releases were made in 2006, on 10 February, 12 April, 18 October, and 8 December.

4.2. LimSee

Participants: Romain Deltour, Nabil Layaïda, Jan Mikáč.

LimSee2 is an open source authoring tool for multimedia documents using the SMIL 1.0, 2.0, and 2.1 formats. It features a powerful graphical user interface designed to ease the manipulation of time-based scenarios in SMIL multimedia presentations. SMIL (Synchronized Multimedia Integration Language) is an XML language, so LimSee2 is an application that constantly deals with common XML issues: parsing, validation, namespaces, DTD-driven editing, encoding, etc.

The aim of LimSee2 is to keep most of the XML aspects hidden from the user, so that there is no need to manipulate raw data: everything can be done graphically. The main specificity of the SMIL language is that it clearly separates the two main areas of a multimedia presentation:

- Spatial layout specifies where and how multimedia objects should be displayed on a screen.
- Media synchronization specifies how multimedia objects should be synchronized over time.

The development of LimSee2 started in October 2002. The first public release was made in June 2003. Version 1.0 was released in September 2004. The current version is 1.8 and was published in early 2006.

In 2004, a collaboration started with NRCD (National Research Center for Persons with Disabilities, Japan) to make progress in the areas of internationalization, accessibility and ease of use. Joint effort directly resulted in new internationalization features (a Japanese version is now available). Improving usability and adding support for a powerful template mechanism required deeper refactoring. These objectives are the root of a totally new version, LimSee3, based on a new document model (see section 3.3.1). This new activity is being developed in the context of the European Project Palette (see section 6.1).

5. New Results

5.1. Transformations

5.1.1. Guided Tree Automata for the XPath Containment

The XPath containment problem between two XPath expressions p_1 and p_2 consists in determining if, for any XML tree, the set of nodes obtained by the evaluation of p_1 is included in the resulting set of nodes of p_2. Fundamental questions such as the equivalence of two expressions and the satisfiability of an expression are both by-products of the containment. Containment is also important for static analysis of XSLT and XQuery transformations, in which all input data selections are performed using XPath.

We have proposed a sound and complete decision procedure for containment of XPath queries [3]. The XPath fragment considered covers most of the language features used in practice, with the only exceptions of counting and data values comparisons. Specifically, we have shown how XPath queries can be translated into the Weak Second Order Logic of Two Successors (WS2S). Using this translation, we construct an optimized logical formulation of the containment problem, which is decided using specific tree automata operations equipped with guides. When the containment relation does not hold between two XPath expressions, a counter-example XML tree is generated. We have provided detailed practical experiments that illustrate the empirical cost of the decision procedure for realistic scenarios of the XPath containment problem.

5.1.2. XML/XPath Analysis based on the Alternation Free Modal mu-calculus

We have proposed a modal logic approach for the resolution of decision problems where both XPath queries and regular tree types are translated into the mu-calculus. XML decision problems are expressed as formulas in this logic, then decided using a decision procedure for mu-calculus satisfiability. We take advantage of the expressive power of a variant of the mu-calculus, called the alternation-free modal mu-calculus with converse. We have shown how this logic can be used for reasoning on XML trees, XPath queries and XML types, then reduce several other XML decision problems to satisfiability in the mu-calculus such as coverage and overlap. We have obtained an enhanced complexity of O(n log(n)) for the decision procedure of XML related problems. We propose a system that has been fully implemented [2] and tested on a wide range of decision problems.

5.1.3. An Efficient Tree Logic for Reasoning on XML Types and Paths

We have proposed a new logic and the corresponding satisfiability algorithm and we have shown its effectiveness in the context of XML static analysis. To this end, we have proven the decidability of a logic with converse for finite ordered trees whose time complexity is a simple exponential of the size of a formula. The logic is closed under boolean operations and has only the least fixpoint for finite recursion.

Our proof method is based on two auxiliary results. First, XML regular tree types and XPath expressions have a linear translation to cycle-free formulas. Second, the least and greatest fixpoints are equivalent for finite trees, hence the logic is closed under negation. With these proofs, we have implemented a practically effective system for solving the satisfiability of cycle-free formulas. The system has been experimented with the XML decision problems introduced above. The advantage of the approach is that the system is very effective as compared to earlier results and can be used for larger XML problems [1].

5.2. Content Adaptation

The multiplication of execution contexts for multimedia documents requires the adaptation of document specifications to the particularities of the contexts. We proposed a semantic approach to multimedia document adaptation which was temporally defined with regards to the Allen algebra of relations. A new work [8] extends this framework to the spatial dimension of SMIL documents. It allows to find a qualitative spatial representation that computes a set of adaptation solutions close to the initial document respecting the adaptation constraints. The quality of an adaptation can be regarded on two respects : expressiveness of adaptation solutions and computation speed. In this context, we characterize the adaptation quality of existing spatial representations. We have shown that these representations do not provide optimal quality. Thus, we have proposed a new spatial representation which is sufficiently expressive and additionnaly allows to adapt SMIL documents faster.

5.3. Multimedia Authoring

Techniques for editing structured multimedia documents constitute the backbone of the editors Amaya and LimSee3. Recent work carried out by the WAM team in this area was published in 2006. More precisely, the implementation work done in Amaya for supporting template-guided editing was published in [4].

The first version of the LimSee3 authoring model is being completed. It is a generic document model for the representation of multimedia documents. A dedicated syntax developed to represent templates for these documents was presented in [6]. This modeling activity is performed through the analysis of requirements from communities of practice for authoring multimedia documents, in the context of the Palette European Project [5].

An authoring system for interactive and spatialised audio is being built inside a graphical modelling framework. We define an XML format for JSR 234 (see section 3.4) which could be considered as a tiny XMF format playing the same role SVG Tiny is playing for SVG. This authoring system will enable to put artistic control in the hand of audio designers in the same way SVG Tiny allows to put artistic control in the hand of visual designers using an authoring system such as Adobe Illustrator, for instance.

5.4. Document Formats and Description

The XTiger language (see section 3.4) created in the team in 2006 is versatile enough to represent templates that can capture the overall structure of large documents as well as the fine details of a microformat [4]. It borrows from various types of languages found in the XML family, such as schema languages or transformation languages. It is different from these languages however, because its main goal is to drive the creation of new documents instead of validating or transforming existing documents. This brings original features to the language, in particular its ability to be emmbedded in the documents it describes, instead of constituting external resources.

The audio part of JSR-234, for which reference implementations exist, enhances the audio support on mobile devices by adding rendering features like 3D audio and virtual acoustics, but also by introducing a 3-level hierarchical model for mixing, muting and rendering parameters, thus allowing interesting special audio effects. At this point, it is interesting to observe that iXMF is a format with no API and that, at the opposite, JSR-234 is an API with no format. We have defined an XML format (iXMFT) for JSR-234 which could be considered as a Tiny iXMF format. An editor and its associated soundtrack manager are in construction using EMF databinding technology (see section 5.3).

The activities with INA through the PhD thesis of Marc Caillet on multimedia content description have provided two main results in 2006:

- The FDL language (FERIA Description Language) has been completely recast. The goal was 1) to obtain a meta-model that handles homogeneously instances and classes hierarchies and 2) to make it possible to specify a temporal order among temporal descriptors. Moreover, a whole document model has been specified and implemented to handle not only media assets but also document

collections. Different tools for managing FDL descriptors have also been implemented: a parser for the production of internal structures, a descriptor database for storing them, and a temporal request interpretor for accessing them.

- An application called JAM! (Jouons Avec le Misanthrope) is being experimented with FDL. Thanks to a cooperation with François Yvon from ENST, a corpus of six performances of this play is available for segmentation: several kinds of structural segmentations are performed on audio (phonems, words), text (acts, scenes, verses) and video (partial scene segmentation) with synchronisation between them. These sets of descriptors pave the way for the development of several navigation and publication applications. The objective is to demonstrate how FDL can provide generic behaviors that can be attached to descriptors classes and reused by other descriptors, thanks to their relations in the class hierarchy.

6. Contracts and Grants with Industry

6.1. Palette

Participants: Jan Mikáč, Vincent Quint, Cécile Roisin, Irène Vatton.

Palette (Pedagogically sustained Adaptive Learning through the Exploitation of Tacit and Explicit knowledge) is a European IST FP-6 Integrated Project. The project aims at developing an extensible set of innovative, interoperable and standard-based services that enhance the learning process in communities of practice. Services are validated through various pedagogical scenarios fostering the emergence of new learning practices that remove barriers for the exploitation of mental models, knowledge resources and competencies of individuals inside and outside communities.

The main contributions of WAM concern document models and authoring tools. More specifically, templating mechanisms are designed, developed and experimented in the context of communities of practice. These developments and experiments are based both on Amaya and LimSee3.

7. Other Grants and Activities

7.1. National Actions

WAM participates in CNRS network RTP 33, Documents and content

WAM collaborates with INA on description languages for multimedia documents (M. Caillet's PhD.)

7.2. International Actions

WAM contributes to the Urakawa project with NRCD (National Rehabilitation Center for Persons with Disabilities, Japan), CWI (The Netherlands), and the DAISY Consortium (Digital Accessible Information SYstems). This software project aims at providing a multimedia authoring toolkit for designing content that is fully accessible to persons with disabilities.

The Amaya Web editor is developed jointly with W3C. The software is distributed by W3C.

8. Dissemination

8.1. Leadership within Scientific Community

Vincent Quint is co-chairing the W3C Technical Architecture Group (TAG) with Tim Berners-Lee. He is also a member of the W3C Advisory Committee. Nabil Layaïda is a member of the W3C Synchronized Multimedia working group and is the editor of several chapters of the SMIL standard.

Cécile Roisin is a member of AS95: Time in digital documents.

Jacques Lemordant is a member of IASIG (Interactive Audio Special Interest Group).

Agnès Guerraz is a member of the International Society for Haptics ISFH.

8.2. Conferences, Meetings and Tutorial Organization

Cécile Roisin is a member of the steering committee of the ACM Symposium on Document Engineering.

Vincent Quint is on the steering committee of the H2PTM conference series.

8.3. Teaching

Pierre Genevès, Nabil Layaïda and Vincent Quint give Master lectures on Documents and Multimedia Applications at UJF (University of Grenoble).

Nabil Layaïda and Vincent Quint teach on XML Technologies at ENSIMAG, Grenoble (3rd year).

Cécile Roisin teaches on XML Technologies at INSA, Department of Telecommunication (3rd year), Lyon.

Jacques Lemordant teaches on XML Technologies at the L3 level of MIAGE (UJF, Grenoble), on Multimedia Technologies at the M1 level of RICM (Polytech, Grenoble) and Web Technology at the M2 level of IICAO (UJF, Grenoble).

Agnès Guerraz teaches XML query languages for XML databases (XPath and XQuery) at the fourth year of ESISAR/INPG Valence.

8.4. Conference and Workshop Committees, Invited Conferences

Cécile Roisin is a member of the editorial board of the journal Document numérique.

Members of the WAM project were on the following program committees or editorial boards: ACM Symposium on Document Engineering DocEng2006, Euro American Conference on Telematics and Information Systems (EATIS 2006), 21st Annual ACM Symposium on Applied Computing SAC 2006, Hypertextes-Hypermédia H2PTM, International Workshop on Semantically Aware Document Processing and Indexing SADPI, WebMedia 2006, SIAV 2006, Multimedia Systems Special Issue on User Centered Multimedia, Computer/Human Interaction CHI 2007, Presence.

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