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INCREASED CONTENT ACCESSIBILITY FOR WIKIS AND BLOGS

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Abstract

This paper aims to introduce a useful approach on the combined use of template based publishing tools (i.e. for blogs and wikis) and content personalization services. The approach considers that the original developers of web content have limited awareness on accessibility issues, and they are facilitated and guided by the editing interface. The publishing mechanism is responsible for storing web content in a flexible representation, where structured content is separated from the formatting information. Intermediate brokering services (i.e aggregators, mediators or simply the portal software) produce multiple versions of the same content in order to increase content accessibility. Finally, end-users are able to set their preferences on how the content will be presented and get a homogeneous representation of the community content. The different versions may comprise multiple languages, audio and text representations etc and be based on a single version of the original content. The structured nature of content produced by template based tools allows intermediate services to intervene and reproduce the original content in various formats and client tools to filter and present information according to user needs and capabilities. The paper presents the focal points of the suggested approach, details on the underlying architecture and presents the required supporting infrastructure.

Keywords: *Accessibility, Web 2.0, Architecture*

1   INTRODUCTION

In traditional web sites the content is developed or moderated by a group of editors, and thus it is easier for them to define guidelines and control the format and accessibility of the final result. Web 2.0 tools promote the idea of template based publishing, which allows the quick creation of structured and semantically enhanced content. However, user generated content is likely to offer poor accessibility even if the content is template driven.

Blogs and wikis promote user generated content and make it difficult for website administrators to control the accessibility of content. In some cases, the result can be acceptable in terms of accessibility or simply chaotic in others. A quick browsing of blogs in Blogger or WordPress reveals blogs which are written in a dozen of different languages, which assemble videos, images and audio clips in various formats, which contain text in a multitude of sizes, colours and backgrounds. The blogs rarely offer alternative representations of their contents (i.e. descriptions for images or videos, multilingual versions of content etc). On the other side a quick look on Wikipedia, reveals pages that: share more or less the same structure (definition, basic concepts, details, references, and external links), the same font and formatting and are written in one main language with translation to many other languages. Images are

used only as a complement to the text and have always text alternatives. Additional media types are supported by the Wikimedia project. Most wikis' follow the above design principles thus making the format of the wiki content predictable and easy to access with traditional accessibility solutions.

In contrast to other Rich Internet Applications (Stringer et al 2007) (i.e. AJAX, XForms and IFrames), blogs and wikis avoid the use of dynamic technologies and scripting within the content and instead they focus on the simplicity of content input and output. However, they have gained popularity among web users and thus deserve to offer increased accessibility. Grace to the structured nature of blogs and wikis' content, third party applications have been developed that aggregate and process clear contents (i.e. RSS feeds) and make them available to web users.

Content is our primary interest and in this direction the paper presents an architecture that exploits content structure and additional semantic information, processes, reformats and enriches content to increase accessibility and makes it available to end users. End users' applications are able to further adapt content into users' specific needs.

According to the proposed architecture, a content aggregator site re-publishes the contents of several distinct blogs or wikis and its registered users are able to access the content, which is formatted according to their preferences. The aggregator collects, processes and reformats contents based on the preferences of each individual user. The gains from the suggested approach are many. First, the blog and wiki owners need not follow any accessibility guidelines, since their content is automatically collected by the aggregator and reformatted accordingly. Second, the users of the aggregator need not be aware of accessibility tools and solutions; they should rather set their preferences or simply declare their disabilities thus letting the aggregator software decide on the final format. Finally, the aggregator owners are able to improve accessibility for each group of users by adding formatting solutions that cover the different disabilities.

In the sections that follow, we give an overview of content accessibility guidelines (section 2), identify the changes and the critical points in the new social web applications (section 3), discuss several improvements on the accessibility of content that can be applied on server and client side (section 4) and present our conclusions from this work.

2 RELATED WORK

Since the advent of web and its technologies, several guidelines have been published by W3C and other associations, such as the Web Content Accessibility Guidelines (WCAG 2.0, 2009) by the Web Accessibility Initiative (WAI), the Common Look and Feel Standards (CLF, 2007) by the Treasury Board of Canada Secretariat or the Publicly Available Specification (PAS 78, 2006) by the British Standards Institution. All existing guidelines agree in rough terms that web content must be: ***perceivable, operable, understandable*** *and* ***robust***.

Based on these guidelines, several tools have been implemented for the evaluation of web sites in terms of content accessibility. The two richest lists are provided by WAI and WebAIM and comprise tools, which evaluate web content in terms of code validity, produce error reports and provide useful hints on improving web site accessibility.

Improving the accessibility of content has been the aim of web developers for several years. According to (Hanson 2001), users can be young or elder; their disabilities can be full or partial and may refer to vision, dexterity, cognition and hearing problems. The suggested solutions comprise user devices, user software and web authors' awareness on design guidelines. However, accessibility remains a problem nowadays, since individual users are not always aware of technological solutions (either hardware or

software) and web authors find it time-consuming to provide alternate forms of their content for people with disabilities.

When it comes to blogs, wikis and other social media applications, content is created by users with limited or no expertise in web publishing. As a consequence, content accessibility guidelines and associated tools, must be adapted to cover accessibility issues on user provided content and on web authoring applications. The Authoring Tool Accessibility Guidelines (Treviranus et al, 2000) and User Agent Accessibility Guidelines (Jacobs et al, 2002) aim to assist developers to create authoring tools that will be accessible to authors regardless of disability, that will produce accessible content by default, and that will support and encourage the author in creating accessible content.

In (Sloan et al, 2006) the authors suggest that we can maximize the benefit from accessibility guidelines through a holistic approach. The authors support that the guidelines are theoretic in nature, complex and ambiguous and suggest that universal accessibility should be replaced by user-sensitive inclusive design. According to this, each web site should be designed in accordance to its 'context of use'. The term 'context of use' comprises characteristics (abilities or disabilities) of target users and domain, technological and performance requirements and is on the responsibility of web designers to define.

In our work, we suggest moving the responsibility of defining the 'context of use' from web designers (blog or wiki authors in our case) to the designers of specialized content aggregators. The same designers should provide users the ability to declare disabilities and define preferences in content delivery and should also inform users on this customization capability. The increasing number of solutions such as text-transcoders, text-to-speech features and alternative style sheets allow web content aggregators to provide on-the-fly alternative formats of the same content. The only task for web users is to define their browsing preferences, which can be done once for each user, for all sites in the aggregator, as explained in section 4.

The new social media scenery requires changes in the authoring tools but also in the way technologies and standards are employed. In the following section, we give an overview of the content lifecycle in social media applications and highlight the intermediate processes that can be modified to improve content accessibility.

3   TYPICAL CONTENT LIFECYCLE

The collaborative nature of Web 2.0 resulted in portal like solutions with many registered users, a lot of contributors and various facilitation services (i.e. translation etc) (Coetzee et al 2007)**Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.**. Such portals encourage users to contribute their content using simple interfaces and format it according to their preferences. Often, portals act as information brokers; they aggregate content from various sources, and push new content or notifications for changes to their users.

The lifecycle of blog and wiki information which comprises four main steps, is depicted in Figure 53. Accessibility guidelines can be applied to any of these steps, however it is important to keep it as simple as possible for the users (Sayago and Blat 2007)**Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.**.
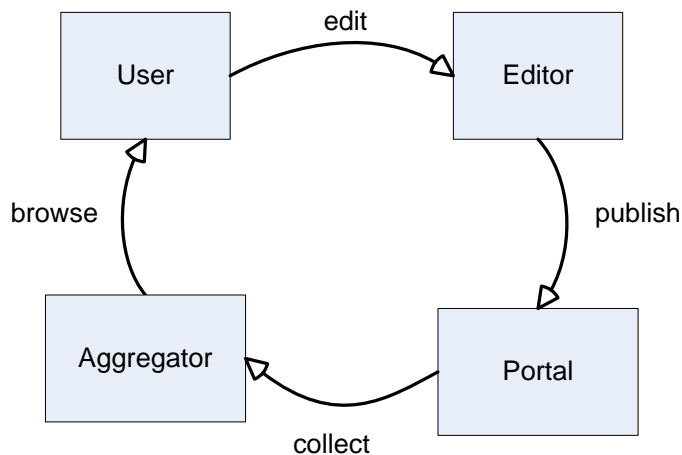
Figure 53. Information lifecycle for user created content

3.1 Editing guidelines

When content is developed or moderated by a group of editors, it is easier to define guidelines and control the format and accessibility of the final result. However, in blogs and wikis, any user can become an editor and user generated content is likely to offer poor accessibility even if the content is template driven.

One solution is to use solid templates and strict guidelines (W3C, 2009), which consequently discourage users' contribution. Another solution is to use open source, editable templates and thus result in a multitude of presentation formats which confuse web surfers and information seekers and brokers.

Wikis usually follow the first solution and although the result is fairly accessible, most editors are reluctant in contributing. The problem is usually harder in the case bloggers, who perceive their blogs as extension of themselves. In an effort to differentiate the look and feel of their blogs they usually ignore accessibility guidelines. The result is appealing to themselves or their friends but eventually leads to decreased usefulness for the majority of web surfers.

A random walk in large blogging services (i.e. WordPress or Blogger) reveals blogs that are almost unreadable even to users without any disability (Cohen and Krishnamurthy, 2006). Although the tools offer an extended list of accessibility guidelines (WordPress, 2009), bloggers prefer to ignore them and publish based on their own preferences. Color and font selection, invalid backgrounds, the use of authors' native language are some of the issues that hinder accessibility of blogs. When blog aggregators are used to reproduce blog contents, the result is homogeneously presented but usually audio, video and image content is lost in favor of text. Moreover, the aggregated babel contains blog posts in different languages that confuse end users.

3.2 Flexible publishing mechanism

Accessibility features can be added to the publishing mechanism as suggested in (Rainville-Pitt and D'Amour 2007). A flexible CMS allows users to easily contribute content and format it according to their preferences. In the same time, the CMS serve the same content in alternative formats (i.e. using TTS services and audio streaming or simply as RSS feed).

3.3   Content aggregators

Usually, aggregators use wrapping services on top of different content sources in order to separate content (mainly textual) from the formatting instructions. With the use of XML and RSS technologies, content aggregation for blogs and wikis become easier. However, audiovisual information is usually neglected during aggregation, and original formatting information is lost.

3.4   End user accessibility solutions

At the end of the day, blog and wiki content is accessed by the users themselves. They are able to access content using one of the following: general purpose accessibility tools on top of standard web browsers, specifically designed browsers, adapted open source browsers or browser extensions and pluggins (Obrenović and van Ossenbruggen, 2007). For example, Greasemonkey, an extension for Mozilla/Firefox, allows users to format web content appearance by assigning DHTML processing scripts to their browser. Translation services are offered through browser extensions, such as Google toolbar.

The aforementioned solutions can be applied in any web site but is up to the user's awareness to setup the tools and exploit their services. It would be preferable for the blog and wiki authors, to be able to publish their ideas without being experts in computer applications and accessibility and in the same time for other users to be able to access (hear or read) their favorite information sources by simply stating their language preferences, their color and font setup, their visual or hearing difficulties.

The following section presents an architecture, which is based on the information lifecycle presented in Figure 1, results from the analysis performed above and requires minimum user awareness on technologies and solutions.

4   INCREASED ACCESSIBILITY WITH LIMITED USER AWARENESS

The information cycle depicted in Figure 53, cannot be changed in the case of blogs and wikis. However, with the selection of appropriate tools and services in some of the steps of this cycle, we are able to facilitate editing and browsing tasks for inexperienced users. The components of the lifecycle remain the same. However, their role and interactions are modified (see Figure 54).
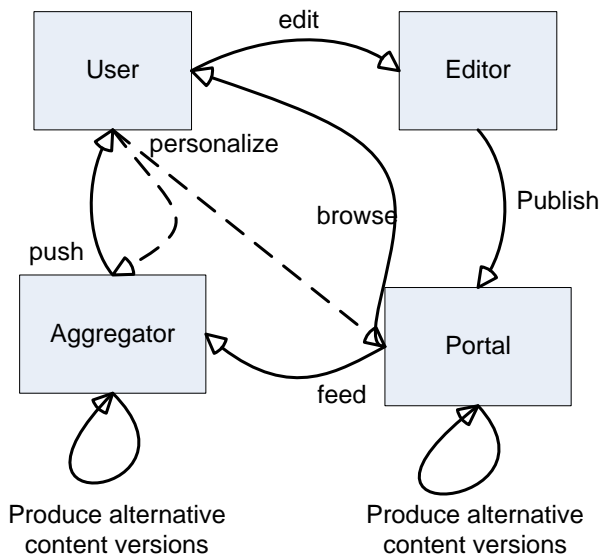
Figure 54. The suggested information lifecycle

Our aim is to allow editors to select from a range of different presentation options for their content and in the same time to provide alternative presentation options to the end user. In this way editors will be able to differentiate their contributions and web surfers will be able to choose the representation that fits their needs.

4.1   Simple editing, flexible output

The first step towards increasing accessibility of blog and wiki content is to increase the flexibility of the user created content. This can be achieved by a minimum additional effort from the content editors. A template driven editing model will facilitate editors in providing content but will also ask for metadata (concerning language, format, sampling, dimensions, alternative representations etc) that will be used in the presentation step.

A controlled set of parameterised widgets, or an equivalent set of html forms will guide editors to the desirable result and will collect useful information regarding the language, the audiovisual content format and the presentation choices. This is currently the case with most blog or wiki editing mechanisms that separate textual from audiovisual content and content structure from formatting instructions. They employee XML or related technologies and split user content into: a) text and semantics, b) audiovisual content and c) formatting instructions and store it in a modular format in the portal server (see Figure 55).
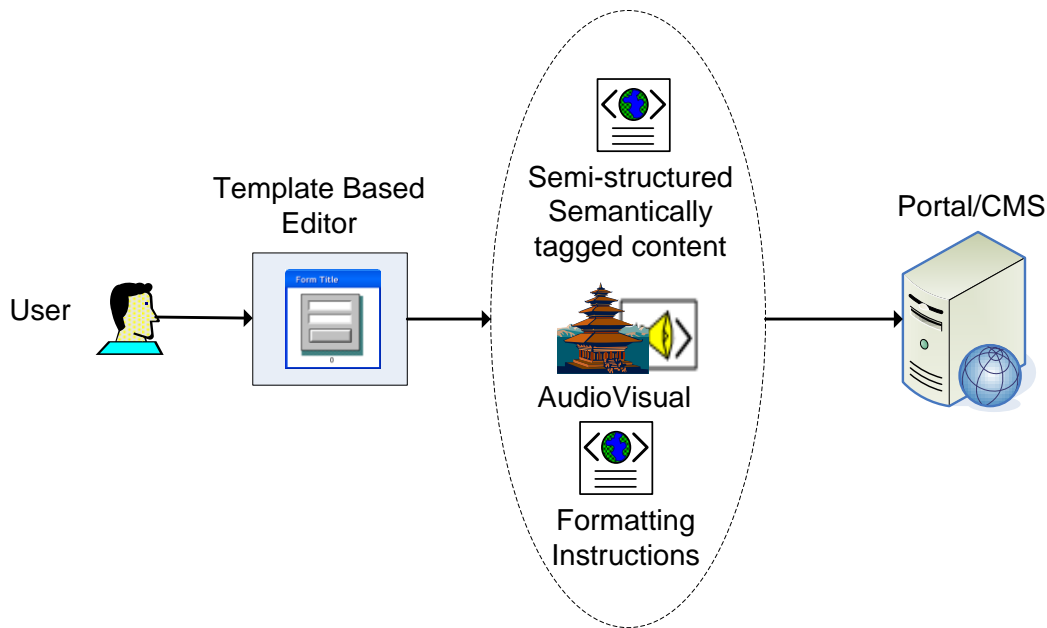
Figure 55. Template and form driven editing

The formatting preferences of the editor can be stored in XSL files and can be applied selectively to all or some of her posts. Semantic information can be attached at any point to allow end users or intermediate services to reformat the result according to their needs.

4.2   Reformat and publish on demand

In the second step, the information lifecycle in Figure 2, follows two alternative paths. When the end user accesses a blog as a registered member of the blog portal, she has the option to set her presentation preferences (Richards and Hanson 2004). These preferences take the form of an XSL file which is attached to any blog she visits. As a result the final output for the same original content is affected by the presentation parameters which can be set by both the editor and the end user. When no parameters are set for the end-user (for example in the case of a visitor) the editor's layout is used.

Although the use of XML and XSL increases flexibility and alters output on demand (Encelle and Baptiste-Jessel, 2007)**Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.**, there are still issues to be solved. Textual or visual content can not be accessed by everybody and the same holds for audio. The multilingualism is another big issue that demands content processing.
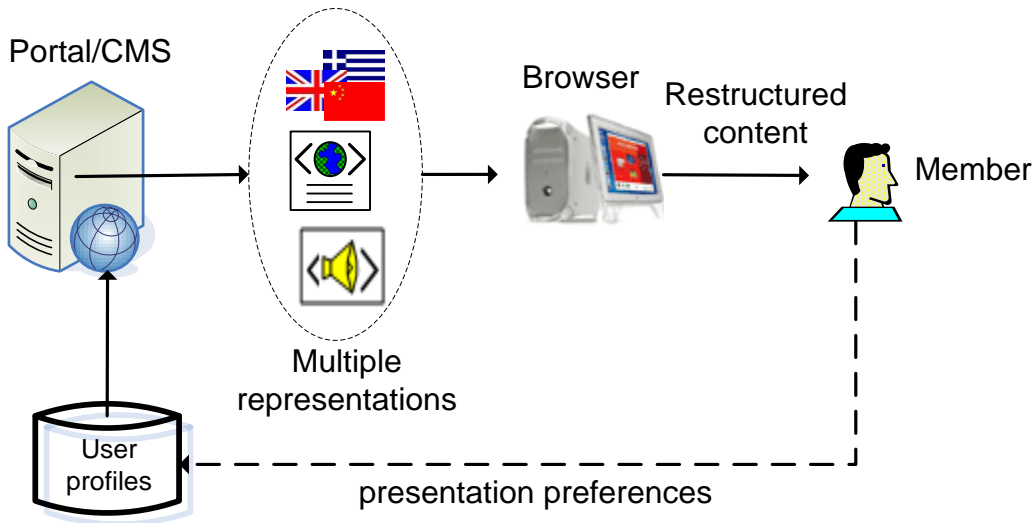
Figure 56. Content reformation and production

When member preferences are available, the CMS will know in advance the necessary output format for the content, so it can reformat and enrich content, using translation, text to speech or speech to text services. All other presentation parameters (font size, color, etc) are handled by the XSL (Figure 56).
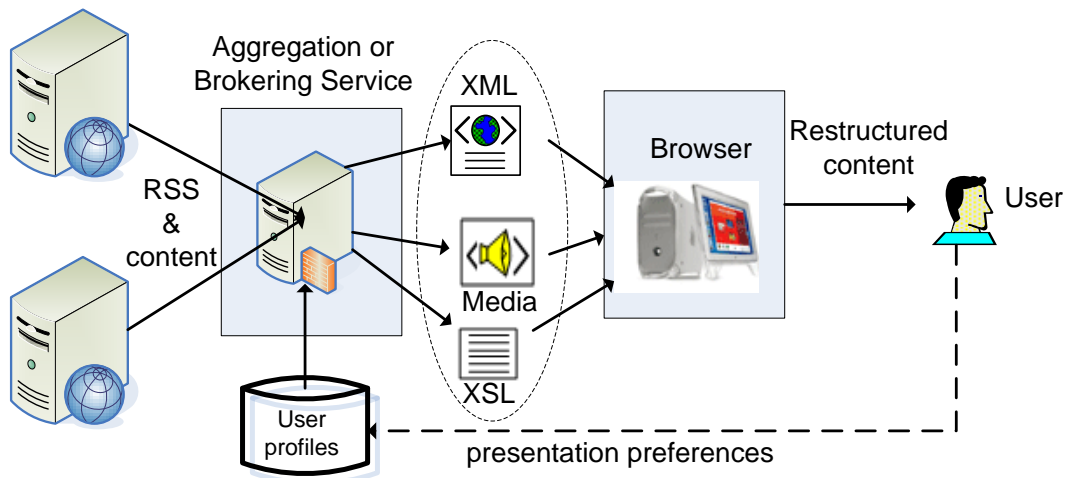
4.3 Personalized and flexible mediators

Figure 57. Personalized mediation

Even when a powerful CMS is missing, intermediate brokering services have the ability to process the structured content, produce alternative representations and serve it to their registered users. Once again, personalization is an option, when the presentation preferences of registered users are stored in the brokering service database (Figure 57).

The architecture can be extended at this point and offer content delivery in multiple channels apart from the web. For example, audio content that is automatically generated from the textual content of a

blog, can be delivered through a telephone service, or news feeds translated into many languages can be forwarded to mobile readers thus extending the pervasiveness of information.

4.4 Simple browsing applications

The use of widgets (Miyashita et al 2007)**Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.** or browser extensions and toolbars (Web Accessibility Toolbar, 2009)**Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.** for supporting screen readers or other devices can increase blog accessibility but requires user expertise for the initial setup. Widgets can be perceived as set of presentation guidelines to the browser but must be downloaded, installed and configured by the user.

In the proposed architecture, the end-user can be totally unaware of accessibility extensions, of supportive services and tools.

In the simplest scenario, the end user registers with his favourite wiki portal or blog aggregator and selects among a set of predefined presentation layouts. She clicks on the language of preference and on whether she has hearing or reading difficulties. Her profile is stored and the user is ready to start browsing. In an advanced scenario, the expert user is able to modify the details of her profile, to setup her colour and font schemes and choose among several presentation widgets. The two alternatives are expected to cover the needs of all end-users, either novices or experts.

5 CONCLUSIONS

This paper suggested a flexible architecture for the production, management and delivery of user-created content such as those in blogs and wikis. The content creation process is template-driven and leads to structured and semantically enhanced content. The content management process incorporates reformation services that produce alternative representations of the original content and enrich browsing capabilities. Finally, the delivery process collects presentation preferences form end-users and restructure content to meet their accessibility requirements. End-users receive and browse their personalized output without needing any browser extensions or add-ons. The suggested approach can be easily implemented using existing technologies and services, which are already employed by expert end-users. Its main advantage will be that only content providers and brokers should be experts in accessibility issues, whilst novice users are able to easily publish or browse information. Our next step is to develop a blog aggregation service that will adopt the proposed architecture and demonstrate the validity of our claims. The service will read the RSS feeds of existing blogs and will reformat it according to the preferences of each user. It will also allow register users to create new content and make it available through the service.

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