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Guidance for the development of accessibility evaluation tools following the Unified Software Development Process

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Abstract

Automated and semi-automated accessibility evaluation tools are key to streamline the process of accessibility assessment, and ultimately ensure that software products, contents, and services meet accessibility requirements. Different evaluation tools may better fit different needs and concerns, accounting for a variety of corporate and external policies, content types, invocation methods, deployment contexts, exploitation models, intended audiences and goals; and the specific overall process where they are introduced. This has led to the proliferation of many evaluation tools tailored to specific contexts. However, tool creators, who may be not familiar with the realm of accessibility and may be part of a larger project, lack any systematic guidance when facing the implementation of accessibility evaluation functionalities. Herein we present a systematic approach to the development of accessibility evaluation tools, leveraging the different artifacts and activities of a standardized development process model (the Unified Software Development Process), and providing templates of these artifacts tailored to accessibility evaluation tools. The work presented specially considers the work in progress in this area by the W3C/WAI Evaluation and Report Working Group (ERT WG).

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Keywords: accessibility evaluation, automatic evaluation tools, Unified Software Development Process, Evaluation and Report Language, business process model, domain model, use case model, analysis model, deployment

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1. Introduction

Imagine you are a technology consultant who has just been commissioned by a large web provider to develop a module for a web application platform, so that non-technology-savvy content and service creators can be assisted in determining whether their creations are equally accessible for people with diverse abilities. That is, you need to develop an automatic accessibility evaluation tool, which will be introduced in a specific workflow and will need to abide by some business constraints. Maybe you are already acquainted with software development, but this is the first time you deal with this kind of tool. Or you have used them before in other projects, but have never tackled the development of your own evaluation tool. Which functionalities are expected? What is exactly meant by "evaluating accessibility"? How are the evaluation results to be handled? What should you start with? Although a definite answer to these questions depends on the varied requirements of the specific evaluation tool to be developed, dozens of such tools already exist, which allow extracting useful guidance on how the process of developing an automatic accessibility evaluation tool can be undertaken.

Based on our experience with existent evaluation tools, we aim at providing some insight to non-accessibility-experts on how to develop accessibility evaluation tools, following a standardized software development process. The work herein presented has taken into special consideration the Guidance on the Development of Web Accessibility Evaluation Tools (working title), a draft document which is currently being composed by the W3C/WAI Evaluation and Report Working Group (ERT WG). (Further information on that document and its evolution may be found at http://www.w3.org/WAI/ACT/deliverables#eval_tools.)

The next section will introduce our vision of accessibility evaluation tools and the process model we will follow; the rest of the paper will provide specific guidance for the different models employed in the process, namely: business process model, domain model, use case model, analysis model and deployment model. We have deliberately omitted references to specific tools, as we want this guidance to be as broadly applicable as possible.

2. Context and goals

Strictly speaking, the accessibility of a product can only be stated regarding specific user needs, goals and contexts of use[2]. If a certain user can access it under those conditions, it will be accessible *for him or her*. It is unreasonable to test this in each possible context of use (real or emulated), so a set of practical criteria have been agreed, based on community experience, as a reference to determine whether a product is accessible or not. Even then, it is not viable to manually test each and every criterion. Thus, **accessibility evaluation software tools** have come to relieve the evaluator of that burden, by automatically analyzing a product and issuing judgments regarding its compliance with accessibility criteria. These tools greatly simplify the process, but cannot provide a definite replacement for human judgment. This is why they are sometimes called semi-automatic evaluation tools. For instance, a software tool may detect whether an image is served with an alternative text, but cannot decide if both convey an equivalent meaning, yet it can point the evaluators towards the image to get their expert assessment.

Same as any other software product, the development of an evaluation tool is usually structured as a project involving a set of activities, worker roles and artifacts. The organization of this project may respond to different process models, one of the most widespread being the **Unified Software Development Process (USDP)**. USDP[1] is characterized by being: driven by use cases, which are used as a tool to capture user requirements and intertwine the subsequent design, implementation and testing activities; centered on the architecture, which represents the internal form the product will take; and incremental and iterative, so that risks are mitigated early at a lower cost.

USDP can be considered a generic framework for software development, which is instantiated in each specific development project. In between, "project templates" can be created[3] which constrain, inherit and extend the process defined by USDP so as to account for specific software engineering concerns. This is the approach we will follow in this paper: show examples of USDP-defined artifacts particularized to the development of accessibility evaluation tools. The **artifact templates** we propose deal with the different disciplines dealt with by USDP: a business model and a domain model to kick off the requirement elicitation, a use-case model to represent the functional requirements, an analysis model to reflect an intermediate view of the architecture, and a deployment model to describe the physical bindings. These artifacts will still be abstract, in that they do not reflect the