Doctoral Colloquium: Integrating Web Content into Mashups on Desktop and Mobile Devices

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Abstract. Mashups, web application hybrids that combine content from different services, are exploiting pervasiveness of the Internet and offering great value for the end user. Constantly evolving web technologies and new web services open up unforeseen possibilities for mashup development. Combining dynamic scripts with binary software is an interesting option. However, developing mashups with current methods and tools for existing deployment environments is challenging. This work concentrates on these challenges and finds ways to solve and circumvent issues related to mashups. Another important topic is analyzing the impact of new web technologies on mashup development. This research presents the mashups as a new breed of web applications that are intended for parsing the web content into easily accessed form on both regular computers as well as on other platforms, e.g. on embedded devices.

Keywords: mashups, web applications, web technologies, mobile devices.

1 Introduction

The Web has become pervasive. It is accessible from everywhere, available for everybody and used for everything. This has led to a paradigm shift, where applications live on the Web as services. Moreover, different kinds of devices can be used to get access to these services, including – in addition to regular computers – many kinds of embedded devices, such as mobile phones, game consoles, and so forth. We believe that this is only the beginning of a new era, where the Web is a ubiquitous distribution channel for data, code and other content.

Applications built on top of the web do not have to live by the same constraints that conventional desktop software. The ability to dynamically combine content from numerous web sites and local resources, and the ability to instantly publish services worldwide has opened up entirely new possibilities for software development. In general, such systems are referred to as mashups, which are content aggregates that leverage the power of the Web to support instant, worldwide sharing of content.

Traditional mashups are executed inside a web browser but other systems can be used as a runtime environment as well. A mashup can combine the content in new,
unforeseen way, thus creating entirely new web service, or a mashup can provide new visualization for existing service. Typically mashups are divided into two categories, client-side and server-side mashups, based on where downloading, processing and generating of the web content takes place.

However, there are numerous stumbling stones on the road of mashup developer. For instance, lack of well-defined interfaces and inadequate security model of browser-based applications makes mashup composing problematic. In addition, our experience has shown that mobile mashups struggle with usability, connectivity and performance problems.

Web browser is not the only execution environment for mashups. Especially when the target device is not regular computer, it might be practical to use custom runtime environments. Many mobile phone manufacturers have their own web application frameworks: Nokia’s WRT Widgets and Apple’s Web Apps, for instance. Furthermore, it is possible to create mashups by combining dynamic code and native binary libraries. This kind of hybrid approach has the flexibility of dynamic code and the performance of binary applications. However, it is still important to make research about what is the best way to divide functionality between static and dynamic parts of the application, and about how technical issues related to combinations of scripts and binaries can be solved.

New web technologies are offering great building blocks for composing web applications. For example, WebGL [4] is enabling 3D graphics API to be used inside a web browser without plugins, and HTML5 [5] is bringing support for embedded audio and video, cross-document messaging, offline storage database and local SQL database, among others. These are remarkable improvements that will gear the web browser into more and more powerful platform for complex applications. From mashup development point of view these tools can enable compositions that are yet completely unforeseen.

This paper is structured as follows. Section 2 provides an overview of related work in the area of the PhD work. Then, in section 3, we present the research objectives and specific problems addressed and describe the methodology used to pursue the objectives. In section 4, we describe the research already carried out and the contributions made in the field of pervasive computing. Finally, in section 5, we summarize this paper.

2 Related Work

Numerous mashup applications have already been developed and deployed. Handful of tools, intended for mashup composition, has been introduced. Current mashup research has been focusing on mashup applications and browser-based frameworks. Some work has already been done on the field of mashup security. On the following we will briefly describe the related work.

2.1 Mashup Application Examples

A simple example of a communication mashup is Nokia N900 device’s instant messaging application. It can be used to make connections to several communication