Security Aspects in Web 2.0 Mashup Systems

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Abstract: Since the idea of Web 2.0 has been implemented, Mashup-Systems have become more and more common. In this work we want to take a look at some Mashup-Systems, furthermore we will analyse some services that can be mashed up. When combining different types of content/services to new services, this will also create new security issues. There are several questions like: who made the information to be combined available? Is the information edited for commercial reasons? or will the combined content be any kind of sensitive data? which is concern to exist in this compilation? Moreover we also want to investigate the consequences that those vulnerabilities possibly can have.

Keywords: Web 2.0, Mash up Systems, Security, Content combination, Vulnerabilities

1. Introduction

The recent and rapid expansion of Web 2.0 has placed considerable pressure upon industry to institutionalize new technologies and conform them to emerging standards. While agreement on the scope of the term Web 2.0 does vary, O'Reilly provides a commonly accepted definition, noting this to include a range of enhanced services including web services, wikis, blogging, BitTorrents, and syndication [11].

The rapid growth of Web 2.0 has also introduced a number of new design patterns and architectural styles in web development. One of the notable techniques involves the mashing up of information from existing services to deliver value-added new services. This process effectively includes the drawing of content from several sources in order to create a new content or service. The resulting web page is finally referred to as mashup of the existing content. While mashup services bring flexibility and speed in delivering new valuable services to consumers, the legal implications of this technology are significant [6].

1.1 What is Web 2.0?

Web 2.0 is both a usage and a technology paradigm. It is a collection of technologies, business strategies and social trends. It is way more dynamic and interactive then Web 1.0 [7].

The offered contents are nowadays not only provided by a few companies. Many users can create and spread their custom information for example with Wikis, Blogs, Image- and Video portals like Flickr and YouTube.

A Wiki for example, is multiauthored and dynamic instead of being monoauthored and static. Even applications have become dynamic in Web 2.0: Disparate components can combine from entirely new mashups, in contrast to the Web's static form-based applications [2].

Social networks, as for example MySpace, Facebook and studiVZ are very common Web 2.0 applications. These applications are highly appreciated by many people as a source of information and communication.

1.2 What are Mashup-Systems

The term “mashup” originates in the music branch, specially from mixing songs or samples from two or more songs, lyrics or background music to produce a new soundtrack.

In case of the world wide web, mashups are websites, web - pages, web - services or applications which combine data, information, music, geotracks from more than one source into one application, service or website. This is generally achieved by using third party application programming interfaces (API´s) or open technologies such as Ajax, PHP or syndicated feeds like RSS or ATOM. Based on service composition in Service Oriented Architecture (SOA) concepts, mashups are flexible and dynamic services. This technology also enables a dynamic way of service re - usability unlike static “cut & paste” re - usability.

Web 2.0 takes us to a deeply service-oriented world, where we can exploit everyday services such as news, instant messaging and blogging via our desktops, mobile phones, PDA, BlackBerry and so on. Most of the time people are not aware of the actions “behind the scenes” in terms of the massive network of service interactions. Such services occasionally seem as if they are re - writing the existing services. In fact they are smart compositions (mashups) of the existing ones. Known as “Web application hybrid” this smart way of combining the content from more than one source into an integrated experience is called “mashup” technology [5].

Drawing 1:

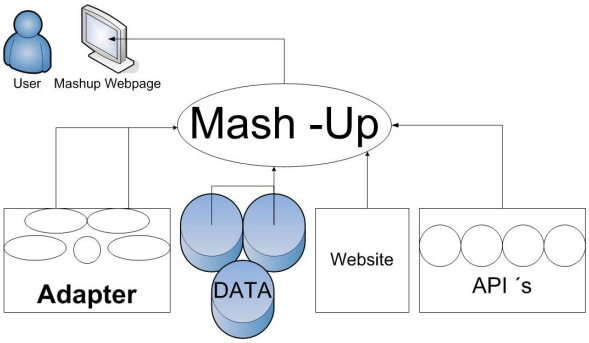
Convergence of SOA and Web 2.0

1.2 What are Web services

A Web service is a programmable software module that is equipped with standard interface descriptions, which can be universally accessed through standard network communication protocols.

This technology provides a comprehensive set of standards including languages, protocols and frameworks in order to allow software applications to be published as machine discoverable and understandable Web services on the Internet. Furthermore allow existing Web services to be easily mashed up with the goal to build new business services [1].

2. Mashup Systems



Drawing 2: Mashup System

The value of a mashup does not originate in the data or service itself, but in a better user interface, or in its ability to combine data from several sources in a more interesting and significant way. Three main types of mashups are commonly in use (see Eric van der Vlist and colleagues, Professional Web 2.0 Programming, Wrox, 2006) which provide the following features:

- An enhanced user interface. Compiling most of the data from one source only, this type of mashup provides a better interface – for example, a simplified way to navigate through information, a more responsive interface, or the presentation of highly relevant information only by displaying a subset of information that is of particular interest to the user in particular.

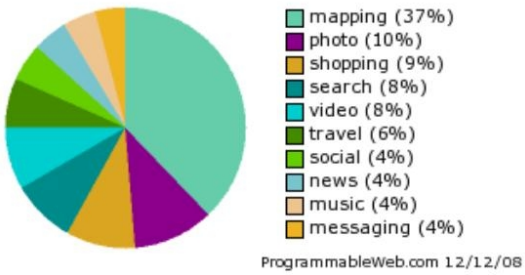
- Value - added information by aggregation, by bringing together information from various sources on the Web – both internal and external to an enterprise – into a dashboard - like view, this type of mashup adds value by aggregating the data, making the combined data more relevant.

- Value - added information augmented with an enhanced user interface. This type of mashup aggregates data from different sources and presents the data with a better user interface.

For information on the latest mashups and new Web 2.0 API´s, see Programmable Web. Developers and enterprises are beginning to use mashups to create new Web applications which provide value - added features, multiple services and rich user interfaces. Because it is easier and quicker to create a mashup than to code an application from scratch in a traditional way. This capability is one of the most important and valuable features in the Web 2.0.[7].

2.1 Mashup API

Mashups are created by using standard API´s. Simple and well documented API´s make mashup creation easier. An API is an interface which allows users to interact or respond to data, make service requests to other programs or Websites. Data exchange between different applications, allow the creation of mashups. For example, the Google Maps API lets developers integrate Google Maps into their Web sites using their own data points. Amazon's Website offers several API´s, making it easy for other business Websites to interact with it. For a directory of categories of API´s available for use, see Webmashup.



Drawing 3: Mashup Categories

2.2 Kind of services

Mashup Systems are an easy way to combine different services from the web. Actually every six months 1000 new Mashup Systems, based on Google Maps are registered. To implement a Mashup System are open API´s an admission. Without these API´s it would be to difficult to implement most of the popular Mashups [9].

There are two different kinds of mashup - systems: Serverside - Mashups and Clientside - Mashups. Serverside - Mashup Systems are combining the data and giving the mashed up information to the users. Clientside - Mashup Systems are combining data from different sources for example with java script directly on the client machine [3].

2.3 The most common Mashup Systems

Some of the most popular Mashup Systems are Housing Maps. It pulls sales and rental information from the classified advertisement Website "Craigslist" (http://www.craigslist.com) and displays the listings on interactive maps pulled from Google Maps. For instance, Fishing Solutions (http://www.fishingsolutions.com.au) uses Google Maps and information from anglers to help users find fishing places. "Roadwatch" (http://www.roadwatch.com.au) shows all the speed cameras in an area or on route to a destination.

- Wikis:
  A wiki is a simple powerful Web based system(It also can be combined with a content management system). In this systems many users are able to write an article or revise an existing article through a Web browser.
  Example(www.wikipedia.org)
- Blogs:
  A blog, short for Web log, is a powerful communication web tool. A blog is a Website where everyone can write his memories, thoughts, ideas, links, pictures or comments. Blog entries, also known as posts, are usually displayed in reverse chronological order. Example(www.blog.com)
- Other popular Mashup Systems:
  StudiVz (www.studivz.net), YouTube (www.youtube.com), Amazon (www.amazon.com), Flickr (www.flickr.com)

3. Risks

In Web 2.0 there are many risks if all users are able to publish their custom informations.

Just take a look at Wikipedia. It is well - known and every user is able to add and edit the content. There is no need to say, that it is impossible to guarantee that Wikipedia provides only valid informations. No one can proof the whole Wikipedia for correctness or can control that the users validate their informations.

Portals like YouTube allow the registered users to upload files like images, videos, archives, programs and many more. These uploaded contents can contain malicious code which could be propagated by people opening these contents.

The Samy worm hit MySpace last year. The author created a piece of JavaScript code that loaded into a browser whenever someone visited an infected MySpace page. Within a day, Samy spread to more than 1 million pages, with the resulting traffic volume forcing MySpace to shut down temporarily.

The Yamanner worm was spammed to Yahoo Mail users. When the attachment was opened, the worm sent a copy, outside the browser window, to everyone in their contact lists [8].

There are numerous ways to attack browsers or computers with Web 2.0 vulnerabilities. The most common attack strategies are, the both well known, cross-site-scripting (XSS) and cross-site-request-forgery (CSRF) [4].

3.1 Combining Services

As already mentioned, Mashup Systems combine several services. For Example, a mashup can combine Google maps and a GPS System. The provider of this mashup could track you, wherever you are using this system. If you are using it in the car he always knows where you are driving, even how fast you are driving. If this system is combined with a list of restaurants, shopping centres, patrol stations, and so on the provider can guess what you are doing the whole day long!

3.2 Combining Information

Everyone of us already provided some private information in the internet. Amazon knows the name, age, address, bank data, what products we are interested in and how much money we spend every month of his users.

Google knows which information we are looking for, is able to analyse our emails if we have a “gMail” Account. With “Google Docs” they can take a look at our work. You can create your personal Google Startpage.

StudiVZ has very personal information about the most users,they also store uploaded pictures, a list of friends, the interests of the users and informations about their study.

There are many services in the world wide web that save personal data. If just the three mentioned services like Amazon, Google and StudiVZ are combined to one single system, the provider would know rather everything about the users. He could offer very personal advertisement, influence your search results, offer personal information to companies, where you are applying to.

3.3 Examples

If a Mashup do more then only merge location - based information with other online sources, like combining data with search functions from another Mashup, then it is possible to create an application that amounts much more than the sum of its parts.

A simple Example for instance, www.chicagocrime.org combines Google Local's maps with Chicago's crime database, pinpointing the city's crime hotspots. At www.housingmaps.com, houses for sale advertised on craigslist.org are injected into Google Maps. So users are able to see the location of properties they are interested in. Now a hacker could feed the location mashup with false data to a crime location, for example to help raise property prices in a particular area by making it crime free.[10]

To demonstrate how easily mashup Systems can combine information in a way that invades people's privacy, computer consultant Tom Owad mashed book wishlists posted by Amazon users with Google Maps. The wishlists often contained the user's first and last name, as well as the city and state in which they lived. Enough information to find their full street address from a search site such as Yahoo People Search. These data are enough to get a satellite image of their home from Google Maps. Thats an easy way to get your full name, your adress and a photo of your neighbourhood [10].

4. Conclusion

Since the World Wide Web started with small steps from a military Project, to connect few locations with some computers, to it´s actual size, importance for companies and every other human who is connected to the web. It has changed from a static form to a more dynamic occur.

This change from a static way to post information and data on the web to the dynamic way like it is today, is called the migration from Web 1.0 to Web 2.0. With Web 2.0 starts a new era of the world wide web, many technologies like, syndicated RSS Feeds, AJAX, ATOM, PHP, API´s and the combination of these services called mashups are available for every user of the web.

But every change has his benefits and his disadvantages. Privacy is a particularly worrying issue because mashup sites have no clear rules on what they can and can't do with data, information or people's details.[10]

The central problem is the fact that the mashup developer does not own the data being mashed. On the other hand the owner neither knows nor cares that their data is being used. So "How do you know the data is real?" A simple example is Wikipedia, every user can edit an entry to correct it or to write his own sight. Another example is to manipulate data, a hacker can feed a mashup application with false data to change the result. Data and mashups can be combined to get a powerful tool which is able to locate your cellphone, to get a picture of your home, sustain information of your daily business or your bank connections. There are numerous ways to manipulate and combine data in order to sustain information about anyone.

Not every mashup is an “evil” one, there are some mashup systems like google-maps, google-earth, amazon and many more which can make our daily life easier. But the combination of some of these mashup systems can be a tool which allows anyone who knows how to handle it, to get information about you, to collect data and last but not least some tools are just one step further towards the transparent human.

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