Facebook Privacy Management Simplified

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***Abstract*— Online social media such as Facebook has started transforming our lives in the past few years. One of the main user concerns in social media is the privacy of personal information. Although social media provides options to manage privacy, those user settings are often complicated, vague, and not user friendly. In this paper, we propose an automated and simple way to manage Facebook privacy by changing the privacy to three predefined levels: basic, medium, and advanced. For platform independence and wide usability, we discuss the development of the proposed application in two different flavors: a PHP application and Firefox add-on.**

Keywords-Facebook; Online Social Media; Privacy; Usability

I. INTRODUCTION

With the growth of ubiquitous access to Internet, online social media [1] applications started reforming our lives. From sharing comments on food and restaurants to posting status and emotional feelings, we share our moments with others via social media. However, the more information we share, the less privacy we have. How to balance or control our privacy becomes a significant concern as the online social media gains popularity. On Facebook, 1.23 billion monthly active users [2] face the same issue because the privacy settings are complicated, vague, and not user friendly. Without proper settings in privacy, users not only expose their private information to strangers but also become vulnerable to cyber-attacks such as profile cloning attacks [3], SSN attacks [4], and phishing attacks.

Although these attacks can be avoided by carefully managing the privacy settings, most people tend to overlook it. In [5], for instance, Strater and Lipford show that most college students configure their privacy settings only once and disclose most of their privacy information. In Facebook, there are three issues that impedes the user intent of privacy management. First of all, privacy settings in Facebook are distributed in multiple locations. For example, instead of placing in *Privacy* section, "*Ads and Friend*," is located in the *ads* section, and "*Review tags*" is in the "*timeline and tagging*" section. Secondly, descriptions of settings are vague and lengthy. The "*third party sites*" setting, for instance, have 89 words to describe its meaning. As a result, many users skip the description. Finally, many users cannot distinguish what risks they are facing when exposing each privacy setting.

To enable users to better manage their privacy settings and avoid being a victim of cyber-attacks, we propose a simplified Facebook management concept and implement in two different approaches: a PHP application and a Firefox add-on. A proof-of-concept implementation of our developed PHP application is available at [6], and the application of Firefox add-on is available at [7].

II. SIMPLY SECURE FACEBOOK

A. Privacy Level Design

Boyd and Hargittai [8] observed that the majority of young adult users of Facebook are engaged in managing their privacy settings to some extent. Also, Acquisti and Gross investigated the user awareness of privacy in [9]. Although earlier works have found issues related to privacy settings, viable solutions have not been proposed. To address this, we propose to change the complicated privacy settings to a simple hierarchical setting. This setting does not need any security knowledge and can be done by only choosing one of the three privacy categories: *Basic*, *Medium* and *Advanced*, as shown in Figure 1.

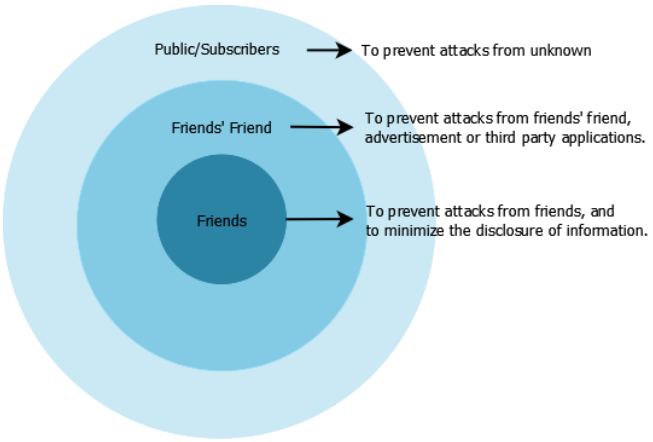

Figure 1. Design rationale of privacy levels

Inspired by the concepts from [10], the Basic level means "*to prevent privacy attacks from unknown*." That is, all users should at least apply this level to ensure the security from unknown attackers. For example, we uncheck the "Link by Search Engine" for all levels, since it allows attackers to randomly access users' timeline. Next, the definition we followed for Medium level is "*to prevent privacy attacks and using information from friends' friends, advertisement or third party applications*." For instance, we uncheck the setting called "*instant personalization*". With this change,

the partners of Facebook cannot get users' information without permissions.

The Advanced level means "*to prevent privacy attacks from friends and to minimize the disclosure of information*." In this level, we not only protect the user from privacy attacks from friends, but also limit any information leakage. However, with this level, the user may lose some interaction with friends. For instance, we set the "*post on your timeline*" to "*only me*," which means the users' friends cannot post a happy birthday greetings on their timelines. With three different levels, the user is able to choose their preference without understanding the complex and detailed interpretation of each setting.

B. Implementation of Simply Secure Facebook Application

For platform independence and wide usability, we discuss the development of the proposed application in two different flavors: a PHP application and Firefox add-on. In Facebook, users configure their privacy in the privacy setting section. In order to edit the settings from an application, we analyzed the existing interfaces, such as Facebook API, Facebook Query Language (FQL), and the OAuth dialog; however, none of these was suitable for modifying privacy settings. Finally, we decided to replicate HTTP POST requests to change the settings in the privacy section. In each HTTP request, numerous parameters are included. We observe that only some of those are necessary for POST requests during the replication, `__user`, `audience_json`, `id`, and `fb_dtsg`: `__user` is a unique id for each user; `audience_json` is the new value for specific setting; `id` is the identifier of the specific setting; and `fb_dtsg` is the access token for the user. Since `id` and `audience_json` are identical, our application only needs to collect `__user` and `fb_dtsg`. Our application also needs the session identifier created by Facebook.

As Figure 2 shows, our PHP application uses the user's Facebook credentials to obtain the session id. Next, the application extracts the user id and token by parsing the information on user's timeline.

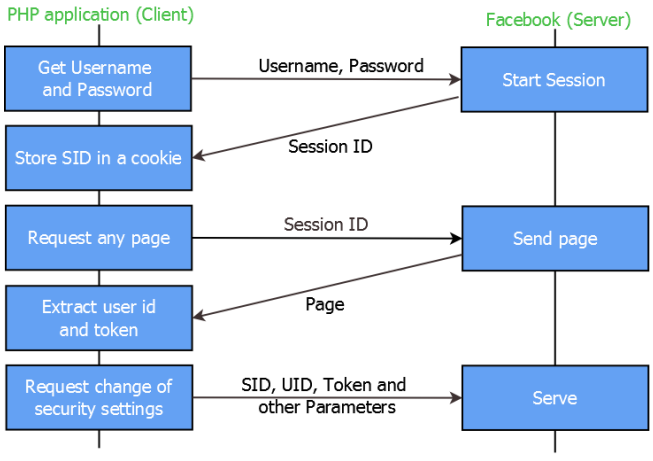

Figure 2. Behavior of PHP-based Simple Secure Facebook

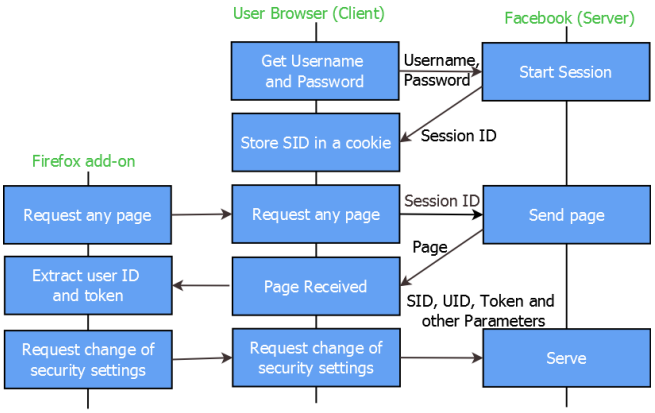

Figure 3. Behavior of Firefox add-on-based Simple Secure Facebook

With these parameters, our application can send series of POST requests when the user chooses a specific privacy level.

The Firefox add-on, an extension of browser, does not need the user's Facebook credentials. As Figure 3 shows, it collects the information from the user's browser. After the user login to Facebook on the Firefox browser, the add-on extracts session id from the cookies and collects user id and token from the timeline. With these parameters, our application can send series of POST requests when the user chooses a specific privacy level.

A proof-of-concept implementation of our developed PHP application is available at [6], and the application of Firefox add-on is available at [7].

REFERENCES

[1] A. M. Kaplan and M. Haenlein, "Users of the world, unite! The challenges and opportunities of Social Media," *Bus. Horiz.*, vol. 53, no. 1, pp. 59–68, Jan. 2010.

[2] D. Crawford, "Facebook reports fourth quarter and full year 2012 results," *Facebook, Inc*, 2013.

[3] L. Bilge, T. Strufe, D. Balzarotti, and E. Kirda, "All your contacts are belong to us: automated identity theft attacks on social networks," *Proc. 18th International Conference on World Wide Web*, 2009.

[4] A. Acquisti, R. Gross, and F. Stutzman, "Faces of facebook: Privacy in the age of augmented reality," *BlackHat USA*, 2011.

[5] K. Strater and H. Lipford, "Strategies and struggles with privacy in an online social networking community," *Proc. 22nd Br. HCI Gr Annual Conference on People and Computers: Culture, Creativity, Interaction*, 2008.

[6] "Simply Secure Facebook – PHP implementation." [Online]. Available: http://simplysecure-facebook.herokuapp.com/. [Accessed: 01-Feb-2015].

[7] "Simply Secure Facebook – Firefox Add-on." [Online]. Available: https://addons.mozilla.org/en-us/firefox/addon/simplysecure/. [Accessed: 01-Feb-2015].

[8] D. Boyd and E. Hargittai, "Facebook privacy settings: Who cares?," *First Monday*, vol. 15, no. 8. 27-Jul-2010.

[9] A. Acquisti and R. Gross, "Imagined communities: Awareness, information sharing, and privacy on the Facebook," *Priv. enhancing Technol.*, pp. 1–22, 2006.

[10] "Understanding how to set up privacy levels in Facebook." [Online]. Available: http://www.slideshare.net/HuggardCaine/setting-you-privacy-in-facebook. [Accessed: 25-Feb-2014]