POSTER: Preliminary Analysis of Google+'s Privacy

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ABSTRACT

In this paper we provide a preliminary analysis of Google+ privacy. We identified that Google+ shares photo metadata with users who can access the photograph and discuss its potential impact on privacy. We also identified that Google+ encourages the provision of other names including maiden name, which may help criminals performing identity theft. We show that Facebook lists are a superset of Google+ circles, both functionally and logically, even though Google+ provides a better user interface. Finally we compare the use of encryption and depth of privacy control in Google+ versus in Facebook.

Categories and Subject Descriptors

K.4.1 [**Computer and Society**]: Public Policy Issues - *Privacy*; K.6.5 [**Management of Computing and Information Systems**]: Security and Privacy

General Terms

Security

Keywords

Google+, Social Network, Privacy, Facebook

1. INTRODUCTION

Google launched its latest social networking site Google+ on June 28th, 2011. According to comScore, an Internet traffic watcher, Google+ registered 25 million users in its first 5 weeks [16], which motivates a close scrutiny. Current leader of social networking market and the key rival of Google+, Facebook, has over 750 million registered users [14]. Facebook users share more than 30 billion pieces of content (photos, videos, web links, notes, blog posts etc.) every month.

Google+ like other social networks is used for sharing private information including status updates, occupation, employment history, home and work addresses, contact numbers, relationship status, photos, videos, etc. As Google+'s market penetration grows, so will the amount of data shared by its users. With the enormous amount of data produced on social networks, privacy is one of the issues widely discussed both in media and academia [3]. Considering the

importance of protection of the private information of its users Google+ has introduced circles as a new concept to address the issue.

Use of social networks has resulted in disclosure of embarrassing information, loss of employment, suspension from school, and blackmail [4]. Social networks are also used for social phishing attacks. Phishers harvest email addresses to find the real names and social network profiles of their victims [17]. This harvest is possible because both Google+ and Facebook require its users to use their real names and allow search based on email addresses. Once the real names and social network profiles are found, phishers extract more information including people in the circles (or friend list) of the victim, any comments, events attended etc. This information is then used to craft personalized phishing attacks, called social phishing [13]. Identity theft is costing US economy $15.6 billion a year [12]. Moreover, social network status updates facilitated robberies on several occasions, where the owner announced absence from their property for a certain duration [15]. Furthermore, the large amount of data is also of interest to advertisers and marketers. According to a survey by Social Media Examiner over 92% marketers use social networks as a tool [18].

In view of the above discussion, it is very important and timely to analyze Google+ and identify any privacy related issues. This is the main goal of this paper.

Our contributions:

- We provide a preliminary analysis of privacy in Google+. We identify that Google+ shares the metadata of photos uploaded which could lead to privacy violations, discussed in Section 2.1. Moreover, Google+ encourages its users to provide their past addresses and other names e.g. maiden name which could be used for identity theft. For further details see Section 2.2.
- We compare Google+ circles (it's main privacy selling point) to Facebook lists. We show that, although Google+ circles have a better graphical user interface, they are logically and functionally a subset of Facebook lists. Details are provided in Section 2.3.
- We also make other comparisons between Facebook and Google+ including the use of encryption and the ability to disable comments and message sharing. Further details are provided in Section 2.4

2. GOOGLE+ PRIVACY

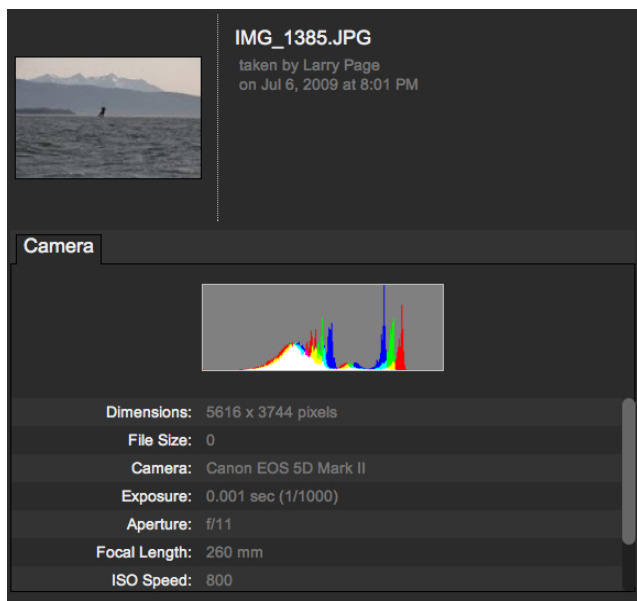In this section we present some privacy related problems

Figure 1: Metadata from a photo by Larry Page on Google+

and features of Google+. We also make a comparison with Facebook, when applicable.

2.1 Google+'s photo metadata

When a user uploads a photo on Google+, some metadata including the name of the photo owner, the date and time the photo was taken, the make and model of the camera etc. are made available to those with whom the photo is shared. This set of information, in particular the date and time, may at first look relatively innocent and trivial, but could in reality lead to some serious privacy concerns. On August 10, 2007, in Pennsylvania (USA), a divorce lawyer proved the spouse of the client being unfaithful to his partner, when the electronic toll records showed him in New Jersey (USA) on that night and not in a business meeting in Pennsylvania [9]. With the metadata revealed by Google+ a user might leak enough information to be legally held liable on similar accounts.

Similarly, the make of the camera could be another concern for privacy. Higher end cameras cost thousands of dollars. There have been past incidents where the victims were killed for their cameras. In May 2011, a Greek citizen, 44, was killed for his camera when taking his wife to the hospital for child birth [19].

Just to give an example of the level of information a picture exposes about the camera, look at the metadata of the publicly shared pictures (from his Google+ profile) of Google co-founder Larry Page, shown in Figure 1. It reveals that they he used a Canon EOS 5D Mark II camera to shoot his vacation photographs. This camera is worth approximately USD 2000. This gives the robber incentives.

2.2 Cities lived in and other names on profile

In the "About" section of personal information, Google+ encourages its user to provide the names of cities the user lived in and other names. In the text box for other names, they write *"For example: maiden name, alternative spelling"*.
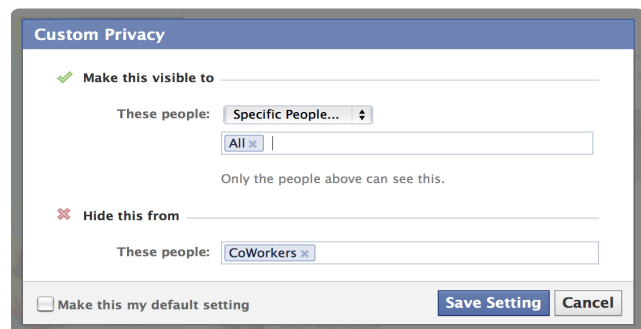

Figure 2: Google+ Circles

Figure 3: Share content with list"All" but hide from list "CoWorkers" on Facebook

Messages, photos and comments on social networks and other online sources can be used to infer family relationships. So, if someone can link a profile to the profile of the mother and if the mother provides the maiden name, then this could be used for identity theft, as mother's maiden name is one of the most widely used secret question [5]. Moreover, the past addresses can only help the attacker with such attacks.

2.3 Google+ circles vs Facebook lists

Paul Adams, then a Google employee, introduced the concept of social circles [2]. These social circles act as the foundation of circles in Google+. In Google+, by default there are four circles: "friends", "family", "acquaintances" and "following". We can remove/ rename any of the default circles or add new circles. A user can add any of her contacts to one or more circles just by a simple drag and drop. Figure 2 shows the graphical interface of Google+ circles. The intersection of two or more circles can be a non-empty set.

A user can share the content of her choice with a specific set of her circles, all her circles, her extended circles(people in all her circles and all people in the circles of the people in her circles) and with the public (everyone). Google+ does not allow any exceptions, i.e. , if some content is shared with a larger circle, there is no way to exclude any subset of that circle. Anything shared with the public is shared with all circles including the family and friends circle, which might not be what the user may require.

Facebook on the other hand calls all the user's connections as "friends". Friends could be divided into groups called "lists". There is no default list, so any structure has to be created from scratch. Content on Facebook can be shared with one or more lists, exactly like Google+ circles. But, there is one difference that makes Facebook lists more robust than Google+ circles i.e. the possibility of making exceptions. In Facebook, we can limit access of our content to a list which is a subsets of a set of lists with whom the

content is shared. This means, we can share a message with a list called "All" (containing all our contacts) and still make the content invisibile to our "CoWorkers", as shown in Figure 3.

As Facebook's list creation was relatively cumbersome, recently a Facebook application called "Circle Hack" [1] has been launched which provides the Google+ circles graphical interface for Facebook lists. The possibility and use of this application further proves our claim that Facebook lists are logically and functionally a superset of Google+ circles.

2.4 Google+ vs Facebook: other comparisons

Facebook uses an encrypted channel only for user authentication (login) while Google+ uses it throughout the connection. This makes it harder to launch a man in the middle attack against Google+. Moreover, Google+ allows finer control of the content shared by a user. A user can disable comments on a post at any time and enable it again later. This could be a useful option to calm down any heated discussions, on the users wall, between two contacts over the shared content or anything else. Facebook, on the other hand, provides its users only with coarser control i.e. they can only block a user from the entire wall but not on an individual content basis (if it was initially shared with them). Furthermore, Google+ allows disabling the resharing of a content at any instant on a content by content basis, again its not possible in Facebook. Finally, Google+ allows its users to edit their comments whenever they want. The time stamp of the last editing remains visible on a comment, so users may modify or backtrack their comments at any time. This too is not possible in Facebook.

3. RELATED WORK

Bradshaw identified the first privacy flaw in Google+ [7]. The flaw was that any content shared with a particular circle could be reshared with anyone by someone from those circles. Although resharing of information is always possible in the electronic world, if someone downloads a copy and upload it again. But, the simplicity and provision of a share button without proper authorization is a privacy problem. This problem is now fixed by Google+.

Social networks privacy and its potential threats have been widely studied in recent years. One of the earliest works on potential threats to individual's privacy including stalking, embarrassment and identity theft was done by Gross *et al.* [11].

Felt [10] presented a vulnerability in Facebook Markup Language which lead to session hijacking. Bonneau and Dhingra independently presented conditional and limited unauthorized access to Facebook photos [6, 8].

4. CONCLUSION

To conclude, we provided a preliminary analysis of Google+ privacy. We expressed concern that Google+ shares the metadata of the photos uploaded by its users. We also showed that Google+ encourages its users to provide their other names, e.g. , maiden names which may help in identity theft. Moreover, we provided a comparison of Google+ circles with Facebook lists and showed that the latter is a superset of the former, both logically and functionally even though Google+ provides a better graphical interface. Finally, we provided other comparisons, including the use of

encryption and the possibility of modifying comments at a later stage, between Facebook and Google+.

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