

Data Security and Privacy in Mobile Technology: A case of Whatsapp Web

Article by Samuel Chris Quist

Department of Computing Regent University College of Science and Technology, Ghana

E-mail: samuel.quist@regent.edu.gh

Abstract

Mobile computing technology is on the ever ascending trajectory, making it the technology to use in any thriving industry. Mobile computing technology is thriving due to its portability as such it is very easy to carry around and can be operated anywhere. However, due to the size of most mobile devices that run mobile apps being very small, which also makes it more portable, it sometimes impedes its usage on very large data inputs volumes. Most people find it more comfortable using their personal computers or laptops to prepare and store their documents and other files. This article reviews the benefits of using WhatsApp web, the potential privacy or security vulnerability as compared with other screen mirroring or casting technologies such as Vysor, Mobizen, AirDroid, etc. It is recommended that WhatsApp web connects to the mobile device through a WiFi or USB as implemented in AirDroid instead of connecting directly to the WhatsApp server once the QR code has been scanned using the WhatsApp on the mobile. Secondly, WhatsApp must implement automatic logout of older WhatsApp web sessions instead of just disconnecting the older session once a new session is connected and reconnects the older session once the new one is disconnected since this increases the vulnerability of the end-user.

Keywords: *WhatsApp Web, Data Security, Privacy, Screen mirroring, Screen casting, Mobile Technology.*

Introduction

Mobile computing technology is on the ever ascending trajectory, making it the technology to use in any thriving industry. Mobile computing technology is thriving due to its portability as such it is very easy to carry around and can be operated anywhere. However, due to the size of most mobile devices that run mobile apps being very small, which also makes it more portable, it sometimes impedes its usage on very large data inputs volumes. Most people find it more comfortable using their personal computers or laptops to prepare and store their documents and other files. However, the easiest and fastest medium for transferring document currently is mainly through social media especially WhatsApp. WhatsApp started mainly as an app for sending text messages at a very low cost compared to the SMS (Short Message Service) by the telecommunications companies on GSM (Global System for Mobile) enabled phones (Unuth, 2017). Transferring document from most laptops to mobile phones has its challenges, as such, the introduction of WhatsApp web made it easier and more convenient in working on document and transferring to others. WhatsApp web is a technology that mirrors the WhatsApp interface on a Mobile phone and synchronizes the messages to your PC or Laptop. This allows you to send and receive WhatsApp messages from your PC or Laptop.

Some screen mirroring technologies

Screenbeam

Screen mirroring is just what it sounds like, that is; putting what's on the screen of one device onto another screen for easy access. Screen mirroring can be very simple to use, especially with Miracast-enabled devices. To make use of screen mirroring, some basic hardware and software are needed. ScreenBeam is an excellent option solution for screen-mirroring. Companies such as Microsoft, Intel, and

leading PC Original Equipment Manufacturers (OEM) and device manufacturers use ScreenBeam as their validation platform because of ScreenBeam's expertise in wireless screen mirroring (La, 2017).

Vysor

Vysor is a relatively new app to quickly mirror, cast or even control your Android device from the PC or Mac. Unlike the other apps, Vysor uses a Chrome app to cast your Android device to the computer. Some of the features of Vysor include but not limited to mirroring the Android screen to the computer, ability to take screenshots, ability to control your Android device with keyboard and mouse (Krishna, 2017). Vysor works by installing Vysor Chrome app on your computer and Vysor app on the android device to establish communication. Vysor casts or mirrors the android phone through a USB connector onto the computer.

Mobizen

Mobizen is one of the complete apps that does not only cast your Android device to a computer but also has the functionality to record the screen, control, take screenshots, and play media directly from your browser or a standalone software on your PC. This app is just like Vysor but better as it permits remotely controlling of the android device by connecting it via the USB cable, over a WiFi network and even over the mobile data (Krishna, 2017). Mobizen works by linking or mirroring the webpage to the Mobizen app via Wifi or Mobile data with a six digit One-Time Password (OTP) generated on the webpage and captured into the Mobizen app.

Screen stream mirroring free

Screen Stream Mirroring Free is the best app that mirrors or casts mobile phones running android screen to Computer over WiFi. Screen stream mirroring free works only if both the computer and Android device is on the same WiFi network. It does not support mobile data or USB (Krishna, 2017). It connects through IP address on the same subnet mask of a WiFi connectivity. This makes it one of the secured mirroring or casting technologies.

Airdroid

Airdroid is one of the best ways to cast your Android device to any computer. Airdroid app generates an IP address which is entered as a URL on the browser on your computer (Krishna, 2017). This connects the Android device to the computer and gives the computer full control of the phone.

How whatsapp web works

WhatsApp is a cross-platform instant messaging service for smart phones that relies on internet connectivity for the transmission of messages. Based on a low-cost subscription model, WhatsApp is a cheap alternative to carrier-billed text messaging via SMS or even e-mail for less official communications, especially for international or group messaging. The mobile messaging app enables users to share text, image, sound or voice and video messages.

For you to be able to connect your WhatsApp web to your phone you need to update your WhatsApp to the current version with the WhatsApp web connector. Open any of the compatible browsers (Google Chrome, Mozilla Firefox, Opera, Microsoft Edge and Safari (for MacOS 10.8+)) on your computer and connect to the URL: <https://web.whatsapp.com>. The WhatsApp web page would load and display a quick response code (QR Code) as shown in fig 1. On your phone, open WhatsApp go to *Menu* on Android phones or *Settings* on iPhones, as shown in fig. 2. On the menu drop down select WhatsApp web (fig 3.), to activate the QR Code reader (fig. 4) on the phone via the camera. Point the QR code reader to the QR code on the computer (fig. 1) for the WhatsApp on the phone to be connected to the WhatsApp web. Once the connection is established, the WhatsApp web on the computer mirrors the WhatsApp contacts on the phone (fig. 5) with the corresponding messages. Click on any one of the contacts to load in the main window to use the WhatsApp web on the computer for chatting.



Figure 1. Whatsapp web qr code

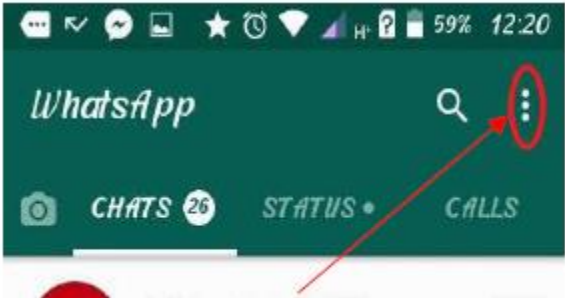


Figure 2. Menu / settings icon on whatsapp

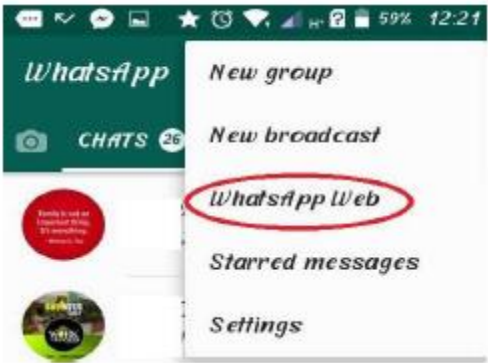


Figure 3. Whatsapp web on phone menu



Figure 4. Whatsapp web qr code scan



Figure 5. Whatsapp web on computer

WhatsApp has been really one of the few mobile apps that is truly multiplatform working on a wide variety of phones running varied operating systems including iPhone, Android, BlackBerry, Nokia, and Windows devices (Bailey, 2017). The number of WhatsApp users worldwide as of July 2017 stands at over 1.3 billion monthly active users an increase of over 3 million of the over 1 billion figure in February, 2016 (Statista, 2017).

Browsers supported

WhatsApp web started with only Google Chrome as the compactible browsers. Currently, WhatsApp web is supported by Google Chrome, Mozilla Firefox, Opera, Microsoft Edge and Safari for only MacOS 10.8+ (Kumar, 2017). However, it does not work on any browser on tablets or mobile phone device. WhatsApp must be installed and configured to an account on a mobile phone in order to use the WhatsApp web clients. The WhatsApp web application syncs directly with the WhatsApp mobile device as such the mobile device must be active or connected to the internet as well as the WhatsApp web for the communication to be established.

WhatsApp is very convenient to use while you're at your computer, and enable you to comfortably chat using your keyboard and wide screen of your monitor, there are some limitations. Several features available on WhatsApp mobile that are not available on the WhatsApp web on your PC or laptop. WhatsApp Web sessions can be initiated from multiple computers, but only one can be active at a time. The user is not granted the option to wrest control from another session. WhatsApp takes care of the security aspect by listing how many WhatsApp Web sessions are connected at any given time, and by letting the user log out of all in one click via the mobile app (Dua, 2015).

Privacy challenges of WhatsApp web

Due to its portability, reliability and timeliness as well as the current number of active users on WhatsApp, it has become one of the most reliable means by which files and documents are transferred. The messages sent via WhatsApp are end-to-end encrypted meaning that only the two communicating devices has the ability to decode them. This prevents messages being intercepted during transmission, but says nothing of their safety while on your device. On both iOS and Android it is possible to create a backup of your messages to either iCloud or Google Drive. The backups that WhatsApp create contain the decrypted messages on your device (Frew, 2017).

According to WhatsApp security by default information, (WhatsApp Inc, 2017), "WhatsApp's end-to-end encryption is available when you and the people you message use the latest versions of our app. Many messaging apps only encrypt messages between you and them, but WhatsApp's end-to-end encryption ensures only you and the person you're communicating with can read what is sent, and nobody in between, not even WhatsApp. This is because your messages are secured with a lock, and only the recipient and you have the special key needed to unlock and read them. For added protection, every

message you send has its own unique lock and key. All of this happens automatically: no need to turn on settings or set up special secret chats to secure your messages”. However, unlike other screen mirroring applications which connects the mobile device directly to the computer or other device, WhatsApp web connects directly to the WhatsApp database via the unique QR code scanned by the mobile device. That is the mobile device and the computer need not be on the same network or even the same location. They can be miles apart, all that is needed it to first scan the QR code with the phone and after that, the two devices are separately connected directly to the WhatsApp server (fig 6). However, the WhatsApp web works only when the WhatsApp on the Mobile device is actively connected.

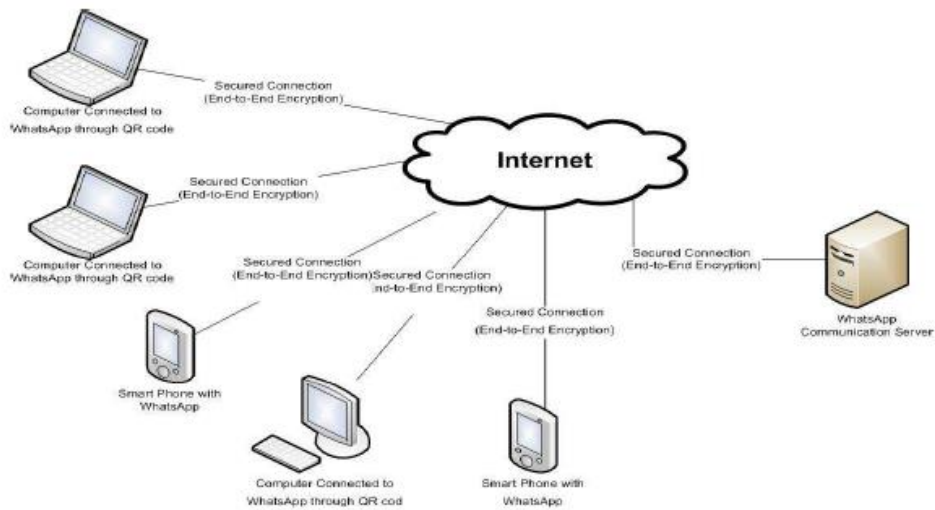


Figure 6. Simplified network architecture of whatsapp & whatsapp web connection

This architecture permits or creates room for an unauthorised person connecting your phone either with or without your knowledge to the WhatsApp web and once the phone is connected to the internet all the chats to that phone can be intercepted, viewed and downloaded. When a new session of the WhatsApp web is created by the same WhatsApp mobile app, WhatsApp logs out the older WhatsApp web and displays a pop up message “WhatsApp is opened on another computer or browser. Click “Use Here” to use WhatsApp in this window” (fig. 7). When the new computer or browser disconnects from the WhatsApp web connection, the older connection is re-established.

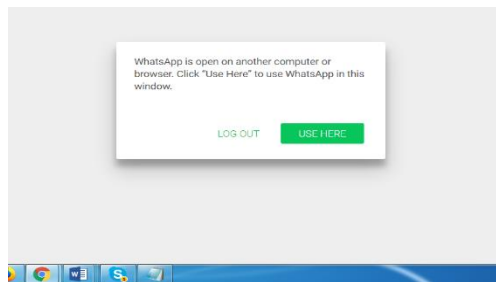


Figure 7. Whatsapp web session lost alert

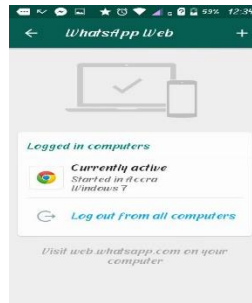


Figure 8. Whatsapp web on computer

Recommendation

WhatsApp web is an excellent application that increases accessibility and usability of one of the fastest growing social media application. However, it also increases the vulnerability of users to unauthorised access to personal communication. This article addressed some of the challenges of WhatsApp web. The recommendation has been sectioned into two. That is what individual users need to do, to prevent unauthorised persons to intentionally or unintentionally have access to their personal communications or document.

Recommendation to WhatsApp web developers

To make WhatsApp web more secured it is recommended that the developer should make it such that the QR code expires after some specified limited time or anytime the WhatsApp on the mobile device is closed. The QR code must then be rescanned to reconnect even to the same computer or browser. This even though would not completely solve the challenge of unauthorised person having access but would greatly reduce the possibility of reconnecting to the mobile device anytime it re-establishes connection.

Secondly, instead of having both the WhatsApp on the mobile device and the WhatsApp web on computer connecting to WhatsApp even from different networks, the architecture should be changed such that only the WhatsApp on the mobile device is connected to the WhatsApp server and the “WhatsApp web” connect to the mobile device via a USB or Wifi as show in the simplified architecture (fig 9). This would make the system more secured, since the mobile device must be in a close proximity for the connection to be established.

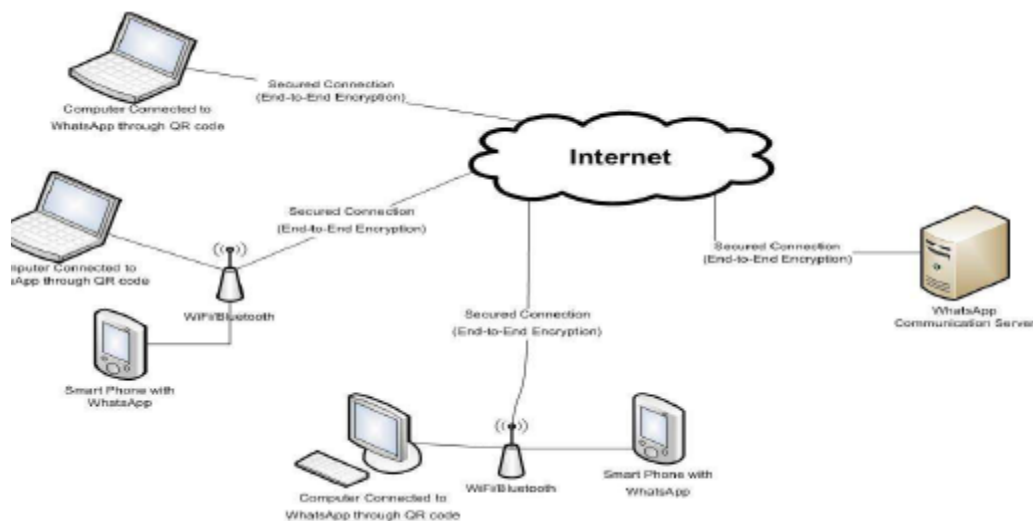


Figure 9. Proposed architecture for connecting whatsapp on mobile devices to whatsapp web

Recommendation for end users

No matter the security measures implemented by the developers of a system or an application, if the end users do not manage the security functionality provided by the system effectively, it increases the system's vulnerability. End users are essential part of privacy or security management. End users should always look out for ways that would make them less vulnerable. The current WhatsApp web, even though closes an existing session once a new session is connected, it does not have the functionality to automatically logout the old session. However, there is a functionality to know the last logged in browser as well as the time (fig. 8), even though it does not indicate any other information like the IP or Computer name of the connected browser or the location of the computer. This functionality also permits end users from logging out all connected browsers (WhatsApp web) or a particular connected browser from the mobile device. In this case to reconnect the WhatsApp web to the WhatsApp on the mobile device, the QR code must be scanned again to establish a connection.

References

- [1]. Bailey, C. M. (2017, September 9). How to Use WhatsApp on Your Laptop or Desktop Computer. Retrieved November 2, 2017, from Livewire: <https://www.lifewire.com>
- [2]. Dua, K. (2015, January 22). WhatsApp Web Feels Like a Hack But Works Surprisingly Well. Retrieved from Gadgets 360: <https://gadgets.ndtv.com/apps/reviews/whatsapp-web-feels-like-a-hack-but-works-surprisingly-well-652347>
- [3]. Frew, J. (2017, March 20). 4 Security Threats WhatsApp Users Needs to Know About. Retrieved July 15, 2017, from Make Use of: <http://www.makeuseof.com/tag/4-security-threats-whatsapp-users-need-know/>
- [4]. Han, S.-H., & Park, H.-Y. (2013). U. S. Patent No. 13/771,959.
- [5]. Kang, P.-S., Hahm, S.-i., & Hwang, T.-H. (2014, September 16). U. S. Patent No. 14/487,673.
- [6]. Kim, J.-H., & Ko, D.-Y. (2015). Implementation of Mirroring and Efficient User Interface System for Smart Phone. *The Journal of Korean Institute of Communications and Information Sciences*, 40(2), 363-365.
- [7]. Krishna, V. (2017, January 12). 8 Ways to Mirror Your Android Screen to Any Computer. Retrieved October 21, 2017, from TechWiser: <https://techwiser.com/cast-your-android-screen/>
- [8]. Kumar, P. (2017, August 16). PC-MobiTech. Retrieved September 15, 2017, from Run Whatsapp on PC With Google Chrome & other Browsers.: <https://www.pcmobitech.com>
- [9]. La, S. (2017, July 20). How Miracast Takes Screen Mirroring to the Next Level. Retrieved November 21, 2017, from ScreenBeam: <http://blog.screenbeam.com>
- [10]. McGill, M., Williamson, J., & Brewster, S. A. (2014, June). Mirror, mirror, on the wall: collaborative screen-mirroring for small groups. In *Proceedings of the ACM International Conference on Interactive Experiences for TV and Online Video* (pp. 87-94). ACM.
- [11]. McGill, M., Williamson, J., & Brewster, S. A. (2015). Who's the Fairest of Them All: Device Mirroring for the Connected Home. In *Proceedings of the ACM International Conference on Interactive Experiences for TV and Online Video* (pp. 83-92). ACM.
- [12]. O'Boyle, B. (2016, May 11). WhatsApp desktop app: What is it, how does it work and how do you use it? Retrieved November 10, 2017, from Pocket-lint: <http://www.pocket-lint.com/news/137580-whatsapp-desktop-app-what-is-it-how-does-it-work-and-how-do-you-use-it>
- [13]. Pathak, K. (2017, July 5). 6 Things You Absolutely Need to Know About WhatsApp Web. Retrieved November 10, 2017, from Guiding Tech: <https://www.guidingtech.com/38225/whatsapp-web/>
- [14]. Sørensen, H., O'Hara, K., Gosset, P., & Kjeldskov, J. (2015, September). Wireless Smartphone Mirroring in Video Calls. In *Human-Computer Interaction*, 410-417.
- [15]. Statista. (2017, July). Number of monthly active WhatsApp users as of 2013-2017. Retrieved November 21, 2017, from The Statistics Portal: <https://www.statista.com>
- [16]. Unuth, N. (2017, October 10). Why WhatsApp is So Popular. Retrieved November 24, 2017, from Lifewire: <https://www.lifewire.com>

DOI: 10.21522/TIJAR.2014.05.01.Art006

ISSN: 2520-3088

[17]. Useful. (2016, February 10). Useful. Retrieved from Screen Mirroring and Why it is Important: <https://www.userful.com>

[18]. WhatsApp Inc. (2017). WhatsApp Security. Retrieved November 20, 2017, from WhatsApp: <https://www.whatsapp.com>

[19]. Ye, B., Wang, F. Z., Li, L., Helian, N., & Dimitrakos, T. (2014). Mirroring mobile phone in the clouds. In Mobile Services (MS), 2014 IEEE International Conference on (pp. 140-146). IEEE.