Secure Computer Folder Via Bluetooth Using Android App

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ABSTRACT

Secure computer folder via Bluetooth using android application. This application will lock the folder and it will not allow the users to unlock it unless his or her mobile phone will come in range of active Bluetooth. This app gives more secure platform to the users and they can secure there confidential data without any hesitation.This application will also allow to lock there folder using Wi-Fi. In Wi-Fi connection we will match IP addresses of device than allow user to access their secusre data. In some case user will lost their connected device than we will allow them to access their data using secure security mechanism. This mechanism allows only valid and authenticate user.

Keywords : Bluetooth, Rijndael, protection, computer, folders, two factor authentication, security, RSA, Diffie Hellman, DES, 3DES, Blowfish, RC4, AES, SHA-256,SHA-512.

I. INTRODUCTION

In present day, the increasing reliance on computer systems has led to the dependence on confidential security measures. Various methods used to identify a user are Digital signature, Challenge-Response, Biometrics, IPSec (Internet Protocol Security), SingleSign On and Password. Password has become one of the most ubiquitous modern day security tool and is very commonly used for authentication. These passwords are string of characters used for authentication or user access. Unfortunately users set passwords that can be easily memorized, in turn increasing threats. Password meters indicating password strength are used to increase effectiveness of passwords and make them less predictable. Biometrics on the other hand requires the assumption of unrealistic preconditions for performance gain. Access control systems require time-trusted and reliable personal recognition. To overcome the problems faced by these processes individually, we can use a combination of two or more security processes. Two-factor authentication has ameliorated security in authentication systems. Sensitive files can be provided double protection using Rijndael security extension and Mobile Bluetooth tokens. This paper will mainly compare various authentication methods and present the improvement in windows password policies using a combination of mobile Bluetooth and Rijndael encryption.

II. Existing Systems

Although passwords are usually considered in terms of authentication for a service or a device, today they are

encountered in many other ways in the workplace – and existing password policies do not cover these. As a result, users adopt ad-hoc solutions, which are usually insecure. (Philip Inglesant & M. Angela Sasse et al, 2010)

2.1 Password security in windows

The password feature is interlinked with windows user accounts. Users possessing administrator privileges can create, modify and delete accounts. In order to judge the strength of passwords, password policies came into existence. This characteristic has been a vital issue in the windows system. Keyloggers or keystroke logging malware can be effectively protected with the help of password managers. However, these managers cannot fight man-in-thebrowser attacks. A major benefit of passwords is that they are portable and stateless. They are very useful in securing web-based and cloud based accounts.

Passwords face several flaws corresponding to bookmarklet, authorization, web and user interfaces. A bookmarklet is a bookmark stored in a web browser that holds JavaScript commands to stretch the browser's functionality. Although biometrics and security tokens are some of the alternatives to passwords, they increase the overall risk theft, privacy threat and rise in infrastructural costs.

Elizabeth Stobert in her paper explains the password life cycle with the help of following diagram:
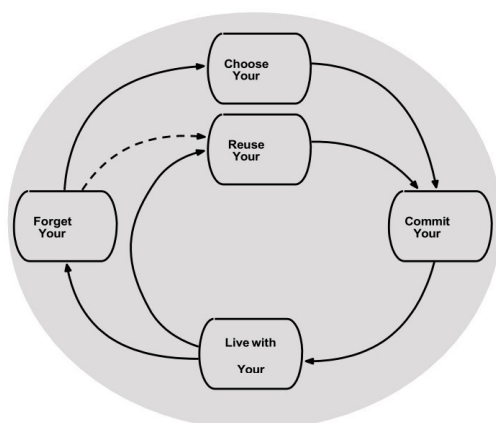
Fig.1 The Password LifeCycle

The length of passwords plays an important role in determining its strength. Success on brute force attack mainly depends on the length of passwords. Generally, brute force attack fails in case of long passwords. Passwords containing alphanumeric characters are another type of strong passwords. Password disclosure should be avoided in order to prevent social engineering attacks.

2.2 Vulnerabilities

There are many reasons due to which password is considered as a weak form of protection. Passwords are user-dependent in network security chain. Users often do not take security procedures for password seriously. This leads to vulnerabilities in passwords. Major problems faced by passwords are follows: ᐧ Noting down of difficult passwords ᐧ Periodic change of passwords ᐧ Using dictionary words as passwords ᐧ Personal information. Example: Username, initials etc. ᐧ Use of default passwords. Example: password ᐧ Double words ᐧ Reverse words ᐧ Mixed case dictiona

III. Solutions to Password Vulnerabilities

Vulnerability is an imperfection in the system which can be victimized by the intruder to weaken the system. This imperfection may be present in design, implementation or maintenance of the system. We can easily block threats if we establish control over the vulnerability. Various kinds of vulnerabilities exist in the password protection system. Synthesizing a strong password and generating a high extremity on the frequency of guesses to minify cracking. Stronger policies could also be implemented using Single SignOn. The load on user shrinks with the help stronger passwords. Opportunistic misuse of unattended desktops can be palliated with the help of screen locks and time-out. Password expiry and prevention of recently used passwords also helps reduce the attack on passwords. Different problems faced by passwords have different solutions. To overcome this two factor authentication is used. It

provides single solution to all the problems faced by passwords.

IV. Two Factor Authentication

The introduction of the Two Factor Authentication has been done in order to heighten the Authentication Systems. The overall access to a System is not defined by a single factor, like password, but the combination of multiple factors. In order to potentiate the security of access control systems, two factor authentication (TFA) comes in very handy mainly because it focusses on combination of both factors. Christian Rathgeb says in his research, "These factors include, passwords, representing 'something you know', or physical tokens, such as smart-cards, representing 'something you have'. Additionally, biometric traits are applied, representing 'something you are'". (Christian Rathgeb et a l, 2010).
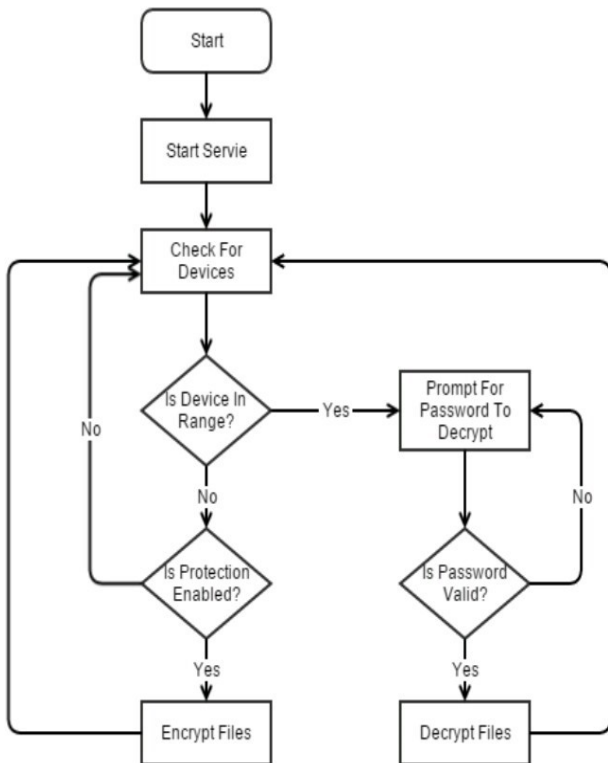
Fig. 2 Windows Service

Popular examples are ATM, Biometrics, etc.

V. Bluetooth in Two Factor Authentication

Bluetooth, a wireless technology for the transmission of data among two devices in close propinquity of each other has veritably changed the world. The connection between two devices are absolutely battened as they operate on Personal Area Network(PAN).The major advantage that Bluetooth offers for T-FA is its range of network which is just 100 meters and is enough to personify an authenticated user's presence. Bluetooth is a Radio Frequency (RF) specification for short range voice and data transfer, whether it be point-to-point or point to multiple points. Bluetooth will empower the users to connect to a wide range of computing and telecommunications devices without the need for proprietary cables that often fall short in terms of ease-of-use. The technology constitutes an opportunity for the industry to deliver wireless solutions that are ubiquitous across a broad range of devices. The strength and direction of the underlying Bluetooth standard will ensure that all solutions meet stringent expectations for ease-of-use and interoperability (Smart Handheld Group). Bluetooth is unremarkably used in Mobile Phone Market. Almost every phone presently contains Bluetooth in it which makes it a very cost effective TFA Authenticator. The operational terms of Bluetooth in terms of processing power and battery is also very minimalistic. Bluetooth can conduce in the T-FA System in the following manner:

Authentication: Connect to a particular device only if the device is known to the system, otherwise abort connection. The familiarity of Bluetooth device is ascertained by the MAC Address of the device. Authorization: Only authorized Bluetooth devices should have the access to the protected data. Confidentiality: Since Bluetooth devices have a range of only 100 meters, there won't be any spoofing since as soon as the device is out of range, the protected personal files and folder would be encrypted.

VI. Rijndael Encryption

Rijndael Cipher is an Advanced Encryption Standard (AES) based on design principle grounded as substitution permutation network and is quick in both software and hardware. Avoidance of the Fiestal network in the AES is its important characteristic. AES, a variant of Rijndael has a fixed block size of 128 bits and a key size of 128, 192 or 256 bits. The key size specifies the total number of rounds for conversion of plaintext to ciphertext. They are,

- 10 rounds for 128 bit keys
- 12 rounds for 192 bit keys
- 14 rounds for 256 bit keys

There are 4 processes in each round namely,

1. Sub Bytes Transformation
2. Shift Rows Transformation
3. Mix Column Transformation
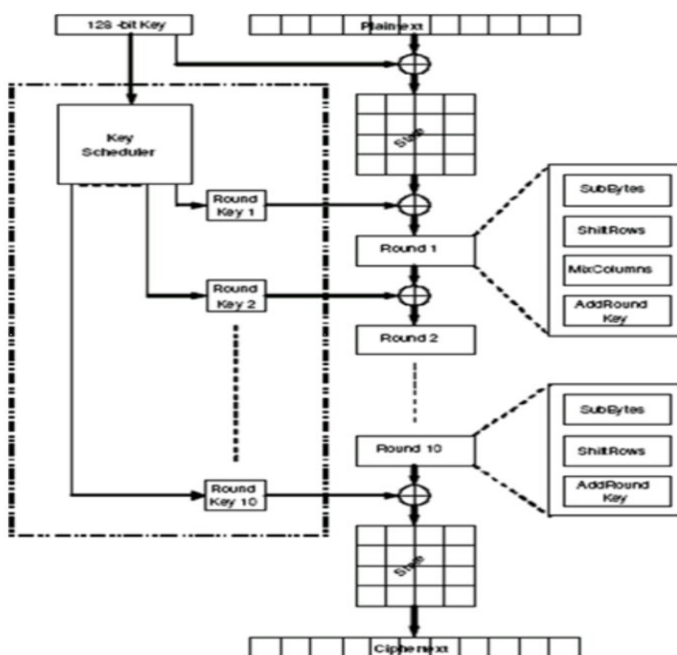4. Add Round Key (Zahir Zainuddin et al, 2013)

Fig. 3 Steps in Rijndael Encryption (Inno-Logic)

6.1 Advantages

Rijndael Algorithm, A Cryptographic Algorithm, is widely conceived as one of the best algorithms for encryption. Efficient implementation of the algorithm is due to the chasteness of its design which makes the effectuation easy to understand.

Joan Daemen in his paper says that " It also facilitates understanding the mechanisms that give the algorithm its high resistance against differential cryptanalysis and linear cryptanalysis, to date the most important general methods of cryptanalysis in symmetric cryptography". (Joan Daemen & Vincent Rijmen et al, 2010)

VII. Symmetric v/s Asymmetric

Information security has grown to be a colossal factor, especially with modern communication networks, leaving loopholes that could be leveraged to devastating effects. This article presents a discussion on two popular encryption schemes that can be used to tighten communication security in Symmetric and Asymmetric Encryption. In principle, the best way to commence this discussion is to start from the basics first.

A. Symmetric Encryption

Symmetric encryption is a form of computerized cryptography using a singular encryption key to guise an electronic message. Its data conversion uses a mathematical algorithm along with a secret key, which results in the inability to make sense out of a message.

Table. 1 Symmetric

Algorithm name	Block/ Stream cipher	Key size/Bits	Number of Rounds	Block size/ Bits
DES	Block	64	16	64
3DES	Block	56,112,168	48	64
AES	Block	128,256	10,12,14	128
Blowfish	Block	32 to 448	16	64
RC4	Stream	40 to 2048	256	N/A

B. Asymmetric Encryption

Asymmetric Encryption is a form of Encryption where keys come in pairs. What one key encrypts, only the other can decrypt. Frequently (but not necessarily), the keys are interchangeable, in the sense that if key A

encrypts a message, then B can decrypt it, and if key B encrypts a message, then key A can decrypt it.

Table. 2 Asymmetric

Algorithm name	Key size/Bits	Block size/ Bits
Diffie Hellman	Key exchange	224 –p 2048-q
RSA	Key Generation	2048
SHA 256	N/A	512
SHA 512	N/A	1024

VIII. Conclusion

This application program would ensure user authentication by the windows password login further authentication to most private files employing their Bluetooth enabled mobile phones. This can lead to less frequent password changes or have less stringent policies that the users are resistant to and they can and

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X. References

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