Extension for Web Browser: Improve the Trust of User on Cloud Providers

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Summary

Today each and every one is using smart phone i.e. they are using cloud services. It means blindly they trust on third parties. But most of the organization is not moving to cloud computing due to their sensitive data. Although unconsciously, all members of an organization are using cloud environment through smart phone. In this paper, author suggested a proposed methodology about AddIns. This AddIns will be responsible for the trust of end user. Author suggested some encryption techniques with user choice order as a code. This user defined code will encrypt the data and encrypted data will be stored on cloud side. This code will also decrypt the data from cloud side. After deep study about literature and through proposed work, author proved that this is best for trust on cloud computing.

Keywords:
Cloud Computing, Encryption, Decryption, Trust Model.

1. Introduction

When the statistical evaluation and/or prediction problems of a random noise environment are discussed, especially from the methodological viewpoint, the following points are essentially important. Organizations can utilize on-demand services from cloud computing when they require. All services from cloud side are available at any time which are reusable and furnished [5]. Hardware, storages, and interfaces are the different services provided by cloud computing through internet. All maintenance with respect to back up and recovery will be the responsibility of service providers [6]. Trust on cloud side issues has been investigated by many researchers from different aspects [7].

Due to SLA [20], user can trust on cloud's providers that they cannot change or delete their data, but they can view their data. This is major issue that is why people are not relying over them. Work of [21] shows that trust increases if users perceive that cloud computing service providers act in honesty and in users' interest, making trust a fundamental factor that informs financial institutions' decision to acquire cloud computing services. But still the trust is challenging issue and most of the research has been done on it [22][23][24].

Work of [16] is very comprehensive work for such issue but it belongs to customized application. Using such work different organizations can move towards clouds because data can be encrypted through different stages. Without dedicated applications, there is lot of applications on cloud side, but users are not using such applications because they have no trust i.e. data is visible by cloud providers. Concept of [16] can be incorporated in web browsers functionality in form of AddIns application. So, everyone will use online photo storage, online documents storage, online compilers etc. This AddIns will increase the trust of people with respect to said issue. Incorporating such AddIns, cloud's providers cannot view users' data. The aim of this study is to propose strategy which can develop the trust of end user on cloud by developing AddIns using different algorithms based on user defined code.

2. Related Work

Basically, three services of cloud computing which are accepted by all over the world [4]. IaaS (Infrastructure as a Service) responsible for providing virtual storage, virtual machines hardware assets as resources, and virtual infrastructure while all other deployment is the responsibility of users. PaaS (Platform as a Service) provides applications, operating systems, transactions, control structures and development frameworks. SaaS (Software as a Service) provides user interface with complete operating environment. Everything from the application down to the infrastructure is the vendor's responsibility. In cloud computing, another company can host organization application and manage the software updates. This

procedure depends upon agreement or contract between them.

Now a day everyone wants same platform on different locations even on different devices. Such wishes can be done through latest concepts cloud computing. But major issues related to such computing are trust of users on cloud providers. There is lot of work on this type of trust. Most of the people are unaware of clouds but they are using clouds in many ways such as emails, facebook, online albums etc. [8]. Due to personal data security issues, they are hesitating to use clouds. To improve the trust of people different researchers has been done their work. Trust model in three steps can motivate the people to use cloud's services [7]. Different types of securities i.e., data security, network security, data locality, data access, authorization etc. are defined by [9] to improve the trust of cloud's users. A survey [3]

represents the Threats and Security Technology Analysis for Secured Cloud Services. A trust model [2] also relates to securities on data traffic. Trusted provider is also an asset on cloud trust, work represented in [1] is depicting that how a provider can be selected.

Due to scalability of cloud computing [11], different advantages of cloud computing [12], mostly organization are trying to move on cloud side [13][14][15].

3. Proposed Methodology

Major purpose of proposed work is to create an application of AddIns, which can be incorporated in a web browser, so that before storing data on cloud side, 1st data will be passed through this Application as shown in following figure.
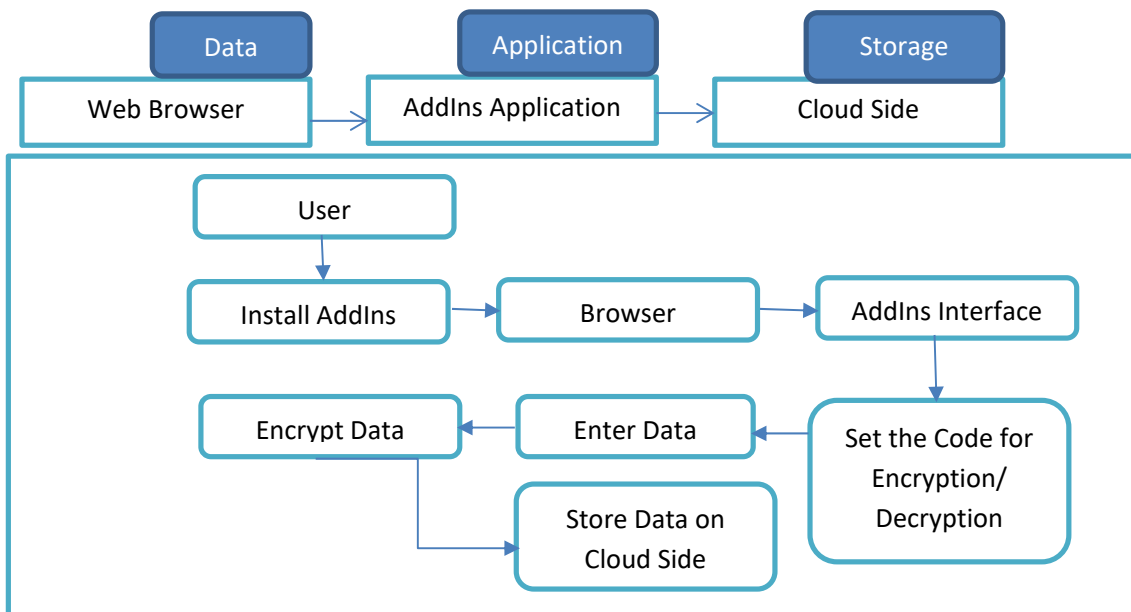

Fig-1: Proposed Work.

In proposed methodology, investigated research is to develop applications.

3.1. Development of Application

Application contains list of algorithms for encryption with tags. These algorithms may be user

defined or some existing techniques i.e. Triple DES Encryption, RSA Encryption, Advanced Encryption Standards (AES), Twofish encryption algorithm, Blowfish encryption algorithm, IDEA encryption algorithm, MD5 encryption algorithm, HMAC encryption algorithm as shown in following figure.
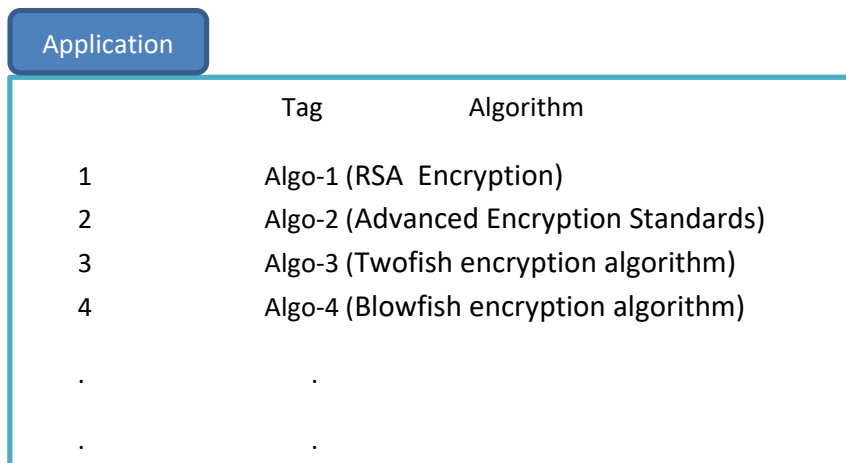
Fig-2: AddIns Architecture

After the installation of such AddIns, browser will contain a textbox for a code. In user code text field, user will enter a code, code will be displayed in esoteric (*).
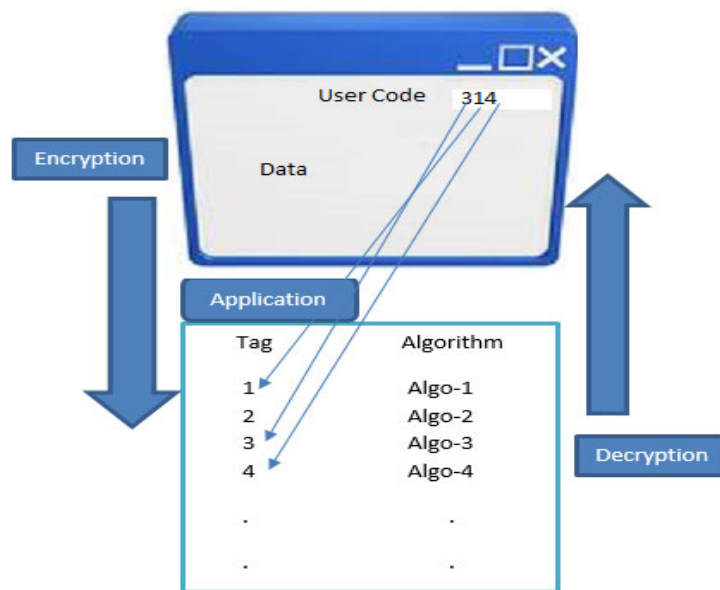

Fig-3: Web Browser with User Code Text Field

Suppose a user enter a code as 314, it means data in browser will pass through Algo-3, Algo-1 and Algo-4. After passing through these algorithms, data will be encrypted, and such encrypted data will be stored on cloud side. User code will not save. Such information will not move towards cloud side, due to this user will increase their trust.

3.2. Working of Proposed Methodology

Working of developed application consists of encryption and decryption.

3.2.1. Encryption of Data

Suppose data on cloud side is DATA. Users enter code 314.

1. DATA will pass through Algo-3
   Data->Algo-3 = DATA-3 (Encrypted from Algorithm of Tag 3)
2. DATA-3 will pass through Algo-1
   Data-3 -> Algo-1 = DATA-31 (Encrypted from Algorithm of Tag 1)
3. DATA-31 will pass through Algo-4
   Data-31 -> Algo-4 = DATA-314 (Encrypted from Algorithm of Tag 4)
4. Data-314 (Encrypted Date) Store on Cloud Side.

From above steps it is clear that, user has entered 314, means data will be encrypted from Algo-3, then such encrypted data (DATA-3) again will be passed through Algo-1, then encrypted data (DATA-31) will be passed through Algo-4 and at the end encrypted data (DATA-314) will be stored on cloud side.

Cloud providers do not know from which sequence (code) of algorithms this data has been encrypted.

3.2.2. Decryption of Data

When user retrieve data from anywhere at any time, 1st he will enter the code on user code text field of web browser, then he can retrieve data in following steps.

1. Data-314 (Encrypted Date) Retrieve from Cloud Side.
2. DATA-314 will pass through Algo-4
   DATA-314 -> Algo-4 = Data-31 (Decrypted from Algorithm of Tag 4)
3. DATA-31 will pass through Algo-1
   Data-31 -> Algo-1 = DATA-3 (Decrypted from Algorithm of Tag 1)
4. DATA-3 will pass through Algo-3
   Data-3->Algo-3 = DATA (Decrypted from Algorithm of Tag 3)
5. Actual Data (DATA) will be displayed to the user.

4. Conclusion

Due to trends of moving towards cloud side, different architectures have been explored for different organization [17][18][19] but not for single user of internet. Using application of proposed methodology everyone can get the following advantages

● Availability: Data of users at any time at any part of the world will be available.

● Portability: User can view their data on different machines such as on laptops or on smart phones etc.

● Backup: Data are regularly updated on cloud side. In case of failure quick recovery should be implemented by provider.

● Data Non-Editable by Cloud Provider: It is confirmed that data of an organization cannot be deleted or edited by any means due to securities provided be providers.

● Data Non-Readable at Cloud Provider: Proposed methodology will be possible that data will not be readable on cloud provider side.

● Software Compatibility: There is lot of problem with new installation of new software on different operating system such as c-complier of XP may not work on latest operating system, so online c-complier will reduce such issues. Everyone can write their programs on online compilers and can store on cloud side, because no one can view their programs, due to proposed work. Similarly, everyone can use online photo editor, online video editor etc. User will remember the code for each data and will install AddIns application on each new machine because machine without such application does not retrieve the data. This is only the limitation of proposed work for future perspective.

References

[1] Fatima Zohra Filali, A General Trust Management Framework for Provider Selection in Cloud Environment. Advances in Databases and Information Systems Volume 9282 of the series Lecture Notes in Computer Science pp 446-457. Date: 15 August 2015

[2] Atoosa Gholami, A Trust Model Based on Quality of Service in Cloud Computing Environment, International Journal of Database Theory and Application Vol.8, No.5 (2015), pp.161-170 http://dx.doi.org/10.14257/ijdta.2015.8.5.13 ISSN: 2005-4270 IJDTA Copyright ⓒ 2015 SERSC

[3] Changsoo Lee, A Survey on Security Threats and Security Technology Analysis for Secured Cloud Services, International Journal of Security and Its Applications Vol.7, No.6 (2013), pp.21-30 http://dx.doi.org/10.14257/ijsia.2013.7.6.03

[4] Barrie Sosinsky, Cloud Computing Bible. Wiley Publishing, Inc. Copyright © 2011 by Wiley Publishing, Inc., Indianapolis, Indiana. ISBN: 978-0-470-90356-8

[5] A. T. Velte, T. J. Velte and R. Elsenpeter, "Cloud Computing: A Practical Approach", The McGraw-Hill Companies, (2010).

[6] J. Hurwitz, R. Bloor, M. aufman and F. Halper; "Cloud Computing for Dummies", Published by Wiley Publishing, Inc. 111 River Street Hoboken, NJ 07030-5774, (2010).

[7] A. Singh, A. Kaur, and D. Gupta, "Reviewing Trust Issues in Cloud Computing," J. Phys. Conf. Ser., vol. 1969, no. 1, 2021, doi: 10.1088/1742-6596/1969/1/012043.

[8] Shakeel Ahmad, "Trust Model: Cloud's Provider and Cloud's User", International Journal of Advanced Science and Technology. Vol. 44, July, 2012

[9] S. V. Kavitha, "A survey on security issues in service delivery models of cloud computing" Journal of Network and Computer Applications, Elsevier, vol. 34, (2011), pp. 1–11.

[10] P. Patel, "Service Level Agreement in Cloud Computing".

[11] P. Adams, "Advantages and Disadvantages Of Cloud Computing System", Advantages And Disadvantages Of Cloud Computing System, (2011) November 18.

[12] C. Robert, "Cloud Computing: Advantages and Disadvantages", http://boardroombrief.com/2010/08/cloud-computing-advantages-and-disadvantages/, (2010) August 24.

[13] K. U. Khan, "Cloud based Data Warehouse 2.0 Storage Architecture: An extension totraditional Data Warehousing", International Journal of Computer Science and Information Security (IJCSIS), vol. 9, no. 6, (2011) June.

[14] L. Coles-Kemp, "Looking at clouds from both sides: The advantages and disadvantages of placing personal narratives in the cloud", information security technical report xxx 1e8, Article in Press, http://www.compseconline.com/publications/prodin f.htm, Elsevier, (2011).

[15] A. Venkatraman, "Advantages and disadvantages of cloud computing", http://searchvirtualdatacentre.techtarget.co.uk/featur e/Advantages-and-disadvantages-of-cloud-computing, (2012).

[16] Muhammad Ahmad Jan, "Extension of Tinny Application for Cloud Based Custom Software with Encryption Queue: A Strategy to Protect Data on Cloud", Innovative Systems Design and Engineering, VOLUME 2, ISSUE 3, August, 2011, ISSN 2222-1727 (Paper) ISSN 2222-2871 (Online)

[17] Hieu Trong Vu,A Traffic and Power-aware Algorithm for Virtual Machine Placement in Cloud Data Center. International Journal of Grid and Distributed Computing Vol.7, No.1 (2014), pp.21-32 http://dx.doi.org/10.14257/ijgdc.2014.7.1.03

[18] Tongrang Fan,Dynamic Pricing Trading Market for Resources Sharing in IIU Federated Cloud. International Journal of u- and e- Service, Science and Technology Vol. 6, No. 3, June, 2013

[19] Kwang-Kyu Seo, An Explorative Model for B2B Cloud Service Adoption in Korea - Focusing on IaaS Adoption . International Journal of Smart Home Vol.7, No.5 (2013), pp.155-164. http://dx.doi.org/10.14257/ijsh.2013.7.5.16

[20]   Service   Level   Agreement, http://en.wikipedia.org/wiki/Service-level_agreement, (2012).

[21] J. K. Adjei, "Explaining the role of trust in cloud computing services," Info, vol. 17, no. 1, pp. 54–67, 2015, doi: 10.1108/info-09-2014-0042.

[22] S. Mehraj and M. T. Banday, "Establishing a zero trust strategy in cloud computing environment," 2020 Int. Conf. Comput. Commun. Informatics, ICCCI 2020, 2020, doi: 10.1109/ICCCI48352.2020.9104214.

[23] Donna Goodison, "10 Future Cloud Computing Trends To Watch In 2021," Crn, 2020, [Online]. Available: https://www.crn.com/news/cloud/10-future-cloud-computing-trends-to-watch-in-2021.

[24] D. R. Swathi and V. Srikanth, "Hybrid trust management in cloud computing," Int. J. Adv. Sci. Technol., vol. 29, no. 3, pp. 8394–8401, 2020.