Do I Trust Google? An Exploration of How People Form Trust in Cloud Computing

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ABSTRACT

The present study explores individual end-users' perspectives of cloud computing, especially issues regarding their trust/distrust of cloud services. While current cloud computing service development focuses on adoption by enterprises and organizations, individual end-users who use cloud services in their everyday lives also constitute an important consumer group. Challenges of trust in cloud computing have gained social and scholarly attention accompanied with the rise of privacy and data security concerns. Studies that investigate individual end-users' views of trust in cloud services, however, are rare. Using semi-structured interviews and a survey questionnaire, the present study aims to capture how ordinary individuals think about cloud computing and how they form their trust/distrust of cloud services and service providers. In this poster, authors present preliminary results of analysis of interview data.

Keywords

Trust, cloud computing, online storage services, end-users.

INTRODUCTION

Current cloud computing technology development has been discussed mostly in the context of enterprise computing — adoption by businesses and organizations. The present study, however, pays particular attention to individual users. With or without awareness, many people are already using cloud services (e.g., e-mail, Web-based document product services, and data storage) to conduct their work and/or non-work related activities. Furthermore, the so-called "digital natives" (Prensky, 2001) are likely to be the lifetime customers of various cloud services. Thus, end-users' evaluations will be an important factor influencing the success or failure of cloud services.

Another focus of the present study is trust. Media

journalists, IT experts, and scholars have addressed challenges of trust in cloud computing often accompanied with concerns for security, privacy, diminishing user control, lack of transparency, and reputation issues (e.g., Ghosh & Arce, 2010; Kahn & Malluhi, 2010; Pearson & Benameur, 2010; Habib, Ries, & Muhlhauser, 2010). Many of the trust-related discussions, however, are often based on the viewpoints of service developers/providers or technology focused (e.g., Hwang & Li, 2010). Cloud service providers (CSPs) saying "trust me" does not necessarily motivate people to respond with "I trust you." Understanding of users' thoughts on trust issues in the cloud computing environment is necessary in order to build and preserve trust between users and cloud service providers.

PURPOSE OF RESEARCH

The current study aims to explore factors that affect the formation of trust or distrust on cloud services and CSPs from the perspective of ordinary individual users, who engaged with cloud computing services in their everyday lives for various purposes.

FRAMEWORK: PROCESS OF TRUST DEVELOPMENT ON THE WEB

Chopra and Wallace (2003) suggest five key concepts in the process of trust development: prediction (predicting consistency of trustees, based on their past behavior), attribution (assessment of trustees' capability, intention, and moral principles), bonding (the emotional development of a trustor-trustee relationship), reputation (awarding of trust on the recommendation of others), and identification (accord of trustors and trustees' identity, goals, and values).

McKnight et al. (2002) explore the formation of "initial trust" and propose a trust prediction model for e-commerce. The domain of initial trust includes when trustors have neither direct interaction with a given system nor credible information. Credible information is gained only after a trustor observes the trustee's trustworthiness and related behavior. During this phase, the trustor develops trust of the trustee (a system or vendor). This model proposes two constructs of trust: trusting beliefs and trusting intentions. Trusting beliefs refer to a trustor's perceptions of a trustee

(i.e., a system or transaction possesses certain attributes that are beneficial to the trustor). Trusting intentions concern whether the trustor is willing or intends to depend on the trustee (p. 337). Initial trust is a significant factor for success for an online merchant (Kim & Prabhakar, 2000) as users often run into unfamiliar systems or services.

RESEARCH METHOD

The present study consists of two phases. In the first phase, the authors analyze narrative accounts gathered through semi-structured interviews. Through a series of open-ended questions, participants are asked to describe types of cloud services that they have/had used, their understandings of cloud computing and personal definitions of trust, and why and why not they "trust" cloud computing services and CSPs. In the second phase, participants are invited to respond to a survey questionnaire.

Currently, this study is in its first phase. The authors will develop a survey questionnaire based on the results of narrative data analysis.

INITIAL DATA ANALYSIS RESULTS

Initial results reported below are based on narrative interviews with 9 participants from various backgrounds (e.g., librarian, office manager, graduate student, software developer, and engineer). During the initial interviews, the authors particularly focus on online data storage services and their providers as an exemplar cloud computing service. The following is a summary of the initial analysis.

1. Needs and convenience (e.g., storing data and documents sharing) are reasons that people initially begin using cloud storage services, regardless of initial trust.

2. Popularity and a number of users of a given cloud service seems to provide people with an emotional safety net for using the service, with or without trust (e.g., "It is like being a little zebra and I am protected because all these other zebras, sort of as a crowd (P06)").

3. People are aware of issues related to data security and privacy on the Web, as informed by reading news and articles and by word-to-mouth (e.g., data hacking, data loss, identity theft, personal information selling, unauthorized access to personal information, and data ownership on the Web). Increased awareness of the concerns

    a) makes people be cautious and limit their use of cloud storage services (e.g., avoid saving any sensitive or personally valuable materials on cloud storage); and/or

    b) fosters distrust — reduces trusting intentions — prior to obtaining a first-hand experience with a given cloud service (e.g., "Because I have that paranoia, I don't trust it [cloud storage] (P04)").

4. Commercial aspects of cloud services

    a) make people aware of different interests of a user and a service provider so they are willing to extend their "trust" as long as the service provider fulfills its (minimum) expectations;

    b) influence people's thoughts about reliability of service providers (e.g., services provided by a non-profit organization would be "more" secure than commercial services); and/or

    c) have an impact on people's evaluation of trustworthiness of services (e.g., "Because I don't trust them anyway, I don't feel like I need to pay for the service (P01)")

5. Once people form a certain level of initial trust, people will

    a) sustain their trust in terms of "lack of mistrust" (P06);

    b) increase their level of trust for a service; and/or

    c) transfer their established trust to different types of services provided by the same provider, thus extend their trust toward the service provider.

Categories of influencing factors on the formation of trust or distrust for cloud services and CSPs identified during the initial analysis correspond to some elements discussed in previous trust building models for information systems and/or e-commerce. Results of the initial analysis of this study, however, are significant in the sense that they captures the voices of ordinary users regarding issues of trust in the context of personal expectations. Narratives provided by participants present the dynamic, rather than static, nature of trust, which is worth exploring further.

CONCLUSION

The current study is ongoing and in the next phase will conduct a survey with a larger sample size. The authors expect that the survey results will enrich as well as confirm themes that emerged from the initial narrative data analysis.

Cloud computing is still in early stages of development. Sustainable development of technology requires not only technical improvements but also an understanding of social issues that surround the technology. Capturing perceptions of cloud computing services, CSPs and trust/distrust issues held by ordinary users will help us to gain a richer insight into the development of cloud computing practices.

REFERENCES

Chopra, K. and Wallace, W. A. 2003. Trust in electronic environments. Proceedings of the 36th Hawaii International Conference on System Sciences, 1-10.

Ghosh, A. & Arce, I. 2010. In Cloud Computing We Trust-But Should We?. IEEE SECURITY & PRIVACY, 8, 6, 14-16.

Habib, S. M., Ries, S., & Muhlhauser, M. 2010. Cloud Computing Landscape and Research Challenges Regarding Trust and Reputation. 2010 7th International Conference on Ubiquitous Intelligence & Computing and 7th International Conference on Autonomic & Trusted Computing (UIC/ATC), 410-415.

Hwang, K. & Li, D. 2010. Trusted Cloud Computing with Secure Resources and Data Coloring. IEEE INTERNET COMPUTING, 14, 5, 14-22.

Khan, K. M. and Malluhi, Q. 2010. Establishing Trust in Cloud Computing. IT Professional. 12, 5, 20-27.

Kim, K. & Prabhakar, B. 2000. Initial trust, perceived risk, and the adoption of internet banking. ICIS '00 Proceedings of the twenty first international conference on Information systems, Atlanta, GA, 537-543.

McKnight, D. H., Choudhury, V. and Kacmar, C. 2002. Developing and Validating Trust Measures for E-Commerce: An Integrative Typolog. Information Systems Research. 13, 3, 334-359.

Pearson, S., & Benameur, A. 2010. Privacy, Security and Trust Issues Arising from Cloud Computing, 2010 IEEE Second International Conference on Cloud Computing Technology and Science (CloudCom), 693-702.

Prensky, M. 2001. Digital natives, digital immigrants Part 1. On the Horizon. 9, 5, 1-3.

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