

# Trust and Cloud Services - An Interview Study

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## Outline

- Background
- What is trust?
- Methodology
- Results
- Conclusions and future work

## Background

- A large Cloud Software Program on-going in Finland
- Launched by the Finnish Strategic Centre for Science, Technology and Innovation TIVIT Plc., formed for the advancement of the Finnish ICT sector
- The program brings together a prominent portion of the Finnish industry and academia dealing with cloud services.
- This paper analyses the views of 33 professionals participating in the program regarding the role of trust in cloud services



## What is trust?

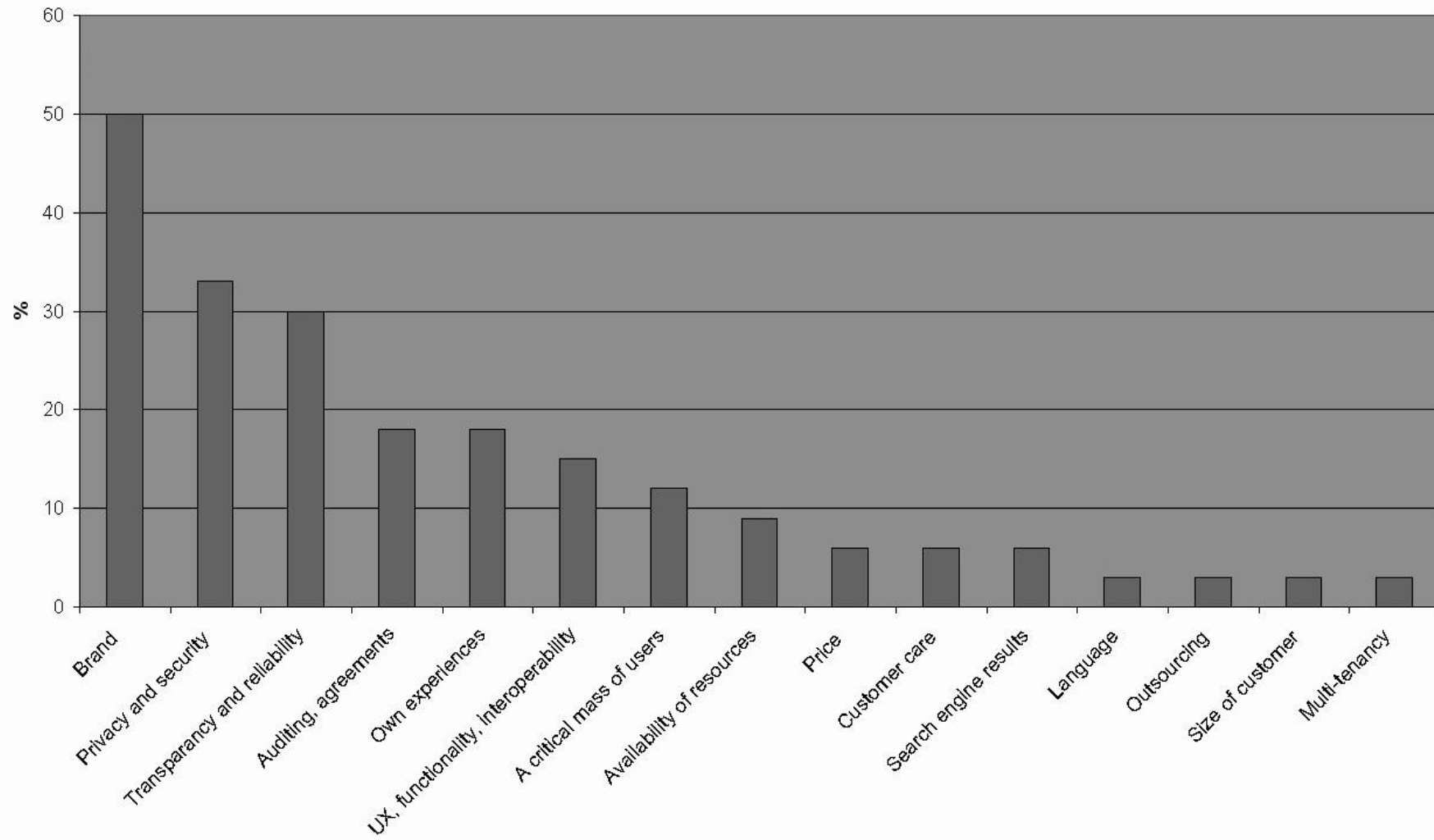
- There is no generic definition of trust. The definitions are discipline-specific
- The (relevant) definitions of trust converge in certain issues: the Trustor's (subject of trust) willingness to be vulnerable (take risk) and (positive) expectations towards the Trustee (object of trust)
- We define trust as being
  - Directed to something that is of importance or has value to the Trustor,
  - Subjective,
  - About giving away control, and
  - A belief that the outcome of the Trustee's actions are positive.

## Methodology

Our objectives for the study were to investigate the following research questions:

- 1) What aspects contribute and affect to trust in the cloud, and how?
  - 2) How is trust or lack of it experienced in the cloud?
  - 3) How could trust in the cloud be measured?
- The method we used was semistructured theme interviewing.
    - a good way to find out information about areas and subjects that are little known nor researched earlier
  - A total of 33 persons were interviewed between March and May 2010.
  - The main criterion for selecting the interviewees was that they should have demonstrable experience and expertise in security and/or user experience field
  - The interviewees included representatives from industry, government and research
  - Cloud Service Providers, Cloud Service Users, regulation authorities, and security, privacy, trust and user experience (UX) researchers.

## Cloud trust affectors



## The 3 most important trust affectors – 1. Brand

- Brand, Reputation, Image, History and Name were seen as the most important aspect, raised by half of the interviewees.
- The history of the CSP has a strong influence on perceived trust, as do other background details such as the country of origin, political situation in the country and legislation.
- Trust can be lost quickly in some cases: *“Incident history has most impact. A negative situation would e.g. be if customer register is leaked or stolen. This could be fatal for business.”*

## The 3 most important trust affectors – 2. Privacy and Security

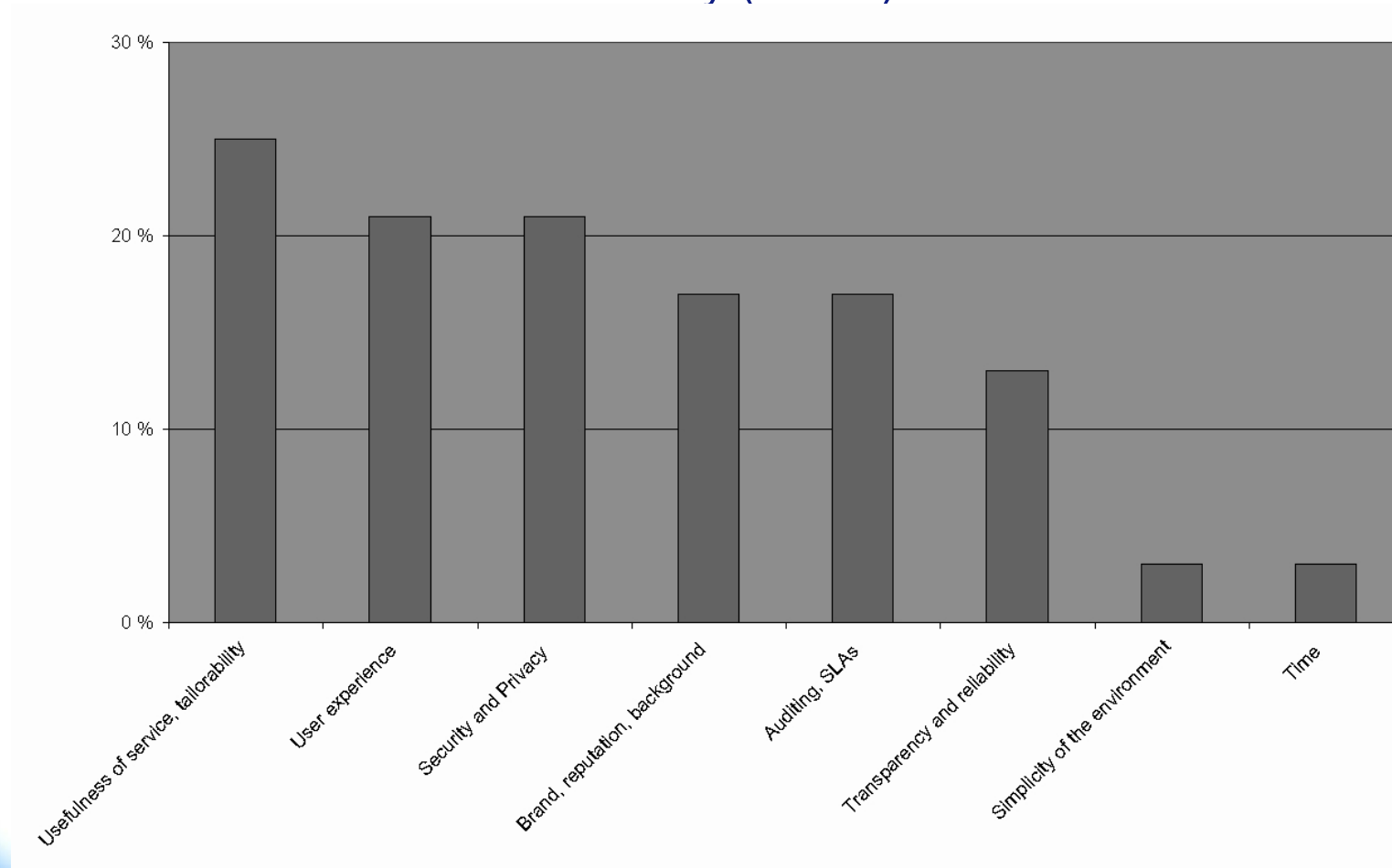
- Privacy and Security. One third of the interviewees emphasized good privacy and security posture of the service as aspects that enforce trust in the cloud.
- The emphasis in security and privacy comes as no surprise, since half of the interviewees were experts in the field.
- Anyhow, the answers affirm that security and privacy go hand in hand with trust.
- *“The cloud could include functionality to present the user with appropriate warnings concerning security and privacy, thus increasing trust.”*



## The 3 most important trust affectors – 3. Transparency and Reliability

- 30% of the interviewees thought that a transparent and reliable cloud service will enforce its trustworthiness
- *“Having good mechanisms promotes trust, like transparent and proactive announcements about changes.”*
- Expert users also prefer open source software, meaning source code availability and transparency of the system.

## Experiencing trust in the cloud - what kinds of experiences give a feeling that a service is trustworthy (or not).



## Experiencing trust – 1. Usefulness of service, tailorability

- Usefulness of service and its tailorability were raised by 25% of interviewees as an item that gives positive trust experiences.
- Even if a service is lacking privacy protection, it does not matter if the service considered to be useful.
- Facebook is a good example of such a service:
- *“No trust, no usage. On the other hand, if a service is truly useful, lack of privacy (as a constituent of trust) does not perhaps matter.”*

## Experiencing trust – 2. User experience

- User experience was mentioned by 21% of the interviewees.
- The interviewees claimed that positive experiences do not affect trust that much, but negative experiences do.
- This is due to the fact that the customer expects a certain level of trustworthiness from the service. Positive experiences only retain this expectation, whereas negative experiences quickly reduce the level of trust.
- *“Technical problems affect trust, e.g. a Skype client has been known to interpret account numbers as phone numbers.”*

## Experiencing trust – 3. Security and privacy

- Security and Privacy were mentioned by 21% of the interviewees.
- *“Information security and privacy contribute to the feeling of trust, but the latter is a wider concept.”*

## Measuring trust

- How to measure trust proved to be a difficult question, and 20% of the interviewees replied literally so.
- *“Difficult to measure ... Perhaps the dependability of technical controls could indicate something. Experiencing trust is subjective.”*
- 33% of the interviewees thought trust could be measured indirectly by looking at changes in revenue and amount of customers, assuming customers vote with their feet and leave services they don't trust.
- According to 25% of the interviewees methods like questionnaires and media follow up could be used:
- *“It is difficult to find absolute metrics, but opinions can be asked.”*

## Conclusions

- The cloud paradigm moves the control of data away from the user, requiring the user to trust the cloud service provider.
- We highlighted main observations from an interview study on experts' views on trust in cloud
- According to the interviews, the most important factor affecting perceived trust in cloud services is Brand, including such sub-aspects as reputation, image, history and name of the CSP.
- Security & Privacy and Transparency and Reliability were the second and third most important aspects.
- CSUser's own experiences affect trust, but mainly when these experiences are negative. Positive or neutral experiences only retain the level of trust the user has had apriori, whereas negative experiences are quick to deteriorate trust.

## Future work

- As our future work we intend to focus on the aspects that were raised by the interviewees as important future research items.
- 30% of the interviewees said that research should focus on trust affectors, to better understand how to build cloud services that users trust.
- 25% of the interviewees mentioned measuring of trust as an interesting, though difficult, research item.
- Other items raised by the interviewees include the relationship between trust and security and privacy.
- An interesting research item raised by one interviewee was how to avoid the use/deployment of clouds for criminal purposes (cf. RBN, botnets): What kind of trust should the service providers have towards the users?
- Other research items mentioned by the interviewees included the perspective towards trust (organizational vs. individual), classification of data and user experience.



Thank you!  
Questions?