The Ethics of Cloud Computing
A Conceptual Review

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ETICA project

- Ethical Issues of Emerging ICT Applications
  - Funded by the European Commission
  - International & Multidisciplinary collaboration
- Aim:
  - identify ethical issues arising from ICTs
  - in the coming 10 to 15 years.
    - E.g. Ambient Intelligence, Affective Computing & Cloud Computing
  - Evaluate issues → support addressing issues (government + R&D)
Computer Ethics

- studies and analyzes social and ethical impacts of ICT
- 1960 – 1990:
  - ethical reflection after the technology is developed and widely adopted
  - Negative image of ethics, “slows down innovation”
- End 90’s – now:
  - the value turn
  - Use ethics before the technology is developed
  - Include moral values in system design: ownership, trust, autonomy, informed consent, privacy, human welfare, etc...
Cloud Computing

- Users **outsource** their computing needs to third parties, over the Internet
- The **control** shifts from users to third parties
- Multiple services can be **interconnected** to provide a specific service
- Data in **multiple physical locations** around the world, possibly owned and administered by different organizations
- All this **complexity is hidden** from the user
Control and Responsibility

• Users relinquish **control** over computation and data

• Unauthorized access, data corruption, who is **responsible**?

• **Deperimeterisation**: disappearing of boundaries between systems and organizations

• The border between organization + infrastructure blurs, but also the **accountability**

• Problem of **many hands**, service oriented architecture
Function creep

- Data collected or a specific purpose can be used for **other purposes**

- A database with biometric data for authentication can be used for crime investigation

- **Unimplementing** might become difficult because of wide scale use
Privacy

- There is a consensus that it is important, the concept is hard to explicate

- Aim to constraint access to certain types of personal data. Which types? Conception differs per type of data/context

- Different opinions of privacy by the service providers

- Different layers/service providers with different policies
Privacy across borders and diversity

- **Legislation differences**, i.e.: Facebook case in Germany, Google Maps in China
- **Cultural differences**: emphasis on the concept of community and negative concept of privacy in Eastern cultures (Capurro, 2005)
- **A minimal sense of privacy** is shared, but an internationally accepted rich sense is lacking (Moor, 2004)
- **Convergences of values** and norms do take place, i.e. incorporation of traditional Chinese values and Western values (Yao-Huai, 2005)
Privacy across borders and diversity

- An opportunity to take **pluralistic ground** and avoid relativism. Globalization can play a role.

- But... Risk of **cultural imperialism**.

- Do not impose values, but **bridge cultures**. Ethics can play an important role in reaching the middle ground (Moor, 2005)
Precautionary Principle

• Precautionary principle: refrain from actions in the face of scientific uncertainties about serious or irreversible harm
• In software engineering ethics: do not abort the development of the technology, but anticipate consequences that are not foreseeable (Pieters 2009)
• Uncertainty is no excuse not to do this
• Technical standardizations, professional, national and international law and regulations must follow
Future for Cloud Computing
Ethics: Value Sensitive Design

- Include **moral values** of ethical importance in design
- Uses **empirical studies**, interviews with stakeholders to include their views into the design
- **Conceptualize** the values
- **Translate** it into technical design
- Why?
  - Design is about changing the world, inherently normative
  - Designers have been doing it all the time: but make it more explicit, transparent and systematic
  - Design for X: Design for maintainability, Design for reliability, etc.
Future for Cloud Computing
Ethics: Value Sensitive Design

• Use is important
  • Same technology in different contexts realizes different values

• Design is important as well
  • Differently designed technologies (with same function) in same user context realize different values

• Deal with value trade-offs (privacy vs accountability, trust vs security), and include user views into the design by means of empirical investigations

• Discover values, translate them into design, verify
Questions?