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Society Trends: Challenges of Privacy and Anonymity in the Information Society

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Trust and Privacy

What are the metrics of Trust for computer systems? (eg web services)

What are the metrics of Privacy for computer systems? (eg web services)

Does the *cloud* paradigm change anything?

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Western
Law

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- **What is privacy**
- **Common conceptions?**
- **Personal information**
- **Specific concerns**
- **Privacy at common law**
- **Overseas initiaitives**
- **DPA 1984**
- **Canada**

What is privacy

- **It is no more than a name for an attitude towards a set of abuses, very weakly, if at all, associated with each other**
- **'the right to be let alone'**
- **The claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others**

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Western *Law*

Common conceptions?

- ◆ **Intrusions on PP are now greater than ever, and increasing**
- ◆ **Modern technology at least part to blame**
- ◆ **Much info inaccurate, unchecked, but users regard as irrefutable**
- ◆ **Anyone can get at it, whether access open or clandestine**
- ◆ **Legal remedies left behind by the speed of technological change as to be useless**

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Personal information

- ❖ **NZ PA PI** "means information about an identifiable individual; ..."

- ❖ **Oz** "information or an opinion (including [that] forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent, or can reasonably be ascertained, from the information or opinion"

- ❖ **Canada PI** "means information about an identifiable individual, but does not include the name, title or business address or phone number of an employee"

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Specific concerns

- Collection of information
- Linking and profiling
- Disclosure of information
- Increased storage capacity
- Unauthorised access

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Privacy at common law?

- ◈ **Victoria Park Racing and Recreation Grounds Co Lt v Taylor (1937) 58 CLR 479**

- ◈ **Tolley v J.S. Fry & Sons [1931] AC 333**

- ◈ **Malone v Commissioner of Police of the Metropolis (No. 2) [1979] Ch 344(UK)**

- ◈ **Also see**

  - ◈ **Kaye v Robertson (1991) (UK)**

  - ◈ **Stephens v Avery (UK)**

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...and some more

- **Tucker v News Media Ownership Ltd [1986]**
- **Morgan v TVNZ (High Court, Christchurch)**
- **Bradley v Wingnut Films Ltd (1992)**

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Faculty of Law
Overseas initiatives

Country	Title of legislation	Year
Denmark	Danish Private Registers Act also D Publ &	1978
Austria	Data Protection A	1978
France	Data Processing, Data Files & Personal Lil	1978
Norway	Personal Data Registers Act	1978
UK	Data Protection Act	1984
Finland	Personal Data File A	1987
Sweden	The Data Act	1989
Belgium	DPA	1993
NZ	PA	1993
US -	Privacy Act	1984

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Features of UK DPA 1984

- **Exemptions for**
    - **national security**
    - **operations solely for the preparation of text document**
    - **public obligation to publish**
    - **domestic processing**
    - **unincorporated clubs (with conditions)**
    - **certain mailing lists**
    - **payroll/accounts**
- **Must comply with eight principles**

Canada

◆**PIPEDA, an act that is designed to establish a right to the protection of personal information in certain circumstances, and billed as an act to "promote electronic commerce".**

Instruments of change

Chips

Watching

Profiling

TGIs

Email

Cryptography

Networks / Clouds / …

Trust

Images redacted

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End of privacy?

- Use of technology to invade privacy.
- Security cameras
- Gossip-Girl (mobile gossip site with push technology)
- Google object recognition
- => Face recognition
- Reasonable expectation of privacy

Privacy and Social Media

- Self produced content
- ..is your own problem!
- ..but..
- Content produced by others
- ..is another problem
- What is the future of reputation, is our attitude changing..
- Is reputation becoming less important..

Privacy and Social Media

- Employers using social media
  - As part of hiring process
  - As monitoring

- Response from young person: If they won't hire me because of my FB profile, then it's OK. I wouldn't work for such company anyway.
- Reputation overrated, tolerance required

Privacy and Social Media

- Recent newspaper report of insurance company using Facebook to assess ability to work..

- Need regulation to protect individuals..

Expert Panel

Digital Society Trends:
Challenges of Privacy and Anonymity in the Information Society.

Privacy and Anonymity for Future Information and Computing Systems Considering Economic Aspects.

The International Conference on Legal Aspects of the e-Society (CYBERLAWS 2010).
International Academy, Research, and Industry Association (IARIA).
DigitalWorld 2010, February 10–16, 2010, Sint Maarten, Netherlands Antilles.

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└─ Apply Privacy and Anonymity to Information and Computing Systems

Apply Privacy and Anonymity to Information and Computing Systems

Individual: Control flow and storage

Privacy: Privacy is the ability and possibility of an individual / person / subject to control the flow and storage of (all) individual-related data/information regarding this individual / person / subject.

Superior: Securing the individual's interests

Anonymity: Anonymity is achieved by using and warranting anonymisation. Using the term anonymisation we understand the modification of individual- or subject-related data in such a way as drawing conclusions from those data on a definite or allocable individual or subject are and will be impossible (for any lobby).

Target Systems and Purpose

- **Future Information Systems (FIS):** Provide various special, *interdisciplinary*, *integrated*, and *interlinked information* and *High End Computing resources* for societal purposes (economy, science, education).

- **Future Computing Systems (FCS):** Get rid of the limitations of current computing architectures and systems for delivering compute power.

Challenges

Incompatibility and Oppositeness

Disciplines	Problems
Information system application	reduce obstacles
Computing	overcome limitations
Technology	integrate and differentiate
Usability/ergonomics	security and usability
User/interests	enable use and protect against misuse
QoS	service and costs
Law/legal regulations	integration and modularisation
Ethics	extend applicat. and restrict use
Implementation	protection and transparency
Society	acquire sense on trustworthiness

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Importance and Politics

Importance and Politics

Dimensions . . .

Scope:	All of us
Political:	Responsibility
Scientific & technological:	Maximum complexity
Legal aspects & laws:	Regulatory
Social & cultural:	Key issues
Economical:	Market readiness

Art is I,
Science is We,
Engineering is They,
and it must be remembered that computer system design is all three.

– DAVID J. KUCK, HIGH PERFORMANCE COMPUTING

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Requirements

Requirements

Requirements for integrated and interlinked systems . . .

- enable customers, industry, and services providers to make use of distributed High End Computing (HEC) resources, even for strategic tasks,
- interdisciplinary components,
- need for a governmental-academia-industry forum,
- increase attractiveness for industry,
- lower the hurdles for international cooperations,
- financing necessary for holistic, transparent initial projects,
- suitable system integration projects,
- standardised components support,
- maximum user transparency,
- complementary means, never means one hundred percent can be reached.

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└─ Present and Future Goals

Present and Future Goals

What is the essence of protecting information?

Present   Future

Support trust! Protect data and information!

Minimise threats and misuse!

Separate security from management & administration!

Communicate: Any process needs communication!

Create modular technical-legal frameworks!
GMES/GEOSS/SEIS, GSDI/INSPIRE/GDI-DE, FDA/HIPAA, PSI/EPSI.

Collaboration frameworks reducing complexity!
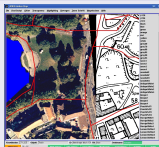Grid-GIS house.

Economic integration, accounting, billing!
Modular distributed systems like SGAS.

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└─ Target System Examples

Target System Examples

Information and Computing Systems :: Data and Information

Discipline	Privacy private societal economic intellectual	Anonymity
Geoscientific Information Systems	p, s, e, i	Individual, Society
Archaeology Information Systems	s	Society
Medical Data Information Systems	p, s, e	Individual, (Society)
Flight and Transport Systems	p	Individual, (Society)
Banking, Accounting, Billing Systems	p	Individual, (Society)
Exploration IS (energy, oil&gas)	e	Society
Environmental IS (pollution)	p, s, e	Individual, Society
Computing shared/distributed	e, i	Individual, Society
Navigation Systems	p	Individual
Recherche Systems, Search Engines	p, s, e, i	Individual
Georeferencing	p, s, e, i	Individual
Automation	p, s, e, i	Individual
Integration	p, s, e, i	Individual

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└─ Target System Examples

  └─ Example: Archaeology Information Systems and Tourism

Example: Archaeology Information Systems and Tourism

Subject/object privacy: Protection of archaeological sites.

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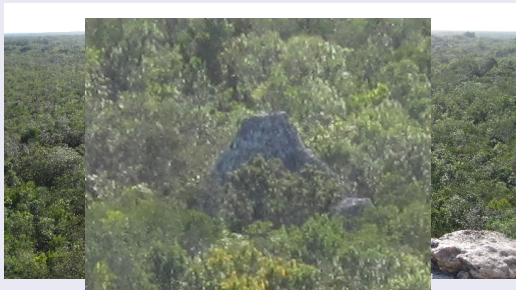
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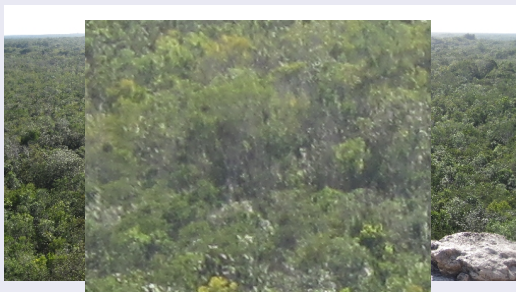
Target System Examples

Example: Archaeology Information Systems and Tourism

Example: Archaeology Information Systems and Tourism

Subject/object privacy: Protection of archaeological sites.

Protect non-public location and existence-information.
Problem: Subject-related. Prevent lootings and illegal digging.
Economy: Promote education & individual tourism.

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└─ Target System Examples
  └─ Example: Medical Data Information Systems

Example: Medical Data Information Systems

Individual privacy and anonymity: Protection of individual information.

| Related to: | ALCOHOL | DRUGS | SELF INFLICTED | NO |

I hereby acknowledge that I HAVE RECEIVED AND UNDERSTAND THE GIVEN INSTRUCTIONS INDICATED. I understand that I may be released before all my medical problems are know or treated. will arrange for follow-up care as instructed above. I fully accept the charges above itemized.

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└─ Target System Examples
   └─ Example: Medical Data Information Systems

Example: Medical Data Information Systems

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└─ Target System Examples
  └─ Example: Medical Data Information Systems

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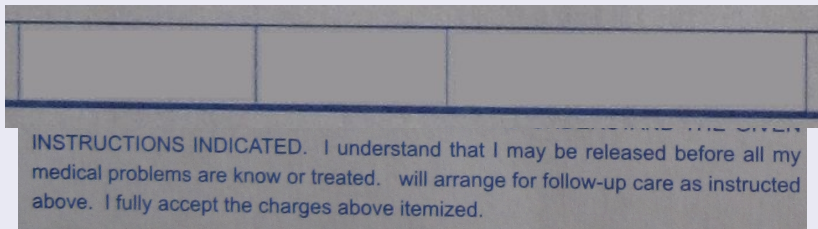
Protect individual information/categorisation.
Problem: Prevent misuse, data collection, data trade, . . .
Problem: Prevent digitalisation side effects.
Economy: Enable medical support, epidemology IS.

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Target System Examples

Example: Flight and Transport Systems

Example: Flight and Transport Systems

Individual privacy and anonymity: Protection individual characteristics.

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Target System Examples
Example: Flight and Transport Systems

Example: Flight and Transport Systems

Individual privacy and anonymity: Protection individual characteristics.

Protect individual characteristics.

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Target System Examples

Example: Banking, Accounting, Billing Systems

Example: Banking, Accounting, Billing Systems

Individual privacy and anonymity: Physical and electronical.

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└─ Target System Examples
  └─ Example: Banking, Accounting, Billing Systems

Example: Banking, Accounting, Billing Systems

Individual privacy and anonymity: Physical and electronical.

Protect properties and values.
Problem: Reduce barriers and protect against misuse.
Economy: Enable efficient banking at "frontend" and "backend".

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Target System Examples

Example: Exploration and Information

Example: Exploration and Information

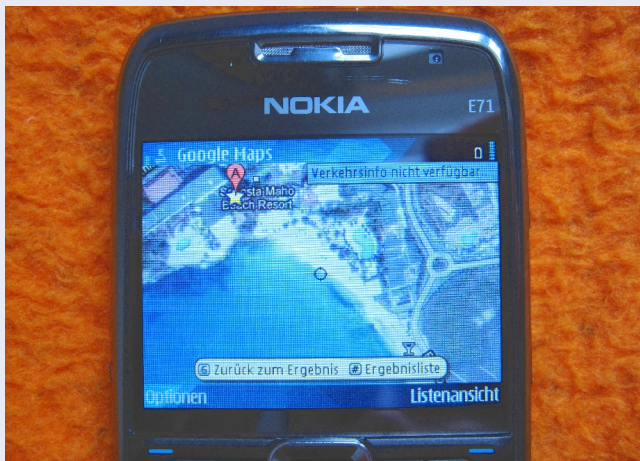**Network privacy and anonymity: Protect individual & resources.**

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└─ Target System Examples
  └─ Example: Exploration and Information

Example: Exploration and Information

Network privacy and anonymity: Protect individual & resources.
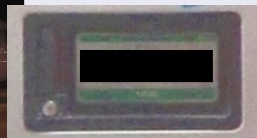
Protect customers, economy, and industry – separate networks.
Problem: Combination of individual and resources inf. (energy).
Economy: Person- and subject-related (exploration/environment).

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└─ Target System Examples
   └─ Example: Navigation Systems

Example: Navigation Systems

Individual privacy and anonymity: Protect individual activities, habits, . . .

Protect individual movement profiles.

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Target System Examples

Example: Distributed Computing Systems / High End Computing

Example: Distributed Computing Systems / High End Computing

Individual privacy and anonymity: Real system base security and protection.

```
top - 12:26:46 up  2:50, 73 users,  load average: 7.85, 7.26, 6.93
Tasks: 247 total,   2 running, 245 sleeping,   0 stopped,   0 zombie
Cpu0  :  0.7%us,  9.3%sy,  0.0%ni,  0.3%id, 88.7%wa,  0.0%hi,  1.0%si,  0.0%st
Cpu1  :  2.3%us,  1.7%sy,  0.0%ni, 21.2%id, 74.8%wa,  0.0%hi,  0.0%si,  0.0%st
Mem:   2061856k total,  2045280k used,    16576k free,     3016k buffers
Swap:  2104472k total,      668k used,  2103804k free,  1068024k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  PPID RUSER       UID GROUP
 4473 wwwrun    23   0 99124 2184  624 S    0  0.1  0:00.00  4469 wwwrun       30 www
 4474 wwwrun    23   0 99124 2184  624 S    0  0.1  0:00.00  4469 wwwrun       30 www
 4475 wwwrun    23   0 99124 2184  624 S    0  0.1  0:00.00  4469 wwwrun       30 www
 4476 wwwrun    23   0 99124 2184  624 S    0  0.1  0:00.00  4469 wwwrun       30 www
 4477 wwwrun    25   0 99124 2184  624 S    0  0.1  0:00.00  4469 wwwrun       30 www
    1 root      18   0   808  304  244 S    0  0.0 71:12.32     0 root          0 root
    2 root      11  -5     0    0    0 S    0  0.0  0:00.02     0 root          0 root
    3 root      RT  -5     0    0    0 S    0  0.0  0:00.00     2 root          0 root
    4 root      34  19     0    0    0 S    0  0.0  0:28.22     2 root          0 root
    5 root      RT  -5     0    0    0 S    0  0.0  0:00.00     2 root          0 root
    6 root      34  19     0    0    0 S    0  0.0  0:00.13     2 root          0 root
    7 root      10  -5     0    0    0 S    0  0.0  0:00.02     2 root          0 root
    8 root      10  -5     0    0    0 S    0  0.0  0:00.08     2 root          0 root
    9 root      11  -5     0    0    0 S    0  0.0  0:00.00     2 root          0 root
   30 root      10  -5     0    0    0 S    0  0.0  0:00.09     2 root          0 root
   31 root      10  -5     0    0    0 S    0  0.0  0:01.63     2 root          0 root
   32 root      20  -5     0    0    0 S    0  0.0  0:00.00     2 root          0 root
```

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Target System Examples
  Example: Distributed Computing Systems / High End Computing

Example: Distributed Computing Systems / High End Computing

Individual privacy and anonymity: Real system base security and protection.

Protect individual properties.
Problem: Ensure privacy for investments and data.
Economy: HW and SW support, separating data, process load ...

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└─ Lessons Learned for Future Milestones

Lessons Learned for Future Milestones

Milestones for work on future information & computing systems

- **Strengthen trust with (Computer-Computer):**
  Creation of legal base, legal frameworks
  Collaboration frameworks, reducing complexity
  Standardisation of suitable authentication/authorisation and encryption methods
  Support for "trustable" computing
  Creation of common policies, access rights, common virtual organisations
  Industry and vendor support, strengthen interoperability, overcome technical limitations
  Integration of Distributed Computing aspects: Grid Computing, Cloud Computing
  Integration of High End Computing, High Performance Computing (HPC)
  Transparency of workflows, accounting, billing, support for business applications
  Flexible licensing
  Open chip design, open tokens, hardware support

- **Envision wider social integration (Computer-Human):**
  Transparency
  Strengthen intellectual properties, combination with e-learning
  Individual configurability
  Technology-modular laws
  Data security, handle sensitive data
  Privacy on critical developments
  Create integrated infonomics / information management

- **Uniform Future Implementations (Long-term future applications):**
  Electronic passport, Electronic health card, . . .
  "Back to the future security" for yesterdays methods and data

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└─ Future Work and Concluding Questions

Future Work and Concluding Questions

Present and future work on basic technological implementations

- Information and Computing Systems (GEXI, ZIVSMP, HLRN and others).
- Collaboration Frameworks (Grid-GIS house).
- Future Internet (Internet N.x).
- Internet of Things (RFID).
- SuperGrid & SmartGrid (Internet Technology). Energy-Sciences & Economy.

Concluding questions

- Privacy and anonymity is regarded a major issue for nearly all information and computing systems. **How can different efforts be integrated?**
- Integrated systems are most complex.
  How can we progress to reduce complexity for integrated systems?
- Most information technology is international, most laws are not.
  What can be the next "technical-legal" steps?
- There are no standards for interlinking information and computing systems. **Which support/services can industry and politics provide?**
- There is no modularisation on technology **and** international legal base.
  Which further actions can press the FIS and FCS topics ahead?