Free Software for Privacy

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The GNUnet Project

Overview

What is privacy?

Why do we need it?

How can we get it?

Challenges

Free Software

Definition:

Free Software gives individuals control over their computing.

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Free Software gives individuals
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Axiom:

Society must control its essential functions,
not private interests.

Privacy

Definition:

Free Software gives individuals
control over their computing.

Definition:

Privacy means individuals are in control
of how their personal data is used.

Privacy and Free Software

Corrolary:

Privacy-enhancing software must be free.

Controlling Information

- Confidentiality
- Integrity
- Availability

Confidentiality

- Data (storage, transmission)

  $\Rightarrow$ Encryption (OpenSSL, gnuTLS, GnuPG, ...)

- Actors (identity)

  $\Rightarrow$ Anonymization

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Good People Need Anonymity[1]

Private Citizens: Privacy

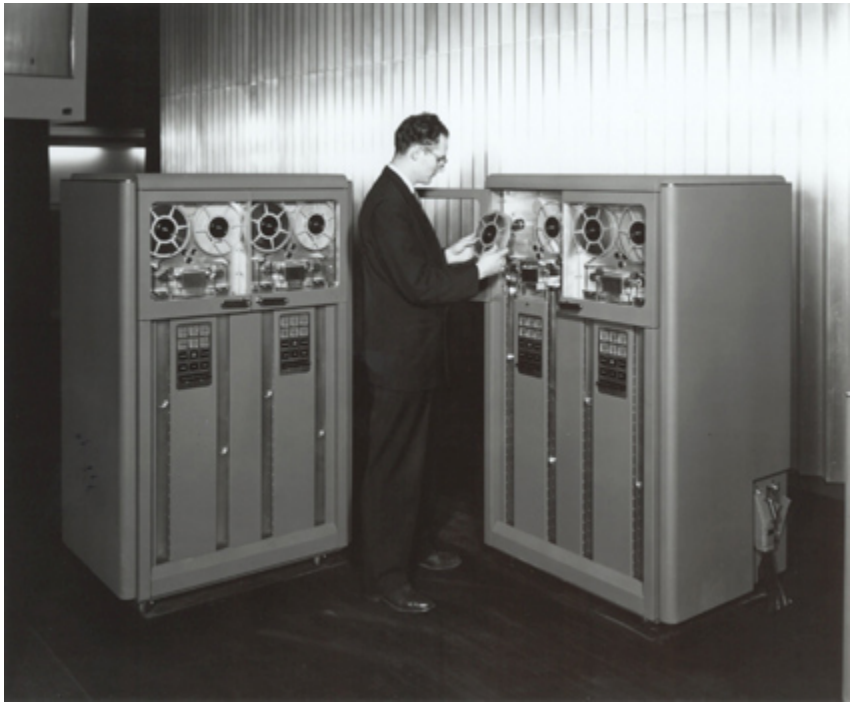
Blocked Users: Reachability

Businesses: Network Security

Governments: Traffic-Analysis Resistance

[1] Thanks to Roger Dingledine.

IBM 726 (1952)



6.1kB/s, 2.3 MB, $850/month ($ 6,775/month inflation adjusted)

IBM TS1130 (2008)

160,000 kB/s, 1,000,000 MB, $11,700 (eBay)

Data Today

- Data does not go away, lives “forever”, instantly accessable to many people
- More expensive to delete data then to retain it

Never Forgetting is a Curse

- Data incorrectly captured
- Data no longer relevant
- Data taken out of context
- Expectations in society change

  $\Rightarrow$ Acceptable today, unaccepatable tomorrow!

Examples

- "Nationwide fined £980,000 over stolen laptop — Details on 11 million customers went awol" (The Register, 14.2.2007)
- "Stolen identities going cheap — access to a bank account was going for $10 (US)" (The Age, 8.4.2008)

Examples

- "1.7 Million Canadians Are Victims of Identity Fraud — Victims spend more than 20 million hours and more than $150 million of their own money to resolve the fraud" (Newswise, 17.11.2008)
- "The Cost of ID Theft — business losses per victim increase (...) to $49,254" (Technology News, 6.2.2008)
- "Security Breaches Cost $90 To $305 Per Lost Record" (InformationWeek, 11.4.2007)

Examples

- "How To (Legally) Spy On Employees" (Forbes, 25.10.2006)
- "UBS claims naming tax evaders would break law" (Times Online, 1.5.2009)

Examples

- "Surveillance warrants? Nah, far too tricky, we don't bother with them — A (Republican) in charge of US Attorney General's Office" (Telecom TV, 30.4.2009)
- "In 2008, two instances were reported of encryptions encountered during state wiretaps; neither prevented officials from obtaining the plain text of the communications." (US 2008 Wiretap Report)

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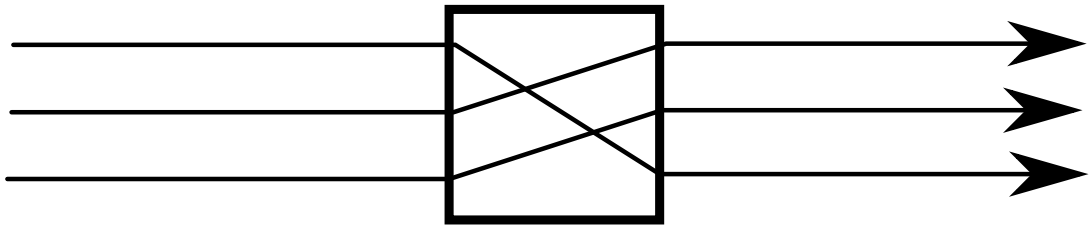
Anonymization Techniques

- Mix Cascades
- Onion Routing

Mixing

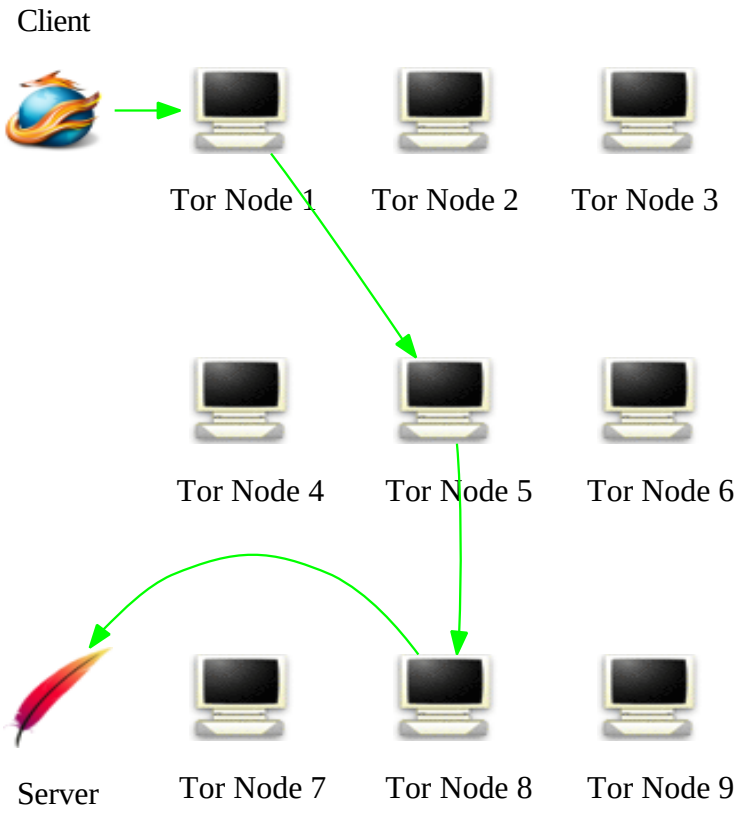
David Chaum's mix (1981) and cascades of mixes are the traditional basis for destroying linkability:



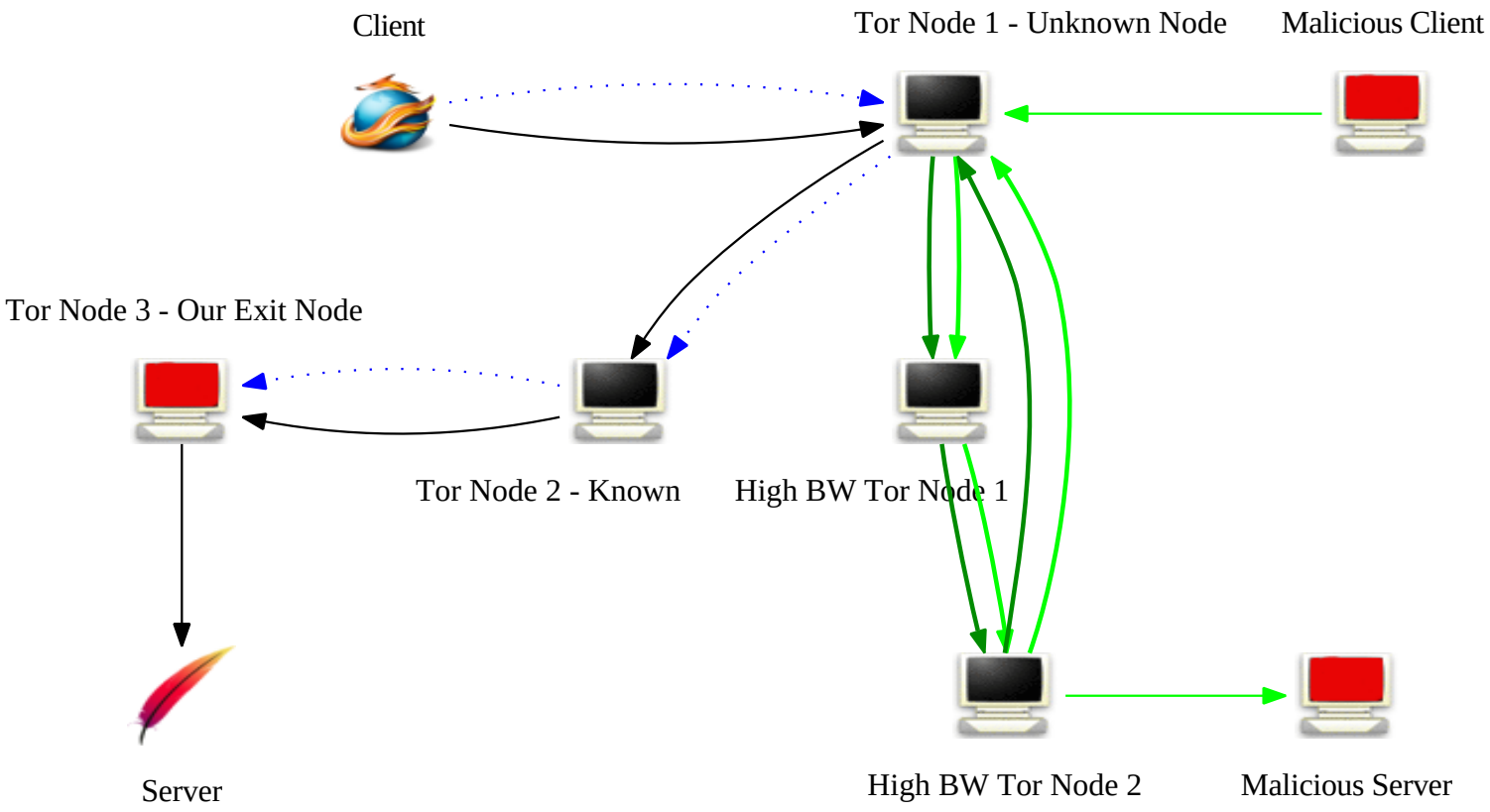
Mixing

David Chaum's mix (1981) and cascades of mixes are the traditional basis for destroying linkability:

Onion Routing (in Tor)



Problems with Onion Routing[2]



[2]Will be presented at USENIX Security 2009.

Privacy-enhancing Free Software

- Tor
- Mixminion
- I2P
- GNUnet

GNUnet Technical Philosophy

- Completely decentralized, open network with malicious participants
- Use “secure” defaults, allow individuals to trade performance for security
- Privacy requires company; enable many applications
- Overall, we are not building a prototype for research

Consequences for GNUnet

- Difficult technical problems
  $\Rightarrow$ slow progress
- Relatively steep learning curve for end-users
  $\Rightarrow$ small userbase
- Need more than file-sharing for a "framework"
- Backwards-compatibility is a goal, not a dogma
  $\Rightarrow$ 0.9.x peers will not work with 0.8.x

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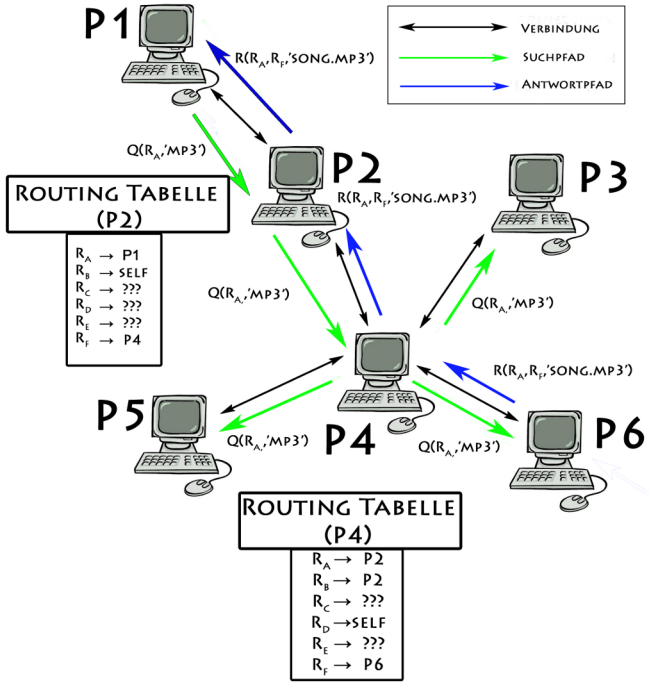
Challenges

- Technical challenges
- Political / Legal challenges
- Social challenges

Technical challenges: Free Software ⇒ Good Software?

- Stealthnet is free software
- CRISP spent ≈ 1 month to analyze

  ⇒ Deanonymized users
- Anonymization is tricky!
- PETs need academic review



Political challenges: Hot Button Issues

Polititical challenges: Data Retention Laws

Directive 2006/24/EC requires providers to retain:

- the source of a communication
- the destination of a communication
- the date, time and duration of a communication
- the type of communication
- the communication device
- the location of mobile communication equipment

$\Rightarrow$ Make sure this information is plentiful and useless.

Polititical challenges: Key Escrow

Political fight for privacy is not just about anonymity anymore:

- Bad Idea in the 90's
- US: back for suitcases!
- UK: encryption key disclosure

Social challenges: Security (1/2)

Lemma:

Good security is more costly and harder to understand and deploy than bad security.

Theorem:

Insecure solutions will continue to be used in capitalistic or democratic societies.

Social challenges: Security (2/2)

Lemma:

If privacy seems to burdensome, temptation to minimize or ignore privacy issues arises.

Social challenges: Volunteers & Abuse

Helping others to remain anonymous can be hazardous:

- Tor exit relays are seen (and prosecuted) as attackers

  $\Rightarrow$ Ideally, we do not have exit relays

- Wiretapping is illegal for non-Republicans (in US), logging is required (in EU)

  $\Rightarrow$ Impossible to abide by all laws

Social challenges: Availability

In France, users caught downloading "illegal" content will:

1. Receive an e-mail warning
2. Receive a written warning
3. Be cut off for a year

A Few Words on Copyright

Popular Culture and Copyright (1/3)

	Art	Software
Before Copyright	Folklore	Hacker culture

Popular Culture and Copyright (2/3)

	Art	Software
Before Copyright	Folklore	Hacker culture
With Copyright	Mass communication Media culture	Helpless users

Popular Culture and Copyright (3/3)

	Art	Software
Before Copyright	Folklore	Hacker culture
With Copyright	Mass communication Media culture	Helpless users
After Copyright	Mass collaboration	Free software

Privacy and Copyright (1/3)[3]

To a computer, facts about me (such as health data with privacy concerns) and copyrighted material are both just data.

Both copyright enforcers and privacy advocates share the same technical problem:

data is out of control

[3]Thanks to Johnathan Zittrain.

Privacy and Copyright (2/3)

The protection methods are fundamentally different:

Concern	Method	Controlled by	Licensing
Copyright	DRM	Data's distributor	Proprietary
Privacy	PET	Who the data is about	free software

Privacy and Copyright (3/3)

Why should we care about free software and PETs?

- Regain control over *our* private data
- Transcend the `ro`-culture and enable creativity (`rw`)

Activities

Human Consider implications of disclosing personal data

Internet-User Learn to use PETs, start with Tor

Developer Contribute to free software projects for privacy

Philosopher Develop guidelines for using data

Conclusion

Privacy is a hard problem

- Critical to modern society

  $\Rightarrow$ Solutions need to be free

- Affects everyone

  $\Rightarrow$ Should you really be using social network sites?

RTFL

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