Privacy in an Online World – Fact or Fantasy?

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Introduction

• This is *not* a political presentation, although the nature of the subject matter in today’s global political climate does have political overtones.

• This *is* a technical presentation.

• There is no technology, no matter how benign in concept, that cannot be subverted for evil ends.

"Those who would give up essential liberty to purchase a little temporary safety, deserve neither liberty nor safety."

**Benjamin Franklin**
Privacy - Definition

• What is meant by privacy?
  • Law’s view of privacy.
  • Privacy From (all sorts of agencies and individuals) …
  • Privacy For (all sorts of things) …

• Potential threats and protection against them:
  Universal unique identification.
  Paranoia and schizophrenia (are your friends).
  The threats of the new digital world.
  Self defense: the judo approach and beyond.
  Some references, both on-line and books.

• Privacy and security are mutually exclusive
A view of privacy and the Law

• The Internet is supra-national

• No single body of law governs the Internet

• Many governments feel threatened
  • U.A.E, Egypt, Libya revolts started through social networks

• Jurisdiction is an issue the Internet is international

• There is little (or no) law that you can depend on for protection

• Where you reside determines what laws can be wielded against you:
  • PATRIOT (US)
  • RIP (UK)
Privacy from “others”

• Friends, neighbors, family, and co-workers
• Marketers and retailers
• Credit agencies and other financial institutions
• Employers, actual and prospective
• Governmental agencies
• Snoops: professional, criminal and amateur
• All ‘round bad folks!
Privacy to guard

• Life history
• Medical records
• Financial records
• Legal records
• Education and employment records
• Activities, habits and personal tastes
• Purchase transaction histories
• THE public record
Identity uniqueness

• Everyone is unique, just like everyone else!

• Ultimate control is represented by instant,
  • automated identification of any individual

• Without unique identity, it is impossible to
  • definitively connect all the dots for any given
  • individual

• Safety and privacy lie in fragmentation

• Many powerful tools are emerging to link
  • fragmented sets of data together
    • Good analytics tools based on powerful
      search engine technology at its heart
Universal Identifiers

National I.D. Numbers
• Passports
• “Secure” boarding information
• Medical Record Identifiers
• Social Security (even if it isn’t supposed to)
  • California and some states have implemented laws to drive out SSN as an identifier
• Insurance Numbers
• Tax and Voting Roll Identifiers
• Name, Address, and Telephone Numbers
• Driving Licenses
• “Agency” Identifiers, both official and not
Biometrics

• What is meant by biometrics?

• It means the measuring of some (ideally unique) physical characteristic/attribute of an individual:
  - Fingerprints, thumbprints, and footprints
  - Voiceprints
  - Iris (eye) scanning
  - Facial profiling
  - DNA profiling
  - RFID Implanting

• The goal is unique identification of individual;
  • Preferably in under 10 seconds on the wall clock
  • To a discrimination of better than 1 in 1e11 (100 billion);
  • Discrimination to 1e10 isn’t going to be good for very long!
Chip implantation anyone?

- A tiny computer chip approved for implantation in a patient’s arm can speed vital information about a patient’s medical history to doctors and hospitals.
- But critics warn that it could open new ways to imperil the confidentiality of medical records.
- The Food and Drug Administration said that Applied Digital Solutions of Delray Beach, Fla., could market the VeriChip, an implantable computer chip about the size of a grain of rice, for medical purposes.
- With the pinch of a syringe, the microchip is inserted under the skin in a procedure that takes less than 20 minutes and leaves no stitches.
- U.S. Army is considering the use of these chips.
Paranoia and Schizophrenia

• Which one of my enemies told you I was paranoid?
  • Yes, *they* really are out to get you
  • Never ascribe to malice that which can adequately be explained by stupidity (or incompetence and ineptness)
  • The combination is spectacularly deadly
    • Lowe's unsecured WiFi network at a store in suburban Detroit

• Schizophrenia is your friend:
  • The more personae you can present, the less chance *they* have of connecting them all to you
  • The increased effectiveness of data analytics will make this more difficult over time
The Digital Threat

- **Data sets are immortal**
- Specific data sets may vanish below the threshold of visibility, but are seldom totally eliminated.
- Only dependence on obsolete media prevents near instant recovery.
  - Government seeking ways to recover obsolete data.
- Important data is never deliberately lost, and seldom accidentally rendered unrecoverable.
- Distributed processing proliferates copies.
Moore’s Law

• Computer hardware doubles in power and halves in price every two years

• Postulated in 1965 (for transistors on chips), by Gordon Moore, founder of Intel Corp

• We’ve remained ahead of the curve ever since:
  • Memory at $1M / megabyte in 1970 …
  • Disk at $1,000 / megabyte in 1970 …
  • 20 cps Teletype represented only universal data transmission infrastructure in 1970 …
  • 256Gb flash drive
Data Density

20 megabytes represents:

• The entire bible (old and new testaments) as uncompressed text
• In 1970: one 1,600 bpi, 5,000 foot tape reel
• In 1970: two weeks of data transmission at 20 cps
• In 1975: 1/5th of a $100,000 IBM 3330-I disk
• In 1980: 1/4 of a $10,000 80 megabyte SMD disk
• In 1990: 6% of a $1,000 5 1/4 inch PC hard disk
• In 2000: 0.1% of a $400 20 gigabyte PC hard disk
• Today: 0.01% of a $200 240 gigabyte PC hard disk

Today: of the order of 1 second of data transmission over a gigabit network
Division and Multiplication = Less (privacy)

- Replication of enormous data sets is a relatively easy task
- Systematic analysis of enormous data sets is routinely performed on desktop hardware
- Increasing trends among “authorities” to link databases, ideally via common unique IDs
  - *Data mining/warehousing* is the name of the game
- Web enablement everywhere: official, public, and private
  - Atom feeds and mashups common
Accidental/Intentional Exposure

- Publishing data can have unexpected side-effects, and unforeseen consequences:
  - The Starr Report’s deleted sections;
  - The British security report on Iraq’s weapons threat

- Ease of access invariably exposes loopholes that enable unauthorized access
  - Patches issued weekly by Microsoft to ‘fix’ O/S and browser software

- Today's network infrastructures were designed around a trust model!

- None of today’s popular publishing and storage technologies are intrinsically secure
  - Even less so, are the ‘cloud’ solutions

- WiKiLeaks
  - Disclosure of 250,000 US Embassy cables
  - Classified Guantanamo prisoner dossiers
Encryption Anyone?

• Strong encryption is truly impenetrable:
  • The only viable attacks are via social engineering;
  • Alas, people are gullible, ignorant, and lazy.
• “Authorities” dislike not being able to know:
  • Key escrow in US (the Clipper chip);
  • RIP bill in the UK mandating key disclosure on demand
  • Anti-terrorist acts everywhere as excuse
• Weak encryption typically mandated or broken and continued use!
  • Resulting in cosmetic security
• Use of strong encryption often draws suspicion.
• When technology is strong, attack the people;
  • Social engineering plus direct and indirect surveillance
  • Key stroke trackers and password grabbers
The State of the Union

• Much replication of huge data sets
  • State/local use of federal databases
• Large proportion of stored data vulnerable to accidental exposure, especially when published on-line or transmitted over IP infrastructure
• Little legal recourse
  • Some countries have begun to enact privacy legislation
• “Authorities” are fundamentally opposed to strong protection that might delay or deny them access
• Everyone wants to construct (secret) profiles…
  • And stuff them chock full of details,
  • Which you can’t see to validate, let alone veto, or even correct
The Judo Defense

• Employ leverage to use attacking agents’ own momentum against them.
• Proportional response to scale of threat
• Learn to recognize when you can’t win
• Avoidance is better than conflict
• Conflict leaves its own records, and they form their own patterns
• Avoiding creating patterns is the key
The Big Stick Wins

• You can never win against the three-letter agencies of the world
  • They have more resources (money, time, people)

• The trick is never to put yourself into their sights
  • The concept is the same as a stealth plane

• Creating and maintaining multiple public personae is a very costly partial defense

• It is extremely hard to avoid creating patterns of some kind, and patterns can be detected and analyzed

• Statistical methods and data analytics are astonishingly powerful in this regard
Fragmentation

- Record every individual release of a personal identifier, and the data associated with it
- Generate a viable variant on the identifier whenever possible, and track proliferation
  - Alter middle initial/name, etc.
  - Different SSN when demanded by say a physician
- Aggressively confront abusers and demand revocation or deletion from records
  - The law may help you, but this depends on the jurisdiction
  - Using the law creates patterns and draws attention
- Monitor all official records and insist on correction and amendment aggressively
Home Defense

- Hide behind a physical personal firewall with NAT translation for indirection
- Use of a proxy server is also good for adding layers to the defense
- Ideally add a second level of indirection
- Strongly encrypt everything all the time
  - Use secure access and control disciplines
  - Never allow software to “remember” a password, ever
- If paranoid, secure the physical environment
- Routinely scans for spyware (and malware)
- Ideally run a secure operating environment
- Absolutely do not run a Microsoft OS
  - PCs, Tablets and Smartphones
  - Turn off GPS services on Smartphones and tablets
Electronic Tracking

• GPS equipped cell phones/Smartphones;
  • Including those built into vehicles (e.g. GM’s OnStar™)
  • Also tools like runners watches with built-in GPS
• Wireless emission trackers:
  • RFID is NOT our friend;
  • Bluetooth at ranges of up to a mile!
  • Voice over IP interception (the digital wire-tap on demand)
    • Note: Phil Zimmerman, creator of PGP, is now tackling this area.
• Surveillance:
  • Terrestrial (Closed Circuit video, card swipers, static sensors, credit card bluetooth);
  • Airborne - EMS imaging, UAVs;
  • Spaceborne - EMS imaging
    • Google Earth
• Desktop:
  • Web bugs, keyloggers and spyware
Anonymity and Free Speech

• Anonymity has been deliberately demonized:
  • Only those with something to hide …
  • True anonymity defeats control (which government HATES)

• Anti-terrorism and drug war have been seized as an excuse

• Maintaining anonymity will attract attention

• E-Mail: use an international version of PGP

• Usenet: use anonymous re-mailers

• WWW: use caching proxies and a non-standard browser such as Opera or OmniWeb
  • As a matter of course turn off cookies and cache
For the Seriously Paranoid

• Always use a lap-top, consider using public PCs like those at a library
• Always maintain critical data on an off-line storage device, and strongly encrypted
  • The “little” USB keychain memories (thumb disks) are great
  • You can also have an entire system on a 2 to 4 Gb USB thumb drive
• Always do your serious computing away from e-surveillance - a park bench, say
• Always connect to networks via public access points such as Internet cafés and hotel lobbies
  • War-chalking might be your friend
• Widely vary your use of such access points and do not use the same one with regularity
War Stories

• Google Groups:
  • regular changes of posting IDs render any matching of all my postings very difficult

• Evading urban surveillance:
  • [http://www.appliedautonomy.com/isee/info2.html](http://www.appliedautonomy.com/isee/info2.html) web-based application charting the locations of closed-circuit television (CCTV) surveillance cameras in urban environments

• Multiple different SSNs to use for medical care ID
  • Slight number variations, all unique, no two the same
  • California residents won’t have this need
Final Thoughts

• Consider doing all your computing using an obscure natural language.
  • Did we all see the film “The Windtalkers”?

• Aggressive anonymity will draw attention:
  • Weigh the costs against the needs very carefully

• Aggressive defense of your records will draw both attention and active hostility:
  • Be prepared for legal battles and publicity
  • Demonization will be expected (The nail that sticks up will be hammered down)

• Martyrdom is currently on the cards:
  • Unheralded disappearance is also
  • Some steps already in place with laws already in effect
On-Line Reference Sites (1)

• The Electronic Privacy Information Center:
  • <http://www.epic.org/>

• People For Internet Responsibility:
  • <http://www.pfir.org/>

• Privacy International:
  • <http://www.privacyinternational.org/>

• The Privacy Forum:
  • <http://www.vortex.com/privacy/>

• The ACLU:
  • <http://www.aclu.org/Privacy/PrivacyMain.cfm>
On-Line Reference Sites (2)

• Bruce Schneier:
  • <http://www.schneier.com/>

• A list of advisories at the Privacy Foundation:
  • <http://www.privacyfoundation.org/>

• An excellent bibliography on anonymity:
  • <http://www.freehaven.net/anonbib/>
  • Well worth watching to see the current state of play.

• Privacy at the Open Directory Project (DMOZ):
  • <http://dmoz.org/Society/Issues/Human_Rights_and_Liberties/Privacy/>
Books for the Serious (1)

- **The Digital Person**: Technology And Privacy In The Information Age

- **How to Be Invisible**
  - J.J. Luna - Thomas Dunne Books 2004

- **Beyond Fear**: Thinking Sensibly about Security in an Uncertain World
  - Bruce Schneier - Copernicus Books 2003

- **Crypto**: How the Code Rebels Beat the Government Saving Privacy in the Digital Age
  - Steven Levy - Penguin Putnam 2002

- **Database Nation**: The Death of Privacy in the 21st Century
  - Simson Garfinkel, Deborah Russell - O'Reilly & Associates 2001

At Amazon, look at what other books customers of each of these books bought.
Books for the Serious (2)

- The End of Privacy: How Total Surveillance is Becoming a Reality
  - Reginald Whittaker - New Press 2000
- Privacy on the Line: The Politics of Wiretapping and Encryption
  - Whitfield Diffie and Susan Landau - MIT Press 1999
- Identity, Privacy, And Personal Freedom: Big Brother vs The New Resistance
  - Sheldon Charrett – Paladin Press 1999
- Technology and Privacy: The New Landscape
  - Philip E. Agre and Marc Rotenberg - MIT Press 1998
- Computer Privacy Handbook *(currently cheap at Amazon)*
  - Andre Bacard - Peachpit Press 1995