

The Significance and Evolution of End User Privacy

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How do you feel about information privacy?



How do others feel about it?



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Data Breach May Have Exposed 100 Million Credit Cards

Wednesday, January 21, 2009 | [FoxNews.com](#)

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A New Jersey credit-card processor disclosed a data breach that analysts said may rank among the biggest ever reported.

Heartland Payment Systems Inc. said Tuesday that cyber criminals compromised its computer network, gaining access to [customer information](#) associated with the 100 million card transactions it handles each month.

The company said it couldn't estimate how many customer records may have been improperly accessed, but said the [data](#) compromised include the information on a card's magnetic strip — card number, expiration date and some internal bank codes — that could be used to duplicate a card.

In the news...

The screenshot shows the MSNBC website interface. At the top left is the MSNBC logo. To its right is a search bar with the text 'Powered by Bing' and a magnifying glass icon. Below the search bar are navigation links for 'featuring TODAY', 'Nightly News', 'Dateline', and 'Meet'. The main navigation bar includes a home icon and the text 'Technology & science / Security'. On the left side, there is a 'Categories' menu with links for U.S. news, World news, Politics, Business, Entertainment, Sports, Health, Tech & science, Science, Space, Tech and gadgets, and Games. The main content area features a large red headline: 'LexisNexis warns of possible data breach'. Below the headline is a sub-headline: 'Notifies 32,000 people that personal data may have compromised'. The author is listed as 'By Amy Westfeldt' from 'Associated Press', with a note that the article was updated at 7:02 p.m. ET on Friday, May 1, 2009. The article text begins with 'NEW YORK - The LexisNexis online information service is warning 32,000 people their personal information may have been improperly accessed in a credit card fraud scheme that postal officials say bilked hundreds.' It continues with 'New York-based LexisNexis says in a letter mailed Friday that former customers of the service may have viewed information including names, birth dates and Social Security numbers.' On the right side of the article, there is a 'Most popular' section with two tabs: 'Most viewed' and 'Top rated'. Under the 'Most viewed' tab, several news items are listed, including 'BP turns to giant shears to Gulf pipe', 'Chile hunts Holloway suspect over', 'Blown call costs Galarraga in 9th', and 'Officials: U.S. believes Gaza blocka 2nd affair claim hits S.C. governor'. At the bottom of this section is a link for 'Most viewed on msnbc.com'.

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LexisNexis warns of possible data breach

Notifies 32,000 people that personal data may have compromised

By Amy Westfeldt
Associated Press
updated 7:02 p.m. ET, Fri., May 1, 2009

NEW YORK - The LexisNexis online information service is warning 32,000 people their personal information may have been improperly accessed in a [credit card fraud](#) scheme that postal officials say bilked hundreds.

New York-based LexisNexis says in a letter mailed Friday that former customers of the service may have viewed information including names, birth dates and [Social Security numbers](#).

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Chile hunts Holloway suspect over

UPDATED Blown call costs Galarraga in 9th

Officials: U.S. believes Gaza blocka 2nd affair claim hits S.C. governor

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In the news...

The screenshot shows a news article on the website newsobserver.com. The page is categorized under 'Technology'. The navigation menu includes Home, News, Sports, Business, Politics, Life, Entertainment, Opinion, and Obits. The article title is 'Hacker hits UNC-CH study data'. It includes a sub-headline 'Foreclosure database: Look up filings in the Triangle from the p...', publication and modification dates from September 25, 2009, and a comment count of 2. The article text discusses a data breach at UNC-Chapel Hill involving 236,000 women's personal data and 163,000 study participants' Social Security numbers.

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Foreclosure database: Look up filings in the Triangle from the p

PUBLISHED FRI, SEP 25, 2009 05:17 AM
MODIFIED FRI, SEP 25, 2009 05:31 AM

Hacker hits UNC-CH study data

ARTICLE COMMENTS (2)

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BY ERIC FERRERI - STAFF WRITER
Tags: [news](#)

CHAPEL HILL -- A hacker has infiltrated a computer server housing the personal data of 236,000 women enrolled in a UNC-Chapel Hill research study.

Among the information exposed: the Social Security numbers of 163,000 study participants.

Though the intrusion was detected in late July, computer forensics experts say it may have happened two years ago, said Matthew Mauro, chairman of the UNC-CH Department of Radiology.

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Hackers Want Millions For Data on Prescriptions

Theft of Va. Patient Records Claimed

By [Brian Krebs and Anita Kumar](#)
Washington Post Staff Writers
Friday, May 8, 2009

RICHMOND, May 7 -- The FBI and Virginia State Police are searching for hackers who demanded that the state pay them a \$10 million ransom by Thursday for the return of millions of personal pharmaceutical records they say they stole from the state's prescription drug database.

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Google Street View Privacy Breach: Lawmakers Get Mad

Jared Newman, PCWorld May 20, 2010 10:40 am

Want a metric for the speed of U.S. government? Just look at the response to Google Street View cars' [accidental collection of private data](#).



On Wednesday, U.S. Lawmakers [started showing some rage](#) over the incident, in which Google admitted that its Street View photography cars around the world inadvertently collected private communications data from unsecured Wi-Fi networks. U.S. Reps. Joe Barton and Edward Markey have asked the Federal

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updated 9:32 p.m. EDT, Tue March 31, 2009

U.S.: Identity theft grows as hackers get savvier

- STORY HIGHLIGHTS**
- Justice official: Techn
 - Official: In many case
 - New method called "f
 - Feds across the cour

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By Terry Frieden
CNN Justice Producer

TEXT SIZE - +

WASHINGTON (CNN) -- Sophisticated techniques developed by a new breed of cyber-criminals intent on stealing personal data represent a growing threat to millions of Americans, a top U.S. Justice Department official told Congress Tuesday.

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CARD SHARP by Aleksandra Todorova (Author Archive)

Published February 2, 2010

Anatomy of a Data Breach

CHANCES ARE GOOD that you've recently been declared a victim of a data breach.

A data breach occurs when records containing sensitive personal information, such as names, addresses or social security numbers, are compromised. That could mean the loss or theft of a laptop; a hack into a retailer or payment processor's database containing credit-card numbers; or a situation in which an employee with access to sensitive information sells it to a third party.

Data breach notification letters are a dime a dozen these days thanks to recently passed laws governing disclosure.

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Facebook in the news...

Thumbs down for Google, Facebook Personal Privacy Concerns

By Oliver Marks | April 20, 2010, 9:58pm PDT

Check your Facebook privacy settings. Now!
More than ever, your personal information is flapping in the breeze

A Flashy Facebook Page, at a Cost to Privacy
Add-Ons to Online Social Profiles Expose Personal Data to Strangers

Facebook's Zuckerberg Says The Age of Privacy is Over

Written by [Marshall Kirkpatrick](#) / January 9, 2010 9:25 PM / [254 Comments](#)

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Google's Orwell Moment

On the Web, privacy has its price.

Google recently introduced a new service that adds social-networking features to its popular Gmail system. The service is called Buzz, and within hours of its release, people were howling about privacy issues—because, in its original form, Buzz showed everyone the list of people you e-mail most frequently. Even people who weren't cheating on their spouses or secretly applying for new jobs found this a little unnerving.

Google backtracked and changed the software, and apologized for the misstep, claiming that, gosh, it just never occurred to us that people might get upset. "The public reaction was something we did not anticipate. But we've reacted very quickly to people's unhappiness," says Bradley Horowitz, vice president for product management at Google.

It's hard to imagine Google could have been so clueless. Google's coder kiddies may be many things, but stupid isn't one of them.

In the news...



Hospital Workers Suspended for Allegedly Peeking at Clooney Medical Info

Wednesday, October 10, 2007

Associated Press

NEWARK, N.J. —

More than two dozen hospital staffers have been suspended for four weeks after allegedly peeking at George Clooney's confidential medical information after he was hurt in a motorcycle accident last month.

Clooney, 46, suffered a broken rib and scrapes in the Sept. 21 crash, while his passenger, Sarah Larson, 28, injured her foot. Both were treated at Palisades Medical Center in North Bergen.

The People Factor

- People are the weakest link!!!
 - Phishing schemes
 - Opening email attachments
 - Easy to guess passwords
 - The desire to trust
 - Unknowledgeable
- User study presented at the IEEE Symp. on Security and Privacy, 2007
 - 100% ignored the absence of HTTPS
 - 97% ignored the absence of site authentication image
 - 53% ignored invalid certificate message from browser

What's going on?



Thanks to Jeff Crume, IBM,
for this image and idea.

Websites and How They Influence Behavior

- What kind of organization is it?
- How reputable is the organization?
- How old is the consumer?

Innovative Web Use to Learn about Consumer Behavior and Online Privacy,
Julia B. Earp and David Baumer, *Communications of the ACM*, 2003.

- Is the consumer male or female?

Privacy Taxonomy

- **Privacy Protection Goals**

- Access/Participation
- Choice/Consent
- Enforcement/Redress
- Integrity/Security
- Notice/Awareness



- **Privacy Vulnerabilities**

- Information Aggregation
- Information Collection
- Information Monitoring
- Personalization
- Solicitation
- Information Storage
- Information Transfer

A Requirements Taxonomy to Reduce Website Privacy Vulnerabilities,

Annie I. Antón and Julie B. Earp.

Requirements Engineering Journal, 2004.

Privacy Values 2002

[IEEE Trans. On Engineering Management, 2005]

- Data was collected from 1005 Internet users in 2002 to establish a privacy values baseline for correlation with our privacy protection goals and privacy vulnerabilities taxonomy.
- Consumers were most concerned with (in order):
 - information transfer
 - notice/awareness
 - information storage

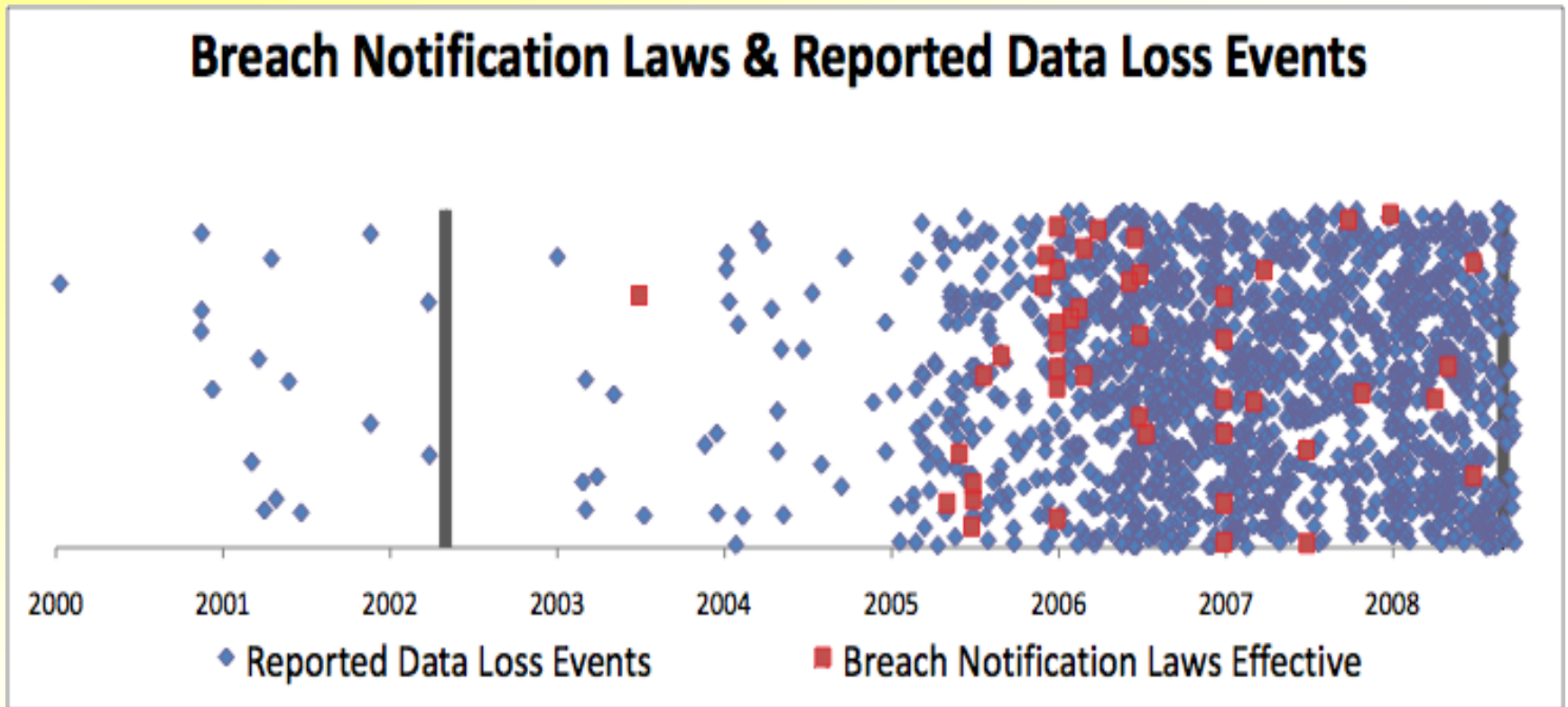
What influential events have occurred since **2002?**



What has happened since 2002?

- E-commerce
 - \$ spent on e-commerce has more than tripled
- Social Networking
 - Linked In now has more than 39 million members
 - Facebook has more than 200 million active users
- Complaints of ID Theft
 - More than doubled
- State legislation
 - Data Breach Notification Laws
- HIPAA Compliance Deadlines

What have the data breach notification laws done?



Privacy Values 2008

Follow-up survey of Internet users
worldwide

2,094

usable responses



Privacy Values 2008

- Respondents use the Internet more often now
($p < 0.0001$)
- Respondents purchase more frequently online
now
($p < 0.0001$)

Have user concerns changed?

- The top three information privacy concerns continue to be
 - information transfer,
 - notice/awareness,
 - information storage.
- The difference lies with the individuals' level of concern

Concern #1: Information Transfer

- Respondents are *more concerned* about
 - Disclosing purchasing patterns to 3rd parties
(p value = .0087)
 - Trading or selling PII to 3rd parties
(p value = .0013)
- What has caused these changes?
 - Reports about increase in fraud and identity theft complaints being filed
 - News stories pertaining to data brokers and data breaches

Concern #2: Notice / Awareness

- Respondents now *want to know*:
 - About security safeguards used to protect their PII
(p value = .0029)
- Respondents are *less concerned* about
 - Having the option to decide how their PII is used
(p < .0001)
 - Changes in privacy practices
(p < .0001)
 - Disclosures concerning PII use
(p = .0144)
 - Previously undisclosed changes in the way PII is used
(p = .0002)

Concerns #3 and 4

- Information Storage
 - No significant changes since 2002
- Access/Participation
 - No significant changes since 2002

Concern #5: Information Collection

- Respondents are *more concerned* about
 - Recording of previously visited web site
(p value = .0002)

Concern #6: Personalization

- Respondents are *more concerned* about PII used:
 - to customize their browsing experience
($p < .0001$)
 - to monitor their purchasing patterns
($p < .0001$)
 - for marketing and research
($p = .0308$)
- Respondents are *less concerned* about:
 - websites using cookies ($p = .0391$)

U.S. vs International Concerns in 2008

- U.S. respondents' top concerns in 2008
 - #1 information transfer
 - #2 notice/awareness
 - #3 information storage
- Non-U.S. respondents' top concerns in 2008
 - #1 information transfer
 - #2 information storage
 - #3 notice/awareness.



U.S. vs International Concerns in 2008

- Specifically, individuals in the U.S. are more concerned about
 - (a) the disclosure of their purchasing patterns and information to third parties
 - (b) their personally identifiable information being traded with or sold to third parties

U.S. Respondents are Significantly More Concerned...

- Ages 22-28
 - about websites disclosing individuals' purchasing patterns to third parties
 - about wanting to know how their PII will be used
- Ages 29-35
 - about general consumer information being shared with third parties
- Ages 22-35
 - about PII being traded with or sold to third parties

Non-U.S. Respondents are Significantly More Concerned...

- Ages 22-28
 - about unauthorized employees and/or unauthorized hackers gaining access to their information.
 - about a website he/she visits collecting information about browser configurations or IP address, without an individual's consent.
- Ages 29-35
 - about wanting a website to allow individuals to check their PII for accuracy.
- Ages 36-42
 - about a website he/she visits collecting information about browsing

Key Takeaways

- People have different views, concerns and strategies with regard to information privacy
- We must incorporate these concerns into our systems
- There are many user studies that will allow you to learn about the users
- Conduct your own user studies if necessary