20 – Privacy and anonymity tools

Lorrie Cranor

April 3, 2017
Today’s class

• Types of privacy tools
• Opt-out tools
• Anonymity tools
• Discussion
Privacy space framework

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Informative</td>
<td>Display information about trackers on current webpage, whether location is being sent</td>
</tr>
<tr>
<td>Detection</td>
<td>Actively look for problems</td>
<td>Find trackers on current webpage</td>
</tr>
<tr>
<td>Prevention</td>
<td>Used as a precaution</td>
<td>Encryption tools, anonymity tools</td>
</tr>
<tr>
<td>Response</td>
<td>Taking action after a problem is detected</td>
<td>Tracking blocker</td>
</tr>
<tr>
<td>Recovery</td>
<td>Help you get back to normal</td>
<td>Patching bugs</td>
</tr>
</tbody>
</table>

Privacy Enhancing Technologies

http://www.mobilecloak.com/

http://tor.eff.org/
KEEP PRIVATE INFORMATION PRIVATE

SECURITY SHREDDER SCISSORS
Only $12.97
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When you win, we won’t tell a soul.
(You may have a harder time.)

When you win with the Delaware Lottery, privacy is our policy. We’ll never release your name for promotional purposes - unless you tell us otherwise. Which means you can keep your good fortune as quiet as you want. So play Delaware Lottery Games. Because when you win big in our state, we won’t say a word.

Click Here To Download Our "Guide To Winning Kit."

Kit includes: Guide To Winning Brochure, Mask Print Out, and Drawing Schedule

You could be the next winner?

Wayne Lemons, Delaware Lottery Director
Delaware Lottery Office
McKee Business Park
1575 McKee Road, Suite 102
Dover, DE 19904
Phone: 302-739-5291
Fax: 302-739-6706

Play Responsibly — If you or someone you know has a gambling problem, call the Delaware Gambling Helpline — 1-888-850-8888.

It’s the Law — You must be 18 years of age or older to purchase Delaware Lottery tickets.

Designed to comply with the accessibility guidelines developed through the WAI and the Web Presentation Guidelines for State of Delaware Agencies.
August 15, 2007
POWERBALL® Drawing
$10,000 Prize Winner
Purchased at 7-11 Foak Road in Wilmington

1. Print out mask
2. Cut along dotted lines
3. Adhere mask to popsicle stick, paint stirrer, drum stick, ruler
4. Cover face and enjoy your anonymity

deottery.com
Types of privacy tools

• Cookie/tracker blockers
• Opt-out, do not track
• Tracking awareness
• Encryption
  – Email, chat, web traffic, VPN, files, file system, disk
• Cleaners/wipers
  – Delete/don’t store browser history, delete files
• Anonymity
  – Web traffic, email, bulletin boards, surveys, voting
• Obfuscation
  – Add noise to web browsing, searches, databases
• Physical
  – Walls, curtains, blinds, laptop privacy screens, shredders
• Others?
Where can privacy tools be implemented?

• Built into browsers
• Browser plugins
• Mobile apps
• Standalone user tool
• Web-based
• Server-side tool
• Built into operating systems
• On the network (routers, firewalls, etc.)
Challenges

• Conveying the purpose of the tool
  – In what way does this tool protect privacy?

• Conveying current privacy state
  – Is tool currently on and working? Have trackers been detected?

• Configuration
  – Provide meaningful and flexible options users can understand and configure to match their preferences and meet their needs, don’t overwhelm users with too many options they can’t understand, make options easy to find and access

• Avoiding errors, failing safe
  – Will users believe they are protected when they are not?
Why Johnny Can’t Opt Out

• August 2011 lab study
• 45 participants, each evaluated 1 of 9 tools
  – Screened for non-technical, no knowledge about privacy tools but interested in testing them
• Protocol
  – Task 1: Learn about and install the tool
  – Task 2: Change tool settings
  – Task 3: Browsing scenario
  – Exit questionnaire


CHI 2012
Online behavioral advertising (OBA)
Later that day…

On www.reference.com:

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On www.nytimes.com

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www.coolcapitals.com

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www.renaultusa.com

On www.cnn.com: is it OBA?
OBA choice mechanisms
Three types of tools tested

<table>
<thead>
<tr>
<th>Blocking Tools</th>
<th>Opt-out Tools</th>
<th>Privacy built in browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdBlock Plus</td>
<td>DAA</td>
<td>Privacy built in browser</td>
</tr>
<tr>
<td>Ghostery</td>
<td>EVIDON</td>
<td></td>
</tr>
<tr>
<td>TPLs</td>
<td>PrivacyMark</td>
<td></td>
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<tr>
<td>ABINE</td>
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</tr>
</tbody>
</table>
Tools to provide notice & choice

- Support from industry, FTC, White House
- Do the tools work?
  - Does technology do what it is supposed to do?
  - Do companies respect user choices?
- Can consumers use them?
  - Do users understand tracking?
  - Do users understand what tools do?
  - Can users make tools do what they want?
Major problems with all tools

- Communication problems and confusing interfaces
- Inappropriate defaults
- Users can’t distinguish between trackers
- Need for feedback
- Users want protections that don’t break websites
DAA website

Welcome to the online home of the Self-Regulatory Program for Online Behavioral Advertising.

Building on the Self-Regulatory Principles for Online Behavioral Advertising (Principles) released in July 2009, the nation’s largest media and marketing associations have come together to launch this Program, which gives consumers a better understanding of and greater control over ads that are customized based on their online behavior (also called “interest-based” advertising).

Our participating companies share a commitment to delivering consumers a robust and credible Program of notice and choice for online behavioral advertising and to enhancing consumer confidence in the online medium.

For Consumers

Learn about Online Behavioral Advertising: If you’re an online user, you can find out more about online behavioral advertising and how it helps provide you with more relevant advertising on the websites you visit. You’ll learn how online advertising supports the free content, products and services you use online, what choices you have, and how to use browser controls to enhance your privacy.

Exercise Your Choice: You can now visit the beta version of the Program’s Consumer Opt Out Page, which allows users to...
Opting out can be challenging
Ghostery configuration interface

- Performance Options
  - Scan and block images served off the matched tracker domain
  - Scan and block iframes served off the matched tracker domain
  - Scan and block embed and object tags served off the matched tracker domain
  - Look for and prevent redirection from known trackers
  - Scan for dynamically inserted page elements

- Blocking Options
  - Enable web bug blocking
  - Enable cookie protection [experimental]

659 bugs & 396 cookies (click for more info)

- 24/7 Real Media
- 2Ieep
- 33Across
- 3DStats
- 5min Media
- [x+1]
- Accelerator Media
- Ad Age Media
IE settings use jargon

- Blocks third-party cookies that do not have a compact privacy policy
- Restricts first-party cookies that save information that can be used to contact you without your implicit consent
IE tracking protection list
Takeaways

- Problematic defaults
- Poorly designed interfaces and jargon
- Feedback
- Misconceptions about opt-out tools
- Users unable to make meaningful decisions on a per-company basis
Some recent improvements/changes

• Many changes to UIs of pluggin tools
• Microsoft removed some privacy features from Edge
• Do Not Track standard continues to be a work in progress
• DAA website hasn’t changed much
Gorsuch picks up another vote

Third Senate Democrat announces support for judge

Here’s how senators plan to vote on Gorsuch

McConnell, Schumer square off ahead of Gorsuch votes

Graham booed over Gorsuch vote

News and buzz

From computer whiz to ISIS’ Twitter star
Tracker Options

Select the trackers that you want to block, individually or by category, to customize your browsing experience.

Categories | Collapse | Expand | Show All Trackers | Unblock All | Block All
--- | --- | --- | --- | --- | ---
Advertising | 1546 TRACKERS | 1518 Blocked | Provides advertising or advertising-related services such as data collection, behavioral analysis or retargeting.

Site Analytics | 531 TRACKERS | 127 Blocked | Collects and analyzes data related to site usage and performance.

Customer Interaction | 234 TRACKERS | 30 Blocked | Includes chat, email messaging, customer support, and other interaction tools.

Social Media | 94 TRACKERS | All trackers in category blocked | Includes tracking for social media sites.

Clear tracker settings
<table>
<thead>
<tr>
<th>Category</th>
<th>Trackers</th>
<th>Blocked</th>
<th>Description</th>
</tr>
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<tr>
<td>Customer Interaction</td>
<td>234</td>
<td>30</td>
<td>Includes chat, email messaging, customer support, and other interaction tools.</td>
</tr>
<tr>
<td>Social Media</td>
<td>94</td>
<td></td>
<td>Integrates features related to social media sites.</td>
</tr>
<tr>
<td>Audio/Video Player</td>
<td>48</td>
<td>14</td>
<td>Enables websites to publish, distribute, and optimize video and audio content.</td>
</tr>
<tr>
<td>Essential</td>
<td>47</td>
<td>3</td>
<td>Includes tag managers, privacy notices, and technologies critical to function.</td>
</tr>
<tr>
<td>Adult Advertising</td>
<td>19</td>
<td></td>
<td>Delivers advertising technology designed specifically for adult content sites.</td>
</tr>
<tr>
<td>Comments</td>
<td>10</td>
<td></td>
<td>Enables comments sections for articles and product reviews.</td>
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Audio/Video Player

Enables websites to publish, distribute, and optimize video and audio content.

<table>
<thead>
<tr>
<th>Company</th>
<th>Block Status</th>
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<tbody>
<tr>
<td>5min Media</td>
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<tr>
<td>Anvato</td>
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<tr>
<td>Auditude</td>
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<tr>
<td>Avid Media</td>
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<td>Blastro Networks</td>
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<td>Brightcove</td>
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<td>Burda</td>
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<td>Carambola</td>
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<td>CBS Interactive</td>
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<td>Celtra</td>
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<td>Comcast-Technology-Solutions</td>
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<td>FreeWheel</td>
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<td>Gannett Media</td>
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<td>Gazprom-Media Digital</td>
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<td>Georama</td>
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<tr>
<td>GetGlue</td>
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<tr>
<td>Hearst Digital Studios</td>
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### Social Media

**30 TRACKERS** All trackers in category blocked
Integrates features related to social media sites.

### Audio/Video Player

**14 TRACKERS** 14 Blocked
Enables websites to publish, distribute, and optimize video and audio content.

<table>
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<td>EuroWheel</td>
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About BurdaForward:
BurdaForward operates: Burda

About Us: https://www.burda-forward.de/impressum/
Website: https://www.burda-forward.de/
Industry Affiliations:

Privacy Information
Privacy Policy:
n/a
Data Collected:
Undisclosed
Data Sharing:
Undisclosed
Data Retention:
Undisclosed

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Keep browsing! Participation in Ghostrank helps us build a set of sites where this tracker was found (and we haven't seen a lot of it yet).
About Brightcove:
Brightcove operates: Brightcove, Brightcove Player, VideoJS

In Their Own Words
"Brightcove Inc., a leading global provider of cloud content services, provides a family of products used to publish and distribute the world's professional digital media. The company's products include Brightcove Video Cloud, the market-leading online video platform, and Brightcove App Cloud, the pioneering content app platform."

About Us: https://www.brightcove.com/en/company/about
Website: http://www.brightcove.com/en/
Industry Affiliations:
Tags: Video Player

Privacy Information
Privacy Policy:
http://www.brightcove.com/en/privacy
Data Collected:
Learn More
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Need help? Visit our support forums.

Want to detect and block Brightcove?
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Keep browsing! Participation in Ghostrank helps us build a set of sites where this tracker was found (and we haven't seen a lot of it yet).
Website: http://www.brightcove.com/en/
Industry Affiliations:
Tags: Video Player

Privacy Information

Privacy Policy:
http://www.brightcove.com/en/privacy

Data Collected:
Anonymous (Ad Views, Analytics, Browser Information, Cookie Data, Date/Time, Demographic Data, Hardware/Software Type, Internet Service Provider, Interaction Data, Page Views)
Pseudonymous (IP Address (EU PII), Search History, Location Based Data, Device ID (EU PII))
PII (PII Collected via 3rd Parties, Login, EU IP Address, EU Unique Device ID, Personally Identifiable Information (details undisclosed))
Sensitive (Financial Information)

Data Sharing:
Aggregate data is shared with 3rd parties., Anonymous data is shared with 3rd parties.

Data Retention:
As long as necessary to fulfill a business need or as required by law.

Privacy Contact

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The Anonymizer

- Acts as a proxy for users
- Hides information from end servers
- Sees all web traffic
- Adds ads to pages (free service; subscription service also available)
- http://www.anonymizer.com
Mixes [Chaum81]

Sender routes message randomly through network of “Mixes”, using layered public-key encryption.

\( k_X = \text{encrypted with public key of Mix } X \)
**How Tor Works: 1**

- Step 1: Alice’s Tor client obtains a list of Tor nodes from a directory server.
How Tor Works: 2

Step 2: Alice’s Tor client picks a random path to destination server. Green links are encrypted, red links are in the clear.
How Tor Works: 3

Step 3: If the user wants access to another site, Alice’s Tor client selects a second random path. Again, green links are encrypted, red links are in the clear.
Privacy tool discussion

• What are your favorite privacy tools?
• What functions do they perform?
• What makes them usable?