What is the value of anonymous communication?

Andrea Forte, Nazanin Andalibi, Rachel Greenstadt

32C3
December 27, 2015
This talk is not about stylometry

• Unlike my other CCC talks...

• Aylin Caliskan-Islam is speaking in Saal G on Day 3 at 17:15
Three Ways for Tor to Die

A call to arms: Helping Internet services accept anonymous users

- Legal/policy problems prevent relays or use of Tor
- Pressure on/from ISPs prevents exit relays
- Tor users shut out from websites

https://blog.torproject.org/blog/call-arms-helping-internet-services-accept-anonymous-users
Talk Overview

• How Tor is blocked by Internet services
• Wikipedia’s relationship with Tor
• Interview study of Tor users and Wikipedians
Sorry, you're not allowed to access this page.
Your IP address is: 104.149.238.180
Please retry your request and contact Yelp if you continue experiencing issues.

One more step
Please complete the security check to access blog.wfmu.org

Access denied. Your IP address [171.25.193.132] is blacklisted. If you feel this is in error please contact your hosting providers abuse department.

Access Denied
You don't have permission to access "http://www.foxnews.com/" on this server.
Reference #18.4d6e5668.1445538492.20b9c5ab

Error 403
Bad Behavior (anti-spam plugin)

We're sorry, but we could not fulfill your request for / on this server.
You do not have permission to access this server. Before trying again, run anti-virus and anti-spyware software and remove any viruses and spyware from your computer.
Your technical support key is: 591f-3905-2b02-1b1f
You can use this key to fix this problem yourself.
Disclosures

All interviews conducted by Andrea Forte who is trained in ethnographic methods
How Tor Works: 1

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

Dave

Jane

Bob
**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.
Do You See What I See?
Differential Treatment of Anonymous Users
Sheharbano Khattak, Sheharbano Khattak, David Fifield, Sadia Afroz, Mobin Javed,
Srikanth Sundaresan, Vern Paxson, Steven J. Murdoch, Damon McCoy,
to appear NDSS 2016

3.5% of Alexa top-1000 blocked for Tor users

- 2.507% Cloudflare (CDN)
- 0.362% other
- 0.349% custom
- 0.144% Bluehost (hosting)
- 0.126% Akamai (CDN)
- 0.028% Site5 (hosting)
- 0.028% Convio (hosting)

2000 blocked sites (ooni)
Wikipedia

“The problem with Wikipedia is that it only works in practice. In theory, it can never work.”


Wikipedia is a free-access, free-content Internet encyclopedia, supported and hosted by the non-profit Wikimedia Foundation. Those who can access the site can edit most of its articles.[5] Wikipedia is ranked among the ten most popular websites[4] and constitutes the Internet's largest and most popular general reference work.[6][7][8]
The decline in Wikipedia contributors

Figure 2. The English Wikipedia’s editor decline
The number of active, registered editors (≥5 edits per month) is plotted over time.
Wikipedia reflects its editors

**Effect of Movie Gender on Article Length**

- **Article Length**
  - **Men**
  - **Women**

- **Movie Gender (Z-Score)**
  - Values range from -3 to 3.
How can Tor protect Wikipedians

Even when they are logged in and not hiding from Wikipedia!

- Protects against local or government surveillance
- Wikipedia database of user IPs
  - administrators, attackers
- Reachability
- Cover and solidarity
Participation can be dangerous

- Bassel Khartabil
- Wikipedia editor, open source software developer, founder creative commons Syria
- Jailed for three years, disappeared
- Founded #NewPalmyra project to use satellite and high resolution imagery to create open 3d models of ancient structures
- Structures razed by Da’esh in 2015
Wikipedian of the year

I learned of a remarkable case of a Wikipedian, but to name this person would put them into danger, and I’ve been asked not to do it. And so the Wikipedian of the year 2015 is …in pectore.

-Jimmy Wales
Anonymity is just for jerks and trolls?

John Gabriel’s
Greater Internet Dickwad Theory

Normal Person + Anonymity + Audience = Total Dickwad

$#%@!!
Anonymous Blacklisting

Many variants: Nymble, Nymbler...

*Connecting to a Server*

- **Pseudonym Manager**
- **Nymble Manager**
- **Anonymizing Network**
- **Destination Server**

**Steps**:

1. Alice contacts the PM to obtain a pseudonym.
2. Alice provides the NM her pseudonym and obtains a nymble ticket.
3. Alice uses her nymble ticket to connect to her desired server.

Slides from Apu Kapadia
Anonymous Blacklisting
Many variants: Nymble, Nymbler...

Blacklisting a User

Step 1: Alice defaces a website
Step 2: The server complains to the NM, providing the misbehaving user's nymble ticket
Step 3: The NM provides the server a linking token for the misbehaving user's nymble ticket
Step 4: The server adds the misbehaving user to the blacklist
Step 5: Since Alice is blacklisted, she is refused further connections

Slides from Apu Kapadia
Anonymous Blacklisting

Many variants: Nymble, Nymbler....

Slides from Apu Kapadia
Basically no adoption

- Limited Code
- Crypto is hard
  - Semi-trusted 3rd party, degraded privacy (pseudonymity), or computational overhead
- Belief that number of non-jerks is approximately 0?
Ethnographic Study

• Talk to Tor users who participate in open collaboration

• Talk to Wikipedia editors about privacy concerns

• Not representative--a strategic sample

• Advertise on Tor blog, tor-talk, Wikipedia mailing lists
Research Questions

• R1. What kinds of threats do contributors to open collaboration projects perceive?

• R2. How do people who contribute to open collaboration projects manage risk?
They’re not anecdotes, that’s small batch artisanal data...

@pikelet
## Participants

<table>
<thead>
<tr>
<th></th>
<th>12 Tor Participants</th>
<th>11 Wikipedia Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Male: 8 Female: 3</td>
<td>Male: 8 Female: 3</td>
</tr>
<tr>
<td></td>
<td>Fluid Gender: 1</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Min: 18 Max: 41 Avg: 30</td>
<td>Min: 20 Max: 53 Avg: 30</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>HS: 3 Und: 4 Grad: 5</td>
<td>Unreported: 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Und: 8 Grad: 2</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>AU, BE, CA, ZA, SE, US (7)</td>
<td>AU, FR, GH, IL, UK, US (5)</td>
</tr>
</tbody>
</table>
Types of participation
Interview Protocol

• $20 compensation gift cards or cash
  • (30% declined)
• Phone, Skype, or encrypted audio (1 f2f)
• Conducted by Andrea Forte
• Tell in-depth stories, prompted for detail
Analysis

• Ongoing...
• Transcribed and coded to identify themes
• Themes were grouped/merged accordingly
Interview Topics: Tor

• Ask them to explain Tor and what it is for
• Current examples of use
• Retrospective examples of use
• The story of how and why they first started using Tor
• Examples of when they do not use Tor online
• Questions about their participation in online projects

• How and why they started editing
• Examples of privacy concerns associated with editing
• Steps they may have taken to protect their privacy while editing
• Examples of interactions with other editors
Limitations

- May be missing participants with severe privacy concerns
- Need to talk to unknown parties
- Need to speak remotely over communications channel
  - Conducted some interviews over encrypted channels such as jitsi
  - Mentioned Skype in recruitment materials
- No residents of Iran or China
What is anonymity? to a Wikipedian

- Editing without logging in ("IP editing")
- Editing under a pseudonymous account while not leaving clues about your identity
Somewhat problematic...

Liberty Caucus (Undid revision 58136977 by 109.150.241.232)
Content-based Anonymity

these are small things but I would usually not edit things relating to my school or places near where I lived while logged in… It is actually weirdly easy to piece together someone's identity based on—say it was based on the location.

• According to Wikipedians most deanonymization is done based on contextual cues

• Tor won’t help with this
Wikipedia policy on Tor

- MediaWiki’s TorBlock extension automatically blocks editing through Tor
- IP Block exemption
  - Registered users in good standing can ask for exemption
- Hard to establish standing
  - Requires editing without Tor
- Closed proxies for Chinese users
Can Wikipedia be edited through Tor?

If the account exists, yes. So, trying to do an anonymous edit with Tor is really difficult.

And I had one that came through the mailing list in the last couple of weeks that, their employer had been checking up on them...and we allowed that.

So, as an administrator, I have a user bot that allows me to get around that, but as well as feeling bad about doing that, because other people don't have the option

But sometimes, like every so many exit nodes you have, sometime one works..Yeah, many sites block tor, or try to block it, and it's quite annoying if you are trying to do something

We do sometimes let people edit through them. I know that we have users in China coming through the Great Firewall and stuff
Is this a good policy?

They block all Tor exit nodes for good reason I guess, but it's not convenient to those who need it.

I think it's necessary to prevent abuse, but there are obvious arguments to allow people to use open proxies, and there are some cases where we do.

My sense from the discussions I've watched is that I don't think it's always going to remain policy.

We generally block Tor nodes because they can be used to... I don't know. I'm not a technical person in that respect, but you can be anonymized, and a lot of people can use it very openly, and we get a lot of vandalism through services like that.

So because you can change your IP address with the click of a button, it's very difficult to prevent abuse.
Sources of Threats
Mentioned by Interviewees

• Government
• Business
• Organized crime
• Private citizens
• Other project members
• Project outsiders
## Threats Reported

<table>
<thead>
<tr>
<th># people</th>
<th>Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Surveillance/Loss of privacy</td>
</tr>
<tr>
<td>10</td>
<td>Loss of employment/opportunity</td>
</tr>
<tr>
<td>9</td>
<td>Harassment/Intimidation</td>
</tr>
<tr>
<td>9</td>
<td>Safety of Self or Loved Ones</td>
</tr>
<tr>
<td>6</td>
<td>Reputation Loss</td>
</tr>
</tbody>
</table>
Surveillance

You know in my country there's basically unknown surveillance going on... and I don't know what providers to use, and at some point I decided to use Tor for everything.

- Online activities accessed or logged without consent
- Want to be private by default, public by effort
- Sensitive edit histories

Sunday, December 27, 15
Loss of employment

77% of employers google prospective employees -Monster

Tor: I am transgender. I am queer... my boss... would rant for hours about this kind of person, that kind of person, the other kind of person, all of which I happen to be. And I decided that if I was going to do anything [online] at all, I had best look into options for protecting myself because I didn't want to get fired.

WP: a friend of mine was also involved in the discussion, and he actually got it worse than I did. He's in a position now where anyone who Googles him finds allegations that he... is this awful monster, and he's terrified of having to look for work now because you Google him and that's what you find.
Harassment

I would say the fear of harassment, of real, of stalking and things like that, is quite substantial. At least among administrators I know, especially women.
Safety of Loved Ones

Tor: …they busted his door down and they beat the ever living crap out of him, he was hospitalized for two-and-a-half weeks, and told him, "If you and your family want to live, then you're going to stop causing trouble." And they said that to him in Farsi... I have a family. So, after I visited him in the hospital, I started—Well, at first I started shaking and went into a cold sweat, then I realized I have to—I started taking some of my human rights activities into other identities through the Tor network.

WP: I pulled back from some of that [Wikipedia] work when I could no longer hide in quite the same way. For a long time I lived on my own, so it's just my own personal risk I was taking with things. Now, my wife lives here as well, so I can't take that same risk.
Reputation Loss

Tor
Guilt by association

Wikipedia
Vendettas / edit wars
Reputation Loss

Tor

Guilt by association

Wikipedia

Vendettas / edit wars

User: I hate big bitch Alison (blocked indef by Alison)
Other Threats

- Diminished Project Quality
- Legal sanctions (only two people)
- Security concerns
Security Breach

- Tor
  - Liked authentication properties of .onion services
  - Less data about them to sweep up in data breaches

- Wikipedia
  - Won’t log in on public terminals
  - Concerns about security of administrative credentials
Concrete things people were afraid of *

* Not a complete list

- Having their head photoshopped onto porn
- Being beaten up
- Being swatted
- Receiving pipe bombs
- Fake information about them published
Lack of Threat

yeah I am not that worried about it mostly because there's pretty good support for some of those viewpoints, kind of a mainstream discourse and it's not so radical and I don't think anyone is gonna be knocking down on my door….I have been in contact with activists who have been engaged with higher risk activities, and I do wonder about, I do have concerns about their welfare, and the desire that they have the tools that they need to be able to pursue their activities without facing consequences.

• Some participants said they rarely perceive threats when contributing
• In some of these cases, they pointed out that they enjoyed certain privileges
• gender, nationality, interests
but I appreciate the need for protecting vulnerable people around the world. So, I run several relays, some of them are actually relays, others are middle relays, I run them around the world.

And while you use it, you help diversify the network for those who may be subject to traffic monitoring. And you can look up any information that you like, whether or not it is sensitive, and you will get it. And if you live in a place where it may be not the greatest in legal standing to look it up, you're able to find out information.
Mitigation Strategies

• Modifying participation
• Attempts at anonymity
Chilling Effects: Lost editors

basically I used to edit Wikipedia prior to doing a lot of tor… and so yeah, mostly just reading….I used to be doing a lot of editing for license design and for like open source software licenses and occasionally random forms and stuff like that I knew about, and sometimes grammar.

Several Tor users mentioned that they no longer edited Wikipedia or edited less because of the difficulty of editing through Tor.
Chilling Effects: State Surveillance

For the Edward Snowden page I have pulled myself away from adding sensitive contributions, like different references, because I thought the name may be traced back to me in some way. But, not refraining from adding useful content, I guess.

In March 2015, Wikipedia announced it was suing the NSA

“People aren’t willing to engage with us when they know the government is watching their every move”

Editing activity dropped off significantly on certain articles after Upstream program revealed.
Chilling Effects: Women’s Health

Trolls have called their bosses and been like, "Did you know that your employee was editing the clitoris article last week?" They will do stuff like that.

A vacuum aspiration abortion at eight weeks gestational age (six weeks after fertilization). 1: Amniotic sac 2: Embryo 3: Uterine lining 4: Speculum 5: Vacurette 6: Attached to a suction pump

From Wikipedia abortion article
Threshold of Participation

And as long as I have that pseudonym reasonably separated from my real name, I felt fairly comfortable dealing with those sorts of things, and dealing with death threats etcetera, that turns up when you do that.

- People involved in curating content (deleting, promoting, arbitrating, etc) will make enemies

- Some of these enemies will make nasty threats and some of them will act on them
Doxing/Threats on Admins and ArbCom

They found my parents' home address, they found one of my old phone numbers. They wrote a blog post about all my horrible things I've done and here is my contact information and “for a good time call.” And once it's on the internet it doesn't die.

WikiPediodiocracy
Chilling Effects: Handling Abuse

Since I didn't have any privacy, I felt limited in what I could do. I could still write articles, but blocking people and stuff like that was something I had tried to avoid, since I didn't want to get angry phone calls.

WP: I used to check for use of the "N" word, the ruder of the two "F" words, and one or two other things that were indicative of possible significant problems in user space, and deleted lots and lots of attack pages which were fairly hot on dealing with them when they turn up in article space. But when people create a user account in somebody's name and then say a bunch of things about that person that they wouldn't necessarily agree with...
Privacy Measures

• Avoiding posting linking info / details
• Tor
• proxies/VPN / Hide My Ass
• Edit from public computer
• Multiple accounts
• Privacy browser plugins/safeguards
  • noscript, ghostery
I tried using Tor, I did, when I was younger and everything was so slow and terrible I was just like, "So not worth it."

<table>
<thead>
<tr>
<th>Tor Users</th>
<th>Wikipedians on Tor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency</td>
<td>Slow</td>
</tr>
<tr>
<td>Catchas</td>
<td>“Too much trouble”</td>
</tr>
<tr>
<td>Unusable website features</td>
<td>“Just the need to download the software and connect to it each time”</td>
</tr>
<tr>
<td>Used to be slow</td>
<td>Unnecessary</td>
</tr>
</tbody>
</table>
Other interesting topics

• Information revelation as a defense mechanism

• Limits of long term participation

Until it happens to you, it doesn't occur to you that, "Well, why would anyone be Googling me? Why would they want my address?" And by the time you realize that all it takes is some kid being bored someday, it's a little late to hide it. So I would like there to be, and I don't even know how there could be because people don't really read things on the internet, but I wish we had a way to warn people, "No really, you should give this some serious thought."
Conclusions

- Raises more questions than answers
  - That was the goal
- Tor users and Wikipedians share privacy concerns
- Valuable participation is lost when people cannot participate privately
- Plans for a larger survey study to learn more
If you find this interesting....

PETS 2016
The 16th Privacy Enhancing Technologies Symposium
July 19 – 22, 2016
Darmstadt, Germany

• https://petsymposium.org/
Thank You

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