



What is the value of anonymous communication?

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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

Posted August 29th, 2014 by arma

<https://blog.torproject.org/blog/call-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**

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.

Yelp

One more step

Please complete the security check to access
blog.wfmu.org

Cloudflare

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.

Bluehost

Access Denied

You don't have permission to access "http://www.foxnews.com/" on this server.

Reference #18.4d6e5668.1445538492.20b9c5ab

Akamai

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](#).

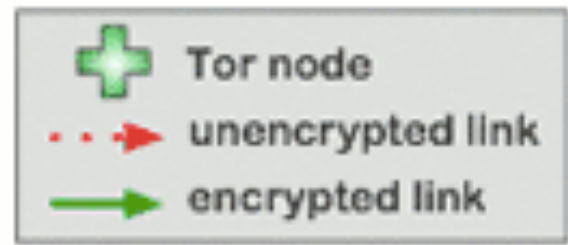
5

Disclosures

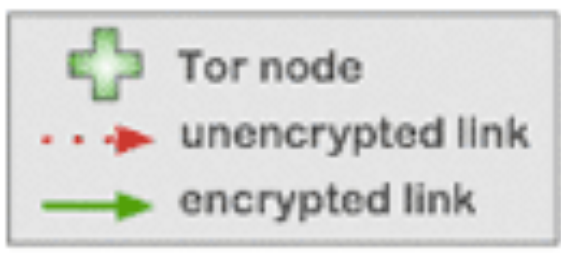


All interviews
conducted by
Andrea Forte
who is trained in
ethnographic
methods

How Tor Works: 1



How Tor Works: 2



Alice



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



Dave



Jane



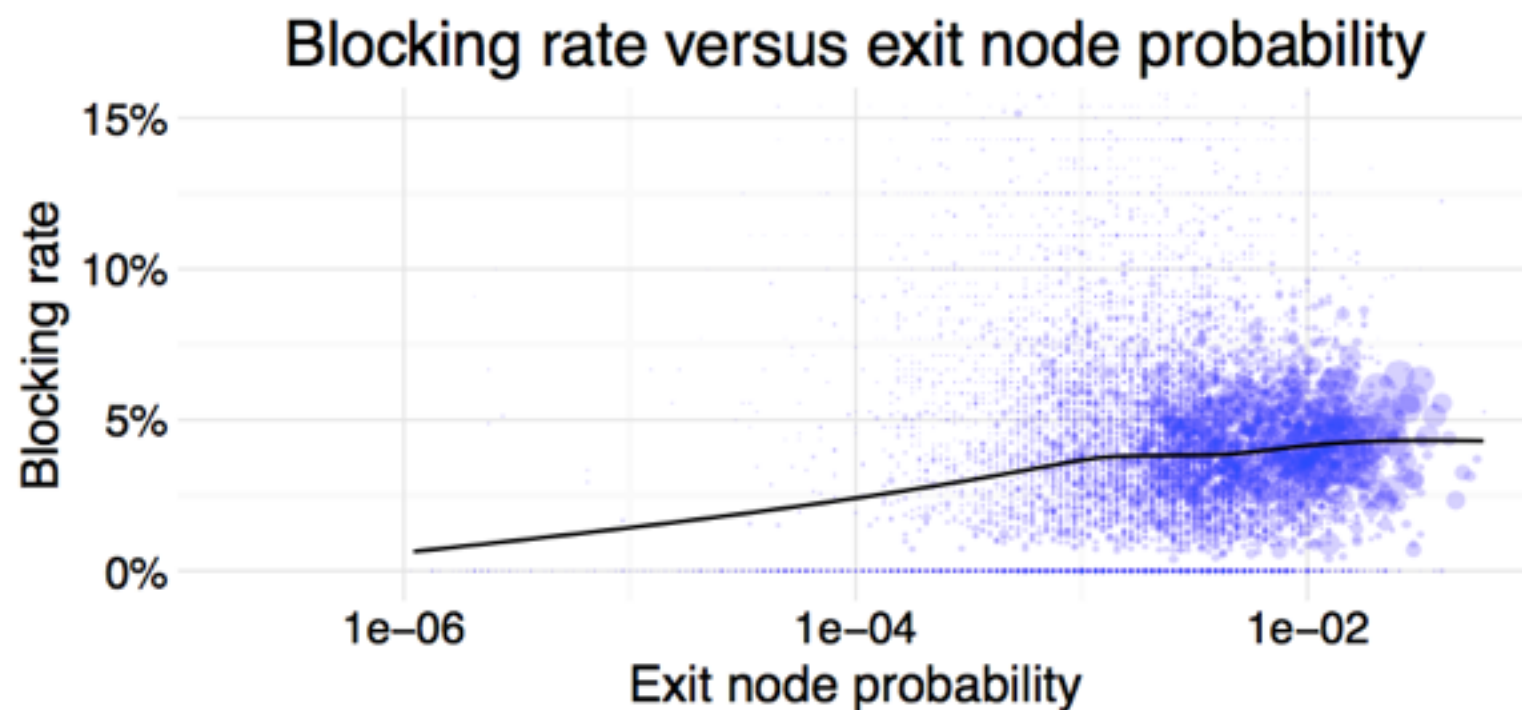
Bob

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.”

– *New York Times*, 2007

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

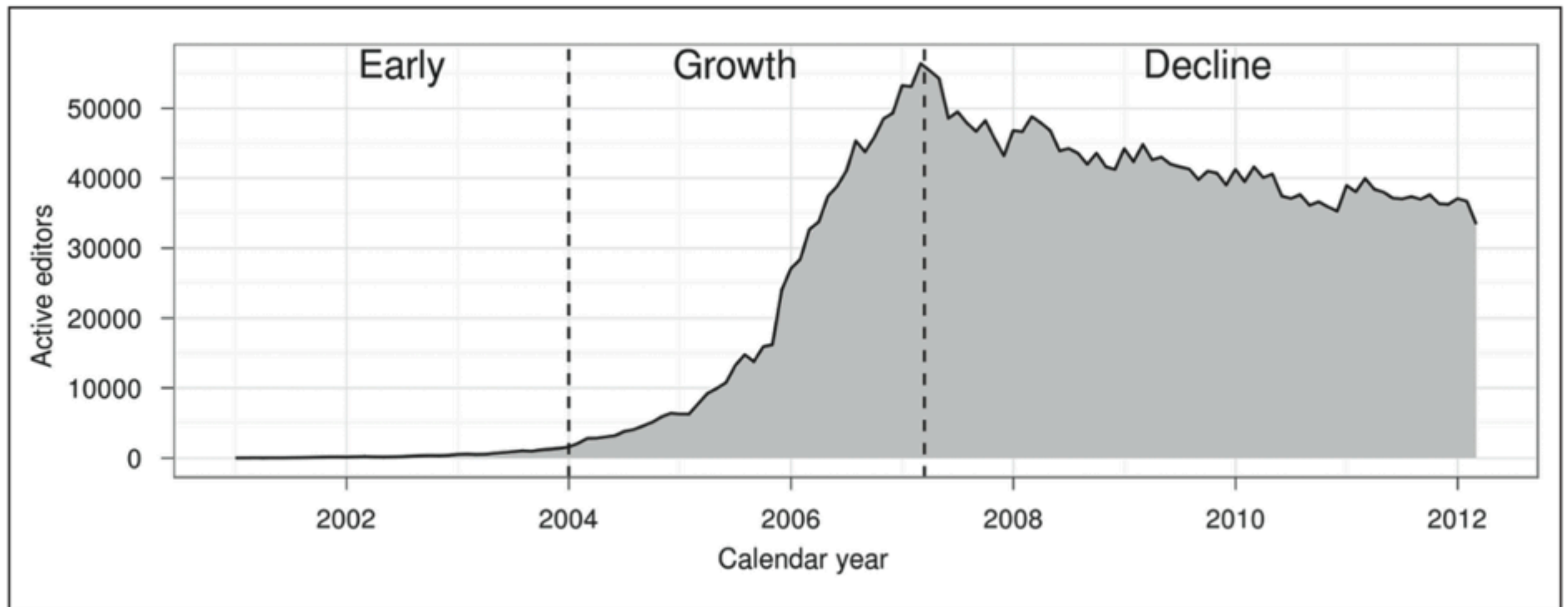


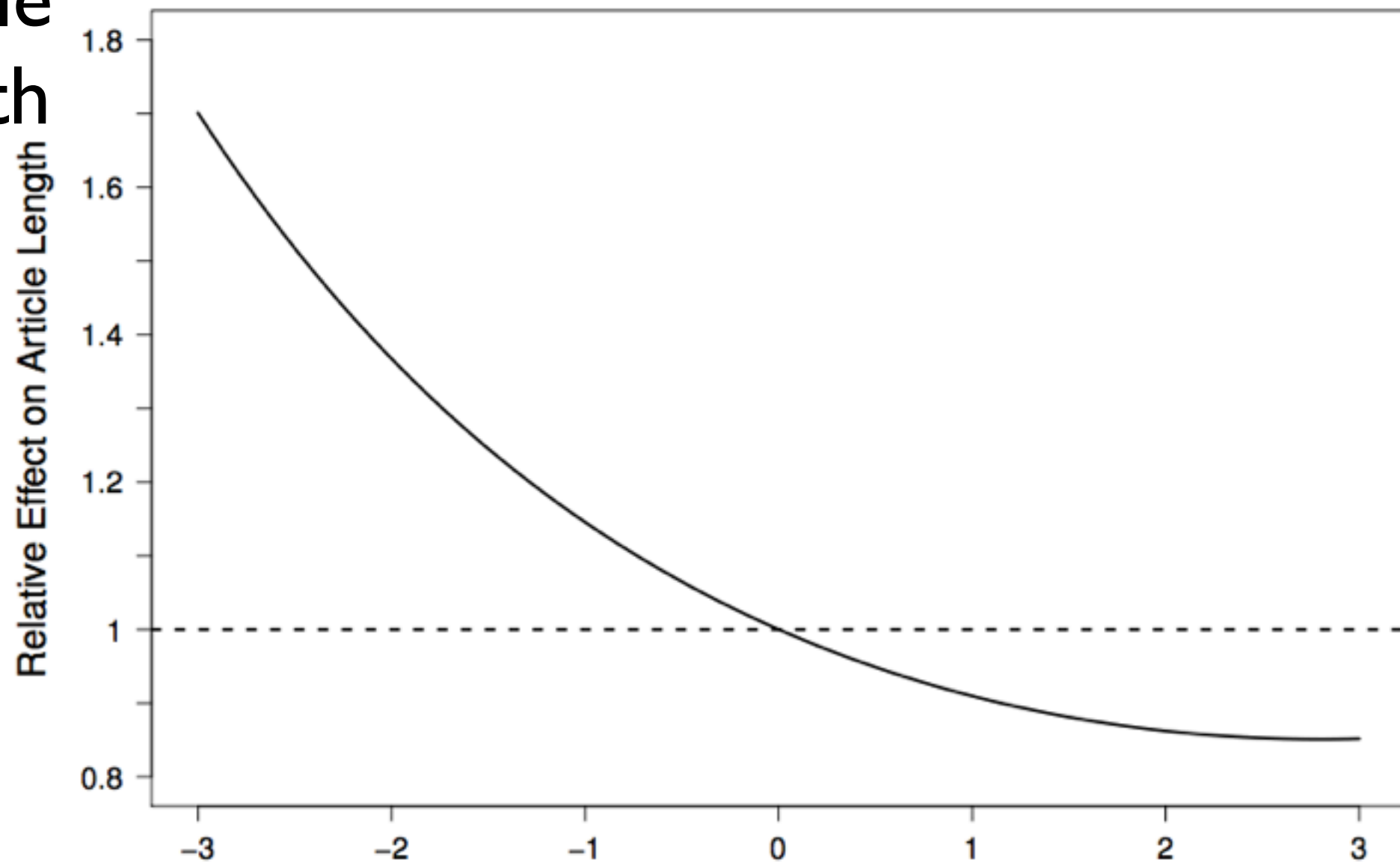
Figure 2. The English Wikipedia's editor decline

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

Movie Gender (Z-Score)

Women

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



Temple of Bel 3-D model renderings, [CC0](#)



- 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?

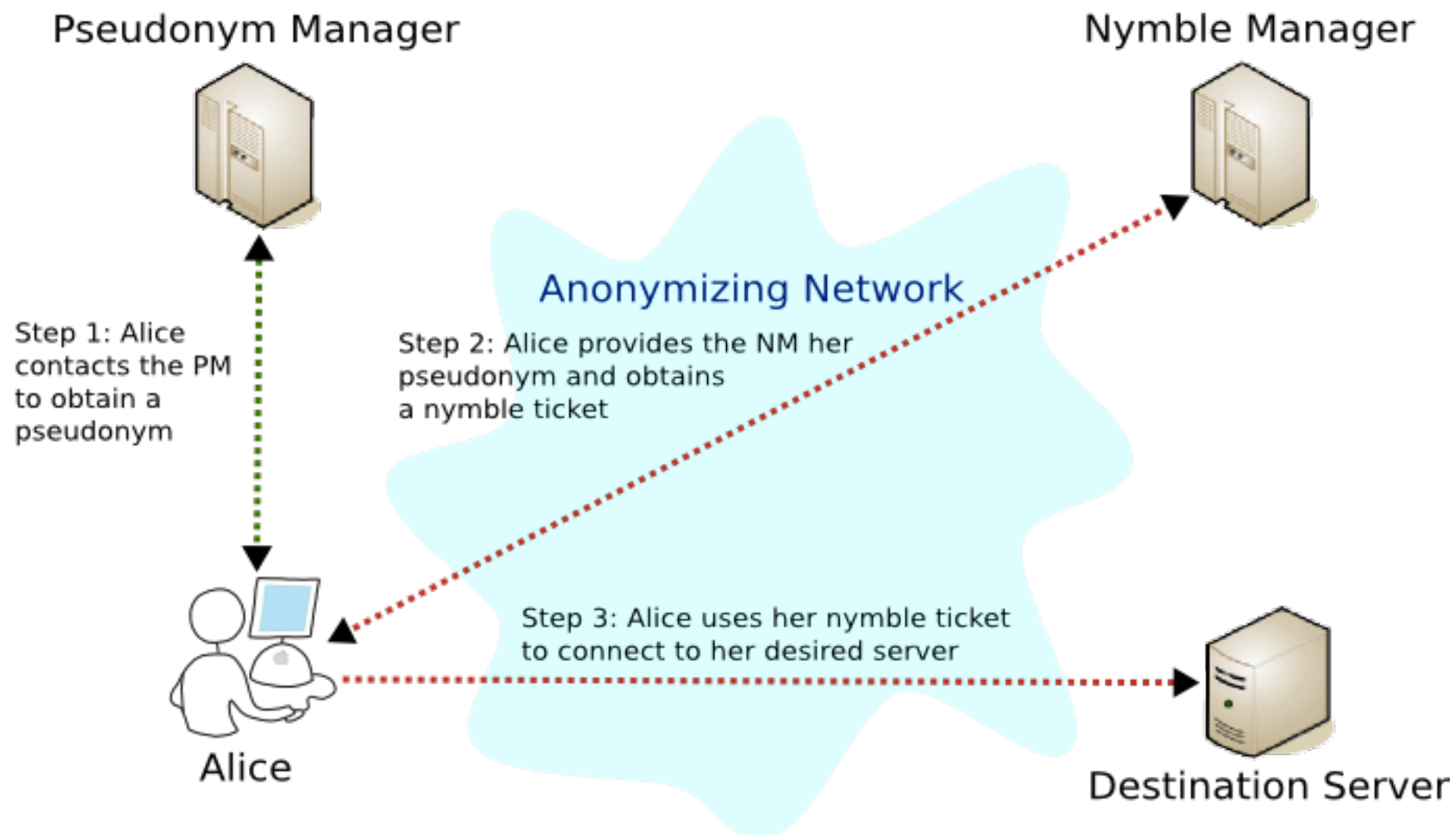
John Gabriel's Greater Internet Dickwad Theory



Anonymous Blacklisting

Many variants: Nymble, Nymbler...

Connecting to a Server



Slides from Apu Kapadia

Anonymous Blacklisting

Many variants: Nymble, Nymbler...

Blacklisting a User

Pseudonym Manager



Nymble Manager



Anonymizing Network



Alice

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

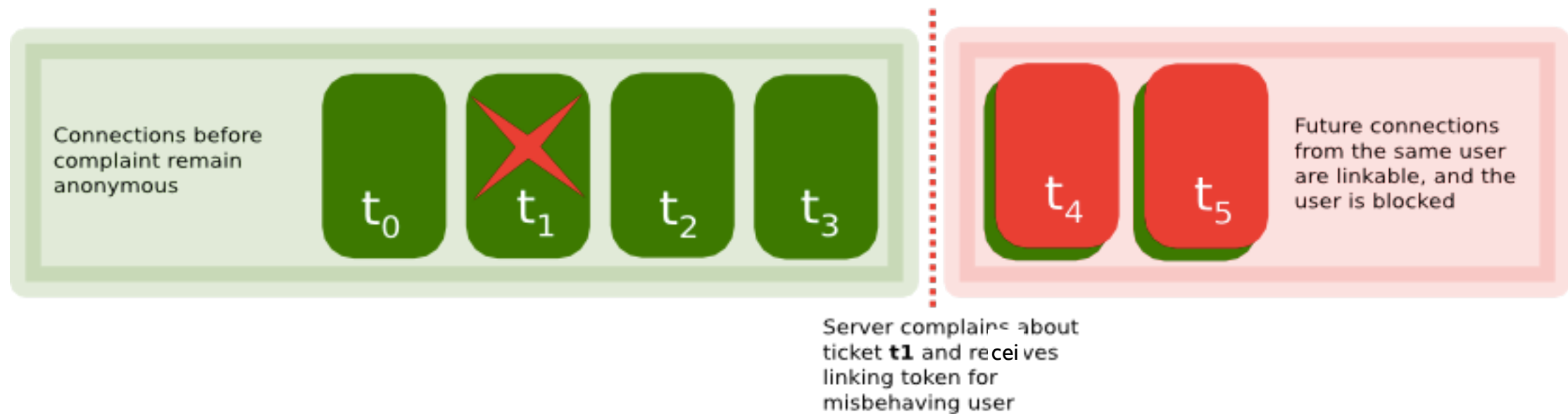
Step 5: Since Alice is blacklisted, she is refused further connections

Destination Server

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?

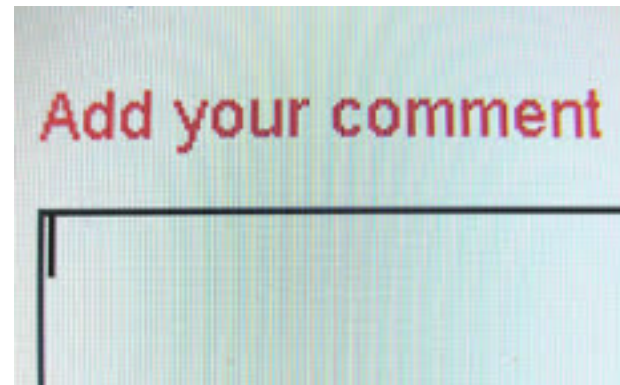
**They're not anecdotes,
that's small batch
artisanal data...**

@pikelet

Participants

12 Tor Participants	Gender	Male: 8 Female: 3 Fluid Gender: 1
	Age	Min: 18 Max: 41 Avg: 30
	Education	HS: 3 Und: 4 Grad: 5
	Location	AU, BE, CA, ZA, SE, US (7)
11 Wikipedia Participants	Gender	Male: 8 Female: 3
	Age	Min: 20 Max: 53 Avg: 30
	Education	Unreported: 1 Und: 8 Grad: 2
	Location	AU, FR, GH, IL, UK, US (5)

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

Interview Topics: Wikipedia

- 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...

User contributions
For 143.231.249.141 (talk | block log | uploads | logs | filter log)

Search for contributions

Show contributions of new accounts only
 User: 143.231.249.141

Namespace: all Invert selection Associated namespace
Tag filter:

Only show edits that are latest revisions

From year (and earlier): 2013 From month (and earlier): all Search

(newest | oldest) View (newer 3,000 | older 3,000) (20 | 50 | 100 | 250 | 500)

- 03:37, 26 November 2013 (diff | hist) .. (+6) .. Nazi views on Catholicism
- 03:36, 26 November 2013 (diff | hist) .. (+198) .. Nazi views on Catholicism
- 23:58, 21 November 2013 (diff | hist) .. (+162) .. Thirty Years' War (→Fiction)
- 21:10, 21 November 2013 (diff | hist) .. (+442) .. Wikipedia talk:Articles for creation/Fattah Neuroscience Initiative (→Multimedia)
- 16:27, 18 November 2013 (diff | hist) .. (-996) .. Liberty Caucus (Undid revision 581536977 by 109.150.241.232 (talk)) (current)
- 19:14, 15 November 2013 (diff | hist) .. (+64) .. Delta Delta Delta (→Politics and public service)
- 19:08, 15 November 2013 (diff | hist) .. (+57) .. Delta Delta Delta (→Entertainment Media)
- 15:45, 12 November 2013 (diff | hist) .. (-93) .. Parkway Central High School (current)
- 14:26, 1 November 2013 (diff | hist) .. (+5) .. Daniel Sheehan (attorney) (current)
- 13:53, 1 November 2013 (diff | hist) .. (-143) .. John Gleason (judge) (current) (Tag: section blanking)
- 20:43, 31 October 2013 (diff | hist) .. (0) .. Michelle Lujan Grisham (→2012)

53,757 TOTAL VIEWS 2.1X SOCIAL LIFT STATS

LOL fail

33 Embarrassing Congressional Edits To Members' Wikipedia Pages

A search through the House of Representatives IP address on Wikipedia shows which pages have been edited by Congressional staff. The IP address, shared by all Congressional offices offers a glimpse at who decided to do a bit of historical airbrushing.

posted on July 10, 2012 at 12:09am EDT

 **Andrew Kaczynski**
BuzzFeed Staff Follow 18k

Share 228 Like 277 Tweet 496 Email

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

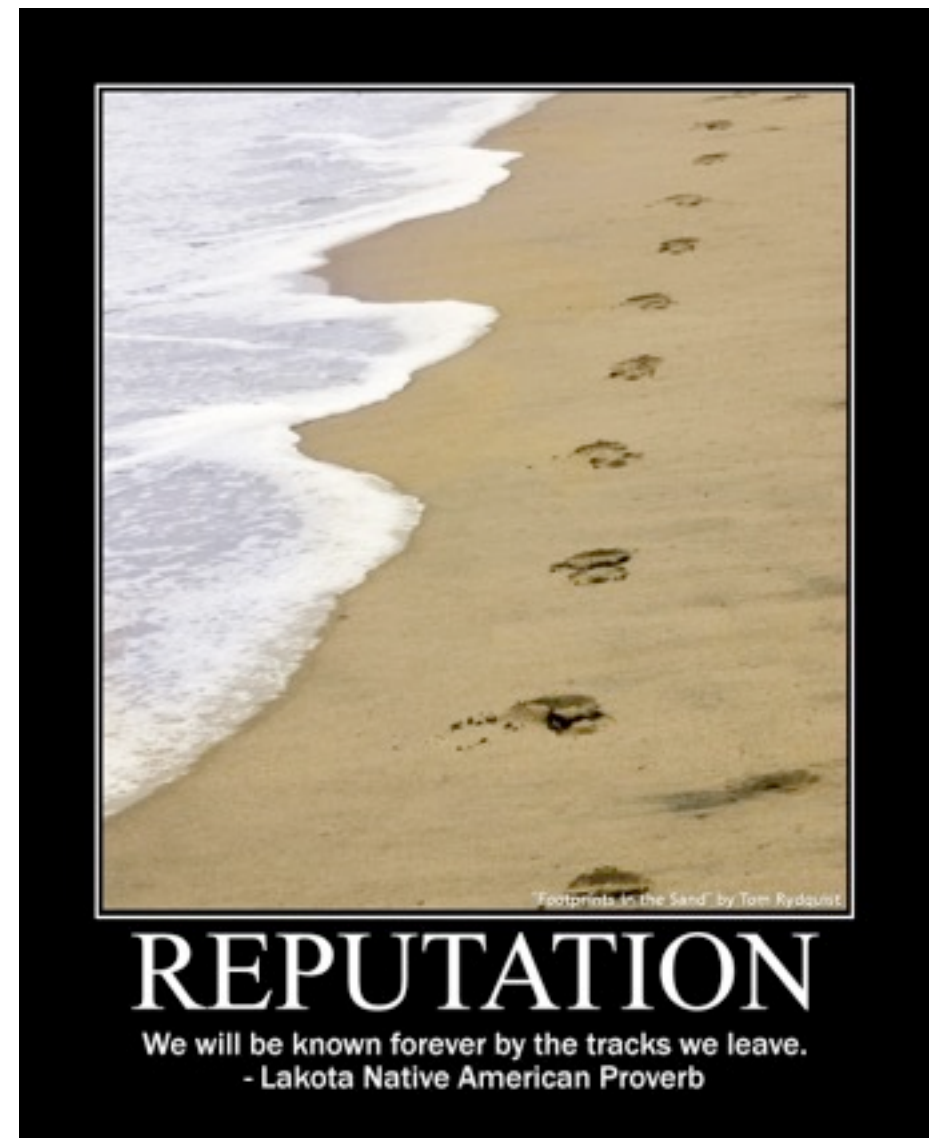
Threats Reported

# people	Threat
12	Surveillance/Loss of privacy
10	Loss of employment/opportunity
9	Harassment/Intimidation
9	Safety of Self or Loved Ones
6	Reputation Loss

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



Loss of employment

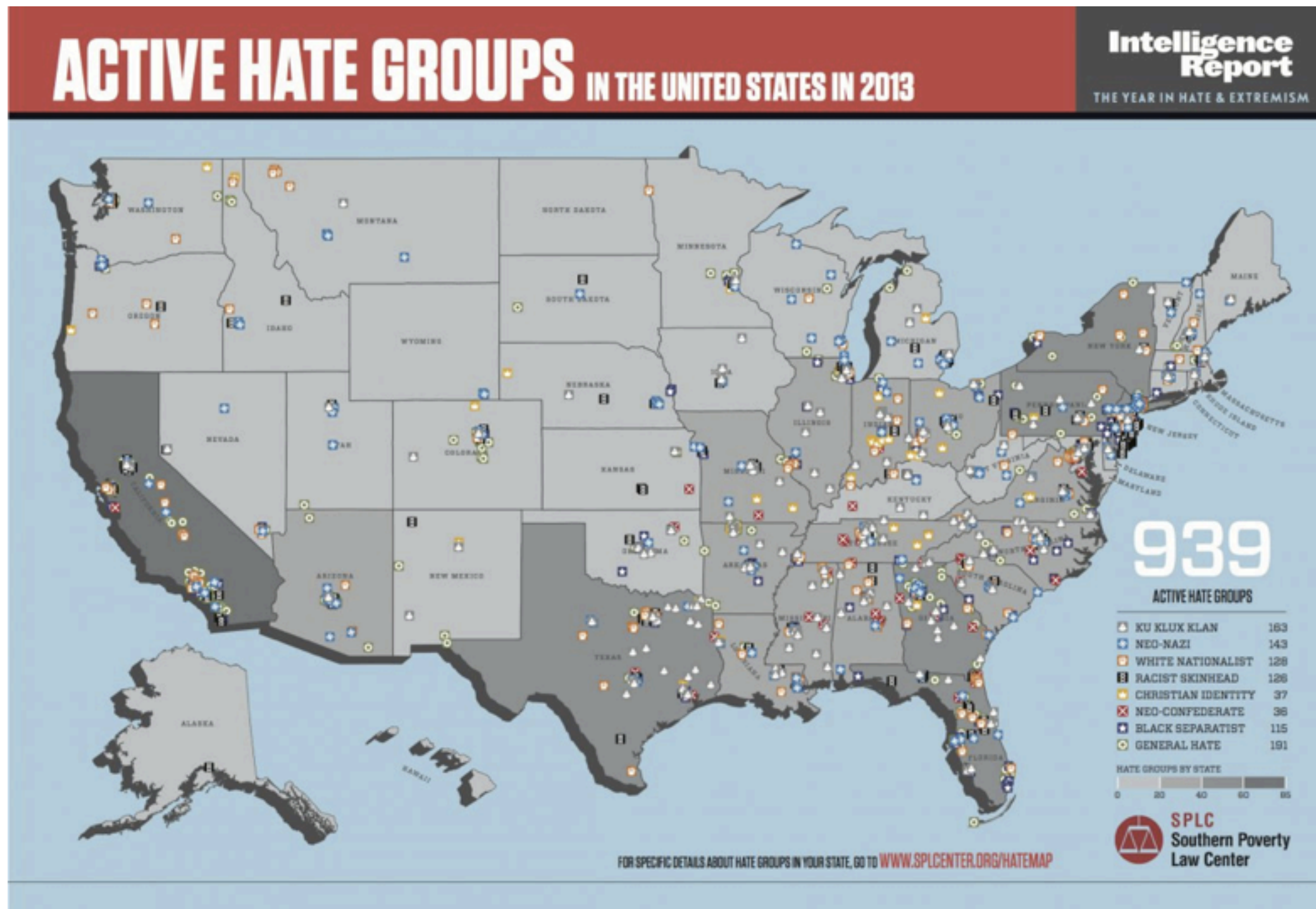
77% of employers google prospective employees -Monster

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

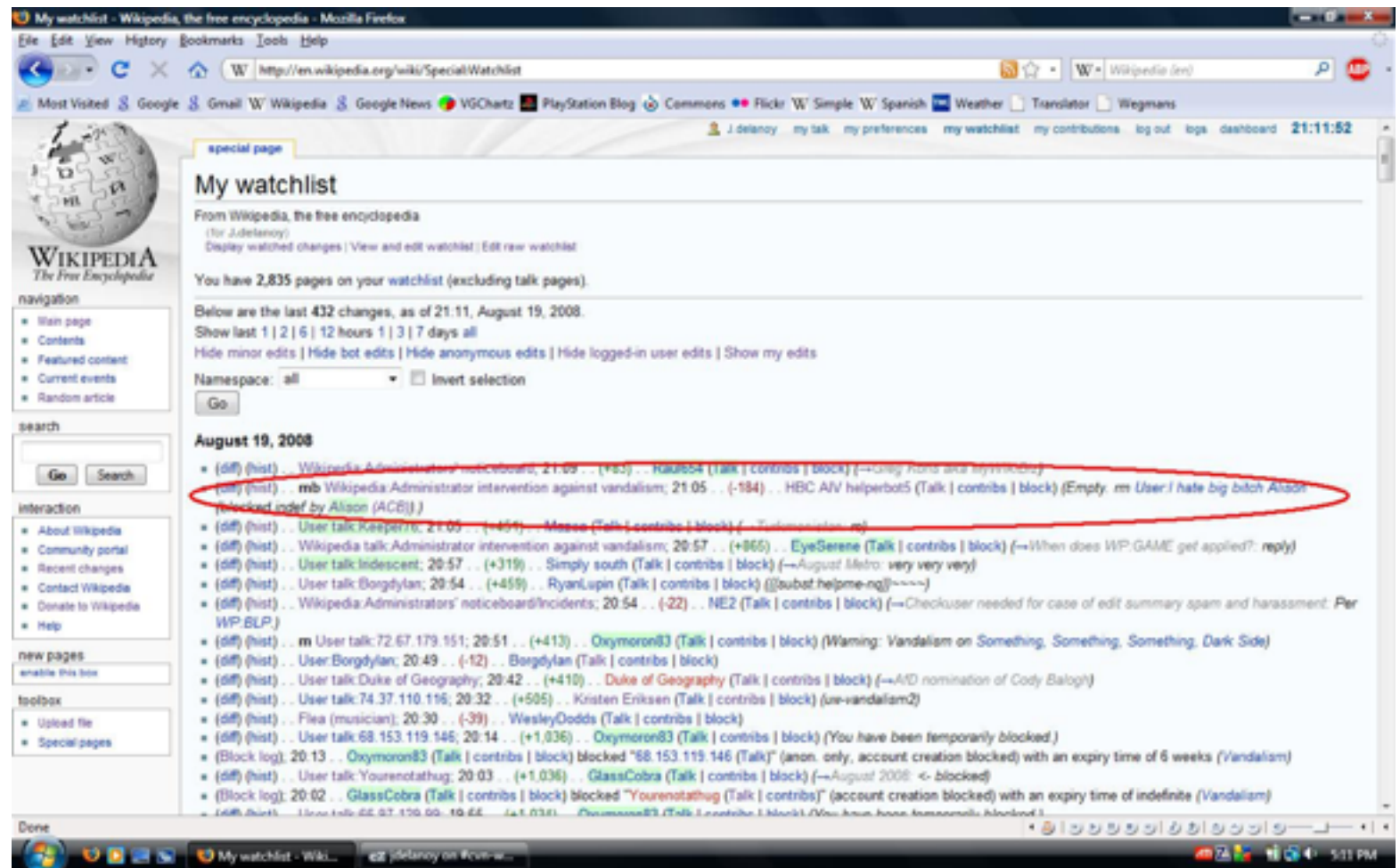
Tor: ...they busted his door down and they beat the ever living crap out of him, he was hospitalized for two-and-a-half weeks, and told him, "If you and your family want to live, then you're going to stop causing trouble." And they said that to him in Farsi... I have a family. So, after I visited him 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



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

Cover and solidarity

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

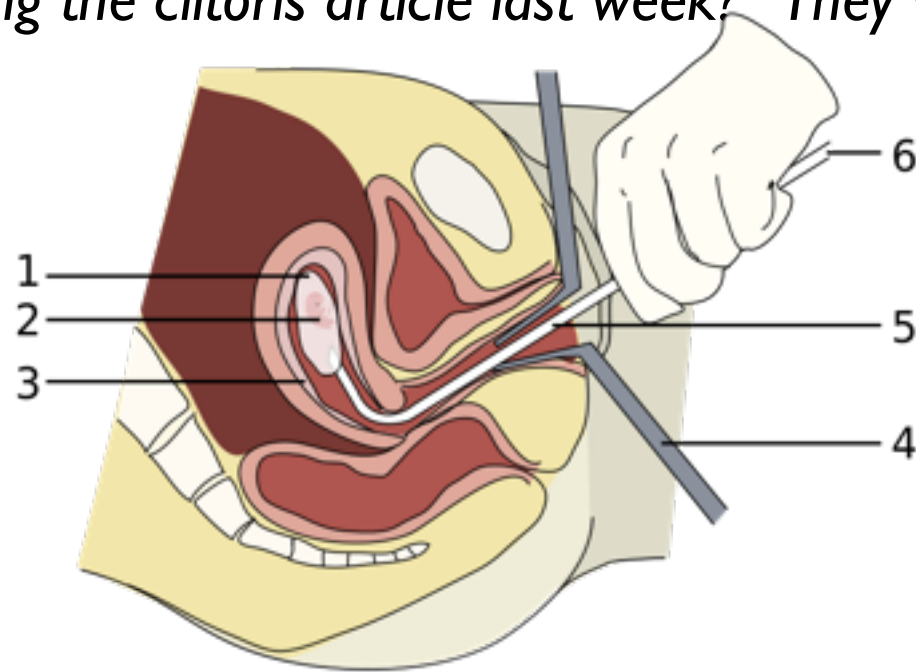
“People aren’t willing to engage with us when they know the government is watching their every move”

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: Vacuumurette 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.



WIKIPEDIOCRACY

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

Tor Barriers/Difficulty

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."

- Tor Users
 - Latency
 - Catchas
 - Unusable website features
 - Used to be slow
- Wikipedians on Tor
 - Slow
 - “Too much trouble”
 - “Just the need to download the software and connect to it each time”
 - Unnecessary

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

- Co-Authors
 - Andrea Forte and Nazanin Andalibi
- Interview Participants, Wikimedia, the Tor Project
- NSF I253302 and NSF I253418
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