Anonymity and Censorship: The Tor Network

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The Tor Project
https://www.torproject.org/
Tor: Big Picture

- Freely available (Open Source), unencumbered.
- Comes with a spec and full documentation: Dresden, Aachen, Yale groups implemented their own compatible Java Tor clients; researchers use it to study anonymity. One person implemented it entirely on his own in a few weeks (!)
- ~3000 active relays ~400,000 active users ~>12Gb/s
- Official US 501(c)(3) non-profit. A ~15 funded developers, ~100 more dedicated volunteers.
- Funding from U.S. Naval Research Lab, Electronic Frontier Foundation, SIDA, Voice of America, Human Rights Watch, NLnet, Google, ...you?
Anonymity serves different interests for different user groups.

- Governments: “It's traffic-analysis resistance!”
- Private citizens: “It's privacy!”
- Businesses: “It's network security!”
- Blocked users: “It's reachability!”
خطر!

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http://torproject.org/

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A crash course in Tor

Tor is a peer to peer network with a focus on anonymity, privacy and security.

Tor is used for *anonymous* TCP connections

- Tor relays publish to directory authorities
- Directory authorities create a consensus of relays
- Clients bootstrap by downloading the consensus
- Clients choose their own network path
- No logins, no passwords, no fees or costs

There's a lot more to this protocol. Read our specifications or ask me!
The basic Tor design uses a simple centralized directory protocol.

Servers publish self-signed descriptors. We call these servers relays.

Authorities publish a signed consensus list of all relay descriptors.

Alice may download the consensus and descriptors from anywhere.
Tor avoids the single hop paradigm; This is Privacy by Design!
Why bother with all of this?

A single hop proxy *is* a single point of failure. Its use allows for blocking, risks temptation of abuse untrusted operators, or worse: allows for wiretaps to surveil unsuspecting or even *targeted* users.

At best a single hop proxy is encrypted, not monitored and the administrator is trusted. Often these proxies are *blocked*, not encrypted, monitored by multiple parties, and the administrator is able to target users.
The basic Tor design is also exceptionally easy to block.
We have an ecosystem

- I'd encourage everyone to look at the anonbib:
  - http://freehaven.net/anonbib/
- Submit papers to FOCI:
  - https://www.usenix.org/conference/foci12/
- Check out our code:
  - https://gitweb.torproject.org/
We have the agency for change

If you'd like to directly help fight censorship, attacks on freedom of expression, attacks on historical events – you don't have to wait:

Run a Tor bridge or a Tor relay today.

You will directly help a person who would otherwise be censored. You do not have to remain silent about your discontent. You are empowered to enable others.