



# The Tor Project

*Our mission is to be the global resource for technology, advocacy, research and education in the ongoing pursuit of freedom of speech, privacy rights online, and censorship circumvention.*





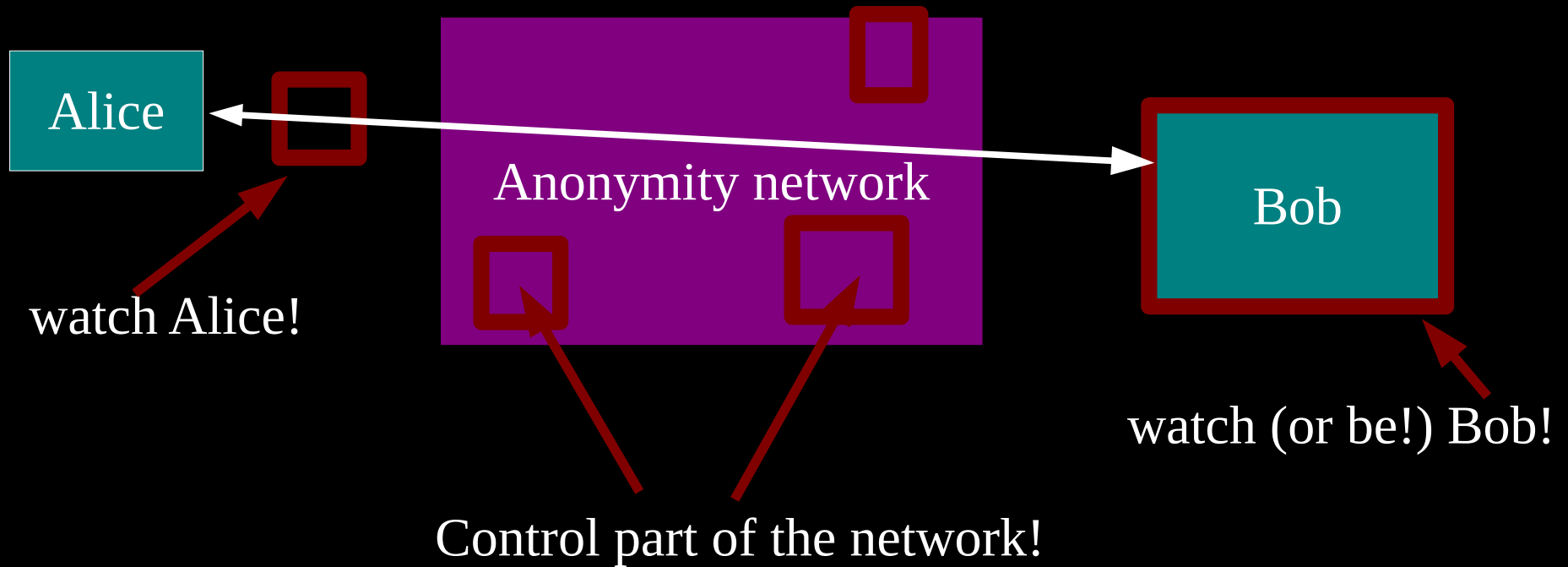
- Online Anonymity
  - Open Source
  - Open Network
- Community of researchers, developers, users and relay operators.
- U.S. 501(c)(3) non-profit organization



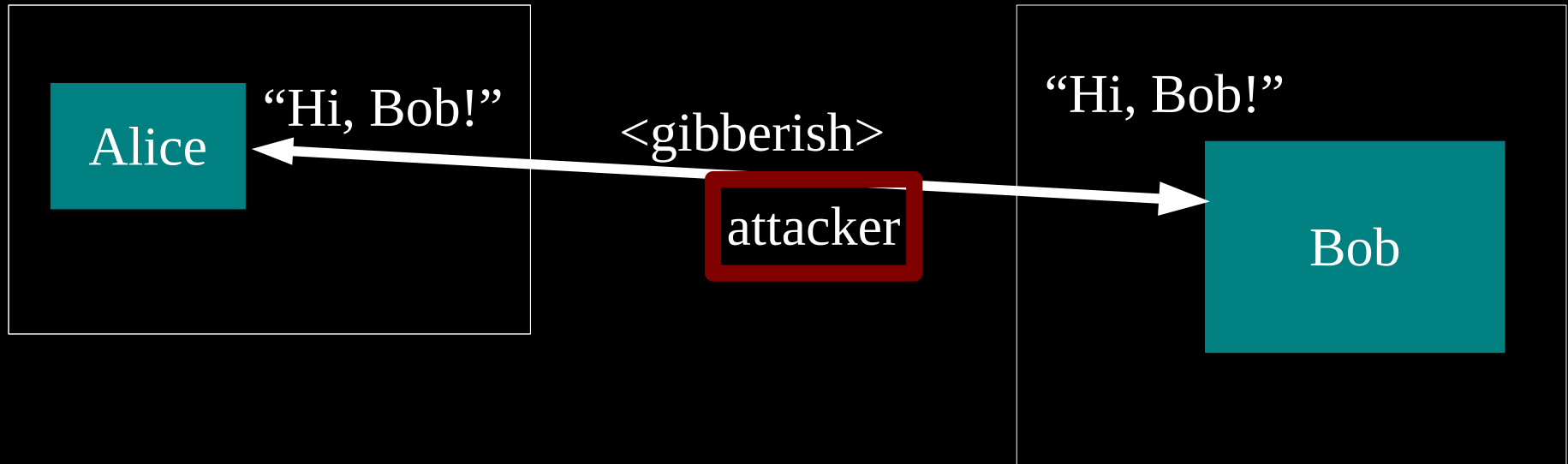


Estimated 2,000,000+  
daily Tor users

# Threat model: what can the attacker do?

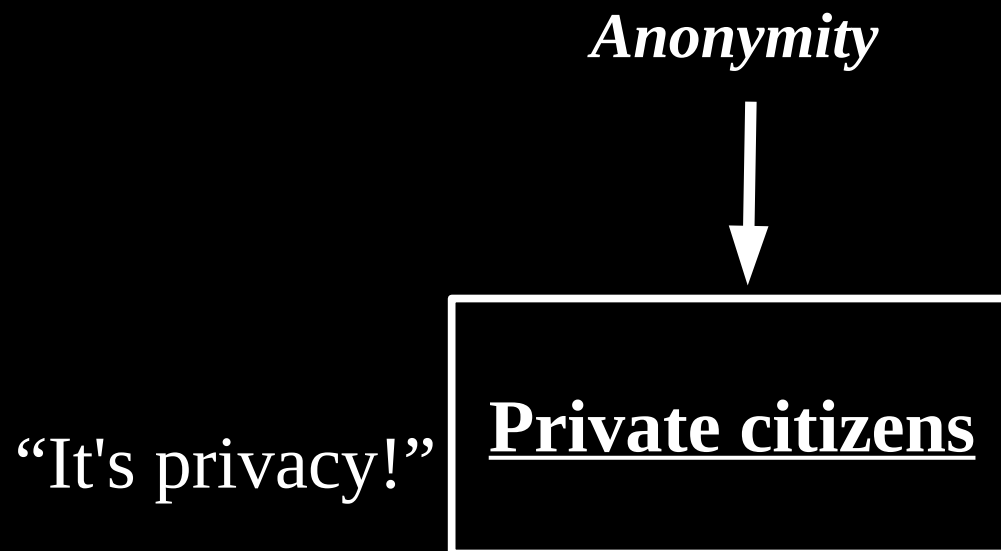


# Anonymity isn't encryption: Encryption just protects contents.

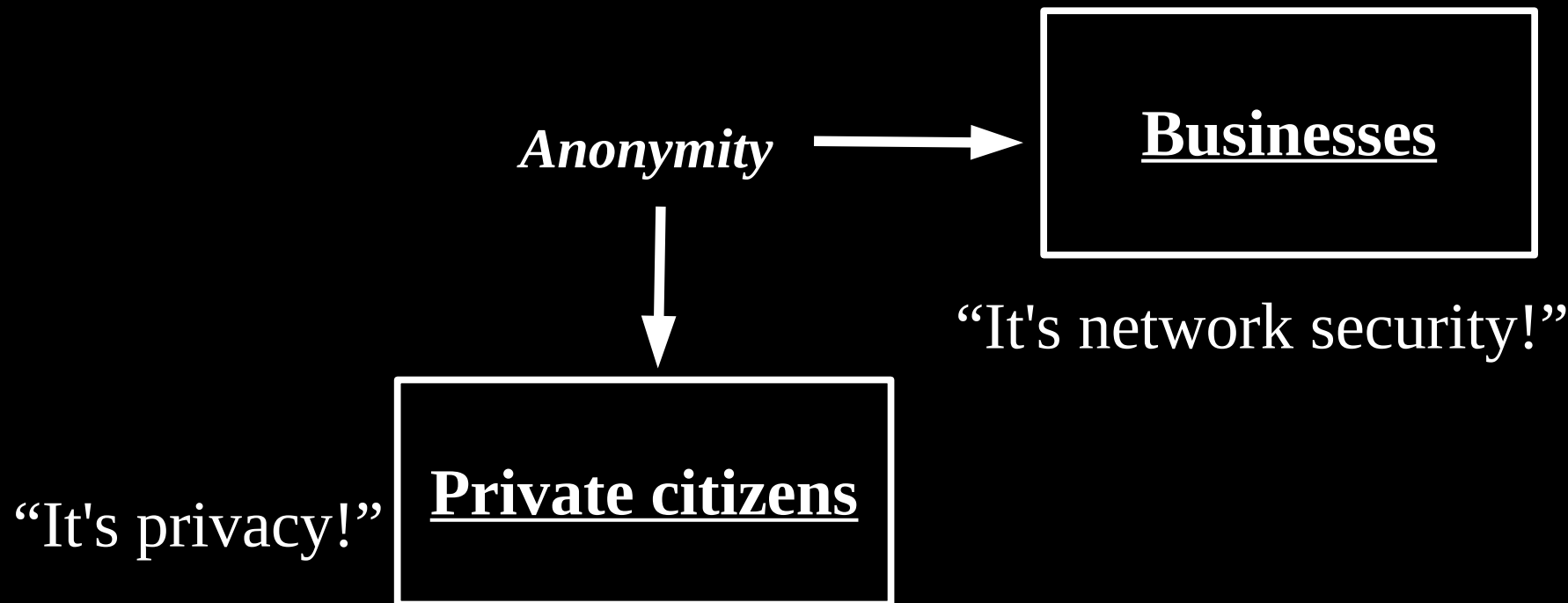




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“It's traffic-analysis resistance!”



*Anonymity*



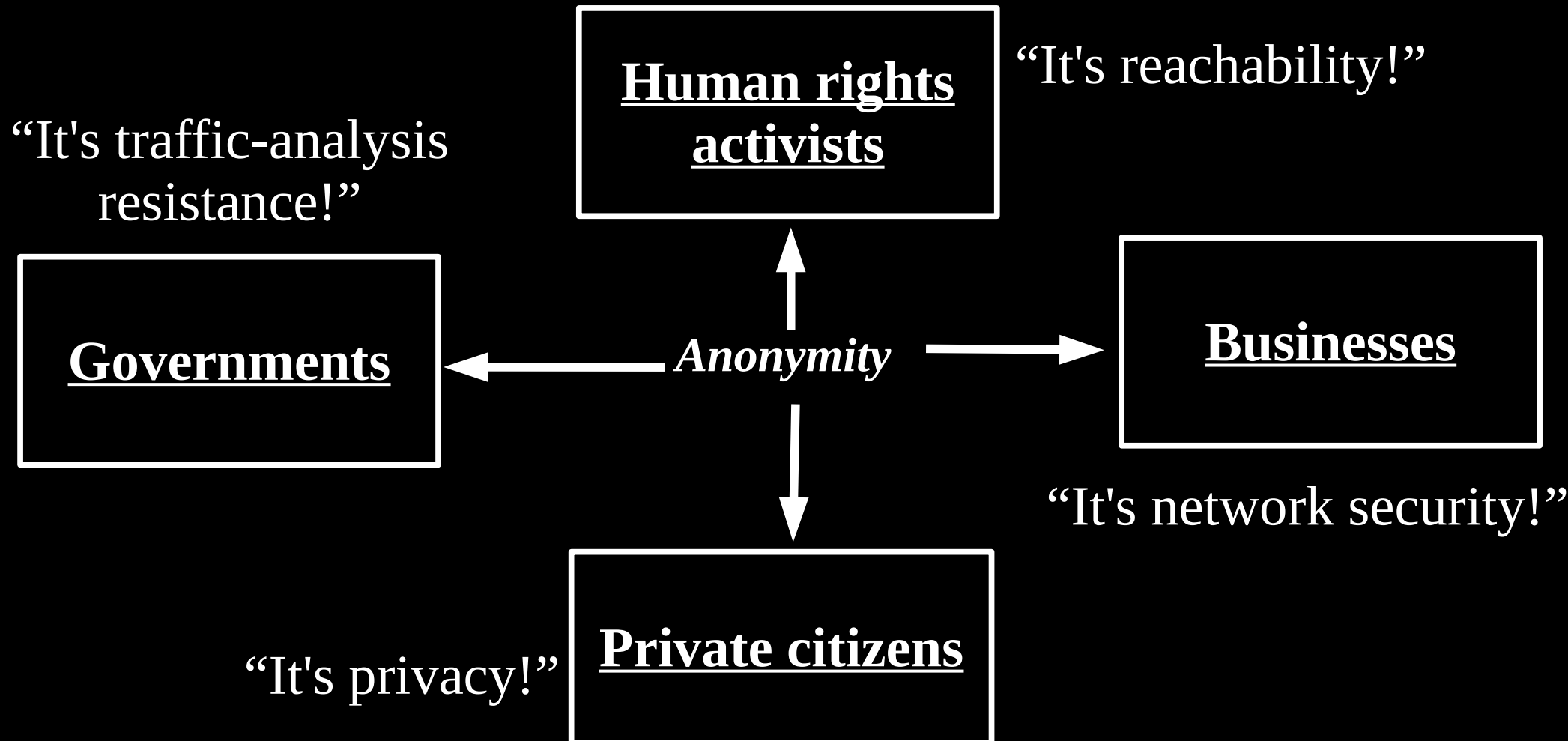
“It's network security!”

“It's privacy!”

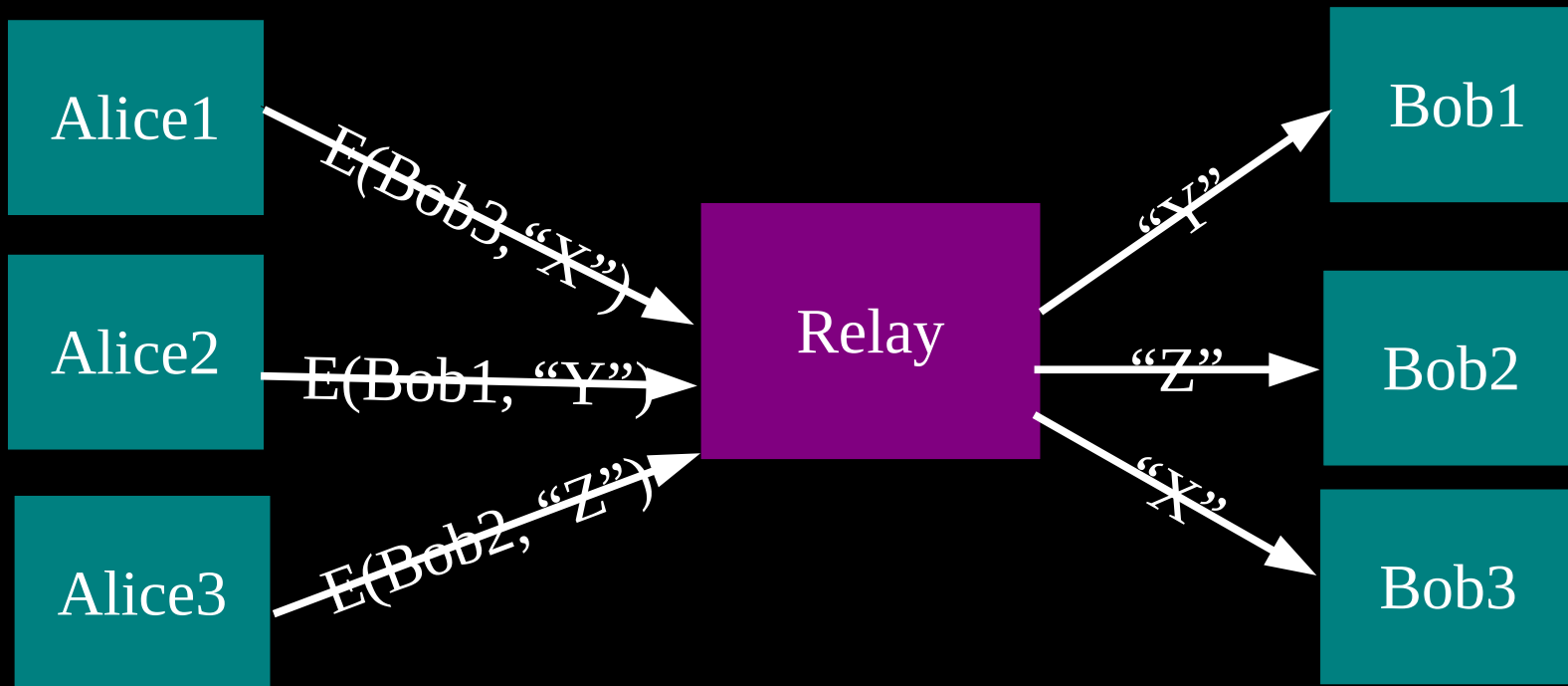




# Anonymity serves different interests for different user groups.

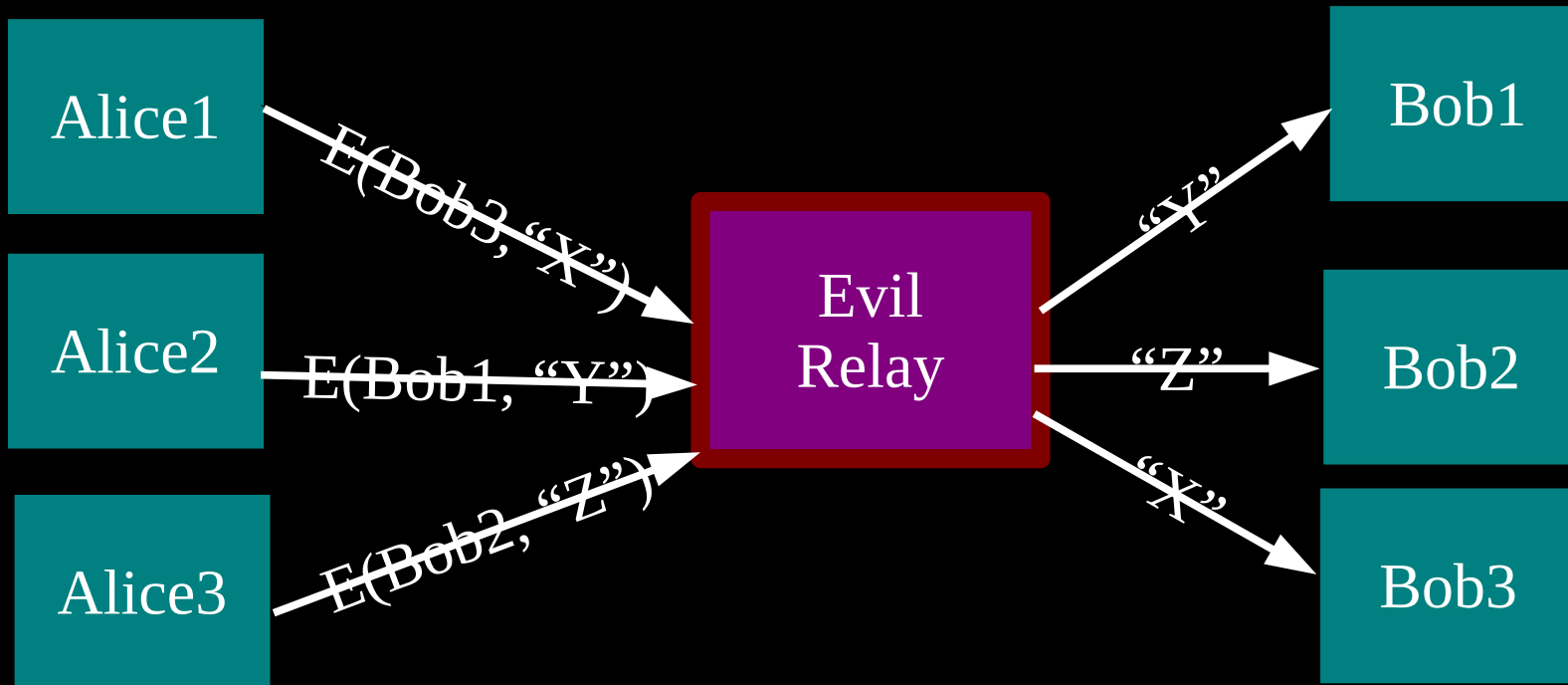


# The simplest designs use a single relay to hide connections.



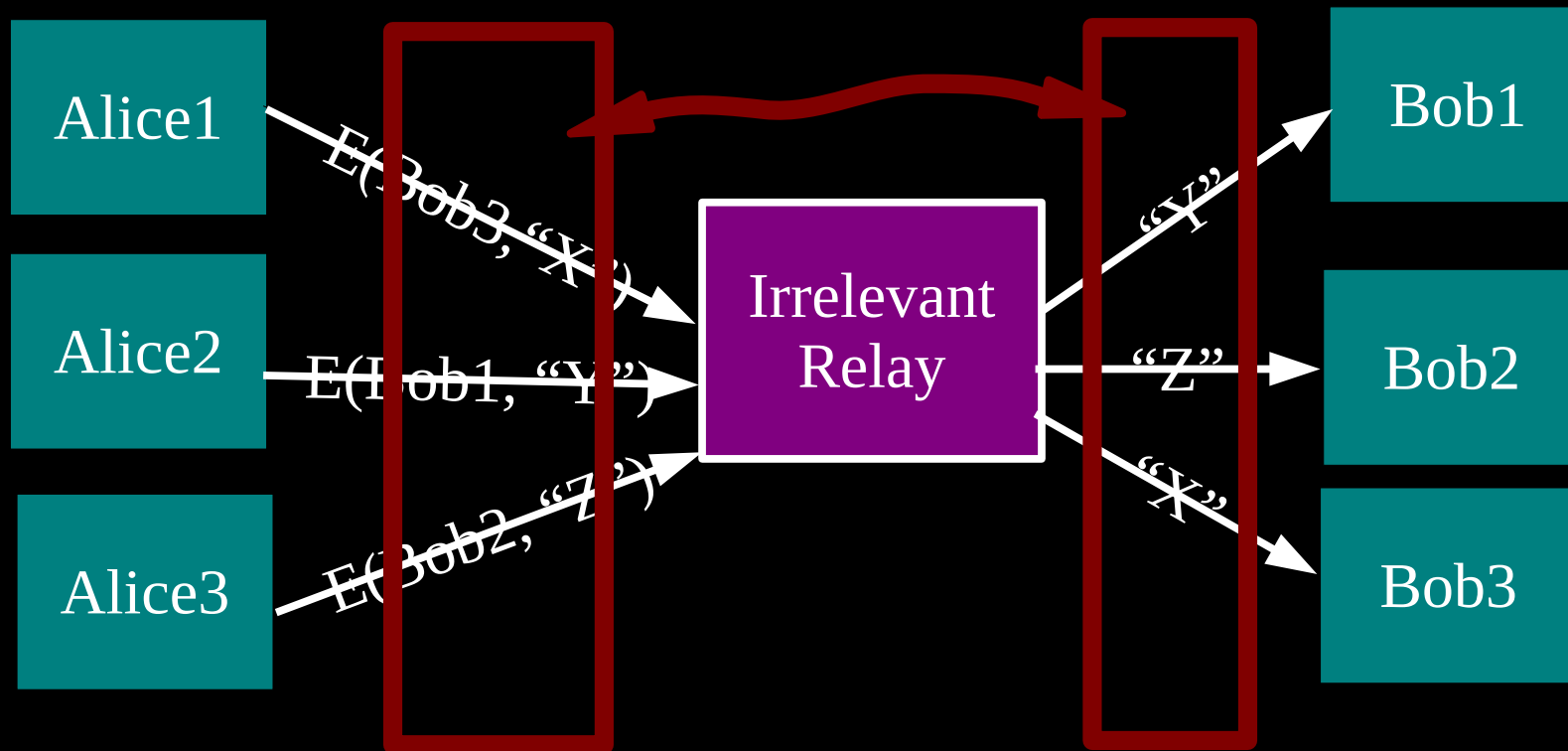
(example: some commercial proxy providers)

**But a central relay is  
a single point of failure.**



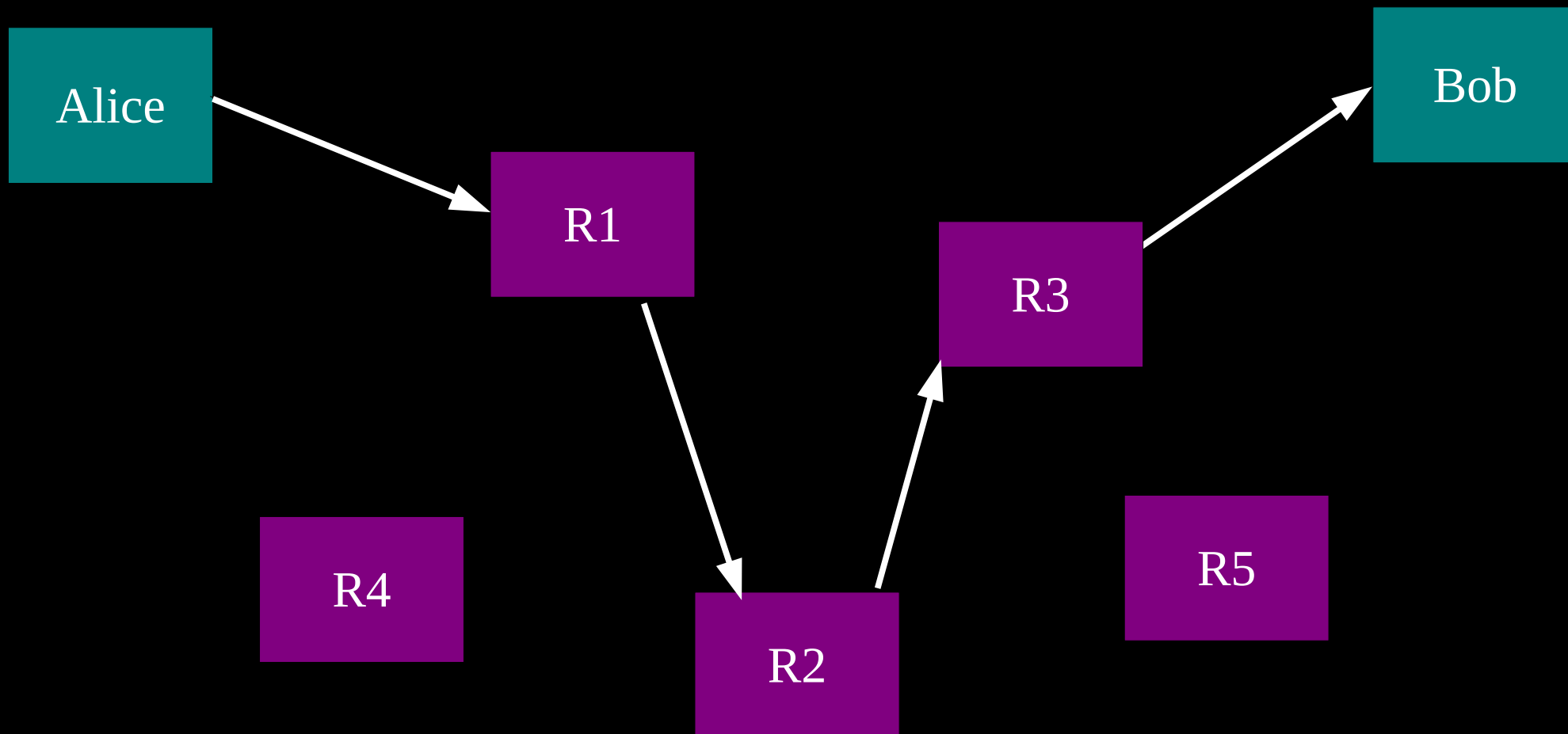


**... or a single point of bypass.**

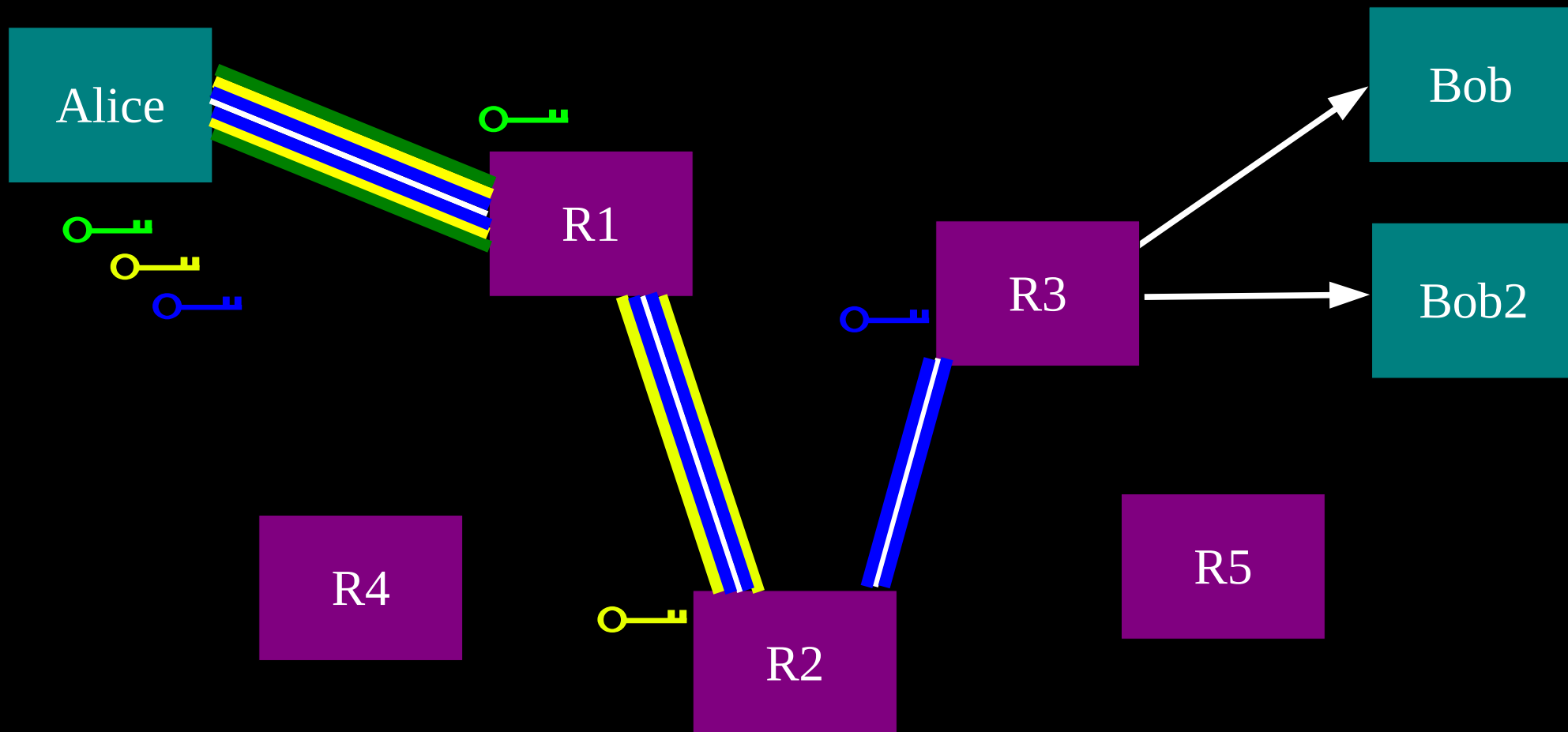


Timing analysis bridges all connections through relay  $\Rightarrow$  An attractive fat target

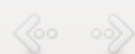
**So, add multiple relays so that  
no single one can betray Alice.**



**Alice makes a session key with R1  
...And then tunnels to R2...and to R3**







about:tor



Startpage

Tor Browser  
3.5-Linux

New Identity

Cookie Protections

Preferences...

About Torbutton...

Open Network Settings...

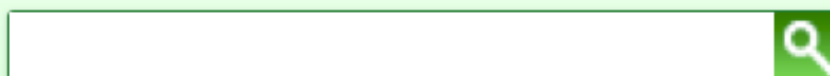


# Congratulations!

This browser is configured to use Tor.

*You are now free to browse the Internet anonymously.*

[Test Tor Network Settings](#)



Search [securely](#) with [Startpage](#).

## What Next?

Tor is NOT all you need to browse anonymously! You may need to change some of your browsing habits to ensure your identity stays safe.

[Tips On Staying Anonymous »](#)

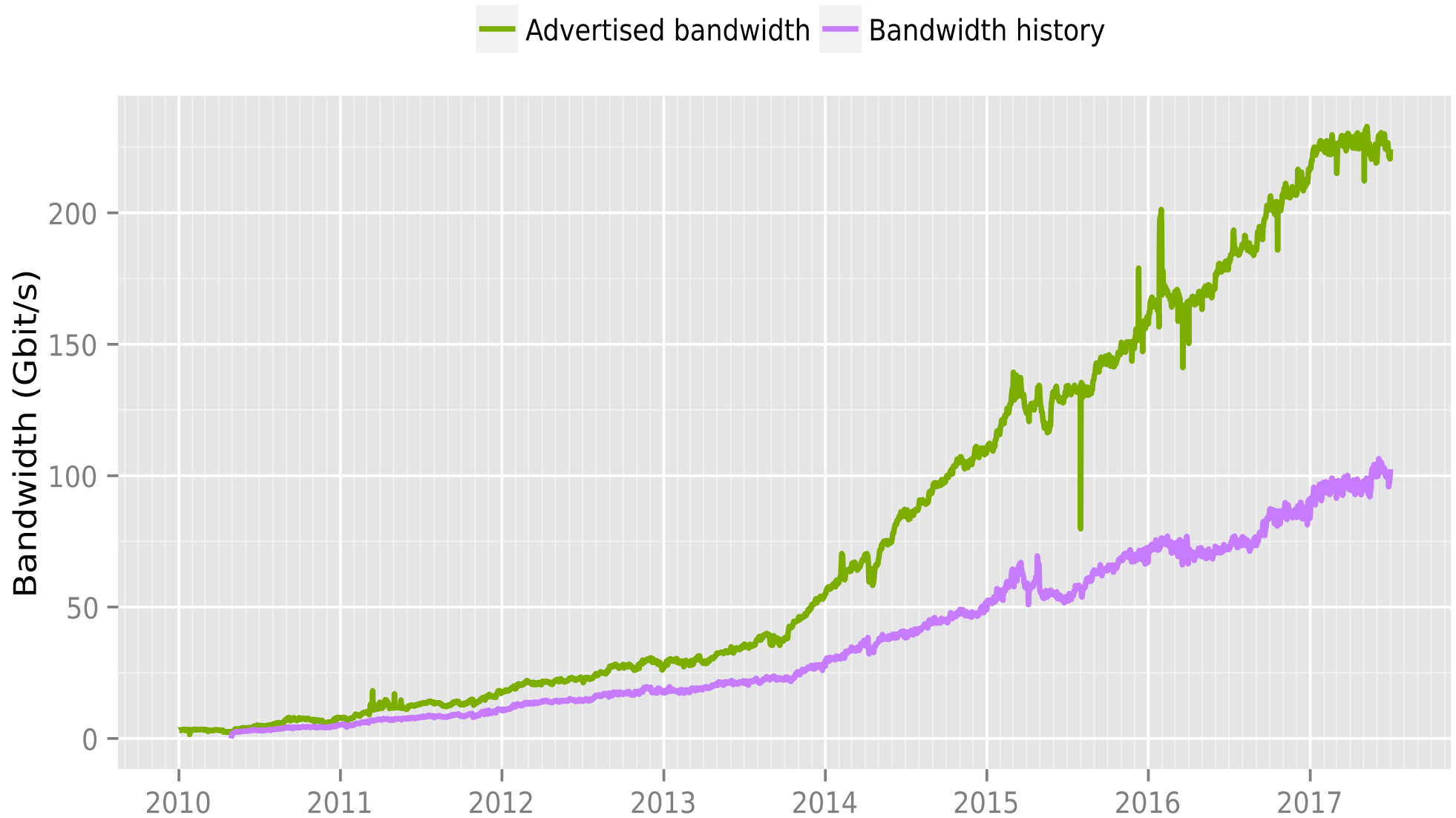
## You Can Help!

There are many ways you can help make the Tor Network faster and stronger:

- [Run a Tor Relay Node »](#)
- [Volunteer Your Services »](#)
- [Make a Donation »](#)

The Tor Project is a US 501(c)(3) non-profit dedicated to the research, development, and education of online anonymity and privacy. [Learn more about The Tor Project »](#)

## Total relay bandwidth



The Tor Project - <https://metrics.torproject.org/>

# **Tor's safety comes from diversity**

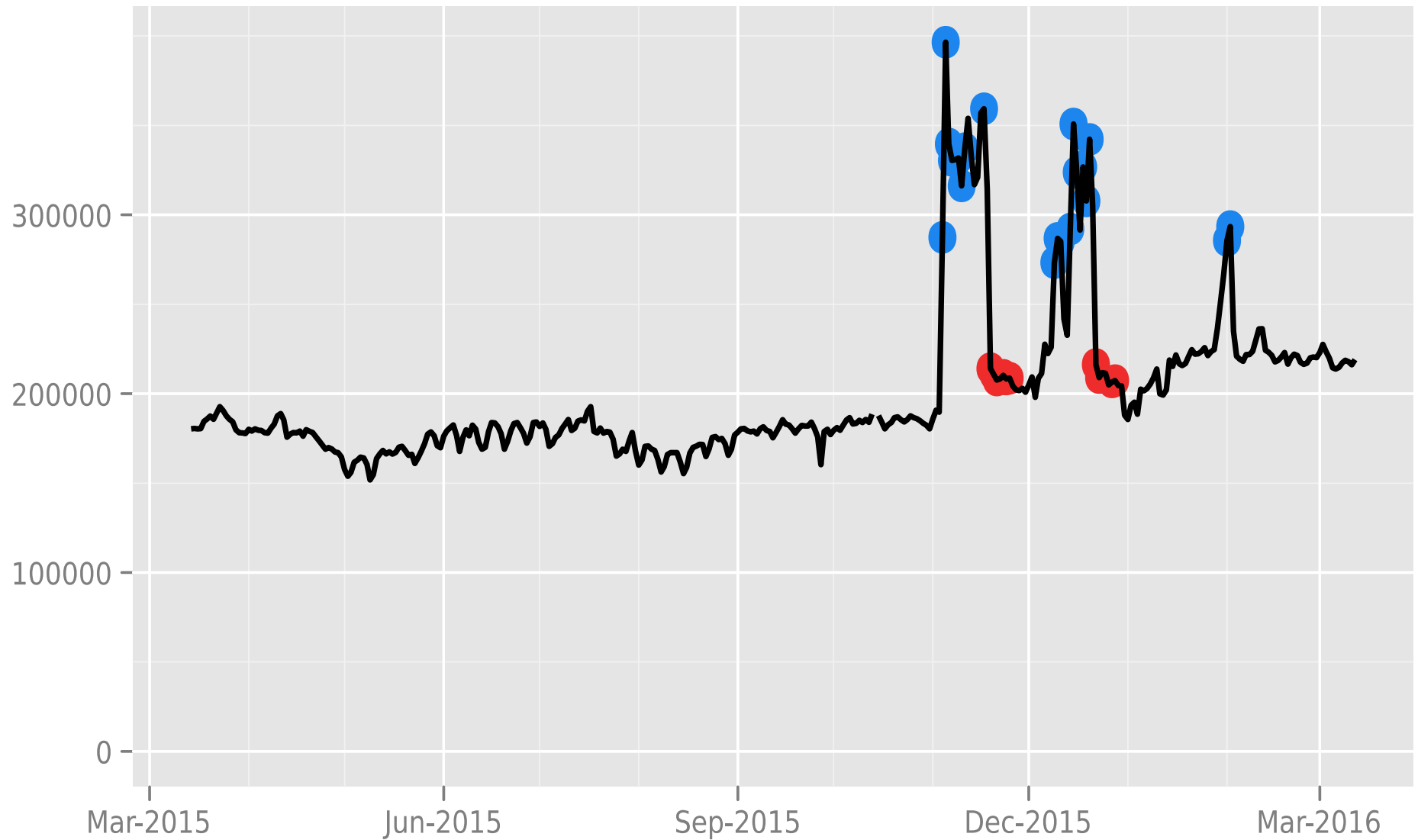
- #1: Diversity of relays. The more relays we have and the more diverse they are, the fewer attackers are in a position to do traffic confirmation. (Research problem: measuring diversity over time)
- #2: Diversity of users and reasons to use it. 50000 users in Iran means almost all of them are normal citizens.



# Transparency for Tor is key

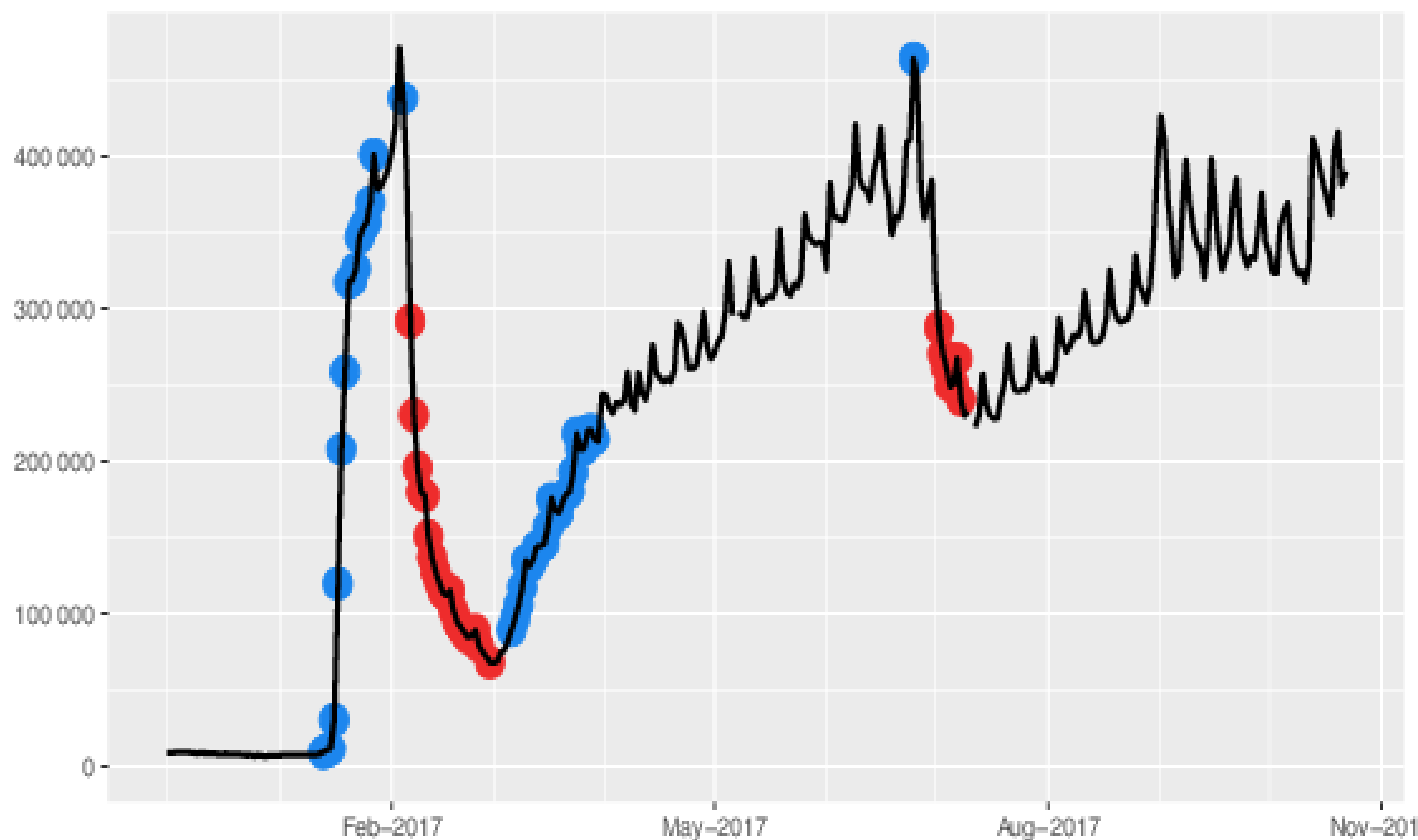
- Open source / free software
- Public design documents and specifications
- Publicly identified developers
- Not a contradiction:  
privacy is about choice!

## Directly connecting users from Russia



The Tor Project - <https://metrics.torproject.org/>

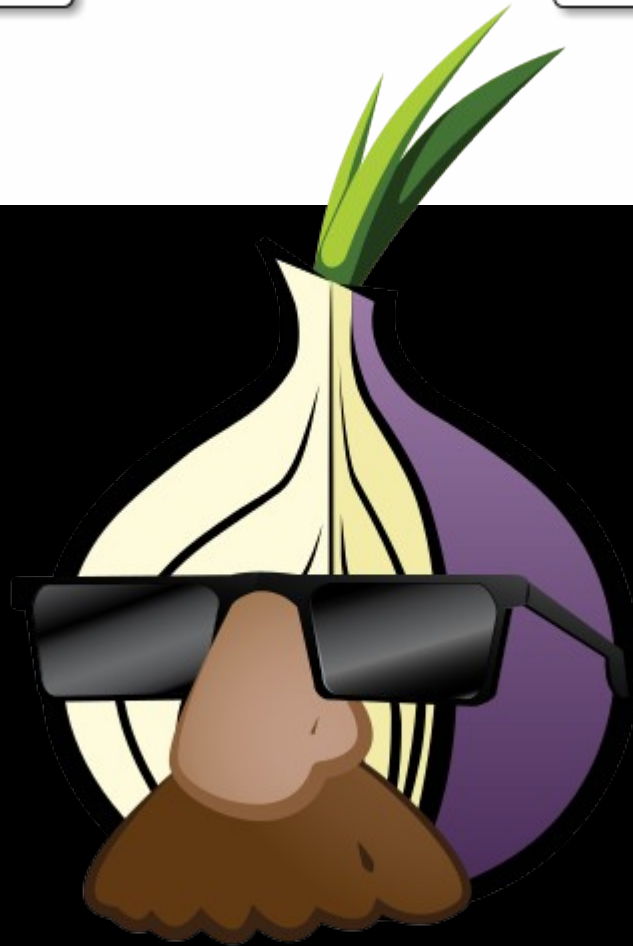
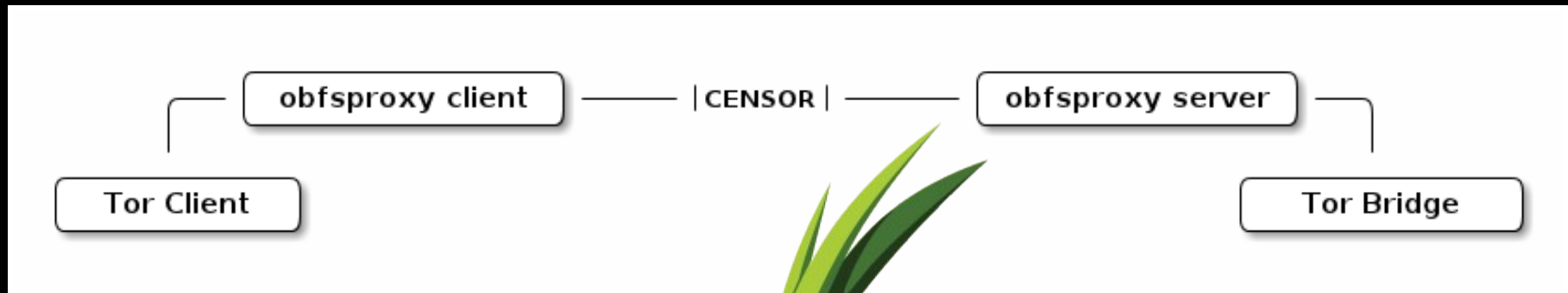
## Directly connecting users from the United Arab Emirates



The Tor Project – <https://metrics.torproject.org/>



# Pluggable transports

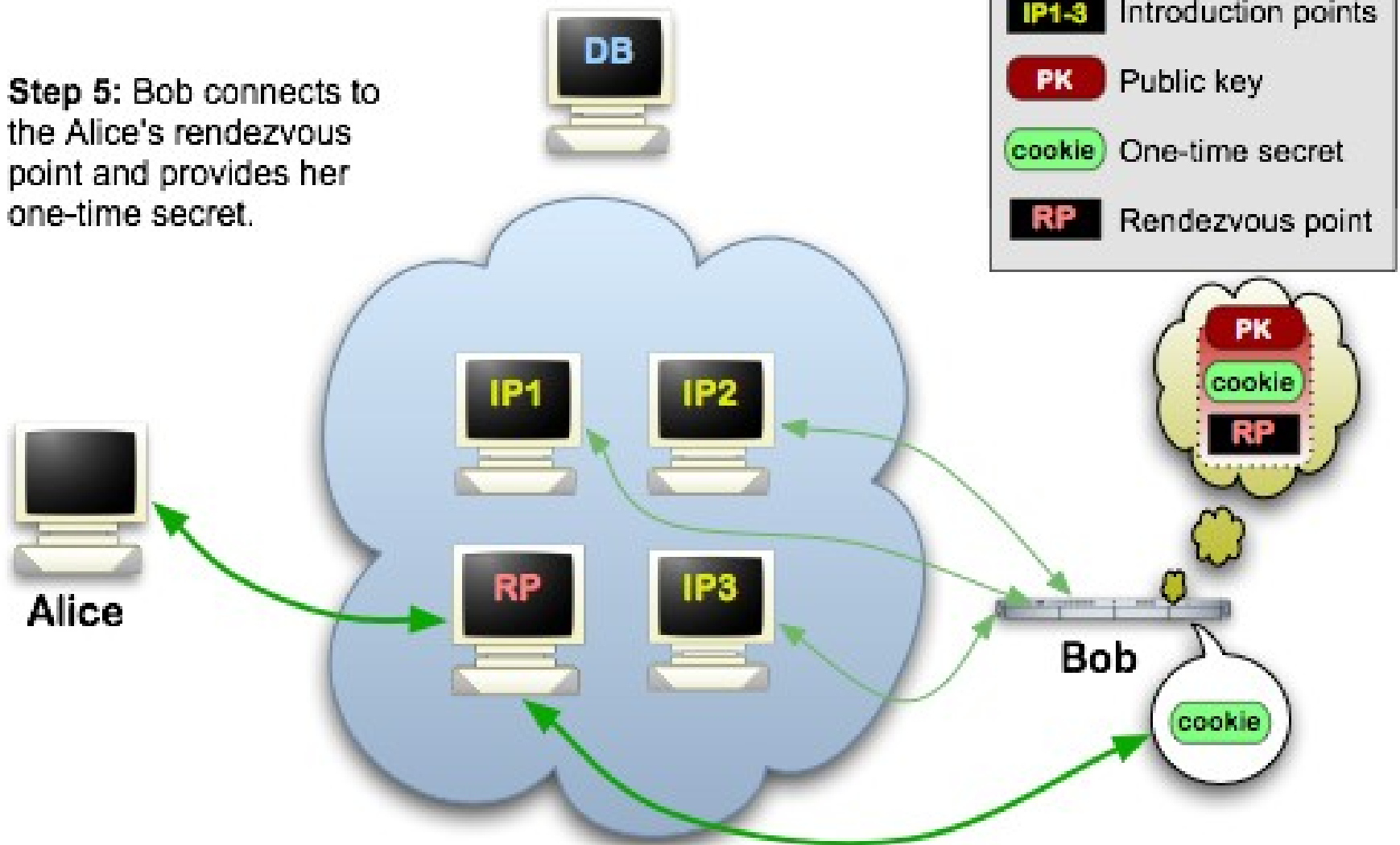


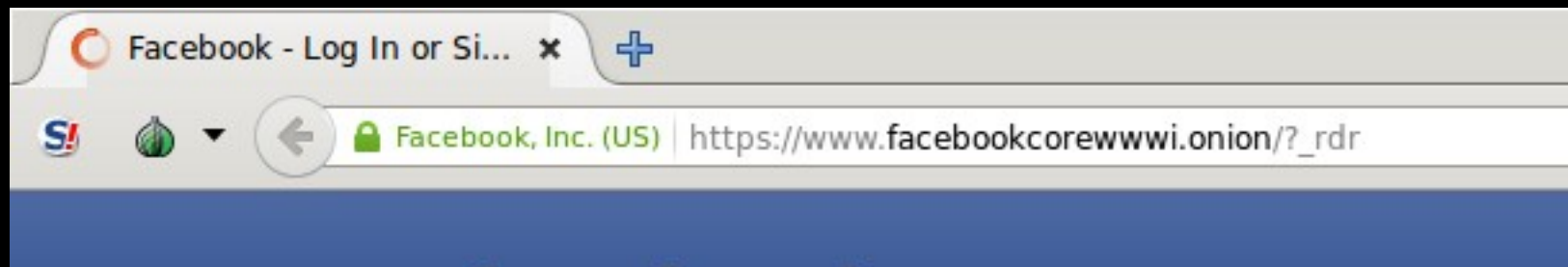
# Pluggable transports

- Flashproxy (Stanford), websocket
- FTEProxy (Portland St), http via regex
- Stegotorus (SRI/CMU), http
- Skypemorph (Waterloo), Skype video
- uProxy (Google), webrtc
- ScrambleSuit (Karlstad), obfs-based
- Telex (Michigan/Waterloo), traffic divert

# Tor Hidden Services: 5

Step 5: Bob connects to the Alice's rendezvous point and provides her one-time secret.





# 1 Million People use Facebook over Tor

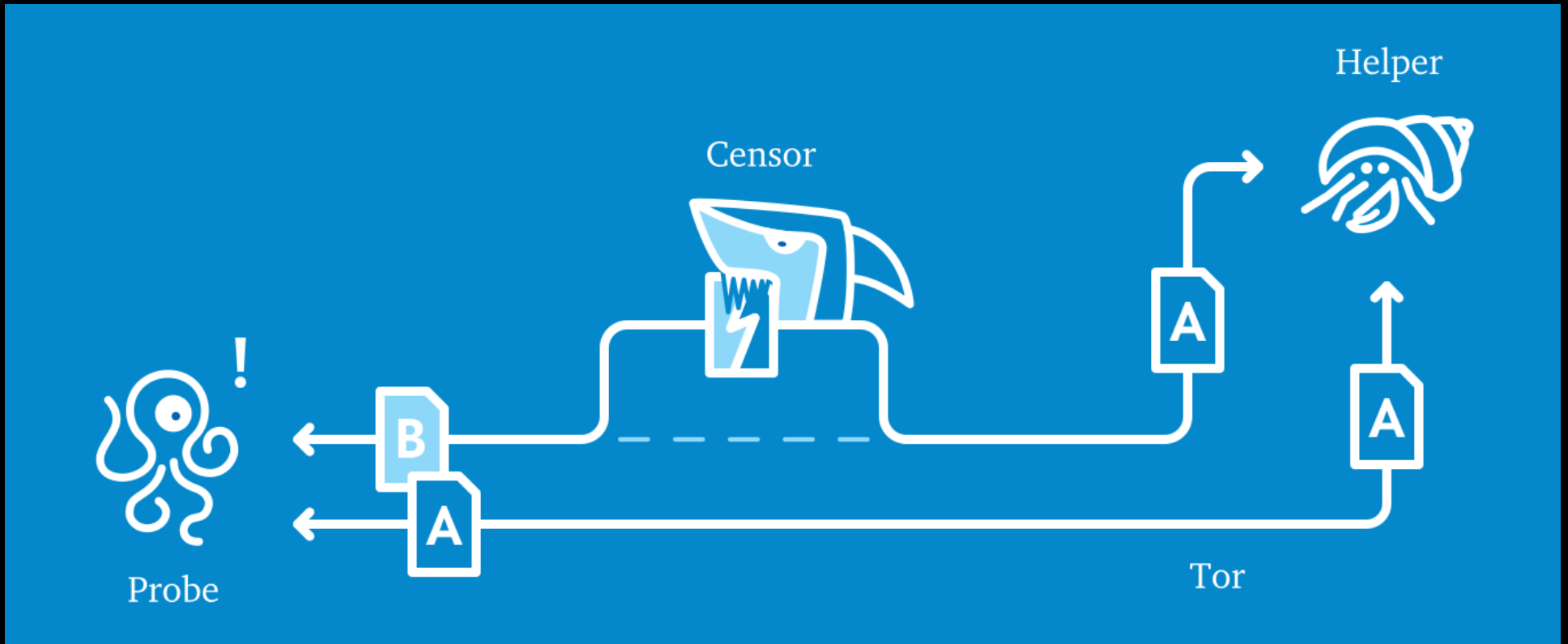


FACEBOOK OVER TOR · FRIDAY, APRIL 22, 2016

People who choose to communicate over Tor do so for a variety of reasons related to privacy, security and safety. As we've [written previously](#) it's important to us to provide methods for people to use our services securely – particularly if they lack reliable methods to do so.

This is why in the last two years we built [the Facebook onion site](#) and [onion-mobile site](#), helped [standardise the “.onion” domain name](#), and implemented Tor connectivity [for our Android mobile app](#) by enabling connections through [Orbot](#).

ooni.torproject.org





# explorer.ooni.torproject.org



OONI Explorer

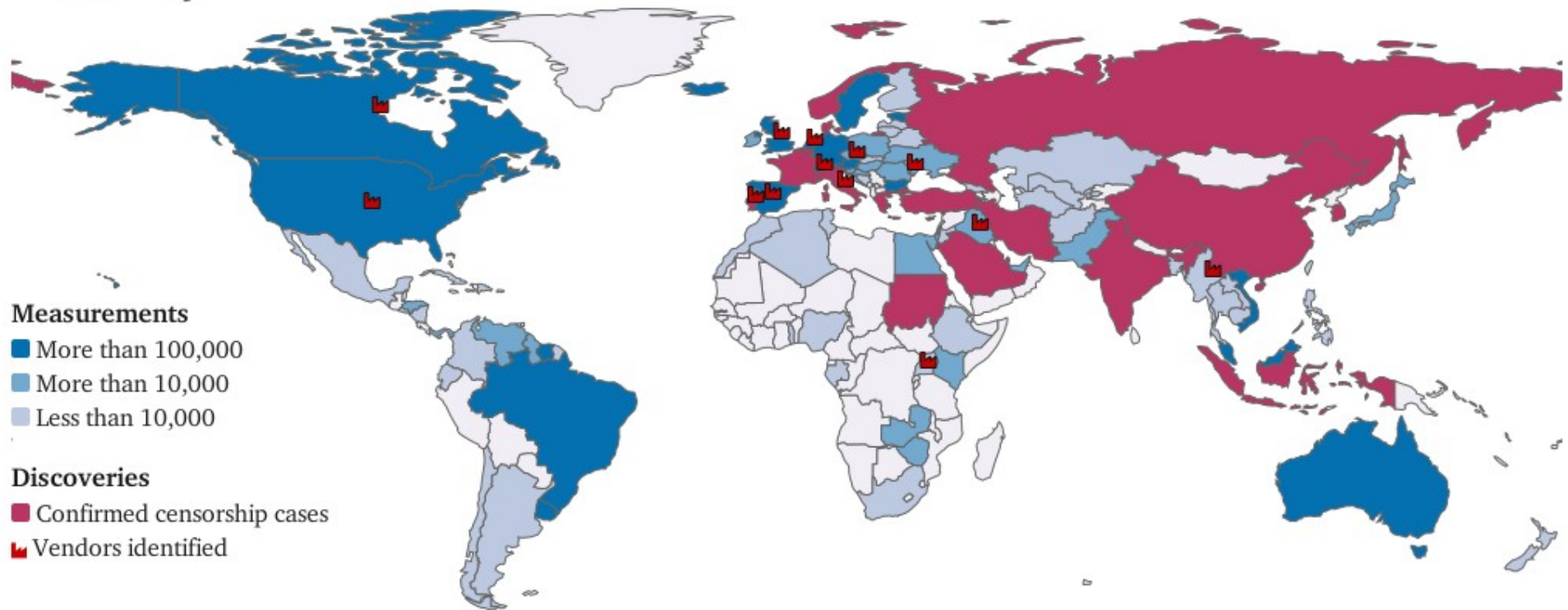
World

Explorer

Highlights

About

## World Map





“Still the King of high secure,  
low latency Internet Anonymity”

Contenders for the throne:

- None