Einführung in Tor

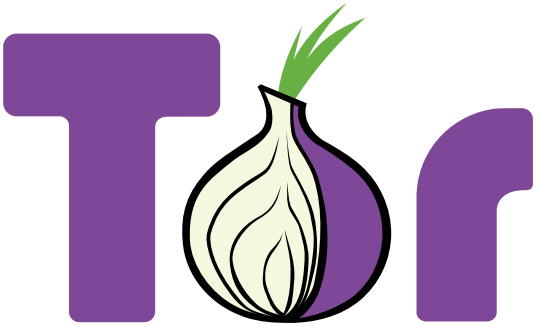
KunterBuntesSeminar

November 12, 2019

FBI

Outline

- Introduction to Tor
- Q&A
- Tor Association for Hamburg



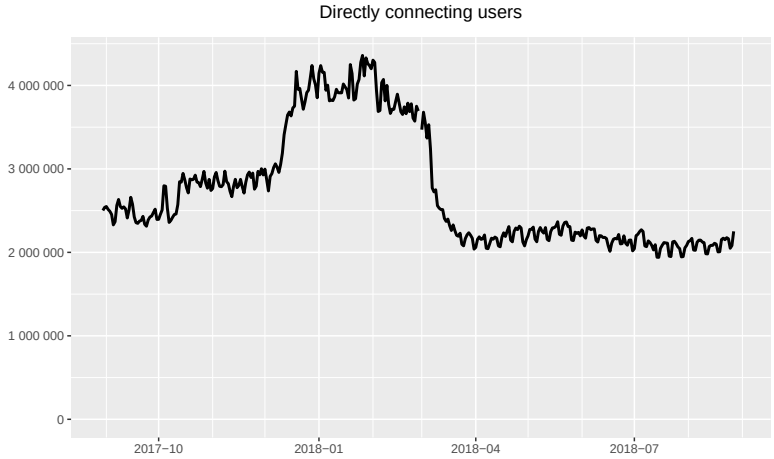
The Tor Project

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

What is Tor?

- Online anonymity
  - FLOSS
  - Open (volunteer-based) network
- Community: researchers, developers, users, relay operators, [. . .]
- U.S. 501(c)(3) non-profit organization

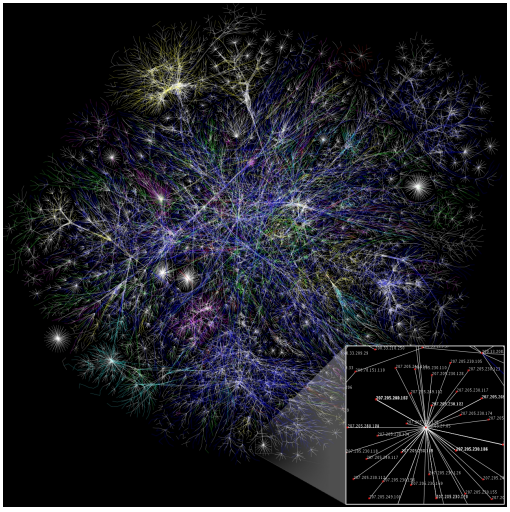
What is Tor?



The Tor Project − https://metrics.torproject.org/

Estimated 2.000.000+ Tor users (daily)

How does the Internet work?



The Opte Project, Internet map 1024, CC BY 2.5

- A gigantic network of computers, servers and devices
- Every PC, server, device, refrigerator, . . . requires a unique identifier - **IP address**
- Internet is not the WWW (World Wide Web)
- Internet is the infrastructure
- Web is a service of this infrastructure

How does the Internet work?

On the Internet we are sending (a lot) of private data:

- Source/destination IP address
  - Geographical location
- WWW
  - Web browser
  - Operating system
  - Addons and extensions
- Other services: e-mail, telephone, chat (IRC, IM), file sharing, . . .

Understanding your threat model

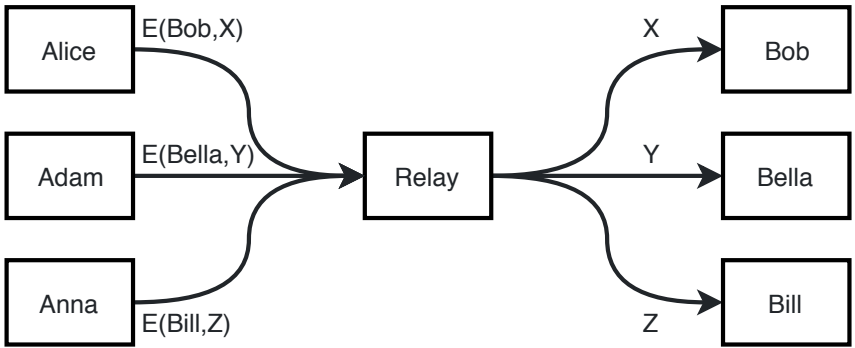
I use encryption (HTTPS, ...) my ISP cannot see my traffic!

Maybe it cannot see your traffic (in cleartext), **but** it tracks:

- Websites visited
- Location logs
- IP address logs
- …archived for x time: data retention

VPN / Proxy providers

Often a single point of failure



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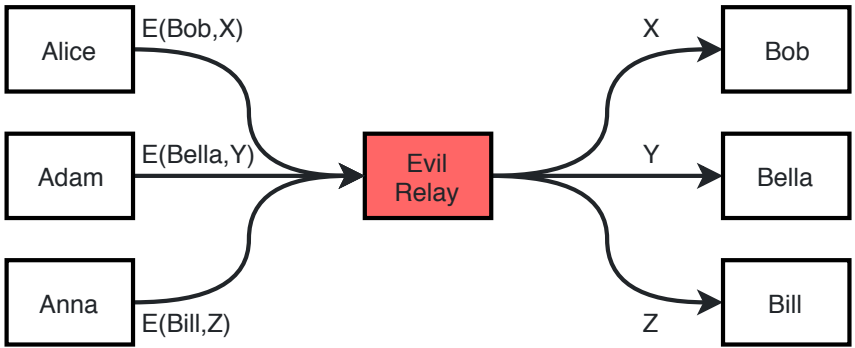

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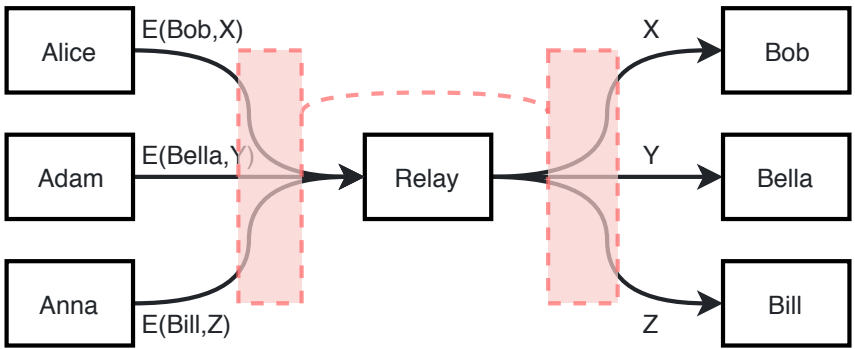
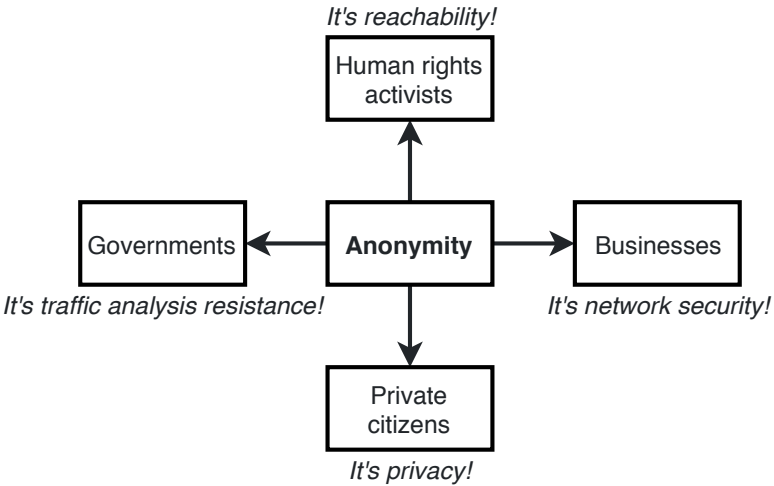
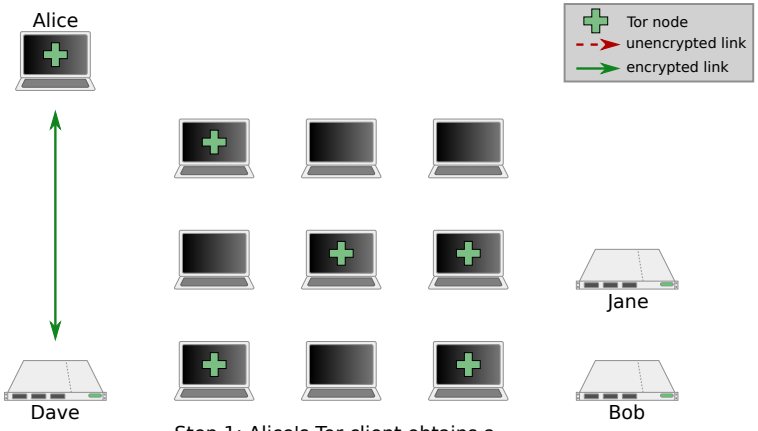


Anonymity: different interests for different user groups



How Tor works



https://svn.torproject.org/svn/website/trunk/images/htw1.svg

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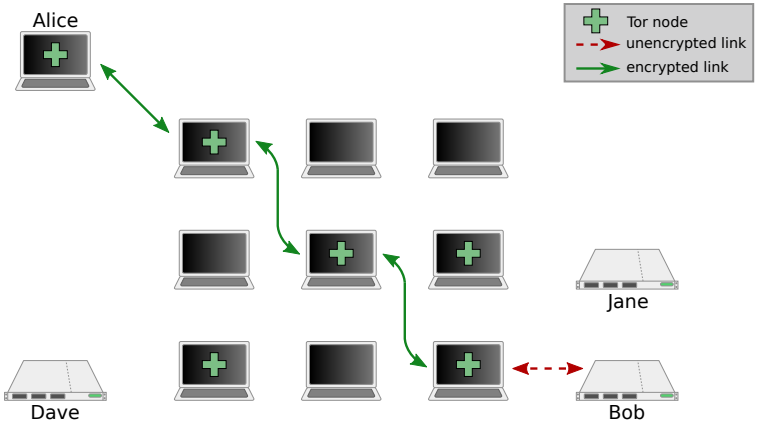
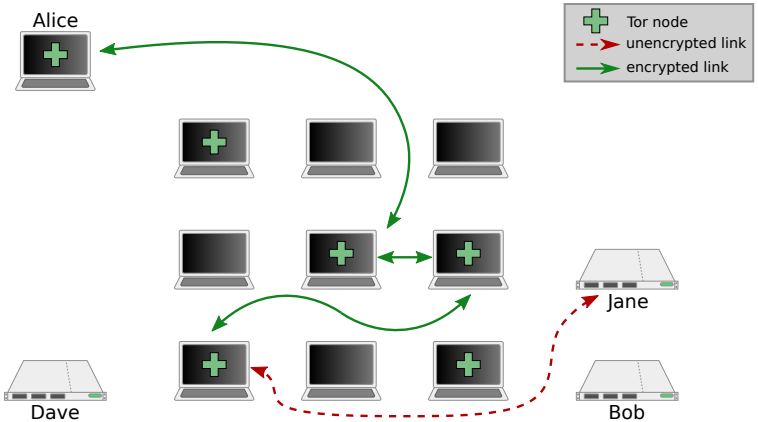


Step 2: Alice's Tor client picks a random path to destination server. **Green links** are encrypted, **red links** are in the clear.

https://svn.torproject.org/svn/website/trunk/images/htw2.svg

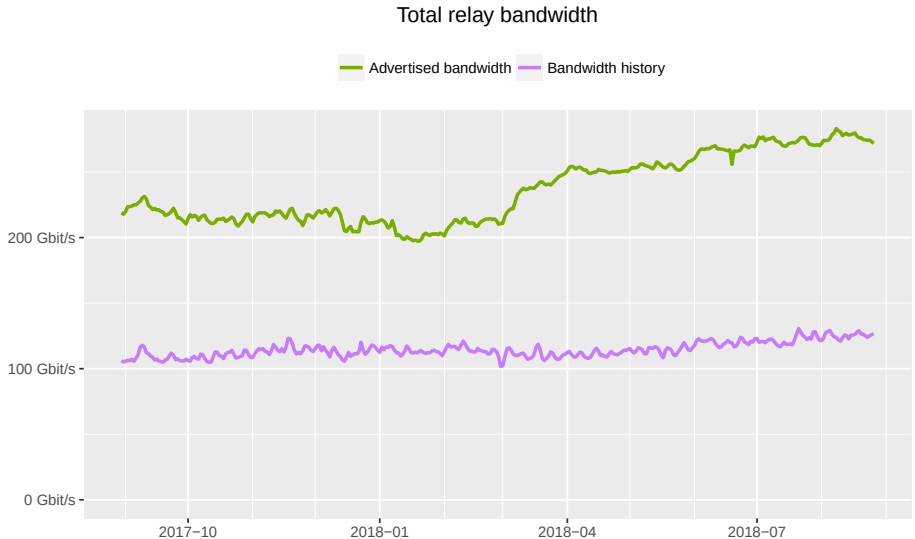
How Tor works



Step 3: If at a later time, the user visits another site, Alice's Tor client selects a second random path. Again, **green links** are encrypted, **red links** are in the clear.

https://svn.torproject.org/svn/website/trunk/images/htw3.svg

Tor relay bandwidth



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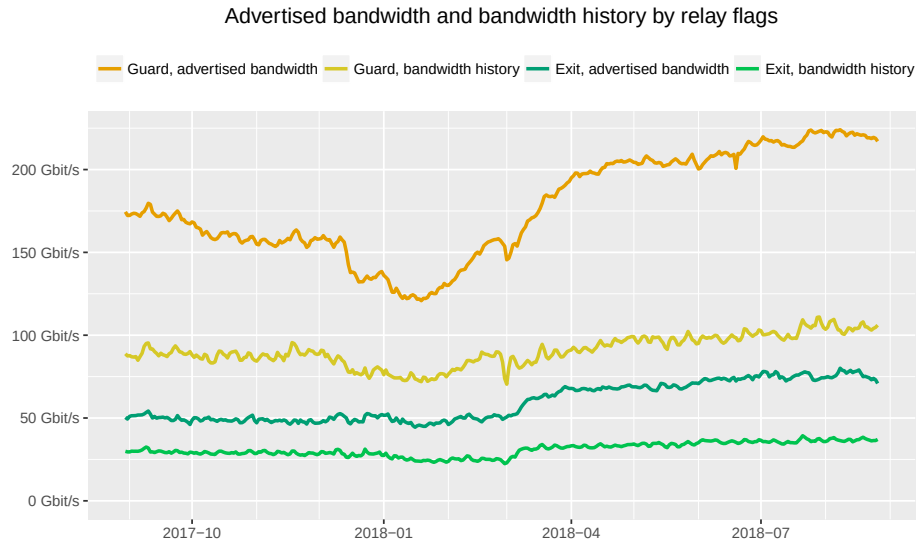

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Safety

Tor’s safety comes from diversity

- Diversity of relays
- Diversity of users and reasons to use Tor

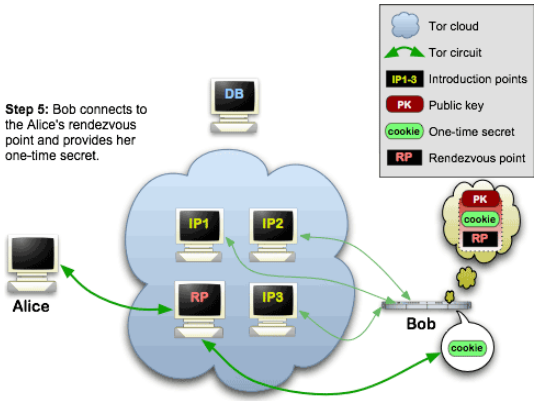
Transparency

- FLOSS
- Public design documents and specifications
- Public research

Onion services

Publish web sites and other services without needing to reveal the location of the site

- Self authenticated
- End-to-end encrypted
- Built-in NAT punching
- Limit surface area
- No need to *exit* from Tor

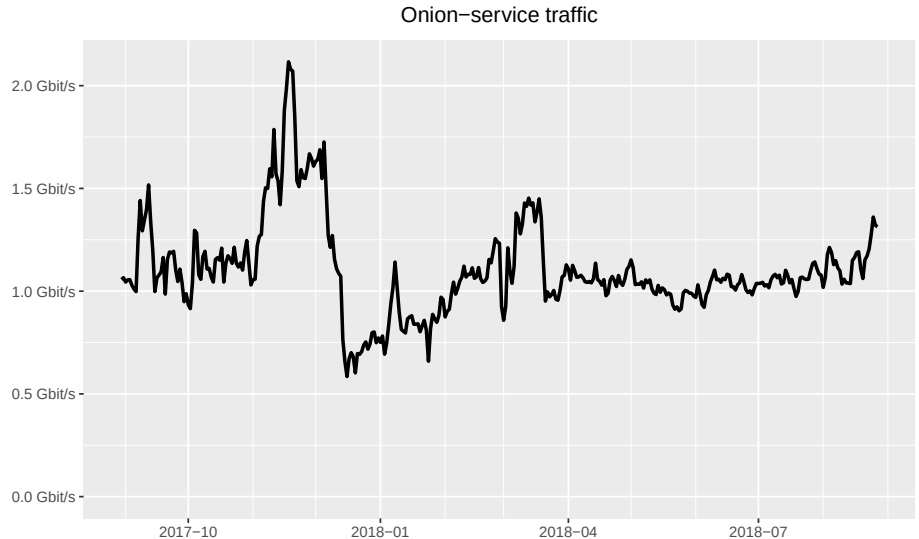


https://www.torproject.org/images/tor-onion-services-5.png

Onion addresses

- 3g2upl4pq6kufc4m.onion
- facebookcorewwwi.onion
- jamie3vkiwibfiwucd6vxijskbhpjdyajmzeor4mc4i7yopvpo4p7cyd.onion

Onion-service traffic



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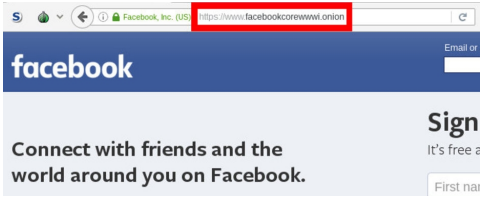
Onion services

- About 3% of Tor's traffic has to do with onion services at all
- Onion services are evolving technology
- Terbium labs (and others) found 7000 onion websites
- Also used for messengers and other applications



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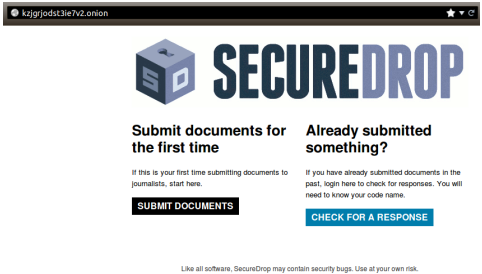

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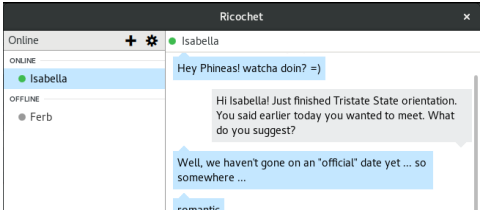

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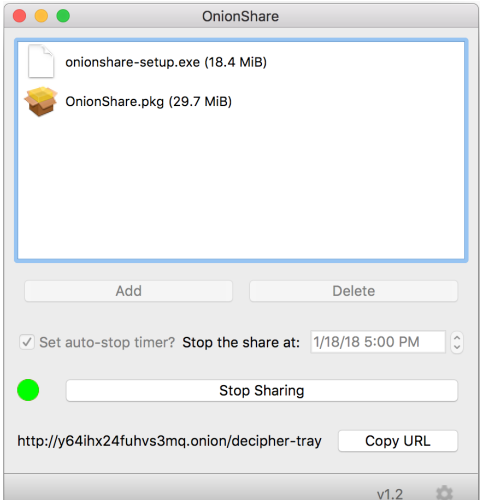
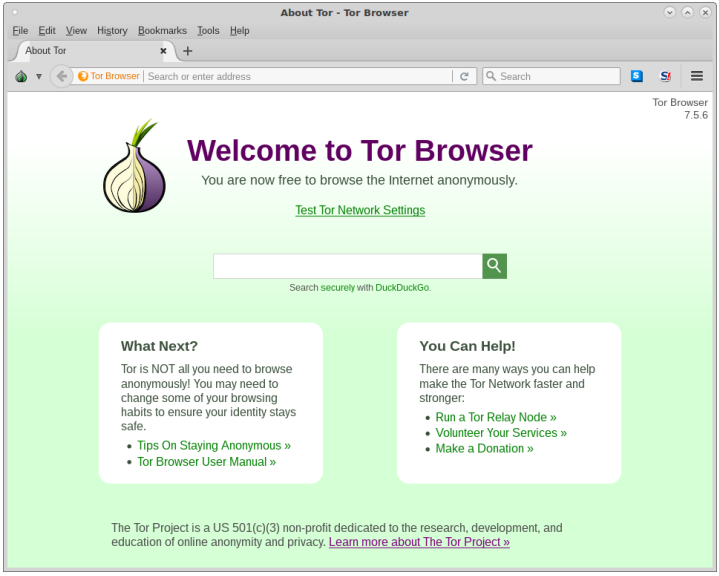


How can you help Tor?

- Use Tor and teach your friends
- Run a relay or a bridge
- Help fix – and fix – bugs
- Work on open research problems (petsymposium.org)
- Donate

Protect your privacy



Further information

- www.torproject.org
- support.torproject.org
- Blog
- Metrics
- Tails

Artikel 10

2 people, running relays for years

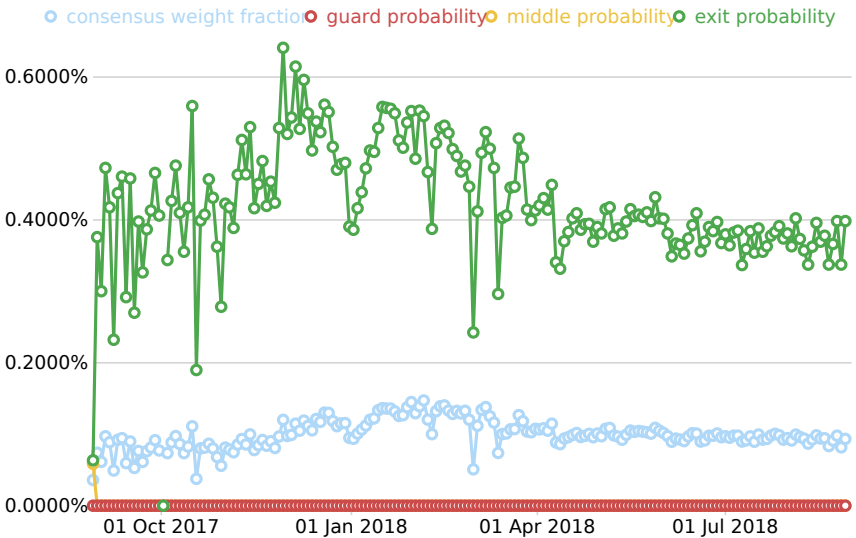
- 1 exit since about 1 year

family:F8BEB0F7AACC4F3EA6FF2C1FC19A9BD753887355

Nickname†	Advertised Bandwidth	Country	Flags	Add. Flags
Artikel10 (5)	18 MiB/s			
mmx (2)	6 MiB/s			
EinTeilDerAntwort (4)	4 MiB/s			
AllCreaturesWelcome (4)	4 MiB/s			
Artikel10Exit2 (4)	2.3 MiB/s			
Total	**34.3 MiB/s**			

We want to grow.

Artikel 10


consensus weight fraction
guard probability
middle probability
exit probability
0.6000%
0.4000%
0.2000%
0.0000%
01 Oct 2017
01 Jan 2018
01 Apr 2018
01 Jul 2018

YATA – Yet another Tor association?

Others: Zwiebelfreunde, Digitalcourage, Artikel 5, Foundation for Applied Privacy

Why? Decentralize all the things!

Artikel10! Ein neuer Tor-Verein für Hamburg und Umgebung

Stay in contact

lists.riseup.net/www/info/artikel10

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Sources

The presentation is based on
https://people.torproject.org/ andz/presentations/enucomp-keynote-parnaiba-br-2017.pdf.