

Einführung in Tor

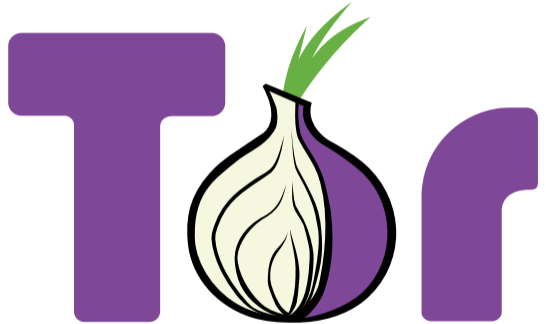
KunterBuntesSeminar

November 12, 2019

FBI



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



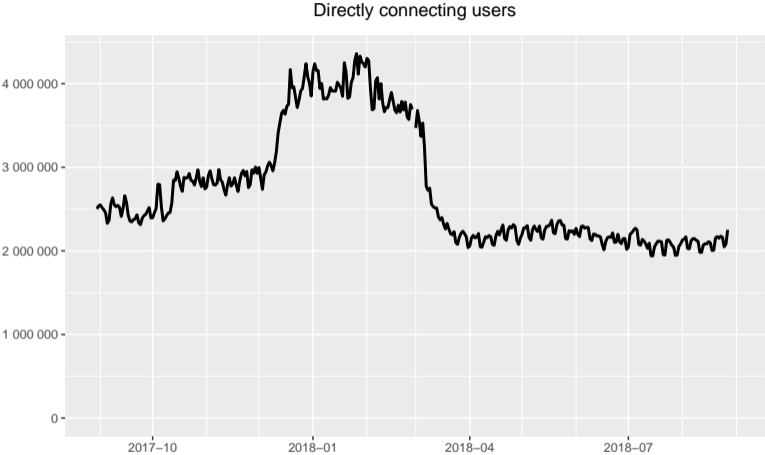
The Tor Project

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

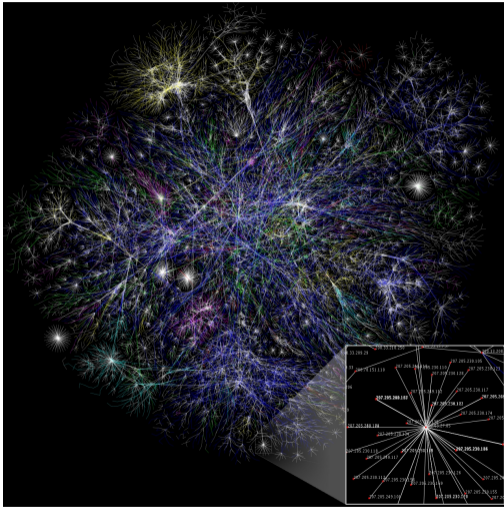
What is Tor?



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

Estimated 2.000.000+ Tor users (daily)

How does the Internet work?



- 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

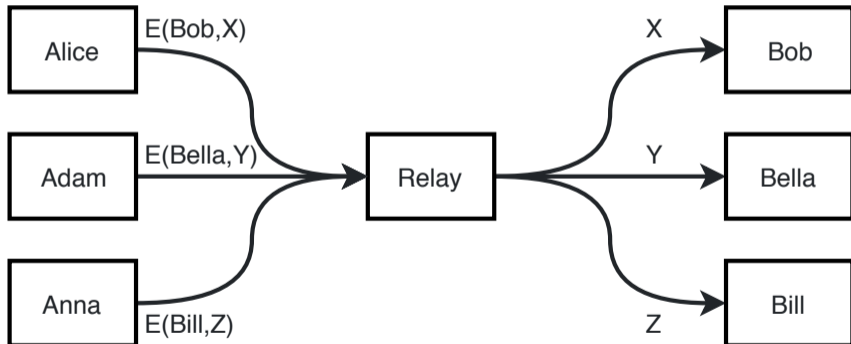
I use encryption (HTTPS, ...) my ISP cannot see my traffic!

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

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

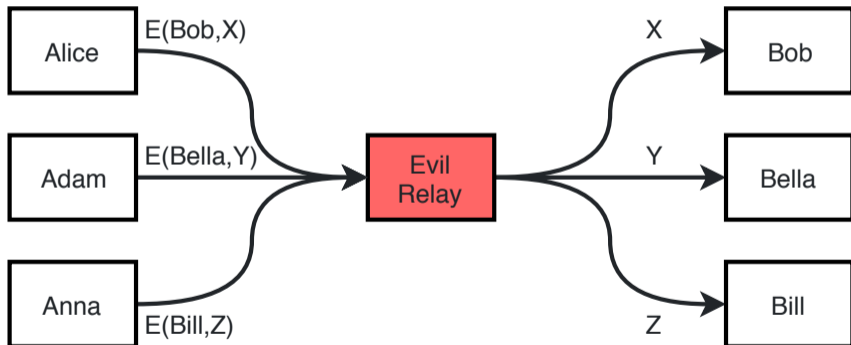
VPN / Proxy providers

Often a single point of failure



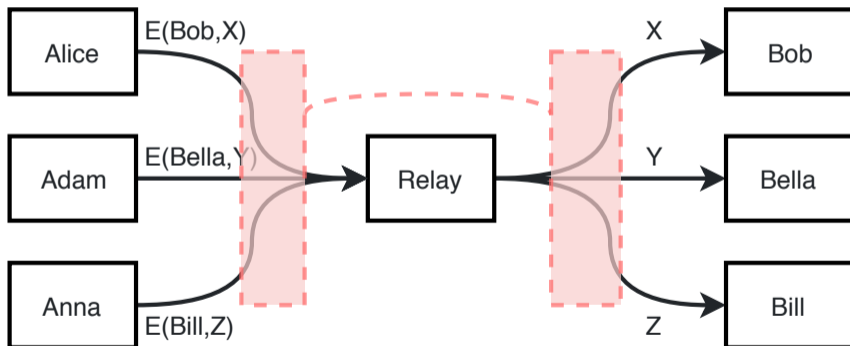
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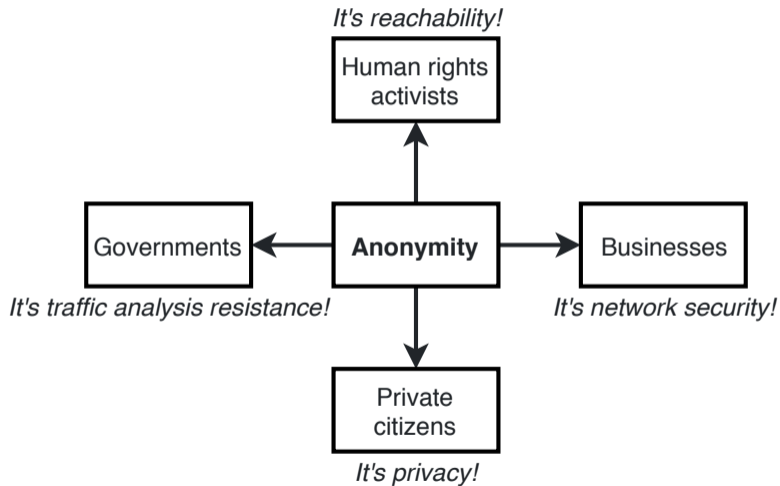


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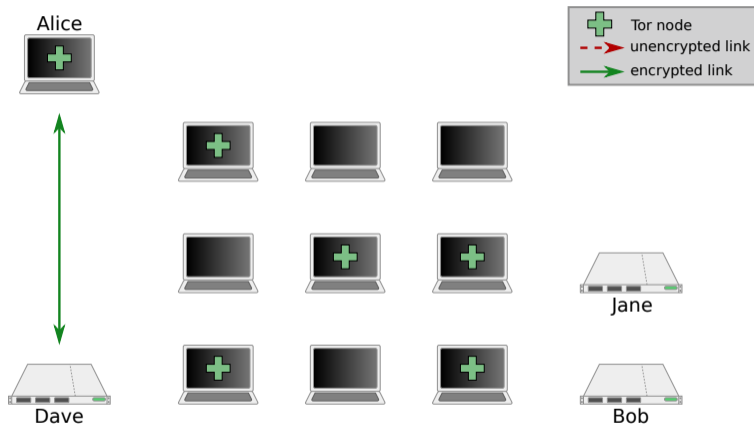
Often a single point of failure



Anonymity: different interests for different user groups

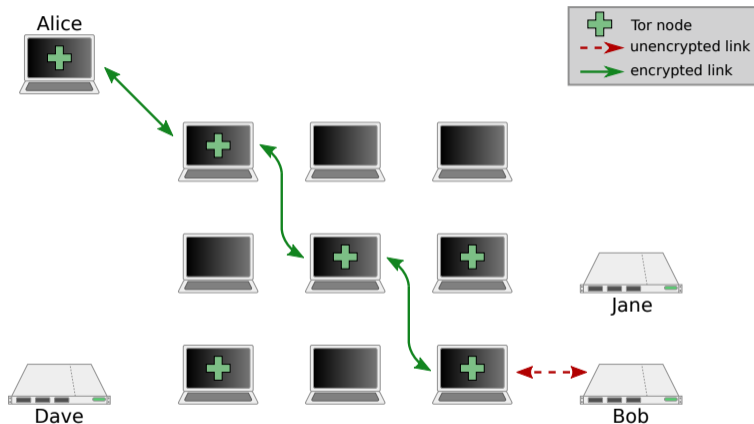


How Tor works



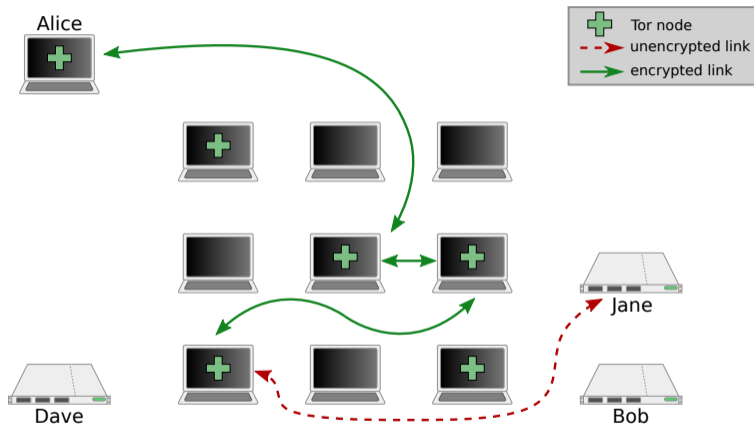
Step 1: Alice's Tor client obtains a list of Tor nodes from a directory server, Dave.

How Tor works



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

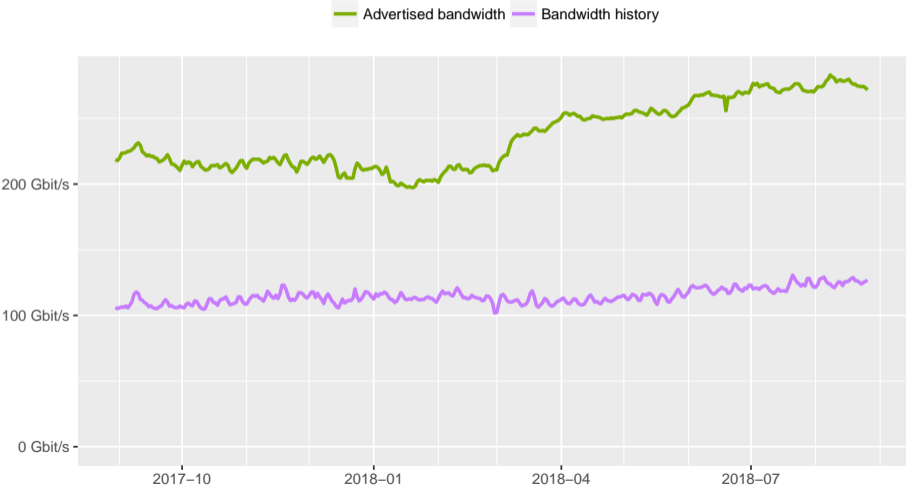
How Tor works



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.

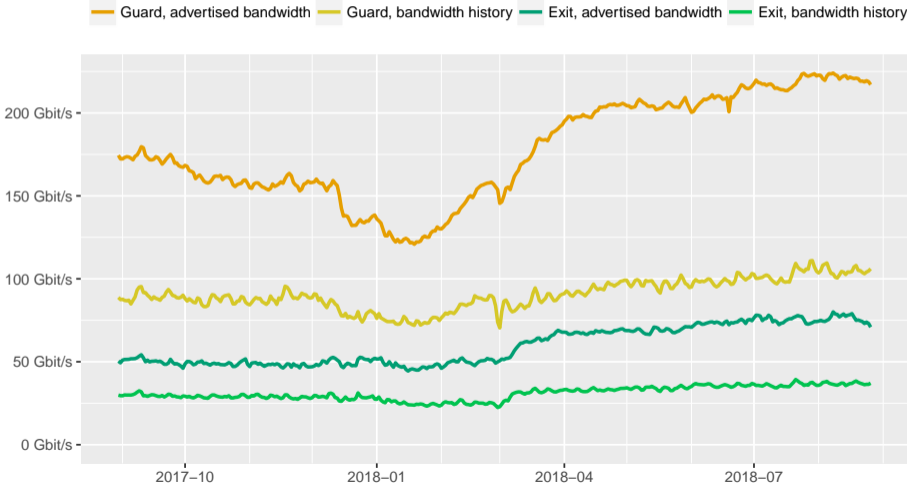
Tor relay bandwidth

Total relay bandwidth



Tor relay bandwidth

Advertised bandwidth and bandwidth history by relay flags



Tor's safety comes from diversity

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

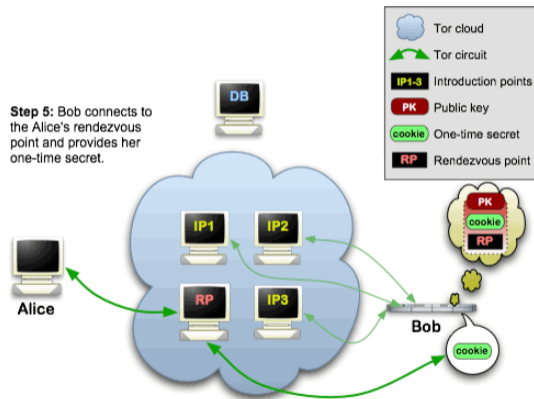
Transparency

- 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
- facebookcorewwi.onion
- jamie3vkiwibfiwucd6vxijskbhpjdyajmzeor4mc4i7yopvpo4p7cyd.onion

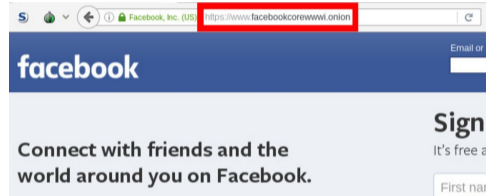
Onion-service traffic

Onion-service traffic



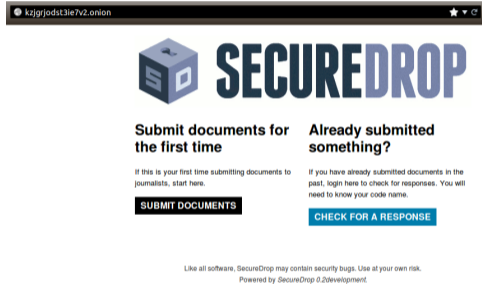
Onion services

- 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



Onion services

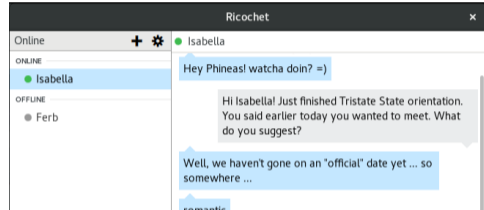
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The screenshot shows a web browser window with the address bar displaying 'kzjgrjodst3ie7v2.onion'. The main content area features the SecureDrop logo, which consists of a blue cube icon with a white 'S' and a white square with a blue 'D' on its faces, followed by the text 'SECUREDROP' in a bold, blue, sans-serif font. Below the logo, there are two columns of text. The left column is titled 'Submit documents for the first time' and includes a link 'If this is your first time submitting documents to journalists, start here.' with a black button labeled 'SUBMIT DOCUMENTS'. The right column is titled 'Already submitted something?' and includes a link 'If you have already submitted documents in the past, login here to check for responses. You will need to know your code name.' with a blue button labeled 'CHECK FOR A RESPONSE'. At the bottom of the page, there is a small disclaimer: 'Like all software, SecureDrop may contain security bugs. Use at your own risk. Powered by SecureDrop 0.2development'.

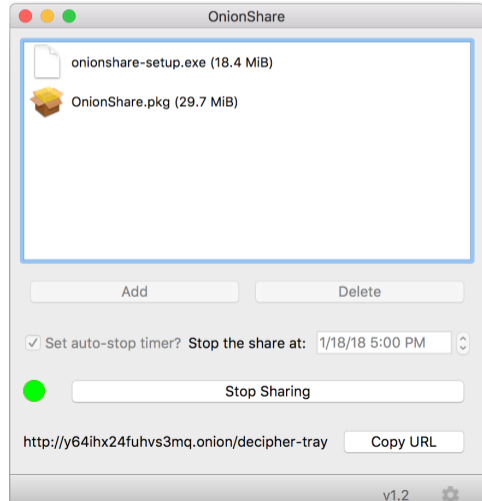
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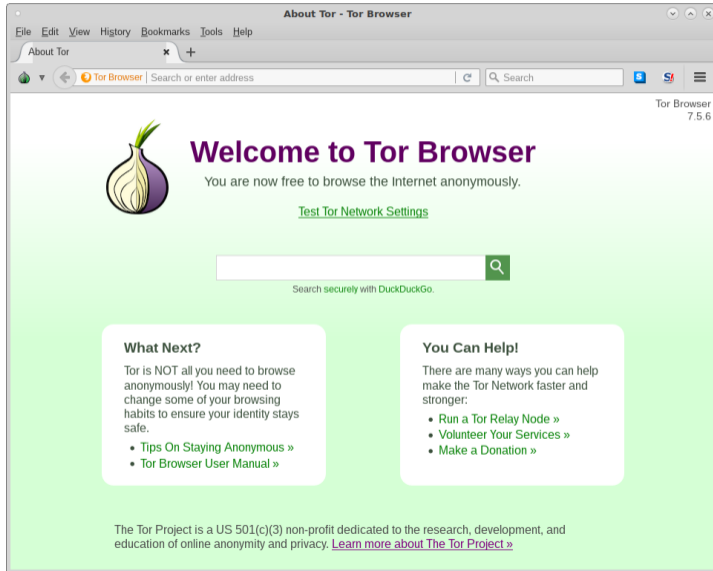
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How can you help Tor?

- 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



About Tor - Tor Browser

File Edit View History Bookmarks Tools Help

About Tor x +

Tor Browser Search or enter address Search

Tor Browser 7.5.6



Welcome to Tor Browser

You are now free to browse the Internet anonymously.

[Test Tor Network Settings](#)

Search securely with DuckDuckGo.

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 »](#)
- [Tor Browser User Manual »](#)

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 »](#)

Further information


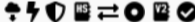











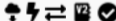

- www.torproject.org
- support.torproject.org
- Blog
- Metrics
- Tails

Artikel 10

2 people, running relays for years

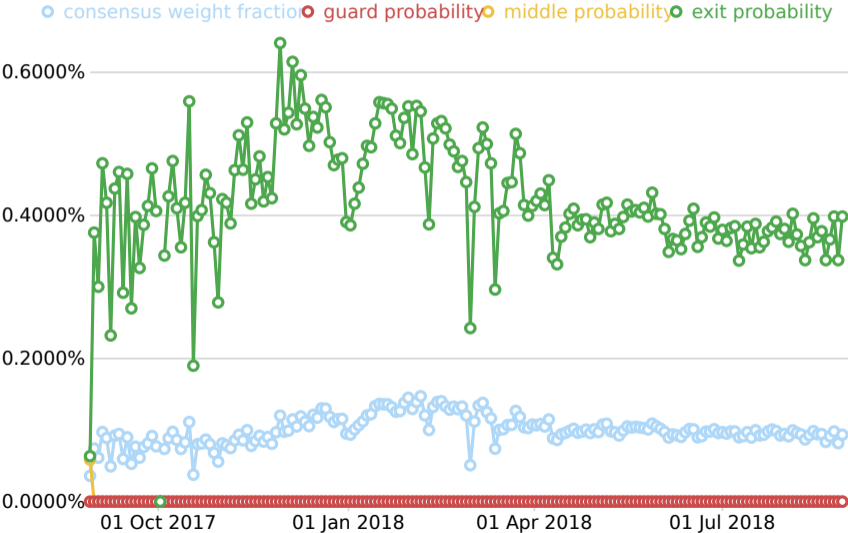
- 1 exit since about 1 year

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



YATA – Yet another Tor association?

Others: Zwieblefreunde, 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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The presentation is based on

<https://people.torproject.org/andz/presentations/enucomp-keynote-parnaiba-br-2017.pdf>.