

Nástroje a možnosti internetu

Hlubší vrstvy Internetu II.

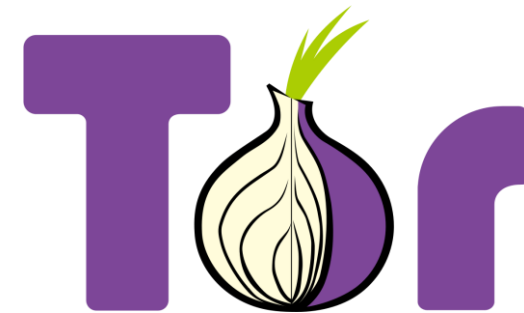
25. 11. 2022

Onion routing



- původ v armádním [výzkumu](#)
- vytvořit spojení, které neprozradí kdo s kým mluví
- nosnou myšlenkou byl **onion routing**
- MIT (2000) – výzkumy *Tor* (The Onion Routing)
- fungování založeno na decentralizované síti

Tor




- potřeba uzlů: otevřeno (2002)
- 2004 – podpora EFF
- ALE: technologická náročnost
- **Tor Browser** (2008)
- 2010 – Arabské jaro (*ochrana identity, přístup*)
- 2013 – kauza Snowden

2022 State of the Onion



Wednesday November 9 @ 17:00 UTC
Wednesday November 16 @ 17:00 UTC

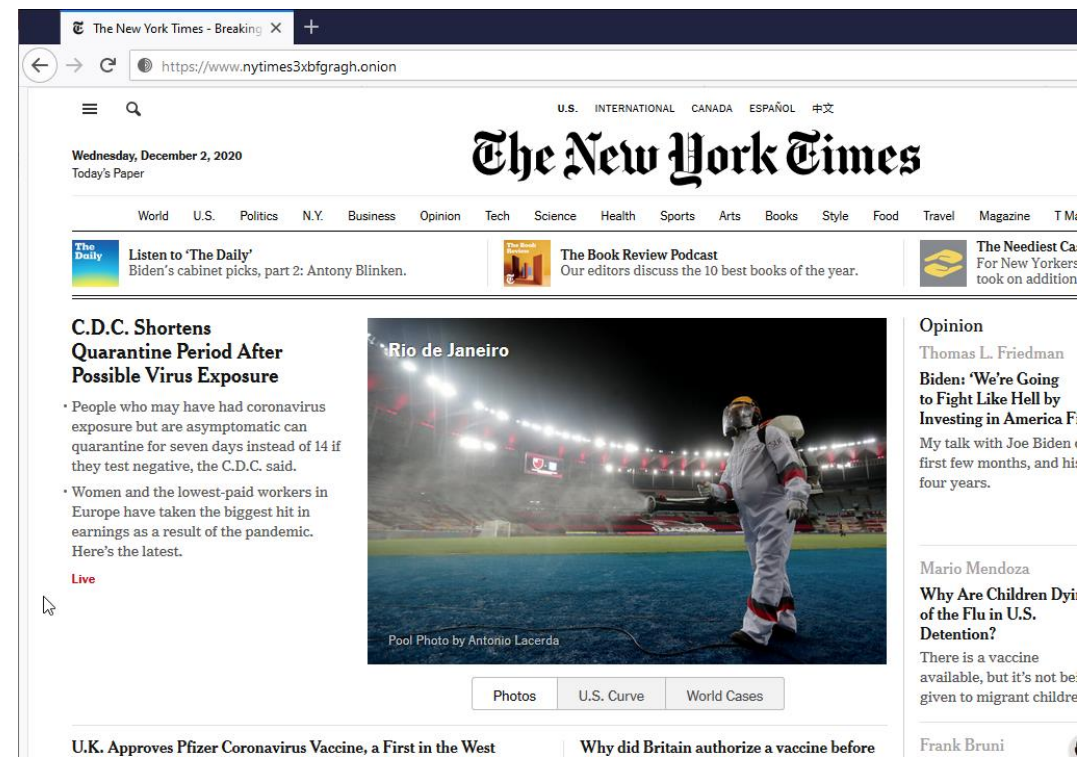
 @torproject  @torproject  @TorProjectInc



skryté služby

Onion Hidden Services

- .onion pseudo-doména
- speciální doména pro onion služby
- dostupné pouze skrze Tor
- existují *www2onion* brány, ale to ztrácí smysl



www.nytimes3xbfgragh.onion

Kolik procent adres
na *.onion* doménách
obsahuje **nelegální**
obsah?

muni.cz/go/nami22



.onion doména

- [Darksum](#) (2016): 30.000 adres – 13.000 zkoumáno
- něco málo přes 50 % obsahovalo nelegální obsah
- 28 % domén k prodeji uniklých dat a hesel
- ilegální pornografie, prodej nelegálního zboží
- ultraprivátní socializační prostory (*furry atp.*)

- Moore, Rid (2016) – *etika výzkumu?*
- <https://doi.org/10.1080/00396338.2016.1142085>

Category	Details
Arms	Trading of firearms and weapons
Drugs	Trade or manufacture of illegal drugs, including illegally obtained prescription medicine
Extremism	Content espousing extremist ideologies, including ideological texts, expressions of support for terrorist violence, militant how-to guides and extremist community forums
Finance	Money laundering, counterfeit bills, trade in stolen credit cards or accounts
Hacking	Hackers for hire, trade or distribution of malware or DDoS ⁴⁵ capabilities
Illegitimate pornography	Pornographic material involving children, violence, animals or materials obtained without participants' consent
Nexus	Websites primarily focused on linking to other illicit websites and resources within the darknet
Other illicit	Materials that did not easily fit into the other categories but remain problematic, such as trade of other illegal goods and fake passports or IDs
Social	Online communities for sharing illicit material in the form of forums, social networks and other message boards
Violence	Hitmen for hire, and instructional material on conducting violent attacks
Other	Non-illicit content, such as ideological or political content, secure drop sites, information repositories, legitimate services
None	Websites which were either completely inaccessible or otherwise had no visible content, including websites which hosted only placeholder text, indicating that their operator had yet to generate indicative content

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Category	Websites
None	2,482
Other	1,021
Drugs	423
Finance	327
Other illicit	198
Unknown	155
Extremism	140
Illegitimate pornography	122
Nexus	118
Hacking	96
Social	64
Arms	42
Violence	17
Total	5,205
Total active	2,723
Total illicit	1,547

On the state of V3 onion services

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ABSTRACT

Tor onion services are a challenging research topic because they were designed to reveal as little metadata as possible which makes it difficult to collect information about them. In order to improve and extend privacy protecting technologies, it is important to understand how they are used in real world scenarios. We discuss the difficulties associated with obtaining statistics about V3 onion services and present a way to monitor V3 onion services in the current Tor network that enables us to derive statistically significant information about them without compromising the privacy of individual Tor users. This allows us to estimate the number of currently deployed V3 onion services along with interesting conclusions on how and why onion services are used.

CCS CONCEPTS

• **Networks** → **Network measurement**; Network monitoring; • **Security and privacy** → *Pseudonymity, anonymity and untraceability; Privacy-preserving protocols*;

1 INTRODUCTION

Tor onion services enable individuals to operate publicly reachable servers without disclosing their network location. Historically, they have been a sideline of the work done by the Tor project. Some have even claimed that onion services were originally conceived as a demonstration of interesting applications that could be built on top of a free and open network like Tor [2]. This sentiment is also supported by their own statistics which show that in 2021 onion services accounted for only 6 Gbit/s of traffic within the Tor network [9]. This pales in comparison to the almost 300 Gbit/s of bandwidth that the Tor network currently consumes in total.

In stark contrast to these numbers, the public opinion often considers onion services a significant building block of the “Darknet” which is believed to be several times larger in size than the easily accessible parts of the Internet. While it is commonly accepted that this perception is incorrect, it does show that reliable figures on the state of the Tor network and onion services in particular are of interest to a lot of parties.

Unfortunately, the desire to collect this information directly conflicts with the fact that onion services are designed to avoid data collection as much as possible so there is actually a very limited amount of information about onion services that is gathered and

published by the Tor project. Currently, the only collected metrics are the number of V2 onion services which were around 200,000 in the first months of 2021 and the amount of traffic generated by V2 and V3 onion services [9].

In the past there have been several other research efforts to learn more about how onion services are being used [6, 7], but they all focused on V2 onion services. This is mainly caused by the fact that certain weaknesses in V2 onion services made it easier to collect and analyze data about them. Since there are no similar issues known about V3 onion services, we know much less about the current version of onion services than we knew about the previous version.

A simple and obvious example would be the total number of active onion services in the Tor network. Right now, we have a solid estimate on the number of V2 onion services but have no information about V3. This is especially relevant, because V2 onion service will be discontinued in 2021 [3] leaving the research community with no information on how many onion services are currently running.

This work tackles the challenge of collecting basic information about V3 onion service usage like the number of currently running V3 onion services and the amount of users they have.

We first discuss the improvements introduced by V3 onion services that make gathering and interpreting data about onion services harder. In section 3 we describe our measurement setup in detail. Afterwards, we present a detailed analysis of our collected data which answers several open questions about V3 onion services.

2 TOR AND ONION SERVICES

Tor is an onion routing technology that anonymizes network traffic by tunneling it via several nodes. A connection established via the Tor network is referred to as *circuit* and usually consists of three nodes. The currently available members of the Tor network are defined by the *consensus*, a document that is created by a selected small group of trusted relay operators called *directory authorities*. This consensus is published every hour and lists all currently known relays along with all the information needed to create circuits through them. Additionally, the consensus assigns *flags* on relays based on their behavior and capabilities. The most important flags in the context of this paper are *Fast*, *Stable*, and *HSDir*. A relay is considered fast if it has a bandwidth of more than 105 KB/s, stable if it has a weighted mean time between failure of more than 7 days, and HSDir if it is stable, fast, and has an uptime of more than 96 hours. Of special importance when talking about onion services is the fact that the consensus also includes a shared random value which changes every 24 hours to ensure that certain parts of the

How Do Tor Users Interact With Onion Services?

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Princeton University

Anne Edmundson
Princeton University

Laura M. Roberts
Princeton University

Agnieszka Dutkowska-Żuk
Independent

Marshini Chetty
Princeton University

Nick Feamster
Princeton University

Abstract

messaging [4] and file sharing [15]. The Tor Project currently does not have data on the number of onion

Even if the onion domain is more readable, the user still needs to have a way of discovering the onion service in the first place. In contrast to conventional network services, onion services are designed to be difficult to discover. The operator of an onion service must manually advertise the domain, for example by manually adding it to onion site search engines such as Ahmia [22]. The lack of a go-to service such as a “Google for onion services” prompted the community to devise various ways to disseminate onion services through a variety of search engines and curated lists.

to anonymity for clients (e.g., obfuscating a client IP address using a virtual private network), Tor onion services provide anonymity for servers, allowing a web server to obfuscate its network location (specifically, its IP address). An operator of a web service may need to anonymize the location of a web service to escape harassment, speak out against power, or voice dissenting opinions.

Onion services were originally developed in 2004 and

ices differ from conventional web services. First, they can only be accessed over the Tor network, and onion domains are hashes over their IP addresses which make them difficult to remember. Third, the path between client and the onion service is multi-hop, increasing latency and thus reducing the performance of the service. Finally, onion services are not advertised, meaning that users must discover these services manually, rather than with a search engine.

In this paper, we study how users cope with these difficulties by exploring the following questions:

• How do users’ mental models of onion services differ from conventional web services?
• How do users use and manage onion services?
• What are the challenges of using onion services?

Onion services depend on the Tor Browser and the Tor network to exchange traffic, some of which we explored users’ mental models of Tor itself, but this is not the focus of our paper.

To answer these questions, we employed a mixed-method approach. First, we conducted exploratory interviews with Tor and onion service users to guide the design of an online survey. We then conducted a large-scale online survey that included questions on Tor Browser, onion service usage and operation, onion site phishing, and users’ general expectations of privacy. Next, we conducted follow-up interviews to further explore the topics and themes that we discovered in the exploratory interviews and survey. We complemented this qualitative data

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- Dare Me: A Novel
- The Case against Education: Why the Education System Is a Waste of Time and Money
- Air

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Chief Librarian: Las Zenow <zenow@riseup.net>
 Fork the source code from [gitlab](#).

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Copyright laws are obsolete. With the technology to copy books without cost we can finally have universal access to the culture. We can provide the tools to allow everybody read any book without dependence on their monetary resources.

Of course we have to feed the authors, but with the capitalist way of commercialize culture now we are doing a really bad job at that. We are feeding big corporations, not the authors.

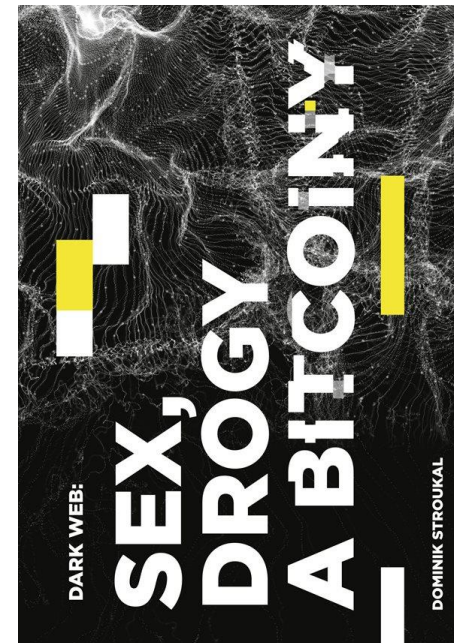
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Our notes are made with the highest quality cotton fibre, all security features are included: watermarks, security thread, microprint, magnetic ink, color shifting ink, etc.

When you use CleanCoin to mix your Bitcoins, you will receive Bitcoins that originate from lots and lots of different transactions and wallet addresses, making it almost impossible for someone to track your wallet activity.

Kamagra is the preferred alternative to Viagra for customers wishing to use the generic version of this popular treatment for impotence and erectile dysfunction.



Commerce [\[edit \]](#)



See also: [Darknet market](#)

- [Agora](#) (defunct)
- [Atlantis](#) (defunct)
- [AlphaBay](#) (defunct)
- [Black Market Reloaded](#) (defunct)
- [Dream Market](#) (defunct)
- [Evolution](#) (defunct)
- [The Farmer's Market](#) (defunct)
- [Hansa](#) (defunct)
- [Sheep Marketplace](#) (defunct)
- [Silk Road](#) (defunct)
- [TheRealDeal](#) (defunct)
- [Utopia](#) (defunct)

procesní vyspělost

kvalita služeb

Ordering form

	US Fullz	69\$	0.0173 BTC 1.21 LTC 0.523 ETH	Quantity: <input type="text"/>
	US Dumps (101)	49\$	0.0123 BTC 0.86 LTC 0.371 ETH	Quantity: <input type="text"/>
	EU Fullz	59\$	0.0148 BTC 1.04 LTC 0.447 ETH	Quantity: <input type="text"/>
	EU Dumps (102)	55\$	0.0138 BTC 0.96 LTC 0.417 ETH	Quantity: <input type="text"/>

Payment type

 **bitcoin**

 **litecoin**

 **ETHEREUM**

1 btc = 3985 usd. 1 ltc = 57 usd. 1 eth = 132 usd.

<https://metrics.torproject.org/>

Jak odhalovat, řešit
a postihovat nelegální
obsah na takovéto síti?

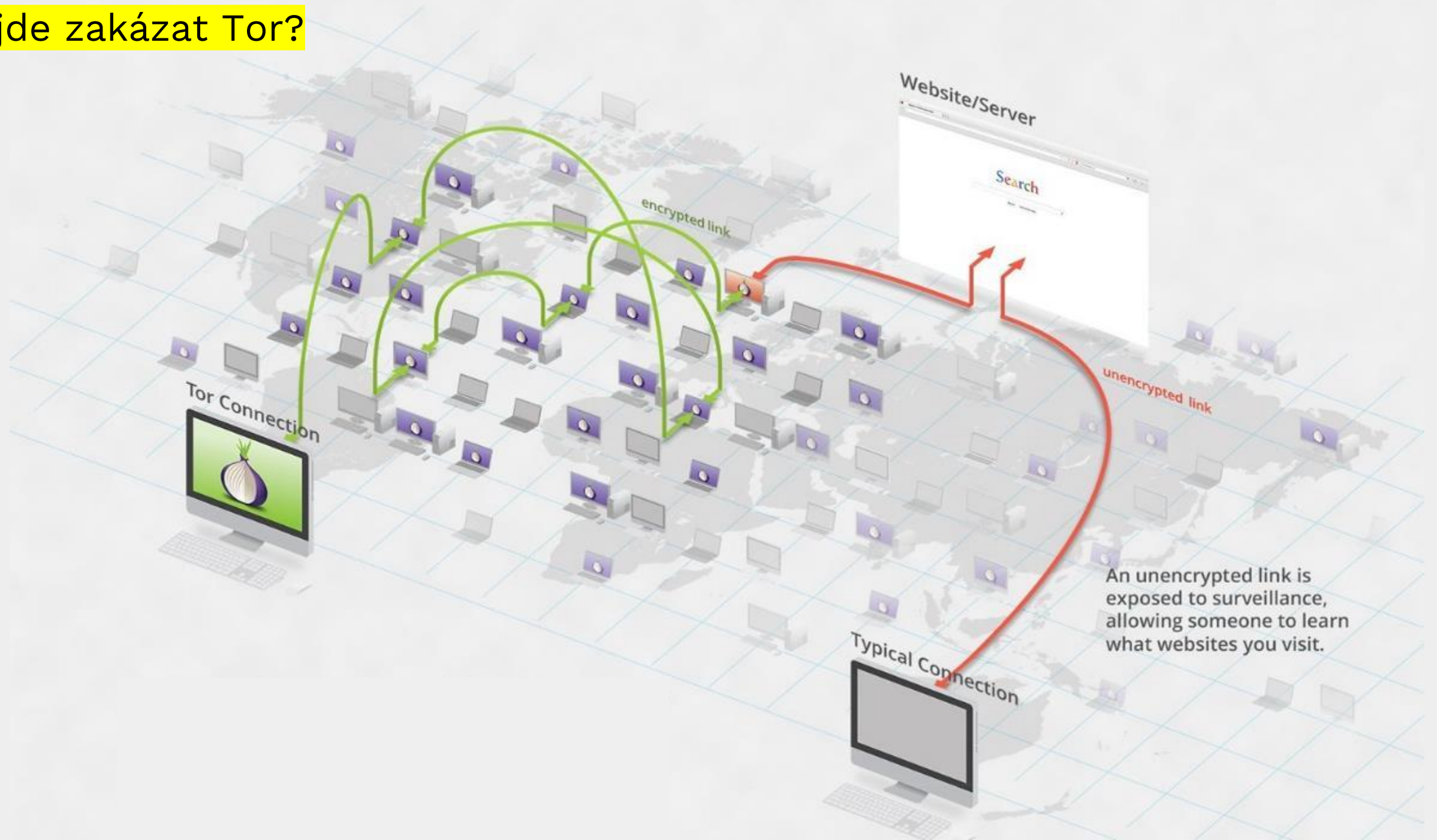




Věra
Pohlová,
72 let,
důchodkyně:

- Tyhle aféry
každého jenom
otravují. Já bych
všechny ty inter-
nety a počítače zakázala.

jde zakázat Tor?



Jde to zakázat?

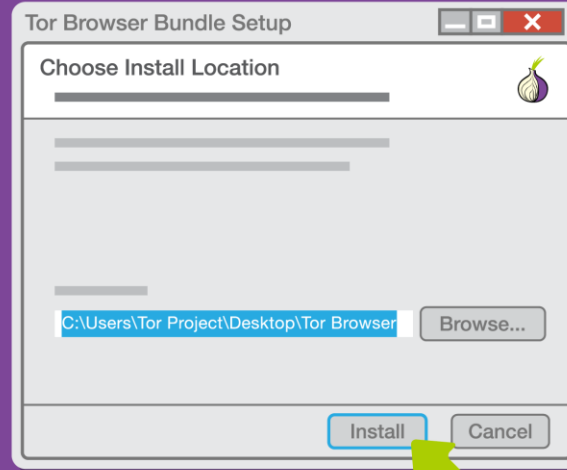
- [databáze exit relays](#)
- [Tor Bridges](#)
- *obfuscation*
- DPI (Deep Packet Inspection) *packet sniffing*
- *i to lze obejít*
- [Pluggable Transports](#)

What to do when Tor is blocked?

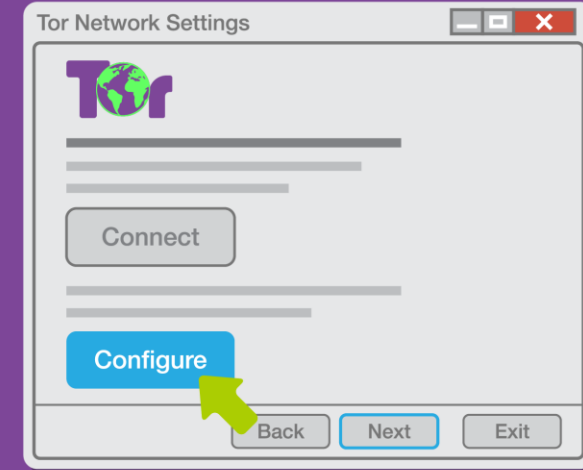
Step 1: Download Tor Browser



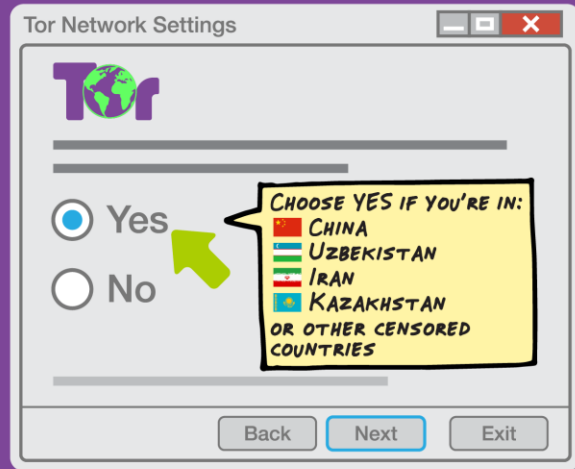
Step 2: Install



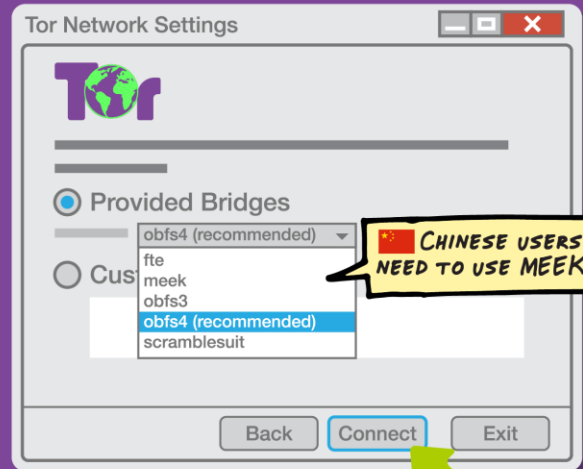
Step 3: Configure



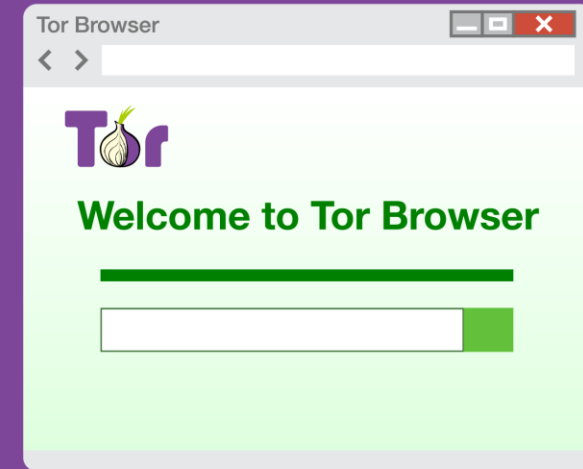
Step 4: Does your ISP block Tor?



Step 5: Pick a Bridge



Step 6: Enjoy!



Krájení cibule

- **Operation Onymous**

- 17 zapojených zemí, 400 onion služeb zaříznuto
- 17 zatčených, milion \$ v Bitcoinu zabaveno, €180,000 v hotovosti, drogy a zlato
- *Blake Benthall*, zakladatel Silk Road 2.0
- [*jak se to povedlo?*](#)
- **Europol:** „This is something we want to keep for ourselves. The way we do this, we can't share with the whole world, because we want to do it again and again and again.“ ZDROJ

Měl by EUROPOL
zveřejnit, jak přesně
k odhalení došlo?



operational security



Silk Road -> Silk Road 2.0 -> Silk Road 3.0

Categories

Drugs	18836
Fraud Related	2026
Guides & Tutorials	3702
Services	1431
Jewellery	54
Digital Goods	12425
Erotica	1396
Counterfeits	683
Electronics	33
Security & Hosting	90
Miscellaneous	312

Welcome to HANSA Market

The Darknet Market with the main focus on a trustless payment system, which makes it impossible for the vendors OR the site staff to run away with Bitcoins of the buyers.

Multisig escrow

Optional 2-of-3 multisig for buyers and 2-of-2 multisig as a fallback for buyers that do not want to bother with multi-signature. Money can never be accessed by the market staff. Theft is impossible.

No Bitcoin deposits

Every order has its unique Bitcoin address similar to BitPay's or Coinbase's payment system. Buyers have 15 minutes to pay the order and do not have to wait for deposits to arrive.

No Finalize Early

We do not support FE or partial escrow releases and we don't have to! The multisignature escrow makes it impossible for the site staff or vendors to steal any Bitcoins.

Current Lottery Jackpot: ₿ 8.4545 USD 21,635.72

[Buy tickets](#)

Featured Listings

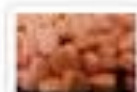


USD 11.35
₿ 0.0044

0.2G Sample - 80% Pure Bolivian Cocaine (Levamisole Free) (Free shipping) 10 €

AmsterdamSupply [+8|0]

Level 2 (9)



USD 199.00
₿ 0.0778

100 XTC Pill 230mg (MDMA) 84% ★ PINK DONALD TRUMP FACE ★ ONLY USA ★ SPECIAL DISCOUNT

DreamShop [+588|0]

★ Level 9 (800+)



USD 150.99
₿ 0.059

100 - Xanax Pfizer X2 Replicas 3mg Alprazolam - US2US - Tracked

StarkoftheNorth [+1|0]

★ Level 1 (1)

Bylo podle vás
v pořádku, že policie
zvolila tento způsob
zátahu?



Police arrest 150 suspects after closure of dark web's largest illegal marketplace

15

The international operation seized millions of dollars in cash, crypto, and drugs

By [James Vincent](#) | Oct 27, 2021, 6:53am EDT

[f](#) [t](#) [SHARE](#)

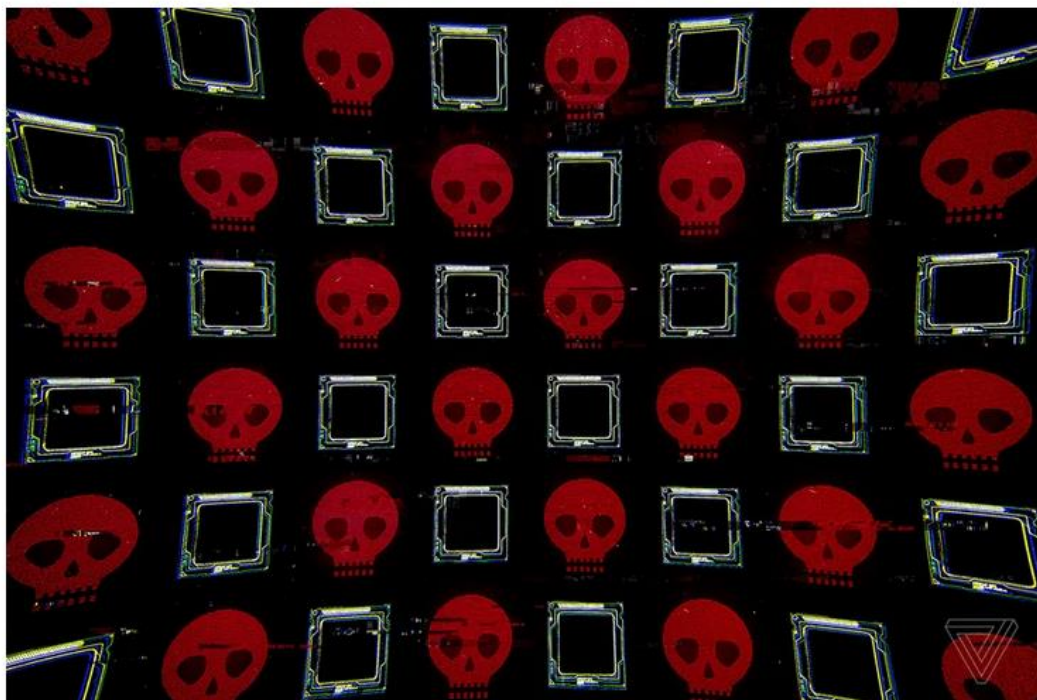


Illustration by Alex Castro / The Verge


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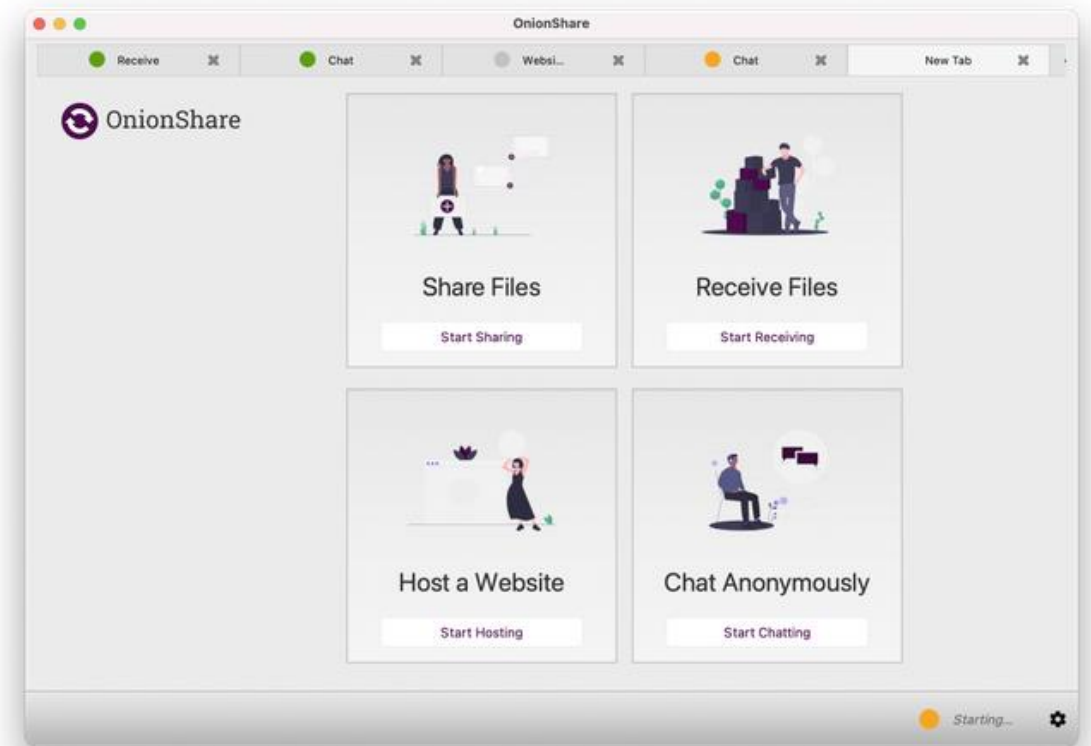
Video Display FPS: 30.01

Playback FPS 30,00

Next City
E11_2SecExtract 01

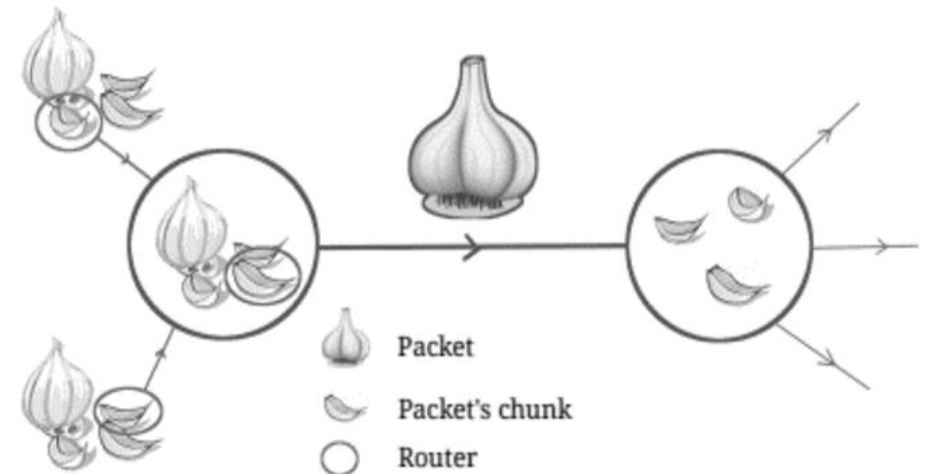
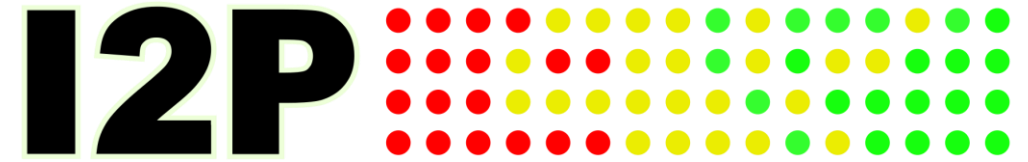
Další Tor služby

- Tor Messenger – *skončil 2018*
- [OnionShare](#)
- [Whonix](#)

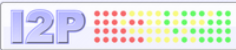


I2P

- Invisible Internet Project
- *garlic routing*
- <https://geti2p.net/>
- vlastní aplikace (I2PMessenger,...)
- [eepsites](#) *.i2p*
- hidden service, ~~exit traffic~~



I2P Router Console - ... x
 127.0.0.1:7657/home



Version: 0.9.31-0
 Uptime: 3 min

BANDWIDTH IN/OUT

3 Sec: 0.13 / 1.64 KBps
 Total: 0.27 / 1.57 KBps
 Used: 79.96 KB / 335.46 KB

Network: Firewallled

LOCAL TUNNELS

shared clients
 shared clients (DSA)











I2P ROUTER CONSOLE

8/12/17 CONGRATULATIONS ON GETTING I2P INSTALLED!




















Welcome to I2P! Please have patience as I2P boots up and finds peers. While you are waiting, please **adjust your bandwidth settings** on the [configuration page](#). Also you can setup your browser to use the I2P proxy to reach eepsites. Just enter 127.0.0.1 (or localhost) port 4444 as a http proxy into your browser settings. Do not use SOCKS for this. More information can be found on the [I2P browser proxy setup page](#). Once you have a "shared clients" destination listed on the left, please **check out our FAQ**. Point your IRC client to **localhost:6668** and say hi to us on **#i2p**.

WELCOME TO I2P

APPLICATIONS AND CONFIGURATION

 Addressbook	 Configure Bandwidth	 Configure UI	 Customize Home Page	 Email	 Help	 Manage Plugins	 Router Console	 Torrents
 Web Server								

HIDDEN SERVICES OF INTEREST

 anoncoin.i2p	 Dev Forum	 diftracker	 echelon.i2p	 exchanged.i2p	 git.repo.i2p	 I2P Bug Reports	 I2P FAQ	 I2P Plugins
 I2P Technical Docs	 I2P Wiki	 Open4You	 Pastebin	 Planet I2P	 Postman's Tracker	 Project Website	 stats.i2p	 The Tin Hat
 Trac Wiki								

14. Google records reflect that a Russian-based telephone number ending in - 2458 (“Napolsky Phone-1”) was used to register the email Napolsky7@gmail.com as well as the emails donation.zlib@gmail.com, zlibdoms@gmail.com and feedback.bookos@gmail.com.

15. Google records also reflect that the account associated with the email address feedback.bookos@gmail.com was created with the name “Z-Library Team” and feedback.bookos@gmail.com is the recovery e-mail for the account zlibsupp@gmail.com, which was created with the name “ZLibrary Support.” Similarly, zlibsupp@gmail.com is the recovery e-mail account associated with the email address zlibdonat@gmail.com, that was created with the name “Zlibrary Mailer.”

ss internet connection) was used to log in to all three accounts.

nts logged in from the IP address 5.8.39.0 as indicated below:

	Time Stamp
	10/27/2021 8:48:31 AM
	10/27/2021 8:55:31 AM
Ermakova Personal Email-1	10/27/2021 8:55:31 AM
zlibsupp@gmail.com	10/27/2021 8:55:31 AM
feedback.bookos@gmail.com	10/30/2021 9:49:14 PM
zlibsupp@gmail.com	10/30/2021 9:49:39 PM
Ermakova Personal Email-1	10/30/2021 9:49:39 PM
Ermakova Personal Email-1	10/31/2021 8:58:57 AM
zlibsupp@gmail.com	10/31/2021 8:58:58 AM
Ermakova Personal Email-1	11/3/2021 3:33:39 PM
zlibsupp@gmail.com	11/3/2021 3:33:36 PM
Ermakova Personal Email-1	11/6/2021 11:13:14 AM
zlibsupp@gmail.com	11/6/2021 11:13:15 AM
Ermakova Personal Email-1	11/7/2021 8:23:02 PM
zlibsupp@gmail.com	11/7/2021 8:23:03 PM

operational security

Anonymní OS

- nejvyšší level anonymity
- běží z CD nebo USB
- nezanechává stopu v PC
- <https://tails.boum.org/>
- <https://www.qubes-os.org/>



Nabídli byste službu
Tor uživatelům
své **knihovny**
na lokálních PC?



Tor | Knihovny

- Aktuální debata
- <https://doi.org/10.1080/01616846.2019.1696078>
- [Toronto Public Library](#)
- [Library Freedom Project](#)
- knihovny jako prostředník k osvětě
- knihovny jako [hostitelé](#) *exit relays* ([na chvíli](#))

Co s tím vším?



Slovníček pro další roky

- decentralizace
- splinternet
- small internet
- web3

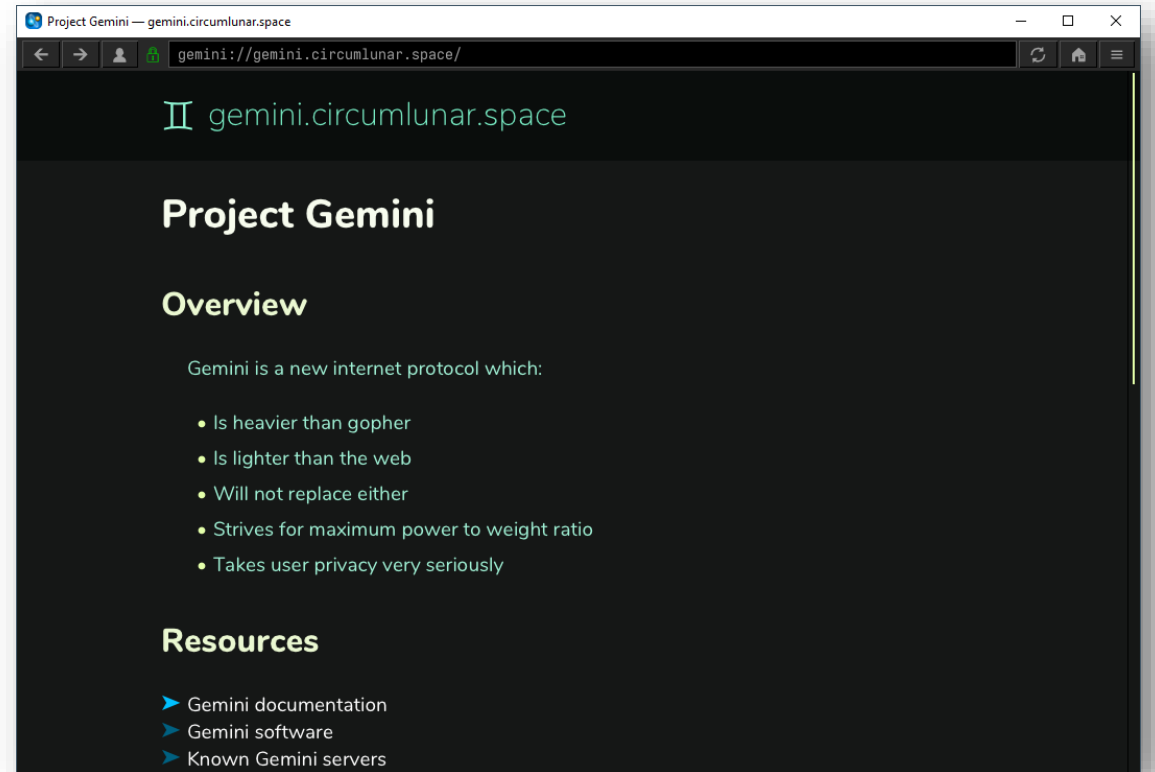
Splinternet

- také jako „balkanizace“
- národní firewally
- štěpení do platforem
- walled gardens
- různé protokoly
- překryvné služby

Splinternet je označení pro trend štěpení Internetu do mnoha protokolů a sítí. Důvodem je množství potíží tradičního Internetu, založeného na protokolech HTTP/TCP/IP: od cenzury přes monopolizaci Internetového provozu i fyzickou centralizaci, až po problémy se soukromím a sledováním v prostředí webu. V jádru *splinteringu* je nejčastěji otázka svobody slova, mnohdy ale také DIY a technologické hračičkovství.

Small Internet

- např. návrat ke GOPHERu
- <gopher://i-logout.cz/>
- nové lehké protokoly
- např. Gemini
- <https://gemini.circumlunar.space/>



Web3

FF:ISKM73 Commons, P2P a digitální ident - Informace o ...

ISKM73 Commons, P2P a digitální identita ✨

Filozofická fakulta

podzim 2020

▣ Rozsah

1/1/0, 4 kr. Ukončení: k.

Vyučováno online.

▣ Vyučující

Bc. et Bc. Jakub Lanc (přednášející)

Mgr. Roman Novotný (přednášející)

PhDr. Ladislava Zbiejczuk Suchá, Ph.D. (cvičící)

▣ Garance

PhDr. Petr Škyřík, Ph.D.

Katedra informačních studií a knihovnictví - Filozofická fakulta

Kontaktní osoba: Mgr. Alice Lukavská

Dodavatelské pracoviště: Katedra informačních studií a knihovnictví - Filozofická fakulta

▣ Rozvrh

každé liché úterý 9:00–11:40 B2.22 🗄

▣ Předpoklady

TYP_STUDIA (N)

Studium	Prerekvizity	Splněno
CST C-CV	typ_studia(N)	Nesplněné předpoklady: <i>Studentovo studium není typu 'N'.</i>

▣ Omezení zápisu do předmětu

Předmět je nabízen i studentům mimo mateřské obory.

Předmět si smí zapsat nejvýše 20 stud.

Momentální stav registrace a zápisu: zapsáno: 8/20, pouze zareg.: 0/20, pouze zareg. s předností (mateřské obory): 0/20

▣ Mateřské obory/plány

předmět má 7 mateřských oborů, zobrazit

▣ Cíle předmětu

- Přiblížit aktuální socioekonomické trendy související s nástupem platformové ekonomiky.

- Zmapovat klíčové souvislosti s problematikou "osobních dat" a digitální identity.

- Přiblížit možnou roli "commons-based" přístupů ve snáhách směřovat ke zdravějším řešením.

- Ukázat jejich relevanci pro designové uvažování.

- Podnítit schopnost uvažovat v těchto kategoriích a zájem aktivně experimentovat s jejich aplikací.

pomalu končíme...



eseje?



sdílení!

P2P setkání!

praskání bublin!

NaMI barcamp

spolupráce!

decentralizovaná přednáška!

Jaké služby vám pomáhají v každodenní práci?
Na jaké (legální) weby chodíte a chcete je ukázat
i ostatním? Jak vám Internet změnil život?
Co nejvtipnějšího jste s Internetem zažili?
Co nejhoršího se Vám na Internetu stalo? Jaké
tipy a triky používáte na webu a chcete je
naučit i ostatní? Pojdte to sdílet!