osint + python: extracting information from tor network and darkweb

Presentation · August 2019

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University of Alicante
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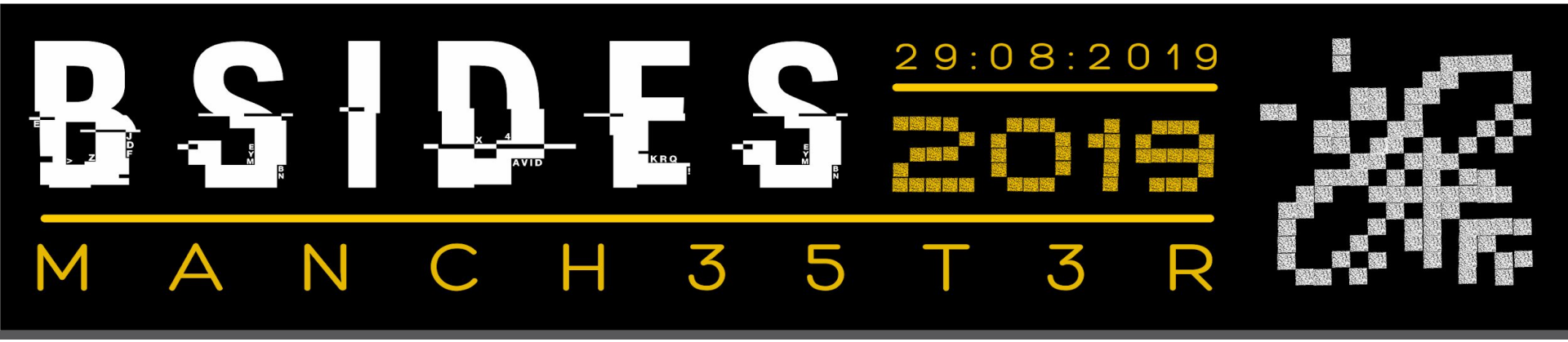


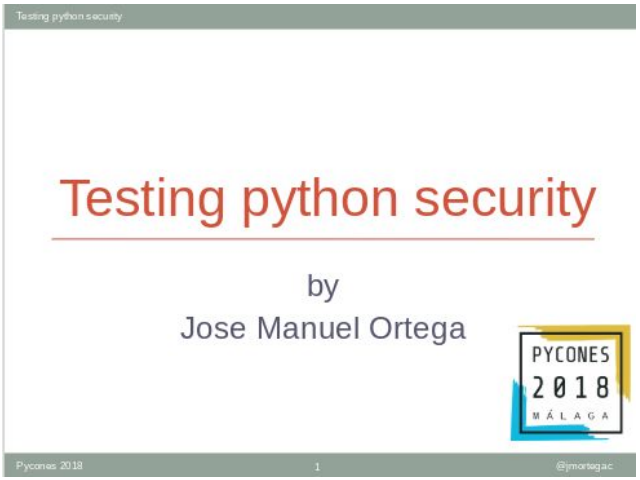
OSINT + PYTHON: Extracting information from TOR network and Darkweb

@jmortegac

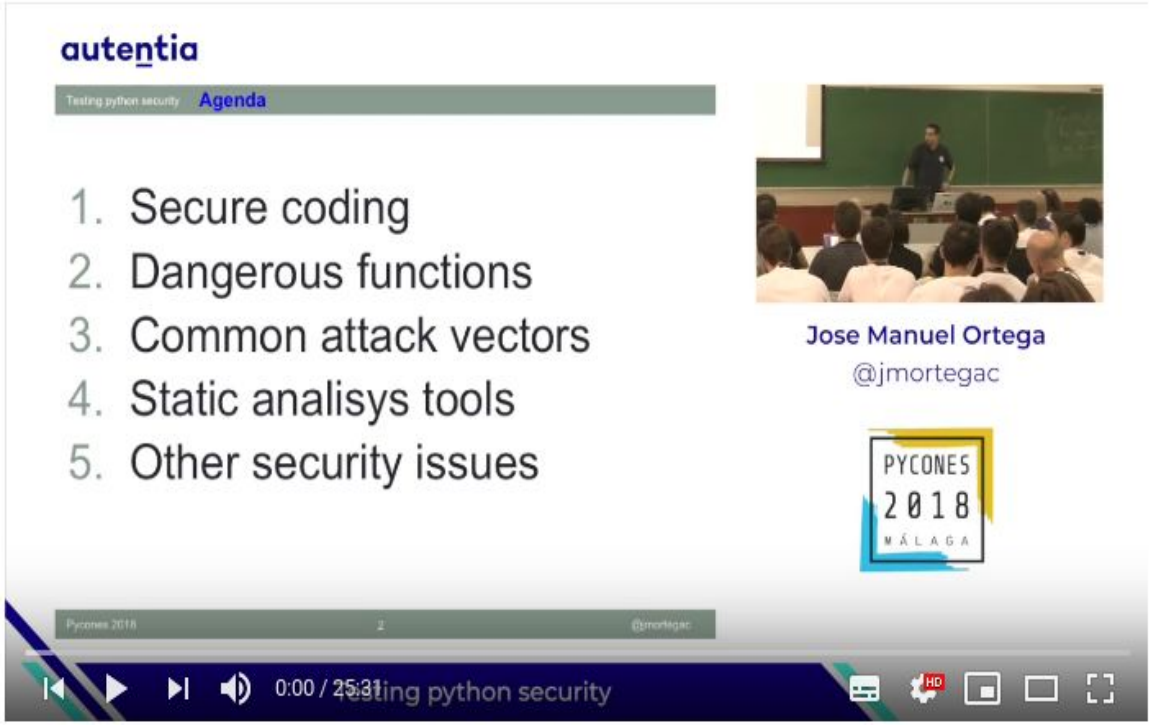
BSIDES MANCHESTER, 2019

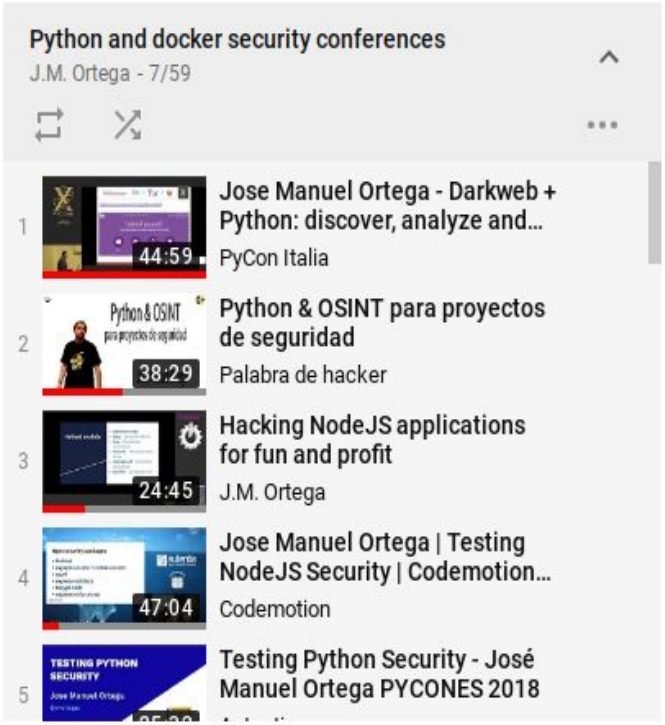
About me

http://jmortega.github.io/

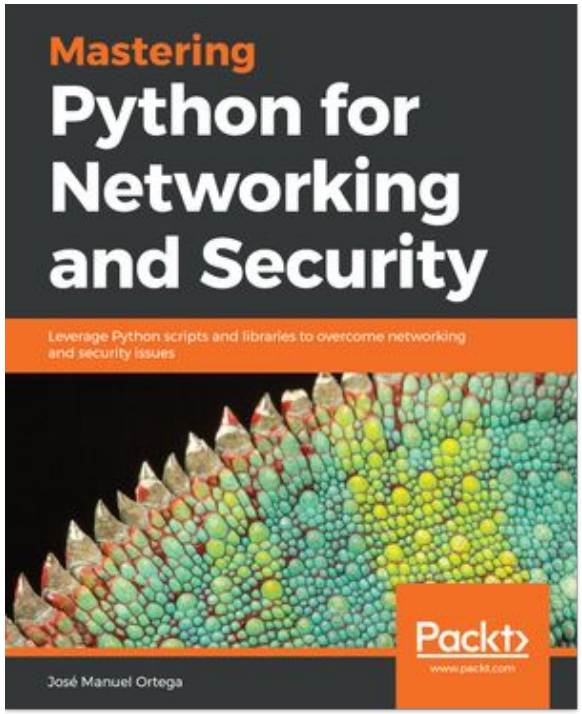


About me


autentia
Testing python security
Agenda
1. Secure coding
2. Dangerous functions
3. Common attack vectors
4. Static analisys tools
5. Other security issues
Jose Manuel Ortega
@jmortegac
PYCONES
2018
MÁLAGA
0:00 / 25:31
Testing python security


Python and docker security conferences
J.M. Ortega - 7/59
1
Jose Manuel Ortega - Darkweb + Python: discover, analyze and...
44:59
PyCon Italia
2
Python & OSINT para proyectos de seguridad
38:29
Palabra de hacker
3
Hacking NodeJS applications for fun and profit
24:45
J.M. Ortega
4
Jose Manuel Ortega | Testing NodeJS Security | Codemotion...
47:04
Codemotion
5
Testing Python Security - José Manuel Ortega PYCONES 2018

About me



SHODAN

>_SSH

FTP

Nessus®
vulnerability scanner

scapy

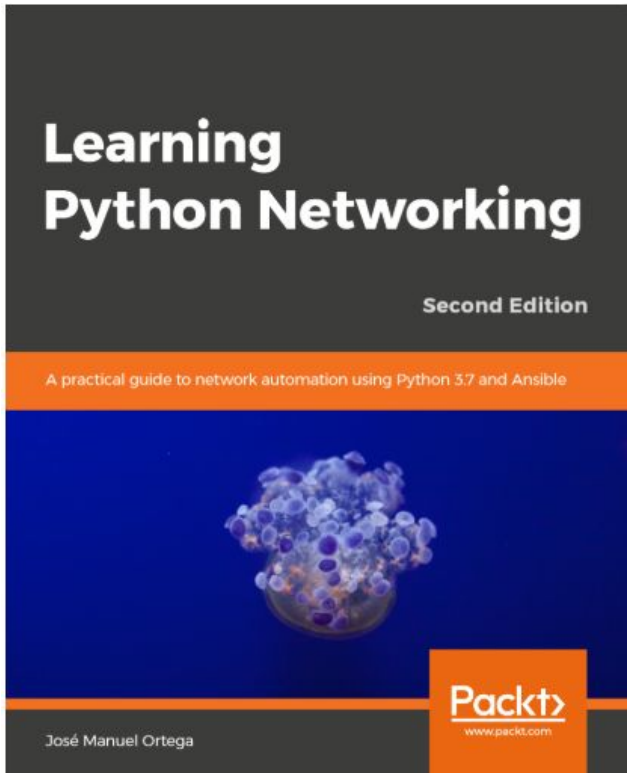
PYTHON SOCKET

metasploit®

OWASP
Open Web Application Security Project

SSL TLS

About me



Requests
http for humans

IPv6

Scrapy

scrapinghub

amazon web services S3

LDAP

WIRESHARK

Tornado

django

Flask
web development,
one drop at a time

ANSIBLE

Scan me

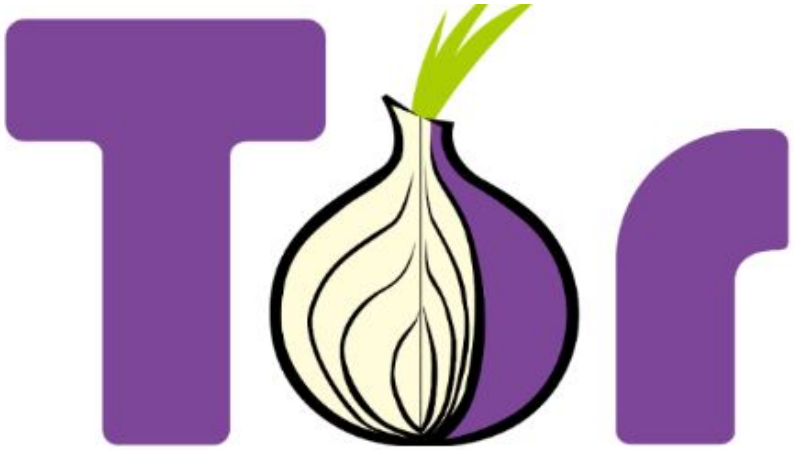
Agenda

- Introduction to Tor project and discover hidden services
- Modules and packages we can use in python for connecting with Tor network
- Tools that allow search hidden services and atomate the crawling process in Tor network
- OSINT TOOLS for discovering hidden services

Surface vs Deep vs Dark Web

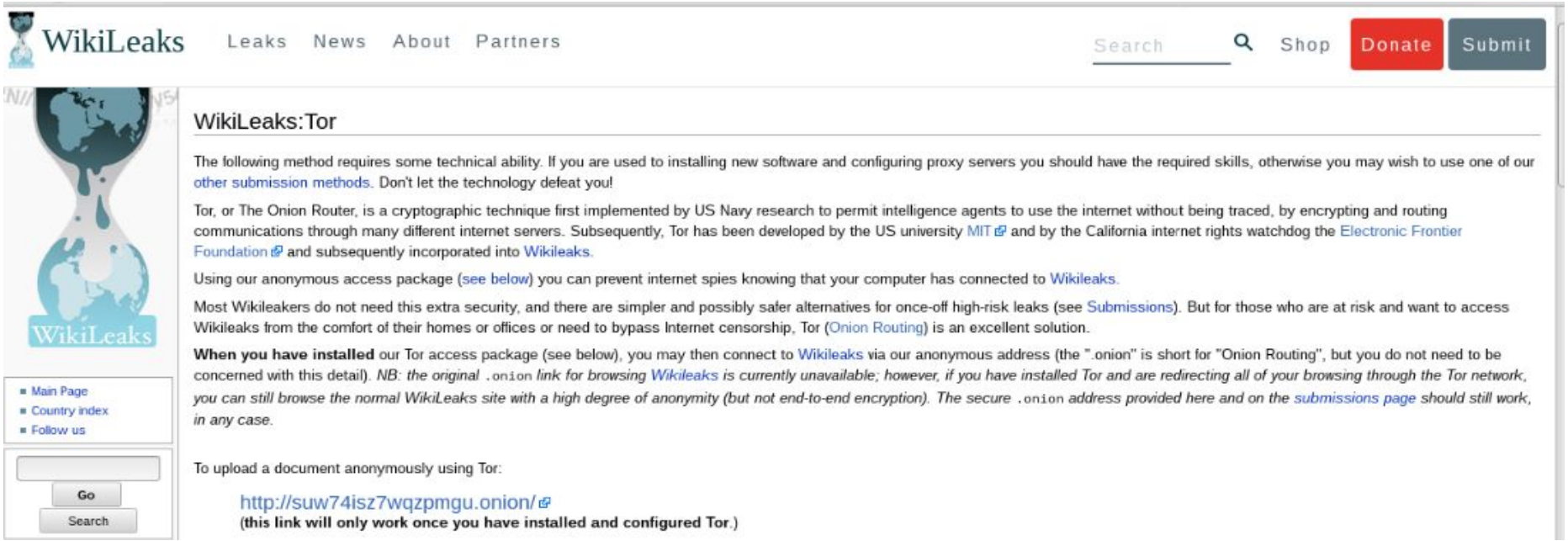
What is Tor?

- Tor is a free tool that allows people to use the internet anonymously.
- Tor anonymizes the origin of your traffic



The Onion Router

What is Tor?


WikiLeaks
Leaks
News
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Partners
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Donate
Submit
WikiLeaks:Tor
The following method requires some technical ability. If you are used to installing new software and configuring proxy servers you should have the required skills, otherwise you may wish to use one of our other submission methods. Don't let the technology defeat you!
Tor, or The Onion Router, is a cryptographic technique first implemented by US Navy research to permit intelligence agents to use the internet without being traced, by encrypting and routing communications through many different internet servers. Subsequently, Tor has been developed by the US university MIT and by the California internet rights watchdog the Electronic Frontier Foundation and subsequently incorporated into Wikileaks.
Using our anonymous access package (see below) you can prevent internet spies knowing that your computer has connected to Wikileaks.
Most Wikileakers do not need this extra security, and there are simpler and possibly safer alternatives for once-off high-risk leaks (see Submissions). But for those who are at risk and want to access Wikileaks from the comfort of their homes or offices or need to bypass Internet censorship, Tor (Onion Routing) is an excellent solution.
When you have installed our Tor access package (see below), you may then connect to Wikileaks via our anonymous address (the ".onion" is short for "Onion Routing", but you do not need to be concerned with this detail). NB: the original .onion link for browsing Wikileaks is currently unavailable; however, if you have installed Tor and are redirecting all of your browsing through the Tor network, you can still browse the normal WikiLeaks site with a high degree of anonymity (but not end-to-end encryption). The secure .onion address provided here and on the submissions page should still work, in any case.
To upload a document anonymously using Tor:
http://suw74isz7wqzpmgu.onion/
(this link will only work once you have installed and configured Tor.)
Main Page
Country index
Follow us
Go
Search

What is Tor?

The Advantages of TOR:

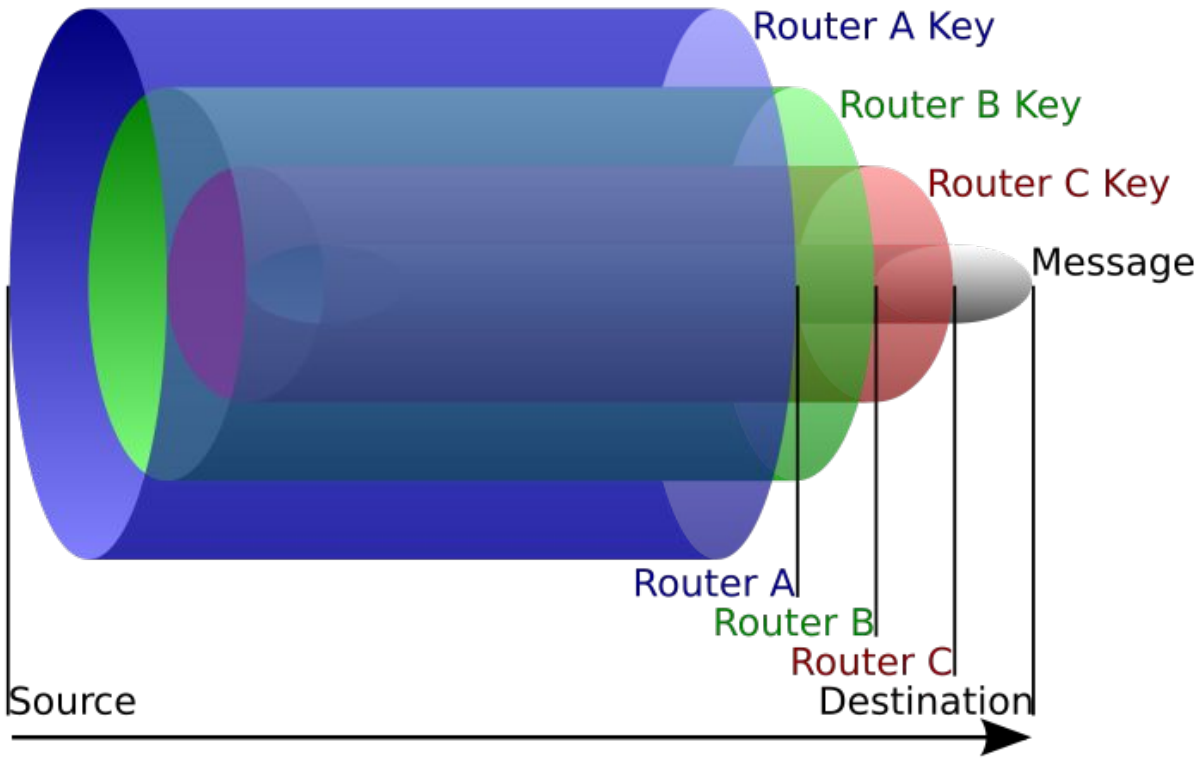
1. Tor is considered a strong security tool against surveillance
2. It's the low latency anonymity network
3. Unlike Mix-Networks, the message doesn't have to wait for more messages

The Disadvantages of TOR:

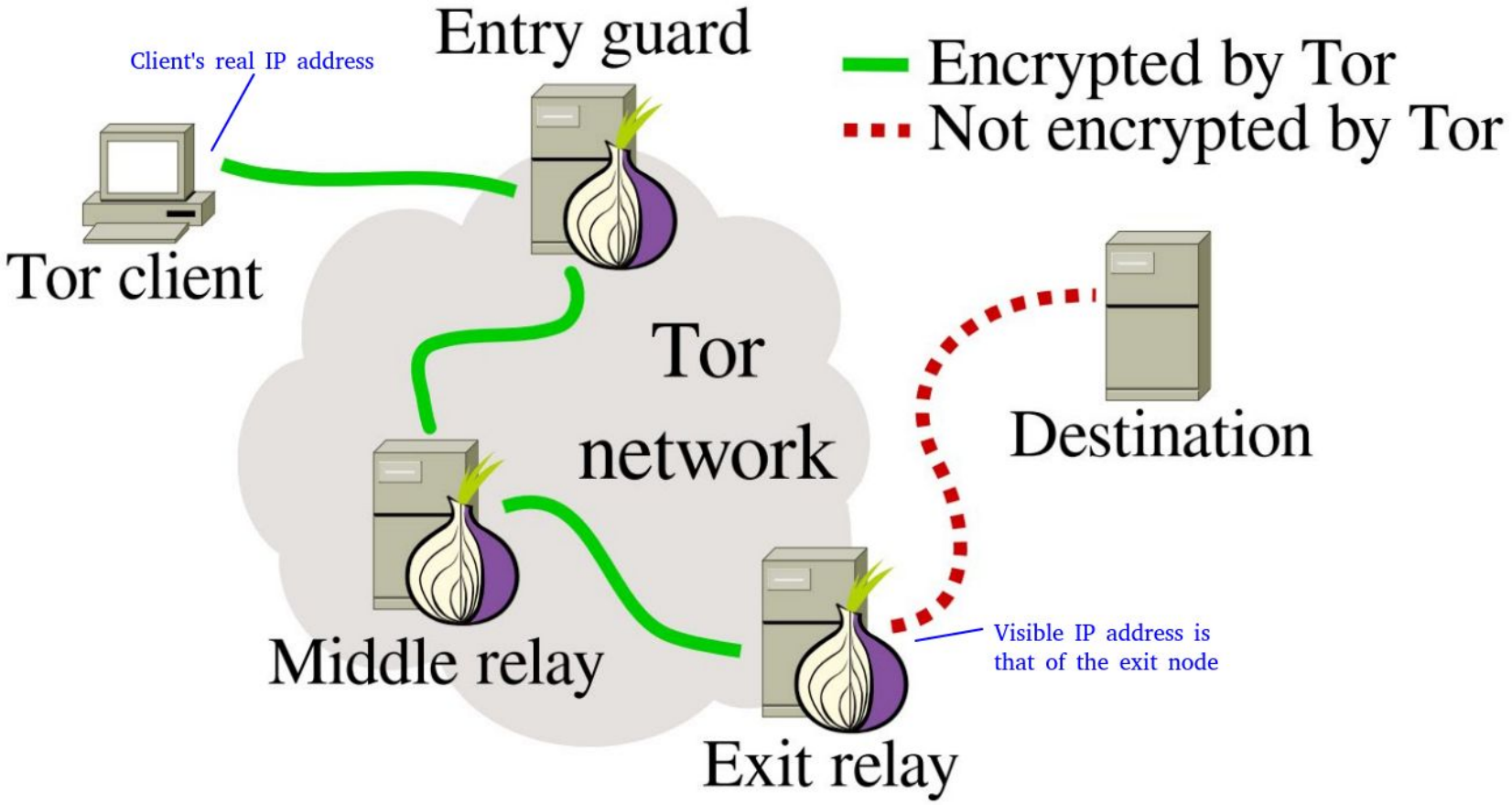
1. It isn't safe against end-to-end correlation (attacks at the boundaries of Tor network) and manual traffic analysis.
2. It's slow as the message is routed many times
3. Some ISP tries to search and block Tor relays

Onion Routing

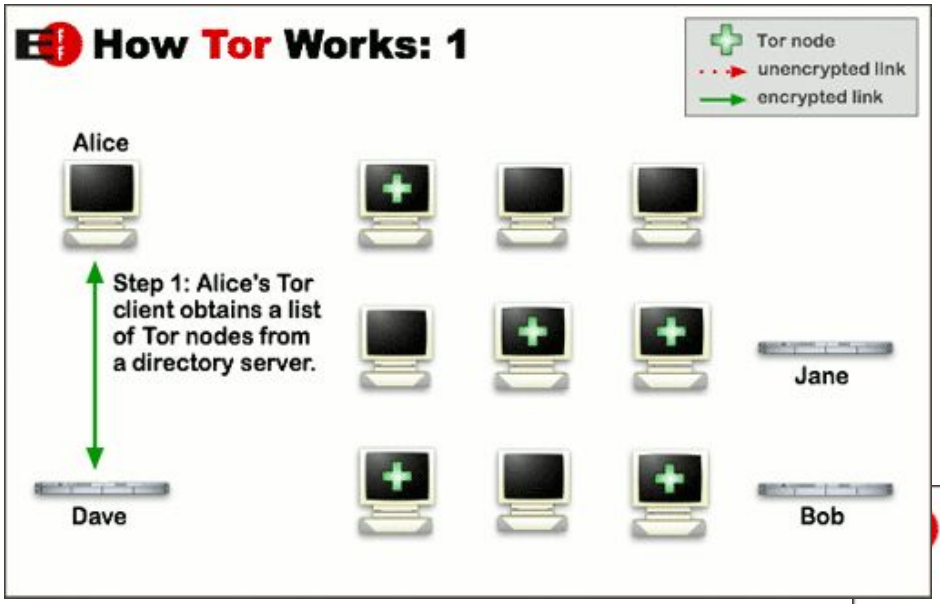
Tor is based on Onion Routing, a technique for anonymous communication over a computer network.



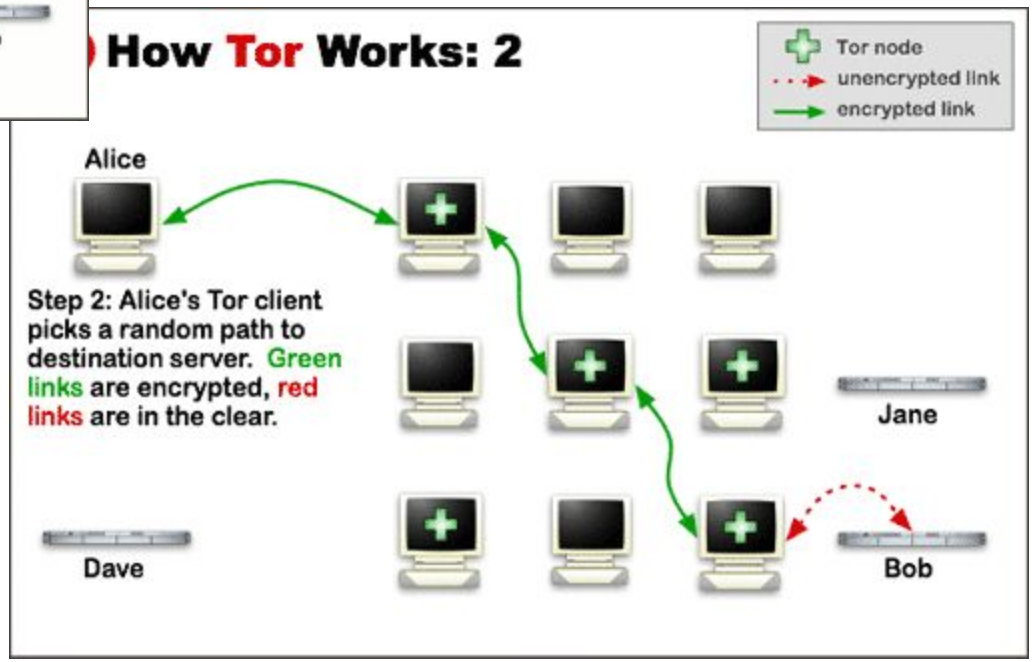
Onion Routing



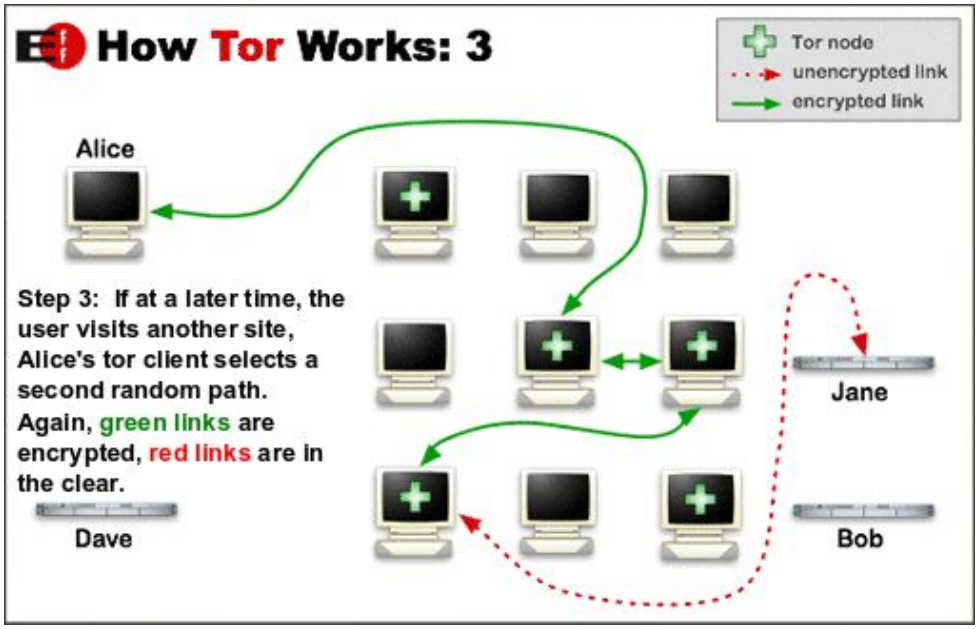
Establish TOR circuit



User's software or client incrementally builds a circuit of encrypted connections through relays on the network.

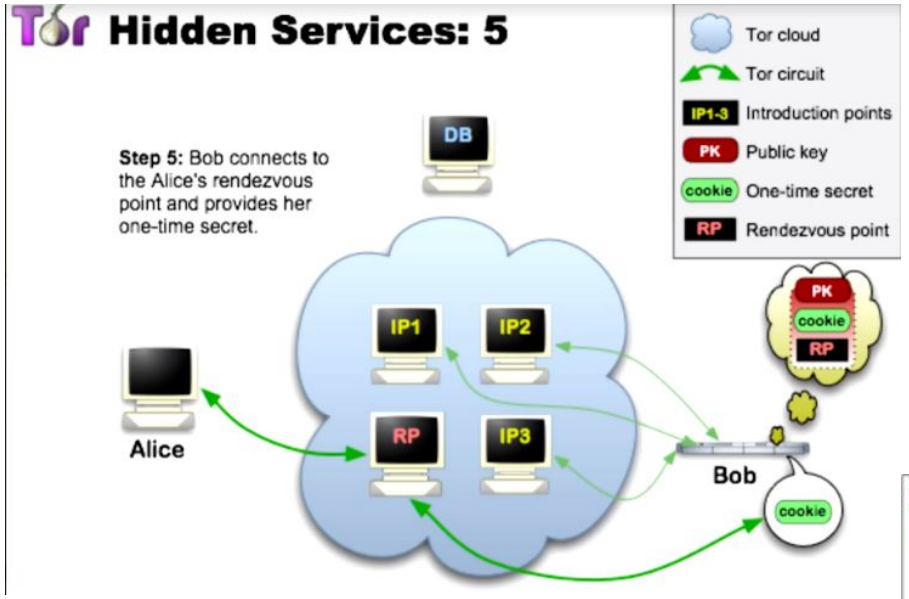


Establish TOR circuit

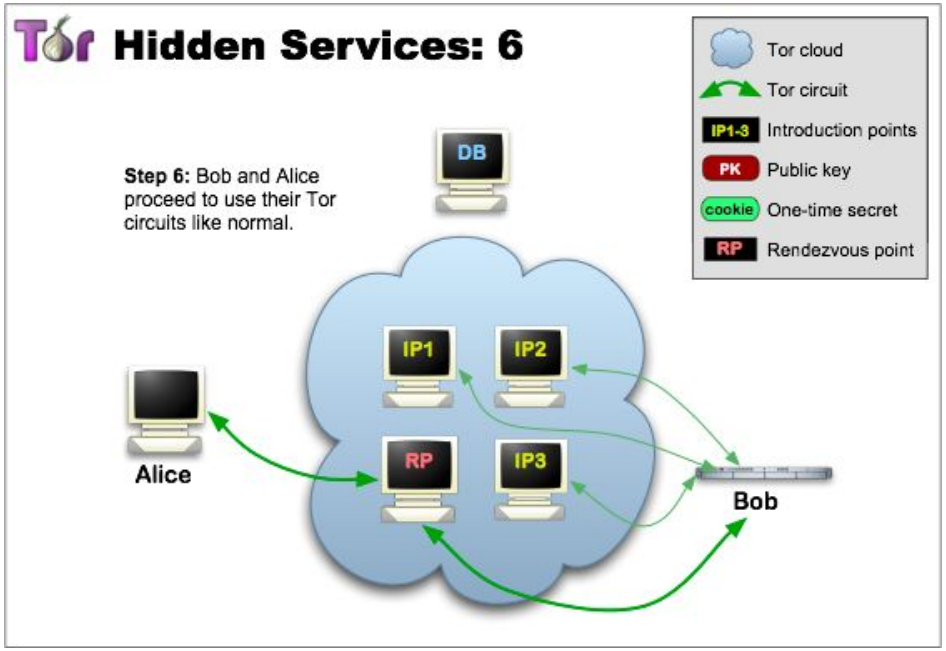


When we connect to the TOR network, we do it through a circuit formed by 3 repeaters, where the encrypted packet sent from the client is passing. Each time the packet goes through a repeater, an encryption layer is added.

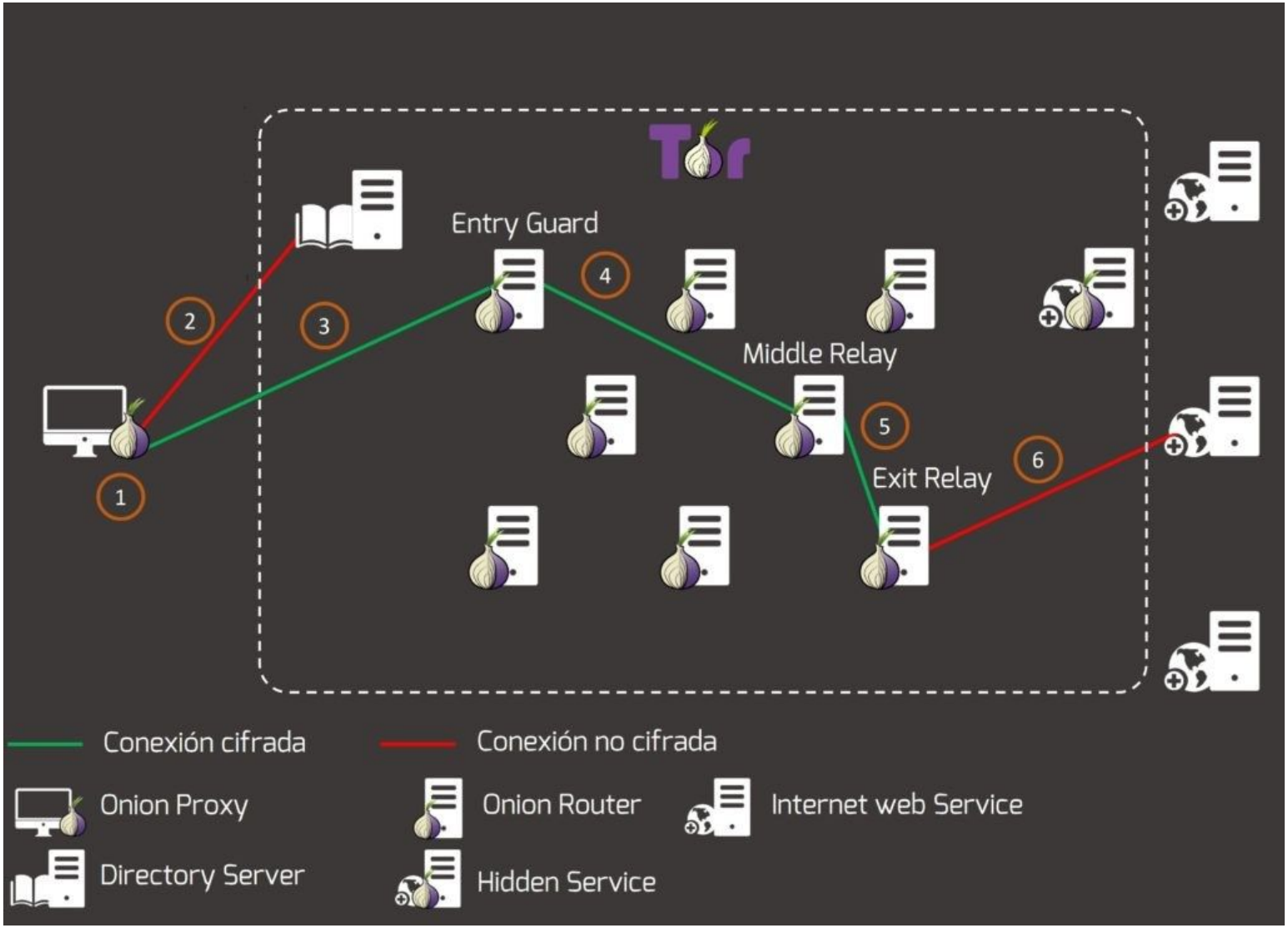
Hidden services



User's software or client incrementally builds a circuit of encrypted connections through relays on the network.

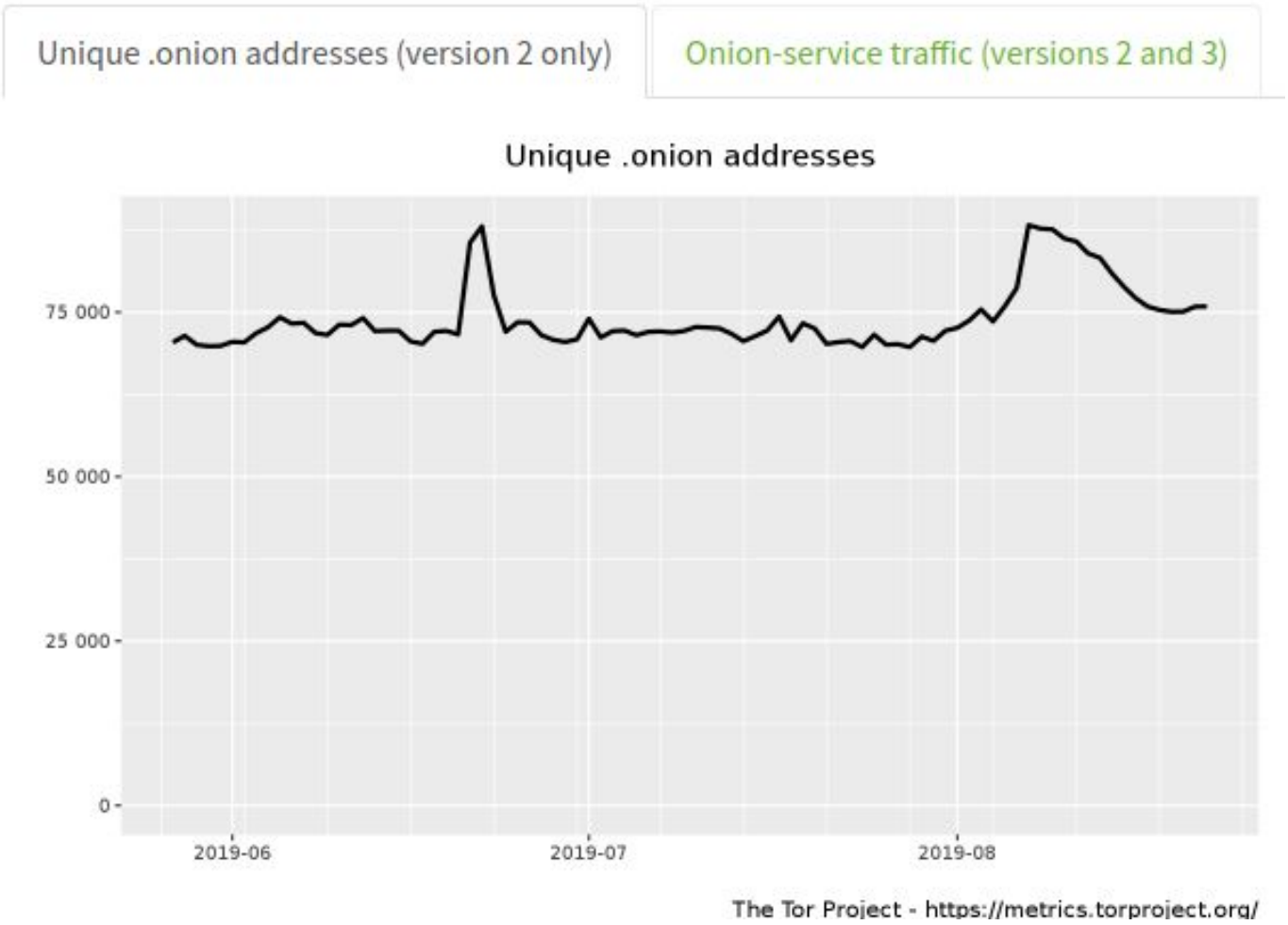


Directory server



Hidden services

https://metrics.torproject.org/hidserv-dir-onions-seen.html



Tor NODE List

Aggregate Network Statistic Summary | Graphs / Details		
Total Bandwidth of displayed Routers [MByte/s]	20734	
Total Number of Routers	6641	100%
Routers in Current Query Result Set	6640	99.98%
Total Number of 'Authority' Routers	10	0.2%
Total Number of 'Bad Directory' Routers	0	0%
Total Number of 'Bad Exit' Routers	1	0%
Total Number of 'Exit' Routers	921	13.9%
Total Number of 'Fast' Routers	5783	87.1%
Total Number of 'Guard' Routers	2922	44%
Total Number of 'Hibernating' Routers	1	0%
Total Number of 'Named' Routers	0	0%
Total Number of 'Stable' Routers	5592	84.2%
Total Number of 'Running' Routers	6641	100%
Total Number of 'Valid' Routers	6641	100%
Total Number of 'V2Dir' Routers	6012	90.5%
Total Number of 'Directory Mirror' Routers	4457	67.1%

Tor NODE List

https://www.dan.me.uk/tornodes

http://torstatus.blutmagie.de

Router Name	Bandwidth (KB/s)	Uptime	Hostname	ORPort	DirPort	Bad Exit	FirstSeen	ASName
IPredator	95512	9 d	exit1.ipredator.se [197.231.221.211]	443	9030	✕	2014-04-19	CYBERDYNE, L
BizNasty	73940	80 d	46.166.187.77 [46.166.187.77]	9001	9030	✕	2019-02-03	NFORCE, NL
Hansa	72654	15 d	ns3130724.ip-51-75-145.eu [51.75.145.219]	443	80	✕	2019-04-03	OVH, FR
exit4	59340	19 d	exit4.tor-network.net [31.220.40.54]	443	80	✕	2019-03-13	AMARUTU-TEC
flo	58785	62 d	delta.flo-du.com [144.76.196.92]	9001	9090	✕	2018-10-19	HETZNER-AS, D
drjohn	51026	125 d	ns3129544.ip-51-75-144.eu [51.75.144.67]	443	8080	✕	2018-12-21	OVH, FR
AIKO	50623	112 d	78.129.218.56 [78.129.218.56]	443	80	✕	2019-01-03	IOMART-AS, GE
PIAzrhexit	46313	42 d	zrh-exit.privateinternetaccess.com [195.206.105.217]	443	80	✕	2018-12-21	M247, GB
exit3	45161	42 d	exit3.tor-network.net [31.220.0.225]	443	80	✕	2018-12-15	AMARUTU-TEC
PrivacyRepublic0001	44514	157 d	tor-exit-node.1.privacyrepublic.org [178.32.181.96]	443	80	✕	2014-11-21	OVH, FR
ExitNinja	44412	59 d	46.165.245.154 [46.165.245.154]	443	80	✕	2014-11-06	LEASEWEB-DE
haedus	44146	13 d	static.232.44.9.176.clients.your-server.de [176.9.44.232]	9001	9030	✕	2018-08-03	HETZNER-AS, D
torrelay01	43837	128 d	78.129.150.54 [78.129.150.54]	9001	9030	✕	2018-12-18	IOMART-AS, GE
HORUS1	43349	4 d	ra.horus-it.com [94.130.34.199]	9001	9030	✕	2016-08-04	HETZNER-AS, D
hyacinthinus	41936	21 d	94.23.150.81 [94.23.150.81]	443	80	✕	2017-05-01	OVH, FR
theWOPR	41336	125 d	customer.worldstream.nl [212.8.243.229]	9001	9030	✕	2018-12-21	WORLDSTREAM
martasy	41094	50 d	ip81-173-112-100.pbiaas.com [81.173.112.100]	9030	9040	✕	2018-12-11	PROFITBRICKS
sellerie	40211	55 d	tor-exit-anonymizer-09.appliedprivacy.net [109.70.100.10]	443	80	✕	2018-05-01	NEXTLAYER-AS
ididedtheconfig	40084	58 d	185-171-130-240.skpnet.nl [185.171.130.240]	9001	9030	✕	2018-02-11	UNET Unet Netv
poiuty	39976	44 d	static.166.105.4.46.clients.your-server.de [46.4.105.166]	443	80	✕	2016-01-26	HETZNER-AS, D
gurke	39557	60 d	tor-exit-anonymizer-07.appliedprivacy.net [109.70.100.8]	443	80	✕	2018-04-16	NEXTLAYER-AS
rucola	38926	60 d	tor-exit-anonymizer-08.appliedprivacy.net [109.70.100.9]	443	80	✕	2018-04-18	NEXTLAYER-AS
Unnamed	38806	128 d	78.129.150.83 [78.129.150.83]	9001	9030	✕	2018-12-18	IOMART-AS, GE
erbse	38362	60 d	tor-exit-anonymizer-02.appliedprivacy.net [109.70.100.3]	443	80	✕	2018-04-05	NEXTLAYER-AS
PIAnycexit	38119	42 d	nyc-exit.privateinternetaccess.com [209.95.51.11]	443	80	✕	2019-01-22	HOSTINGSERV
radieschen	37486	60 d	tor-exit-anonymizer-01.appliedprivacy.net [109.70.100.2]	443	80	✕	2018-08-16	NEXTLAYER-AS
sofia	37327	12 h	chomsky.torservers.net [77.247.181.162]	443	80	✕	2017-10-03	NFORCE, NL

Tor NODE List

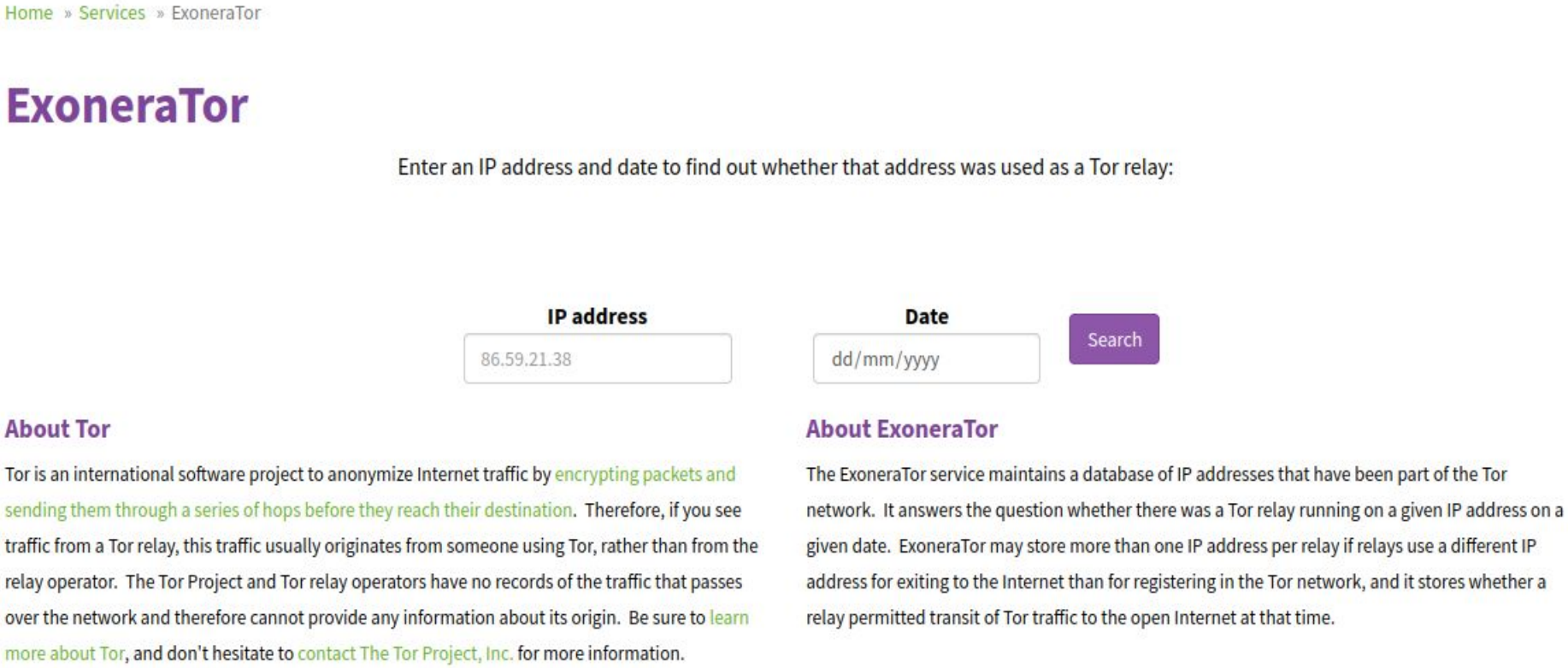
https://onionite.now.sh

Top nodes by consensus weight

#	Nickname	Bandwidth	Uptime	Country	Flags	Type
1	drakeforce1	76.2 MB/s	254d 19h	United Kingdom		Relay
2	Unnamed	87.9 MB/s	257d 1h	United Kingdom		Relay
3	privacyguardian	77.3 MB/s	251d 2h	United Kingdom		Relay
4	LittleFoxRahja	81.1 MB/s	172d 3h	Germany		Relay
5	Unnamed	85.4 MB/s	257d 1h	Germany		Relay
6	drjohn	78 MB/s	247d 1h	Germany		Relay
7	martinsrelay	77.7 MB/s	251d 7m	United Kingdom		Relay
8	cryptocrax0r	72.4 MB/s	247d 1h	Germany		Relay
9	PicklePower	72.9 MB/s	4d 7h	United Kingdom		Relay
10	torrelay01	69.6 MB/s	250d 7h	United Kingdom		Relay

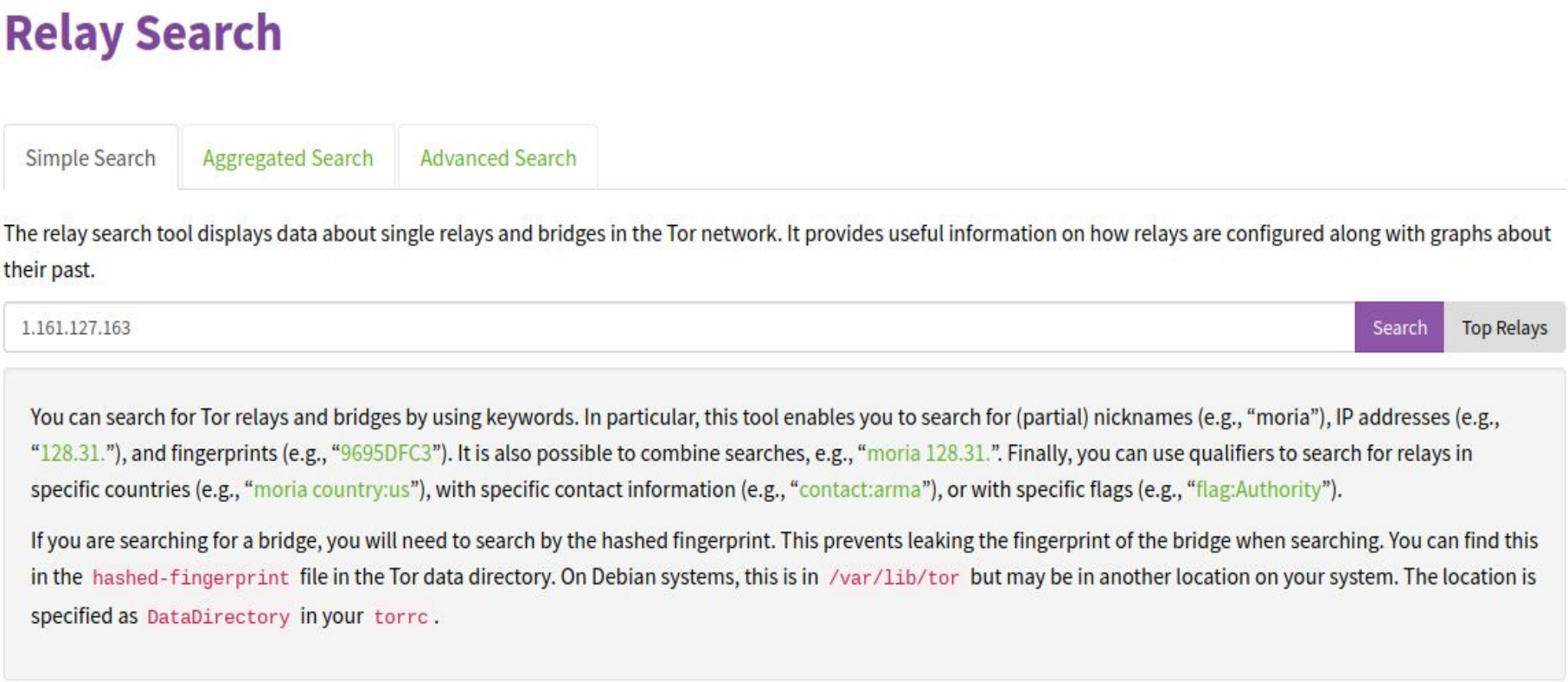
Exonera TOR

https://metrics.torproject.org/exonerator.html



Relay search

https://metrics.torproject.org/rs.html#simple



Relay search

https://metrics.torproject.org/rs.html#simple

Relay Search

country:it

country:it

Show 10 entries

Nickname†	Advertised Bandwidth	Uptime	Country	IPv4	IPv6	Flags	Add. Flags	ORPort	DirPort	Type
pingu (4)	20.4 MiB/s	23d 22h		176.126.83.211	-			9001	9030	Relay
Dazzle (1)	18.86 MiB/s	97d 6h		54.37.207.82	-			443	0	Relay
bauruine55 (8)	18.1 MiB/s	51d 7h		158.58.170.183	2a02:29e0:2:5::7			443	80	Relay
mailaddressislegit (1)	17.6 MiB/s	28d 9h		83.136.106.130	2a02:29e0:2:6:1:1:123d:4d1c			54200	54400	Relay
CanopoIT (6)	16.88 MiB/s	47d 8h		37.9.231.195	2001:4b78:2006:ffc3::1			443	80	Relay
bauruine66 (8)	15.15 MiB/s	51d 7h		94.198.98.21	2a02:29e0:2:5::1c			3443	8888	Relay
bauruine56 (8)	12.95 MiB/s	51d 7h		94.198.98.21	2a02:29e0:2:5::1c			443	80	Relay
bauruine65 (8)	12.71 MiB/s	51d 7h		158.58.170.183	2a02:29e0:2:5::7			4443	5580	Relay
Unnamed (1)	11.49 MiB/s	203d 17m		91.134.147.134	-			9001	9030	Relay
blackmamba (1)	11.49 MiB/s	45d 8h		195.135.194.134	2001:678:7dc:134::dead:beef			443	80	Relay
Total	**378.56 MiB/s**									

Relay search

https://metrics.torproject.org/rs.html#simple

Relay Search

1.161.127.163

Details for: Unnamed ●

Configuration

Nickname
Unnamed

OR Addresses
```
1.161.127.163:80
```

Contact
kcwu A csie org

Dir Address
none

Exit Addresses
1.161.127.163

Advertised Bandwidth
1.58 MiB/s

IPv4 Exit Policy Summary
```
accept
  53
  80
  443
  1194
```

Properties

Fingerprint
```
0A50AA36FD41F4BED31810DED7CDB9B3D32E1686
```

Uptime
1 day 1 hour 23 minute and 45 seconds

Flags
Exit Fast Running V2Dir Valid

Additional Flags
none

Host Name
```
1-161-127-163.dynamic-ip.hinet.net
```

Country
Taiwan

AS Number
AS3462

AS Name
Data Communication Business Group

Discover hidden services

HiddenWiki:http://wikitjerrta4qgz4.onion/

Dark Links: http://wiki5kauuihowqi5.onion

Tor Links: http://torlinkbgs6aabns.onion

Dark Web Links:
http://jdpskjmgy6kk4urv.onion/links.html

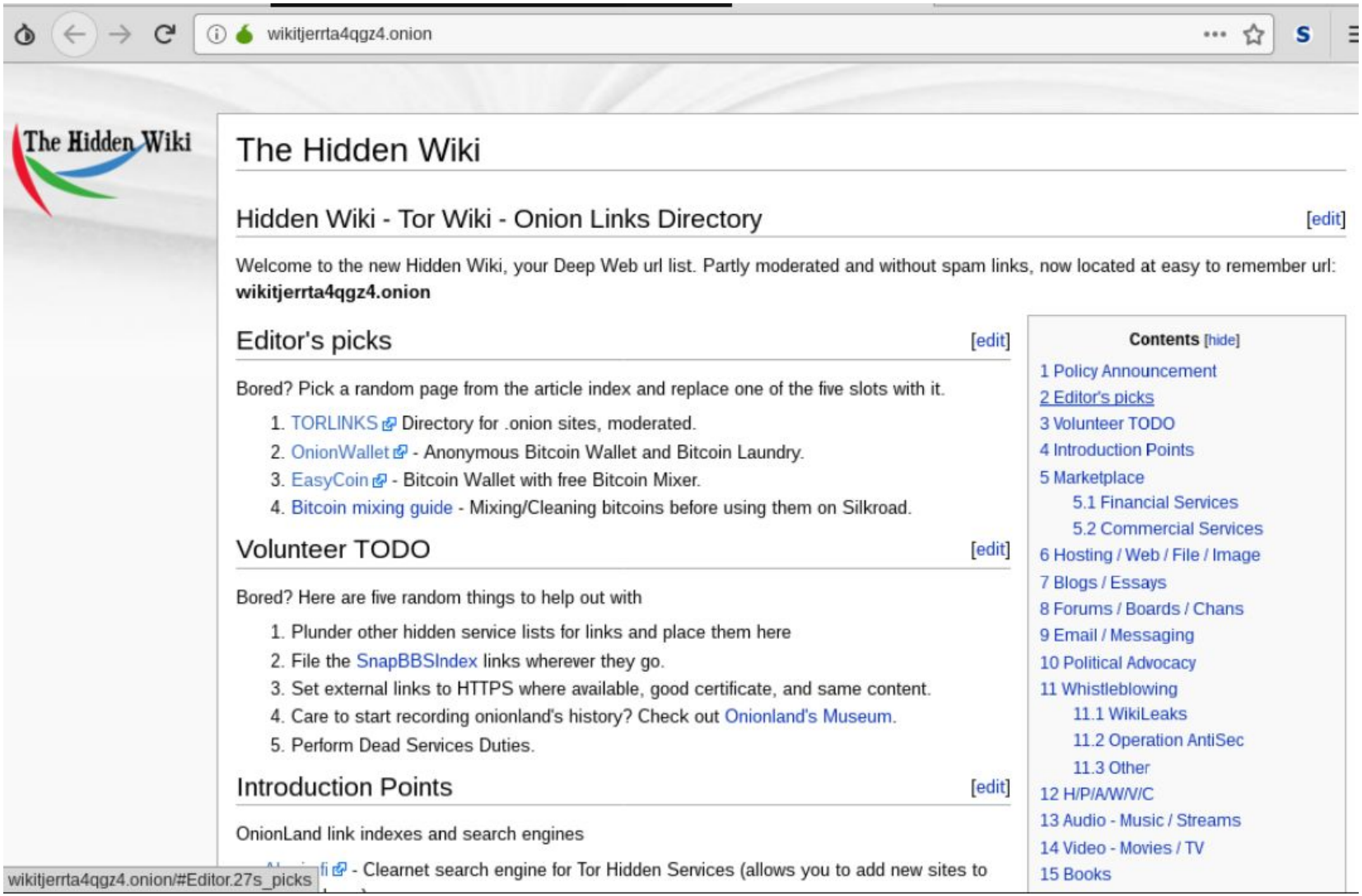
HDWiki: http://hdwikicorldcisiy.onion

OnionDir: http://dirnxxdraygbifgc.onion

DeepLink: http://deeplinkdeatbml7.onion

Ahmia: http://msydqstlz2kzerdg.onion

Tor onnion services



Tor onnion services

https://en.wikipedia.org/wiki/List_of_Tor_onion_services

https://en.wikipedia.org/wiki/The_Hidden_Wiki

V·T·E	Tor onion services	[hide]
	List · Category	
Web directories	The Hidden Wiki	
Search engines	Ahmia · DuckDuckGo · Grams · MetaGer · Searx	
File storage and peer-to-peer file sharing	BTDigg · Freedom Hosting · Free Haven Project · KickassTorrents · The Pirate Bay	
Email and instant messaging	Bitmessage.ch · Riseup · Tor Mail · TorChat · SIGAINT · ProtonMail	
Social media and forums	8chan · Dark0de · Facebook · HackBB · Russian Anonymous Marketplace · The Hub · Tor Carding Forum	
Cryptocurrency tumblers	Bitcoin Fog · Blockchain.info · Helix	
Commerce	Agora · AlphaBay · Assassination market · Atlantis · Black Market Reloaded · Dream Market · Evolution · The Farmer's Market · Hansa · Sheep Marketplace · Silk Road · TheRealDeal · Utopia	
News, whistleblowing, and document archives	Archive.is · BuggedPlanet · DeepDotWeb · Doxbin · Filtrala · GlobaLeaks · Independent Media Center · Ljost · NawaatLeaks · ProPublica · SecureDrop · Sci-Hub · The Daily Stormer · The Intercept · WildLeaks · WikiLeaks	
Nonprofit organizations	Courage Foundation · Freedom of the Press Foundation · La Quadrature du Net · Telecomix	
Pornography	Lolita City · Playpen · Childs Play	
	Tor · .onion domain · Tor2web	

TOR2web

https://www.onion.to

onion.to Tor Hidden Services Gateway

This gateway to Tor hidden services provides convenient access to Tor hidden services. It is a pure proxy that forwards requests to the respective hidden service. We do not store any data and are not liable for the content.

No anonymity!

Onion.to as a gateway **cannot offer any anonymity for the visitor**. For example, both onion.to and the hidden service itself can see the visitor's IP address, and use browser fingerprinting to track users across different sessions. In *all cases*, it is better to download the Tor Browser Bundle and access the hidden service using Tor (don't forget to remove the .to from the URL!).

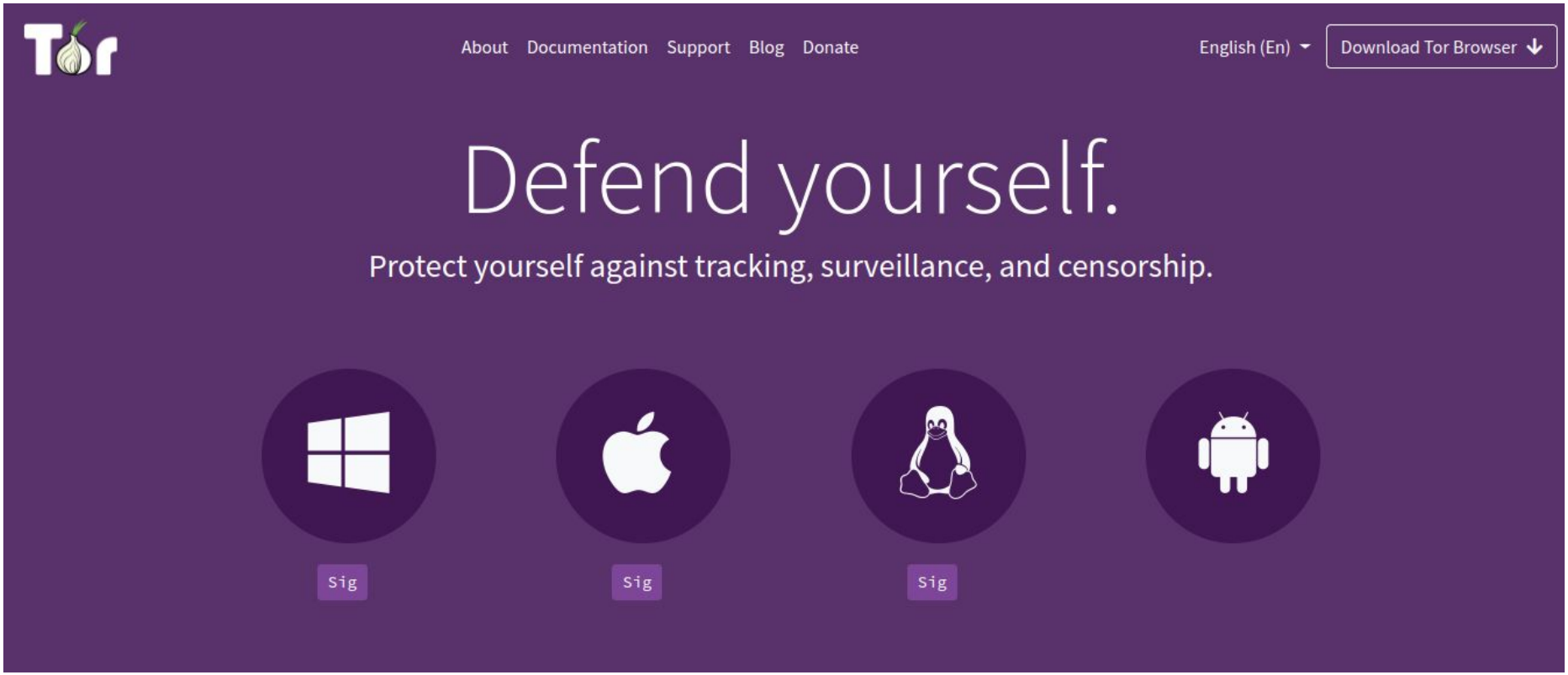
Enter onion address here:

http://duskgytldkxiuqc6.onion/

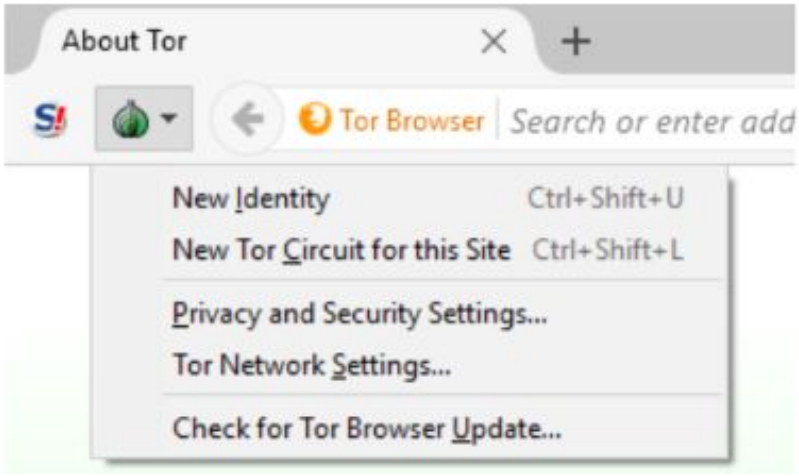
open via onion.to proxy

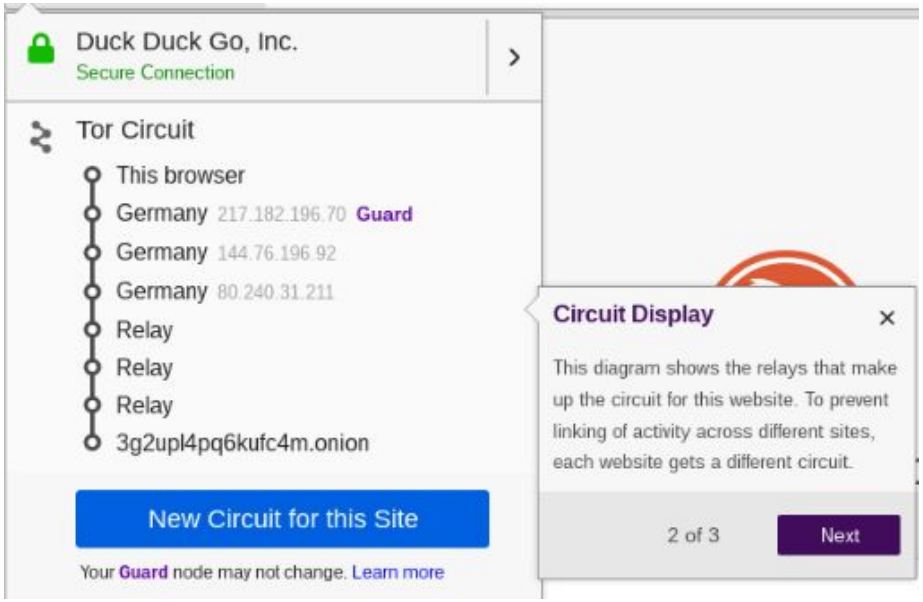
TOR browser

https://www.torproject.org/download/



Onion Routing





Installing TOR

```
sudo apt-get update
sudo apt-get install tor
sudo /etc/init.d/tor restart
```

TORrc

```
## Configuration file for a typical Tor user
## Last updated 22 September 2015 for Tor 0.2.7.3-alpha.
## (may or may not work for much older or much newer versions of Tor.)
##
## Lines that begin with "## " try to explain what's going on. Lines
## that begin with just "#" are disabled commands: you can enable them
## by removing the "#" symbol.
##
## See 'man tor', or https://www.torproject.org/docs/tor-manual.html,
## for more options you can use in this file.
##
## Tor will look for this file in various places based on your platform:
## https://www.torproject.org/docs/faq#torrc

## Tor opens a SOCKS proxy on port 9050 by default -- even if you don't
## configure one below. Set "SOCKSPort 0" if you plan to run Tor only
## as a relay, and not make any local application connections yourself.
#SOCKSPort 9050 # Default: Bind to localhost:9050 for local connections.
#SOCKSPort 192.168.0.1:9100 # Bind to this address:port too.
```

Running TOR

```
$ tor --SocksPort 9050 --ControlPort 9051
```

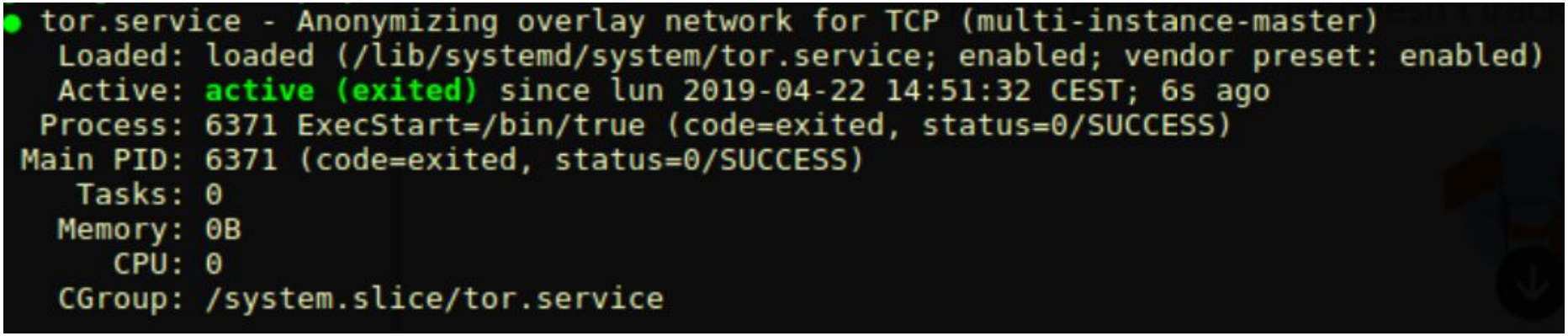
```
 Tor 0.2.9.14 running on Linux with Libevent 2.0.21-stable, (
 Tor can't help you if you use it wrong! Learn how to be safe
 Read configuration file "/etc/tor/torrc".
ontrolPort is open, but no authentication method has been con
pgrade your Tor controller as soon as possible.
 Opening Socks listener on 127.0.0.1:9050
 Opening Control listener on 127.0.0.1:9051
 Bootstrapped 0%: Starting
 Bootstrapped 80%: Connecting to the Tor network
 Bootstrapped 85%: Finishing handshake with first hop
 Bootstrapped 90%: Establishing a Tor circuit
 Tor has successfully opened a circuit. Looks like client fun
 Bootstrapped 100%: Done
```

Running TOR

```
Bootstrapped 0%: Starting
Bootstrapped 5%: Connecting to directory server
Bootstrapped 10%: Finishing handshake with directory server
Bootstrapped 15%: Establishing an encrypted directory connection
Bootstrapped 20%: Asking for networkstatus consensus
Bootstrapped 25%: Loading networkstatus consensus
I learned some more directory information, but not enough to build a circuit:
Bootstrapped 40%: Loading authority key certs
Bootstrapped 45%: Asking for relay descriptors
I learned some more directory information, but not enough to build a circuit:
have 0% of guards bw, 0% of midpoint bw, and 0% of exit bw = 0% of path bw.)
Bootstrapped 50%: Loading relay descriptors
Bootstrapped 55%: Loading relay descriptors
Bootstrapped 61%: Loading relay descriptors
Bootstrapped 66%: Loading relay descriptors
Bootstrapped 72%: Loading relay descriptors
Bootstrapped 80%: Connecting to the Tor network
Bootstrapped 90%: Establishing a Tor circuit
Tor has successfully opened a circuit. Looks like client functionality is work
Bootstrapped 100%: Done
```

Tor service

service tor start/restart
service tor status



Connecting with TOR

Stem
https://stem.torproject.org/

TorRequest
https://github.com/erdiaker/torrequest

Requests + socks5

Stem

BSIDES MANCH35T3R 2019

pip install stem

```
.. data:: Signal (enum)

  Signals that the tor process will accept.

  .. versionchanged:: 1.3.0
     Added the HEARTBEAT signal.

  ======================== ===========
  Signal                   Description
  ======================== ===========
  **RELOAD** or **HUP**    reloads our torrc
  **SHUTDOWN** or **INT**  shut down, waiting ShutdownWaitLength first if we're a relay
  **DUMP** or **USR1**     dumps information about open connections and circuits to our log
  **DEBUG** or **USR2**    switch our logging to the DEBUG runlevel
  **HALT** or **TERM**     exit tor immediately
  **NEWNYM**               switch to new circuits, so new application requests don't share any circuits
  **CLEARDNSCACHE**        clears cached DNS results
  **HEARTBEAT**            trigger a heartbeat log message
  ======================== ===========
```

TOR descriptors

Server descriptor: Complete information about a repeater

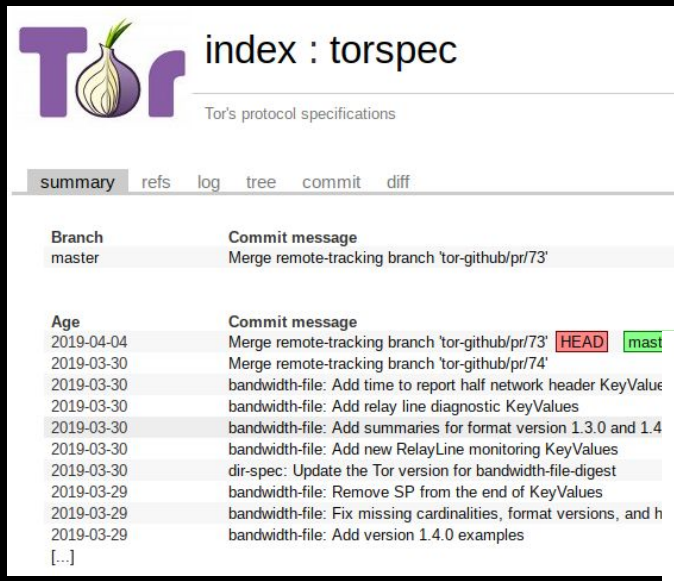
ExtraInfo descriptor: Extra information about the repeater

Micro descriptor: Contains only the information necessary for TOR clients to communicate with the repeater

Consensus (Network status): File issued by the authoritative entities of the network and made up of multiple entries of information on repeaters (router status entry)

Router status entry: Information about a repeater in the network, each of these elements is included in the consensus file generated by the authoritative entities.

TOR spec



index : torspec

Tor's protocol specifications

summary refs log tree commit diff

log msg

Branch	Commit message	Author
master	Merge remote-tracking branch 'tor-github/pr/73'	Nick Mathewson

Age	Commit message	Author
2019-04-04	Merge remote-tracking branch 'tor-github/pr/73' HEAD mast	
2019-03-30	Merge remote-tracking branch 'tor-github/pr/74'	
2019-03-30	bandwidth-file: Add time to report half network header KeyValue	
2019-03-30	bandwidth-file: Add relay line diagnostic KeyValues	
2019-03-30	bandwidth-file: Add summaries for format version 1.3.0 and 1.4	
2019-03-30	bandwidth-file: Add new RelayLine monitoring KeyValues	
2019-03-30	dir-spec: Update the Tor version for bandwidth-file-digest	
2019-03-29	bandwidth-file: Remove SP from the end of KeyValues	
2019-03-29	bandwidth-file: Fix missing cardinalities, format versions, and h	
2019-03-29	bandwidth-file: Add version 1.4.0 examples	

[...]

```
Recognized keys and their values include:

  "version" -- The version of the server's software, which MAY include the
    name of the software, such as "Tor 0.0.9.4".  The name of the software,
    if absent, is assumed to be "Tor".

  "config-file" -- The location of Tor's configuration file ("torrc").

  "config-defaults-file" -- The location of Tor's configuration
    defaults file ("torrc.defaults").  This file gets parsed before
    torrc, and is typically used to replace Tor's default
    configuration values. [First implemented in 0.2.3.9-alpha.]

  "config-text" -- The contents that Tor would write if you send it
    a SAVECONF command, so the controller can write the file to
    disk itself. [First implemented in 0.2.2.7-alpha.]

  "exit-policy/default" -- The default exit policy lines that Tor will
    *append* to the ExitPolicy config option.

  "exit-policy/reject-private/default" -- The default exit policy lines
    that Tor will *prepend* to the ExitPolicy config option when
    ExitPolicyRejectPrivate is 1.
```

Stem

```
from stem import Signal
from stem.control import Controller

with Controller.from_port(port = 9051) as
controller:
    controller.authenticate(password='your
password set for tor controller port in torrc')
    print("Success!")
    controller.signal(Signal.NEWNYM)
    print("New Tor connection processed")
```

Periodic Tor IP Rotation

```
import time
from stem import Signal
from stem.control import Controller
def main():
    while True:
        time.sleep(20)
        print ("Rotating IP")
        with Controller.from_port(port = 9051) as controller:
          controller.authenticate()
          controller.signal(Signal.NEWNYM) #gets new identity

if __name__ == '__main__':
    main()
```

Stem.Circuit status

```
from stem.control import Controller

controller = Controller.from_port(port=9051)
controller.authenticate()

print(controller.get_info('circuit-status'))
```

Stem.Network status

```
from stem.control import Controller

controller = Controller.from_port(port=9051)
controller.authenticate(password)

entries = controller.get_network_statuses()
for routerEntry in entries:
    print(routerEntry)
```

Stem.circuits

```
for circ in sorted(controller.get_circuits()):
  if circ.status != CircStatus.BUILT:
    continue

  print("")
  print("Circuit %s (%s)" % (circ.id, circ.purpose))

  for i, entry in enumerate(circ.path):
    div = '+' if (i == len(circ.path) - 1) else '|'
    fingerprint, nickname = entry

    desc = controller.get_network_status(fingerprint, None)
    address = desc.address if desc else 'unknown'

    print(" %s- %s (%s, %s)" % (div, fingerprint, nickname, address))
```

Stem.circuits

```
Circuit 10 (GENERAL)
 |- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
 |- 12CF6DB4DAE106206D6C6B09988E865C0509843B (ATZv5, 159.69.114.110)
 +- E19D4503D2FD584C8099A954270A9BC819596E74 (Unnamed, 51.68.206.35)

Circuit 11 (GENERAL)
 |- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
 |- 44DF1007B545B4D8057F279025EBB33CF99BE227 (Kroell, 80.241.214.102)
 +- 96126645008717 98CFB52E8A71A956F316AA0503 (Polaris, 130.230.113.235)

Circuit 12 (GENERAL)
 |- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
 |- 9E1E4F5B5F94812D02C4D18CB4086CE71CA5C614 (torpidsDEhetzner1, 78.46.217.214)
 +- 615ABEA2DE76EB3760BC51E7306BAA59F15CD8F2 (Cloud, 5.135.158.101)

Circuit 13 (GENERAL)
 |- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
 |- 91B14EB2893544F0EC8F16086261A10B8E46B5C5 (okthx, 163.172.210.167)
 +- 03EE7DDD931D92BB57B81B3038AE7C40A08AB237 (Shockrealm, 123.30.128.138)

Circuit 14 (GENERAL)
 |- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
```

Server descriptors

```
import stem.descriptor.remote

server_descriptors = stem.descriptor.remote.get_server_descriptors().run()

with open('/tmp/descriptor_dump', 'wb') as descriptor_file:
  descriptor_file.write(''.join(map(str, server_descriptors)))
```

class stem.descriptor.server_descriptor.**RelayDescriptor**(*raw_contents*, *validate=False*, *annotations=None*, *skip_crypto_validation=False*)

Bases: stem.descriptor.server_descriptor.ServerDescriptor

Server descriptor (**descriptor specification**)

Variables:
- **certificate** (*stem.certificate.Ed25519Certificate*) -- ed25519 certificate
- **ed25519_certificate** (*str*) -- base64 encoded ed25519 certificate
- **ed25519_master_key** (*str*) -- base64 encoded master key for our ed25519 certificate
- **ed25519_signature** (*str*) -- signature of this document using ed25519
- **onion_key** (*str*) -- * key used to encrypt EXTEND cells
- **onion_key_crosscert** (*str*) -- signature generated using the onion_key
- **ntor_onion_key_crosscert** (*str*) -- signature generated using the ntor-onion-key
- **ntor_onion_key_crosscert_sign** (*str*) -- sign of the corresponding ed25519 public key
- **signing_key** (*str*) -- * relay's long-term identity key
- **signature** (*str*) -- * signature for this descriptor

* attribute is required when we're parsed with validation

Changed in version 1.5.0: Added the ed25519_certificate, ed25519_master_key, ed25519_signature, onion_key_c ntor_onion_key_crosscert, and ntor_onion_key_crosscert_sign attributes.

Changed in version 1.6.0: Moved from the deprecated **pycrypto** module to **cryptography** for validating signatures.

Changed in version 1.6.0: Added the certificate attribute.

Deprecated since version 1.6.0: Our **ed25519_certificate** is deprecated in favor of our new **certificate** attribute. The base64 certificate is available via the certificate's **encoded** attribute.

Introduction points

```
from stem.control import Controller

with Controller.from_port(port = 9051) as controller:
  controller.authenticate()
  desc = controller.get_hidden_service_descriptor('3g2upl4pq6kufc4m')

  print("DuckDuckGo's introduction points are...\n")

  for introduction_point in desc.introduction_points():
    print('  %s:%s => %s' % (introduction_point.address, introduction_point.port, introducti
ifier))
~
```

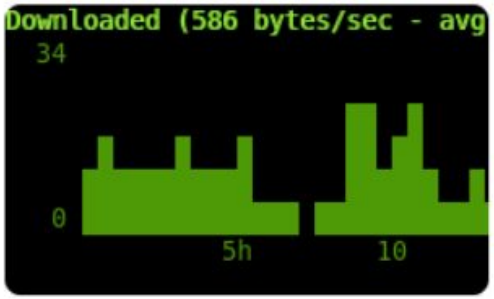
```
DuckDuckGo's introduction points are...

  93.72.79.64:9001 => c2otnj2rbdm5o62cfse67j4dz66gmk7y
  82.64.78.170:9001 => 2fszgcjszlkiiw66lzfsnedgu6rylbd3
  95.216.136.46:9001 => atr3les6wx3gy3wiccr5o4bobsr7tvph
  65.49.20.10:9001 => 2nlifk3ofhmrvibq4a5jx22coagznipp
  194.187.249.116:443 => zzmm6ztpecmfoubpz2xrznjpmofp7pld
  144.76.236.14:443 => lgnhbb2wasezhiictmtxl3xyzhsaxnsa
  144.217.94.84:443 => ujqniwgkiagv6t6265uqeqbqlmvkkdeu
  212.89.225.242:443 => eeyq6sagnjgkvxvsx7jsj4ftr6hbisgw
  88.198.70.137:9090 => fdcszw5xrwsgcjg2mlwb2z4wncphdeqq
  198.16.70.10:9001 => r3ri5lyiosxzwa7lxv43l22qlhrfi42v
```

Tor nyx

https://nyx.torproject.org/

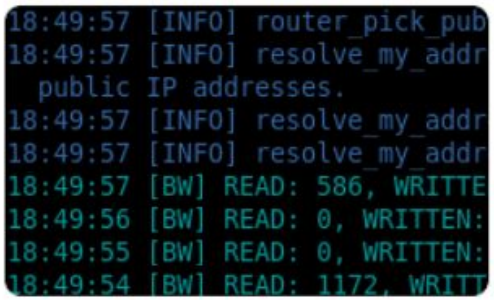
Tor nyx

What does Nyx provide?



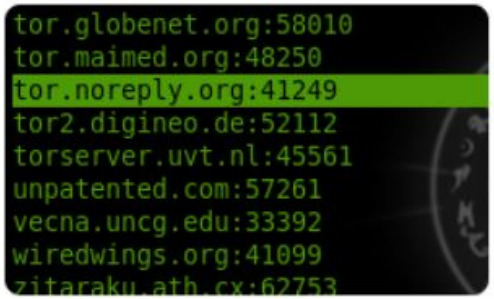
<< Bandwidth Graph

Bandwidth used by Tor. You can press 'i' to pick the graphing **interval**, or 's' to show other usage **statistics**.



<< Event Log

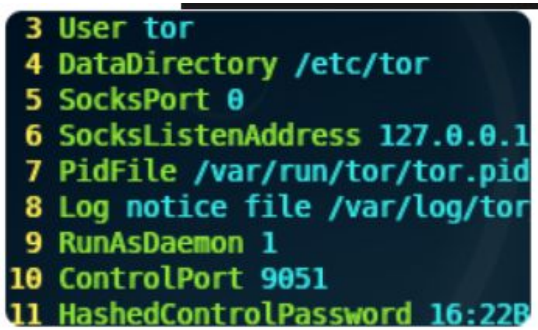
Tor logs a wealth of information about itself. We present it, colorized and deduplicated. Press 'e' to select what **events** are logged and 'f' to **filter** to just what you want.



<< Connections

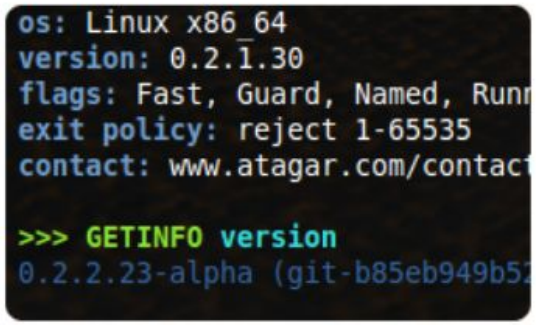
Connection data similar to netstat or lsof, but correlated with Tor relay information to make it much richer. Press 'enter' for more **details**, 's' to **sort**, and 'd' to see raw **descriptor** data.

Tor nyx



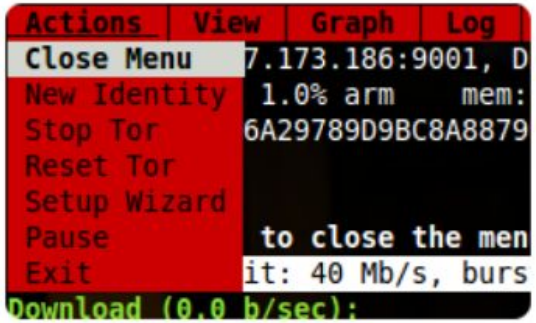
<< Torrc

Provides your torrc with line numbers and syntax highlighting. Comments can be **stripped** by pressing 's'.



<< Interpreter

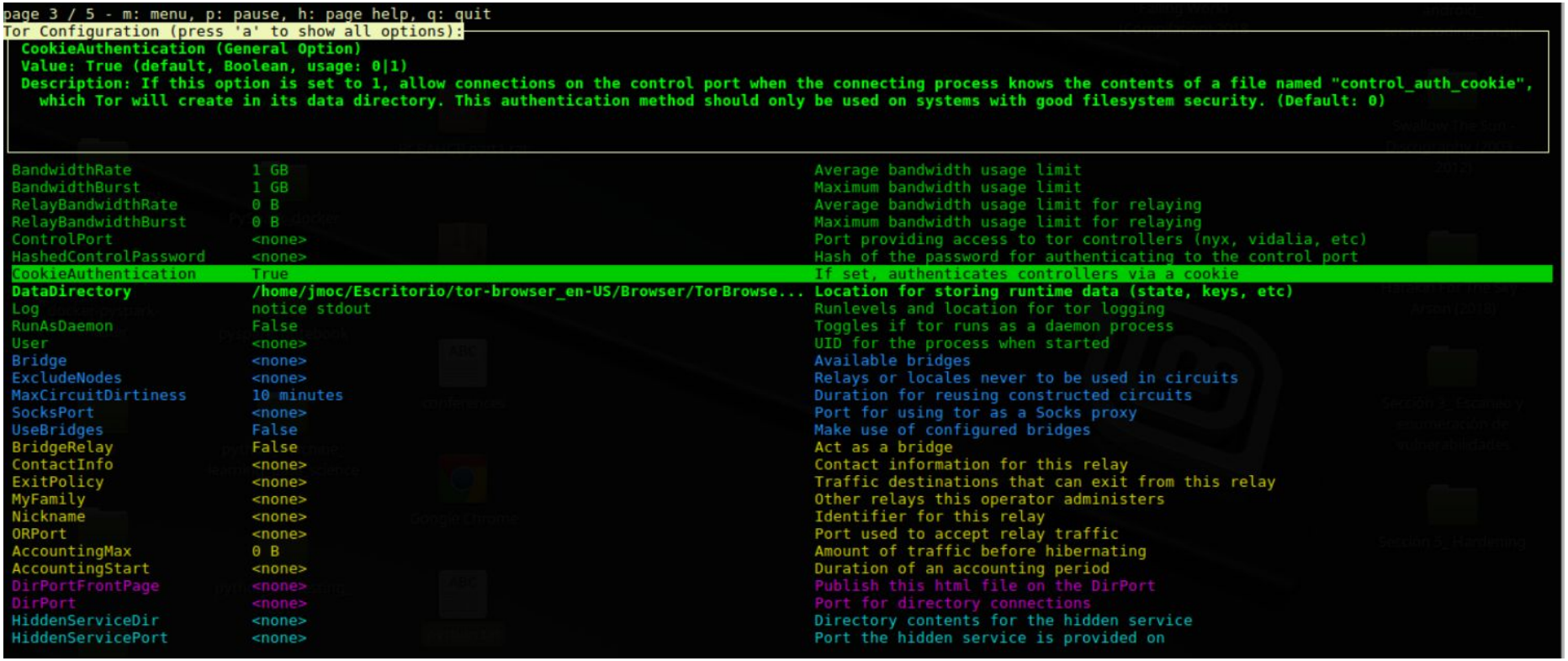
Integration with Stem's interpreter, providing raw controller access, irc-style commands like **/help**, tab completion, history scrollback, and a python prompt.



<< ... and more!

That's just the tip of the iceberg. All pages within Nyx provide **help** information when you press 'h' and **menu** in response to 'm'. So go explore!

Tor nyx


page 3 / 5 - m: menu, p: pause, h: page help, q: quit
Tor Configuration (press 'a' to show all options):
CookieAuthentication (General Option)
Value: True (default, Boolean, usage: 0|1)
Description: If this option is set to 1, allow connections on the control port when the connecting process knows the contents of a file named "control_auth_cookie", which Tor will create in its data directory. This authentication method should only be used on systems with good filesystem security. (Default: 0)
BandwidthRate 1 GB Average bandwidth usage limit
BandwidthBurst 1 GB Maximum bandwidth usage limit
RelayBandwidthRate 0 B Average bandwidth usage limit for relaying
RelayBandwidthBurst 0 B Maximum bandwidth usage limit for relaying
ControlPort <none> Port providing access to tor controllers (nyx, vidalia, etc)
HashedControlPassword <none> Hash of the password for authenticating to the control port
CookieAuthentication True If set, authenticates controllers via a cookie
DataDirectory /home/jmoc/Escritorio/tor-browser_en-US/Browser/TorBrowse... Location for storing runtime data (state, keys, etc)
Log notice stdout Runlevels and location for tor logging
RunAsDaemon False Toggles if tor runs as a daemon process
User <none> UID for the process when started
Bridge <none> Available bridges
ExcludeNodes <none> Relays or locales never to be used in circuits
MaxCircuitDirtiness 10 minutes Duration for reusing constructed circuits
SocksPort <none> Port for using tor as a Socks proxy
UseBridges False Make use of configured bridges
BridgeRelay False Act as a bridge
ContactInfo <none> Contact information for this relay
ExitPolicy <none> Traffic destinations that can exit from this relay
MyFamily <none> Other relays this operator administers
Nickname <none> Identifier for this relay
ORPort <none> Port used to accept relay traffic
AccountingMax 0 B Amount of traffic before hibernating
AccountingStart <none> Duration of an accounting period
DirPortFrontPage <none> Publish this html file on the DirPort
DirPort <none> Port for directory connections
HiddenServiceDir <none> Directory contents for the hidden service
HiddenServicePort <none> Port the hidden service is provided on

VIDEO


Archivo Editar Ver Buscar Terminal Pestañas Ayuda
jmoc@jmoc-HP-Compaq-60...
root@jmoc-HP-Compaq-600...
jmoc@jmoc-HP-Compaq-600...
192.168.100.9:33520 => 217.182.196.70:443
127.0.0.1:9151 => 127.0.0.1:36266
127.0.0.1:9151 => 127.0.0.1:36254
tor_examples # clear
tor_examples # vi list_circuits.py
tor_examples # python list_circuits.py
Circuit 595 (GENERAL)
|- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
|- 3CCA722A0DB4E67689610906 1C4E9DCF2F0009EB (1EpHny, 158.69.198.177)
+- 315F08F355D96D678267D7B708127ACBC87BA7E9 (nodvrelay10, 45.62.245.142)
Circuit 597 (GENERAL)
|- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
|- DE847D94E78B2E560AB87D272DC90192D3144F17 (kohlrabi, 109.70.100.15)
+- 1C90D3AEADFF3BCD079810632C8B85637924A58E (Multivac, 163.172.53.84)
Circuit 598 (GENERAL)
|- CE3FE883C6C9EF475EA097DC3E33A6F32B852DA1 (AIKO, 78.129.218.56)
|- 6B9EA8927AB6E94E216067E65372182343A5AFA2 (angelinajolie, 62.210.83.207)
+- 13557448AD1632BF080757C2FF7769BB230F1DF3 (bauruine11, 144.76.71.91)
Circuit 600 (GENERAL)

TorRequest

```
from torrequest import TorRequest

with TorRequest() as tr:
    response = tr.get('http://ipecho.net/plain')
    print(response.text)  # not your IP address

    tr.reset_identity()

    response = tr.get('http://ipecho.net/plain')
    print(response.text)  # another IP address
```

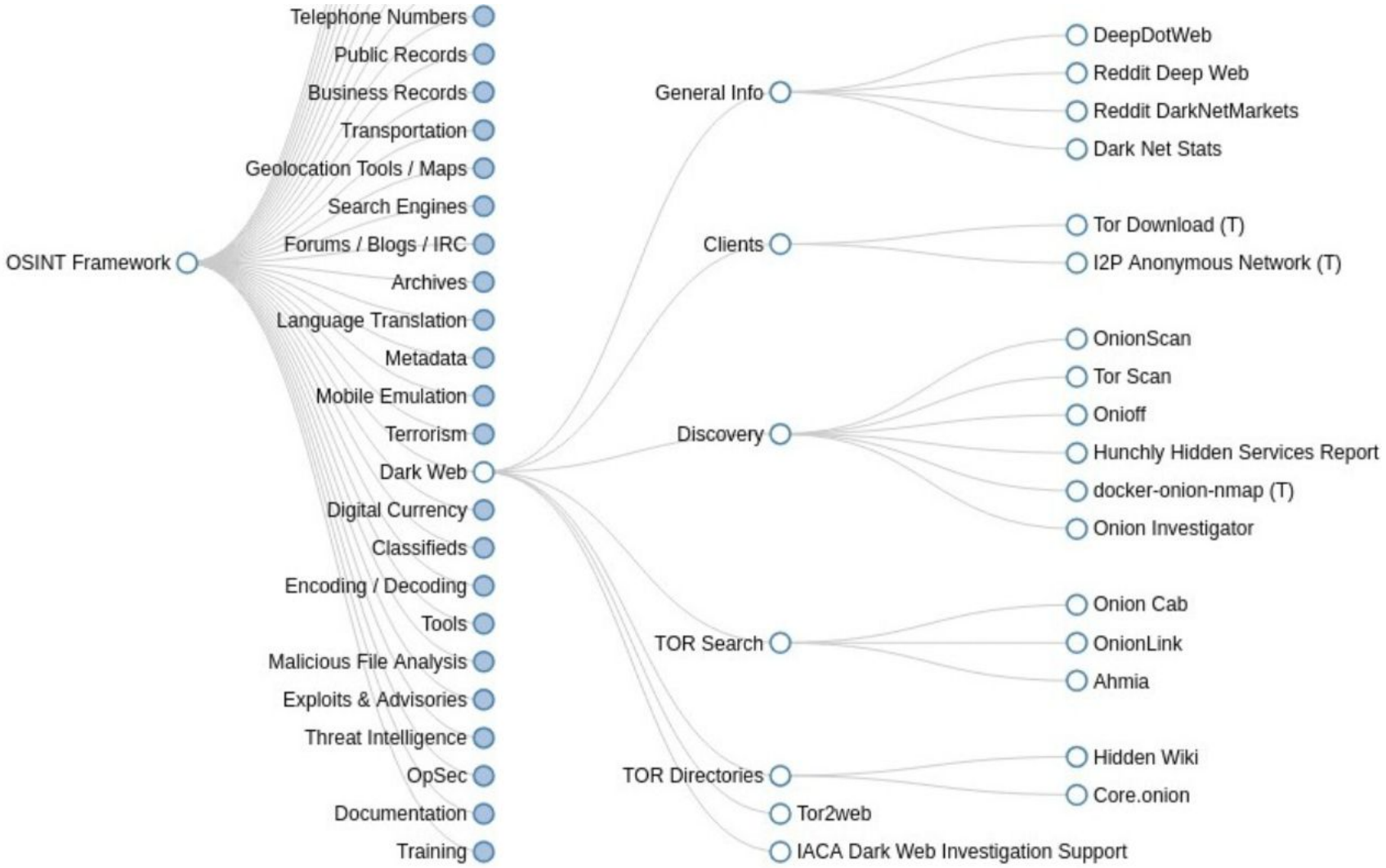
Request

```
import requests

def get_tor_session():
        session = requests.session()
         # Tor uses the 9050 port as the default socks port
        session.proxies = {'http':  'socks5h://127.0.0.1:9050',
                           'https': 'socks5h://127.0.0.1:9050'}
        return session

# Following prints your normal public IP
print(requests.get("http://httpbin.org/ip").text)

# Make a request through the Tor connection
# Should print an IP different than your public IP
session = get_tor_session()
print(session.get("http://httpbin.org/ip").text)
r = session.get('https://www.facebookcorewwwi.onion/')
print(r.headers)
```

Analyze hidden services

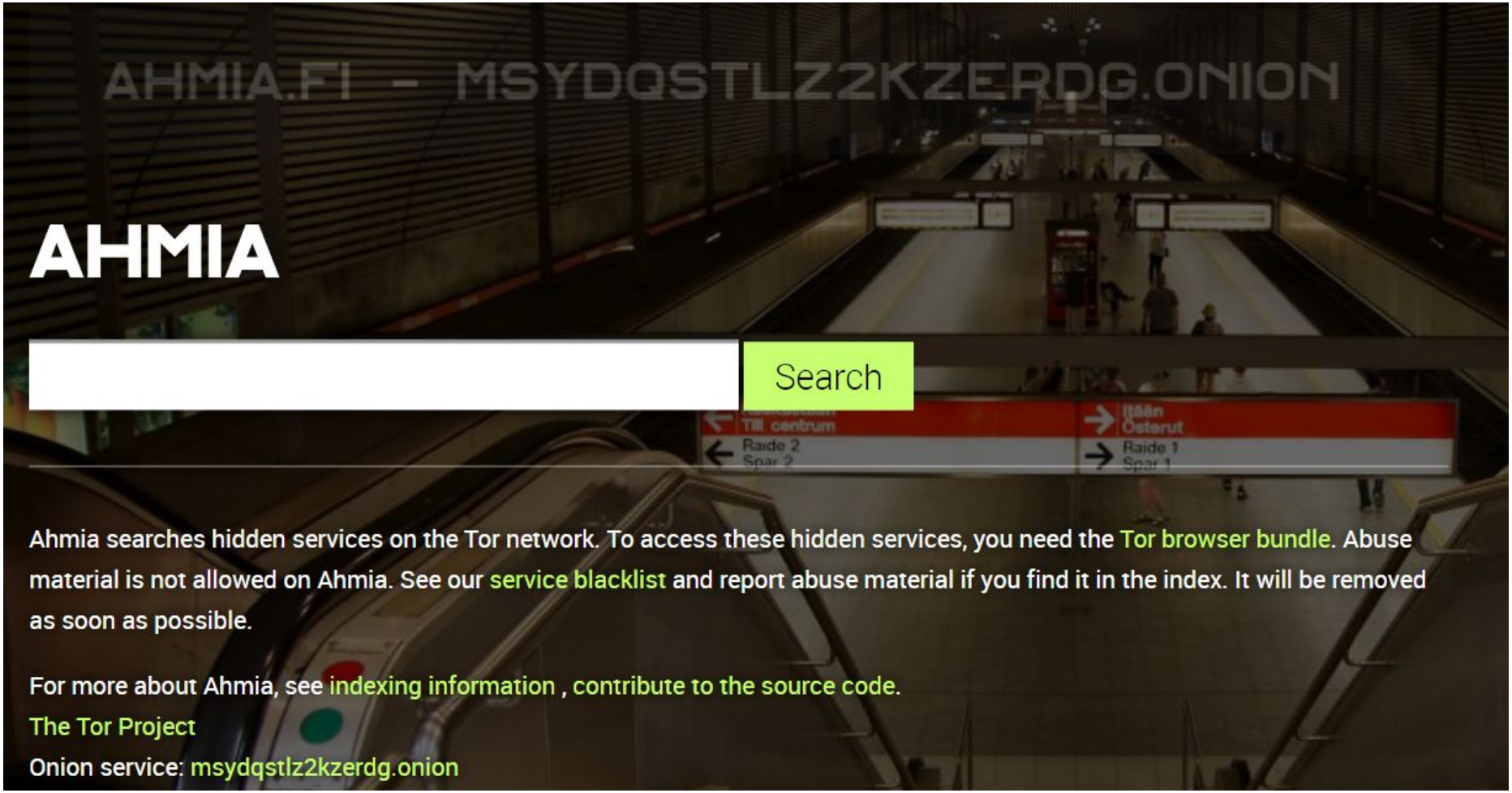
1) Queries to the data sources.
2) Filter adresses that are active.
3) Testing against each active address and analysis of the response.
4) Store URLs from websites.
5) Perform a crawling process against each service
6) Apply patterns and regular expressions to detect specific content(for example mail addresses)

OSINT


OSINT Framework
Telephone Numbers
Public Records
Business Records
Transportation
Geolocation Tools / Maps
Search Engines
Forums / Blogs / IRC
Archives
Language Translation
Metadata
Mobile Emulation
Terrorism
Dark Web
Digital Currency
Classifieds
Encoding / Decoding
Tools
Malicious File Analysis
Exploits & Advisories
Threat Intelligence
OpSec
Documentation
Training
General Info
DeepDotWeb
Reddit Deep Web
Reddit DarkNetMarkets
Dark Net Stats
Clients
Tor Download (T)
I2P Anonymous Network (T)
Discovery
OnionScan
Tor Scan
Onioff
Hunchly Hidden Services Report
docker-onion-nmap (T)
Onion Investigator
TOR Search
Onion Cab
OnionLink
Ahmia
TOR Directories
Hidden Wiki
Core.onion
Tor2web
IACA Dark Web Investigation Support

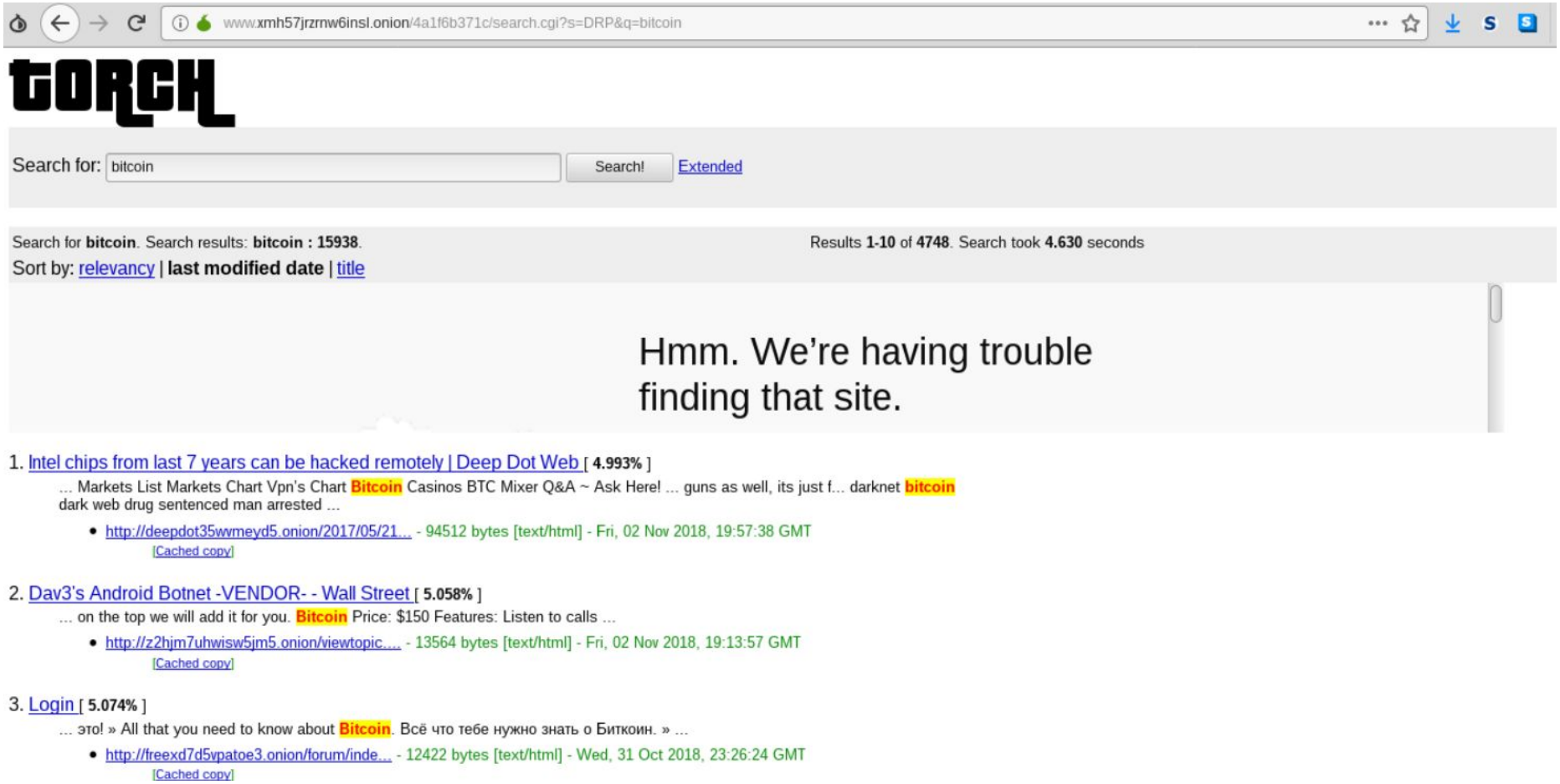
Ahmia search engine

https://ahmia.fi/

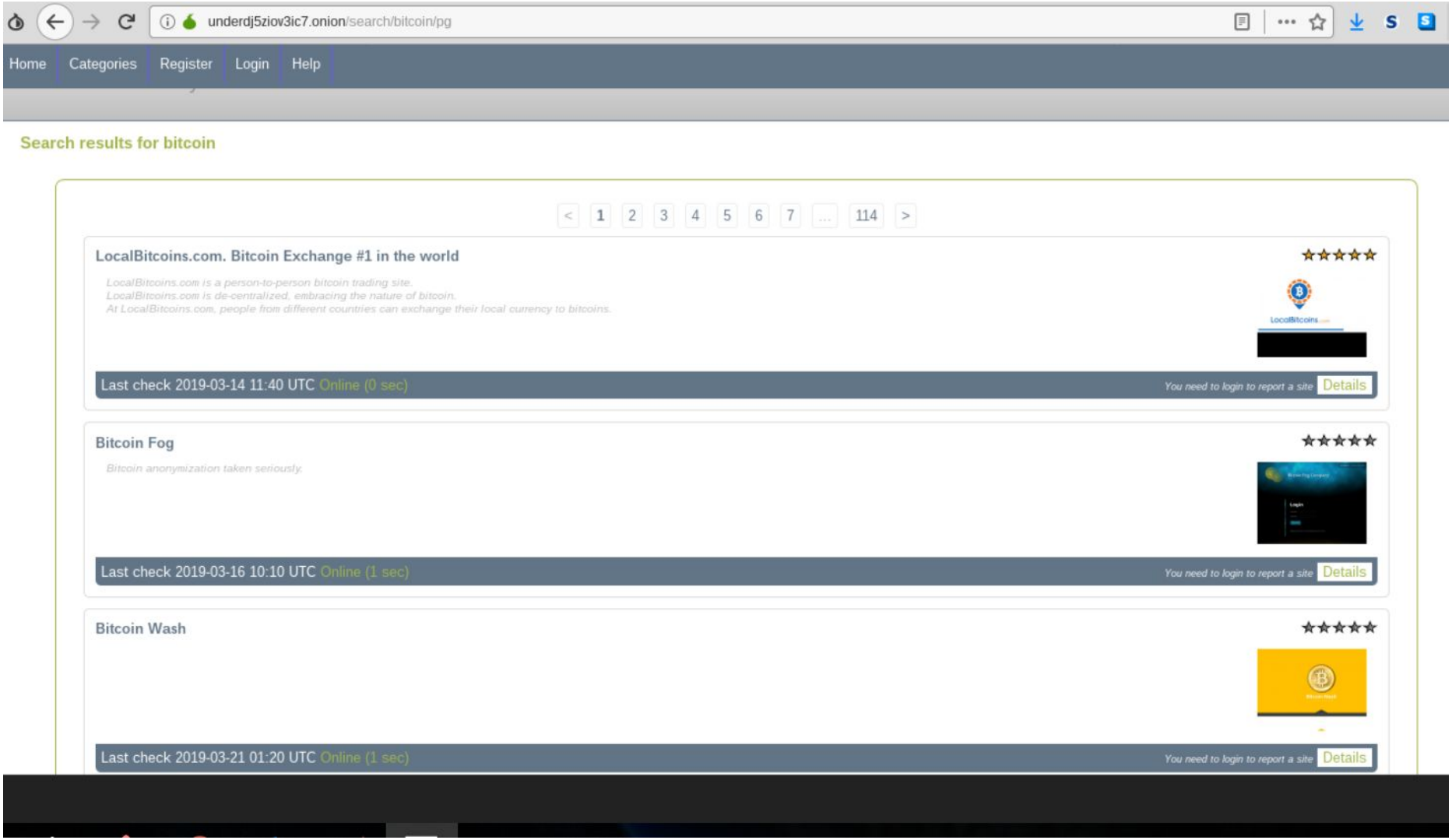


Torch search engine

http://xmh57jrzrnw6insl.onion



UnderDir Search engine



Hidden services

```python
import requests

def get_tor_session():
    session = requests.session()
    # Tor uses the 9050 port as the default socks port
    session.proxies = {'http':  'socks5h://127.0.0.1:9050','https': 'socks5h://127.0.0.1:9050'}
    return session

def searchUnderDir(address,session):
    for page in range(1,19):
        for searchItem in ['bitcoin']:
            addressWithCriteria = address.replace("CRITERIA_WILDCARD",searchItem)
            #http://underdj5ziov3ic7.onion/search/bitcoin/pg/1
            addressToSearch = addressWithCriteria + "/"+ str(page)
            print(addressToSearch)
            response = session.get(address)
            print(response.text)

# Following prints your normal public IP
print(requests.get("http://httpbin.org/ip").text)

# Make a request through the Tor connection
# IP visible through Tor
# Should print an IP different than your public IP
session = get_tor_session()
print(session.get("http://httpbin.org/ip").text)

searchUnderDir('http://underdj5ziov3ic7.onion/search/CRITERIA_WILDCARD/pg',session)
```

Search Hidden services

```
while len(deeplinks) <= number_results or length_of_web_links_to_crawl <= iterations:
            try:
                with timeout(10):
                    crawl = session.get(deeplinks[iterations])
            except:
                error=1
            if not error:
                crawl = crawl.text
                try:
                    soup = BeautifulSoup(crawl, "lxml")
                except:
                    print("Error creating 'soup' object")
                    os.system("sudo service tor stop")
                    exit()

                for a in soup.find_all('a', href=True):
                    if len(deeplinks) >= number_results:
                        print(" \033[0;32m LINKS COLLECTED!\033[0m")
```

```
#process first 5 pages
    for page in range(1,5):
        #http://underdj5ziov3ic7.onion/search/bitcoin/pg
        #http://www.xmh57jrzrnw6insl.onion/4a1f6b371c/search.cgi?s=DRP&q=bitcoin
        search_query = "http://underdj5ziov3ic7.onion/search/"+search_string+"/pg/"+str(page)
        #search_query = "http://www.xmh57jrzrnw6insl.onion/4a1f6b371c/search.cgi?s=DRP&q="+search_string+"&np="+str(page)

        print("Search query",search_query)
        try:
            content = session.get(search_query)
            content = content.text
```

Search Hidden services

```
# -------------------- MAIN PROGRAM --------------------
if len(sys.argv) not in [4,5] or sys.argv[3] not in ["all", "none", "default"]:
    print("search_dark_web.py SEARCH NUMBER_OF_RESULTS crawl_options intext")
    print("Crawl Options:")
    print("            all) crawl each link")
    print("            none) dont crawl")
    print("            default) crawl if not enough links")
```

Search Hidden services

```
for a in soup.find_all('a', href=True):
    if len(deeplinks) >= number_results:
        print(" \033[0;32m LINKS COLLECTED!\033[0m")
        os.system("sudo service tor stop")
        exit()

    darklink = isValidOnionAdress(a['href'],session)
    if darklink:
        if not darklink in deeplinks:
            if intexts in crawl or intexts == "":
                deeplinks.append(darklink)
                print(darklink)
            else:
                print("valid link, but have not '" + intexts + "' inside: \033[0;31m" + darklink + "\033[0m")
```

Other tools

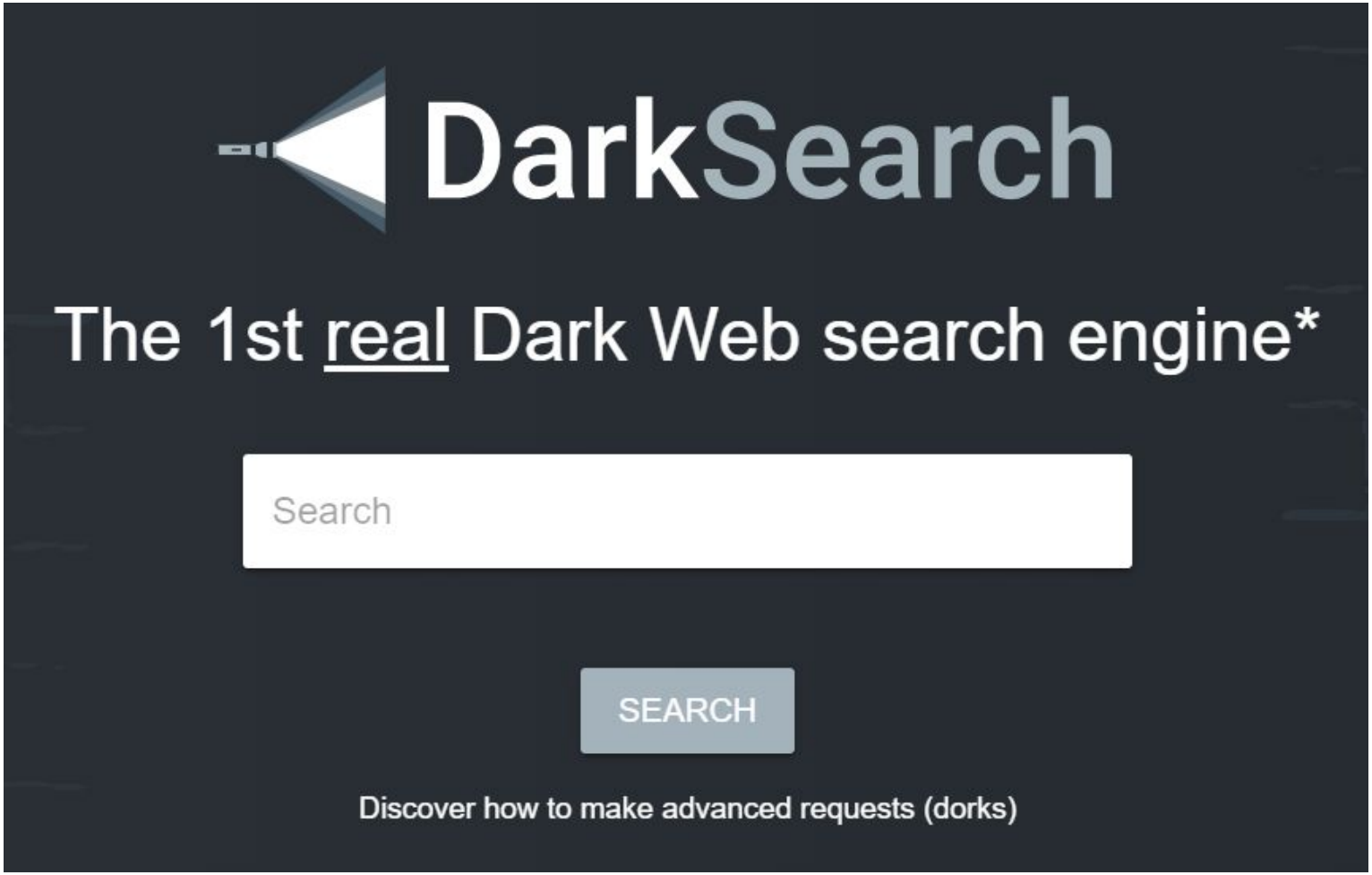
POOPAK - TOR Hidden Service Crawler
https://github.com/teal33t/poopak

Tor spider
https://github.com/absingh31/Tor_Spider

Tor router
https://gitlab.com/edu4rdshl/tor-router

DarkSeach

https://darksearch.io/

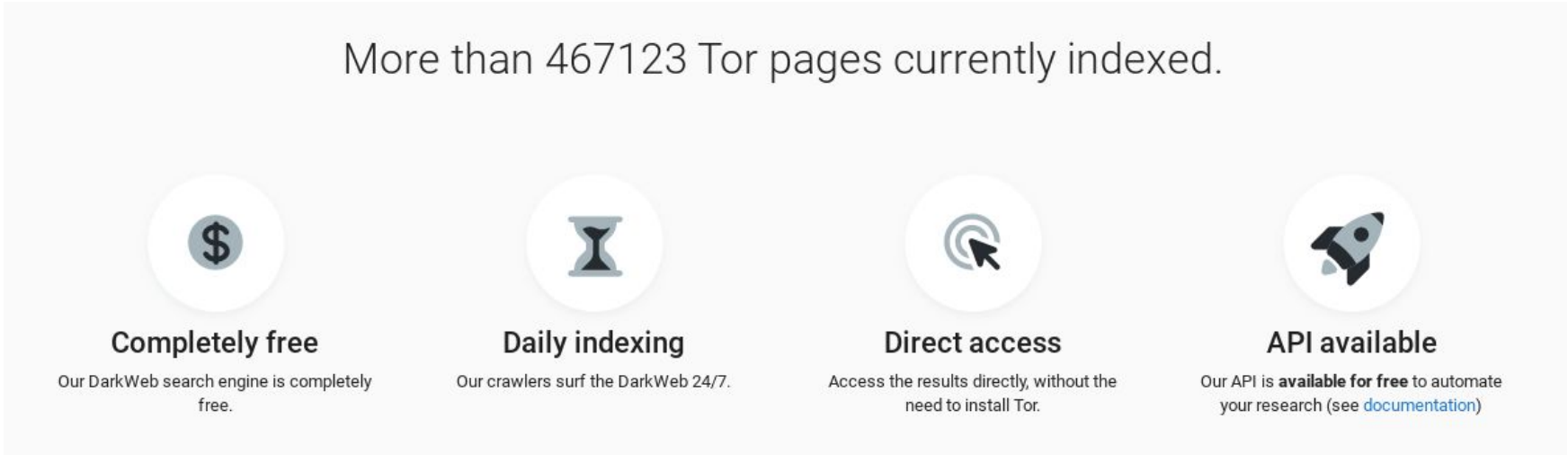


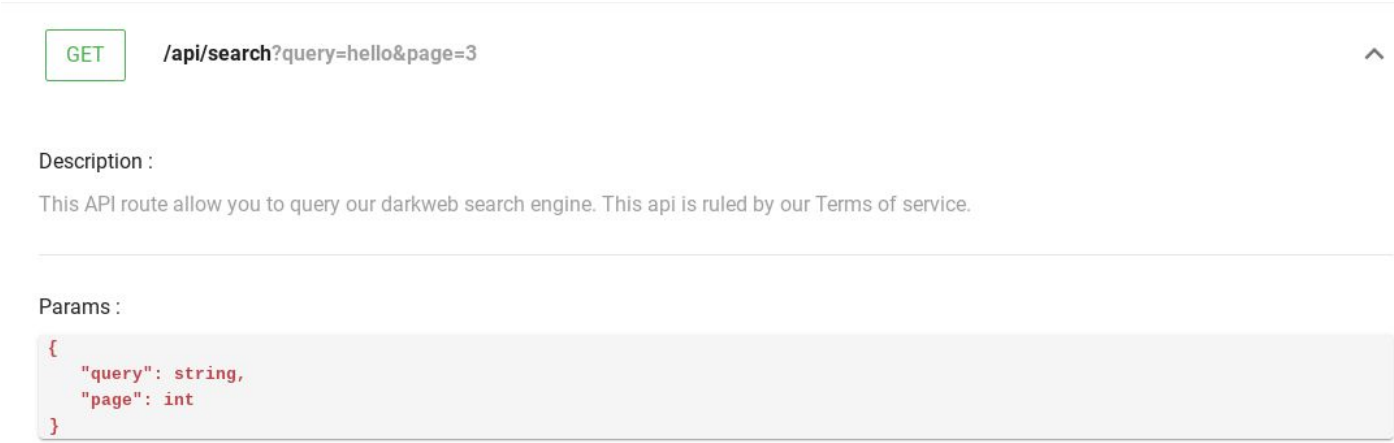
DarkSeach vs Ahmia

- Both offers results directly accessible on the inernet thanks to Tor2Web with connecting tor network.
- DarkSeach provide a free API to automate searches (with some limitations to avoid the DDOS)
- DarkSeach indexes almost half million .onion addresses.Ahmia indexes almost 5.000 sites.
- Finally, both search engines not keep logs of searches done.

DarkSeach API

https://darksearch.io/apidoc





DarkSeach API

https://darksearch.io/api/search?query=bsides

Raw Parsed


```
{
  "total": 4,
  "per_page": 20,
  "current_page": 1,
  "last_page": 1,
  "from": 1,
  "to": 20,
  "data": [
    {
      "title": "HOUSE - TPB",
      "link": "http://rss.rss.rss.rss.rss.rss.rss.rss.rss.rss.uj3wazyk5u4hnvtk.onion/tag/HOUSE/11/11",
      "description": "\n\nUploaded 12-17 2011, Size 238.78 MiB, ULed by xtrancex | 0 | 1  \nAudio  \n(Music)  |\n\nVA - OM: Miami 2012 (OM-559) WEB 2012-
      <em>BSiDE</em>\n\nUploaded 04-03 2012, Size 382.54 MiB, ULed by xtrancex | 1 | 0  \nAudio  \n(Music)  |\n\nVA - Noze Presents Body Language Vol. 11 WEB 2012-
      OMA\n\nUploaded 03-30 2012, Size 455.21 MiB"
    },
    {
      "title": "cheap | Deep Dot Web",
      "link": "http://deepdot35wvmeyd5.onion/tag/cheap/",
      "description": " Las Vegas, Nevada for a\nweek of hacker conferences which include Black Hat, DEFCON, and <em>BSides</em> Las\nVegas. Every year
      vulnerabilities are exposed at these conferences. This year\nat Black Hat, it was revealed in a talk given at the conference that some of\nthe most popular
      and affordable smartphones"
    },
    {
      "title": "hacks | Deep Dot Web",
      "link": "http://deepdot35wvmeyd5.onion/tag/hacks/",
      "description": " at Black Hat and DEFCON This Year\n\nAugust 18, 2017 1 Comment\n\nEvery July hackers from around the globe descend on Las Vegas, Nevada for
      a\nweek of hacker conferences which includes Black Hat USA, DEFCON, and <em>BSides</em>\nLas Vegas. The annual week of hacker conferences brings security
      researchers\nwho"
    },
    {
      "title": "privacy | Deep Dot Web",
      "link": "http://deepdot35wvmeyd5.onion/tag/privacy/",
      "description": ", and <em>BSides</em> Las\nVegas. Every year vulnerabilities are exposed at these conferences. This year\nat Black Hat, it was revealed in a
      talk given at the conference that some of\nthe most popular and affordable smartphones  Read More »\n\n## Commodity Aesthetics of Privacy Across
```

DarkSeach API

BSIDES MANCH35T3R 2019

https://darksearch.io/api/search?query=python

```
1  import requests
2  import json
3
4  r = requests.get('https://darksearch.io/api/search?query=python')
5
6  data_json = r.text
7
8  json_data = json.loads(data_json)
9
10 pages = json_data['last_page']
11 print(pages)
12 for p in range(1,pages):
13   for i in range(0,20):
14     try:
15       url = 'https://darksearch.io/api/search?query=python'+'&page='+str(p)
16       r=requests.get(url)
17       data_json = r.text
18       json_data = json.loads(data_json)
19       print(json_data['data'][i]['title'])
20     except Exception as excep:
21       print(excep)
```

Onion investigator

https://oi.ctrlbox.com/

Statistics

Total Scanned: **16,602**

Out of **16,602** scanned .onions the system detects that there is **568** running no detectable http service on port 80 while there are **7,310** .onions run more than one detectable service and **8,724** .onions that only run a single service.

Service(Ports)

http	16034
smtp	6981
https	199
ssh	89
xmpp	41
ircd	38
imap	25

Web Technologies

Nginx	6831
jQuery	2939
Apache	2380
PHP	2174
Twitter Bootstrap	1248
Font Awesome	728
Google Font API	659

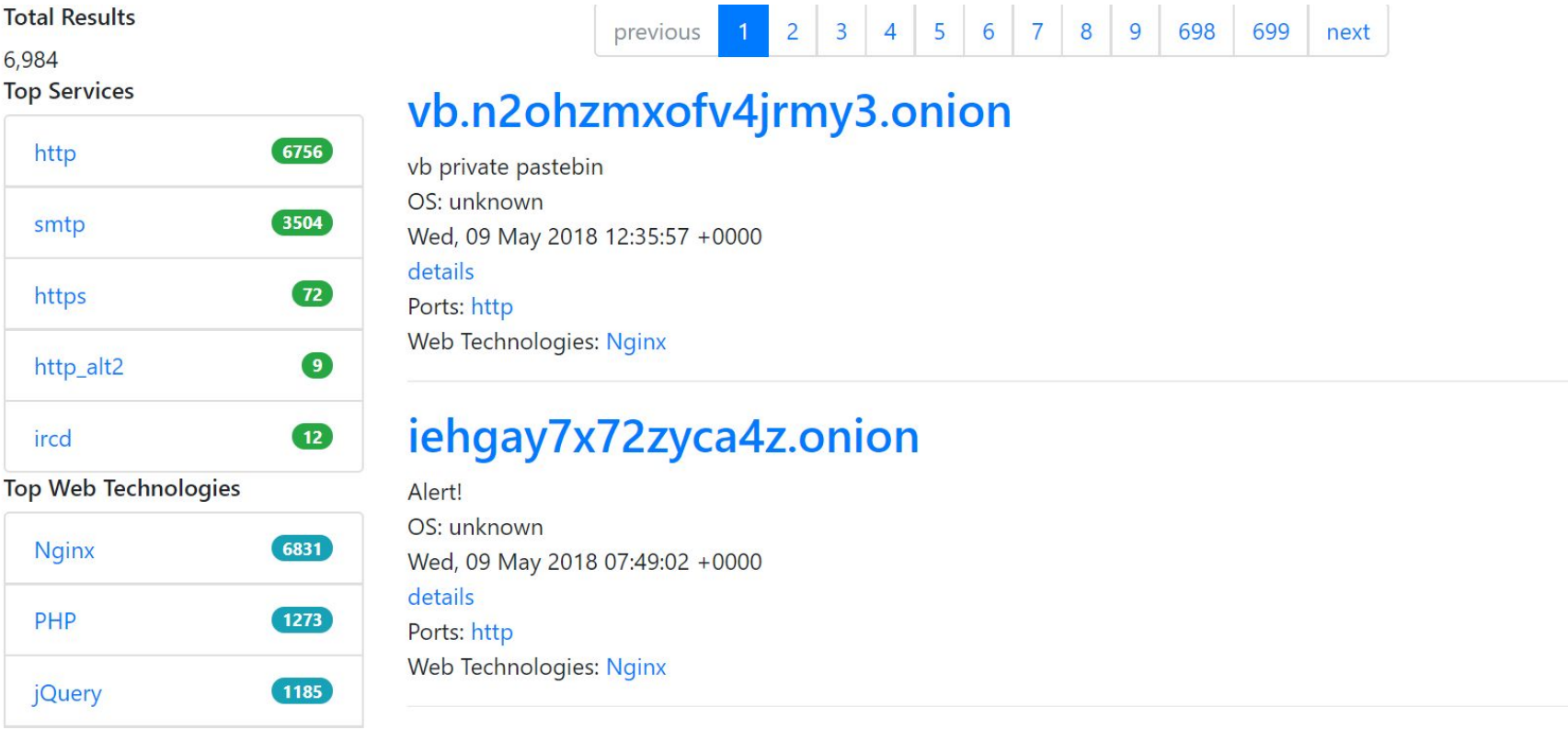
Servers

warning that there is some funky results within these.

nginx	14884
Apache	2050
Uknown	884
nginx/1.6.2	807
nginx/1.12.2	383
Apache/2.4.25 (Debian)	266

Onion investigator

https://oi.ctrlbox.com/index.php?search=apps:Nginx



Inspect onion address

https://github.com/k4m4/onioff

```
Usage: python3 onioff.py {onion} [options]

Options:
  --version             show program's version number and exit
  -h, --help            show this help message and exit
  -f FILE, --file=FILE  name of onion file
  -o OUTPUT_FILE, --output=OUTPUT_FILE
                        output filename
  -a, --active          log active onions only to output file

Examples:
  python3 onioff.py http://xmh57jrzrnw6insl.onion/
  python3 onioff.py -f ~/onions.txt -o ~/report.txt -a
  python3 onioff.py https://facebookcorewwwi.onion/ -o ~/report.txt
```

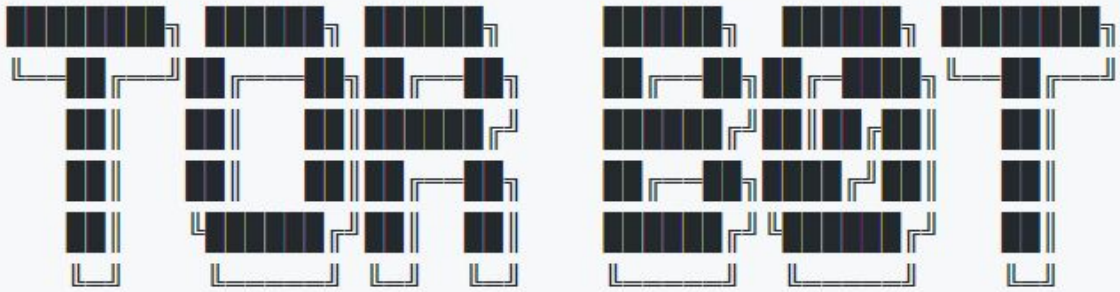
Inspect onion address

https://github.com/k4m4/onioff

```
[+] Commencing Onion Inspection
[+] Tor Running Normally
[!] Inspecting Onion --> http://xmh57jrzrnw6insl.onion/
[+] Sending Request
[+] Onion Up & Running --> ACTIVE
[+] Retrieving Onion Title
[+] Onion Title --> TORCH: Tor Search!
[!] Inspecting Onion --> http://facebookcorewwwi.onion/
[+] Sending Request
[+] Onion Up & Running --> ACTIVE
[+] Retrieving Onion Title
[+] Onion Title --> Facebook - Log In or Sign Up
[!] Inspecting Onion --> http://sms4tor3vcr2geip.onion/
[+] Sending Request
[-] Onion Down --> INACTIVE
```

Crawling onion address

https://github.com/DedSecInside/TorBot



Crawling onion address

BSIDES MANCH35T3R 2019

https://github.com/DedSecInside/TorBot

```
usage: torBot.py [-h] [-v] [--update] [-q] [-u URL] [-s] [-m] [-e EXTENSION]
                 [-l] [-i]

optional arguments:
  -h, --help            Show this help message and exit
  -v, --version         Show current version of TorBot.
  --update              Update TorBot to the latest stable version
  -q, --quiet           Prevent header from displaying
  -u URL, --url URL     Specifiy a website link to crawl, currently returns links on that page
  -s, --save            Save results to a file in json format
  -m, --mail            Get e-mail addresses from the crawled sites
  -e EXTENSION, --extension EXTENSION
                        Specifiy additional website extensions to the
                        list(.com or .org etc)
  -l, --live            Check if websites are live or not (slow)
  -i, --info            Info displays basic info of the scanned site (very
                        slow)`
```

Crawling onion address

https://github.com/MikeMeliz/TorCrawl.py

Crawling onion address

https://github.com/dirtyfilthy/freshonions-torscraper

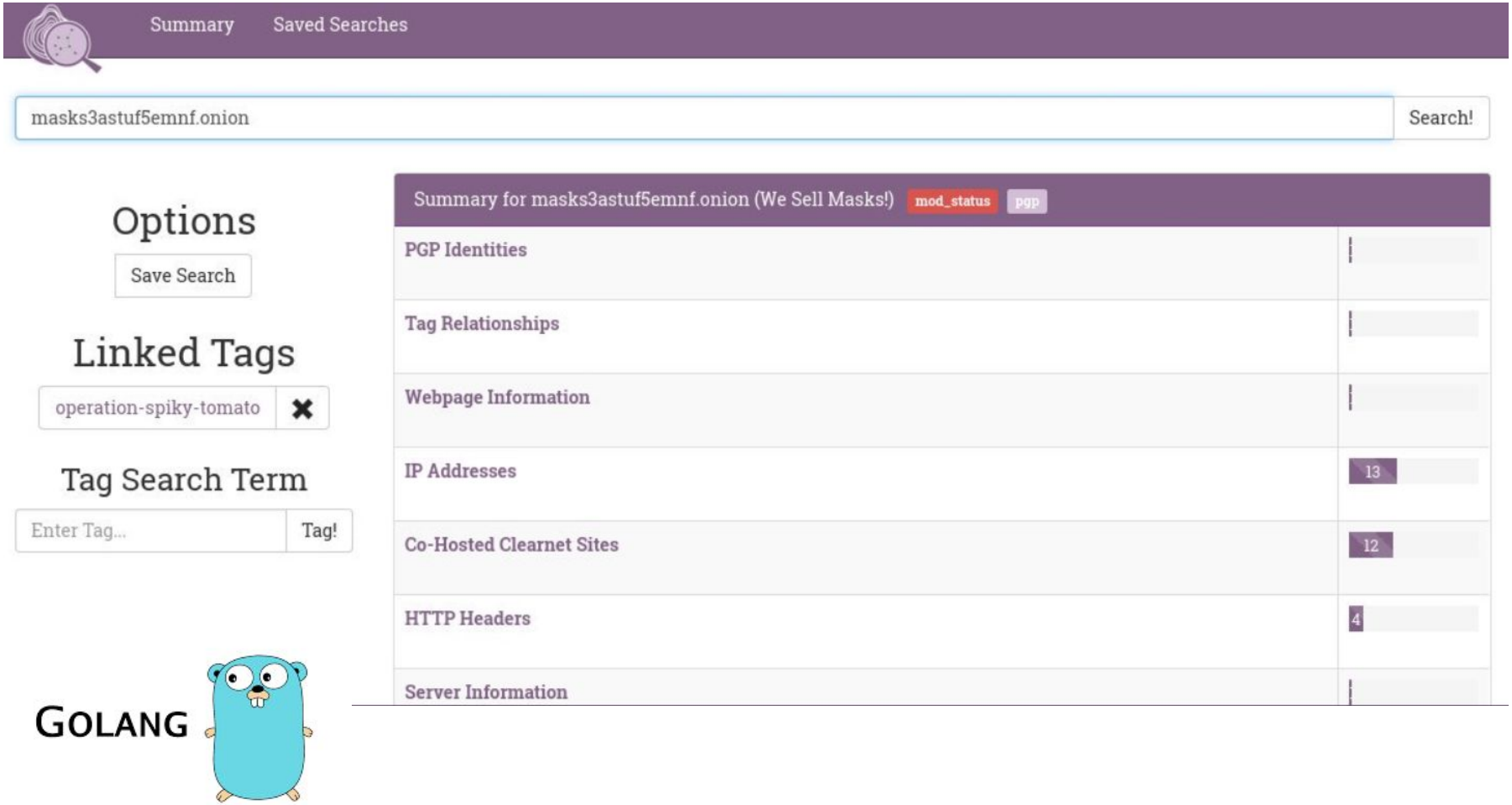
docker-onion-nmap

https://github.com/milesrichardson/docker-onion-nmap

```
$ docker run -e DEBUG_LEVEL=1 --rm -it milesrichardson/onion-nmap -p 80,443 facebookcorewwwi.onion
[tor_wait] Wait for Tor to boot... (might take a while)
[tor_wait retry 0] Check socket is open on localhost:9050...
[tor_wait retry 0] Socket OPEN on localhost:9050
[tor_wait retry 0] Check SOCKS proxy is up on localhost:9050 (timeout 2 )...
[tor_wait retry 0] SOCKS proxy DOWN on localhost:9050, try again...
[tor_wait retry 1] Check socket is open on localhost:9050...
[tor_wait retry 1] Socket OPEN on localhost:9050
[tor_wait retry 1] Check SOCKS proxy is up on localhost:9050 (timeout 4 )...
[tor_wait retry 1] SOCKS proxy UP on localhost:9050
[tor_wait] Done. Tor booted.
[nmap onion] nmap -p 80,443 facebookcorewwwi.onion
[proxychains] config file found: /etc/proxychains.conf
[proxychains] preloading /usr/lib/libproxychains4.so
[proxychains] DLL init: proxychains-ng 4.12

Starting Nmap 7.60 ( https://nmap.org ) at 2019-08-24 14:54 UTC
[proxychains] Dynamic chain  ...  127.0.0.1:9050  ...  facebookcorewwwi.onion:80  ...  OK
[proxychains] Dynamic chain  ...  127.0.0.1:9050  ...  facebookcorewwwi.onion:443  ...  OK
RTTVAR has grown to over 2.3 seconds, decreasing to 2.0
RTTVAR has grown to over 2.3 seconds, decreasing to 2.0
```

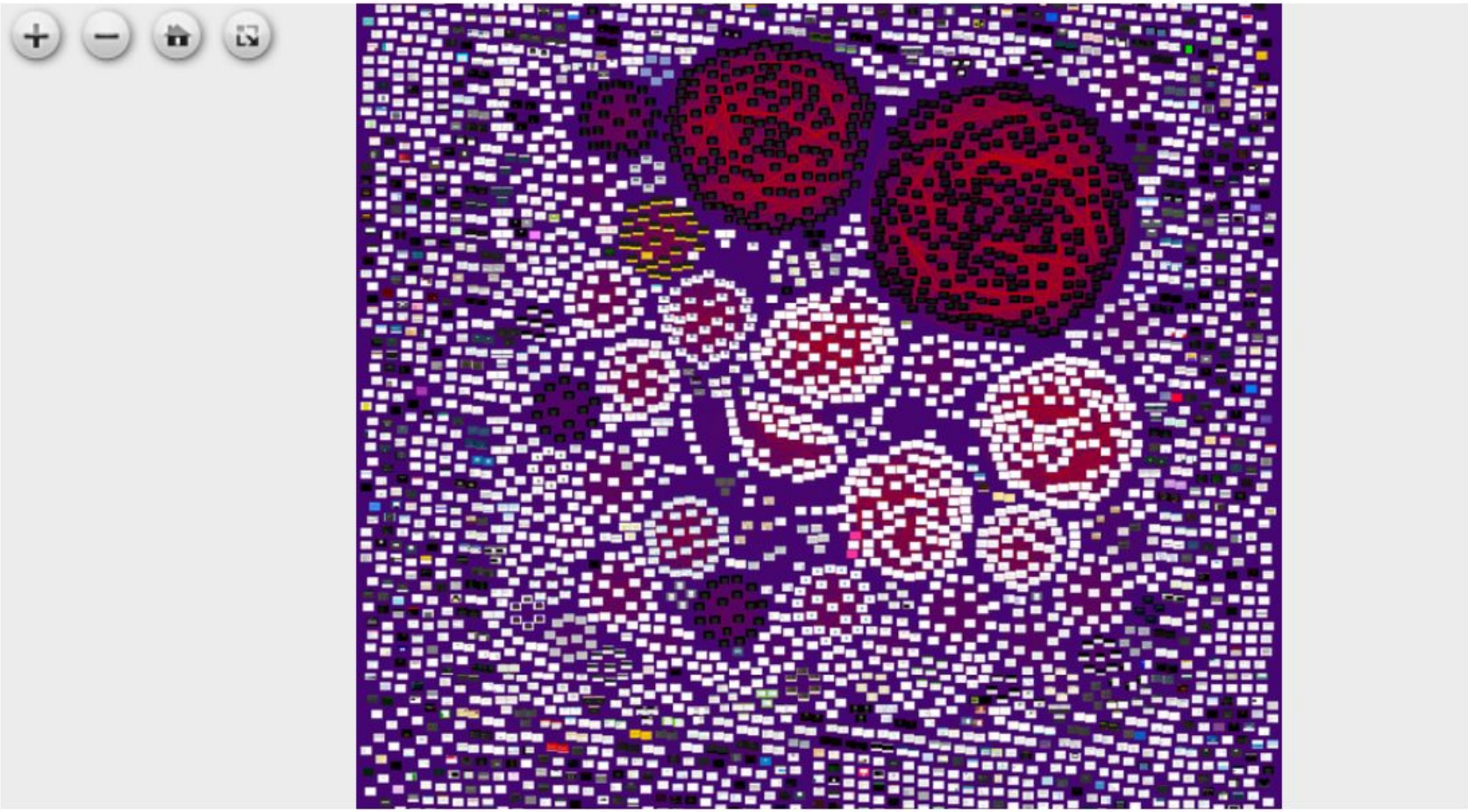
Onion scan

https://github.com/s-rah/onionscan



Dark Web map

https://www.hyperiongray.com/dark-web-map/



GitHub repositories

https://github.com/serfer2/python-deepweb

Table of contents

GitHub repositories

https://github.com/jmortega/python_dark_web

circuit-status.py	Add files via upload	4 months ago
current_descriptors.py	Add files via upload	4 months ago
darkweb_python_hidden_services.pdf	Add files via upload	4 months ago
descriptor_from_tor_data_directory.py	Add files via upload	4 months ago
get_hidden_service_descriptor.py	Add files via upload	4 months ago
hidden_service.py	Add files via upload	4 months ago
info_top_relays.py	Add files via upload	4 months ago
introduction_points.png	Add files via upload	4 months ago
introduction_points.py	Add files via upload	4 months ago
list_circuits.png	Add files via upload	4 months ago