OONI

Internet Censorship Measurements

University of Cape Town, 16th February 2018

WHY MEASURE INTERNET CENSORSHIP?

- It's harder to notice the blocking of less popular sites and services.
- Internet censorship often differs from network to network within a country.
- Most censorship techniques are quite subtle.
- Cases of over-blocking, collateral damage, and censorship leakages.
- The fact that a site or service is inaccessible doesn't necessarily mean that it's blocked by your ISP.

OONI
The Open Observatory of Network Interference

OONI IS
OPEN METHODOLOGIES
OPEN SOURCE SOFTWARE
OPEN DATA
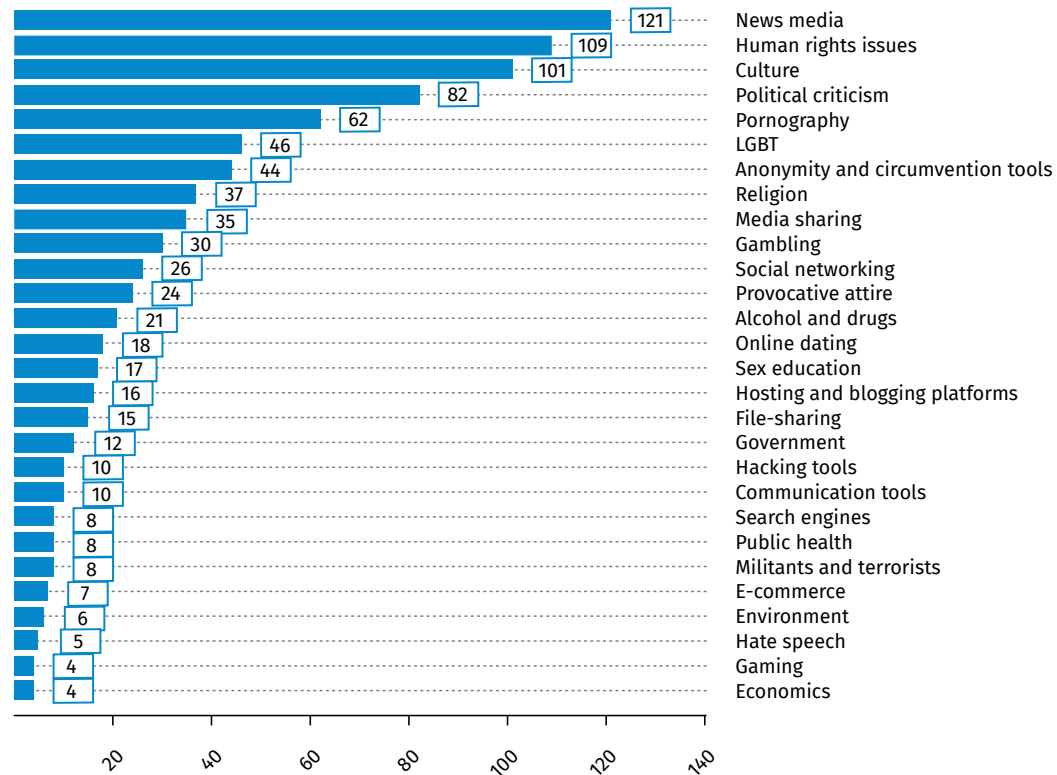## FOR REPRODUCIBLE
RESEARCH!

WhatsApp Blocked

Deep Packet Inspection (DPI) detected

Media outlets, LGBT sites, human rights websites, political opposition sites
& censorship circumvention tool sites found to be blocked

Ethiopia's wave of political protests

December 2016

https://ooni.torproject.org/post/ethiopia-report/

Blocked domains in Iran
From 2014 to 2017

News media — 121
Human rights issues — 109
Culture — 101
Political criticism — 82
Pornography — 62
LGBT — 46
Anonymity and circumvention tools — 44
Religion — 37
Media sharing — 35
Gambling — 30
Social networking — 26
Provocative attire — 24
Alcohol and drugs — 21
Online dating — 18
Sex education — 17
Hosting and blogging platforms — 16
File-sharing — 15
Government — 12
Hacking tools — 10
Communication tools — 10
Search engines — 8
Public health — 8
Militants and terrorists — 8
E-commerce — 7
Environment — 6
Hate speech — 5
Gaming — 4
Economics — 4

September 2017

https://ooni.torproject.org/post/iran-internet-censorship/

At least 25 websites related to the Catalonia Independence Referendum were blocked.

The .cat registry was raided and forced to take down many websites.

Spain

October 2017

OONI SOFTWARE ECOSYSTEM

OONI
Probe

OONI
Run
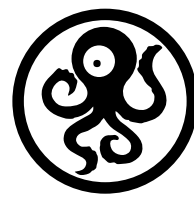
OONI
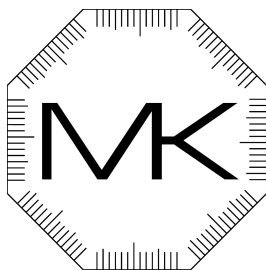Explorer

OONI
Proteus

OONI
Sync

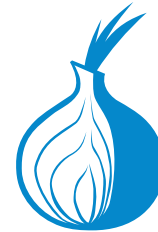**Measurement Kit**

OONI
API

OONI
Pipeline

OONI Software tests
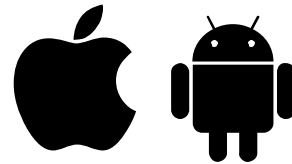

Web Censorship
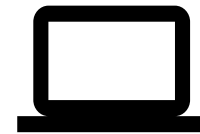

Instant Messaging Apps

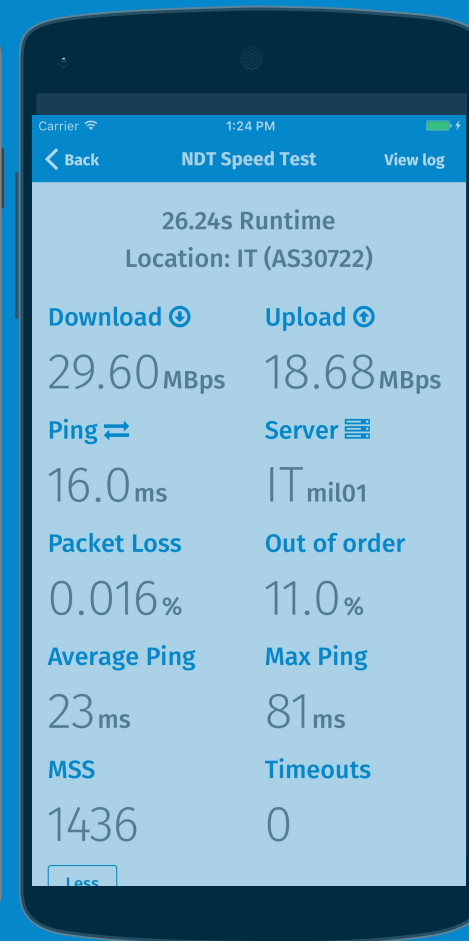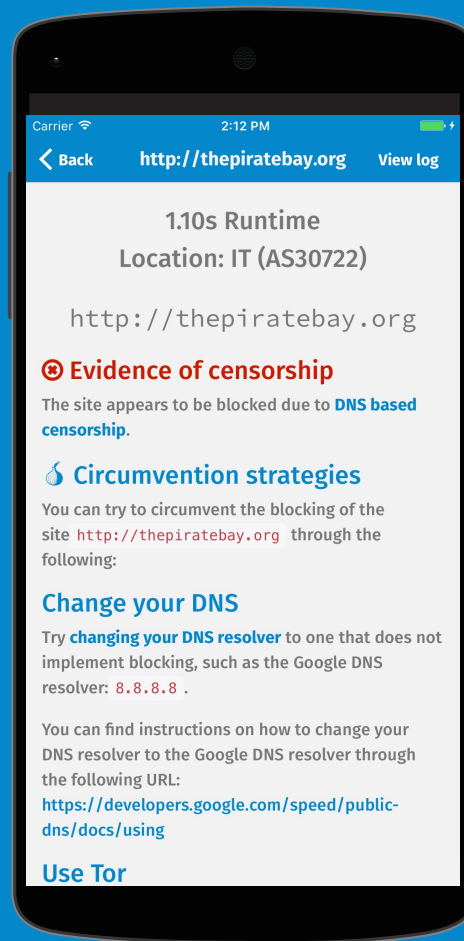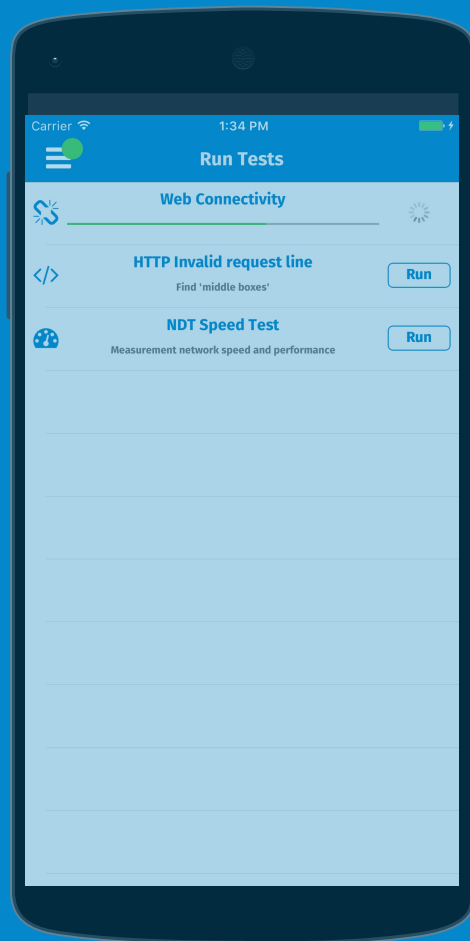
Censorship Circumvention

Middleboxes

Speed & Performance

OONI
Probe

MEASUREMENT APP FOR

Android
iOS

macOS
Linux

Screen 1 — Run Tests

Carrier 1:34 PM

Run Tests

Web Connectivity

HTTP Invalid request line
Find 'middle boxes'
Run

NDT Speed Test
Measurement network speed and performance
Run

Screen 2 — http://thepiratebay.org

Carrier 2:12 PM

Back   http://thepiratebay.org   View log

1.10s Runtime
Location: IT (AS30722)

http://thepiratebay.org

⊗ **Evidence of censorship**

The site appears to be blocked due to **DNS based censorship**.

💧 **Circumvention strategies**

You can try to circumvent the blocking of the site `http://thepiratebay.org` through the following:

Change your DNS

Try **changing your DNS resolver** to one that does not implement blocking, such as the Google DNS resolver: `8.8.8.8` .

You can find instructions on how to change your DNS resolver to the Google DNS resolver through the following URL:

https://developers.google.com/speed/public-dns/docs/using

Use Tor

Screen 3 — NDT Speed Test

Carrier 1:24 PM

Back   NDT Speed Test   View log

26.24s Runtime
Location: IT (AS30722)

Download ⊕   **Upload** ⊕
29.60 MBps   18.68 MBps

Ping ⇄   **Server** ▤
16.0 ms   IT mil01

Packet Loss   **Out of order**
0.016 %   11.0 %

Average Ping   **Max Ping**
23 ms   81 ms

MSS   **Timeouts**
1436   0

Less

OONI Probe Dashboard

ooniprobe 2.2.1-dev | **running** ⊘ | Location: IS (AS47172)

Test Tor	**Test the Web**	**Test Instant Messaging Apps**	**Test for Middle Boxes**
ℹ ⊘ ▶	ℹ ⊘ ▶	ℹ ⟳ ▶	ℹ ⊘ ▶

Last 4 tests

💬 telegram	Dec 23, 2017 3:14 AM	AS47172	IS	⊘
💬 facebook_messenger	Dec 23, 2017 3:14 AM	AS47172	IS	⊘
💬 whatsapp	Dec 23, 2017 3:10 AM	AS47172	IS	⊘
🔥 tcp_connect	Dec 23, 2017 3:05 AM	AS47172	IS	⚠

View your measurements

About OONI   Data policy   Help   Explore data

OPEN DATA

OONI | Pipeline — Provides **evidence** of censorship events

OONI | API — Allows researchers to conduct **independent studies** & to explore other research questions

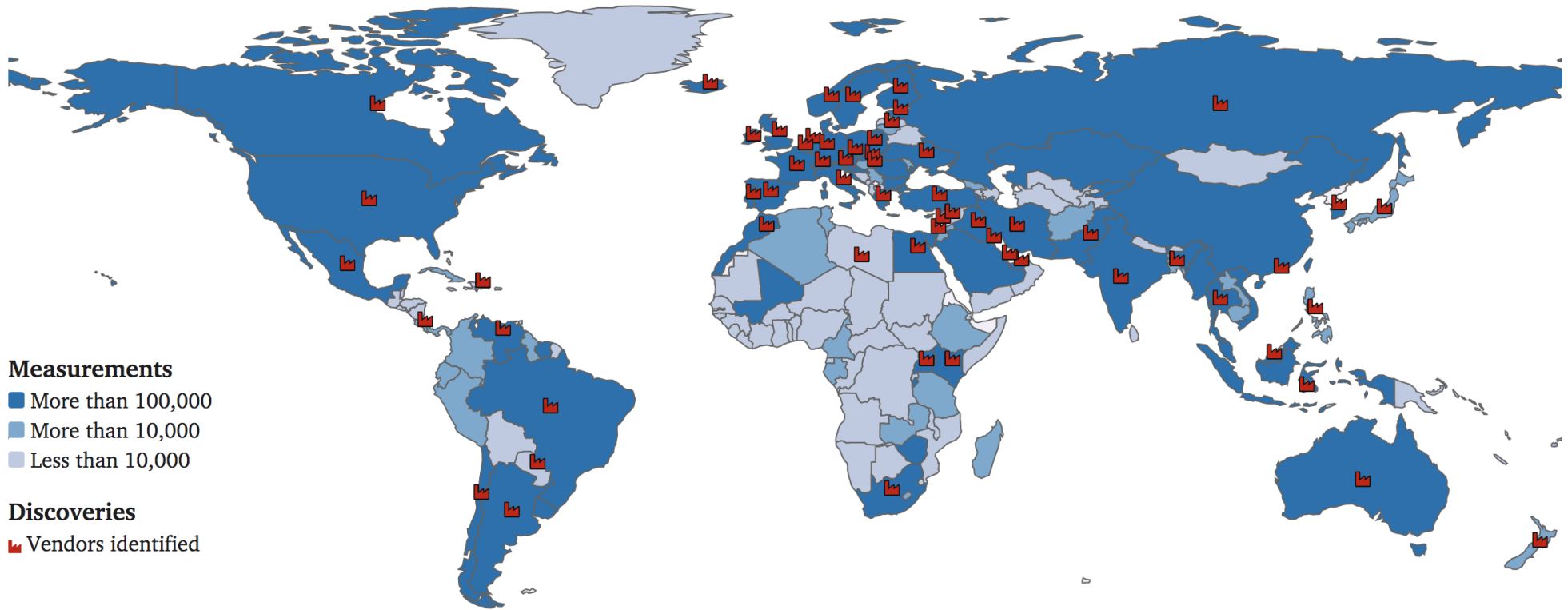**OONI | Explorer** — Allows the public to **verify** our findings

Measurements
- More than 100,000
- More than 10,000
- Less than 10,000

Discoveries
- Vendors identified

Country List

Browse countries to find the one you want to investigate measurements for

Filter Country N...

https://explorer.ooni.io

Afghanistan	24,756 measurements	**Albania**	8,450 measurements
Algeria	36,756 measurements		
Andorra	142	**Angola**	1,848	**Antigua And Barbuda**	47

OONI | API

Welcome to the OONI API

Dynamically updated every day, the OONI API enables researchers and data scientists to analyze all data collected from OONI Probes around the world.

Download and search OONI Probe network measurements.

Join the OONI data analyst community and help uncover internet censorship worldwide!
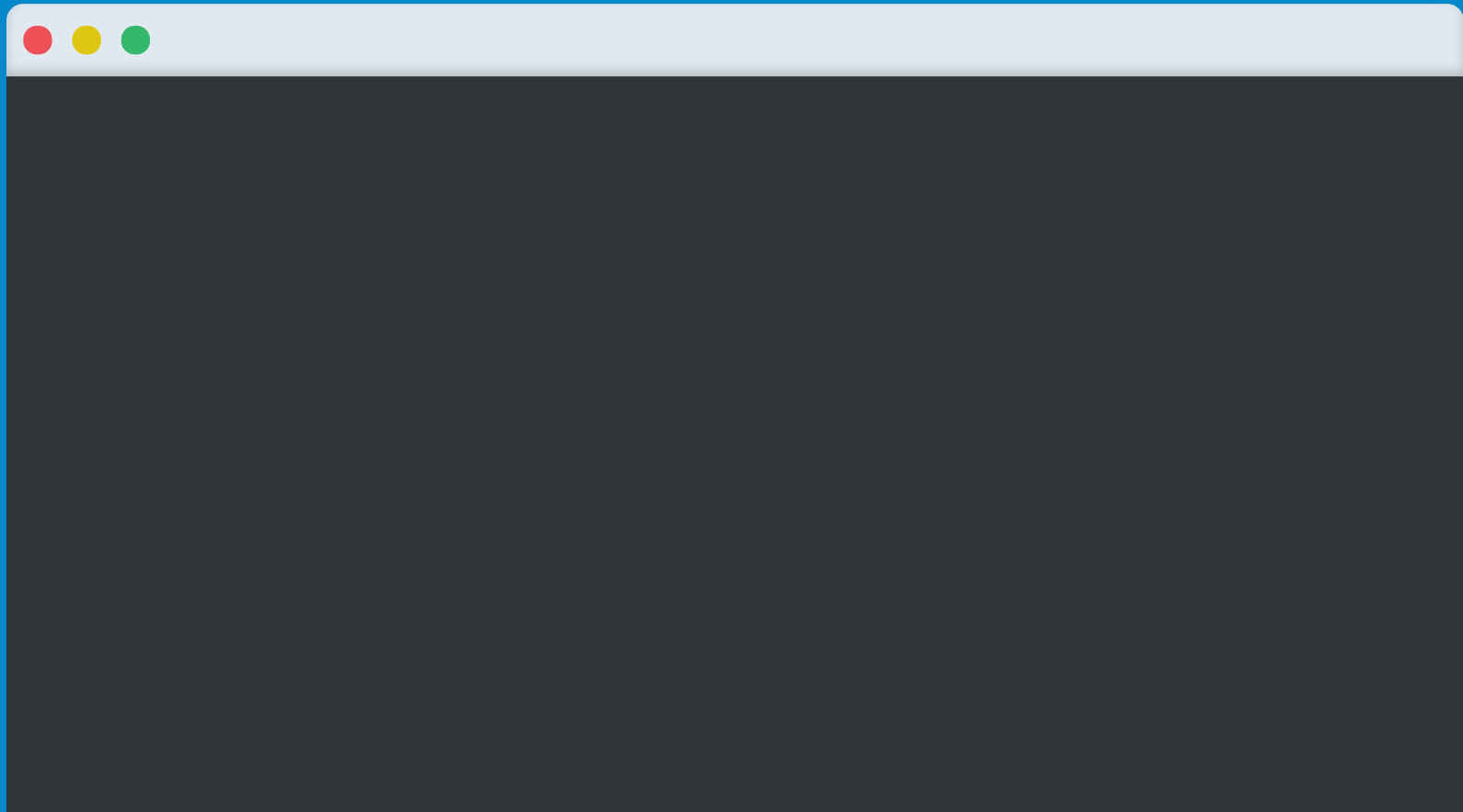
READ THE API DOCS

Latest Measurements

ASN	Country code	Test Start Time	Test Name	
AS9121	TR	2018-01-04 21:32:10	ndt	Download
AS15895	https://api.ooni.io	2017-12-30 05:49:02	ndt	Download
AS15895	UA	2017-12-30 01:46:11	ndt	Download
AS5438	TN	2017-12-29 11:14:18	ndt	Download
AS197207	IR	2017-12-28 16:35:15	ndt	Download
AS4818	MY	2017-12-28 01:59:24	ndt	Download

MINING OONI DATA

https://ooni.torproject.org/post/mining-ooni-data/

OONI-SYNC

https://github.com/thetorproject/ooni-sync

AWS S3

https://aws.amazon.com/cli/
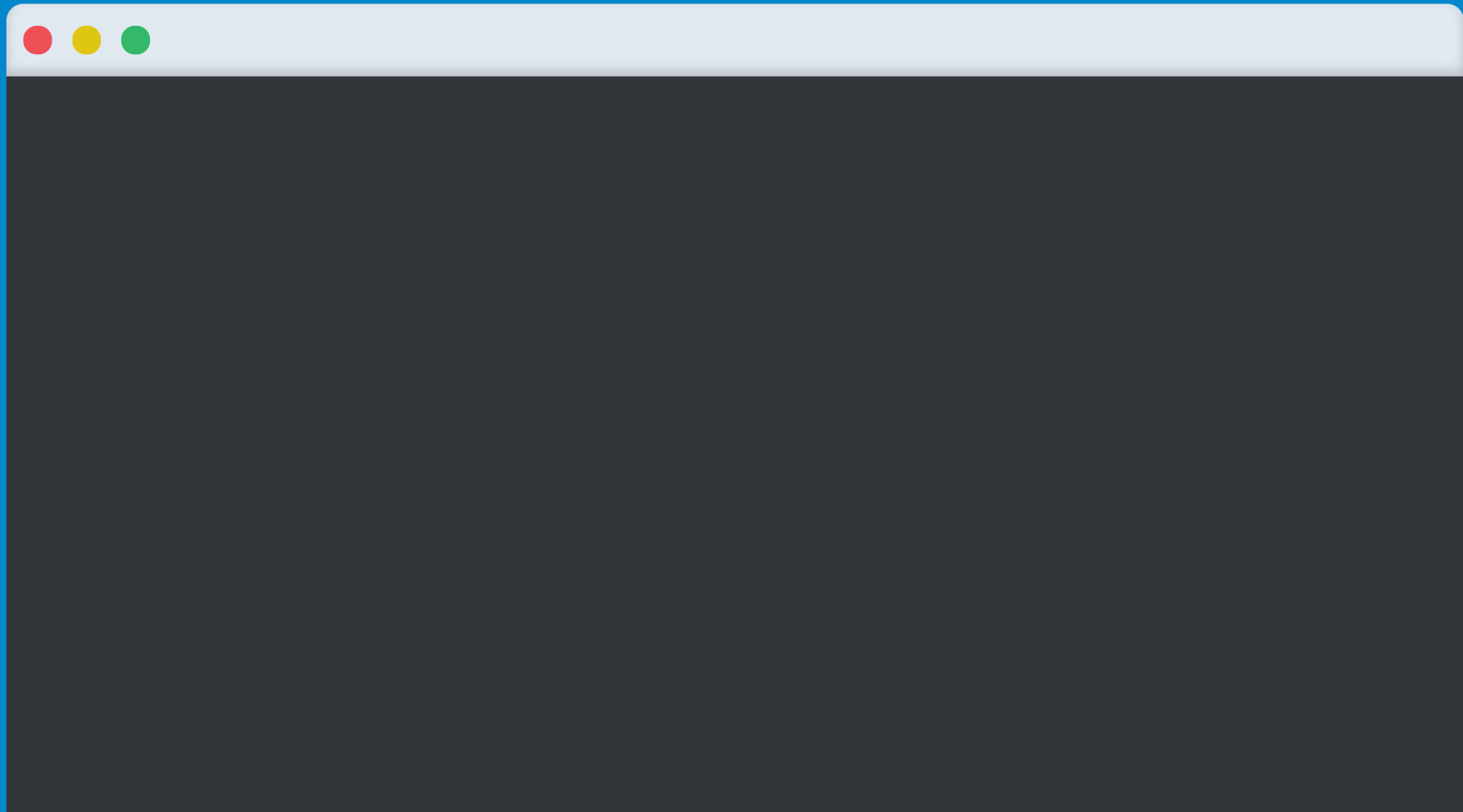
```
11. import requests
12. try:
13.     from urllib.parse import urlparse
14.     from urllib.request import urlopen
15. except ImportError
16.     from urllib import urlopen
17.     from urlparse import urlparse
18.
19. # Date parsing
20. from dateutil.parser import parse as parse_date
21.
22. # For dealing with ASN data (optional)
23. import pyasn
24. import radix
25.
26. # Numpy and pandas
27. import pandas as pd
28. import numpy as np
29.
30. # Dask
31. import dask.bag as db
32. import dask.dataframe as dd
33. from dask.delayed import delayed
34. import dask.multiprocessing
35. from dask.diagnostics import ProgressBar
36.
37. # censys (optional)
38. import censys.ipv4 as censsysipv4
39.
40. MEASUREMENT_DIR = 'data/'
41.
42. import re
43. BLOCKPAGES = [
44.     {
45.         'match': [
```

Essential tools

LEARN MORE

- https://ooni.torproject.org/
- https://api.ooni.io/
- https://explorer.ooni.io/
- Code Example

Contacts

- https://slack.openobservatory.org/
- contact@openobservatory.org