



OONI

**Measuring Internet
filters
and their unexpected
impact**

Leonid Evdokimov
nullcon, Goa, March 2018

WHAT IS INTERNET CENSORSHIP?

Internet Censorship |'ɪntənɛt sɛnsərʃɪp|

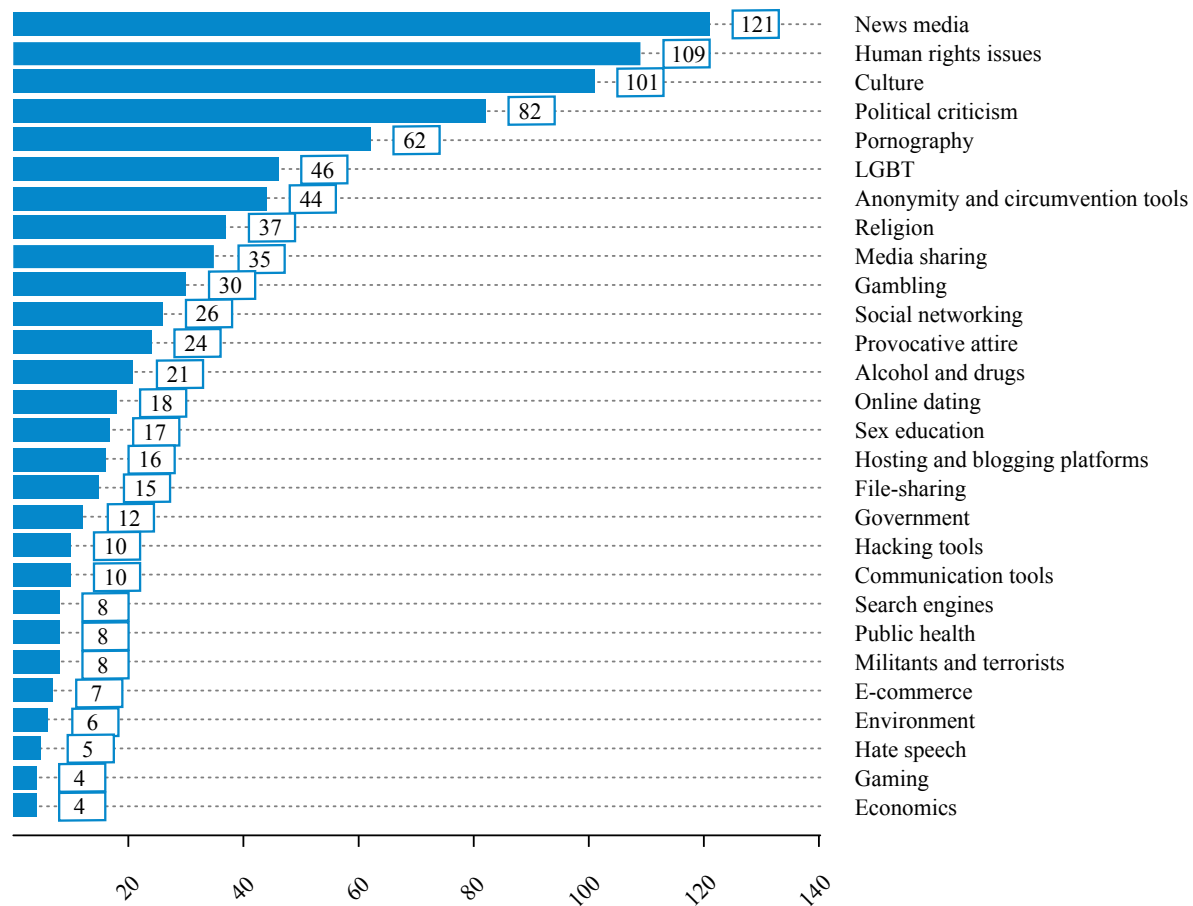
1. a distortion of the reality of the Internet created by those in power.
2. another term for **FILTERNET**.



OONI

The Open Observatory of Network Interference

OONI IS
OPEN METHODOLOGIES
OPEN SOURCE SOFTWARE
OPEN DATA



Blocked domains in Iran

From 2014 to 2017

September 2017

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

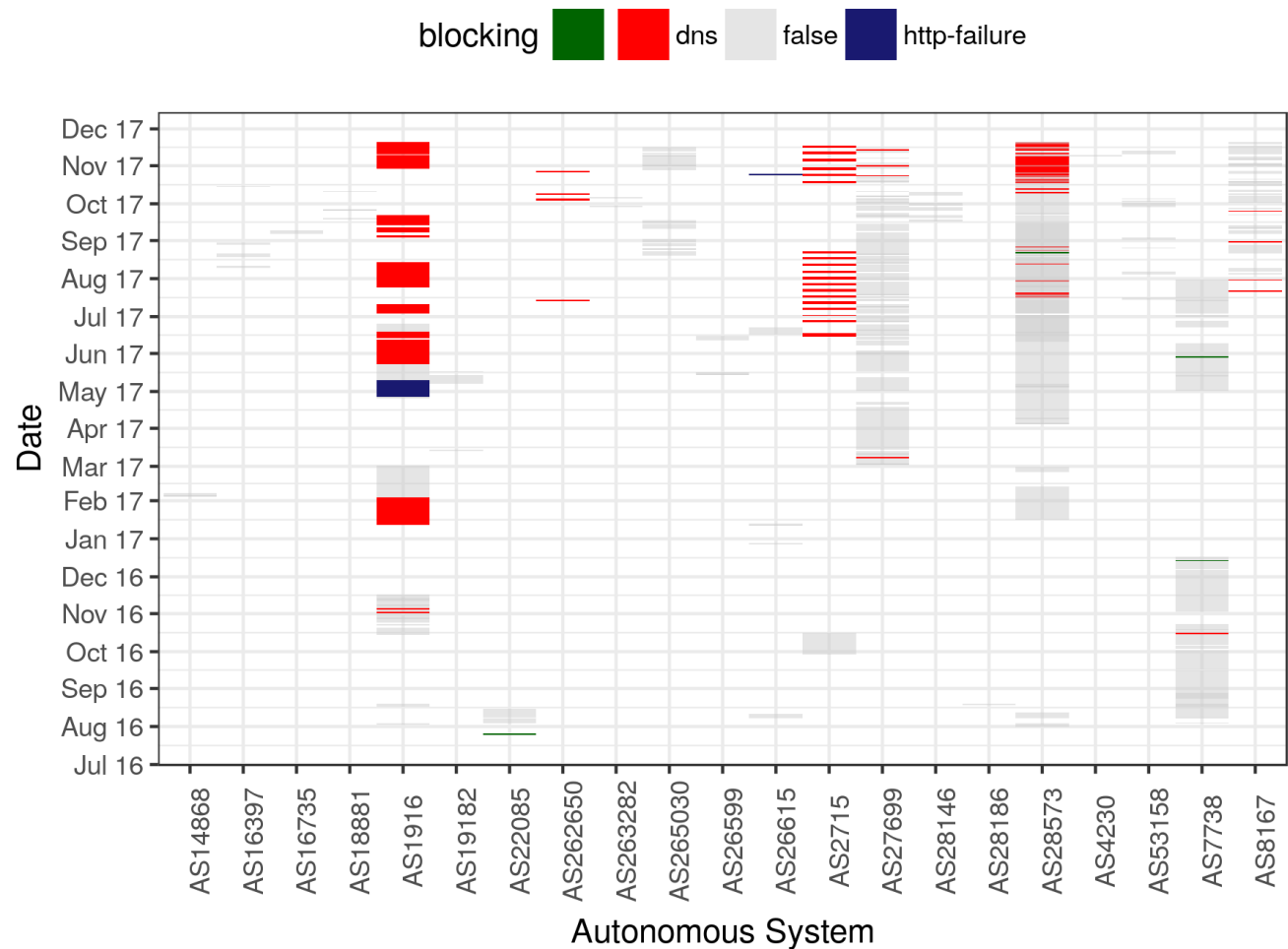
The .cat registry was raided and forced to take down many websites.

Spain

October 2017

ooni.torproject.org/post/internet-censorship-catalonia-independence-referendum

Web connectivity measurements to pernambuco.com



November 2017



WikiLeaks ✓

@wikileaks

Follow



Memo leaked last year from State Department policy chief reveals US human rights playbook currently active in its Iran (but not Saudi) discourse. [politico.com/f/?id=00000160](https://www.politico.com/f/?id=00000160) ...

One useful guideline for a realistic and successful foreign policy is that allies should be treated differently -- and better -- than adversaries. Otherwise, we end up with more adversaries, and fewer allies. The classic dilemma of balancing ideals and interests is with regard to America's *allies*. In relation to our competitors, there is far less of a dilemma. We do not look to bolster America's adversaries overseas; we look to pressure, compete with, and outmaneuver them. For this reason, we should consider human rights as an important issue in regard to US relations with China, Russia, North Korea, and Iran. And this is not only because of moral concern for practices inside those countries. It is also because pressing those regimes on human rights is one way to impose costs, apply counter-pressure, and regain the initiative from them strategically.

2:30 PM - 2 Jan 2018

twitter.com/statuses/948320651407962112

**OONI
SOFTWARE
ECOSYSTEM**



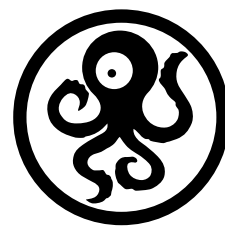
OONI

Probe



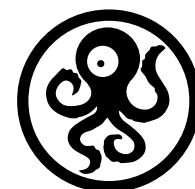
OONI

Run



OONI

Explorer



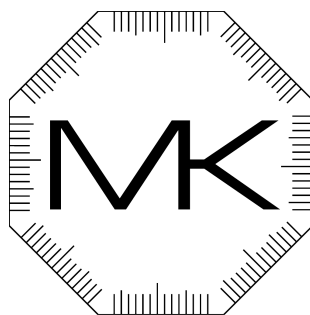
OONI

Proteus

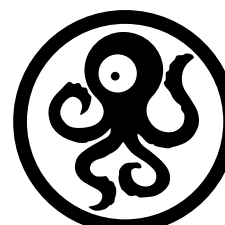


OONI

Sync

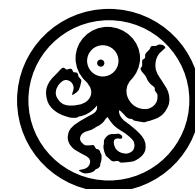


Measurement Kit



OONI

API



OONI

Pipeline

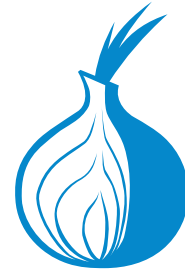
OONI Software tests



Web Censorship



**Instant Messaging
Apps**



**Censorship
Circumvention**



Middleboxes



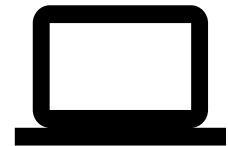
Speed & Performance



OONI

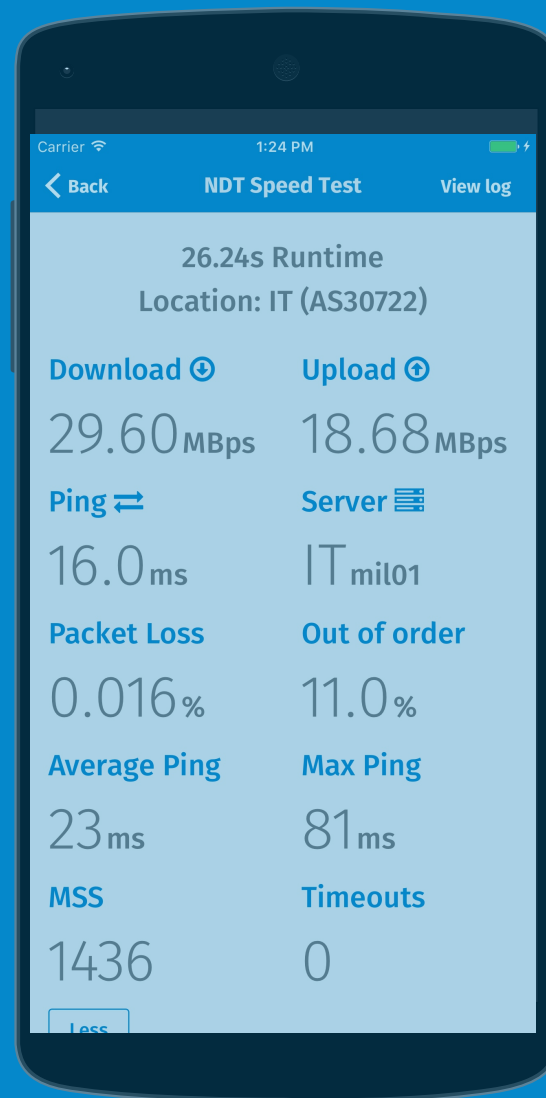
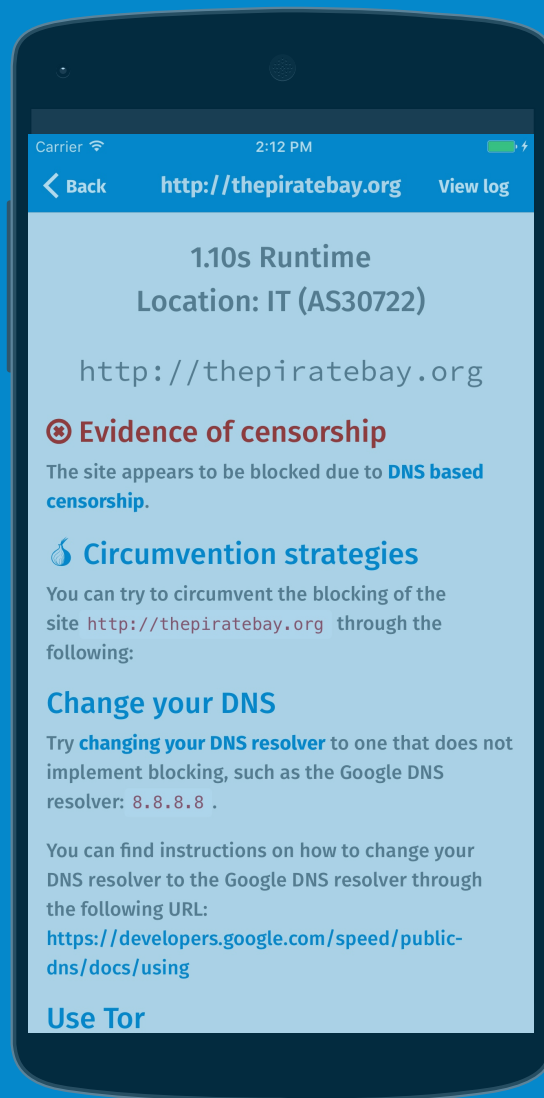
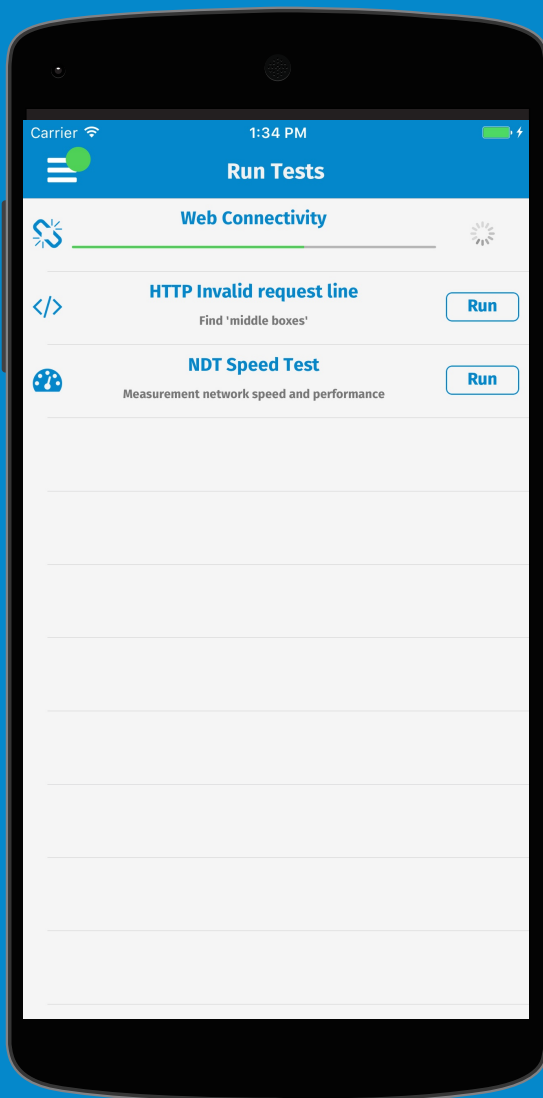
Probe

MEASUREMENT APP FOR



Android
iOS


macOS
Linux






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



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



Let's fight internet censorship together!

Test Name

Internet Censorship

- ☒ Web Connectivity
Check if websites are blocked.
[Learn how this test works here](#)

Speed & Performance

- ☐ NDT Speed Test
☐ DASH Video Streaming

Middleboxes

- ☐ HTTP Invalid Request Line
☐ HTTP Header Field Manipulation.

What you can do

Generate a link and share it with your friends and contacts around the world. Encourage them to run OONI Probe to test the sites of your choice!

URLs

http://



+ Add URL

GENERATE

<https://run.ooni.io>

OPEN DATA

 **OONI** | Pipeline

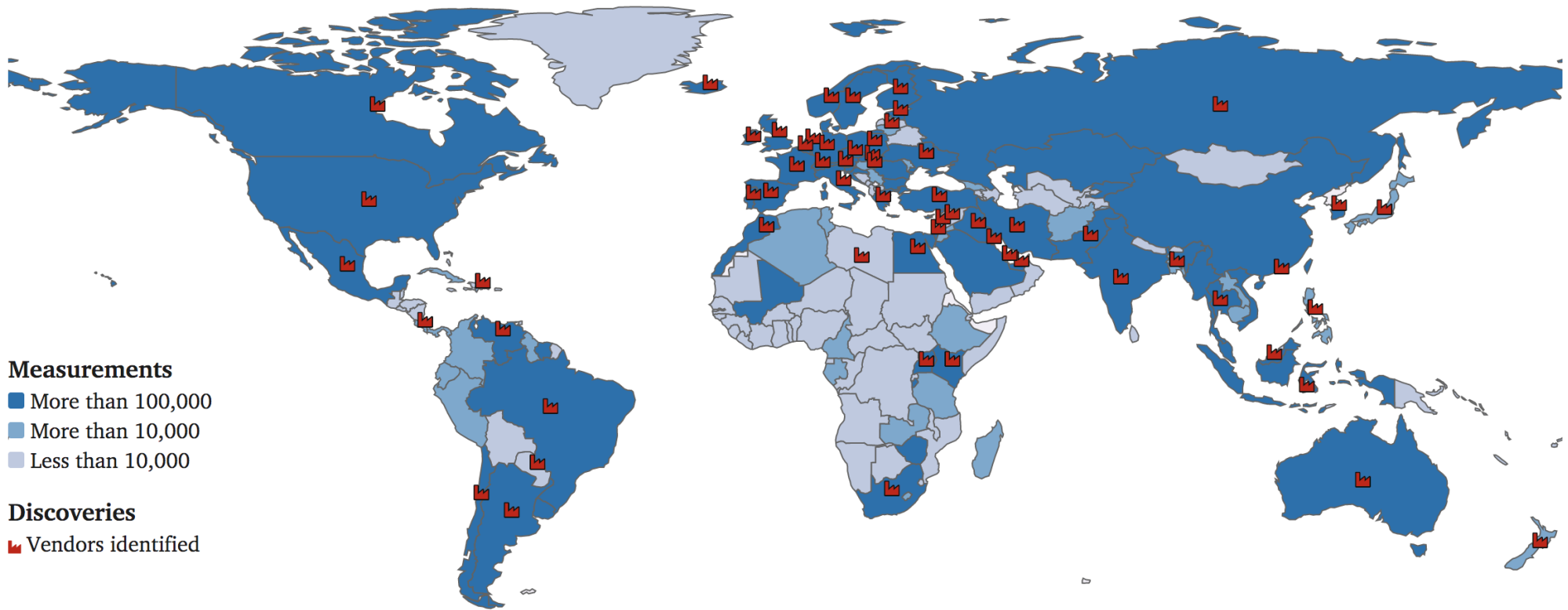
Provides **evidence** of
censorship events

 **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 Name:

<https://explorer.ooni.io>



Afghanistan

measurements

8,450

measurements



Algeria

36,756

measurements



Andorra

142



Angola

1,848



Antigua And Barbuda

47



[Files](#) [API docs](#) [Statistics](#)

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		2017-12-30 05:49:02	ndt	Download
AS15895		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

<https://api.ooni.io>

GO RAW!

Mining OONI data

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

**READ THE
SOURCE
LUKE**



**What's wrong with
INTERNET
CENSORSHIP?**

HTTPS throttled, AlexaTop50 adult websites serving malware.
Users complaining for months.

Unauthorised access? Corrupt sysadmin?

Egypt

Autumn 2016

ooni.torproject.org/post/egypt-network-interference

Certificate Hierarchy

▾ DigiCert High Assurance EV Root CA
 ▾ DigiCert SHA2 High Assurance Server CA
 *.wikipedia.org

Certificate Fields

<input type="checkbox"/>	Certificate Basic Constraints
<input type="checkbox"/>	Certificate Key Usage
<input type="checkbox"/>	Extended Key Usage
<input checked="" type="checkbox"/>	Authority Information Access
<input type="checkbox"/>	CRL Distribution Points
<input type="checkbox"/>	Certificate Policies
<input type="checkbox"/>	Certificate Subject Key ID
<input type="checkbox"/>	Certificate Authority Key Identifier
<input type="checkbox"/>	Certificate Signature Algorithm

Field Value

Not Critical
OCSP: URI: <http://ocsp.digicert.com>

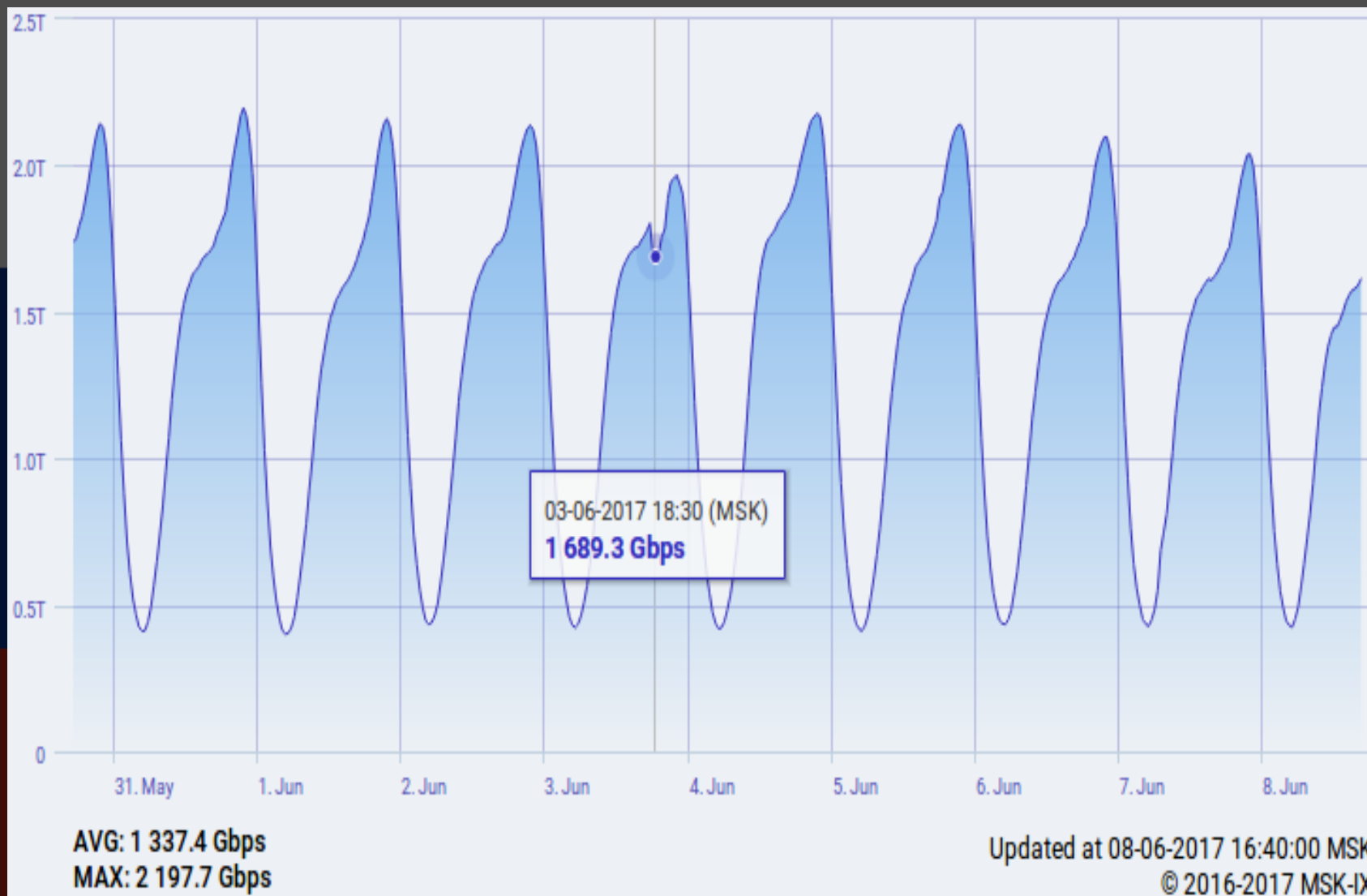
October 2016

Prosecutor's experts try to ban gambling app endpoints
Probably, enumerating them with network sniffer...

Digicert OCSP responders are gone

Chrome and Firefox lag, Safari can't access wikipedia & facebook at all

October 2016



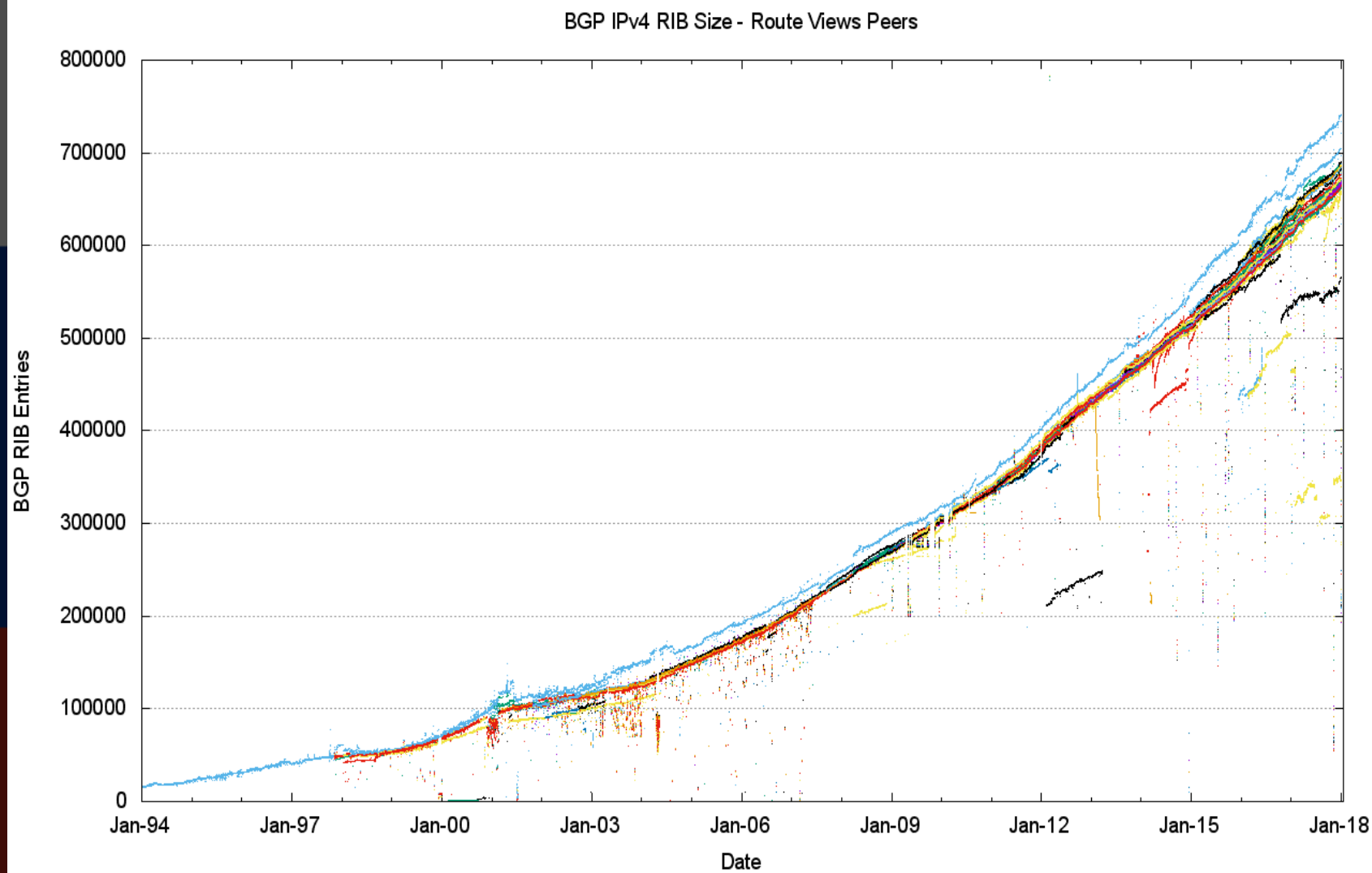
June 2017

Hacktivists added *some* IPs from MSK-IX-NET as A records of blacklisted domain

Filtering /32 routes appeared at borders...

8% of traffic is gone

June 2017



Geoff Huston, APNIC Labs

~600 domains for "entity" like Grani, BaltBet or ZenitBet
(or ~3900 available expired domains per [Phil Kulin's stats](#))

× 4093 A DNS RRs per domain name

≈ 2.5M /32 routes in RIB and, maybe, TCAM

OONI IS
OPEN METHODOLOGIES
OPEN SOURCE SOFTWARE
OPEN DATA
LOTS OF FUN!

LEARN MORE

- ooni.torproject.org
- api.ooni.io
- explorer.ooni.io

Contacts

- slack.openobservatory.org
- contact@openobservatory.org