A Brief Overview of the Censorship Arms Race

Diogo Barradas

BarcampLx #2

State-Level Censorship

- What are the motivations?

- Who is involved?

- How is it performed?

- How can it be evaded?

A case against "Internet chaos"

13:34 27 Dec 2017

Vietnam censors to fight 'internet chaos'

Local media reports the People's Army has hired more than 10,000 people to tackle "wrongful views".

Read more >

Russia begins blocking access to Telegram

⊘ TUE, APR 17, 2018 - 7:00 AM

No Justification for Spanish Internet Censorship During Catalonian Referendum
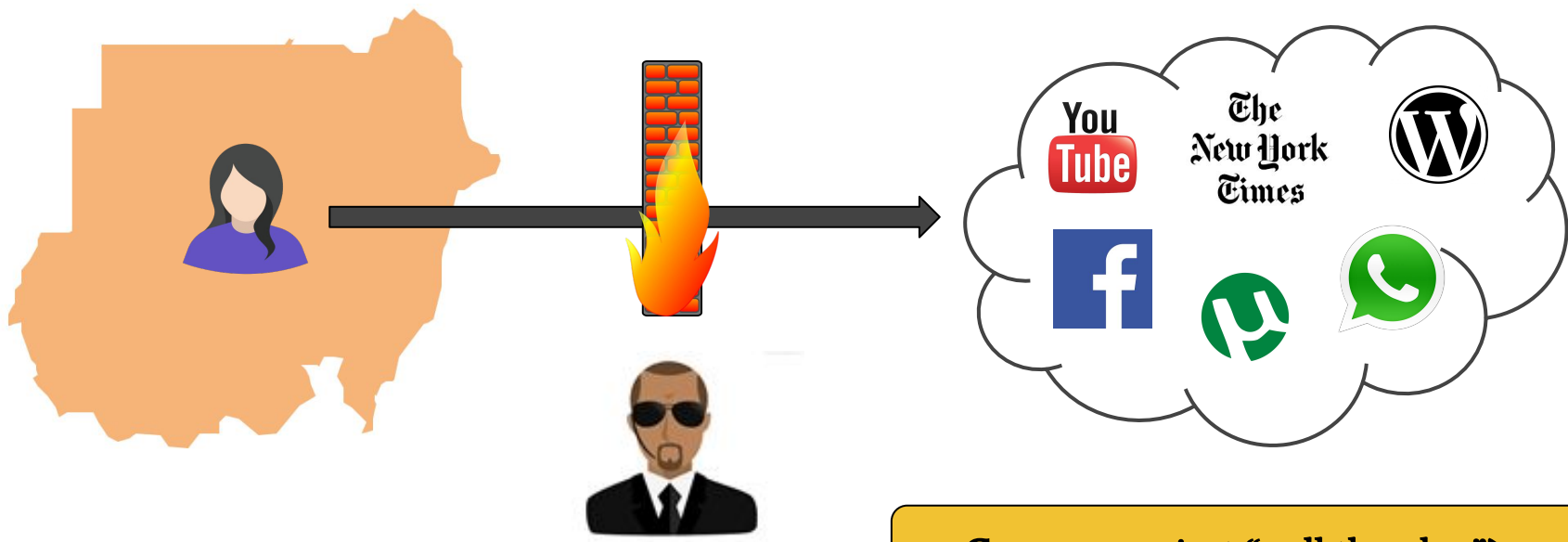
BY JEREMY MALCOLM | OCTOBER 2, 2017

June 25, 2018

After John Oliver's Jokes About Xi Jinping, China Blocks HBO Website

A week after Mr. Oliver mocked China's president, the authorities there have taken additional strides to block him on the internet.

By TIFFANY MAY and OLIVIA MITCHELL RYAN
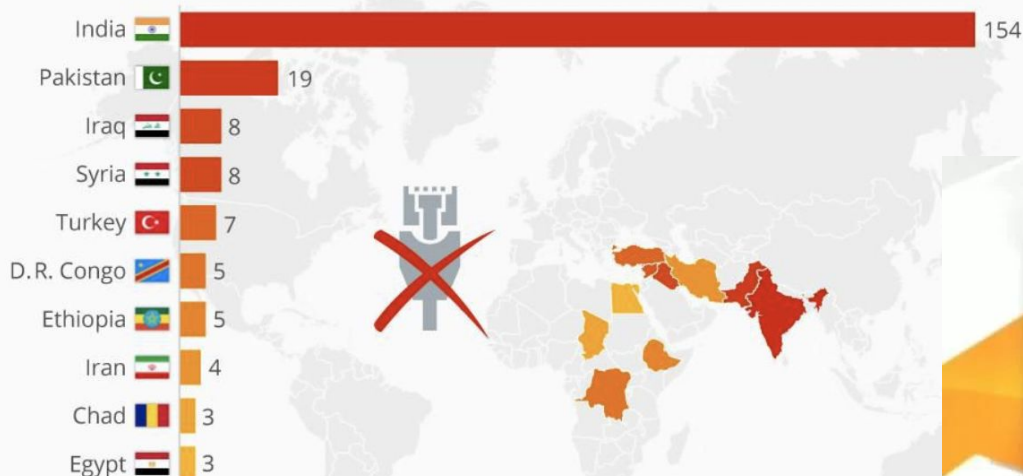
The typical state-level censorship scenario

Can censors just "pull the plug"?

Well... they can. And they do pull the plug!

The Countries Shutting Down The Internet The Most
Number of internet shutdowns by country (Jan 2016–May 2018)*

Country	Shutdowns
India	154
Pakistan	19
Iraq	8
Syria	8
Turkey	7
D.R. Congo	5
Ethiopia	5
Iran	4
Chad	3
Egypt	3

* An internet shutdown occurs when someone (usually the government) intentionally disrupts the internet or mobile apps to control what people say or do.

@StatistaCharts   Source: Access Now via Vice News

Forbes stati

NEWS / ALGERIA

Algeria and Iraq shut down internet to prevent exam cheating

EGYPT'S INTERNET SHUTDOWN
THE DRAMATIC DROP IN INTERNET TRAFFIC

Source: Arbor Networks

RICAN MORN   **GETTING OUT THE WORD IN EGYPT**
Google offers voice-tweeting service   CNN
UPDATE Be a CNN insider @ Facebook.com/CNN   5:29 AM

But at a cost...

> "As a result of the government's Internet shutdown during exams, I lost a job opportunity with an international company because I missed the Skype interview."

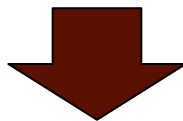**Riyadh, Marketer from Algeria**

#NoExamShutdowns
#Algeria
#KeepItOn

> "I used to work for an online TV channel in Syria. During national exams each year the government would shut the communication services down, which crippled our work and delayed the publishing of our reports and programs."

Ali, a journalist from Syria

#NoExamShutdowns
#Syria
#KeepItOn

Citizen backlash contributes to government unpopularity

A <u>steep</u> cost...

The Internet and communications infrastructure is a key platform to conduct business, connect people and provide government services. The Egyptian government has taken great steps in the past years to develop and promote the use and uptake of technologies. But the current shutdown of Internet and communications services for five days will have a pronounced economic impact. It is estimated to have incurred direct costs of at minimum USD 90 million. This amount refers to lost revenues due to blocked telecommunications and Internet services, which account for around USD 18 million per day, or, on a yearly scale, for roughly 3-4% of GDP.

January 2011

OECD
BETTER POLICIES FOR BETTER LIVES

Country's sustainability is jeopardized

How can censors block selected information flows?

Deep Packet Inspection

HTTP Request Header

Request URL: http://www.nytimes.com/2018/06/21/world/asia/john-oliver-china-ban.html

Request Method: GET

Status Code: 🟢 200

Remote Address: 151.101.1.164:443

Webpage Content
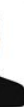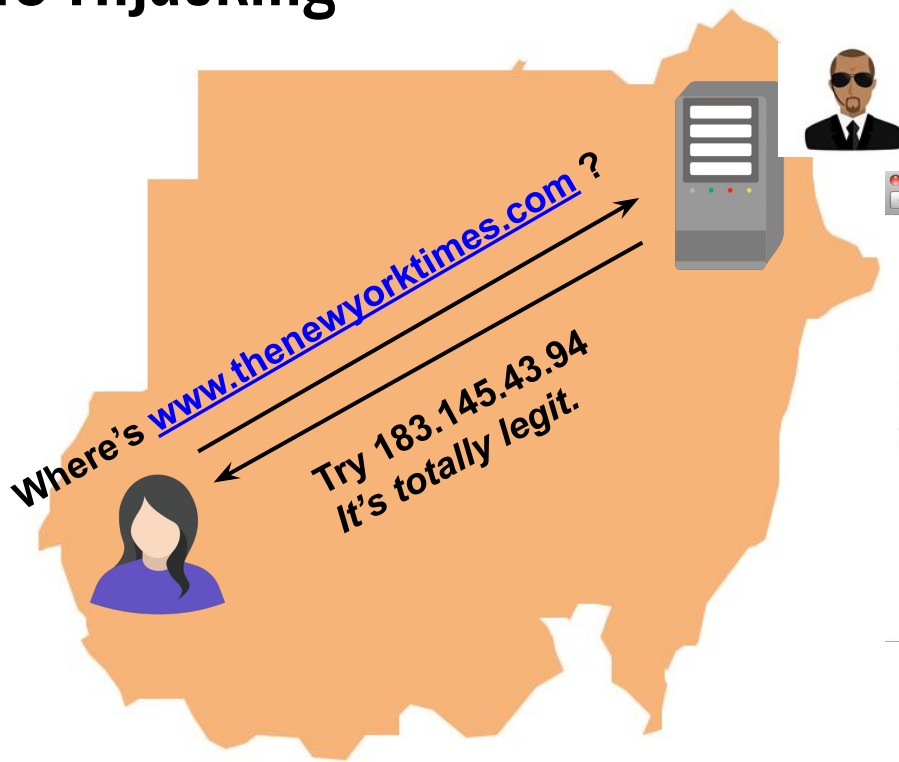
```
class="css-1572rug"><div class="css-18sbwfn StoryBodyCompanionColumn"><div class="css-4w7y5l"><p class="css-
1xl4flh e2kc3sl0">HONG KONG — In a 20-minute segment about China that aired Sunday on the satirical news show
"Last Week Tonight," the host John Oliver brought up President Xi Jinping's <a class="css-1g7m0tk"
href="http://www.nytimes.com/2017/07/17/world/asia/china-winnie-the-pooh-censored.html?module=inline"
title="">resemblance to Winnie the Pooh</a>.</p><p class="css-1xl4flh e2kc3sl0">That, among other delicate
references, seems to have touched a nerve in China, where the British comedian has now been censored on a major
social media platform — just as the cartoon bear had been.</p><p class="css-1xl4flh e2kc3sl0">"Apparently, Xi
Jinping is very sensitive about his perceived resemblance to Winnie the Pooh," Mr. Oliver said on the show.
```

DNS Hijacking

Where's www.thenewyorktimes.com ?

Try 183.145.43.94
It's totally legit.

Censor Site

http://www.censor.qa/

Google

This Site has been Blocked

The webpage you are trying to access has been blocked by **Internet Qatar** as the content contains materials which are prohibited in the State of Qatar.

If you feel this is an error then please email us at **customer.service@qtel.com.qa** or contact our **Help Desk at 111.**

Regards,
Internet Qatar

الصفحة التي تحاول الوصول إليها تم إغلاقها بواسطة **إنترنت قطر** لأنها تحتوي على مواد ممنوعة في دولة قطر.

إذا كنت ترى أن هناك خطأ تفضل بالكتابة إلينا على العنوان التالي: **customer.service@qtel.com.qa**

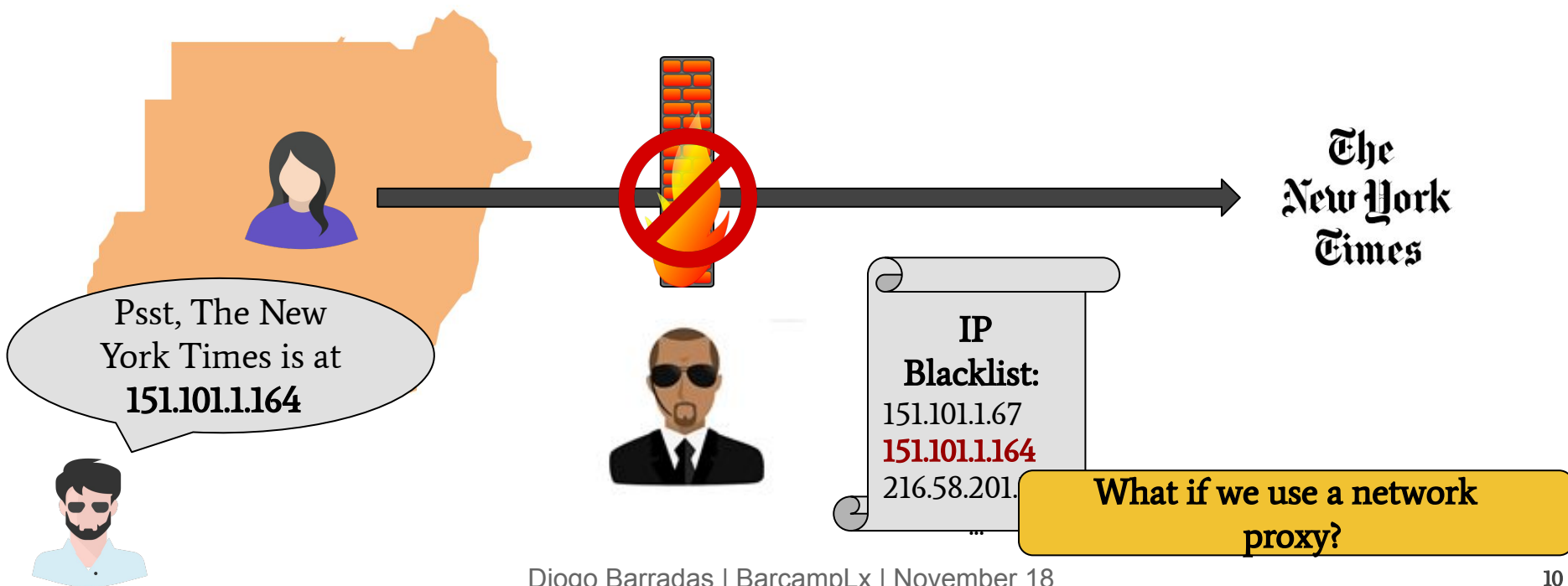أو الاتصال بنا على خط المساعدة رقم : **111.**

مع أطيب التمنيات
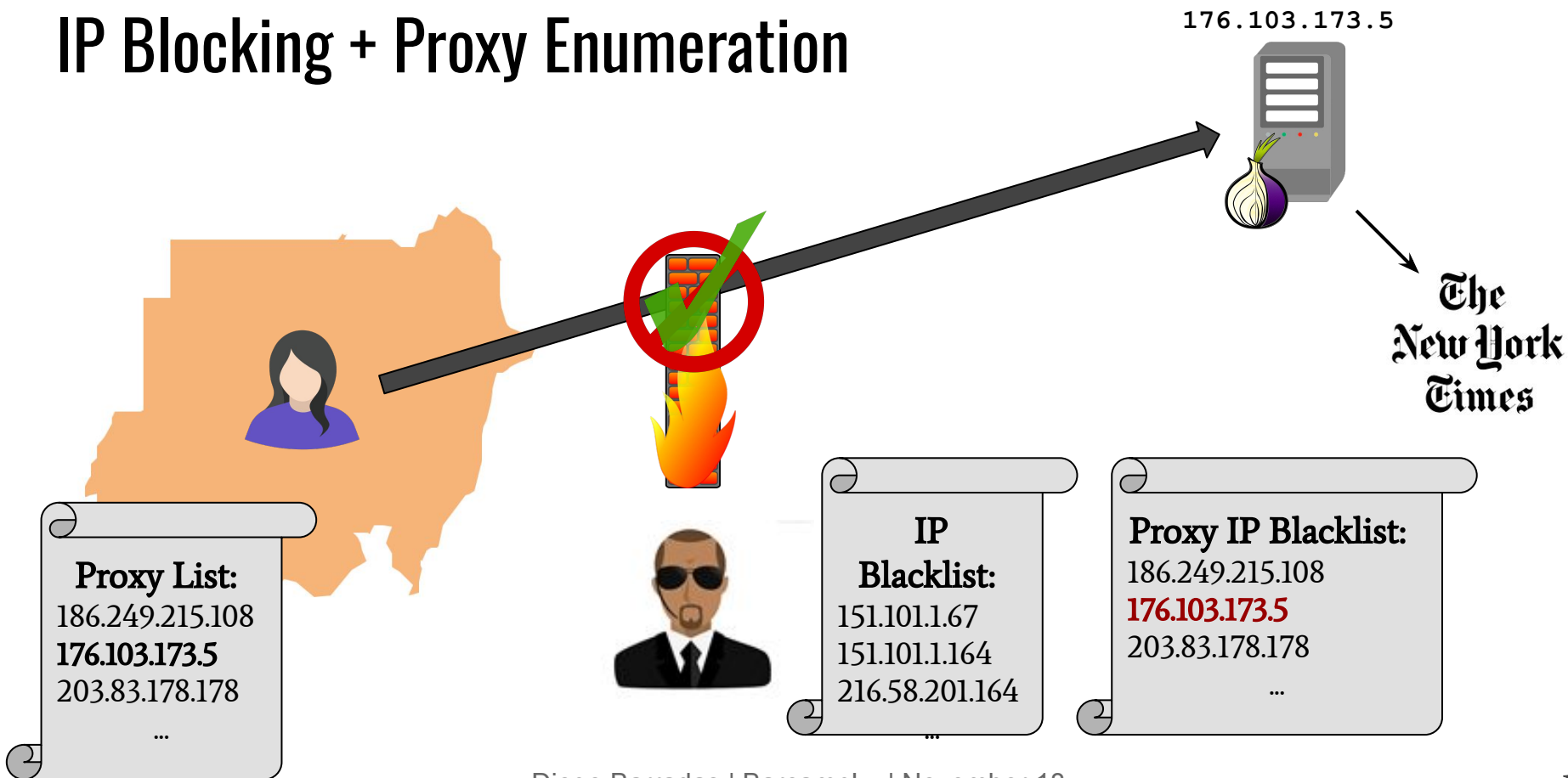إنترنت قطر

What if we know the true IP address?

IP Blocking

IP Blocking + Proxy Enumeration

176.103.173.5

Proxy List:
186.249.215.108
176.103.173.5
203.83.178.178

...

IP Blacklist:
151.101.1.67
151.101.1.164
216.58.201.164

...

Proxy IP Blacklist:
186.249.215.108
176.103.173.5
203.83.178.178

...

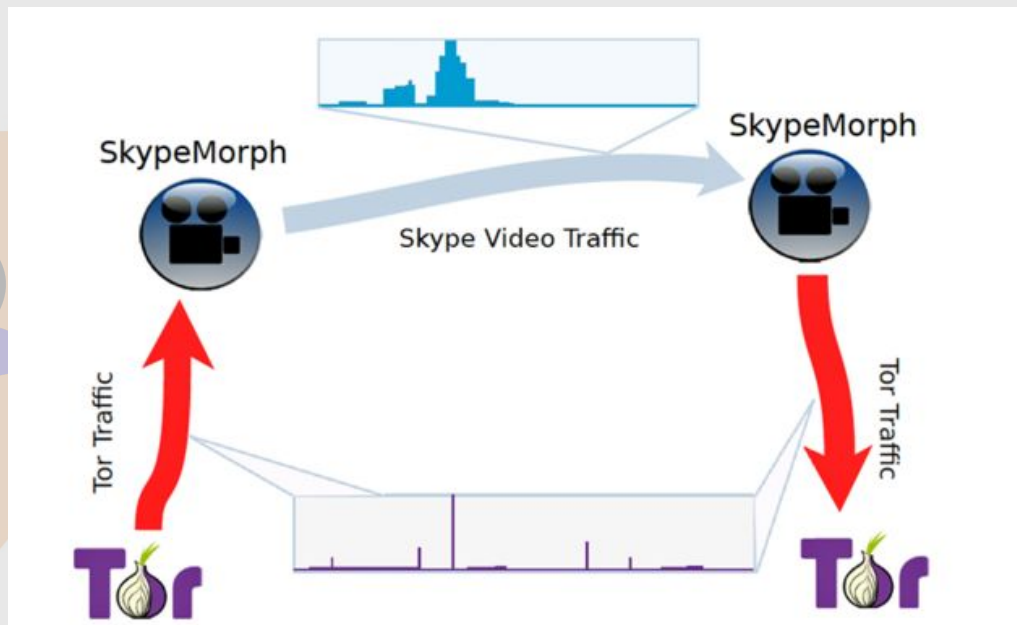The New York Times

So... Like... Are we doomed?

Not at all!

Network covert channels!

Disclaimer: There are <u>a lot</u> more designs :)

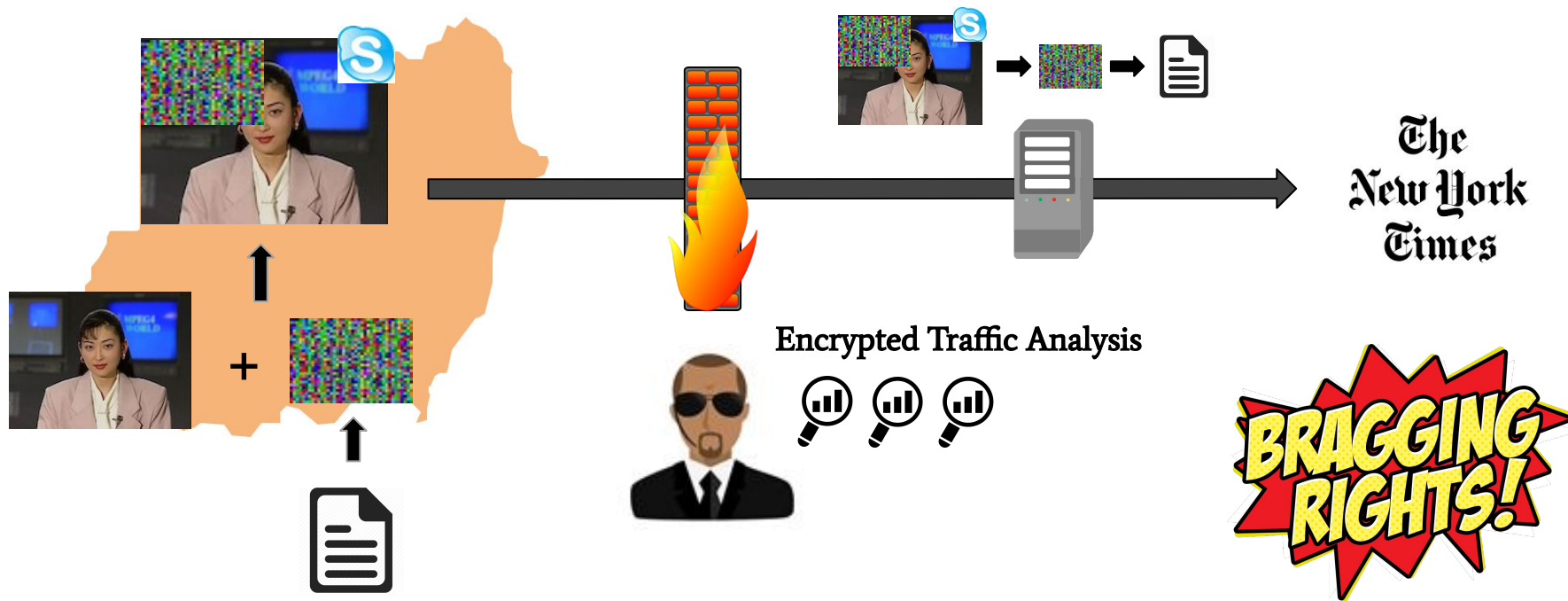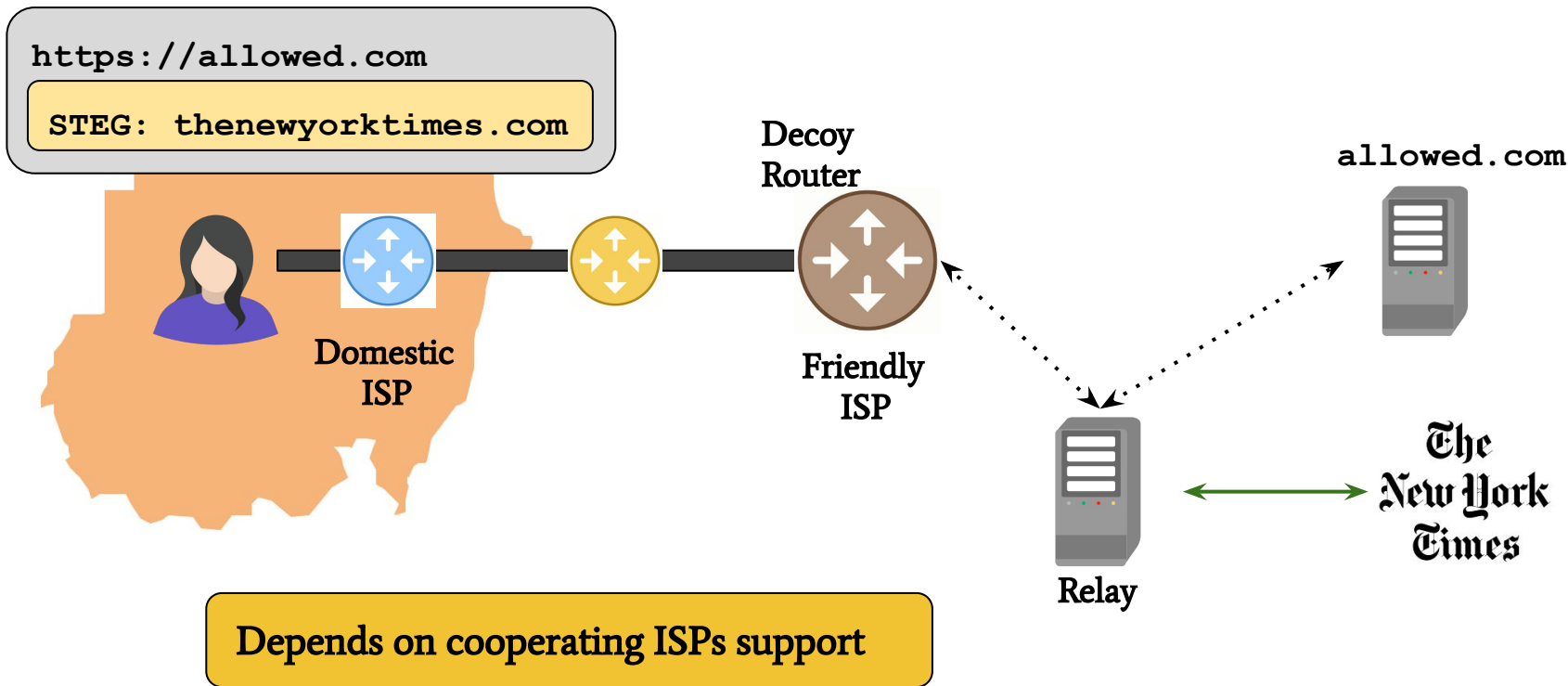# Protocol Mimicking - *SkypeMorph*

Perfect mimicking is hard!
What if we use the protocol itself?

Protocol Tunneling - *DeltaShaper*

Encrypted Traffic Analysis

Decoy Routing - *Slitheen*

`https://allowed.com`

`STEG: thenewyorktimes.com`

Decoy Router

Domestic ISP

Friendly ISP

allowed.com

Relay

The New York Times

Depends on cooperating ISPs support

Recap

- Repressive regimes rely on Internet censorship
  - Prevent citizens from exercising civilian rights
  - Block selected content deemed inappropriate

- The sophistication of censorship techniques is escalating
  - From simple DNS Hijacking to complex encrypted traffic analysis

- We're living in a cat-and-mouse game
  - Many proposals for covert channels designs
  - Censors are forced to keep up the pace, not the other way around

Thank You!

Grab a drink and let's talk!

🐦 **@dmbb_93**

🌐 `https://web.ist.utl.pt/diogo.barradas`

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