



**PADERBORN
UNIVERSITY**



PROJECT GROUP 2023 | SYSTEM SECURITY

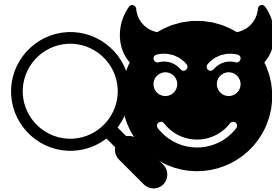
BANC

BUILDING A NETWORK CENSOR

ENTRY PRESENTATION

Niklas Niere – 06.02.2022

Assumption

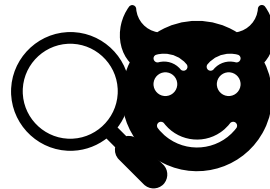


User



twitter.com

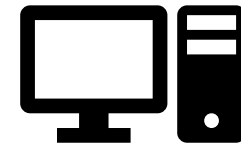
HTTP Censorship




User

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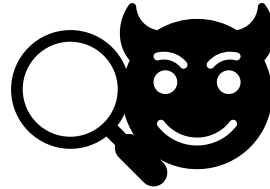


twitter.com



- bbc.co.uk
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- wikipedia.com
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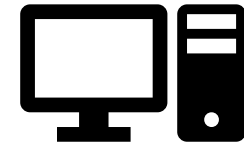
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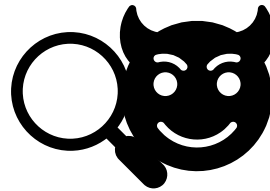


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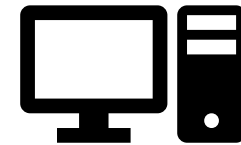
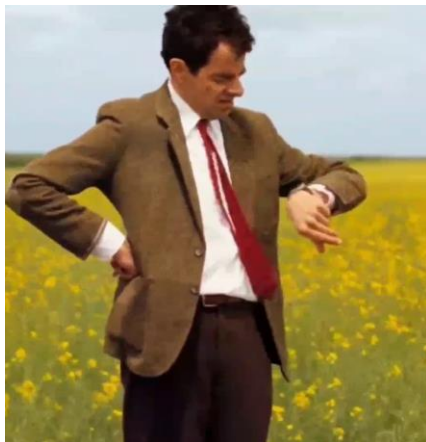
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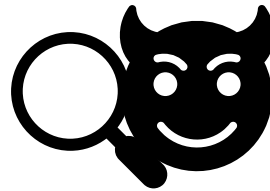
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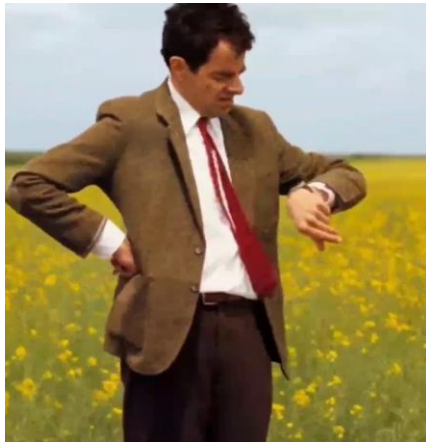
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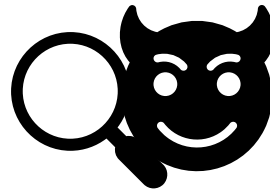


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HTTP Censorship



User

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RST

RST

RST



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Whats More?

Hostname	HTTP
(E)SNI	TLS
Port	TCP
Ip Address	IP

China is now blocking all encrypted HTTPS traffic that uses TLS 1.3 and ESNI

```
11 The Google Public DNS IP addresses
11
12 8.8.8.8
8.8.4.4
```


Are we lost?

Socks Proxy

IP Address	Port	Code
103.131.80.169	1080	BD
213.6.68.210	4145	PS
115.242.248.222	5678	IN
117.11.176.28	70997	ID

Geneva: Evolving Censorship Evasion Strategies

Kevin Bock
University of Maryland

George Hughey
University of Maryland

Analyzing and Circumventing ESNI-/ECH-Based Censorship

Dave Levin
University of Maryland

Nik

OONI

Open Observatory of Network Interference

Global community measuring Internet censorship since 2012

Why do we build a Censor again?

- **Network Censors are black boxes**
- **Circumventing Censors becomes a grey box approach**
- **First Open-Source Network Censor for others to attack**
- **"Levels the playing field"**
- **Save censorship behavior in the wild and simulate later**

What to expect!

- Develop Censorship Techniques
 - IP
 - TCP
 - HTTP
 - Cryptographic Protocols (TLS, SSH...)
- Develop Censorship Evasion Techniques
 - Attack/Defense?
- Programming
 - OS-level
 - Network Code
 - Performance Optimization (real-life constraint)
 - Configurability
 - Statistic Extraction



Sources

- Mr. Bean Waiting
 - Mr. Bean's Holiday, 2007, Steve Bendelack, Universal Pictures
- Angry Turtle
 - <https://www.pexels.com/@ludvighedenborg/>