

# Monitoring Internet Censorship

**Linux Day 2013**  
Napoli, October 26 2013

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# @ Linux Day 2013: Monitoring Internet Censorship

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# Internet Censorship

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# Agenda

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- ▶ **Part I**

- ▶ Some Example
- ▶ Introduction to Internet Censorship
- ▶ Censorship @ work
- ▶ Monitoring Internet Censorship
- ▶ Our Contribution
- ▶ Open Questions
- ▶ Conclusion

- ▶ **Part II**

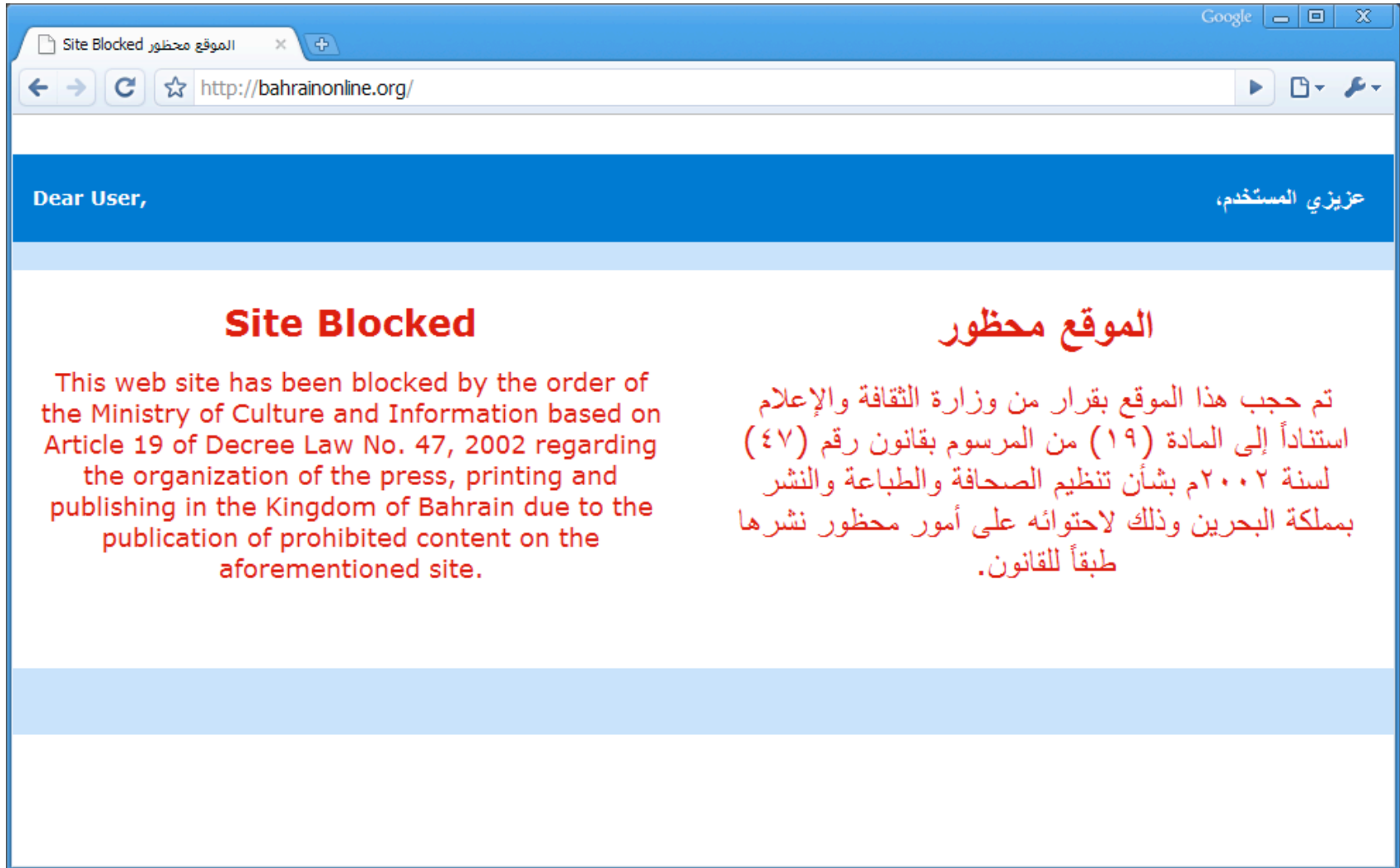
- ▶ UBICA, User-Based Internet Censorship Analysis



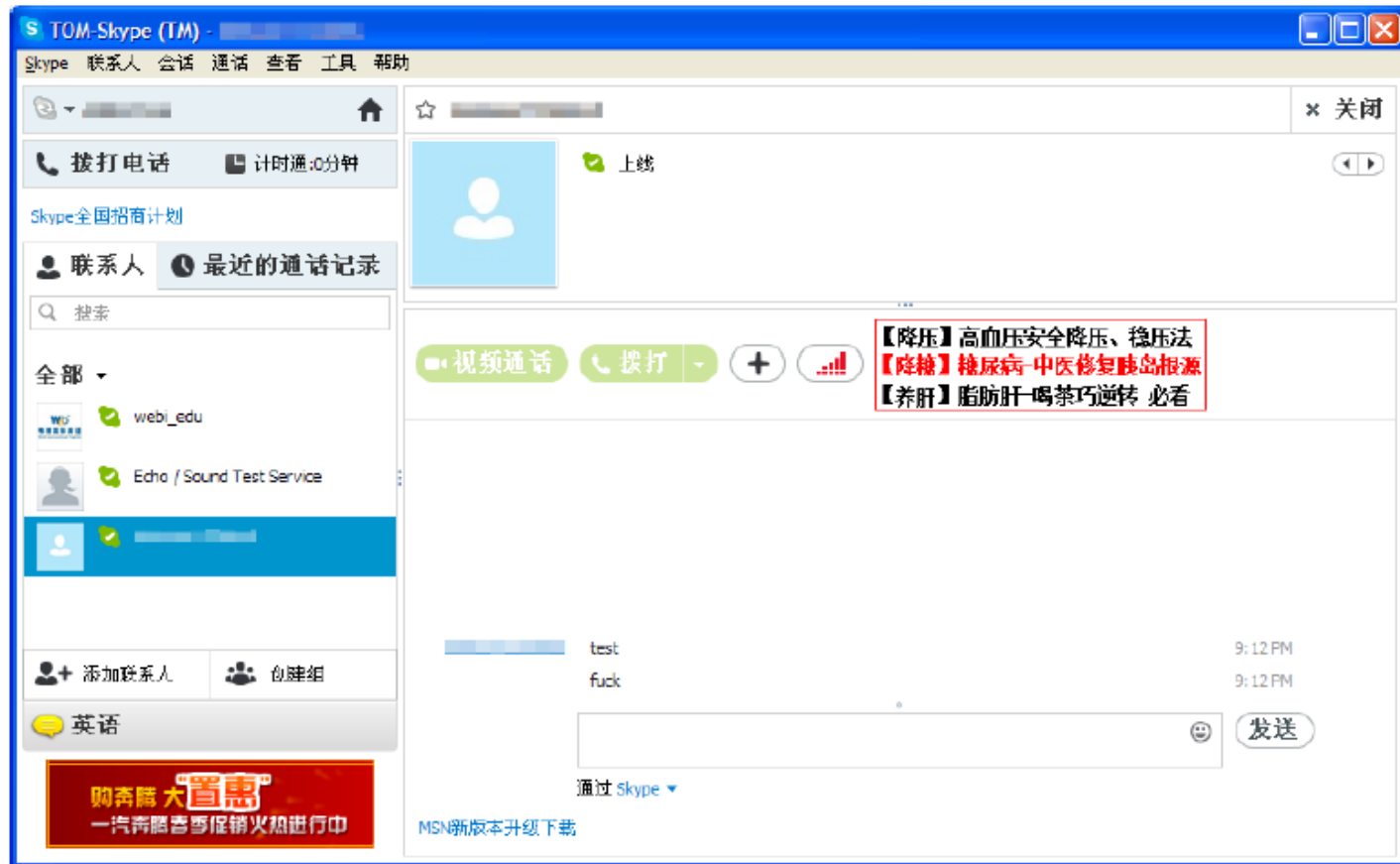
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# **Some Example**

# Example: Site Blocked



# Example: TOM Skype



- Different Versions Censor Differently
- Censor and Surveillance / Surveillance Only

# Example: Google Search (1 / 3)

Google

网页 图片 资讯 更多

tiananmen tank

搜索

高级图片搜索  
使用偏好

使用了 SafeSearch 功能。(了解更多)

图片 显示: 所有尺寸图片

找不到和您的查询 "tiananmen tank" 相符的网页。

建议:

- 请检查输入字词有无错误。
- 请换用另外的查询字词。
- 请改用较常见的字词。
- 请减少查询字词的数量。

In a Google.cn search for *tiananmen tank*  
"According to local laws and policies  
some search results are not showing"

根据当地法律法规和政策, 部分搜索结果未予显示。

Images Showing: All image sizes Results 1 - 20 of about 86 for tiananmen tank (0.21 seconds)



... 06 01 tiananmen tank standoff.jpg  
220 x 168 pixels - 14k - jpg  
i.a.cnn.net



Tiananmen Square 1989  
640 x 403 pixels - 116k - jpg  
bieniosek.com



Tiananmen 1989  
736 x 463 pixels - 85k - jpg  
www.wellesley.edu



The most famous image ... from 1989. ...  
450 x 292 pixels - 20k - jpg  
www.hongkongbrother.com

# Example: Google Search (2/3)

tiananmen square protest - ...

http://images.google.cn/images?gbv=2&hl=zh-CN&sa=1&q=tiananmen+square+;

网页 图片 视频 地图 资讯 问答 贴吧 购物 更多

Google 图片 谷歌

tiananmen square protest

搜索图片 高级


使用了 SafeSearch 功能。(了解更多) 筛选图片


图片 打开百宝箱


获得约 214 条结果, 以下是第 1-20 条 (用时 0.05 秒)

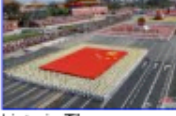
赞助商家


[Tian'an Men Square](#)  
hotels.english.ctrip.com Book Hotel Rooms with Confidence. The Best Values for Beijing Hotels.


  
**Tiananmen**  
450 x 263 - 374k - bmp  
chinadaily.com.cn


  
the vast Tiananmen  
420 x 272 - 37k - jpg  
anti-cnn.com


  
**Tiananmen**  
450 x 260 - 49k - jpg  
chinadaily.com.cn





  
historic Tiananmen  
650 x 425 - 95k - jpg  
junshi.xilu.com

  
English is very  
300 x 300 - 19k - jpg  
hi.baidu.com

  
only at Tiananmen  
450 x 300 - 88k - jpg  
eol.cn

  
**Tiananmen**  
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2008.sina.com.cn  
[查找相似图片](#)

  
the Tiananmen  
500 x 334 - 72k - jpg  
2008.cn.yahoo.com

tiananmen square protest - ...

http://images.google.co.uk/images?hl=en&source=hp&q=tiananmen%20square%20

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Google images

tiananmen square protest


Search images Advanced Image Search


SafeSearch: Moderate


Images Show options...


Results 1 - 20 of about 506,000 (0.23 seconds)


[Tiananmen Square Posters](#)  
www.AllPosters.co.uk Choose from over 500,000 Posters and Prints. Find your favourite!


  
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600 x 408 - 68k - jpg  
ramblingsofpassion...  
[Find similar images](#)


  
**Tiananmen Square**  
400 x 267 - 38k - jpg  
facsimilemagazine.com  
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Populism, Plutocracy  
264 x 400 - 31k - jpg  
thechinadesk...  
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**Tiananmen by**  
1600 x 1173 - 278k - jpg  
aroundtheedges...

  
**Tiananmen**  
460 x 276 - 27k - jpg  
waronyou.com

  
The Tiananmen  
668 x 462 - 39k - jpg  
learningwithoutdisc...  
[Find similar images](#)

  
**Tiananmen Square**  
300 x 339 - 25k - jpg  
kokeytechnology.com

  
on Tiananmen  
755 x 471 - 204k - gif  
cnd.org  
[Find similar images](#)

## Example: Google Search (3/3)

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- ▶ Imagine having to do research on the **Tiananmen Square Massacre** for history homework and you are only able to access bias information that the government allows you to read.
- ▶ Isn't this a really bad research?
- ▶ Isn't this a violation of your rights and the violation of the internet freedom?
- ▶ The universal declaration of Human Rights say “human beings shall enjoy freedom of speech...”

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# Introduction



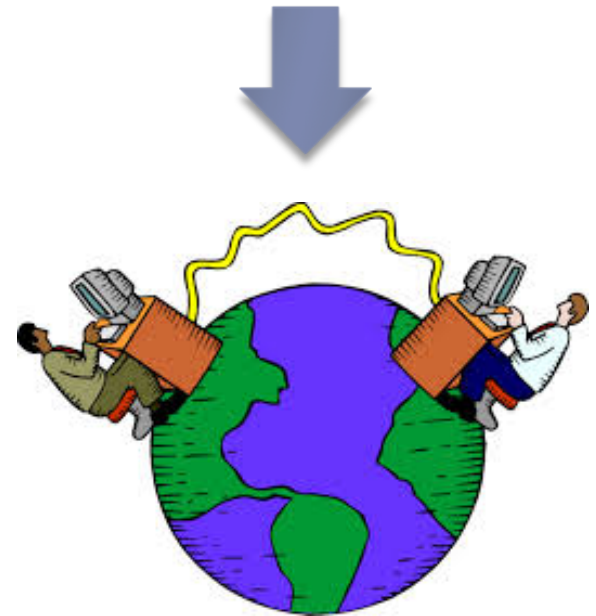
# Censorship: Introduction

- ▶ Startling growth in short time
- ▶ Change in source of information
  - from libraries, books to internet
  - boom in individual contribution



(book needs much investment, but internet not)

- ▶ Increase in individual inclusion
  - ▶ disclosure of ideologies, creativities, documents which leads to virtual pollution
- ▶ Intervention of authorities by censorship
  - ▶ nature of censorship varies acc. to states





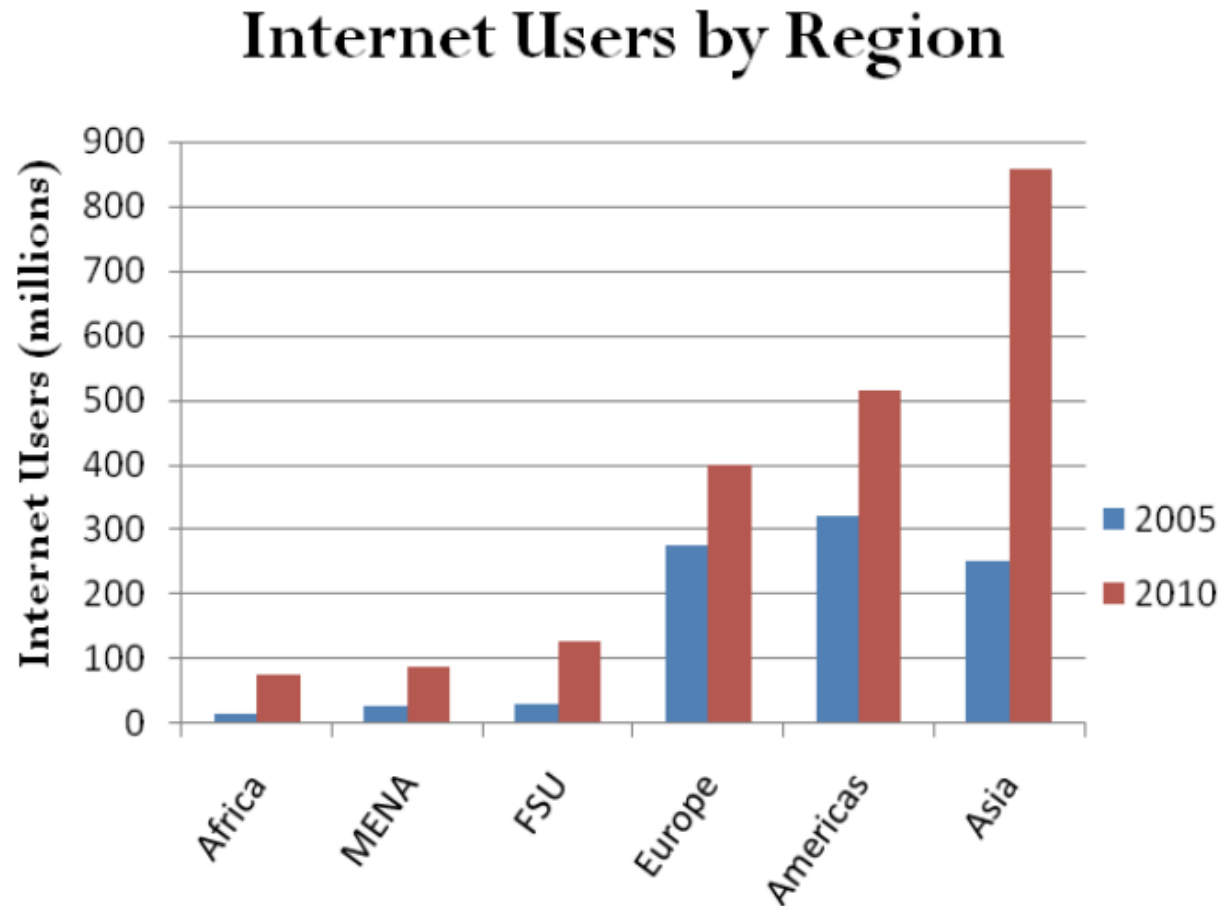
# Internet Censorship is Widespread

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- ▶ Practiced in **59 countries around the world**
  - ▶ Many western countries
  - ▶ Several electoral democracies (e.g., S. Korea, Turkey) have significant censorship
    - ▶ YouTube blocked in Turkey for two years
    - ▶ Many North Korean sites blocked in South Korea
- ▶ Twelve countries have **centralized infrastructure for monitoring/blocking**

# **Trend:** Increasing Number of Users in Non-Western Regions

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\* Source: International Telecommunications Union

# Examples of Recent Trends

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- ▶ In **23** countries, a blogger or Internet user was **arrested** for content posted online
  - ▶ Chinese woman sent to labor camp for satirical Twitter message
  - ▶ Indonesian woman fined for an email complaining about a local hospital
- ▶ Twelve countries instituted **bans** on Twitter, YouTube or some other **online social media** service.

# Internet Censorship by Governments

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- ▶ Here's a list of countries who practices extreme levels of internet censorship

UCC VIETNAM

\* Identified by OpenNet Initiative and Reporters without borders

# Why do countries censor?

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## ▶ Political stability

August 11, 2011, 12:21 PM

### In British Riots, Social Media and Face Masks Are the Focus





Prime Minister David Cameron [told Parliament on Thursday](#) that if people are using social media to organize violence, as has been reported, than “we need to stop them.” He asked the police to tell him if they need “new powers” to do so.

## ▶ National security

### Internet ‘Kill Switch’ Legislation Back in Play



By [David Kravets](#)   January 28, 2011 | 6:09 pm | Categories: [Cyber Warfare](#), [Cybersecurity](#)

## ▶ Social values

**NEWS** - Written by [Renai LeMay](#) on Friday, June 24, 2011 14:34 - [28 Comments](#)



### Voluntary ISP filter attracts global attention

This week, [Telstra and Optus reiterated](#) that they were still planning to start filtering their customers' traffic for a list of internet addresses provided by the Australian Communications and Media Authority which it has deemed to contain child pornography. The initiative is a stop-gap measure [agreed to by ISPs and the Federal Government in mid-2010](#) while a review is carried out into the Refused Classification category of content which the wider mandatory filter will block.

# Internet Surveillance & Censorship

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## ▶ **Pros:**

- ▶ **Protecting children (Child violence and pornography)**
- ▶ **Control of terrorist activities**
- ▶ **Crime control**

## ▶ **Cons:**

- ▶ **Violate freedom of speech**
- ▶ **Violate media freedom**
- ▶ **Limited access to extensive source of information**

# Censorship Targets

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- ▶ **“UNHEALTHY INFORMATION”.**
  - ▶ Violent video games
  - ▶ Child pornography
  - ▶ Terrorism
  - ▶ Etc.

But also...

- ▶ Human rights activists
- ▶ Anti-government organizations
- ▶ Anti-government criticism issues

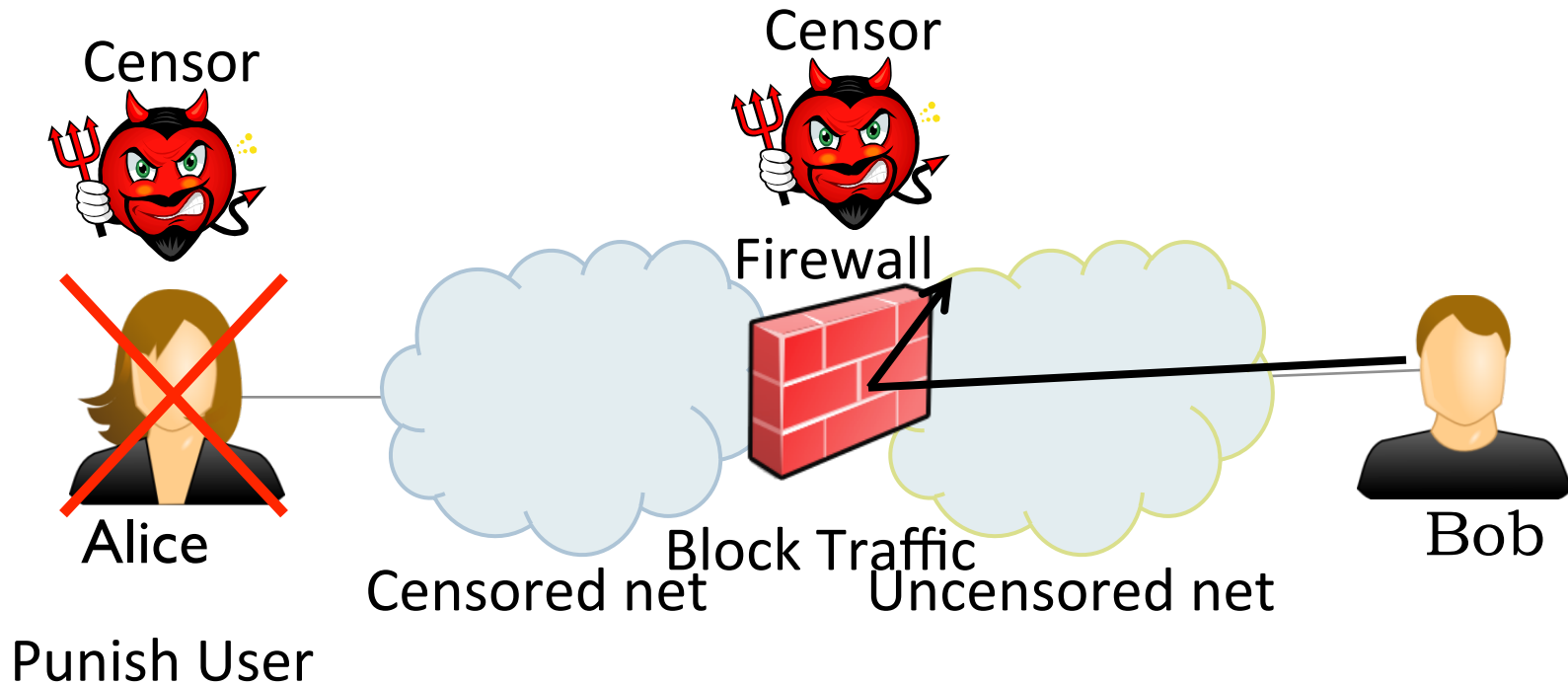
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# Censorship @ work



# Conventional Internet Censorship

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“Suppose Alice wants to get some content from Bob. If she accesses the Internet from behind a censorship firewall then the censor may monitor or block communication with Bob, and may even punish Alice for trying to communicate with Bob.”

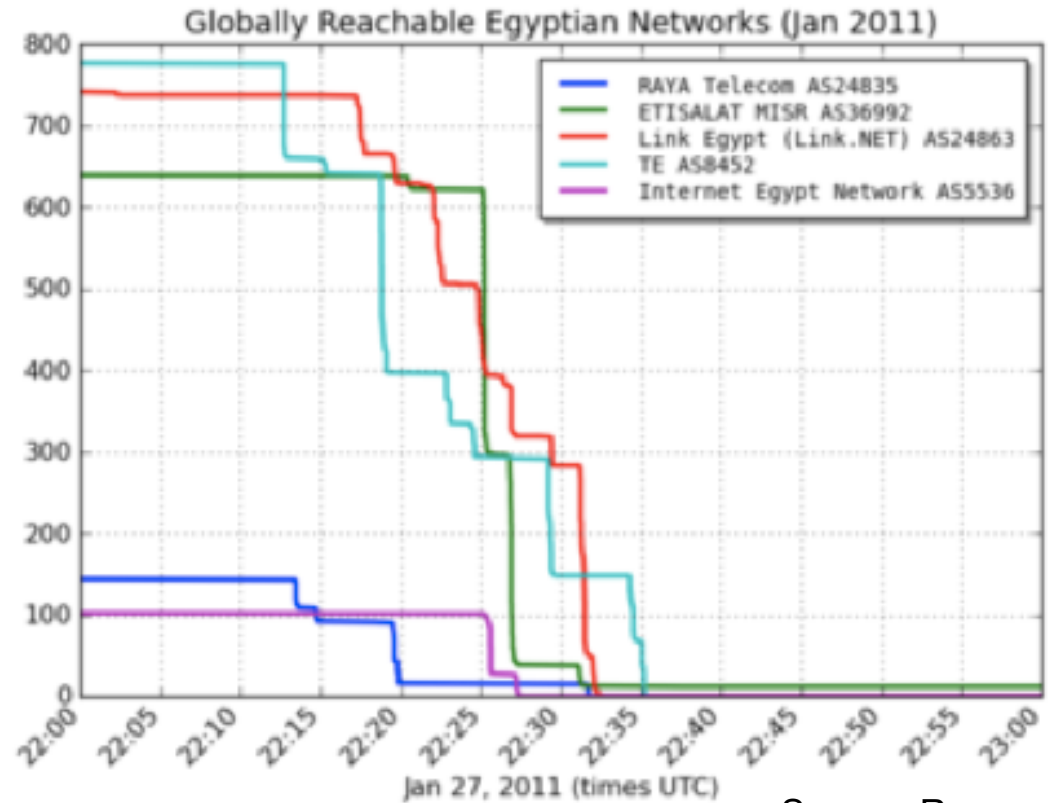
# Technical Enforcement

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- ▶ **IP blocking**
- ▶ **Domain Name System filtering & redirection**
- ▶ **URL filtering**
- ▶ **Deep Packet filtering**
- ▶ **Connection reset**
- ▶ **Web feed blocking**
- ▶ **Reverse surveillance**
- ▶ **Self censorship**

# Technical Enforcement: Blocking

- ▶ ISP acts on instructions from a judge, government official, etc.
  - ▶ Filtering: IP address, DNS
  - ▶ Keyword-based: search for keyword in URL
    - ▶ China, Iran, Tunisia have such systems in place
- ▶ Common: Use of centralized infrastructure (e.g., routing)



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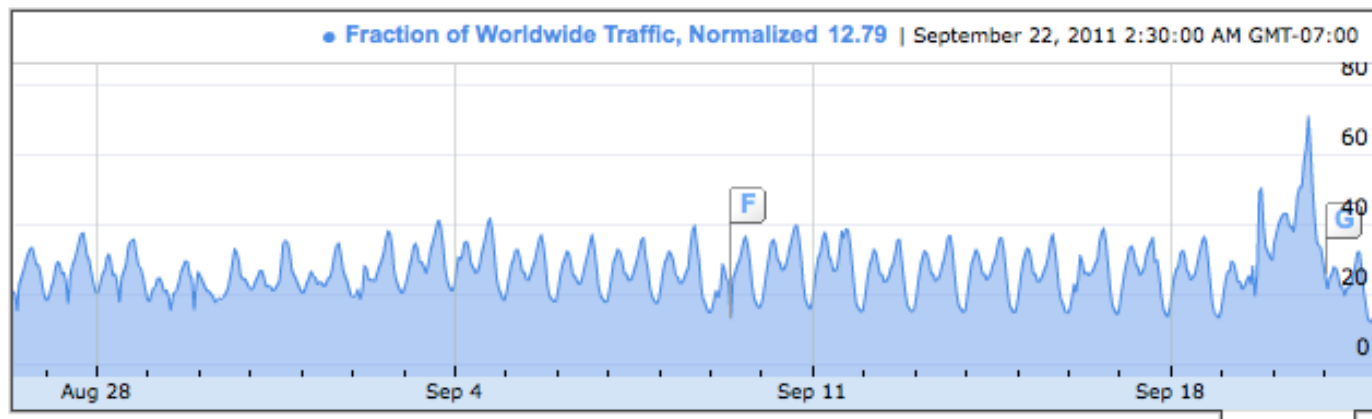
# **Monitoring Internet Censorship**

# Monitoring Censorship (1 / 3)

- ▶ **Herdict:** Crowdsourcing reports of Internet censorship
- ▶ **Google Transparency Report:** Monitor reachability of online services

Egypt All Products

All Products, Egypt Traffic Divided by Worldwide Traffic and Normalized



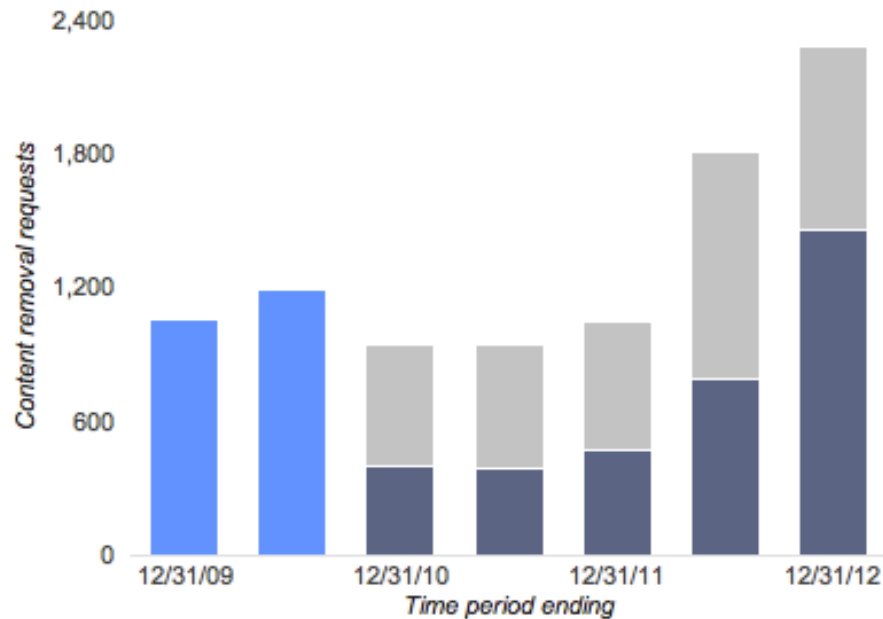


# Monitoring Censorship (3/3)

## ► **Google Transparency Report: Summary of all requests**

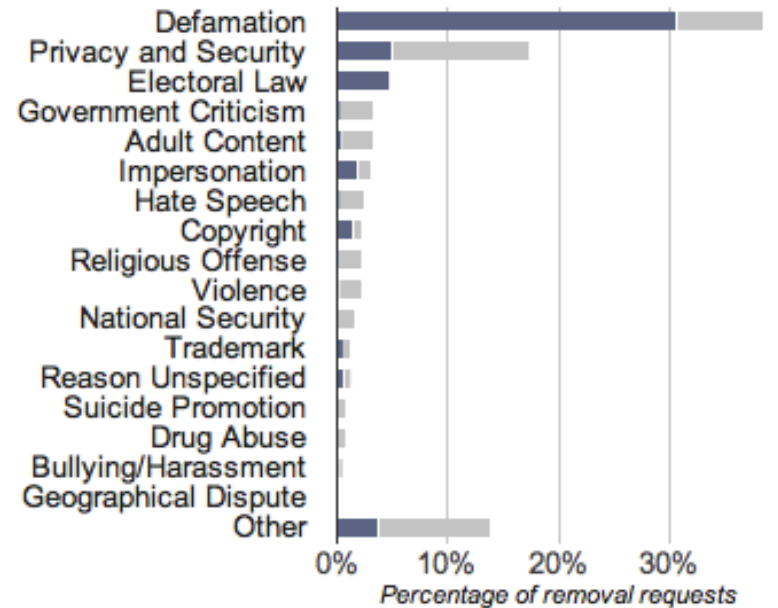
**By Reporting Period**

■ All Requests ■ Court Orders ■ Executive, Police, etc.



**By Reason (since July 2010)**

■ Court Orders ■ Executive, Police, etc.



# Monitoring Censorship: Challenges

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- ▶ “Censorship” is **ill-defined**
  - ▶ Personalization may be confused with censorship
  - ▶ Performance problems may be confused with censorship
- ▶ Measurement tools **can be blocked**
  - ▶ Measurements may be blocked
  - ▶ Reports may be blocked
- ▶ Measurements **tough to characterize**
  - ▶ Reports may be falsified
- ▶ Running the tool **may be incriminating**



# Problems with Current Approaches

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- ▶ Biased by what users choose to report
- ▶ Lack of corroborating, open measurements
- ▶ Not general (focused only on limited services)
- ▶ Not longitudinal
- ▶ Do not cover a set of ISPs or access modes within a country
- ▶ Do not run on a diversity of hardware

# Design Requirements

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- ▶ **Easy to install and use:** Should be easy to install and run on a variety of platforms.
- ▶ **Cross-platform:** Tests should be write once, run anywhere.
- ▶ **Flexible:** Should be capable of implementing a wide variety of experiments, including many from the test specifications from existing projects (e.g., OONI).
- ▶ **Secure:** Arbitrary remote code execution is bad.
- ▶ **Extensible:** Should be capable of incorporating new experiments.

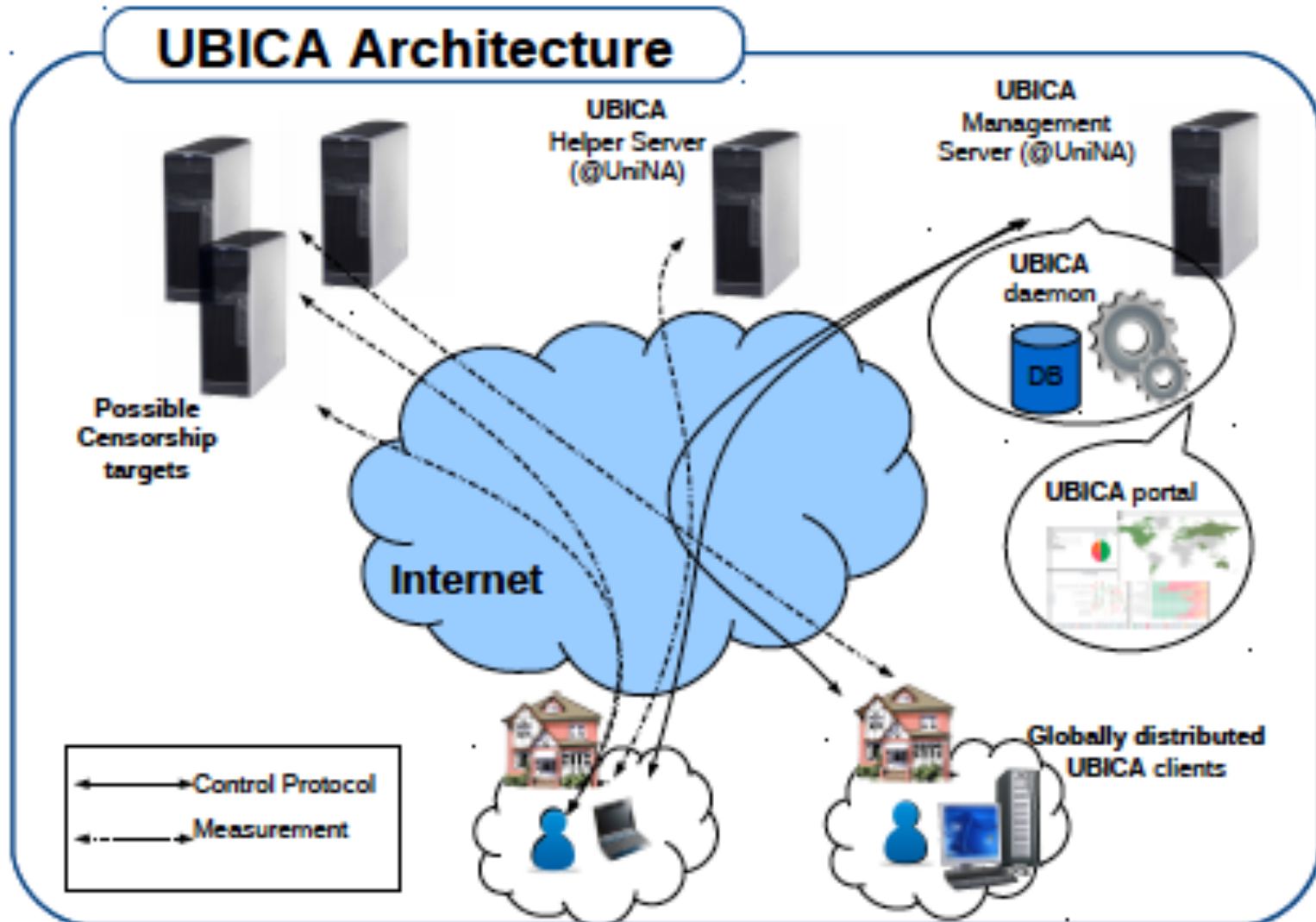
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# **Censorship: our contributions**

# Contributions

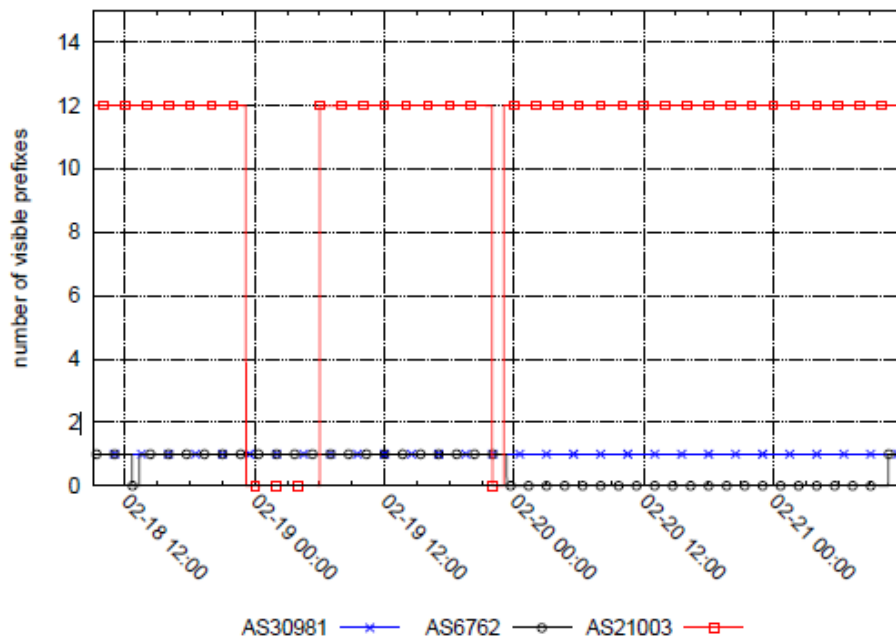
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- ▶ UBICA, User-based Internet Censorship Analysis
- ▶ Analysis of Country-wide Internet Outages Caused by Censorship

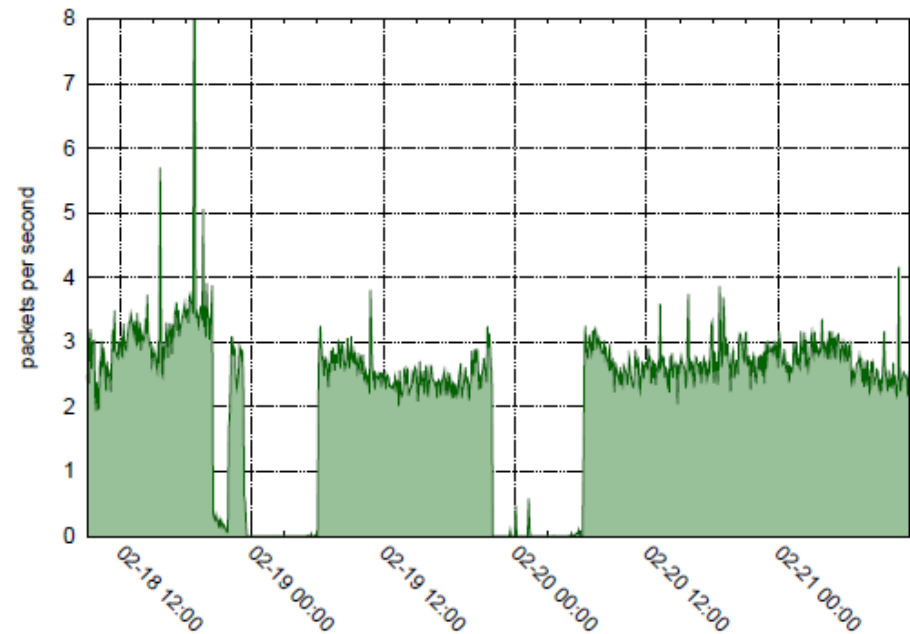


# Detection of Country-wide Censorship Episodes

- ▶ We analyzed disruptions of Internet communications in Egypt and Libya in response to civilian protests and threats of civil war, by combining BGP updates, Ark traceroutes, and darknet measurements.



(a)



(b)

- ▶ 34 *The first two Libyan outages: (a) visibility of Libyan IPv4 prefixes in BGP; (b) unsolicited traffic to UCSD telescope from Libya.*

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# Open Questions



# Questions

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- ▶ **How widespread** is Internet censorship?
- ▶ How do countries **enforce** censorship?
  - ▶ How does it evolve over time?
    - ▶ i.e. Iran
  - ▶ Does it coincide with other events?
    - ▶ i.e. “Arab Spring”
- ▶ How can citizens **circumvent** it?
- ▶ How (else) might a government (or organization) exercise **control** over its citizens?



# Questions

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- ▶ (Self-)Censorship is not limited to China—in France, Italy, Austria, and Germany, sites such as Google, eBay, and Amazon are required to block white supremacist and nazi-related items.
- ▶ In France, one cannot buy Nazi paraphernalia from any merchant. eBay cooperates with this law by blocking all products and users linked to Nazism from their sites.
  - ▶ Is this form of censorship more acceptable than Beijing's policy of blocking “sensitive” topics? Keep in mind that buying Nazi products is completely legal in the States.

# Final Remarks

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- Sensor and Surveillance change continuously
- Importance of Interdisciplinary Research
  - Policy
  - Technology
  - Etc.
- Importance of Crowd-sourced approaches

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# Conclusion



# Linux Day 2013: take home message

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# Linux Day 2013: take home message

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- ▶ **As long as hackers are around...there will always be ways to bypass Internet censorship!!!**
- ▶ Here are some examples:
  - ▶ Proxy websites
  - ▶ Java Anon Proxy
  - ▶ Psiphon
  - ▶ Tor (The Onion Router)
  - ▶ Sneakernets





# Looking at the future: Hackers, Unite !!!



# References / Credits

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- Part of this talk contains slides or ideas from the following sources:
  - GOVERNMENT REGULATION AND SURVEILLANCE OF THE INTERNET, Ayman Irziqat, Katarzyna Kosarska, Sergio Pradel
  - Measuring and Circumventing Internet Censorship and Control, Nick Feamster
  - FREEDOM OF THE INTERNET
  - Internet Censorship in Turkey: Stop Legalized Cyber-Murder
  - *Self-Censorship in China*, Eric Schabel & Fahad Pervaiz
- Thanks/Credits to
  - Google
  - Herdict Project
  - ONI
  - Google Images
  - Images found thanks to Google Images

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**Thank you for your attention!**



*Any Questions?*