Monitoring Internet Censorship

Linux Day 2013

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@ Linux Day 2013: Monitoring Internet Censorship

Internet Censorship

Agenda

- Part I
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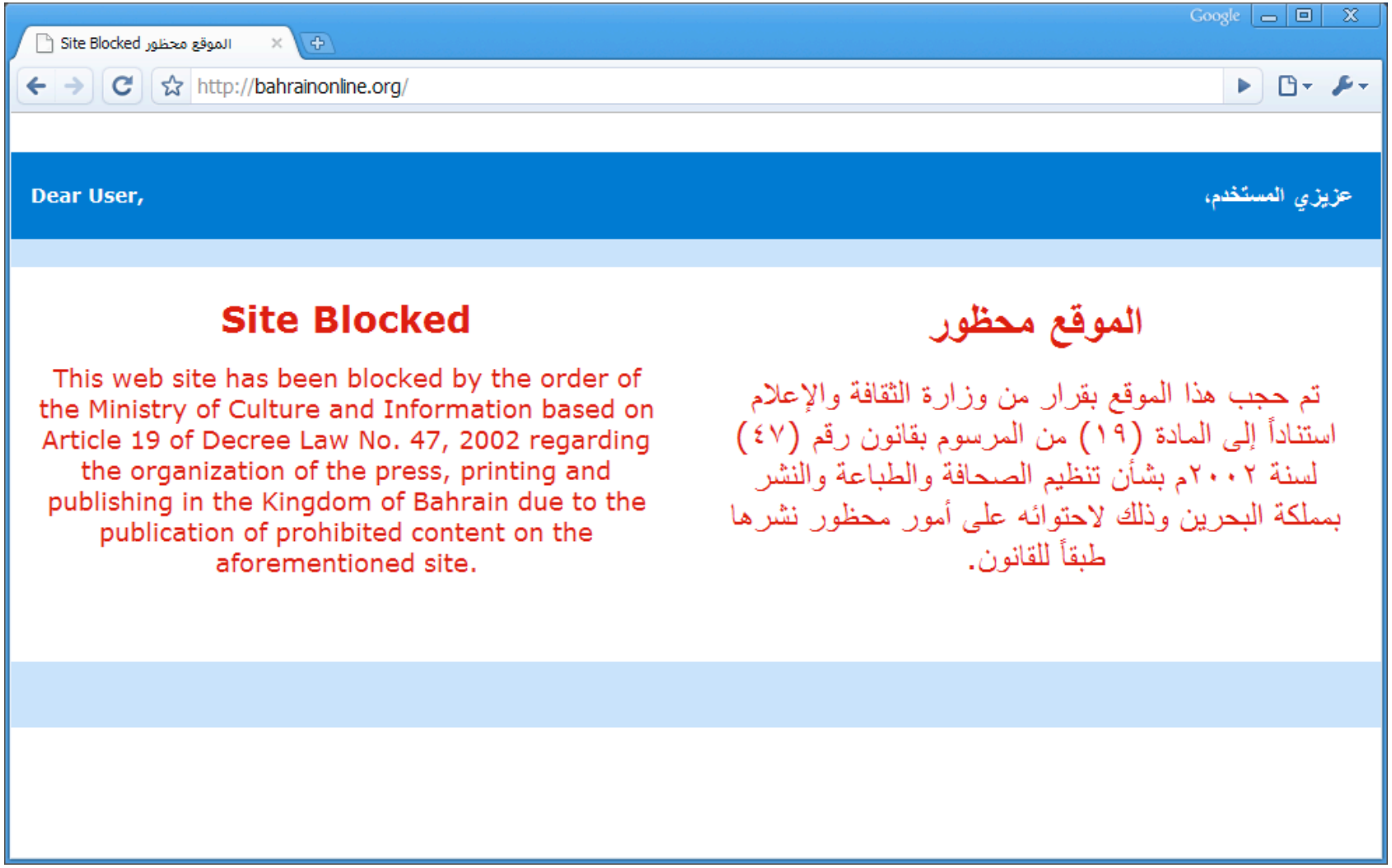
  - Introduction to Internet Censorship
  - Censorship @ work
  - Monitoring Internet Censorship
  - Our Contribution
  - Open Questions
  - Conclusion
- Part II
  - UBICA, User-Based Internet Censorship Analysis

Some Example

Example: Site Blocked

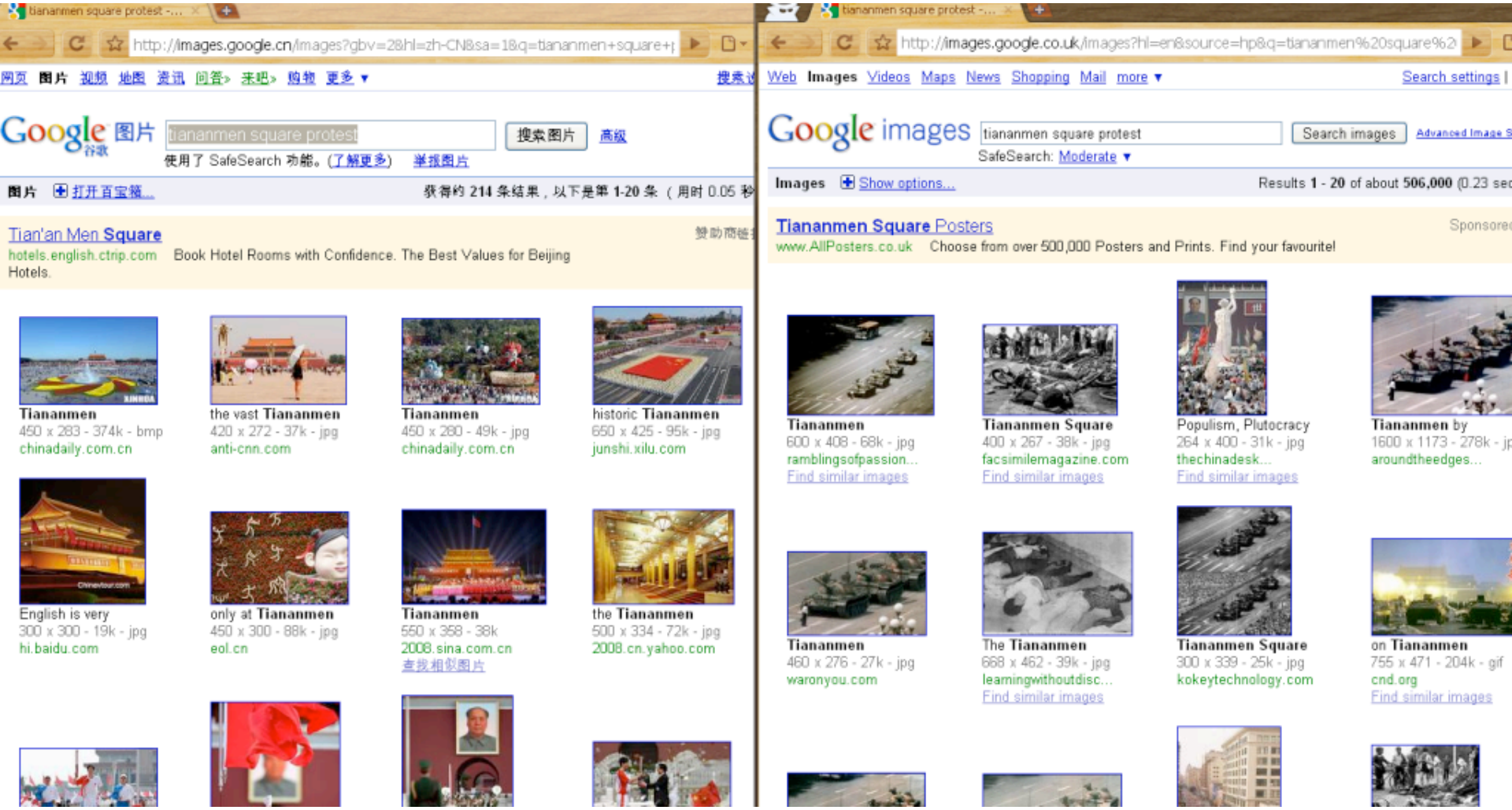


Example: TOM Skype

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

Example: Google Search (1/3)

Example: Google Search (2/3)



Example: Google Search (3/3)

- 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…"

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

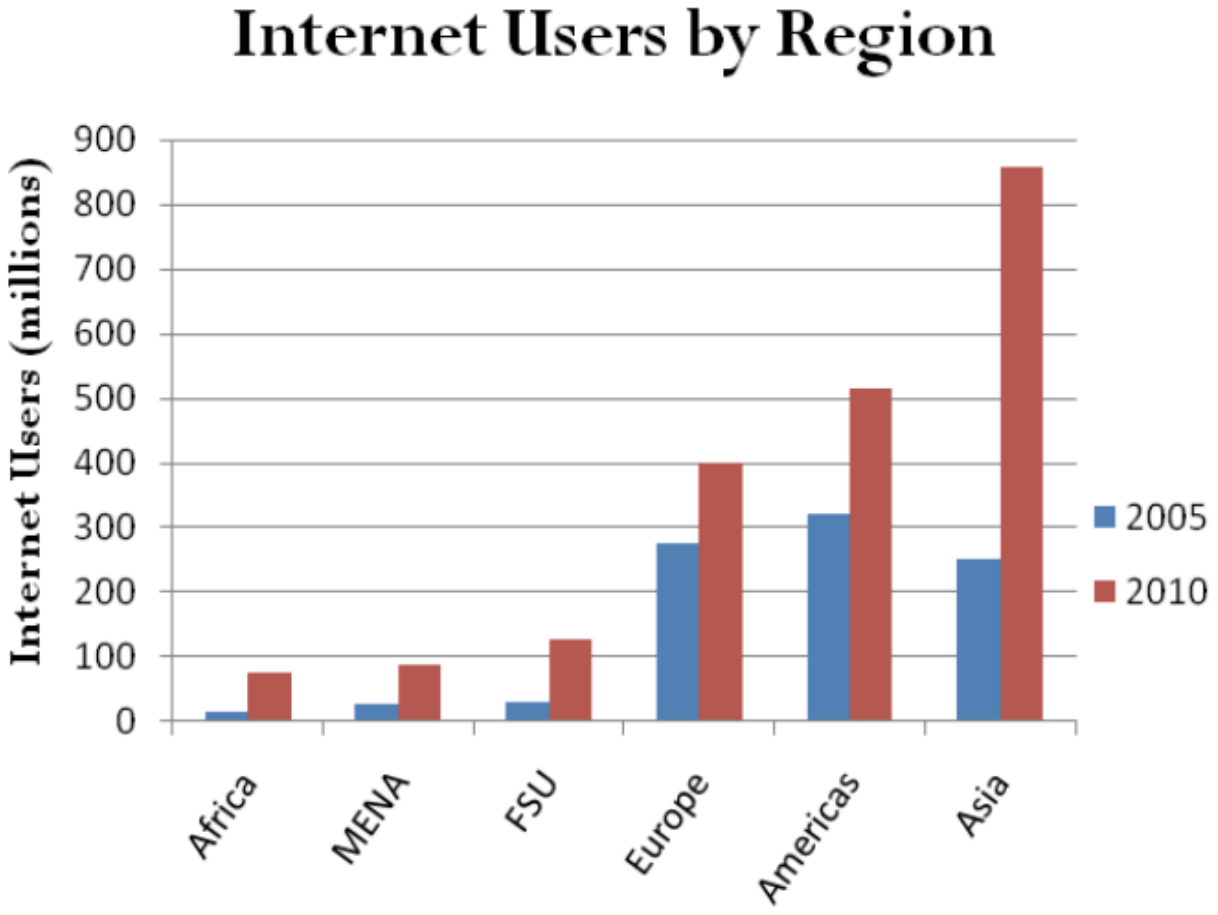
Internet Censorship is Widespread

- 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**

Source: Open Network Initiative

Trend: Increasing Number of Users in Non-Western Regions



* Source: International Telecommunications Union

Examples of Recent Trends

- 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

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

* Identified by OpenNet Initiative and Reporters without borders

Why do countries censor?

- **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

- **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

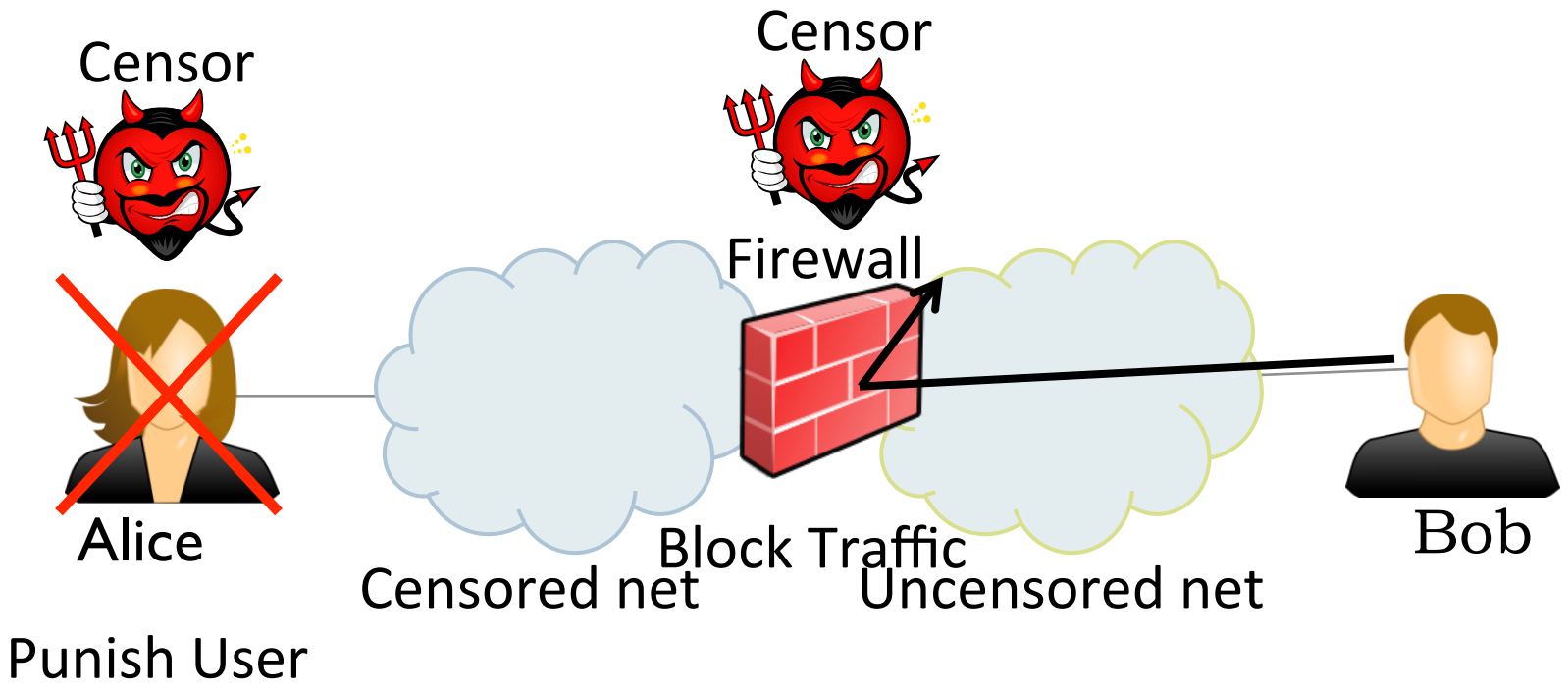
- **"UNHEALTY INFORMATION".**
  - **Violent video games**
  - **Child pornography**
  - **Terrorism**
  - **Etc.**

But also…

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

Censorship @ work

Conventional Internet Censorship



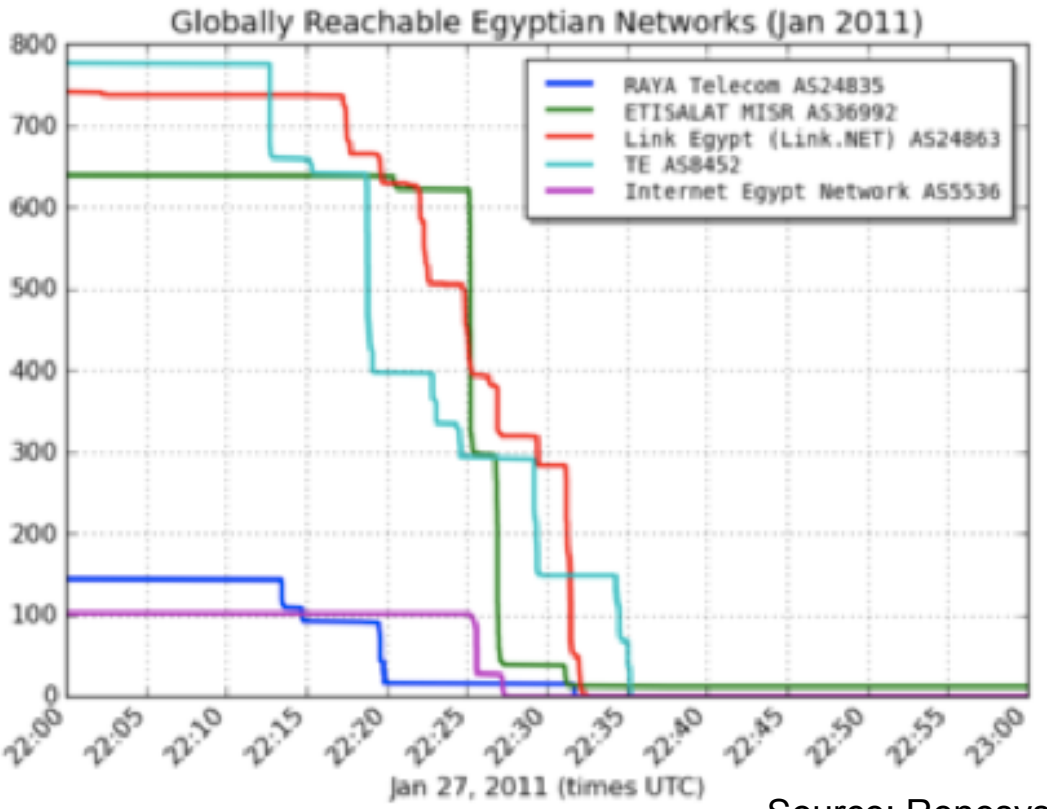
"Suppose Alice wants to get some content from Bob. If she accesses the Internet from behind a censorship firewall then the censor may monitor or block communication with Bob, and may even punish Alice for trying to communicate with Bob."

Technical Enforcement

- **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)

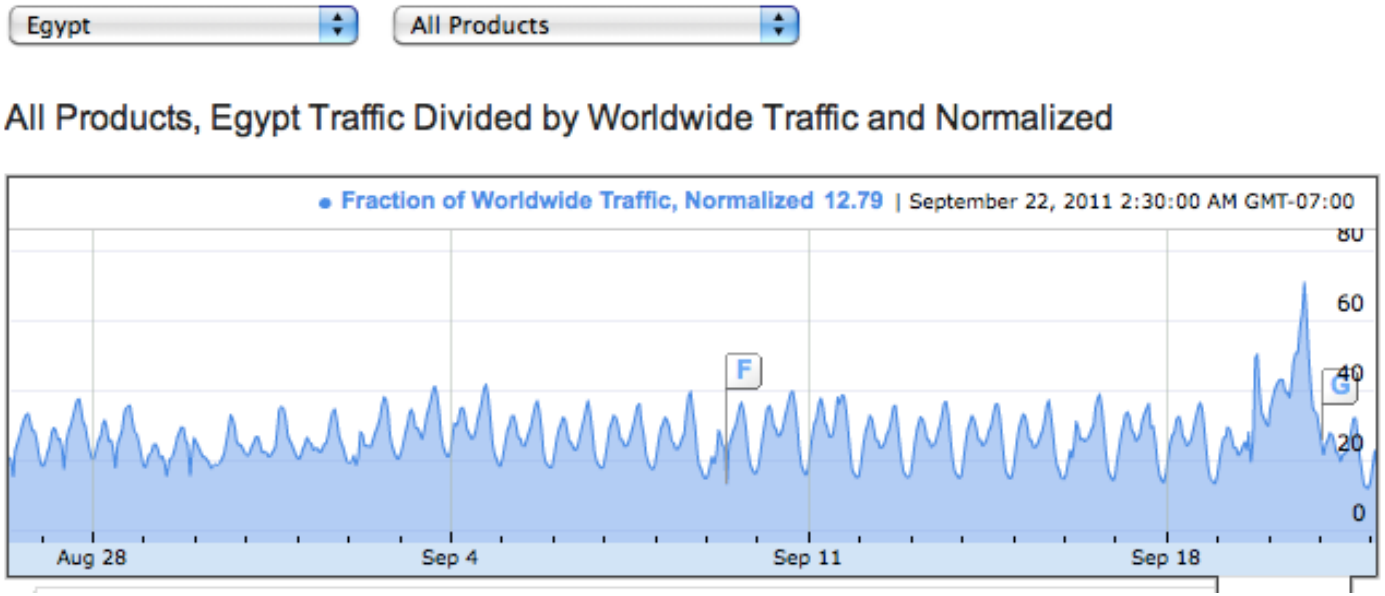


Source: Renesys

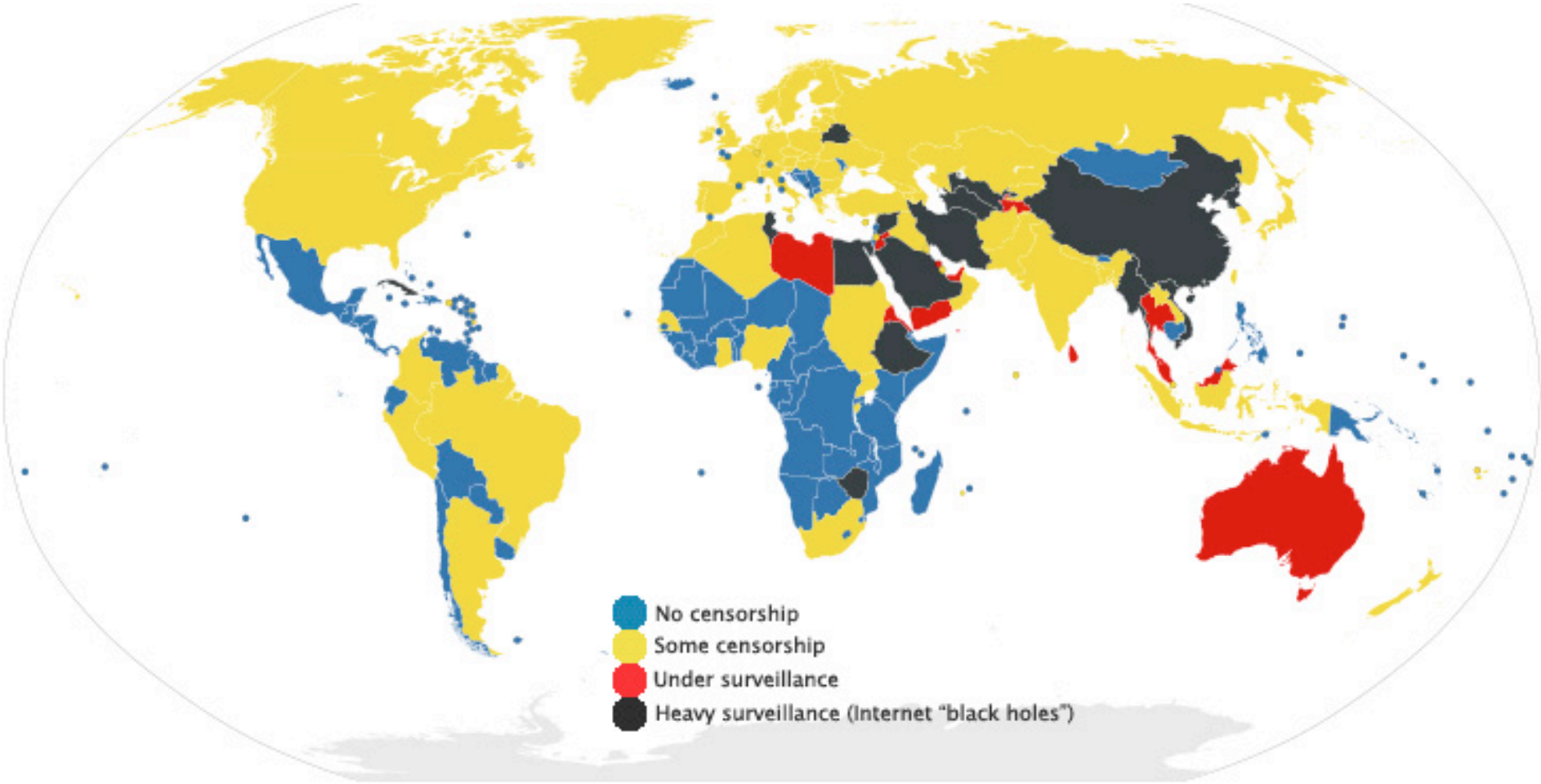
Monitoring Internet Censorship

Monitoring Censorship (1/3)

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



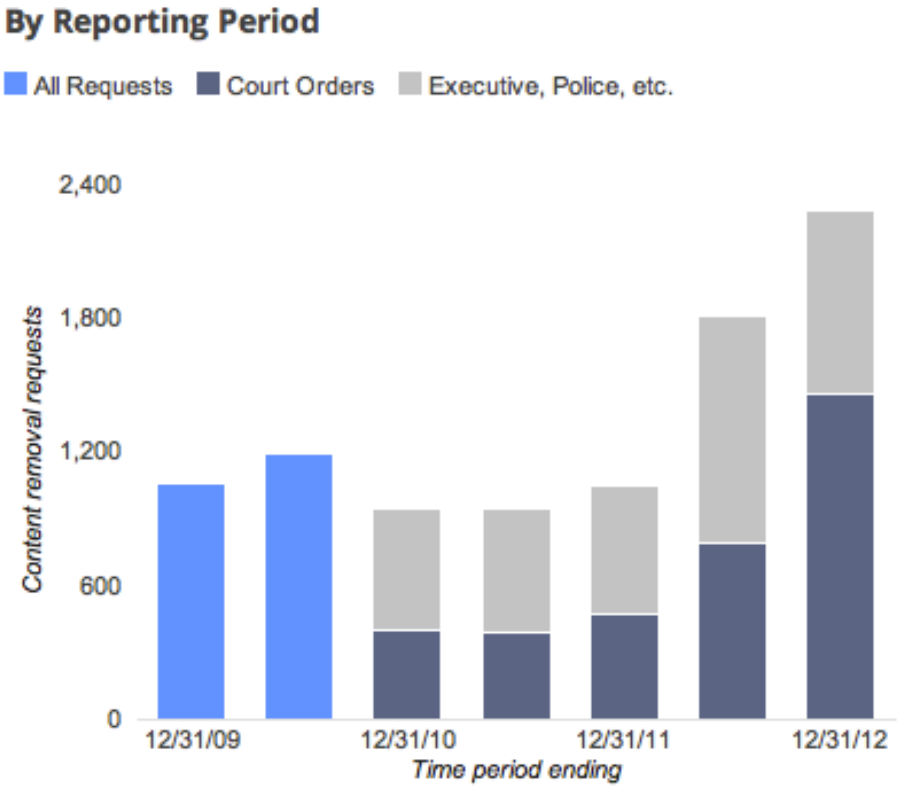
Monitoring Censorship (2/3)

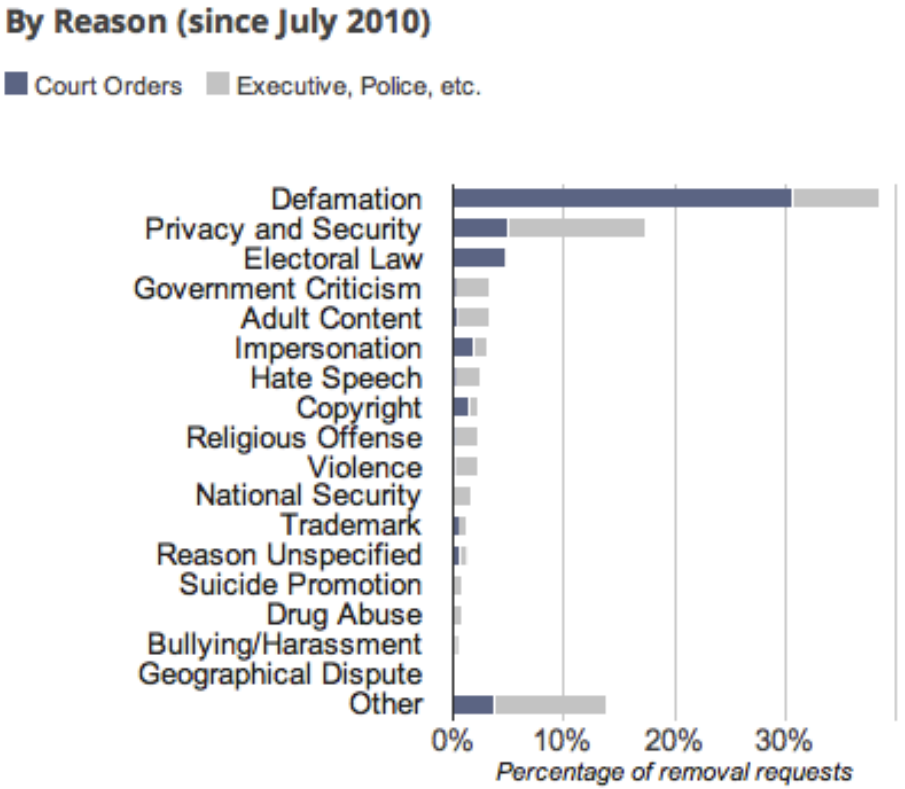


Source: http://www.thenutgraph.com/six-words-on-internet-censorship/

Monitoring Censorship (3/3)

- **Google Transparency Report:** Summary of all requests





Monitoring Censorship: Challenges

- "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

- 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

- **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.

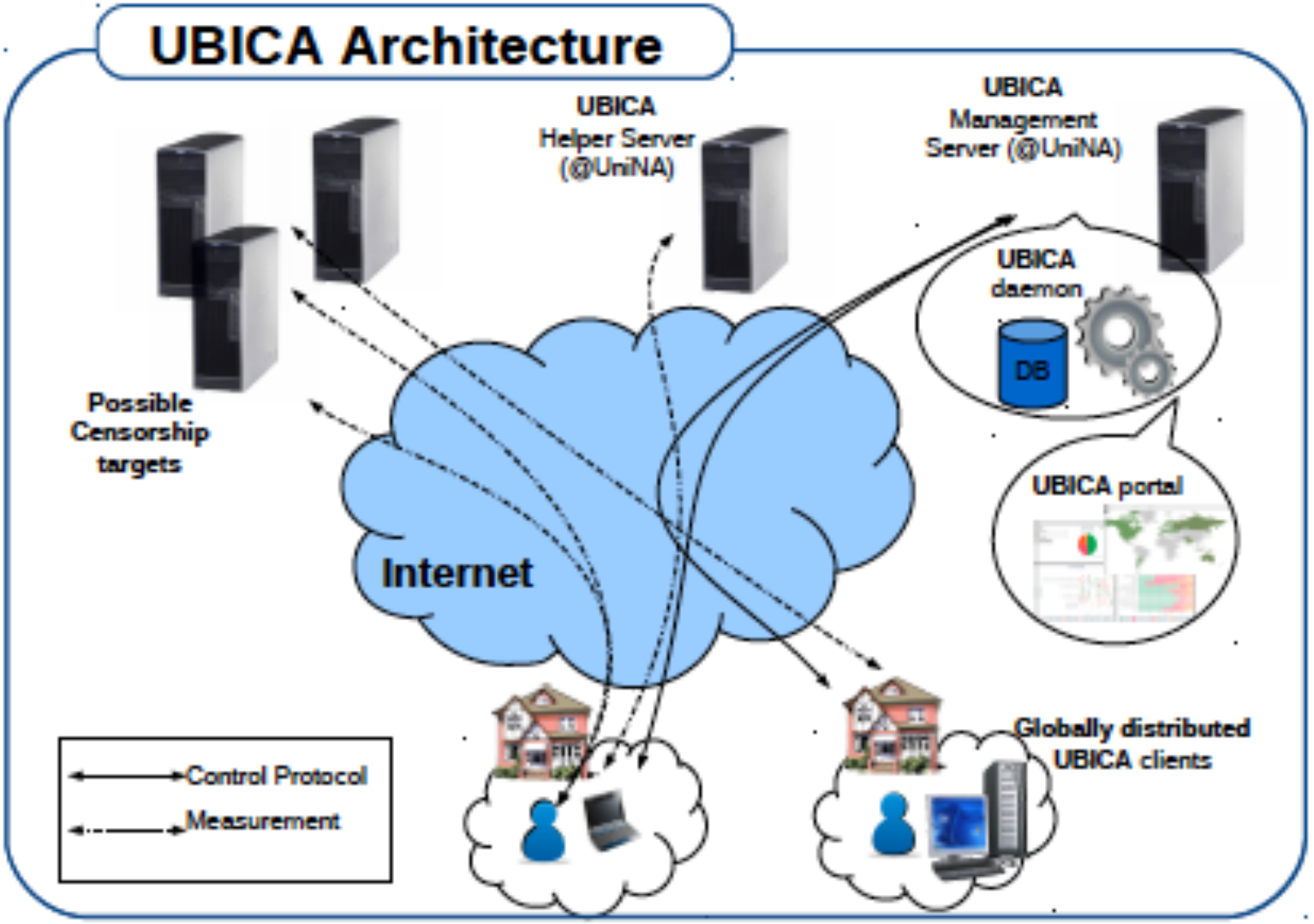
Censorship: our contributions

Contributions

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

UBICA

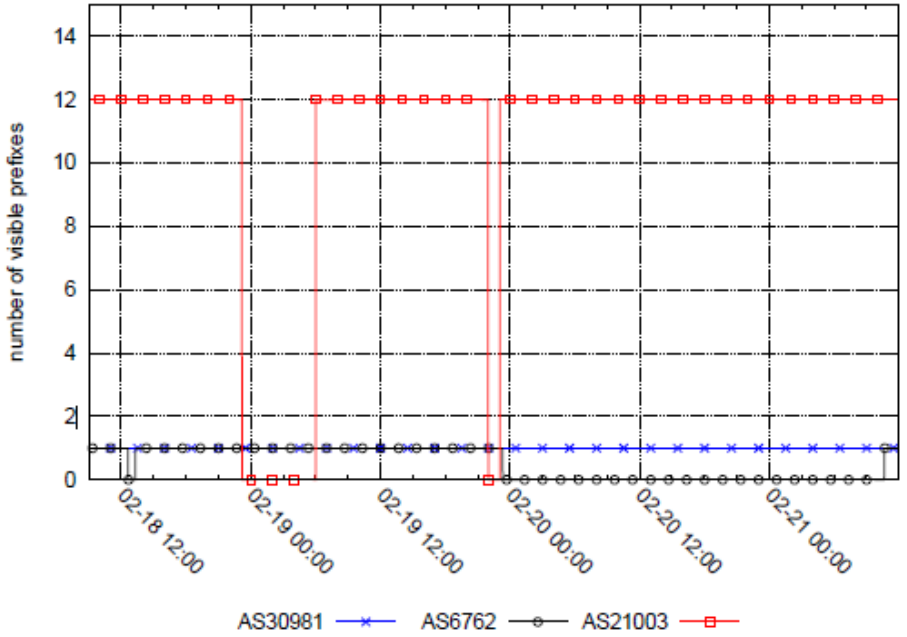
Google Faculty Research Awards



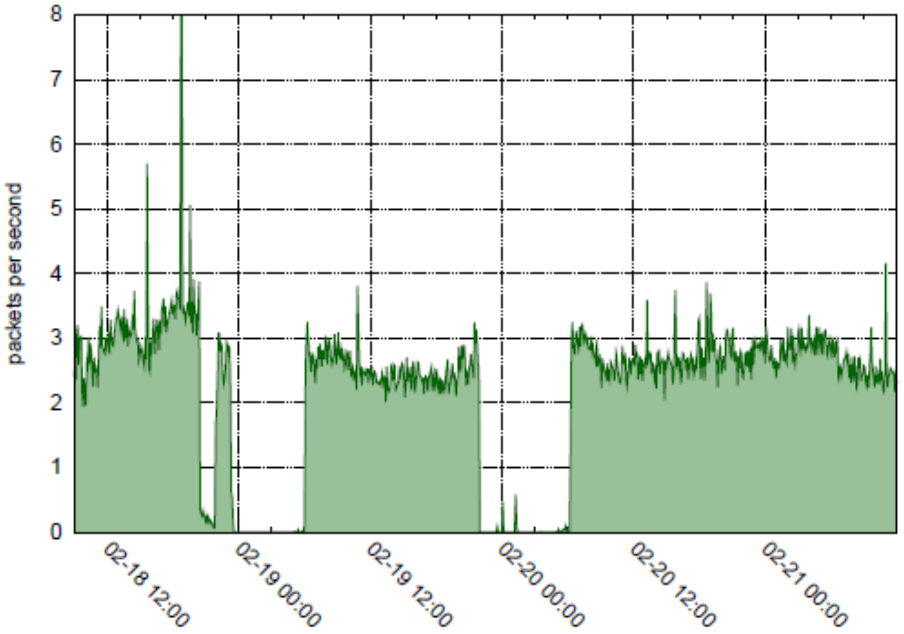
http://traffic.comics.unina.it/internetcensor.php

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)

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

Open Questions

Questions

- **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

- (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

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

Conclusion

Linux Day 2013: take home message

Linux Day 2013: take home message

- 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

- 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
  - Giorgio Ventre for his "Looking at the future…."

Thank you for your attention!

Any Questions?