INTERNET CENSORSHIP AND RESISTANCE

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(thanks to Steven Murdoch)

UNIVERSITY OF CAMBRIDGE
Computer Laboratory

GATES SCHOLARS’ SYMPOSIUM 2010
He who controls the past controls the future, and he who controls the present controls the past

—George Orwell, *Nineteen Eighty Four*, 1949
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Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

—Article 19, UN Declaration of Human Rights (1948)
The final freedom, one that was probably inherent in what both President and Mrs. Roosevelt thought about and wrote about all those years ago, ... is the freedom to connect—the idea that governments should not prevent people from connecting to the internet, to websites, or to each other... a new information curtain is descending across much of the world.

—Hillary Clinton, US Secretary of State (2010)
The Internet Dream

*The Net treats censorship as damage and routes around it.*

— John Gilmore, 1993
The Internet Reality

AS1053
AODnet

AS3156
Level3

AS3130
PTCNET 3130

AS2814
HIDC-GINAS

AS1108
INTERNAP-BLOCK-4

AS2202
LINX-PH3

AS3608
AT&T

AS701
UUNET

AS852
AS-TELUS

AS762
SEABONE-NET

AS939
HURRICANE

AS209
Qwest

AS453
GLOBEINTERNET

AS4837
China Network Communications Group

AS4809
CHINANET-BJAS

AS2406
CNNIC-CRITICAL-AP

Diagram: robtex.com
Pervasive Censorship

Reporters Without Borders Internet censorship ratings

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### Saudi Arabia

**Country Report:** Saudi Arabia

- **7 reports** of inaccessible sites ([7 unique](#))
- **10 reports** of accessible sites ([9 unique](#))
- Saudi Arabia is ranked 8 in number of reports by the herd.
- Join the discussion on Saudi Arabia [here](#).

### Sites in Saudi Arabia

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Accessible</th>
<th>Inaccessible</th>
</tr>
</thead>
<tbody>
<tr>
<td>sixline.com</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><a href="http://www.sixline.com">www.sixline.com</a></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Arab Times</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><a href="http://www.arabtimes.com">www.arabtimes.com</a></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Camfrog free video chat rooms &amp; webcam community!</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><a href="http://www.camfrog.com">www.camfrog.com</a></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Xo.com - payday loan Resources and Information. This website is for sale!</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><a href="http://www.xo.com">www.xo.com</a></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ad Free Proxy Site</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><a href="http://www.ad-free-proxy-site.info">www.ad-free-proxy-site.info</a></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>YouTube - Broadcast Yourself.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><a href="http://www.youtube.com">www.youtube.com</a></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>xboard.us</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><a href="http://www.xboard.us">www.xboard.us</a></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>84.235.120.55</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>84.235.120.56</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### OpenNet Initiative Feed: All Content Related to Saudi Arabia

#### Saudi Arabia

Background: Saudi Arabia is the birthplace of the Prophet Muhammad and the cradle of Islam. It embraces a strict interpretation of Sunni Islam and has a strong religious self-identity. Political parties are banned and activists who publicly call...

#### Bahrain, Tunisia Filtering Individual Twitter Pages

Over the past few weeks, reports have trickled in to Herdict via Twitter, alerting us of the filtering of individual Twitter pages in Tunisia and Bahrain (as well as, possibly, China). In Tunisia, the accounts of exiled activist Sami Ben...

#### Internet Filtering in Saudi Arabia in 2006–2007

**PDF Version Note:** A newer version of this report is available at Country Profiles: Saudi Arabia. Overview: Saudi Arabia has filtered the Internet since its introduction into the kingdom less than a decade ago. The filtering regime most...

**All Content Related to Saudi Arabia**
Frequently Blocked Content

- International News
- Political Opposition
- Militant Groups
- Human Rights
- Religion
- Pornography
- Sex Education
- Homosexuality
- Drugs & Alcohol
- “Illegal” Content
  - Hate groups
  - Child pornography
  - Copyrighted material
  - Witness identities
Frequently Blocked Content

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  - Copyrighted material
  - Witness identities
  - Falun Gong
  - Child pornography
  - Copyrighted material
  - Witness identities

Falun Gong, also known as Falun Dafa, is an ancient practice for refining the body and mind, moral and spiritual elevation in accordance with the universal principles of Truthfulness, Compassion, and Forbearance. It includes qigong exercises and meditation. Since being introduced to the general public in 1992 by Mr. Li Hongzhi, Falun Dafa’s effectiveness in improving health and its profound principles have quickly made the practice immensely popular throughout the entire world. Falun Dafa has attracted tens of millions of people in over 60 countries. Read more about Falun Gong in Introduction and Frequently Asked Questions. In July 1999 Chinese government banned Falun Gong, presuming that very large number of followers could pose a threat to their ruling power, and started brutal persecution of Falun Gong practitioners in China.

“We are not against the government now, nor will we be in the future. Other people may treat us badly, but we do not treat others badly, nor do we treat people as enemies. We are calling for all governments, international organizations and people of good will worldwide to extend their support and assistance to us in order to resolve the crisis that is taking place in China.”

- Li Hongzhi, July 22
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Kurdistan Worker's Party (PKK)
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**PRESS RELEASE/STATEMENT**

Beijing Lawyers Beaten for Representing Falun Gong Case

HRIC has learned that Beijing rights defense lawyers Zhang Kai (张凯) and Li Chunfu (李春富) were violently beaten at their client’s home in Chongqing by local police on May 13, 2009. They were then brought to the local police station for interrogation and were locked up in an iron cage and slapped in the face. A month earlier, Beijing rights defense lawyer Cheng Hai was also violently beaten by the police in Chengdu, Sichuan for handling a Falun Gong case. More >>

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**PRESS RELEASE/STATEMENT**

Wife of Abducted Rights Defense Lawyer Gao Zhisheng Requests Urgent Help from U.S. Congress in Open Letter

Geng He (耿和), wife of Gao Zhisheng (高智星), the prominent Chinese rights defense lawyer who has been disappeared since early February, 2009, is requesting help from the United States government to put pressure on the Chinese government to disclose Gao’s whereabouts. She has requested that Human Rights in China (HRIC) release her open letter, dated April 23, 2009, to members of the U.S. Congress. More >>

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Human Rights in China
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Christianity.com

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May 15, 2009

Playboy
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Wikipedia

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Coming to a Country Near You?

Leaked 2009 Blacklist:

- Poker
- Youtube videos
- Gay porn
- Wikipedia pages
- “Fringe” religions
- Euthanasia
- A tour operator
- A dental practice
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Normal Web Browsing

1. User requests www.example.org/page.html
2. DNS lookup for www.example.org
3. Lookup response: www.example.org is 192.0.2.166
4. www.example.org is 192.0.2.166
5. Get web page: www.example.org/page.html at 192.0.2.166
6. Here is www.example.org/page.html

Diagram: Jane Gowan
DNS Blocking

1. User requests www.example.org/page.html
2. DNS response: www.example.org does not exist

Diagram: Jane Gowan
1. User requests www.example.org/page.html
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4. www.example.org is 192.0.2.166
5. Get web page: www.example.org/page.html at 192.0.2.166
6. Router drops all packets to 192.0.2.166
7. Browser concludes that www.example.org is inaccessible

Diagram: Jane Gowan
Address Not Found

Firefox can't find the server at www.freetibet.cn.

The browser could not find the host server for the provided address.

- Did you make a mistake when typing the domain? (e.g. “ww.mozilla.org” instead of “www.mozilla.org”)
- Are you certain this domain address exists? Its registration may have expired.
- Are you unable to browse other sites? Check your network connection and DNS server settings.
- Is your computer or network protected by a firewall or proxy? Incorrect settings can interfere with Web browsing.

Try Again
Connection Interrupted

The connection to the server was reset while the page was loading.

The network link was interrupted while negotiating a connection. Please try again.
Tradeoffs

- DNS blocking
  - Cheap, very easy
  - Over-blocks complete websites
  - Trivial to bypass

- IP blocking
  - Cheap, easy
  - Over-blocks virtual hosting

- Deep Packet Inspection
  - Expensive
  - Tricky to get right
  - Far more powerful

Photograph: David Gaya
The Censorship-Industrial Complex

Seven “Corporations of Interest,” EFF
Blocking Through Regulation

- ISPs
- Web service providers
- Search engines
blocking through regulation

"Tiananmen Square" on Google.com and Google.cn
You have got to decide do you want to obey the laws of the countries you are in or not? If not, you may not end up doing business there...
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Bill Gates
Blocking Through Fear & Intimidation

- Ubiquitous Warnings
- Intimidation
  - Social pressure
  - Disconnection
  - Extra-legal punishment
- Citizen policing
I call on Egyptian government officials to take the necessary procedures to protect the Egyptian youth from the spread of subversive religious ideologies among them by permanently shutting down religious institutions in this country.

—Kareem Ameer, Egyptian blogger (sentenced to four years in prison)
Problems with Blocking

- Deployment costs
- Lack of transparency
- Temptation to abuse
- Transition to active surveillance
  - USA: NSA wiretapping
  - UK: Interception Modernisation Programme

NSA room 641
Avoid telling hackers they shouldn’t do something, and NEVER tell them they can’t do it…

Software to resist censorship:
- Hide where a user is visiting
- Hide who the user is
- Hide where content is hosted

Must also resist attack by censors
Web Proxies

- Relay traffic through an uncensored machine
- Vulnerable to monitoring and punishment
A little peace of mind in a dangerous world.

products & services

personalVPN™ - SSL (openVPN)

Our openVPN-based SSL VPN is our most popular service. WiTopia openVPN customers enjoy full access to all WiTopia gateways - Dallas, TX, London, UK, Las Angeles, CA, Manchester, UK, New York Metro, San Francisco, CA, Seattle, WA, Washington, DC, Hong Kong, CN (more coming soon!) - as well as alternate ports and 256-bit encryption options. This will ensure the ultimate in speed, unblockability, and security. Experts worldwide agree that openVPN is a wonderfully robust and powerful VPN solution. As the first VPN service provider to deploy it commercially back in March 2005 we absolutely agree. See chart at bottom of page for compatible devices and comparison.

$59.99 / YEAR

Buy Now | Buy Now | 30 Day Moneyback Guarantee
Psiphon

- Users in free countries set up proxies
- Censored users choose a proxy run by somebody they trust
- No software for browsing user
- Encryption hides traffic
- Weak anonymity
Tor

- Anonymous web-browsing
- Anonymous hosting
- De-centralised
- Versatile
How Tor Works: 1

Step 1: Alice’s Tor client obtains a list of Tor nodes from a directory server.
Step 2: Alice's Tor client picks a random path to destination server. **Green links** are encrypted, **red links** are in the clear.
Step 3: If the user wants access to another site, Alice's Tor client selects a second random path. Again, green links are encrypted, red links are in the clear.
Each relay in circuit removes/adds one encryption layer

- Separate encryption between relays
- Careful traffic analysis can correlate flows
Each relay in circuit removes/adds one encryption layer

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Careful traffic analysis can correlate flows . . .
Wikileaks helps everyone safely expose corruption in government and other organizations.

Recent Analyses
- *East Timor: Leaked autopsy report shows alleged "coup" leader Reinado shot at point-blank range*
- Dili investigator called to Canberra as evidence of execution mounts
- How ministers plotted murder
- Ministers deny violence claim

Fresh Disclosures
- South African Mining Refuge Chaimbers Report 2007
- US Treasury Strategic Direction 2009-2011
- DHS Schools: Lessons Learned 2007
- DHS Golden Guardian After Action Review 2004
- FBI Gang Related Activity in the US Armed Forces is
Repository of sensitive documents
Source anonymity strongly protected
Mirrored and de-centralised
Over 1.2M documents:
  - Classified documents
  - Corporate whistle-blowers’ leaks
  - Political leaks
  - Censorship blacklists
  - Security breaches
  ...
Freenet

- Parallel to World Wide Web
- Can create websites and post files
- Content collaboratively hosted
- Content encrypted and replicated
- Users don’t know what they host!
Fight Censorship!

- **Read Up**
  - “Access Denied”:
    opennet.net/accessdenied
  - Anonymity bibliography:
    www.freehaven.net/anonbib/

- **Participate, Donate, Volunteer**
  - Tor
  - Psiphon
  - FreeNet
  - Wikileaks
  - Electronic Frontier Foundation
  - Open Net Initiative
  - Reporters Without Borders

- Experience it Yourself...
  - chinachannel.hk
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Censorship resistance often illegal

Technologically impossible to block bad uses
   Even with a definition of ‘bad’

Deployed systems commonly used to break laws
Nature knows no indecencies, man invents them

Ideas won’t go to jail

Information wants to be free...