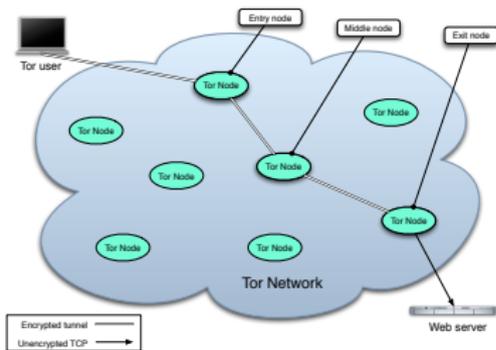


Internet Censorship and How It Is Resisted



Steven J. Murdoch

<http://www.cl.cam.ac.uk/users/sjm217/>



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CAMBRIDGE

Computer Laboratory



www.torproject.org

Construction of the Internet

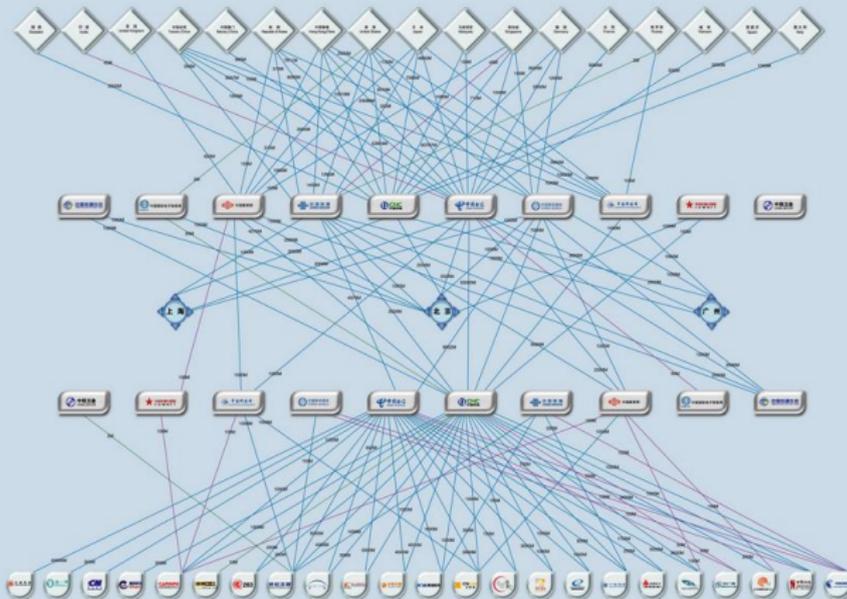
- Internet Service Providers (ISPs) give people access to the Internet, and allow people to host services such as websites
- ISPs connect to other ISPs so the customers of one ISP can communicate with those of others
- Some ISPs have international connections, others use those of the bigger ISPs
- ISPs are typically based in one country and governed by the laws of that country
- Often governments control international Internet connections, either directly or via regulation

Construction of the Internet

CNIC
中国互联网络信息中心
CHINA INTERNET NETWORK INFORMATION CENTER

中国互联网络连接带宽图
Internet Connection Map of China

监制单位: 信息产业部电信管理局
Supervised by: 工业和信息化部
数据截止时间: 2006年12月31日



图例

LEGEND



省级节点
Provincial Node



主要ISP节点
Major ISP Node



骨干网节点
Backbone Node



主要ISP节点
Major ISP Node



100M



100M > 100M



> 100M

说明:
本图为中国互联网络信息中心(CNIC)提供, 仅供参考, 不作为法律依据。
如有变更, 恕不另行通知。

Note:
The service is provided by China
Internet Network Information Center(CNIC),
and each service is free of charge. The map
may have some error of network data,
department data is not included.

Tel: +86-10-88081000
E-mail: info@cnic.gov.cn
Website: WWW.CNIC.CN



What is being blocked, and why

- Out of the 40 countries studied by the OpenNet Initiative in 2006, 26 censored the Internet in some way
- The types of material censored varied depending on country, e.g.:
 - Human Rights (blocked in China)
 - Religion (blocked in Saudi Arabia, UAE, Iran, Bahrain)
 - Pornography (blocked in Saudi Arabia, UAE, Iran, Bahrain, Singapore, Burma, ...)
- Other issues censored include: military and militant websites; sex education, alcohol/drugs, music; gay and lesbian websites; news



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The screenshot shows a web browser window with the following details:

- Browser title: Prophecies & fulfillments about Jesus - Christian issues - islameyat
- Address bar: http://www.islameyat.com/english/c
- Page content: A table titled "Prophecies & fulfillments about Jesus" with 9 rows of text.

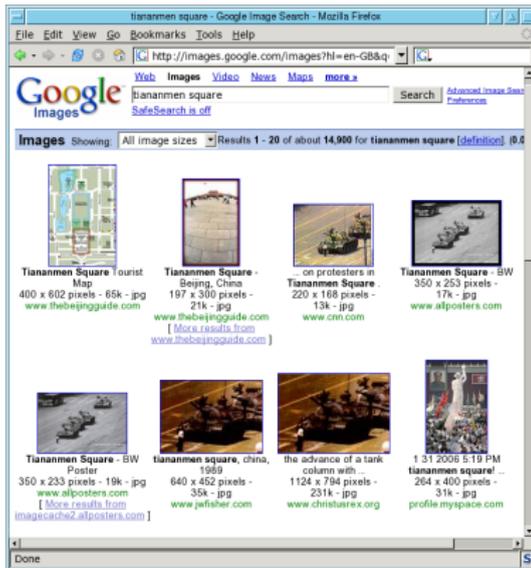
| Prophecies & fulfillments about Jesus | Old T |
|---|--------------|
| 1.He was to be born in Bethlehem | MI |
| 2.He was to be born of virgin | ISAIAH |
| 3.He was to be prophet like Moses | Due 18 |
| 4.He was to enter Jerusalem in triumph | Zech |
| 5.He was to be rejected by his own | Isaiah psalm |
| 6.He was to be betrayed by one of his followers | Psa |
| 7.He was to be tried and condemned | Isaiah |
| 8. He was to be silent before his accusers | Isaiah |
| 9. He was to be struck and spat on by his | Isaiah |

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Even if a site is accessible, it may be removed from search engine results



Searching for “Tiananmen Square” on Google.com and Google.cn

Blocking with technology

- When a country's government controls international connectivity, they can block requests for banned websites
- There are a number of different approaches (URL blocking, keyword blocking, IP address blocking)
- Software may be produced in-country, but often is an adapted commercial product
- These companies not only make the software, but provide a continuously updated list of websites to be blocked

See “Tools and Technology of Internet Filtering”, a chapter in *Access Denied: The Practice and Policy of Global Internet Filtering*, edited by Ronald Deibert, John Palfrey, Rafal Rohozinski, Jonathan Zittrain. Available at <http://opennet.net/accessdenied>.

Blocking through laws, fear, and intimidation

- ISPs may be forced to block sites themselves, or implement self-regulation
- People can be intimidated into not testing rules through fear of detection and retribution
- These may be through laws, social pressure or extra-legal punishment
- All these approaches may be used at the same time, and complement each other



Limitations of blocking

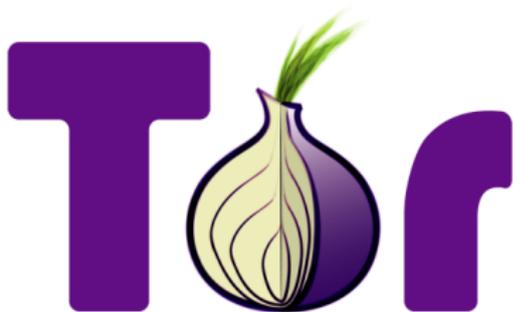
- Censorship systems block legitimate content and fail to block banned content
- It is fairly easy for readers and publishers to circumvent the technical measures
- Building and maintaining censorship systems is expensive
- Blocking one type of content encourages other types to be blocked
- Often the process of censorship is not transparent



Photograph: David Gaya

Censorship resistance systems

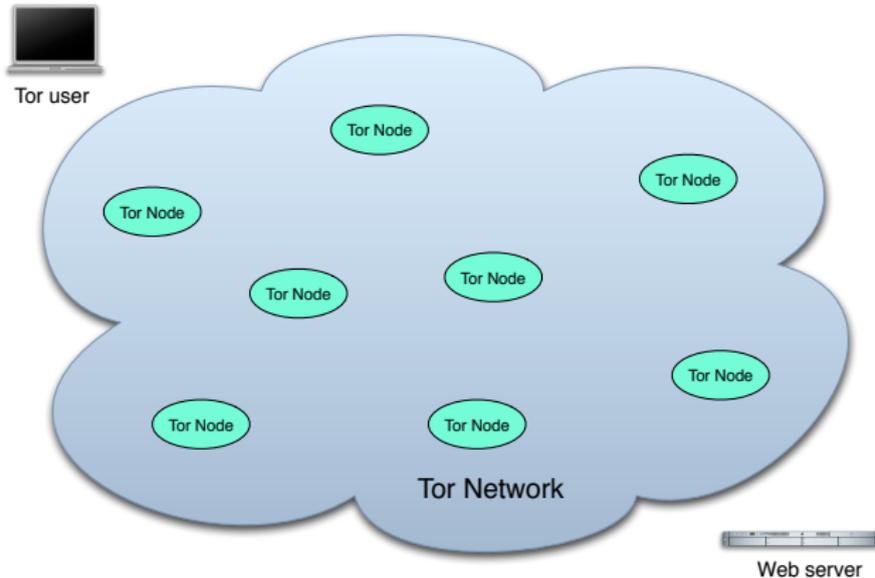
- Software to resist censorship should
 - Hide where user is visiting (to prevent blocking)
 - Hide who the user is (to protect them from intimidation)
- These properties should be maintained even if the censorship resistance system is partially compromised



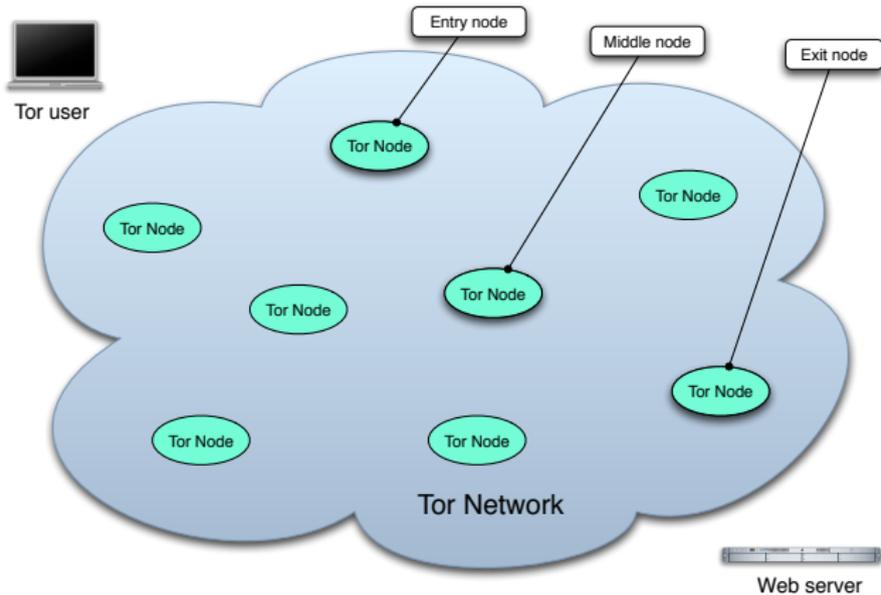
Limitations of censorship resistance

- Censorship resistance is thought controversial – especially by the censors
- There is something for everyone to like, and something for everyone to dislike, going on with censorship resistance systems
- Bad people do use them to do bad things (for many different definitions of bad people)
- It is impossible to block bad uses, even if we could come up with a common definition of bad content
- The systems are not perfect, so it is possible some people will be caught

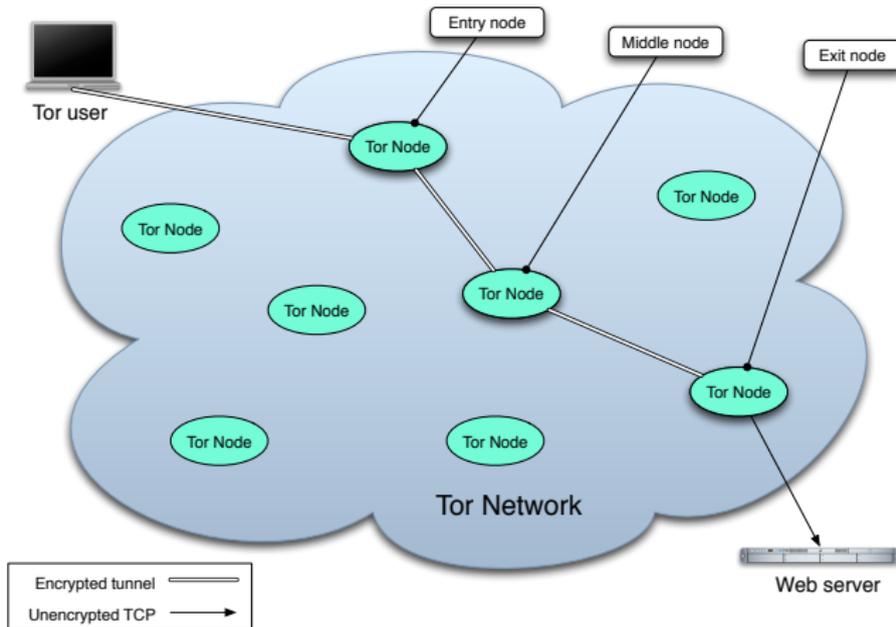
Tor hides communication patterns by relaying data through volunteer servers



Tor hides communication patterns by relaying data through volunteer servers



Tor hides communication patterns by relaying data through volunteer servers



Tor hidden services allow censorship resistant hosting of services

Wikileaks - Wikileaks - Mozilla Firefox

http://gaddbiwdfatpglkq.onion/wiki/V

Reveal it! Report it! Reform it!

Wikileaks helps everyone safely expose corruption in government and other organizations.

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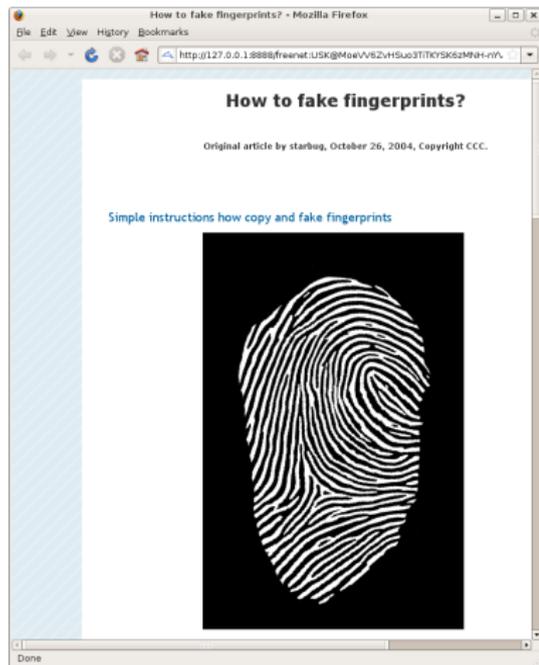
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Main Page (secure)
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Donate

http://gaddbiwdfatpglkq.onion/wiki/East_Timor:_Leaked_autopsy_report_shows_alleged_"coup"...

Tor Enabled

Freenet is an anonymous content distribution network

- While Tor allows access to the Internet, Freenet creates a private network
- Users can create websites, share files and send/receive emails between other members of the network
- Content is hosted by sharing it amongst users of the network
- Users cannot select what content they host, and it is stored in an encrypted form



Psiphon a is censorship resistance system with different tradeoffs to Tor

- There is no centralized control, so it is hard to block but also hard for user to find a server
- Users do not have to download software, but this limits the strength of protection
- If the user cannot modify browser settings or install software, Psiphon is still usable
- Users within a censored country can ask someone they trust outside of the country to install the Psiphon server



Ethical issues in censorship resistance

- People take risks in using censorship resistance systems, and contributing to them – many of these risks are not well understood
- Censorship resistance systems are used for evil, as well as for good – does the latter outweigh the former
- Censorship does serve a useful purpose for some people – when is it acceptable
- Is it appropriate to develop censorship software, deploying in countries with poor human right records, building list of blocked sites, designing surveillance systems

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Discuss