

Scaling and tunneling the Great Fire Wall of China

Rodney Beard

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Background

Scaling and
tunneling the
Great Fire Wall of
China

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Introduction

Tunneling

Scaling

How the West
blocks China

- ▶ One year in China at China Agricultural University (CAU), Beijing
- ▶ China Agricultural University # 6 ranked University in China, # 1 ranked in Agricultural Science in China, # 3 Ranked in Agricultural science Globally
- ▶ My background is academic: Interdisciplinary, economics, business (operations research/management science), biology, computing, languages.
- ▶ My research: Computational economics (Scientific programming applied to economics and finance, increasingly computational linguistics (due to private business interests), microeconomic theory

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- ▶ Role at CAU teaching agricultural economics and agribusiness (I do this with a lot of technology)
- ▶ I also teach in the MBA program at Athabasca University, previously taught in Business school at UofA and in Dept of Rural Economy, UofA (1 semester).
- ▶ Also affiliated with Institute for Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, Scotland.

Going to China - Preparation

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- ▶ What I knew (I had been before but a long time ago)
- ▶ Blocked: Google, Facebook (don't use it), Linked.in (maybe)
- ▶ What I needed: Github, Digital Ocean, Piazza, Nb.mit.edu, e-mail
- ▶ First redirect: gmail to my microsoft e-mail account

Checking what is blocked

- ▶ Ask non-technical counterparts in China
- ▶ <http://www.greatfirewallofchina.org/> let's you test whether a website is blocked in China
- ▶ Github comes up as maybe blocked (early 2016). Everything else looks fine.
- ▶ Fly to China

Day One

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It's true gmail is blocked. Everyone tells me I need a VPN.

Later on Day One

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Try logging into Outlook. Can't get in Microsoft is blocking me because I'm in china and finds this suspicious. Password recovery doesn't work. End up having to call Microsoft in Canada.

How does the GFW work?

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Best reference on this is

<http://fermatslibrary.com/s/>

examining-how-the-great-firewall-discovers-hidden-circumvention-servers

- ▶ Active probing of suspicious traffic
- ▶ Deep packet inspection
- ▶ Machine learning
- ▶ 30000 machines employed in China to monitor (sometimes without the user being aware)
- ▶ 16083 prober IP's
- ▶ One recurring IP
- ▶ HQ in Tianjin
- ▶ IP: 202.108.181.70

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How to Webbrowse

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Choices:

VPN or something else. I don't want to use a known VPN because this is likely monitored and could be blocked at any time.

A good overview of alternatives is available here:

<http://blog.zorinaq.com/>

[my-experience-with-the-great-firewall-of-china/](http://blog.zorinaq.com/my-experience-with-the-great-firewall-of-china/)
(I discovered this later also thanks to Steve for posting this in Slack).

Bevand's Four Ideas (previous link)

Bevand is an infosec guy so the better reference.

- ▶ Idea1 : socks tunnel
\$ google-chrome --proxy-server=socks://127.0.0.1:1080
\$ ssh -D 1080 my-server
- ▶ Idea 2 : Web-proxy
\$ google-chrome --proxy-server=127.0.0.1:1234
\$ ssh -L 1234:127.0.0.1:\$port my-server
- ▶ Idea 3: TLS (Transport Layer Security) connection
- ▶ Idea 4: Random padding packets to circumvent GFW detection
- ▶ I used A socks5 tunnel and configured firefox as my Browser with bash script to switch the tunnel on and off

<https://www.digitalocean.com/community/tutorials/>

how-to-route-web-traffic-securely-without-a-vpn-using-a-socks-tunnel

Limitations of Tunneling

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- ▶ Bevand reported packet loss with this approach, mostly I didn't have much problem but I think my server capacity was a little limited
- ▶ Youtube didn't work
- ▶ Gmail worked without any problems
- ▶ Server dropped out occasionally but it did this with a straight ssh connection as well

Using Slack to Scale the GFW

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- ▶ Slack is not popular in China, Tencent's WeChat dominates (there is a business version a competitor to Slack but they lag in this space)
- ▶ However, Slack is not blocked. (Principle: That which is not popular is not blocked)
- ▶ I discover Slack integrations
- ▶ Blockspring; I add Blockspring as an integration to Slack and then integrate Blockspring and gmail (This requires obtaining an API key from Blockspring)
- ▶ This let's me read gmail in Slack on my phone effectively scaling the firewall.
- ▶ The nice thing about cloud integrations is they are customizable and reconfigurable (so you can adapt them to any blocking attempt - just switch integration platforms)

Local network issues

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- ▶ Static IP's used everywhere.
- ▶ University has these partitioned off (needed to work around this for teaching so I could use Splashtop)
- ▶ Splashtop Let's me control my Laptop from my phone
- ▶ Was able to bypass University firewall by upgrading my Splashtop account (Access from Anywhere option)

Website Design

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- ▶ a lot of access issues are due to things like geo-blocking
- ▶ Poor web design not thinking about what scripts will run where
- ▶ some of this is also more sinister

Example

- ▶ Piazza (a learning management system) used Cloudflare for faster page loading
- ▶ In March this year Piazza suddenly started to be throttled and sometimes didn't load at all. Investigation showed it was hanging when trying to load scripts from Cloudflare.

Example

- ▶ Late last year Cloudflare partnered with Baidu to deliver services in China
- ▶ To allow access from China to sites using Cloudflare it is now necessary to purchase an ICP license in China (even for websites outside of China - Cloudflare and Baidu may have modified their implementation of this in the last couple of weeks).

Some links:

<https://blog.cloudflare.com/>

[how-we-extended-cloudflares-performance-and-security-into-mainland-china/](https://blog.cloudflare.com/how-we-extended-cloudflares-performance-and-security-into-mainland-china/)

<https://www.nytimes.com/2015/09/14/business/>

[partnership-boosts-users-over-chinas-great-firewall.html](https://www.nytimes.com/2015/09/14/business/partnership-boosts-users-over-chinas-great-firewall.html)

Miscellaneous

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Tor doesn't work

Reports say that the EPIC browser does work (I haven't tested this)

Lantern (might work as well)

https://getlantern.org/en_US/

Thanks

Thanks for listening!

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