A Wall Behind A Wall: Emerging Regional Censorship in China

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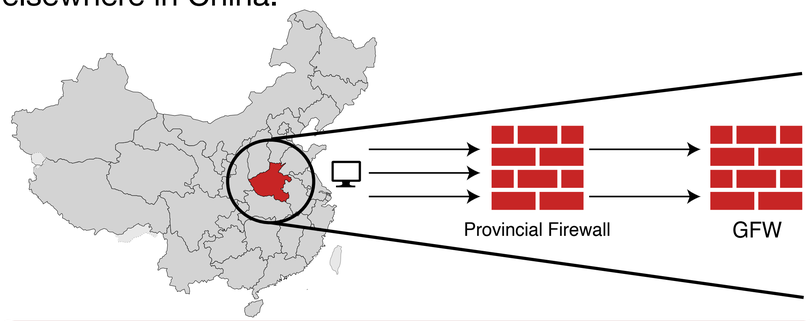
Project Homepage

Discovering Regional Censorship

China has long employed **centralized blocking policies and implementations,** namely the Great Firewall of China.

In August 2023, users in **Henan** province reported losing access to some websites that were still reachable elsewhere in China.



Henan has deployed its own HTTP Host-based & TLS SNI-based firewall to censor traffic leaving the province.

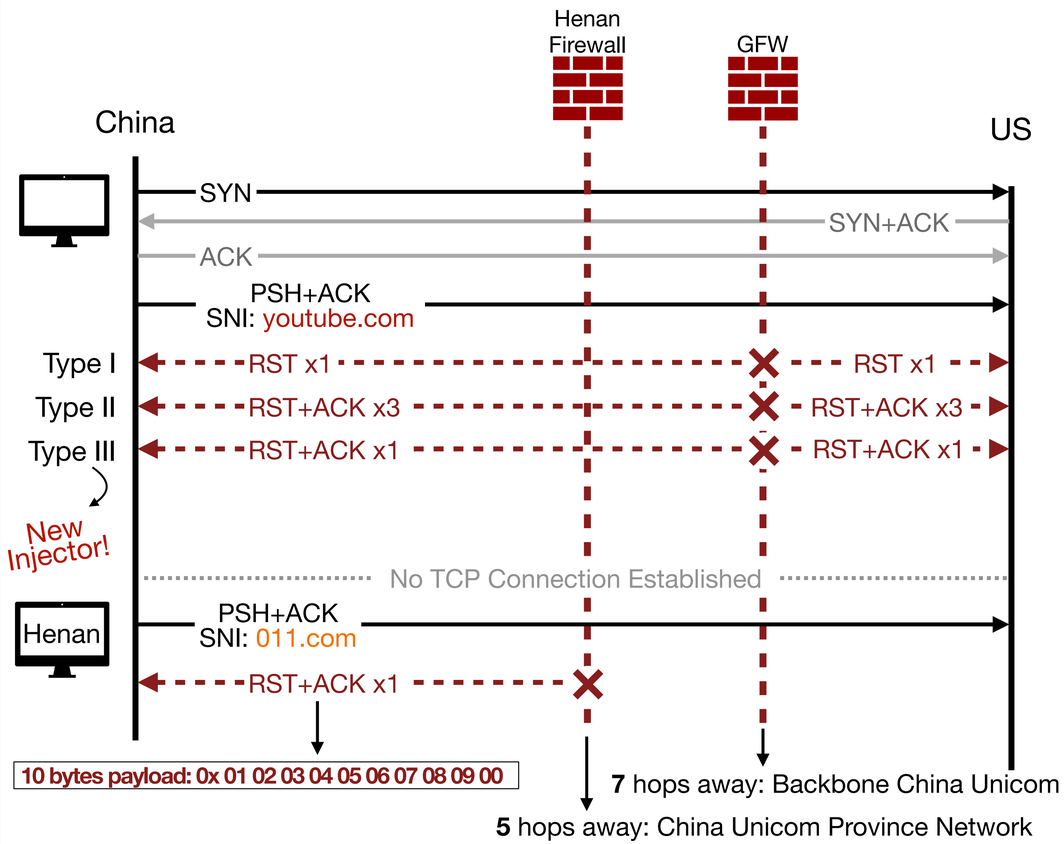
CLIENTS \ SERVERS	Beijing	Sichuan	Chongqing	Guangdong	Jiangsu	Shanghai	Henan
Beijing	0	0	0	0	0	0	0
Sichuan	0	0	0	0	0	0	0
Chongqing	0	0	0	0	0	0	0
Guangdong	0	0	0	0	0	0	0
Jiangsu	0	0	0	0	0	0	0
Shanghai	0	0	0	0	0	0	0
Henan	123	122	122	122	124	122	0

Blocked-domain counts per client→server pair, based on TLS probes using SNIs from the top 10K Tranco domains.

No evidence of inter-provincial blocking in any other tested regions; Henan is the first confirmed case.

Henan Firewall v.s. The Great Firewall (GFW)

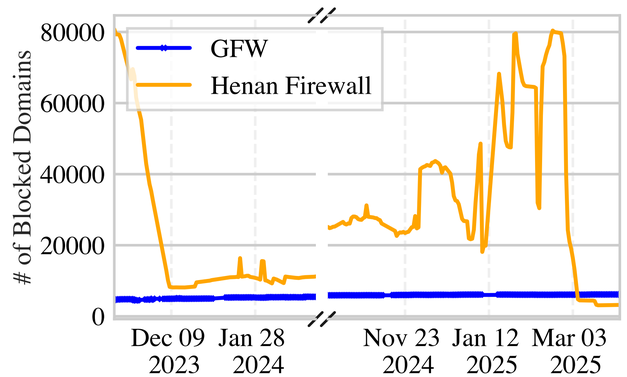
We measure the Henan Firewall and compare it with the GFW: the Henan Firewall is **less sophisticated** and exhibits more parsing flaws.

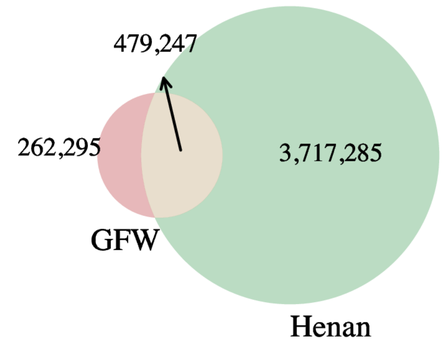


Circumvention Strategies

Client-Side Circumvention Strategies	GFW	Henan Firewall
TCP Segmentation	✘	✔
TLS Fragmentation	✔	✔
Enable any TCP options (e.g. Timestamps), making TCP Header Length > 20 bytes	✘	✔
Ignore TCP RSTs with payload	✘	✔

Comparing the Blocklists





Henan Firewall's blocking is **more aggressive and volatile** than the GFW due to its frequent blocking and unblocking of generic second-level domains (e.g., *.org.uk, *.com.au). It once blocked **10×** more domains than the GFW.

Takeaways

- China's Internet censorship **is no longer strictly centralized**.
- Fragmented regional censorship **complicates both measurement & circumvention efforts**.