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Digital Discrimination of Users in Sanctioned States: The Case of the Cuba Embargo

Anna Ablove , Shreyas Chandrashekar, Hieu Le, Ram Sundara Raman, Reethika Ramesh, Harry Oppenheimer*, and Roya Ensafi

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Understanding Assad's New Cyber-Crackdown in Syria

The New Year Brings Greater Censorship and Repression in Russia

Censorship Major Tool Of Suppression, Iranian Writers Say

Iran unveils plan for tighter internet rules to promote local platforms

Russia Strengthens Its Internet Controls in Critical Year for Putin

Sanctions Can Deny Internet Access When People Need It Most

**The Invasion of Ukraine is
Horrific. Cutting the Russian
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Iranian Tech Users Are Getting Knocked Off the Web by Ambiguous Sanctions

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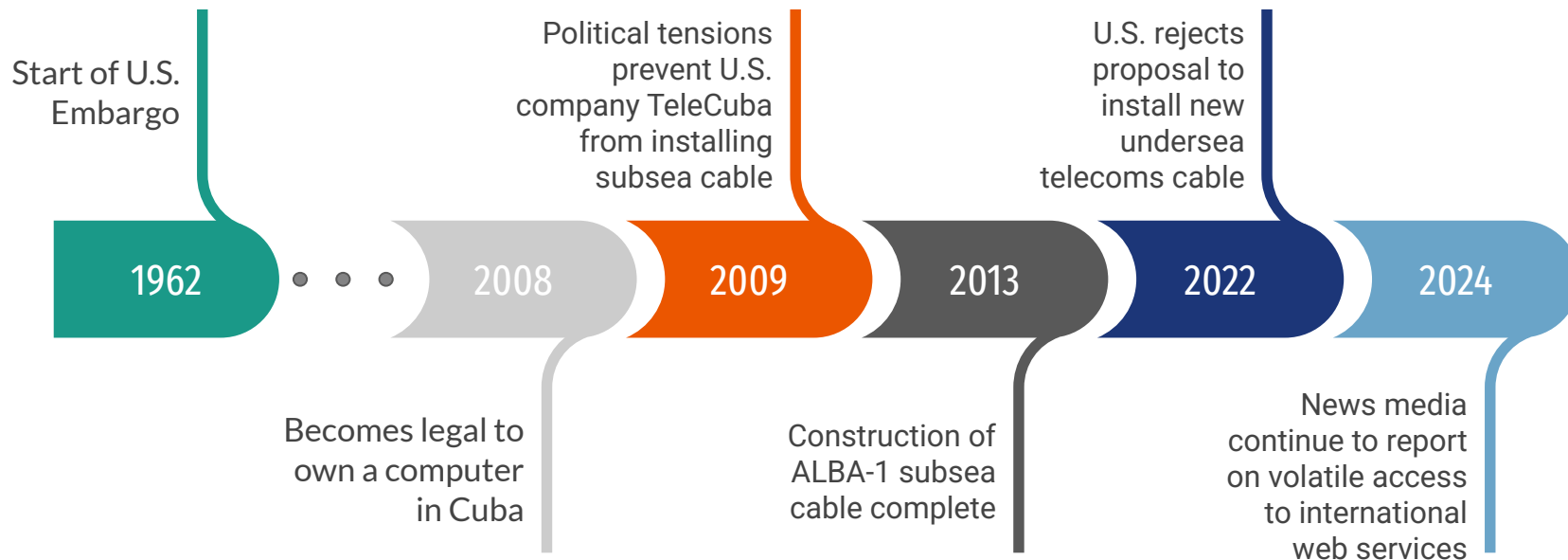
'Give Us a Break!' Cuban Activists Say U.S. Sanctions Are Blocking Them from Online Services

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Cuba Internet History



From Sanctions to Geoblocking

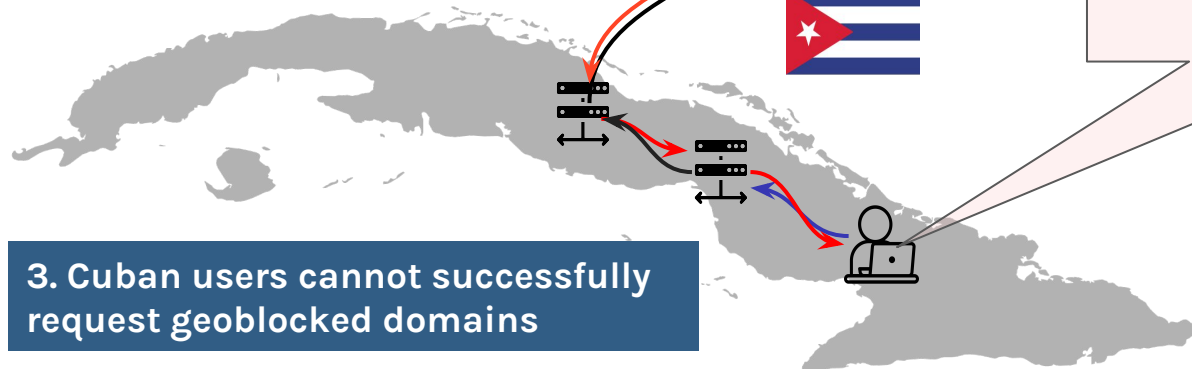
1. Regulatory bodies publish sanctions



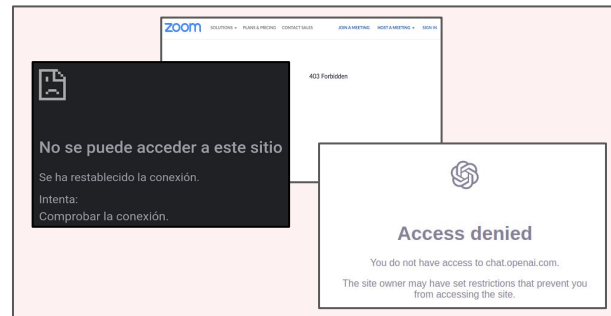
2. Providers interpret legislation and implement geoblocking



Hola VPN
Tik Tok
Zoom
Webex



3. Cuban users cannot successfully request geoblocked domains



Geoblocking: Server-side blocking on the basis of a user's location

Research Questions

1

What sort of **content** is **geoblocked**?

2

How is geoblocking **implemented** at the network layer and how does this impact **auditability**?

3

How do current geoblocking implementations help or hurt **user transparency**?

Challenges

Ethics

Addition of sanctions
increases complexity

↪ Need to **engage with**
Office of Foreign
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(OFAC) and IRB



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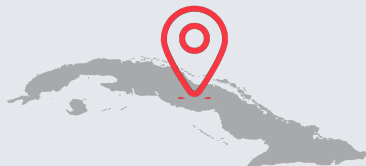
- ↪ Need to **engage with Office of Foreign Assets Control (OFAC)** and IRB



Vantage Point

Sanctions and **poor infrastructure**

- ↪ Obtain a VP from a collaborator in **state-owned, only public ISP**



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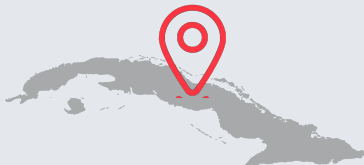
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User Perspective

Wanted to **center user perspective** and learn about geoblocking first-hand

- ↪ Engage with 10 tech-savvy **users** in **small-scale study**



Insights from User Study

- Observed consistent levels of **frustration** at the **negative impacts** of embargo sanctions
 - ◆ Career opportunities and general information access especially affected
- Participants **report 123 domains** as **geoblocked**
- Suggested **lack** of geoblocking **transparency**

"...it makes it impossible for us to create projects that can be used internationally."

"Blocked sites only affect the people who need the knowledge, not the government."

"It is another form of segregation."



Measurement and Attribution of Geoblocking

Test list: Tranco Top 10K list + domains from the user-study

Control runs: Run control measurements from the U.S. and U.K.

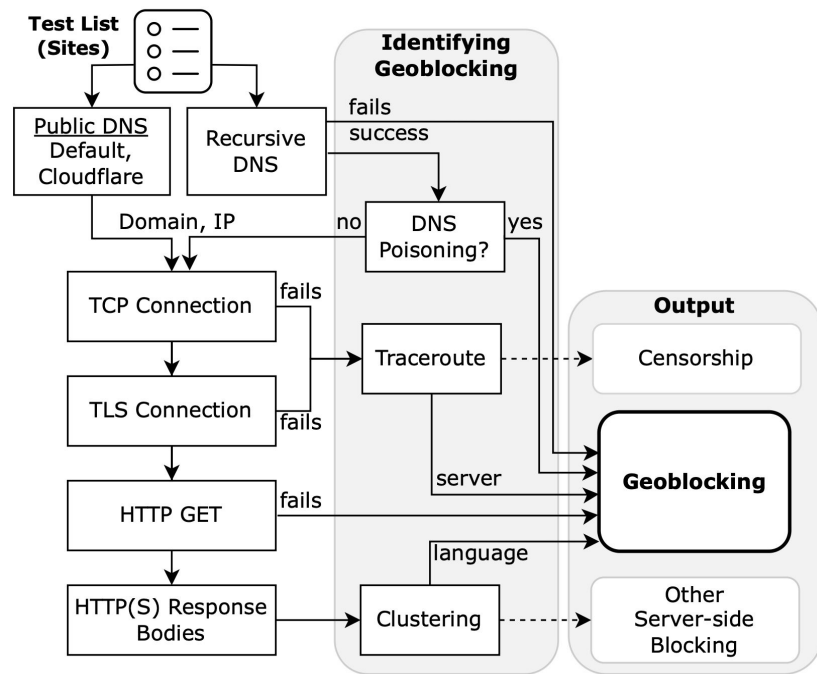
Challenges of Attribution

We need to handle other reasons for failure:

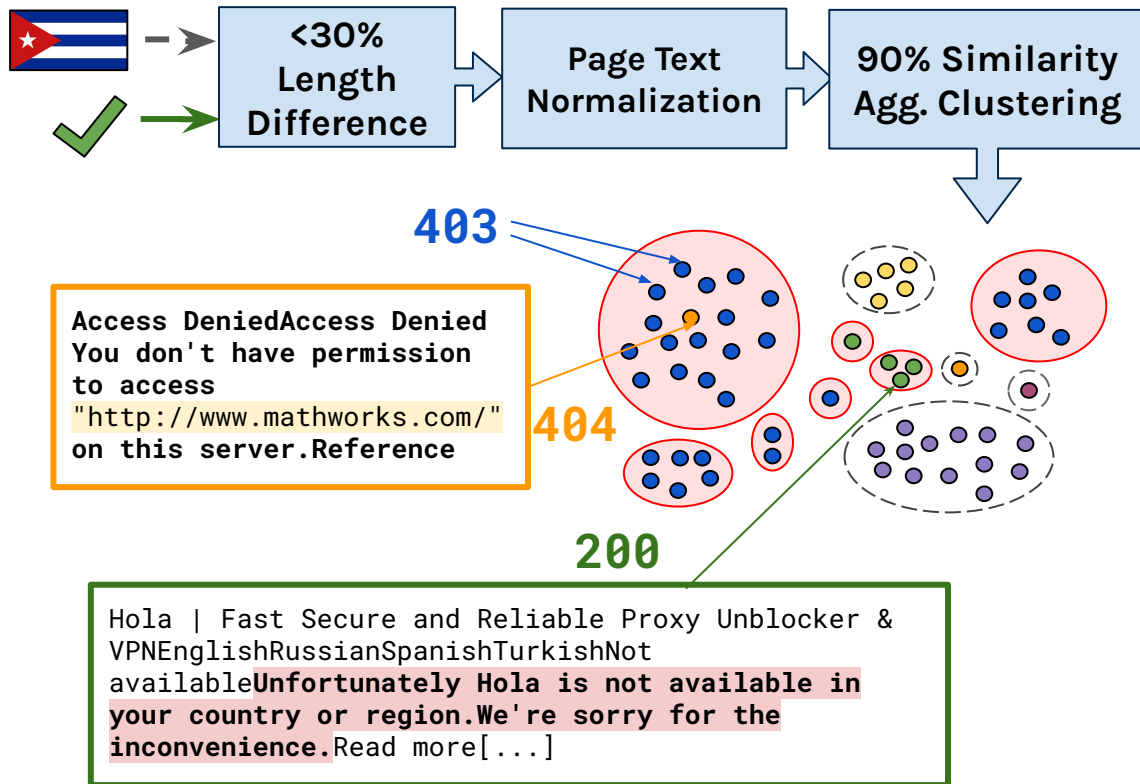
→ Slower measurement runs to handle poor network conditions



→ Traceroutes for censorship by Cuban government to isolate location of failure



Example: Blockpage Attribution



1. Parse HTML text and isolate variant responses
2. Apply normalization heuristics
3. Use agglomerative clustering to group fingerprints
4. Mark clusters with 403 or 451 error codes as geoblocking
5. Inspect remainder for geoblocking-explicit language

Prioritizing Attribution

Manual Examination of Geoblocked domains



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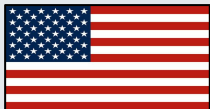
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3. You are single or are separated from your spouse;
4. You are not located in a country that is subject to a U.S. Government embargo, or that has been designated by the U.S. Government as a "terrorist supporting" country;



Cuban Perspective



No se puede acceder a este sitio

Se ha restablecido la conexión.

Intenta:

Comprobar la conexión.

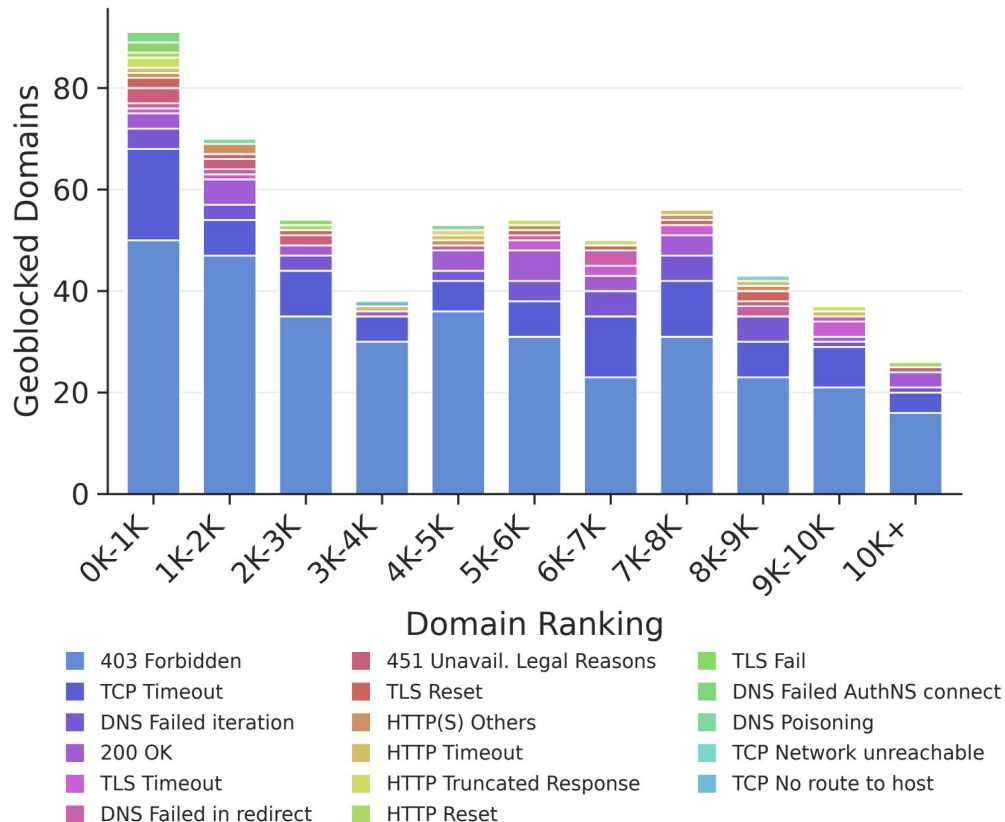


Findings – Geoblocking Characterization

We find **546 domains** geoblocked by **17 distinct implementations**

↳ **403 Forbidden** and **TCP Timeouts** most frequent

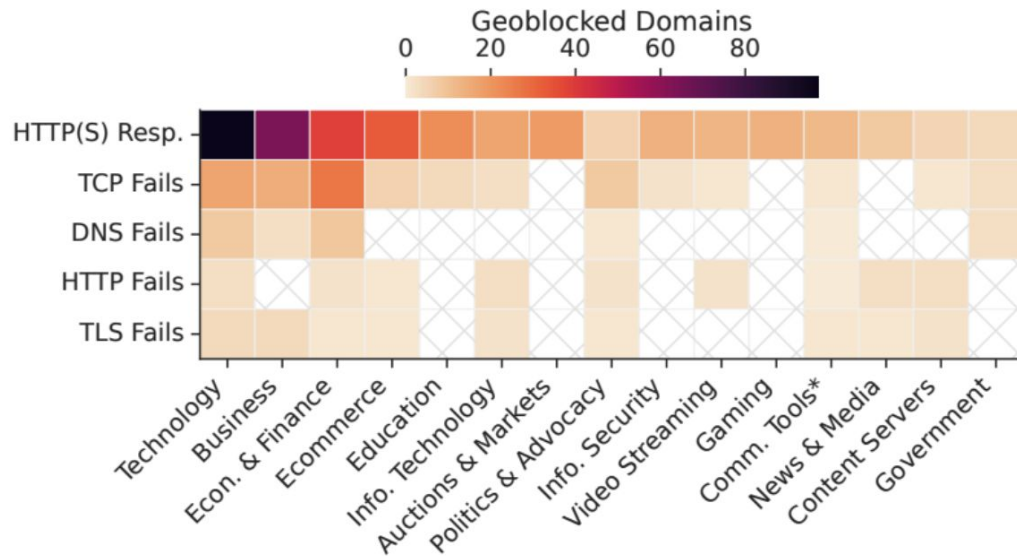
27% of geoblocked domains are in the Tranco **top 2K**



Findings – Geoblocking Characterization

Highest number of blocking in the categories of **Technology, Business,** and **Economy & Finance**

↪ Also see blocking in **Education** and **Communication Tools**



Findings – User Transparency

Transparency	Example Responses	Fingerprints	Domains	Disclosed
Informative	“This server denied by region”, “Not available in your area” ”IP address associated with a country or region currently subject to U.S. economic and trade sanctions”	48	79	59.5%
Vague	“Access Denied”, “403 Forbidden”, “Request blocked”	24	182*	30.2%
None	“There was a problem with the request”, “Error”	28	135*	30.4%

88% of geoblocked domains **do not serve informative notice** why they are blocked

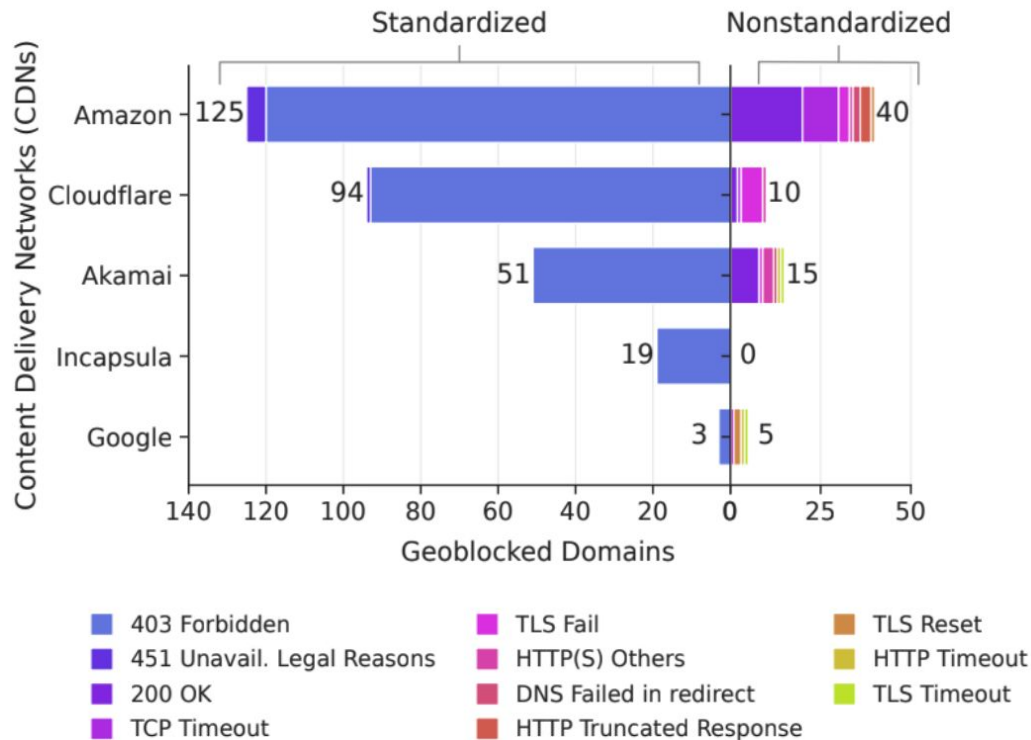
We **classify blockpage** fingerprints by **clarity**: informative, vague, or none

↪ Only find **79 informative** blockpages

Findings – Standardization Infrastructure

Infrastructure like **CDNs** is **underutilized by clients**

- Implementations can **vary widely** even **within CDNs**
- See **non-standard blockpages** served with error codes other than 403 (Forbidden) or 451 (Unavailable for Legal Reasons)

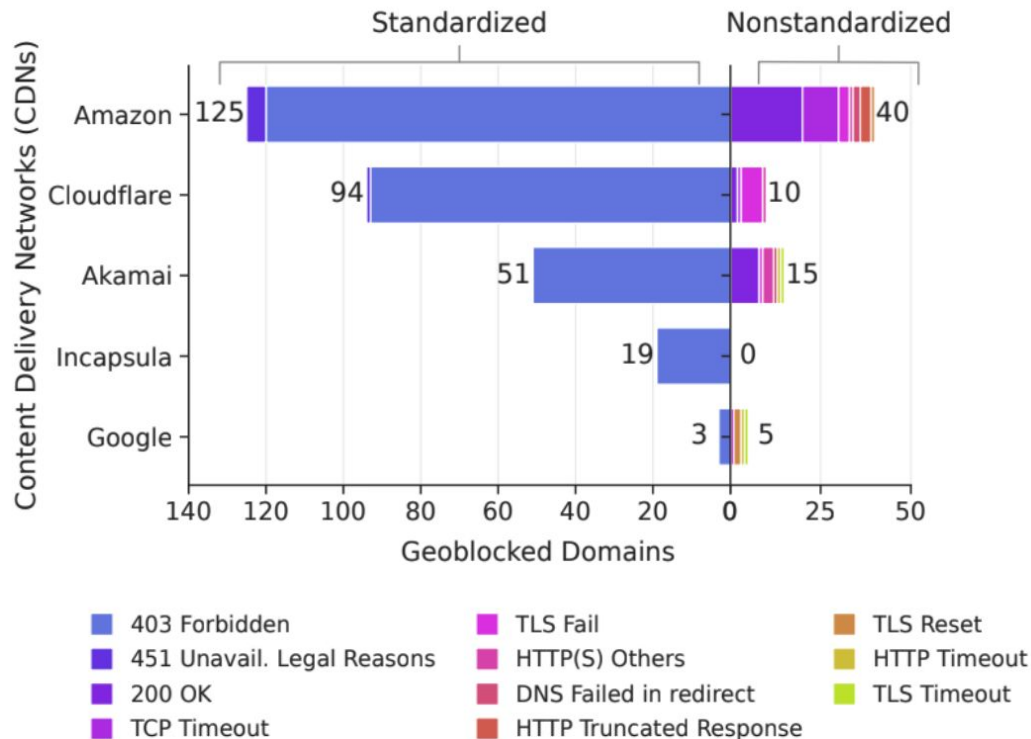


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32 blockpages served with **200 OK**



403 ERROR

The request could not be satisfied.

The Amazon CloudFront distribution is configured to block access from your country. We can't connect to the server for this app or website at this time. There might be too much traffic or a configuration error. Try again later, or contact the app or website owner. If you provide content to customers through CloudFront, you can find steps to troubleshoot and help prevent this error by reviewing the CloudFront documentation.

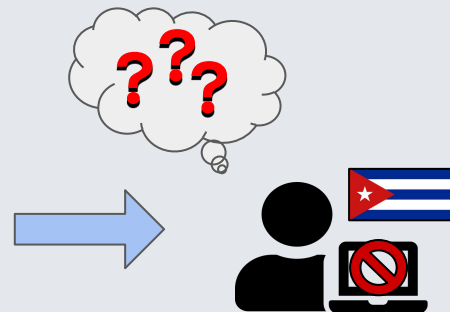
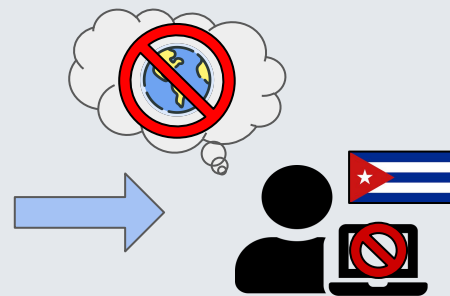
Generated by cloudfront (CloudFront)Request ID: A60WUQV-cC3V7rtgXBP-Ko0nuWps5wDxcjVqsfgWlxPhwXvg09QqDw==

403 ERROR

The request could not be satisfied.

Request blocked. We can't connect to the server for this app or website at this time. There might be too much traffic or a configuration error. Try again later, or contact the app or website owner. If you provide content to customers through CloudFront, you can find steps to troubleshoot and help prevent this error by reviewing the CloudFront documentation.

Generated by cloudfront (CloudFront)Request ID: _j-Tg14UCztY0HwscV5NQAfUFWREKMTtoAC5eqFieE4u6q1J9zidJXQ==



Recommendations

Service providers should implement standardized, transparent blockpages to ease auditability and help end users

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Recommendations

Policymakers must work more directly with service providers for large-scale, impactful improvements

- ↪ U.S. Government spent \$47M over the past 3 years to aid free flow of information in Cuba
- ↪ Need better strategies to reduce Internet splintering

Recommendations

As researchers with the capacity to technically audit this ecosystem, we should engage more to encourage positive change



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