

Challenges in Measuring and Evading Nation-state Censors

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<https://censorship.ai>

Censorship is common, diverse, and adaptive

Diversity of censors

Diversity of protocols

HTTP HTTPS DNS FTP SMTP

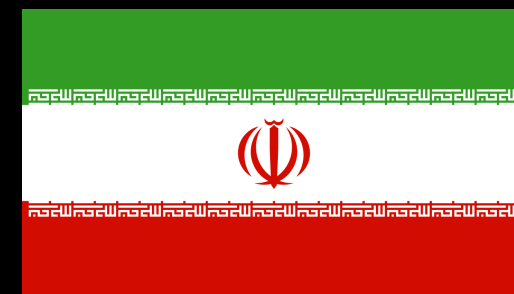
Injects TCP RSTs



China



Injects, blackholes,
filters protocols



Iran



Injects, blackholes,
fake root certs



Kazakhstan



New techniques
added in the past year

Injects a block page



India



Fundamental research questions

① How do sensors operate?

How do they censor?
Whom? What content?

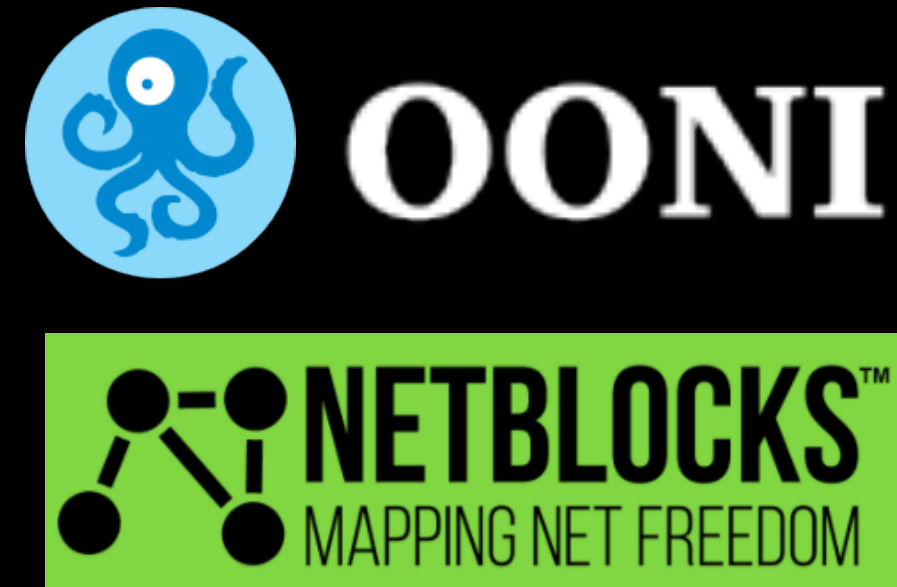
② How can censorship be circumvented?

What techniques work?
Where? For what content?

Answering these questions can help
create a more free and open Internet

Fundamental research questions

① How do censors operate?



② How can censorship be circumvented?



Ingredients of censorship research

Longitudinal data

Capture ephemeral “censorship events”
Observe changes in the deployment

Vantage points

Inside/near censoring regimes
Broad coverage of ISPs and protocols

— Volunteers often donate vantage points

— Researchers sometimes identify unwitting vantage points

Echo servers

Users' browsers

*Government-run
infrastructure*

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Community

Volunteers to donate resources, inform
Anti-censorship tools to inform, deploy

Challenge: Barrier of entry

Community

Volunteers to donate resources, inform
Anti-censorship tools to inform, deploy

Without these connections, it is difficult to
enter this space, **reproduce results**, or avoid pitfalls

Proposal: Partner with the broader anti-censorship community

OONI Slack

OTF

State Dept.

Early ideas

Deployments

Challenge: Safety and ethics

Safety of measurement
participants

Volunteering a vantage point
Running evasion software

Safety of researchers
(*esp. students*)

Exposing censorship details
Empowering political activists

Proposal: Develop shared knowledge

*What are
the risks?*

*How to
explain them?*

*How to
mitigate them?*

IRB is not enough

Measuring and evading nation-state censors

Challenges

Vantage points

Reproducibility

Safety

Ethics

Proposals

*Shared
knowledge*

*Shared
infrastructure*

*Engagement with
community*

NSF's potential roles

- Fund longitudinal, safe measurement infrastructure
- Provide a venue for best practices, safety, ethics
- Bridge between early research (OTF) and deployment (State Dept)