



Refraction Networking

TECHNOLOGY NUMBER: 2024-046

Technology ID

2024-046

Category

Software

Software & Content

Inventor

Scott Wolchok

Eric Wustrow

J. Alex Halderman

Further information

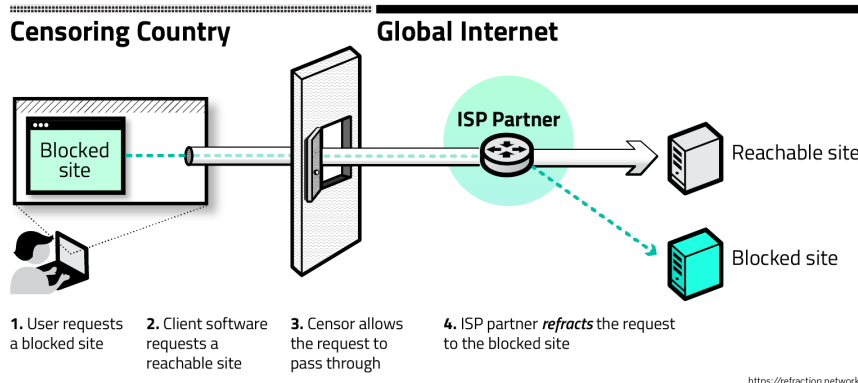
Ashwathi Iyer

ashwathi@umich.edu

Innovation Partnerships Tech

Marketing Team

IPInventions@umich.edu



OVERVIEW

Refraction networking for robust censorship circumvention.

- Integrates proxy functionality within network core, making censorship prohibitively costly
- Applies to internet freedom, bypassing censorship, secure global communication

BACKGROUND

Internet censorship is a global issue, with many countries imposing restrictions on access to websites and online services. Historically, approaches to circumventing censorship have included the use of VPNs, proxies, and Tor networks. However, these technologies typically face limitations such as being easily blocked by censors, requiring significant user effort to configure, or degrading the speed and quality of internet connections. The need for improved methods arises from an ongoing cat-and-mouse game between censors and users seeking free access to information. Existing solutions often fail to maintain consistent access to censored content without being quickly detected and blocked. Hence, there is an urgent demand for robust and resilient technologies that can seamlessly integrate into the existing infrastructure and offer users a reliable means to bypass censorship without sacrificing performance or security.

INNOVATION

Refraction networking offers a groundbreaking solution to the limitations of traditional censorship circumvention tools. Developed through research at the University of Michigan, and supported by the U.S. State Department, this approach integrates proxy functionality directly into the core of the network by partnering with ISPs and network operators. By dispersing the

View online



proxy service across entire networks, refraction networking makes it exponentially harder for censors to selectively block access points. Notable implementations, like Telex and TapDance, have already demonstrated their effectiveness, with a production deployment serving over a million global users since 2019. The technology's potential applications are vast, ranging from safeguarding Internet freedom in oppressive regimes to ensuring secure, uncensored communication for activists and journalists worldwide. Refraction networking shifts the balance, making censorship not just challenging, but economically and technically unsustainable.

ADDITIONAL INFORMATION

PROJECT LINKS:

- [Refraction Networking Project Website](#)
- [TapDance Code Repository](#)

DEPARTMENT/LAB:

- [J. Alex Halderman, Computer Science and Engineering](#)

LICENSE:

- [Apache-2.0](#)