

Security, Privacy, and Censorship

SIGCOMM 2015 Preview Sessions

Phillipa Gill

Stony Brook University



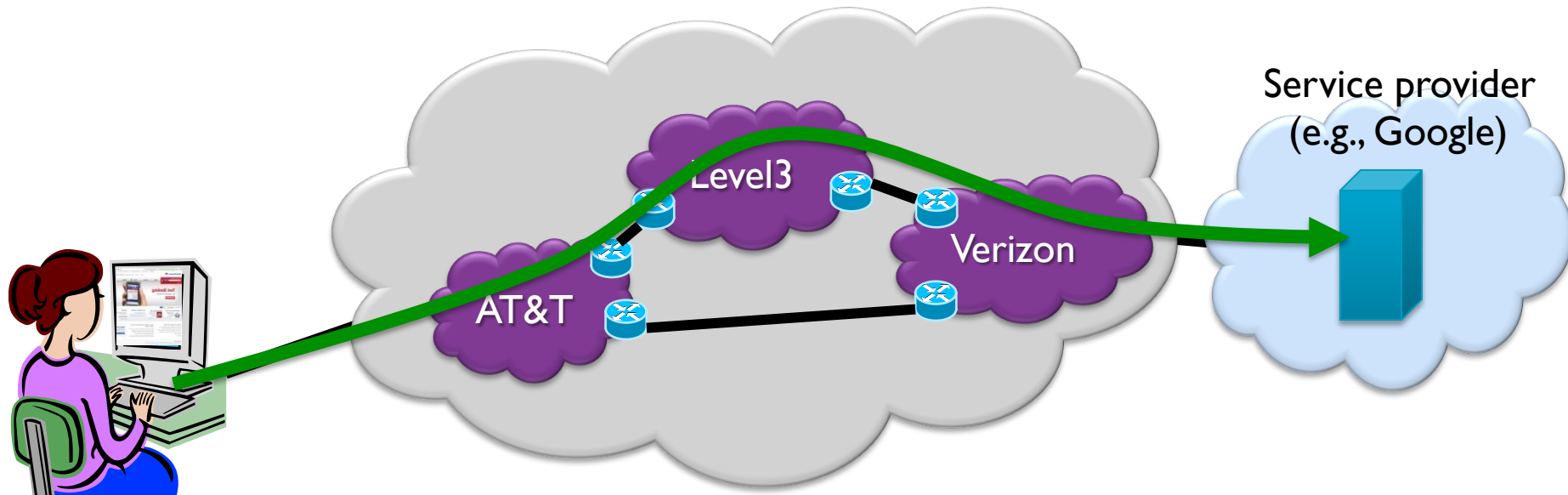
Stony Brook **University**

Networking Research Group

Internet was not designed with security in mind

- Mainly a way for researchers to share/access data

Fine if you just care about accessing data...

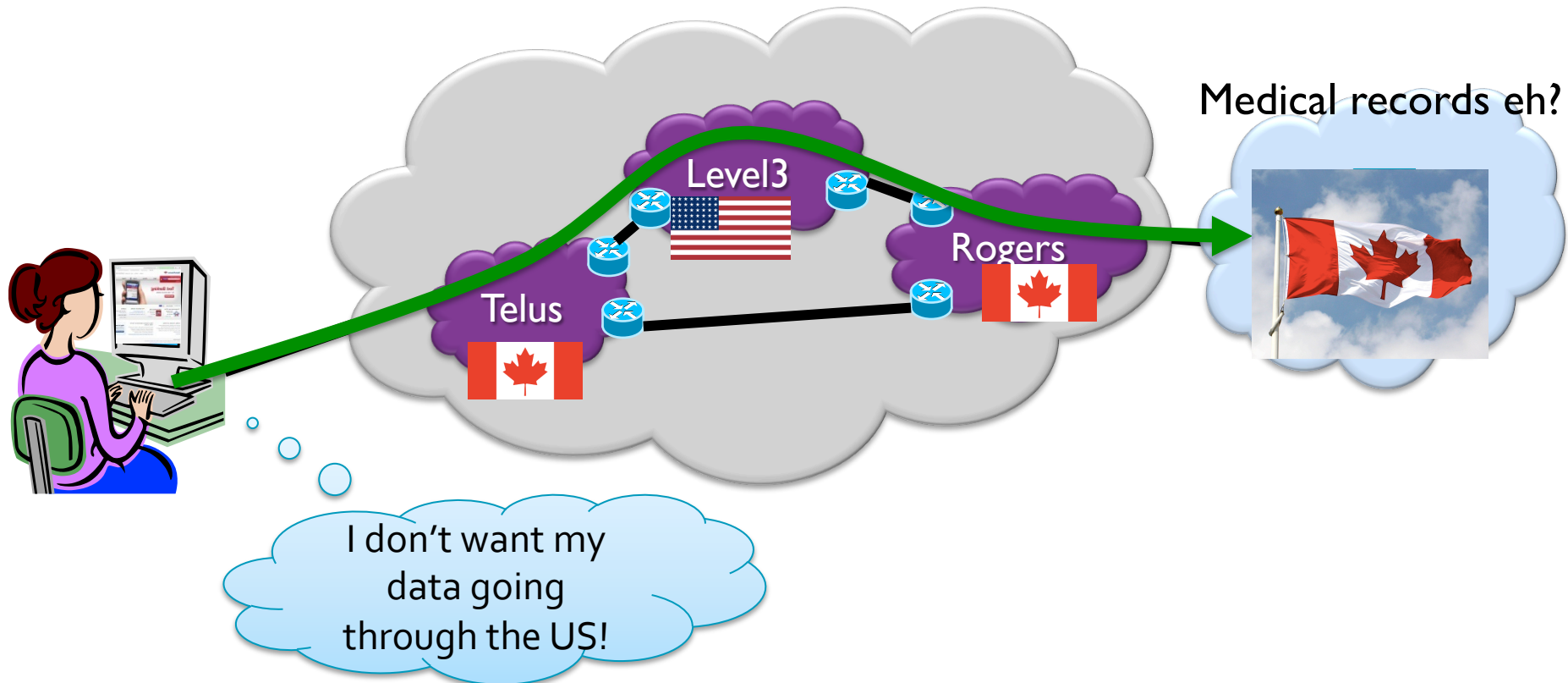


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Fine if you just care about accessing data...

... but what if you want your data to avoid a certain region

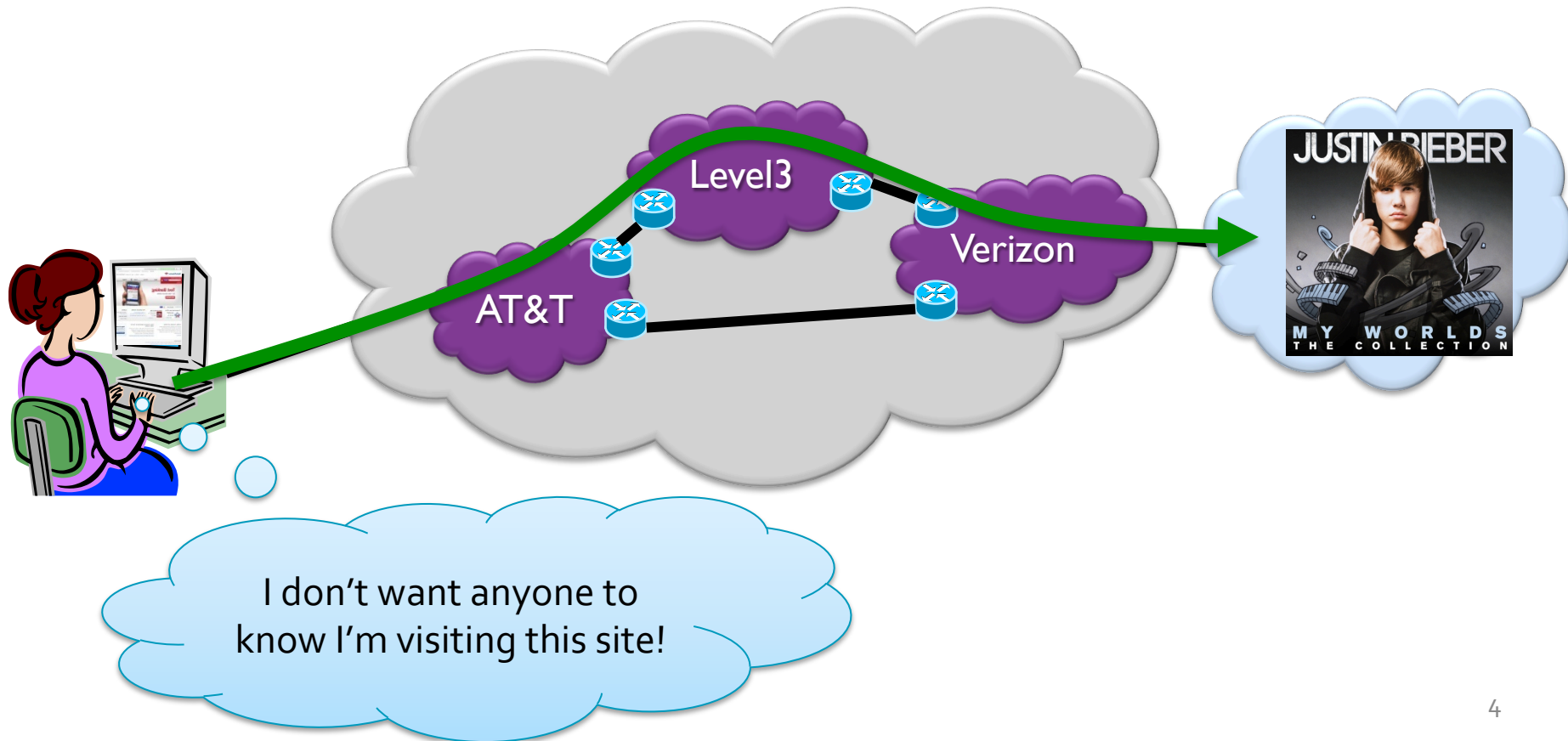


Internet was not designed with security in mind

- Mainly a way for researchers to share/access data

Fine if you just care about accessing data...

... but what if you want to be anonymous?

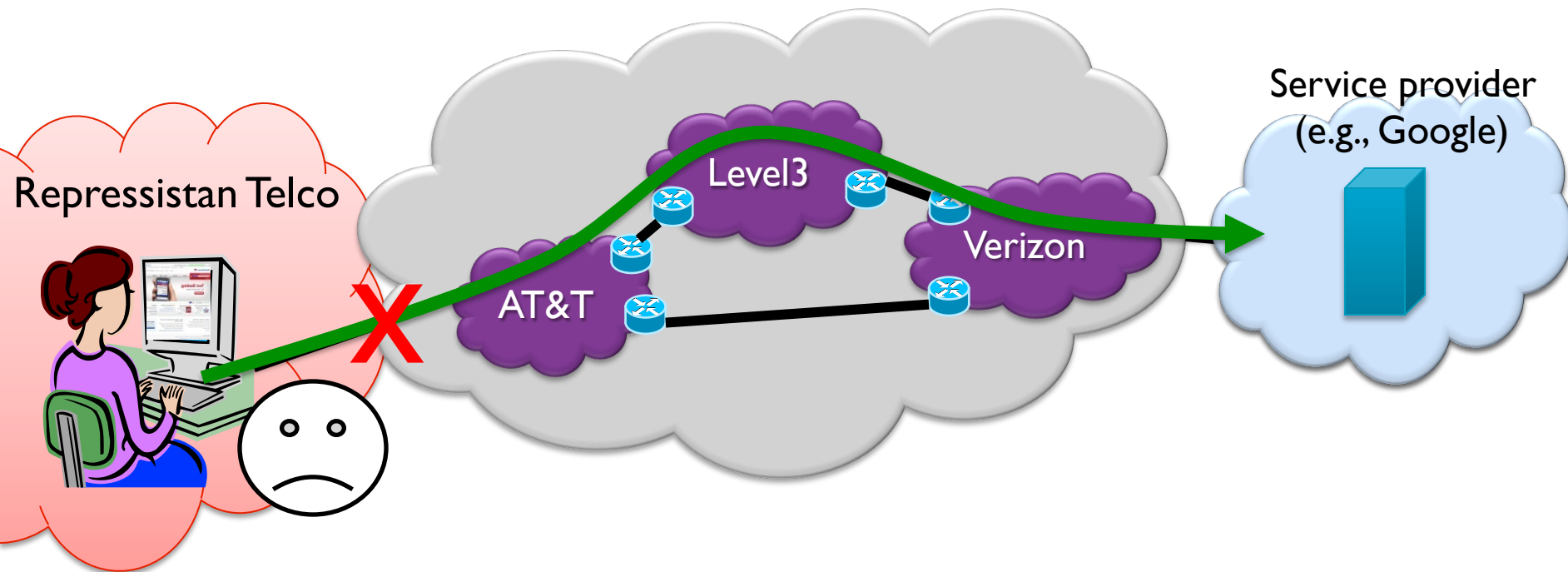


Internet was not designed with security in mind

- Mainly a way for researchers to share/access data

Fine if you just care about accessing data...

... but what if your ISP doesn't want you to access content?

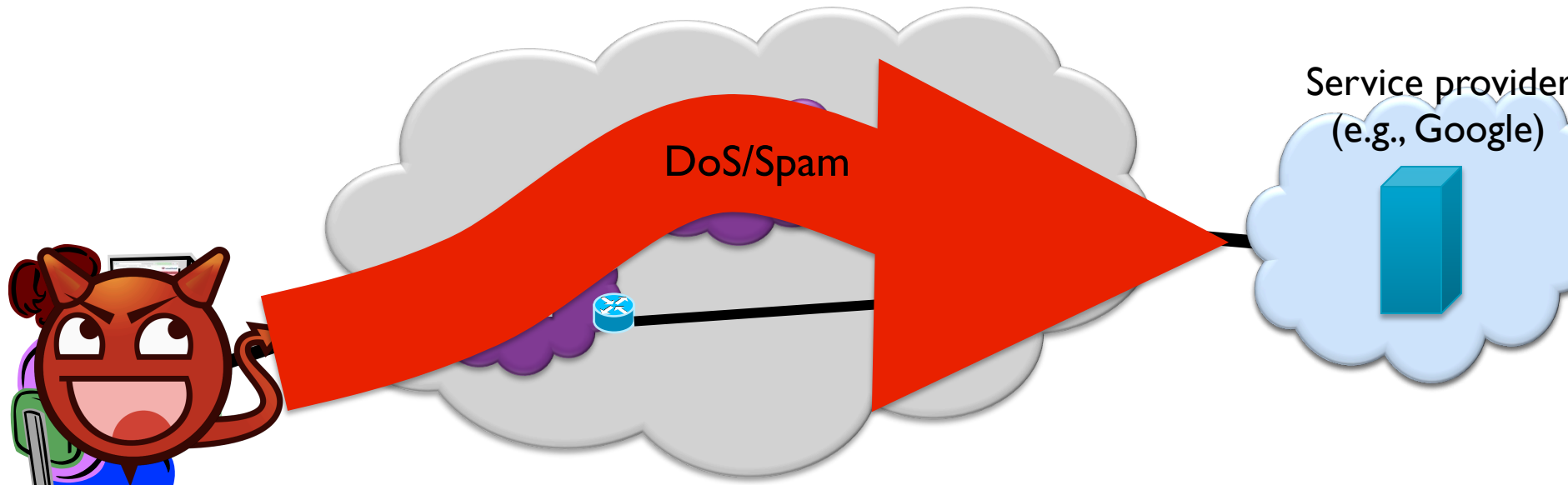


Internet was not designed with security in mind

- Mainly a way for researchers to share/access data

Fine if you just care about accessing data...

... but what if your computer or ISP are compromised?



Security, Privacy, and Censorship

Alibi Routing.

- Dave Levin (University of Maryland), Youndo Lee (University of Maryland), Luke Valenta (University of Pennsylvania), Zhihao Li (University of Maryland), Victoria Lai (University of Maryland), Cristian Lumezanu (NEC Labs), Neil Spring (University of Maryland), Bobby Bhattacharjee (University of Maryland)

Herd: A Scalable, Traffic Analysis Resistant Anonymity Network for VoIP Systems

- Stevens Le Blond (MPI-SWS), David Choffnes (Northeastern University), William Caldwell (MPI-SWS), Peter Druschel (MPI-SWS), Nicholas Merritt (MPI-SWS)

Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests

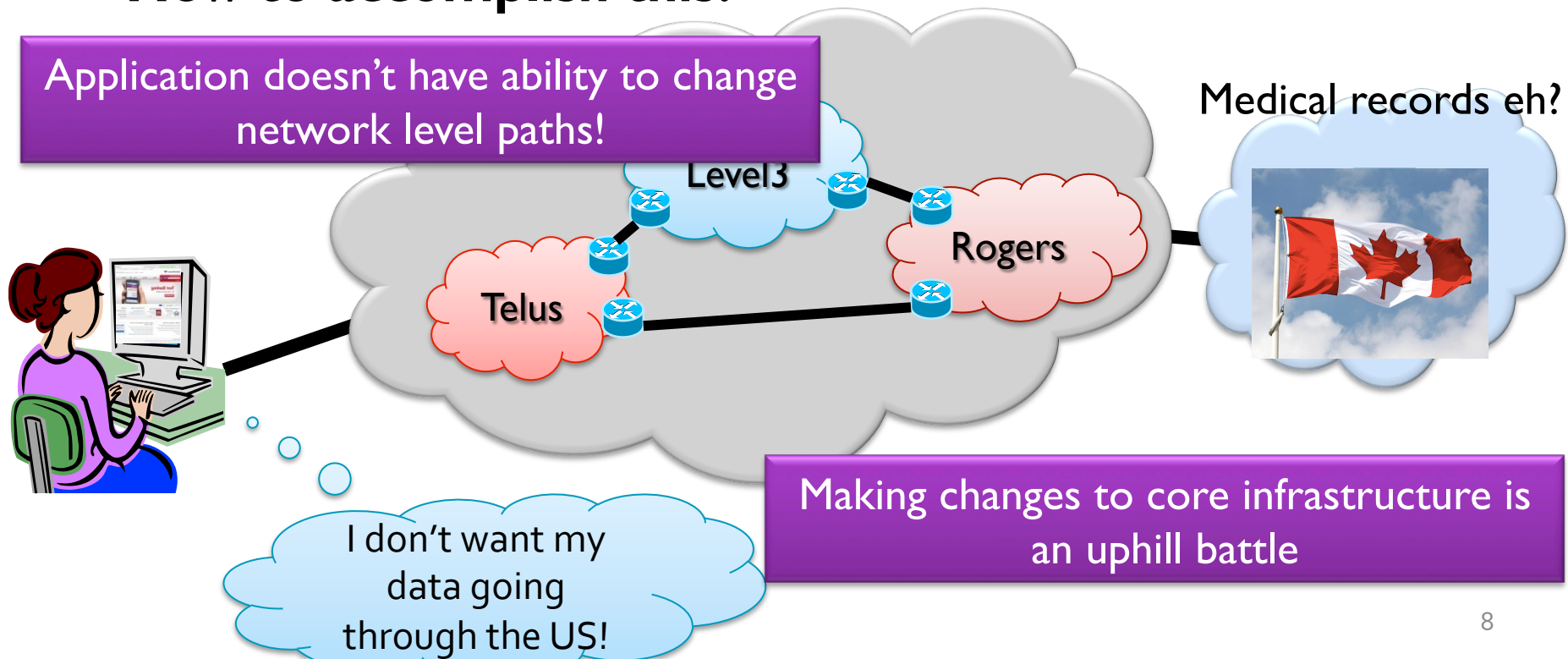
- Sam Burnett (Georgia Tech), Nick Feamster (Princeton)

ASwatch: An AS Reputation System to Expose Bulletproof Hosting ASes

- Maria Konte (Georgia Institute of Technology), Roberto Perdisci (University of Georgia), Nick Feamster (Princeton University)

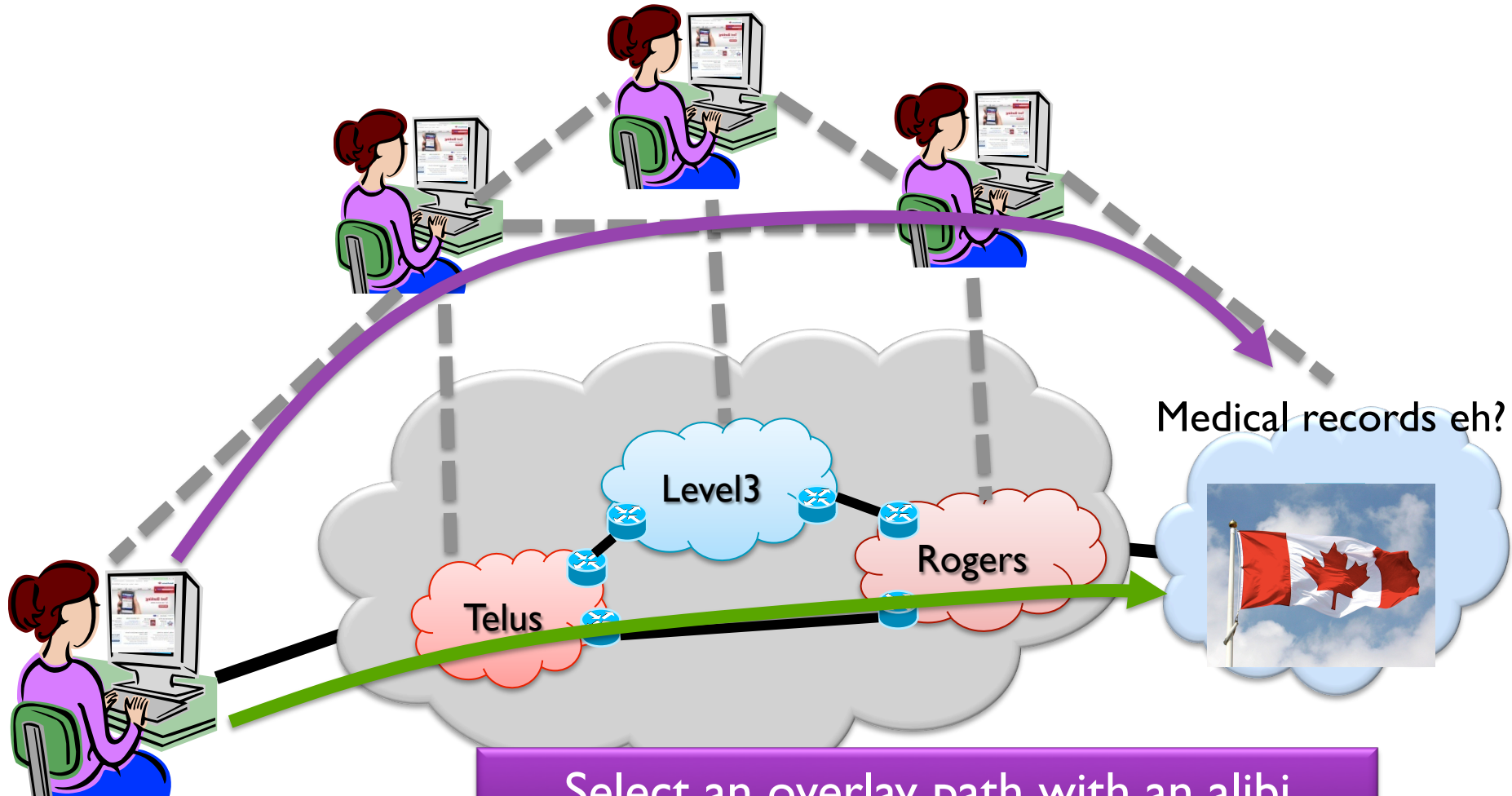
Alibi Routing

- **Motivation:** What if you want your traffic to avoid a certain geographic region?
 - Canadian health data cannot flow into US
 - Maybe you want to avoid a country that performs filtering
 - Related reading: [CCR paper by anonymous](#)
- **How to accomplish this?**



Alibi Routing

- **Key idea:** Routing in an application layer overlay



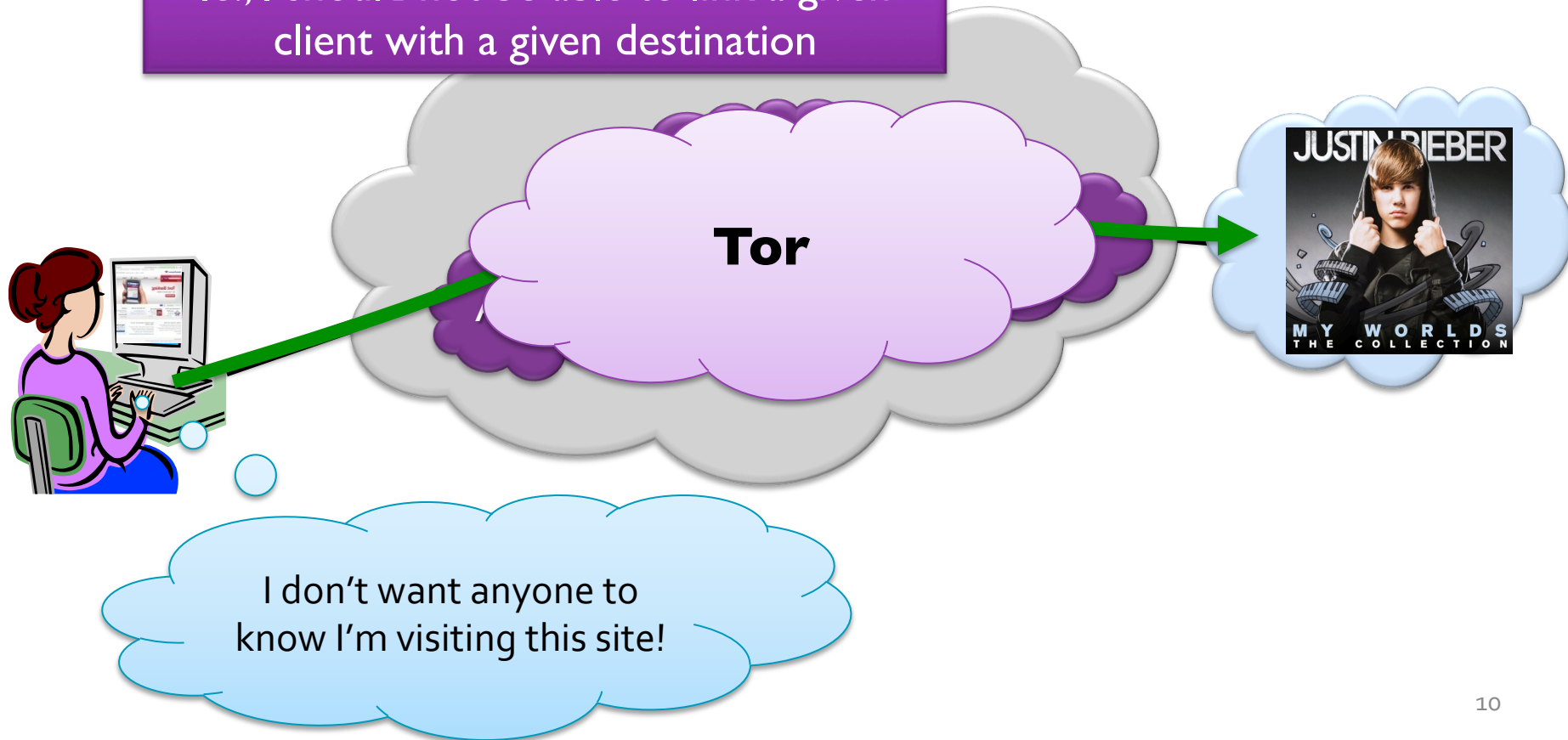
Select an overlay path with an alibi

Use speed of light violations to identify violations

Herd: A Scalable, Traffic Analysis Resistant Anonymity Network for VoIP Systems

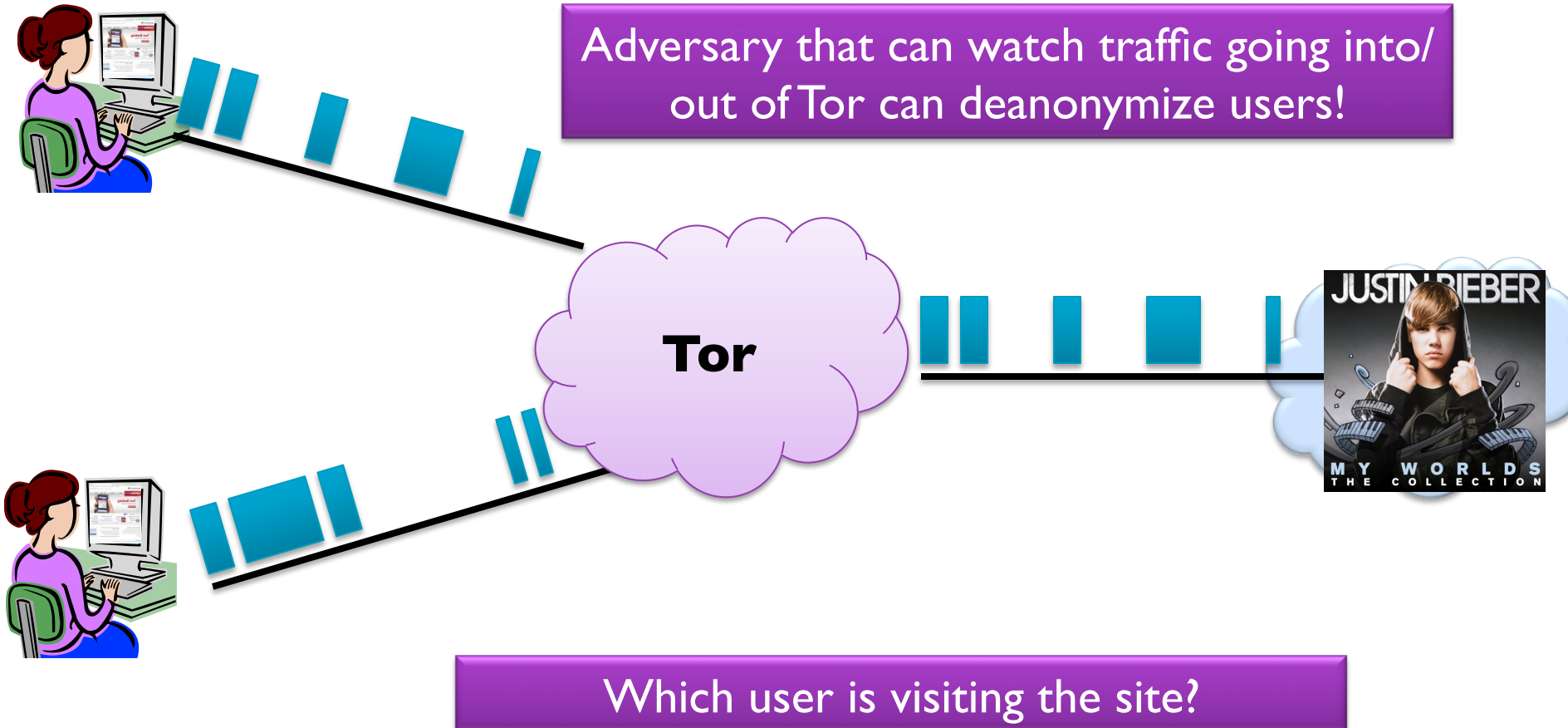
Services like Tor designed to help users access the Internet **anonymously**

ie., I should not be able to link a given client with a given destination



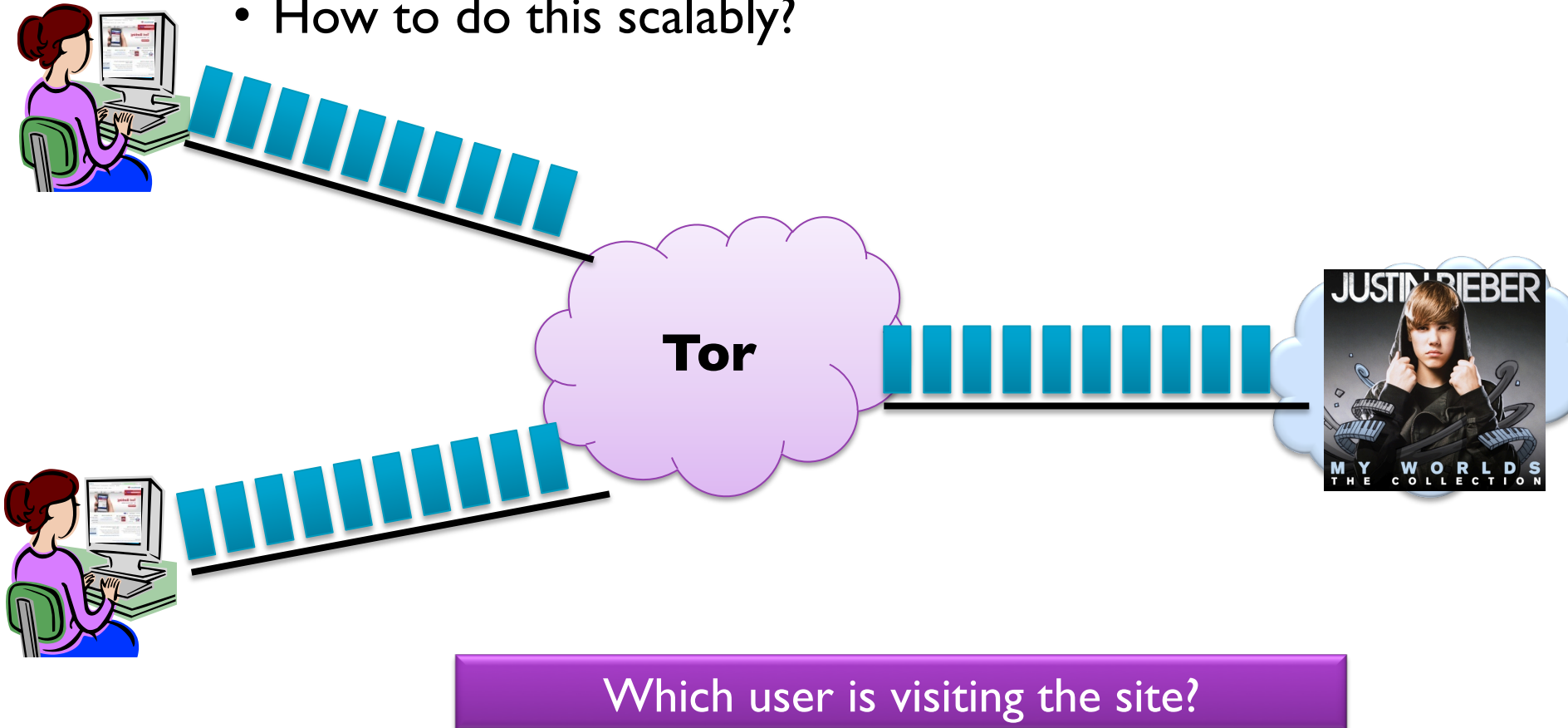
Herd: A Scalable, Traffic Analysis Resistant Anonymity Network for VoIP Systems

- Tor is subject to traffic analysis attacks



Herd: A Scalable, Traffic Analysis Resistant Anonymity Network for VoIP Systems

- **Key idea:** Chaff user traffic to get rid of the signal
- How to do this scalably?



Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests

- Governments around the world realize Internet is a key communication tool
 - ... working to clamp down on it!
- How can we measure censorship?

Main approaches:

- **User-based testing:** Give users software/tools to perform measurements
 - E.g., [ONI testing](#), [ICLab](#)
- **External measurements:** Probe the censor from outside the country via carefully crafted packets/probes
 - E.g., [IPID side channels](#), probing the [great firewall](#)/[great cannon](#)

Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests

Censorship measurement challenges:

- Gaining access to vantage points
- Managing user risk
- Obtaining high fidelity technical data

Encore key idea:



Nick Feamster

Professor, Princeton University



Acting Director
Center for Information Technology

Computer Science
Princeton University

Sloan Fellow
Presidential Early Career (PECASE) Recipient

Script to have
browser query
Web sites for
testing

310 Sherrerd Hall
feamster - cs . princeton . edu
Office: + 1 609 258 2203
I do not check voice mail.

[CV \(January 2015\)](#)
[Publications](#)
[Google Scholar](#)
[Bio](#)
[Research Blog](#)
[Advice Blog](#)
[Twitter](#)

Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests

Issues...

- Informed consent?
 - Users can opt out ... after the test has already run
 - Does consent increase risk?
 - ... no consent = plausible deniability?
- What is the risk of having users query sites?
 - Magnitude of risk vs. likelihood of bad event
- Censorship measurement is inherently risky
 - Risk benefit trade offs

ASwatch: An AS Reputation System to Expose Bulletproof Hosting ASes

- Bulletproof hosting ASes:
 - ASes with the sole purpose of hosting malicious activities
 - Illegal content, spammers etc.
- Previous reputation approaches focus on client behavior
 - E.g., spamming, DDoS etc.
- How to identify maliciousness at the AS-level vs. a benign AS with compromised clients?
 - **Key idea:** Look at control plane data. Routing churn, announcing different subsets of IP space.
- Gives a signal before anything malicious has even happened
 - Data- vs. control- plane data as input
- Identifies suspicious behavior of the AS not the clients

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Thanks for your attention!
Slides will be tweeted: @phillipa_gill