Building Dissent Networks Towards Effective Countermeasures Against Large-Scale Communications Blackouts

Shaddi Hasan, Yahel Ben-David, Giulia Fanti, Eric Brewer, Scott Shenker





Credit: Renesys

In-Country Dissident Infrastructure

THESE NOT THESE Commotion Tor Serval Ultrasurf Freegate Freedom Tower FabFi VPNs Hyperboria Proxies

Your government just shut off your country's Internet access.

Now what?

Your government just shut off your country's Internet access.

"Let's build a mesh network."

Still a thing...



Home | Tech | News

Meshnet activists rebuilding the internet from scratch

> 08 August 2013 by Hal Hodson







How will it grow? Planned vs. Organic?

How will it be managed? Centralized vs. Decentralized?

What is the topology?

Stationary vs. Mobile?





OrganicPlannedDecentralizedCentralizedMobileStationary

Dissent Networks Resilient to disruption Meaningful scalability Innocuous components

Resistant to tracking



W = Bits/second n = # nodes **"These results** have some implications that designers may want to consider. **Perhaps efforts** should be targeted at designing networks with small numbers of nodes."

[Gupta00]





IFVOUSEND VIDEOSACROSSA WIRELESS MESH NETWORK

VOURBEINNHAUBAREDUINE

INSTRUCTOR























For each tweet!



Making it work

- Directional antennas
- Mobility
- Multi-radio nodes
- Delay tolerance
- Small networks
- Small number of users
- Network planning
- Coordinated management



Your government just shut off your country's Internet access.

And your basic mesh network didn't work.

Are there practical modifications that might?

Satellite?

- + Easy to deploy+ Works!
- Expensive
- Slow
- Hard to source
- Easy to trace
- Easy to jam
- May be illegal!









Large directional antennas?





Let's assume we successfully build an effective network for activists. **What about anonymity?**



Keeping users safe

(a) True anonymity

- Encryption is not enough
- "Just the metadata" is still dangerous

(b) Deniability

- Non-dissent uses of network (Tor)
- Hide dissent in innocuous traffic (Telex)

Real answer: some combination of these





Dissent [Corrigan-Gibbs10]





Download Commotion Android

Android

Here you can find pre-built downloads for the Commotion android devices we currently support.

NOTE: Your phone must be rooted to run this package. See the Commotion Android Supported Hardware page for device-specific information.

Current Release = (PR3) Pre-Release 3 Next Release = (DR1.1) Developer Release 1.1

STABLE BUILDS (PR3):

CommotionMeshTether-pr3.apk - 09/17/2012 02:36 am - (1 MB)

WARNING

Commotion

- Cannot hide your identity
- Does not prevent monitoring of internet traffic
- Does not provide strong security against monitoring over the mesh
- Can be jammed with radio/data-interference

For More Info Click Here







Weird Looking equipment gets you arrested.



Anonymity matters just like confidentiality.

Dissent Networks Resilient to disruption Meaningful scalability Innocuous components

Resistant to tracking

Thanks!

Shaddi Hasan

shaddi@cs.berkeley.edu @shaddih http://cs.berkeley.edu/~shaddi

Backup slides

Directional Antennas	Fewer routes
Mobility	Complex routing
Multi-radio nodes	Increased cost
Delay tolerance	Poor UX, new apps
Small networks	Limits reach
Few users	Limits reach
Network planning	Slows growth
Coordinated management	Single point of failure

Pseudonymity is not enough!

[Goga13] Exploiting Innocuous Activity for Correlating Users Across Sites

[Reid13] An Analysis of Anonymity in the Bitcoin System

[Srivatsa12] Deanonymizing mobility traces: Using social network as a side-channel

Many others!