DROPPING DOCS ON DARKNETS: HOW PEOPLE GOT CAUGHT

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http://Irongeek.com
About Adrian

- I run Irongeek.com
- I have an interest in InfoSec education
- I don’t know everything - I’m just a geek with time on my hands
- Sr. Information Security Consultant at TrustedSec
- Co-Founder of Derbycon
  http://www.derbycon.com
Perspective and General Warnings

- I will be taking two perspectives
  - People trying to stay anonymous
  - People trying to de-anonymize users
- I’m not really a privacy guy
- IANAL
- Be careful where you surf, contraband awaits
BASICS OF HOW TOR WORKS
A little background...

Darknets

- There are many definitions, but mine is “anonymizing private network”
- Use of encryption and proxies (some times other peers) to obfuscate who is communicating to whom
- Sometimes referred to as Cipherspace (love that term)
Who?
First the US Naval Research Laboratory, then the EFF and now the Tor Project (501c3 non-profit).
http://www.torproject.org/

Why?
“Tor is free software and an open network that helps you defend against a form of network surveillance that threatens personal freedom and privacy, confidential business activities and relationships, and state security known as traffic analysis.” ~ As defined by their site

What?
Access normal Internet sites anonymously, and Tor hidden services.

How?
Locally run SOCKS proxy that connects to the Tor network.

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Layered encryption
Bi-directional tunnels
Has directory servers
Mostly focused on out proxying to the Internet
More info at https://www.torproject.org
Layers like an Ogre

http://Irongeek.com
Layout to connect to Hidden Service

Step 1: Bob picks some introduction points and builds circuits to them.

Image from http://www.torproject.org/hidden-services.html.en
http://Irongeek.com
Step 2: Bob advertises his hidden service -- XYZ.onion -- at the database.
Step 3: Alice hears that XYZ.onion exists, and she requests more info from the database. She also sets up a rendezvous point, though she could have done this before.

Image from http://www.torproject.org/hidden-services.html.en
http://Irongeek.com
Step 4: Alice writes a message to Bob (encrypted to PK) listing the rendezvous point and a one-time secret, and asks an introduction point to deliver it to Bob.

Image from http://www.torproject.org/hidden-services.html.en
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[Diagram of Tor's Hidden Services: 4]
Step 5: Bob connects to the Alice’s rendezvous point and provides her one-time secret.
Layout to connect to Hidden Service

Step 6: Bob and Alice proceed to use their Tor circuits like normal.

Image from http://www.torproject.org/hidden-services.html.en
http://Irongeek.com
Node types

- **Client**
  Just a user

- **Relays**
  These relay traffic, and can act as exit points

- **Bridges**
  Relays not advertised in the directory servers, so harder to block

- **Guard Nodes**
  Used to mitigate some traffic analysis attacks

- **Introduction Points**
  Helpers in making connections to hidden services

- **Rendezvous Point**
  Used for relaying/establishing connections to hidden services
What does it look like to the user?

Welcome to Irongeek.com, Adriaan Crenshaw's Information Security site (along with a bit about my personal life for the fancy). As I write articles and tutorials I will be posting them here. If you would like to republish one of them please e-mail me. Enjoy the site and write us if you have any good ideas for articles or in need of a guest writer.

Adriaan

News/Change Log:

ShmooCon Firetalks 2014
These are the videos for the ShmooCon Firetalks 2014. Day 2 I overslept, but SquidyVR has a recording, 
http://www.MediArchives.net

http://Irongeek.com
Applications/Sites

- Tails: The Amnesic Incognito Live System
  https://tails.boum.org/
- Tor2Web Proxy
  http://tor2web.org
- Tor Hidden Wiki:
  http://kpvz7ki2v5agwt35.onion
- Scallion (make host names)
  https://github.com/lachesis/scallion
- Onion Cat
  http://www.cypherpunk.at/onioncat/
- Reddit Onions
  http://www.reddit.com/r/onions
Tor Pros and Cons

Pros

- If you can tunnel it through a SOCKS proxy, you can make just about any protocol work.
- Three levels of proxying, each node not knowing the one before last, makes things very anonymous.

Cons

- Slow
- Do you trust your exit node?
- Semi-fixed Infrastructure:
  Sept 25th 2009, Great Firewall of China blocks 80% of Tor relays listed in the Directory, but all hail bridges!!!
  https://blog.torproject.org/blog/tor-partially-blocked-china
  http://yro.slashdot.org/story/09/10/15/1910229/China-Strangles-Tor-Ahead-of-National-Day
- Fairly easy to tell someone is using it from the server side
What does the traffic look like?

(Keep in mind, this is just the defaults)

- **Local**
  - 9050/tcp Tor SOCKS proxy
  - 9051/tcp Tor control port
  - (9150 and 9151 on Tor Browser Bundle)

- **Remote**
  - 443/tcp and 80/tcp mostly
  - Servers may also listen on port 9001/tcp, and directory information on 9030.

- **More details**
  - [http://www.room362.com/tor-the-yin-or-the-yang](http://www.room362.com/tor-the-yin-or-the-yang)
SHOUT OUT TO I2P

http://geti2p.net

http://Irongeek.com
Bitcoin?

- Crypto Currency
- Proof of work
- Bitcoin Addresses & Private Keys
- Block Chain (ledger)
- Tumblers (laundering)
- Way more info by Bob Weiss
  

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Case 0: Harvard Bomb Threat

- On Dec. 16th 2013 a bomb threat was made to Harvard’s student newspaper and some officials.
- The person used https://www.guerrillamail.com to send email after connecting over Tor.
- Guerrilla Mail puts an X@Originating@IP header on that marked where the message was sent from.

To: "irongeek@irongeek.com"
From: <e9jnqrz+oo4j3w@guerrillamail.com>
Subject: Hey baby!

X-Originating IP: [74.128.28.74]
Content-Type: text/plain; charset=us-ascii

shrapnel bombs placed in:
senate center
sever hall
emerson hall
thayer hall
2/4.
guess correctly.
be quick for they will go off soon

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Case 0: Harvard Bomb Threat

- All Tor nodes are publicly known (except bridges): http://torstatus.blutmagie.de
- Easy to correlate who was attached to Harvard network and using Tor at the same time the email was sent (unless you use a bridge).
- Eldo Kim was connected to the Tor network around that time.
- Suspect Eldo Kim wanted to get out of a final and admitted he made the bomb threat when interviewed.
- More Details:
Case 0: Harvard Bomb Threat

Lessons Learned:

- Don’t be the only person using Tor on a monitored network at a given time
- Use a bridge?
- Don’t admit anything
- Correlation attacks are a bitch
Timing Correlation

I could just watch the timings.

DoS outside host to affect traffic.

Pulse the data flows myself.

Or even just change the load on the path.

Client

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If I don’t use the proxy for DNS, I may send the query to a DNS server. It won’t see my traffic to/from the destination, but may now know I’m visiting someplace.com/.onion/.i2p
Case 1: LulzSec

- Hector Xavier Monsegur (Sabu) normally used Tor for connecting to IRC but was caught not using it once and FBI found his home IP. After being caught, he started to collaborate.

- Hector spoke with Jeremy Hammond (sup_g) on IRC, and Jeremy casually let slip where he had been arrested before and groups he was involved with.

- This narrowed the suspect pool, so the FBI got a court order to monitor his Internet access.
Case 1: LulzSec

- Hammond used Tor, and while the crypto was never busted, FBI correlated times sup_g was talking to Subu on IRC with when Hammond was at home using his computer.

Case 1: LulzSec

Lessons Learned:

- Use Tor consistently
- Don’t give personal information
- Correlation attacks are still a bitch!

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Case 2: Freedom Hosting

Freedom Hosting hosted, amongst other things, child porn related hidden service websites. Freedom Hosting had previously come under attack by Anonymous during Op Darknet because of it hosting CP.

- In July of 2013, the FBI compromised Freedom Hosting, and inserted malicious Java Script that used Firefox bug CVE-2013-1690 in version 17 ESR. The Tor Browser Bundle is based on Firefox, and the newest version was already patched, but not everyone updates in a timely fashion.
The payload was “Magneto”, which phoned home to servers in Virginia using the host’s public IP. [http://ghowen.me/fbi-tor-malware-analysis](http://ghowen.me/fbi-tor-malware-analysis)

It also reported back the computer’s:
- MAC address
- Windows host name
  unique serial number to tie a user to a site

May be same as EgotisticalGiraffe.

See also:
- Magic Lantern
- FOXACID
- Computer and Internet Protocol Address Verifier (CIPAV)

Thanks to Joe Cicero for "Privacy In a Surveillance State, Evading Detection" (P.I.S.S.E.D.) talk.
Case 2: Freedom Hosting

- An Irish man, Eric Eoin Marques, is alleged to be the operator of Freedom Hosting. The servers hosting Freedom Hosting were tied to him because of payment records.
- Marques was said to have dived for his laptop to shut it down when police raided him.
- More Details:
Case 2: Freedom Hosting

**Lessons Learned:**

- Don't host Captain Picard or Julian Bashir
- Patch, patch, patch
- Follow the money
- Leave encrypted laptops in a powered down state when not in use!
Let's see if the hidden server app is vulnerable to an exploit (buffer overflow/web app shell exec/etc). Send a payload that contacts an IP monitor.
From court documents:


“There were 159 listings on the site under the category "Services." Most concerned computer-hacking services: for example, one listing was by a vendor offering to hack into Facebook, Twitter, and other social networking accounts of the customer's choosing, so that "You can Read, Write, Upload, Delete, View All Personal Info"; another listing offered tutorials on "22 different methods" for hacking ATM machines. Other listings offered services that were likewise criminal in nature. For example, one listing was for a "HUGE Blackmarket Contact List," described as a list of "connects" for "services" such as "Anonymous Bank Accounts," "Counterfeit Bills (CAD/GBP/EUR/USD)," "Firearms +Ammunition," "Stolen Info (CC [credit card], Paypal)," and "Hitmen (10+ countries)." “

“Sellers may not list forgeries of any privately issued documents such as diplomas/certifications, tickets or receipts. Also, listings for counterfeit currency are still not allowed in the money section.”
Case 3: The Silk Road

- The earliest they could find was from “altoid” on the Shroomery.org forums on 01/27/11. http://www.shroomery.org/forums/showflat.php/Number/13860995
Case 3: The Silk Road

BitCoinTalk.org Post

"Quote from: altoid on January 29, 2011, 07:44:51 PM

What an awesome thread! You guys have a ton of great ideas. Has anyone seen Silk Road yet? It's kind of like an anonymous Amazon.com. I don't think they have heroin on there, but they are selling other stuff. They basically use bitcoin and Tor to broker anonymous transactions. It's at http://tydgccykixpbu6uz.onion. Those not familiar with Tor can go to silkroad420.wordpress.com for instructions on how to access the .onion site.

Let me know what you guys think"

http://bitcointalk.org/index.php?topic=175.msg42479#msg42479
Case 3: The Silk Road

An account named “altoid” also made a post on Bitcointalk.org about looking for an “IT pro in the bitcoin community” and asked interested parties to contact “rossulbricht at gmail dot com” (10/11/11). https://bitcointalk.org/index.php?topic=47811.0
Case 3: The Silk Road

- Ulbricht’s Google+ profile show an interest in the “Mises Institute” a “world center of the Austrian School of economics.”
- Dread Pirate Roberts’ signature on the Silk Road forums had a link to the Mises Institute. Austrian Economic theory was also stated by Dread Pirate Roberts to be influential to the Silk Road’s philosophy.
**Case 3: The Silk Road**

- "Ross Ulbricht." account also posted on StackOverflow asking for help with PHP code to connect to a Tor hidden service. The username was quickly changed to “frosty” (03/16/12).
  

- Guess who is now a suspect for being “Dread Pirate Roberts”? Ross William Ulbricht.

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Case 3: The Silk Road

- Someone was connecting to a server that hosts the Silk Road from an Internet café near where Ross lived in San Francisco. Private messages on Silk Road make it seem Dread Pirate Roberts lived in the Pacific time zone.
- IP of a Silk Road server was attached to via a VPN server that was connected to by an IP belonging to an Internet cafe on Laguna Street in San Francisco from which Ulbricht had also connected to his Gmail account with (both on June 3, 2013).
- PM to Dread Pirate Roberts from a user said the site was leaking "some sort of external IP address" belonging to the VPN.
- FBI starts taking down SilkRoad servers, though I’m are not sure how they were found. Could have been money trail to aliases, or as Nicholas Weaver conjectured, they hacked SilkRoad and made it contact an outside server without using Tor so it revealed it’s real IP. Once located, FBI was able to get a copy of one of the servers.
Case 3: The Silk Road

- On 07/10/13 US Customs intercepted 9 IDs with different names, but all having a picture of Ulbricht. Homeland Security interviewed Ulbricht, but he denied having ordered them.

- Smart: “ULBRICHT generally refused to answer any questions pertaining to the purchase of this or other counterfeit identity documents.”

- Stupid: “However, ULBRICHT volunteered that "hypothetically" anyone could go onto a website named "Silk Road" on "Tor" and purchase any drugs or fake identity documents the person wanted. “

- Roommates knew him as “Josh”. PMs show DPR was interested in getting fake IDs.
Case 3: The Silk Road

- Server used SSH and a public key that ended in frosty@frosty. Server also had some of the same code posted on StackOverflow.
- Eventually, on 10/01/2013 the FBI landed on him in a Library right after he entered the password for his laptop. More evidence was found on his laptop.
- More info (Big thanks to Nate Anderson for the original article and Agent Christopher Tarbell for court docs):

http://Irongeek.com
Case 3: The Silk Road

Lessons Learned:

- Keep online identities separate
  - Keep different usernames
  - From different locations
- Have a consistent story
- Don’t talk about interests
- Don’t volunteer information!
DEMONS

Maybe?
Many More Links

- Talk on Darknets in general

- I2P FAQ
  http://www.i2p2.de/faq.html

- Tor FAQ
  https://trac.torproject.org/projects/tor/wiki/doc/TorFAQ

- Tor Manual
  https://www.torproject.org/docs/tor-manual.html.en

- I2P Index to Technical Documentation
  http://www.i2p2.de/how
Sites of Mine

- Intro to Darknets: Tor and I2P Workshop

- My Tor/I2P Notes

- Cipherspaces/Darknets An Overview Of Attack Strategies

- Anonymous proxy to the normal web

- Hidden services
  Normally websites, but can be just about any TCP connection
ADHD Linux

- Active Defense Harbinger Distribution (ADHD) http://sourceforge.net/projects/adhd/
  from Black Hills Information Security & SecureIdeas
- Metasploit Decloaker, web bugs, etc.
Events

**DERBYCON**

Sept 24th-28th, 2014

http://www.derbycon.com

Others

http://www.louisvilleinfosec.com
http://skydogcon.com
http://hack3rcon.org

http://outerz0ne.org
http://phreaknic.info
http://notacon.org

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