Identifying 3rd Party Sinkhole Operations for Computer Network Defense and Threat Analysis

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Outline

How I got here

Applying heuristics

Validation

Some open questions

Heuristics for Finding Sinkholes

Some things just stand out

Parking services and sinkholes

Odd patterns of behavior (Gaps in known sinkhole IP)

Multiple actors on same infrastructure

Significant gaps in activity

Pull this thread

frickl.purpledaily.com	54.248.229.24	30-Apr-14	30-Apr-14
zyxel.webhop.net	254.0.0.88	30-Apr-14	30-Apr-14
naver.ironybl00dy.net	23.253.46.64	30-Apr-14	30-Apr-14
news.firewall-gateway.com	109.169.77.230	29-Apr-14	29-Apr-14
publics-dns.com	91.194.254.94	29-Apr-14	24-Nov-14
baatarhuu.com	216.108.231.122	29-Apr-14	1-May-14
dataday3.no-ip.org	108.62.211.195	29-Apr-14	30-Apr-14
uiop.wekby.com	**23.253.46.64**	29-Apr-14	29-Apr-14
service.purpledaily.com	54.248.229.24	28-Apr-14	28-Apr-14
www.eshow-online.com	95.211.172.143	27-Apr-14	27-Apr-14
cancunluxurystyle.com	184.168.221.91	26-Apr-14	27-Apr-14
upinfo.biz	192.31.186.21	26-Apr-14	28-Apr-14
opmsecurity.org	184.168.221.39	26-Apr-14	28-Apr-14

Pull this thread

uiop.wekby.com	173.212.56.174	21-Jun-12	28-Jul-12
uiop.wekby.com	108.61.4.52	4-Sep-12	4-Sep-12
uiop.wekby.com	69.43.161.172	10-May-12	31-Dec-12
uiop.wekby.com	199.59.163.207	1-Feb-13	7-Feb-13
uiop.wekby.com	69.43.161.179	27-Jun-11	12-Mar-13
uiop.wekby.com	141.8.224.25	1-Apr-13	1-Apr-13
uiop.wekby.com	69.43.161.174	19-Apr-13	19-Apr-13
uiop.wekby.com	**208.91.197.27**	28-Mar-14	28-Mar-14
uiop.wekby.com	23.253.46.64	29-Apr-14	29-Apr-14
uiop.wekby.com	208.91.197.132	18-Nov-15	20-Dec-15

Identifying some patterns of behavior

uiop.wekby.com	208.91.197.27	28-Mar-14	28-Mar-14
update.cnnonlie.com	208.91.197.216	23-Mar-13	30-Mar-13
updateie.net	208.91.197.134	11-Feb-14	11-Feb-14
wekby.com	208.91.197.27	9-Nov-13	8-Jan-14
ww2.wekby.com	208.91.197.132	18-Nov-15	20-Dec-15
www.cartek.com	208.91.197.132	3-Jul-15	4-Jul-15
www.didoa.dns-dns.com	208.91.197.132	7-Jan-13	7-Jan-13
www.syscation.net	208.91.197.44	21-Mar-13	1-May-13
www.twitterdocs.com	208.91.197.115	13-Jun-13	13-Jun-13
www.update-adobe.com	208.91.197.133	13-Dec-11	19-Jan-12
filesassociate.net	208.91.197.101	16-Jul-13	21-Jul-13
cryptoanalysis.net	208.91.197.101	1-Apr-13	1-Apr-13

Find the Sinkhole

www.update-adobe.com	208.91.197.133	13-Dec-11	19-Jan-12
www.update-adobe.com	208.91.197.134	13-Dec-11	19-Jan-12
www.update-adobe.com	**23.22.175.89**	18-Oct-12	29-Nov-12

filesassociate.net	37.46.127.76	29-Jun-12	30-Oct-12
filesassociate.net	208.91.197.7	4-Jun-13	6-Jun-13
filesassociate.net	**95.211.172.143**	9-Sep-13	9-Feb-16

cryptoanalysis.net	208.91.197.101	1-Apr-13	1-Apr-13
cryptoanalysis.net	**81.166.122.234**	18-Dec-13	18-Dec-13
cryptoanalysis.net	69.195.129.72	31-Jul-15	31-Jul-15

Gaps Between Known Sinkholes

phil-army.gotdns.org	123.232.63.3	4-Jun-14	4-Jun-14
phil-army.gotdns.org	87.106.24.200	1-Aug-14	11-Feb-15
phil-army.gotdns.org	**87.106.20.192**	3-Mar-15	23-Jan-16
phil-army.gotdns.org	213.165.83.176	3-Mar-15	23-Jan-16
phil-army.gotdns.org	74.208.164.166	22-Mar-15	6-Nov-15
phil-army.gotdns.org	**87.106.250.34**	22-Mar-15	6-Nov-15
phil-army.gotdns.org	108.175.9.189	22-Mar-15	6-Nov-15
phil-army.gotdns.org	**74.208.153.9**	31-Mar-15	23-Jan-16
phil-army.gotdns.org	**87.106.253.18**	2-Apr-15	23-Jan-16
phil-army.gotdns.org	**50.21.181.152**	3-Apr-15	23-Jan-16

Multiple Actors on Same Infrastructure

Consider sinkhole IP candidate **81.166.122.234**

- **454** domains
- **148** Malware samples associated with domain
- **18** Unique malware families

Significant Gaps in Activity

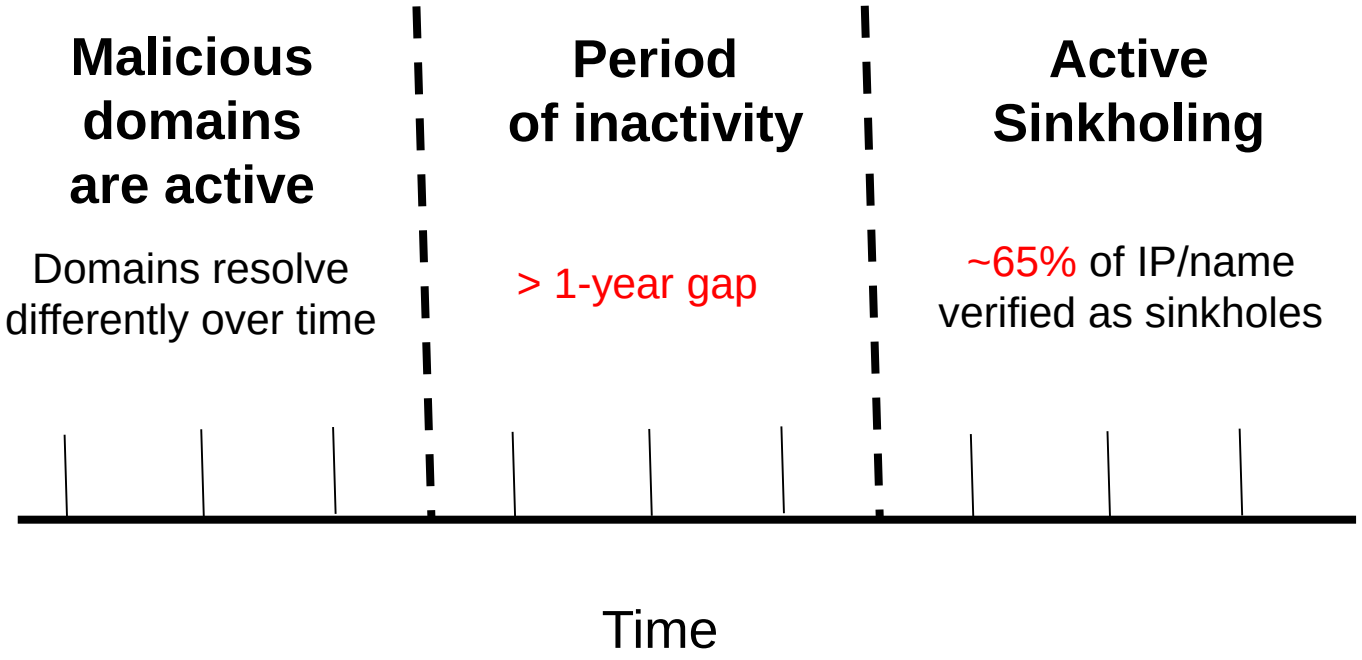
01ret.mrslove.com	46.37.162.57	28-Oct-12	4-Nov-12
01ret.mrslove.com	92.242.132.8	7-Feb-13	**7-Feb-13**
01ret.mrslove.com	**188.226.194.251**	**29-Jul-14**	17-Oct-15

asdepy.my03.com	188.165.95.15	26-Sep-12	**2-Oct-12**
asdepy.my03.com	**192.241.149.43**	**24-Jun-14**	24-Jun-14
asdepy.my03.com	188.226.194.251	18-Apr-15	14-Sep-15
asdepy.my03.com	46.101.26.41	30-Jan-16	30-Jan-16

astor1.xxuz.com	91.211.88.62	14-Apr-12	**12-Oct-12**
astor1.xxuz.com	**198.199.78.132**	**27-Mar-14**	27-Mar-14
astor1.xxuz.com	188.226.194.251	19-Aug-14	19-Aug-14

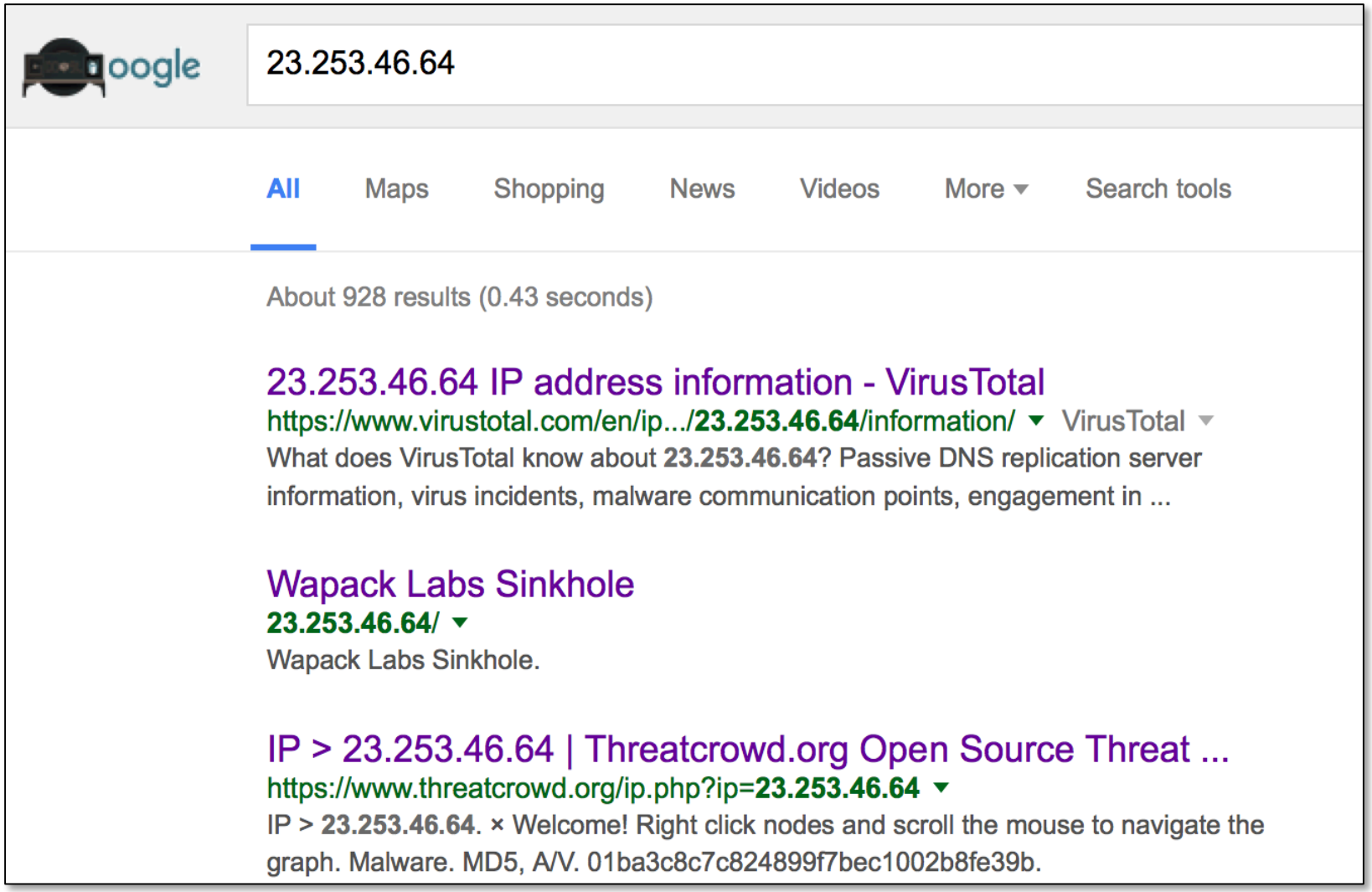
Activity Gaps as a feature of (APT) sinkholing?

Starting with 683 domain/IP candidates…



Confirming what I've found are actually sinkholes…

Just Google it!



Keep It Simple Stupid (KISS)

... right there on the Unix command line:

```
$ host 87.106.253.18

18.253.106.87.in-addr.arpa domain name pointer
87-106-253-18.sinkhole.shadowserver.org
```

Thank you, Passive DNS

Sometimes the nameserver says it all

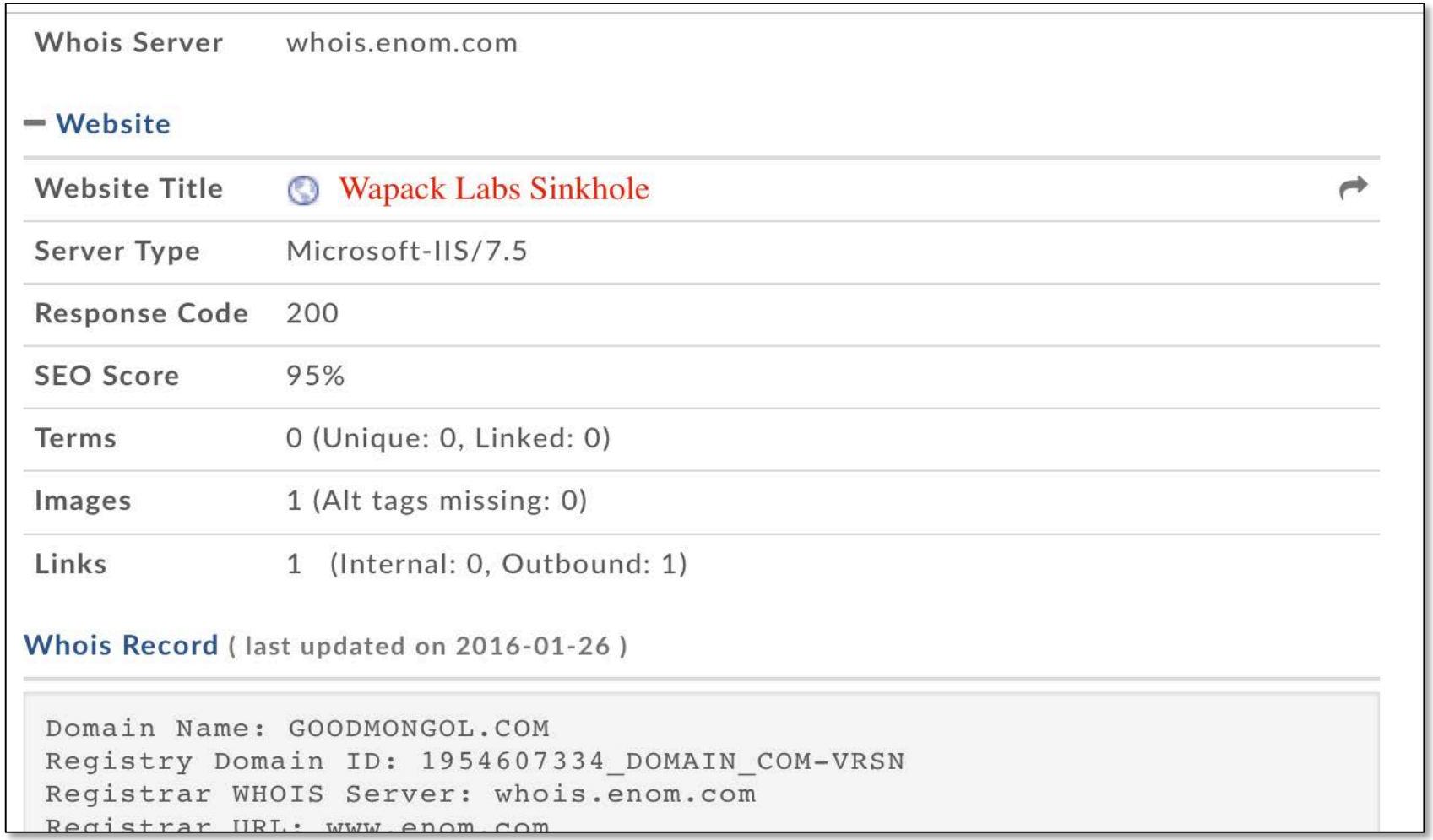
```
/usr/bin/curl -Sks -H "X-API-Key: $key" -H "Accept:
application/json"
https://api.dnsdb.info/lookup/rrset/name/kabsersky.com/NS


["ns1-sinkhole.xaayda.com.","ns2-sinkhole.xaayda.com."]
```

For a list of all domains on the nameserver

```
/usr/bin/curl -Sks -H "X-API-Key: $key " -H "Accept:
application/json" https://api.dnsdb.info/lookup/rdata/name/ns1-
sinkhole.xaayda.com/
```

Whois - Domaintools



Whois Server	whois.enom.com

Website

Website Title	Wapack Labs Sinkhole
Server Type	Microsoft-IIS/7.5
Response Code	200
SEO Score	95%
Terms	0 (Unique: 0, Linked: 0)
Images	1 (Alt tags missing: 0)
Links	1 (Internal: 0, Outbound: 1)

Whois Record (last updated on 2016-01-26)

```
Domain Name: GOODMONGOL.COM
Registry Domain ID: 1954607334_DOMAIN_COM-VRSN
Registrar WHOIS Server: whois.enom.com
Registrar URL: www.enom.com
```

Retrieved from: *http://whois.domaintools.com/goodmongol.com*

Cool Tools - ThreatCrowd

DNS RESOLUTIONS

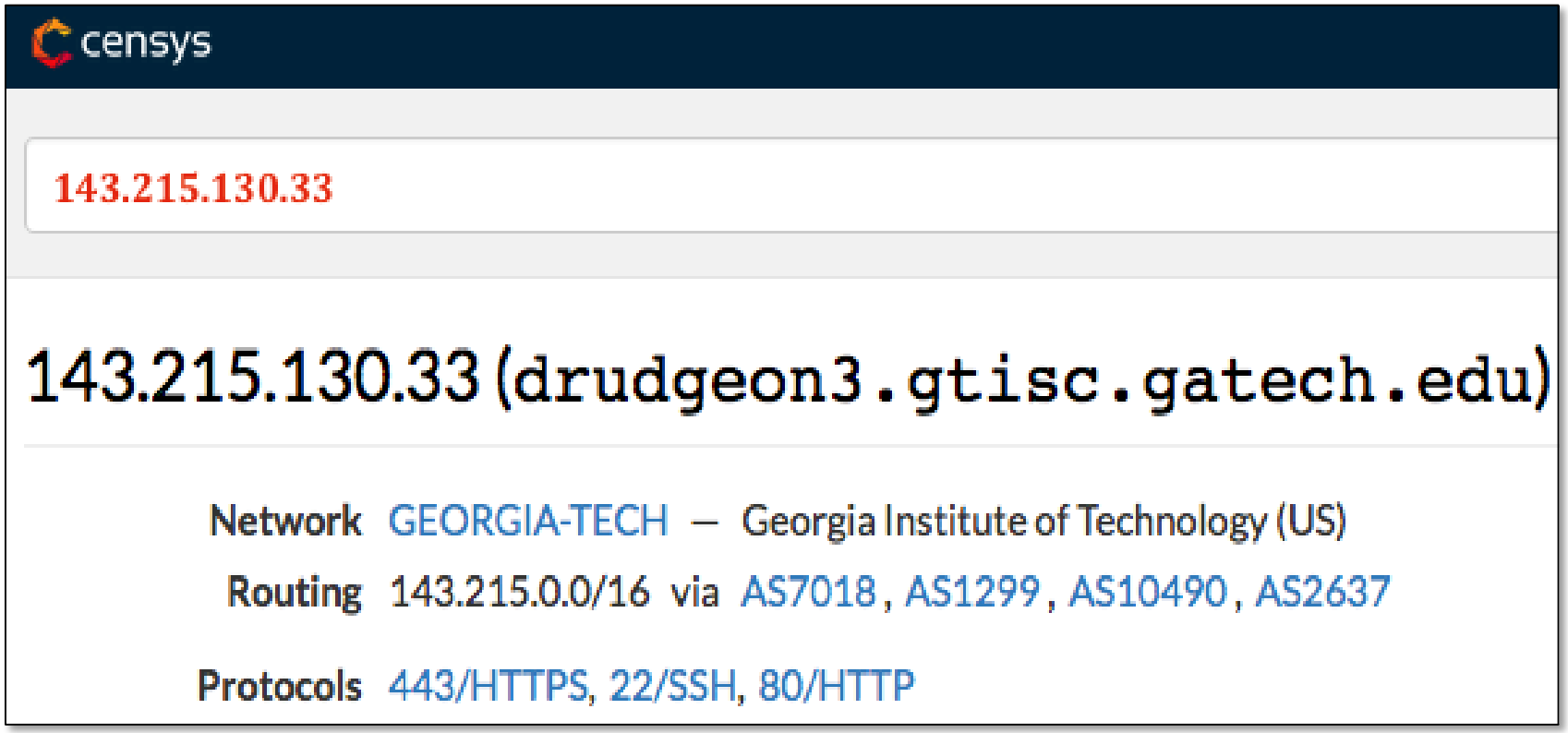
Date	IP Address
2015-08-26	23.253.46.64 (263 , ClassC=Browse , ClassB=Browse)
2016-02-15	-

HTTP/1.1 200 OKContent-Type: text/htmlLast-Modified: Thu, 12 Feb 2015 15:37:37 GMTAccept-Ranges: bytesETag: 503450d4d946d01:0Server: Microsoft-IIS/7.5X-Powered-By: ASP.NETDate: Sat, 31 Oct 2015 21:34:55 GMTContent-Length: 682

!DOCTYPE html PUBLIC -//W3C//DTD XHTML 1.0 Strict//EN http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd>html xmlnshttp://www.w3.org/1999/xhtml>head>meta http-equivContent-Type contenttext/html; charsetiso-8859-1 />title>Wapack Labs Sinkhole /title>style typetext/css>!--body { color:#000000:background-color:#B3B3B3: margin:0:}#container { margin-

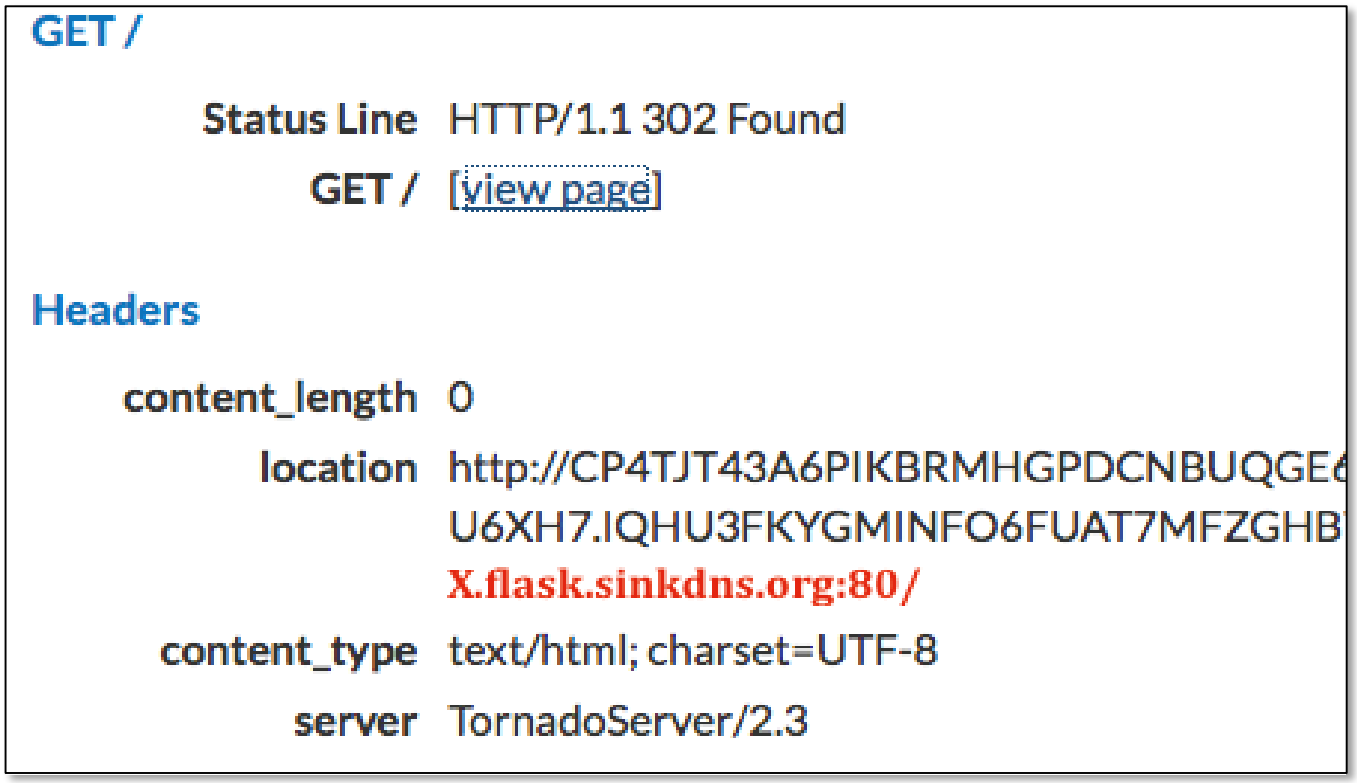
Retrieved from: *https://www.threatcrowd.org/domain.php?domain=goodmongol.com*

Cool Tools - Censys



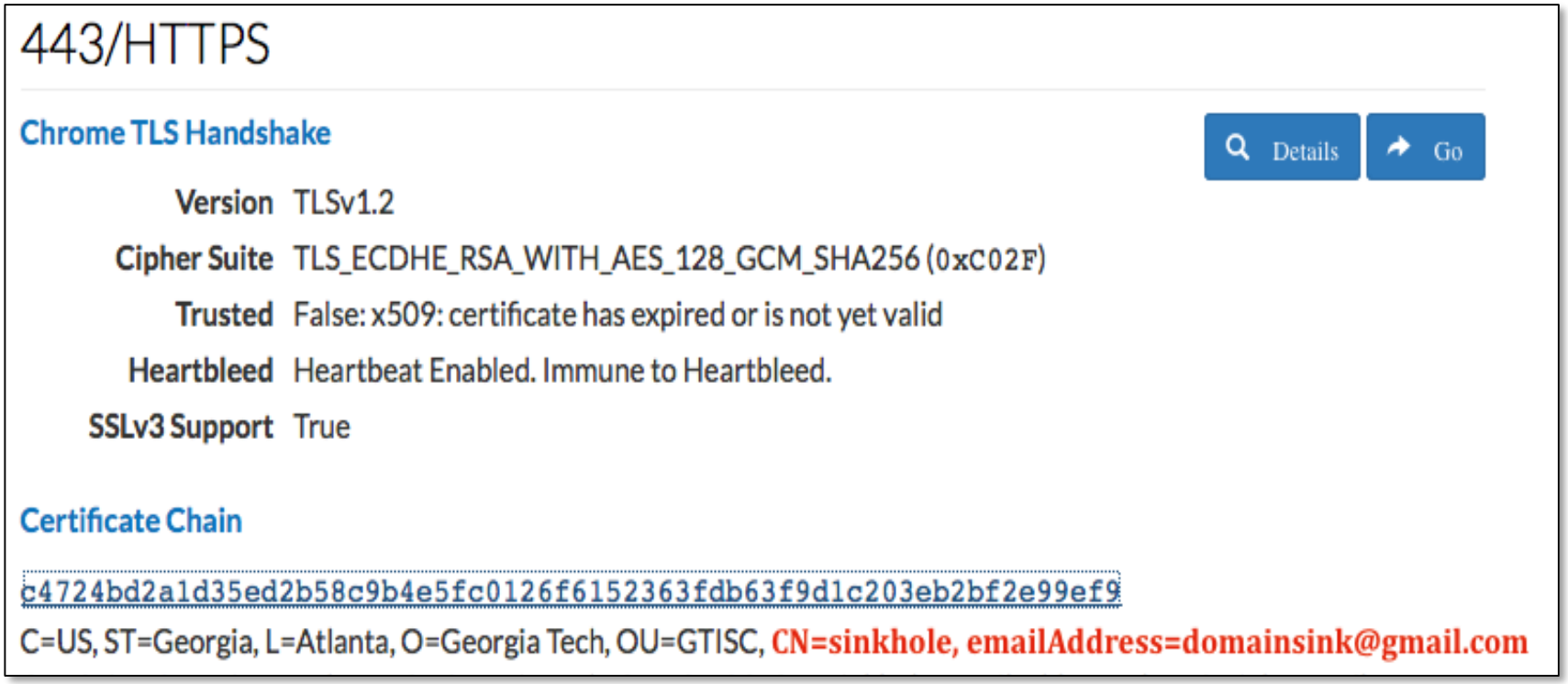
Retrieved from: *https://www.censys.io/ipv4/143.215.130.33*

Cool Tools - Censys



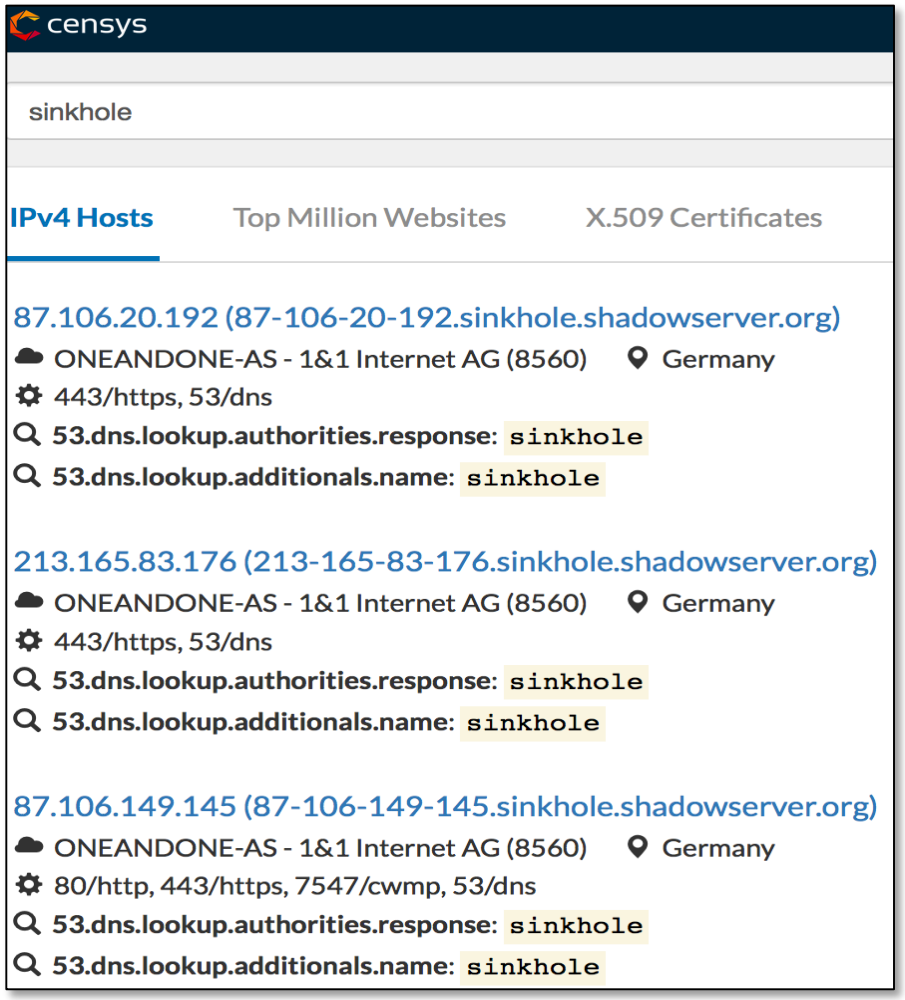
Retrieved from: *https://www.censys.io/ipv4/143.215.130.33*

Cool Tools - Censys



Retrieved from: *https://www.censys.io/ipv4/143.215.130.33*

Wholesale Searches with Cool Tools



Retrieved from: *https://www.censys.io/ipv4?q=sinkhole&page=3*

Recap

Maintaining sinkhole lists for CND and cyber threat analysis

Parking/unparking patterns are telling

Multiple actors on the same IP address at same time

Don’t miss the obvious: *sinkole*.[org,com,net]

Lots of different ways we can validate

So, what's next?

Open Questions

Can we quantify how well these heuristics work?

Can we automate?

Applying this work in operations

Sharing findings with community?

Sources

PassiveTotal. *Know Your Foe: It Might Be a Sinkhole If…,* 21 July 2015. http://blog.passivetotal.org/kyf-if-might-be-a-sinkhole-if/.

SinkMiner: Mining Botnet Sinkholes for Fun and Profit, http://www.covert.io/research-papers/security/SinkMiner-%20Mining%20Botnet%20Sinkholes%20for%20Fun%20and%20Profit.pdf

https://github.com/stamparm/maltrail/commit/511166fa5e3ddceff2e5c0c483c4955c74e8d4e0

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