Practical Usage of Passive DNS Monitoring for E-Crime Investigations

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Topics

- Passive DNS overview
- Use Cases
- Challenges
- The future

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Passive DNS Replication

- 2004 – Florian Weimer at the University of Stuttgart
- Monitor DNS queries and responses "near" recursive servers
  - Physical network location with visibility
  - Filter down to just the DNS queries/responses
- Know what is being asked for and what the responses are being received back from authority servers
- Put it in a database
- Find out all kinds of interesting stuff!

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Queryable PDNS Collections

- BFK (Florian's)
- SIE (ISC)
- DNSParse (Bojan)
- CERT-EE
- One Ring to Rule Them All?
  - passive-dns-query-tool
  - http://code.google.com/p/passive-dns-query-tool/

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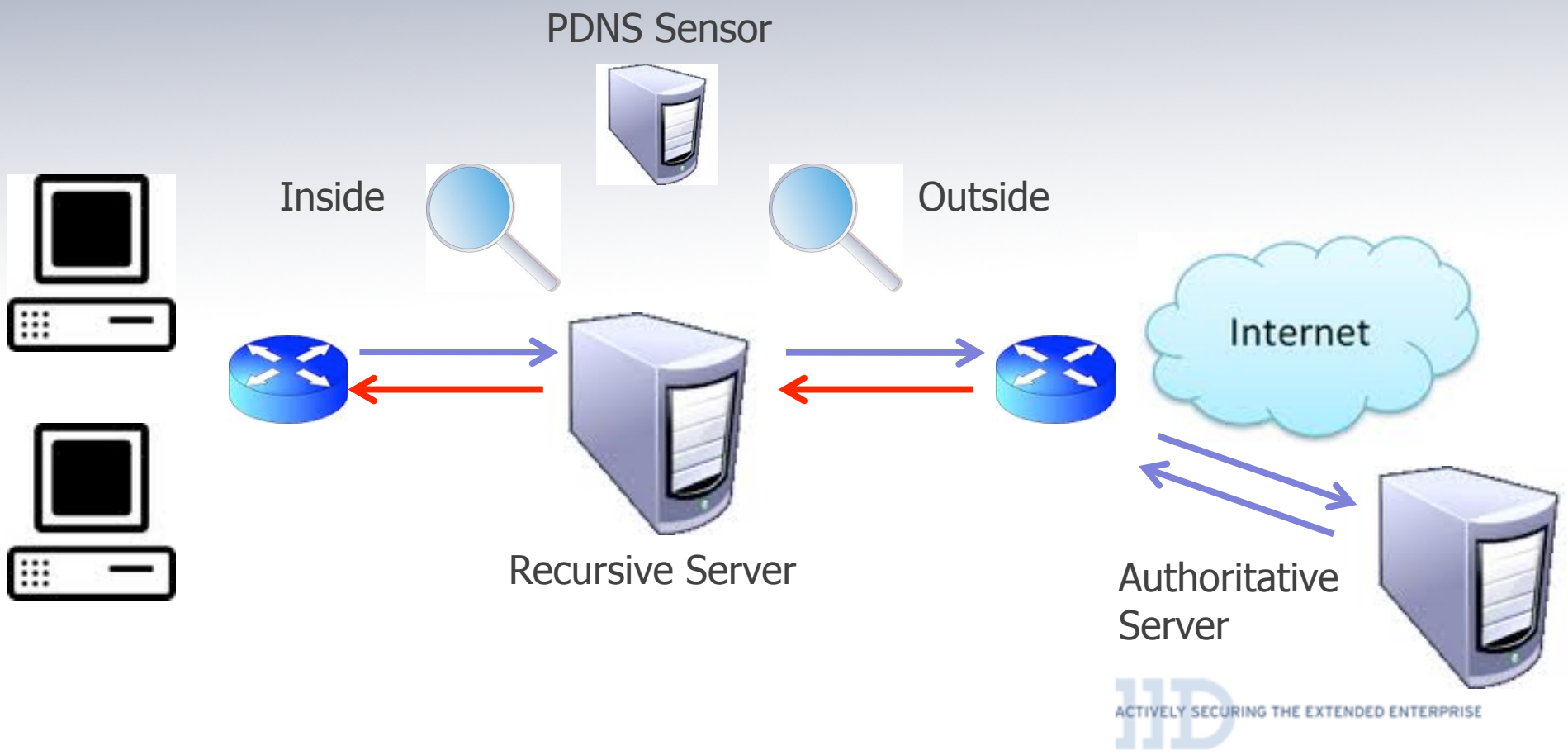
Inside vs. Outside

- Where do we monitor from?



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Inside Monitoring

- Get all resolution attempts (minus stub caching)
  - Good for watching for volume spikes
  - Volume can be quickly overwhelming
- Know exact machine(s) making requests
  - Can track down infections to the source
  - Privacy concerns (ISPs)

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Outside Monitoring

- See aggregate numbers of resolutions for the organization, ISP etc.
  - Easier data management
  - Lose volume information to caching
- Privacy and internal security concerns largely handled

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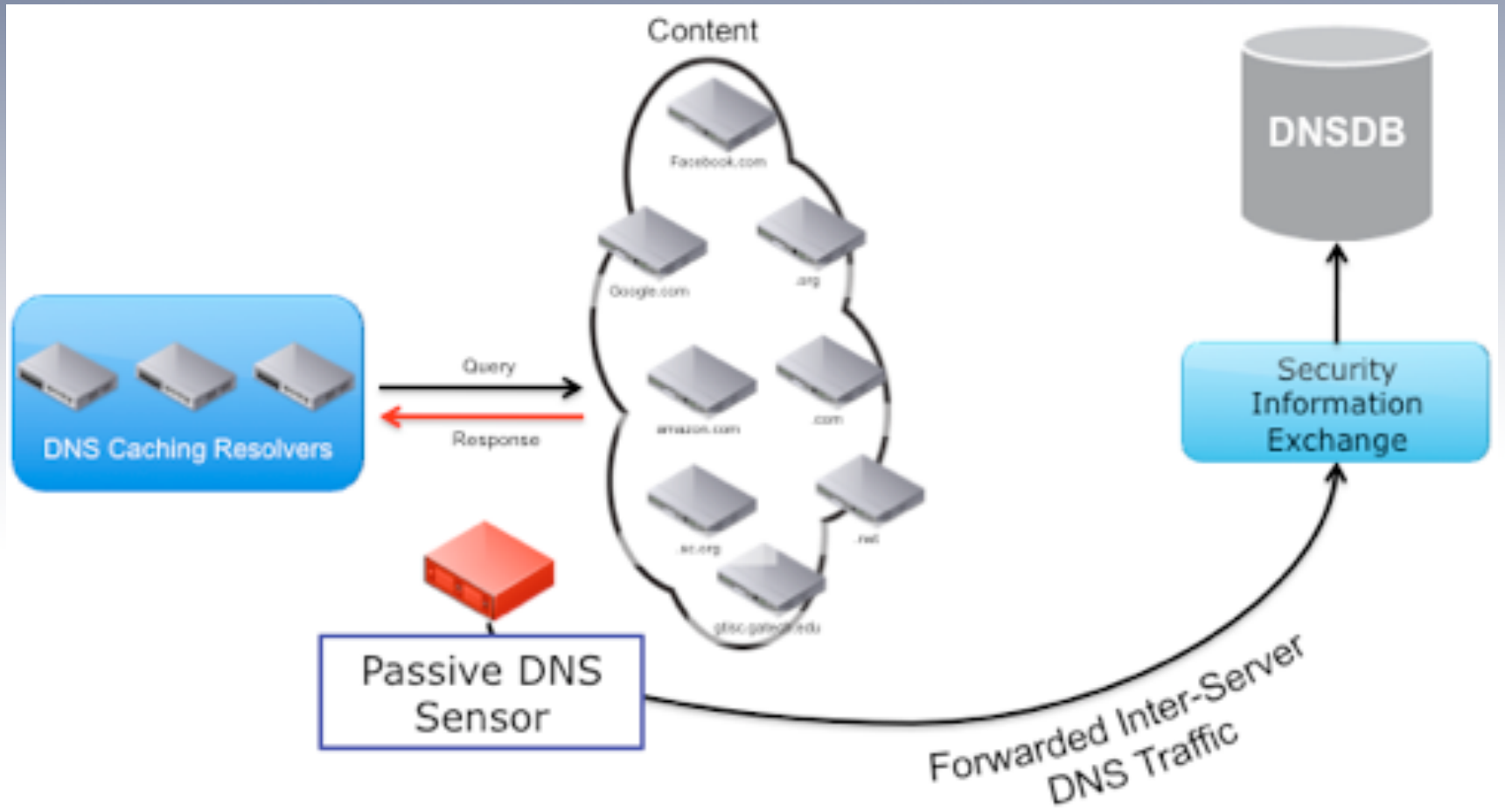
SIE Model



Source: ISC

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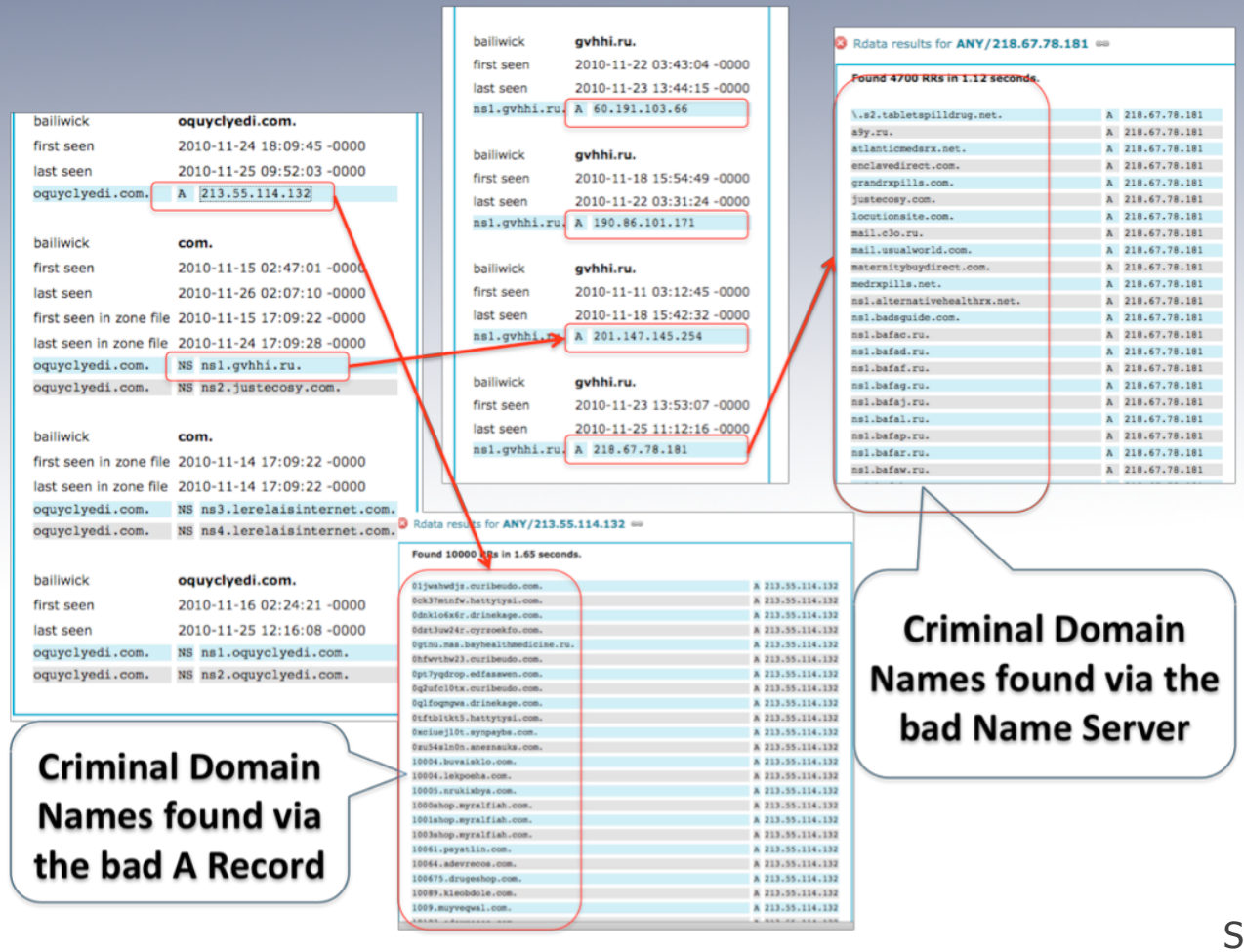
Mapping Criminal Infrastructure



Source: ISC

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Tracking Down a Spam E-mail

From: Claire Newell anarchdd@yeonil.net
Subject: Fwd:
Date: April 4, 2011 5:44:06 PM PDT

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Whois pillsgy.com???

Domain Name: PILLSGY.COM
Registrar: IPNIC, INC.
Whois Server: whois.myorderbox.com
Referral URL: http://www.ipnic.com
Name Server: NS1.DNSPLAC.COM
Name Server: NS2.BEZZDNS.RU
Status: clientTransferProhibited
Updated Date: 03-apr-2011
Creation Date: 18-mar-2011
Expiration Date: 18-mar-2012

Registrant:
Koshil Igor
Igor (KoshilIgor@mail.com)
Koneva str. 12-48
Koneva str. 12-48
Omsk
Omsk,644031
RU
Tel. +7.3812447211
Fax. +7.3812447211

Creation Date: 18-Mar-2011
Expiration Date: 18-Mar-2012

Domain servers in listed order:
ns1.dnsplac.com
ns2.bezzdns.ru

Administrative Contact:
Koshil Igor
Igor (KoshilIgor@mail.com)
Koneva str. 12-48
Koneva str. 12-48
Omsk
Omsk,644031
RU
Tel. +7.3812447211
Fax. +7.3812447211

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Oh Goodie – V1agr4, eh.

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Passive DNS Doesn't Look "Bad"

IP search:
Found 2 records

Host/Domain Name	First Seen	IP	ASN	BGP Netblock
pillsgy.com	2011-03-25 02:43:30	122.224.6.32	4134	122.224.0.0/12
pillsgy.com	2011-03-20 02:28:22	127.0.0.1		

Nameserver search:
Found 4 records

Nameserver	First Seen
ns2.bezzdns.ru	2011-03-25 02:43:27
ns1.dnskt.com	2011-03-25 02:43:27
ns1.ezydomain.com	2011-03-20 02:28:22
ns2.ezydomain.com	2011-03-20 02:28:22

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Let's Look at That IP…

inetnum: 122.224.6.0 - 122.224.6.255
netname: NINBO-LANZHONG-LTD
country: CN
descr: Ninbo Lanzhong Network Ltd
descr:
admin-c: TD209-AP
tech-c: CS64-AP
status: ASSIGNED NON-PORTABLE
changed: auto-dbm@dcb.hz.zj.cn 20100105
mnt-by: MAINT-CN-CHINANET-ZJ-SX
source: APNIC

role: CHINANET-ZJ Shaoxing
address: No.9 Sima Road,Shaoxing,Zhejiang.
312000
country: CN
phone: +86-575-5136199
fax-no: +86-575-5114449
e-mail: anti-spam@mail.sxptt.zj.cn
trouble: send spam reports to anti-
spam@mail.sxptt.zj.cn
trouble: and abuse reports to
anti-spam@mail.sxptt.zj.cn
admin-c: CH109-AP
tech-c: CH109-AP
nic-hdl: CS64-AP
mnt-by: MAINT-CHINANET-ZJ
changed: master@dcb.hz.zj.cn 20031204
source: APNIC

person: Taichun Du
nic-hdl: TD209-AP
e-mail: anti-spam@mail.sxptt.zj.cn
address: Shaoxing,Zhejiang.Postcode:312000
phone: +86-574-88311333
country: CN
changed: auto-dbm@dcb.hz.zj.cn 20100105
mnt-by: MAINT-CN-CHINANET-ZJ-SX
source: APNIC

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Jackpot!

Your query returned 438,394 records.

First Seen	Host/Domain
3/23/2011 8:59	0.2k.medicsy.com
3/23/2011 10:30	0.2l60.medicsy.com
3/23/2011 21:19	0.3.medicdm.com
3/23/2011 22:42	0.3.medicsy.com
4/4/2011 16:53	0.3.topmedicb.ru
4/4/2011 20:18	0.348t.medicsy.com
3/21/2011 0:00	0.6fj0.medicsy.com
1/27/2011 18:26	0.bsirr.doctorgco.ru
1/26/2011 15:42	0.bsirr.sodoctorg.ru
1/27/2011 8:44	0.bsirr.sudoctorg.ru
3/23/2011 8:59	0.cf7ts7.topmedicb.ru
3/23/2011 10:30	0.cf9.topmedicb.ru
3/23/2011 21:19	0.ct.medicsy.com
3/23/2011 22:42	0.cu60.medicsy.com
3/24/2011 2:52	0.d.medicsy.com

First Seen	Host/Domain
3/21/2011 10:43	candmedic.ru
3/19/2011 14:59	candoctor.ru
3/25/2011 12:14	candx.wke.asterwase.net
2/25/2011 10:58	cazht.medicinexi2.ru
3/29/2011 17:12	cazkt.extralegallow.org
1/28/2011 3:43	cazuy.pharmacyrx38.com
3/26/2011 6:16	cb.r.10yearsextrces.net
3/23/2011 8:16	cb6kf.v.topmedicb.ru
3/23/2011 9:25	cb6n8.8a.medicsy.com
3/23/2011 12:54	cb6s.gy.topmedicb.ru
3/23/2011 17:35	cb6zy.5v2rt.medicsy.com
3/23/2011 21:46	cb8.t.medicsy.com
3/24/2011 3:18	cba8g.st9al.topmedicb.ru
2/1/2011 16:36	cbaaf.rxshopds9.com

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How About a Nameserver?

Found 26 records

First Seen	Domain
4/4/2011 1:51	bljxpills.ru
4/3/2011 23:12	brjxpills.ru
4/4/2011 13:51	caxrpills.com
4/3/2011 16:09	chxrpills.com
4/3/2011 16:33	dnsplac.com
4/3/2011 21:45	doctorje.com
4/4/2011 15:47	doctorod.com
4/3/2011 16:20	doctorrg.com
4/3/2011 16:25	doctorrl.com
4/3/2011 23:41	fajxpills.ru
4/4/2011 18:58	gejxpills.ru
4/4/2011 9:32	medicaqap.ru
4/4/2011 8:01	medicaqar.ru

First Seen	Domain
4/4/2011 17:02	medicaqch.ru
4/4/2011 10:14	medicaqci.ru
4/3/2011 22:15	medicaqee.ru
4/3/2011 22:18	medicaqen.ru
4/3/2011 22:18	midiclxia.ru
4/3/2011 22:38	midiclxic.ru
4/3/2011 22:46	midiclxme.ru
4/3/2011 22:15	midiclxnf.ru
4/3/2011 22:51	midiclxto.ru
4/4/2011 20:23	pillsin.com
4/3/2011 16:26	pillsll.com
4/4/2011 23:56	rafpills.com
4/3/2011 21:19	stpills.com

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Tracking Malware C&C's

- Once you know a C&C IP, you can start tracking down probable C&C and rendezvous domains
- Zeus is a great example – typically controlled via a series of domains
- Let's take data from ZeusTracker and see if we can improve detection using PDNS

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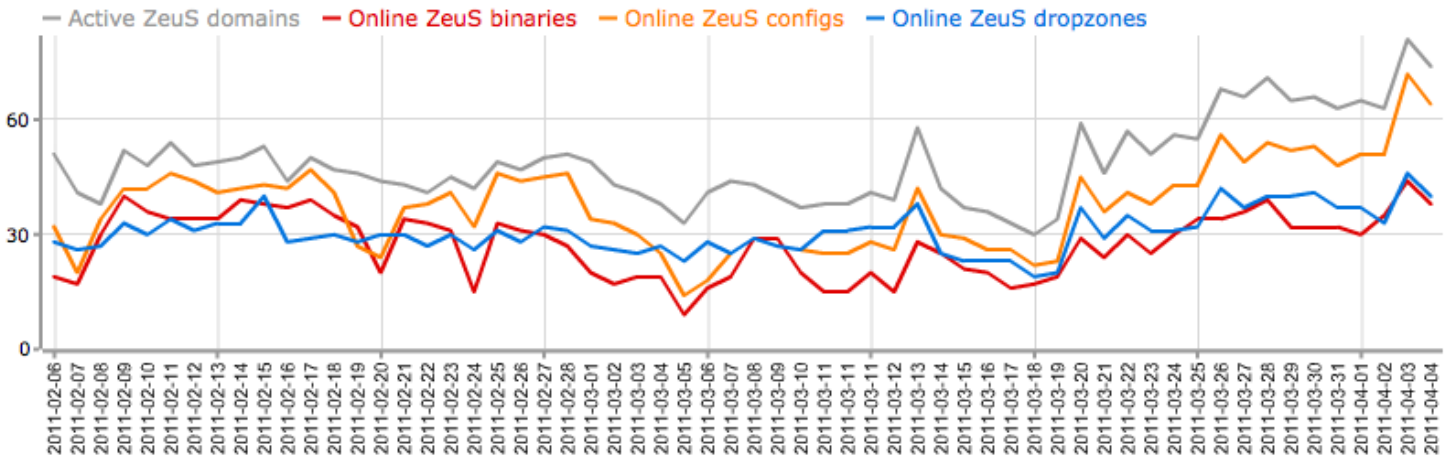
ZeusTracker

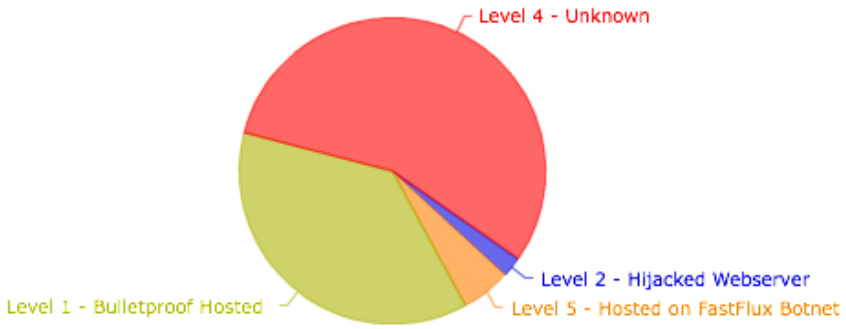
ZeuS Tracker :: Statistic

Here are some statistics about the ZeuS crimeware. Note: You need the Adobe Flash player to view the statistics.

# of active ZeuS files (last 60 days)



Hosting Statistic (# of Hosts per Level)



https://zeustracker.abuse.ch

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Zeus C&C IP - 94.63.244.32

- Located in Romania
- ZeusTracker has 6 domains on it

Below is a list of all ZeuS Hosts which are currently hosted on this IP address.

Hosts on this IP address

Dateadded	CC	FU	Host	Status	Files online	Registrar	Nameserver(s)
2011-03-08	CC		biqupdate.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com
2011-03-08	CC		biqupdatings.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com
2011-03-07	CC		biqupdater.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com
2011-03-07	CC		biqupdates.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com
2011-03-07	CC		biqupdating.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com
2011-03-07	CC		biqupdaters.ru	online	0	REGTIME-REG-RIPN	ns1.nameself.com | ns2.nameself.com

# of Host on this IP address: **6**

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Passive DNS Expands the Story

- 13 Records on 12 distinct domains – double the action for blocking and remediation

Found 13 records

IP Address	ASN	BGP Netblock	First Seen	Host/Domain
94.63.244.32	49469	94.63.244.0/24	2011-03-02 06:55:57	bigupdate.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-10 01:28:05	bigupdate1.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-05 11:14:42	bigupdater.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-04 22:31:11	bigupdaters.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-03 03:50:22	bigupdates.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-05 07:03:41	bigupdating.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-08 22:03:12	bigupdatings.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-03 07:04:40	hotupdating.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-10 23:57:28	topupdate.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-13 08:38:09	topupdater.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-15 23:38:01	topupdaters.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-11 22:47:02	topupdates.ru
94.63.244.32	49469	94.63.244.0/24	2011-03-19 07:18:06	www.bigupdater.ru

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Even more to find

- Checking one of the "new" domains for this IP, we find 2 new IPs – from topupdates.ru

Found 3 records

Host/Domain Name	First Seen	IP	ASN	BGP Netblock
topupdates.ru	2011-03-28 00:35:07	94.63.149.52	42741	94.63.149.0/24
topupdates.ru	2011-03-18 01:40:39	86.55.140.204	49469	86.55.140.0/24
topupdates.ru	2011-03-11 22:47:02	94.63.244.32	49469	94.63.244.0/24

- Turns out several of the "new" domains just weren't seen on the first IP, but were spotted later.
  - PDNS would greatly improve detection speed

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Fast-Flux Detection

- PDNS an excellent way to find new FFLUX domains and hosts
- Set-up traps on new (or old) domains/hosts and watch for tell-tales
  - Multiple IPs across ASNs
  - Lots and lots of hostnames (wildcarding)
- Was particularly good for ROCK/Avalanche
- Not in vogue as much these days

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FFLUX Example

Suspected Avalanche Domain - platinumalbumm.com
Detected via flux behavior 31/8/2010

Found 175 records

First Seen	IP	ASN	BGP Netblock
2010-09-02 06:03:33	125.224.87.9	3462	125.224.0.0/16
2010-09-10 17:06:36	187.18.177.80	28270	187.18.128.0/17
2010-09-11 19:53:43	217.85.219.235	3320	217.80.0.0/12
2010-09-01 01:40:41	61.63.60.123	18042	61.63.0.0/18
2010-09-06 21:30:54	69.66.112.254	7029	69.66.0.0/16
2010-09-11 16:33:28	76.168.233.98	20001	76.168.0.0/13
2010-09-06 16:13:21	78.88.220.232	29314	78.88.216.0/21
2010-09-11 11:23:17	82.61.71.66	3269	82.61.0.0/16
2010-09-07 06:41:22	87.165.115.97	3320	87.128.0.0/10
2010-09-09 07:56:47	91.82.177.158	12301	91.82.0.0/15
2010-09-13 08:39:00	95.89.168.93	31334	95.88.0.0/14
2010-09-08 22:11:47	109.184.56.252	25405	109.184.0.0/16
2010-09-11 17:53:43	178.92.69.20	6849	178.92.0.0/14

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Bullet Proof Hosting

- PDNS allows you to explore entire hosting locations to tie criminal activities together
- Search CIDR blocks and correlate data
- Can't kill a pharma shop or replica knock-offs?
  - Go after them for phishing and malware hosting
  - Better chance of de-peering with nastier stuff

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Monitoring Your Infrastructure

- PDNS is a great tool for alerting you of unauthorized activities with your names and your IP space
- Take-over of infrastructure – hacking/hijacking
- Compromises of machines for hosting malicious content or activities
- The latest marketing campaign you weren't told about
- Domain name expirations 

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Finding Bots on Your Network

- Map out IP infrastructure and set-up standard scans/ alerts based on new hostname mappings appearing
- Filter out "known good" domains/hosts
- Filter known anomalies
  - DNS tunneling services
  - SonicWall router responses
  - Other bizarre "chaff" that shows up
- ISPs may want to filter Dynamic DNS services – maybe not depending on hostname

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Sample Network Scan

- Let's look at a large bank range (165.32.0.0/12)
- 1751 Records we've seen in past 18 months
  - Lots of standard junk
  - 918 DNS Tunneling hosts
    - b9d2183d19a87a6776d09df644df5dab898a.1.ziyouforever.com
  - 830 SonicWall hosts
    - 2.047870c52e682d85000000000000000418.griddnsd.global.sonicwall.com

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Three Records to Examine

- No bank hosts showing up – good, it's a non-public network space!
  - uluqwovl.info -> 165.44.178.223
  - pnncfoxrtfz.ekuxejqw.com -> 165.43.189.113
  - midvalleydental.net -> 165.38.174.232
- First one is just plain weird – no ties to anything else and not operative
- Third is odd, until you look at this:
  - Dig midvalleydental.net -> 165.38.174.232
  - Dig www.midvalleydental.net -> 65.38.174.232

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pnncfoxrtfz.ekuxejqw.com

- Whois looks bad…
  - Registrar: TODAYNIC.COM, INC.
  - Creation Date: 05-mar-2011
  - Nameservers: N588.COZVEND.BIZ, N776.COZVEND.BIZ
- On some spam lists, not working now
- Rotated IPs

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IPs Moving All Over

Found 9 records

First Seen	IP	ASN	BGP Netblock
2011-03-15 00:35:03	220.146.6.136	2510	220.146.0.0/15
2011-03-14 21:25:04	150.211.25.152		
2011-03-15 00:35:02	165.43.189.113		
2011-03-15 00:35:02	180.51.204.16	4713	180.0.0.0/10
2011-03-14 21:25:03	64.120.170.101	21788	64.120.128.0/18
2011-03-14 21:25:03	18.169.198.126	3	18.0.0.0/8
2011-03-15 00:35:03	67.137.15.43	7385	67.136.0.0/14
2011-03-14 21:25:04	201.28.47.15	10429	201.28.0.0/17
2011-03-14 21:25:03	11.134.78.67		

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Nameservers Look Suspicious

Found 60 records

First Seen	Domain
2011-03-07 02:48:27	adubapot.com
2011-03-14 03:23:34	afohilim.com
2011-03-14 03:23:08	afypisur.com
2011-03-14 03:19:44	ahamifej.com
2011-03-14 03:20:28	ajupymyx.com
2011-03-14 03:22:27	amqzewit.com
2011-03-14 03:21:54	apimywax.com
2011-03-07 02:57:23	arohuhuv.com
2011-03-14 03:22:44	atasyzel.com
2011-03-07 02:49:14	avqfugqv.com
2011-03-14 03:08:54	awyxufel.com
2011-03-07 02:56:33	azyjyroc.com
2011-03-14 01:55:39	ekqtagiw.com
2011-03-07 02:50:51	ekuxejqw.com
2011-03-07 02:46:49	elqvizyk.com
2011-03-14 01:59:27	epofapeb.com
2011-03-14 01:59:48	itipytob.com
2011-03-07 02:41:14	ixohoren.com
2011-03-07 02:37:47	izetqmab.com
2011-03-07 03:49:35	ocesytaw.com
2011-03-07 03:36:02	ofyruwqb.com
2011-03-07 03:29:55	ogqhejej.com
2011-03-14 02:23:14	ogycovqb.com
2011-03-14 02:26:55	omizodav.com
2011-03-14 02:48:34	orynypoh.com
2011-03-14 02:45:31	osodigaw.com
2011-03-14 02:49:18	owapupih.com
2011-03-14 02:59:04	oxaxesuz.com
2011-03-07 03:09:20	qdopqcqh.com
2011-03-07 02:47:49	qdulyjqd.com
2011-03-07 02:49:01	qfatunam.com
2011-03-14 02:38:07	qgucipyl.com
…	

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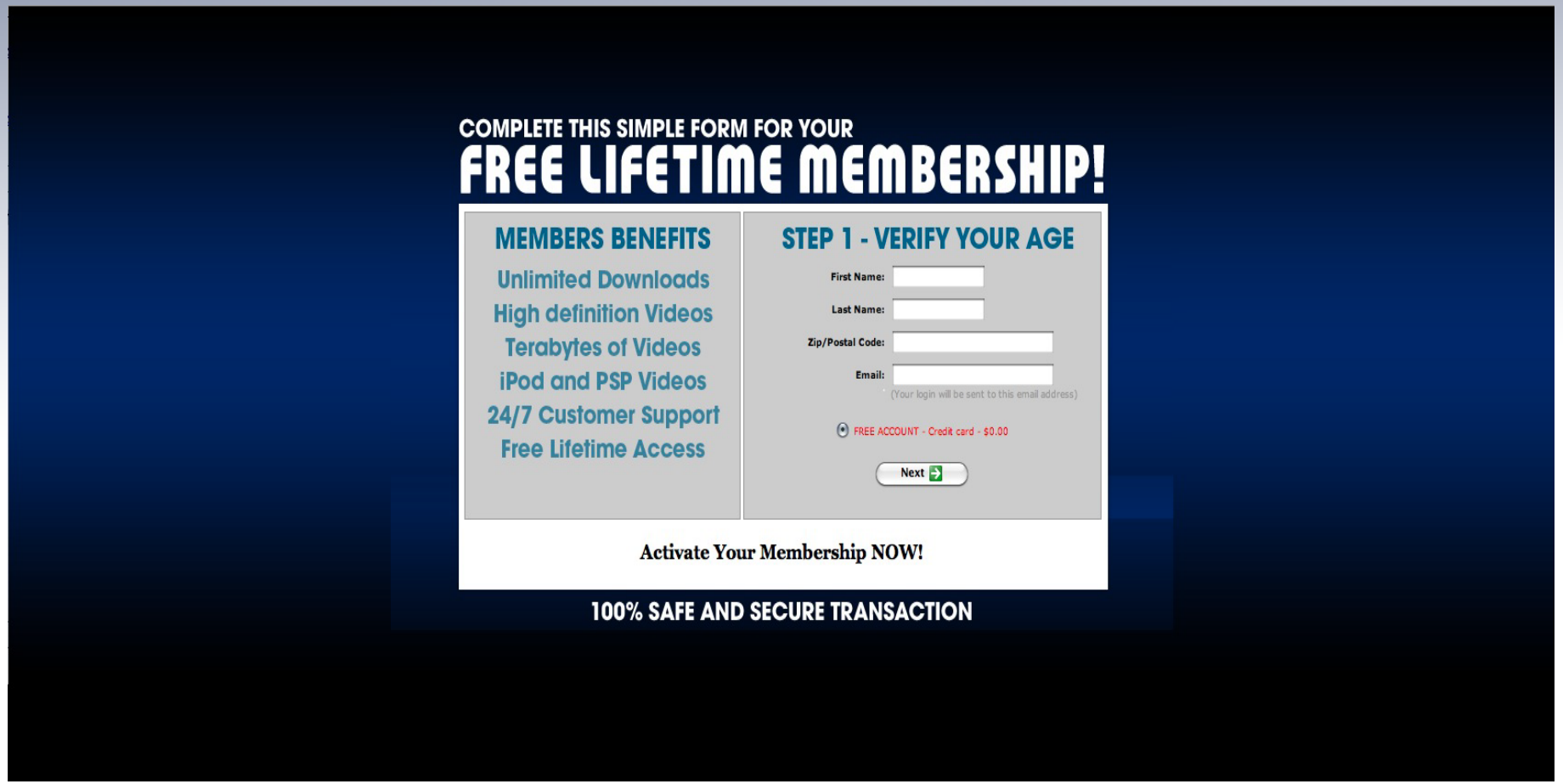
pnncfoxrtfz.ekuxejqw.com

- Google cache of this one – oops!



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pnncfoxrtfz.ekuxejqw.com

- Following that link – sure not our bank!

SAFE SECURE ENCRYPTED

100% SECURE

Your personal information is safe with this form. 100% safe and secure billing.

Todays charge is $0.00
for your free access to www.bannedfromfaceb--k.com

RTA RESTRICTED TO ADULTS

You must be 18 years of age or older to access this site.
Please submit your information below for **VERIFICATION**

First Name: Joe
Last Name: Schmoe

Card Number:
CVV2/CVC2 Number: What's This?
Expiration Date: 01 Jan 2010

Zip/Postal Code: 27529
Email: phillipazimmeropse@gmail.com
(Your login will be sent to this email address)

Special Offer: Your membership today Qualifies for a FREE VIP upgrade+

By pressing CLICK FOR FREE ACCESS, I certify that I have read and agree to the Terms and Conditions and Privacy Policy and that the information entered above is my own and I am fully authorized to use it. I also understand that my information will be shared with third parties.Fraud will be prosecuted to the fullest extent of the law.

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Data Exfiltration

- Same techniques can be used to spot data exfiltration from your networks
- Google found Aurora via DNS logs, PDNS works from the outside or in conjunction with inside monitoring position without the overhead of DNS log parsing
- Night Dragon case – well, not so much – didn't see the hosts in the main passive feed (we got them from a separate source)
  - Assumption is that they used the hacked company's own recursive servers for resolution to the data dump domains

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RSA Breach

- Several reported domains/subdomains

AGOOGLE.IN
ALBERTSTEIN.DDNS.US
ALVINTON.JETOS.COM
BILLGATES.ITSAOL.COM
BUFFET.BBSINDEX.COM
BUFFET80.ITSAOL.COM
DOMIKSTART.HOPTO.ORG
FOOTBALL.DYNAMICLINK.DDNS.US
FREE2.77169.NET
FTP.XMAHOME.OCRY.COM
GOOD.MINCESUR.COM
OBAMA.SERVEHTTP.COM
PRC.DYNAMICLINK.DDNS.US
SAFECHECK.ORGANICCRAP.COM
SMTP.DYNAMICLINK.DDNS.US
SUPERAROUND.NS02.BIZ
UP82673.HOPTO.ORG
WWW.ALVINTON.JETOS.COM
WWW.COMETOWAY.ORG
WWW.CZ88.NET
WWW.USGOODLUCK.COM

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RSA Breach – Prelim PDNS Info

- A few of those domains appear to be outliers
- Attacks may have lasted months
- Most IPs for activities were in China, a few in South Korea and India, and at least one in the US
- We found several unreported "ftp" hostnames that point straight to possible exfiltration of data

```
;; first seen: 2010-10-18 05:46:58 -0000
ftp.alvinton.jetos.com. IN A 114.248.86.49 CHINA
```

```
;; first seen: 2011-03-14 00:51:18 -0000
ftp.alvinton.jetos.com. IN A 123.120.96.142 CHINA
```


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Detecting Domain Hijacking

- Set-up watches for changes to nameservers and/or IP addresses on critical hostnames under a domain.
- Can combine with active DNS monitoring of critical assets
- Changes to ASN's used by those hosts or to known or suspicious neighborhoods can be alerted for investigation
- Can use PDNS database to determine if the event is specific or widespread (e.g. registry hack, domain account take-overs)

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Bangladesh gets p0wned

- Through active DNS monitoring, we spotted microsoft.com.bd being moved onto malicious looking nameservers and an odd IP address

- Sure enough… domain name hijacking!

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PDNS Tells the Bigger Story

- A lot more victims = Registry hack
- Looks like cross-site scripting attack against BD NIC

Found 4 records

Nameserver	First Seen	Host
localh0st1.avjournal.com	2011-01-08 09:51:15	google.com.bd
localh0st1.avjournal.com	2011-01-08 09:53:36	hsbc.com.bd
localh0st1.avjournal.com	2011-01-08 13:26:00	music.com.bd
localh0st1.avjournal.com	2011-01-08 16:28:19	aloashbei.com.bd

Found 3 records

Host/Domain Name	First Seen	IP	ASN	BGP Netblock
hsbc.com.bd	2010-12-03 04:38:46	203.112.92.6	9221	203.112.92.0/24
hsbc.com.bd	2011-01-08 11:32:31	173.233.68.2	40244	173.233.64.0/19
hsbc.com.bd	2010-07-01 12:49:08	203.112.92.44	9221	203.112.92.0/24

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Take-over of legit DNS

- Bad guys like to use DNS but know their own domains can get blocked/shut-down
- Great leverage if you can compromise the DNS of a real site
  - Can't (or shouldn't) block/shut-down legit domain
  - Site owner may be unaware of compromise
- Can do in conjunction with site or just the DNS

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Domain DNS Take-over Vectors

- Control all aspects – website/DNS/e-mail
  - Registrar/hosting combo accounts
  - Cpanel or other management tools
  - Site server looks "guilty" as evil content present
- Control the DNS
  - Registrar or DNS provider take-over
  - P0wn the nameserver
  - IPs for legit and illegitimate servers differ

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Legit website

http://townhouseflorida.com/

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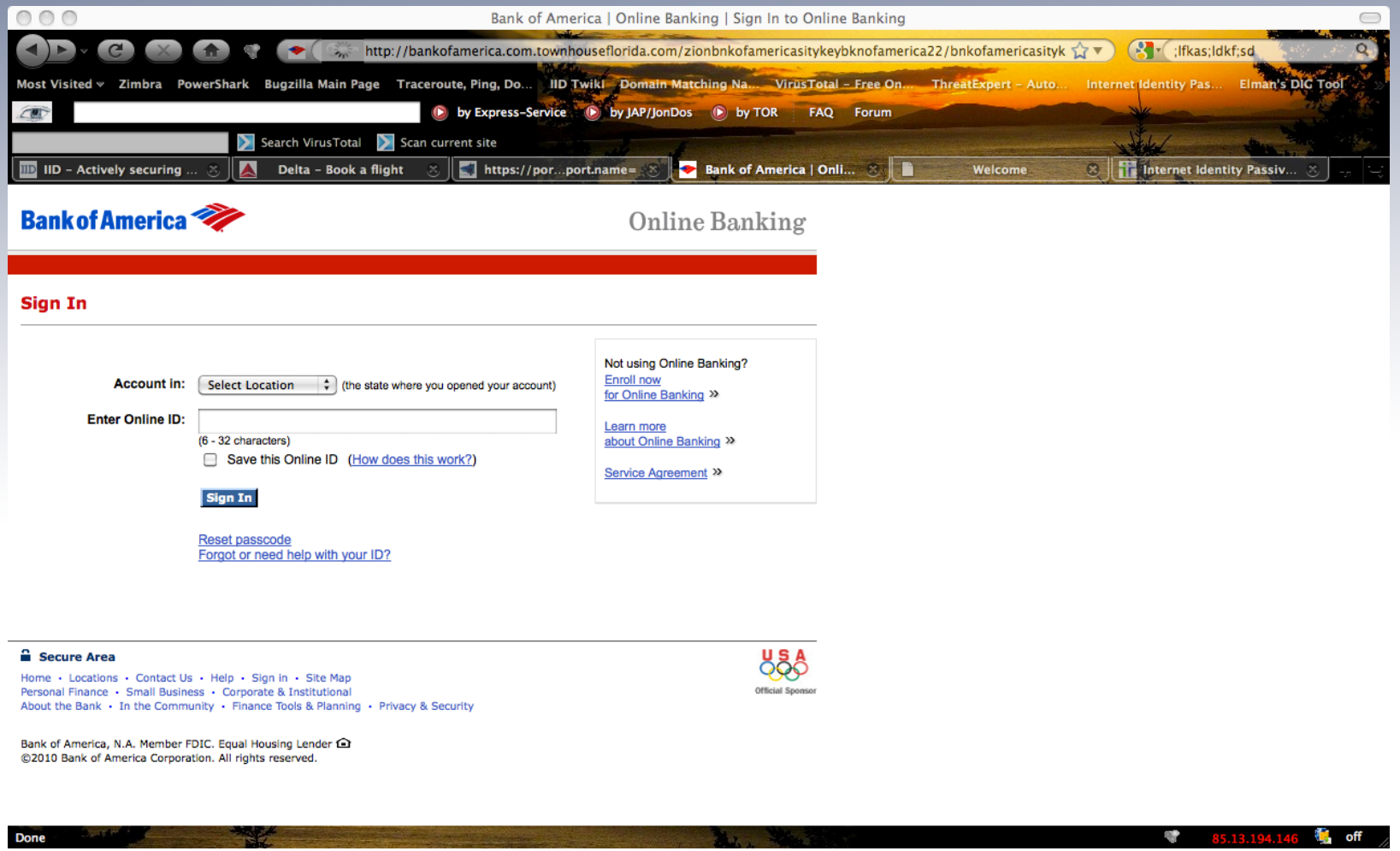
Hitchhiker Site



http://bankofamerica.com.townhouseflorida.com/zionbnkofamericasitykeybknofamerica22/bnkofamericasityk1eybknofamerica/bnkofamericasitykeybknofamerica/signon.php?section=signinpage&update=&cookiecheck=yes&destination=nba/signin

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PDNS tells a story…

Found 3 records in Passive DNS

IP Address	ASN	BGP Netblock	First Seen	Host/Domain
85.13.194.146	31708	85.13.192.0/19	2010-11-30 00:06:36	bankofamerica.com.sitekey.securepages.infoupdate.verifyinfo.townhouseflorida.com
85.13.194.146	31708	85.13.192.0/19	2010-07-08 20:19:20	bankofamerica.com.townhouseflorida.com
85.13.194.146	31708	85.13.192.0/19	2010-07-14 05:40:30	townhouseflorida.com

Note that a wildcard DNS record for a domain can
Be exploited similarly if you have compromised the site.
Thanks Peter!

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Disaster Scams

- Katrina, Indian Ocean Tsunami, Haiti, Japan Disaster
- Scams set-up to solicit funds
- Lots of "real" efforts too – careful analysis needed
- PDNS a great tool for finding quickly and in any ccTLD or subdomains
- Generate lists for automated and human analysis

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Japan Disaster Tracking Sample

- Set-up alerts for likely string combos
  - Japan & Tsunami, Sendai & Earthquake, etc.
- Whitelists and automation to block known sites and find likely candidates
- Human Review of likely ones.

http://tsunamireliefforjapan.net
http://www.disaster-relief-shelters.org
http://thejapanearthquakefund.com
http://www.japan-tsunami-relief.org
http://www.japanesequake2011.com
http://www.donatetojapan.org
http://www.japanrelief2011.tk
http://www.japanrelieffunds.weebly.com
http://www.ihelpjapan.org
http://www.helpdonatejapan.com
http://www.helpjapan.piczo.com
http://www.japanesedisasterrelief.org
http://helpmyjapan.com
http://helpfirstjapan.org

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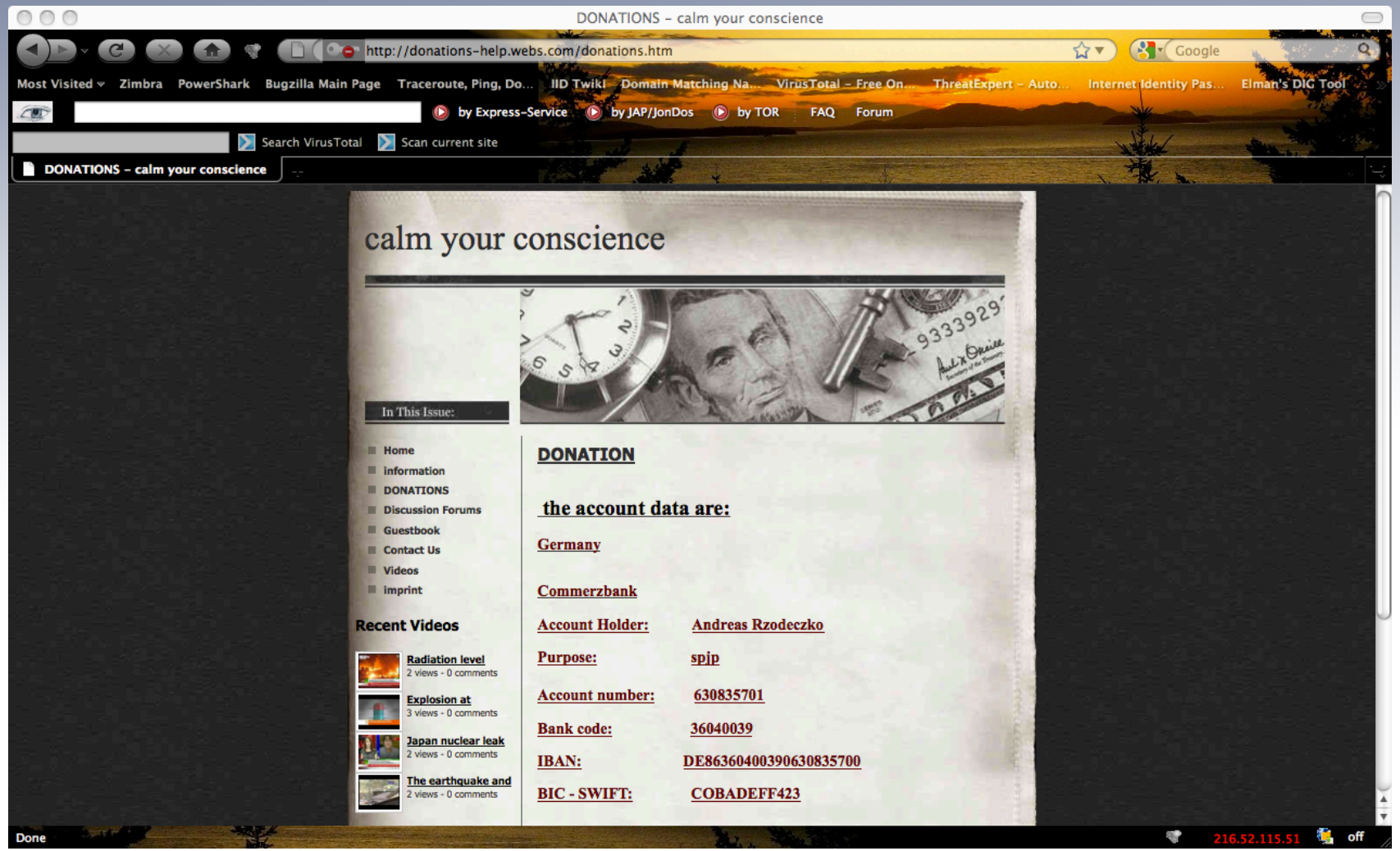
donations-help.webs.com



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Same Techniques for Brands

- Search for terms, typo variants
- Group results and drill in on potential offenders
- Set-up alerts on new hits for potential nastiness

The following alerts for "google" were generated on 2010-06-30 at 23:35.
Search terms: google

ggoogle.de
goodgoogle346.cn
google-secrets.com
googlematt.com

- Build cases based on large corpus of offender data

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Need a Zone File?

- If it's being used, you can get it via PDNS
- I've solved my ccTLD access problems! 
- Subdomain resellers aren't a major issue any more
- Can use the info to understand hostname behavior and properly categorize hosting companies, DNS providers and the like
- Would have REALLY helped ICE when they shut-down mooo.com to have done this kind of analysis (besides just looking at their homepage)

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Sample Zones

- .TK – 1 million plus
- Mooo.com – 35K records
  - Just what is stuff like "0wrr6d267.mooo.com" for anyway?
- ibm.com – 947 records
- facebook.com - Just kidding! A bazillion records
- Not 100%, but pretty good coverage

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Challenges/Pitfalls/Gotchas

- Not everything is perfect in PDNS land
- False-positives due to shared hosting
- People treating the DNS badly
  - DNS Tunneling
  - Facebook
- Akamai and CDN's
- Domain parking sites

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The Future…

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More Sensors Needed – Help!

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Use of caching DNS for botnets

- 1) Victim PC is infected
- 2) Attacker registers a domain or subdomain
- 3) Attacker encodes malware binary in a set of CNAME RRs in the authoritative zone with long TTLs
- 4) Attacker queries for malware RR's using popular open recursive servers and those servers cache the responses
- 5) Attacker removes domain used from delegation
- 6) Malware on victim PC uses DNS queries to the same popular open resolvers to acquire code
- 7) Removal of authoritative doesn't mitigate threat because caches of CNAME RRs persist well beyond remediation

Paper by Rodriguez and Hidalgo - http://goo.gl/LyTnw

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Automating Detection

- Two interesting proposals, Notos, EXPOSURE
- Notos – Dynamic Reputation System for DNS
  - Build reputation and use on new hosts
  - *www.usenix.org/events/sec10/tech/full_papers/Antonakakis.pdf*
- EXPOSURE – Feature Based System for PDNS
  - Use training on features to tag new hosts
  - *www.iseclab.org/papers/bilge-ndss11.pdf*

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Notos

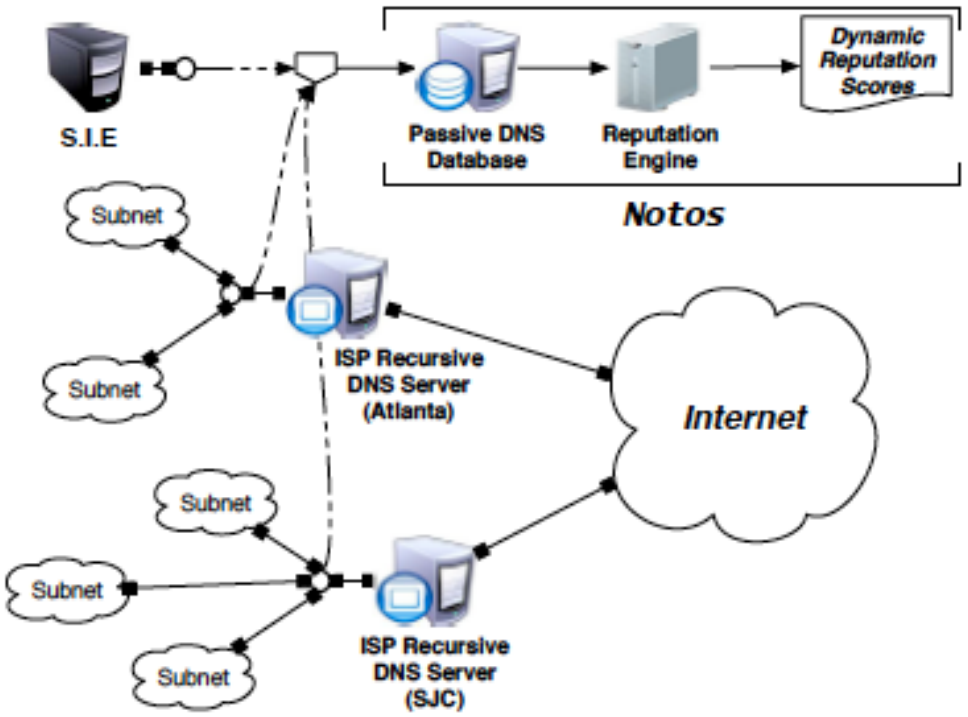

Figure 1. System overview.

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Notos

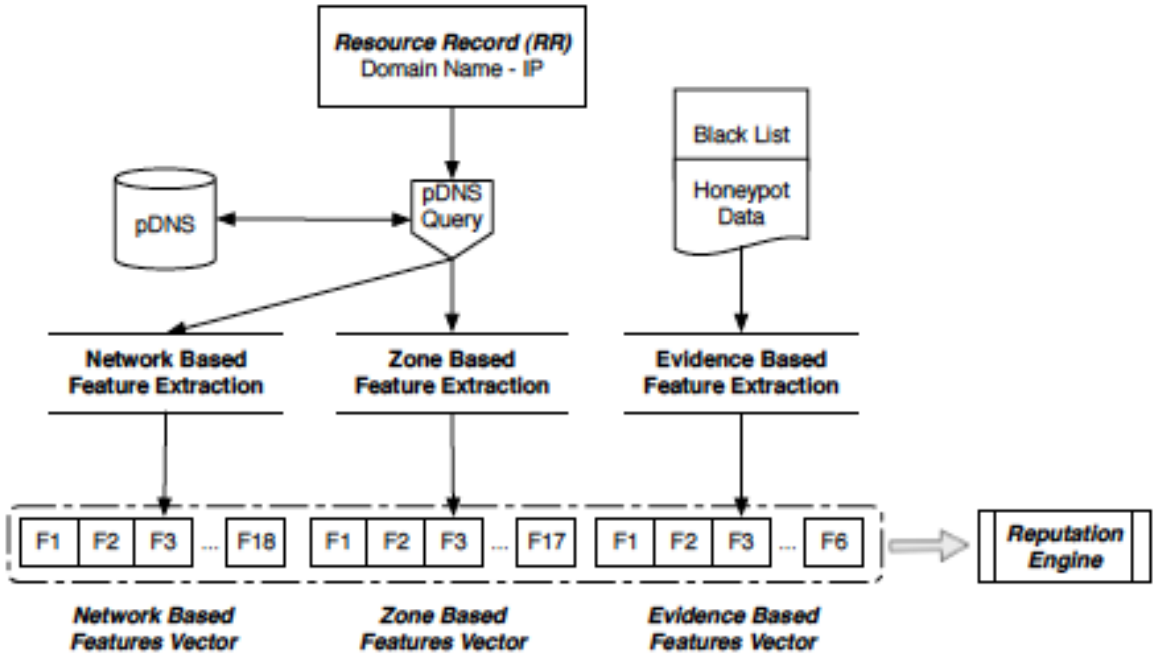

Figure 2. Computing network-based, zone-based, evidence-based features.

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EXPOSURE

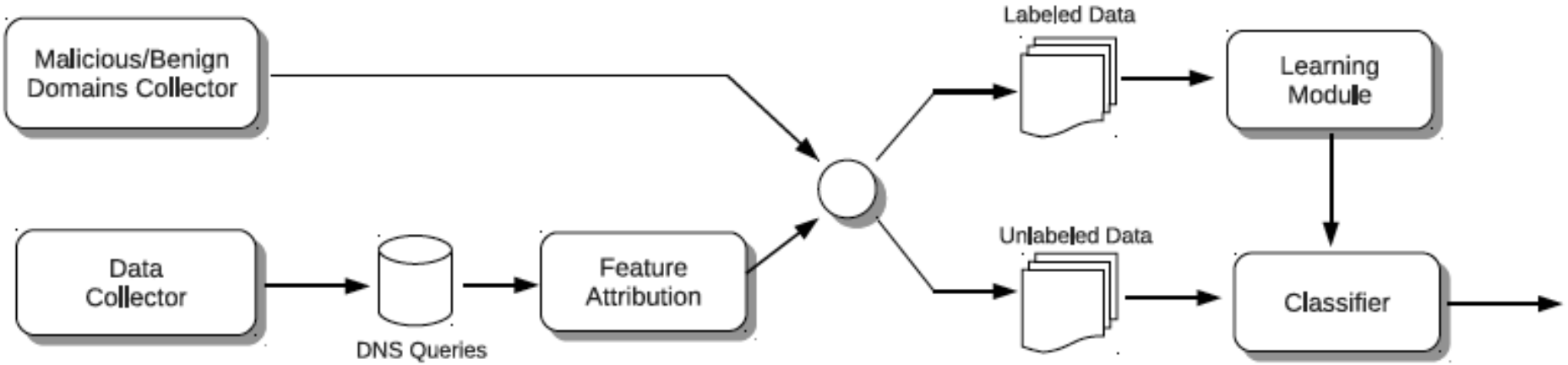

Figure 1: Overview of EXPOSURE

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Questions?

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Practical Usage of Passive DNS Monitoring for E-Crime Investigations

Thanks!

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