Incident Response tactics with Compromise Indicators

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Outline

Introduction

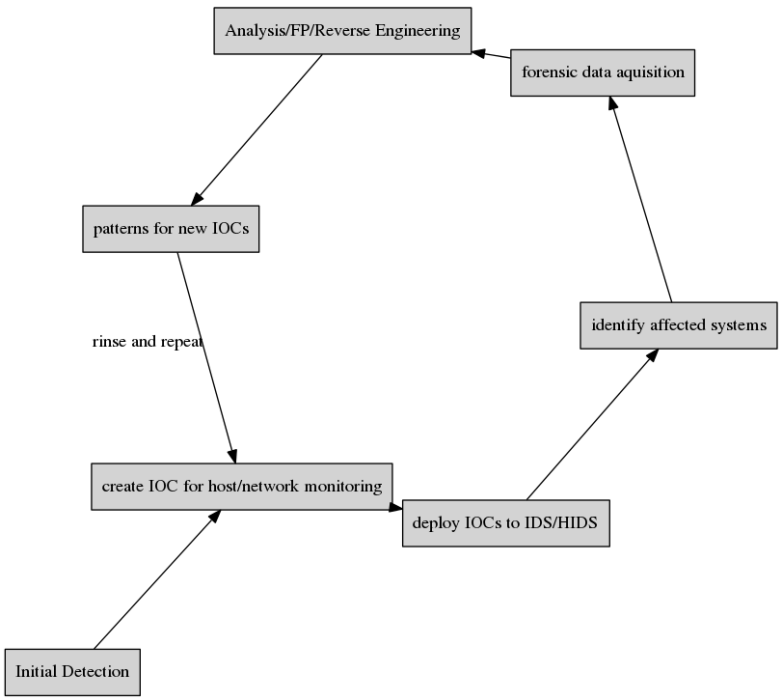
Indicators of Compromise

Indicator of compromise (IOC) in computer forensics is an artifact observed on network or in operating system that with high confidence indicates a computer intrusion.

`http://en.wikipedia.org/wiki/Indicator_of_compromise`

IOC workflow

A typical flow with Indicators of Compromise allows to integrate dynamic threat intelligence into detection process:



source: Sophisticated indicators for the modern threat landscape, 2012 paper

Standards: OpenIOC

OpenIOC - Mandiant-backed effort for unform representation of IOC (now FireEye) `http://www.openioc.org/`

```
−<ioc id="6d2a1b03-b216-4cd8-9a9e-8827af6ebf93" last-modified="2011-10-28T19:28:20">
   <short_description>Zeus</short_description>
   <description>Finds Zeus variants, twexts, sdra64, ntos</description>
   <keywords/>
   <authored_by>Mandiant</authored_by>
   <authored_date>0001-01-01T00:00:00</authored_date>
   <links/>
  −<definition>
   −<Indicator operator="OR" id="9c8df971-32a8-4ede-8a3a-c5cb2c1439c6">
    −<Indicator operator="AND" id="0781258f-6960-4da5-97a0-ec35fb403cac">
     −<IndicatorItem id="50455b63-35bf-4efa-9f06-aeba2980f80a" condition="contains">
        <Context document="ProcessItem" search="ProcessItem/name" type="mir"/>
        <Content type="string">winlogon.exe</Content>
      </IndicatorItem>
     −<IndicatorItem id="b05d9b40-0528-461f-9721-e31d5651abdc" condition="contains">
        <Context document="ProcessItem" search="ProcessItem/HandleList/Handle/Type" type="mir"/>
        <Content type="string">File</Content>
      </IndicatorItem>
     −<Indicator operator="OR" id="67505775-6577-43b2-bccd-74603223180a">
      −<IndicatorItem id="c5ae706f-c032-4da7-8acd-4523f1dae9f6" condition="contains">
          <Context document="ProcessItem" search="ProcessItem/HandleList/Handle/Name" type="mir"/>
          <Content type="string">system32\sdra64.exe</Content>
        </IndicatorItem>
      −<IndicatorItem id="25ff12a7-665b-4e45-8b0f-6e5ca7b95801" condition="contains">
          <Context document="ProcessItem" search="ProcessItem/HandleList/Handle/Name" type="mir"/>
          <Content type="string">system32\twain_32\user.ds</Content>
        </IndicatorItem>
      −<IndicatorItem id="fea11706-9ebe-469b-b30a-4047cfb7436b" condition="contains">
          <Context document="ProcessItem" search="ProcessItem/HandleList/Handle/Type" type="mir"/>
          <Content type="string">\WINDOWS\system32\twext.exe</Content>
        </IndicatorItem>
```

Standards: Mitre

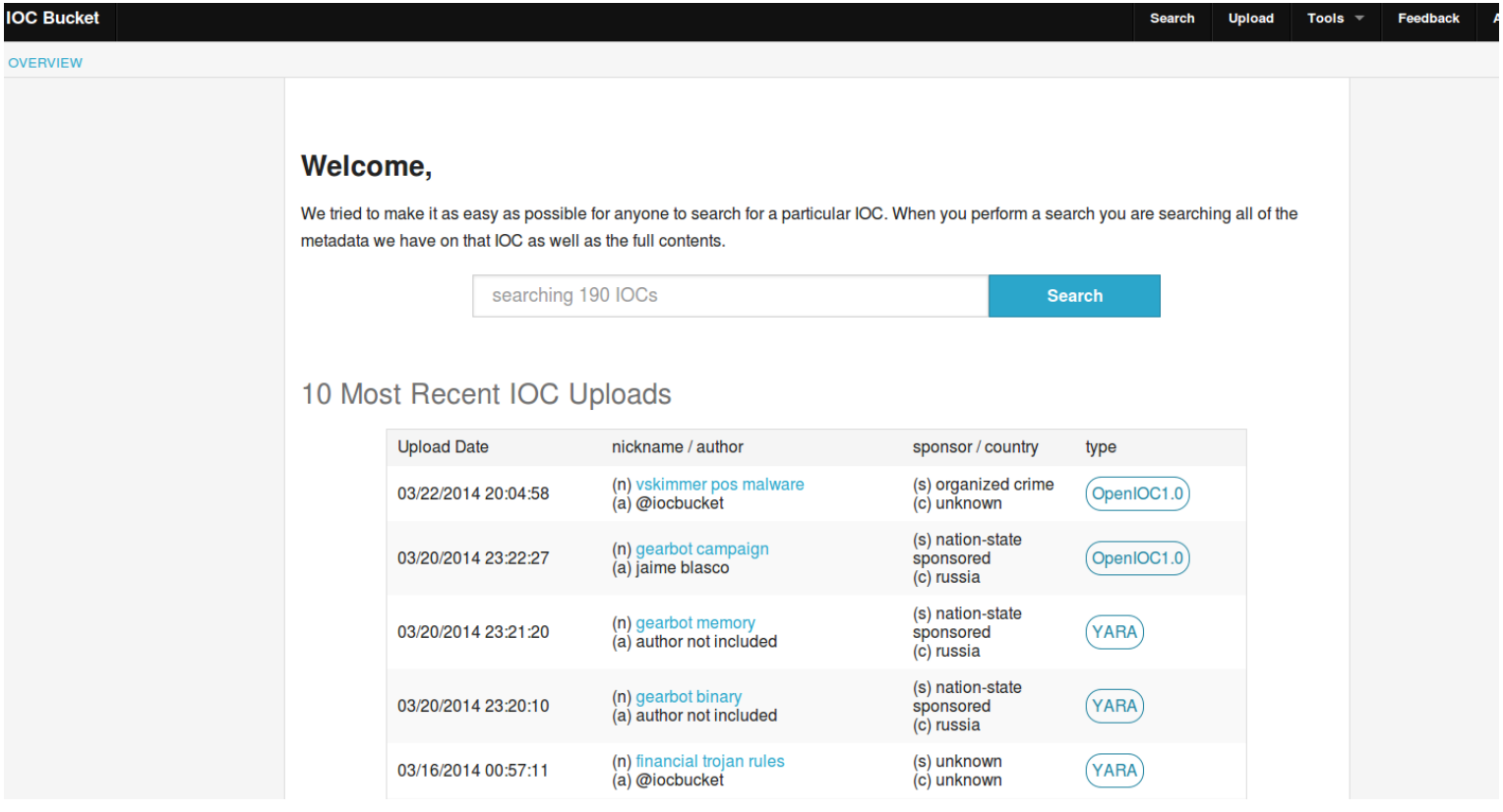
Mitre CybOX: http://cybox.mitre.org/
https://github.com/CybOXProject/Tools
https://github.com/CybOXProject/openioc-to-cybox Mitre CAPEC: http://capec.mitre.org/ Mitre STIX: http://stix.mitre.org/ Mitre TAXII http://taxii.mitre.org/

Open-source tools

OpenIOC manipulation
https://github.com/STIXProject/openioc-to-stix
https://github.com/tklane/openiocscripts
Mantis Threat Intelligence Framework
https://github.com/siemens/django-mantis.git Mantis supports STIX/CybOX/IODEF/OpenIOC etc via importers:
https://github.com/siemens/django-mantis-openioc-importer
Search splunk data for IOC indicators:
https://github.com/technoskald/splunk-search
Our framework: http://github.com/fygrave/iocmap/

Online Sharing of IOCs

http://iocbucket.com/



Policies on Sharing

Policies on sharing IOCs:

- what to be shared/can be shared
- who to share with
- when to share

Where to look for IOCs:

- Outbound Network Traffic
- User Activities/Failed Logins
- User profile folders
- Administrative Access
- Access from unsual IP addresses
- Database IO: excessive READs
- Size of responses of web pages
- Unusual access to particular files within Web Application (backdoor)
- Unusual port/protocol connections
- DNS and HTTP traffic requests
- Suspicious Scripts, Executables and Data Files

Challenges

Why we need IOCs? because it makes it easier to systematically describe knowledge about breaches.

- Identifying intrusions is hard
- Unfair game:
  - defender should protect all the assets
  - attacker only needs to 'poop' one system.
- Identifying targeted, organized intrusions is even harder
- Minor anomalous events are important when put together
- Seeing global picture is a mast
- Details matter
- Attribution is hard

Challenges

All networks are compromised

The difference between a good security team and a bad security team is that with a bad security team you will never know that you've been compromised.

An Example

A Network compromise case study:

- Attackers broke via a web vuln.
- Attackers gained local admin access
- Attackers created a local user
- Attackers started probing other machines for default user ids
- Attackers launched tunneling tools – connecting back to C2
- Attackers installed RATs to maintain access

Indicators

So what are the compromise indicators here?

- Where did attackers come from? (IP)
- What vulnerability was exploited? (pattern)
- What web backdoor was used? (pattern, hash)
- What tools were uploaded? (hashes)
- What users were created locally? (username)
- What usernames were probed on other machines

Good or Bad?

```
File Name                       : RasTls.exe
File Size                       : 105 kB
File Modification Date/Time     : 2009:02:09 19:42:05+08:00
File Type                       : Win32 EXE
MIME Type                       : application/octet-stream
Machine Type                    : Intel 386 or later, and compatibles
Time Stamp                      : 2009:02:02 13:38:37+08:00
PE Type                         : PE32
Linker Version                  : 8.0
Code Size                       : 49152
Initialized Data Size           : 57344
Uninitialized Data Size         : 0
Entry Point                     : 0x3d76
OS Version                      : 4.0
Image Version                   : 0.0
Subsystem Version               : 4.0
Subsystem                       : Windows GUI
File Version Number             : 11.0.4010.7
Product Version Number          : 11.0.4010.7
File OS                         : Windows NT 32-bit
Object File Type                : Executable application
Language Code                   : English (U.S.)
Character Set                   : Windows, Latin1
Company Name                    : Symantec Corporation
File Description                : Symantec 802.1x Supplicant
File Version                    : 11.0.4010.7
Internal Name                   : dot1xtray
```

It really depends on context

`RasTls.DLL`
`RasTls.DLL.msc`
`RasTls.exe`

`http://msdn.microsoft.com/en-us/library/ms682586(v=VS.85).aspx`
Dynamic-Link Library Search Order

Tools for Dynamic Detection of IOC

- Snort
- Yara + yara-enabled tools
- Moloch
- Splunk/Log search

Tools for Dynamic Detection

- Moloch
  - Moloch supports Yara (IOCs can be directly applied)
  - Moloch has tagger plugin:

```
# tagger.so
# provides ability to import text files with IP and/or hostnames
# into a sensor that would cause autotagging of all matching ses
plugins=tagger.so
taggerIpFiles=blacklist,tag,tag,tag...
taggerDomainFiles=domainbasedblacklists, tag, tag, tag
```

Sources of IOCs

ioc collection `http://iocbucket.com`
Public blacklists/trackers could also be used as source:
`https://zeustracker.abuse.ch/blocklist.php?download=ipblocklist`
`https://zeustracker.abuse.ch/blocklist.php?download=domainblocklist`

where to mine IOC

- passive HTTP (keep your data recorded)
- passive DNS

These platforms provide ability to mine traffic or patterns from the past based on IOC similarity
show me all the packets similar to this IOC
We implemented a whois service for IOC look-ups

```
whois -h ioc.host.com   attribute:value+attribute:value
```

Mining IOCs from your own data

- find and investigate incident
- Or even read paper
- determine indicators and test it in YOUR Environment
- use new indicators in the future
  see IOC cycle we mentioned earlier

Example

If event chain leads to compromise

`http:// liapolasens[.]info/indexm.html`

`http:// liapolasens[.]info/counter.php?t=f&v=win%2011,7,700,169&`

`http:// liapolasens[.]info/354RIcx`

`http:// liapolasens[.]info/054RIcx`

What to do?

Use YARA, or tune your own tools

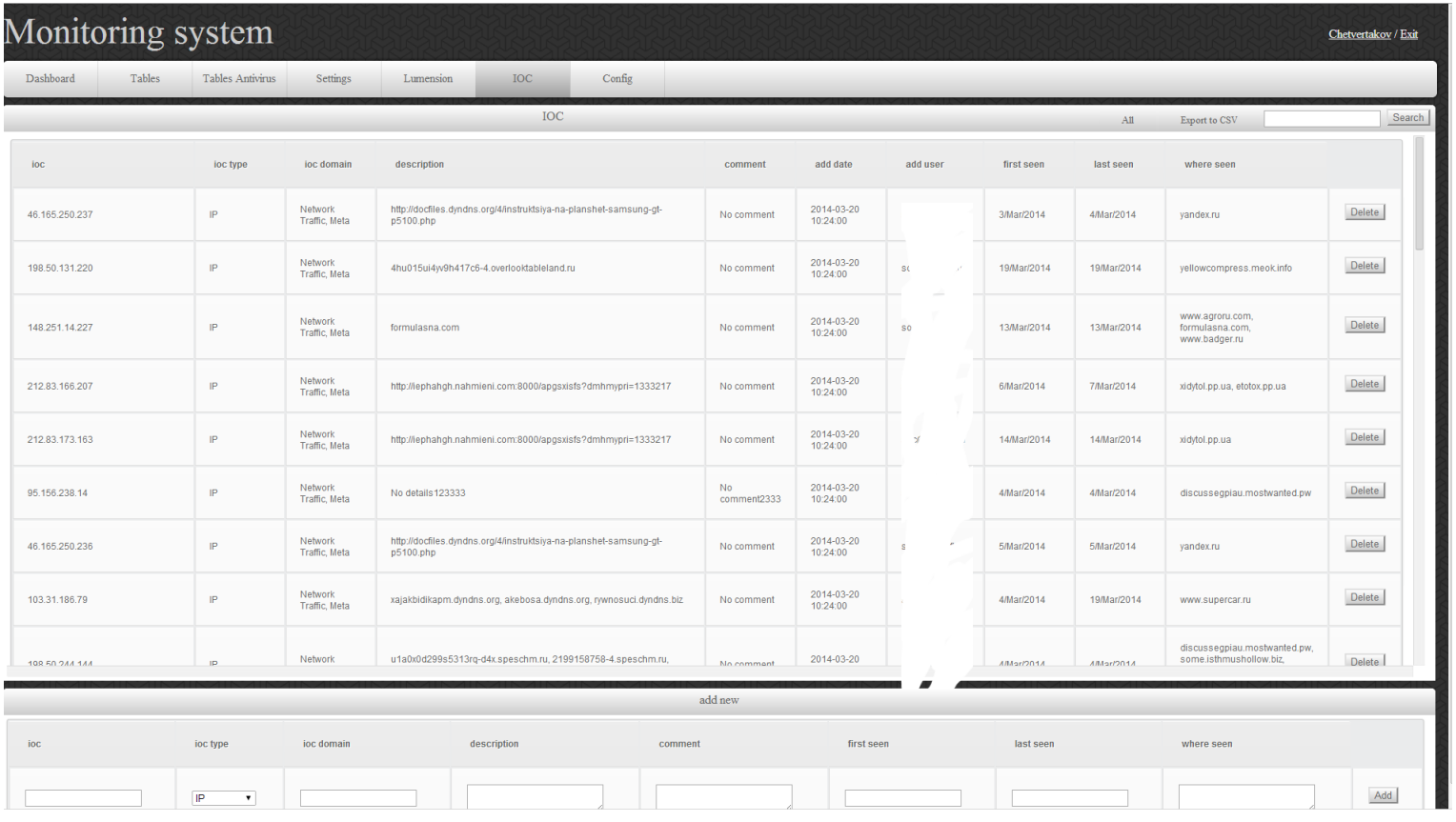
```
rule susp_params_in_url_kind_of_fileless_bot_drive_by
{
        meta:
        date = "oct 2013"
        description = "Landing hxxp://jdatastorelame.info/indexm
        description1 =  " Java Sploit hxxp://jdatastorelame.info


    strings:
        $string0 = "http"
        $string1 = "indexm.html"
        $string2 = "054RI"



    condition:
        all of them
}
```

Use snort to catch suspicious traffic:

```
# many plugX deployments connect to google DNS when not in use
alert tcp !$DNS_SERVERS any -> 8.8.8.8 53 (msg:"APT possible Plu
port 53 connection attempt"; classtype:misc-activity; sid:500000
rev:1;)
```

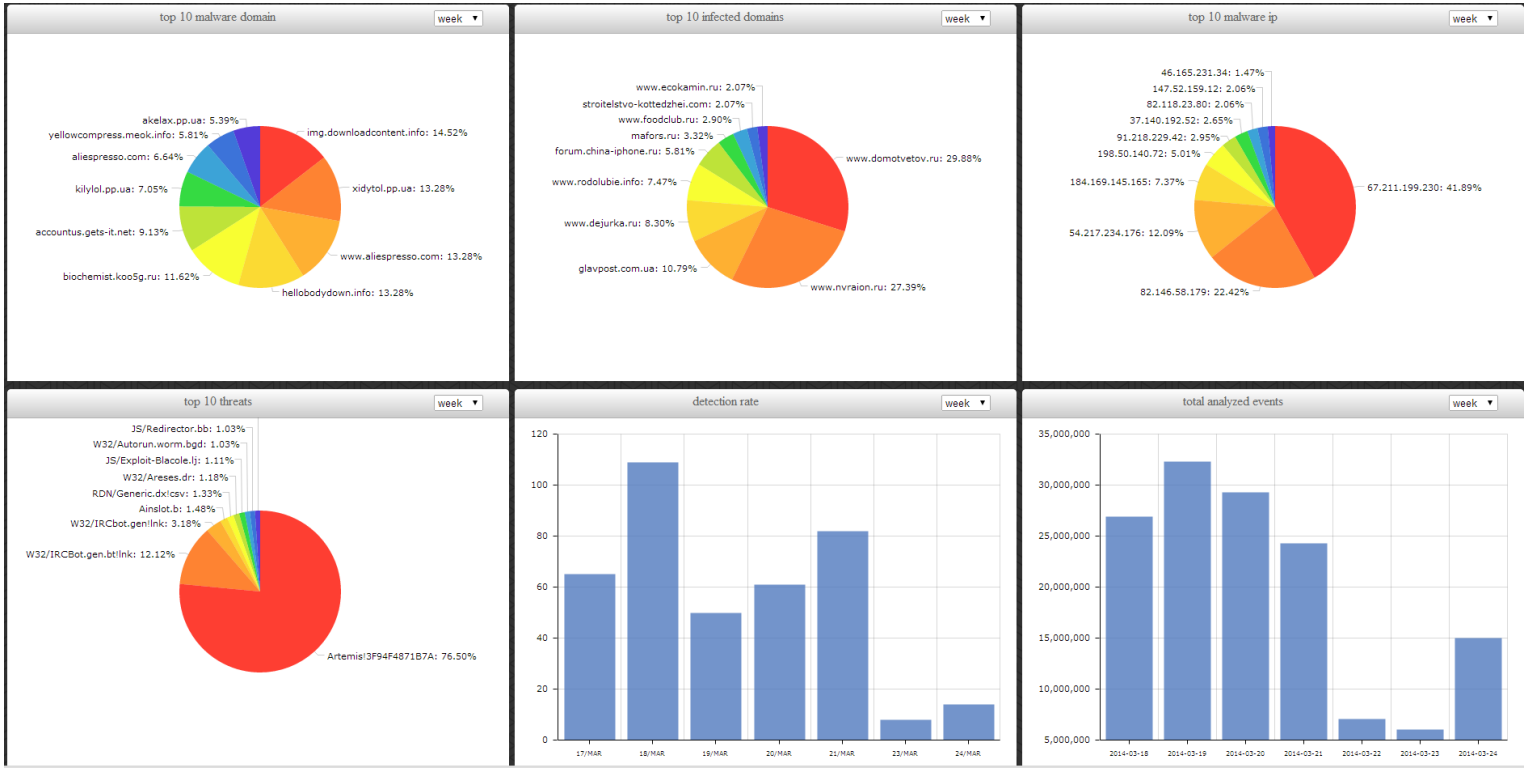
IOC management portal

IOC management can be automated



and show nice graphs ;)

every manager loves graphs :p



Q and A

Or contact us at . . .