Incident Response tactics with Compromise Indicators

Vladimir Kropotov, Vitaly Chetvertakov, Fyodor Yarochkin

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Basics

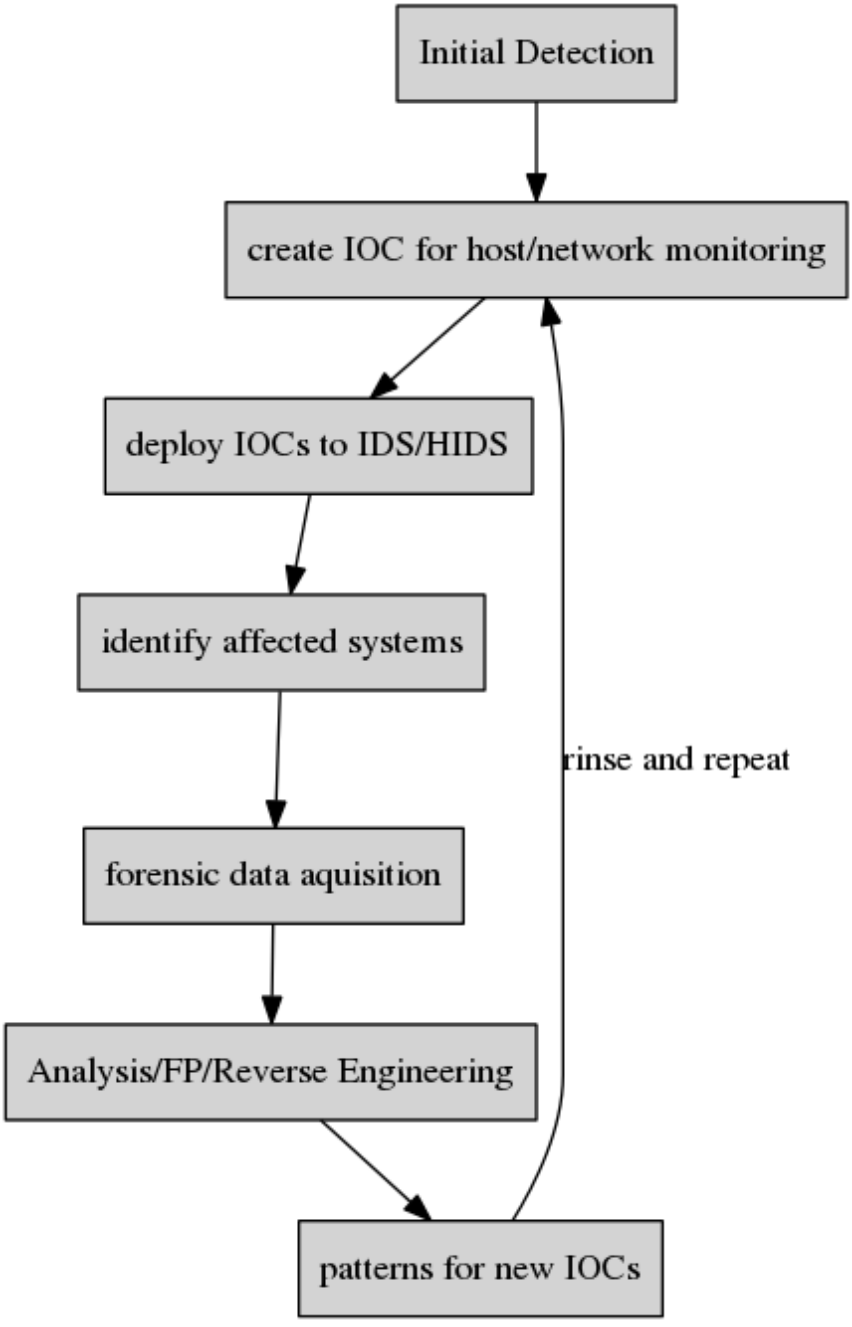
Indicators of Compromise

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/`

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/`

Tools

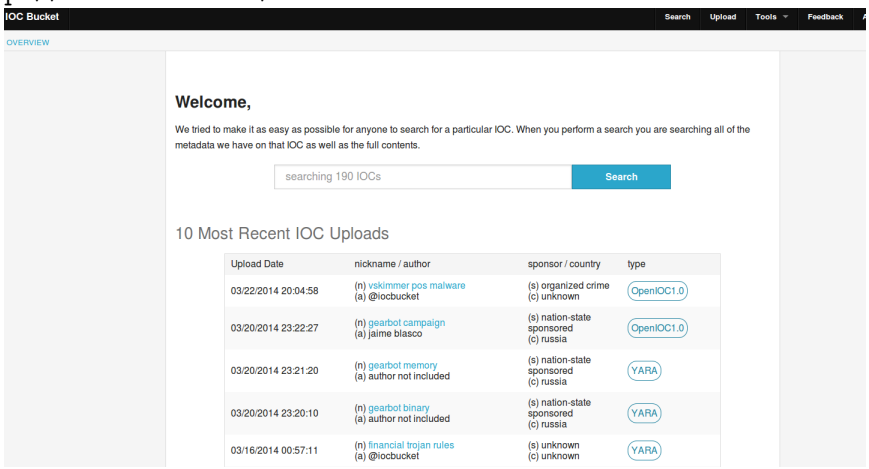
`https://github.com/STIXProject/openioc-to-stix` `https://github.com/tklane/openiocscripts`

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`

Online Sharing of IOCs

`http://iocbucket.com/`



Sharing IOCS

Policies on sharing IOCs:

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

IOCs composites

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 sessions
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&a=true

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.html  04.10.2013 13:14
        description1 =  " Java Sploit hxxp://jdatastorelame.info/054RIwj     "


    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 PlugX Google DNS TCP
port 53 connection attempt"; classtype:misc-activity; sid:500000112;
rev:1;)
```

Questions

Or contact us at ...