Data mining Tor, social networks, OSINT with AIL Project

E.102

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MISP Project
https://www.misp-project.org/
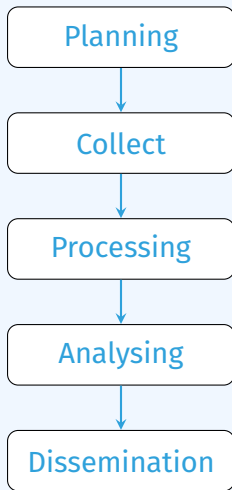
October 27, 2022 - v0.7

INTRODUCTION

- **Deep Web** is the part of World Wide Web not indexed or directly accessible by standard web search-engines;
- This can be content hidden from **crawlers** by requiring a specific access and this can includes private social media, password-protected forums or content protected by different measures such as paywalls or specific security interface to access the information;
- A large portion of content accessible via Internet is part of the deep web[1].

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[1]also called invisible web, hidden web or non-indexed web

- **Darknet** is an overlay network running on top of Internet requiring specific software to access the network and its services;
- Tor, I2P and Freenet are the most commonly used ones. Many are used for hidden services access and some for proxy access to the Internet;
- There are **legitimate use-cases** for such network but also many **illegal or criminal usage**.

```
┌─────────────────┐
│    Planning     │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│     Collect     │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│   Processing    │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│    Analysing    │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│  Dissemination  │
└─────────────────┘
```

Collecting, processing and analysing content - web pages

- Building a search engine on the web is a challenging task because:
  - ▶ it has to crawl webpages,
  - ▶ it has to to make sense of **unstructured data**,
  - ▶ it has to **index** these data,
  - ▶ it has to provide a way to retrieve data and structure data (e.g. correlation).
- Doing so on Tor is even more challenging because:
  - ▶ services don't always want to be found,
  - ▶ parts of the dataset have to be discarded.
- in each case, it requires a lot of bandwidth, storage and computing power.

- Some data are structured and are easy to process:
  - ▶ metadata!
  - ▶ API responses.
- Some even provide cryptographic evidences:
  - ▶ authentication mechanisms between peers,
  - ▶ OpenGPG can leak a lot of metadata
    - key ids,
    - subject of email in thunderbird,
  - ▶ Bitcoin's Blockchain is public,
  - ▶ pivoting on these data with external sources yields interesting results.

AIL design Objectives

- Show how to use and extend an open source tool to monitor web pages, pastes, forums and hidden services
- Explain challenges and the design of the AIL open source framework
- Review different **collection mechanisms** and **sources**
- Learn how to create new modules
- Learn how to use, install and start AIL
- **Supporting investigation using the AIL framework** and including it in cyber threat intelligence lifecycle

AIL Framework

History:

- AIL initially started as an **internship project** (2014) to evaluate the feasibility to automate the analysis of (un)structured information to find leaks.
- In 2019, AIL framework is an **open source software** in Python. The software is actively used (and maintained) by CIRCL and many organisations.
- In 2020, AIL framework is now a complete project called **ail project**[2].

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[2]https://github.com/ail-project/

Capabilities Overview

- **Check** if mail/password/other sensitive information (terms tracked) leaked
- **Detect** reconnaissance of your infrastructure
- **Search** for leaks inside an archive
- **Monitor** and crawl websites

- Proactive investigation: leaks detection
  - List of emails and passwords
  - Leaked database
  - AWS Keys
  - Credit-cards
  - PGP private keys
  - Certificate private keys
- Feed Passive DNS or any passive collection system
- CVE and PoC of vulnerabilities most used by attackers

- Website monitoring
  - ▶ monitor booters
  - ▶ Detect encoded exploits (WebShell, malware encoded in Base64...)
  - ▶ SQL injections
- Automatic and manual submission to threat sharing and incident response platforms
  - ▶ MISP
  - ▶ TheHive
- Term/Regex/Yara monitoring for local companies/government

- Example: `https://gist.github.com/`
  - ▶ Easily storing and sharing text online
  - ▶ Used by programmers and legitimate users
    $\rightarrow$ Source code & information about configurations

- Example: `https://gist.github.com/`
  - ▶ Easily storing and sharing text online
  - ▶ Used by programmers and legitimate users
    - → Source code & information about configurations
- Abused by attackers to store:
  - ▶ List of vulnerable/compromised sites
  - ▶ Software vulnerabilities (e.g. exploits)
  - ▶ Database dumps
    - → User data
    - → Credentials
    - → Credit card details
  - ▶ More and more …

Why so many leaks?

- Economical interests (e.g. Adversaries promoting services)
- Ransom model (e.g. To publicly pressure the victims)
- Political motives (e.g. Adversaries showing off)
- Collaboration (e.g. Criminals need to collaborate)
- Operational infrastructure (e.g. malware exfiltrating information on a pastie website)
- Mistakes and errors

Yes!
and we have to deal with this as a CSIRT.

- **Contacting companies or organisations** who did specific accidental leaks
- **Discussing with media** about specific case of leaks and how to make it more practical/factual for everyone
- Evaluating the economical market for cyber criminals (e.g. DDoS booters[3] or reselling personal information - reality versus media coverage)
- Analysing collateral effects of malware, software vulnerabilities or exfiltration

$\rightarrow$ And it's important to detect them automatically.

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[3] https://github.com/D4-project/

- Monitored paste sites: 27
  - ▶ *gist.github.com*
  - ▶ *ideone.com*
  - ▶ ...

	2016	2017	08.2018
Collected pastes	18,565,124	19,145,300	11,591,987
Incidents	244	266	208

Table: Pastes collected and incident[4] raised by CIRCL

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[4]`http://www.circl.lu/pub/tr-46`

Current capabilities

- Extending AIL to add a new **analysis module** can be done in 50 lines of Python
- The framework **supports multi-processors/cores by default**. Any analysis module can be started multiple times to support faster processing during peak times or bulk import
- **Multiple** concurrent **data input**
- Tor Crawler (handle cookies authentication)

AIL Framework: Current features

- Extracting **credit cards numbers, credentials, phone numbers, ...**
- Extracting and validating potential **hostnames**
- Keeps track of **duplicates**
- Submission to threat sharing and incident response platform (**MISP** and **TheHive**)
- **Full-text indexer** to index unstructured information
- **Tagging** for classification and searches
- Terms, sets, regex and YARA **tracking and occurences**
- Archives, files and raw **submission** from the UI
- PGP, Cryptocurrency, Decoded (Base64, ...) and username Correlation
- And many more

- Search and monitor specific keywords/patterns
  - ▶ Automatic Tagging
  - ▶ Email Notifications
- Track Term
  - ▶ ddos
- Track Set
  - ▶ booter,ddos,stresser;2
- Track Regex
  - ▶ circl\.lu
- YARA rules
  - ▶ https://github.com/ail-project/ail-yara-rules

82a87a6a-88f1-4ab1-ba53-1bf15211b4b8

Type	Tracker	Date added	Level	Created by	First seen	Last seen	Tags	Email
regex	\b[A-Z]{2}[0-9]{2}(?:[ ]?[0-9]{4})(4)(?!(?:[ ]?[0-9]{3})(?:[ ]?[0-9]{1,2})?\b	2019/09/12	1	admin@admin.test	2018/08/31	2019/11/28		

\b[A-Z]{2}[0-9]{2}(?:[ ]
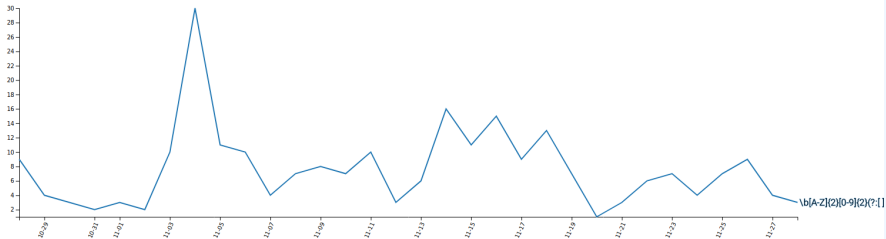
| 📅 yyyy-mm-dd | 📅 yyyy-mm-dd |

🔍 Search Tracked Items

YARA Tracker

Type	Tracker	Date added	Level	Created by	First seen	Last seen	Tags ✏	Email ✏
yara	all-yara-rules/rules/code/vbscript.yar	2020/09/17	1	admin@admin.test	2020/09/17	2021/04/01		

Edit Tracker ✏ 🗑

```
rule test_vbscript
{
    meta:
        author = "kevthehermit"
        info = "Part of PasteHunter"
        reference = "https://github.com/kevthehermit/PasteHunter"

    strings:
        $a = "Function" nocase wide ascii fullword
        $b = "CreateObject" nocase wide ascii fullword
        $c = "wscript" nocase wide ascii fullword
        $d = "As Long" nocase wide ascii fullword
        $e = "run" nocase wide ascii fullword
        $f = "for each" nocase wide ascii fullword
        $g = "end function" nocase wide ascii fullword
        $h = "NtAllocateVirtualMemory" nocase wide ascii fullword
        $i = "NtWriteVirtualMemory" nocase wide ascii fullword


    condition:
        5 of them
}
```


all-yara-rules/rules/c

Create and test your own tracker

🏷 Tags (optional, space separated)	

🔵 👥 Show tracker to all Users

@ E-Mails Notification (optional, space separated)	
✏ Tracker Description (optional)	

– Select a tracker type – ▲▼

+ Add Tracker

- **Attacker also share informations**
- Recon tools detected: 94
  - ▶ sqlmap
  - ▶ dnscan
  - ▶ whois
  - ▶ msfconsole (metasploit)
  - ▶ dnmap
  - ▶ nmap
  - ▶ ...

```
################################################################################
================================================================================
Hostname          www.pabloquintanilla.cl                ISP     Wix.com Ltd.
Continent         North America             Flag
US
Country           United States       Country Code     US
Region   Unknown                 Local time        19 Nov 2019 07:59 CST
City     Unknown                 Postal Code       Unknown
IP Address        185.230.60.195        Latitude        37.751
                         Longitude        -97.822
================================================================================
################################################################################
> www.pabloquintanilla.cl
Server:           38.132.106.139
Address:          38.132.106.139#53

Non-authoritative answer:
www.pabloquintanilla.cl canonical name = www192.wixdns.net.
www192.wixdns.net       canonical name = balancer.wixdns.net.
Name:   balancer.wixdns.net
Address: 185.230.60.211
>
################################################################################
Domain name: pabloquintanilla.cl
Registrant name: SERGIO TORO
Registrant organisation:
Registrar name: NIC Chile
Registrar URL: https://www.nic.cl
Creation date: 2018-11-21 14:34:34 CLST
                      :34 CLST
```

- Search for encoded strings
  - Base64
  - Hexadecimal
  - Binary
- Guess Mime-type
- Correlate paste with decoded items

Decoder:

estimated type	hash	first seen	last seen	nb item	size	Virus Total		Sparkline
📄 application/x-dosexec	c11c2be8d9ba4e86c8effaa411aa6b867ba75abe	2019/11/28	2019/11/28	1	191	🚀 Send this file to VT	🔄	
📄 application/x-dosexec	a50cba731204ecce193b40178399a250b5ce6f67	2019/11/28	2019/11/28	1	32768	🚀 Send this file to VT	🔄	
📄 application/x-dosexec	cc5f2f0da71f443ec12ae1b3cb6ab8bad80f22c4	2019/11/28	2019/11/28	1	203	🚀 Send this file to VT	🔄	
📄 application/x-dosexec	eed67e8fa9cb9a43fea21ae653983a8e0a174f63	2019/11/26	2019/11/28	6	83	🚀 Send this file to VT	🔄	

CRAWLER

- Crawlers are used to navigate on regular website as well as .onion addresses (via automatic extraction of urls or manual submission)
- Splash ("scriptable" browser) is rending the pages (including javascript) and produce screenshots (HAR archive too)
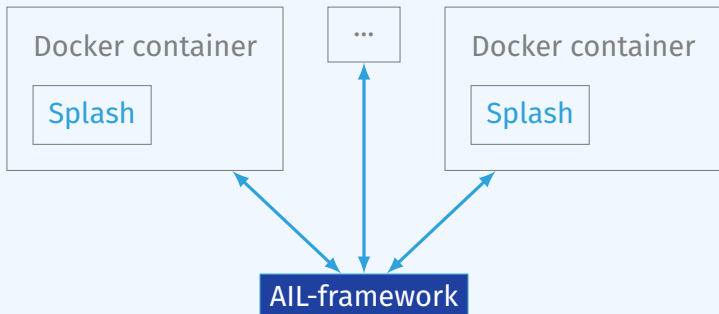
How a domain is crawled by default

1. Fetch the first url
2. Render javascript (webkit browser)
3. Extract all urls
4. Filter url: keep all url of this domain
5. crawl next url (max depth = 1)

CRAWLER: COOKIEJAR

Use your cookies to login and bypass captcha

🍪 Edit Cookiejar

Description	Date	UUID	User
3thxemke2x7hcibu.onion	2020/03/31	90674deb-38fb-4eba-a661-18899ccb3841	admin@admin.test

Edit Description ✏ **Add Cookies 🍪**

```
{
    "domain": ".3thxemke2x7hcibu.onion",
    "name": "mybb[lastactive]",
    "path": "/forum/",
    "value": "1583829465"
}
```

```
{
    "domain": ".3thxemke2x7hcibu.onion",
    "name": "loginattempts",
    "path": "/forum/",
    "value": "1"
}
```

```
{
    "domain": ".3thxemke2x7hcibu.onion",
    "name": "sid",
    "path": "/forum/",
    "value": "047ab0cd97ff5bcc77edb6a"
}
```

```
{
    "name": "remember_token",
    "value": "12|58cddd1511d74d341f23"
}
```

```
{
    "domain": ".3thxemke2x7hcibu.onion",
    "name": "mybb[announcements]",
    "path": "/forum/",
    "value": "0"
}
```

CRAWLER: COOKIEJAR

Live demo!

infoleak:automatic-detection="phone-number"   infoleak:automatic-detection="mail"   infoleak:automatic-detection="base64"   +

Date	Source	Encoding	Language	Size (Kb)	Mime	Number of lines	Max line length
04/05/2019	pastebin.com_pro	text/plain	None	6.12	text/plain	1650	100

Create MISP Event

Duplicate list:

Show 10 entries   Search: [_____]

Hash type	Paste info	Date	Path	Action
['tlsh']	Similarity: [19]%	2019-04-13	archive/pastebin.com_pro/2019/04/13/EbMVR87S.gz	⊞
['tlsh']	Similarity: [10]%	2019-04-11	archive/pastebin.com_pro/2019/04/11/2X5HRVnX.gz	⊞
['tlsh']	Similarity: [23]%	2019-04-25	archive/pastebin.com_pro/2019/04/25/TS2b6M4c.gz	⊞
['tlsh']	Similarity: [14]%	2019-04-17	archive/pastebin.com_pro/2019/04/17/CuS93H7K.gz	⊞
['tlsh']	Similarity: [23]%	2019-04-20	archive/pastebin.com_pro/2019/04/20/AQd0qGVQ.gz	⊞
['tlsh']	Similarity: [20]%	2019-04-20	archive/pastebin.com_pro/2019/04/20/6DDc13b8.gz	⊞
['tlsh']	Similarity: [21]%	2019-05-05	alerts/pastebin.com_pro/2019/05/05/X8nJLzda.gz	⊞
['tlsh']	Similarity: [7]%	2019-04-13	archive/pastebin.com_pro/2019/04/13/Lyp4FVWW.gz	⊞

Showing 1 to 8 of 8 entries   Previous 1 Next

Hash files:

Show [5] entries   Search: [   ]

estimated type	hash	saved_path	Virus Total
📄 application/octet-stream	3975f058bb0d445b60c10a11f1a5d88e19e4fa84 (1)	HASHS/application/octet-stream/39/3975f058bb0d445b60c10a11f1a5d88e19e4fa84	📤 Send this file to VT ⟳
📄 application/octet-stream	fed93c1753270fc849a4db37027b569cdd9a6108 (1)	HASHS/application/octet-stream/fe/fed93c1753270fc849a4db37027b569cdd9a6108	📤 Send this file to VT ⟳

Showing 1 to 2 of 2 entries   Previous | 1 | Next

Content:

```
http://members2.mofosnetwork.com/access/login/
somosextremos:buddy1990
brazzers_glenn:cocklick
brazzers61:braves01

http://members.naughtyamerica.com/index.php?m=login
gernblanston:3unc2352
Janhuss141200:310575
igetalliwant:1377zeph
pwilks89:mon22key
Bman1551:hockey

MoFos IKnowThatGirl PublicPickUps
http://members2.mofos.com
Chrismagg40884:loganm40
brando1:zzbrando1
aacoen:1q2w3e4r
1rstunkle23:my8self

BraZZers
http://ma.brazzers.com
gcjensen:gcj21pva
skycsc17:rbcdnd


        ###########################################################
             >| Get Daily Update Fresh Porn Password Here |<

                 =>   http://www.erq.io/4mF1
```

Content:

```
Over 50000+ custom hacked xxx passwords by us! Thousands of free xxx passwords to the hottest paysites!

#######################################################
 >| Get Fresh New Premium XXX Site Password Here |<

  =>   http://www.erq.io/4mF1


#######################################################


http://ddfnetwork.com/home.html
eu172936:hCSBgKh
UecwB6zs:159X0$!r#6K78FuU

http://pornxn.stiffia.com/user/login
feldwWek8939:RObluJ8XtB
dabudka:17891789
brajits:brajits1

http://members.pornstarplatinum.com/sblogin/login.php/
gigiriveracom:xxxjay
jayx123:xxxjay69

http://members.vividceleb.com/
Rufio99:fairhaven
ScHiFRvi:102091
Chaos84:HOLE5244
Riptor795:blade7
Domi80:harkonnen
GaggedUK:a1k0chan

http://www.ariellaferrera.com/
```

EXAMPLE: SEARCH BY TAGS

MISP

- **Tagging** is a simple way to attach a classification to an event or anattribute.
- **Classification must be globally used to be efficient.**
- Provide a set of already defined classifications modeling estimative language
- Taxonomies are implemented in a simple JSON format [5].
- Can be easily cherry-picked or extended

---

[5]`https://github.com/MISP/misp-taxonomies`

- **infoleak**: Information classified as being potential leak.
- **estimative-language**: Describe quality and credibility of underlying sources, data, and methodologies.
- **admiralty-scale**: Rank the reliability of a source and the credibility of an information
- **fpf**[6]: Evaluate the degree of identifiability of personal data and the types of pseudonymous data, de-identified data and anonymous data.

---

[6]Future of Privacy Forum

- **tor**: Describe Tor network infrastructure.
- **dark-web**: Criminal motivation on the dark web.
- **copine-scale**[7]: Categorise the severity of images of child sex abuse.

---

[7]Combating Paedophile Information Networks in Europe

Goal: submission to threat sharing and incident response platforms.

1. Use infoleak taxonomy[8]
2. Add your own tags
3. Export AIL objects to MISP core format
4. Download it or Create a MISP Event[9]

---
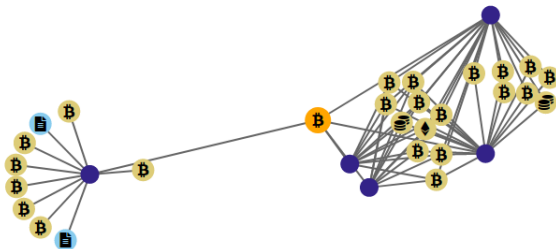
[8]https://www.misp-project.org/taxonomies.html
[9]https://www.misp-standard.org/rfc/misp-standard-core.txt

nttfj36sp47cw2yecop572zjvjeazgazieunllouudplzqt2m5h465yd.onion :

✅ UP

First Seen	Last Check	Ports
2020/02/19	2020/02/19	['80']

infoleak:automatic-detection="onion"

⊞

Last Origin: crawled/2020/02/19/dark.failc126d32a-3ed1-468f-ba24-f2e5956f4035

🔍 Show Domain Correlations 4

Add to MISP Export

🖼 Screenshot 4 🔽

🚫 Hide

Empire Market

LOGIN   REGISTER   FORUMS   VE

Login

LOGIN TO EMPIRE MAR

Welcome to Empire Market! Please log
Registrations are free and open to ever

Username

Password

What's th

Login

Copyright © 2020 Empire Market

MISP Export

AUTOMATIC SUBMISSION ON TAGS

API

AIL exposes a ReST API which can be used to interact with the back-end[10].

```
curl https://127.0.0.1:7000/api/v1/get/item/default
        --header "Authorization: iHc1_ChZxj1aXmiFiF1m
        -H "Content-Type: application/json"
        --data @input.json -X POST
```

- AIL API is currently covering 60% of the functionality of back-end.

---

[10]https://github.com/ail-project/ail-framework/blob/master/doc/README.md

Setting up the framework

Setting up AIL-Framework from source

```
1  git clone
       https://github.com/ail-project/ail-framework.git
2  cd AIL-framework
3  ./installing_deps.sh
```

FEEDING THE FRAMEWORK

There are different way to feed AIL with data:

1. Setup *pystemon* and use the custom feeder
   - *pystemon* will collect items for you
2. Use the new JSON Feeder (twitter)
3. Feed your own data using the API or the `import_dir.py` script
4. Feed your own file/text using the UI (`Submit section`)

Files submission

Submit a file

[Browse...] No file selected.

Archive Password

[Optionnal]

Tags :

[Select Tags] [▾]

Taxonomie Selection ⌄

[Select Tags] [▾]

Galaxy Selection ⌄

[Submit this paste]

Submitting Pastes ...

100 %

Files Submitted 1/1

Submitted pastes

/home/ail/git/AIL-framework/PASTES/submitted/2018/06/29/02071570-b464-4bbb-be59-37c58c9b8925.gz

Submitted Pastes ✈

Success ✔

api/v1/import/item

```
1  {
2    "type": "text",
3    "tags": [
4      "infoleak:analyst-detection=\"private-key\""
5    ],
6    "text": "text to import"
7  }
```

/!\ requirements:

- Each file to be fed must be of a reasonable size:
  - ▶ $\sim$ `3 Mb` / file is already large
  - ▶ This is because some modules are doing regex matching
  - ▶ If you want to feed a large file, better split it in multiple ones

Feeding AIL with your own data - import_dir.py (2)

1. Check your local configuration `configs/core.cfg`
   - In the file `configs/core.cfg`,
   - Add `127.0.0.1:5556` in ZMQ_Global
   - (should already be set by default)
2. Launch `import_dir.py` with de directory you want to import
   - `import_dir.py -d dir_path`