

# AIL Framework for Analysis of Information Leaks

Practical and Efficient Data-Mining of Suspicious Websites, Forums and Tor Hidden-Services



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# Links

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- AIL project <https://github.com/ail-project>
- AIL framework  
<https://github.com/ail-project/ail-framework>
- Training materials  
<https://github.com/ail-project/ail-training>
- Online chat <https://gitter.im/ail-project/community>

## Legal and Ethics

## Privacy, AIL and GDPR (PII)

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- Many modules in AIL can process personal data and even special categories of data as defined in GDPR (Art. 9).
- The data controller is often the operator of the AIL framework (limited to the organisation) and has to define **legal grounds for processing personal data**.
- To help users of AIL framework, a document is available which describe points of AIL in regards to the regulation<sup>1</sup>.

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<sup>1</sup>[https:](https://www.circl.lu/assets/files/information-leaks-analysis-and-gdpr.pdf)

[//www.circl.lu/assets/files/information-leaks-analysis-and-gdpr.pdf](https://www.circl.lu/assets/files/information-leaks-analysis-and-gdpr.pdf)

## Potential legal grounds

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- **Consent of the data subject** is in many cases not feasible in practice and often impossible or illogical to obtain (Art. 6(1)(a)).
- Legal obligation (Art. 6(1)(c)) - This legal ground applies mostly to CSIRTs, in accordance with the powers and responsibilities set out in CSIRTs mandate and with their constituency, as they may have the legal obligation to collect, analyse and share information leaks without having a prior consent of the data subject.
- Art. 6(1)(f) - Legitimate interest - Recital 49 explicitly refers to CSIRTs' right to process personal data provided that they have a legitimate interest but not colliding with fundamental rights and freedoms of data subject.

# Ethics in Information Security and Cybersecurity

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- The materials and tools presented can open a significant numbers of questions regarding ethics;
- Our researches and tools are there for education, supporting the public good and improve incident response;
- We ask all users and participants to **follow ethical principles and act professionally**<sup>2</sup>.

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<sup>2</sup><https://www.acm.org/code-of-ethics>

<https://www.first.org/global/sigs/ethics/ethics-first>

# Introduction

## Concepts - Deep Web

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- **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<sup>3</sup>.

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<sup>3</sup>also called invisible web, hidden web or non-indexed web



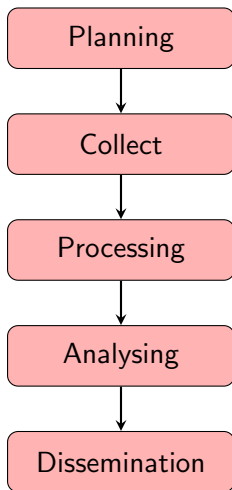
## Concepts - darknet

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- **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**.

## Lifecycle of collection and analysis

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# Collecting, processing and analysing content - web pages

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- Building a search engine on the web is a challenging task because:
  - it has to crawl webpages,
  - it has 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.

# Collecting, processing and analysing content - structured data

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- Some data are structured and are easy to process:
  - metadata!
  - API responses.
- Some even provide cryptographic evidences:
  - authentication mechanisms between peers,
  - OpenPGP 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

## Objectives of the session

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- 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

# From a requirement to a solution: AIL Framework

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## 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**<sup>4</sup>.

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<sup>4</sup><https://github.com/ail-project/>



## Capabilities Overview

## Common usage

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- **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

## Support CERT and Law Enforcement activities

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- 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


## Support CERT and Law Enforcement activities

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- 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

## Sources of leaks

# Mistakes from users:



remove\_password

[Pull requests](#) [Issues](#) [Marketplace](#) [Gist](#)

[Repositories](#) **135**

[Code](#) **1K**

[Commits](#) **322K**


[Issues](#)

[Wikis](#)


[Users](#)

## 322,302 commit results


Sort: **Best match** ▾




**Make remove\_password actually work**  
javitonino committed to freaktiful/cartodb on 1 Mar




def411c







**remove password**  
wenlei committed to cjw1990/wap\_demo 2 days ago




e9611e0






**remove password**  
yejune committed to yejune/dockerfile-sshd 3 days ago



037b956



## Sources of leaks: Paste monitoring

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- Example: <https://gist.github.com/>
  - Easily storing and sharing text online
  - Used by programmers and legitimate users
    - Source code & information about configurations

## Sources of leaks: Paste monitoring

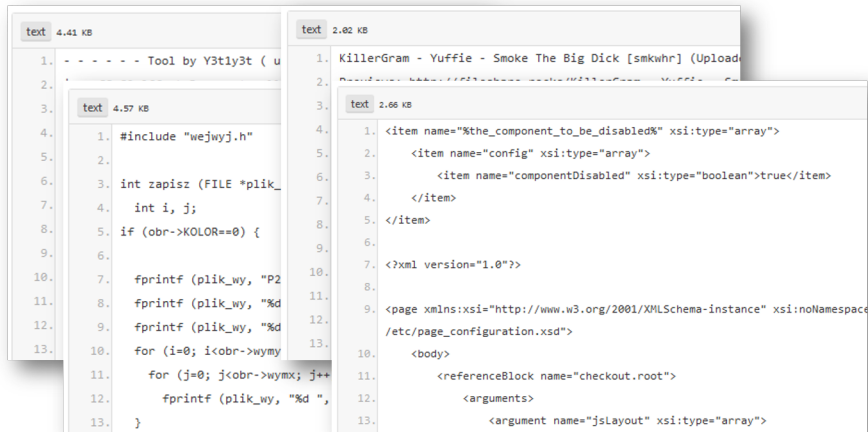
---

- 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 ...



# Examples of pastes (items)

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The image displays three overlapping screenshots of text editors, each showing a different type of pasted content:

- Top-left editor (4.41 KB):** Shows a C program snippet. The visible code includes a header file, variable declarations, and a loop structure. The text is as follows:

```
1. - - - - - Tool by Y3t1y3t ( u
2.
3.
4. #include "wejwyj.h"
5.
6. int zapisz (FILE *plik_
7.     int i, j;
8.     if (obr->KOLOR==0) {
9.
10.     fprintf (plik_wy, "P2
11.     fprintf (plik_wy, "%d
12.     fprintf (plik_wy, "%d
13.     for (i=0; i<obr->wymy
```
- Top-right editor (2.82 KB):** Shows a forum post header. The visible text is:

```
1. KillerGram - Yuffie - Smoke The Big Dick [smkwhr] (Upload
2.
3.
```
- Bottom editor (2.66 KB):** Shows an XML configuration file snippet. The visible XML code is:

```
1. <item name="%the_component_to_be_disabled%" xsi:type="array">
2.     <item name="config" xsi:type="array">
3.         <item name="componentDisabled" xsi:type="boolean">true</item>
4.     </item>
5. </item>
6.
7. <?xml version="1.0"?>
8.
9. <page xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespace
10. /etc/page_configuration.xsd">
11.     <body>
12.         <referenceBlock name="checkout.root">
13.             <arguments>
14.                 <argument name="jsLayout" xsi:type="array">
```

## Why so many leaks?

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- 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

## Are leaks frequent?

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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<sup>5</sup> or reselling personal information - reality versus media coverage)
- Analysing collateral effects of malware, software vulnerabilities or exfiltration

→ And it's important to detect them automatically.

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<sup>5</sup><https://github.com/D4-project/>

## Paste monitoring at CIRCL: Statistics

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- 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<sup>6</sup> raised by CIRCL

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<sup>6</sup><http://www.circl.lu/pub/tr-46>

## Current capabilities

## AIL Framework: Current capabilities

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- 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

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- 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 occurrences**
- Archives, files and raw **submission** from the UI
- PGP, Cryptocurrency, Decoded (Base64, ...) and username Correlation
- And many more

# Trackers - Retro Hunt


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



# YARA Tracker

**Certificate**



**Type**  yara

**Tracked** all-yara-rules/rules/crypto/certificate.yar

**Date** 2023/05/12

**Level** Global

**Creator** admin@admin.test

**First Seen** 2023 / 05 / 12

**Last Seen** 2023 / 05 / 31



**Tags**

**Mails**

**Webhook**

**Filters** No Filters

**Objects Match** decoded 0  
item 00

[Edit Tracker](#)  

## Yara Rule:

```
rule certificates
{
  meta:
    author = "@kevTheHermit"
    info = "Part of Pastehunter"
    reference = "https://github.com/kevthehermit/Pastehunter"

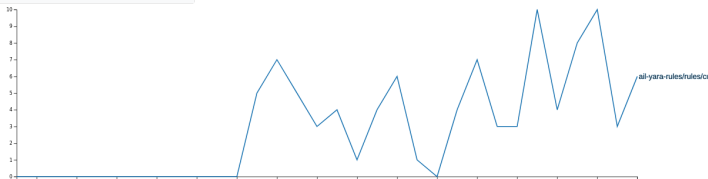
  strings:
    $ssh_priv = "BEGIN RSA PRIVATE KEY" wide ascii nocase
    $openssh_priv = "BEGIN OPENSSH PRIVATE KEY" wide ascii nocase
    $dsa_priv = "BEGIN DSA PRIVATE KEY" wide ascii nocase
    $ec_priv = "BEGIN EC PRIVATE KEY" wide ascii nocase
    $pgp_priv = "BEGIN PGP PRIVATE KEY" wide ascii nocase
    $pem_cert = "BEGIN CERTIFICATE" wide ascii nocase
    $pkcs7 = "BEGIN PKCS7"

  condition:
    any of them
}
```

 2023-05-12

 2023-05-31


 [Tracked Objects](#)





# Trackers - Practical part


- **Create and test** your own tracker

Create a new Tracker


 E-Mails Notification (optional, space separated)


 Webhook URL

 Tracker Description (optional)


☒  Show tracker to all Users


Objects to Track:

☒  Decoded


☒  Item


Filter Item by sources

 Item Sources to track (ALL IF EMPTY)


☒  PGP

Filter PGP by subtype:

☒  name

☒  mail

Tags

 Custom Tags (optional, space separated)

Select Tags

Taxonomie Selected

Select Tags

Galaxy Selected

Tracker Type:

# Retro Hunt

**test** completed

Date2023/05/10

DescriptionNone

Tags

Creatoradmin@admin.test

Filters

item

{  
 "date\_from": "20230304",  
 "date\_to": "20230601"  
}

Objects Match

item

Show Objects

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

  strings:
    $ssh_priv = "BEGIN RSA PRIVATE KEY" wide ascii nocase
    $openssh_priv = "BEGIN OPENSSH PRIVATE KEY" wide ascii nocase
    $dsa_priv = "BEGIN DSA PRIVATE KEY" wide ascii nocase
    $ec_priv = "BEGIN EC PRIVATE KEY" wide ascii nocase
    $pgp_priv = "BEGIN PGP PRIVATE KEY" wide ascii nocase
    $pem_cert = "BEGIN CERTIFICATE" wide ascii nocase
    $pkcs7 = "BEGIN PKCS7"

  condition:
    any of them
}
```

Show 10 entries

Search:

Type	Id	Tags
	archive/gist.github.com/2023/04/14/huizmiranda7_3b3d1133a3d3842092c5fc5fb39e84f2.gz	infoleak:automatic-detection="private-key" test23 test12 infoleak:automatic-detection="certificate"
	submitted/2023/04/20/submitted_cc9190ab-80d2-4d2b-9c9e-97c51e69a855.gz	infoleak:submission="manual" test12 infoleak:automatic-detection="rsa-private-key" infoleak:automatic-detection="vpn-static-key" test23 infoleak:automatic-detection="certificate" infoleak:automatic-detection="onion"
	archive/gist.github.com/2023/04/13/chipzoller_d8d6d2d737d02ad4fe9d30a897170761.gz	test12 test23 infoleak:automatic-detection="certificate"

# Recon and intelligence gathering tools

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

# Recon and intelligence gathering tools

```
#####
=====
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

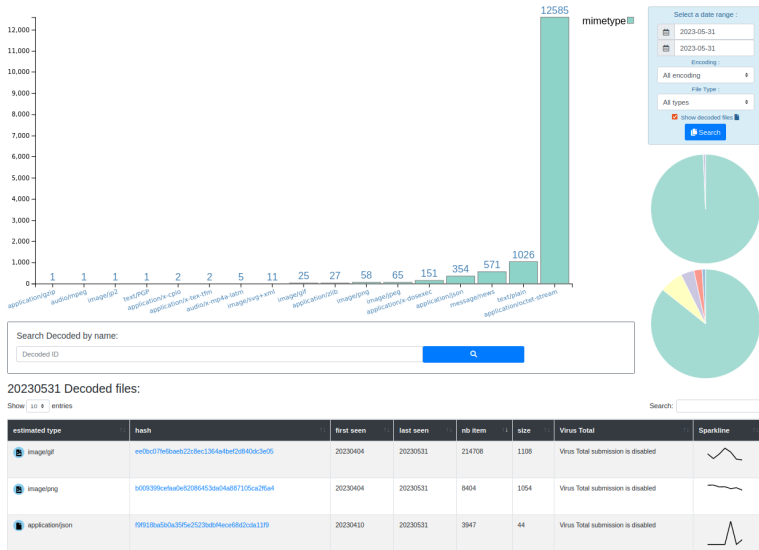
Non-authoritative answer:
www.pabloquintanilla.cl canonical name = www192.wixdns.net.
www192.wixdns.net      canonical name = balancer.wixdns.net.
Name:   balancer.wixdns.net
Address: 185.230.60.211
>
#####
Domain name: pabloquintanilla.cl
Registrant name: SERGIO TORO
Registrant organisation:
Registrar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

# Decoder

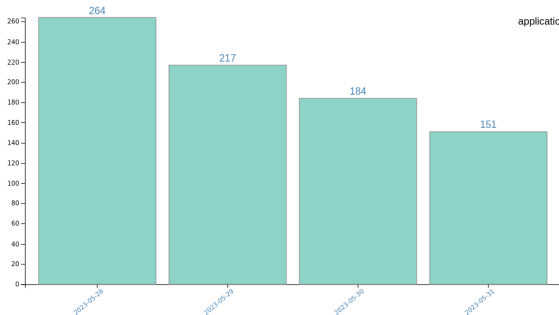
---

- Search for encoded strings
  - Base64
  - Hexadecimal
  - Binary
- Guess Mime-type
- Items/Domains Correlation

# Decoder:



# Decoder:



application/x-dosexec

Select a date range :

2023-05-28  
2023-05-31

Encoding :

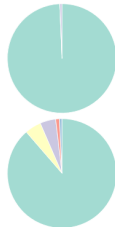
All encoding

File Type :

application/x-dosexec

Show decoded files

Search



Search Decoded by name:

Decoded ID



20230528 to 20230531 Decoded files:

Show 10 entries

Search:

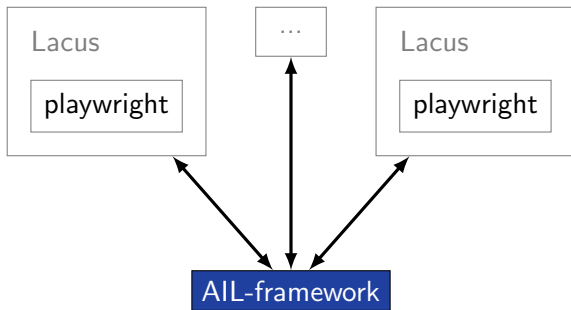
estimated type	hash	first seen	last seen	nb item	size	Virus Total	Sparkline
application/x-dosexec	c408501f702d8279704c380a661d329c611962	20230421	20230529	76	64	Virus Total submission is disabled	
application/x-dosexec	a9ecbb74ce7d22b70f0dc0f5729931ce570161	20230405	20230530	56	55666	Virus Total submission is disabled	
application/x-dosexec	e58f5aa6a66c6e013d5ebddab48c45b4c94127	20230529	20230531	4	32	Virus Total submission is disabled	



# Crawler

---

- Crawlers are used to navigate on regular website as well as .onion addresses (via automatic extraction of urls or manual submission)
- Lacus ("scriptable" browser) is rendering the pages (including javascript) and produce screenshots (HAR archive too)



# Crawler

---

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": "847ab8cd97ff5bcc77eddb6a"
}
```

```
{
  "name": "remember_token",
  "value": "12158cddd151d74d341f23"
}
```

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

# Crawler: Cookiejar

3thxemke2x7hcibu.onion :



First Seen Last Check Ports

2020/03/09 2020/03/30 [80]

infoleak:automatic-detection="onion"

infoleak:automatic-detection="base64"



manual

Show Domain Correlations 139

Add to MISP Export

Decoded 1

Screenshot 134

Crawled Items

Date: 2020/03/23 - 13:10:40 PORT: 80

Show 10 entries

Search:

Crawled Pastes



Shere Khan

Portal Search Member List Help

Welcome back, zuluport. You last visited: 03-20-2020, 01:35 PM Log Out

User: CP

View New Posts

View Today's Posts

Private Messages (Unread: 2, Total: 2)

You have 2 unread private messages. The most recent is from Jack3 (ID: KEY FOR PRIVATE SECTIONS)

Shere Khan - Official Forum

Private Messages

Home

User CP Home

Messages

Compose

Inbox

Send

Trash Can

Tracking

Build Folder

Your Profile

Get Profile

Change Password

Change Email

Change Avatar

Change Signature

Build Options

Microtransmissions

Group Memberships

Buddy/Ignore List

Manage Attachments

Saved Drafts

Subscribed Threads

Forum Subscriptions

View Profile

Inbox | Compose Message | Manage Folders | Empty Folders | Download Messages 1% of PM space used.

Message Title Sender Date/Time Sent (asc)

KEY FOR PRIVATE SECTIONS Jack3 3 hours ago

Verification Jack3 03-09-2020, 11:55 AM

Move To Inbox or Delete the selected messages

Jump to Folder: Inbox Go

Forum Team Contact Us Shere Khan - Hacking group Return to Top Lite (Archiva) Mode Mark all forums read RSS Syndication

Powered by MyBB, © 2002-2020 MyBB Group.

Current time: 03-23-2020, 01:33 PM

<http://3thxemke2x7hcibu.onion/forum/private.php>

# Lacus

---

- Lacus<sup>7</sup> is a capturing system using playwright, as a web service
- AIL utilizes Lacus for fetching and rendering domains.
  - Lacus can be installed and executed outside of AIL,
  - Enqueue what you want to capture,
  - Trigger the capture,
  - Get the capture result,

---

<sup>7</sup><https://github.com/ail-project/lacus>

# Crawler Settings - Lacus

---

AIL Lacus Crawler

✓ Connected

Lacus URL

http://lacus.circl.lu:7100

Edit

Crawlers

✓ It works!


-----  
- TOR CRAWLER TEST OUTPUT: -  
-----  
It works!

ReRun Test

Number of Concurrent Crawlers to Launch: 15

Edit

# Crawler: DDoS Booter



qy4n6ptiraa7mtfy73wcp6da2xrapmbanwfr5kei4zrq2va4uscvogid.onion :

First Seen	Last Check	Ports
2019/08/15	2019/10/06	[80]


infoleak:automatic-detection="bitcoin-address"

infoleak:automatic-detection="ethereum-address"



infoleak:automatic-detection="onion"




infoleak:automatic-detection="credit-card"




ddos



Last Origin: [crawled/2019/10/05/mqbyxj4ladgz5cd.onion0aa31681-fa45-4fc3-8151-7a7c5ac7e906](#)

 Show Domain Correlations 


 Cryptocurrencies  

[HOME](#) [ABOUT](#) [PROOF](#) [PRICE](#) [PAYMENT](#)

## DDOSTECH

WICKR. DDOS. TECHNOLOGY



### Reviews

**April 25, 2019**






I turned to this service on the recommendation of my friend, ordered an attack for a whole week, the work was done with high quality and responsibility.

**September 21, 2018**

I found this site through YAHOO, immediately contacted this service, and I had a free attack for almost ten minutes.

### We accept:

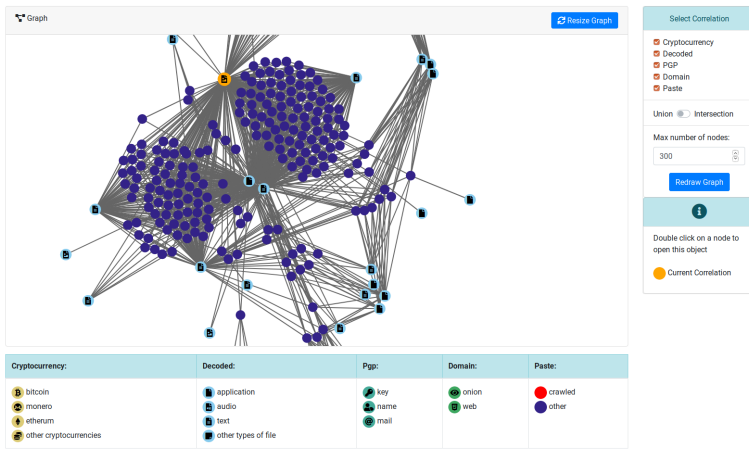
Accept payments cryptocurrency. Cryptocurrency transfers guarantee your our security transaction. We accept BTC, ETH, DASH, LTC, ETC, XMP ...



### Wallets Addresses

...

# Correlations and relationship





# Investigations

Tor Coin Mixer

UUID	9189d0e7c04c47a2985666e9507e0a5
Creator	admin@admin.test
Tags	<a href="#">dark-web-topics/mixer</a>
Date	2023-05-31
Threat Level	medium
Analysis	initial
Info	Tor Coin Mixer
# Objects	6
Timestamp	2023-05-31 12:50:45
Last change	2023-05-31 12:54:20

Delete

Edit

Export as Event

## Objects

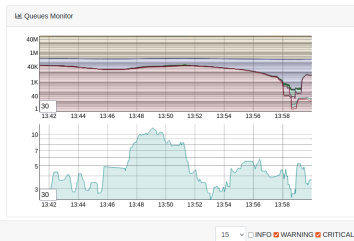
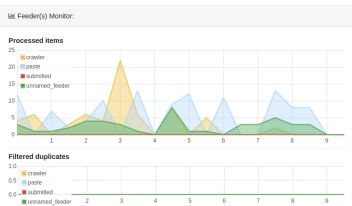
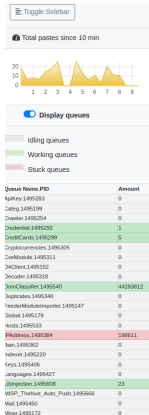
Show 10 entries

Search:

Type	Id	Tags	
onion	jambler72gpknhmj3mhdaajmyddqxbuif6vsa32h5w4otux3crqd.onion	<a href="#">infoleak-automatic-detection=anon</a> <a href="#">infoleak-automatic-detection=ygg-public-key-block</a>	<div></div>
onion	btmxihtf4cpncluhwflussk23t6vowsibe4itdree74qxjnz2vyqgd.onion	<a href="#">infoleak-automatic-detection=anon</a>	<div></div>
key	0xD3B280956F0E7CAF		<div></div>
mail	support@jambler.io		<div></div>
telegram	jambler		<div></div>
name	Jambler.io		<div></div>

Live demo!

# Example: Dashboard



Time	Channel	Level	Script Name	Source	Date	Paste name	Message	Actions
08:42:42	Script	WARNING	CreditCard	archive/pastebin.com_pro	20230531	KWbBqXh9.gz	Checked 1 valid number(s)	<a href="#">🔍</a>
08:45:47	Script	WARNING	Credential	crawled	20230531	7hd5yvuuzuu44bhhghomh4sjsfjxpw5bkofgkmxofsv3erid.onionc5fd0810-6791-4198-a3eb-55865a32aa87	Checked 9 credentials found. Related websites: <a href="http://lonionmail.info/directory.html">http://lonionmail.info/directory.html</a>	<a href="#">🔍</a>
09:21:02	Script	WARNING	Mails	crawled	20230531	sou4v4k45pesk83dzfh3efve5eu3m3hstmidqevtdslq3qg2ad.onion76075609-d359-4d75-8147-2ec46f763752	Checked 20 e-mail(s)	<a href="#">🔍</a>
09:30:36	Script	WARNING	Mails	archive/pastebin.com_pro	20230531	qKld3As.gz	Checked 24 e-mail(s)	<a href="#">🔍</a>
09:36:56	Script	WARNING	Iban	archive/pastebin.com_pro	20230531	JfTMNpR.gz	Checked found 1 IBAN	<a href="#">🔍</a>
09:40:18	Script	WARNING	CreditCard	archive/gist.github.com	20230531	Anjum48_38cddcf1082295935cd2d8c3daac69c3.gz	Checked 1 valid number(s)	<a href="#">🔍</a>
09:55:03	Script	WARNING	CreditCard	archive/pastebin.com_pro	20230531	wR6uV77S.gz	Checked 4 valid number(s)	<a href="#">🔍</a>

# Example: Text search

---

Q 1 Results for "gandcrab"

Index: 2019-05-20 - 1365.328591 Mb

Show 10 entries Search:

#	Path	Date	Size (Kb)	Action
0	<a href="#">crawled/2019/05/17/vs5e7g245s3pxjoc.onion374a1a89-4b16-4c3f-a460-4be8898da140</a> <a href="#">crawled</a> <a href="#">cve</a>	2019/05/17	15.44	<a href="#">i</a> <a href="#">Q</a>

Showing 1 to 1 of 1 entries

Previous 1 Next

Totalling 1 results related to paste content

# Example: Items Metadata (1)


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  Event

## Duplicate list:

Show  entries

Search:

Hash type	Paste info	Date	Path	Action
[tlsh]	Similarity: [19]%	2019-04-13	<a href="archive/pastebin.com_pro/2019/04/13/EbMVR87S.gz">archive/pastebin.com_pro/2019/04/13/EbMVR87S.gz</a>	
[tlsh]	Similarity: [10]%	2019-04-11	<a href="archive/pastebin.com_pro/2019/04/11/2X5HfVhX.gz">archive/pastebin.com_pro/2019/04/11/2X5HfVhX.gz</a>	
[tlsh]	Similarity: [23]%	2019-04-25	<a href="archive/pastebin.com_pro/2019/04/25/TS2b6M4c.gz">archive/pastebin.com_pro/2019/04/25/TS2b6M4c.gz</a>	
[tlsh]	Similarity: [14]%	2019-04-17	<a href="archive/pastebin.com_pro/2019/04/17/CuS93H7K.gz">archive/pastebin.com_pro/2019/04/17/CuS93H7K.gz</a>	
[tlsh]	Similarity: [23]%	2019-04-20	<a href="archive/pastebin.com_pro/2019/04/20/AQd0qGVQ.gz">archive/pastebin.com_pro/2019/04/20/AQd0qGVQ.gz</a>	
[tlsh]	Similarity: [20]%	2019-04-20	<a href="archive/pastebin.com_pro/2019/04/20/6DDc13b8.gz">archive/pastebin.com_pro/2019/04/20/6DDc13b8.gz</a>	
[tlsh]	Similarity: [21]%	2019-05-05	<a href="alerts/pastebin.com_pro/2019/05/05/X8nJLzda.gz">alerts/pastebin.com_pro/2019/05/05/X8nJLzda.gz</a>	
[tlsh]	Similarity: [7]%	2019-04-13	<a href="archive/pastebin.com_pro/2019/04/13/Lyp4FVWW.gz">archive/pastebin.com_pro/2019/04/13/Lyp4FVWW.gz</a>	

Showing 1 to 8 of 8 entries





Previous **1** Next

## Example: Items Metadata (2)

### Hash files:

Show  entries

Search:



estimated type	hash	saved_path	Virus Total
 application/octet-stream	3975f058bb0d445b60c10a11f1a5d88e19e4fa84 (1)	HASHS/application/octet-stream /39/3975f058bb0d445b60c10a11f1a5d88e19e4fa84	<a href="#">Send this file to VT</a> 
 application/octet-stream	fed93c1753270fc849a4db37027b569cdd9a6108 (1)	HASHS/application/octet-stream /fe/fed93c1753270fc849a4db37027b569cdd9a6108	<a href="#">Send this file to VT</a> 

Showing 1 to 2 of 2 entries

Previous **1** Next

## Example: Items Metadata (3)


---


 Crawled Item 

Domain [2gtyctckj2y5e3ln.onion:80](#)

Father [crawled/2019/05/20/2gtyctckj2y5e3ln.onion954e1b05-aca-4586-a4bc-804bf27b54f7](#)


Url [http://2gtyctckj2y5e3ln.onion/index/forgot/password?tc=1](#)





Empire Market

LOGIN REGISTER FORUMS VERIFY MIRROR

 MNEMONIC VERIFICATION - PASSWORD/PIN RESET

Please type your username and security mnemonic below that was provided to you at the time of registration.

# Example: Browsing content

---

## Content:

```
http://members2.mofosnetwork.com/access/login/  
somoextremos: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 IKnowThatGir1 PublicPickUps  
http://members2.mofos.com  
Chrismagg40884:loganm40  
brando1:zzbrando1  
aacoen:1q2w3e4r  
1rstunk1e23:my8self
```

```
BraZZers  
http://ma.brazzers.com  
gcjensen:gcj21pva  
skycsc17:rbcndnd
```

```
#####
```

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

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



# Example: Browsing content

---

## 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:R0bluJ8XtB
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.ariellaferreira.com/
```

# Example: Search by tags

Search Items by Tags :

2023-05-14 2023-05-27

infoleak:automatic-detection="cve" infoleak:automatic-detection="bitcoin-address"

Search Items

Show 10 entries Search:

Date	Item	Action
2023/05/16	<a href="#">archive/gist.github.com/2023/05/16/Vazgen7788_c036ee7aad316d9038f2a3968abbbc5d.gz</a> infoleak:automatic-detection="searchsploit-tool" infoleak:automatic-detection="cve" infoleak:automatic-detection="ethereum-address" infoleak:automatic-detection="base64" infoleak:automatic-detection="bitcoin-address"	
2023/05/16	<a href="#">archive/gist.github.com/2023/05/16/vijay922_d35cf2f5c9abe682140379e35d5cd935.gz</a> infoleak:automatic-detection="searchsploit-tool" infoleak:automatic-detection="cve" infoleak:automatic-detection="ethereum-address" infoleak:automatic-detection="base64" infoleak:automatic-detection="bitcoin-address"	
2023/05/16	<a href="#">archive/gist.github.com/2023/05/16/DmitriyLewen_930515cde810283b7804950efafe3273.gz</a> infoleak:automatic-detection="searchsploit-tool" infoleak:automatic-detection="cve" infoleak:automatic-detection="credential" infoleak:automatic-detection="bitcoin-address"	
2023/05/19	<a href="#">archive/gist.github.com/2023/05/19/GrahamcOfBorg_46422a069e8b942352a65f3121a769c5.gz</a> infoleak:automatic-detection="cve" infoleak:automatic-detection="credential" infoleak:automatic-detection="bitcoin-address"	
2023/05/26	<a href="#">archive/pastebin.com_pro/2023/05/26/5ewhAHl0.gz</a> infoleak:automatic-detection="ethereum-address" infoleak:automatic-detection="cve" infoleak:automatic-detection="bitcoin-address"	

Showing 1 to 5 of 5 entries

Previous 1 Next

Previous 1 Next

Items: 14

MISP

# MISP Taxonomies

---

- **Tagging** is a simple way to attach a classification to an event or an attribute.
- **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 <sup>8</sup>.
- Can be easily cherry-picked or extended

---

<sup>8</sup><https://github.com/MISP/misp-taxonomies>

## Taxonomies useful in AIL

---

- **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<sup>9</sup>**: Evaluate the degree of identifiability of personal data and the types of pseudonymous data, de-identified data and anonymous data.

---

<sup>9</sup>Future of Privacy Forum

## Taxonomies useful in AIL

---

- **tor**: Describe Tor network infrastructure.
- **dark-web**: Criminal motivation on the dark web.
- **copine-scale**<sup>10</sup>: Categorise the severity of images of child sex abuse.

---

<sup>10</sup>Combating Paedophile Information Networks in Europe

## threat sharing and incident response platforms

---



**Goal:** submission to threat sharing and incident response platforms.

## threat sharing and incident response platforms

---



1. Use infoleak taxonomy<sup>11</sup>
2. Add your own tags
3. Export AIL objects to MISP core format
4. Download it or Create a MISP Event<sup>12</sup>

---


<sup>11</sup><https://www.misp-project.org/taxonomies.html>

<sup>12</sup><https://www.misp-standard.org/rfc/misp-standard-core.txt>



# MISP Export

1Gt545E48EPsyTC8voKQDCFpTkwiuXduw :

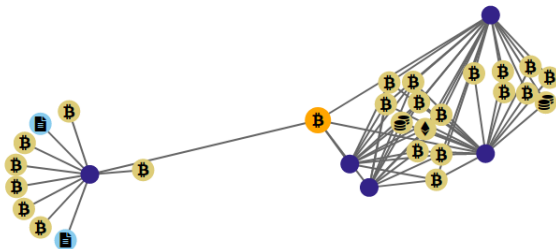
Object type	type	First seen	Last seen	Nb seen
cryptocurrency	 bitcoin	2020/01/17	2020/02/20	5

Expand Bitcoin address

Graph

Resize Graph

Add to  Export



# MISP Export

nttfj36sp47cw2yecop572zjvjeazgazieunllouudplzqt2m  
5h465yd.onion :



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 Export

Hide

Empire Market

[LOGIN](#) [REGISTER](#) [FORUMS](#) [VER](#)

Login

LOGIN TO EMPIRE MARI

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


Username

Password







What's th

Login

# MISP Export

 MISP Exporter

Select a list of objects to export

Object Type	Object ID	Lvl		
Object type... ▾		0		
Object type... ▾	1Gt545E48EPsyTC8voKQDCfpTkwiuXduw	✓ 1		
Domain ▾	nttfj36sp47cw2yecop572zjvjeazgazieunllouudplzqt2m5h465yd.onion	✓ 0		

JSON Export ☒ Export to MISP Instance

Distribution:

Threat Level:

Analysis:


Event Info:

Publish Event ☐

Export Objects


# Automatic MISP Export on tags

MISP Auto Event Creation Enabled



[✕ Disable Event Creation](#)

The Hive Auto Alert Creation Disabled



[Enable Alert Creation](#)

MISP Tags To Push : 3 / 89

Show 10 entries Search:

Enabled	Tag
<input checked="" type="checkbox"/>	infoleak:analyst-detection="aws-key"
<input checked="" type="checkbox"/>	infoleak:automatic-detection="credit-card"
<input checked="" type="checkbox"/>	test_custom
<input type="checkbox"/>	infoleak:analyst-detection="api-key"
<input type="checkbox"/>	infoleak:analyst-detection="base64"

The Hive Tags To Push : 4 / 89

Show 10 entries Search:

Enabled	Tag
<input type="checkbox"/>	infoleak:analyst-detection="api-key"
<input type="checkbox"/>	infoleak:analyst-detection="aws-key"
<input checked="" type="checkbox"/>	infoleak:analyst-detection="base64"
<input checked="" type="checkbox"/>	infoleak:analyst-detection="binary"
<input type="checkbox"/>	infoleak:analyst-detection="bitcoin-address"

API

AIL exposes a ReST API which can be used to interact with the back-end<sup>13</sup>.

```
1 curl https://127.0.0.1:7000/api/v1/get/item/default
2     --header "Authorization:
3     iHc1_ChZxj1aXmiFiF1mkxxQkzawwriEaZpPqyTQj "
4     -H "Content-Type: application/json"
5     --data @input.json -X POST
```

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

---

<sup>13</sup>[https:](https://github.com/ail-project/ail-framework/blob/master/doc/README.md)

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

## Setting up the framework

## Setting up AIL-Framework from source

---

### 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

# Feeding Data to AIL

---

There are different ways to feed data into AIL:

1. AIL Importers:
  - Dir / Files
  - ZMQ
  - *pystemon*
2. AIL Feeders (discord, telegram, ...)
3. Feed your own data using the API
4. Feed your own file/text using the UI (Submit section)

## Feeding Data to AIL - Limitation

---

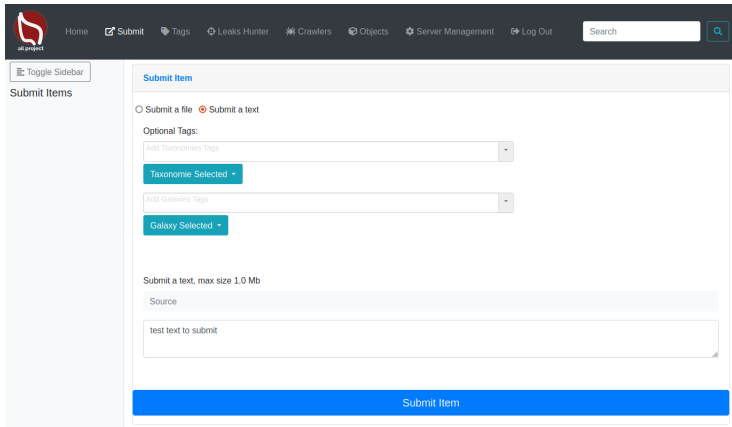


### /!\ Limitation:

- Each file to be fed must be of a reasonable size:
  - ~ 3 Mb / file is already large
  - This is because some modules are doing regex matching (default timeout of 30 seconds)
  - If you want to feed a large file, better split it in multiple ones

# Via the UI (1)

---

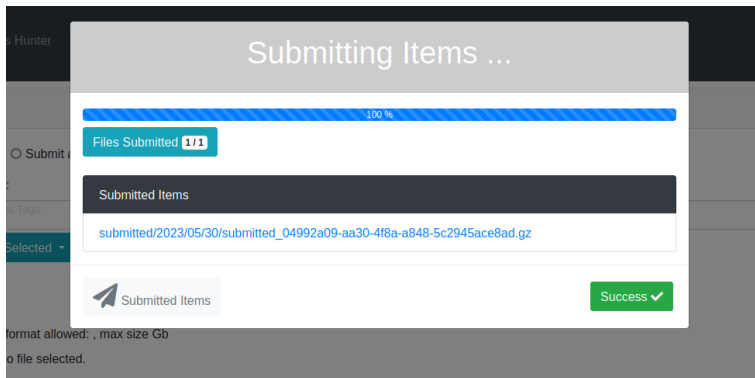


The screenshot shows a web application interface for submitting items. At the top is a dark navigation bar with a logo on the left and a search bar on the right. The logo is a red stylized 'n' with 'n-project' below it. The navigation bar contains links: Home, Submit, Tags, Leaks Hunter, Crawlers, Objects, Server Management, and Log Out. The search bar has the text 'Search' and a magnifying glass icon.

Below the navigation bar is a sidebar on the left with a 'Toggle Sidebar' button and the text 'Submit Items'. The main content area is titled 'Submit Item' and contains two radio buttons: 'Submit a file' (unselected) and 'Submit a text' (selected). Under 'Optional Tags:', there are two dropdown menus. The first is labeled 'Add Taxonomies Tags' and has a blue button below it that says 'Taxonomie Selected'. The second is labeled 'Add Galaxies Tags' and has a blue button below it that says 'Galaxy Selected'. Below these is a section titled 'Submit a text, max size 1.0 Mb' which contains a 'Source' label and a text input field with the placeholder text 'test text to submit'. At the bottom of the main content area is a large blue button labeled 'Submit Item'.

## Via the UI (2)

---



## API - Feeding AIL with your own data

---

**api/v1/import/item**

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

# Importers

---

- Importers are located in the `/bin/importer` directory
- They are used to import different types of data into AIL
- Adding new Importers is straightforward.
- Available Importers:
  - AIL Feeders
  - ZMQ
  - pystemon
  - Files

# File Importer

---

- importer/FileImporter.py

## Import File

```
1 . ./AILENV/bin/activate
2 cd tools/
3 ./file_dir_importer.py -f MY_FILE_PATH
```

## Import Dir

```
1 . ./AILENV/bin/activate
2 cd tools/
3 ./file_dir_importer.py -d MY_DIR_PATH
```



## AIL feeders Importers

---

- **12+ feeders are available** for all AIL users to feed from external sources
- External feeders can run anywhere and are completely separated from AIL framework
- The feeder can use their **own internal logic** and even push JSON metadata
- Feeder are then pushing the generated JSON to AIL API

# Certificate transparency feeder for AIL

---

- ail-feeder-cti<sup>14</sup> is a generic software to extract information from a certstream server (certificate transparency)
- All metadata extracted will be processed by AIL
- Onion addresses crawled automatically by AIL if seen in a certificate

---

<sup>14</sup><https://github.com/ail-project/ail-feeder-ct>

## GitHub archive and GitHub repository

---

- ail-feeder-gharchive<sup>15</sup> is a generic software to extract informations from **GHArchive**, collect and feed AIL via AIL ReST API
- ail-feeder-github-repo<sup>16</sup> is collecting from a GitHub repository and push everything to AIL
- For monitoring a set of **suspicious git repositories** or finding leaks on existing or managed git repositories, it's a simple way to feed AIL with such source.

---

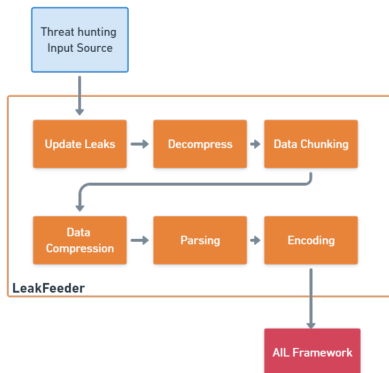
<sup>15</sup><https://github.com/ail-project/ail-feeder-gharchive>

<sup>16</sup><https://github.com/ail-project/ail-feeder-github-repo>

# AIL LeakFeeder

---

- ail-feeder-leak<sup>17</sup> automates the process to feed leaked large files automatically to AIL



---

<sup>17</sup><https://github.com/ail-project/ail-feeder-leak>

## AIL feeder ActivityPub

---

- ail-feeder-activity-pub<sup>18</sup> is feeder for the ActivityPub standard used in distributed social networks
- Accounts are required on the ActivityPub instance to get the stream

---

<sup>18</sup><https://github.com/ail-project/ail-feeder-activity-pub>

## AIL feeder telegram

---

- ail-feeder-telegram<sup>19</sup> is a **Telegram feeder**
- An API ID/hash for Telegram is required and linked to your Telegram phone number

---

<sup>19</sup><https://github.com/ail-project/ail-feeder-telegram>

## More feeders

---

- ail-feeder-discord<sup>20</sup> is a generic **Discord** feeder for AIL
- ail-feeder-atom-rss<sup>21</sup> is an **Atom and RSS reader** and feeder for AIL
- ail-feeder-jsonlogs<sup>22</sup> is a **JSON aggregator** to submit generic JSON input into AIL

---

<sup>20</sup><https://github.com/ail-project/ail-feeder-discord>

<sup>21</sup><https://github.com/ail-project/ail-feeder-atom-rss>

<sup>22</sup><https://github.com/ail-project/ail-feeder-jsonlogs>

# Feeding AIL with custom JSON

---



**conti leaks**  
@ContiLeaks

...

conti jabber leaks [anonfiles.com/VeP6K6K5xc/1\\_t...](https://anonfiles.com/VeP6K6K5xc/1_t...)

9:22 PM · 27 févr. 2022 · Twitter Web App

**123** Retweets   **23** Tweets cités   **297** J'aime

```
{
  "ts": "2020-09-08T00:28:49.471678",
  "from": "ceram@q3mcco35auwcstmt.onion",
  "to": "stern@q3mcco35auwcstmt.onion",
  "body": "Проинструктируйте меня. Что делать?"
}
```



## Feeding AIL with Conti leaks

---

- Conti jabber leaks are a good candidate for AIL analysis:
  - PGP keys
  - Bitcoin addresses, maybe others,
  - onion hidden services
- first we translated the files on english using deepl.com
- then we created a feeder to import json data in AIL
- Support added in AIL to correlate jabber usernames

## Feeding AIL with Conti leaks

---

```
from pyail import PyAIL
#... imports
#... setup code
for content in sys.stdin:
    elm = json.loads(content)
    tmp = elm['body']
    tmpmt = {}
    tmpmt['jabber:to'] = elm['to']
    tmpmt['jabber:from'] = elm['from']
    tmpmt['jabber:ts'] = elm['ts']
    tmpmt['jabber:id'] = "{}".format(uuid.uuid4())
    pyail.feed_json_item(tmp, tmpmt, ailfeedertype,
        source_uuid)
```

feeder.py

```
$ cat ~/conti/* | jq . -c | python ./feeder.py
```

## Feeding AIL with Conti leaks

---

- use grep to limit the noise on an instance by only sending interesting bits:
  - PGP keys

```
$ cat ~/conti/* | jq . -c | grep PGP | python ./feeder.py
```

- onion hidden services | grep http:// |
- telegram addresses | grep tg:// |
- bitcoins addresses | egrep  
--regexp="[13][a-km-zA-HJ-NP-Z1-9]25,34" |

## Starting the framework

## Running your own instance from source

---

### Accessing the environment and starting AIL

```
1  
2 # Launch the system and the web interface  
3 cd bin/  
4 ./LAUNCH -l
```

# Updating AIL

---

## Launch the updater:

```
1 cd bin/
2 # git pull and launch all updates:
3 ./LAUNCH -u
4
5
6 # PS:
7 # The Updater is launched by default each time
8 # you start the framework with
9 # ./LAUNCH -l
```

## AIL ecosystem - Challenges and design

## ALL ecosystem: Technologies used

---

**Programming language:** Full python3

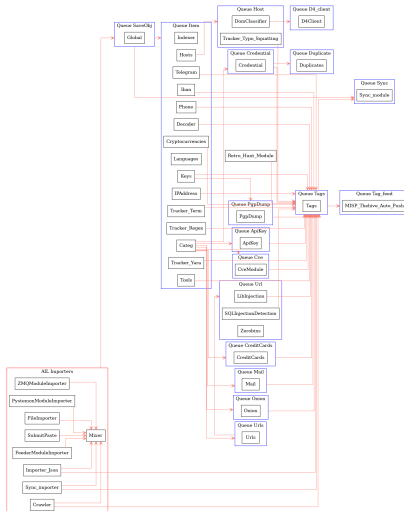
**Databases:** Redis and Kvrocks

**Server:** Flask

**Data message passing:** Redis Set

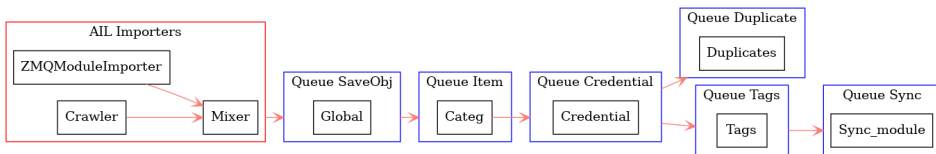


# AIL global architecture: Data streaming between module



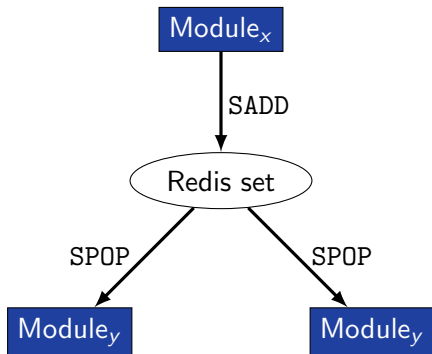
# AIL global architecture: Data streaming between module (Credential example)

---



## Message consuming

---



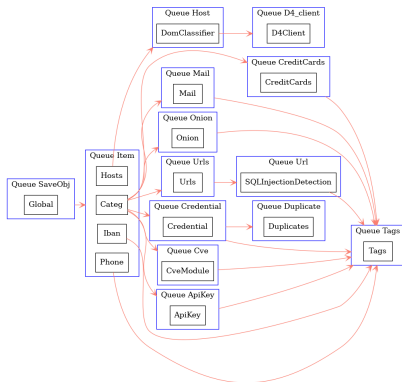
- No message lost nor double processing
- Multiprocessing!

## Creating new features

# Developing new features: Plug-in a module in the system

---

Choose where to put your module in the data flow:



Then, modify configs/modules.cfg accordingly

# Writing your own modules -

## /bin/modules/TemplateModule.py

---

```
1 from modules.abstract_module import AbstractModule
2
3 class NewModule(AbstractModule):
4
5     def __init__(self):
6         super().__init__()
7         self.logger.info(f'Module {self.module_name} initialized')
8
9     # Do something with the message from the queue
10    def compute(self, message):
11        # Process Message
12
13    # LAUNCH MODULE
14    if __name__ == '__main__':
15        module = NewModule()
16        module.run()
17
18
```

# Writing your own Importer - /bin/importer/

---

```
1 from importer.abstract_importer import AbstractImporter
2 from modules.abstract_module import AbstractModule
3
4 class MyNewImporter(AbstractImporter):
5
6     def __init__(self):
7         super().__init__()
8         # super().__init__(queue=True) # if it's an one-time run importer
9         self.logger.info(f'Importer {self.name} initialized')
10
11     def importer(self, my_var): # import function
12         # Process my_var and get content to import
13         content = GET_MY_CONTENT_TO_IMPORT
14         # if content is not gzipped and/or not b64 encoded,
15         # set gzipped and/or b64 to False
16         message = self.create_message(item_id, content)
17         return message
18         # if it's an one-time run, otherwise create an AIL Module
19         # self.add_message_to_queue(message)
20
21 class MyNewModuleImporter(AbstractModule):
22     def __init__(self):
23         super().__init__() # init module ...
24         # init module ...
25         self.importer = MyNewImporter()
```

## Writing your own Importer - /bin/importer/

---

```
1
2     def get_message(self):
3         return self.importer.importer()
4
5     def compute(self, message):
6         self.add_message_to_queue(message)
7
8 if __name__ == '__main__':
9     module = MyNewModuleImporter()
10    module.run()
11
12    # if it's an one-time run:
13    # importer = MyImporter()
14    # importer.importer(my_var)
15
16
```



## Contribution rules

## How to contribute

---



## Glimpse of contributed features

---

- Docker
- Ansible
- Email alerting
- SQL injection detection
- Phone number detection

## How to contribute

---

- Feel free to fork the code, play with it, make some patches or add additional analysis modules.

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---

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---

- Feel free to fork the code, play with it, make some patches or add additional analysis modules.
- Feel free to make a pull request for your contribution
- That's it!

< ( ^ . ^ )

## Final words

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- Building AIL helped us to find additional leaks which cannot be found using manual analysis and **improve the time to detect duplicate/recycled leaks.**

→ Therefore quicker response time to assist and/or inform proactively affected constituents.

## Implementation Steps in AIL project

---

- **Gradual changes** in AIL to add required functionalities to support the objectives.
- **Time-memory trade-off** can be challenging to ensure a functional framework.
- Evaluation and integration of new modules in AIL based on time-memory comparisons.
- Semantic aspects are challenging due to the diverse data sources, unstructured data and languages seen.



## Ongoing developments

---

- MISP Importer
- Bloom filter filtering
- Data retention and lifetime management of objects
- MISP modules expansion
- Auto classification of content by set of terms (semantic analysis)
- Improved export stream to third parties software
- Improved indexing relying on Solr, Lucene or other components

## Annexes

## Managing AIL: Old fashion way

---

### Access the script screen

```
1 screen -r Script
```

Table: GNU screen shortcuts

Shortcut	Action
C-a d	detach screen
C-a c	Create new window
C-a n	next window screen
C-a p	previous window screen